



**DATA VALIDATION
FOR THE MONUMENT VALLEY, AZ.
UMTRA SITE**

**August 1999
Water Sampling**

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



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MONUMENT VALLEY
Sampled August 1999
DATA PACKAGE CONTENTS

This data package includes the following information:

- | <u>Item No.</u> | <u>Description of Contents</u> |
|-----------------|--|
| 1. | Site Hydrologist Summary |
| 2. | Data Package Assessment, which includes the following: <ul style="list-style-type: none">a. Field procedures verification checklistb. 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 validators findings. |
| 4. | Suspected Anomalies Reports 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. | Anomalous Data Review Checksheets which list the subset of data from sampling event that merits explanation or follow-up action. The "disposition" column of this report describes the evaluators judgments on the listed anomalies. |
| 6. | UMTRA Database Printouts <ul style="list-style-type: none">a. Ground-Water Quality Data (included on disk)b. Surface-Water Quality Data (included on disk)c. Equipment Blank Data (included on disk)d. Time Versus Concentration Graphse. Water Level Data |
| 7. | Sampling and Analysis Work Order and Trip Report. |

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Site Hydrologist Summary

Site: Monument Valley

Sampling Period: August 1999

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 location 640 (upgradient, background) was sampled for nitrate, sulfate, and chloride. The nitrate concentration did not exceed any standard, and there are no current standards for sulfate or chloride. The sulfate concentration was 550 mg/L and the chloride concentration was 75.8 mg/L. The sulfate to chloride ratio of less than 10 is indicative of background water.

- 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?**

Wells 619 and 774 are located on-site adjacent to the paleovalley where slightly elevated uranium occurs in the De Chelly sandstone. The source of the uranium is believed to be from the alluvial water in the paleovalley. Former pumping on the De Chelly wells may have actively drawn water from the alluvial aquifer into the De Chelly Sandstone. Well 619 monitors the De Chelly bedrock aquifer. Uranium concentrations in this well increased to 0.083 mg/L from the 0.078 mg/L measured one year ago, and 0.053 mg/L measured two years ago. De Chelly monitor well 776 is located 70-feet upgradient of well 619. Uranium concentrations in this well have decreased to 0.021 mg/L from the 0.025 mg/L measured one year ago, and the 0.037 mg/L measured two years ago. The uranium concentration of 0.071 mg/L in well 774 which monitors the alluvial water adjacent to the De Chelly wells has shown relatively no change during the past two years. This indicates that the uranium concentrations in the De Chelly are naturally flushing downgradient as expected. Dedicated low-flow sampling pumps were installed in the De Chelly wells after the sampling event two years ago. The purpose of installing the low-flow sampling pumps was to avoid drawing alluvial water that is slightly elevated in uranium into the De Chelly aquifer thereby allowing the bedrock formation to naturally flush the uranium downgradient.

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

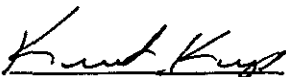
There is no historical upstream ambient water quality data from Cane Valley Wash to provide comparison to downstream locations; therefore, surface water concentrations of UMTRA related contaminants were compared to a statistical benchmark derived from data obtained from upgradient alluvial well 602. There were no UMTRA constituents from surface locations that exceeded the benchmark.

Wells with sample concentrations that exceeded UMTRA ground water standards are listed in Table 1.

Table 1. Monument Valley Wells with Samples that Exceeded UMTRA Standards in August 1999.

Analyte	Standard ¹	Wells Exceeding Standards (Concentration ¹)
Nitrate	44.27	771 (542), 669 (66), 770 (152), 655 (534), 606 (890), 662 (53), 656 (194), 777 (729), 762 (109), 653 (124), 765 (580), 761 (76), 764 (115), 772 (138)
Uranium	0.044	619 (0.0830), 774 (0.0716)

¹Units are in mg/L


 Ken Karp
 Site Hydrologist

11/2/99
 Date

DATA ASSESSMENT

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DATA PACKAGE ASSESSMENT

REQUISITION NUMBERS: 16742 SITE: Monument Valley LABORATORY: GJO ANALYSIS DATES: 8/24/99 - 9/17/99

REVIEWER: DAVID MILLER *D. Miller* 10/25/99
NAME (print) SIGNATURE DATE

	ICP-MS	ICP-AES	GFAA	FAA	NaBH ₄	AS	LSc	PC	IC	Gravimetric	Colorimetric (Spectrophotometry)	Other	
CHAIN OF CUSTODY	OK	NA	NA	NA	NA	NA	NA	NA	OK	NA	OK	NA	—
HOLDING TIME	OK	↓	↓	↓	↓	↓	↓	↓	OK	↓	OK	↓	—
CALIB. VERIFICATION (For AS, internal tracer)	OK	↓	↓	↓	↓	↓	↓	↓	OK	NA	OK	↓	—
PREP. BLANKS (Only if digestion)	NA	↓	↓	↓	↓	↓	↓	↓	NA	↓	NA	↓	—
INT/CONT CAL. BLANKS	OK	↓	↓	↓	↓	NA	NA	NA	①	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	NA	↓	↓	↓	↓	↓	↓	↓	OK	↓	NA	↓	—
DUPLICATES	OK	↓	↓	↓	↓	↓	↓	↓	OK	↓	OK	↓	—
POSTDIGEST. SPKS. (Only if MS fails)	NA	↓	↓	↓	↓	NA	NA	NA	NA	NA	NA	↓	—
MATRIX SPKS.	OK	↓	↓	↓	↓	↓	↓	↓	OK	NA	—	↓	—
OVERALL ASSESS.	OK	↓	↓	↓	↓	↓	↓	↓	OK	↓	OK	↓	—

REVIEWER COMMENTS: _____

ITEMS REQUIRING ATTENTION: ① CCRs contamination; U Flag Sulfate result 261704 (equipment blank); and NO₃ results 261714 (624) and 24729 (equipment blank).

UGW Water Sampling Field Activities Verification Checklist

Project UMTRA - Monument Valley

Date(s) of Ground Water Sampling 8/23/99 - 8/27/99

Date(s) of Verification 10/25/99

Name of Verifier _____

	Response (Yes, No, N/A)	Comments
1. Is the SAP the primary document directing field procedures? List other documents, SOPs, Instructions.	<u>Yes</u>	_____ <u>Work order letter dated 7/23/99, and verbal direction from K. Karp</u>
2. Were the sampling locations specified in the planning documents sampled?	<u>Yes</u>	_____ _____
3. Was field equipment calibrated as specified in the above named documents? Were the number and types (alkalinity, temperature, conductivity pH, turbidity, DO, Eh) of field measurements taken as specified? Were the standard solutions used for the calibration and operational checks of the field instruments brought to within 10°C of the temperature of the water to be sampled? Was the calibration information recorded on the field data sheets?	<u>Yes</u> <u>Yes</u> <u>Yes</u> <u>Yes</u>	_____ _____ <u>except: @ location 606, 621, & 640</u> _____
4. Was a duplicate alkalinity measurement conducted on a frequency of one duplicate per 20 samples?	<u>NA</u>	_____ _____
5. Was depth to water measured before purging? Was this information used to calculate the purge volume?	<u>Yes</u> <u>Yes</u>	_____ _____
6. 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?	<u>Yes</u>	_____ _____
7. If low-flow purging was used, was the purge rate less than 0.125 gal/min, and was the drawdown less than 0.3 feet?	<u>Yes</u>	_____ _____

8. Were duplicates taken at a frequency of one per 20 samples? Yes However, a duplicate was not collected from surface water
9. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment? Yes
10. Were trip blanks prepared and included with each shipment of VOC samples? NA
11. Were QC samples assigned a fictitious site identification number?
Was the true identity of the samples recorded in the field notes? Yes
Yes
12. Were samples collected in the containers specified?
Were certified pre-cleaned containers used for the sampling? Yes
Yes
13. Were samples filtered and preserved as specified? Yes
14. Were the number and types of samples collected as specified? Yes
15. Were chain of custody records completed and was sample custody maintained? Yes
16. Were sample ticket book numbers recorded on field data forms and on the chain of custody? Yes
17. Are field data sheets signed and dated by the field team leader? Yes
18. Was all other pertinent information documented on the field data sheets? Yes
19. Was the presence or absence of ice in the cooler documented at every sample location? Yes
20. Were water levels measured at the locations specified in the planning documents? Yes

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**MONUMENT VALLEY, AZ
AUGUST 1999 SAMPLING EVENT
DATA ASSESSMENT SUMMARY**

The DOE-GJO Analytical Laboratory analyzed samples and reported results for this sampling event under requisition number 16742 for the UMTRA ground water project.

METALS/MAJOR CATIONS ANALYSIS

The determination uranium was analyzed by inductively coupled plasma-mass spectrometry (ICP-MS). All quality control requirements were met during the course of these analyses.

INORGANIC ANALYSIS

Chloride, nitrate, and sulfate were determined by ion chromatography (IC), and ammonium was determined by spectrophotometry (Colorimetry). Except as noted, all quality control requirements were met during the course of these analyses.

The following results were qualified with a "U" flag because of CCB contamination: sulfate result 261704 (equipment blank); and nitrate results 261729 (equipment blank), and 261714 (624).

FIELD ANALYSIS/ACTIVITIES

Low-flow purging was used at wells 657, 775, 776 and 619; 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 purged dry prior to removal of three casing volumes included 403, 602, 606, 656, 771, and 764; 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 33 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 33 sampled locations. Duplicate samples were collected from wells 775 and 767. There is 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. All duplicate sample results met the laboratory duplicate criteria (20 relative percent difference); and therefore, duplicate results are considered acceptable.

SAR

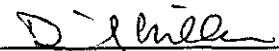
The SAR reflects samples collected in August 1999. Values listed in the SAR were considered valid if: (1) identified low concentrations were the results of low detection limits; or (2) the concentrations detected were within 50 percent of the historical minimum or maximum observed

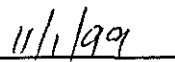
values. Results that did not meet this criteria are listed on the Anomalous Data Review Checksheet.

