40-8728

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M-ZONE RESTORATION

1.0 Introduction

The initial M sand five-spot pattern was drilled and completed in the third and fourth quarters of 1979. This original pattern was laid out on an approximately 60' x 40' rectangle and the wells were drilled to an average depth of ~350 feet. Surface insulated piping was used to connect the wells to the flow distribution center. The pattern was placed in production January 22, 1980. Routine mining and test work continued to July 12, 1980 when mining was suspended in order to install additional five-spot patterns. Two 5-spot patterns contiguous to the original M-1 pattern were drilled within the permit area. These patterns were designated M-3 and M-5 and expanded the field dimensions to 40' x 182'. (See Figure 1.)

Mining was reinitiated August 8, 1980 in the M sands and continued to February 24, 1981. At this point, it was determined that adequate mineral extraction had occurred and due to economic considerations, the M-zone patterns were placed in restoration.

1.1 M-Zone Mining - Technical Discussion

During the mining phase, 28×10^6 gallons were recovered from the zone containing about 12,000 lbs. U_3O_8 at an average 51 mg/l U_3O_8. Average recovery flow was 34 gpm prior to the expanded pattern operation and 69 gpm during the final mining operation. Injection flow to the zone totalled 27.1×10^6 gallons which represented a bleed volume of 0.9×10^6 gallons and an overrecovery ratio of 3%. The bleed volume generated

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was diverted to the solar evaporation ponds. Utilizing a pore volume determined from the actual wellfield area within the injection wells, average porosity and average total sand thickness within that area (969,951 gallons), 28.9 pore volumes were required to mine the zone to 63% extraction.

During the mining phase, certain parameters were expected to rise significantly above the zone baseline. The major lixiviant parameters including sodium and bicarbonate were expected to rise along with the soluble uranium concentration. Chloride ion increased due to the ion exchange circuit utilized for uranium recovery within the process plant. Calcium, magnesium and radium increases were noted due to a combination effect of sodium forced clay ion exchange and the Co_2 induced pH reduction altering zone equilibrium. Side reactions between H_2O_2 and O_2 and the host ore were evidenced by increased levels of sulfate, arsenic, selenium, manganese and iron. As a net result of the mining process, total dissolved solids peaked at nearly 3,200 mg/l at recovery or roughly 6 times the 483 mg/l baseline level (TDS determined by summation of major paramters). Section 1 - Table I lists the chemical concentrations of recovery and restoration monitor wells at the inception of the restoration program.

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SECTION 1 - TABLE I

M-ZONE AFTER MINING BEFORE RESTORATION

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UNC TETON EXPLORATION DRILLING, INC.

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DATE SMPLD	MR-1 2-19-81	MR-3 2-19-81	MR-5 2-19-81	301 2-19-81	306 2-23-81	308 2-23-81	MEAN ± STD DEV
ANALYSIS DATES	2-23-81 ↓ 4-1-81	2-23-81 ↓ 4-1-81	2-23-81 ↓ 4-1-81	2-23-81 ↓ 4-1-81	2-24-81 ↓ 4-1-81	2-24-81 ↓ 4-1-81	
HCO_3^- mg/l	1747	1885	1640	1348	760	1128	1418 ± 424
$CO_3^=$ mg/l	48	-0-	9.6	32.6	-0-	-0-	15 ± 20.5
Cl^- mg/l	81.6	103.5	86.4	66.4	28	103	78.2 ± 28.3
$SO_4^=$ mg/l	475	444	433	418	233	362	394 ± 87
Anion eq.	42.44	43.07	38.66	33.77	18.10	28.94	
Ca^{++} mg/l	244	224	214	224	225	122	209 ± 44
Mg^{++} mg/l	57	54	54	44	44	36.7	48.3 ± 7.9
Na^+ mg/l	556	611	549	428	70	429	440 ± 196
K^+ mg/l	22.5	23.5	23.5	19.5	12.5	19.5	20.2 ± 4.2
Cation eq.	41.70	42.87	39.67	33.98	18.28	28.31	
-/+balance	101.76	100.47	97.46	99.38	99.03	102.22	
Sum TDS	3231	3345	3010	2581	1373	2200	2623 ± 746
Cond um/cm	3030	2930	2920	2530	1400	2400	2535 ± 609
TDS mg/l	2114	2188	2006	1868	1034	1630	1807 ± 427
pH unit	7.3	7.1	7.2	7.5	7.4	7.5	7.3 ± 0.2
U mg/l	25.4	3.8	12.8	53.6	33.4	1.6	21.8 ± 19.9
mg/l	0.08	0.08	0.05	<0.05	<0.05	<0.05	0.06 ± 0.02
NH_4^+ mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
As mg/l	0.011	0.005	0.012	0.009	0.010	0.016	0.011 ± 0.004
Ba mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
B mg/l	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Cd mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cr mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cu mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
F mg/l	0.28	0.17	0.18	0.39	0.28	0.33	0.27 ± 0.09
Fe mg/l	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Pb mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mn mg/l	0.21	0.18	0.31	0.24	0.17	0.06	0.18 ± 0.06
Hg mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10
Ni mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
NO_2/NO_3 "	0.42	0.30	0.34	0.26	0.17	0.37	0.31 ± 0.09
Se mg/l	.020	0.029	0.029	0.014	<0.005	<0.005	0.022 ± 0.017
V mg/l	<0.10	<0.10	0.7	0.2	<0.10	<0.10	0.22 ± 0.24
Zn mg/l	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	0.05
Ra-226 pci/l	2055.5	188	949.5	2704.9	2598.5	282.19	1463.1 ± 1137
…0 pci/l	69	70	71	72	5	5	48.7 ± 33.8
Gross A "							
Gross B "							

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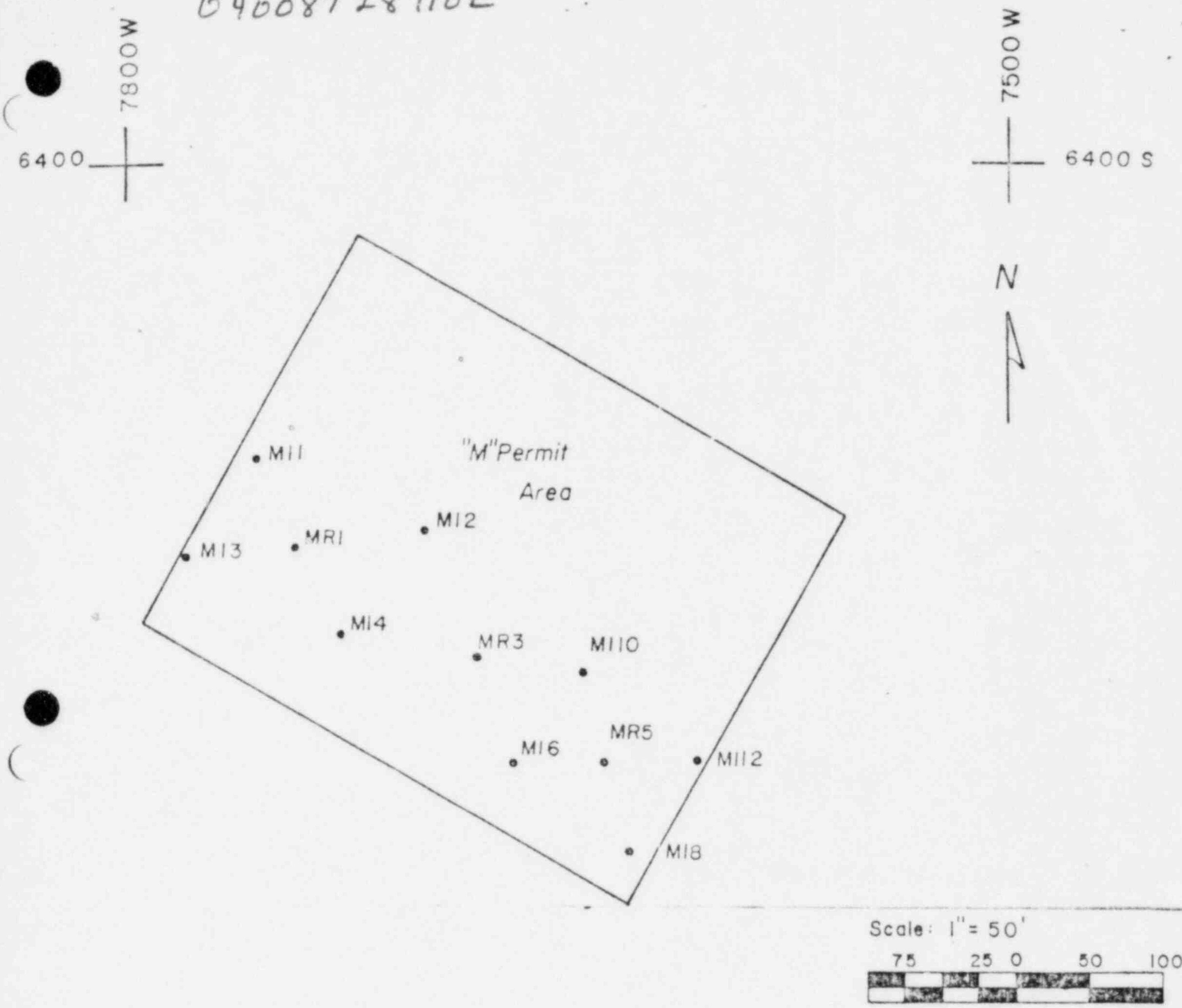

LEUENBERGER PROJECT-
R & D WELL FIELD

Date: 8/6/80

Sec. 1 Fig. I

7500 W

7000 S

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2.0 Determination of M-Zone Baseline and Restoration Goals

Restoration goals for chemical parameters were set at the inception of the R & D project and are included in the Source Material License Applications under Table IV.1.02 page IV-5. These goals were to conform to the recommended public water supply criteria or the mean baseline of wells 301, 306 and 308, whichever was higher in value. Table IV.1.02 is attached to this report. (Section 2 - Table I.)

Although the goals seemed realistic and achievable, Teton was concerned that goals based on a three-well survey might not adequately represent the entire affected aquifer area. In order to verify the baseline survey, an additional water quality survey was performed utilizing 12 additional monitor wells drilled and completed either prior to mining or during the period from July 12 to August 7, 1980. The analyses selected were chosen based on a +/- 5% cation/anion balance criteria. The 15-well survey is attached as Section 2 - Table II and the supporting, selected raw data is in Appendix "D." Analyses selected are asterisked on the individual raw data sheets.

As a result of this exercise, it was determined that there was only minor variation in water quality throughout the zone in the permit area. The original restoration goals were verified based on the survey and Teton was able to determine major parameter baseline levels to use as indicators of restoration progress.

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SECTION 2 - TABLE I

LICENSED RESTORATION GOALS

Ground Water Restoration Goals for R & D Test
(All units in mg/l except as noted.)

Chemical Parameter	M Aquifer Restoration Goal
pH	5.0-9.0
Ammonia (NH_3)	.5
NO_2/NO_3 Total	1
Bicarbonate	TDS[1]
Carbonate	TDS
Calcium	TDS
Chloride	250
Boron	1
Fluoride	1.4 to 2.4
Magnesium	TDS
Potassium	TDS
Sodium	TDS
Sulfate	250
Aluminum	.33[2]
Arsenic	.05
Barium	1.0
Cadmium	.01
Chromium	.05
Copper	1.0
Iron	.7[3]
Lead	.05
Manganese	.06[3]
Mercury	.001
Molybdenum	.20[2]
Nickel	1.0
Radium 226	236.5[3]
Selenium	.01
Uranium	5
Vanadium	.34
Zinc	5
TDS	500

1) The concentration of this parameter shall be at a level such that the restoration concentration for TDS is not exceeded. There is no known recommended Public Water Supply criteria for this parameter.

2) No Public Water Supply Criteria exists. Average values shown are determined from wells PN5-L301, PN5-L306, and PN5-L308 in M Aquifer and wells PN5-L302, PN5-L312, PN5-L317, PN5-572, PN5-L573, PN5-L574 in N Aquifer.

3) Baseline value (Table II.6.04) exceeds Public Water Supply Criteria. Average values shown are determined from wells PN5-L301, PN5-L306, & PN5-L308 in M Aquifer and wells PN5-6302, PN5-L312, PN5-6317, PN5-572, PN5-L573, PN5-L574 in N Aquifer.

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LEUENBERGER PILOT PROJECT - M AQUIFER - BASELINE WATER QUALITY

SECTION 2 - TABLE II

WELL ①	301	305	306	307	308	575	576	MM-1	MM-2	MM-4	MM-5	MM-6	MM-7	MM-9	MM-10	MEAN ± STD. DEV.
DATES SAMPLED ①	1-10-79 1-10-79 2-16-79	3-13-79 3-13-79 6-5-79 4-6-81	6-11-79 6-11-79 5-13-80	6-1-79 10-10-80 1-14-81	5-31-79	2-29-79 5-13-80 7-16-80 10-6-80 1-13-81 4-6-81	4-6-81 6-29-79 5-13-80 7-16-80 1-4-81	1-11-80 5-13-80 7-16-80 10-6-80 1-13-81	7-17-80 10-6-80 1-12-81 4-6-81	7-5-80	7-8-80 8-23-80	7-21-80 7-22-80	7-7-80 8-22-80	7-10-80	7-7-80 8-1-80	
HCO_3^- mg/l	214.7	268.3	234	234	142	217	224	215.8	216	213.5	227.1	257	224.8	244	212.5	223 ± 27.9
$CO_3^=$ mg/l	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0 ± 0
Cl^- mg/l	2.3	7.3	6.0	6.7	8	8.8	8	5.8	7.3	4	4.8	4.8	4.5	5.6	1.9	5.7 ± 2.0
$SO_4^=$ mg/l	106.3	124.5	94.7	323	246	103	100	104.2	95.5	97	120	115.5	91.5	110	96.5	128.9 ± 65.5
ANION EQ. ③	5.81	7.20	5.98	10.76	7.67	5.96	5.98	5.87	5.74	5.43	6.36	6.76	5.85	6.45	5.54	6.50 ± 1.32
Ca^{++} mg/l	61.3	77.1	58.7	112	95	62.5	66	67.6	57.8	58	72.5	76	66.5	72	54.5	70.5 ± 13.4
Mg^{++} mg/l	16	22	17.4	43.4	21	16.5	15.3	12.4	16.3	15.2	15.2	18.6	4.6	16.5	18.2	18.6 ± 7.3
Na^+ mg/l	26.7	30.8	29	26.3	22	27.5	28.6	28.4	26.5	27	27	25.5	26.7	25.9	27.5	27.0 ± 1.9
K^+ mg/l	7	9.1	8.3	10.2	10	3.4	8.5	8.2	8.4	9.5	11.3	8.6	8.9	8.3	7.4	8.9 ± 1.1
CATION EQ. ④	5.74	7.76	5.86	10.62	7.68	5.95	6.04	5.85	5.62	5.56	6.36	6.68	5.94	6.29	5.64	6.47 ± 1.50
ION BALANCE ⑤	101.22	99.17	102.05	101.32	99.9	100.17	99.01	100.34	102.14	101.3	100.00	101.20	98.48	102.5	98.23	100.41 ± 1.35
SUM T.D.S. ⑥	434.3	532.1	448.1	755.6	544	444.7	430.4	442.4	427.8	424.2	477.9	506	443.5	482.3	418.5	482.6 ± 85.2
Cond umho/cm	NA	537	463	812	715	476	476	480	465.8	519	550	490.5	400	560	505	538 ± 102
TDS mg/l	330	445	341	700	137	350	550	357.8	348	324	986	397	372	482	328	381 ± 108
pH unit	NA	7.8	7.85	8.04	8.04	7.5	7.63	7.56	7.6	7.40	7.59	7.31	7.38	7.55	7.40	7.6 ± 0.2
U mg/l ⑤	<.005	<.10	0.15	<.10	0.072	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10
Al mg/l ⑥	<.10	<.10	0.36	<.05	0.04	<.05	<.05	0.24	<.05	0.18	0.065	<.05	0.70	0.07	<.05	0.14 ± 0.18
NH_4 mg/l ⑥	1.19	0.16	0.12	0.15	<.10	0.12	<.10	<1.0	<.10	<.10	<.10	0.12	<.10	<.10	<.10	0.24 ± 0.35
As mg/l ⑥	<.005	0.005	0.007	<.005	<.005	0.006	<.005	0.011	0.044	0.011	<.005	<.005	0.006	<.005	<.005	0.009 ± 0.010
Ba mg/l ⑥	<.50	<.50	<.40	0.12	0.05	<.5	<.50	<.10	<.10	<.10	<.10	<.10	<.10	<.10	0.08	<0.50
B mg/l ⑥	0.10	<.25	0.08	<.25	0.01	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<0.25
Cd mg/l ⑥	<.005	<.01	<.02	<.05	0.002	<.01	<.01	<.05	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<0.05
Cr mg/l ⑥	<.02	<.05	<.10	<.05	0.02	<.05	<.05	<.05	<.05	0.07	<.05	<.05	<.05	<.05	<.05	<0.10
Cu mg/l ⑥	<.01	<.05	<.09	<.06	<.01	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<0.09
F mg/l	0.51	0.62	0.48	0.43	0.51	0.49	0.50	0.49	0.45	0.50	0.46	0.45	0.48	0.42	0.49	0.49 ± 0.05
Fe mg/l	0.26	0.48	1.31	0.11	0.10	0.13	0.12	0.57	0.31	1.12	0.52	0.65	2.16	0.55	0.56	0.60 ± 0.56
Pb mg/l ⑥	<.02	<.05	0.06	<.05	0.02	0.017	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	0.04 ± 0.01
Mn mg/l ⑥	0.05	0.09	0.08	0.053	0.04	<.20	0.055	<.05	<.05	<.05	0.09	<.05	0.09	<.05	0.13	0.08 ± 0.04
Hg mg/l ⑥	<.001	<.001	<.001	0.003	<.0005	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	0.0011 ± 0.0005
Mo mg/l ⑥	<.02	<.10	<.50	<.10	<.05	<.10	<.10	<.10	<.10	<.05	<.05	<.05	<.10	<.05	<.05	<.50
Ni mg/l ⑥	<.01	<.05	<.10	<.05	<.02	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
NO_3/NO_2 ⑥	0.013	<.10	0.45	0.10	<.05	0.16	0.11	0.35	<.28	0.30	0.24	0.29	0.20	0.12	0.23	0.20 ± 0.12
Se mg/l ⑥	<.005	<.006	<.01	0.019	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	0.006 ± 0.004
V mg/l ⑥	<1.0	<1.0	<.05	<.10	<.05	<.10	<.10	<.50	<.10	<.05	<.10	<.05	<.10	<.05	<.10	<1.0
Zn mg/l ⑥	0.026	<.34	<.05	<.05	0.03	<.05	<.05	<.05	<.05	0.24	0.92	0.019	<.05	<.01	<.05	0.092 ± 0.110
Ra^{226} pci/l ⑥	420	6.7	562.0	4.67	102	7.41	20.96	16.92	3.98	220	52.92	986.6	185.6	920	28.22	235.96 ± 315.37
Th^{230} pci/l ⑥	NA	2.2	2.6	1.67	2.4	2.37	1.25	3.0	20.5	0.49	0.46	1.83	0.35	0.92	0.67	3.59 ± 7.25

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3.0 Restoration Plan

Per Section IV.1.2, pages IV5a-IV5c of the Source Material License Application, Teton agreed to perform restoration by ground water sweep. As this technology was successfully employed in the Upper Zone (N sands) and the option was presented to test alternate methods for restoration, Teton decided to employ the electrodialysis process and additional water treatment technology in the M sand restoration project.

3.1 Determination of Affected M-Zone Aquifer Volume

The logical first step in planning an aquifer restoration program was to identify the area affected by leach solutions. This determination was made utilizing data relative to the area geology, hydrological characteristics, operational mass chemical balances, and involvement of restoration monitors during mining.

The basic premise involved in determining the affected aquifer volume was that the volume could be determined by noting mass addition of a foreign trace element to the aquifer during mining and by assaying its final equilibrium concentration. The specie added to the zone during mining that was not susceptible to loading on clays and was not present in the zone prior to mining to an appreciable degree, was the chloride ion.

The source of chloride ion injected to the zone was the IRA-430 strong base anion exchange resin used for extracting soluble uranium from solution during mining. The mechanism involved is represented by the following equation:

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Ext.

Recovered Solution → Resin → Injected Solution

$$\begin{matrix} SO_4^{=} & & & & SO_4 & & \\ UO_2(CO_3)_2 \cdot 2H_2O^{=}\ (UDC) & + & R\text{-}Cl^- & \rightarrow & R\ \ UDC & + & Cl^- \\ HCO_3^- & & & & HCO_3 & & \end{matrix}$$

The total amount of chloride ion that was available for addition to the zone via ion exchange was determined by noting the total ion exchange capacity of the resin and accepting the theory that resin elution reconverts all sites to chloride form. The expected chloride ion increase to the extraction circuit was calculated to be ≈3,500 lbs.

The actual chloride mass lost to the zone during mining was determined by daily accounting of injection minus recovery chloride pounds. The actual mass of chloride residing in the zone at the inception of restoration was 2,554 lbs. The determination of affected volume and area was a two-part effort and results and data bases are shown on Section 3 - Figures I and II.

By assuming that all the chloride residing within the wellfield boundary was at equilibrium recovery levels, it was determined that 817.5 lbs. of the total was within the wellfield. This indicated that 1,736.5 lbs. chloride had diffused outward from the three patterns. The chloride concentration in the externally affected area would decrease linearly from the wellfield perimeter to the unaffected area and would therefore be approximately one-half the field concentration as an average. By noting the actual chloride mass external to the wellfield and its expected mean concentration, the affected volume including the wellfield volume was determined to be 5,089,136 gallons. With a wellfield pore volume of 969,951 gallons, 4,119,185 gallons were expected to be affected adjacent to the patterns.

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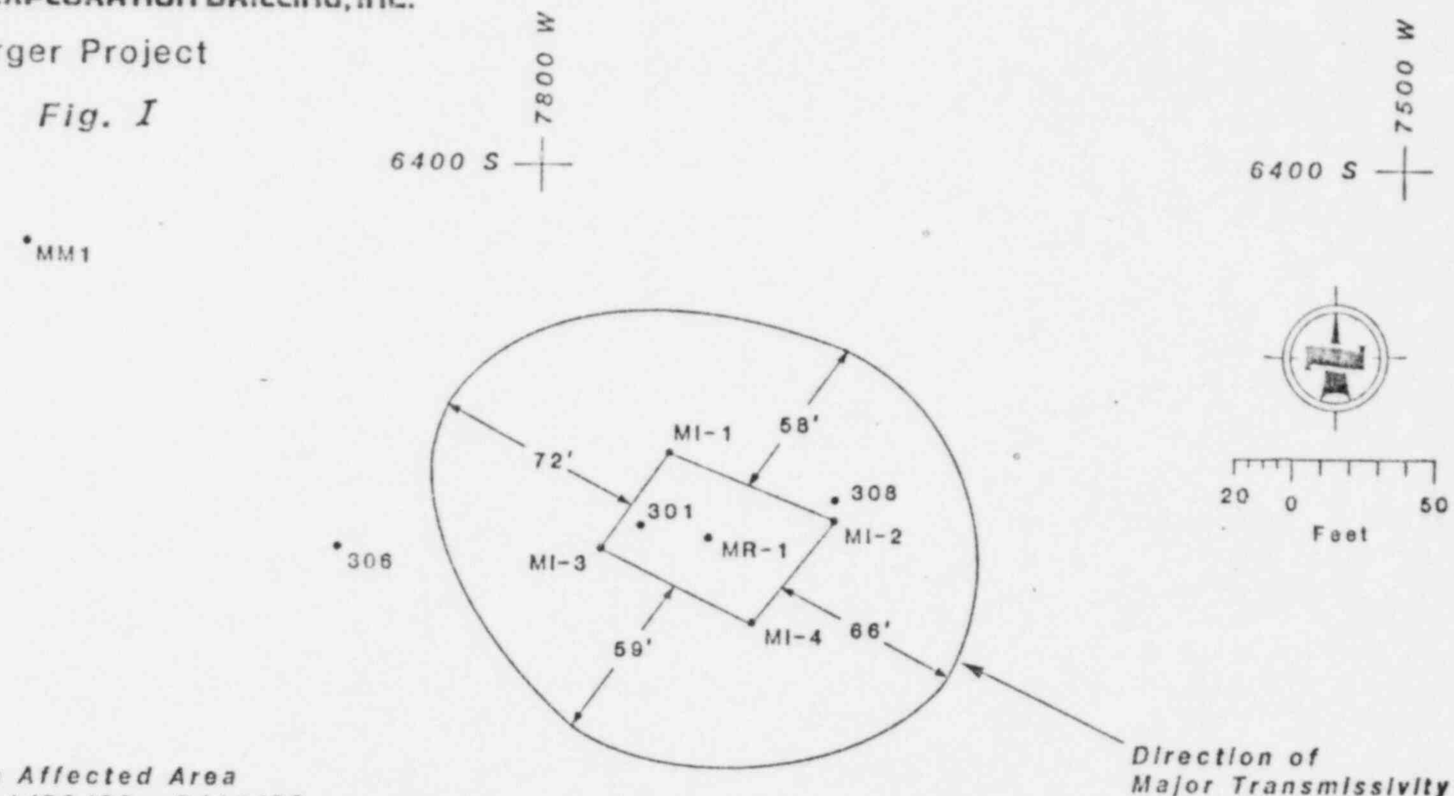
UNC TETON EXPLORATION DRILLING, INC.

Leuenberger Project

Sec. 3 Fig. I



Determination of Leach Affected Area
M-I Pattern Operation 1/22/80 - 7/11/80

Well	Gallons A/I	% O.R.	% to Tot.	Lbs Cl⁻ Lost	Cl⁻ Conc. 7-11-80	Lbs Cl⁻ Inside	Lbs Cl⁻ Outside	Sand Thickness	Porosity	Gallons Affected	Ft² Affected
M-1 Pattern	8,110,786(I)	NA	NA	574.5	NA	111.1	463.4	70'	24.8%	2,776,380	21,381
MR-1	8,254,153(R)	1.74%	NA	NA	46	NA	NA	80'	NA	NA	NA
MI-1	2,034,185	NA	25.08	144.1	NA	NA	116.2	68'	NA	696,192	5,362
MI-2	2,073,928	NA	25.57	146.9	NA	NA	118.5	80'	NA	709,972	5,468
MI-3	2,004,986	NA	24.72	142.0	NA	NA	114.6	57'	NA	686,606	5,288
MI-4	1,998,498	NA	24.64	141.6	NA	NA	114.2	65'	NA	684,209	5,269

M-ZONE RESTORATION DETERMINATION OF LEACH AFFECTED AREA

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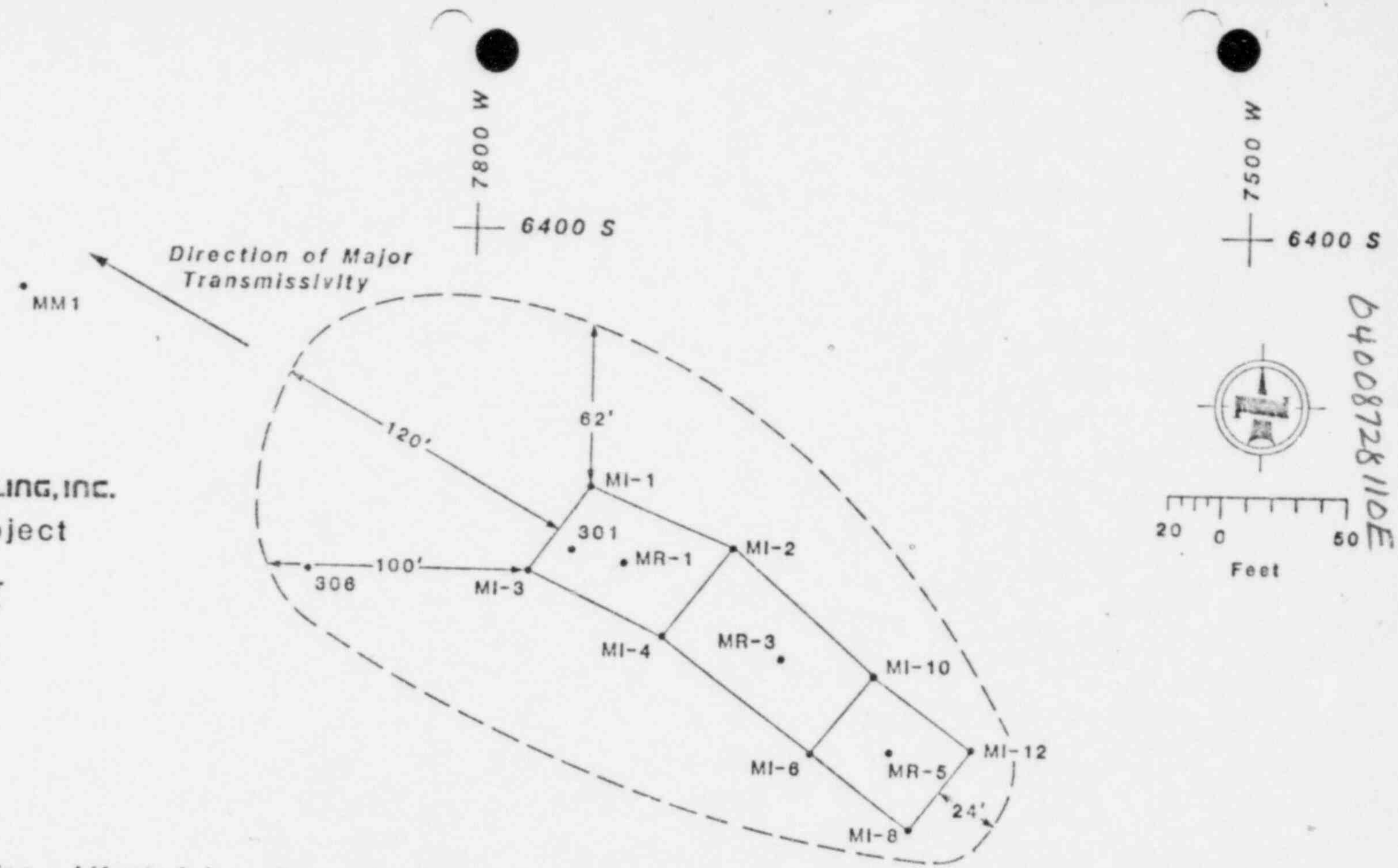
UNC TETON EXPLORATION DRILLING, INC.

Leuenberger Project

Sec. 3 Fig. II



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M-Zone Wellfield Operation - Affected Area Determination - Data Base - 1/22/80 - 2/25/80

		Gallons Inj/Rec	Field Dimensions	Field Area/Ft²	Sand Thickness	Field Volume/Ft³	Porosity	Reservoir Volume/Gal	Lbs Cl⁻ Inj-Rec	Lbs Cl⁻ In Field	Lbs Cl⁻ Ext Area	Gal/Ft²	Affected Area Ext/Ft²	Affected Volume/Gal
CELLS	M-1	20,204,884(R	60.5'x43'	2,562	70'	179,354	24.8%	332,709		280.4		129.85		
	M-3	5,067,319(R	72.5'x42'	3,000	72.6'	217,764	24.8%	403,961		340.5		134.67		
	M-5	2,726,833(R	49.5'x39.5'	1,926	65.3'	125,755	24.8%	233,281		196.6		121.10		
INJECTION WELLS	MI-1	5,270,011(I)			68'				480.5		332.5	129.85	6,076	788,957
	MI-2	4,291,421(I)			80'				377.5		266.7	132.26	4,785	632,826
	MI-3	5,360,729(I)			57'				490.9		338.9	129.85	6,193	804,143
	MI-4	6,718,998(I)			[illegible]5'				632.4		429.8	132.26	7,711	1,019,830
	MI-6	2,411,642(I)			[illegible]1'				250.7		161.2	127.89	2,991	382,496
	MI-8	513,926(I)			62'				53.4		34.4	121.10	674	81,624
	MI-10	2,006,213(I)			66'				208.6		134.1	127.89	2,488	318,193
	MI-12	574,836(I)			60'				59.8		38.4	121.10	752	91,116
	Total	27,147,776(I)	182.5'x40.5'	7,488	69.3'	518,918	24.8%	969,951	2,554	817.5	1,736.5	129.54	31,670	4,119,165

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M-ZONE RESTORATION DETERMINATION OF LEACH AFFECTED AREA

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In order to determine the approximate location of the affected volume several factors including duration of well operation, sand thickness and porosity, injected volume, and transmissivity directions were utilized. With the knowledge of pounds chloride injected to each well during operations and by assuming that simple diffusion was responsible for field flaring, a radial influence for each injection well was developed. Well-to-well radial influence overlaps were summed in the direction of major transmissivity to determine an overall affected area approximation. (See Section 3 - Figure II.) It was assumed that the entire M sand thickness was involved in the leach effect.

3.2 Restoration Process

In order to remove aquifer volume constituents while maintaining minimal process bleed, a plan was needed which would concentrate undesirable recovery chemical parameters in a reduced volume. The two processes investigated were reverse osmosis and electrodialysis. Due to economic considerations, reversing polarity electrodialysis was chosen as the base unit for the restoration plant.

The basic process employed for the M-Zone restoration incorporated the following:

Process	Purpose
A. Filtration of recovered solutions	Remove clay and solids prior to further treatment.
B. Ion exchange treatment	Removal of uranium.
C. Reversing polarity electrodialysis	Concentrating constituents in IX effluent in a reduced volume - clean product generated was used to dilute IX effluent to baseline water quality prior to reinjection.
D. Reinjection of diluted solution	Dilute parameters in leach affected area. Hydrologically guide affected waters to recovery wells for treatment.

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The following diagram (Section 3 - Figure III) illustrates the general flow sheet for the restoration plant:

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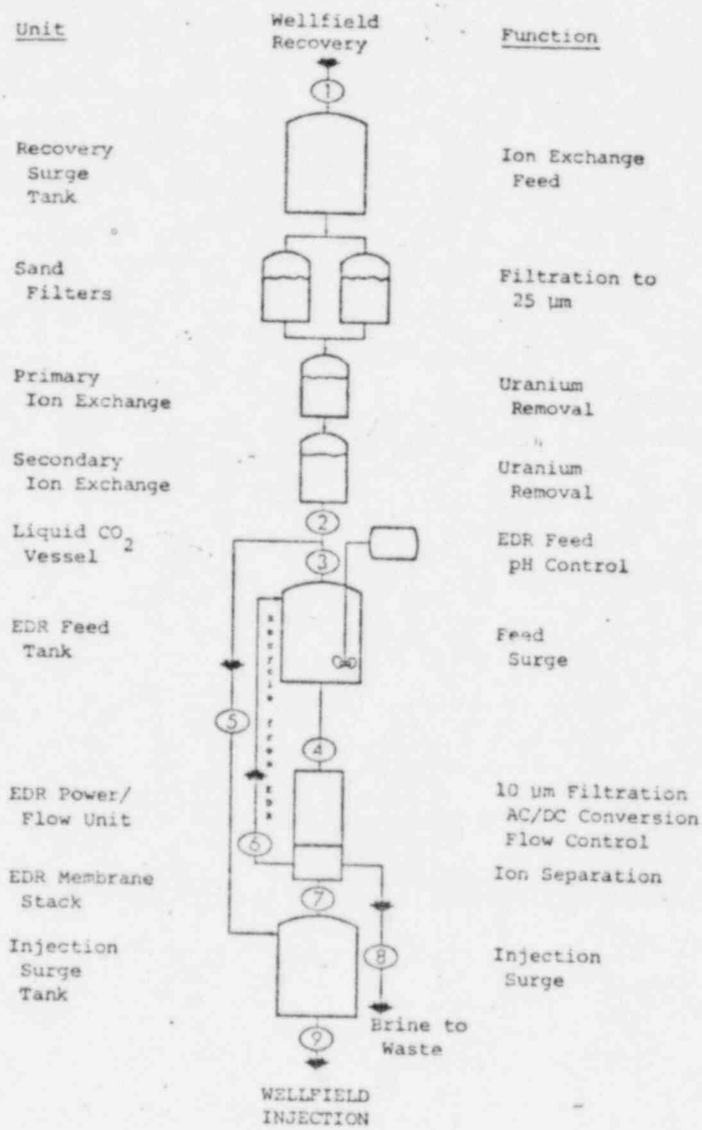

TYPICAL FLOW/COND. BALANCE

#	Flow Rate GPM	Solution Conductivity µmhos/cm
1	52.1	1,289
2	52.1	1,289
3	25.4	1,289
4	30.8	1,748
5	26.7	1,289
6	5.4	3,907
7	21.2	182
8	4.2	5,956
9	47.9	856

- EDR BASED RESTORATION - FLOW DIAGRAM

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The report attached as Appendix "A" describes the electrodialysis process and summarizes actual operational data gathered during the restoration program. Additional data relative to the electrodialysis operation is available on Table I, Section 4-1, M-Zone Restoration Data.

3.3 Wellfield Operation

Due to the knowledge that the leach area involved restoration monitor well 306 (Note see Section 3, Figures I and II) and that approximately 12 months were required for the field to diffuse to a distance of >85 feet in the direction of major transmissivity, approaching restoration in the same manner as mining relative to wellfield flow patterning would require excessive time.

It was suspected that operating the field exclusively with external injection wells would ultimately leave a high TDS halo around the patterns. In order to pull the halo to recovery wells a program was developed which utilized some injection wells as recovery wells while injecting baseline quality water elsewhere in the field to provide hydrological barriers. A phased program which is discussed in the following section was implemented.

3.4 Restoration Plan

3.4.1 Phase 1 - The initial phase at M-zone restoration was designed to reduce chemical parameters within the wellfield confines, remove uranium and other constituents which had been subjected to recent oxidation and allow time to de-bug the

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electrodialysis unit and develop a comprehensive restoration plan. Phase 1 was to consist of terminating chemical injection to the zone, treating a recovery split with the EDR unit, and operating the wellfield in a usual fashion.

3.4.2 Phase 2 - Phase 2 was designated to begin a directional sweep approach which was designed to remove the solution external to the patterns. The overall program consisted of recovering from triangular patterns of two injectors and one recovery well, while injecting into the center of the field to reduce recovery from the field internal area.

Phase 2 was designed to remove and treat leach affected solution adjacent to the M-5 pattern (see M-5 sweep area, (Section 3, Figure IV) while maintaining a draw on the M-1 sweep area.

The following pumping patterns were to be used:

Reovery wells - MR-5, M1-8, M1-12, 301

Injection wells - M1-10, M1-6, M1-2, M1-4

3.4.3 Phase 3 - Phase 3 was designed to remove and treat solution adjacent to the M-3 pattern and complete any withdrawal in the M-5 area near the injectors. A continuous draw on the M-1 pattern was also anticipated.

Recovery wells - M1-10, M1-6, MR-3, 301

Injection wells - M1-2, M1-4, M1-1, M1-3

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3.4.4 Phase 4 - The final phase of M restoration was to be the sweep of the M-1 pattern. Reinjection of baseline water quality to the already restored field area was planned to balance the recovery flow.

Recovery wells - M1-1, M1-3, MR-1, 301

Injection wells - M1-2, M1-4, M1-6, M1-8, M1-10, M1-1

3.5 Restoration Schedule

The means of determining the restoration schedule was based on the expected chloride removal rate provided by the EDR and an estimation of the area that would be affected by the directional sweep approaches. The sweep areas are shown on Section 3, Figure IV, and Section 3, Table I, outlines the scheduling justification. The major premise involved in the scheduling was that in removing the noted trace parameter to background levels, the affected volume and other elevated parameters would also be reduced to acceptable levels. An assumption was also made that by the selective injection, little injected solution would be directly recovered.

SECTION 3 - TABLE I

RESTORATION SCHEDULE

	Phase 1	Phase 2	Phase 3	Phase 4	Total
Expected Initial Cl^- Conc.	107	103	111	99	NA
Expected Final Cl^- Conc.	6	6	6	6	6
Average Recovery Cl^- Conc.	50.5	48.5	52.5	46.5	NA
EDR Feed Gallons	43200	43200	43200	43200	43200
Lbs. Fed/Day	18.2	17.5	18.9	16.8	NA
% Cl^- Rejection	75%	75%	75%	75%	75%
Lbs. Cl^- Removed/Day	13.7	13.1	14.2	12.6	NA
Lbs. Cl^- in Sweep Area	817.5	127.9	226.4	1382.2	2554
Days Required for Removal	60	10	16	110	196

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4.0 M-Zone Restoration Results

4.1 Phase 1 - Results and Discussion

Phase 1 of M-Zone restoration was initiated February 25, 1981 with the completion of installation and debugging of the electrodialysis unit. Chemical injection to M-zone had been terminated February 17 and prerestoration samples of operating recovery wells, injection streams and restoration monitors were collected between February 15 and February 23. (See Appendix "B.")

This phase consisted of routine wellfield operation (Section 4, Figure I for injection and recovery wells) without chemical injection and partial removal of recovered constituents via ion exchange and electrodialysis.

Phase 1 was successful in reducing recovery TDS by an average 57% at the four recovery wells. As expected, rapid cleanup of the internal wellfield area was noted; however, restoration monitor 306 showed only minor reductions as a result of 301 pumping. In addition, it was necessary to treat the EDR feed with hydrochloric acid to prevent $CaCO_3$ scaling in the stack. This reduced the chloride removal efficiency of the phase to ~20% of expected.

In order to assure recovery and treatment of solution that had diffused laterally from the operating fields, the directional area sweep approach outlined in Section 3.4 was implemented on schedule April 21, 1981.

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During the initial phase 6,456,750 gallons were recovered from the four operating wells and 5,989,750 gallons of diluted injection were reintroduced to the zone. A total of 2,012,315 gallons of the IX treated recovery solution were fed to the EDR, which produced 1,636,277 gallons of product for reinjection and rejected 376,038 gallons of brine to waste. The EDR unit provided an 80.3% water recovery and 85.1% salt rejection. No wells were completely restored during this phase; however, recovery parameters were reduced to a point where CO_2 was substituted for the hydrochloric acid pH adjustment on EDR feed.

