



**DATA VALIDATION  
MONUMENT VALLEY, ARIZONA  
UMTRA SITE**

**August 2001  
Water Sampling**

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



**RECORD**



*MON 410,02 (A)  
GW MON 14-11*

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# MONUMENT VALLEY

Sampled August 2001

## DATA PACKAGE CONTENTS

This data package includes the following information:

- | <u>Item No.</u> | <u>Description of Contents</u>   |
|-----------------|--|
| 1.              | <b>Site Hydrologist Summary</b>  |
| 2.              | <b>Data Package Assessment</b> , which includes the following: <ol style="list-style-type: none"><li>Field procedures verification checklist</li><li>Confirmation that chain-of-custody was maintained.</li><li>Confirmation that holding time requirements were met.</li><li>Evaluation of the adequacy of the QC sample results.</li></ol>   |
| 3.              | <b>Data Assessment Summary</b> , which describes problems identified in the data validation process and summarizes the validator's findings.   |
| 4.              | <b>Suspected Anomalies Report (SAR)</b> 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 evaluator's 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.              | <b>UMTRA Database Printouts</b> <ol style="list-style-type: none"><li>Ground-Water Quality Data (included on disk)</li><li>Equipment Blank Data (included on disk)</li><li>Time Versus Concentration Graphs</li><li>Water Level Data</li></ol>   |
| 6.              | <b>Sampling and Analysis Work Order and Trip Report.</b>   |

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## Site Hydrologist Summary

**Site:** Monument Valley

**Sampling Period:** August 2001

### 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 wells 200, 201, 625, and 640 were sampled during this event; all analyte concentrations were below ground water standards, primary drinking water standards, and health advisory limits.

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 chloride, nitrate and sulfate 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?**

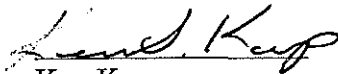
Surface water was not sampled during this event.

Site Hydrologist Summary (continued)

Table 1. Monument Valley Wells with Samples that Exceeded UMTRA Standards in August 2001.

ANALYTE	STANDARD <sup>1</sup>	WELLS EXCEEDING STANDARDS (CONCENTRATION <sup>1</sup> )
Nitrate	44.27	606 (813), 648 (330), 649 (877), 653 (194), 655 (455), 656 (167), 669 (63.7), 761 (91.2), 762 (159), 764 (153), 765 (629), 770 (141), 771 (681), 777 (777), 778 (572)
Uranium	0.044	774 (0.0645)

<sup>1</sup>Units are in mg/L.

  
Ken Karp  
Site Hydrologist

3/11/02  
Date

# **DATA ASSESSMENT**

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## UGW Water Sampling Field Activities Verification Checklist

Project Monument Valley  
 Date(s) of Verification 2-28-02

Date(s) of Water Sampling August 6 to August 8, 2001  
 Name of Verifier Sam Campbell

**Response Comments**  
 (Yes, No, N/A)

1. Is the SAP the primary document directing field procedures?

Yes

List other documents, SOP's, instructions.

Sampling work order dated 7-9-01

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

ORP op check reading too low at many locations

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?

Yes

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

Except pH was not stable at well 650; conductivity was not stable at well 761; purge not required at domestic wells

6. If low-flow purging was used, was the purge rate less than 0.125 gal/min, was the drawdown less than 0.3 ft, and was the low-flow purge volume removed prior to sampling?

Yes

Except low flow purge volume was not removed at well 657

- 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? NA
- 10. Were QC samples assigned a fictitious site identification number?  
Was the true identity of the samples recorded in the field notes? Yes  
Yes
- 11. Were samples collected in the containers specified?  
Were certified pre-cleaned containers used for the sampling? Yes  
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? Yes
- 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? Yes Except at well 619
- 19. Were water levels measured at the locations specified in the planning documents? Yes

### DATA PACKAGE ASSESSMENT

REQUISITION NUMBERS: 17567 SITE: Monument Valley LABORATORY: GJO ANALYSIS DATES: 8-13-01 to 9-6-01

REVIEWER: Sam Campbell Sam Campbell 12-13-01  
NAME (print) SIGNATURE DATE

	ICP-MS	ICP-AES	GFAA	FAA	NaBH <sub>4</sub>	AS	LSc	PC	IC	Gravimetric	Colorimetric	Other
CHAIN OF CUSTODY	<u>OK</u>	<u>OK</u>	<u>NA</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>NA</u>
HOLDING TIME	<u>OK</u>	<u>OK</u>			<u>OK</u>		<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	
CALIB. VERIFICATION (For AS, internal tracer)	<u>OK</u>	<u>OK</u>			<u>OK</u>		<u>OK</u>	<u>OK</u>	<u>OK</u>	NA	<u>OK</u>	
PREP. BLANKS (Only if digestion)	<u>OK</u>	<u>②</u>			<u>OK</u>	<u>↓</u>	<u>OK</u>	<u>OK</u>	<u>NA</u>	NA	<u>NA</u>	
INT/CONT CAL. BLANKS	<u>OK</u>	<u>③</u>	<u>↓</u>	<u>↓</u>	<u>OK</u>	NA	NA	NA	<u>④</u>	NA	<u>OK</u>	
ICP SERIAL DILUTION	<u>OK</u>	<u>OK</u>	NA	NA	NA	NA	NA	NA	NA	NA	NA	
ICS (ICP only)	<u>OK</u>	<u>OK</u>	NA	NA	NA	NA	NA	NA	NA	NA	NA	
LAB. CONTROL SAMPLE	<u>OK</u>	<u>OK</u>			<u>OK</u>		<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>NA</u>	
DUPLICATES	<u>OK</u>	<u>OK</u>			<u>OK</u>	<u>↓</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	
POSTDIGEST. SPKS. (Only if MS fails)	<u>NA</u>	<u>NA</u>			<u>NA</u>	NA	NA	NA	<u>NA</u>	NA	NA	
MATRIX SPKS.	<u>OK</u>	<u>OK</u>			<u>OK</u>		<u>NA</u>	<u>①</u>	<u>OK</u>	NA	<u>OK</u>	
OVERALL ASSESS.	<u>OK</u>	<u>OK</u>	<u>↓</u>	<u>↓</u>	<u>OK</u>	<u>↓</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>↓</u>

**REVIEWER COMMENTS:**

③ mg, K, Na, and Sr detected in the prep blank - no samples affected. ③ mg, K, Na, and Sr detected in ECBs - no samples affected. ④ Cl detected in ECBs - no samples affected.

**ITEMS REQUIRING ATTENTION:**

① J flag all gross alpha results because of matrix spike recovery. ④ U flag SO<sub>4</sub> result 280264 because of ECB contamination.

**MONUMENT VALLEY, AZ  
AUGUST 2001 SAMPLING EVENT  
DATA ASSESSMENT SUMMARY**

The DOE-GJO Analytical Laboratory analyzed samples and reported results for this sampling event under requisition number 17567 for the UMTRA ground water project.

**METALS/MAJOR CATIONS ANALYSIS**

Calcium magnesium, manganese, potassium, sodium, strontium, and vanadium were analyzed using inductively coupled plasma-atomic emission spectrometry (ICP-AES). Cadmium and uranium were analyzed by inductively coupled plasma-mass spectrometry (ICP-MS), and selenium was analyzed by hydride generation atomic absorption spectrometry (NaBH<sub>4</sub>). Data validation qualifiers were not required for these analyses.

**INORGANIC ANALYSIS**

Chloride, nitrate, and sulfate were determined by ion chromatography (IC), and ammonium was determined by spectrophotometry (colorimetry). TDS was determined gravimetrically.

The sulfate result from one of the equipment blanks (280264) was qualified with a "U" (nondetect) flag in the database because of continuing calibration blank contamination.

**RADIOCHEMICAL ANALYSIS**

The determination of gross alpha was performed using gas proportional counting (PC). Although not requested, gross beta results are included in this report because gross beta activity is determined concurrently with gross alpha activity. Radium-226 and radium-228 were analyzed by liquid scintillation spectrometry (LSc).

Values less than the minimum detectable activity (MDA) and/or the 3-sigma counting statistic range were qualified with a "U" flag in the database, as shown on the Ground Water Quality Data by Parameter printout.

The gross alpha result from well 201 was qualified with a "J" flag in the database because the matrix spike recovery did not meet criteria.

## FIELD ANALYSIS/ACTIVITIES

Results from wells 619, 657, 775, and 776 were qualified with an "F" flag in the database indicating these wells were purged and sampled using the low-flow method. Results from wells 403, 602, 606, 655, 669, and 764 were qualified with a "L" flag in the database indicating that less than three casing volumes were removed prior to sampling.

Two equipment blanks were collected for the 32 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.

Three field duplicates were collected for the 34 sampled locations. Duplicate samples were collected from wells 604, 648, 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.

The oxidation-reduction potential (ORP) measurement at well 648 was qualified with an "R" flag in the database because of a failed operational check.

## 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 less than 5 historical results for comparison. All results listed in the SAR met the above criteria and are considered valid.

The chloride result from well 655 and the nitrate result from well 774 from the February 2001 sampling event were listed in the February 2001 data validation package as potentially anomalous. These results were listed on the Anomalous Data Review Checksheet and were designated for comparison to results from this sampling event to make a final determination of validity. As a result of this comparison, these results were considered anomalous and were qualified with an "R" flag (unusable) in the database.

## 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 with the qualifiers incorporated is included with this data validation package.

  
\_\_\_\_\_  
Sam Campbell  
Data Validation Lead

2-28-02  
Date

**SAR**

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SUSPECTED ANOMALIES REPORT  
 REPORT DATE: 2/27/2002      TIME: 3:14:00 PM