SUMMARY

All analytical quality control criteria were met except as qualified on the Ground Water Quality Data by Parameter, Surface Water Quality Data by Parameter, or 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 meet the validation criteria and may be treated as final results.

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


David Miller
Data Validation Lead


Date

SAR

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SUSPECTED ANOMALIES REPORT

REPORT DATE: 10/26/1999

TIME: 1:38:39 PM

Site : MON01 MONUMENT VALLE Test Data Date Range : 8/1/1999 to 8/30/1999

Older Data Only Used for Baseline Data

155 Chemical Records

1168 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		
0621	5 OK	SO4 mg/L	8/25/1999	0001	41.8000	11	10.000	14.000	61.9987	8/26/1998	0001	85.8000	2/23/1998	0001	140.0000	11/22/1992	N001	50.0000
						0	120.000	140.000	156.8288								0	1
0623	6 OK	NH4 mg/L	8/25/1999	0001	0.0462	10	0.013	0.020	0.0000	8/26/1998	0001	0.0207	2/23/1998	0001	0.0197	8/27/1997	0001	0.0203
			B			50	0.100	0.100	0.0380	B			B			B		
0624	6 OK	CHLORI mg/L	8/25/1999	0001	170.0000	6	15.000	17.000	16.4633	1/13/1997	0001	33.5000	1/16/1996	0001	45.1000	4/20/1995	0001	61.2000
						0	45.100	61.200	86.4736					0	0.5		0	0.5
	4	NH4 mg/L	8/25/1999	0001	9.6500	5	0.037	0.100	0.0247	1/13/1997	0001	0.0369	4/20/1995	N001	0.8000	12/13/1994	N001	0.1200
						40	0.120	0.800	1.2000	B				0	0.1		0	0.1
	6 OK	SO4 mg/L	8/25/1999	0001	481.0000	7	53.000	58.000	0.0000	1/16/1996	0001	191.0000	4/20/1995	0001	263.0000	12/13/1994	N001	63.0000
						0	935.000	935.000	445.9266	I	0	1		0	1		0	1
0627	6 OK	CHLORI mg/L	8/24/1999	0001	124.0000	5	96.300	568.000	0.0000	8/21/1997	0001	96.3000	1/15/1996	0001	583.0000	12/11/1994	N001	746.0000
						0	936.000	936.000	-30.2638					0	0.5		0	0.5
0631	5 OK	ALKALI mg/L	8/24/1999	N001	295.0000	4	629.000	729.000	844.3379	8/27/1998	0001	815.0000	8/27/1998	0001	815.0000	8/27/1998	N001	850.0000
						0	815.000	850.000	936.8055									
	5 OK	ALKALI mg/L	8/24/1999	0001	233.0000	4	629.000	729.000	844.3379	8/27/1998	0001	815.0000	8/27/1998	0001	815.0000	8/27/1998	N001	850.0000
						0	815.000	850.000	936.8055									
	5 OK	CHLORI mg/L	8/24/1999	0001	63.5000	4	3.200	79.000	213.7488	8/27/1998	0001	204.0000	1/14/1997	0001	195.0000	1/16/1996	0001	79.0000
						0	195.000	204.000	363.9679								0	0.5
0640	3 OK	NO3 mg/L	8/24/1999	0001	0.3080	1	11.000	11.000	5.5000	12/12/1993	0001	11.0000	12/12/1993	0001	11.0000	12/12/1993	0001	11.0000
			B			0	11.000	11.000	22.0000		0	1		0	1		0	1
0650	6 OK	ALKALI mg/L	8/24/1999	N001	273.0000	11	178.000	180.000	168.3989	8/28/1998	0001	178.0000	8/28/1998	N001	180.0000	2/25/1998	N001	220.0000
						0	219.000	220.000	200.8839									
0655	6 OK	NO3 mg/L	8/26/1999	0001	534.0000	17	380.000	387.000	240.1890	8/25/1998	0001	388.0000	2/24/1998	0001	387.0000	8/20/1997	0001	581.0000
						0	940.000	1140.000	521.9137									
0656	6 OK	ALKALI mg/L	8/26/1999	N001	282.0000	11	241.000	246.000	237.6128	8/27/1998	N001	253.0000	8/27/1998	0001	247.0000	2/24/1998	N001	248.0000
						0	263.000	312.000	259.6514									

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 D. A. Williams
 Hydrologist "OK" Indicates Insignificant variation

Date 10/26/99

SUSPECTED ANOMALIES REPORT

REPORT DATE: 10/26/1999

TIME: 1:38:39 PM

Site : MON01 MONUMENT VALLE Test Data Date Range : 8/1/1999 to 8/30/1999

Older Data Only Used for Baseline Data

155 Chemical Records

1168 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		
0662	OK	6 ALKALI mg/L	8/25/1999	0001	180.0000	14	114.000	174.000	115.2392	8/26/1998	0001	174.0000	8/26/1998	N001	114.0000	8/26/1998	0001	174.0000
						0	474.000	592.000	178.5433									
	OK	6 ALKALI mg/L	8/25/1999	N001	181.0000	14	114.000	174.000	115.2392	8/26/1998	0001	174.0000	8/26/1998	N001	114.0000	8/26/1998	0001	174.0000
0760	OK	6 CHLORI mg/L	8/25/1999	0001	10.3000	12	8.870	9.100	5.8530	8/26/1998	0001	9.1000	2/25/1998	0001	8.8700	1/12/1997	0001	11.1000
						0	19.000	20.000	10.0622									
	OK	6 ALKALI mg/L	8/25/1999	0001	179.0000	4	168.000	170.000	165.5183	8/27/1998	0001	170.0000	8/27/1998	N001	173.0000	2/26/1998	N001	168.0000
0761	OK	6 ALKALI mg/L	8/26/1999	0001	210.0000	4	120.000	126.000	44.3581	8/27/1998	0001	126.0000	8/27/1998	0001	126.0000	8/27/1998	N001	120.0000
						0	166.000	181.000	111.6051									
	OK	6 ALKALI mg/L	8/26/1999	N001	196.0000	4	120.000	126.000	44.3581	8/27/1998	0001	126.0000	8/27/1998	0001	126.0000	8/27/1998	N001	120.0000
0762	OK	6 ALKALI mg/L	8/26/1999	N001	243.0000	4	197.000	199.000	199.7822	8/27/1998	N001	199.0000	8/27/1998	0001	206.0000	2/24/1998	N001	197.0000
						0	199.000	206.000	212.6415									
	OK	6 ALKALI mg/L	8/26/1999	N001	206.0000	4	157.000	182.000	125.6321	8/28/1998	N001	157.0000	8/28/1998	0001	182.0000	8/28/1998	N001	157.0000
0764	OK	6 ALKALI mg/L	8/26/1999	0001	206.0000	4	157.000	182.000	125.6321	8/28/1998	N001	157.0000	8/28/1998	0001	182.0000	8/28/1998	N001	157.0000
						0	182.000	201.000	186.0381									
	OK	6 ALKALI mg/L	8/26/1999	0001	206.0000	4	157.000	182.000	125.6321	8/28/1998	N001	157.0000	8/28/1998	0001	182.0000	8/28/1998	N001	157.0000
0765	OK	5 ALKALI mg/L	8/27/1999	0001	273.0000	4	239.000	276.000	328.0613	8/27/1998	0001	285.0000	8/27/1998	N001	296.0000	8/27/1998	0001	285.0000
						0	285.000	296.000	354.0365									
	OK	5 ALKALI mg/L	8/27/1999	N001	294.0000	4	239.000	276.000	328.0613	8/27/1998	0001	285.0000	8/27/1998	N001	296.0000	8/27/1998	0001	285.0000
0767	OK	6 ALKALI mg/L	8/25/1999	0001	168.0000	4	123.000	148.000	35.6717	8/27/1998	N001	123.0000	8/27/1998	0001	148.0000	8/27/1998	N001	123.0000
						0	176.000	218.000	156.1188									
	OK	6 ALKALI mg/L	8/25/1999	N001	162.0000	4	123.000	148.000	35.6717	8/27/1998	N001	123.0000	8/27/1998	0001	148.0000	8/27/1998	N001	123.0000
					0	176.000	218.000	156.1188										

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 *[Signature]*
 Hydrologist "OK" indicates insignificant variation

Date 10/26/99

SUSPECTED ANOMALIES REPORT

REPORT DATE: 10/28/1999

TIME: 1:38:40 PM

Site : MON01 MONUMENT VALLE Test Data Date Range : 8/1/1999 to 8/30/1999

Older Data Only Used for Baseline Data

155 Chemical Records

1168 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		
0771	3 OK	NH4 mg/L	8/25/1999	0001	28.1000	3	187.000	286.000	93.5000	8/25/1998	0001	327.0000	2/27/1998	0001	286.0000	8/28/1997	0001	187.0000
0774	6 OK	ALKALI mg/L	8/25/1999	0001	163.0000	4	159.000	184.000	7.2945	8/28/1998	0001	159.0000	8/28/1998	0001	159.0000	8/28/1998	N001	170.0000
			8/25/1999	N001	162.0000	4	159.000	164.000	7.2945	8/28/1998	0001	159.0000	8/28/1998	0001	159.0000	8/28/1998	N001	170.0000
0775	5 OK	ALKALI mg/L	8/28/1999	0001	179.0000	4	106.000	200.000	251.2680	8/28/1998	0001	216.0000	8/28/1998	N001	200.0000	8/28/1998	0001	216.0000
			8/28/1999	N001	200.0000	4	106.000	200.000	251.2680	8/28/1998	0001	216.0000	8/28/1998	N001	200.0000	8/28/1998	0001	216.0000
0776	5 OK	ALKALI mg/L	8/25/1999	N001	162.0000	4	146.000	171.000	179.5872	8/28/1998	N001	171.0000	8/28/1998	0001	177.0000	8/28/1998	N001	171.0000
			8/25/1999	0001	161.0000	4	146.000	171.000	179.5872	8/28/1998	N001	171.0000	8/28/1998	0001	177.0000	8/28/1998	N001	171.0000