Attachments:

A. Section 4.1, Table I - M-Zone Restoration Data Base

B. Section 4.1, Figure II - Phase 1 - Wellfield Operation

C. Section 4.1, Figures I-VII - Phase 1 - Analytical Trends

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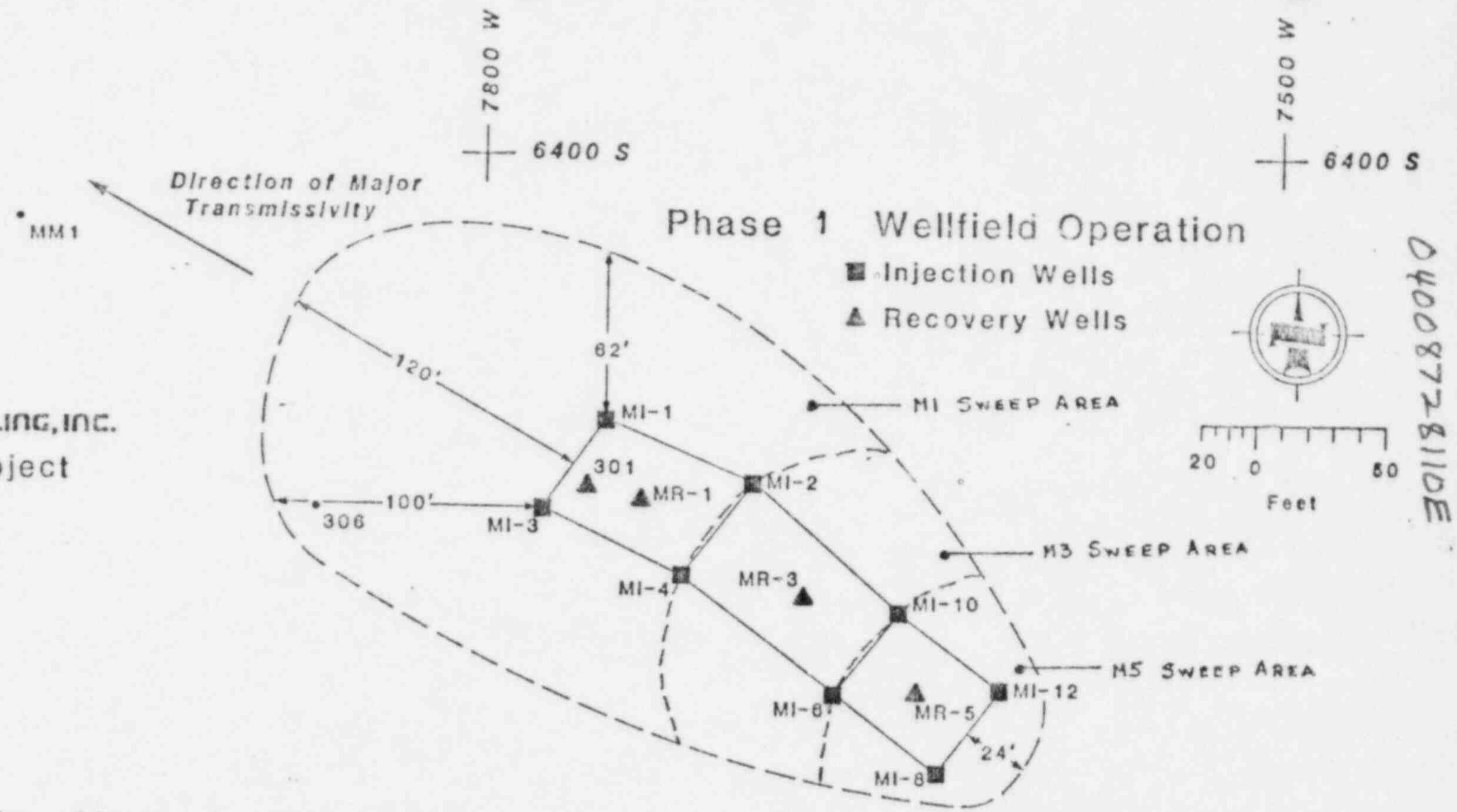
Sec. 4.1. Fig. I



Extent of Lixiviant Migration

M-Zone Wellfield Operation - Affected Area Determination - Data Base - ./22/80 - 2/25/80

		Gallons Inj/Rec	Field Dimensions	Field Area/Ft²	Sand Thickness	Field Volume/Ft³	Porosity	Reservoir Volume/Gal	Lbs Cl⁻ Inj-Rec	Lbs Cl⁻ In Field	Lbs Cl⁻ Ext Area	Gal/Ft²	Affected Area Ext/Ft²	Affected Volume/Gal
CELLS	M-1	20,204,884(R	60.5'x43'	2,562	70'	179,354	24.8%	332,709		280.4		129.85		
	M-3	5,067,319(R	72.5'x42'	3,000	72.6'	217,764	24.8%	403,961		340.5		134.67		
	M-5	2,726,833(R	49.5'x39.5'	1,926	65.3'	125,755	24.8%	233,281		196.6		121.10		
INJECTION WELLS	MI-1	5,270,011(I)			68'				480.5		332.5	129.85	6,076	788,957
	MI-2	4,291,421(I)			80'				377.5		266.7	132.26	4,785	632,826
	MI-3	5,360,729(I)			57'				490.9		338.9	129.85	6,193	804,143
	MI-4	6,718,998(I)			65'				632.4		429.8	132.26	7,711	1,019,830
	MI-6	2,411,642(I)			71'				250.7		161.2	127.89	2,991	382,496
	MI-8	513,926(I)			62'				53.4		34.4	121.10	674	81,624
	MI-10	2,006,213(I)			66'				208.6		134.1	127.89	2,488	318,193
	MI-12	574,836(I)			60'				59.8		38.4	121.10	752	91,116
	Total	27,147,776(I)	182.5'x40.5'	7,488	69.3'	818,918	24.8%	969,951	2,554	817.5	1,736.5	129.54	31,670	4,119,185

M-ZONE RESTORATION DETERMINATION OF LEACH AFFECTED AREA

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SECTION 4.1 TABLE 1

M ZONE RESTORATION - DATA BASE

WELLFIELD RECOVERY

REC.* WELLS	DATES OPERATED	[Cl⁻] I	[Cl⁻] F	% RED	[TDS] I	[TDS] F	% RED	GALLONS RECOVERED	PORE VOL. REC	LB. Cl⁻ EXT.	% Cl⁻ EXT.
PHASE 1 2/25/81 - 4/20/81											
301	2/25/81 - 4/20/81	97	59	39.2	2347	1107	52.8	2211320	2.28	54.8	2.1
MR-1	2/25/81 - 4/20/81	101	65	35.6	2434	1240	49.1	1663801	1.72	41.2	1.6
MR-3	2/25/81 - 4/20/81	111	75	32.4	2773	1134	56.5	1832753	1.89	45.4	1.8
MR-5	2/25/81 - 4/20/81	103	69	33.0	2572	1107	57.0	148876	0.77	18.6	0.7
	TOTALS	107	68	36.4	2604	1208	53.6	6456750	6.66	160.0	6.3
PHASE 2 4/21/81 - 8/10/81											
MI-3	6/26/81 - 8/10/81	28.0	9.0	67.9	884	361	59.2	950582	1.02	122.5	4.8
MI-8	4/21/81 - 8/10/81	62.0	17.0	72.6	1055	734	30.4	1345119	1.39	260.6	10.2
MI-12	4/21/81 - 7/29/81	54.0	17.0	68.5	1083	714	34.1	1077541	1.11	159.9	6.3
301	4/21/81 - 6/25/81	57.0	37.0	35.1	1232	1160	5.8	2625029	2.71	551.5	21.6
MR-5	4/21/81 - 8/10/81	67.0	13.0	80.6	1216	470	61.3	1213440	1.25	200.1	7.8
	TOTALS	58.0	19.0	67.2	1188	721	39.3	7251711	7.48	1295	50.7
PHASE 3 8/10/81 - 9/1/81											
MI-2	8/10/81 - 8/13/81	9.0	11.3	-25.6	361	367	-1.7	5011	0	0.2	—
MI-3	8/10/81 - 9/1/81	26.0	27.3	-5.0	965	1028	-6.5	634730	0.65	71.5	2.8
MI-4	8/10/81 - 9/1/81	11.0	15.0	-36.4	398	595	-49.5	307365	0.32	17.6	0.7
MR-3	8/11/81 - 9/1/81	18.0	14.2	20.0	758	612	19.3	356280	0.35	21.0	0.8
MI-1	8/14/81 - 9/1/81	29.4	36.5	-24.1	1084	1108	-2.2	186356	0.19	25.8	1.0
	TOTALS	17.0	25.1	-47.6	684	868	-26.9	1469742	1.52	136.1	5.3
PHASE 4 9/1/81 - 12/20/81											
MI-1	9/1/81 - 12/20/81	34.1	14.8	56.6	1096	658	40.0	2842563	2.93	270.2	10.6
MI-3	9/1/81 - 11/16/81	27.1	13.4	50.6	1016	581	42.8	979295	1.01	119.2	4.7
301	9/8/81 - 12/8/81	31.1	11.4	63.3	1137	553	51.4	2467701	2.54	243.2	9.5
MR-1	9/1/81 - 9/30/81 12/8/81 - 12/14/81	12.8	11.9	7.0	682	520	23.8	808791	0.83	61.5	2.4
MR-3	9/1/81 - 9/8/81 12/2/81 - 12/8/81	13.3	11.9	10.5	548	530	3.3	262662	0.27	—	—
MR-5	12/2/81 - 12/8/81	11.2	10.9	2.7	515	553	-7.4	52133	0.05	—	—
	TOTALS	21.9	12.9	41.1	813	579	28.8	7413145	7.64	694.1	27.2
M ZONE RESTORATION - PHASE 1 THROUGH PHASE 4 - TOTAL											
MR-1	PHASES 1,4	101	11.9	88.2	2434	520	78.6	2472592	2.55	102.7	4.0
MR-3	PHASES 1,3,4	111	10.5	90.5	2773	530	80.9	2491695	2.51	66.4	2.6
MR-5	PHASES 1,2,4	103	10.9	89.4	2572	553	78.5	2014449	2.08	218.7	8.6
301	PHASES 1,2,4	97	11.4	88.2	2347	553	76.4	7304050	7.53	849.9	33.3
MI-1	PHASES 3,4	29.4	14.8	49.7	1084	658	39.3	3028919	3.12	296	11.6
MI-2	PHASE 3	9	11.3	-25.6	361	367	-1.7	5011	NO	0.2	NO
MI-3	PHASES 2,3,4	28	13.4	52.1	884	581	34.3	2604607	2.69	313.2	12.3
MI-4	PHASE 3	11	15	-36.4	398	595	-49.4	307365	0.32	17.6	0.7
MI-8	PHASE 2	62	17	72.6	1055	734	30.4	1345119	1.39	260.6	10.2
MI-12	PHASE 2	54	17	68.5	1083	714	34.1	1077541	1.11	159.9	6.3
	TOTALS	107	12.9	87.9	2604	579	77.8	22591548	23.29	2285	89.5

WELLFIELD INJECTION / ELECTRODIALYSIS UNIT OPERATION (EDR)

INJ. WELLS	DATES OPERATED	GALLONS INJECTED	% O.R.*	BRINE GALLONS	PORE VOLS.*	FEED GALLONS	% OF REC*	PRODUCT GALLONS	% OF INJ*	% SALT REJ.*	% WATER REC.*
PHASE 1 2/25/81 - 4/20/81											
MI-1	2/25/81 - 4/20/81	1101225									
MI-2	2/25/81 - 4/20/81	481613									
MI-3	2/25/81 - 4/20/81	739627									
MI-4	2/25/81 - 4/20/81	2107296									
MI-6	2/25/81 - 4/20/81	358570									
MI-8	2/25/81 - 4/20/81	145486									
MI-10	2/25/81 - 4/20/81	849219									
MI-12	2/25/81 - 4/20/81	206714									
	TOTALS	5989750	7.23	376038	0.39	2012315	31.2	1636277	27.3	85.1	80.3
PHASE 2 4/21/81 - 8/10/81											
MI-2	4/21/81 - 8/10/81	937091									
MI-4	4/21/81 - 8/10/81	2271895									
MI-6	4/21/81 - 8/10/81	1481809									
MI-10	4/21/81 - 8/10/81	1966475									
	TOTALS	6657270	8.20	631523	0.65	4054016	56.5	3462493	52.0	89.9	84.6
PHASE 3 8/10/81 - 9/1/81											
MI-6	8/10/81 - 9/1/81	260476									
MI-8	8/10/81 - 9/1/81	151487									
MI-10	8/10/81 - 9/1/81	567288									
MI-12	8/10/81 - 9/1/81	366670									
	TOTALS	1345921	8.42	116374	0.12	808317	55.0	691943	51.4	85.0	85.6
PHASE 4 9/1/81 - 12/20/81											
MI-2	9/1/81 - 12/20/81	684647									
MI-3	11/17/81 - 12/20/81	706514									
MI-4	9/1/81 - 12/20/81	2223246									
MI-6	9/1/81 - 12/14/81	722071									
MI-8	9/1/81 - 12/8/81	426263									
MI-10	9/1/81 - 12/14/81	944567									
MI-12	9/1/81 - 12/8/81	755512									
	TOTALS	6462820	12.8	581536	0.60	3549215	47.5	2967679	40.0	89.0	83.6
M ZONE RESTORATION - PHASE 1 THROUGH PHASE 4 - TOTAL											
MI-1	PHASE 1	1101225									
MI-2	PHASES 1,2,4	2103351									
MI-3	PHASES 1,4	1446141									
MI-4	PHASES 1,2,4	6602437									
MI-6	PHASES 1,2,3,4	2822926									
MI-8	PHASES 1,3,4	723236									
MI-10	PHASES 1,2,3,4	4327549									
MI-12	PHASES 1,3,4	1328896									
	TOTALS	20455761	9.45	1705471	1.76	10463863	46.3	8758392	42.8	89.4	83.7

* HEADING DEFINITIONS - ABBREVIATIONS

- * REC. WELLS - RECOVERY WELLS
- * [Cl⁻] I - INITIAL Cl⁻ CONCENTRATION mg/l
- * [Cl⁻] F - FINAL Cl⁻ CONCENTRATION mg/l
- * % RED - % REDUCTION
- * [TDS] I - INITIAL CALCULATED TDS mg/l
- * [TDS] F - FINAL CALCULATED TDS mg/l
- * PORE VOL. REC - PORE VOLUMES RECOVERED
  1 FIELD PORE VOLUME = 969951 GAL (FIG. 2)
- * LB. Cl⁻ EXT. - POUNDS Cl⁻ ION EXTRACTED
- * % Cl⁻ EXT. - % Cl⁻ ION EXTRACTED
  REFERS TO Cl⁻ ION LOST DURING MINING - 2554 lb.
- * % O.R. - % WELLFIELD OVER RECOVERY
- * % of REC - % of RECOVERY TREATED BY EDR UNIT
- * % of INJ - EDR PRODUCT RATIO TO INJECTION
- * % SALT REJ - % TDS REMOVAL BY EDR
- * % WATER REC - EDR PRODUCT TO FEED RATIO

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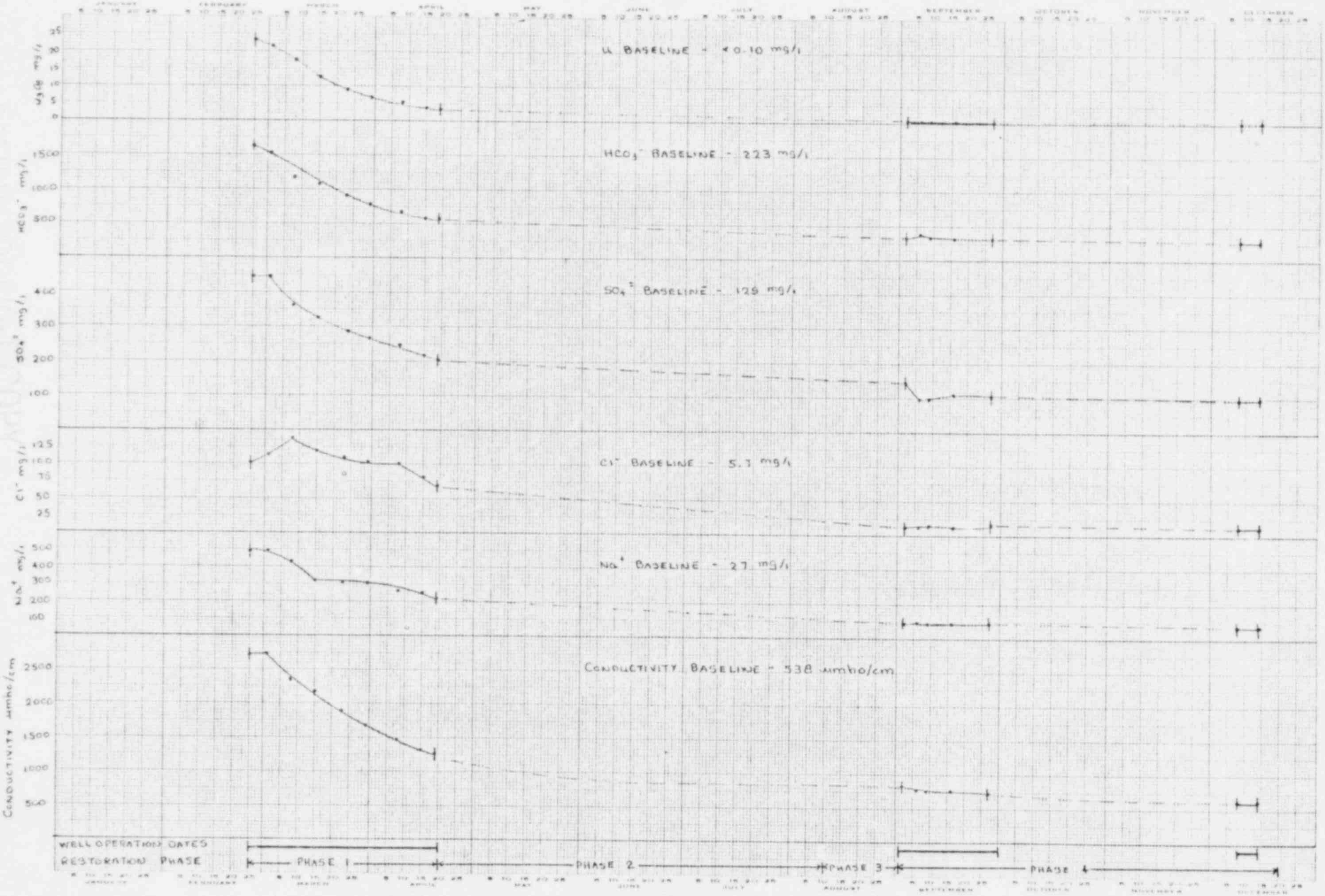
SECTION 4.1 FIGURE 11

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL MR-1



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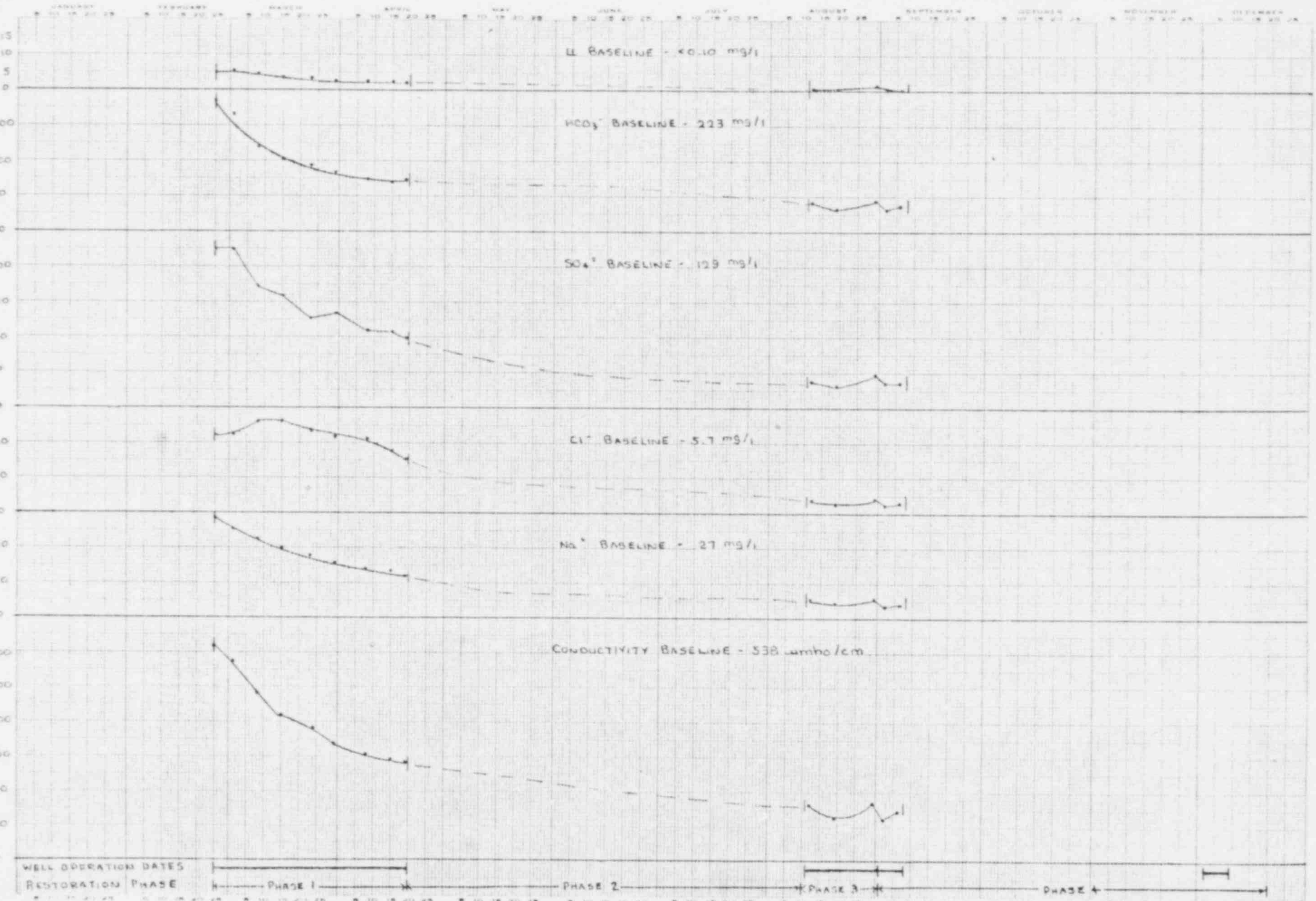
SECTION 4.1 FIGURE III

UNC-TETON EXPLORATION DRILLING COMPANY INC.
LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL MR-3



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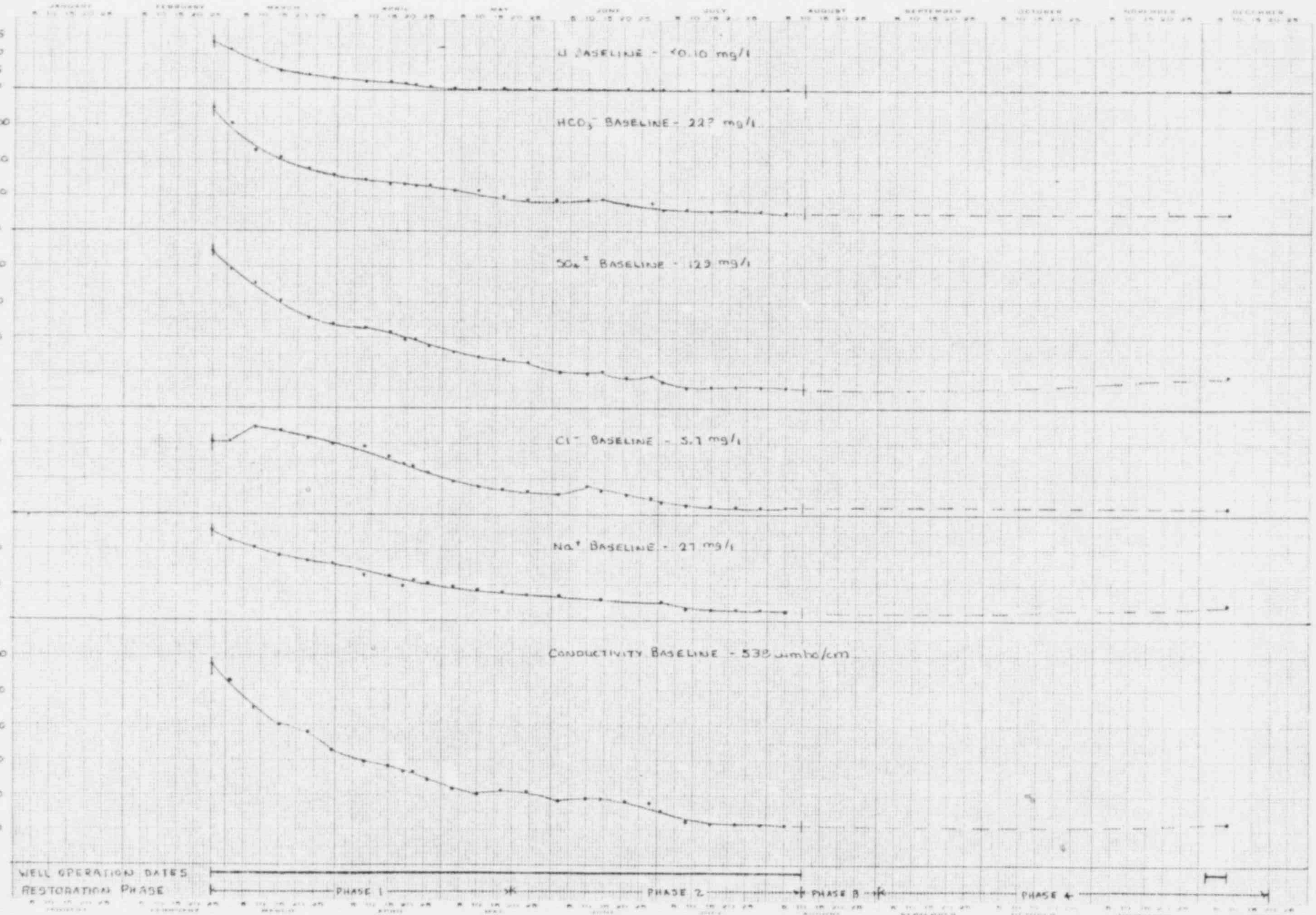
SECTION 4.1 FIGURE IV

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL MR-5



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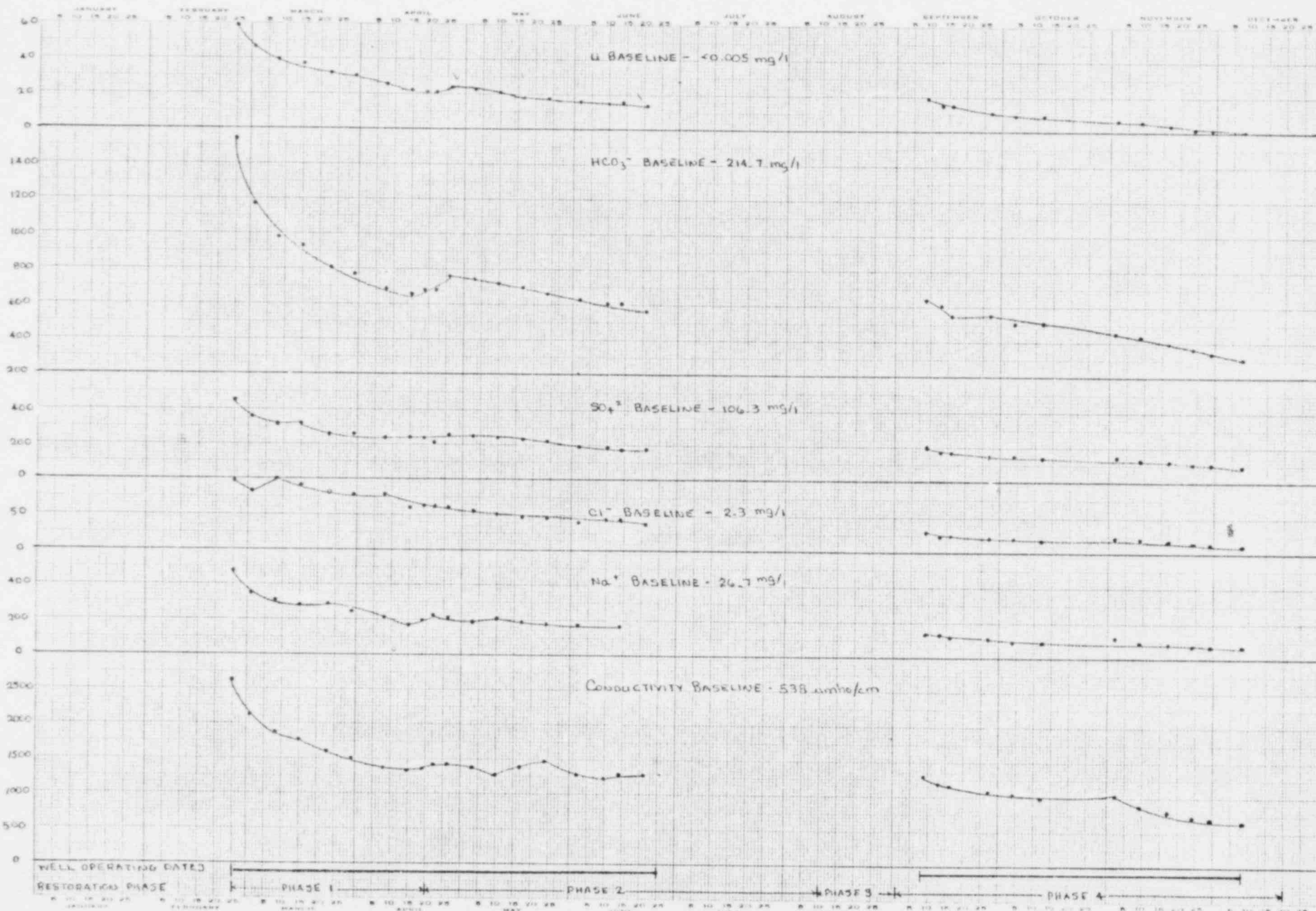
SECTION 4.1 FIGURE V

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL 301



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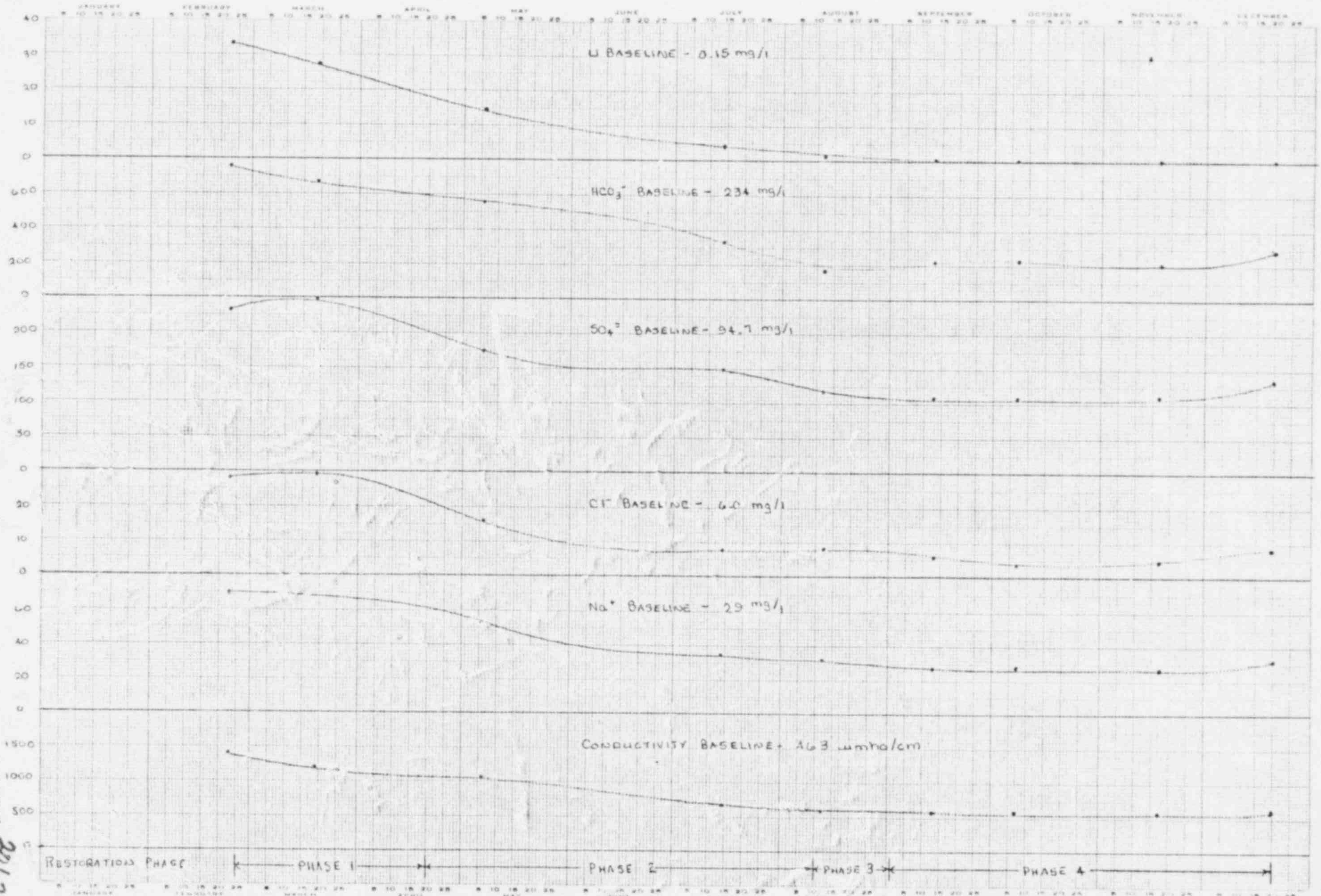
SECTION 4.1 FIGURE VI

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL 306



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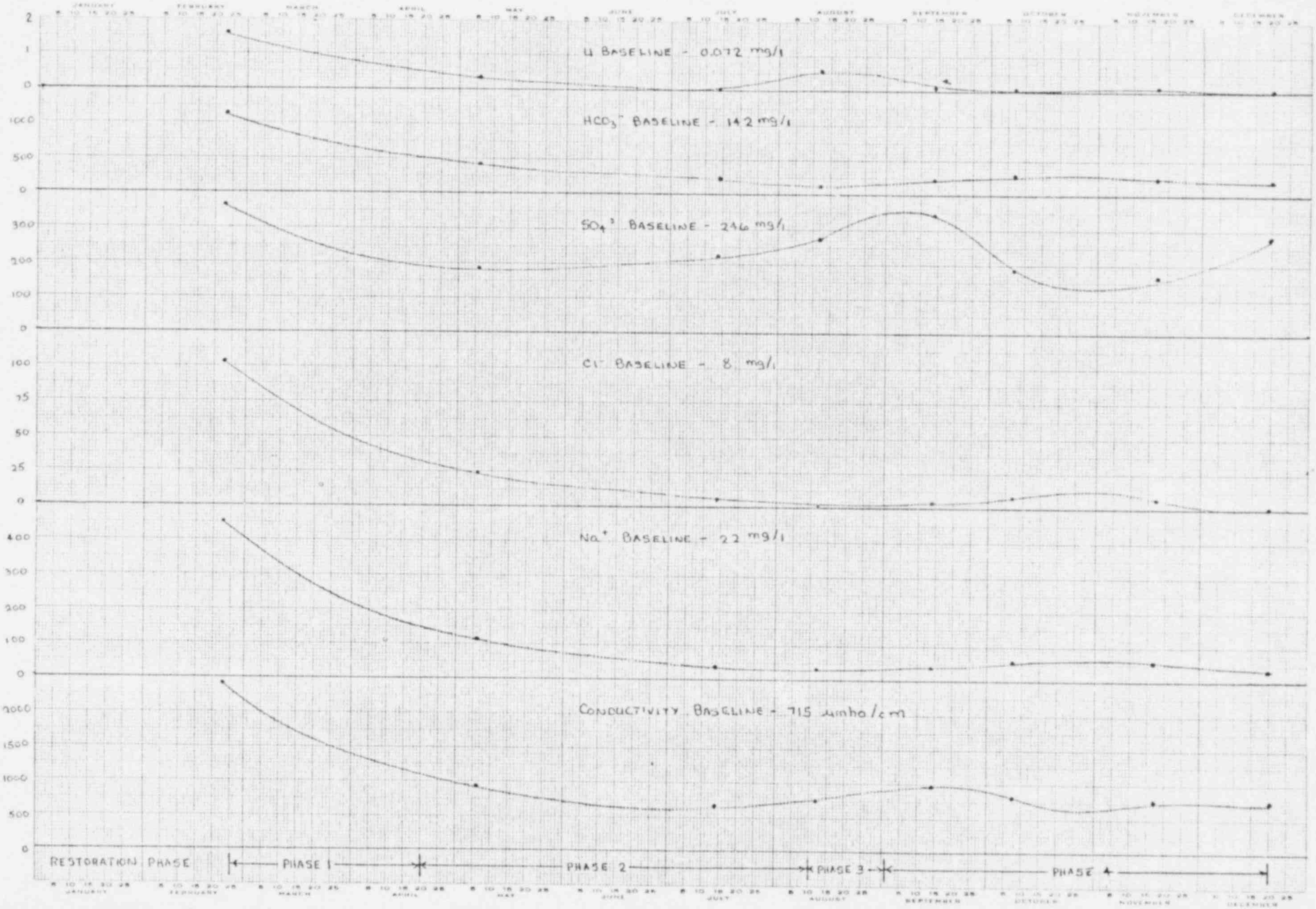
SECTION 4.1 FIGURE VII

UNC-TETON EXPLORATION DRILLING COMPANY, INC.
LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL 308



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4.2 Phase 2 - Results and Discussion

The M-5 area directional sweep program was initiated April 21, 1981 with wells M1-8, M1-12 and MR-5 serving as recovery wells in the area. Due to the slow response of restoration monitor 306 noted during Phase 1, wells 301 (4/21-8/10) and M1-3 (6/26-8/10) were utilized as recovery wells in the M-1 sweep area. Dilute reinjection was introduced to wells M1-2, 4, 6 and 10 during the entire phase. A total of 7,251,711 gallons were recovered during Phase 2 with 3,636,100 gallons derived directly from the M-5 sweep area.

Phase 2 required from April 21 until August 10, 1981 in order to reduce chemical parameters at the three recovery wells to near baseline levels. During the phase 1,295 lbs. of chloride ion (50.7%) were recovered and extracted from the zone, 621 lbs. of which were derived directly from the M-5 recovery wells. Considering that only 19 lbs. Cl^- had been recovered from the M-5 area during Phase 1, it was suspected that 306.5 lbs. Cl^- were residing in the area. Obviously, additional areas had been affected through the phase which was evidenced by the nearly total clean-up in the M-3 sweep area.

Of the total recovery fluid, 4,094,016 gallons were fed to the EDR unit which provided a 89.9% salt rejection with an 84.6% water recovery. A total of 3,462,493 product gallons were reinjected to the field and 631,523 gallons were bled to the evaporation ponds as brine.

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The purpose of running Phase 2 to 111 days (as opposed to the scheduled 10) was to reduce the east end of the wellfield to near baseline level prior to moving forward. This was to facilitate having a restored wellfield area in which to reinject clean water without risking excursion of an unrecovered portion of the "halo."

To the end of Phase 2, a total of 14.1 wellfield pore volumes had been recovered and treated and only 1.04 pore volumes had been bled as process brine. A total of 1,455 lbs. Cl^- or 57% of the chloride lost during mining had been recovered.

Attachments:

A. Section 4-2, Figure I - Phase 2-Wellfield Operation

B. Section 4-2, Table I - M-Zone Restoration Data Base

C. Section 4.2, Figures II-VIII - Phase 2-Analytical Trends

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UNC TETON EXPLORATION DRILLING, INC.

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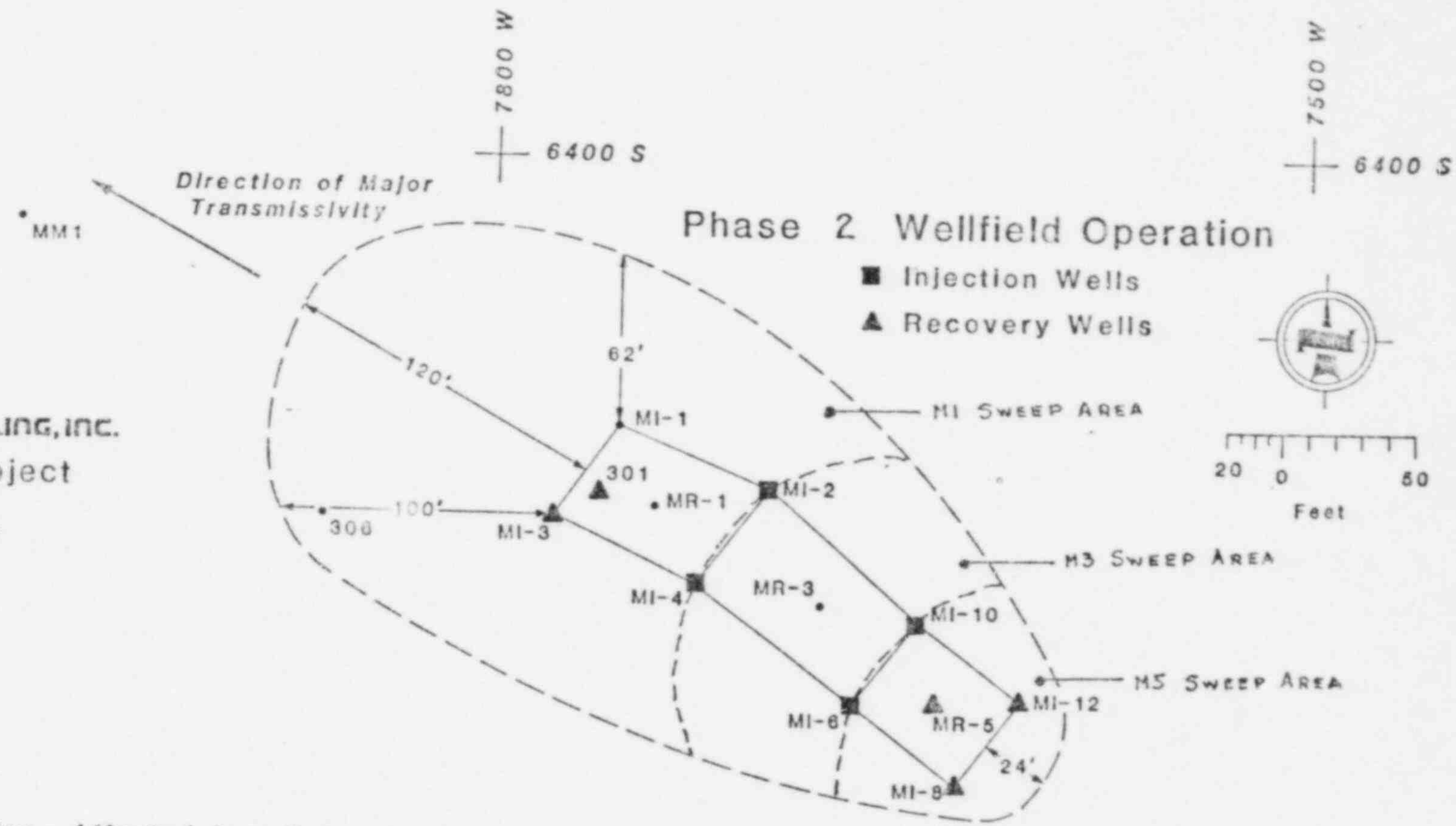
Sec. 4.2. Fig. I



M-Zone Wellfield Operation - Affected Area Determination - Data Base - 1/22/80 - 2/25/80

		Gallons Inj/Rec	Field Dimensions	Field Area/Ft²	Sand Thickness	Field Volume/Ft³	Porosity	Reservoir Volume/Gal	Lbs Cl⁻ Inj-Rec	Lbs Cl⁻ In Field	Lbs Cl⁻ Ext Area	Gal/Ft²	Affected Area Ext/Ft²	Affected Volume/Gal
CELLS	M-1	20,204,884(R	60.5'x43'	2,562	70'	179,354	24.8%	332,709		280.4		129.85		
	M-3	5,067,319(R	72.5'x42'	3,000	72.6'	217,764	24.8%	403,961		340.5		134.67		
	M-5	2,726,633(R	49.5'x39.5'	1,926	65.3'	125,755	24.8%	233,281		196.6		121.10		
INJECTION WELLS	MI-1	5,270,011(I)			68'				480.5		332.5	129.85	6,076	788,957
	MI-2	4,291,421(I)			80'				377.5		266.7	132.26	4,785	632,826
	MI-3	5,360,729(I)			57'				490.9		338.9	129.85	6,193	804,143
	MI-4	6,718,998(I)			65'				632.4		429.8	132.26	7,711	1,019,830
	MI-6	2,411,642(I)			71'				250.7		161.2	127.89	2,991	382,496
	MI-8	513,926(I)			62'				53.4		34.4	121.10	674	81,624
	MI-10	2,006,213(I)			66'				208.6		134.1	127.89	2,488	318,193
	MI-12	574,836(I)			60'				59.8		38.4	121.10	752	91,116
	Total	27,147,776(I)	182.5'x40.5'	7,488	69.3'	518,918	24.8%	969,951	2,554	817.5	1,736.5	129.54	31,670	4,119,185