Site : MON01 MONUMENT VALLE    Test Data Date Range : 8/1/2001 to 8/31/2001

Older Data Only Used for Baseline Data

222 Chemical Records

1298 History Records

LOC. ID.	ERR. TYPE FLAG	PARAM CODE UNITS	ANOMALOUS TEST DATA POINT			# OF SAMP. %NON DETE C	ALL TIME MINIMUMS		LOWER BOUND UPPER BOUND	3 MOST RECENT SAMPLING EVENTS								
			LOG DATE	SAMPLE VALUE	VALUE		ALL TIME MAXIMUMS	LOG DATE		SAMPLE VALUE	VALUE	LOG DATE	SAMPLE VALUE	VALUE	LOG DATE	SAMPLE VALUE	VALUE	
			FLAGS	UNCERTAINTY	DETLIM			FLAGS		UNCERTAINTY	DETLIM	FLAGS	UNCERTAINTY	DETLIM	FLAGS	UNCERTAINTY	DETLIM	
0200	5 OK	ORP mV	8/8/2001	N001	-76.0000	4	-38.000	4.000	0.0000	8/15/2000	N001	57.0000	8/28/1998	N001	-38.0000	2/26/1998	N001	4.0000
						0	130.000	130.000	129.2194									
0201	2 OK	GA pCi/L	8/15/2001	0001	4.4900	1	4.030	4.030	0.0000	2/27/2001	0001	4.0300	2/27/2001	0001	4.0300	2/27/2001	0001	4.0300
						100	4.030	4.030	4.0300	U	2.49	4.03	U	2.49	4.03	U	2.49	4.03
	3 OK	NH4 mg/L	8/15/2001	0001	0.0062	1	0.026	0.026	0.0066	2/27/2001	0001	0.0262	2/27/2001	0001	0.0262	2/27/2001	0001	0.0262
						0	0.026	0.026	0.1048	B	0.0047		B	0.0047		B	0.0047	
	4 OK	ORP mV	8/15/2001	N001	59.0000	1	-3.000	-3.000	-1.5000	2/27/2001	N001	-3.0000	2/27/2001	N001	-3.0000	2/27/2001	N001	-3.0000
						0	-3.000	-3.000	-6.0000									
	2 OK	Pb-210 pCi/L	8/15/2001	0001	1.4200	1	1.220	1.220	0.0000	2/27/2001	0001	1.2200	2/27/2001	0001	1.2200	2/27/2001	0001	1.2200
						100	1.220	1.220	1.2200	U	0.72	1.22	U	0.72	1.22	U	0.72	1.22
	4 OK	Zobell T C	8/15/2001	N001	25.9000	1	5.200	5.200	2.6000	2/27/2001	N001	5.2000	2/27/2001	N001	5.2000	2/27/2001	N001	5.2000
						0	5.200	5.200	10.4000									
0403	6 OK	SO4 mg/L	8/8/2001	0001	37.4000	4	25.200	30.000	19.9225	8/24/1999	0001	25.2000	8/27/1998	0001	30.9000	2/26/1998	0001	30.0000
						0	32.300	32.300	25.6368									
0602	6 OK	ORP mV	8/8/2001	N001	40.0000	6	-16.000	25.000	0.0000	8/24/1999	N001	111.0000	8/28/1998	N001	-16.0000	2/26/1998	N001	25.0000
						0	458.000	458.000	20.7383									
0605	5 OK	ORP mV	8/8/2001	N001	-69.0000	7	-166.000	-129.000	0.0000	2/21/2001	N001	-71.0000	8/28/1998	N001	-166.0000	2/26/1998	N001	-129.0000
						0	441.500	441.500	-47.6281									
	4 OK	Zobell T C	8/8/2001	N001	22.2000	1	9.900	9.900	4.9500	2/21/2001	N001	9.9000	2/21/2001	N001	9.9000	2/21/2001	N001	9.9000
						0	9.900	9.900	19.8000									
0625	3 OK	NO3 mg/L	8/8/2001	N001	0.0305	11	0.930	1.000	0.6231	11/19/1995	N001	1.0000	4/23/1995	N001	1.0000	12/13/1994	N001	1.0000
						90.909	1.000	1.000	1.5000	U	0	1	U	0	1	U	0	1
	3 OK	ORP mV	8/8/2001	N001	60.0000	3	167.000	306.000	83.5000	11/19/1995	N001	306.0000	4/23/1995	N001	342.0000	12/13/1994	N001	167.0000
						0	306.000	342.000	684.0000		0	0		0	0		0	0
	6 OK	SO4 mg/L	8/8/2001	N001	52.2000	12	42.000	46.000	23.1761	11/19/1995	0001	48.0000	4/23/1995	0001	53.0000	12/13/1994	N001	42.0000
						0	88.500	88.500	49.3799		0	1		0	1		0	1

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*  
 Hydrologist "OK" indicates insignificant variation

Date 2-27-02

SUSPECTED ANOMALIES REPORT

REPORT DATE: 2/27/2002

TIME: 3:14:05 PM

Site : MON01 MONUMENT VALLE Test Data Date Range : 8/1/2001 to 8/31/2001

Older Data Only Used for Baseline Data

222 Chemical Records

1298 History Records

LOC. ID.	ERR. TYPE FLAG	PARAM CODE UNITS	ANOMALOUS TEST DATA POINT			# OF SAMP. %NON DETE C	ALL TIME MINIMUMS		LOWER BOUND UPPER BOUND	3 MOST RECENT SAMPLING EVENTS								
			LOG DATE	SAMPLE VALUE	VALUE		LOG DATE	SAMPLE VALUE		VALUE	LOG DATE	SAMPLE VALUE	VALUE	LOG DATE	SAMPLE VALUE	VALUE		
			FLAGS	UNCERTAINTY	DETLIM		FLAGS	UNCERTAINTY		DETLIM	FLAGS	UNCERTAINTY	DETLIM	FLAGS	UNCERTAINTY	DETLIM		
0640	3 OK	ORP mV	8/8/2001	N001	-19.0000	1	113.000	113.000	56.5000	8/24/1999	N001	113.0000	8/24/1999	N001	113.0000	8/24/1999	N001	113.0000
						0	113.000	113.000	226.0000									
0648	3 OK	ORP mV	8/8/2001	N001	-377.0000	1	201.000	201.000	100.5000	2/26/2001	N001	201.0000	2/26/2001	N001	201.0000	2/26/2001	N001	201.0000
						0	201.000	201.000	402.0000									
	4 OK	Zobell T C	8/8/2001	N001	17.6000	1	4.300	4.300	2.1500	2/26/2001	N001	4.3000	2/26/2001	N001	4.3000	2/26/2001	N001	4.3000
						0	4.300	4.300	8.6000									
0649	3 OK	ORP mV	8/6/2001	N001	-7.0000	1	166.000	166.000	83.0000	2/26/2001	N001	166.0000	2/26/2001	N001	166.0000	2/26/2001	N001	166.0000
						0	166.000	166.000	332.0000									
	4 OK	Zobell T C	8/6/2001	N001	21.4000	1	4.300	4.300	2.1500	2/26/2001	N001	4.3000	2/26/2001	N001	4.3000	2/26/2001	N001	4.3000
						0	4.300	4.300	8.6000									
0650	5 OK	ORP mV	8/7/2001	N001	-135.0000	9	-25.000	21.000	0.0000	2/27/2001	N001	151.0000	8/16/2000	N001	74.0000	8/24/1999	N001	21.0000
						0	376.000	376.000	175.5981									
	6 OK	SO4 mg/L	8/7/2001	0001	30.2000	13	25.500	25.900	24.5883	2/27/2001	0001	28.4000	8/16/2000	0001	27.9000	8/24/1999	0001	25.9000
						0	47.700	47.700	29.2550									
0653	5 OK	ORP mV	8/8/2001	N001	-2.0000	12	22.000	35.000	0.0000	2/27/2001	N001	161.0000	8/15/2000	N001	73.0000	8/27/1998	N001	94.0000
						0	443.100	443.100	198.4150									
0655	5 OK	ORP mV	8/6/2001	N001	-20.0000	9	69.000	82.000	0.0000	2/26/2001	N001	151.0000	8/17/2000	N001	179.0000	8/26/1999	N001	142.0000
						0	457.900	460.000	211.4293									
0662	5 OK	NO3 mg/L	8/7/2001	0001	21.2000	16	11.000	20.000	22.6414	2/27/2001	0001	52.2000	8/16/2000	0001	34.0000	8/25/1999	0001	53.4000
						0	95.000	98.000	65.1642									
	5 OK	SO4 mg/L	8/7/2001	0001	273.0000	16	329.000	335.000	485.6348	2/27/2001	0001	389.0000	8/16/2000	0001	583.0000	8/25/1999	0001	903.0000
						0	903.000	953.000	1062.7094									
0760	5 OK	ORP mV	8/7/2001	N001	-224.0000	6	-279.000	-231.000	0.0000	2/22/2001	N001	-231.0000	8/23/2000	N001	-104.0000	8/25/1999	N001	-279.0000
						0	3.000	3.000	-100.5137									
0761	6 OK	Chloride mg/L	8/7/2001	0001	15.9000	5	15.200	15.300	14.5754	2/21/2001	0001	15.4000	8/26/1999	0001	15.3000	8/27/1998	0001	15.2000
						0	16.000	16.400	15.6868									

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



Date 2-27-02

Hydrologist "Ok" indicates insignificant variation

SUSPECTED ANOMALIES REPORT

REPORT DATE: 2/27/2002

TIME: 3:14:06 PM

Site : MON01 MONUMENT VALLE Test Data Date Range : 8/1/2001 to 8/31/2001

Older Data Only Used for Baseline Data

222 Chemical Records

1298 History Records

LOC. ID.	ERR. TYPE FLAG	PARAM CODE UNITS	ANOMALOUS TEST DATA POINT			# OF SAMP. %NON DETE C	ALL TIME MINIMUMS		LOWER BOUND UPPER BOUND	3 MOST RECENT SAMPLING EVENTS								
			LOG DATE	SAMPLE VALUE			ALL TIME MAXIMUMS			LOG DATE	SAMPLE VALUE		LOG DATE	SAMPLE VALUE		LOG DATE	SAMPLE VALUE	
			FLAGS	UNCERTAINTY	DETLIM		FLAGS	UNCERTAINTY		DETLIM	FLAGS	UNCERTAINTY	DETLIM	FLAGS	UNCERTAINTY	DETLIM	FLAGS	UNCERTAINTY
0761	5 OK	ORP mV	8/7/2001	N001	-16.0000	5	-17.000	66.000	124.2295	2/21/2001	N001	155.0000	8/26/1999	N001	205.0000	8/27/1998	N001	109.0000
						0	155.000	205.000	293.4874									
0762	6 OK	NO3 mg/L	8/7/2001	0001	159.0000	6	63.700	68.300	121.9263	2/21/2001	0001	128.0000	8/23/2000	0001	110.0000	8/26/1999	0001	109.0000
					0.061	0	110.000	128.000	145.8333			0.1256						
	5 OK	ORP mV	8/7/2001	N001	-33.0000	6	-33.000	-13.000	58.3263	2/21/2001	N001	138.0000	8/23/2000	N001	109.0000	8/26/1999	N001	149.0000
						0	138.000	149.000	243.4214									
	6 OK	SO4 mg/L	8/7/2001	0001	1300.0000	6	761.000	869.000	1124.0045	2/21/2001	0001	1200.0000	8/23/2000	0001	1070.0000	8/26/1999	0001	904.0000
					0.0506	0	1070.000	1200.000	1272.0444			0.2356						
0764	5 OK	ORP mV	8/8/2001	N001	109.0000	6	70.000	128.000	162.9168	2/22/2001	N001	227.0000	8/23/2000	N001	143.0000	8/26/1999	N001	199.0000
						0	199.000	227.000	272.5057									
0765	5 OK	ORP mV	8/6/2001	N001	136.0000	6	82.000	115.000	163.6487	2/27/2001	N001	166.0000	8/15/2000	N001	208.0000	8/27/1999	N001	168.0000
						0	168.000	208.000	242.6907									
0767	5 OK	ORP mV	8/7/2001	N001	-191.0000	6	-200.000	-191.000	0.0000	2/22/2001	N001	-200.0000	8/24/2000	N001	-165.0000	8/25/1999	N001	-103.0000
						0	25.000	25.000	-122.6947									
	6 OK	SO4 mg/L	8/7/2001	0001	30.3000	6	26.900	27.900	26.8539	2/22/2001	0001	28.9000	8/24/2000	0001	28.2000	8/25/1999	0001	26.9000
					0.0253	0	28.900	29.600	29.4783			0.0589						
0768	5 OK	ORP mV	8/8/2001	N001	-198.0000	6	-230.000	-222.000	0.0000	2/22/2001	N001	-222.0000	8/24/2000	N001	-183.0000	8/25/1999	N001	-160.0000
						0	-86.000	-86.000	-152.1303									
	6 OK	SO4 mg/L	8/8/2001	0001	711.0000	6	680.000	688.000	600.7656	2/22/2001	0001	716.0000	8/24/2000	0001	680.0000	8/25/1999	0001	688.0000
					0.0253	0	862.000	862.000	705.3376			0.0589						
0770	5 OK	ORP mV	8/7/2001	N001	97.0000	5	-71.000	81.000	109.9488	2/21/2001	N001	157.0000	8/15/2000	N001	182.0000	8/25/1999	N001	203.0000
						0	182.000	203.000	332.2404									
0771	5 OK	Chloride mg/L	8/6/2001	0001	27.8000	5	29.600	31.700	28.2182	8/17/2000	0001	29.6000	8/25/1999	0001	33.0000	8/25/1998	0001	32.2000
					0.0745	0	32.400	33.000	31.7730									
	5 OK	ORP mV	8/6/2001	N001	-29.0000	5	-30.000	38.000	140.7056	8/17/2000	N001	200.0000	8/25/1999	N001	126.0000	8/25/1998	N001	-30.0000
						0	126.000	200.000	328.6561									