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 [Signature]
 Hydrologist "OK" indicates insignificant variation

Date 10/26/99

SUSPECTED ANOMALIES REPORT

REPORT DATE: 10/28/1999 TIME: 1:38:38 PM

Site : MON01 MONUMENT VALLE Test Data Date Range : 8/1/1999 to 8/30/1999

Older Data Only Used for Baseline Data

155 Chemical Records

1168 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		
0403	6 OK	ALKALI mg/L	8/24/1999	N001	279.0000	4	202.000	213.000	131.4595	8/27/1998	0001	213.0000	8/27/1998	N001	202.0000	8/27/1998	0001	213.0000
	6 OK	ALKALI mg/L	8/24/1999	0001	259.0000	4	202.000	213.000	131.4595	8/27/1998	0001	213.0000	8/27/1998	N001	202.0000	8/27/1998	0001	213.0000
0602	5 OK	ALKALI mg/L	8/24/1999	0001	196.0000	14	196.000	199.000	202.9500	8/28/1998	0001	215.0000	8/28/1998	N001	196.0000	2/26/1998	N001	266.0000
0603	6 OK	ALKALI mg/L	8/25/1999	0001	202.0000	12	168.000	172.000	161.1880	8/28/1998	N001	180.0000	8/28/1998	0001	168.0000	8/28/1998	0001	168.0000
	6 OK	ALKALI mg/L	8/25/1999	N001	212.0000	12	168.000	172.000	161.1880	8/28/1998	N001	180.0000	8/28/1998	0001	168.0000	8/28/1998	0001	168.0000
0604	6 OK	ALKALI mg/L	8/25/1999	N001	263.0000	13	161.000	177.000	171.7222	8/28/1998	N001	184.0000	8/28/1998	0001	186.0000	2/26/1998	N001	256.0000
0606	6 OK	ALKALI mg/L	8/28/1999	N001	330.0000	22	234.000	259.000	191.2154	8/28/1998	N001	400.0000	8/28/1998	0001	234.0000	2/24/1998	N001	259.0000
0614	6 OK	ALKALI mg/L	8/28/1998	0001	194.0000	20	148.000	173.000	160.5130	8/28/1998	N001	175.0000	8/28/1998	0001	148.0000	8/28/1998	N001	175.0000
	6 OK	ALKALI mg/L	8/28/1998	N001	193.0000	20	148.000	173.000	160.5130	8/28/1998	N001	175.0000	8/28/1998	0001	148.0000	8/28/1998	N001	175.0000
0621	6 OK	ALKALI mg/L	8/25/1999	N001	620.0000	11	194.000	201.000	307.1709	8/26/1998	0001	355.0000	8/26/1998	N001	334.0000	8/26/1998	0001	355.0000
	6 OK	ALKALI mg/L	8/25/1999	0001	603.0000	11	194.000	201.000	307.1709	8/26/1998	0001	355.0000	8/26/1998	N001	334.0000	8/26/1998	0001	355.0000
	5 OK	CHLOR	8/25/1999	0001	14.0000	11	4.900	5.300	15.0937	8/26/1998	0001	6.3700	2/23/1998	0001	32.2000	1/11/1997	N001	30.8000
	6 OK	NH4 mg/L	8/25/1999	0001	0.2900	9	0.037	0.042	0.0176	8/26/1998	0001	0.0432	2/23/1998	0001	0.0420	1/11/1997	N001	0.0369

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 *D. Miller*
 Hydrologist "OK" indicates insignificant variation

Date 10/26/99

DATA REVIEW CHECKSHEET

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**ANALYTICAL
LABORATORY
RESULTS**

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GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
 REPORT DATE: 11/1/1999 2:52 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	0403	08/24/1999	0001	AL	U	259	L	#	-	-	
	mg/L	0403	08/24/1999	N001	AL	U	279	L	#	-	-	
	mg/L	0602	08/24/1999	0001	AL	U	196	L	#	-	-	
	mg/L	0603	08/25/1999	0001	AL	U	202		#	-	-	
	mg/L	0603	08/25/1999	N001	AL	U	212		#	-	-	
	mg/L	0604	08/25/1999	0001	AL	C	198		#	-	-	
	mg/L	0604	08/25/1999	N001	AL	C	263		#	-	-	
	mg/L	0606	08/28/1999	0001	AL	D	256	L	#	-	-	
	mg/L	0606	08/28/1999	N001	AL	D	330	L	#	-	-	
	mg/L	0614	08/28/1999	0001	SR	D	194		#	-	-	
	mg/L	0614	08/28/1999	N001	SR	D	193		#	-	-	
	mg/L	0619	08/25/1999	0001	DC	O	167	F	#	-	-	
	mg/L	0619	08/25/1999	N001	DC	O	165	F	#	-	-	
	mg/L	0640	08/24/1999	N001	AL	U	359		#	-	-	
	mg/L	0650	08/24/1999	0001	AL	D	197		#	-	-	
	mg/L	0650	08/24/1999	N001	AL	D	273		#	-	-	
	mg/L	0655	08/28/1999	0001	AL	D	287		#	-	-	
	mg/L	0655	08/28/1999	N001	AL	D	280		#	-	-	
	mg/L	0656	08/28/1999	0001	AL	D	242	L	#	-	-	
	mg/L	0656	08/28/1999	N001	AL	D	282	L	#	-	-	
	mg/L	0657	08/25/1999	0001	DC	O	161	F	#	-	-	
	mg/L	0657	08/25/1999	N001	DC	O	158	F	#	-	-	
	mg/L	0662	08/25/1999	0001	AL	D	180		#	-	-	
	mg/L	0662	08/25/1999	N001	AL	D	181		#	-	-	
	mg/L	0669	08/27/1999	0001	AL	D	204		#	-	-	
	mg/L	0669	08/27/1999	N001	AL	D	197		#	-	-	
	mg/L	0760	08/25/1999	0001	AL	D	179		#	-	-	

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
 REPORT DATE: 11/1/1999 2:52 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	0761	08/26/1999	0001	AL	D	210			#	-	-
	mg/L	0761	08/26/1999	N001	AL	D	196			#	-	-
	mg/L	0762	08/26/1999	0001	AL	D	204			#	-	-
	mg/L	0762	08/26/1999	N001	AL	D	243			#	-	-
	mg/L	0764	08/26/1999	0001	AL	D	206		L	#	-	-
	mg/L	0764	08/26/1999	N001	AL	D	206		L	#	-	-
	mg/L	0765	08/27/1999	0001	AL	D	273			#	-	-
	mg/L	0765	08/27/1999	N001	AL	D	294			#	-	-
	mg/L	0767	08/25/1999	0001	AL	D	168			#	-	-
	mg/L	0767	08/25/1999	N001	AL	D	162			#	-	-
	mg/L	0768	08/25/1999	0001	AL	D	179			#	-	-
	mg/L	0768	08/25/1999	N001	AL	D	171			#	-	-
	mg/L	0770	08/25/1999	0001	AL	D	216			#	-	-
	mg/L	0770	08/25/1999	N001	AL	D	224			#	-	-
	mg/L	0771	08/25/1999	0001	AL	D	320		L	#	-	-
	mg/L	0771	08/25/1999	N001	AL	D	335		L	#	-	-
	mg/L	0772	08/26/1999	0001	AL	O	252			#	-	-
	mg/L	0772	08/26/1999	N001	AL	O	263			#	-	-
	mg/L	0774	08/25/1999	0001	AL	O	163			#	-	-
	mg/L	0774	08/25/1999	N001	AL	O	162			#	-	-
	mg/L	0775	08/26/1999	0001	DC	D	179		F	#	-	-
	mg/L	0775	08/26/1999	N001	DC	D	200		F	#	-	-
	mg/L	0776	08/25/1999	0001	DC	O	161		F	#	-	-
	mg/L	0776	08/25/1999	N001	DC	O	162		F	#	-	-
	mg/L	0777	08/27/1999	0001	AL	D	300			#	-	-
	mg/L	0777	08/27/1999	N001	AL	D	287			#	-	-
Ammonia as NH4	mg/L	0602	08/24/1999	0001	AL	U	0.0160	B	L	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
 REPORT DATE: 11/1/1999 2:52 p

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
								LAB	DATA	QA		
Ammonia as NH4	mg/L	0655	08/26/1999	0001	AL	D	147.000			#	-	-
	mg/L	0656	08/26/1999	0001	AL	D	102.000		L	#	-	-
	mg/L	0765	08/27/1999	0001	AL	D	198.000			#	-	-
	mg/L	0771	08/25/1999	0001	AL	D	26.100		L	#	-	-
	mg/L	0772	08/26/1999	0001	AL	O	16.400			#	-	-
	mg/L	0774	08/25/1999	0001	AL	O	0.0160	B		#	-	-
	mg/L	0777	08/27/1999	0001	AL	D	292.000			#	-	-
Chloride	mg/L	0403	08/24/1999	0001	AL	U	12.900		L	#	-	-
	mg/L	0602	08/24/1999	0001	AL	U	15.300		L	#	-	-
	mg/L	0603	08/25/1999	0001	AL	U	12.800			#	-	-
	mg/L	0604	08/25/1999	0001	AL	C	11.700			#	-	-
	mg/L	0606	08/26/1999	0001	AL	D	17.800		L	#	-	-
	mg/L	0614	08/26/1999	0001	SR	D	24.000			#	-	-
	mg/L	0619	08/25/1999	0001	DC	O	5.380		F	#	-	-
	mg/L	0640	08/24/1999	0001	AL	U	75.800			#	-	-
	mg/L	0650	08/24/1999	0001	AL	D	9.270			#	-	-
	mg/L	0655	08/26/1999	0001	AL	D	27.300			#	-	-
	mg/L	0656	08/26/1999	0001	AL	D	16.600		L	#	-	-
	mg/L	0657	08/25/1999	0001	DC	O	5.730		F	#	-	-
	mg/L	0662	08/25/1999	0001	AL	D	10.300			#	-	-
	mg/L	0669	08/27/1999	0001	AL	D	12.200			#	-	-
	mg/L	0760	08/25/1999	0001	AL	D	10.300			#	-	-
	mg/L	0761	08/26/1999	0001	AL	D	15.300			#	-	-
	mg/L	0762	08/26/1999	0001	AL	D	59.800			#	-	-
	mg/L	0764	08/26/1999	0001	AL	D	13.600		L	#	-	-
	mg/L	0765	08/27/1999	0001	AL	D	21.900			#	-	-
	mg/L	0767	08/25/1999	0001	AL	D	5.660			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
 REPORT DATE: 11/1/1999 2:52 p