M-ZONE RESTORATION DETERMINATION OF LEACH AFFECTED AREA

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UNC - TETON EXPLORATION DRILLING CO., INC. LEUENBERGER PROJECT

M ZONE RESTORATION - DATA BASE

SECTION 4.2 TABLE I

WELLFIELD RECOVERY												WELLFIELD INJECTION				ELECTRODIALYSIS UNIT OPERATION (EDR)							
REC.* WELLS	DATES OPERATED	[Cl⁻] I	[Cl⁻] F	%* RED	[TDS] I	[TDS] F	%* RED	GALLONS RECOVERED	PORE* VOL. REC.	Lb. Cl⁻ EXT.*	% Cl⁻* EXT.	INJ. WELLS	DATES OPERATED	GALLONS INJECTED	%* O.R.	BRINE GALLONS	PORE* VOLS.	FEED GALLONS	% of* REC.	PRODUCT GALLONS	% of* INJ.	%* SALT REJ.	%* WATER REC.
PHASE 1 2/25/81 - 4/20/81																							
301	2/25/81 - 4/20/81	97	59	39.2	2347	1107	52.8	2211320	2.28	54.8	2.1	MI-1	2/25/81 - 4/20/81	1101225									
MR-1	2/25/81 - 4/20/81	101	65	35.6	2434	1240	49.1	1663801	1.72	41.2	1.6	MI-2	2/25/81 - 4/20/81	481613									
MR-3	2/25/81 - 4/20/81	111	75	32.4	2773	1194	56.9	1832753	1.89	45.4	1.8	MI-3	2/25/81 - 4/20/81	739627									
MR-5	2/25/81 - 4/20/81	103	69	33.0	2572	1107	57.0	748876	0.77	18.6	0.7	MI-4	2/25/81 - 4/20/81	2107296									
												MI-6	2/25/81 - 4/20/81	358570									
												MI-8	2/25/81 - 4/20/81	145486									
												MI-10	2/25/81 - 4/20/81	349219									
												MI-12	2/25/81 - 4/20/81	206714									
	TOTALS	107	68	36.4	2604	1208	53.6	6456750	6.66	160.0	6.3		TOTALS	5983750	7.23	376038	0.39	2012315	31.2	1636277	27.3	85.1	80.9
PHASE 2 4/21/81 - 8/10/81																							
MI-3	6/26/81 - 8/10/81	28.0	9.0	67.9	884	361	59.2	990582	1.02	132.5	4.8	MI-2	4/21/81 - 8/10/81	937091									
MI-8	4/21/81 - 8/10/81	62.0	17.0	72.6	1055	734	30.4	1345119	1.39	260.6	10.2	MI-4	4/21/81 - 8/10/81	2271895									
MI-12	4/21/81 - 7/29/81	54.0	17.0	68.5	1083	714	34.1	1077541	1.11	159.5	6.3	MI-6	4/21/81 - 8/10/81	1481809									
301	4/21/81 - 6/25/81	57.0	37.0	35.1	1232	1160	5.8	2625029	2.71	551.5	21.6	MI-10	4/21/81 - 8/10/81	1966475									
MR-5	4/21/81 - 8/10/81	67.0	13.0	80.6	1216	470	61.3	1213440	1.25	200.1	7.8												
	TOTALS	58.0	19.0	67.2	1188	721	39.3	7251711	7.48	1295	50.7		TOTALS	6657270	8.20	631523	0.45	4054016	56.5	3462493	52.0	89.9	84.6
PHASE 3 8/10/81 - 9/1/81																							
MI-2	8/10/81 - 8/13/81	9.0	11.3	-25.6	361	367	-1.7	5011	0	0.2	—	MI-6	8/10/81 - 9/1/81	260476									
MI-3	8/10/81 - 9/1/81	26.0	27.3	-5.0	965	1028	-6.5	634730	0.65	71.5	2.8	MI-8	8/10/81 - 9/1/81	151487									
MI-4	8/10/81 - 9/1/81	11.0	15.0	-36.4	398	595	-49.5	307365	0.32	17.6	0.7	MI-10	8/10/81 - 9/1/81	567288									
MR-3	8/11/81 - 9/1/81	18.0	14.2	20.0	758	612	19.3	356280	0.55	21.0	0.8	MI-12	8/10/81 - 9/1/81	366670									
MI-1	8/14/81 - 9/1/81	29.4	36.5	-24.1	1084	1108	-2.2	186356	0.19	25.8	1.0												
	TOTALS	17.0	25.1	-47.6	684	868	-26.9	1469742	1.52	136.1	5.3		TOTALS	1345921	8.42	116374	0.12	808317	55.0	691943	51.4	89.0	85.6
PHASE 4 9/1/81 - 12/20/81																							
MI-1	9/1/81 - 12/20/81	34.1	14.8	56.6	1096	658	40.0	2842563	2.93	270.2	10.6	MI-2	9/1/81 - 12/20/81	684647									
MI-3	9/1/81 - 11/16/81	27.1	13.4	50.6	1016	581	42.8	979295	1.01	119.2	4.7	MI-3	11/17/81 - 12/20/81	706514									
301	9/8/81 - 12/8/81	31.1	11.4	63.3	1137	553	51.4	2467701	2.54	243.2	5.5	MI-4	9/1/81 - 12/20/81	2223246									
MR-1	9/1/81 - 9/30/81 12/8/81 - 12/14/81	12.8	11.9	7.0	682	520	23.8	808791	0.83	61.5	2.4	MI-6	9/1/81 - 12/14/81	722071									
MR-3	9/1/81 - 9/8/81 12/3/81 - 12/8/81	13.3	11.9	10.5	548	530	3.3	262662	0.27	—	—	MI-8	9/1/81 - 12/8/81	426263									
MR-5	12/3/81 - 12/8/81	11.2	10.9	2.7	515	553	-7.4	52133	0.05	—	—	MI-10	9/1/81 - 12/14/81	944567									
												MI-12	9/1/81 - 12/8/81	755512									
	TOTALS	21.9	12.9	41.1	813	579	28.8	7413145	7.64	694.1	27.2		TOTALS	6462820	12.8	581536	0.60	3549215	47.5	2967679	40.0	89.0	83.6
M ZONE RESTORATION - PHASE 1 THROUGH PHASE 4 - TOTAL																							
MR-1	PHASES 1,4	101	11.9	88.2	2434	520	78.6	2472592	2.55	102.7	4.0	MI-1	PHASE 1	1101225									
MR-3	PHASES 1,3,4	111	10.5	90.5	2773	530	80.9	2491695	2.51	66.4	2.6	MI-2	PHASES 1,2,4	2103351									
MR-5	PHASES 1,2,4	103	10.9	89.4	2572	553	78.5	2014449	2.08	218.7	8.6	MI-3	PHASES 1,4	1446141									
301	PHASES 1,2,4	97	11.4	88.2	2347	553	76.4	7304050	7.53	849.9	33.3	MI-4	PHASES 1,2,4	6602437									
MI-1	PHASES 3,4	29.4	14.8	49.7	1084	658	39.3	3028919	3.12	296	11.6	MI-6	PHASES 1,2,3,4	2822926									
MI-2	PHASE 3	9	11.3	-25.6	361	367	-1.7	5011	NO	0.2	NO	MI-8	PHASES 1,3,4	723236									
MI-3	PHASES 2,3,4	28	13.4	52.1	884	581	34.3	2604607	2.69	313.2	12.3	MI-10	PHASES 1,2,3,4	4327549									
MI-4	PHASE 3	11	15	-36.4	398	595	-49.4	307365	0.32	17.6	0.7	MI-12	PHASES 1,3,4	1328896									
MI-8	PHASE 2	62	17	72.6	1055	734	30.4	1345119	1.39	260.6	10.2												
MI-12	PHASE 2	54	17	68.5	1083	714	34.1	1077541	1.11	159.9	6.3												
	TOTALS	107	12.9	87.9	2604	579	77.8	22591348	23.29	2285	89.5		TOTALS	20455761	9.45	1705471	1.76	10463863	46.3	8758392	42.8	89.4	85.7

* HEADING DEFINITIONS - ABBREVIATIONS

* REC. WELLS - RECOVERY WELLS
* [Cl⁻] I - INITIAL Cl⁻ CONCENTRATION mg/l
* [Cl⁻] F - FINAL Cl⁻ CONCENTRATION mg/l
* % RED - % REDUCTION
* [TDS] I - INITIAL CALCULATED TDS mg/l
* [TDS] F - FINAL CALCULATED TDS mg/l
* PORE VOL. REC - PORE VOLUMES RECOVERED
(FIELD PORE VOLUME = 969951 GAL (FIG. 2))
* Lb. Cl⁻ EXT. - POUNDS Cl⁻ ION EXTRACTED
* % Cl⁻ EXT. - % Cl⁻ ION EXTRACTED
REFERS TO Cl⁻ ION LOST DURING MINING - 2554 lb.
* % O.R. - % WELLFIELD OVER RECOVERY
* % of REC - % of RECOVERY TREATED BY EDR UNIT
* % of INJ - EDR PRODUCT RATIO TO INJECTION
* % SALT REJ - % TDS REMOVAL BY EDR
* % WATER REC - EDR PRODUCT TO FEED RATIO

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SECTION 4.2 FIGURE 11

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL M1-8

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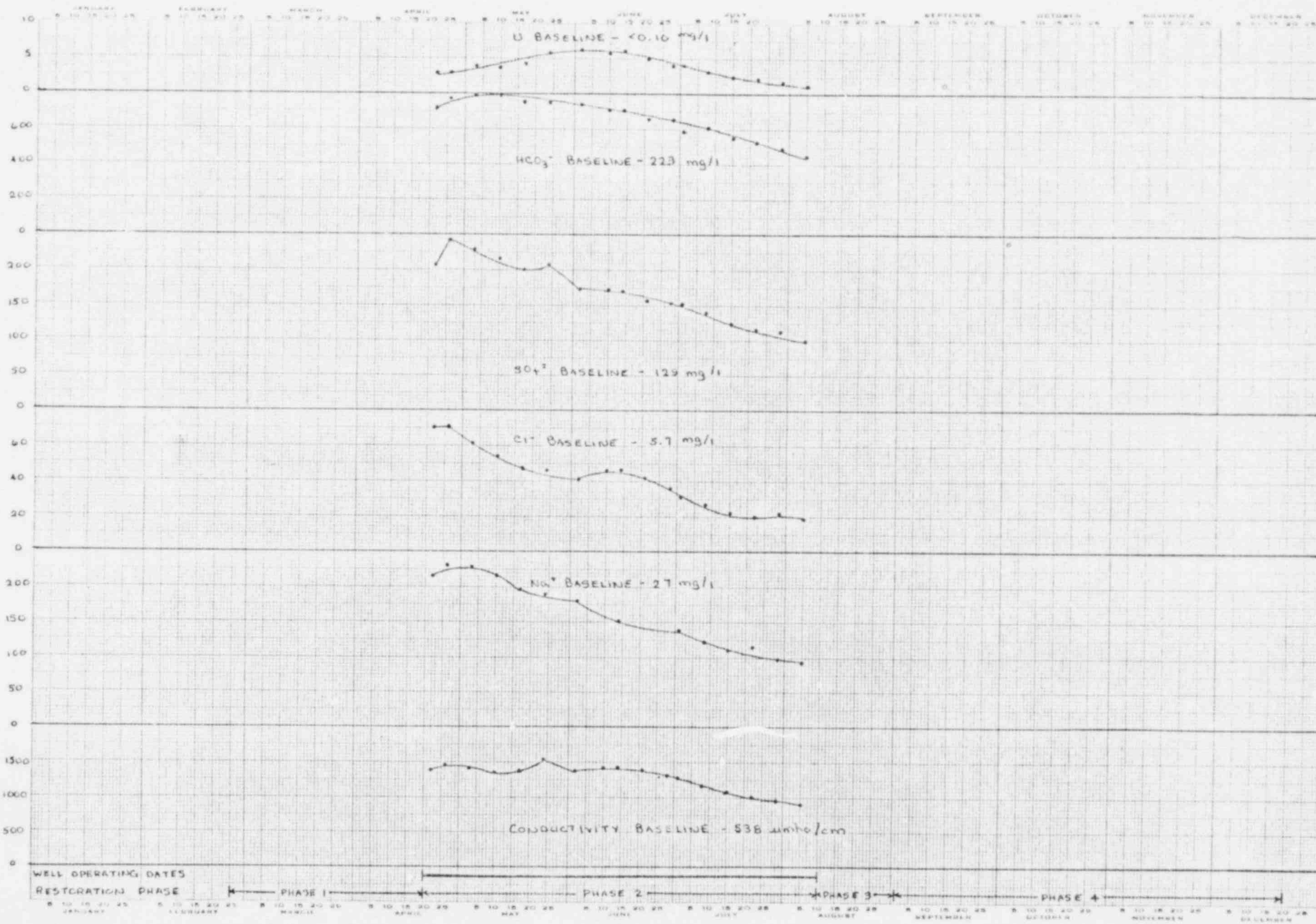

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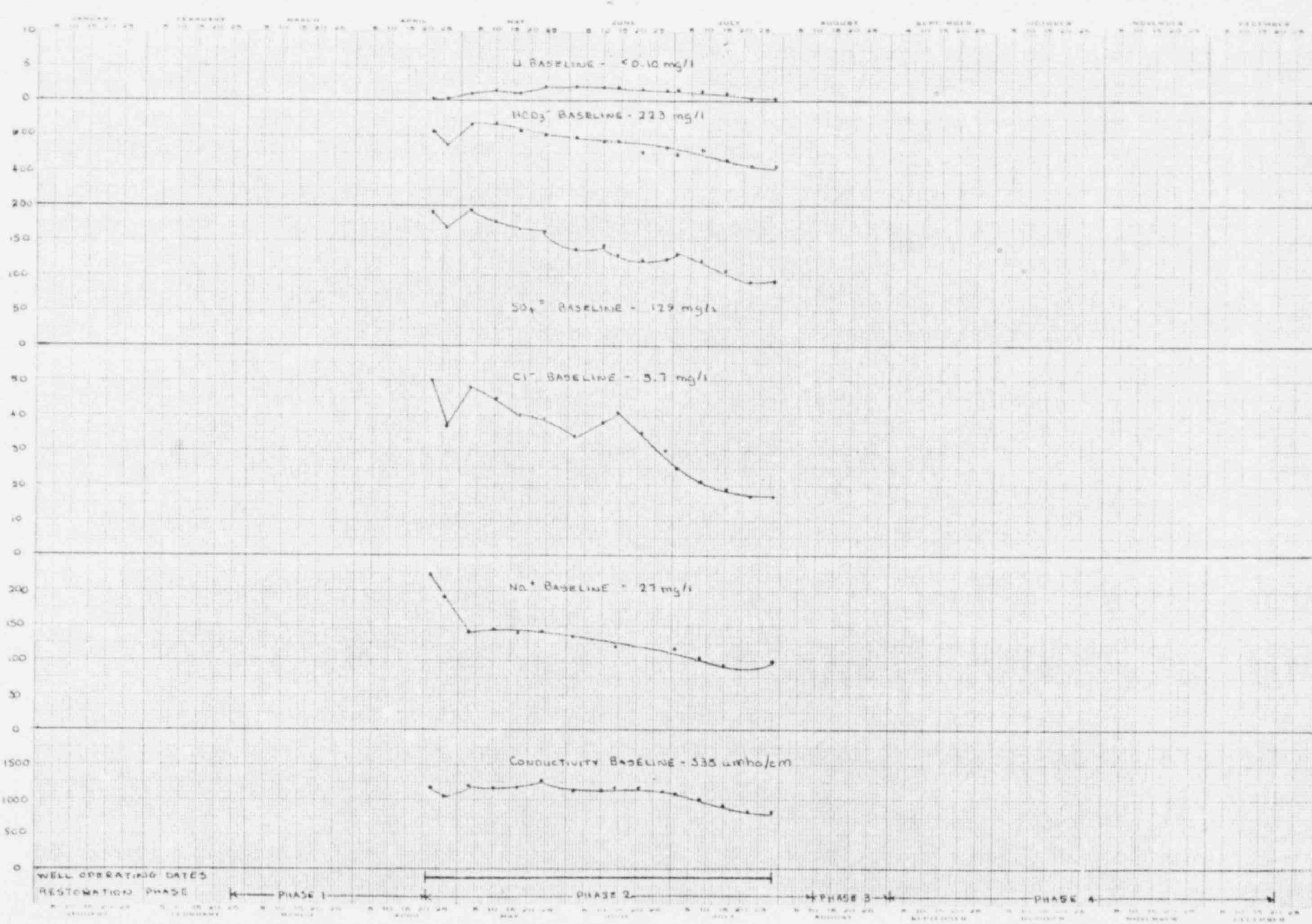
SECTION 4.2 FIGURE III

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL MI-12

04008728 110E



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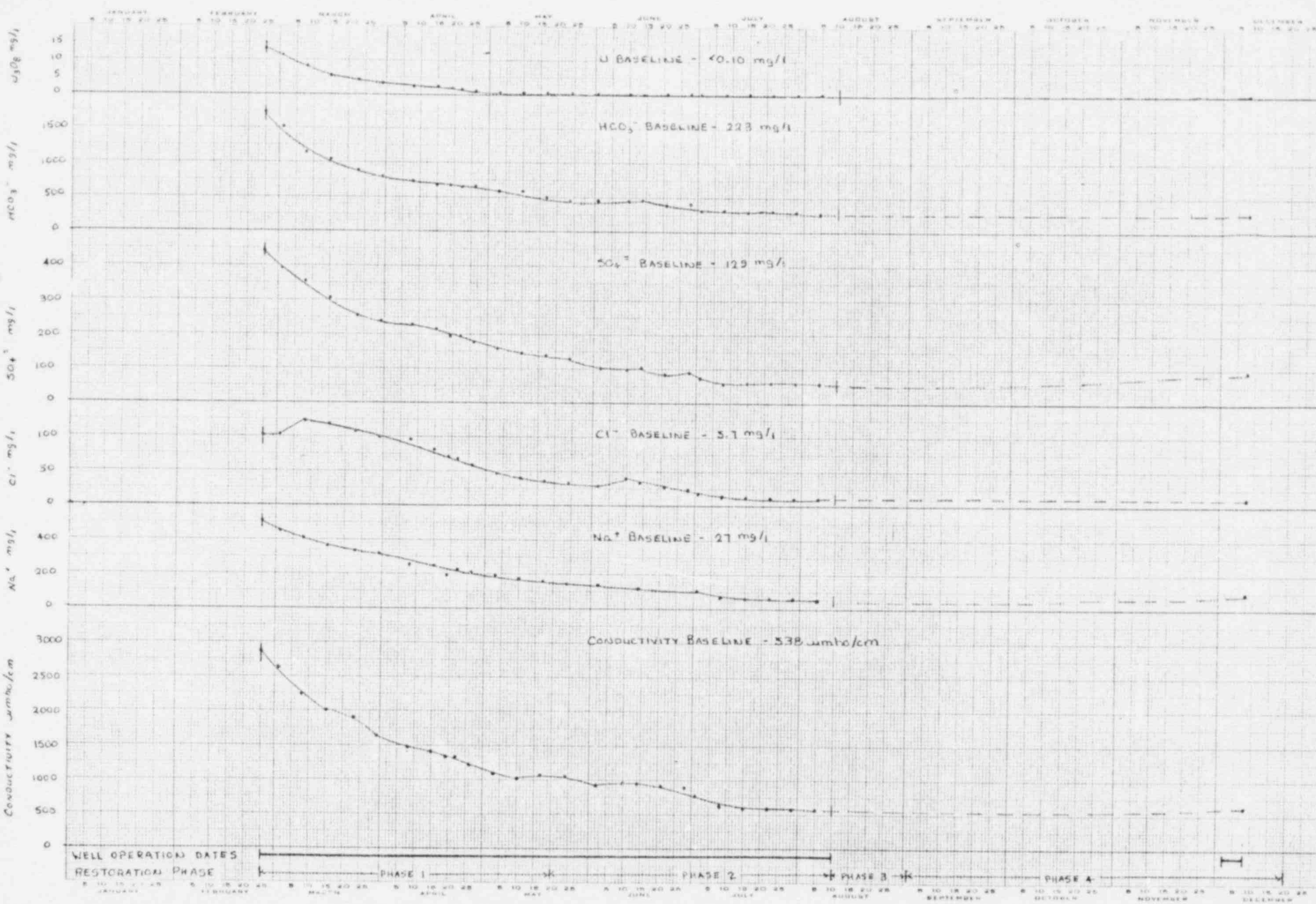
SECTION 4.2 FIGURE IV

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL MR-5



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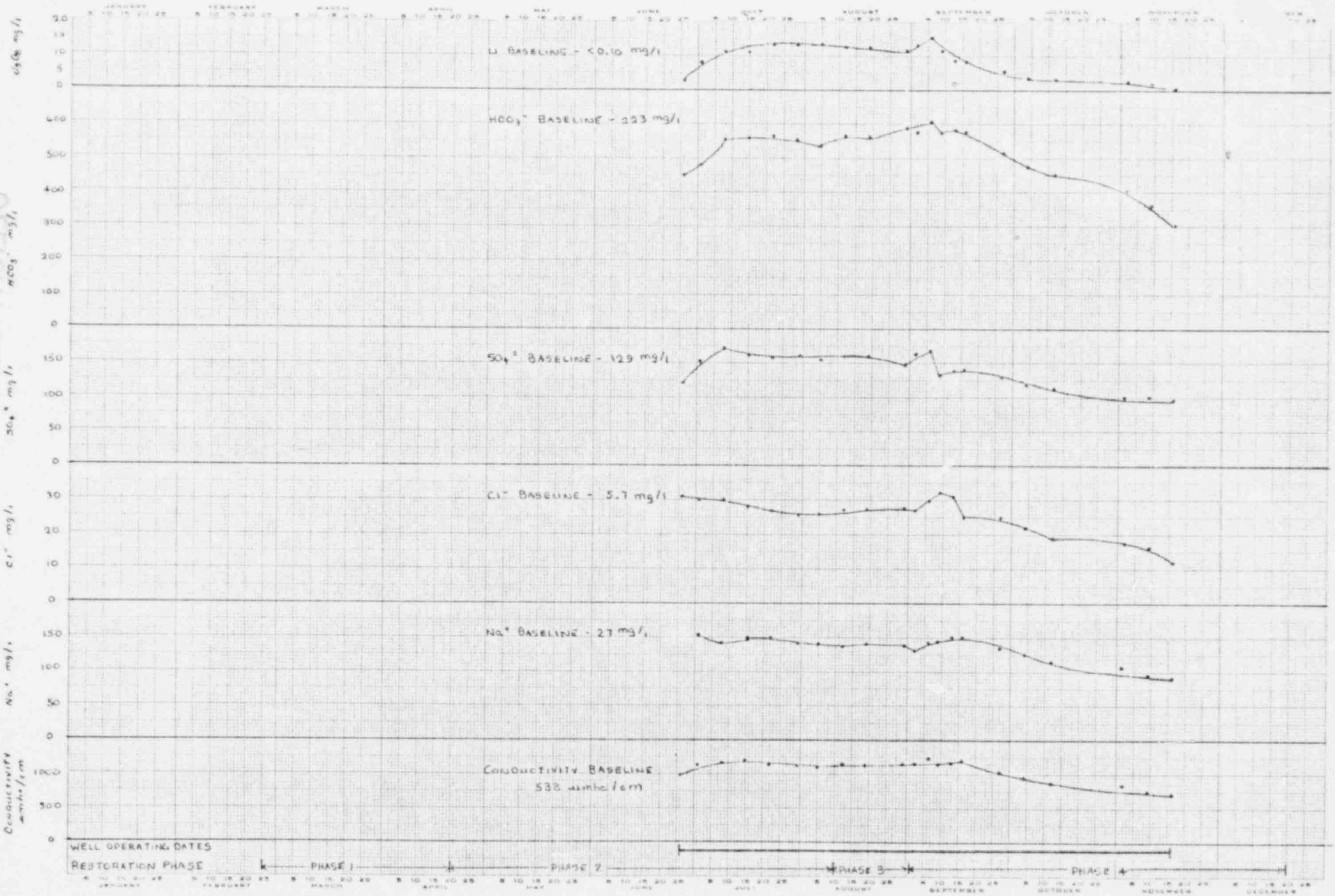
SECTION 4.2 FIGURE V

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL M1-3



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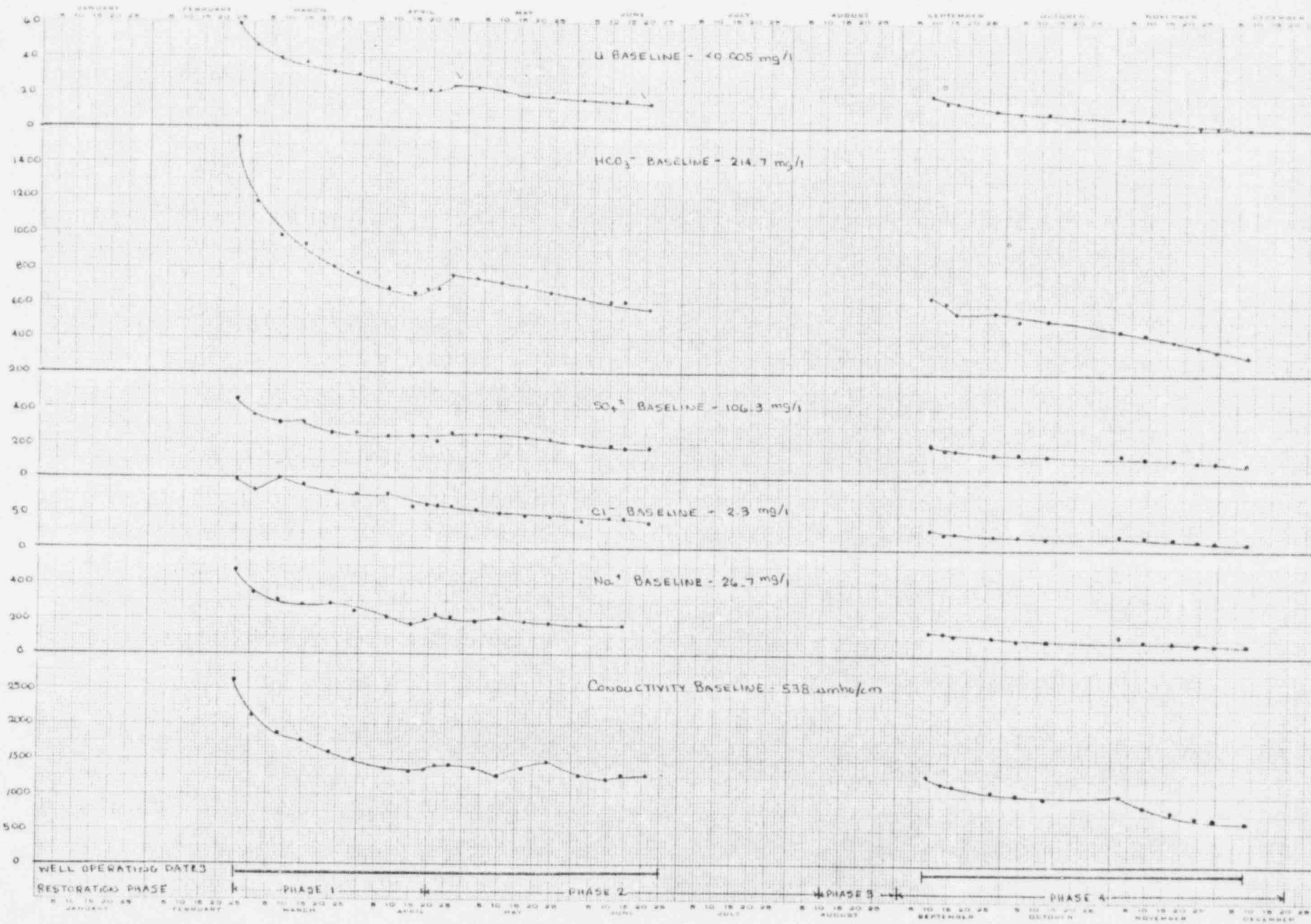
SECTION 4.2 FIGURE VI

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL 301



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SECTION 4.2 FIGURE VII

UNC-TETON EXPLORATION DRILLING COMPANY INC.
LEUENFLRGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL 306

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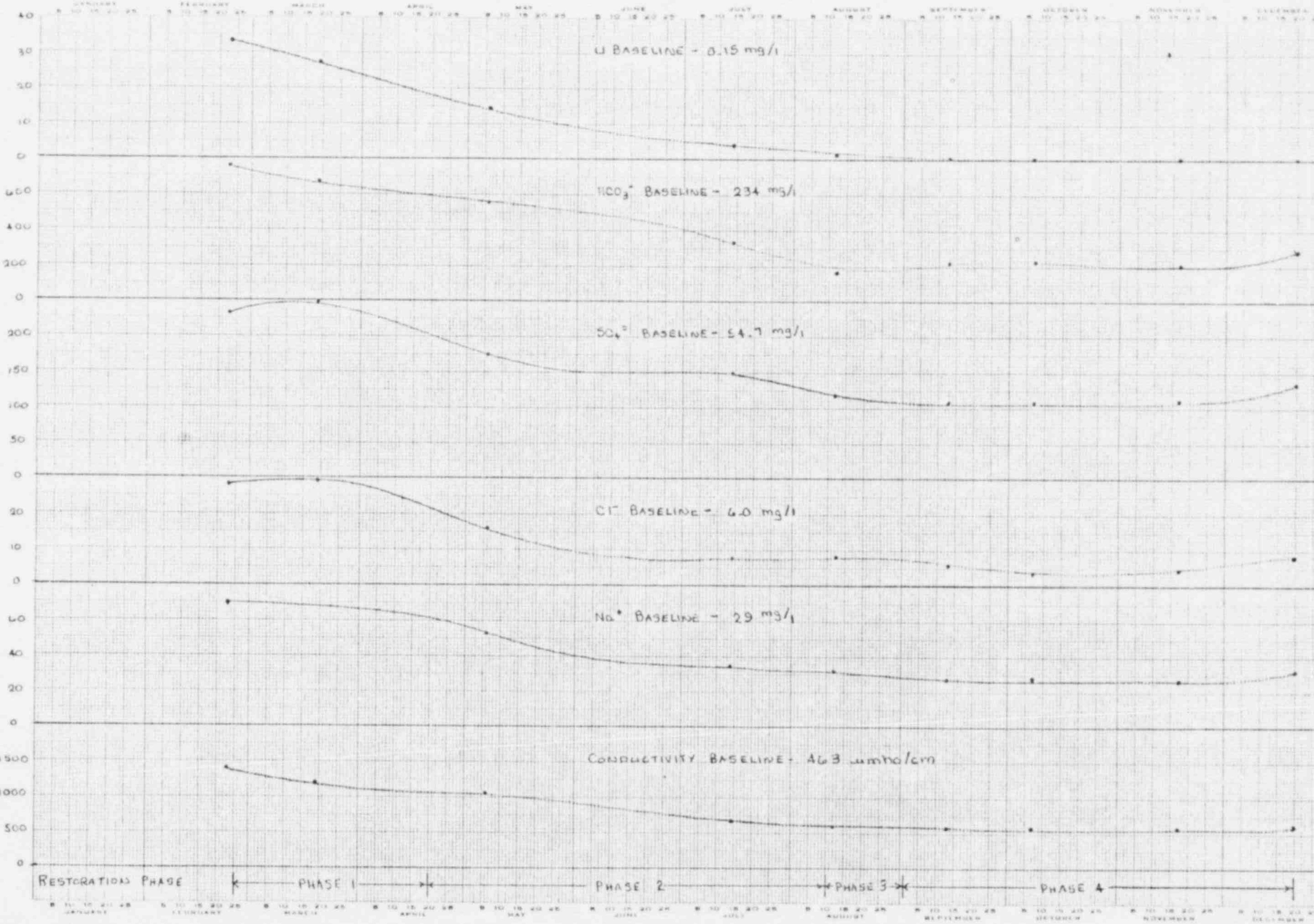

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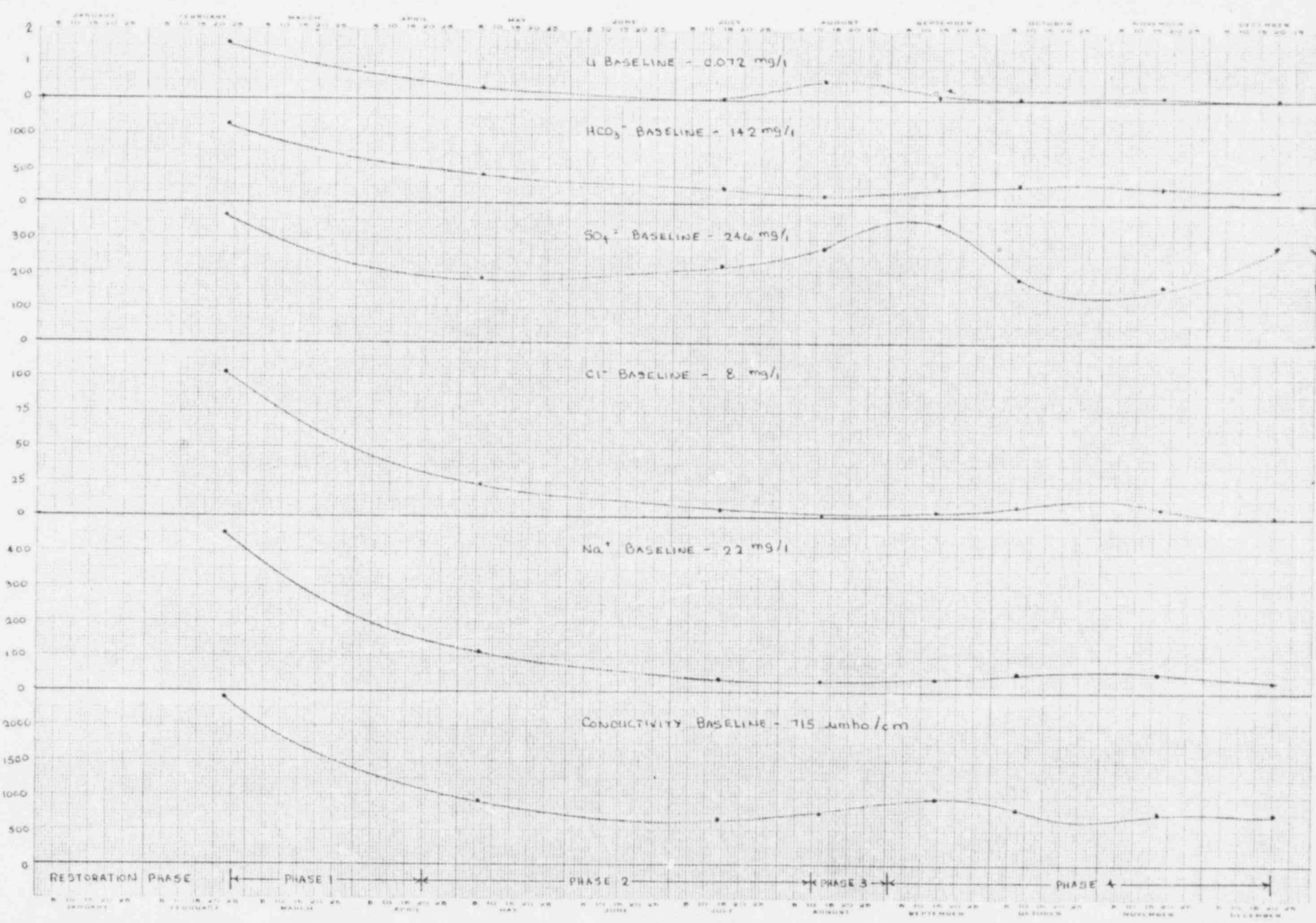
SECTION 4.2 FIGURE VIII

UNC-TETON EXPLORATION DRILLING COMPANY, INC.
LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL 308



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4.3 Phase 3 - Results and Discussion

The M-3 directional sweep program due to the extensive time required for completion of the M-5 area, was altered from the plan. As it was suspected that some 315 lbs. of Cl^- had been recovered from the M-3 area during Phase 2, and that the possibility existed that additional pounds had been recovered at the M-1 area, it was decided to focus recovery nearer the M-1 end of the wellfield. M-3 area recovery wells designated were M1-2, M1-4 and MR-3 and injection was diverted to M1-6, 8, 10 and 12. M-1 area recovery wells included M1-1 and M1-3.

Phase 3 was operated from August 10, 1981 through September 1, 1981 or 22 days. Although this compared favorably with the proposed schedule of 16 days, only 39 lbs. Cl of an expected 207 lbs. were recovered directly from the M-3 pattern. A total of 136 lbs. Cl were recovered and removed from the total zone and each of the M-3 recovery wells were restored to near baseline levels.

A total of 1,469,742 gallons were recovered from the zone and after IX and EDR treatment, 1,345,921 gallons of baseline quality water were reinjected. Of the total recovery, 808,317 gallons of IX effluent was diverted to the EDR unit for treatment and 691,943 product gallons were generated. The unit provided an 85.6% water recovery and 89.0% salt rejection. A total of 116,374 gallons were rejected as EDR brine.

To September 1, 1981, a total of 1,123,935 gallons or 1.16 wellfield pore volumes had been bled from the restoration process while circulating 15.66 pore volumes through the restoring wellfield.

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Attachments:

A. Section 4.3, Figure I - Phase3-Wellfield Operation

B. Section 4.3, Table I - M-Zone Restoration Data Base

C. Section 4.3, Figures II-VI - Phase 2-Analytical Trends

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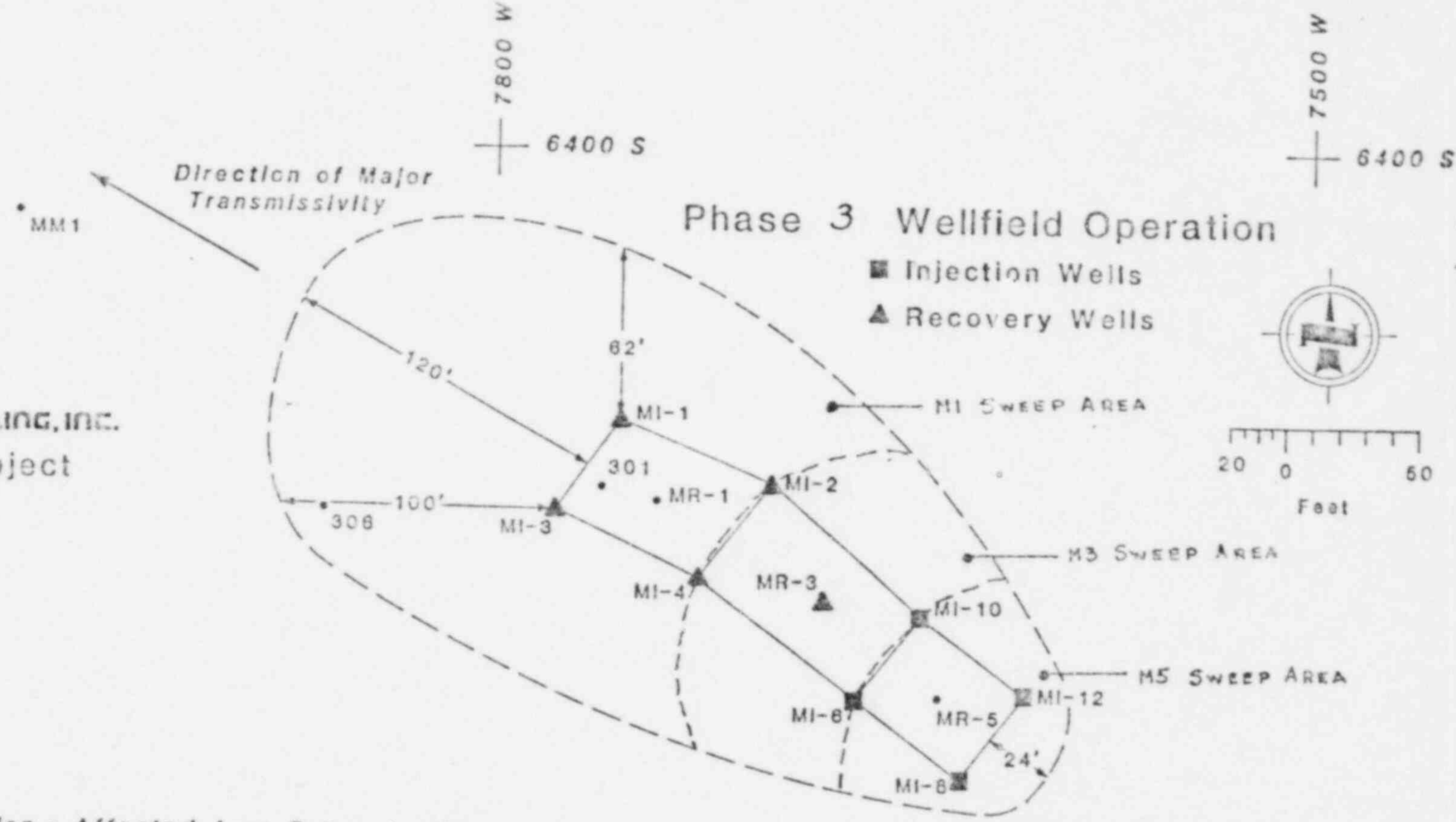
UNC TETON EXPLORATION DRILLING, INC.