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 San Campbell  
 Hydrologist "OK" indicates insignificant variation

Date 2-27-02

SUSPECTED ANOMALIES REPORT

REPORT DATE: 2/27/2002

TIME: 3:14:07 PM

Site : MON01 MONUMENT VALLE Test Data Date Range : 8/1/2001 to 8/31/2001

Older Data Only Used for Baseline Data

222 Chemical Records

1298 History Records

LOC. ID.	ERR. TYPE FLAG	PARAM CODE UNITS	ANOMALOUS TEST DATA POINT			# OF SAMP. %NON DETE C	ALL TIME MINIMUMS		LOWER BOUND UPPER BOUND	3 MOST RECENT SAMPLING EVENTS								
			LOG DATE	SAMPLE VALUE	DET LIM		LOG DATE	SAMPLE VALUE		DET LIM	LOG DATE	SAMPLE VALUE	DET LIM	LOG DATE	SAMPLE VALUE	DET LIM		
			FLAGS	UNCERTAINTY	DET LIM		FLAGS	UNCERTAINTY		DET LIM	FLAGS	UNCERTAINTY	DET LIM	FLAGS	UNCERTAINTY	DET LIM		
0771	6 OK	SO4 mg/L	8/6/2001	0001	2870.0000 0.1265	5 0	2890.000 3540.000	3210.000 3710.000	2517.8252 2831.8373	8/17/2000	0001	2890.0000	8/25/1999	0001	3210.0000	8/25/1998	0001	3510.0000
0772	6 OK	Chloride mg/L	8/8/2001	0001	18.6000 0.0149	6 0	16.900 20.300	17.800 20.600	15.6051 17.3664	2/21/2001	0001	16.9000 0.024	8/15/2000	0001	17.8000	8/26/1999	0001	17.9000
	6 OK	SO4 mg/L	8/8/2001	0001	149.0000 0.0253	6 0	139.000 186.000	144.000 186.000	116.7811 146.3117	2/21/2001	0001	139.0000 0.0589	8/15/2000	0001	149.0000	8/26/1999	0001	144.0000
0774	5 OK	NO3 mg/L	8/7/2001	0001	12.8000 0.0305	6 0	11.900 15.200	12.900 29.500	17.3271 31.5151	2/27/2001	0001	29.5000 0.1256	8/16/2000	0001	15.2000	8/25/1999	0001	13.3000
	5 OK	ORP mV	8/7/2001	N001	39.0000	6 0	-26.000 166.000	28.000 224.000	56.4032 287.6296	2/27/2001	N001	166.0000	8/16/2000	N001	92.0000	8/25/1999	N001	224.0000
	5 OK	U mg/L	8/7/2001	0001	0.0645 0.0001	6 0	0.069 0.072	0.070 0.073	0.0695 0.0736	2/27/2001	0001	0.0724 0.0001	8/16/2000	0001	0.0697	8/25/1999	0001	0.0716
0775	5 OK	NO3 mg/L	8/8/2001	0001	2.4100 0.0305	5 0	0.230 2.210	0.656 2.220	2.5023 3.6806	8/23/2000	0001	2.2200	8/26/1999	0001	2.2100	8/26/1998	0001	1.3200
	5 OK	ORP mV	8/8/2001	N001	38.0000	5 0	-97.000 118.000	-69.000 175.000	79.3385 342.6882	8/23/2000	N001	118.0000	8/26/1999	N001	175.0000	8/26/1998	N001	-97.0000
0776	5 OK	ORP mV	8/8/2001	N001	49.0000	5 0	23.000 90.000	25.000 182.000	79.8516 246.4626	8/16/2000	N001	90.0000	8/25/1999	N001	182.0000	8/28/1998	N001	25.0000
	6 OK	SO4 mg/L	8/8/2001	0001	36.4000 0.0253	5 0	30.500 40.400	32.200 40.400	25.6178 28.0189	8/16/2000	0001	30.5000	8/25/1999	0001	32.2000	8/28/1998	0001	35.7000
0777	5 OK	NH4 mg/L	8/6/2001	0001	231.0000 0.0062	5 0	208.000 292.000	229.000 436.000	303.6188 476.5835	2/22/2001	0001	436.0000 0.0047	8/15/2000	0001	241.0000	8/27/1999	0001	292.0000
	5 OK	ORP mV	8/6/2001	N001	120.0000	5 0	-15.000 199.000	44.000 207.000	160.0161 323.0503	2/22/2001	N001	168.0000	8/15/2000	N001	207.0000	8/27/1999	N001	199.0000
0778	4 OK	Chloride mg/L	8/7/2001	0001	22.3000 0.0298	1 0	3.140 3.140	3.140 3.140	1.5700 6.2800	2/27/2001	0001	3.1400 0.096	2/27/2001	0001	3.1400 0.096	2/27/2001	0001	3.1400 0.096

Error Type Flags : 2 - All time high detection limit  
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 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  
 Hydrologist "OK" indicates insignificant variation

Date 2-27-02

SUSPECTED ANOMALIES REPORT

REPORT DATE: 2/27/2002

TIME: 3:14:08 PM

Site : MON01 MONUMENT VALLE Test Data Date Range : 8/1/2001 to 8/31/2001

Older Data Only Used for Baseline Data

222 Chemical Records

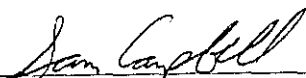
1298 History Records

LOC. ID.	ERR. TYPE FLAG	PARAM CODE UNITS	ANOMALOUS TEST DATA POINT			# OF SAMP. %NON DETE C	ALL TIME MINIMUMS		LOWER BOUND UPPER BOUND	3 MOST RECENT SAMPLING EVENTS								
			LOG DATE	SAMPLE VALUE			ALL TIME MAXIMUMS			LOG DATE	SAMPLE VALUE	LOG DATE	SAMPLE VALUE	LOG DATE	SAMPLE VALUE			
			FLAGS	UNCERTAINTY	DETLIM					FLAGS	UNCERTAINTY	DETLIM	FLAGS	UNCERTAINTY	DETLIM	FLAGS	UNCERTAINTY	DETLIM
0778	4 OK	Zobell T C	8/7/2001	N001	25.8000	1 0	8.900 8.900	8.900 8.900	4.4500 17.8000	2/27/2001	N001	8.9000	2/27/2001	N001	8.9000	2/27/2001	N001	8.9000

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



Date 2-27-02

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: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE:		ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
			DATE	ID				LAB	DATA	QA		
Alkalinity as CaCO3	mg/L	0200	08/08/2001	N001	AL	U	241			#	-	-
	mg/L	0201	08/15/2001	0001			222			#	-	-
	mg/L	0201	08/15/2001	N001			221.8			#	-	-
	mg/L	0403	08/08/2001	0001	AL	U	299		L	#	-	-
	mg/L	0403	08/08/2001	N001	AL	U	301		L	#	-	-
	mg/L	0602	08/08/2001	0001	AL	U	203		L	#	-	-
	mg/L	0602	08/08/2001	N001	AL	U	205		L	#	-	-
	mg/L	0604	08/08/2001	0001	AL	C	180			#	-	-
	mg/L	0604	08/08/2001	N001	AL	C	181			#	-	-
	mg/L	0605	08/08/2001	0001	AL	C	220			#	-	-
	mg/L	0605	08/08/2001	N001	AL	C	207			#	-	-
	mg/L	0606	08/07/2001	0001	AL	D	218		L	#	-	-
	mg/L	0606	08/07/2001	N001	AL	D	230		L	#	-	-
	mg/L	0619	08/08/2001	0001	DC	O	152		F	#	-	-
	mg/L	0619	08/08/2001	N001	DC	O	157		F	#	-	-
	mg/L	0625	08/08/2001	N001	DC	C	201			#	-	-
	mg/L	0640	08/08/2001	N001	AL	U	400			#	-	-
	mg/L	0648	08/08/2001	0001	AL	N	194			#	-	-
	mg/L	0648	08/08/2001	N001	AL	N	203			#	-	-
	mg/L	0649	08/06/2001	0001	AL	N	214			#	-	-
	mg/L	0649	08/06/2001	N001	AL	N	201			#	-	-
	mg/L	0650	08/07/2001	0001	AL	D	233			#	-	-
	mg/L	0650	08/07/2001	N001	AL	D	241			#	-	-
	mg/L	0653	08/08/2001	0001	AL	D	205			#	-	-
	mg/L	0653	08/08/2001	N001	AL	D	202			#	-	-
	mg/L	0655	08/06/2001	0001	AL	D	215		L	#	-	-
	mg/L	0655	08/06/2001	N001	AL	D	187		L	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY

REPORT DATE: 2/28/2002 3:15 p

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	0656	08/07/2001	0001	AL	D	230	#	-	-
	mg/L	0656	08/07/2001	N001	AL	D	228	#	-	-
	mg/L	0657	08/08/2001	0001	DC	O	141	F #	-	-
	mg/L	0657	08/08/2001	N001	DC	O	157	F #	-	-
	mg/L	0662	08/07/2001	0001	AL	D	225	#	-	-
	mg/L	0662	08/07/2001	N001	AL	D	204	#	-	-
	mg/L	0669	08/08/2001	0001	AL	D	190	L #	-	-
	mg/L	0669	08/08/2001	N001	AL	D	195	L #	-	-
	mg/L	0760	08/07/2001	0001	AL	D	182	#	-	-
	mg/L	0760	08/07/2001	N001	AL	D	185	#	-	-
	mg/L	0761	08/07/2001	0001	AL	D	202	#	-	-
	mg/L	0761	08/07/2001	N001	AL	D	212	#	-	-
	mg/L	0762	08/07/2001	0001	AL	D	245	#	-	-
	mg/L	0762	08/07/2001	N001	AL	D	259	#	-	-
	mg/L	0764	08/08/2001	0001	AL	D	247	L #	-	-
	mg/L	0764	08/08/2001	N001	AL	D	241	L #	-	-
	mg/L	0765	08/06/2001	0001	AL	D	240	#	-	-
	mg/L	0765	08/06/2001	N001	AL	D	256	#	-	-
	mg/L	0767	08/07/2001	0001	AL	D	187	#	-	-
	mg/L	0767	08/07/2001	N001	AL	D	180	#	-	-
	mg/L	0768	08/08/2001	0001	AL	D	184	#	-	-
	mg/L	0768	08/08/2001	N001	AL	D	184	#	-	-
	mg/L	0770	08/07/2001	0001	AL	D	202	#	-	-
	mg/L	0770	08/07/2001	N001	AL	D	198	#	-	-
	mg/L	0771	08/06/2001	0001	AL	D	217	#	-	-
	mg/L	0771	08/06/2001	N001	AL	D	187	#	-	-
	mg/L	0772	08/08/2001	0001	AL	O	248	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE:		ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
			DATE	ID				LAB	DATA	QA		
Alkalinity as CaCO3	mg/L	0772	08/08/2001	N001	AL	O	251			#	-	-
	mg/L	0774	08/07/2001	0001	AL	O	160			#	-	-
	mg/L	0774	08/07/2001	N001	AL	O	150			#	-	-
	mg/L	0775	08/08/2001	0001	DC	D	165		F	#	-	-
	mg/L	0775	08/08/2001	N001	DC	D	165		F	#	-	-
	mg/L	0776	08/08/2001	0001	DC	O	145		F	#	-	-
	mg/L	0776	08/08/2001	N001	DC	O	149		F	#	-	-
	mg/L	0777	08/06/2001	0001	AL	D	242			#	-	-
	mg/L	0777	08/06/2001	N001	AL	D	280			#	-	-
	mg/L	0778	08/07/2001	0001	AL	N	248			#	-	-
	mg/L	0778	08/07/2001	N001	AL	N	250			#	-	-
Ammonium	mg/L	0201	08/15/2001	0001			0.0062	U		#	0.0062	-
	mg/L	0606	08/07/2001	0001	AL	D	175.000		L	#	0.0062	-
	mg/L	0655	08/06/2001	0001	AL	D	77.000		L	#	0.0062	-
	mg/L	0656	08/07/2001	0001	AL	D	81.900			#	0.0062	-
	mg/L	0765	08/06/2001	0001	AL	D	174.000			#	0.0062	-
	mg/L	0770	08/07/2001	0001	AL	D	50.600			#	0.0062	-
	mg/L	0771	08/06/2001	0001	AL	D	277.000			#	0.0062	-
	mg/L	0772	08/08/2001	0001	AL	O	9.030			#	0.0062	-
	mg/L	0774	08/07/2001	0001	AL	O	0.0062	U		#	0.0062	-
	mg/L	0777	08/06/2001	0001	AL	D	231.000			#	0.0062	-
Cadmium	mg/L	0201	08/15/2001	0001			0.00033	U		#	0.00033	-
Calcium	mg/L	0201	08/15/2001	0001			21.800			#	0.09044	-
Chloride	mg/L	0200	08/08/2001	N001	AL	U	98.800			#	0.0149	-
	mg/L	0201	08/15/2001	0001			15.900			#	0.0149	-
	mg/L	0403	08/08/2001	0001	AL	U	13.900		L	#	0.0149	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Chloride	mg/L	0602	08/08/2001	0001	AL	U	15.400	L #	0.0149	-
	mg/L	0604	08/08/2001	0001	AL	C	11.500	#	0.0149	-
	mg/L	0604	08/08/2001	0002	AL	C	11.500	#	0.0149	-
	mg/L	0605	08/08/2001	0001	AL	C	179.000	#	0.0149	-
	mg/L	0606	08/07/2001	0001	AL	D	16.900	L #	0.0298	-
	mg/L	0619	08/08/2001	0001	DC	O	5.360	F #	0.0149	-
	mg/L	0625	08/08/2001	N001	DC	C	9.190	#	0.0149	-
	mg/L	0640	08/08/2001	N001	AL	U	77.100	#	0.0149	-
	mg/L	0648	08/08/2001	0001	AL	N	37.700	#	0.0298	-
	mg/L	0648	08/08/2001	0002	AL	N	37.700	#	0.0298	-
	mg/L	0649	08/06/2001	0001	AL	N	20.600	#	0.0149	-
	mg/L	0650	08/07/2001	0001	AL	D	9.150	#	0.0149	-
	mg/L	0653	08/08/2001	0001	AL	D	34.700	#	0.0298	-
	mg/L	0655	08/06/2001	0001	AL	D	26.500	L #	0.0149	-
	mg/L	0656	08/07/2001	0001	AL	D	17.800	#	0.0149	-
	mg/L	0657	08/08/2001	0001	DC	O	5.650	F #	0.0149	-
	mg/L	0662	08/07/2001	0001	AL	D	7.600	#	0.0149	-
	mg/L	0669	08/08/2001	0001	AL	D	11.200	L #	0.0149	-
	mg/L	0760	08/07/2001	0001	AL	D	9.760	#	0.0149	-
	mg/L	0761	08/07/2001	0001	AL	D	15.900	#	0.0149	-
	mg/L	0762	08/07/2001	0001	AL	D	81.800	#	0.0298	-
	mg/L	0764	08/08/2001	0001	AL	D	14.700	L #	0.0149	-
	mg/L	0765	08/06/2001	0001	AL	D	21.900	#	0.0298	-
	mg/L	0767	08/07/2001	0001	AL	D	5.190	#	0.0149	-
	mg/L	0768	08/08/2001	0001	AL	D	89.600	#	0.0149	-
	mg/L	0770	08/07/2001	0001	AL	D	17.100	#	0.0149	-
	mg/L	0771	08/06/2001	0001	AL	D	27.800	#	0.0745	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE:		ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
			DATE	ID				LAB	DATA	QA		
Chloride	mg/L	0772	08/08/2001	0001	AL	O	18.600			#	0.0149	-
	mg/L	0774	08/07/2001	0001	AL	O	5.790			#	0.0149	-
	mg/L	0775	08/08/2001	0001	DC	D	5.320		F	#	0.0149	-
	mg/L	0776	08/08/2001	0001	DC	O	5.650		F	#	0.0149	-
	mg/L	0776	08/08/2001	0002	DC	O	5.710		F	#	0.0149	-
	mg/L	0777	08/06/2001	0001	AL	D	22.200			#	0.0298	-
	mg/L	0778	08/07/2001	0001	AL	N	22.300			#	0.0298	-
Gross Alpha	pCi/L	0201	08/15/2001	0001			4.49	U	J	#	4.49	± 2.35
Gross Beta	pCi/L	0201	08/15/2001	0001			4	U		#	4	± 2.38
Lead-210	pCi/L	0201	08/15/2001	0001			1.42	U		#	1.42	± 0.86
Magnesium	mg/L	0201	08/15/2001	0001			13.400			#	0.00378	-
Nitrate as NO3	mg/L	0200	08/08/2001	N001	AL	U	13.900			#	0.0305	-
	mg/L	0201	08/15/2001	0001			4.760			#	0.0305	-
	mg/L	0403	08/08/2001	0001	AL	U	0.0778	B	L	#	0.0305	-
	mg/L	0602	08/08/2001	0001	AL	U	3.540		L	#	0.0305	-
	mg/L	0604	08/08/2001	0001	AL	C	0.0382	B		#	0.0305	-
	mg/L	0604	08/08/2001	0002	AL	C	0.0437	B		#	0.0305	-
	mg/L	0605	08/08/2001	0001	AL	C	0.0305	U		#	0.0305	-
	mg/L	0606	08/07/2001	0001	AL	D	813.000		L	#	0.61	-
	mg/L	0619	08/08/2001	0001	DC	O	13.300		F	#	0.0305	-
	mg/L	0625	08/08/2001	N001	DC	C	0.0305	U		#	0.0305	-
	mg/L	0640	08/08/2001	N001	AL	U	0.439	B		#	0.0305	-
	mg/L	0648	08/08/2001	0001	AL	N	330.000			#	0.1525	-
	mg/L	0648	08/08/2001	0002	AL	N	333.000			#	0.1525	-
	mg/L	0649	08/06/2001	0001	AL	N	877.000			#	0.305	-
mg/L	0650	08/07/2001	0001	AL	D	1.280			#	0.0305	-	

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY

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PARAMETER	UNITS	LOCATION ID	SAMPLE:		ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
			DATE	ID				LAB	DATA	QA		
Nitrate as NO3	mg/L	0653	08/08/2001	0001	AL	D	194.000			#	0.1525	-
	mg/L	0655	08/06/2001	0001	AL	D	455.000		L	#	0.305	-
	mg/L	0656	08/07/2001	0001	AL	D	167.000			#	0.061	-
	mg/L	0657	08/08/2001	0001	DC	O	10.400		F	#	0.0305	-
	mg/L	0662	08/07/2001	0001	AL	D	21.200			#	0.0305	-
	mg/L	0669	08/08/2001	0001	AL	D	63.700		L	#	0.0305	-
	mg/L	0760	08/07/2001	0001	AL	D	0.0305		U	#	0.0305	-
	mg/L	0761	08/07/2001	0001	AL	D	91.200			#	0.0305	-
	mg/L	0762	08/07/2001	0001	AL	D	159.000			#	0.061	-
	mg/L	0764	08/08/2001	0001	AL	D	153.000		L	#	0.061	-
	mg/L	0765	08/06/2001	0001	AL	D	629.000			#	0.305	-
	mg/L	0767	08/07/2001	0001	AL	D	0.0305		U	#	0.0305	-
	mg/L	0768	08/08/2001	0001	AL	D	0.0305		U	#	0.0305	-
	mg/L	0770	08/07/2001	0001	AL	D	141.000			#	0.061	-
	mg/L	0771	08/06/2001	0001	AL	D	681.000			#	0.305	-
	mg/L	0772	08/08/2001	0001	AL	O	5.620			#	0.0305	-
	mg/L	0774	08/07/2001	0001	AL	O	12.800			#	0.0305	-
	mg/L	0775	08/08/2001	0001	DC	D	2.410		F	#	0.0305	-
	mg/L	0776	08/08/2001	0001	DC	O	4.440		F	#	0.0305	-
	mg/L	0776	08/08/2001	0002	DC	O	4.420		F	#	0.0305	-
mg/L	0777	08/06/2001	0001	AL	D	777.000			#	0.305	-	
mg/L	0778	08/07/2001	0001	AL	N	572.000			#	0.305	-	
ORP of Zobell Solution	mV	0200	08/08/2001	N001	AL	U	200			#	-	-
	mV	0201	08/15/2001	N001			219			#	-	-
	mV	0403	08/08/2001	N001	AL	U	200		L	#	-	-
	mV	0602	08/08/2001	N001	AL	U	225		L	#	-	-
	mV	0604	08/08/2001	N001	AL	C	229			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE:		ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
			DATE	ID				LAB	DATA	QA		
ORP of Zobell Solution	mV	0605	08/08/2001	N001	AL	C	223			#	-	-
	mV	0606	08/07/2001	N001	AL	D	226	L		#	-	-
	mV	0619	08/08/2001	N001	DC	O	234	F		#	-	-
	mV	0625	08/08/2001	N001	DC	C	225			#	-	-
	mV	0640	08/08/2001	N001	AL	U	201			#	-	-
	mV	0648	08/08/2001	N001	AL	N	203			#	-	-
	mV	0649	08/06/2001	N001	AL	N	193			#	-	-
	mV	0650	08/07/2001	N001	AL	D	210			#	-	-
	mV	0653	08/08/2001	N001	AL	D	190			#	-	-
	mV	0655	08/06/2001	N001	AL	D	190	L		#	-	-
	mV	0656	08/07/2001	N001	AL	D	221			#	-	-
	mV	0657	08/08/2001	N001	DC	O	234	F		#	-	-
	mV	0662	08/07/2001	N001	AL	D	219			#	-	-
	mV	0669	08/08/2001	N001	AL	D	200	L		#	-	-
	mV	0760	08/07/2001	N001	AL	D	195			#	-	-
	mV	0761	08/07/2001	N001	AL	D	192			#	-	-
	mV	0762	08/07/2001	N001	AL	D	195			#	-	-
	mV	0764	08/08/2001	N001	AL	D	202	L		#	-	-
	mV	0765	08/06/2001	N001	AL	D	225			#	-	-
	mV	0767	08/07/2001	N001	AL	D	199			#	-	-
	mV	0768	08/08/2001	N001	AL	D	190			#	-	-
	mV	0770	08/07/2001	N001	AL	D	235			#	-	-
	mV	0771	08/06/2001	N001	AL	D	206			#	-	-
	mV	0772	08/08/2001	N001	AL	O	226			#	-	-
	mV	0774	08/07/2001	N001	AL	O	226			#	-	-
	mV	0775	08/08/2001	N001	DC	D	229	F		#	-	-
	mV	0776	08/08/2001	N001	DC	O	229	F		#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 2/28/2002 3:15 p