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA			DETECTION LIMIT	UN-CERTAINTY
Chloride	mg/L	0767	08/25/1999	0002	AL	D	5.710			#	-	-
	mg/L	0768	08/25/1999	0001	AL	D	78.900			#	-	-
	mg/L	0770	08/25/1999	0001	AL	D	17.100			#	-	-
	mg/L	0771	08/25/1999	0001	AL	D	33.000	L		#	-	-
	mg/L	0772	08/28/1999	0001	AL	O	17.900			#	-	-
	mg/L	0774	08/25/1999	0001	AL	O	6.220			#	-	-
	mg/L	0775	08/28/1999	0001	DC	D	6.250	F		#	-	-
	mg/L	0775	08/28/1999	0002	DC	D	6.330	F		#	-	-
	mg/L	0776	08/25/1999	0001	DC	O	6.070	F		#	-	-
	mg/L	0777	08/27/1999	0001	AL	D	21.700			#	-	-
Nitrate	mg/L	0403	08/24/1999	0001	AL	U	0.0248	B	L	#	-	-
	mg/L	0602	08/24/1999	0001	AL	U	3.460		L	#	-	-
	mg/L	0603	08/25/1999	0001	AL	U	1.680			#	-	-
	mg/L	0604	08/25/1999	0001	AL	C	0.419	B		#	-	-
	mg/L	0606	08/28/1999	0001	AL	D	890.000		L	#	-	-
	mg/L	0614	08/28/1999	0001	SR	D	20.900			#	-	-
	mg/L	0619	08/25/1999	0001	DC	O	12.800		F	#	-	-
	mg/L	0640	08/24/1999	0001	AL	U	0.306	B		#	-	-
	mg/L	0650	08/24/1999	0001	AL	D	1.120			#	-	-
	mg/L	0655	08/28/1999	0001	AL	D	534.000			#	-	-
	mg/L	0656	08/28/1999	0001	AL	D	194.000		L	#	-	-
	mg/L	0657	08/25/1999	0001	DC	O	9.720		F	#	-	-
	mg/L	0662	08/25/1999	0001	AL	D	53.400			#	-	-
	mg/L	0669	08/27/1999	0001	AL	D	66.000			#	-	-
	mg/L	0760	08/25/1999	0001	AL	D	0.227	B		#	-	-
	mg/L	0761	08/28/1999	0001	AL	D	76.200			#	-	-
	mg/L	0762	08/26/1999	0001	AL	D	109.000			#	-	-

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

REPORT DATE: 11/1/1999 2:52 p

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Nitrate	mg/L	0764	08/26/1999	0001	AL	D	115.000	L #	-	-
	mg/L	0765	08/27/1999	0001	AL	D	580.000	#	-	-
	mg/L	0767	08/25/1999	0001	AL	D	0.0141	B #	-	-
	mg/L	0767	08/25/1999	0002	AL	D	0.0247	B #	-	-
	mg/L	0768	08/25/1999	0001	AL	D	0.0116	B #	-	-
	mg/L	0770	08/25/1999	0001	AL	D	152.000	#	-	-
	mg/L	0771	08/25/1999	0001	AL	D	542.000	L #	-	-
	mg/L	0772	08/26/1999	0001	AL	O	138.000	#	-	-
	mg/L	0774	08/25/1999	0001	AL	O	13.300	#	-	-
	mg/L	0775	08/26/1999	0001	DC	D	2.210	F #	-	-
	mg/L	0775	08/26/1999	0002	DC	D	2.210	F #	-	-
	mg/L	0776	08/25/1999	0001	DC	O	4.280	F #	-	-
	mg/L	0777	08/27/1999	0001	AL	D	729.000	#	-	-
	pH	s.u.	0403	08/24/1999	N001	AL	U	8.12	L #	-
s.u.		0602	08/24/1999	N001	AL	U	7.84	L #	-	-
s.u.		0603	08/25/1999	N001	AL	U	7.68	#	-	-
s.u.		0604	08/25/1999	N001	AL	C	8.04	#	-	-
s.u.		0606	08/26/1999	N001	AL	D	7.06	L #	-	-
s.u.		0614	08/26/1999	N001	SR	D	7.52	#	-	-
s.u.		0619	08/25/1999	N001	DC	O	7.61	F #	-	-
s.u.		0640	08/24/1999	N001	AL	U	7.67	#	-	-
s.u.		0650	08/24/1999	N001	AL	D	8.18	#	-	-
s.u.		0655	08/26/1999	N001	AL	D	7.17	#	-	-
s.u.		0656	08/26/1999	N001	AL	D	7.52	L #	-	-
s.u.		0657	08/25/1999	N001	DC	O	7.63	F #	-	-
s.u.		0662	08/25/1999	N001	AL	D	7.18	#	-	-
s.u.		0669	08/27/1999	N001	AL	D	7.44	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
 REPORT DATE: 11/1/1999 2:52 p

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
pH	s.u.	0760	08/25/1999	N001	AL	D	8.31	#	-	-
	s.u.	0761	08/26/1999	N001	AL	D	7.37	#	-	-
	s.u.	0762	08/26/1999	N001	AL	D	7.59	#	-	-
	s.u.	0764	08/26/1999	N001	AL	D	7.73	L #	-	-
	s.u.	0765	08/27/1999	N001	AL	D	7.32	#	-	-
	s.u.	0767	08/25/1999	N001	AL	D	7.91	#	-	-
	s.u.	0768	08/25/1999	N001	AL	D	7.78	#	-	-
	s.u.	0770	08/25/1999	N001	AL	D	7.37	#	-	-
	s.u.	0771	08/25/1999	N001	AL	D	7.04	L #	-	-
	s.u.	0772	08/26/1999	N001	AL	O	8.10	#	-	-
	s.u.	0774	08/25/1999	N001	AL	O	7.66	#	-	-
	s.u.	0775	08/26/1999	N001	DC	D	7.93	F #	-	-
	s.u.	0776	08/25/1999	N001	DC	O	7.82	F #	-	-
	s.u.	0777	08/27/1999	N001	AL	D	7.22	#	-	-
	Redox Potential	mV	0403	08/24/1999	N001	AL	U	-74	L #	-
mV		0602	08/24/1999	N001	AL	U	111	L #	-	-
mV		0603	08/25/1999	N001	AL	U	96	#	-	-
mV		0604	08/25/1999	N001	AL	C	1	#	-	-
mV		0606	08/26/1999	N001	AL	D	118	L #	-	-
mV		0614	08/26/1999	N001	SR	D	148	#	-	-
mV		0619	08/25/1999	N001	DC	O	170	F #	-	-
mV		0640	08/24/1999	N001	AL	U	113	#	-	-
mV		0650	08/24/1999	N001	AL	D	21	#	-	-
mV		0655	08/26/1999	N001	AL	D	142	#	-	-
mV		0656	08/26/1999	N001	AL	D	112	L #	-	-
mV		0657	08/25/1999	N001	DC	O	164	F #	-	-
mV		0662	08/25/1999	N001	AL	D	132	#	-	-

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

REPORT DATE: 11/1/1999 2:52 p

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Redox Potential	mV	0669	08/27/1999	N001	AL	D	121	#	-	-
	mV	0760	08/25/1999	N001	AL	D	-279	#	-	-
	mV	0761	08/26/1999	N001	AL	D	205	#	-	-
	mV	0762	08/26/1999	N001	AL	D	149	#	-	-
	mV	0764	08/26/1999	N001	AL	D	199	L #	-	-
	mV	0765	08/27/1999	N001	AL	D	168	#	-	-
	mV	0767	08/25/1999	N001	AL	D	-103	#	-	-
	mV	0768	08/25/1999	N001	AL	D	-160	#	-	-
	mV	0770	08/25/1999	N001	AL	D	203	#	-	-
	mV	0771	08/25/1999	N001	AL	D	126	L #	-	-
	mV	0772	08/26/1999	N001	AL	O	101	#	-	-
	mV	0774	08/25/1999	N001	AL	O	224	#	-	-
	mV	0775	08/26/1999	N001	DC	D	175	F #	-	-
	mV	0776	08/25/1999	N001	DC	O	182	F #	-	-
	mV	0777	08/27/1999	N001	AL	D	199	#	-	-
Specific Conductance	umhos/cm	0403	08/24/1999	N001	AL	U	599	L #	-	-
	umhos/cm	0602	08/24/1999	N001	AL	U	610	L #	-	-
	umhos/cm	0603	08/25/1999	N001	AL	U	649	#	-	-
	umhos/cm	0604	08/25/1999	N001	AL	C	618	#	-	-
	umhos/cm	0606	08/26/1999	N001	AL	D	3320	L #	-	-
	umhos/cm	0614	08/26/1999	N001	SR	D	888	#	-	-
	umhos/cm	0619	08/25/1999	N001	DC	O	475	F #	-	-
	umhos/cm	0640	08/24/1999	N001	AL	U	1995	#	-	-
	umhos/cm	0650	08/24/1999	N001	AL	D	487	#	-	-
	umhos/cm	0655	08/26/1999	N001	AL	D	3930	#	-	-
	umhos/cm	0656	08/26/1999	N001	AL	D	1571	L #	-	-
	umhos/cm	0657	08/25/1999	N001	DC	O	370	F #	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
 REPORT DATE: 11/1/1999 2:52 p