Leuenberger Project

Sec. 4.3. Fig. I



M-Zone Wellfield Operation - Affected Area Determination - Data Base - 1/22/80 - 2/25/80

		Gallons Inj/Rec	Field Dimensions	Field Area/Ft²	Sand Thickness	Field Volume/Ft³	Porosity	Reservoir Volume/Gal
CELLS	M-1	20,204,884(R	60.5'x43'	2,562	70'	179,354	24.8%	332,709
	M-3	5,067,319(R	72.5'x42'	3,000	72.6'	217,764	24.8%	403,961
	M-5	2,726,833(R	49.5'x39.5'	1,926	65.3'	125,755	24.8%	233,281
INJECTION WELLS	MI-1	5,270,011(I)			68'			
	MI-2	4,291,421(I)			80'			
	MI-3	5,360,729(I)			57'			
	MI-4	6,718,998(I)			65'			
	MI-6	2,411,642(I)			71'			
	MI-8	513,926(I)			62'			
	MI-10	2,006,213(I)			66'			
	MI-12	574,836(I)			60'			
	Total	27,147,776(I)	182.5'x40.5'	7,488	69.3'	618,918	24.8%	969,951

Lbs Cl⁻ Inj-Rec	Lbs Cl⁻ In Field	Lbs Cl⁻ Ext Area	Gal/Ft²	Affected Area Ext/Ft²	Affected Volume/Gal
	280.4		129.85		
	340.5		134.67		
	196.6		121.10		
460.5		332.5	129.85	6,076	788,957
377.5		266.7	132.26	4,785	632,826
490.9		338.9	129.85	6,193	804,143
632.4		429.8	132.26	7,711	1,019,830
250.7		161.2	127.89	2,991	382,496
53.4		34.4	121.10	674	81,624
208.6		134.1	127.89	2,488	318,193
59.8		38.4	121.10	752	91,116
2,554	817.5	1,736.5	129.54	31,670	4,119,185

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M-ZONE RESTORATION DETERMINATION OF LEACH AFFECTED AREA

UNC - TETON EXPLORATION DRILLING CO., INC. LEUENBERGER PROJECT

M ZONE RESTORATION - DATA BASE

(SECTION 4.3 TABLE I

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WELLFIELD RECOVERY

REC. WELLS*	DATES OPERATED	[Cl⁻] I	[Cl⁻] F	% RED*	[TDS] I	[TDS] F	% RED*	GALLONS RECOVERED	PORE VOL. REC.*	Lb. Cl⁻ EXT.*	% Cl⁻ EXT.*
PHASE 1 2/25/81 - 4/20/81											
301	2/25/81 - 4/20/81	97	59	39.2	2347	1107	52.8	2211320	2.28	54.8	2.1
MR-1	2/25/81 - 4/20/81	101	65	35.6	2434	1240	49.1	1663801	1.72	41.2	1.6
MR-3	2/25/81 - 4/20/81	111	75	32.4	2773	1194	56.9	1832753	1.89	45.4	1.8
MR-5	2/25/81 - 4/20/81	103	69	33.0	2572	1107	57.0	748876	0.77	18.6	0.7
	TOTALS	107	68	36.4	2604	1208	53.6	6456750	6.66	160.0	6.3
PHASE 2 4/21/81 - 8/10/81											
MI-3	6/26/81 - 8/10/81	22.0	9.0	67.9	884	361	59.2	990582	1.02	122.5	4.8
MI-8	4/21/81 - 8/10/81	62.0	17.0	72.6	1055	734	30.4	1345119	1.39	260.6	10.2
MI-12	4/21/81 - 7/29/81	54.0	17.0	68.5	1083	714	34.1	1077541	1.11	159.9	6.3
301	4/21/81 - 6/25/81	57.0	37.0	35.1	1232	1160	5.8	2625029	2.71	551.9	21.6
MR-5	4/21/81 - 8/10/81	67.0	13.0	80.6	1216	470	61.3	1213440	1.25	200.1	7.8
	TOTALS	58.0	19.0	67.2	1188	721	39.3	7251711	7.48	1295	50.7
PHASE 3 8/10/81 - 9/1/81											
MI-2	8/10/81 - 8/13/81	9.0	11.3	-25.6	361	367	-1.7	5011	0	0.2	—
MI-3	8/10/81 - 9/1/81	26.0	27.3	-5.0	965	1028	-6.5	634730	0.65	71.5	2.8
MI-4	8/10/81 - 9/1/81	11.0	15.0	-36.4	398	595	-49.5	307365	0.32	17.6	0.7
MR-3	8/11/81 - 9/1/81	18.0	14.2	20.0	758	612	19.3	336280	0.35	21.0	0.8
MI-1	8/14/81 - 9/1/81	29.4	36.5	-24.1	1084	1108	-2.2	186356	0.19	25.8	1.0
	TOTALS	17.0	25.1	-47.6	684	868	-26.9	1469742	1.52	136.1	5.3
PHASE 4 9/1/81 - 12/20/81											
MI-1	9/1/81 - 12/20/81	34.1	14.8	56.6	1096	658	40.0	2842563	2.93	270.2	10.6
MI-3	9/1/81 - 11/16/81	27.1	13.4	50.6	1016	581	42.8	979295	1.01	119.2	4.7
301	5/8/81 - 12/8/81	31.1	11.4	63.3	1137	553	51.4	2467701	2.54	243.2	9.5
MR-1	9/1/81 - 9/30/81; 12/8/81 - 12/14/81	12.8	11.9	7.0	682	520	23.8	808791	0.83	61.5	2.4
MR-3	9/1/81 - 9/8/81; 12/2/81 - 12/8/81	13.3	11.9	10.5	548	530	3.3	262662	0.27	—	—
MR-5	12/2/81 - 12/8/81	11.2	10.9	2.7	515	553	-7.4	52133	0.05	—	—
	TOTALS	21.9	12.9	41.1	813	579	28.8	7413145	7.64	694.1	27.2
M ZONE RESTORATION - PHASE 1 THROUGH PHASE 4 - TOTAL											
MR-1	PHASES 1,4	101	11.9	88.2	2434	520	78.6	2472592	2.55	102.7	4.0
MR-3	PHASES 1,3,4	111	10.5	90.5	2773	530	80.9	2431695	2.51	66.4	2.6
MR-5	PHASES 1,2,4	103	10.9	89.4	2572	553	78.5	2014449	2.08	218.7	8.6
301	PHASES 1,2,4	97	11.4	88.2	2347	553	76.4	7304050	7.53	849.9	33.3
MI-1	PHASES 3,4	29.4	14.8	49.7	1084	658	39.3	3028919	3.12	296	11.6
MI-2	PHASE 3	9	11.3	-25.6	361	367	-1.7	5011	NO	0.2	NO
MI-3	PHASES 2,3,4	28	13.4	52.1	884	581	34.3	2604607	2.69	313.2	12.3
MI-4	PHASE 3	11	15	-36.4	398	595	-49.4	307365	0.32	17.6	0.7
MI-8	PHASE 2	62	17	72.6	1055	734	30.4	1345119	1.39	260.6	10.2
MI-12	PHASE 2	54	17	68.5	1083	714	34.1	1077541	1.11	159.9	6.3
	TOTALS	107	12.9	87.9	2604	579	77.8	22591548	23.29	2285	89.5

WELLFIELD INJECTION / ELECTRODIALYSIS UNIT OPERATION (EDR)

INJ. WELLS	DATES OPERATED	GALLONS INJECTED	% O.R.*	BRINE GALLONS	PORE VOLS.*	FEED GALLONS	% of REC*	PRODUCT GALLONS	% of INJ*	% SALT REJ*	% WATER REC.*
PHASE 1											
MI-1	2/25/81 - 4/20/81	1101225									
MI-2	2/25/81 - 4/20/81	481613									
MI-3	2/25/81 - 4/20/81	799627									
MI-4	2/25/81 - 4/20/81	2107296									
MI-6	2/25/81 - 4/20/81	358570									
MI-8	2/25/81 - 4/20/81	145486									
MI-10	2/25/81 - 4/20/81	849219									
MI-12	2/25/81 - 4/20/81	206714									
	TOTALS	5989150	7.23	376038	0.39	2012315	31.2	1636277	27.3	85.1	80.3
PHASE 2											
MI-2	4/21/81 - 8/10/81	937091									
MI-4	4/21/81 - 8/10/81	2271895									
MI-6	4/21/81 - 8/10/81	1481809									
MI-10	4/21/81 - 8/10/81	1966475									
	TOTALS	6657270	8.20	631523	0.65	4094016	56.5	3462493	52.0	83.9	84.6
PHASE 3											
MI-6	8/10/81 - 9/1/81	260476									
MI-8	8/10/81 - 9/1/81	151487									
MI-10	8/10/81 - 9/1/81	567288									
MI-12	8/10/81 - 9/1/81	366670									
	TOTALS	1345921	8.42	116374	0.12	808317	55.0	691943	51.4	89.0	85.6
PHASE 4											
MI-2	9/1/81 - 12/20/81	684647									
MI-3	11/17/81 - 12/20/81	706514									
MI-4	9/1/81 - 12/20/81	2223246									
MI-6	9/1/81 - 12/14/81	722071									
MI-8	9/1/81 - 12/8/81	426263									
MI-10	9/1/81 - 12/14/81	944567									
MI-12	9/1/81 - 12/8/81	755512									
	TOTALS	6462820	12.8	581536	0.60	3549215	47.9	2967679	40.0	89.0	83.6
PHASE 1 THROUGH PHASE 4 - TOTAL											
MI-1	PHASE 1	1101225									
MI-2	PHASES 1,2,4	2103351									
MI-3	PHASES 1,4	1446141									
MI-4	PHASES 1,2,4	6602437									
MI-6	PHASES 1,2,3,4	2822926									
MI-8	PHASES 1,3,4	723236									
MI-10	PHASES 1,2,3,4	4327549									
MI-12	PHASES 1,3,4	1328896									
	TOTALS	20455761	9.45	1705471	1.76	10463863	46.3	8758392	42.8	89.4	83.7

* HEADING DEFINITIONS - ABBREVIATIONS

* REC. WELLS - RECOVERY WELLS
* [Cl⁻] I - INITIAL Cl⁻ CONCENTRATION mg/l
* [Cl⁻] F - FINAL Cl⁻ CONCENTRATION mg/l
* % RED - % REDUCTION
* [TDS] I - INITIAL CALCULATED TDS mg/l
* [TDS] F - FINAL CALCULATED TDS mg/l
* PORE VOL. REC - PORE VOLUMES RECOVERED
(FIELD PORE VOLUME = 969951 GAL. (FIG. 2)
* Lb. Cl⁻ EXT. - POUNDS Cl⁻ ION EXTRACTED
* % Cl⁻ EXT. - % Cl⁻ ION EXTRACTED
REFERS TO Cl⁻ ION LOST DURING MINING - 2554 lb.
* % O.R. - % WELLFIELD OVER RECOVERY
* % of REC - % of RECOVERY TREATED BY EDR UNIT
* % of INJ - EDR PRODUCT RATIO TO INJECTION
* % SALT REJ - % TDS REMOVAL BY EDR
* % WATER REC - EDR PRODUCT TO FEED RATIO

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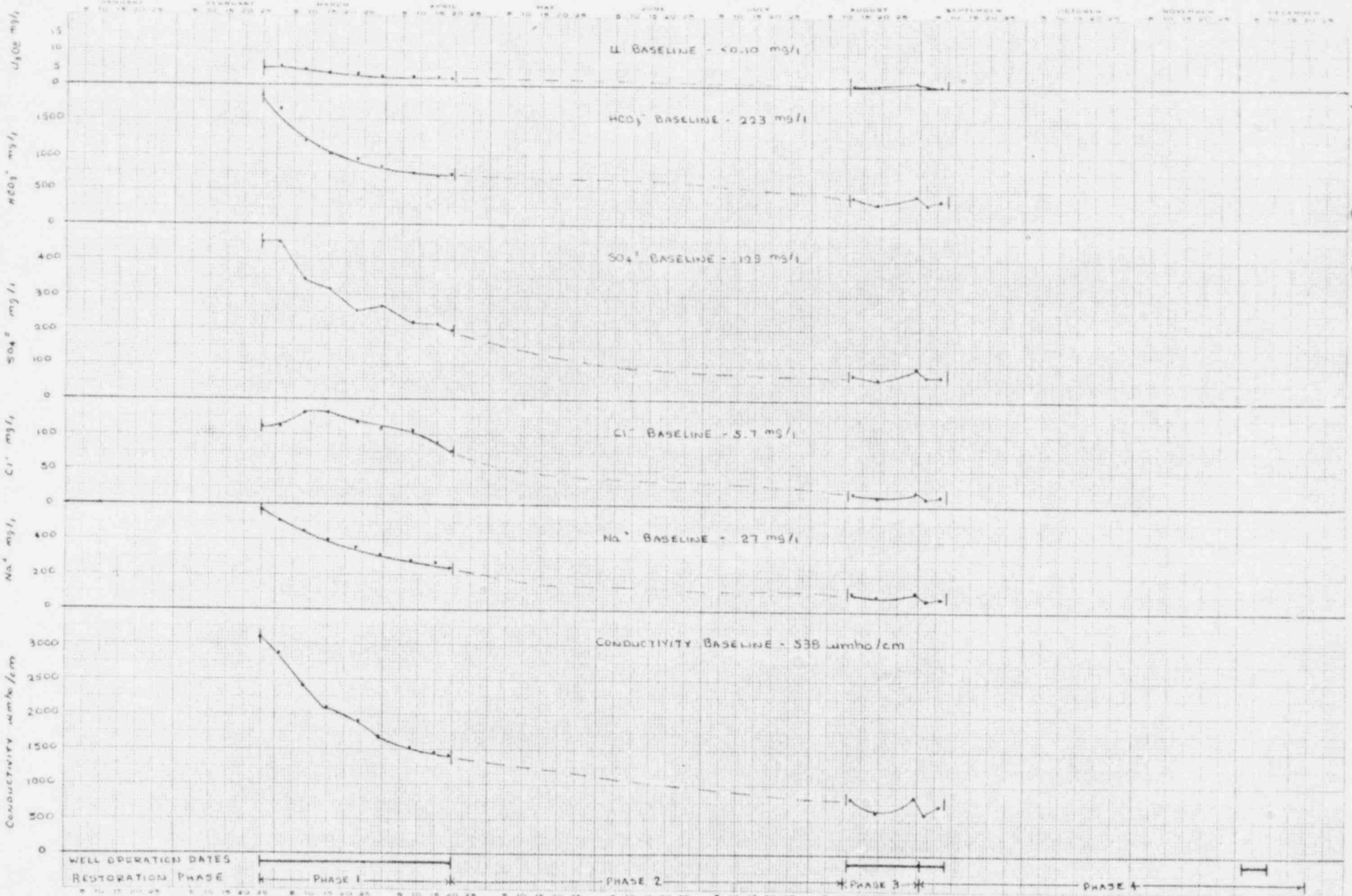
SECTION 4.3 FIGURE 11

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL MR-3



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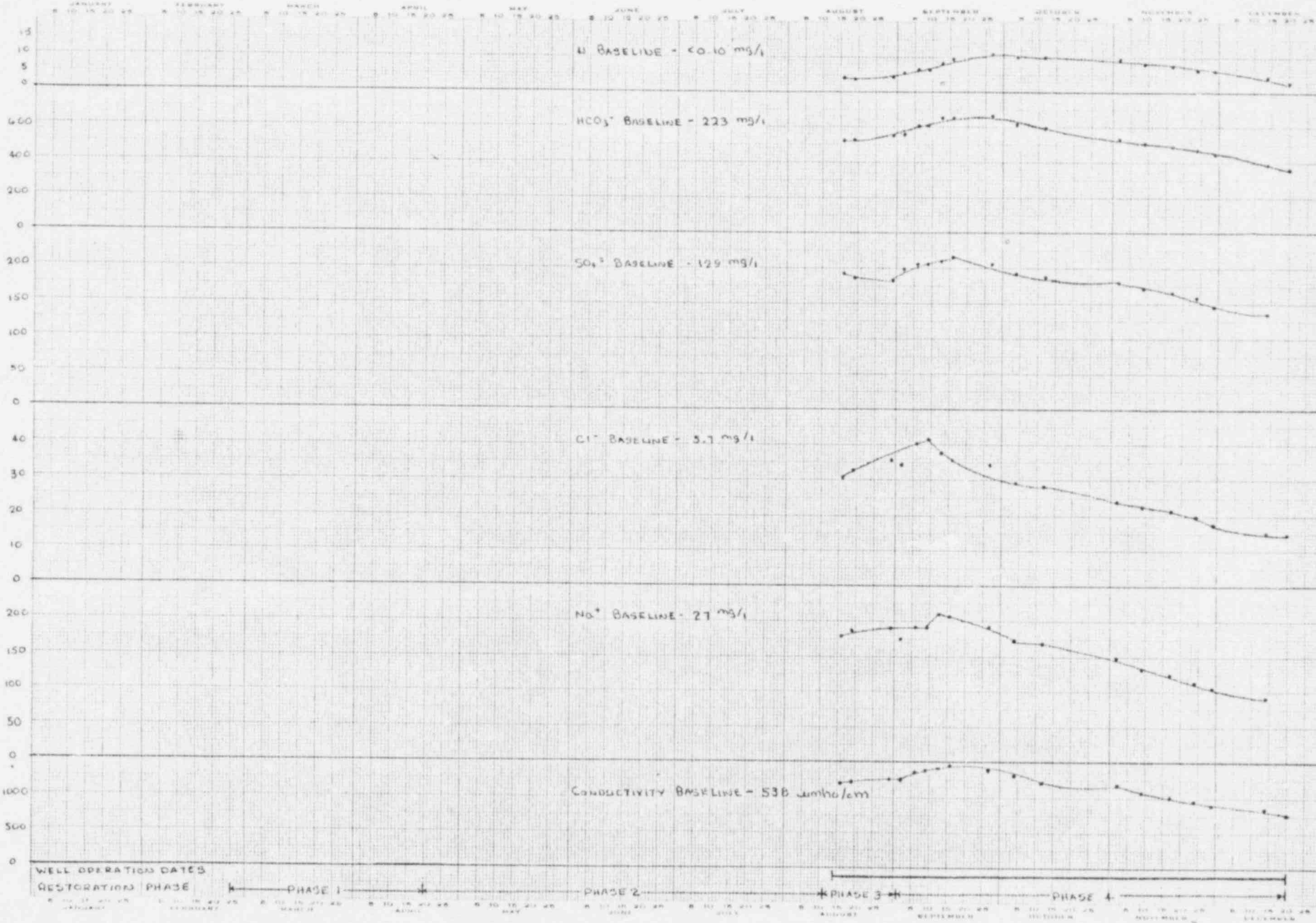
SECTION 4.3 FIGURE III

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL M1-7



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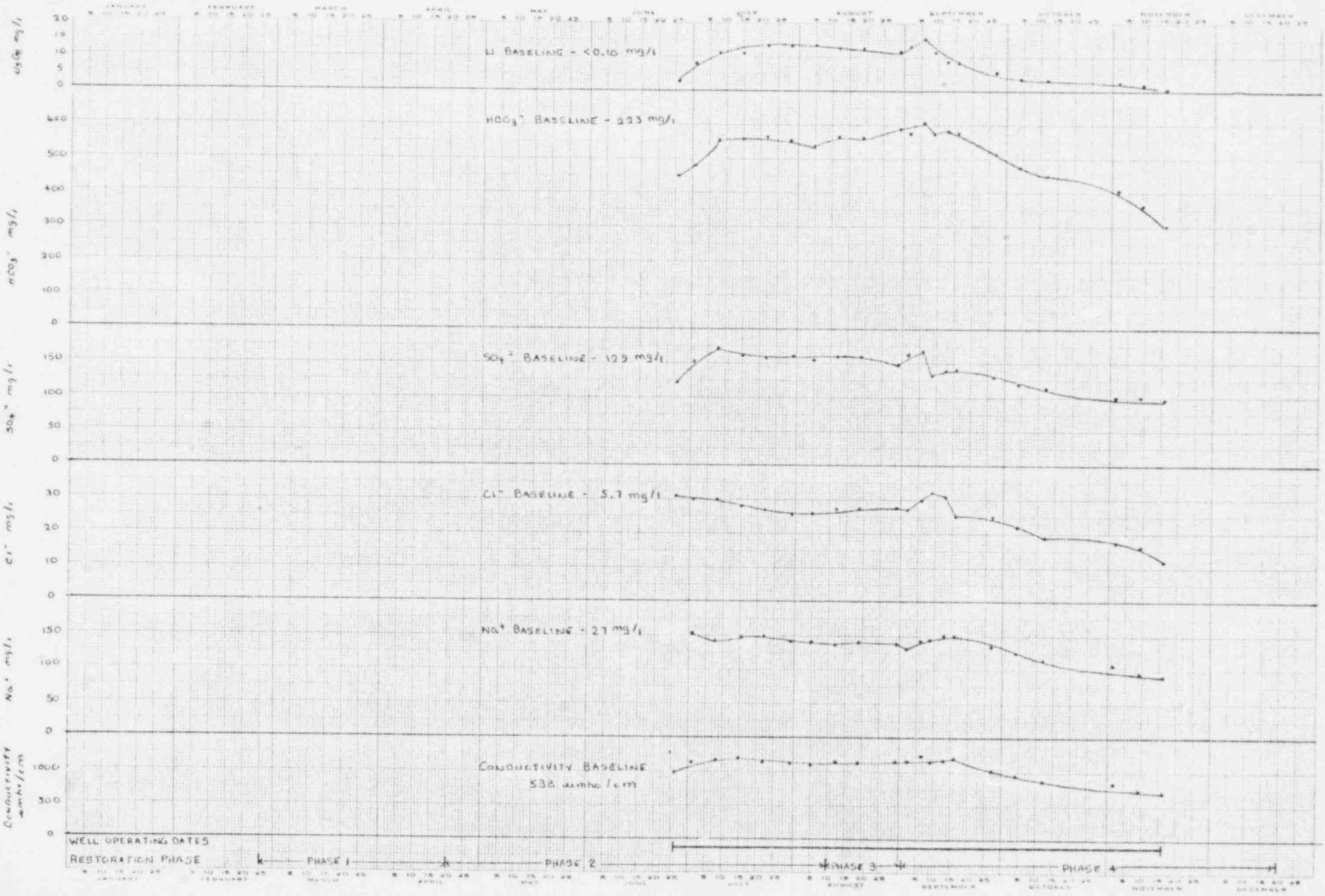
SECTION 4.3 FIGURE IV

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL MI-3



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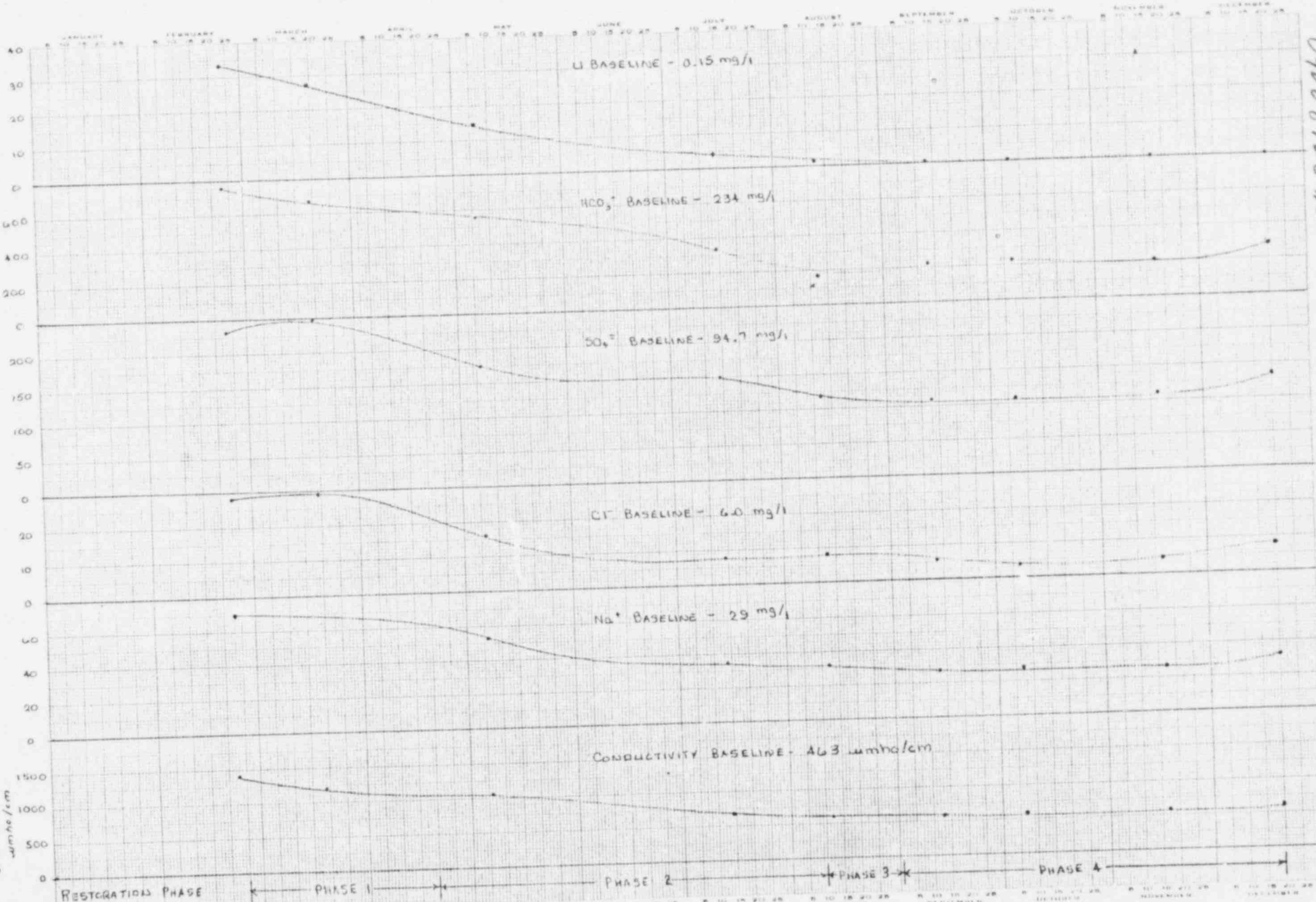
SECTION 4.3 FIGURE V

UNC-TETON EXPLORATION DRILLING COMPANY INC. ANALYTICAL TRENDS WELL 306

LEUENBERGER PROJECT M ZONE RESTORATION



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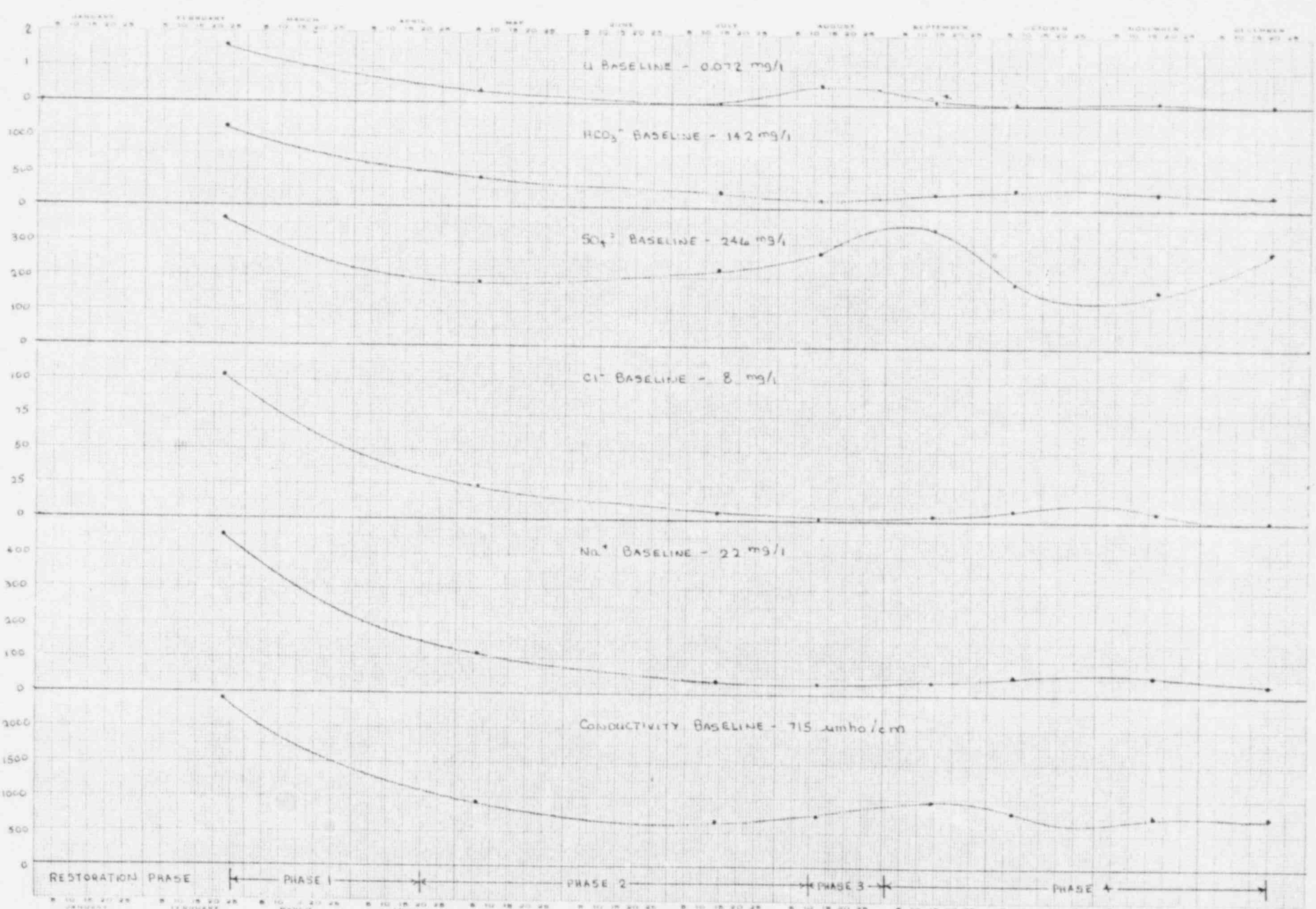
SECTION 4.3 FIGURE VI

UNC-TETON EXPLORATION DRILLING COMPANY, INC.
LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL 308



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4.4 Phase 4 - Results and Discussion

The final phase of M-Zone restoration was initiated September 1, 1981 and consisted of withdrawing solution from M-1 area wells, M1-1, M1-3 and MR-1 while injecting to M1-2, 4, 6, 8, 10 and 12. Well 301 was brought on-line as a producer September 8, 1981 and Well M1-3 was converted to an injector November 17, 1981. Due to the directional sweep approach utilized and consistently injecting "behind" the affected area as restoration progressed, it was determined that the balance of leach affected solution could be recovered through the M-1 area.

A total of 1,591 lbs. Cl^- or 62.3% of that lost during mining had been recovered and removed in Phases 1-3 which left .963 lbs. available for a total Cl^- removal. Between September 1 and December 20, 1981, 694.1 lbs. Cl^- were actually removed by the EDR unit which represented a total 89.5% removal rate.

Phase 4 required 111 days for completion which closely matched the 110 day schedule. As wells began showing baseline water quality, they were withdrawn from service. From December 8 to December 20 M1-1 was the sole M-1 area recovery well. Each of the original recovery wells was pumped for a several day period to insure that all leach affected water had been treated in the other sweep areas.

A total of 7,413,145 gallons were recovered and treated during Phase 4. Of the total 3,549,215 gallons were fed to the EDR unit

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which provided 2,967,679 product gallons for reinjection to the zone. Injection flow totalled 6,462,820 gallons during the phase. The EDR unit was capable of a 89% salt rejection with an 83.6 water recovery. Brine flow totalled 581,536 gallons or 0.60 wellfield pore volumes.

Attachments:

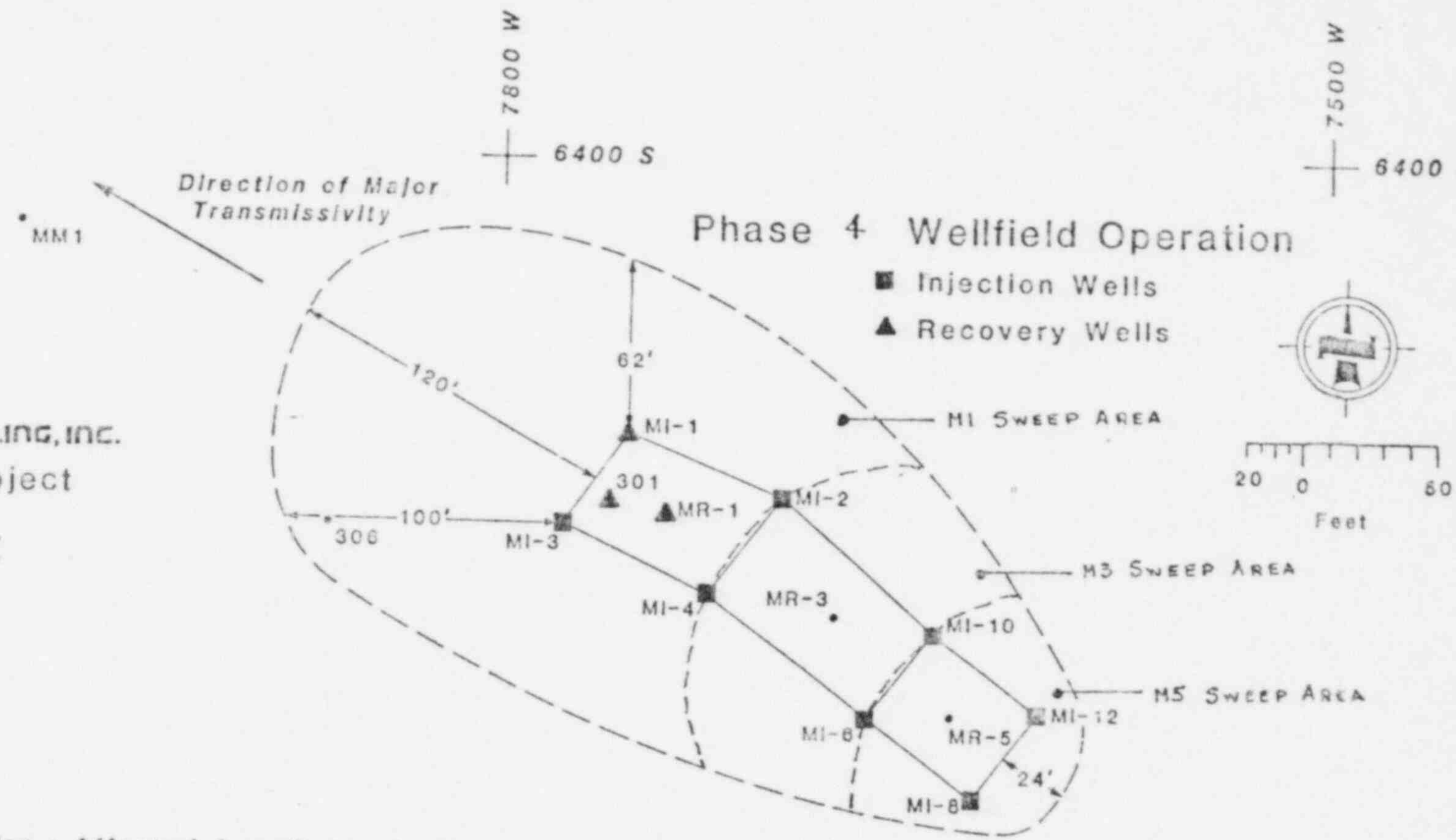
A. Section 4.4, Figure I - Wellfield Operation

B. Section 4.4, Table I - M-Zone Restoration Data Base

C. Section 4.4, Figures II-VII - Analytical Trends

UNC TETON
EXPLORATION DRILLING, INC.
Leuenberger Project

Sec. 4.4. Fig. I



Extent of Lixiviant Migration

M-Zone Wellfield Operation - Affected Area Determination - Data Base - 1/22/80 - 2/25/80

		Gallons Inj/Rec	Field Dimensions	Field Area/Ft²	Sand Thickness	Field Volume/Ft³	Porosity	Reservoir Volume/Gal	Lbs Cl⁻ Inj-Rec	Lbs Cl⁻ In Field	Lbs Cl⁻ Ext Area	Gal/Ft³	Affected Area Ext/Ft²	Affected Volume/Gal
CELLS	M-1	20,204,884(R	60.5'x43'	2,562	70'	179,354	24.8%	332,709		280.4		129.85		
	M-3	5,067,319(R	72.5'x42'	3,000	72.6'	217,764	24.8%	403,961		340.5		134.67		
	M-5	2,726,833(R	49.5'x39.5'	1,926	65.3'	125,755	24.8%	233,281		196.6		121.10		
INJECTION WELLS	MI-1	5,270,011(I)			68'				480.5		332.5	129.85	6,076	788,957
	MI-2	4,291,421(I)			80'				377.5		266.7	132.26	4,785	632,826
	MI-3	5,360,729(I)			57'				490.9		336.9	129.85	6,193	804,143
	MI-4	6,718,998(I)			65'				632.4		429.8	132.26	7,711	1,019,830
	MI-6	2,411,642(I)			71'				250.7		161.2	127.89	2,991	382,496
	MI-8	513,926(I)			62'				53.4		34.4	121.10	674	81,624
	MI-10	2,006,213(I)			66'				208.6		134.1	127.89	2,468	318,193
	MI-12	574,836(I)			60'				59.8		38.4	121.10	752	91,116
	Total	27,147,776(I)	182.5'x40.5'	7,488	69.3'	518,918	24.8%	969,951	2,554	817.5	1,736.5	129.54	31,670	4,119,165

M-ZONE RESTORATION DETERMINATION OF LEACH AFFECTED AREA

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UNC-TETON EXPLORATION DRILLING CO., INC. LEUENBERGER PROJECT

M ZONE RESTORATION - DATA BASE

SECTION 4.1. TABLE I

REC.* WELLS	DATES OPERATED	[Cl⁻] I	[Cl⁻] F	% RED	[TDS] I	[TDS] F	% RED	GALLONS RECOVERED	PORE VOL. REC.	Lb. Cl⁻ EXT.	% Cl⁻ EXT.	INJ. WELLS	DATES OPERATED	GALLONS INJECTED	% O.R.	BRINE GALLONS	PORE VOLS.	FEED GALLONS	% OF REC	PRODUCT GALLONS	% OF INJ	% SALT REJ	% WATER REC.
WELLFIELD RECOVERY												WELLFIELD INJECTION				ELECTRODIALYSIS UNIT OPERATION (EDR)							
PHASE 1 2/25/81 - 4/20/81																							
301	2/25/81 - 4/20/81	57	59	39.2	2347	1107	52.8	2211320	2.28	54.8	2.1	MI-1	2/25/81 - 4/20/81	1101225									
MR-1	2/25/81 - 4/20/81	101	65	35.6	2434	1240	49.1	1663801	1.72	41.2	1.6	MI-2	2/25/81 - 4/20/81	481613									
MR-3	2/25/81 - 4/20/81	111	75	32.4	2773	1194	56.9	1832753	1.89	45.4	1.8	MI-3	2/25/81 - 4/20/81	739627									
MR-5	2/25/81 - 4/20/81	103	69	33.0	2572	1107	57.0	148876	0.77	18.6	0.7	MI-4	2/25/81 - 4/20/81	2107296									
												MI-6	2/25/81 - 4/20/81	358570									
												MI-8	2/25/81 - 4/20/81	145486									
												MI-10	2/25/81 - 4/20/81	849219									
												MI-12	2/25/81 - 4/20/81	206714									
	TOTALS	107	68	36.4	2604	1208	53.6	6456750	6.66	160.0	6.3		TOTALS	5989750	7.23	376038	0.39	2012315	31.2	1636277	27.3	85.1	80.9
PHASE 2 4/21/81 - 8/10/81																							
MI-3	6/26/81 - 8/10/81	28.0	9.0	67.9	884	361	59.2	990582	1.02	122.5	4.8	MI-2	4/21/81 - 8/10/81	937091									
MI-8	4/21/81 - 8/10/81	62.0	17.0	72.6	1055	734	30.4	1345119	1.39	260.6	10.2	MI-4	4/21/81 - 8/10/81	2271895									
MI-12	4/21/81 - 7/29/81	54.0	17.0	68.5	1083	714	34.1	1077541	1.11	159.9	6.3	MI-6	4/21/81 - 8/10/81	1481809									
301	4/21/81 - 6/25/81	57.0	37.0	35.1	1232	1160	5.8	2625029	2.71	551.9	21.6	MI-10	4/21/81 - 8/10/81	1966475									
MR-5	4/21/81 - 8/10/81	67.0	13.0	80.6	1216	470	61.3	1213440	1.25	200.1	7.8												
	TOTALS	58.0	19.0	67.2	1188	721	39.3	7251711	7.48	1295	50.7		TOTALS	6657270	8.20	631523	0.65	4054016	56.5	3462493	52.0	89.9	84.6
PHASE 3 8/10/81 - 9/1/81																							
MI-2	8/10/81 - 8/13/81	9.0	11.3	-25.6	361	367	-1.7	5011	0	0.2	—	MI-6	8/10/81 - 9/1/81	260476									
MI-3	8/10/81 - 9/1/81	26.0	27.3	-5.0	965	1028	-6.5	634730	0.65	71.5	2.8	MI-8	8/10/81 - 9/1/81	151487									
MI-4	8/10/81 - 9/1/81	11.0	15.0	-36.4	398	595	-49.5	307365	0.32	17.6	0.7	MI-10	8/10/81 - 9/1/81	567288									
MR-3	8/11/81 - 9/1/81	18.0	14.2	20.0	758	612	19.3	336280	0.35	21.0	0.8	MI-12	8/10/81 - 9/1/81	366670									
MI-1	8/14/81 - 9/1/81	29.4	36.5	-24.1	1084	1108	-2.2	186356	0.19	25.8	1.0												
	TOTALS	17.0	25.1	-47.6	684	868	-26.9	1469742	1.52	136.1	5.3		TOTALS	1345921	8.42	116374	0.12	808317	55.0	691943	51.4	89.0	85.6
PHASE 4 9/1/81 - 12/20/81																							
MI-1	9/1/81 - 12/20/81	34.1	14.8	56.6	1096	658	40.0	2842563	2.93	270.2	10.6	MI-2	9/1/81 - 12/20/81	684647									
MI-3	9/1/81 - 11/16/81	27.1	13.4	50.6	1016	581	42.8	979295	1.01	119.2	4.7	MI-3	11/17/81 - 12/20/81	706514									
301	9/8/81 - 12/8/81	31.1	11.4	63.3	1137	553	51.4	2467701	2.54	243.2	5.5	MI-4	9/1/81 - 12/20/81	2223246									
MR-1	9/1/81 - 9/30/81; 12/8/81 - 12/14/81	12.8	11.9	7.0	682	520	23.8	808791	0.83	61.5	2.4	MI-6	9/1/81 - 12/14/81	722071									
MR-3	9/1/81 - 9/8/81; 12/2/81 - 12/8/81	13.3	11.9	10.5	548	530	3.3	262662	0.27	—	—	MI-8	9/1/81 - 12/8/81	426263									
MR-5	12/2/81 - 12/8/81	11.2	10.9	2.7	515	555	-7.4	52133	0.05	—	—	MI-10	9/1/81 - 12/14/81	944567									
												MI-12	9/1/81 - 12/8/81	755512									
	TOTALS	21.9	12.9	41.1	813	579	28.8	7413145	7.64	694.1	27.2		TOTALS	6462820	12.8	581536	0.60	3545215	47.9	2967679	40.0	89.0	83.6
M ZONE RESTORATION - PHASE 1 THROUGH PHASE 4 - TOTAL																							
MR-1	PHASES 1,4	101	11.9	88.2	2434	520	78.6	2472592	2.55	102.7	4.0	MI-1	PHASE 1	1101225									
MR-3	PHASES 1,3,4	111	10.5	90.5	2773	530	80.9	2491695	2.51	66.4	2.6	MI-2	PHASES 1,2,4	2103351									
MR-5	PHASES 1,2,4	103	10.9	89.4	2572	553	78.5	2014449	2.08	218.7	8.6	MI-3	PHASES 1,4	1446141									
301	PHASES 1,2,4	97	11.4	88.2	2347	553	76.4	7304050	7.53	849.9	33.3	MI-4	PHASES 1,2,4	6602437									
MI-1	PHASES 3,4	29.4	14.8	49.7	1084	658	39.3	3028919	3.12	296	11.6	MI-6	PHASES 1,2,3,4	2822926									
MI-2	PHASE 3	9	11.3	-25.6	361	367	-1.7	5011	NO	0.2	NO	MI-8	PHASES 1,3,4	723236									
MI-3	PHASES 2,3,4	28	13.4	52.1	884	581	34.3	2604607	2.69	313.2	12.3	MI-10	PHASES 1,2,3,4	4327549									
MI-4	PHASE 3	11	15	-36.4	398	595	-49.4	307365	0.32	17.6	0.7	MI-12	PHASES 1,3,4	1328896									
MI-8	PHASE 2	62	17	72.6	1055	734	30.4	1345119	1.39	260.6	10.2												
MI-12	PHASE 2	54	17	68.5	1083	714	34.1	1077541	1.16	159.9	6.3												
	TOTALS	107	12.9	87.9	2604	579	77.8	22591948	23.29	2285	89.5		TOTALS	20455761	9.45	1705471	1.76	10463863	46.3	8758392	42.8	89.4	85.7

* HEADING DEFINITIONS - ABBREVIATIONS

* REC. WELLS - RECOVERY WELLS
* [Cl⁻] I - INITIAL Cl⁻ CONCENTRATION mg/l
* [Cl⁻] F - FINAL Cl⁻ CONCENTRATION mg/l
* % RED - % REDUCTION
* [TDS] I - INITIAL CALCULATED TDS mg/l
* [TDS] F - FINAL CALCULATED TDS mg/l
* PORE VOL. REC - PORE VOLUMES RECOVERED
FIELD PORE VOLUME = 969951 GAL (FIG. 7)
* Lb. Cl⁻ EXT. - POUNDS Cl⁻ ION EXTRACTED
* % Cl⁻ EXT. - % Cl⁻ ION EXTRACTED REFERS TO Cl⁻ ION LOST DURING MINING - 2554 lb.
* % O.R. - % WELLFIELD OVER RECOVERY
* % of REC - % of RECOVERY TREATED BY EDR UNIT
* % of INJ - EDR PRODUCT RATIO TO INJECTION
* % SALT REJ - % TDS REMOVAL BY EDR
* % WATER REC - EDR PRODUCT TO FEED RATIO

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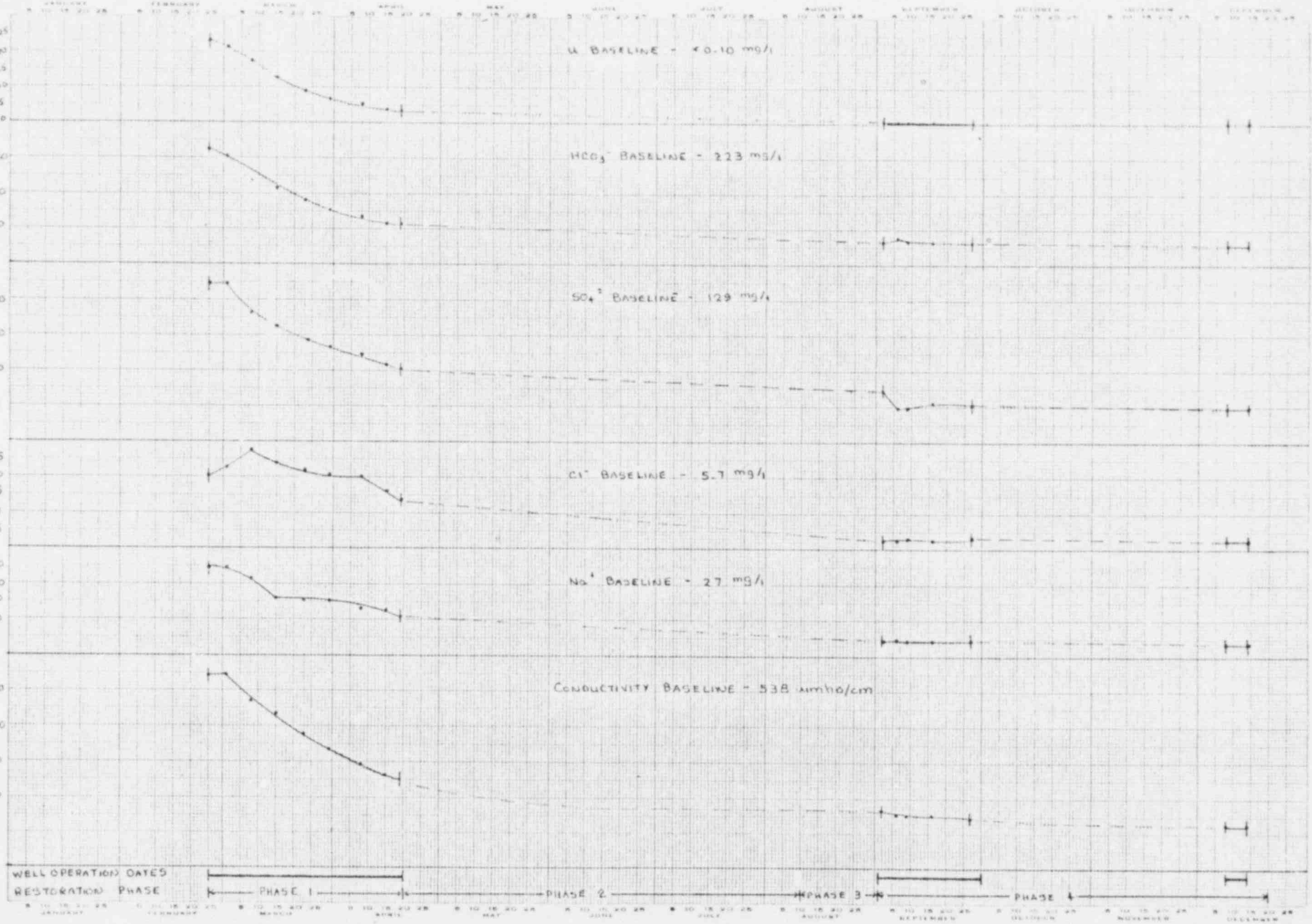
SECTION 4.4. FIGURE II