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	0777	08/06/2001	N001	AL	D	211	#	-	-
	mV	0778	08/07/2001	N001	AL	N	211	#	-	-
Oxidation Reduction Potent	mV	0200	08/08/2001	N001	AL	U	-76	#	-	-
	mV	0201	08/15/2001	N001			59	#	-	-
	mV	0403	08/08/2001	N001	AL	U	-73	L #	-	-
	mV	0602	08/08/2001	N001	AL	U	40	L #	-	-
	mV	0604	08/08/2001	N001	AL	C	16	#	-	-
	mV	0605	08/08/2001	N001	AL	C	-69	#	-	-
	mV	0606	08/07/2001	N001	AL	D	183	L #	-	-
	mV	0619	08/08/2001	N001	DC	O	36	F #	-	-
	mV	0625	08/08/2001	N001	DC	C	60	#	-	-
	mV	0640	08/08/2001	N001	AL	U	-19	#	-	-
	mV	0649	08/06/2001	N001	AL	N	-7	#	-	-
	mV	0650	08/07/2001	N001	AL	D	-135	#	-	-
	mV	0653	08/08/2001	N001	AL	D	-2	#	-	-
	mV	0655	08/06/2001	N001	AL	D	-20	L #	-	-
	mV	0656	08/07/2001	N001	AL	D	47	#	-	-
	mV	0657	08/08/2001	N001	DC	O	54	F #	-	-
	mV	0662	08/07/2001	N001	AL	D	72	#	-	-
	mV	0669	08/08/2001	N001	AL	D	128	L #	-	-
	mV	0760	08/07/2001	N001	AL	D	-224	#	-	-
	mV	0761	08/07/2001	N001	AL	D	-16	#	-	-
mV	0762	08/07/2001	N001	AL	D	-33	#	-	-	
mV	0764	08/08/2001	N001	AL	D	109	L #	-	-	
mV	0765	08/06/2001	N001	AL	D	136	#	-	-	
mV	0767	08/07/2001	N001	AL	D	-191	#	-	-	
mV	0768	08/08/2001	N001	AL	D	-198	#	-	-	



GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Oxidation Reduction Potent	mV	0770	08/07/2001	N001	AL	D	97	#	-	-
	mV	0771	08/06/2001	N001	AL	D	-29	#	-	-
	mV	0772	08/08/2001	N001	AL	O	58	#	-	-
	mV	0774	08/07/2001	N001	AL	O	39	#	-	-
	mV	0775	08/08/2001	N001	DC	D	38	F #	-	-
	mV	0776	08/08/2001	N001	DC	O	49	F #	-	-
	mV	0777	08/06/2001	N001	AL	D	120	#	-	-
	mV	0778	08/07/2001	N001	AL	N	139	#	-	-
pH	s.u.	0200	08/08/2001	N001	AL	U	7.17	#	-	-
	s.u.	0201	08/15/2001	N001			8.38	#	-	-
	s.u.	0403	08/08/2001	N001	AL	U	7.65	L #	-	-
	s.u.	0602	08/08/2001	N001	AL	U	7.69	L #	-	-
	s.u.	0604	08/08/2001	N001	AL	C	8	#	-	-
	s.u.	0605	08/08/2001	N001	AL	C	7.54	#	-	-
	s.u.	0606	08/07/2001	N001	AL	D	7.01	L #	-	-
	s.u.	0619	08/08/2001	N001	DC	O	7.65	F #	-	-
	s.u.	0625	08/08/2001	N001	DC	C	8.02	#	-	-
	s.u.	0640	08/08/2001	N001	AL	U	7.02	#	-	-
	s.u.	0648	08/08/2001	N001	AL	N	7.06	#	-	-
	s.u.	0649	08/06/2001	N001	AL	N	6.55	#	-	-
	s.u.	0650	08/07/2001	N001	AL	D	7.51	#	-	-
	s.u.	0653	08/08/2001	N001	AL	D	6.78	#	-	-
	s.u.	0655	08/06/2001	N001	AL	D	6.65	L #	-	-
	s.u.	0656	08/07/2001	N001	AL	D	7.5	#	-	-
	s.u.	0657	08/08/2001	N001	DC	O	7.74	F #	-	-
	s.u.	0662	08/07/2001	N001	AL	D	7.22	#	-	-
	s.u.	0669	08/08/2001	N001	AL	D	7.11	L #	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY

REPORT DATE: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE:		ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
			DATE	ID				LAB	DATA	QA		
pH	s.u.	0760	08/07/2001	N001	AL	D	7.67			#	-	-
	s.u.	0761	08/07/2001	N001	AL	D	6.95			#	-	-
	s.u.	0762	08/07/2001	N001	AL	D	7.12			#	-	-
	s.u.	0764	08/08/2001	N001	AL	D	7.29	L		#	-	-
	s.u.	0765	08/06/2001	N001	AL	D	7.16			#	-	-
	s.u.	0767	08/07/2001	N001	AL	D	7.49			#	-	-
	s.u.	0768	08/08/2001	N001	AL	D	7.28			#	-	-
	s.u.	0770	08/07/2001	N001	AL	D	7.39			#	-	-
	s.u.	0771	08/06/2001	N001	AL	D	6.69			#	-	-
	s.u.	0772	08/08/2001	N001	AL	O	8.02			#	-	-
	s.u.	0774	08/07/2001	N001	AL	O	7.38			#	-	-
	s.u.	0775	08/08/2001	N001	DC	D	7.55		F	#	-	-
	s.u.	0776	08/08/2001	N001	DC	O	7.78		F	#	-	-
	s.u.	0777	08/06/2001	N001	AL	D	7.09			#	-	-
	s.u.	0778	08/07/2001	N001	AL	N	7.15			#	-	-
Potassium	mg/L	0201	08/15/2001	0001			2.460			#	0.00978	-
Radium-226	pCi/L	0201	08/15/2001	0001			0.21			#	0.09	± 0.07
Radium-228	pCi/L	0201	08/15/2001	0001			0.8	U		#	0.8	± 0.47
Selenium	mg/L	0201	08/15/2001	0001			0.0017	B		#	0.00033	-
Sodium	mg/L	0201	08/15/2001	0001			105.000			#	0.00944	-
Specific Conductance	umhos/cm	0200	08/08/2001	N001	AL	U	1631			#	-	-
	umhos/cm	0201	08/15/2001	N001			688			#	-	-
	umhos/cm	0403	08/08/2001	N001	AL	U	510		L	#	-	-
	umhos/cm	0602	08/08/2001	N001	AL	U	684		L	#	-	-
	umhos/cm	0604	08/08/2001	N001	AL	C	617			#	-	-
	umhos/cm	0605	08/08/2001	N001	AL	C	3090			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY

REPORT DATE: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE:		ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS:			DETECTION LIMIT	UN- CERTAINTY
			DATE	ID				LAB	DATA	QA		
Specific Conductance	umhos/cm	0606	08/07/2001	N001	AL	D	2790	L	#	-	-	
	umhos/cm	0619	08/08/2001	N001	DC	O	469	F	#	-	-	
	umhos/cm	0625	08/08/2001	N001	DC	C	557		#	-	-	
	umhos/cm	0640	08/08/2001	N001	AL	U	1826		#	-	-	
	umhos/cm	0648	08/08/2001	N001	AL	N	3350		#	-	-	
	umhos/cm	0649	08/06/2001	N001	AL	N	4260		#	-	-	
	umhos/cm	0650	08/07/2001	N001	AL	D	488		#	-	-	
	umhos/cm	0653	08/08/2001	N001	AL	D	3140		#	-	-	
	umhos/cm	0655	08/06/2001	N001	AL	D	3820	L	#	-	-	
	umhos/cm	0656	08/07/2001	N001	AL	D	1420		#	-	-	
	umhos/cm	0657	08/08/2001	N001	DC	O	374	F	#	-	-	
	umhos/cm	0662	08/07/2001	N001	AL	D	765		#	-	-	
	umhos/cm	0669	08/08/2001	N001	AL	D	851	L	#	-	-	
	umhos/cm	0760	08/07/2001	N001	AL	D	426		#	-	-	
	umhos/cm	0761	08/07/2001	N001	AL	D	1233		#	-	-	
	umhos/cm	0762	08/07/2001	N001	AL	D	2890		#	-	-	
	umhos/cm	0764	08/08/2001	N001	AL	D	1330	L	#	-	-	
	umhos/cm	0765	08/06/2001	N001	AL	D	2960		#	-	-	
	umhos/cm	0767	08/07/2001	N001	AL	D	408		#	-	-	
	umhos/cm	0768	08/08/2001	N001	AL	D	1838		#	-	-	
	umhos/cm	0770	08/07/2001	N001	AL	D	1340		#	-	-	
	umhos/cm	0771	08/06/2001	N001	AL	D	5200		#	-	-	
	umhos/cm	0772	08/08/2001	N001	AL	O	860		#	-	-	
	umhos/cm	0774	08/07/2001	N001	AL	O	468		#	-	-	
	umhos/cm	0775	08/08/2001	N001	DC	D	399	F	#	-	-	
	umhos/cm	0776	08/08/2001	N001	DC	O	416	F	#	-	-	
	umhos/cm	0777	08/06/2001	N001	AL	D	3410		#	-	-	

