



**DATA VALIDATION
SHIPROCK, NEW MEXICO
UMTRA SITE**

**June 1998
Water Sampling**

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



RECORD COPY

SHIPROCK, NEW MEXICO
Sampled June 1998

DATA PACKAGE CONTENTS

This data package includes the following information:

Item No. Description of Contents

1. **Site Hydrologist Summary**

2. **Data Package Assessment**, which includes the following:
 - a. Field procedures verification checklist
 - b. Confirmation that chain-of-custody was maintained.
 - c. Confirmation that holding time requirements were met.
 - d. Evaluation of the adequacy of the QC sample results.

3. **Data Assessment Summary**, which describes problems identified in the data validation process and summarizes the validator's findings.

4. **Suspected Anomalies Reports (SAR)**, which is generated by the UMTRA database system. This report compares the new data set with historical data and designates "suspected anomalies" based on the many criteria listed as footnotes on each page. In aggregate, these criteria cause the suspected anomaly program to be very conservative; many of the data shown in the tables are not, in the evaluators judgment, truly anomalies, but merely natural variations in data or routine changes in laboratory detection limits. The designation "OK" affirms the judgment that the particular entry is not an anomaly and, therefore, requires no further inquiry.

5. **UMTRA Database Printouts** of analytical data organized as follows:
 - a. Ground Water Quality Data (included on disk)
 - b. Field QC Sample Data (included on disk)
 - c. Time Versus Concentration Graphs
 - d. Static Ground Water Level Measurement Data

6. **Sampling and Analysis Work Order and Trip Report.**

Site Hydrologist Summary

Site: Shiprock

Sampling Period: June 2 to June 4, 1998

SUMMARY CRITERIA

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

Sample concentrations from sample location 300 (domestic water at the Abandoned Mine Lands Office) were below applicable standards.

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

There are no point-of-compliance wells established at the Shiprock site.

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

There is no indication of unexpected movement of contaminated ground water; however, previous ground water sampling at the Shiprock site has indicated that contamination has been present in both the terrace ground water and alluvial aquifer systems since samples were first collected in 1982. Assessment of the rate of contaminated ground water movement will be made in conjunction with a field investigation at the Shiprock site in the near future.

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

Surface water samples were not collected during this sampling event.

Site Hydrologist Summary (continued)

Wells with sample concentrations that exceeded UMTRA ground water standards are listed in Table 1. Graphs showing nitrate and uranium concentrations versus time for selected wells are included with the analytical data.

Table 1. Shiprock Wells where UMTRA Standards were Exceeded in June 1998.

Analyte	Standard (mg/L)	Wells Exceeding Standards (concentration in mg/L)
Nitrate	44.27	725 (151), 726 (184), 727 (1,710), 728 (2,840), 730 (412), 604 (4,960), 603 (4,390), 731 (808), 602 (82.3),
Uranium	0.044	725 (0.287), 727 (0.369), 728 (0.466), 604 (0.0692), 731 (0.0516), 602 (0.741)

Craig Goodknight 8/20/98
Craig Goodknight Date
Project Lead

Mark Kautsky 8-20-98
Mark Kautsky Date
Site Hydrologist

DATA ASSESSMENT

UGW Water Sampling Field Activities Verification Checklist

Project Shiprock

Date(s) of Ground Water Sampling 6/2/98 to 6/4/98

Date(s) of Verification 8/17/98

Name of Verifier Sam Campbell

	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 memo 5/7/98</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>No</u> <u>Yes</u> <u>Yes</u> <u>Yes</u>	<u>Turbidity cal solutions expired. Temp probe check did not meet specification.</u> <u>Except well 648</u>
4. Was a duplicate alkalinity measurement conducted on a frequency of one duplicate per 20 samples?	<u>Yes</u>	
5. Was depth to water measured before purging? Was this information used to calculate the purge volume?	<u>Yes</u> <u>Yes</u>	<u>Except for domestic well 300 - no purge, and 648 - flowing</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>	<u>Except for domestic well 300 - no purge, and 648 - flowing</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>NA</u>	

8. Were duplicates taken at a frequency of one per 20 samples? Yes _____
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? Yes _____
Was the true identity of the samples recorded in the field notes? Yes _____
12. Were samples collected in the containers specified? Yes _____
Were certified pre-cleaned containers used for the sampling? 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? No One COC was not signed as "received" _____
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 _____

DATA PACKAGE ASSESSMENT

REQUISITION NUMBERS: 16028 SITE: Ship rock LABORATORY: GJO ANALYSIS DATES: 6-9-98 to 7-7-98

REVIEWER: Sam Campbell Sam Campbell 8-18-98
NAME (print) SIGNATURE DATE

	ICP-MS	ICP-AES	GFAA	FAA	NaBH ₄	AS	LSc	PC	IC	Gravimetric	Colorimetric	Other	
CHAIN OF CUSTODY	①	①	NA	NA	①	①	①	①	①	①	①	NA	—
HOLDING TIME	OK	OK			OK	OK	OK	OK	OK	OK	OK		—
CALIB. VERIFICATION (For AS, internal tracer)	OK	OK			OK	OK	OK	OK	OK	NA	OK		—
PREP. BLANKS (Only if digestion)	OK	②			OK	OK	OK	OK	NA	NA	NA		—
INT. CAL. BLANKS	OK	OK			OK	NA	NA	NA	③	NA	OK		—
CONT. CAL. BLANKS	OK	OK	↓	↓	OK	NA	NA	NA	④	NA	OK		—
ICS (ICP only)	OK	OK	NA	NA	NA	NA	NA	NA	NA	NA	NA		—
LAB. CONTROL SAMPLE	OK	OK			OK	OK	OK	OK	NA	OK	NA		—
DUPLICATES	OK	OK			OK	OK	OK	OK	OK	OK	OK		—
POSTDIGEST. SPKS. (Only if MS fails)	NA	NA			NA	NA	NA	NA	NA	NA	NA		—
MATRIX SPKS.	OK	OK			OK	NA	NA	⑤	OK	NA	OK		—
OVERALL ASSESS.	OK	OK	↓	↓	OK	OK	OK	OK	OK	OK	OK	↓	—

REVIEWER COMMENTS: ① One COC was not signed as "received" Samples 300, 648 + dup, and equip blank affected.
 ② Ca and Mg detected in the prep blank - no samples affected. ③ Cl, NO₃, and SO₄ detected in the ICB - no samples affected. ④ SO₄ detected in the CCB - no samples affected.