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL MR-1



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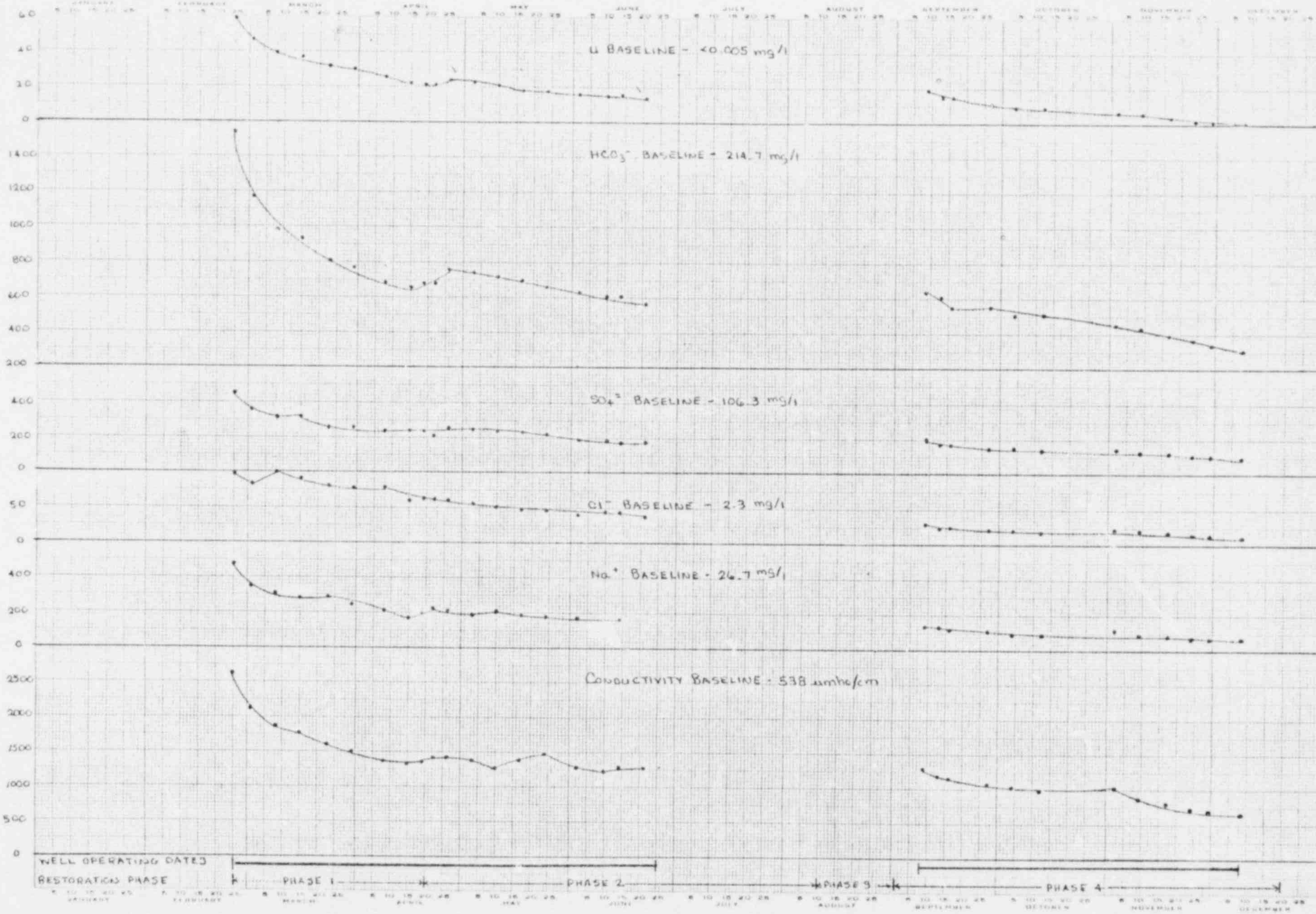
SECTION 4.4. FIGURE III

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL 301

D400 8728 110E



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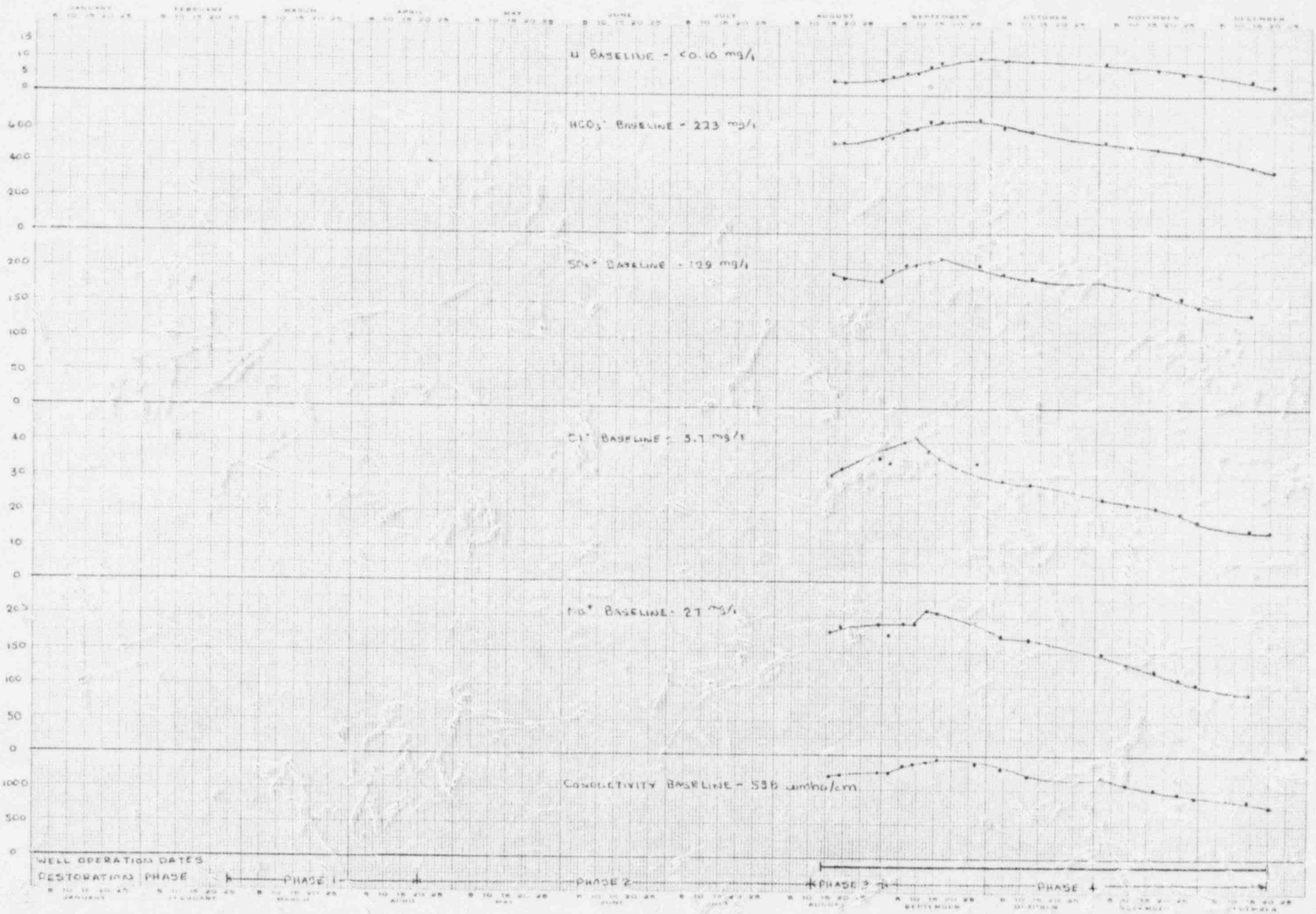
SECTION 4.4 FIGURE IV

UNC-TETON EXPLORATION DRILLING COMPANY INC.
LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL MI-1



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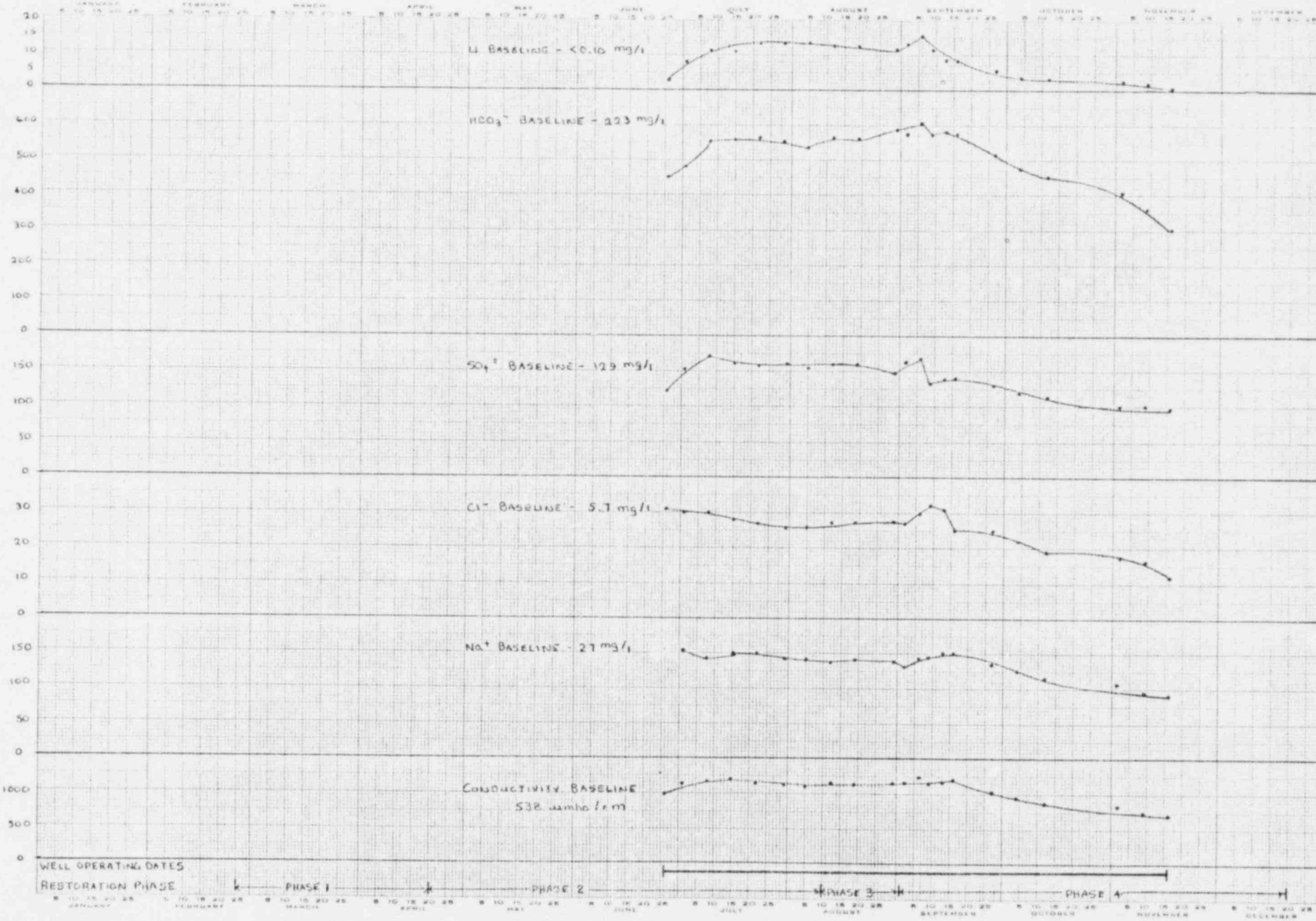
SECTION 4.4 FIGURE V

UNC-TETON EXPLORATION DRILLING COMPANY INC.

LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL MI-3



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SECTION 4.4 FIGURE VI

UNC-TETON EXPLORATION DRILLING COMPANY INC.
LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL 306

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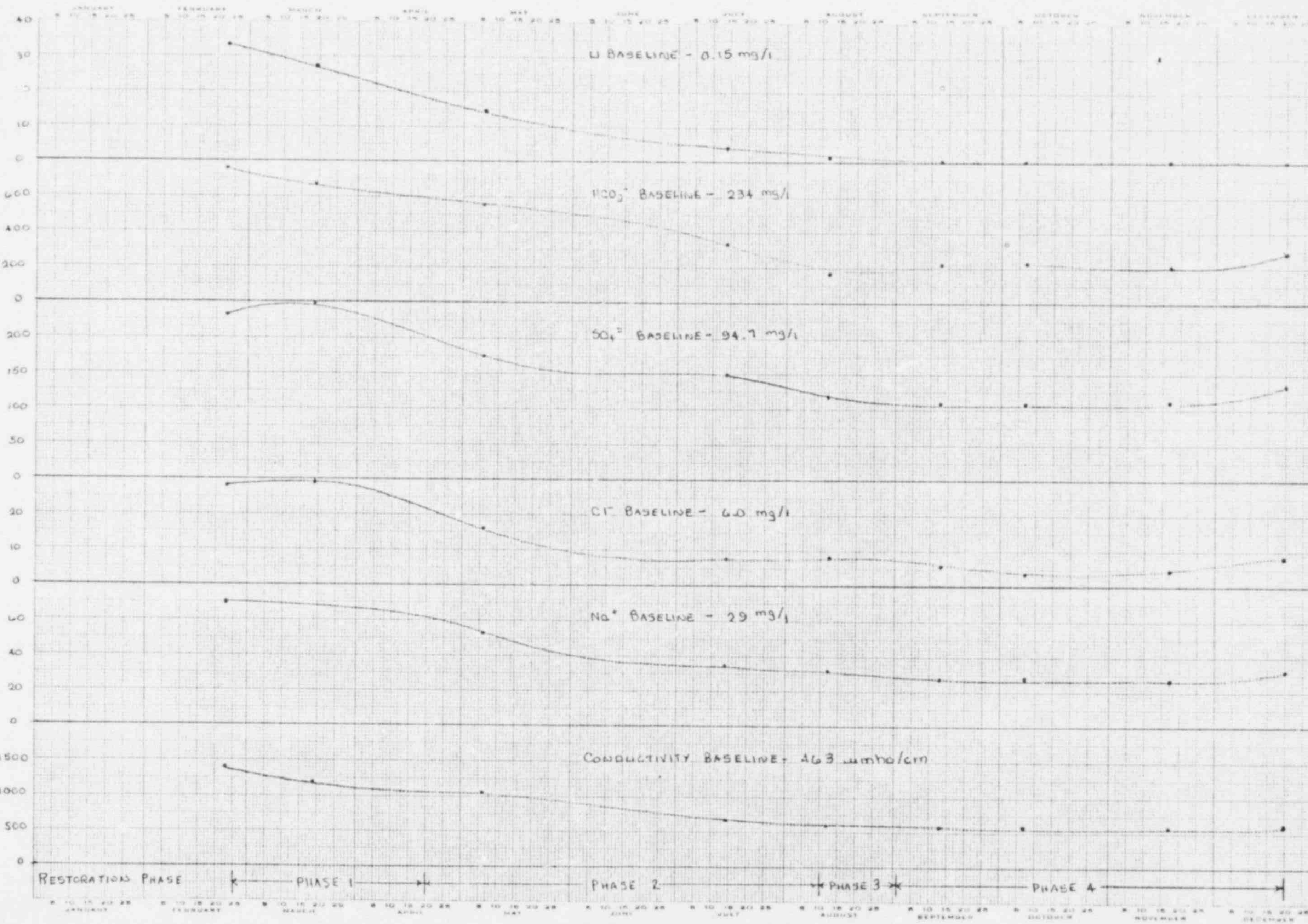

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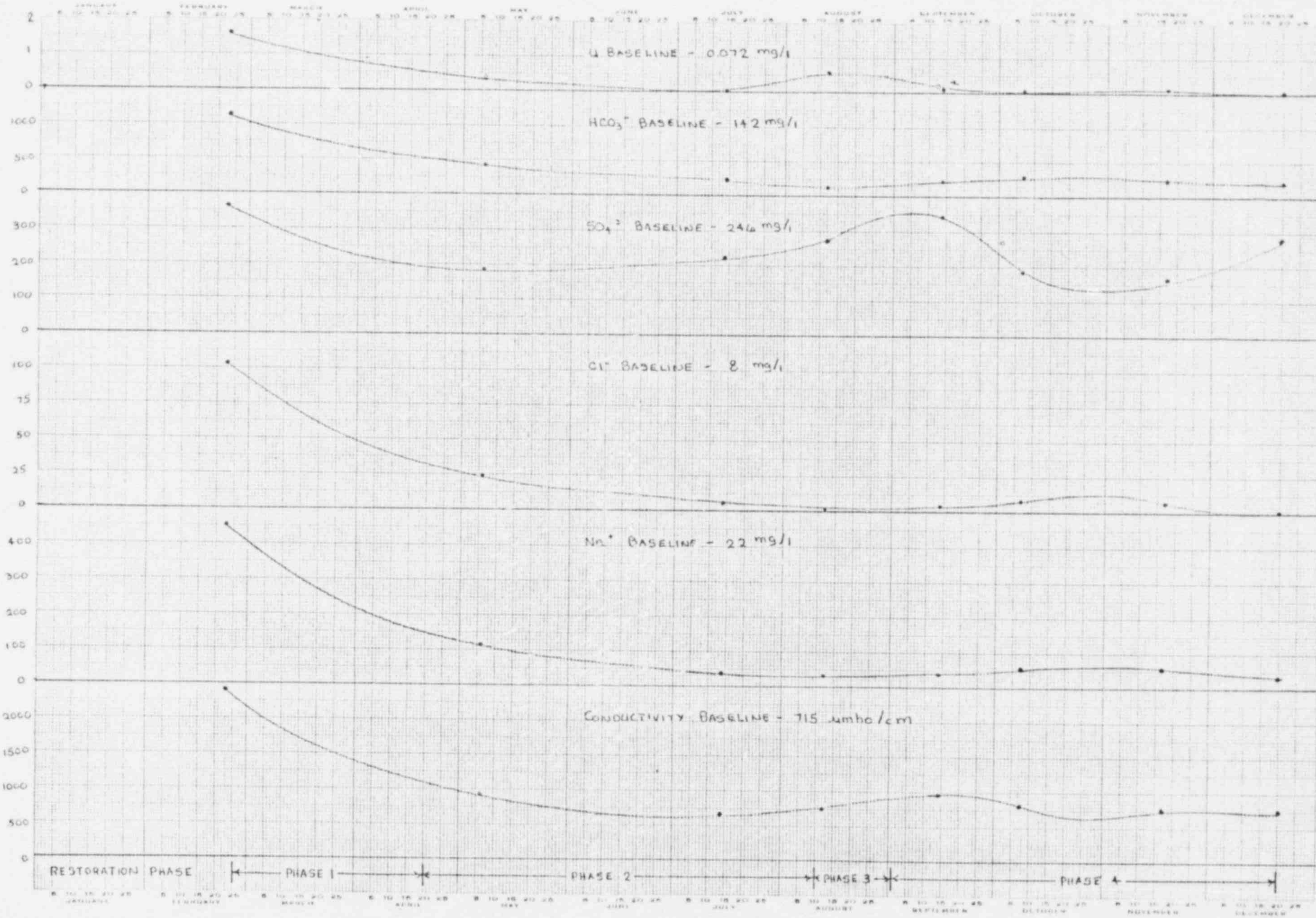
SECTION 4.4 FIGURE VII

UNC-TETON EXPLORATION DRILLING COMPANY, INC.
LEUENBERGER PROJECT M ZONE RESTORATION

ANALYTICAL TRENDS WELL 308



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4.5 - M-Zone Restoration - Summary

The overall M restoration program was initiated February 25, 1981 and terminated December 20, 1981. The program had been scheduled to operate for 196 days based upon expected electrodialysis unit performance and hydrological flow patterns, and actually required 299 days. The project was designed to ensure recapture of all solution affected by leach constituents as a result of diffusion.

The affected area was determined utilizing a mass balance between injection and recovery for chloride ion introduced during mining. It was determined that 2,554 pounds of chloride ion had been introduced to the zone and that at equilibrium concentrations 4,119,185 gallons (31,670 $ft.^2$) outside the actual wellfield confines had been affected. The means of calculating the affected area was supported by the involvement of restoration monitor 306 and the timing of the involvement.

As it had required over a year of operation for diffusion to extend the leach affected area over 85 feet in the direction of major transmissivity, it was decided a directional sweep approach would be more effective in recovering affected solution than would be collapsing that area solely through increased overrecovery. As a result, a phased program which utilized injection wells and recovery wells to recover solutions outside the wellfield confines along with injection sites designed to block recovery of already restored solutions was implemented.

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A total of 22.6 x 10^6 gallons were recovered and IX treated for uranium removal during the project. With a wellfield pore volume calculated to be 969,951 gallons, this represented wellfield circulation of 23.3 pore volumes. Of the 22.6 M gallons of IX effluent, 10.46 M gallons were fed to the EDR unit for treatment. The unit successfully concentrated 89.4% of dissolved solids fed into 1.71 M gallons of brine which was diverted to the solar evaporation ponds and/or eventually transferred directly to a licensed disposal facility. The 8.76 M gallons of low TDS product generated were used to dilute the injection stream to baseline water quality. Total injection to M-Zone during the restoration process was 20.46 M gallons which represented an over-recovery of 9.45%. Effectively all of the overrecovery was EDR brine and this totalled 1.76 wellfield pore volumes.

The completeness of restoration was demonstrated both by the operating wells achieving the appropriate goals and the recovery of nearly 90% of the trace parameter introduced during mining. Of the 2,554 lbs. Cl^- lost during mining, 2,285 lbs. were effectively removed by the EDR unit. The residual 269 lbs., assuming that they are equally distributed in the total affected area would represent an increase of 6.3 mg/l above the 5.7 mg/l baseline or 13 mg/l. The average final restoration chloride concentration at monitored wells was actually 12.1 mg/l.

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At the point of terminating the restoration program, all operation and restoration monitor wells were at or below the restoration goals presented in Section 2. Of the wells, one showed anomalous behavior after shutdown and prior to the January 1982 initial restoration sampling. Well M1-1 decreased from a summation TDS of 658 on December 20 to 166 mg/l by January 12, 1982. As M1-1 was the last well providing water to the restoration process plant and the EDR was treating nearly all of the recovered solution, reinjection to wells M1-2, M1-3, and M1-4 was exceptionally dilute (<100 mg/l & TDS). It is suspected that in the process of M1-1 recharging after pump shutdown, that solution from those injection wells was drawn to the well bore area. This is also supported by decreases of >100 mg/l TDS at non-pumping wells between the December 20, 1981 restoration end and the initial sampling. (MR-1, MR-3, M1-3, 301) See Table I, Section 4.5, for final values for wells chosen as restoration monitors.

Attachments:

A. Section 4.5, Figure I - Leach Affected Area Det.

B. Section 4.5, Table I - M-Zone Restoration Data Base

C. Section 4.5, Table II - Post Restoration Analytical Values

D. Section 4.5, Figure II - Indicator Parameter Analytical Trends

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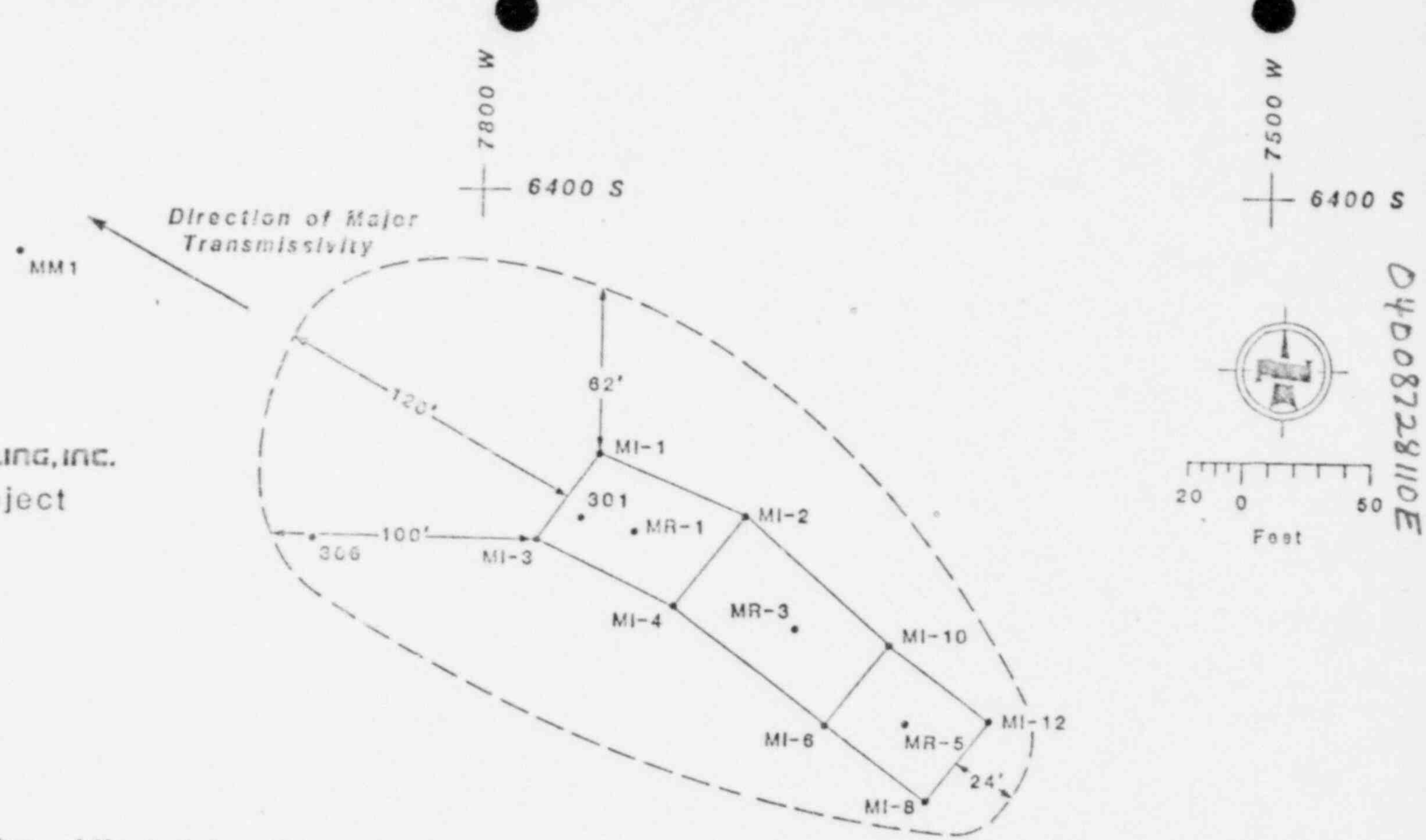
UNC TETON EXPLORATION DRILLING, INC.

Leuenberger Project

Sec. 4.5 Fig. I



Extent of Lixiviant Migration

M-Zone Wellfield Operation - Affected Area Determination - Data Base - 1/22/80 - 2/25/80

		Gallons Inj/Rec	Field Dimensions	Field Area/Ft²	Sand Thickness	Field Volume/Ft³	Porosity	Reservoir Volume/Gal	Lbs Cl⁻ Inj-Rec	Lbs Cl⁻ In Field	Lbs Cl⁻ Ext Area	Gal/Ft²	Affected Area Ext/Ft²	Affected Volume/Gal
CELLS	M-1	20,204,884(R	60.5'x43'	2,562	70'	179,354	24.8%	332,709		280.4		129.85		
	M-3	5,067,319(R	72.5'x42'	3,000	72.6'	217,764	24.8%	403,961		340.5		134.67		
	M-5	2,726,833(R	49.5'x39.5'	1,926	65.3'	125,755	24.8%	233,281		196.6		121.10		
INJECTION WELLS	MI-1	5,270,011(I)			68'				480.5		332.5	129.85	6,076	788,957
	MI-2	4,291,421(I)			80'				377.5		266.7	132.26	4,785	632,826
	MI-3	5,360,729(I)			57'				490.9		338.9	129.85	6,193	804,143
	MI-4	6,718,998(I)			65'				632.4		429.8	132.26	7,711	1,019,830
	MI-6	2,411,642(I)			71'				250.7		161.2	127.89	2,991	382,496
	MI-8	513,926(I)			62'				53.4		34.4	121.10	674	81,624
	MI-10	2,006,213(I)			66'				208.6		134.1	127.89	2,488	318,193
	MI-12	574,836(I)			60'				59.8		38.4	121.10	752	91,116
	Total	27,147,776(I)	182.5'x40.5'	7,488	69.3'	518,918	24.8%	969,951	2,554	817.5	1,736.5	129.54	31,670	4,119,185

M-ZONE RESTORATION DETERMINATION OF LEACH AFFECTED AREA

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UNC - TETON EXPLORATION DRILLING CO., INC. LEUENBERGER PROJECT

M ZONE RESTORATION - DATA BASE

SECTION 4.5 TABLE I

WELLFIELD RECOVERY												WELLFIELD INJECTION				ELECTRODIALYSIS UNIT OPERATION (EDR)							
REC.* WELLS	DATES OPERATED	[Cl⁻]* I	[Cl⁻]* F	%* RED	[TDS]* I	[TDS]* F	%* RED	GALLONS RECOVERED	PORE* VOL. REC.	LB. Cl* EXT.	% Cl* EXT.	INJ. WELLS	DATES OPERATED	GALLONS INJECTED	%* O.R.	BRINE GALLONS	PORE* VOLS.	FEED GALLONS	% of* REC	PRODUCT GALLONS	% OF* INJ	%* SALT REJ.	%* WATER REC.
PHASE 1 2/25/81 - 4/20/81																							
301	2/25/81 - 4/20/81	97	59	39.2	2347	1107	52.8	2211320	2.28	54.8	2.1	MI-1	2/25/81 - 4/20/81	1101225									
MR-1	2/25/81 - 4/20/81	101	65	35.6	2434	1240	49.1	1663801	1.72	41.2	1.6	MI-2	2/25/81 - 4/20/81	481613									
MR-3	2/25/81 - 4/20/81	111	75	32.4	2773	1194	56.9	1832753	1.89	45.4	1.8	MI-3	2/25/81 - 4/20/81	739627									
MR-5	2/25/81 - 4/20/81	103	69	33.0	2572	1107	57.0	748876	0.77	18.6	0.7	MI-4	2/25/81 - 4/20/81	2107296									
												MI-6	2/25/81 - 4/20/81	358570									
												MI-8	2/25/81 - 4/20/81	145486									
												MI-10	2/25/81 - 4/20/81	849219									
												MI-12	2/25/81 - 4/20/81	206714									
	TOTALS	107	68	36.4	2604	1208	53.6	6456750	6.66	160.0	6.3		TOTALS	5989750	7.23	376038	0.39	2012315	31.2	1636277	27.3	85.1	80.9
PHASE 2 4/21/81 - 8/10/81																							
MI-3	6/26/81 - 8/10/81	28.0	9.0	67.9	884	361	59.2	990582	1.02	122.5	4.8	MI-2	4/21/81 - 8/10/81	937091									
MI-8	4/21/81 - 8/10/81	62.0	17.0	72.6	1055	734	30.4	1345119	1.39	260.6	10.2	MI-4	4/21/81 - 8/10/81	2271895									
MI-12	4/21/81 - 7/29/81	54.0	17.0	68.5	1083	714	34.1	1077541	1.11	159.9	6.3	MI-6	4/21/81 - 8/10/81	1481809									
301	4/21/81 - 6/25/81	57.0	37.0	35.1	1232	1160	5.8	2625029	2.71	551.5	21.6	MI-10	4/21/81 - 8/10/81	1966475									
MR-5	4/21/81 - 8/10/81	67.0	13.0	80.6	1216	470	61.3	1213440	1.25	200.1	7.8												
	TOTALS	58.0	19.0	67.2	1188	721	39.3	7251711	7.48	1295	50.7		TOTALS	6657270	8.20	631523	0.65	4094016	56.5	3462493	52.0	89.9	84.4
PHASE 3 8/10/81 - 9/1/81																							
MI-2	8/10/81 - 8/13/81	9.0	11.3	-25.6	361	367	-1.7	5011	0	0.2	—	MI-6	8/10/81 - 9/1/81	260476									
MI-3	8/10/81 - 9/1/81	26.0	27.3	-5.0	965	1028	-6.5	634730	0.65	71.5	2.8	MI-8	8/10/81 - 9/1/81	151487									
MI-4	8/10/81 - 9/1/81	11.0	15.0	-36.4	398	595	-49.5	307365	0.32	17.6	0.7	MI-10	8/10/81 - 9/1/81	567288									
MR-3	8/11/81 - 9/1/81	18.0	14.2	20.0	758	612	19.3	336280	0.35	21.0	0.8	MI-12	8/10/81 - 9/1/81	366670									
MI-1	8/14/81 - 9/1/81	29.4	36.5	-24.1	1084	1108	-2.2	186356	0.19	25.8	1.0												
	TOTALS	17.0	25.1	-47.6	684	868	-26.9	1469742	1.52	136.1	5.3		TOTALS	1345921	8.42	116374	0.12	808317	55.0	691943	51.4	89.0	85.6
PHASE 4 9/1/81 - 12/20/81																							
MI-1	9/1/81 - 12/20/81	34.1	14.8	56.6	1096	658	40.0	2842563	2.93	270.2	10.6	MI-2	9/1/81 - 12/20/81	684647									
MI-3	9/1/81 - 11/16/81	27.1	13.4	50.6	1016	581	42.8	979295	1.01	119.2	4.7	MI-3	11/17/81 - 12/20/81	706514									
301	9/8/81 - 12/8/81	31.1	11.4	63.3	1137	553	51.4	2467701	2.54	243.2	5.5	MI-4	9/1/81 - 12/20/81	2223246									
MR-1	9/1/81 - 9/30/81 12/8/81 - 12/14/81	12.8	11.9	7.0	682	520	23.8	808751	0.83	61.5	2.4	MI-6	9/1/81 - 12/14/81	722071									
MR-3	9/1/81 - 9/8/81 12/2/81 - 12/8/81	13.3	11.9	10.5	548	530	3.3	262662	0.27	—	—	MI-8	9/1/81 - 12/8/81	426263									
MR-5	12/2/81 - 12/6/81	11.2	10.9	2.7	515	553	-7.4	52133	0.05	—	—	MI-10	9/1/81 - 12/14/81	944567									
												MI-12	9/1/81 - 12/6/81	755512									
	TOTALS	21.9	12.9	41.1	813	579	28.8	7413145	7.64	694.1	27.2		TOTALS	6462820	12.8	581536	0.60	3549215	47.9	2967679	40.0	89.0	83.6
M ZONE RESTORATION - PHASE 1 THROUGH PHASE 4 - TOTAL																							
MR-1	PHASES 1,4	101	11.9	88.2	2434	520	78.6	2472592	2.55	102.7	4.0	MI-1	PHASE 1	1101225									
MR-3	PHASES 1,3,4	111	10.5	90.5	2773	530	80.9	2431695	2.51	66.4	2.6	MI-2	PHASES 1,2,4	2103351									
MR-5	PHASES 1,2,4	103	10.9	89.4	2572	553	78.5	2014449	2.08	218.7	8.6	MI-3	PHASES 1,4	1446141									
301	PHASES 1,2,4	97	11.4	88.2	2347	553	76.4	7304050	7.53	849.9	33.3	MI-4	PHASES 1,2,4	6602437									
MI-1	PHASES 3,4	29.4	14.8	49.7	1084	658	39.3	3028919	3.12	296	11.6	MI-6	PHASES 1,2,3,4	2822926									
MI-2	PHASE 3	9	11.3	-25.6	361	367	-1.7	5011	NO	0.2	NO	MI-8	PHASES 1,3,4	723236									
MI-3	PHASES 2,3,4	28	13.4	52.1	884	581	34.3	2604607	2.69	313.2	12.3	MI-10	PHASES 1,2,3,4	4327549									
MI-4	PHASE 3	11	15	-36.4	398	595	-49.4	307365	0.32	17.6	0.7	MI-12	PHASES 1,3,4	1328896									
MI-8	PHASE 2	62	17	72.6	1055	734	30.4	1345119	1.39	260.6	10.2												
MI-12	PHASE 2	54	17	68.5	1083	714	34.1	1077541	1.11	159.9	6.3												
	TOTALS	107	12.9	87.9	2604	579	77.8	22591348	23.29	2285	89.5		TOTALS	20455761	9.45	1705471	1.76	10463863	46.3	8758392	42.8	89.4	83.7

* HEADING DEFINITIONS - ABBREVIATIONS

* REC. WELLS - RECOVERY WELLS
* [Cl⁻] I - INITIAL Cl⁻ CONCENTRATION mg/l
* [Cl⁻] F - FINAL Cl⁻ CONCENTRATION mg/l
* % RED - % REDUCTION
* [TDS] I - INITIAL CALCULATED TDS mg/l
* [TDS] F - FINAL CALCULATED TDS mg/l
* PORE VOL. REC - PORE VOLUMES RECOVERED
FIELD PORE VOLUME = 969951 GAL. (FIG. 2)
* LB. Cl⁻ EXT. - POUNDS Cl⁻ ION EXTRACTED
* % Cl⁻ EXT. - % Cl⁻ ION EXTRACTED
REFERS TO Cl⁻ ION LOST DURING MINING - 2554 lb.
* % O.R. - % WELLFIELD OVER RECOVERY
* % of REC - % of RECOVERY TREATED BY EDR UNIT
* % of INJ - EDR PRODUCT RATIO TO INJECTION
* % SALT REJ - % TDS REMOVAL BY EDR
* % WATER REC - EDR PRODUCT TO FEED RATIO

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UNC-TETON EXPLORATION DRILLING COMPANY

LEUENBERGER PROJECT

M ZONE RESTORATION PROJECT

SECTION 4.5 TABLE II POST RESTORATION ANALYTICAL VALUES / BASELINE & GOALS

ANALYSIS	MI-1	MI-6	MI-10	MR-1	MR-3	MR-5	301	306	308	MEAN ± DEV.	BASELINE MEAN	RESTORATION GOALS		PRE-REST MEAN
DATES	1-8-82 1-12-82 → 2-16-82	1-8-82 1-12-82 → 2-16-82	1-8-82 1-12-82 → 2-16-82	1-8-82 1-12-82 → 2-16-82	1-8-82 1-12-82 → 2-16-82	1-8-82 1-12-82 → 2-16-82	1-8-82 1-12-82 → 2-16-82	1-8-82 1-12-82 → 2-16-82	1-8-82 1-12-82 → 2-16-82		PRE-OPERATION	SECTION 2.		2-81 MR-1,3,5 301,306,308
HCO_3^- mg/l	93	240	236	244	248	248	211	281	211	228 ± 56.2	223 ± 27.9	TDS		1418 ± 424
$CO_3^=$ mg/l	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0 ± 0	0 ± 0	TDS		15 ± 20.5
Cl mg/l	ND	8	6	7	8	9	6	8	ND	5.8 ± 3.4	5.7 ± 2.0	250		78.2 ± 28.3
$SO_4^=$ mg/l	28	77	82	82	82	82	84	135	280	103.6 ± 71.4	128.9 ± 65.5	250		334 ± 87
Anion eq.	2.11	5.76	5.74	5.91	6.34	6.36	5.38	7.50	9.28	6.04 ± 1.90	6.50 ± 1.32			
Ca^{++} mg/l	15	54	44	40	42	45	45	85	123	54.6 ± 31.4	70.5 ± 13.4	TDS		209 ± 44
Mg^{++} mg/l	3	4	10	11	10	10	6	20	20	10.4 ± 6.1	18.6 ± 7.3	TDS		48.3 ± 7.9
Na^+ mg/l	25.0	59	61	64	74	72	57	32	32	52.9 ± 18.4	27.0 ± 1.9	TDS		440 ± 196
K^+ mg/l	2	5	5	5	6	6	5	7	9	5.6 ± 1.9	8.9 ± 1.1	TDS		20.2 ± 4.2
Cation eq.	2.14	5.72	5.80	5.81	6.29	6.25	5.35	7.45	9.40	6.02 ± 1.91	6.47 ± 1.36			
-/+balance	98.60	100.70	98.97	101.72	100.95	101.76	100.56	100.67	98.72	100.29 ± 1.23	100.47 ± 1.35			
Sum TDS	166	447	444	453	490	490	414	548	675	460.8 ± 134.3	482.6 ± 85	NA		2623 ± 746
Cond um/cm	240	500	490	500	540	550	470	600	750	515.6 ± 133.7	538 ± 102	NA		2535 ± 609
TDS mg/l	119	328	324	339	358	364	311	428	569	348.9 ± 117.5	581 ± 108	500		[illegible]7 ± 427
pH unit	7.44	7.17	7.32	7.02	7.12	7.02	7.45	7.84	7.88	7.36 ± 0.32	7.6 ± 0.2	5.0 - 9.0		7.3 ± 0.2
U mg/l	0.007	0.036	0.015	0.007	0.002	0.005	0.008	0.093	0.004	0.020 ± 0.029	<0.10	5.0		21.8 ± 19.9
Alk mg/l	77	197	193	200	220	220	173	230	173	187 ± 45.9		NA		
Al mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.14 ± 0.18	0.33		0.06 ± 0.02
NH_4^+ mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.24 ± 0.55	0.50		<0.10
As mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.009 ± 0.010	0.05		0.011 ± 0.004
Ba mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.50	1.0		<0.10
B mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.25	1.0		<0.25
Cd mg/l	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.06	0.01		<0.01
Cr mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	0.05		<0.05
Cu mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.09	1.0		<0.05
F mg/l	0.27	0.30	0.30	0.30	0.33	0.27	0.30	0.57	0.65	0.37 ± 0.14	0.49 ± 0.05	1.4 - 2.4		0.27 ± 0.09
Fe mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.60 ± 0.56	0.30		0.05
Pb mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04 ± 0.01	0.05		<0.05
Mn mg/l	0.01	0.01	0.01	0.02	0.03	0.02	0.02	<0.01	0.02	0.016 ± 0.008	0.08 ± 0.04	0.06		0.18 ± 0.06
Hg mg/l	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0011 ± 0.0005	0.001		<0.001
Mo mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.50	0.20		<0.10
Ni mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	1.0		<0.05
NO_2/NO_3 "	<0.05	0.30	0.10	0.10	0.10	<0.05	0.10	<0.05	<0.05	0.10 ± 0.08	0.20 ± 0.12	1.0		0.31 ± 0.09
Se mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006 ± 0.004	0.01		0.022 ± 0.017
V mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1.0	0.34		0.22 ± 0.24
Zn mg/l	<0.005	<0.005	<0.005	<0.006	<0.005	<0.005	<0.006	<0.005	<0.005	<0.005	0.092 ± 0.110	5.0		0.05
Ra^{226} pci/l	75 ± 5	326 ± 10	199 ± 8	391 ± 11	18.6 ± 2.4	215 ± 8	109 ± 15	1229 ± 20	13.1 ± 2.1	352.9 ± 394.3	235.96 ± 335.4	236.5		1469 ± 1137
Th^{230} pci/l	2.5 ± 0.8	14.1 ± 1.8	4.3 ± 1.0	8.0 ± 1.4	5.2 ± 1.5	5.5 ± 1.1	5.5 ± 1.1	6.7 ± 1.3	2.5 ± 0.8	6.5 ± 3.6	3.59 ± 7.25	NA		48.7 ± 33.8
Gross A "	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
Gross B "	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA

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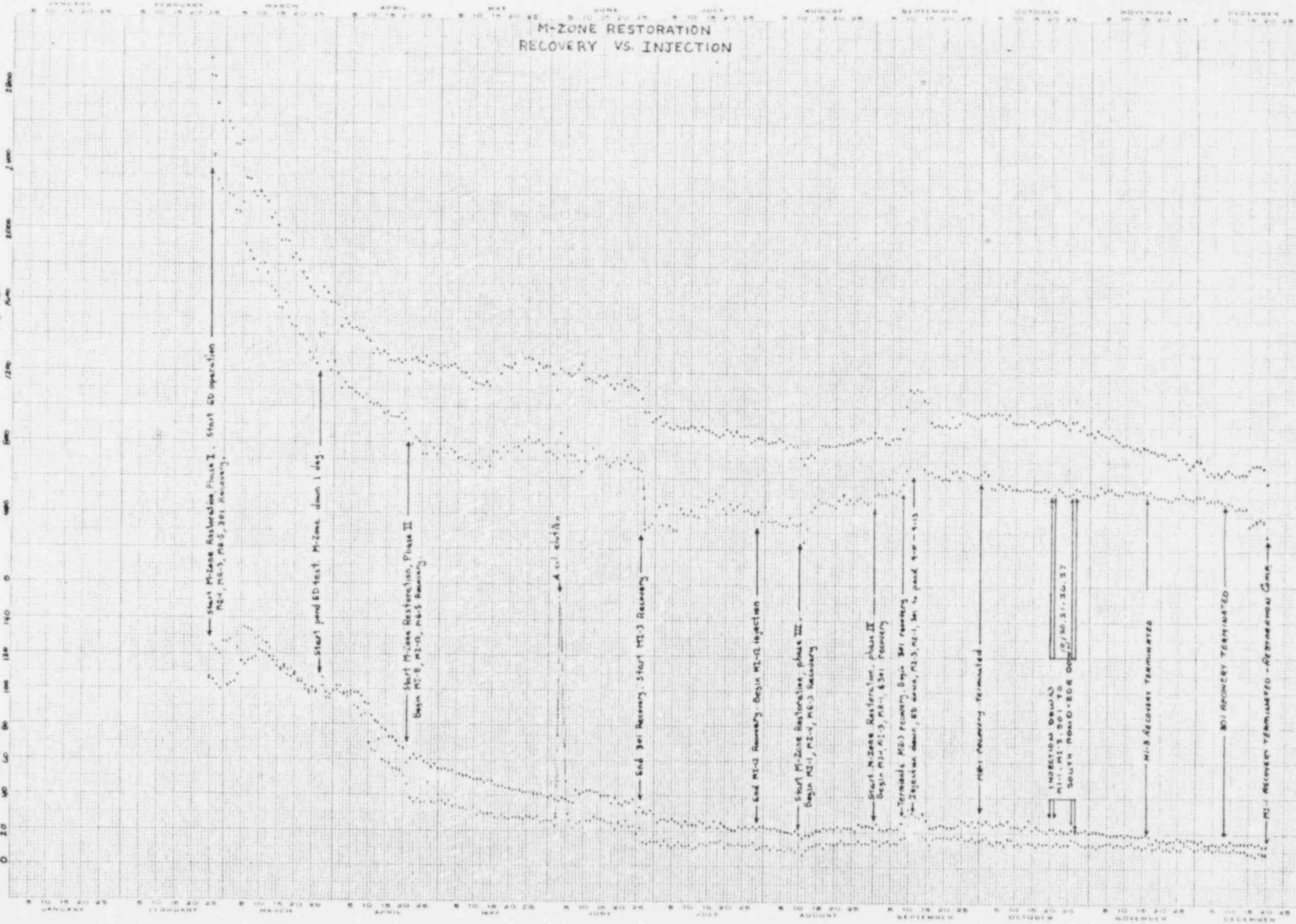
SECTION 4.5, FIGURE II

UNC TETON EXPLORATION DRILLING, INC.