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY

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PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Specific Conductance	umhos/cm	0778	08/07/2001	N001	AL	N	2970	#	-	-
Strontium	mg/L	0201	08/15/2001	0001			0.248	#	0.00011	-
Sulfate	mg/L	0200	08/08/2001	N001	AL	U	446.000	#	0.0253	-
	mg/L	0201	08/15/2001	0001			120.000	#	0.0253	-
	mg/L	0403	08/08/2001	0001	AL	U	37.400	L #	0.0253	-
	mg/L	0602	08/08/2001	0001	AL	U	130.000	L #	0.0253	-
	mg/L	0604	08/08/2001	0001	AL	C	113.000	#	0.0253	-
	mg/L	0604	08/08/2001	0002	AL	C	113.000	#	0.0253	-
	mg/L	0605	08/08/2001	0001	AL	C	1390.000	#	0.0506	-
	mg/L	0606	08/07/2001	0001	AL	D	495.000	L #	0.0506	-
	mg/L	0619	08/08/2001	0001	DC	O	64.800	F #	0.0253	-
	mg/L	0625	08/08/2001	N001	DC	C	52.200	#	0.0253	-
	mg/L	0640	08/08/2001	N001	AL	U	590.000	#	0.0253	-
	mg/L	0648	08/08/2001	0001	AL	N	1680.000	#	0.0506	-
	mg/L	0648	08/08/2001	0002	AL	N	1670.000	#	0.0506	-
	mg/L	0649	08/06/2001	0001	AL	N	1540.000	#	0.0506	-
	mg/L	0650	08/07/2001	0001	AL	D	30.200	#	0.0253	-
	mg/L	0653	08/08/2001	0001	AL	D	1610.000	#	0.0506	-
	mg/L	0655	08/06/2001	0001	AL	D	1780.000	L #	0.0506	-
	mg/L	0656	08/07/2001	0001	AL	D	279.000	#	0.0253	-
	mg/L	0657	08/08/2001	0001	DC	O	17.100	F #	0.0253	-
	mg/L	0662	08/07/2001	0001	AL	D	273.000	#	0.0253	-
mg/L	0669	08/08/2001	0001	AL	D	180.000	L #	0.0253	-	
mg/L	0760	08/07/2001	0001	AL	D	91.500	#	0.0253	-	
mg/L	0761	08/07/2001	0001	AL	D	520.000	#	0.0253	-	
mg/L	0762	08/07/2001	0001	AL	D	1300.000	#	0.0506	-	
mg/L	0764	08/08/2001	0001	AL	D	391.000	L #	0.0253	-	

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY

REPORT DATE: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE:		ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS:			DETECTION LIMIT	UN- CERTAINTY
			DATE	ID				LAB	DATA	QA		
Sulfate	mg/L	0765	08/06/2001	0001	AL	D	809.000			#	0.0506	-
	mg/L	0767	08/07/2001	0001	AL	D	30.300			#	0.0253	-
	mg/L	0768	08/08/2001	0001	AL	D	711.000			#	0.0253	-
	mg/L	0770	08/07/2001	0001	AL	D	315.000			#	0.0253	-
	mg/L	0771	08/06/2001	0001	AL	D	2870.000			#	0.1265	-
	mg/L	0772	08/08/2001	0001	AL	O	149.000			#	0.0253	-
	mg/L	0774	08/07/2001	0001	AL	O	65.300			#	0.0253	-
	mg/L	0775	08/08/2001	0001	DC	D	25.400		F	#	0.0253	-
	mg/L	0776	08/08/2001	0001	DC	O	36.400		F	#	0.0253	-
	mg/L	0776	08/08/2001	0002	DC	O	36.500		F	#	0.0253	-
	mg/L	0777	08/06/2001	0001	AL	D	904.000			#	0.0506	-
	mg/L	0778	08/07/2001	0001	AL	N	830.000			#	0.0506	-
	Temperature	C	0200	08/08/2001	N001	AL	U	16.3			#	-
C		0201	08/15/2001	N001			17.4			#	-	-
C		0403	08/08/2001	N001	AL	U	21.9		L	#	-	-
C		0602	08/08/2001	N001	AL	U	16.4		L	#	-	-
C		0604	08/08/2001	N001	AL	C	15.5			#	-	-
C		0605	08/08/2001	N001	AL	C	16.8			#	-	-
C		0606	08/07/2001	N001	AL	D	19		L	#	-	-
C		0619	08/08/2001	N001	DC	O	18		F	#	-	-
C		0625	08/08/2001	N001	DC	C	17			#	-	-
C		0640	08/08/2001	N001	AL	U	21.4			#	-	-
C		0648	08/08/2001	N001	AL	N	17.1			#	-	-
C		0649	08/06/2001	N001	AL	N	17.8			#	-	-
C		0650	08/07/2001	N001	AL	D	17.5			#	-	-
C		0653	08/08/2001	N001	AL	D	17.2			#	-	-
C		0655	08/06/2001	N001	AL	D	20.4		L	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE:		ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
			DATE	ID				LAB	DATA	QA		
Temperature	C	0656	08/07/2001	N001	AL	D	20.1			#	-	-
	C	0657	08/08/2001	N001	DC	O	19.4	F		#	-	-
	C	0662	08/07/2001	N001	AL	D	18.9			#	-	-
	C	0669	08/08/2001	N001	AL	D	18	L		#	-	-
	C	0760	08/07/2001	N001	AL	D	19.3			#	-	-
	C	0761	08/07/2001	N001	AL	D	19.7			#	-	-
	C	0762	08/07/2001	N001	AL	D	18.4			#	-	-
	C	0764	08/08/2001	N001	AL	D	18	L		#	-	-
	C	0765	08/06/2001	N001	AL	D	17.4			#	-	-
	C	0767	08/07/2001	N001	AL	D	18.1			#	-	-
	C	0768	08/08/2001	N001	AL	D	16.4			#	-	-
	C	0770	08/07/2001	N001	AL	D	17.9			#	-	-
	C	0771	08/06/2001	N001	AL	D	25.7			#	-	-
	C	0772	08/08/2001	N001	AL	O	16.4			#	-	-
	C	0774	08/07/2001	N001	AL	O	17.5			#	-	-
	C	0775	08/08/2001	N001	DC	D	18.4	F		#	-	-
	C	0776	08/08/2001	N001	DC	O	19.7	F		#	-	-
	C	0777	08/06/2001	N001	AL	D	17.7			#	-	-
C	0778	08/07/2001	N001	AL	N	17			#	-	-	
Temperature of Zobell Solu	C	0200	08/08/2001	N001	AL	U	19.7			#	-	-
	C	0201	08/15/2001	N001			25.9			#	-	-
	C	0403	08/08/2001	N001	AL	U	19.7	L		#	-	-
	C	0602	08/08/2001	N001	AL	U	21.2	L		#	-	-
	C	0604	08/08/2001	N001	AL	C	19.1			#	-	-
	C	0605	08/08/2001	N001	AL	C	22.2			#	-	-
	C	0606	08/07/2001	N001	AL	D	22.8	L		#	-	-
	C	0619	08/08/2001	N001	DC	O	16.8	F		#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE:		ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
			DATE	ID				LAB	DATA	QA		
Temperature of Zobell Solu	C	0625	08/08/2001	N001	DC	C	21.2			#	-	-
	C	0640	08/08/2001	N001	AL	U	22.2			#	-	-
	C	0648	08/08/2001	N001	AL	N	17.6			#	-	-
	C	0649	08/06/2001	N001	AL	N	21.4			#	-	-
	C	0650	08/07/2001	N001	AL	D	19.5			#	-	-
	C	0653	08/08/2001	N001	AL	D	24.8			#	-	-
	C	0655	08/06/2001	N001	AL	D	24.5		L	#	-	-
	C	0656	08/07/2001	N001	AL	D	26			#	-	-
	C	0657	08/08/2001	N001	DC	O	16.8		F	#	-	-
	C	0662	08/07/2001	N001	AL	D	25.8			#	-	-
	C	0669	08/08/2001	N001	AL	D	18.7		L	#	-	-
	C	0760	08/07/2001	N001	AL	D	22.9			#	-	-
	C	0761	08/07/2001	N001	AL	D	23.9			#	-	-
	C	0762	08/07/2001	N001	AL	D	22.8			#	-	-
	C	0764	08/08/2001	N001	AL	D	19.4		L	#	-	-
	C	0765	08/06/2001	N001	AL	D	22.9			#	-	-
	C	0767	08/07/2001	N001	AL	D	23.9			#	-	-
	C	0768	08/08/2001	N001	AL	D	24.2			#	-	-
	C	0770	08/07/2001	N001	AL	D	21.1			#	-	-
	C	0771	08/06/2001	N001	AL	D	17.7			#	-	-
	C	0772	08/08/2001	N001	AL	O	20.4			#	-	-
	C	0774	08/07/2001	N001	AL	O	22.8			#	-	-
	C	0775	08/08/2001	N001	DC	D	19.1		F	#	-	-
	C	0776	08/08/2001	N001	DC	O	18		F	#	-	-
	C	0777	08/06/2001	N001	AL	D	25.8			#	-	-
	C	0778	08/07/2001	N001	AL	N	25.8			#	-	-
	Total Dissolved Solids	mg/L	0201	08/15/2001	0001			425			#	10

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE:		ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
			DATE	ID				LAB	DATA	QA		
Turbidity	NTU	0200	08/08/2001	N001	AL	U	1.35			#	-	-
	NTU	0201	08/15/2001	N001			3.3			#	-	-
	NTU	0403	08/08/2001	N001	AL	U	698		L	#	-	-
	NTU	0602	08/08/2001	N001	AL	U	60.2		L	#	-	-
	NTU	0604	08/08/2001	N001	AL	C	7.6			#	-	-
	NTU	0605	08/08/2001	N001	AL	C	1.35			#	-	-
	NTU	0606	08/07/2001	N001	AL	D	1000	>	L	#	-	-
	NTU	0619	08/08/2001	N001	DC	O	0.41		F	#	-	-
	NTU	0640	08/08/2001	N001	AL	U	3.72			#	-	-
	NTU	0648	08/08/2001	N001	AL	N	0.97			#	-	-
	NTU	0649	08/06/2001	N001	AL	N	1.26			#	-	-
	NTU	0650	08/07/2001	N001	AL	D	0.76			#	-	-
	NTU	0653	08/08/2001	N001	AL	D	1.1			#	-	-
	NTU	0655	08/06/2001	N001	AL	D	47.9		L	#	-	-
	NTU	0656	08/07/2001	N001	AL	D	8.66			#	-	-
	NTU	0657	08/08/2001	N001	DC	O	7.57		F	#	-	-
	NTU	0662	08/07/2001	N001	AL	D	2.01			#	-	-
	NTU	0669	08/08/2001	N001	AL	D	11.2		L	#	-	-
	NTU	0760	08/07/2001	N001	AL	D	7.02			#	-	-
	NTU	0761	08/07/2001	N001	AL	D	4.32			#	-	-
	NTU	0762	08/07/2001	N001	AL	D	7.8			#	-	-
	NTU	0764	08/08/2001	N001	AL	D	363		L	#	-	-
	NTU	0765	08/06/2001	N001	AL	D	2.32			#	-	-
	NTU	0767	08/07/2001	N001	AL	D	0.83			#	-	-
	NTU	0768	08/08/2001	N001	AL	D	10			#	-	-
	NTU	0770	08/07/2001	N001	AL	D	1.99			#	-	-
	NTU	0771	08/06/2001	N001	AL	D	6.55			#	-	-



GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY

REPORT DATE: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Turbidity	NTU	0772	08/08/2001	N001	AL	O	8.58	#	-	-
	NTU	0774	08/07/2001	N001	AL	O	2.72	#	-	-
	NTU	0775	08/08/2001	N001	DC	D	2.64	F #	-	-
	NTU	0776	08/08/2001	N001	DC	O	2.25	F #	-	-
	NTU	0777	08/06/2001	N001	AL	D	4.9	#	-	-
	NTU	0778	08/07/2001	N001	AL	N	0.53	#	-	-
Uranium	mg/L	0201	08/15/2001	0001			0.0025	#	0.00011	-
	mg/L	0774	08/07/2001	0001	AL	O	0.0645	#	0.0001	-
Vanadium	mg/L	0201	08/15/2001	0001			0.0043	B #	0.00033	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 2/28/2002 3:15 p