ITEMS REQUIRING ATTENTION ② U flag Fe result 251859 because of prep blank contamination. ④ U flag Cl result 251862 and NO₃ results 251859, 251860, 251861, and 251862 because of CCB contamination. ⑤ J flag all gross α results because matrix spike recovery did not meet criteria.

**SHIPROCK, NEW MEXICO
JUNE 1998 SAMPLING
DATA ASSESSMENT SUMMARY**

The DOE-GJO Analytical Laboratory analyzed samples and reported results for this sampling event under requisition number 16028 for the UMTRA Ground Water Project.

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. The detection limits for gross alpha are higher than those specified in the planning documents due to high TDS in the samples. Polonium-210 was determined using alpha spectrometry (AS). Radium-226 and radium-228 were determined by liquid scintillation (LSc).

Radiological results that were less than the minimum detectable activity (MDA) and/or the 3-sigma counting statistic range were qualified with a "U" flag (nondetect) in the database, as reflected on the Ground Water Quality Data by Parameter and equipment blank printouts.

All gross alpha results were qualified with a "J" flag (estimated) in the data base because the matrix spike recovery did not meet criteria.

METALS/MAJOR CATIONS ANALYSIS

The determination of calcium, iron, magnesium, manganese, potassium, sodium, and strontium was performed using inductively coupled plasma-atomic emission spectrometry (ICP-AES). Antimony, cadmium, and uranium were analyzed using inductively coupled-mass spectrometry (ICP-MS). Arsenic and selenium were determined by hydride generation atomic absorption spectroscopy (NaBH₄).

Iron result 251859 (300) was qualified with a "U" flag in the data base because of prep blank contamination.

INORGANIC ANALYSIS

Chloride, nitrate, and sulfate were determined by ion chromatography (IC), and ammonium was determined by spectrophotometry (or colorimetry). TDS was determined gravimetrically. Chloride result 251862 (equipment blank) and nitrate results 251859 (300), 251860 (648), 251861 (648 duplicate), and 251862 (equipment blank) were qualified with a "U" flag in the data base because of continuing calibration blank contamination.

FIELD ANALYSIS/ACTIVITIES

There were no wells with a measured pH greater than 9 during this sampling event; therefore "G" flags indicating potential grout contamination were not required. Because low-flow purging was not used during this sampling event, "F" flags were not required. Results from wells 727, 730, 731, and 604 were qualified with an "L" flag in the data base indicating that less than three casing volumes were removed prior to sampling.

One equipment blank was collected for the 11 locations where samples were collected using non-dedicated equipment. The equipment blanks were analyzed for the same constituents as the environmental samples. All UMTRA related contaminants had equipment blank concentrations less than the contract required detection limit (CRDL) or MDA/3-sigma.

One field duplicate sample was collected during this event. There is no established regulatory criteria for the evaluation of field duplicate samples. However, using the EPA guidance for laboratory duplicates (which is conservative for field duplicates), duplicate results met the laboratory duplicate criteria and are acceptable.

SAR

Values listed in the SAR were considered valid if: (1) identified low concentrations were the result of low detection limits; (2) the concentration detected was within 50 percent of the historical minimum or maximum concentration; or (3) there were fewer than 5 historical samples for comparison. All values met the above criteria and considered acceptable.

SUMMARY

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

A disk copy of the Ground Water Quality Data by Parameter and equipment blank database printouts with the qualifiers incorporated are included in this package.

Sam Campbell 8-20-98
Sam Campbell Date
Data Validation Lead

Craig Goodknight 8/20/98
Craig Goodknight Date
Project Lead

Mark Kautsky 8-20-98
Mark Kautsky Date
Project Hydrologist

SUSPECTED ANOMALIES REPORT

SUSPECTED ANOMALIES REPORT

REPORT DATE: 8/18/98

TIME: 8:25:08 AM

Site : SHP02 SHIPROCK (TAILING Test Data Date Range : 6/1/98 to 7/1/98

Older Data Only Used for Baseline Data

45 Chemical Records

241 History Records

LOC. ID.	ERR. TYPE FLAG	PARAM CODE UNITS	ANOMALOUS TEST DATA POINT			# OF SAMP. %NON DETEC	ALL TIME MINIMUMS		LOWER BOUND UPPER BOUND	3 MOST RECENT SAMPLING EVENTS								
			LOG DATE	SAMPLE	VALUE		LOG DATE	SAMPLE		VALUE	LOG DATE	SAMPLE	VALUE	LOG DATE	SAMPLE	VALUE		
			FLAGS	UNCERTAINTY	DETLIM		FLAGS	UNCERTAINTY		DETLIM	FLAGS	UNCERTAINTY	DETLIM	FLAGS	UNCERTAINTY	DETLIM		
0602	6 OK	CACO3 mg/L	6/4/98	N001	2193.0000	11	2010.000	2113.000	1987.2668	2/4/98	N001	2010.0000	2/4/98	N001	2010.0000	1/23/97	N001	2113.0000
	5 OK	CACO3 mg/L	6/4/98	0001	1203.0000	11	2010.000	2113.000	1987.2668	2/4/98	N001	2010.0000	2/4/98	N001	2010.0000	1/23/97	N001	2113.0000
	6 OK	NH4 mg/L	6/4/98	0001	845.0000	9	0.613	249.000	295.1327	2/4/98	0001	481.0000	1/8/96	N001	585.0000	1/13/94	0001	249.0000
	6 OK	SO4 mg/L	6/4/98	0001	17600.0000	12	12500.000	16400.000	15540.2114	2/4/98	0001	17100.0000	1/23/97	0001	16400.0000	1/8/96	0001	12500.0000
0604	3 OK	NH4 mg/L	6/4/98	0001	0.0661	1	0.570	0.570	0.2850	2/5/98	0001	0.5700	2/5/98	0001	0.5700	2/5/98	0001	0.5700
		B				0	0.570	0.570	1.1400									
0728	5 OK	CACO3 mg/L	6/3/98	N001	655.0000	7	416.000	587.000	887.9237	2/4/98	N001	1175.0000	2/4/98	N001	1175.0000	1/24/97	N001	960.0000
	5 OK	CACO3 mg/L	6/3/98	0001	799.0000	7	416.000	587.000	887.9237	2/4/98	N001	1175.0000	2/4/98	N001	1175.0000	1/24/97	N001	960.0000
	5 OK	NO3 mg/L	6/3/98	0001	2840.0000	7	2220.000	2310.000	2941.2815	2/4/98	0001	4170.0000	1/24/97	0001	3010.0000	1/7/96	N001	2310.0000
	5 OK	SO4 mg/L	6/3/98	0001	7660.0000	7	4370.000	4990.000	7883.4410	2/4/98	0001	10300.0000	1/24/97	0001	8610.0000	1/7/96	0001	6520.0000
0730	3 OK	CACO3 mg/L	6/3/98	0001	9.0000	1	19.000	19.000	9.5000	2/4/98	N001	19.0000	2/4/98	N001	19.0000	2/4/98	N001	19.0000
						0	19.000	19.000	38.0000									
0731	6 OK	NH4 mg/L	6/4/98	0001	32.7000	4	23.300	68.300	18.4452	2/5/98	0001	23.3000	1/13/94	0001	68.3000	9/1/93	N001	68.3000
	5 OK	SO4 mg/L	6/4/98	0001	4840.0000	4	4770.000	4780.000	5064.7868	2/5/98	0001	5060.0000	1/13/94	0001	4830.0000	9/1/93	N001	4770.0000
					0	4830.000	5060.000	5095.2294						0	1	0	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 8-18-98