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Specific Conductance	umhos/cm	0662	08/25/1999	N001	AL	D	1936	#	-	-
	umhos/cm	0669	08/27/1999	N001	AL	D	887	#	-	-
	umhos/cm	0760	08/25/1999	N001	AL	D	539	#	-	-
	umhos/cm	0761	08/26/1999	N001	AL	D	1191	#	-	-
	umhos/cm	0762	08/28/1999	N001	AL	D	2340	#	-	-
	umhos/cm	0764	08/26/1999	N001	AL	D	1331	L #	-	-
	umhos/cm	0765	08/27/1999	N001	AL	D	3080	#	-	-
	umhos/cm	0767	08/25/1999	N001	AL	D	408	#	-	-
	umhos/cm	0768	08/25/1999	N001	AL	D	1878	#	-	-
	umhos/cm	0770	08/25/1999	N001	AL	D	1136	#	-	-
	umhos/cm	0771	08/25/1999	N001	AL	D	5940	L #	-	-
	umhos/cm	0772	08/26/1999	N001	AL	O	998	#	-	-
	umhos/cm	0774	08/25/1999	N001	AL	O	466	#	-	-
	umhos/cm	0775	08/26/1999	N001	DC	D	419	F #	-	-
	umhos/cm	0776	08/25/1999	N001	DC	O	428	F #	-	-
umhos/cm	0777	08/27/1999	N001	AL	D	3470	#	-	-	
Sulfate	mg/L	0403	08/24/1999	0001	AL	U	25.200	L #	-	-
	mg/L	0602	08/24/1999	0001	AL	U	122.000	L #	-	-
	mg/L	0603	08/25/1999	0001	AL	U	106.000	#	-	-
	mg/L	0604	08/25/1999	0001	AL	C	103.000	#	-	-
	mg/L	0606	08/26/1999	0001	AL	D	553.000	L #	-	-
	mg/L	0614	08/26/1999	0001	SR	D	212.000	#	-	-
	mg/L	0619	08/25/1999	0001	DC	O	51.900	F #	-	-
	mg/L	0640	08/24/1999	0001	AL	U	550.000	#	-	-
	mg/L	0650	08/24/1999	0001	AL	D	25.900	#	-	-
	mg/L	0655	08/26/1999	0001	AL	D	1600.000	#	-	-
	mg/L	0656	08/26/1999	0001	AL	D	288.000	L #	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
 REPORT DATE: 11/1/1999 2:52 p

PARAMETER	UNITS	LOCATION ID	SAMPLE:		ZONE COMPL	FLOW REL	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
			DATE	ID				LAB	DATA	QA		
Sulfate	mg/L	0657	08/25/1999	0001	DC	O	20.700	F	#	-	-	
	mg/L	0662	08/25/1999	0001	AL	D	903.000		#	-	-	
	mg/L	0669	08/27/1999	0001	AL	D	191.000		#	-	-	
	mg/L	0760	08/25/1999	0001	AL	D	84.200		#	-	-	
	mg/L	0761	08/28/1999	0001	AL	D	473.000		#	-	-	
	mg/L	0762	08/28/1999	0001	AL	D	904.000		#	-	-	
	mg/L	0764	08/28/1999	0001	AL	D	377.000	L	#	-	-	
	mg/L	0765	08/27/1999	0001	AL	D	711.000		#	-	-	
	mg/L	0767	08/25/1999	0001	AL	D	26.900		#	-	-	
	mg/L	0767	08/25/1999	0002	AL	D	27.000		#	-	-	
	mg/L	0768	08/25/1999	0001	AL	D	688.000		#	-	-	
	mg/L	0770	08/25/1999	0001	AL	D	331.000		#	-	-	
	mg/L	0771	08/25/1999	0001	AL	D	3210.000	L	#	-	-	
	mg/L	0772	08/28/1999	0001	AL	O	144.000		#	-	-	
	mg/L	0774	08/25/1999	0001	AL	O	55.000		#	-	-	
	mg/L	0775	08/28/1999	0001	DC	D	26.800	F	#	-	-	
	mg/L	0775	08/26/1999	0002	DC	D	26.900	F	#	-	-	
	mg/L	0776	08/25/1999	0001	DC	O	32.200	F	#	-	-	
	mg/L	0777	08/27/1999	0001	AL	D	947.000		#	-	-	
Temperature	C	0403	08/24/1999	N001	AL	U	21.6	L	#	-	-	
	C	0602	08/24/1999	N001	AL	U	16.6	L	#	-	-	
	C	0603	08/25/1999	N001	AL	U	15.8		#	-	-	
	C	0604	08/25/1999	N001	AL	C	15.9		#	-	-	
	C	0606	08/26/1999	N001	AL	D	18.2	L	#	-	-	
	C	0614	08/26/1999	N001	SR	D	18.7		#	-	-	
	C	0619	08/25/1999	N001	DC	O	24.4	F	#	-	-	
	C	0640	08/24/1999	N001	AL	U	20.6		#	-	-	

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

REPORT DATE: 11/1/1999 2:52 p

PARAMETER	UNITS	LOCATION ID	SAMPLE:		ZONE COMPL	FLOW REL	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
			DATE	ID				LAB	DATA	QA		
Temperature	C	0650	08/24/1999	N001	AL	D	17.7			#	-	-
	C	0655	08/26/1999	N001	AL	D	19.9			#	-	-
	C	0656	08/26/1999	N001	AL	D	17.3		L	#	-	-
	C	0657	08/25/1999	N001	DC	O	19.1		F	#	-	-
	C	0662	08/25/1999	N001	AL	D	17.6			#	-	-
	C	0669	08/27/1999	N001	AL	D	20.1			#	-	-
	C	0760	08/25/1999	N001	AL	D	17.0			#	-	-
	C	0761	08/26/1999	N001	AL	D	18.7			#	-	-
	C	0762	08/26/1999	N001	AL	D	16.9			#	-	-
	C	0764	08/26/1999	N001	AL	D	18.3		L	#	-	-
	C	0765	08/27/1999	N001	AL	D	17.1			#	-	-
	C	0767	08/25/1999	N001	AL	D	15.8			#	-	-
	C	0768	08/25/1999	N001	AL	D	15.5			#	-	-
	C	0770	08/25/1999	N001	AL	D	16.6			#	-	-
	C	0771	08/25/1999	N001	AL	D	23.9		L	#	-	-
	C	0772	08/26/1999	N001	AL	O	16.8			#	-	-
	C	0774	08/25/1999	N001	AL	O	18.1			#	-	-
	C	0775	08/26/1999	N001	DC	D	18.8		F	#	-	-
	C	0776	08/25/1999	N001	DC	O	27.4		F	#	-	-
C	0777	08/27/1999	N001	AL	D	16.6			#	-	-	
Turbidity	NTU	0403	08/24/1999	N001	AL	U	56.5		L	#	-	-
	NTU	0602	08/24/1999	N001	AL	U	18.3		L	#	-	-
	NTU	0603	08/25/1999	N001	AL	U	0.74			#	-	-
	NTU	0604	08/25/1999	N001	AL	C	5.00			#	-	-
	NTU	0606	08/26/1999	N001	AL	D	1000	>	L	#	-	-
	NTU	0614	08/26/1999	N001	SR	D	7.62			#	-	-
	NTU	0619	08/25/1999	N001	DC	O	1.13		F	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
 REPORT DATE: 11/1/1999 2:52 p

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Turbidity	NTU	0640	08/24/1999	N001	AL	U	6.16	#	-	-
	NTU	0650	08/24/1999	N001	AL	D	2.53	#	-	-
	NTU	0655	08/26/1999	N001	AL	D	2.43	#	-	-
	NTU	0656	08/26/1999	N001	AL	D	217	L #	-	-
	NTU	0657	08/25/1999	N001	DC	O	5.89	F #	-	-
	NTU	0662	08/25/1999	N001	AL	D	35.8	#	-	-
	NTU	0669	08/27/1999	N001	AL	D	1.36	#	-	-
	NTU	0760	08/25/1999	N001	AL	D	1.76	#	-	-
	NTU	0761	08/26/1999	N001	AL	D	10.2	#	-	-
	NTU	0762	08/26/1999	N001	AL	D	8.41	#	-	-
	NTU	0764	08/26/1999	N001	AL	D	227	L #	-	-
	NTU	0765	08/27/1999	N001	AL	D	3.84	#	-	-
	NTU	0767	08/25/1999	N001	AL	D	0.41	#	-	-
	NTU	0768	08/25/1999	N001	AL	D	3.65	#	-	-
	NTU	0770	08/25/1999	N001	AL	D	0.80	#	-	-
	NTU	0771	08/25/1999	N001	AL	D	1000	> L #	-	-
	NTU	0772	08/26/1999	N001	AL	O	7.18	#	-	-
	NTU	0774	08/25/1999	N001	AL	O	30.2	#	-	-
	NTU	0775	08/26/1999	N001	DC	D	20.9	F #	-	-
	NTU	0776	08/25/1999	N001	DC	O	6.07	F #	-	-
NTU	0777	08/27/1999	N001	AL	D	8.85	#	-	-	
Uranium	mg/L	0619	08/25/1999	0001	DC	O	0.0830	F #	-	-
	mg/L	0657	08/25/1999	0001	DC	O	0.0095	F #	-	-
	mg/L	0774	08/25/1999	0001	AL	O	0.0716	#	-	-
	mg/L	0775	08/26/1999	0001	DC	D	0.0027	F #	-	-
	mg/L	0775	08/26/1999	0002	DC	D	0.0027	F #	-	-
	mg/L	0776	08/25/1999	0001	DC	O	0.0219	F #	-	-

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

REPORT DATE: 11/1/1999 2:52 p

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN- CERTAINTY
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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 #8/1/1999# and #8/30/1999#

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.

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.

SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE MON01, MONUMENT VALLEY
 REPORT DATE: 11/1/1999 2:52 pm

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Alkalinity as CaCO3	mg/L	0621	08/25/1999	0001	603	#	-	-
	mg/L	0621	08/25/1999	N001	620	#	-	-
	mg/L	0622	08/25/1999	0001	627	#	-	-
	mg/L	0622	08/25/1999	N001	610	#	-	-
	mg/L	0623	08/25/1999	0001	280	#	-	-
	mg/L	0623	08/25/1999	N001	265	#	-	-
	mg/L	0624	08/25/1999	0001	786	#	-	-
	mg/L	0624	08/25/1999	N001	775	#	-	-
	mg/L	0627	08/24/1999	0001	427	#	-	-
	mg/L	0627	08/24/1999	N001	590	#	-	-
	mg/L	0631	08/24/1999	0001	233	#	-	-
	mg/L	0631	08/24/1999	N001	295	#	-	-
Ammonia as NH4	mg/L	0621	08/25/1999	0001	0.290	#	-	-
	mg/L	0622	08/25/1999	0001	0.0634 B	#	-	-
	mg/L	0623	08/25/1999	0001	0.0462 B	#	-	-
	mg/L	0624	08/25/1999	0001	9.650	#	-	-
	mg/L	0627	08/24/1999	0001	0.356	#	-	-
	mg/L	0631	08/24/1999	0001	0.0871 B	#	-	-
Chloride	mg/L	0621	08/25/1999	0001	14.000	#	-	-
	mg/L	0622	08/25/1999	0001	51.600	#	-	-
	mg/L	0623	08/25/1999	0001	10.900	#	-	-
	mg/L	0624	08/25/1999	0001	170.000	#	-	-
	mg/L	0627	08/24/1999	0001	124.000	#	-	-
	mg/L	0631	08/24/1999	0001	63.500	#	-	-
Nitrate	mg/L	0621	08/25/1999	0001	0.146 B	#	-	-
	mg/L	0622	08/25/1999	0001	0.0337 B	#	-	-
	mg/L	0623	08/25/1999	0001	0.0380 B	#	-	-
	mg/L	0624	08/25/1999	0001	0.0586 B	U	#	-
	mg/L	0627	08/24/1999	0001	0.325 B	#	-	-
	mg/L	0631	08/24/1999	0001	0.0503 B	#	-	-
pH	s.u.	0621	08/25/1999	N001	7.70	#	-	-
	s.u.	0622	08/25/1999	N001	9.47	#	-	-
	s.u.	0623	08/25/1999	N001	7.90	#	-	-
	s.u.	0624	08/25/1999	N001	8.76	#	-	-
	s.u.	0627	08/24/1999	N001	8.66	#	-	-
	s.u.	0631	08/24/1999	N001	8.45	#	-	-

SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE MON01, MONUMENT VALLEY
 REPORT DATE: 11/1/1999 2:52 pm

PARAMETER	UNITS	LOCATION ID	SAMPLE:		RESULT	QUALIFIERS:		
			DATE	ID		LAB	DATA	QA
Redox Potential	mV	0621	08/25/1999	N001	-103	#	-	-
	mV	0622	08/25/1999	N001	113	#	-	-
	mV	0623	08/25/1999	N001	13	#	-	-
	mV	0624	08/25/1999	N001	3	#	-	-
	mV	0627	08/24/1999	N001	152	#	-	-
	mV	0631	08/24/1999	N001	-69	#	-	-
Specific Conductance	umhos/cm	0621	08/25/1999	N001	1388	#	-	-
	umhos/cm	0622	08/25/1999	N001	1652	#	-	-
	umhos/cm	0623	08/25/1999	N001	638	#	-	-
	umhos/cm	0624	08/25/1999	N001	2680	#	-	-
	umhos/cm	0627	08/24/1999	N001	2500	#	-	-
	umhos/cm	0631	08/24/1999	N001	1039	#	-	-
Sulfate	mg/L	0621	08/25/1999	0001	41.800	#	-	-
	mg/L	0622	08/25/1999	0001	105.000	#	-	-
	mg/L	0623	08/25/1999	0001	36.900	#	-	-
	mg/L	0624	08/25/1999	0001	481.000	#	-	-
	mg/L	0627	08/24/1999	0001	399.000	#	-	-
	mg/L	0631	08/24/1999	0001	156.000	#	-	-
Temperature	C	0621	08/25/1999	N001	24.9	#	-	-
	C	0622	08/25/1999	N001	20.2	#	-	-
	C	0623	08/25/1999	N001	19.9	#	-	-
	C	0624	08/25/1999	N001	27.4	#	-	-
	C	0627	08/24/1999	N001	21.8	#	-	-
	C	0631	08/24/1999	N001	20.3	#	-	-
Turbidity	NTU	0621	08/25/1999	N001	368	#	-	-
	NTU	0622	08/25/1999	N001	3.58	#	-	-
	NTU	0623	08/25/1999	N001	12.0	#	-	-
	NTU	0624	08/25/1999	N001	1000	>	#	-
	NTU	0627	08/24/1999	N001	1000	>	#	-
	NTU	0631	08/24/1999	N001	1000	>	#	-

SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 11/1/1999 2:53 pm

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
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RECORDS: SELECTED FROM USEE800 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 #8/1/1999# and #8/30/1999#

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 organo) 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 organo) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organo) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

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

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

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Equipment Blank Data for Monument Valley 8/99 Sampling Event

11/1/99

ANALYTE	SITE CODE	LOCATION CODE	DATE	SAMPLE ID	UNIT	RESULT	LAB QUALIFIERS	DATA VAL QUALIFIERS	DETECTION LIMIT	UNCERTAINTY
Ammonia as NH4	MON01	0999	8/26/99	0001	mg/L	0.005	U		0.005	
Chloride	MON01	0999	8/24/99	0001	mg/L	0.451	B			
Chloride	MON01	0999	8/26/99	0001	mg/L	0.103	B			
Nitrate	MON01	0999	8/24/99	0001	mg/L	0.0401	B			
Nitrate	MON01	0999	8/26/99	0001	mg/L	0.0204	B	U		
Sulfate	MON01	0999	8/24/99	0001	mg/L	0.152	B	U		
Sulfate	MON01	0999	8/26/99	0001	mg/L	0.251	B			

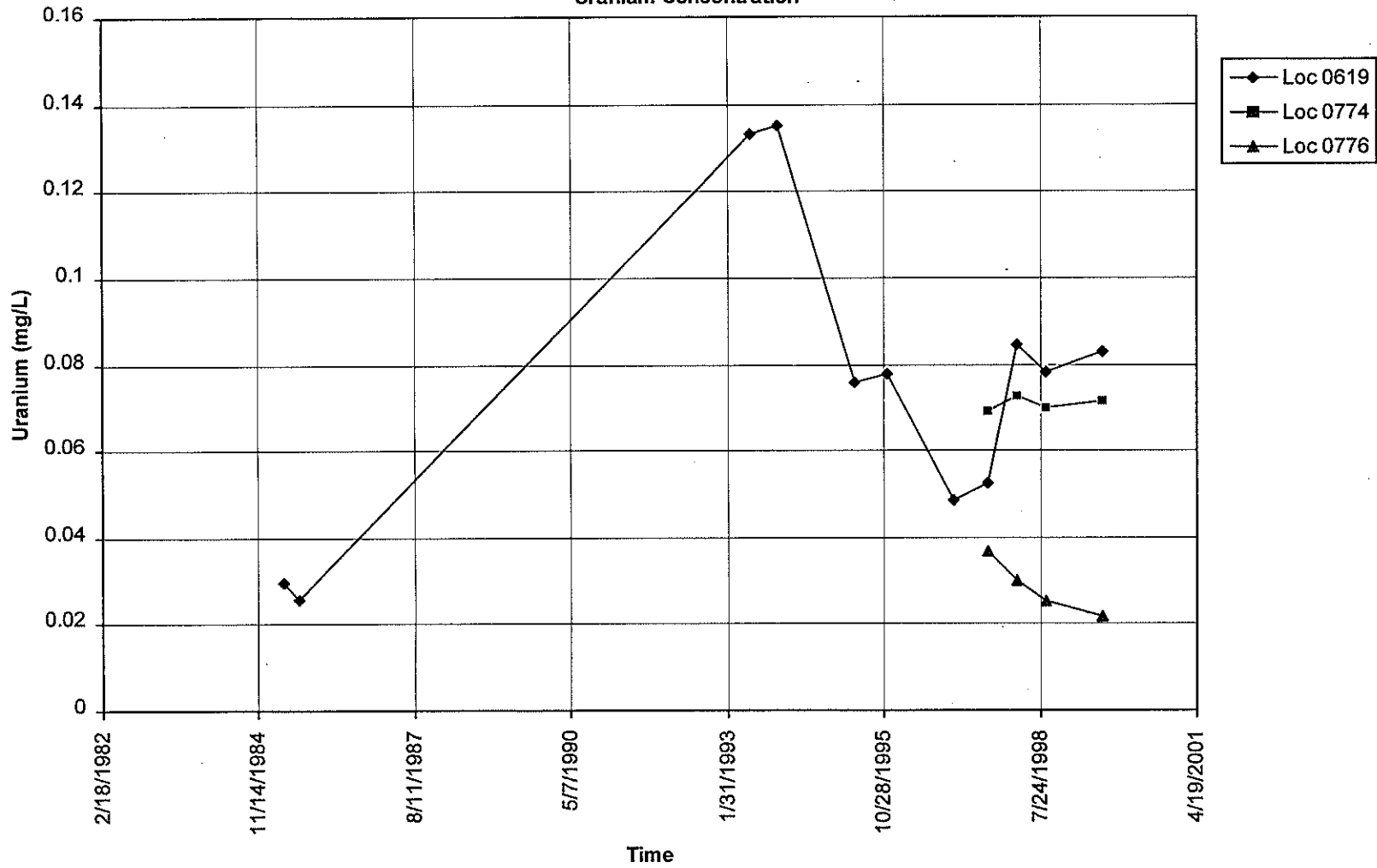
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TIME/CONCENTRATION PLOTS