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
-----------	-------	-------------	--------------	------------	-----------	--------	-------------------------	-----------------	--------------

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 #8/1/2001# and #8/31/2001#

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

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

## Blanks Data for Monument Valley 08/2001 Sampling Event

02/28/2002

ANALYTE	SITE CODE	LOCATION CODE	DATE	SAMPLE ID	UNIT	RESULT	LAB QUAL	DATA VAL QUAL	DETECT LIMIT	UNCERTAINTY	SAMPLE TYPE
Chloride	MON01	0999	08/08/2001	0001	mg/L	0.049	B		0.0149		E
Chloride	MON01	0999	08/10/2001	0001	mg/L	0.0624	B		0.0149		E
Nitrate as NO3	MON01	0999	08/08/2001	0001	mg/L	0.0305	U		0.0305		E
Nitrate as NO3	MON01	0999	08/10/2001	0001	mg/L	0.0305	U		0.0305		E
Sulfate	MON01	0999	08/08/2001	0001	mg/L	0.12	B	U	0.0253		E
Sulfate	MON01	0999	08/10/2001	0001	mg/L	0.0512	B		0.0253		E

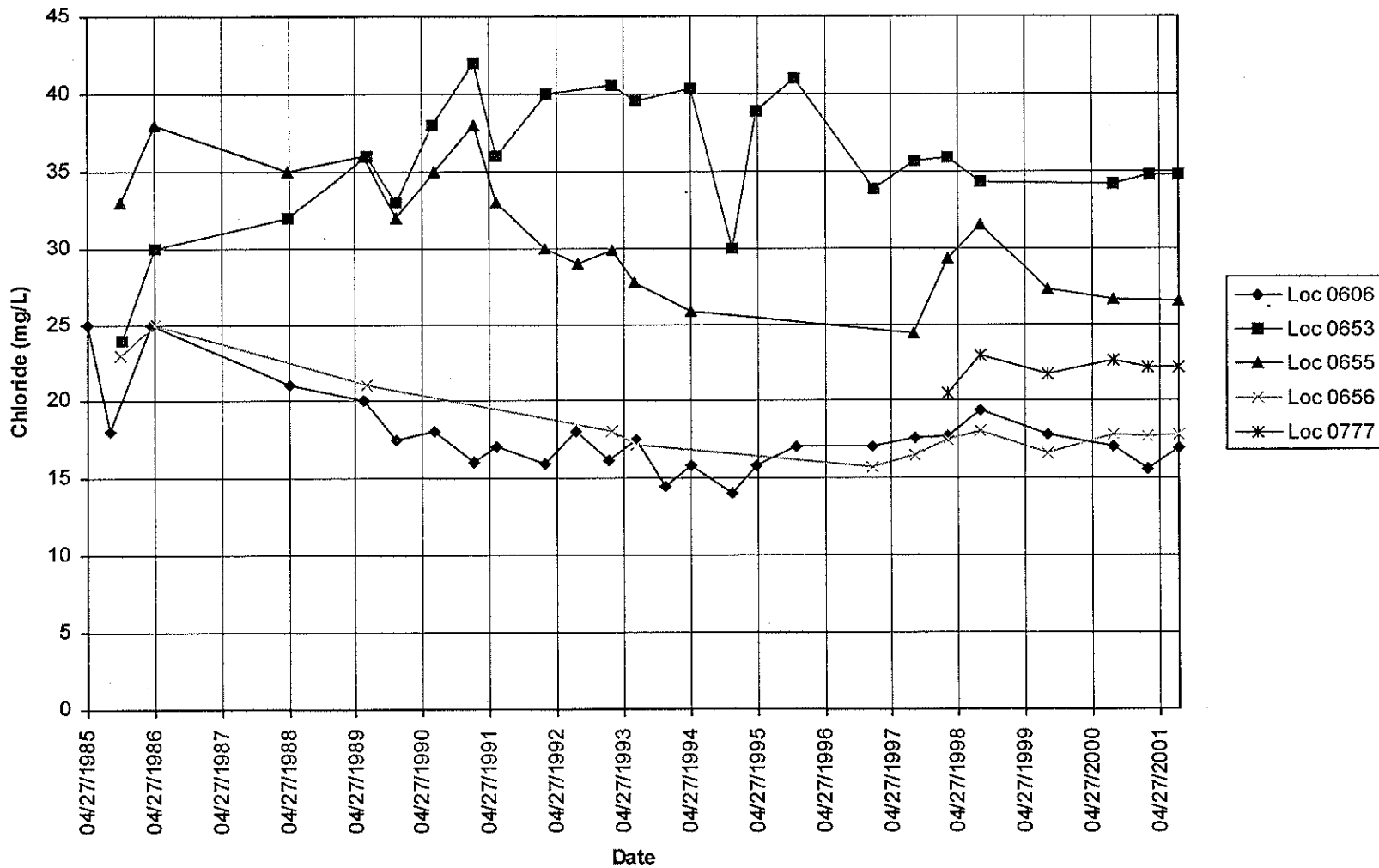
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# **TIME VERSUS CONCENTRATION GRAPHS**

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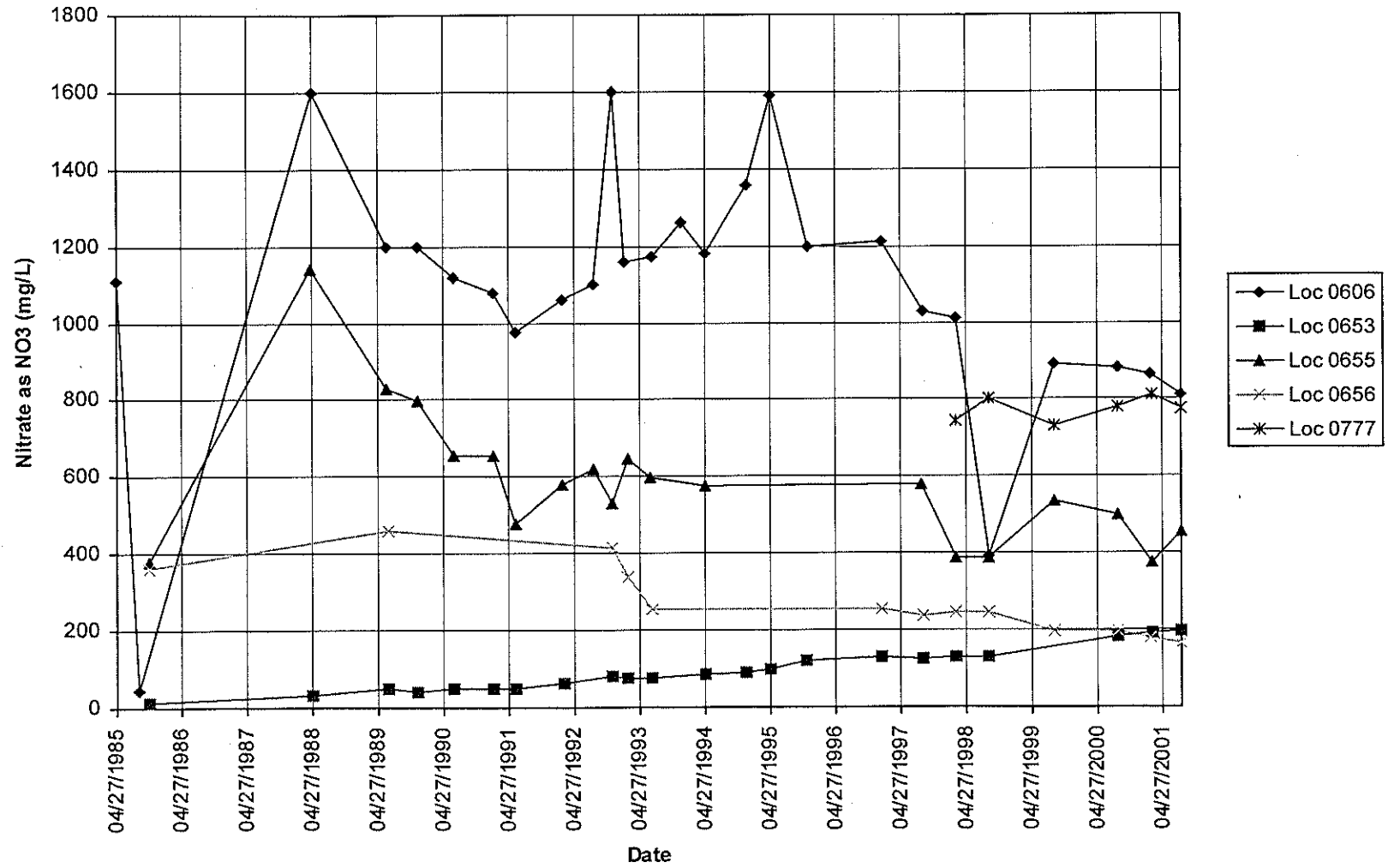
MONUMENT VALLEY (MON01)

Chloride Concentration



MONUMENT VALLEY (MON01)