WATER QUALITY DATA

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE SHP02, SHIPROCK (TAILINGS AREA)
 REPORT DATE: 8/19/98 3:45:20 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	0602	06/04/98	0001	KM	O	1203			#	-	-
	mg/L	0602	06/04/98	N001	KM	O	2193			#	-	-
	mg/L	0603	06/04/98	0001	AL	N	294			#	-	-
	mg/L	0603	06/04/98	N001	AL	N	276			#	-	-
	mg/L	0604	06/04/98	0001	KM	N	730		L	#	-	-
	mg/L	0648	06/03/98	0001	JM	N	59			#	-	-
	mg/L	0648	06/03/98	N001	JM	N	52			#	-	-
	mg/L	0725	06/03/98	0001	AL	N	291			#	-	-
	mg/L	0725	06/03/98	N001	AL	N	288			#	-	-
	mg/L	0726	06/03/98	0001	KM	N	551			#	-	-
	mg/L	0726	06/03/98	N001	KM	N	502			#	-	-
	mg/L	0727	06/03/98	0001	KM	N	1472		L	#	-	-
	mg/L	0727	06/03/98	N001	KM	N	1523		L	#	-	-
	mg/L	0728	06/03/98	0001	AL	N	799			#	-	-
	mg/L	0728	06/03/98	N001	AL	N	655			#	-	-
	mg/L	0730	06/03/98	0001	AL	N	9		L	#	-	-
	mg/L	0730	06/03/98	N001	AL	N	13		L	#	-	-
	mg/L	0731	06/04/98	0001	AL	N	360		L	#	-	-
	mg/L	0731	06/04/98	N001	AL	N	485		L	#	-	-
Ammonia as NH4	mg/L	0602	06/04/98	0001	KM	O	845.000			#	-	-
	mg/L	0603	06/04/98	0001	AL	N	2150.000			#	-	-
	mg/L	0604	06/04/98	0001	KM	N	0.0661	B	L	#	-	-
	mg/L	0648	06/03/98	0001	JM	N	0.569			#	-	-
	mg/L	0648	06/03/98	0002	JM	N	0.601			#	-	-
	mg/L	0725	06/03/98	0001	AL	N	0.0343	B		#	-	-
	mg/L	0726	06/03/98	0001	KM	N	0.0100	U		#	0.01	-
	mg/L	0727	06/03/98	0001	KM	N	16.800		L	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE SHP02, SHIPROCK (TAILINGS AREA)
 REPORT DATE: 8/19/98 3:45:24 P

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/L	0728	06/03/98	0001	AL	N	203.000	#	-	-
	mg/L	0730	06/03/98	0001	AL	N	211.000	L #	-	-
	mg/L	0731	06/04/98	0001	AL	N	32.700	L #	-	-
Antimony	mg/L	0648	06/03/98	0001	JM	N	0.0010	U #	0.001	-
	mg/L	0648	06/03/98	0002	JM	N	0.0010	U #	0.001	-
Arsenic	mg/L	0648	06/03/98	0001	JM	N	0.0010	U #	0.001	-
	mg/L	0648	06/03/98	0002	JM	N	0.0010	U #	0.001	-
Cadmium	mg/L	0648	06/03/98	0001	JM	N	0.0010	U #	0.001	-
	mg/L	0648	06/03/98	0002	JM	N	0.0010	U #	0.001	-
Calcium	mg/L	0648	06/03/98	0001	JM	N	110.000	#	-	-
	mg/L	0648	06/03/98	0002	JM	N	110.000	#	-	-
Chloride	mg/L	0648	06/03/98	0001	JM	N	52.200	#	-	-
	mg/L	0648	06/03/98	0002	JM	N	53.700	#	-	-
Gross Alpha	pCi/L	0648	06/03/98	0001	JM	N	20.21	U J #	20.21	± 12.04
	pCi/L	0648	06/03/98	0002	JM	N	20.19	U J #	20.19	± 10.62
Gross Beta	pCi/L	0648	06/03/98	0001	JM	N	21.88	U #	21.88	± 12.69
	pCi/L	0648	06/03/98	0002	JM	N	21.83	U #	21.83	± 12.87
Iron	mg/L	0648	06/03/98	0001	JM	N	0.106	#	-	-
	mg/L	0648	06/03/98	0002	JM	N	0.123	#	-	-
Magnesium	mg/L	0648	06/03/98	0001	JM	N	13.500	#	-	-
	mg/L	0648	06/03/98	0002	JM	N	13.400	#	-	-
Manganese	mg/L	0648	06/03/98	0001	JM	N	0.0886	#	-	-
	mg/L	0648	06/03/98	0002	JM	N	0.0887	#	-	-
Nitrate	mg/L	0602	06/04/98	0001	KM	O	82.300	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE SHP02, SHIPROCK (TAILINGS AREA)
 REPORT DATE: 8/19/98 3:45:27 P