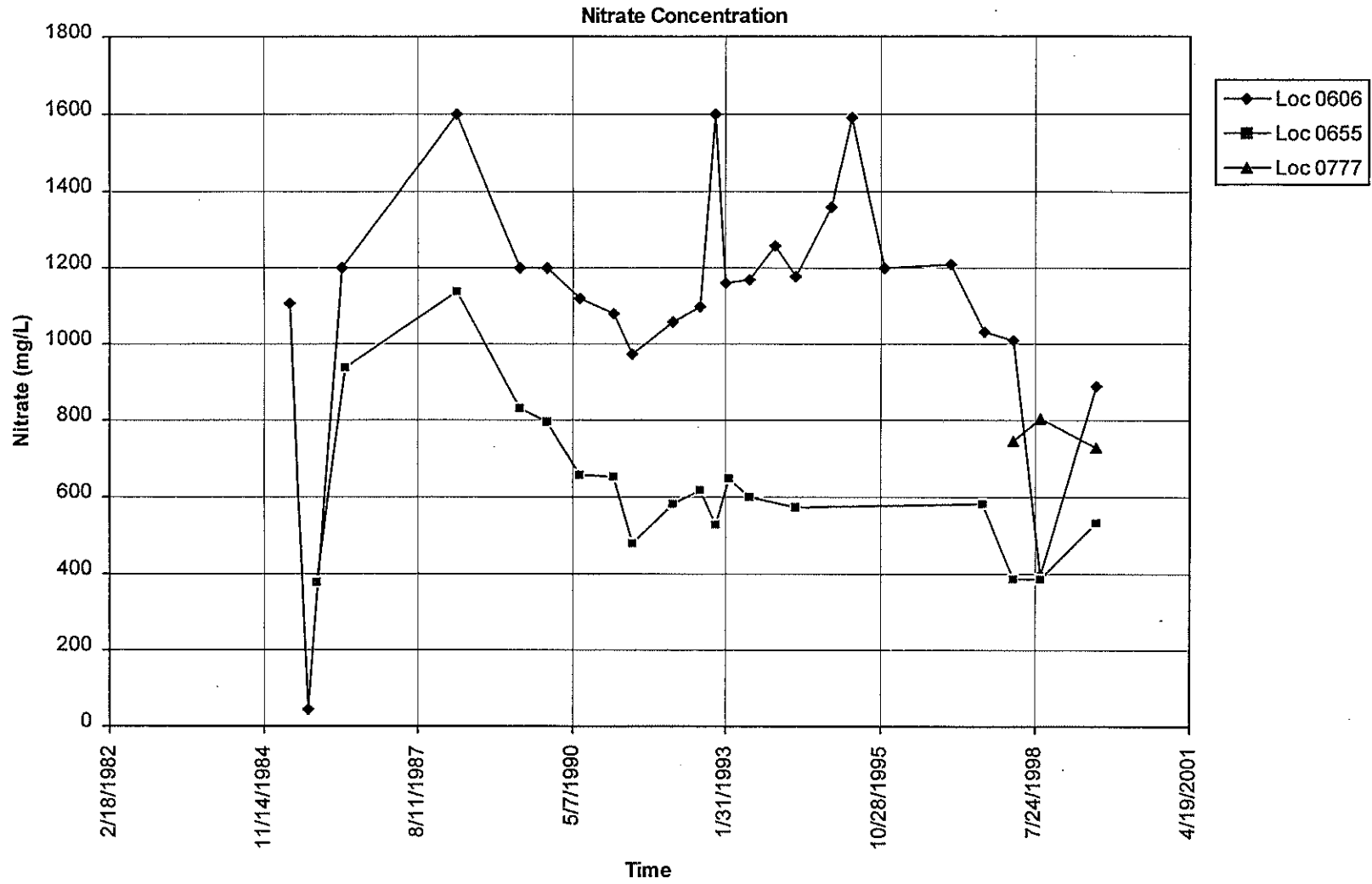
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MONUMENT VALLEY (MON01)

Uranium Concentration

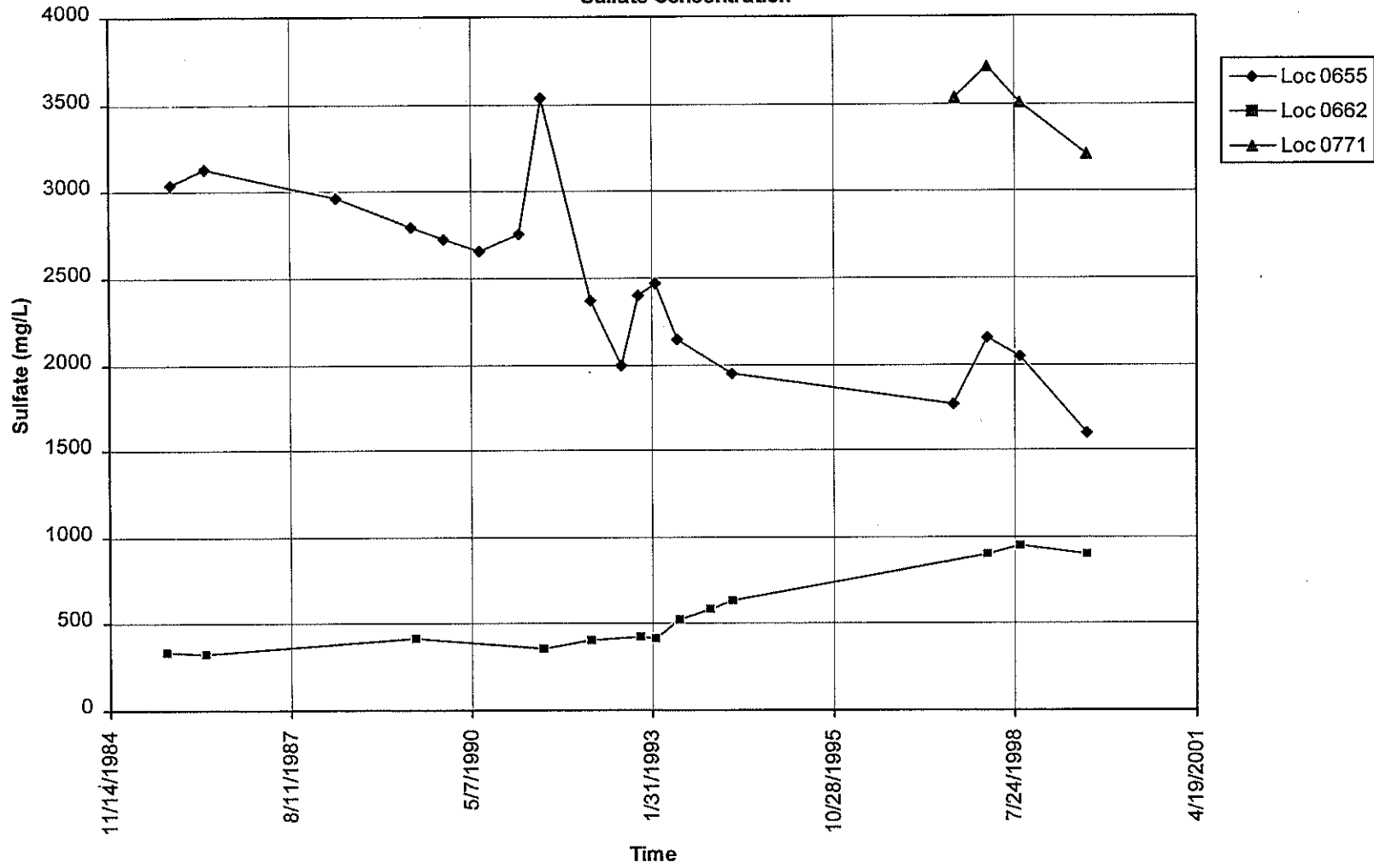


MONUMENT VALLEY (MON01)



MONUMENT VALLEY (MON01)

Sulfate Concentration



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WATER LEVELS

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STATIC GROUND WATER LEVELS (USEE700) FOR SITE MON01, MONUMENT VALLE
 REPORT DATE: 10/27/1999 9:57 am

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT		DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
			DATE	TIME		
0200	U	-	08/24/1999	10:23		-17.70
0400	U	4870.41	08/24/1999	10:12	2.69	4867.72
0401	U	4870.38	08/24/1999	10:13	2.68	4867.70
0402	U	4840.30	08/24/1999	10:53	4.86	4835.44
0403	U	4836.19	08/24/1999	10:48	1.73	4834.46
0404	U	4837.66	08/24/1999	10:45	3.85	4833.81
0405	U	4836.50	08/24/1999	10:47	1.82	4834.68
0407	C	4820.07	08/24/1999	13:25	6.35	4813.72
0408	C	4823.54	08/24/1999	11:17	1.53	4822.01
0409	C	4821.54	08/24/1999	11:23	0.63	4820.91
0410	C	4823.41	08/24/1999	11:26	5.69	4817.72
0411	C	4821.38	08/24/1999	11:22	3.12	4818.26
0413	C	4783.86	08/24/1999	11:49	4.24	4779.62
0414	C	4782.02	08/24/1999	11:53	1.81	4780.21
0415	C	4783.80	08/24/1999	12:00	3.39	4780.41
0416	C	4785.27	08/24/1999	12:02	4.44	4780.83
0417	C	4782.15	08/24/1999	11:55	1.69	4780.46
0601	U	4884.88	08/24/1999	09:58	14.49	4870.39
0602	U	4864.43	08/24/1999	09:50	9.65	4854.78
0603	U	4849.41	08/25/1999	15:35	10.99	4838.42
0604	C	4840.42	08/25/1999	16:24	8.63	4831.79
0605	C	4835.07	08/24/1999	13:35	10.47	4824.60
0606	D	4864.73	08/26/1999	11:15	36.64	4828.09
0607	D	4871.39	08/24/1999	11:04		-
0609	O	4879.99	08/24/1999	10:35		-
0610	U	4863.21	08/24/1999	09:54		-
0611	U	4849.31	08/24/1999	10:04	0.00	4849.31
0612	U	5007.82	08/24/1999	09:46	161.38	4846.44
0614	D	4856.81	08/26/1999	09:24	50.13	4806.68