LEUENBERGER PROJECT - IN SITU LEACH RESTORATION PROJECT

INDICATOR PARAMETER ANALYTICAL TRENDS



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5.0 M-Zone Restoration Stability Plan

5.1 Agency Requirements

Although the R & D permits as accepted by the DEG and NRC specified a four-month restoration stabilization monitoring period, it was determined that a longer period was required. Wells 301, 306 and 308 were baselined and designated as restoration monitor wells; however, additional wells were required for adequate post restoration monitoring.

The period required by the licensing agencies was extended to 13 months after the end of restoration with sampling to be performed monthly for six months and quarterly for the duration.
Wells being sampled during the stability period are MR-1, MR-3, MR-5 M1-1, M1-6, M1-10, 301, 306 and 308.

5.2 Well Sampling

The monthly and quarterly sampling was to be performed by means designed to collect representative samples of aquifer solution. In the field operation wells and 301, sampling is performed utilizing one-half HP Grundfos stainless steel submersible pumps hung on 170 feet of chemically inert plastic pipe. A minimum of 1.5 casing displacements on each well is pumped to waste prior to sampling.

Wells 306 and 308 were completed with two-inch PVC casing, which restricts the use of downhole pumping devices. These wells are sampled by air lifting solution from the well with a 100 cfm air compressor and >200 feet of chemically inert plastic pipe. Each well is air lifted for a minimum of three hours prior to sampling.

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5.3 Sample Treatment and Preservation

Samples drawn from the wells are placed in unused polyethylene containers for shipment to the Casper laboratories. Samples are treated with chemicals as designated by EPA methods for sample preservation.

5.4 Sample Analysis

Treated samples are analyzed utilizing EPA and Standard Methods Procedures at the Teton Central Research Laboratory and/or WAMCO Laboratory (Casper, Wyoming) or other accepted commercial laboratories. Results are checked for quality both by Standard Quality Assurance Methods and by ionic balance procedures.

5.5 Attached as Appendix "E" is stability data on the designated sample wells to date.

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6.0 Implications to Commercial Scale Restoration

6.1 Introduction

In addition to performing restoration on the M-Zone patterns for license compliance, environmental safety and site decommissioning purposes, the implications to commercial scale restoration were studied. The following section expands the knowledge gained in M-Zone R & D level restoration to commercial scale wellfield restoration.

The R & D restoration effort was actually a "worst case" operation due to the following factors:

a) All injection wells utilized during mining were external injectors which precluded directional or selective wellfield overrecovery and provided the maximum diffusion rate external to the patterns.

b) The rate of diffusion would be expected to be greatest in the direction of major transmissivity and this was the case in the R & D patterns. Although this was detrimental in the case of an isolated R & D pattern, the diffusion effect would be beneficial to the Leuenberger commercial wellfield operation. Fluid migrating or chemical parameters diffusing in the direction of major transmissivity would generally be migrating into the next scheduled mining unit, thereby, creating the possibility of recapturing desirable leach chemicals for subsequent mining. The volume of affected area that would

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necessarily be addressed by a single mining unit restoration program would be reduced. Several knowledge areas gained from the R & D restoration program and made commerical restoration projections possible. These areas included:

1) The rate of dissolved solids generation during restoration as a result of lixiviant action in the affected area ore.

2) Development of a means to determine affected aquifer volume after mining through quantifiable means.

3) The actual operating efficiency of the electrodialysis unit and overall restoration process.

The following commercial scale restoration analysis also utilizes several "worst case" assumptions in order to present the maximum expected restoration time spans and process bleed requirements.

6.2 Dissolved Solids Generation During Restoration

As was noted in the R & D effort, one of the more difficult goals to achieve was TDS reduction to required levels. It is believed that due to the effect of oxidant and pH adjusters in the lixiviant, TDS was actually generated during restoration. Because the internal portion of the wellfield was saturated with these chemicals during mining, it was hypothesized that wellfield TDS generation and equilibration occurred during the mining phase.

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The source area of the TDS generation would therefore be the affected area. This hypothesis was supported by the relatively extended recovery requirements from wells M1-3 and M1-1 and those parameters which showed marked elevation at 306 prior to restoration.

Section 6, Table I is a determination of the TDS generation rate in the affected area. This rate will be applied to the commercial wellfield affected area.

The TDS generation rate was 38.13% which means that one can expect to remove ~40% more constituents from the affected area during restoration than would be normally expected.

6.3 Determination of Commercial Wellfield Affected Area

The commercial wellfield affected area is defined as that area affected by horizontal flaring due to natural diffusion. In order to determine this linear distance, the average M-Zone R & D pattern flaring distance was used. This distance is justified by the fact that not only will chemical constituents be similar in the commercial operation, but injection well flow rates and pressures will be similar. This flaring distance is another "worst case" assumption because directional overrecovery will be utilized in a commercial wellfield pattern.

Section 6, Table II summarizes the assumptions and geologic/hydrologic data used in determining the "average" mining unit affected area. This data illustrates the "worst case" nature of

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the R & D restoration operation. The ratio of affected volume to pore volume for the R & D pattern was 5.25 to 1 and the expected commercial field ratio would be less than or equal to 1.52 to 1.

6.4 Determination of Post Mining Water Quality

The lixiviant strength and composition was efficient in the R & D operation; therefore, Teton anticipates using the same solution make-up for commercial mining. For the purpose of this report, the assumption that post mining water quality within the commercial wellfield will approximate that in the R & D operation will be adopted. This too, is a "worst case" assumption as the R & D pattern: a) operated more than one year, and b) excessive pore volumes were circulated in the R & D due to the small field size which promotes chemical spirals in such parameters as Cl^-, $SO_4^=$, Ca^{++}, and Na^+. The expected TDS in the post mining wellfields of mining unit I & II would be 3.0 gm/1. The assumption is made that TDS would decrease linearly from the field boundary to baseline at the unaffected area.

6.5 Restoration Process - Mine Plan & Schedule

In order to reduce the post mining TDS in the wellfield area prior to restoration, initiate the leach in subsequent fields and preserve leach chemicals, a water transfer from a mined out unit to a new unit will start the restoration cycle. Assumptions made include:

a) The water transfer will approximate a blend of the new unit baseline water quality and the post mining water quality from the transfer unit. This would leave both units half way between baseline and post mining quality.

b) As progression through the units occurs, post mining TDS will increase as a function of the initial transfer. This straight line increase is a "worst case" assumption as leach chemical injection demands would decrease after unit transfers.

c) The transfer could be performed in the wellfield itself, thereby bypassing plant circuits. Assuming a 43.4 x 10^6 gal. standard wellfield unit pore volume, 60 days at 500 gpm would be required for the transfer. As there would be no overrecovery on the transfer, the assumption is made that only the internal unit is affected, leaving the external affected area at post mining TDS levels.

Section 6, Table III determines the prerestoration TDS at each of the wellfield units following the water transfer. The table also determines time requirements for the electrodialysis unit to remove the required dissolved solids from solution. EDR efficiencies were determined in the R & D operation and the unit in the commercial flow sheet will treat 200 gpm from the anticipated 500 gpm restoration flow.

As Section 6, Table III demonstrates, between 337 and 456 days/mining unit will be required for complete restoration. Considering the number of "worst case" assumptions used in generating these time requirements, actual time may be reduced by 10 to 20%.

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The restoration unit flow would be approximately 500 gpm and that flow would be diverted through an ion exchange system to remove oxidized uranium. A split of 200 gpm would be taken from the barren ion exchange effluent and fed to the electrodialysis unit. The EDR would provide 170 gpm of low TDS water which would be used to dilute the remaining 300 gpm of IX effluent. The total 470 gpm would be reinjected to the field.

In order to draw in the affected area, directional overrecovery would be used in the restoring field (high overrecovery at outer field edge with balanced flows in field center).

Section 6, Figure 1 demonstrates the mine plan and schedule based upon this restoration plan.

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SECTION 6, TABLE I

DETERMINATION OF TDS GENERATION RATE

R & D Original TDS - Baseline	482.6 mg/l
Total R & D Affected Volume	5,089,136 gals.
Lbs. TDS in Affected Volume - Baseline	20,496 lbs.
R & D Wellfield Pore Volume	969,951 gals.
Affected Area Volume	4,119,185 gals.
Wellfield TDS at 2/25/81	2.965 g/l
*Affected Area Average TDS at 2/25/81	1.724 g/l
Lbs. TDS in Wellfield Area	24,000 lbs.
Lbs. TDS in Affected Area	59,265 lbs.
Total TDS Lbs. in M Area	83,265 lbs.
TDS Lbs. in M Area at 0.5 g/l	21,235 lbs.
TDS Lbs. Requiring Removal to 0.5 g/l	62,030 lbs.
Actual TDS Lbs. Removed by EDR	86,324 lbs.
Final Average M Zone TDS	0.460 g/l
Excess TDS Lbs. Removed	1,699 lbs.
Lbs. Requiring Removal to 0.5 g/l	84,625 lbs.
Lbs. TDS Generated During Restoration	22,595 lbs.
TDS Generation Rate in Affected Area	38.13 %

*Assumes linear decrease from 2.965 g/l at wellfield boundary to 482.6 mg/l at edge of affected area.

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SECTION 6, TABLE II

DETERMINATION OF COMMERCIAL WELLFIELD
VOLUME AND AFFECTED AREA

As well flow rates would be similar to the R & D Phase, lateral diffusion would be roughly equal.

Based on noted distance of lateral diffusion in the R & D patterns, a nominal linear distance of 70 feet is assumed.

The average wellfield perimeter is assumed to be a rectangle of X . 2X.

Average Mining Unit Area	400,000 $ft.^2$
Average Sand Thickness	58 ft.
Average Mining Unit Volume	23.2×10^6 $ft.^3$
Average Porosity	25%
Average Wellfield Pore Volume	5.8×10^6 $ft.^3$
Average Wellfield Fluid P.V.	43.4×10^6 gals.
Average Mining Unit Perimeter	447 ft. x 894 ft.
Expected Max. Diffusion Distance	70 ft.
Affected Area 587 ft. x 1,034 ft.	606,958 $ft.^2$
Affected Volume Fluid	65.8×10^6 gals.
Volume Outside Wellfield Perimeter	22.4×10^6 gals.

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SECTION 6, TABLE III

PRE-RESTORATION TDS DETERMINATION

	Fields 1 & 2	Fields 3 & 4	Fields 5 & 6	Fields 7 & 8
Pre-mining TDS (Post-transfer)	0.482 g/l	1.741 g/l	2.371 g/l	2.685 g/l
Post-mining TDS (Pre-transfer)	3.00 g/l	4.259 g/l	4.889 g/l	5.203 g/l
Pre-restoration TDS (Post-transfer)	1.741 g/l	2.371 g/l	2.685 g/l	5.203 g/l
Affected Area TDS	1.741 g/l	2.371 g/l	2.685 g/l	2.843 g/l
Wellfield Volume	43.4×10^6 gals.	43.4×10^6 gals.	43.4×10^6 gals.	43.4×10^6 gals.
Affected Area Volume	22.4×10^6 gals.	22.4×10^6 gals.	22.4×10^6 gals.	22.4×10^6 gals.
Lbs. TDS Wellfield	630,573	858,753	972,481	1,894,256
Lbs. TDS Affected Area	325,457	443,228	501,926	531,462
Lbs. TDS Wellfield & Affected Area	956,030	1,301,981	1,474,407	2,425,718
Lbs. TDS @ 0.5 g/l Wf. & Aff. Area	274,563	274,563	274,563	274,563
Lbs. TDS Generated in Aff. Area (40%)	130,183	177,291	200,770	212,585
Lbs. TDS Requiring Removal to .5 g/l	811,650	1,204,709	1,400,614	2,363,740
Ave. TDS Feed During Restoration	1.112 g/l	1.427 g/l	1.584 g/l	2.452 g/l
GPD Feed to EDR	288,000	288,000	288,000	288,000
TDS Lbs. Feed/Day	2,673	3,430	3,807	5,893
Percent Salt Rejection	90%	90%	89%	88%
TDS Brine Lbs/Day (Removal Rate)	2,406	3,087	3,388	5,186
Days Required/Wellfield	337	390	413	456
Percent Water Recovery	85%	85%	85%	85%
Brine Generated/Wellfield (Gals.)	14.6×10^6 gals.	16.8×10^6 gals.	17.8×10^6 gals.	19.7×10^6 gals.

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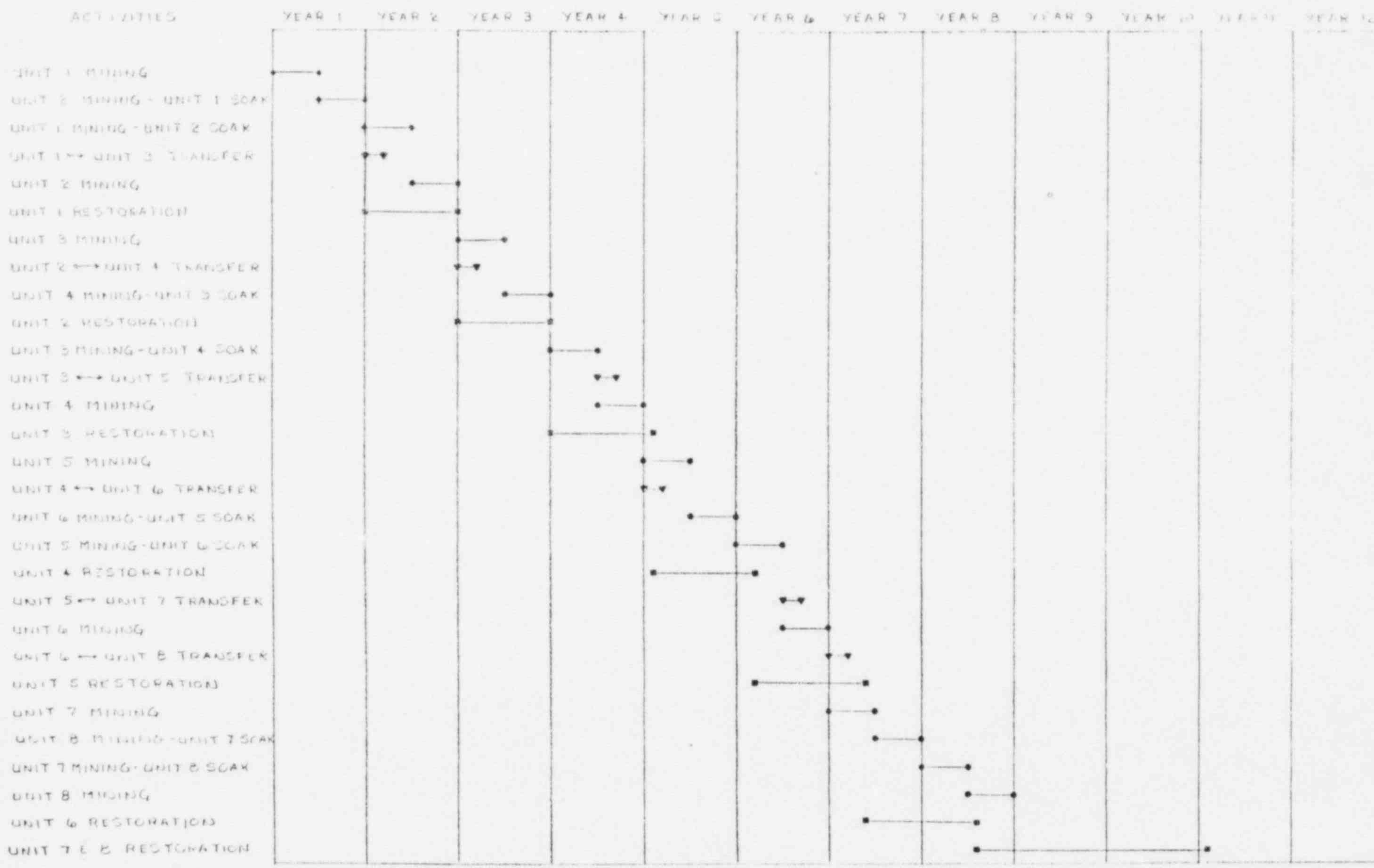
Section 4 Figure I

Lerenberger Commercial In-Situ Uranium Mining Project
Mining and Aquifer Restoration Schedule



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APPENDIX "A"

EVALUATION OF ELECTRODIALYSIS FOR PROCESS
WATER TREATMENT FOR IN SITU MINING

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EVALUATION OF ELECTRODIALYSIS FOR PROCESS WATER TREATMENT FOR IN SITU MINING

R. A. Garling

UNC Teton Exploration Drilling, Inc.
3030 Energy Lane
Casper, WY 82601

INTRODUCTION

Since the infancy of in situ uranium mining, a growing number of hydrometallurgical processes have been incorporated into pilot and commercial scale flowsheets. Although initial design efforts were geared toward maximizing uranium recovery and minimizing plant and wellfield flow circuit maintenance, recent emphasis has shifted to improved means of water conservation and aquifer restoration. As mining units approached depletion, evaporation ponds reached minimum freeboard, and state and federal agencies demanded proof of groundwater restoration, processes including mixed bed and conventional ion exchange, reverse osmosis and electrodialysis were adopted by the industry. These units served the additional function of reducing process bleed flows during mining in states where the deep disposal well permitting ice remains unbroken.

This report concerns the use of electrodialysis as an alternative to the more conventional processes used in in situ mining. In addition to a brief history and description of the process, a comparison to reverse osmosis and operational data derived from testing an Ionics, Inc. 1.31×10^{-3} m^3/s (30,000 gallon/day) unit at the Teton-Nedco Leuenberger Research and Development pilot will be presented.

HISTORY

Commercially practicable electrodialysis was contingent upon the development of synthetic ion exchange membranes in 1940's. In 1952, Ionics Inc. demonstrated that the process was amenable to the treatment of salt and brackish water and, in 1954, made their first commercial sale. The following decade saw several major electrodialysis unit sales which were generally targeted for use on private or municipal potable water treatment. Major increases in membrane desalting unit capacities, facilitated by technological advances in the reserve osmosis industry, were noted during the 1970's. The development of polarity reversing electrodialysis equipment which reduced feed pretreatment requirements, increased water recovery rates, and simplified unit operation, kept Ionics Inc. competetive in the water treatment industry. Engineering advances which incorporated automated equipment, non-corrosive construction materials, and improved ion exchange membranes allowed the electrodialysis process to compete in industrial waste treatment among other commercial markets.

PROCESS AND APPARATUS DESCRIPTION

The electrodialysis process utilizes direct electrical current passed across a stack of alternating cation and anion selective membranes in order to achieve an electrochemical separation of ionized materials in an aqueous solution. The membrane stack has the appearance of a plate and frame filter press and auxilliary equipment includes solution pumps, electrically actuated valves, filters, piping and a direct current power source. The ion separation membranes are thin sheets of synthetic cation or anion selective resins. Attaching sulfonate or quaternary ammonium groups to the cross linked copolymer structure determines the ion selectivity of the membrane. The membranes are separated from each other in the stack by non-conductive spacers that house flow channels which route the flow tortuously and parallel to the membranes. Direct electrical current passing perpendicularly to the membranes and solution passages attracts cations toward the cathode and anions toward the anode (Figure 1). As the ions from the feed stream pass through the ion selective membranes, they become concentrated in the adjacent brine channel and are retained there by the combined attractive force of the electrode and the repelling force of the next membrane toward the electrode. Limiting factors on the degree of demineralization possible include chemical solubilities in the brine flow and the current density that will produce an unacceptable degree of polarization (Figure 1). Feed or brine solution treatment with complexing agents or acids has been successfully applied to prevent membrane scaling. Polarization can occur when sufficient current density is applied to dissociate water in the ion depleted region of the diluting compartments near the membrane surfaces. Significant polarization is evidenced by large electrical resistances across cell pairs and notable pH differences between diluting and concentrating streams. Limiting current densities have been increased in U.S. manufactured equipment by utilizing tortuous flow paths of relatively high linear velocities thereby promoting continous solution mixing. Energy consumption is due to separating electrolytes and solutions, oxidation and reduction reactions occurring in electrode compartments, overcoming electrical resistance, conversion from AC to DC power, solution pumping and auxiliary equipment actuation.

A major improvement to the basic electrodialysis process was applied in 1970 which resulted in frequent, automatic cleaning and descaling of membrane surfaces. The process, polarity reversal, incorporates alternating the cathode and anode on a periodic basis while exchanging product and brine flow channels via electrically actuated values. The reversal reduces the potential of stack plugging with $CaCO_3$ (calcite), $CaSO_4$ (gypsum), and colloidal materials and, in most waters, eliminates feed pre-treatment requirements. For approximately two minutes during and following the reversal, off spec. water is flushed to waste or reintroduced to the feed supply. The usual feed treatment on polarity reversing electro-

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dialysis equipment (EDR) consists of filtration of particulates exceeding 10 μm (micron).

EDR COMPARED TO REVERSE OSMOSIS (R.O.)

The tool widely adopted by the ISL industry for process bleed reduction and groundwater restoration has been reverse osmosis (R.O.). R.O. units utilize excessive pressure exerted across semi permeable spiral wound cellulose acetate or hollow fiber polyamide membrane elements in order to reverse the natural osmotic process. The net result is similar to electrodialysis in that dissolved solids in feed water are concentrated into a reduced volume and relatively high "clean" water recoveries are noted.

There are several dissimilarities between the processes that suggest significant advantages to the EDR operator. Due to the microscopic pore size of the R.O. membrane, more chemical pretreatment and filtration is required than for the 1 mm flow channels in the EDR stack. Pre-softening or complexing EDR feed is not generally required and the membranes withstand silica scaling. ED membranes can be operated in the pH 1-10 range and exhibit stability to 316°K(110°F). R.O. membranes typically operate only in relatively small pH and temperature ranges. Materials of construction and maintenance costs are reduced for EDR due to the comparatively low feed pressures.

Perhaps the greatest single advantage to the EDR process is the stability and accessibility of the ion exchange membranes. Although ED and RO are similar in that the ion exchange media represents a large proportion of the initial capital cost of the unit, ED is unique because of the long term stability and maintainability of the membranes. Due to the low pressure feed and nature of the process, ED membranes do not suffer from the gradual compaction noted on R.O. membranes, and, as a result have demonstrated working lives in excess of 10 years. Formation of $CaSO_4$ scale that can result in RO membrane failure or plugging, is restricted in EDR operation due to polarity reversal and the commercial stack cleaning circuit. In contrast to R.O. membranes, ED membrane stacks may be physically disassembled and membranes may be individually scrubbed if scaling cannot be controlled or dissolved by the "clean in place" circuit.

Based on recent quotes from both RO and EDR manufactures, capital equipment costs are comparable and range from $175,000 to $250,000 for $1.26 \times 10^{-2} m^3/s$ (200 gpm) units. Operating costs for EDR units have historically been equal to lower than comparably size RO units (when feed TDS remains below 5000 mg/l) and EDR feed pretreatment costs are typically lower.

PILOT TEST RESULTS

In late 1980, Teton Exploration and Ionics, Inc. initiated an agreement to perform a three month test with a commercially sized EDR unit on the ISL circuits at the Leuenberger pilot project located near Glenrock, Wyoming. An Aquamite V-M $1.31 \times 10^{-3} m^3/s$ (30000 gallon/day) unit was received, installed, and operating continuously by 2-25-81. The dual stage unit was expected to produce 665 mg/l TDS water from a feed of 2650 mg/l with a product water recovery of ~80%.

Installation of the three ton, two piece unit required skid placement, plumbing unit feed, product and brine lines, and providing a peak 1.26×10^8 J (35 KVA) power source. Electrical power was provided by the plant three phase diesel generators. Overall dimensions of the unit including reasonable maintenance clearance are 4.27 m (14 ft) x 6.1 m (20 ft) x 3.65 m (12 ft H).

The unit was to be tested on feed solutions comparable to those anticipated during the commercial operation including ion exchange barren effluent, mining zone restoration fluids, and impounded bleed.

Continuous operation began 2/25/81 with a 2.9 g/l TDS feed split from the ion exchange barren effluent stream. Due to the high initial Ca^{++} and HCO_3^- concentrations (0.25 g/l and 1.7 g/l respectively), pH adjustment of the feed flow to pH 5.8 to 6.0 with 35% hydrochloric acid was required to prevent $CaCO_3$(g) precipitation in the brine stream. As feed parameters reduced from the effect of field restoration, CO_2(g), introduced in gaseous form to the feed tank, replaced HCl as the pretreatment chemical.

Pretreatment costs during the test were $0.80/3785 L (1000 gal) for HCl and $0.91/3785 L (1000 gal) for CO_2(g). Although costs were ~14% higher for CO_2 (g) pretreatment, the addition was continued in order to prevent reintroduction of Cl^- ion to the restoring mining zones.

Ionics Inc., testwork indicated that membrane life would not be significantly reduced by feeding elevated levels of free chlorine which allowed recirculation of electrode compartment flows to the feed solution. This reduced brine flow from ~3.5 x 10^{-4} m^3/s (8000 gallons/day) to ~2.5 x 10^{-4} m^3/s (5700 gallons/day).

During the evaluation period, 1.25×10^7 L (3.31×10^6 gal) were fed at an average TDS of 2.35 g/l, and 1.02×10^7 L (2.7×10^6 gal) product at 0.35 g/l TDS and 2.24×10^6 L (5.8×10^5 gal) of brine were generated representing a salt rejection of 87.5% and water recovery of 81.5%. Chemical results from the final month of the test are presented in Table 1.

The unit operated 96% of the time available requiring only four cleaning cycles and no stack disassembly. Cleaning downtime was necessitated by operator error in neglecting to maintain flow to the feed tank during polarity reversals. The off specification water generated during the reversals continually enchances raw feed parameters by ~55%.

Routine operating costs averaged $1.02/3785 L (1000 gal) and broke down into pH adjustment chemicals ($0.86/3785 L (1000 gal)) and power requirements ($0.149/3785 L (1000 gal)). Approximately four manhours/day were required for data collection and unit operation and one manhour/day was needed for site analytical work.

A single day, 52,900 L (14000 gal) test was performed on feed from impounded bleed derived from an earlier groundwater restoration sweep. This test was designed to determine the feasibility of reducing water storage volumes by concentrating dissolved solids in a reduced volume and creating a product that met state surface discharge criteria. Test results indicated that the 3.1 g/l TDS feed could be split to provide 78% product water recovery at 0.66 g/l TDS. Additional pre or post treatment of the product to further reduce Ra-226 levels would be required to meet discharge quality.

Analyses performed over the duration of the test period showed a divalent ion rejection of 90.5% and a monovalent ion rejection of 84.8%. Radiometric and detectable trace elements showed feed to product splits equivalent to major constituents (Table 1).

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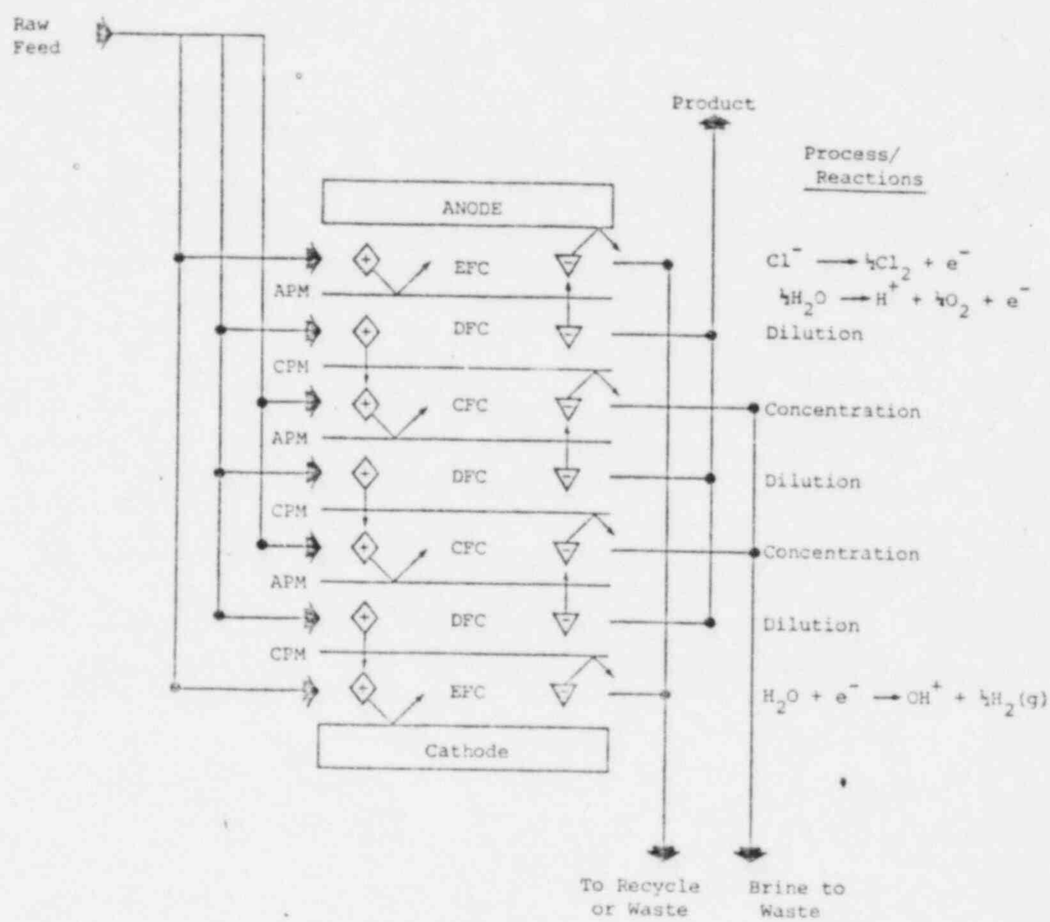

APM - Anion Permeable Membrane
CPM - Cation Permeable Membrane
DFC - Diluting Flow Chamber
CFC - Concentrating Flow Chamber
EFC - Electrode Flow Chamber
(+) - Cation
(−) - Anion

FIGURE 1: ELECTRODIALYSIS PROCESS DIAGRAM

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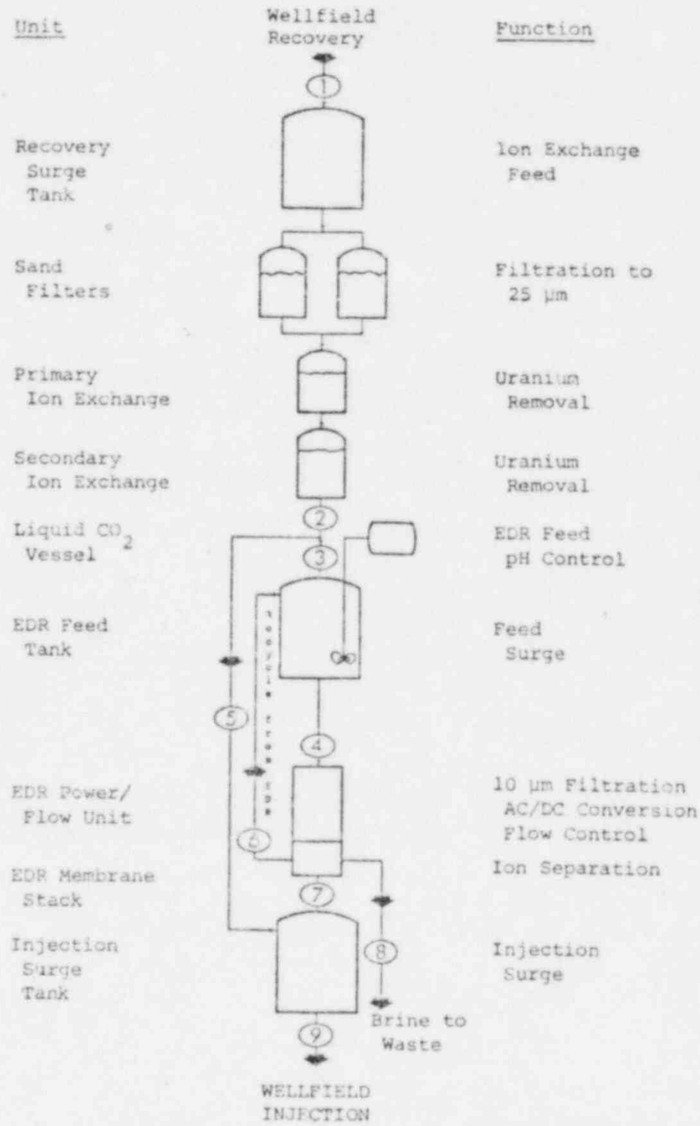

TYPICAL FLOW/COND. BALANCE

#	Flow Rate GPM	Solution Conductivity μmhos/cm
1	52.1	1,289
2	52.1	1,289
3	25.4	1,289
4	30.8	1,748
5	26.7	1,289
6	5.4	3,907
7	21.2	182
8	4.2	5,956
9	47.9	856

FIGURE 2 - EDR BASED RESTORATION - FLOW DIAGRAM

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TABLE 1
EDR TEST/ANALYTICAL MEANS

PARAMETER	FEED	BRINE	PRODUCT	REJECTION
Major Parameter	mg/l	mg/l	mg/l	
HCO_3^-	573	2,384	106	81.5%
Cl^-	432	1,884	61	85.9%
$SO_4^=$	363	1,656	23	93.7%
Ca^{++}	191	826	16	91.6%
Na^+	337	1,464	61	81.9%
Mg^{++}	44	208	6	84.6%
K^+	20	88	2	90.0%
Traces				
As	.022	0.104	0.009	59.1%
Ba	0.15	0.23	<0.1	>50%
NO_3+NO_2	1.9	8.0	0.44	76.8%
Se	0.11	0.19	0.02	81.8%
U	9.15	21.4	1.80	80.3%
Radiometrics	pCi/L	pCi/L	pCi/L	
Ra 226	667	2,904	64	90.4%
Th 230	54	415	10.0	81.5%
Gross α	735	3,294	149	79.7%
Gross β	2,182	4,390	379	82.6%

CONCLUSION

Based on the results of the three month test period, Teton-Nedco purchased the Aquamite V-M unit for the pilot restoration and decommissioning project. We feel that the EDR process has satisfactorily proven its amenability to HCO_3^- leach ISL water treatment requirements and this and a larger unit have been incorporated into the commercial scale flow sheet. Ease of operation, mechanical availability, capital and operating costs comparable to alternate systems, the units ability to provide >80% water recovery at >80% salt rejection, and the cooperation of the manufacturer were all factors in the decision to use EDR at the commercial level.

The anticipated uses of EDR under commercial operation include:

1) Provision of a source of low TDS process water for Na_2CO_3 makeup, slurry product washing and post elution resin rinsing. The unit feed would be the 0.5 to 2% field overrecovery fluid.

2) Commercial scale wellfield restoration would be accomplished using an Aquamite 20 1.26×10^{-2} m^3/sec. (200 gpm) unit.

3) Process bleed reduction may be attempted by reducing product radiometric levels to a point where the solution is usable for construction water, dust control, drilling, plant washing or, with appropriate approvals, surface discharge.

At this time, the Aquamite V-M unit continues to operate and a "state of the art" pilot scale wellfield restoration is nearing completion.

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TETON EXPLORATION DRILLING, INC.

LEUENBERGER PILOT

IONICS AQUAMITE V-M OPERATING RESULTS

FEBRUARY 25, 1981 - SEPTEMBER 1, 1981

% Mechanical Availability	>98%
Feed Volume	6.9×10^6 Gallons
Feed TDS	1.72 G/L
Brine Volume	1.1×10^6 Gallons
Brine TDS	9.5 G/L
Product Volume	5.8×10^6 Gallons
Product TDS	0.20 G/L
% Salt Rejection	88.37%
% Product Water Recovery	84.06%

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TETON EXPLORATION DRILLING, INC.

LEUENBERGER PILOT

IONICS AQUAMITE V-M TEST RESULTS

FEBRUARY, 1981 - MAY, 1981

EXPECTED RESULTS:

Feed TDS	2.65 G/L
Product TDS	0.655 G/L
% Product Water Recovery	80%

ACTUAL RESULTS:

% Mechanical Availability	96%
Feed Gallons	3.3×10^6 Gallons
Feed TDS	2.35 G/L
Brine Gallons	580,000 Gallons
Product Gallons	2.7×10^6 Gallons
Product TDS	0.35 G/L
% Salt Rejection	87.5%
% Product Water Recovery	81.5%
Operating Cost	$1.01/1000 Gallons

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APPENDIX "B"

WATER QUALITY ANALYTICAL RESULTS
OF RESTORATION PROGRESS

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MP-1

DATE SMPLD	2-19-81	9-1-81					
ANALYSIS DATES							
HCO_3^- mg/l	1747	298					
$CO_3^=$ mg/l	48	-0-					
Cl^- mg/l	81.6	11.4					
$SO_4^=$ mg/l	475	169					
Anion eq.	42.44	8.73					
Ca^{++} mg/l	244	63.8					
Mg^{++} mg/l	57	15.9					
Na^+ mg/l	556	84					
K^+ mg/l	22.5	9.8					
Cation eq.	41.70	8.42					
-/+balance	101.76	103.68					
Sum TDS	3231	650					
Cond um/cm	3030	784					
TDS mg/l	2114	478					
pH unit	7.3	7.03					
U mg/l	25.4	0.56					
Al mg/l	0.08	<0.50					
NH_4^+ mg/l	<0.10	<0.05					
As mg/l	0.011	0.84					
Ba mg/l	<0.10	<0.10					
B mg/l	<0.25	<0.01					
Cd mg/l	<0.01	<0.01					
Cr mg/l	<0.05	<0.05					
Cu mg/l	<0.05	<0.05					
F mg/l	0.28	0.36					
Fe mg/l	0.08	26.7					
Pb mg/l	<0.05	<0.05					
Mn mg/l	0.21	0.073					
Hg mg/l	<0.001	NA					
Mo mg/l	<0.10	<0.10					
Ni mg/l	<0.05	<0.05					
NO_2/NO_3 "	0.42	0.50					
Se mg/l	0.050	0.03					
V mg/l	<0.10	0.70					
Zn mg/l	<0.05	0.01					
Ra^{226} pci/l		1329±18					
Th^{230} pci/l							
Gross A "							
Gross B "							

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MP-3

DATE SMPLD	2-19-81	9-9-81					
ANALYSIS DATES							
HCO_3^- mg/l	1885	287					
$CO_3^=$ mg/l	-0-	-0-					
Cl mg/l	103.5	13.6					
$SO_4^=$ mg/l	444	72					
Anion eq.	43.07	6.59					
Ca^{++} mg/l	224	46.2					
Mg^{++} mg/l	54	10.3					
Na^+ mg/l	611	82					
K^+ mg/l	23.5	9.6					
Cation eq.	42.87	6.98					
-/+balance	100.47	94.41					
Sum TDS	3345	521					
Cond um/cm	2930	623					
TDS mg/l	2188	364					
pH unit	7.1	6.90					
U mg/l	3.8	0.09					
Al mg/l	0.08	<0.5					
NH_4 mg/l	<0.10	<0.10					
As mg/l	0.005	0.010					
Ba mg/l	<0.10	<0.10					
B mg/l	0.25	<0.01					
Cd mg/l	<0.01	<0.01					
Cr mg/l	<0.05	<0.05					
Cu mg/l	<0.05	<0.05					
F mg/l	0.17	0.30					
Fe mg/l	<0.05	<0.05					
Pb mg/l	<0.05	<0.05					
Mn mg/l	0.18	<0.05					
Hg mg/l	<0.001	<0.005					
Mo mg/l	<0.10	<0.10					
Ni mg/l	<0.05	<0.05					
NO_2/NO_3 "	0.30	<0.01					
Se mg/l	0.029	0.01					
V mg/l	<0.10	<0.50					
Zn mg/l	0.08	<0.01					
Ra^{226} pci/l		23 ± 2					
Th^{230} pci/l							
Gross A "							
Gross B "							

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MA-5

DATE SMPLD	2-19-81	8-12-81					
ANALYSIS DATES							
HCO_3^- mg/l	1640	293					
$CO_3^=$ mg/l	9.6	-0-					
Cl^- mg/l	86.4	9					
$SO_4^=$ mg/l	433	52					
Anion eq.	38.66	6.14					
Ca^{++} mg/l	214	36					
Mg^{++} mg/l	54	10					
Na^+ mg/l	549	74					
K^+ mg/l	23.5	7					
Cation eq.	39.67	6.03					
-/+balance	97.46	101.83					
Sum TDS	3010	481					
Cond um/cm	2920	525					
TDS mg/l	2006	330					
pH unit	7.2	6.29					
[illegible] mg/l	12.8	0.083					
[illegible]1 mg/l	0.05	0.32					
NH_4^+ mg/l	<0.10	<0.05					
As mg/l	0.012	<0.001					
Ba mg/l	<0.10	<0.10					
B mg/l	<0.25	<0.01					
Cd mg/l	<0.01	0.007					
Cr mg/l	<0.05	<0.01					
Cu mg/l	<0.05	0.01					
F mg/l	0.18	0.33					
Fe mg/l	<0.05	0.80					
Pb mg/l	<0.05	<0.05					
Mn mg/l	0.21	<0.02					
Hg mg/l	<0.001	<0.0002					
Mo mg/l	<0.10	<0.10					
Ni mg/l	<0.05	<0.02					
NO_2/NO_3 "	0.34	<0.05					
Se mg/l	0.029	0.033					
V mg/l	0.7	<0.10					
Zn mg/l	<0.05	0.015					
[illegible]226 pci/l		360±10					
[illegible]230 pci/l							
Gross A "							
Gross B "							

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MI-1

DATE SMPLD	2-19-81						
ANALYSIS DATES							
HCO_3^- mg/l	1562						
$CO_3^=$ mg/l	38.4						
Cl^- mg/l	80.4						
$SO_4^=$ mg/l	466						
Anion eq.	38.86						
Ca^{++} mg/l	215						
Mg^{++} mg/l	58.5						
Na^+ mg/l	529						
K^+ mg/l	22.0						
Cation eq.	39.19						
-/+balance	99.17						
Sum TDS	2971						
Cond um/cm	2800						
TDS mg/l	1920						
pH unit	7.2						
U mg/l	0.2						
Al mg/l	<0.05						
NH_4^+ mg/l	<0.10						
As mg/l	0.009						
Ba mg/l	<0.10						
B mg/l	<0.25						
Cd mg/l	<0.01						
Cr mg/l	<0.05						
Cu mg/l	<0.05						
F mg/l	0.30						
Fe mg/l	<0.05						
Pb mg/l	<0.05						
Mn mg/l	0.40						
Hg mg/l	<0.001						
Mo mg/l	<0.10						
Ni mg/l	<0.05						
NO_2/NO_3 "	0.30						
Se mg/l	0.021						
V mg/l	0.2						
Zn mg/l	<0.05						
Ra^{226} pci/l							
Th^{230} pci/l							
Gross A "							
Gross B "							