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Nitrate	mg/L	0603	06/04/98	0001	AL	N	4390.000	#	-	-
	mg/L	0604	06/04/98	0001	KM	N	4960.000	L #	-	-
	mg/L	0648	06/03/98	0001	JM	N	0.0285	B U #	-	-
	mg/L	0648	06/03/98	0002	JM	N	0.0245	B U #	-	-
	mg/L	0725	06/03/98	0001	AL	N	151.000	#	-	-
	mg/L	0726	06/03/98	0001	KM	N	184.000	#	-	-
	mg/L	0727	06/03/98	0001	KM	N	1710.000	L #	-	-
	mg/L	0728	06/03/98	0001	AL	N	2840.000	#	-	-
	mg/L	0730	06/03/98	0001	AL	N	412.000	L #	-	-
	mg/L	0731	06/04/98	0001	AL	N	808.000	L #	-	-
pH	s.u.	0602	06/04/98	N001	KM	O	6.13	#	-	-
	s.u.	0603	06/04/98	N001	AL	N	6.04	#	-	-
	s.u.	0604	06/04/98	N001	KM	N	6.70	L #	-	-
	s.u.	0648	06/03/98	N001	JM	N	7.80	#	-	-
	s.u.	0725	06/03/98	N001	AL	N	6.86	#	-	-
	s.u.	0726	06/03/98	N001	KM	N	6.66	#	-	-
	s.u.	0727	06/03/98	N001	KM	N	6.15	L #	-	-
	s.u.	0728	06/03/98	N001	AL	N	6.31	#	-	-
	s.u.	0730	06/03/98	N001	AL	N	5.58	L #	-	-
	s.u.	0731	06/04/98	N001	AL	N	6.60	L #	-	-
Polonium-210	pCi/L	0648	06/03/98	0001	JM	N	0.07	U #	0.07	± 0.09
	pCi/L	0648	06/03/98	0002	JM	N	0.04	U #	0.04	± 0.06
Potassium	mg/L	0648	06/03/98	0001	JM	N	7.820	#	-	-
	mg/L	0648	06/03/98	0002	JM	N	7.820	#	-	-
Radium-226	pCi/L	0648	06/03/98	0001	JM	N	0.58	#	0.15	± 0.11
	pCi/L	0648	06/03/98	0002	JM	N	0.57	#	0.15	± 0.12

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE SHP02, SHIPROCK (TAILINGS AREA)
 REPORT DATE: 8/19/98 3:45:30 P

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Radium-228	pCi/L	0648	06/03/98	0001	JM	N	0.83	#	0.54	± 0.33
	pCi/L	0648	06/03/98	0002	JM	N	1.01	#	0.55	± 0.34
Redox Potential	mV	0602	06/04/98	N001	KM	O	206	#	-	-
	mV	0603	06/04/98	N001	AL	N	232	#	-	-
	mV	0604	06/04/98	N001	KM	N	172	L #	-	-
	mV	0648	06/03/98	N001	JM	N	-138	#	-	-
	mV	0725	06/03/98	N001	AL	N	188	#	-	-
	mV	0726	06/03/98	N001	KM	N	188	#	-	-
	mV	0727	06/03/98	N001	KM	N	217	L #	-	-
	mV	0728	06/03/98	N001	AL	N	155	#	-	-
	mV	0730	06/03/98	N001	AL	N	221	L #	-	-
	mV	0731	06/04/98	N001	AL	N	167	L #	-	-
Selenium	mg/L	0648	06/03/98	0001	JM	N	0.0010	U #	0.001	-
	mg/L	0648	06/03/98	0002	JM	N	0.0010	U #	0.001	-
Sodium	mg/L	0648	06/03/98	0001	JM	N	836.000	#	-	-
	mg/L	0648	06/03/98	0002	JM	N	845.000	#	-	-
Specific Conductance	umhos/	0602	06/04/98	N001	KM	O	17440	#	-	-
	umhos/	0603	06/04/98	N001	AL	N	1729	#	-	-
	umhos/	0604	06/04/98	N001	KM	N	1866	L #	-	-
	umhos/	0648	06/03/98	N001	JM	N	3940	#	-	-
	umhos/	0725	06/03/98	N001	AL	N	5180	#	-	-
	umhos/	0726	06/03/98	N001	KM	N	10190	#	-	-
	umhos/	0727	06/03/98	N001	KM	N	14180	L #	-	-
	umhos/	0728	06/03/98	N001	AL	N	8790	#	-	-
	umhos/	0730	06/03/98	N001	AL	N	3840	L #	-	-
umhos/	0731	06/04/98	N001	AL	N	7880	L #	-	-	

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE SHP02, SHIPROCK (TAILINGS AREA)
 REPORT DATE: 8/19/98 3:45:32 P