STATIC GROUND WATER LEVELS (USEE700) FOR SITE MON01, MONUMENT VALLE
 REPORT DATE: 10/27/1999 9:57 am

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT		DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
			DATE	TIME		
0615	U	4850.16	08/24/1999	10:07	11.33	4838.83
0618	O	4924.81	08/24/1999	10:55	91.89	4832.92
0619	O	4888.63	08/24/1999	10:24	56.79	4831.84
		4888.63	08/25/1999	15:05	58.62	4830.01
0650	D	4794.28	08/24/1999	12:00	19.65	4774.63
0651	C	4787.88	08/24/1999	13:00	8.76	4779.12
0652	C	4808.93	08/24/1999	13:07	19.02	4789.91
0654	C	4824.36	08/24/1999	13:17	1.73	4822.63
0655	D	4862.06	08/24/1999	12:05	39.17	4822.89
		4862.06	08/28/1999	15:05	39.20	4822.86
0656	D	4856.33	08/24/1999	11:41	35.99	4820.34
		4856.33	08/26/1999	13:26	36.03	4820.30
0657	O	4878.99	08/24/1999	10:40	49.32	4829.67
		4878.99	08/25/1999	13:15	49.31	4829.68
0658	U	4879.96	08/24/1999	10:03	9.90	4870.06
0662	D	4878.56	08/24/1999	10:37	48.72	4829.84
		4878.56	08/25/1999	11:07	48.70	4829.86
0669	D	4867.19	08/24/1999	11:22	49.33	4817.86
		4867.19	08/27/1999	09:00	49.36	4817.83
0760	D	4814.80	08/25/1999	12:15	25.13	4789.67
0761	D	4835.02	08/24/1999	11:09	42.48	4792.54
		4835.02	08/26/1999	15:05	42.45	4792.57
0762	D	4820.74	08/24/1999	11:14	31.89	4788.85
		4820.74	08/26/1999	12:21	31.86	4788.88
0764	D	4851.53	08/24/1999	11:55	49.18	4802.35
		4851.53	08/26/1999	16:45	49.64	4801.89
0765	D	4848.45	08/27/1999	09:10	35.60	4812.85
0767	D	4808.25	08/25/1999	09:03	6.81	4801.44
0768	D	4820.73	08/25/1999	10:52	13.62	4807.11
0769	D	4861.30	08/24/1999	12:00	39.03	4822.27

STATIC GROUND WATER LEVELS (USEE700) FOR SITE MON01, MONUMENT VALLE
 REPORT DATE: 10/27/1999 9:57 am

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT		DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
			DATE	TIME		
0770	D	4857.26	08/24/1999	11:40	32.54	4824.72
		4857.26	08/25/1999	17:10	32.51	4824.75
0771	D	4863.26	08/24/1999	12:02	41.37	4821.89
		4863.26	08/25/1999	14:37	41.34	4821.92
0772	O	4847.60	08/24/1999	10:12	11.64	4835.76
		4847.60	08/26/1999	12:25	11.88	4835.72
0774	O	4880.14	08/24/1999	10:29	48.48	4831.66
		4880.14	08/25/1999	09:25	48.15	4831.99
0775	D	4879.68	08/24/1999	11:16	49.01	4830.67
		4879.68	08/26/1999	10:40	38.97	4840.71
0776	O	4883.33	08/24/1999	10:20	52.49	4830.84
		4883.33	08/25/1999	15:50	52.41	4830.92
0777	D	4848.24	08/27/1999	10:13	36.16	4812.08

RECORDS: SELECTED FROM USEE700 WHERE site_code='MON01' AND LOG_DATE between #8/1/1999# and #8/30/1999#

FLOW CODES:

C CROSS GRADIENT D DOWN GRADIENT O ON-SITE
 U UPGRADIENT

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TRIP REPORT/WORK ORDER

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CONTRACT NO.: DE-AC13-96GJ87335
TASK ORDER NO.: MAC99-05
CONTROL NO.: 3100-N/A

MEMO TO: Sam Marutzky
FROM: C.E. Poland *CE Poland*
DATE: September 1, 1999
SUBJECT: UMTRA Ground Water Trip Report

Site: Monument Valley, AZ

Dates of Sampling Event: August 23 through August 27, 1999.

Team Members: Chuck Poland, Dan Sellers, Paul Burdett, and Rick Findley.

Number of Locations Sampled: 26 ground water monitoring wells, 1 well point, and 6 surface water locations.

Locations Not Sampled/Reason: Samples were collected at all locations identified for sampling.

Field Variance: Turbidity did not stabilize during the purging of wells 761 and 774. Turbidity was above 10 NTUs after purging wells 662 and 775, but the readings were within 10%.

Wells purged dry prior to removing 3 casing volumes: 403 (well point), 602, 606, 656, 771, and 764.

The temperature of the calibration standards was not within 10° C of the sample temperature at ground water location 606 and surface locations 621 and 640.

A field duplicate was not collected from the surface water locations.

Requisition Numbers Assigned: All samples were assigned to requisition 16742.

Water Level Measurements: Water level measurements were taken on all wells.

RECORD COPY

BWmon14.12

Quality Control Sample Cross Reference: Following are the false identifications assigned to the quality control samples and two surface water locations:

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
500	775	Duplicate	Ground Water	NDG-798
501	Equipment Blank	Equipment Blank	Ground Water	NDG-800
1001	Equipment Blank	Equipment Blank	Surface Water	NDJ-106
1002	767	Duplicate	Ground Water	NDJ-108

Well Inspection Summary: Well inspections were conducted on all wells that were sampled. Sampled wells were in good condition. A riser cap was missing from 4-inch well 669. The sampling team did not have a replacement.

Corrective Action: None

Equipment: None.

Regulatory: None.

Site Issues: Access to several of the wells was difficult. Driving to well 764 is not recommended because of deep, soft sand.

Additional Action Required/Taken: None

CP/lcg

Distribution:

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

CONTRACT NO.: DE-AC13-96GJ87335
TASK ORDER NO.: MAC99-05
CONTROL NO.: 3100-99-1027

July 23, 1999

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 1999 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 23, 1999.

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

Ground Water Project Monitor Well (filtered)*

602 Al	614 Sr	656 Al	760 Al	764 Al	768 Al	772 Al
603 Al	650 Al	662 Al	761 Al	765 Al	770 Al	774 Al
604 Al	655 Al	669 Al	762 Al	767 Al	771 Al	777 Al
606 Al						

Private Well (unfiltered)

640 Al

Well Points (filtered)*

403 Al

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

Surface Water (filtered)

621 622 623 624 627 631

RECORD COPY

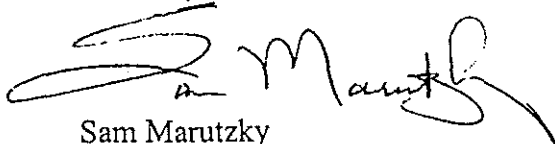
2597 B 3/4 ROAD
GRAND JUNCTION, COLORADO 81503
970/248-6000 (FAX) 970/248-6040

Donald Metzler
July 23, 1999
Page 2
Control No.: 3100-99-1027

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 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.

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: R. Bowen
R. Chessmore
D. Miller
K. Miller
D. Traub
Contract File (C. Spor)

cc w/att: C. Bahrke
K. Karp
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
<i>Ground Water Project Monitor Wells</i>						
601					X	
602				Odd year		
603			X			
604			X			
605					X	
606			X			
610					X	
611					X	
612					X	
614			X			
615					X	
618					X	
619					X	
650			X			
651					X	
652					X	
653					X	
654					X	
655			X			
656			X			
657					X	
658					X	
659					X	
660					X	
661					X	
662			X			
663					X	
664					X	
668					X	
669			X			
760			X			Alluvial well added - 7/97
761			X			Alluvial well added - 7/97
762			X			Alluvial well added - 7/97
764			X			Alluvial well added - 7/97
765			X			Alluvial well added - 7/97
767			X			Alluvial well added - 7/97
768			X			Alluvial well added - 7/97
770			X			Alluvial well added - 7/97
771			X			Alluvial well added - 7/97
772			X			Alluvial well added - 7/97
774			X			Alluvial well added - 7/97
775					X	DeChelly well added - 7/97
776					X	DeChelly well added - 7/97
777			X			Alluvial well added - 7/97

**Sampling Frequencies for Locations at
Monument Valley, Arizona**

Wells	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Private Wells						
200				Even year		
613					X	
616					X	
640				Odd year		Broken pump 1/97, couldn't sample
Surface Water/Sediment Locations						
620					X	SPRING DOWNGRADIENT
621		X				
622		X				
623		X				
624		X				
626					X	
627		X				
631		X				
632					X	
Well Points						
400				Even year		
402				Even year		
403				Odd year		
407					X	
409					X	

**Constituent Sampling Breakdown
For Individual UMTRA Sites**

Site	Monument Valley	
Analyte	Ground Water	Surface Water
Approx. No. Samples/yr	22	8
<i>Field Measurements</i>	<i>GW</i>	<i>GW</i>
Alkalinity	X	X
Dissolved Oxygen		
Redox Potential	X	X
pH	X	X
Specific Conductance	X	X
Turbidity	X	
Temperature	X	X
<i>Laboratory Measurements</i>	<i>GW</i>	<i>GW</i>
Aluminum	602, 655, 656, 765, 770, 771, 772, 774, 777	
Ammonium		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	
	Ground Water	Surface Water
<i>Laboratory Measurements (Continued)</i>	<i>GW</i>	<i>GW</i>
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		
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.