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MI-2

DATE SMPLD	2-19-81						
ANALYSIS DATES							
HCO_3^- mg/l	156.2						
$CO_3^=$ mg/l	38.4						
Cl mg/l	80.4						
$SO_4^=$ mg/l	466						
Anion eq.	38.86						
Ca^{++} mg/l	215						
Mg^{++} mg/l	58.5						
Na^+ mg/l	529						
K^+ mg/l	22.0						
Cation eq.	39.19						
-/+balance	99.17						
Sum TDS	2971						
Cond um/cm	2800						
TDS mg/l	1920						
pH unit	7.2						
U mg/l	0.2						
Al mg/l	<0.05						
NH_4^+ mg/l	<0.10						
As mg/l	0.009						
Ba mg/l	<0.10						
B mg/l	<0.25						
Cd mg/l	<0.01						
Cr mg/l	<0.05						
Cu mg/l	<0.05						
F mg/l	0.30						
Fe mg/l	<0.05						
Pb mg/l	<0.05						
Mn mg/l	0.40						
Hg mg/l	<0.001						
Mo mg/l	<0.10						
Ni mg/l	<0.05						
NO_2/NO_3 "	0.30						
Se mg/l	0.021						
V mg/l	0.2						
Zn mg/l	<0.05						
Ra^{226} pci/l							
Th^{230} pci/l							
Gross A "							
Gross B "							

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MI-3

DATE SMPLD	2-19-81	8-12-81					
ANALYSIS DATES							
HCO_3^- mg/l	1562	373					
$CO_3^=$ mg/l	38.4	-0-					
Cl mg/l	80.4	24					
$SO_4^=$ mg/l	466	154					
Anion eq.	38.86	10.00					
Ca^{++} mg/l	215	56					
Mg^{++} mg/l	58.5	12					
Na^+ mg/l	529	137					
K^+ mg/l	22.0	12					
Cation eq.	39.19	10.06					
-/+balance	99.17	99.36					
Sum TDS	2971	768					
Cond um/cm	2800	918					
TDS mg/l	1920	607					
pH unit	7.2	6.58					
U mg/l	0.2	5.678					
Al mg/l	<0.05	<0.10					
NH_4^+ mg/l	<0.10	0.24					
As mg/l	0.009	<0.001					
Ba mg/l	<0.10	<0.10					
B mg/l	<0.25	0.13					
Cd mg/l	<0.01	0.003					
Cr mg/l	<0.05	<0.01					
Cu mg/l	<0.05	<0.01					
F mg/l	0.30	0.43					
Fe mg/l	<0.05	<0.01					
Pb mg/l	<0.05	<0.05					
Mn mg/l	0.40	<0.01					
Hg mg/l	<0.001	<0.0002					
Mo mg/l	<0.10	<0.10					
Ni mg/l	<0.05	<0.02					
NO_2/NO_3 "	0.30	<0.05					
Se mg/l	0.021	<0.001					
V mg/l	0.2	<0.10					
Zn mg/l	<0.05	0.008					
Ra^{226} pci/l		814 ± 15					
Th^{230} pci/l							
Gross A "							
Gross B "							

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MI-4

DATE SMPLD	2-19-81	9-1-81					
ANALYSIS DATES							
HCO_3^- mg/l	1562	333					
$CO_3^=$ mg/l	38.4	-0-					
Cl mg/l	80.4	14.3					
$SO_4^=$ mg/l	466	72					
Anion eq.	38.86	7.36					
Ca^{++} mg/l	215	51.3					
Mg^{++} mg/l	58.5	12.8					
Na^+ mg/l	529	77					
K^+ mg/l	22.0	7.0					
Cation eq.	39.19	7.16					
-/+balance	99.17	102.84					
Sum TDS	2971	567					
Cond um/cm	2800	673					
TDS mg/l	1920	368					
pH unit	7.2	6.85					
U mg/l	0.2	0.07					
Al mg/l	<0.05	<0.50					
NH_4 mg/l	<0.10	<0.05					
As mg/l	0.009	<0.01					
Ba mg/l	<0.10	<0.10					
B mg/l	<0.25	<0.01					
Cd mg/l	<0.01	<0.01					
Cr mg/l	<0.05	<0.05					
Cu mg/l	<0.05	<0.05					
F mg/l	0.30	0.36					
Fe mg/l	<0.05	<0.05					
Pb mg/l	<0.05	<0.05					
Mn mg/l	0.40	<0.05					
Hg mg/l	<0.001	NA					
Mo mg/l	<0.10	<0.10					
Ni mg/l	<0.05	<0.05					
NO_2/NO_3 "	0.30	0.50					
Se mg/l	0.021	<0.01					
V mg/l	0.2	<0.50					
Zn mg/l	<0.05	<0.01					
Ra^{226} pci/l		345±9					
Th^{230} pci/l							
Gross A "							
Gross B "							

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # HI-8

DATE SMPLD	2-19-81	8-12-81
ANALYSIS DATES		
HCO_3^- mg/l	1562	324
$CO_3^=$ mg/l	38.4	-0-
Cl mg/l	80.4	20
$SO_4^=$ mg/l	466	88
Anion eq.	38.86	7.71
Ca^{++} mg/l	215	41
Mg^{++} mg/l	58.5	19
Na^+ mg/l	529	89
K^+ mg/l	22.0	9
Cation eq.	39.19	7.73
-/+balance	99.17	99.68
Sum TDS	2971	590
Cond um/cm	2800	734
TDS mg/l	1920	458
pH unit	7.2	6.58
U mg/l	0.2	1.670
Al mg/l	<0.05	0.12
NH_4^+ mg/l	<0.10	<0.05
As mg/l	0.009	0.033
Ba mg/l	<0.10	<0.10
B mg/l	<0.25	0.11
Cd mg/l	<0.01	0.007
Cr mg/l	<0.05	<0.01
Cu mg/l	<0.05	<0.01
F mg/l	0.30	0.28
Fe mg/l	<0.05	<0.01
Pb mg/l	<0.05	<0.05
Mn mg/l	0.40	<0.01
Hg mg/l	<0.001	<0.0002
Mo mg/l	<0.10	<0.10
Ni mg/l	<0.05	<0.02
NO_2/NO_3 "	0.30	<0.05
Se mg/l	0.021	0.016
V mg/l	0.2	<0.10
Zn mg/l	<0.05	0.005
Ra^{226} pci/l		200±8
Th^{230} pci/l		
Gross A "		
Gross B "		

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MI-12

DATE SMPLD	2-19-81						
ANALYSIS DATES							
HCO_3^- mg/1	1562						
$CO_3^=$ mg/1	38.4						
Cl mg/1	80.4						
$SO_4^=$ mg/1	466						
Anion eq.	38.86						
Ca^{++} mg/1	215						
Mg^{++} mg/1	58.5						
Na^+ mg/1	529						
K^+ mg/1	22.0						
Cation eq.	39.19						
-/+balance	99.17						
Sum TDS	2971						
Cond um/cm	2800						
TDS mg/1	1920						
pH unit	7.2						
U mg/1	0.2						
Al mg/1	<0.05						
NH_4^+ mg/1	<0.10						
As mg/1	0.009						
Ba mg/1	<0.10						
B mg/1	<0.25						
Cd mg/1	<0.01						
Cr mg/1	<0.05						
Cu mg/1	<0.05						
F mg/1	0.30						
Fe mg/1	<0.05						
Pb mg/1	<0.05						
Mn mg/1	0.40						
Hg mg/1	<0.001						
Mo mg/1	<0.10						
Ni mg/1	<0.05						
NO_2/NO_3 "	0.30						
Se mg/1	0.021						
V mg/1	0.2						
Zn mg/1	<0.05						
Ra^{226} pci/1							
[illegible]230 pci/1							
Gross A "							
Gross B "							

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # 301

DATE SMPLD	2-19-81	5-6-81	9-9-81				
ANALYSIS DATES							
HCO_3^- mg/l	1348	719	659				
$CO_3^=$ mg/l	32.6	-0-	-0-				
Cl mg/l	66.4	47	28.1				
$SO_4^=$ mg/l	418	248	229				
Anion eq.	33.77	18.28	16.37				
Ca^{++} mg/l	224	130	141.9				
Mg^{++} mg/l	44	33	33.0				
Na^+ mg/l	428	203	139				
K^+ mg/l	19.5	13.0	13.5				
Cation eq.	33.98	18.41	16.23				
-/+balance	99.38	99.29	100.84				
Sum TDS	2581	1393	1244				
Cond um/cm	2530	1400	1383				
TDS mg/l	1868	1068	935				
pH unit	7.5	6.7	7.00				
U mg/l	53.6	19.7	19.8				
Al mg/l	<0.05	0.08	<0.5				
NH_4^+ mg/l	<0.10	<0.10	<0.10				
As mg/l	0.009	0.125	0.044				
Ba mg/l	<0.10	<0.50	<0.10				
B mg/l	<0.25	0.28	<0.01				
Cd mg/l	<0.01	<0.01	<0.01				
Cr mg/l	<0.05	<0.05	<0.05				
Cu mg/l	<0.05	<0.05	<0.05				
F mg/l	0.39	0.36	0.45				
Fe mg/l	<0.05	1.07	0.94				
Pb mg/l	<0.05	<0.05	<0.05				
Mn mg/l	0.24	0.13	0.133				
Hg mg/l	<0.001	<0.001	<0.005				
Mo mg/l	<0.10	<0.10	<0.10				
Ni mg/l	<0.05	<0.05	<0.05				
NO_2/NO_3 "	0.26	0.28	<0.01				
Se mg/l	0.014	<0.005	<0.01				
V mg/l	0.2	<0.10	<0.50				
Zn mg/l	<0.05	<0.05	<0.01				
Ra^{226} pci/l		1139 ± 20	1549 ± 19				
Th^{230} pci/l							
Gross A "							
Gross B "							

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # 306

DATE SMPLD	2-23-81	5-6-81	7-14-81	8-12-81			
ANALYSIS DATES							
HCO_3^- mg/l	760	559	328	166			
$CO_3^=$ mg/l	0	16	14	-0-			
Cl mg/l	28	16	8	8			
$SO_4^=$ mg/l	233	174	150	118			
Anion eq.	18.10	13.77	8.19	5.41			
Ca^{++} mg/l	225	125	96	51			
Mg^{++} mg/l	44	43	25	17			
Na^+ mg/l	70	53	35	32			
K^+ mg/l	12.5	11.1	9	7			
Cation eq.	18.28	12.42	8.64	5.54			
-/+balance	99.03	110.88	106.47	97.61			
Sum TDS	1373	997	665	399			
Cond um/cm	1400	1050	667	597			
TDS mg/l	1034	822	498	352			
pH unit	7.4	7.4	7.8	7.78			
U mg/l	33.4	14.5	4.5	1.386			
Al mg/l	<0.05	0.17	0.10	<0.10			
NH_4^+ mg/l	<0.10	<0.10	<0.10	0.22			
As mg/l	0.010	0.013	<0.005	0.005			
Ba mg/l	<0.10	<0.50	0.20	<0.10			
B mg/l	<0.25	<0.25	<0.25	<0.01			
Cd mg/l	<0.01	<0.01	0.02	0.003			
Cr mg/l	<0.05	<0.05	<0.05	<0.01			
Cu mg/l	<0.05	<0.05	<0.05	<0.01			
F mg/l	0.28	0.28	0.36	0.61			
Fe mg/l	<0.05	0.39	0.06	<0.01			
Pb mg/l	<0.05	<0.05	<0.05	<0.05			
Mn mg/l	0.17	0.10	0.08	<0.01			
Hg mg/l	<0.001	<0.001	<0.001	<0.0002			
Mo mg/l	<0.10	<0.10	<0.10	<0.10			
Ni mg/l	<0.05	<0.05	<0.05	<0.02			
NO_2/NO_3 "	0.17	0.23	<0.10	<0.05			
Se mg/l	<0.005	<0.005	<0.005	<0.001			
V mg/l	<0.10	<0.10	<0.10	<0.10			
Zn mg/l	<0.05	<0.05	<0.05	0.007			
Ra 226 pci/l	2598.5 ± 8.34	2530 ± 24	1074 ± 16	879 ± 16			
Th 230 pci/l	5						
Gross A "							
Gross B "							

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # 308

DATE SMPLD	2-23-81	5-6-81	7-14-81	8-12-81			
ANALYSIS DATES							
HCO_3^- mg/l	1128	409	238	137			
$CO_3^=$ mg/l	0	14	19	-0-			
Cl mg/l	103	24	6	2			
$SO_4^=$ mg/l	362	185	224	272			
Anion eq.	28.94	11.70	9.37	7.97			
Ca^{++} mg/l	122	77	100	100			
Mg^{++} mg/l	36.7	24	22	17			
Na^+ mg/l	729	112	38	32			
K^+ mg/l	19.5	11.0	9	9			
Cation eq.	41.35	11.00	8.72	8.04			
-/+balance	69.98	106.37	107.51	99.13			
Sum TDS	2500	856	656	569			
Cond um/cm	2400	940	672	745			
TDS mg/l	1630	684	524	546			
pH unit	7.5	7.55	7.8	7.80			
U mg/l	1.6	0.30	<0.10	0.568			
Al mg/l	<0.05	0.25	<0.10	<0.10			
NH_4^+ mg/l	<0.10	<0.10	0.15	0.12			
As mg/l	0.016	0.033	<0.005	0.025			
Ba mg/l	<0.10	<0.50	0.20	<0.10			
B mg/l	<0.25	0.34	<0.25	<0.01			
Cd mg/l	<0.01	<0.01	0.02	0.003			
Cr mg/l	<0.05	<0.05	<0.05	<0.01			
Cu mg/l	<0.05	<0.05	<0.05	<0.01			
F mg/l	0.33	0.29	0.36	0.65			
Fe mg/l	<0.05	0.33	0.24	<0.01			
Pb mg/l	<0.05	<0.05	<0.05	<0.05			
Mn mg/l	0.06	0.08	0.07	<0.01			
Hg mg/l	<0.001	<0.001	<0.001	<0.0002			
Mo mg/l	<0.10	<0.10	<0.10	<0.10			
Ni mg/l	<0.05	<0.05	<0.05	<0.02			
NO_2/NO_3 "	0.37	0.26	<0.10	<0.05			
Se mg/l	<0.005	<0.005	<0.005	<0.001			
V mg/l	<0.10	<0.10	<0.10	<0.10			
Zn mg/l	<0.05	<0.05	<0.05	<0.005			
Ra^{226} pci/l	282.19±2.74	68±4	13.9±1.8	56±4			
Th^{230} pci/l	5						
Gross A "							
Gross B "							

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APPENDIX "C"

M-ZONE RESTORATION PROCESS
MONITORING ANALYTICAL RESULTS

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UNC - TETON EXPLOR. I[illegible] DRILLING COMPANY, INC.

M ZONE RESTORATION ANALYTICAL HISTORY

WELL: MR-1

PHASE	DATE	U_3O_8	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-	ANIONS	Ca^{++}	Mg^{++}	Na^+	K^+	CATION	BAL	COND	SUM TDS	pH
		mg/l	mg/l	mg/l	mg/l	mg/l	meq.	mg/l	mg/l	mg/l	mg/l	meq	%	umho	mg/l	unit
1	2-25	23.1	-0-	1610	445	101		206		488				2710		7.27
1	3-1	21.7	-0-	1525	446	113	37.48	158	49	490	25	33.93	110.5	2715	2828	7.30
1	3-8	17.3	-0-	1171	362	138	30.63	168	43	427	21	31.09	98.5	2340	2347	7.62
1	3-15	12.8	-0-	1074	328	120	27.82	124	28	320	19	22.93	121.3	2160	2026	7.25
1	3-23	9.0	-0-	903	284	109		101		313				1890		7.49
1	3-30	6.9	-0-	793	267	103	21.47	121	30.5	306	16	22.31	96.2	1669	1644	7.20
1	4-8	5.2	-0-	683	248	101	19.21	106	29.2	259	14.5	19.37	99.2	1470	1446	
1	4-15	3.7	-0-	586	217	81	16.41	92	25	246	13	17.71	92.7	1305	1264	
1	4-19	3.3	-0-	586	201	68		96		215				1255		
4	9-2	0.6	-0-	332	143	11.8	8.75	63.9	15.0	84	9.8	8.35	104.9	839	661	
4	9-6	0.5	-0-	372	98	13.1	8.51	63	13.2	92	9.5	8.49	100.2	774	662	
4	9-9	0.4	-0-	348	98	14.9	8.17	62	12.9	88	9.0	8.23	99.2	755	633	
4	9-16	0.4	-0-	323	110	13.7	7.97	62.7	13.0	84	9.1	8.10	98.4	753	616	
4	9-27	0.3	-0-	323	106	16.6	7.97	52.8	12.8	86	8.2	7.63	104.5	718	605	
4	12-8	0.2	-0-	275	95	11.7	6.82	49.5	11.7	73.8	6.7	6.83	99.8	613	523	
4	12-14	0.2	-0-	275	98	11.9	6.89	47	10.3	74	6.9	6.60	101.3	619	523	

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UNC - TETON EXPLORATION DRILLING COMPANY, INC.

M ZONE RESTORATION ANALYTICAL HISTORY

WELL: MR-3

PHASE	DATE	U_3O_8	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-	ANIONS	Ca^{++}	Mg^{++}	Na^+	K^+	CATION	BAL	COND	SUM TDS	pH
		mg/1	mg/1	mg/1	mg/1	mg/1	meq.	mg/1	mg/1	mg/1	mg/1	meq	%	umho	mg/1	unit
1	2-25	4.8	-0-	1854	448	111		209		571				3080		7.09
1	3-1	5.2	-0-	1659	446	113	39.68	142	51	508	27	34.13	116.25	2860	2951	7.03
1	3-8	4.5	-0-	1196	345	130	30.46	134	47	450	23	30.77	99.0	2400	2330	7.46
1	3-15	3.6	-0-	1025	317	130	27.07	91	34	397	17	25.08	108.0	2095	2015	7.40
1	3-23	3.2	-0-	939	254	118		90		354				1915		7.31
1	3-30	2.6	-0-	830	269	109	22.29	128	29.8	314	16	22.95	97.1	1680	1699	7.17
1	4-8	2.3	-0-	744	220	107	19.80	106	31.1	279	15.5	20.42	97.0	1520	1505	
1	4-15	2.2	-0-	695	214	89	18.36	104	28	267	15	19.53	94.0	1455	1414	
1	4-19	2.1	-0-	720	198	77		106		240				1410		
3	8-12	0.3	-0-	415	76	16.9	8.86	60	13	109	10	9.08	97.6	811	700	
3	8-19	0.2	-0-	316	68	13.5	7.38	50	12	93	10	7.80	94.6	631	563	
3	8-30	1.4	-0-	442	94	19.8	9.76	67.7	12.2	115	8.5	9.62	101.5	841	761	
4	9-2	0.1	-0-	302	69	13.3	6.76	42.5	10.9	71	8.6	6.34	106.7	602	517	
4	9-6	0.2	-0-	369	72	14.2	7.95	72	10.5	78	9.1	8.10	98.2	714	625	

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UNC - TETON EXPLORATION DRILLING COMPANY, INC.

M ZONE RESTORATION ANALYTICAL HISTORY

WELL: MR-5

PHASE	DATE	U_3O_8	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-	ANIONS	Ca^{++}	Mg^{++}	Na^+	K^+	CATION	BAL	COND	SUM TDS	pH
		mg/l	mg/l	mg/l	mg/l	mg/l	meq.	mg/l	mg/l	mg/l	mg/l	meq	%	umho	mg/l	unit
1	2-25	13.2	-0-	1732	442	103		210		511				2860		7.26
1	3-1	11.2	-0-	1501	391	104	35.69	140	52	454	26	31.74	112.43	2630	2679	7.15
1	3-8	8.1	-0-	1147	356	124	29.72	156	49	408	21	30.16	98.53	2260	2269	7.57
1	3-15	5.4	-0-	1049	302	117	26.79	105	34	360	20	24.25	110.5	2050	1992	7.29
1	3-23	4.0	-0-	891	254	107		92		336				1820		7.43
1	3-30	3.3	-0-	805	239	100	21.00	130	30.0	302	15.5	22.53	93.2	1645	1625	7.27
1	4-8	2.2	-0-	744	230	96	19.70	114	31.9	257	14.9	19.91	98.9	1490	1490	
1	4-15	2.2	-0-	683	217	81	18.00	110	29	253	14	19.28	93.4	1405	1389	
	4-19	1.8	-0-	671	196	71		108		196				1335		
2	4-22	1.3	-0-	647	197	68	16.63	102	31.9	227	13.7	17.98	92.5	1340	1288	
2	4-26	0.9	-0-	659	177	58	16.13	94	27.0	209	12.3	16.35	98.6	1206	1237	
2	5-3	0.6	-0-	586	160	46	14.24	84	17	187	12	14.05	101.3	1095	1093	
2	5-10	0.6	-0-	586	146	40	13.78	88	22	178	11.2	14.26	96.6	1030	1072	
2	5-17	0.7	-0-	500	139	36	12.11	80	21	148	11.2	12.47	97.1	1076	936	
2	5-24	0.3	-0-	464	130	33	11.25	72	19	143	11.2	11.69	96.2	1055	872	
2	6-2	0.2	-0-	464	101	28	10.50	74	17	140	12	11.51	91.2	921	836	
2	6-10	0.2	-0-	451	98	38		70						945		
2	6-14	<0.1	-0-	451	103	34	10.50	64	16	121	9.3	10.03	104.6	945	798	
2	6-21	0.3	-0-	390	87	28		60						905		
2	6-28	0.2	-0-	403	90	23		58						840		
2	7-1	0.2	-0-	303	74	18	7.02	57	13	103	9	8.64	81.2	767	577	

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UNC - TETON EXPLORATION DRILLING COMPANY, INC.

M ZONE RESTORATION ANALYTICAL HISTORY

WELL: MR-5

PHASE	DATE	U_3O_8	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-	ANIONS	Ca^{++}	Mg^{++}	Na^+	K^+	CATION	BAL	COND	SUM TDS	pH
		mg/l	mg/l	mg/l	mg/l	mg/l	meq.	mg/l	mg/l	mg/l	mg/l	meq	%	umho	mg/l	unit
2	7-8	<0.1	-0-	308	58	13	6.62	42	10	77	8	6.45	102.1	612	516	
2	7-15	0.1	-0-	296	60	12	6.44	42	10	69	8	6.14	104.9	583	497	
2	7-22	<0.1	-0-	302	61	12	6.56	43	10	74	8	6.41	102.4	598	510	
2	7-29	0.1	-0-	293	60	12	6.39	40	9.9	81	7.2	6.53	97.9	574	503	
2	8-5	0.1	-0-	286	58	12	6.24	44	11	74	8	6.54	95.4	577	493	
2	12-8	0.2	-0-	271	93	10.9	6.69	45.1	11.2	76.3	7.3	6.69	99.9	611	515	

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UNC - TETON EXPLO...T[illegible] DRILLING COMPANY, INC.

M ZONE RESTORATION ANALYTICAL HISTORY

WELL: MI-1

PHASE	DATE	U_3O_8	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-	ANIONS	Ca^{++}	Mg^{++}	Na^+	K^+	CATION	BAL	COND	SUM TDS	pH
		mg/l	mg/l	mg/l	mg/l	mg/l	meq.	mg/l	mg/l	mg/l	mg/l	meq	%	umho	mg/l	unit
3	8-16	4.0	-0-	521	192	30.9	13.41	87	19	179	12	14.02	95.64	1188	1045	
3	8-19	3.9	-0-	525	186	32.4	13.40	86	21	186	12	14.44	92.74	1202	1052	
3	8-30	4.6	-0-	548	182	35.3	13.77	80.8	17.6	189	9.8	13.98	98.54	1227	1068	
4	9-2	5.6	-0-	558	199	34.1	14.26	82.4	21.9	176	10.3	13.86	102.64	1248	1088	
4	9-6	6.5	-0-	604	206	40.1	15.32	89	21.1	192	11.5	14.85	103.19	1316	1171	
4	9-9	6.7	-0-	605	205	41.4	15.36	89	21.2	192	11.0	14.85	103.44	1376	1172	
4	9-13	8.4	-0-	647	210	37.4	16.04	102	22.8	210	12.0	16.44	97.6	1402	1249	
4	9-16	9.6	-0-	650	216	35.3	15.41	100	23.4	206	11.9	16.21	95.1	1446	1208	
4	9-27	10.9	-0-	662	206	34.1	16.11	100.1	23.3	191	11.8	15.55	103.6	1383	1239	
4	10-4	10.0	-0-	616	193	29.2	14.94	93.5	22.1	173	11.5	14.33	104.3	1305	1148	
4	10-12	10.0	-0-	595	188	28.0	14.46	83.6	20.7	170	13.0	13.63	106.1	1217	1108	
4	11-2	9.3	-0-	531	180	23.8	13.13	90.2	22.6	148	11.5	13.12	100.0	1177	1016	
4	11-9	8.5	-0-	506	172	22.7	12.52	89.1	22.3	133	12.0	12.40	100.9	1071	966	
4	11-17	7.9	-0-	493	167	21.7	12.17	86.9	21.6	125	11.2	11.87	102.6	1012	934	
4	11-24	6.5	-0-	479	159	19.4	11.71	80.3	19.6	112.3	10.6	10.80	108.4	968	887	
4	11-29	6.2	-0-	445	146	17.5	10.83	77.0	19.6	105.4	10.5	10.34	104.8	905	827	
4	12-14	4.1	-0-	390	135	15.1	9.63	74	17.9	91	9.7	9.40	102.5	854	737	
4	12-20	3.0	-0-	360		14.8								770		

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UNC - TETON EXPLORATION DRILLING COMPANY, INC.

M ZONE RESTORATION ANALYTICAL HISTORY

WELL: MI-3

PHASE	DATE	U_3O_8	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-	ANIONS	Ca^{++}	Mg^{++}	Na^+	K^+	CATION	BAL	COND	SUM TDS	pH
		mg/l	mg/l	mg/l	mg/l	mg/l	meq.	mg/l	mg/l	mg/l	mg/l	meq	%	umho	mg/l	unit
2	6-28	2.9	-0-	451	122	31		70						985		
2	7-1	8.1	-0-	481	152	30	11.90	88	20	154	12	13.07	91.0	1138	945	
2	7-8	11.1	-0-	555	170	30	13.49	89	22	142	11	12.74	105.9	1159	1030	
2	7-15	11.1	-0-	558	162	28	13.31	93	22	149	11	13.24	100.5	1180	1034	
2	7-22	13.5	-0-	561	159	27	13.27	91	22	149	10	13.12	101.2	1141	1033	
2	7-29	13.2	-0-	552	160	26	13.12	90	21.6	142	11.3	12.76	102.8	1129	1016	
2	8-5	13.3	-0-	539	154	26	12.78	91	23	141	13	12.93	98.8	1104	1000	
3	8-12	12.8	-0-	564	161	27	13.36	97	23	137	11	13.01	102.7	1139	1033	
3	8-19	12.4	-0-	561	160	27.3	14.28	103	25	141	13	13.70	104.2	1139	1042	
3	8-30	11.9	-0-	589	148	27.5	13.51	98.2	22.8	140	11.6	13.19	102.4	1150	1049	
4	9-2	13.1	-0-	576	164	27.1	13.62	101	27.5	131	12.1	13.35	102.1	1161	1052	
4	9-6	15.5	-0-	607	167	29.7	14.27	108	26.4	144	13.5	14.21	100.4	1243	1112	
4	9-9	11.2	-0-	572	133	32.1	13.05	88	21.9	145	12.8	12.86	101.5	1145	1016	
4	9-13	8.8	-0-	580	139	31.4	13.29	89.1	22.9	151	14.6	13.30	99.9	1166	1037	
4	9-16	8.6	-0-	575	140	25.1	13.05	89.1	22.4	150	13.8	13.20	98.9	1182	1024	
4	9-27	5.6	-0-	512	129	25.1	11.79	75.9	19.0	134	12.4	11.52	102.3	1041	913	
4	10-4	3.4	-0-	476	118	21.9	10.88	69.3	16.9	125	11.6	10.61	102.6	958	842	
4	10-12	3.1	-0-	451	113	19.0	10.28	62.7	16.2	115	11.7	9.79	105.1	879	792	
4	11-2	2.3	-0-	403	100	17.5	9.18	59.4	15.3	107	9.8	9.15	100.4	837	714	
4	11-9	1.8	-0-	360	101	16.2	8.46	51.7	14.0	95.1	9.5	8.13	104.1	737	650	
4	11-16	0.7	-0-	303	96.9	11.6	7.31	48.4	12.3	91.4	8.2	7.63	95.9	705	572	

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UNC - TETON EXPLOR..I DRILLING COMPANY, INC.

M ZONE RESTORATION ANALYTICAL HISTORY

WELL: MI-4

PHASE	DATE	U_3O_8	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-	ANIONS	Ca^{++}	Mg^{++}	Na^+	K^+	CATION	BAL	COND	SUM TDS	pH
		mg/l	mg/l	mg/l	mg/l	mg/l	meq.	mg/l	mg/l	mg/l	mg/l	meq	%	umho	mg/l	unit
3	8-12	<0.1	-0-	271	53	12.3	5.89	42	9	69	6	6.00	98.2	548	462	
3	8-19	<0.1	-0-	310	62	13.8	6.76	51	14	84	8	7.57	89.3	631	548	
3	8-30	0.2	-0-	348	72	14.0	7.40	50.5	11.1	89	7	7.50	101.3	676	592	

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UNC - TETON EXPLORATION DRILLING COMPANY, INC.

M ZONE RESTORATION ANALYTICAL HISTORY

WELL: MI-8

PHASE	DATE	U_3O_8	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-	ANIONS	Ca^{++}	Mg^{++}	Na^+	K^+	CATION	BAL	COND	SUM TDS	pH
		mg/l	mg/l	mg/l	mg/l	mg/l	meq.	mg/l	mg/l	mg/l	mg/l	meq	%	umho	mg/l	unit
2	4-22	2.8	-0-	720	207	70	18.09	126	35	217	12	18.96	95.4	1380	1390	
2	4-26	2.9	-0-	769	241	71	19.63	130	35.5	231	12.6	19.82	99.0	1455	1493	
2	5-3	3.9	-0-	793	228	61	19.47	134	30	229	12	19.46	100.0	1410	1491	
2	5-10	3.8	-0-	793	217	54	19.04	136	33	216	12.6	19.26	98.9	1345	1466	
2	5-17	4.3	-0-	756	199	48	17.89	132	32	196	13.8	18.14	98.6	1380	1381	
2	5-24	5.8	-0-	756	208	46	18.02	130	35	189	13.3	17.98	100.3	1540	1383	
2	6-2	6.2	-0-	744	173	41	16.96	130	33	180	15	17.46	97.1	1366	1322	
2	6-10	5.8	-0-	708	173	46		144						1420		
2	6-14	6.1	-0-	708	170	46	16.45	130	32	151	12.3	16.05	102.5	1425	1255	
2	6-21	5.0	-0-	659	156	42		126						1380		
2	6-28	4.1	-0-	659	154	36		120						1305		
2	7-1	4.0	-0-	586	152	31	13.65	122	29	138	13	14.85	91.9	1266	1075	
2	7-8	3.2	-0-	607	140	27	13.63	105	26	122	12	13.03	104.6	1174	1042	
2	7-15	2.5	-0-	549	125	22	12.22	101	25	111	11	12.24	99.9	1081	947	
2	7-22	2.1	-0-	525	117	20	11.61	100	21	115	10	12.01	96.7	1008	910	
2	7-29	1.7	-0-	494	114	22	11.09	93	22.4	99	11.2	11.11	99.9	959	858	
2	8-5	1.2	-0-	452	101	19	10.05	83	20	94	12	10.21	98.4	897	782	

20628

UNC - TETON EXPLO. [illegible] DRILLING COMPANY, INC.

M ZONE RESTORATION ANALYTICAL HISTORY

WELL: MI-12

PHASE	DATE	U_3O_8	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-	ANIONS	Ca^{++}	Mg^{++}	Na^+	K^+	CATION	BAL	COND	SUM TDS	pH
		mg/l	mg/l	mg/l	mg/l	mg/l	meq.	mg/l	mg/l	mg/l	mg/l	meq	%	umho	mg/l	unit
2	4-22	0.1	-0-	622	192	50	15.61	90	27.7	222	11.1	16.75	93.2	1170	1215	
2	4-26	0.2	-0-	549	169	37	13.56	96	29.6	192	12.3	15.93	85.2	1020	1085	
2	5-3	1.0	-0-	671	194	48	16.40	145	32	141	13	16.38	100.1	1195	1245	
2	5-10	1.5	-0-	671	177	45	15.96	134	34	145	12	16.15	98.8	1160	1218	
2	5-17	1.6	-0-	634	166	40	14.98	120	30	141	11.8	14.93	100.3	1183	1144	
2	5-24	2.0	-0-	610	163	39	14.50	112	30	143	11.9	14.62	99.1	1265	1111	
2	6-2	2.1	-0-	586	137	34	13.42	109	26	135	12	13.79	97.3	1132	1041	
2	6-10	1.9	-0-	573	142	38		140						1135		
2	6-14	1.9	-0-	573	128	41	13.22	106	26	121	10.6	13.00	101.7	1160	1008	
2	6-21	1.6	-0-	512	122	35		102						1160		
2	6-28	1.5	-0-	537	124	30		98						1110		
2	7-1	1.6	-0-	498	131	25	11.60	102	24	118	12	12.54	92.5	1087	912	
2	7-8	1.5	-0-	519	121	21	11.62	92	22	105	11	11.28	103.0	1002	893	
2	7-15	1.2	-0-	461	106	19	10.30	85	20	94	10	10.26	100.4	930	796	
2	7-22	0.4	-0-	427	91	17		80						842		
2	7-29	0.4	-0-	427	92	17	9.40	81	22	99	11.3	10.48	89.7	831	749	

UNC - TETON EXPLORATI[illegible] DRILLING COMPANY, INC.

M ZONE RESTORATION ANALYTICAL HISTORY

WELL: 301

PHASE	DATE	U_3O_8	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-	ANIONS	Ca^{++}	Mg^{++}	Na^+	K^+	CATION	BAL	COND	SUM TDS	pH
		mg/l	mg/l	mg/l	mg/l	mg/l	meq.	mg/l	mg/l	mg/l	mg/l	meq	%	umho	mg/l	unit
1	2-25	59.2	-0-	1537	451	97		212		474				2615		7.22
1	3-1	47.3	-0-	1171	359	83	29.02	182	43	350	20	28.41	102.1	2110	2255	7.32
1	3-8	39.6	-0-	976	316	100	25.40	156	42	309	17	25.17	100.9	1875	1956	7.59
1	3-15	36.7	-0-	927	320	91	24.43	164	34	278	17	23.56	103.7	1770	1868	7.27
1	3-23	32.1	-0-	805	254	82		116		285				1595		7.72
1	3-30	30.4	-0-	769	254	78	20.10	154	31.3	245	14	21.32	94.3	1495	1575	7.35
1	4-8	25.5	-0-	683	237	78	18.33	127	35.3	213	13.7	18.90	97.0	1360	1413	
1	4-15	21.9	-0-	659	242	60	17.54	132	32	165	13	16.77	104.6	1335	1325	
1	4-19	20.6	-0-	683	236	62		136		196				1350		
2	4-22	21.1	-0-	683	222	62	17.57	142	37.8	222	12.5	20.22	86.9	1415	1402	
2	4-26	24.0	-0-	756	258	60	19.46	142	36.7	213	12.3	19.73	98.61	1410	1502	
2	5-3	23.0	-0-	744	248	56	18.94	132	30	191	12	17.71	106.95	1375	1436	
2	5-10	21.4	-0-	720	240	52	18.27	140	32	206	12	18.93	96.5	1275	1423	
2	5-17	18.0	-0-	695	235	49	17.67	120	30	186	11.2	16.87	104.7	1380	1344	
2	5-24	17.4	-0-	659	212	46	16.52	124	31	179	12.3	16.88	97.8	1470	1280	
2	6-2	16.1	-0-	634	191	40	15.50	109	24	171	13	15.22	101.9	1263	1188	
2	6-10	14.6	-0-	610	186	45		102						1235		
2	6-14	15.6	-0-	610	176	44	14.91	104	27	165	10.8	14.90	100.1	1290	1153	
2	6-21	13.5	-0-	561	183	38		102						1295		
4	9-9	19.3	-0-	635	200	29.7	15.42	129	31.2	135	12.2	15.23	101.2	1293	1191	
4	9-13	15.2	-0-	604	171	23.0	14.11	116	27.3	130	12.7	14.05	100.4	1198	1099	

20628

UNC - TETON EXPLOR...I[illegible] DRILLING COMPANY, INC.

M ZONE RESTORATION ANALYTICAL HISTORY

WELL: 301

PHASE	DATE	U_3O_8	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-	ANIONS	Ca^{++}	Mg^{++}	Na^+	K^+	CATION	BAL	COND	SUM TDS	pH
		mg/l	mg/l	mg/l	mg/l	mg/l	meq.	mg/l	mg/l	mg/l	mg/l	meq	%	umho	mg/l	unit
4	9-16	14.9	-0-	549	172	24.8	13.28	116	27.0	120	12.0	13.58	97.9	1150	1036	
4	9-27	11.1	-0-	546	149	22.7	12.70	102.3	25.1	109	11.5	12.24	103.7	1068	977	
4	10-4	9.5	-0-	512	147	20.8	12.04	100.1	24.1	97	11.7	11.53	104.4	1017	923	
4	10-12	9.3	-0-	512	140	19.0	12.74	100	23.5	92	11.1	11.24	113.3	987	897	
4	11-2	6.7	-0-	451	143	21.4	10.98	83.6	20.4	117	10.6	11.24	97.7	1015	854	
4	11-9	6.1	-0-	433	128	18.1	10.28	85.8	21.8	87.7	10.4	10.19	100.9	867	791	
4	11-17	4.1	-0-	396	116	16.2	9.37	73.7	18.7	85	9.4	9.18	102.0	796	719	
4	11-24	2.0	-0-	363	106	14.3	8.56	63.8	15.8	75.9	8.6	8.03	106.7	726	649	
4	11-29	1.3	-0-	339	104	14.1	8.12	60.5	15.4	72.2	8.3	7.66	106.0	650	615	
4	12-8	0.7	-0-	305	98	11.4	7.36	57.2	14.3	71.3	8.0	7.36	100.1	655	566	

20628

0400872811OE

UNC - TETON EXPLO[illegible] DRILLING COMPANY, INC.

M ZONE RESTORATION ANALYTICAL HISTORY

WELL: 306

PHASE	DATE	U_3O_8	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-	ANIONS	Ca^{++}	Mg^{++}	Na^+	K^+	CATION	BAL	COND	SUM TDS	pH
		mg/l	mg/l	mg/l	mg/l	mg/l	meq.	mg/l	mg/l	mg/l	mg/l	meq	%	umho	mg/l	unit
1	2-23	33.4	-0-	760	233	28	18.10	225	44	70	12.5	18.28	99.03	1400	1373	7.4
2	5-6	14.5	16	559	174	16	13.77	125	43	53	11.1	12.42	110.9	1050	997	7.4
2	7-14	4.5	14	328	150	8	9.19	96	25	35	9	8.64	106.5	667	665	7.8
3	8-12	1.39	-0-	166	118	8	5.41	51	17	32	7	5.54	97.6	597	399	7.78
4	9-13	0.35	5	219.4	112	6.1	6.27	73.7	[illegible]	27.2	7.9	6.54	95.9	584	469	
4	10-7	0.24	6.7	226	108	4.1	6.29	73.[illegible]	16.7	28.4	8.4	6.53	96.4	590	472	8.19
4	11-17	0.20	4.8	213.7	110	4.8	6.09	69.3	16.6	27.0	7.2	6.21	98.1	570	453	8.22

20628

04008728110E

UNC - TETON EXPLOR...I[illegible] DRILLING COMPANY, INC.