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Strontium	mg/L	0648	06/03/98	0001	JM	N	12.100	#	-	-
	mg/L	0648	06/03/98	0002	JM	N	12.000	#	-	-
Sulfate	mg/L	0602	06/04/98	0001	KM	O	17600.000	#	-	-
	mg/L	0603	06/04/98	0001	AL	N	10000.000	#	-	-
	mg/L	0604	06/04/98	0001	KM	N	8080.000	L #	-	-
	mg/L	0648	06/03/98	0001	JM	N	2000.000	#	-	-
	mg/L	0648	06/03/98	0002	JM	N	1990.000	#	-	-
	mg/L	0725	06/03/98	0001	AL	N	3190.000	#	-	-
	mg/L	0726	06/03/98	0001	KM	N	7300.000	#	-	-
	mg/L	0727	06/03/98	0001	KM	N	11800.000	L #	-	-
	mg/L	0728	06/03/98	0001	AL	N	7660.000	#	-	-
	mg/L	0730	06/03/98	0001	AL	N	2310.000	L #	-	-
	mg/L	0731	06/04/98	0001	AL	N	4840.000	L #	-	-
Temperature	C	0602	06/04/98	N001	KM	O	16.5	#	-	-
	C	0603	06/04/98	N001	AL	N	16.2	#	-	-
	C	0604	06/04/98	N001	KM	N	16.7	L #	-	-
	C	0648	06/03/98	N001	JM	N	30.4	#	-	-
	C	0725	06/03/98	N001	AL	N	14.7	#	-	-
	C	0726	06/03/98	N001	KM	N	16.6	#	-	-
	C	0727	06/03/98	N001	KM	N	15.2	L #	-	-
	C	0728	06/03/98	N001	AL	N	15.7	#	-	-
	C	0730	06/03/98	N001	AL	N	19.4	L #	-	-
	C	0731	06/04/98	N001	AL	N	14.5	L #	-	-
Total Dissolved Solids	mg/L	0648	06/03/98	0001	JM	N	3100	#	-	-
	mg/L	0648	06/03/98	0002	JM	N	3120	#	-	-
Turbidity	NTU	0602	06/04/98	N001	KM	O	5.61	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE SHP02, SHIPROCK (TAILINGS AREA)
 REPORT DATE: 8/19/98 3:45:35 P

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Turbidity	NTU	0603	06/04/98	N001	AL	N	0.91	#	-	-
	NTU	0604	06/04/98	N001	KM	N	1000	> L #	-	-
	NTU	0725	06/03/98	N001	AL	N	5.16	#	-	-
	NTU	0726	06/03/98	N001	KM	N	7.48	#	-	-
	NTU	0727	06/03/98	N001	KM	N	169	L #	-	-
	NTU	0728	06/03/98	N001	AL	N	5.17	#	-	-
	NTU	0730	06/03/98	N001	AL	N	11.6	L #	-	-
	NTU	0731	06/04/98	N001	AL	N	51.1	L #	-	-
Uranium	mg/L	0602	06/04/98	0001	KM	O	0.741	#	-	-
	mg/L	0603	06/04/98	0001	AL	N	0.0131	#	-	-
	mg/L	0604	06/04/98	0001	KM	N	0.0692	L #	-	-
	mg/L	0648	06/03/98	0001	JM	N	0.0010	U #	0.001	-
	mg/L	0648	06/03/98	0002	JM	N	0.0010	U #	0.001	-
	mg/L	0725	06/03/98	0001	AL	N	0.287	#	-	-
	mg/L	0726	06/03/98	0001	KM	N	0.0369	#	-	-
	mg/L	0727	06/03/98	0001	KM	N	0.369	L #	-	-
	mg/L	0728	06/03/98	0001	AL	N	0.466	#	-	-
	mg/L	0730	06/03/98	0001	AL	N	0.0042	L #	-	-
	mg/L	0731	06/04/98	0001	AL	N	0.0516	L #	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE SHP02, SHIPROCK (TAILINGS AREA)
 REPORT DATE: 8/19/98 3:45:38 P

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ZONE ID	FLOW COMPL.	REL.	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
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RECORDS: SELECTED FROM USEE200 WHERE site_code='SHP02' 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 #6/1/98# and #6/5/98#

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. | 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.



'98 JUN 12 PM 2 43

SUBJECT: SECTION

June 9, 1998

Mr. Court Lisle
 Mantec
 2597 B 3/4 Rd
 Grand Junction, Colorado 81503

RE: Test Results

Dear Mr. Lisle,

Please find enclosed invoice and test results for the samples that were brought in for the Department of Energy from Shiprock, New Mexico on June 3rd and 4th, 1998.

The analysis results are as follows:

Well Number	Total Coliforms	Fecal Coliforms	Fecal Streptococci
300	Absent/Absent	< 1 cfu/100 ml	< 1 cfu/100 ml
602	Conf. NC	< 1 cfu/100 ml	< 1 cfu/100 ml
603	Absent/Absent	< 1 cfu/100 ml	< 1 cfu/100 ml
604	Present/Absent	< 1 cfu/100 ml	5 cfu/100 ml
725	Present/Absent	< 1 cfu/100 ml	< 1 cfu/100 ml
726	Conf. NC	< 1 cfu/100 ml	< 1 cfu/100 ml
727	Conf. NC	< 1 cfu/100 ml	< 1 cfu/100 ml
728	Conf. NC	< 1 cfu/100 ml	< 1 cfu/100 ml
730	Conf. NC	< 1 cfu/100 ml	< 1 cfu/100 ml
731	Conf. NC	< 1 cfu/100 ml	< 1 cfu/100 ml

COMMENTS: Total Coliforms:	Total Coliforms/Fecal Coliforms are reported. Conf. NC = confluent Non-Coliforms
Fecal Coliforms/Fecal Streptococci:	cfu = colony forming units

If you have any questions or need further information, please feel free to contact us at (505) 325-6953.

Best Regards,

Monica Peterson
 Chemist

cc: File

Domestic Supply Data for Shiprock 6/98 Sampling Event

8/19/98

ANALYTE	SITE CODE	LOCATION CODE	Location Type	DATE	SAMPLE ID	UNIT	RESULT	LAB QUALS	DATA VAL QUALS	DETECTION LIMIT	UNCERTAINTY
Alkalinity as CaCO3	SHP02	0300	DOMESTIC SUPPLY	6/3/98	N001	mg/L	70				
Ammonia as NH4	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	0.0001	U		0.0001	
Antimony	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	0.0014	B			
Arsenic	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	0.0011	U		0.0011	
Cadmium	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	0.0011	U		0.0011	
Calcium	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	34.1				
Chloride	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	5.62				
Gross Alpha	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	pCi/L	1.85	U	J	1.85	1.03
Gross Beta	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	pCi/L	2.69	U		2.69	1.6
Iron	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	0.0413		U		
Magnesium	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	4.91				
Manganese	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	0.0046	B			
Nitrate	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	0.243	B	U		
Polonium-210	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	pCi/L	0.07	U		0.07	0.09
Potassium	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	1.5				
Radium-226	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	pCi/L	0.15	U		0.15	0.08
Radium-228	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	pCi/L	0.58	U		0.58	0.34
Redox Potential	SHP02	0300	DOMESTIC SUPPLY	6/3/98	N001	mV	221				
Selenium	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	0.0011	U		0.0011	
Sodium	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	11.4				
Specific Conductance	SHP02	0300	DOMESTIC SUPPLY	6/3/98	N001	umhos/cm	275				
Strontium	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	0.334				
Sulfate	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	53				
Temperature	SHP02	0300	DOMESTIC SUPPLY	6/3/98	N001	C	19.7				
Total Dissolved Solids	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	200				
Uranium	SHP02	0300	DOMESTIC SUPPLY	6/3/98	0001	mg/L	0.0011	U		0.0011	
pH	SHP02	0300	DOMESTIC SUPPLY	6/3/98	N001	s.u.	6.47				