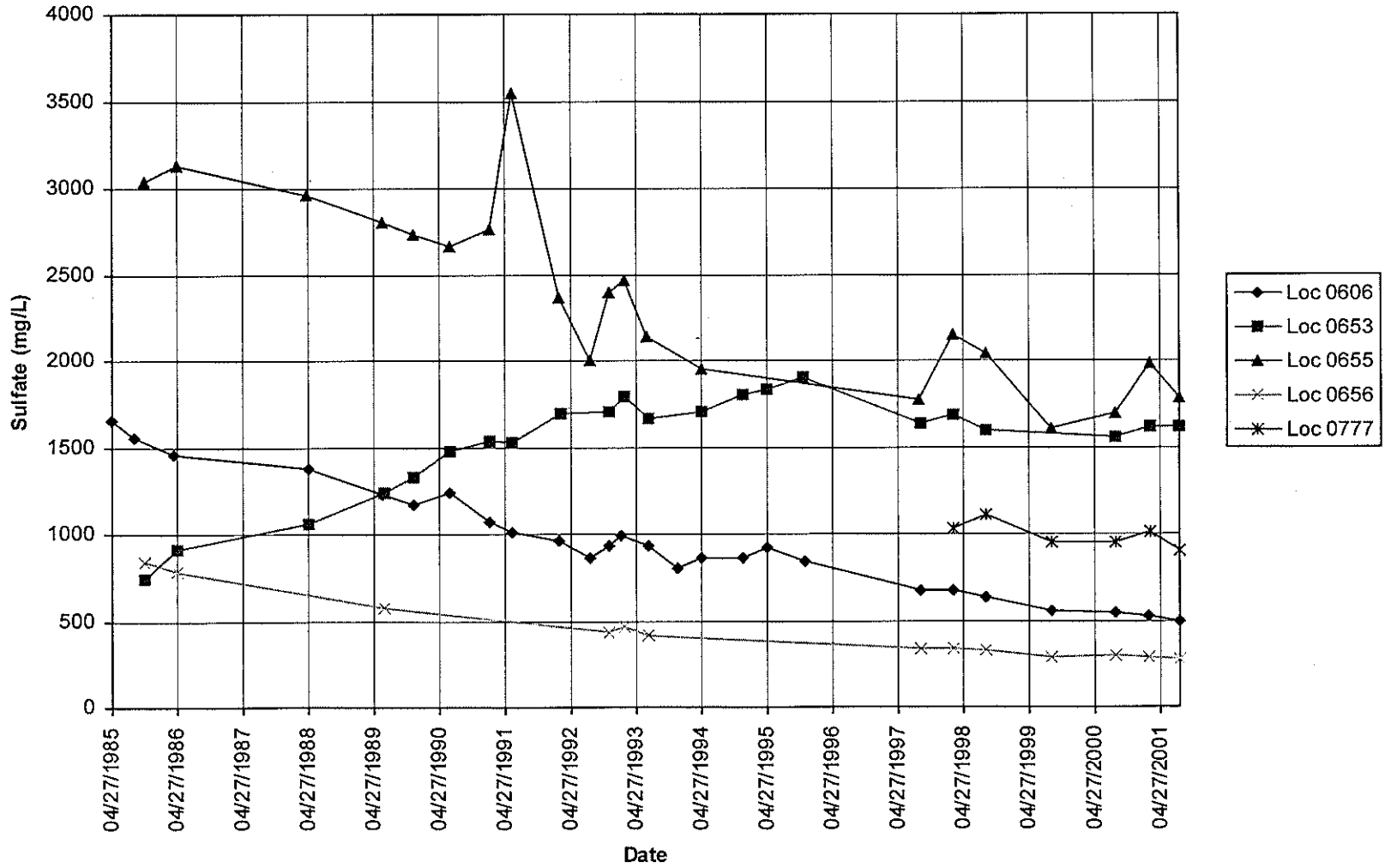
Nitrate as NO3 Concentration





MONUMENT VALLEY (MON01)

Sulfate Concentration



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# **WATER LEVELS**

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STATIC GROUND WATER LEVELS (USEE700) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 2/28/2002 9:32 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	-	08/08/2001	15:52	17.83	-17.83	
0201		-	08/15/2001	14:05	27.61	-27.61	
0403	U	4836.19	08/08/2001	15:14	1.95	4834.24	
0602	U	4864.43	08/08/2001	14:54	9.90	4854.53	
0604	C	4840.42	08/08/2001	13:02	9.19	4831.23	
0605	C	4835.07	08/08/2001	16:07	10.70	4824.37	
0606	D	4864.73	08/07/2001	14:33	35.85	4828.88	
0619	O	4888.63	08/08/2001	10:15	56.80	4831.83	
0648	N	4835.14	08/08/2001	12:09	33.77	4801.37	
0649	N	4861.64	08/06/2001	17:00	39.31	4822.33	
0650	D	4794.28	08/06/2001	09:20	19.99	4774.29	
0653	D	4837.08	08/08/2001	09:12	35.55	4801.53	
0655	D	4862.06	08/06/2001	15:45	39.44	4822.62	
0656	D	4856.33	08/07/2001	11:22	36.36	4819.97	
0657	O	4878.99	08/08/2001	09:28	49.43	4829.56	
0662	D	4878.56	08/07/2001	16:00	48.75	4829.81	
0669	D	4867.19	08/08/2001	13:26	49.47	4817.72	
0760	D	4814.80	08/07/2001	11:52	25.33	4789.47	
0761	D	4835.02	08/07/2001	15:39	42.84	4792.18	
0762	D	4820.74	08/07/2001	14:41	36.13	4784.61	
0764	D	4851.53	08/08/2001	14:26	49.41	4802.12	
0765	D	4848.45	08/06/2001	17:25	35.14	4813.31	
0767	D	4808.25	08/07/2001	13:24	6.98	4801.27	
0768	D	4820.73	08/08/2001	10:48	14.00	4806.73	
0770	D	4857.26	08/07/2001	12:41	32.85	4824.41	
0771	D	4863.26	08/06/2001	17:55	41.83	4821.43	
0772	O	4847.60	08/08/2001	13:50	12.30	4835.30	
0774	O	4880.14	08/07/2001	15:09	48.50	4831.64	
0775	D	4879.68	08/08/2001	12:10	49.00	4830.68	

STATIC GROUND WATER LEVELS (USEE700) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 2/28/2002 9:32 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			
0776	O	4883.33	08/08/2001	10:58	52.50	4830.83	
0777	D	4848.24	08/06/2001	15:50	33.93	4814.31	
0778	N	4846.07	08/07/2001	09:07	33.50	4812.57	

RECORDS: SELECTED FROM USEE700 WHERE site\_code='MON01' AND LOG\_DATE between #8/1/2001# and #8/31/2001#

FLOW CODES:

C CROSS GRADIENT  
 O ON-SITE

D DOWN GRADIENT  
 U UPGRADIENT

N UNKNOWN

WATER LEVEL FLAGS:

**SAMPLING AND ANALYSIS  
WORK ORDER  
AND TRIP REPORT**

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CONTRACT NO.: DE-AC13-96GJ87335  
TASK ORDER NO.: MAC01-05  
CONTROL NO.: 3100-T01-0762

July 9, 2001

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 2001 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 monitor wells at this site as part of the routine UMTRA Ground Water sampling that is scheduled to begin the week of August 6, 2001.

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

**Ground Water Project Monitor Well (filtered)\***

403 Al	619 Dc	655 Al	669 Al	764 Al	770 Al	775 Dc
602 Al	648 Al	656 Al	760 Al	765 Al	771 Al	776 Dc
604 Al	649 Al	657 Dc	761 Al	767 Al	772 Al	777 Al
605 Al	650 Al	662 Al	762 Al	768 Al	774 Al	778 Al
606 Al	653 Al					

**Domestic Wells**

200 Al	201 Nr	625 Dc	640 Al
--------	--------	--------	--------

\*NOTE: Al = Alluvium; Dc = DeChelly Member of the Cutler Formation; Nr = No recovery for classification

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 sampled wells. Monitor well inspections will be conducted and documented to confirm the status of all sampled wells.

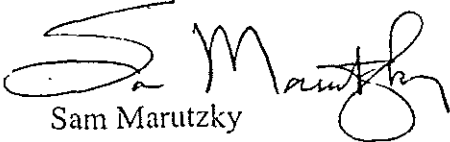
**RECORD COPY**

2597 B 3/4 ROAD  
GRAND JUNCTION, COLORADO 81503  
(PHONE) 970 245-4000 FAX: 970 245-6040

Donald Metzler  
July 9, 2001  
Page 2  
Control No.: 3100-T01-0762

If you have any questions, please call me at extension 6059 or Dave Traub at extension 6557.

Sincerely,



Sam Marutzky  
Project Manager

SM/lcg/ld  
Attachments

cc w/att: R. Chessmore  
K. Karp  
K. Miller  
D. Traub  
Contract File (J. Dearborn)  
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
<b>Ground Water Project Monitor Wells</b>						
403				Odd Year		
602				Odd Year		
604		X				
605		X				Added by K. Karp 1/22/01
606		X				
619			X			
648		X				
649		X				Added by K. Karp 1/22/01
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				
778		X				
<b>Private Wells (unfiltered)</b>						
201			X			IHS water supply well; Added by D. Metzler 1/23/01
200			X			
625			X			Nov-95
640			X			Aug-99

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**Constituent Sampling Breakdown  
For Individual UMTRA Sites**

Site	Monument Valley	
	Ground Water	Surface Water
Approx. No. Samples/yr	26	0
<b>Field Measurements</b>	<b>UGW</b>	<b>UGW</b>
Alkalinity	X	
Dissolved Oxygen		
Redox Potential	X	
pH	X	
Specific Conductance	X	
Turbidity	X	
Temperature	X	
<b>Laboratory Measurements</b>	<b>UGW</b>	<b>UGW</b>
Aluminum		
Ammonium	606, 655, 656, 765, 770, 771, 772, 774, 777, 201	
Antimony		
Arsenic		
Barium		
Boron		
Bromide		
Cadmium	201 only	
Calcium	201 only	
Chloride	X	
Chromium		
Cobalt		
Copper		
Fluoride		
Gamma Spec		
Gross Alpha	201 only	
Gross Beta		
Iron		
Lead		
Lead-210	201 only	
Magnesium	201 only	
Manganese		
Molybdenum		

## Constituent Sampling Breakdown For Individual UMTRA Sites

Site	Monument Valley	
	Ground Water	Surface Water
<i>Laboratory Measurements (Continued)</i>	<i>UGW</i>	<i>UGW</i>
Nickel		
Nickel-63		
Nitrate	X	
Nitrite		
PCBs		
Phosphate		
Polonium-210		
Potassium	201 only	
Radium-226	201 only	
Radium-228	201 only	
Selenium	201 only	
Silica		
Sodium	201 only	
Strontium	201 only	
Sulfate	X	
Sulfide		
Thallium		
Thorium-230		
Tin		
Total Dissolved Solids	201 only	
Total Hardness		
Total Suspended Solids		
Uranium	774 and 201 only	
Uranium-234, -238		
Vanadium	201 only	
Zinc		
<b>Total Analytes</b>	<b>83</b>	<b>0</b>

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 ENVIRONMENTAL RESTORATION SERVICES, LLC



UMON000488

CONTRACT NO.: DE-AC13-96GJ87335  
TASK ORDER NO.: MAC01-05  
CONTROL NO.: 3100-N/A

MEMO TO: Sam Marutzky  
FROM: Daniel L. Sellers *Left for*  
DATE: August 23, 2001

SUBJECT: Trip report for UMTRA water sampling at the Monument Valley site.

Site: Monument Valley, Utah

Dates of Sampling Event: August 6 through August 8, 2001

Team Members: Tony Franzone, Jeff Price, Steve Back and Joe Trevino

Number of Locations Sampled: A total of 34 ground water locations were sampled (30 monitor well locations and 4 domestic well locations).

Locations Not Sampled/Reason: None

Field Variance: Wells 655, 669, 764, 403, 606, and 602 were purged dry prior to removing 3 casing volumes.

Location Specific Information: Roots were encountered in the bottom of well 774.

Well 619 may have a bad check valve; the water level in the flow cell lowered between cycles.

The water in well 768 was gray in color and had an organic odor.

The Eh reading at well 648 may be questionable. When doing the op-check on the next well the Zobel value for Eh was -401.

Quality Control Sample Cross Reference: The following is a list of quality control samples and their assigned false identifications:

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
1100	0776	Duplicate	Ground Water	NDN 642
1101	0604	Duplicate	Ground Water	NDN 645
1300	0605	Equipment Blank		NDN 650
6481	0648	Duplicate	Ground water	NDS 312
7640		Equipment Blank		NDS 318

RECORD

**Requisition Numbers Assigned:** LTSM samples were assigned to requisition 17567.

**Water Level Measurements:** Water level information was collected at all sampled wells.

**Well Inspection Summary:** Monitor well inspections were conducted at all sampled wells. Sand is blowing away from under the concrete pad at well 777. The concrete pad around well 605 is broken into 5 pieces.

**Corrective Action:** None

**Equipment:** None

**Regulatory:** None

**Site Issues:** None

**Additional Action Required/Taken:** Data Loggers were not down loaded at site (problem with computer or wire cable from computer to data loggers). Data loggers need to be down loaded still.

Distribution:

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Project Record File GWMON 14.12 thru P. Taylor