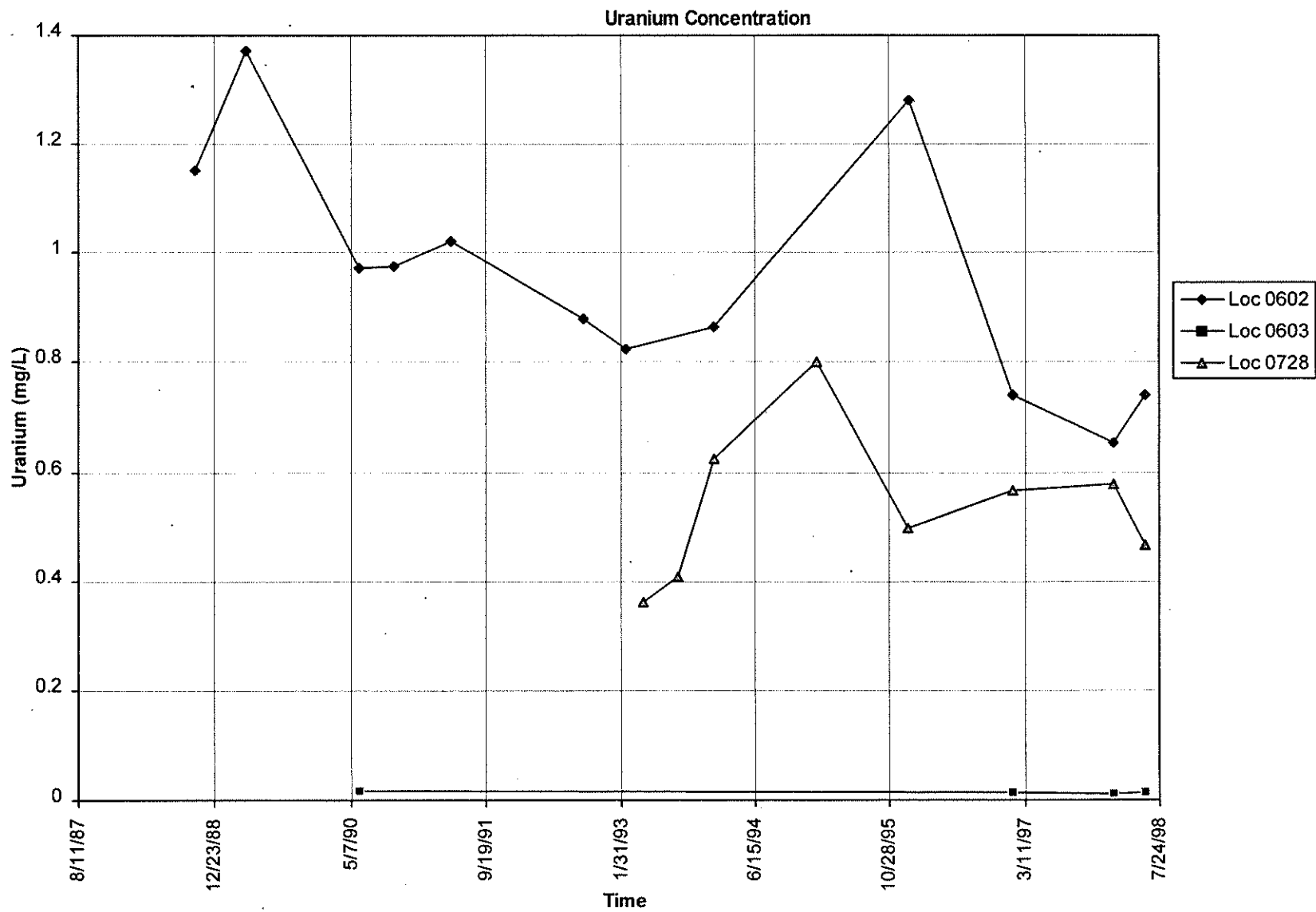
Equipment Blank Data for Shiprock 6/98 Sampling Event

8/19/98

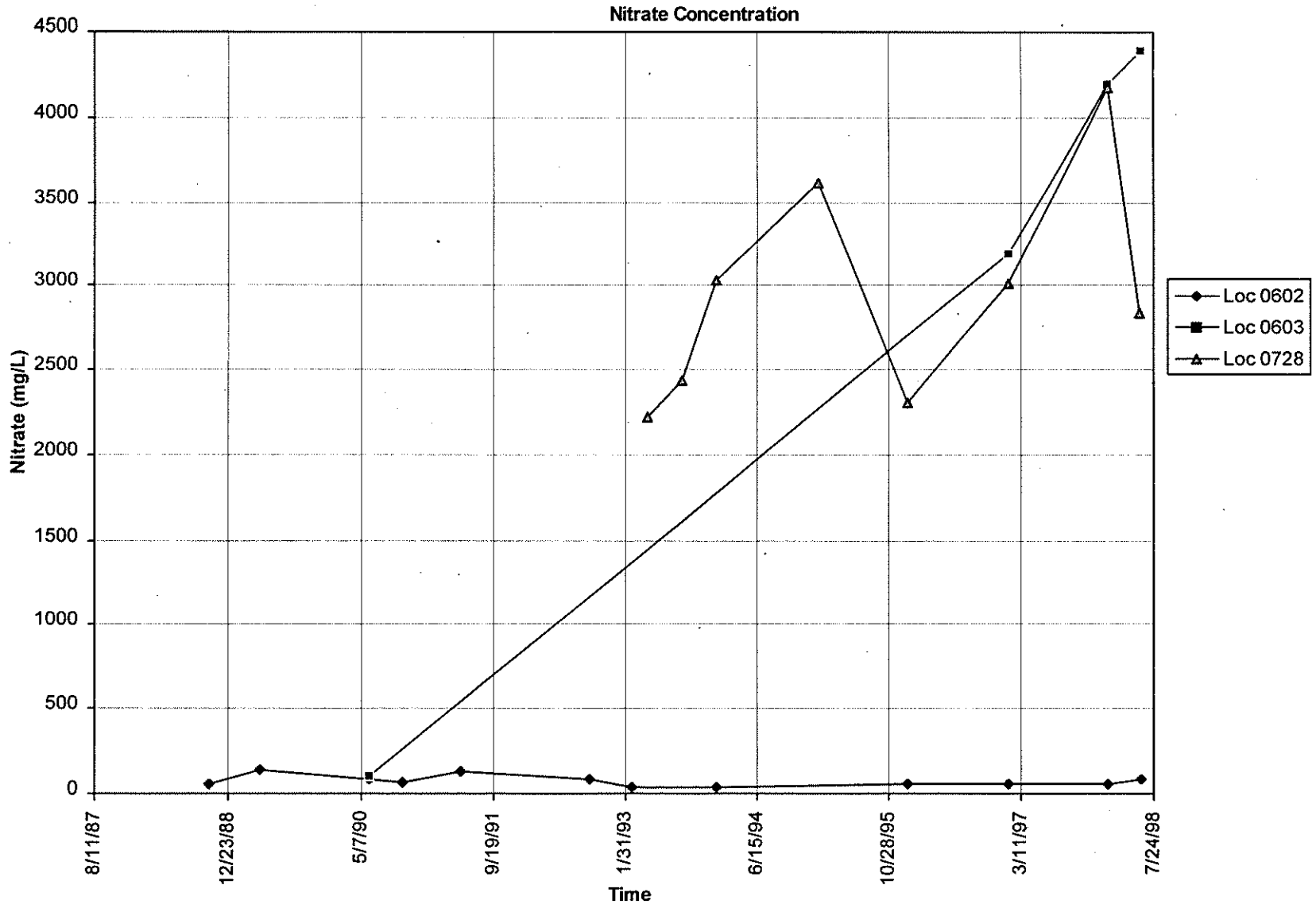
ANALYTE	SITE CODE	LOCATION CODE	DATE	SAMPLE ID	UNIT	RESULT	LAB QUALIFIERS	DATA VAL QUALIFIERS	DETECTION LIMIT	UNCERTAINTY
Ammonia as NH4	SHP02	0999	6/3/98	0001	mg/L	0.0056	B			
Antimony	SHP02	0999	6/3/98	0001	mg/L	0.001	U		0.001	
Arsenic	SHP02	0999	6/3/98	0001	mg/L	0.001	U		0.001	
Cadmium	SHP02	0999	6/3/98	0001	mg/L	0.001	U		0.001	
Calcium	SHP02	0999	6/3/98	0001	mg/L	0.0391	B			
Chloride	SHP02	0999	6/3/98	0001	mg/L	0.0176	B	U		
Gross Alpha	SHP02	0999	6/3/98	0001	pCi/L	1.02	U	J	1.02	0.52
Gross Beta	SHP02	0999	6/3/98	0001	pCi/L	2.11	U		2.11	1.2
Iron	SHP02	0999	6/3/98	0001	mg/L	0.003	U		0.003	
Magnesium	SHP02	0999	6/3/98	0001	mg/L	0.021	U		0.021	
Manganese	SHP02	0999	6/3/98	0001	mg/L	0.001	U		0.001	
Nitrate	SHP02	0999	6/3/98	0001	mg/L	0.0225	B	U		
Polonium-210	SHP02	0999	6/3/98	0001	pCi/L	0.08	U		0.08	0.09
Potassium	SHP02	0999	6/3/98	0001	mg/L	0.071	U		0.071	
Radium-226	SHP02	0999	6/3/98	0001	pCi/L	0.15	U		0.15	0.07
Radium-228	SHP02	0999	6/3/98	0001	pCi/L	0.6	U		0.6	0.35
Selenium	SHP02	0999	6/3/98	0001	mg/L	0.001	U		0.001	
Sodium	SHP02	0999	6/3/98	0001	mg/L	0.412	U		0.412	
Strontium	SHP02	0999	6/3/98	0001	mg/L	0.001	U		0.001	
Sulfate	SHP02	0999	6/3/98	0001	mg/L	0.0626	B			
Total Dissolved Solids	SHP02	0999	6/3/98	0001	mg/L	43				
Uranium	SHP02	0999	6/3/98	0001	mg/L	0.001	U		0.001	

TIME VERSUS CONCENTRATION GRAPHS

SHIPROCK (TAILINGS AREA) (SHP02)



SHIPROCK (TAILINGS AREA) (SHP02)



WATER LEVELS

STATIC GROUND WATER LEVELS (USEE700) FOR SITE SHP02, SHIPROCK (TAILING
 REPORT DATE: 8/20/98 8:18:49 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		
0602	O	4956.89	06/04/98	12:05	19.40	4937.49
0603	N	4978.05	06/04/98	10:40	30.02	4948.03
0604	N	4995.38	06/04/98	08:30	51.46	4943.92
0648	N	-	06/03/98	17:10	0.00	-
0725	N	4908.57	06/03/98	07:40	14.00	4894.57
0726	N	4939.87	06/03/98	08:25	26.15	4913.72
0727	N	4940.42	06/03/98	10:10	6.69	4933.73
0728	N	4964.03	06/03/98	10:55	24.10	4939.93
0730	N	4979.26	06/03/98	11:45	37.30	4941.96
0731	N	4971.48	06/04/98	11:00	24.10	4947.38

RECORDS: SELECTED FROM USEE700 WHERE site_code='SHP02' AND LOG_DATE between #6/1/98# and #6/5/98#

FLOW CODES:

N UNKNOWN

O ON-SITE

**SAMPLING WORK ORDER AND
TRIP REPORT**

CONTRACT NO.: DE-AC13-96GJ87335
TASK ORDER NO.: MAC98-05
CONTROL NO.: 3100-T98-1057

May 7, 1998

Project Manager
Department of Energy
Grand Junction Office
2597 B 3/4 Road
Grand Junction, CO 81503
ATTN: Donald Metzler

SUBJECT: Contract No. DE-AC13-96GJ87335—May 1998 UMTRA Ground Water Sampling
at Shiprock, New Mexico

Dear Mr. Metzler:

Attached are a map and table specifying the sampling locations and analytes for a limited monitoring round at the Shiprock, New Mexico, UMTRA site. Water quality data will be collected from monitoring wells at this site as part of a special UMTRA Ground Water sampling event, scheduled to begin May 26, 1998.

The following list shows the Ground Water Project well locations (with the associated zone of completion) that will be sampled during this sampling event.

Ground Water Project Monitor Wells (filtered)*

SHP02

602 Ta	604 Al	725 Nr	727 Nr	728 Nr	730 Al/Km	731
Al/Km						
603 Al	648 Jm	726 Nr				

*NOTE: Al = Alluvium; Jm = Westwater Canyon member; Km = Mancos shale; Nr = No recovery of data; Ta = Mill tailings

In addition to the monitor wells, tap water will be collected from either the Navajo Engineering and Construction Authority or the Abandoned Mine Lands offices. Flow rates for well 648 (artesian well) and seeps 425 and 426 also will be measured.

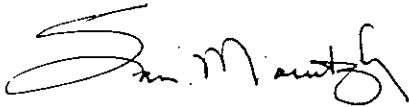
QA/QC samples will be collected as directed in the *Sampling and Analysis Plan for the UMTRA Ground Water Project*. Samples collected for alkalinity will not be filtered. Water level information will be collected from the sampled wells only. Monitor well inspections will be conducted and

Donald Metzler
Page 2
May 7, 1998
Control No.: 3100-T98-1057

documented to confirm the status of all sampled wells. Access agreements are covered under the cooperative agreement.

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

cc w/o att: R. Bowen
D. E. Miller
K. E. Miller
D. G. Traub
Contract File (C. Spor)

cc-w/att: GWSHP 14.6
C. Goodknight

**Well Locations and Analytical Requirements for the
May 1998 Limited Sampling at Shiprock, AZ**

Well	Analytes
602	NO ₃ , U, SO ₄ , NH ₄ , DO, Coliform (fecal, streptococcal, total)
603	NO ₃ , U, SO ₄ , NH ₄ , DO, Coliform (fecal, streptococcal, total)
604	NO ₃ , U, SO ₄ , NH ₄ , DO, Coliform (fecal, streptococcal, total)
648	NH ₄ , Sb, As, Cd, Ca, Cl, Gross Alpha, Fe, Mg, Mn, NO ₃ , Po-210, K, Ra-226, Ra-228, Se, Na, Sr, SO ₄ , TDS, U; measure flow rate
725	NO ₃ , U, SO ₄ , NH ₄ , DO, Coliform (fecal, streptococcal, total)
726	NO ₃ , U, SO ₄ , NH ₄ , DO, Coliform (fecal, streptococcal, total)
727	NO ₃ , U, SO ₄ , NH ₄ , DO, Coliform (fecal, streptococcal, total)
728	NO ₃ , U, SO ₄ , NH ₄ , DO, Coliform (fecal, streptococcal, total)
730	NO ₃ , U, SO ₄ , NH ₄ , DO, Coliform (fecal, streptococcal, total)
731	NO ₃ , U, SO ₄ , NH ₄ , DO, Coliform (fecal, streptococcal, total)

CONTRACT NO.: DE-AC13-96GJ87335
TASK ORDER NO.: MAC98-05
CONTROL NO.: 3100-N/A

MEMO TO: Sam Marutzky
FROM: David Miller *DM*
DATE: June 17, 1998
SUBJECT: UMTRA Ground Water Trip Report

Site: Shiprock, NM

Dates of Sampling Event: June 2 to June 4, 1998

Team Members: David Miller, Dan Sellers, and David Martz

Number of Locations Sampled: 11 wells

Locations Not Sampled/Reason: None

Location Specific Information: Wells 727, 730, 731 and 604 were purged dry prior to sampling.

The tap sample was collected from the bathroom faucet of the AML building. This sample was not filtered, and the location was called 300.

Well 604 was very muddy with a lot of sediment at the bottom, and appears to have never been developed. This well had to be purged and sampled with a bailer. There was not enough water to measure dissolved oxygen, and the water was too turbid to measure unfiltered alkalinity. This well should be evaluated to determine if it is suitable for future sampling. If it is sampled in the future, it is strongly suggested that it be further developed first.

Due to the limited amount of water available from well 730, the DO concentration measured in the field should be considered an estimated value.

There was a very strong reaction when acid (for preservation) was added to the samples from well 602. The reaction was strong enough that it may have possibly affected the sample, and the results of analyses should probably be considered as estimated values.

Field Variance: None

Sam Marutzky
Page 2
June 17, 1998
Control No.: 3100-N/A

Quality Control Sample Cross Reference: A duplicate field alkalinity measurement was collected at location 648. The following are the false identifications assigned to the quality control samples submitted to the GJO analytical laboratory:

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
900	648	Duplicate	Ground Water	NDB-318
901	Equipment Blank	Equipment Blank	Ground Water	NDB-319

Requisition Number Assigned: 16028.

Water Level Measurements: Water levels were measured only on the wells that were sampled. Flow rates were measured at seeps 425 and 426, and from well 648. The flow rate at seep 425 was approximately 2 to 3 gallons/minute, across the entire face of the seep. The flow rate at seep 426 was approximately 300 ml/minute. The flow rate at well 648 was approximately 100 gallons/minute.

Well Inspection Summary: Well inspections were completed for all of the wells where water levels were collected. None of wells have guard posts and most do not have concrete surface pads.

Equipment: All equipment operated correctly.

Regulatory: None.

Site Issues: None

Distribution:

R. Bowen
C. Goodknight
M. Kautsky
D. Metzler
K. Miller
GWSHP 14.12