M ZONE RESTORATION ANALYTICAL HISTORY

WELL: 308

PHASE	DATE	U_3O_8	$CO_3^=$	HCO_3^-	$SO_4^=$	Cl^-	ANIONS	Ca^{++}	Mg^{++}	Na^+	K^+	CATION	BAL	COND	SUM TDS	pH
		mg/l	mg/l	mg/l	mg/l	mg/l	meq.	mg/l	mg/l	mg/l	mg/l	meq	%	umho	mg/l	unit
1	2-23	1.6	-0-	1128	36[illegible]	[illegible]3	28.94	122	36.7	450	19.5	29.22	99.03	2400	2223	7.5
2	3-6	0.3	14	409	185	24	11.70	77	24	112	11.0	11.00	106.4	940	856	7.55
3	7-14	<0.1	19	238	224	6	9.37	100	22	38	9	8.72	107.5	672	656	7.8
4	8-12	0.57	-0-	137	272	2	7.97	100	17	32	9	8.04	99.13	745	569	7.80
4	9-14	0.10	-0-	216.2	342	3.9	10.78	136	29.3	36.9	10.6	11.12	96.95	951	775	
4	10-7	<0.10	-0-	285	186	8.2	8.78	92.4	19.6	52.7	10.2	8.81	99.68	812	654	7.99
4	11-17	0.10	5.3	257.7	167	7.0	8.08	88.0	18.9	53	8.6	8.50	95.04	753	606	8.16

20628

0400872811OE

APPENDIX "D"

RAW DATA FOR
M-ZONE BASELINE DETERMINATION

20628

FIRST PAGE OF ANALYSIS FOR WELL
MAP NUMBER PN5-301

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

0400872811OE

LAB	CDM	CDM	NORTHERN	NORTHERN	CDM	NORTHERN	CDM	TETON	TETON	TETON
JOB				NA	NA			1075	2358	2572
DS	011079	011079	011079	01/10/79	021679	021679	032479	051380	011581	021981
DA	011879	011879	011879	011879	NA	NA	NA	051380	011981	022381
WN	4	4	4	4	4	4	4	4	4	4
SPN	1	2	3	4	5	6	7	8	9	10
PH	7.90	8.10	NA	NA	8	NA	7.30	7.53	7.20	7.50
TC	10	10	NA	NA	11	NA	11.70	NA	10	NA
CD	520	510	NA	NA	480	NA	460	400	3185	2530
NH3	0.30	0.100-	0.36	1.80	0.060	1.37	0.10	0.100-	0.100-	0.100-
NO3	0.020-	0.020-	0.010-	0.020	0.050	0.010	0.040	0.100-	0.44	0.26
HCO3	201	201	211	212	281	192	221	234	2050	1348
CO3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	32.60
CA	112	92.60	63	64	50.70	57	49.80	64	281	224
CL	4	6	2	2	2-	3	4	5	8	66.40
B	0.050-	0.050-	0.100-	0.010-	0.100-	0.20	0.080	0.090	0.250-	0.250-
F	1.30	1.10	0.52	0.48	0.70	0.52	0.70	0.54	0.15	0.39
MG	15.80	15	16	16	20.80	16	16.70	16.50	62.60	44
K	7	6	7	7	7.89	7	7.14	7	25.50	19.50
NA	24	23	28	27	35.90	25	25	32	820	428
SO4	97	86	107	106	93	106	138	118	513	418
AL	0.44	0.090-	0.10	0.100-	0.200-	0.100-	0.100-	0.10	0.050-	0.050-
AS	0.008	0.007	0.005-	0.005-	0.002	0.005-	0.002-	0.005-	0.005-	0.009
BA	0.15	0.050	0.500-	0.500-	0.20	0.500-	0.100-	0.050-	0.43	0.100-
CD	0.006	0.003	0.005-	0.005-	0.004	0.005-	0.007	0.010-	0.010-	0.010-
CR	0.007	0.007-	0.020-	0.020-	0.012	0.020-	0.010-	0.050-	0.050-	0.050-
CU	0.020-	0.020-	0.010-	0.010-	0.010-	0.010-	0.007	0.050-	0.050-	0.050-
FE	1.68	0.71	0.12	0.050-	0.040	0.61	0.18	0.32	0.10	0.050-
PB	0.001-	0.001-	0.020-	0.020-	0.030	0.020-	0.020-	0.050-	0.060	0.050-
MN	0.057	0.047	0.050	0.050	0.052	0.050	0.065	0.070	0.28	0.24
HG	.00011	.00006-	.00100-	.00100-	.00012	.00100-	.00007	.00100-	.00100-	.00100-
MO	0.005-	0.005-	0.020-	0.002-	0.020-	0.006	0.006	0.060	0.100-	0.100-
NI	0.035	0.006	0.010-	0.010-	0.040	0.010-	0.030	0.050-	0.050-	0.050-
RA	345	385	496	248	670	376	NA	864	NA	2704.9
RAER	15	30	10	4	80	4	NA	12	NA	8.90
SE	0.005-	0.005	0.005-	0.005-	0.005-	0.005-	0.005	0.005-	0.005-	0.014
TH	NA	NA	NA	NA	NA	NA	NA	2.60	NA	NA
U	0.064	0.005	0.005-	0.005-	0.005-	0.005-	NA	0.100-	85.80	53.60
V	0.005-	0.005-	1.001-	1.001-	NA	1.001-	NA	0.050-	0.100-	0.20
ZN	0.11	0.070	0.010-	0.010	0.015	0.057	0.21	0.050-	0.13	0.050-
TDS	NA	NA	NA	NA	320	330	463	361	2690	1868
CTDS	460.80	429.60	434	434	491.29	406	461.64	476.50	3760.10	2580.50
CAT	8.11	7.01	5.86	5.86	6.00	5.43	5.13	6.12	55.49	33.91
AN	5.43	5.25	5.74	5.74	6.60	5.44	6.61	6.43	44.51	33.76
CB	19.83	14.31	0.99	1.08	4.713-	0.105-	%12.604-	2.478-	10.99	0.23

RA 2-19-81 Bell Lab * * *

20628

0400878110E

FI[illegible] AGE OF ANALYSIS FOR WELL
MAP NUMBER PNS-305

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

4-06-81

LAB	CDM	NORTHERNWAMCO		PALS	TETON	TETON	TETON	TETON	TETON							
JOB					225	1077	1358	1761	2339							
DS	031379	031379	060579	061279	011480	051380	071600	100680	011381							
DA	NA	NA	NA	NA	NA	051380	071800	100780	011481							
WN	5	5	5	5	5	5	5	5	5	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
SPN	1	2	3	4	5	6	7	8	9							
PH	NA	NA	8.06	NA	7.45	7.70	7.49	7.50	7.24	7.57	0.28	6	7.24	8.06	5- 9	5- 3
TC	NA	NA	11	11	NA	NA	17.50	12.50	11	12.60	2.82	5	11	17.50	5- 9	5- 7
CD	NA	NA	510	NA	550	425	425	495	485	481.67	49.15	6	425	550	5- 7	5- 5
NH3	0.006	0.43	0.100-	0.14	1.001-	0.100-	0.100-	0.100-	0.10	0.23	0.31	9	0.01	1.00	5- 1	5- 5
NO3	0.12	0.010	0.050-	0.040	1.40	0.100-	0.38	0.100-	0.100-	0.26	0.44	9	0.01	1.40	5- 2	5- 5
HCO3	221	220	400	NA	211	217	220	222	217	241	64.34	8	211	400	5- 5	5- 3
CO3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	0	9	0	0	5- 9	5- 9
CA	54.50	72	120	60	84	60	65	61	62	70.94	20.32	9	54.50	120	5- 1	5- 3
CL	2	3	16	NA	3.60	4	7	6	6	5.95	4.40	8	2	16	5- 1	5- 3
B	0.10	0.20	0.010-	0.010-	0.050-	0.060	0.250-	0.250-	0.250-	0.13	0.11	9	0.01	0.25	5- 4	5- 9
F	0.60	0.72	0.48	0.33	0.40	0.50	0.49	0.46	0.40	0.51	0.15	9	0.33	0.60	5- 4	5- 1
MG	20.30	17	32	18	2.30	16	12.60	12	21.10	15.81	8.02	9	2.30	32	5- 5	5- 3
K	12	8	8	9	7.50	8	7.60	7.70	9.20	8.56	1.42	9	7.50	12	5- 5	5- 1
NA	35.30	33	26	33	26	35	27	28	26	29.92	4.06	9	26	35.30	5- 9	5- 1
SO4	134	136	140	NA	85	85	110	103	102	111.88	22.32	8	85	140	5- 6	5- 3
AL	0.100-	0.100-	0.050-	0.100-	0.100-	0.050-	0.050	0.050-	0.050-	0.07	0.03	9	0.05	0.10	5- 9	5- 5
AS	0.007	0.005-	0.005	0.004	0.005-	0.005-	0.005-	0.005-	0.005-	0.01	0.00	9	0.00	0.01	5- 4	5- 1
BA	0.10	0.500-	0.030	0.400-	0.050-	0.050-	0.050-	0.100-	0.10	0.15	0.17	9	0.03	0.50	5- 3	5- 2
CD	0.008	0.005-	0.002-	0.020-	0.050-	0.010-	0.010-	0.010-	0.010-	0.01	0.01	9	0.00	0.05	5- 3	5- 5
CR	0.006-	0.020-	0.010-	0.100-	0.050-	0.050-	0.050-	0.050-	0.050-	0.04	0.03	9	0.01	0.10	5- 1	5- 4
CU	0.010	0.090	0.040	0.090	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.02	9	0.01	0.09	5- 1	5- 4
FE	0.15	1.34	0.070-	0.30	0.28	0.31	0.76	0.79	0.34	0.48	0.40	9	0.07	1.34	5- 3	5- 2
PB	0.060	0.020-	0.010-	0.010-	3	0.050-	0.050-	0.050-	0.050-	0.37	0.99	9	0.01	3	5- 4	5- 5
MN	0.099	0.11	0.050-	0.050	0.050-	0.050-	0.050-	0.050-	0.050-	0.06	0.02	9	0.05	0.11	5- 9	5- 2
HG	.00004	.00100-	.00050-	.00100-	.00100-	.00100-	.00100-	.00100-	.00100-	.00084	.00034	9	.00004	.00100	5- 1	5- 9
MO	0.002	0.020-	0.050-	0.500-	0.100-	0.050-	0.100-	0.100-	0.100-	0.11	0.15	9	0.00	0.50	5- 1	5- 4
NI	0.027	0.050	0.020-	0.010-	0.050-	0.050-	0.050-	0.050-	0.050-	0.04	0.02	9	0.01	0.05	5- 4	5- 9
RA	10	NA	5	11.50	3.48	10.50	8.19	5.10	NA	7.68	3.15	7	3.48	11.50	5- 5	5- 4
RAER	26	NA	0.60	NA	NA	1.10	0.84	1.30	NA							
SE	0.006-	0.005-	0.005-	0.010-	0.005-	0.005-	0.005-	0.005-	0.005-	0.01	0.00	9	0.01	0.01	5- 9	5- 4
TH	NA	NA	NA	NA	NA	2.30	0.40	2.20	NA	1.63	1.07	3	0.40	2.30	5- 7	5- 6
U	0.012	NA	0.015	0.061	0.100-	0.100-	0.100-	0.100-	0.100-	0.07	0.04	8	0.01	0.10	5- 1	5- 9
V	NA	1.001-	0.050-	NA	5-	0.050-	0.100-	0.100-	0.100-	0.91	1.83	7	0.05	5	5- 6	5- 5
ZN	0.21	0.340-	0.020	0.10	0.050-	0.050-	0.050-	0.050-	0.050-	0.10	0.11	9	0.02	0.34	5- 3	5- 2
TDS	463	392	558	NA	330	334	335	342	348	387.75	82.24	8	330	558	5- 5	5- 3
CTDS	479.10	489	742	NA	41[illegible].40	425	449.20	439.70	443.30	485.84	106.28	8	419.40	742	5- 5	5- 3
CAT	6.23	6.63	9.96	NA	5.70	4.72	5.65	5.45	6.20	6.32	1.50	8	4.72	9.96	5- 6	5- 3
AN	6.47	6.52	9.92	NA	5.33	5.33	6.09	5.95	5.85	6.43	1.48	8	5.33	9.92	5- 6	5- 3
CB	1.863-	0.83	0.17	NA	3.39	6.068-	3.786-	4.442-	2.87	2.93	1.94	8	0.17	6.07	5- 3	5- 6
USER CODE		100.00														
	*	*	*													

29628

04008728110E

WATER QUALITY

WELL NAME 305

(Chemical units in mg/l except as noted)

			W	C			
ate Sampled	4-6-81	6-19-81	7/14/81	7/14/81	10-5-81		
lkalinity ppm as C_aC_{O3}			200		172		
(Units)	7.6		7.32	7.2	7.89		
onductivity (umhos/cm)	564		459	494	552		
mmonia (NH_3 as N)	<.1		.32	.11			
al NO_2/NO_3 (as N)	<.1			<.1			
carbonate (HCO_3)	232		244	214	210		
arbonate (CO_3)	-0-		-0-	-0-	-0-		
alcium (Ca)	62		64	65	638		
hloride (Cl)	8		4	4	4.2		
oron (B)	<.25		<.01	<.25			
luoride (F)	.48		.74	.45			
agnesium (Mg)	18.7		17	16	15.4		
otassium (K)	8.2		8	7	8.0		
odium (Na)	29		26	28	26		
ulfate (SO_4)	88		92	102	102		
luminum (Al)	<.05		<.1	.3	<.10		
enic (As)	<.005		<.001	<.005	<.01		
rium (Ba)	<.5		<.1	<.1	<.10		
dmium (Cd)	<.01		<.002	.01	<.01		
hromium (Cr)	<.05		<.01	<.05	<.05		
opper (Cu)	<.05		<.01	<.05	<.05		
ron (Fe)	.37		.43	.20	0.32		
ead (Pb)	<.05		<.05	<.05	<.05		
anganese (Mn)	.09		.04	<.05	<.05		
ercury (Hg)	<.001		<.0002	<.001			
olybdenum (Mo)	<.1		<.10	<.1	<.10		
ickel (Ni)	<.05		<.02	<.05	<.05		
adium 226 (Ra) pCi/l		*6.0±2.5	8.3±1.4	*12±6			
elenium (Se)	<.005		<.001	<.005	<.5		
horium 230 (Th) pCi/l							
ranium (U) ppm	<.1		.006	<.1			
anadium (V)	<.1		<.1	<.1	<.5		
inc (Zn)	<.05		.005	<.05	<.01		
T	368		399	324	336		
210 pCi/L							
itrate (NO_3) as N			<.05				
itrite (NO_2) as N			<.001				

* *CDM *CDM

20628

ANALYSES FOR WELL
MAP NUMBER PN5-306

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

5-6-81

0400872811OE

LAB	WAMCO	PALS	TETON	TETON	TETON	TETON	TETON						
JOB			1078	1414	1778	2400	2584						
DS	061179	061179	051380	072480	100880	012081	022381						
DA	NA	NA	051380	072980	100980	012281	022481						
WN	6	6	6	6	6	6	6						
SPN	1	2	3	4	5	6	7	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
PH	7.96	7.90	7.69	7.95	7.30	7.62	7.40	7.69	0.27	7	7.30	7.96	6- 5	6- 1
TC	11	11	NA	NA	12.50	9.50	NA	11	1.22	4	9.50	12.50	6- 6	6- 5
CD	510	470	410	415	550	1405	1400	737.14	457.20	7	410	1405	6- 3	6- 6
NH3	0.13	0.060	0.17	0.100-	0.100-	0.100-	0.100-	0.11	0.03	7	0.06	0.17	6- 2	6- 3
NO3	0.050-	1.20	0.11	0.100-	0.100-	0.19	0.17	0.27	0.41	7	0.05	1.20	6- 1	6- 2
HCO3	229	244	229	227	264	475	760	345.86	202.77	7	227	760	6- 4	6- 7
CO3	0.000	2-	0.000	0.000	0.000	0.000	0.000	0.29	0.76	7	0	2	6- 7	6- 2
CA	64	57	55	57	72	55	225	83.57	62.67	7	55	225	6- 6	6- 7
CL	10	2	6	8	10	30	28	13.43	11.00	7	2	30	6- 2	6- 6
B	0.010	0.14	0.090	0.250-	0.250-	0.250-	0.250-	0.18	0.10	7	0.01	0.25	6- 1	6- 7
F	0.57	0.37	0.51	0.46	0.50	0.17	0.28	0.41	0.14	7	0.17	0.57	6- 6	6- 1
MG	17	17	18.20	15	19	57.80	44	26.86	16.95	7	15	57.80	6- 4	6- 6
K	8	10	7	7.20	7.40	12	12.50	9.16	2.34	7	7	12.50	6- 3	6- 7
NA	22	34	31	25	31	74	70	41	21.59	7	22	74	6- 1	6- 6
SO4	83	100	101	106	119	238	233	140	66.11	7	83	238	6- 1	6- 6
AL	0.060	0.90	0.12	0.24	0.95	0.050-	0.050-	0.34	0.41	7	0.05	0.95	6- 7	6- 5
AS	0.005-	0.010	0.005-	0.005-	0.005-	0.005-	0.010	0.01	0.00	7	0.01	0.01	6- 6	6- 7
BA	0.41	0.400-	0.050-	0.050-	0.100-	0.23	0.100-	0.19	0.16	7	0.05	0.41	6- 4	6- 1
CD	0.002-	0.020-	0.010-	0.010-	0.010-	0.010-	0.010-	0.01	0.01	7	0.00	0.02	6- 1	6- 2
CR	0.010-	0.100-	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.03	7	0.01	0.10	6- 1	6- 2
CU	0.010	0.090-	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.02	7	0.01	0.09	6- 1	6- 2
FE	0.12	3.600-	0.33	1.26	4.46	0.050-	0.050-	1.41	1.86	7	0.05	4.46	6- 7	6- 5
PB	0.12	0.010-	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.03	7	0.01	0.12	6- 2	6- 1
MN	0.050	0.100-	0.080	0.060	0.070	0.060	0.17	0.08	0.04	7	0.05	0.17	6- 1	6- 7
HG	.00050-	.00100-	.00100-	.00100-	.00100-	.00100-	.00100-	.00093	.00019	7	.00050	.00100	6- 1	6- 7
MO	0.050-	0.500-	0.050-	0.100-	0.100-	0.10	0.100-	0.14	0.16	7	0.05	0.50	6- 3	6- 2
NI	0.020-	0.100-	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.02	7	0.02	0.10	6- 1	6- 2
RA	649	29.98	442	1127	707	NA	2598.50	591.00	400.33	5	29.98	1127	6- 2	6- 4
RAER	7	NA	8	1	15	NA	8.34							
SE	0.005-	0.010-	0.005-	0.005-	0.005-	0.005-	0.005-	0.01	0.00	7	0.01	0.01	6- 7	6- 2
TH	NA	NA	2.80	4.40	19	NA	5	8.73	8.93	3	2.80	19	6- 3	6- 5
U	0.088	0.26	0.100-	0.100-	0.100-	18.30	33.40	7.48	13.29	7	0.09	33.40	6- 1	6- 7
V	0.050	NA	0.050-	0.100-	0.100-	0.100-	0.100-	0.08	0.03	6	0.05	0.10	6- 3	6- 7
ZN	0.030	0.020	0.050-	0.050-	0.050-	0.050-	0.050-	0.04	0.01	7	0.02	0.05	6- 2	6- 7
TDS	324	360	340	323	410	1005	1034	542.29	327.43	7	323	1034	6- 4	6- 7
CTDS	433	466	447.20	445.20	522.40	941.80	1372.50	661.16	362.07	7	433	1372.50	6- 1	6- 7
CAT	5.75	5.98	5.77	5.35	6.69	11.02	18.21	8.40	4.75	7	5.35	18.21	6- 4	6- 7
AN	5.76	6.20	6.03	6.15	7.09	13.59	18.10	8.99	4.83	7	5.76	18.10	6- 1	6- 7
CB	0.085-	1.862-	2.172-	6.983-	2.853-	%10.408-	0.32	3.53	3.80	7	0.09	10.41	6- 1	6- 6
USER CODE		100.00												
	*	*	*											

RA + T done by Bell Lab 2-23-81 2598.50 +-8.34
" " Wamco

20828

04008728110E

ANALYSES FOR WELL
MAP NUMBER PN5-307

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

4-02-81

LAB	HAMCO	PALS	TETON	TETON	TETON	TETON	TETON							
JOB			302	1079	1443	1783	2349							
DS	060179	061279	012280	051380	030580	101080	011481							
DA	NA	NA	NA	051380	080680	101380	011581							
WN	7	7	7	7	7	7	7	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
SPN	1	2	3	4	5	6	7							
PH	8.20	8.04	7.40	7.63	7.75	7.90	8.01	7.85	0.27	7	7.40	8.20	7- 3	7- 1
TC	11	11	18	NA	NA	12	9.50	12.30	[illegible]	5	9.50	18	7- 7	7- 3
CD	875	890	1000	740	750	835	726	830.86	99.88	7	726	1000	7- 7	7- 3
NH3	0.100-	0.040	1.001-	0.50	0.100-	0.25	0.100-	0.30	0.35	7	0.04	1.00	7- 2	7- 3
NO3	0.050	0.084	1.48	0.26	0.25	0.10	0.15	0.34	0.51	7	0.05	1.48	7- 1	7- 3
HCO3	244	232	194	259	254	215	242	234.29	22.93	7	194	259	7- 3	7- 4
CO3	0.000	12	0.000	0.000	0.000	0.000	0.000	1.71	4.54	7	0	12	7- 7	7- 2
CA	136	132	180	133	130	63	138	130.29	34.40	7	63	180	7- 6	7- 3
CL	10	4	4	2	1	5	5	4.43	2.88	7	1	10	7- 5	7- 1
B	0.010	0.010-	0.050-	0.070	0.250-	0.250-	0.250-	0.13	0.12	7	0.01	0.25	7- 2	7- 7
F	0.45	0.32	0.38	0.55	0.50	0.44	0.40	0.43	0.08	7	0.32	0.55	7- 2	7- 4
MG	26	29	3.20	5	42	76	28.20	29.91	24.57	7	3.20	76	7- 3	7- 6
K	9	12	11	12.50	10.10	9.80	11.70	10.87	1.28	7	9	12.50	7- 1	7- 4
NA	30	60	34	57	35	18	31	37.86	15.18	7	18	60	7- 6	7- 2
SO4	294	330	338	340	328	347	329	329.43	17.09	7	294	347	7- 1	7- 6
AL	0.010	0.60	0.30	0.050	0.030	0.050-	0.050-	0.16	0.22	7	0.01	0.60	7- 1	7- 2
AS	0.005-	0.004	0.005-	0.005-	0.005-	0.005-	0.005-	0.00	0.00	7	0.00	0.01	7- 2	7- 7
BA	0.030	0.40	0.050-	0.050-	0.070	0.100-	0.24	0.13	0.14	7	0.03	0.40	7- 1	7- 2
CD	0.002-	0.020-	0.050-	0.010-	0.010-	0.050-	0.010-	0.02	0.02	7	0.00	0.05	7- 1	7- 6
CR	0.010-	0.100-	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.03	7	0.01	0.10	7- 1	7- 2
CU	0.020	0.10	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.02	7	0.02	0.10	7- 1	7- 2
FE	0.10	1.20	0.50	0.080	0.15	0.18	0.050-	0.32	0.42	7	0.05	1.20	7- 7	7- 2
PB	0.020	0.030	0.43	0.050-	0.050-	0.070	0.050-	0.10	0.15	7	0.02	0.43	7- 1	7- 3
MN	0.040	0.12	0.21	0.050-	0.070	0.050-	0.070	0.09	0.06	7	0.04	0.21	7- 1	7- 3
HG	.00050-	.00100-	.00100-	.00100-	.00100-	.00100-	.00600	.00164	.00193	7	.00050	.00600	7- 1	7- 7
MO	0.050-	0.50	0.100-	0.050-	0.100-	0.100-	0.100-	0.14	0.16	7	0.05	0.50	7- 4	7- 2
NI	0.020-	0.100-	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.02	7	0.02	0.10	7- 1	7- 2
RA	8	5.60	3.84	5.26	5.41	11.90	NA	6.67	2.89	6	3.84	11.90	7- 3	7- 6
RAER	0.70	NA	NA	0.82	1.04	2.10	NA							
SE	0.005-	0.005	0.005-	0.005-	0.005-	0.046	0.005-	0.01	0.02	7	0.01	0.05	7- 7	7- 6
TH	NA	NA	NA	0.20	2.60	2.20	NA	1.67	1.29	3	0.20	2.60	7- 4	7- 5
U	0.022	0.049	0.100-	0.100-	0.100-	0.100-	0.100-	0.08	0.03	7	0.02	0.10	7- 1	7- 7
V	0.050-	NA	0.50	0.050-	0.100-	0.100-	0.100-	0.15	0.17	6	0.05	0.50	7- 4	7- 3
ZN	0.010	0.060	0.19	0.050-	0.050-	0.050-	0.050-	0.07	0.06	7	0.01	0.19	7- 1	7- 3
TDS	658	758	724	766	730	716	726	725.43	35.04	7	658	766	7- 1	7- 4
CTDS	749	811	764.20	808.50	800.10	733.80	704.90	778.79	30.38	7	733.80	811	7- 6	7- 2
CAT	10.46	11.89	11.01	9.85	11.72	10.43	10.85	10.89	0.73	7	9.85	11.89	7- 4	7- 2
AN	10.40	11.19	10.33	11.38	11.02	10.89	10.96	10.88	0.39	7	10.33	11.38	7- 3	7- 4
CB	0.28	3.05	3.17	7.222-	3.09	2.159-	0.475-	2.78	2.31	7	0.28	7.22	7- 1	7- 4
USER CODE	100.00													

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20628

04008728110E

ANALYSES FOR WELL
MAP NUMBER PNS-308

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

LAB	WAMCO	PALS	TETON	TETON
JOB			2389	2585
DS	053179	061179	011981	022381
DA	NA	NA	012181	022481

5-06-81

WN	B	B	B	B	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
SPN	1	2	3	4							
PH	8.04	8	7.64	7.50	7.80	0.27	4	7.50	8.04	8- 4	8- 1
TC	11	11	12	NA	11.33	0.58	3	11	12	8- 2	8- 3
CD	715	720	2880	2400	1678.75	1127.12	4	715	2880	8- 1	8- 3
NH3	0.100-	0.15	0.19	0.100-	0.14	0.04	4	0.10	0.19	8- 4	8- 3
NO3	0.050-	1.40	0.40	0.37	0.56	0.59	4	0.05	1.40	8- 1	8- 2
HCO3	142	232	1501	1128	750.75	669.55	4	142	1501	8- 1	8- 3
CO3	0.000	2-	0.000	0.000	0.50	1	4	0	2	8- 4	8- 2
CA	95	109	127	122	113.25	14.34	4	95	127	8- 1	8- 3
CL	8	4	175	103	72.50	82.24	4	4	175	8- 2	8- 3
B	0.010	0.10	0.250-	0.250-	0.15	0.12	4	0.01	0.25	8- 1	8- 4
F	0.51	0.32	0.19	0.33	0.34	0.13	4	0.19	0.51	8- 3	8- 1
MG	21	20	59.20	36.70	34.23	18.32	4	20	59.20	8- 2	8- 3
K	10	12	23	19.50	16.13	6.14	4	10	23	8- 1	8- 3
NA	22	30	730	729	377.75	406.18	4	22	730	8- 1	8- 3
SO4	246	260	410	362	319.50	79.45	4	246	410	8- 1	8- 3
AL	0.040	1.50	0.14	0.050-	0.43	0.71	4	0.04	1.50	8- 1	8- 2
AS	0.005-	0.010-	0.005-	0.016	0.01	0.01	4	0.01	0.02	8- 3	8- 4
BA	0.050	0.400-	0.22	0.100-	0.19	0.16	4	0.05	0.40	8- 1	8- 2
CD	0.002	0.020-	0.010-	0.010-	0.01	0.01	4	0.00	0.02	8- 1	8- 2
CR	0.020	0.100-	0.050-	0.050-	0.06	0.03	4	0.02	0.10	8- 1	8- 2
CU	0.010-	0.090-	0.050-	0.050-	0.05	0.03	4	0.01	0.09	8- 1	8- 2
FE	0.10	1.30	0.050-	0.050-	0.37	0.62	4	0.05	1.30	8- 4	8- 2
PB	0.020	0.010-	0.050-	0.050-	0.03	0.02	4	0.01	0.05	8- 2	8- 4
MN	0.040	0.12	0.050-	0.060	0.07	0.04	4	0.04	0.12	8- 1	8- 2
HG	.00050-	.00100-	.00100-	.00100-	.00088	.00025	4	.00050	.00100	8- 1	8- 4
MO	0.050-	0.500-	0.100-	0.100-	0.19	0.21	4	0.05	0.50	8- 1	8- 2
NI	0.020-	0.100-	0.050-	0.050-	0.06	0.03	4	0.02	0.10	8- 1	8- 2
RA	102	7.10	NA	282.19	54.55	67.10	2	7.10	102	8- 2	8- 1
RAER	2.00	NA	NA	2.74							
SE	0.005-	0.025	0.005-	0.005-	0.01	0.01	4	0.01	0.03	8- 4	8- 2
TH	2.40	NA	NA	5	2.40	0	1	2.40	2.40	8- 1	8- 1
U	0.072	0.26	1.60	1.60	0.88	0.83	4	0.07	1.60	8- 1	8- 4
V	0.050-	0.050-	0.100-	0.100-	0.08	0.03	4	0.05	0.10	8- 2	8- 4
ZN	0.030	0.11	0.050-	0.050-	0.06	0.03	4	0.03	0.11	8- 1	8- 2
TDS	197	616	2065	1630	1127	867.73	4	197	2065	8- 1	8- 3
CTDS	544	669	3025.20	2500.20	1684.60	1264.23	4	544	3025.20	8- 1	8- 3
CAT	7.68	8.70	43.55	41.32	25.31	19.80	4	7.68	43.55	8-	8- 3
AN	7.67	9.40	38.07	28.93	21.02	14.91	4	7.67	38.07	8- 1	8- 3
CB	0.039	3.864-	6.71	17.63	7.06	7.56	4	0.04	17.63	8- 1	8- 4
USER CODE		100.00									

* RA + Th 2-23-81 Done By Bell Lab

20628

04008728710E

ANALYSES FOR WELL
MAP NUMBER PN5-575

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

4-06-81

LAB	PALS	WAMCO	TETON	TETON	TETON	TETON	TETON							
JOB			262	1038	1374	1755	2341							
DS	060279	022979	011780	051380	071680	100680	011301							
DA	NA	NA	NA	051380	071880	100780	011501	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
WN	10	10	10	10	10	10	10							
SPN	1	2	3	4	5	6	7							
PH	9	7.62	7.59	7.52	7.58	7.50	7.48	7.75	0.55	7	7.48	9	10- 7	10- 1
TC	11	11	NA	NA	NA	12	11	11.25	0.50	4	11	12	10- 7	10- 6
CD	510	525	640	425	430	505	485	502.86	71.93	7	425	640	10- 4	10- 3
NH3	0.031	0.100-	0.100-	0.24	0.100-	0.100-	0.100-	0.11	0.06	7	0.03	0.24	10- 1	10- 4
NO3	0.20	0.050-	1.40	0.100-	0.13	0.50	0.100-	0.35	0.48	7	0.05	1.40	10- 2	10- 3
HCO3	232	229	222	220	215	193	220	218.71	12.72	7	193	232	10- 6	10- 1
CO3	2-	0.000	0.000	0.000	0.000	0.000	0.000	0.29	0.76	7	0	2	10- 7	10- 1
CA	66	64	94	62	69	57	60	67.43	12.35	7	57	94	10- 6	10- 3
CL	8	14	8.40	7	7	9	6	8.49	2.63	7	6	14	10- 7	10- 2
B	0.12	0.010-	0.050-	0.050-	0.250-	0.250-	0.250-	0.14	0.11	7	0.01	0.25	10- 2	10- 7
F	0.38	0.65	0.30	0.46	0.46	0.48	0.36	0.44	0.11	7	0.30	0.65	10- 3	10- 2
MG	23	16	7.60	17	12.20	18	19.40	16.17	5.01	7	7.60	23	10- 3	10- 1
K	9	11	11	10.80	8.70	8	9.40	9.70	1.23	7	8	11	10- 6	10- 3
NA	32	24	23	36	28	27	24	27.71	4.79	7	23	36	10- 3	10- 4
SO4	77	84	80	122	110	104	104	97.29	17.08	7	77	122	10- 1	10- 4
AL	0.10	0.050	0.100-	0.050	0.050-	0.050-	0.050-	0.06	0.02	7	0.05	0.10	10- 7	10- 3
AS	0.010-	0.005-	0.015	0.005-	0.011	0.005-	0.005-	0.01	0.00	7	0.01	0.01	10- 7	10- 3
BA	0.100-	0.040	0.050-	0.050-	0.050-	0.100-	0.14	0.08	0.04	7	0.04	0.14	10- 2	10- 7
CD	0.040-	0.002-	0.050-	0.010-	0.010-	0.010-	0.010-	0.02	0.02	7	0.00	0.05	10- 2	10- 3
CR	0.100-	0.010-	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.03	7	0.01	0.10	10- 2	10- 1
CU	0.050-	0.010-	0.050-	0.050-	0.050-	0.050-	0.050-	0.04	0.02	7	0.01	0.05	10- 2	10- 7
FE	0.050	0.010-	0.13	0.16	0.47	0.23	0.070	0.16	0.16	7	0.01	0.47	10- 2	10- 5
PB	0.010-	0.010-	0.050-	0.050-	0.050-	0.050-	0.060	0.04	0.02	7	0.01	0.08	10- 2	10- 7
MN	0.060	0.200-	0.060	0.050-	0.080	0.070	0.080	0.09	0.05	7	0.05	0.20	10- 4	10- 2
HG	.00100-	.00050-	.00100-	.00100-	.00100-	.00100-	.00100-	.00093	.00019	7	.00050	.00100	10- 2	10- 7
MO	0.100-	0.050-	0.100-	0.050-	0.100-	0.12	0.100-	0.09	0.03	7	0.05	0.12	10- 4	10- 6
NI	0.050-	0.020-	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.01	7	0.02	0.05	10- 2	10- 7
RA	NA	0.200-	2.56	19.90	10.50	3.90	NA	7.41	7.96	5	0.20	19.90	10- 2	10- 4
RAER	NA	NA	NA	2.10	1.04	1.20	NA							
SF	NA	0.005-	0.005-	0.005-	0.005-	0.005-	0.005-	0.01	0	6	0.01	0.01	10- 7	10- 7
TH	NA	NA	NA	5.40	0.40	3.10	NA	2.97	2.50	3	0.40	5.40	10- 5	10- 4
U	NA	0.032	0.100-	0.100-	0.100-	0.100-	0.100-	0.09	0.03	6	0.03	0.10	10- 2	10- 7
V	NA	0.050	0.500-	0.050-	0.100-	0.100-	0.100-	0.15	0.17	6	0.05	0.50	10- 4	10- 3
ZN	0.050-	0.005	0.050-	0.050-	0.050-	0.050-	0.050-	0.04	0.02	7	0.01	0.05	10- 2	10- 7
TDS	384	331	412	322	374	360	352	362.14	31.07	7	322	412	10- 4	10- 3
CTDS	449	442	446	474.80	449.90	416	442.80	445.79	17.22	7	416	474.80	10- 6	10- 4
CAT	6.81	5.84	6.60	6.33	5.89	5.70	5.87	6.15	0.43	7	5.70	6.81	10- 6	10- 1
AN	5.70	5.90	5.54	6.34	6.01	5.58	5.94	5.86	0.28	7	5.54	6.34	10- 3	10- 4
CB	8.87	0.528-	8.70	0.070-	1.045-	1.08	0.559-	2.98	3.98	7	0.07	8.87	10- 4	10- 1
USER CODE		100.00												

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20621

04008728110E WELL NAME 575

(Chemical units in mg/l except as noted)

				W.	C	Cooper		
ate Sampled		4-06-81	6-19-81	7-15-81	7-15-81	10-5-81		
alinity ppm as $CaCO_3$				200		171		
(Units)		7.5		7.26	7.6	7.77		
onductivity (umhos/cm)		488		@25°C 463	496	552		
mmonia (NH_3 as N)		<.1		.14	<.1			
otal NO_2/NO_3 (as N)		<.1		<.01	<.1			
icarbonate (HCO_3)	3.72	227		244	216	209		
arbonate (CO_3)		0		-0-	-0-	0		
cium (Ca)	3.15	63		64	67	67.1		
loride (Cl)	0.28	10		5	5	5.2		
oron (B)		<.25		<.01	<.25			
luoride (F)		.51		.92	.44			
agnesium (Mg)	1.35	16.2		12	16	16		
otassium (K)	0.22	8.4		8	8	8.1		
odium (Na)	1.13	26		26	25	26		
ulfate (SO_4)	1.90	91		68	106	102		
luminum (Al)		<.05		.18	.1	<.10		
rsenic (As)		<.005		<.001	<.005	<.01		
ium (Ba)		<.5		<.1	<.1	<.10		
dmium (Cd)		<.01		<.002	<.01	<.01		
hromium (Cr)		<.05		<.01	<.05	<.05		
opper (Cu)		<.05		.01	<.05	<.05		
ron (Fe)		.18		1.26	.39	0.13		
ead (Pb)		<.05		<.05	<.05	<.05		
anganese (Mn)		.08		.06	<.05	0.06		
ercury (Hg)		<.001		<.0002	<.001			
olybdenum (Mo)		<.1		<.1	<.1	<.10		
ickel (Ni)		<.05		<.2	<.05	<.05		
Radium 226 (Ra) pCi/l			*6.8±1.8	7.3±1.4	*3.8±2.9			
Selenium (Se)		<.005		<.001	<.005	<.01		
Thorium 230 (Th) pCi/l				X				
Uranium (U) ppm		<.1		.011	<.1			
Vanadium (V)		<.1		<.1	<.1	<.5		
Zinc (Zn)		<.05		.016	<.05	<.01		
[illegible]		362		370	358	354		
210 pCi/L								
itrate (NO_3) as N								
itrite (NO_2) as N								

*   *CDM   *CDM

20628

04008728110E

ANALYSES FOR WELL
MAP NUMBER PN5-576

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

LAB	WAMCO	TETON	TETON	TETON	TETON	TETON							
JOB		250	1089	12371	1756	2348							
DS	062979	011580	051380	071680	100580	011401							
DA	NA	NA	051380	071880	100780	011581	4-06-81						
WN	11	11	11	11	11	11	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
SPN	1	2	3	4	5	6							
PH	7.79	7.12	7.59	7.57	7.50	7.60	7.53	0.22	6	7.12	7.79	11- 2	11- 1
TC	11	NA	NA	20	12	9.50	13.13	4.70	4	9.50	20	11- 6	11- 4
CD	520	575	430	405	490	490	485	61.32	6	405	575	11- 4	11- 2
NH3	0.100-	1.001-	0.100-	0.100-	0.100-	0.100-	0.25	0.37	6	0.10	1.00	11- 6	11- 2
NO3	0.050-	1.62	0.13	0.16	0.100-	0.100-	0.36	0.62	6	0.05	1.62	11- 1	11- 2
HCO3	220	159	227	220	222	224	212	26.10	6	159	227	11- 2	11- 3
CO3	0.000	0.000	0.000	0.000	0.000	0.000	0	0	6	0	0	11- 6	11- 6
CA	64	88.50	67	67	59	67	68.75	10.17	6	59	88.50	11- 5	11- 2
CL	10	4.40	6	9	7	6	7.07	2.08	6	4.40	10	11- 2	11- 1
B	0.010-	0.050-	0.050-	0.250-	0.250-	0.250-	0.14	0.12	6	0.01	0.25	11- 1	11- 6
F	0.65	0.40	0.50	0.48	0.48	0.37	0.40	0.10	6	0.37	0.65	11- 6	11- 1
MG	16	0.000	14	14.10	16	15.30	12.57	6.22	6	0	16	11- 2	11- 5
K	8	8.50	8.60	8	7.40	9.20	8.32	0.65	6	7.40	9.20	11- 5	11- 6
NA	24	30	36	32	26	24	28.67	4.84	6	24	36	11- 6	11- 3
SO4	93	65	111	103	102	106	96.67	15.60	6	65	111	11- 2	11- 3
AL	0.020	0.30	0.000	0.050-	0.050-	0.050-	0.09	0.10	6	0.02	0.30	11- 1	11- 2
AS	0.005-	0.022	0.005-	0.006	0.005-	0.005-	0.01	0.01	6	0.01	0.02	11- 6	11- 2
BA	0.040	0.050-	0.050-	0.050-	0.100-	0.24	0.09	0.08	6	0.04	0.24	11- 1	11- 6
CD	0.002-	0.050-	0.010-	0.010-	0.010-	0.010-	0.02	0.02	6	0.00	0.05	11- 1	11- 2
CR	0.010-	0.050-	0.050-	0.050-	0.050-	0.050-	0.04	0.02	6	0.01	0.05	11- 1	11- 6
CU	0.010-	0.050-	0.050-	0.050-	0.050-	0.050-	0.04	0.02	6	0.01	0.05	11- 1	11- 6
FE	0.010-	0.46	0.080	0.30	0.11	0.10	0.18	0.17	6	0.01	0.46	11- 1	11- 2
PB	0.010-	0.050-	0.050-	0.050-	0.050-	0.050-	0.04	0.02	6	0.01	0.05	11- 1	11- 6
MN	0.050-	0.050	0.050-	0.060	0.050-	0.070	0.06	0.01	6	0.05	0.07	11- 5	11- 6
HG	.00050-	.00100-	.00100-	.00100-	.00100-	.00100-	.00092	.00020	6	.00050	.00100	11- 1	11- 6
MO	0.050-	0.100-	0.050-	0.100-	0.100-	0.100-	0.08	0.03	6	0.05	0.10	11- 3	11- 6
NI	0.020-	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.01	6	0.02	0.05	11- 1	11- 6
RA	0.050-	0.02	32.80	45.50	18.50	NA	20.97	18.39	5	0.05	45.50	11- 1	11- 4
RAER	NA	NA	2.10	2.60	2.50	NA							
SE	0.005-	0.005-	0.005-	0.005-	0.005-	0.005-	0.01	0	6	0.01	0.01	11- 6	11- 6
TH	NA	NA	1.40	0.40	1.10	NA	0.97	0.51	3	0.40	1.40	11- 4	11- 3
U	0.039	0.100-	0.100-	0.100-	0.100-	0.100-	0.09	0.02	6	0.04	0.10	11- 1	11- 6
V	0.050	0.500-	0.050-	0.100-	0.100-	0.100-	0.15	0.17	6	0.05	0.50	11- 3	11- 2
ZN	0.005-	0.050-	0.050-	0.050-	0.050-	0.050-	0.04	0.02	6	0.01	0.05	11- 1	11- 6
TDS	328	382	345	349	348	353	350.83	17.57	6	328	382	11- 1	11- 2
CTDS	435	355.40	469.80	453.10	439.40	451.50	434.03	40.40	6	355.40	469.80	11- 2	11- 3
CAT	5.76	5.94	6.29	6.10	5.58	5.88	5.92	0.25	6	5.58	6.29	11- 5	11- 3
AN	5.82	4.08	6.20	6.00	5.96	6.05	5.69	0.79	6	4.08	6.20	11- 2	11- 3
CB	0.568-	18.51	0.68	0.79	3.285-	1.395-	4.21	7.08	6	0.57	18.51	11- 1	11- 2
USER CODE		100.00											
	*		*	*		*							

20628

ANAL S FOR WELL
MAP NUMBER PNS-MM-1

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

LAB	TETON	TETON	TETON	TETON	TETON
JOB	223	1090	1367	1757	2339A
DS	011180	051380	071680	100680	011381
DA	011480	051380	071880	100780	011481

4-06-81

WN	1	1	1	1	1	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
SPN	1	2	3	4	5	7.56	0.16	5	7.30	7.70	1- 1	1- 4
PH	7.30	7.66	7.65	7.70	7.51	13	2.65	3	11	16	1- 5	1- 3
TC	NA	NA	16	12	11	480	65.86	5	415	575	1- 3	1- 1
CD	575	420	415	500	490	0.36	0.40	5	0.10	1.00	1- 5	1- 1
NH3	1.001-	0.48	0.100-	0.100-	0.100-	0.35	0.53	5	0.10	1.30	1- 5	1- 1
NO3	1.30	0.100-	0.14	0.100-	0.100-	215.00	7.26	5	205	224	1- 3	1- 4
HCO3	213	220	205	224	217	0	0	5	0	0	1- 5	1- 5
CO3	0.000	0.000	0.000	0.000	0.000	67.60	13.28	5	58	91	1- 4	1- 1
CA	91	63	62	58	64	5.76	2.36	5	1.00	8	1- 1	1- 3
CL	1.60	6	8	7	6	0.17	0.11	5	0.05	0.25	1- 2	1- 5
B	0.050-	0.050-	0.250-	0.250-	0.250-	0.49	0.09	5	0.36	0.60	1- 5	1- 3
F	0.50	0.50	0.60	0.47	0.36	12.44	7.25	5	0	19	1- 1	1- 4
MG	0.000	14	15.10	19	14.10	8.24	1.00	5	7	9.30	1- 1	1- 5
K	7	9	8.50	7.40	9.30	28.40	3.85	5	25	35	1- 1	1- 2
NA	25	35	27	28	27	104.20	3.77	5	100	110	1- 1	1- 3
SO4	100	102	110	105	104	0.24	0.21	5	0.05	0.47	1- 5	1- 3
AL	0.100-	0.45	0.47	0.11	0.050-	0.01	0.01	5	0.01	0.03	1- 5	1- 1
AS	0.034	0.005-	0.005-	0.005-	0.005-	0.07	0.03	5	0.05	0.11	1- 3	1- 5
BA	0.050-	0.050-	0.050-	0.100-	0.11	0.02	0.02	5	0.01	0.05	1- 5	1- 1
CD	0.050-	0.010-	0.010-	0.010-	0.010-	0.05	0.00	5	0.05	0.05	1- 5	1- 5
CR	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.00	5	0.05	0.05	1- 5	1- 5
CU	0.050-	0.050-	0.050-	0.050-	0.050-	0.57	0.55	5	0.10	1.42	1- 1	1- 3
FE	0.10	0.79	1.42	0.44	0.11	0.05	0.00	5	0.05	0.05	1- 5	1- 5
PB	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.00	5	0.05	0.05	1- 5	1- 5
MN	0.050-	0.050-	0.050-	0.050-	0.050-	.00100	.00000	5	.00100	.00100	1- 5	1- 5
HG	.00100-	.00100-	.00100-	.00100-	.00100-	0.09	0.02	5	0.05	0.10	1- 2	1- 5
MO	0.100-	0.050-	0.100-	0.100-	0.100-	0.05	0.00	5	0.05	0.05	1- 5	1- 5
NI	0.050-	0.050-	0.050-	0.050-	0.050-	16.32	12.48	4	7.60	34.10	1- 4	1- 3
RA	7.66	15.90	34.10	7.60	NA							
RAER	NA	1.70	2.60	1.60	NA							
SE	0.005-	0.005-	0.005-	0.005-	0.005-	0.01	0	5	0.01	0.01	1- 5	1- 5
TH	NA	6	0.500-	2.50	NA	3	2.78	3	0.50	6	1- 3	1- 2
U	0.100-	0.100-	0.100-	0.100-	0.100-	0.10	0.00	5	0.10	0.10	1- 5	1- 5
V	0.500-	0.050-	0.100-	0.100-	0.100-	0.17	0.19	5	0.05	0.50	1- 2	1- 1
ZN	0.050-	0.050-	0.050-	0.050-	0.050-	0.05	0.00	5	0.05	0.05	1- 5	1- 5
TDS	356	332	390	358	353	357.80	20.79	5	332	390	1- 2	1- 3
CTDS	437.80	449	435.60	448.40	441.40	442.44	6.08	5	435.60	449	1- 3	1- 2
CAT	5.81	6.05	5.73	5.86	5.77	5.84	0.13	5	5.73	6.05	1- 3	1- 2
AN	5.62	5.90	5.88	6.05	5.89	5.87	0.15	5	5.62	6.05	1- 1	1- 4
CB	1.61	1.25	1.275-	1.598-	1.075-	1.36	0.23	5	1.08	1.61	1- 5	1- 1
USER CODE	100.00											

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04008728110E

20628

0400872811OE

A[illegible]ES FOR WELL
MAP NUMBER PN5-NM-2

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

LAB	TETON	TETON	TETON	TETON		
JOB	253 ✓	1071 ✓	1758 ✓	2334		
DS	011780	051380	100680	011281	7-16-80	4-06-81
DA	011880	051380	100780	011381		

WN	2	2	2	2	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
SPN	1	2	4	5							
PH	7.80	8.43	7.50	7.46	7.80	0.45	4	7.46	8.43	2- 5	2- 2
TC	9	NA	13	10	10.67	2.00	3	9	13	2- 1	2- 4
CD	525	345	490	480	460	79.06	4	345	525	2- 2	2- 1
NH3	1.001-	0.19	0.100-	0.11	0.35	0.44	4	0.10	1.00	2- 4	2- 1
NO3	1.50	0.100-	0.50	0.10	0.55	0.66	4	0.10	1.50	2- 5	2- 1
HCO3	205	150	220	220	198.75	33.26	4	150	220	2- 2	2- 5
CO3	0.000	10	0.000	0.000	2.50	5.00	4	0	10	2- 5	2- 2
CA	86	45	59	52	60.50	17.94	4	45	86	2- 2	2- 1
CL	6.60	2	7	6	5.40	2.30	4	2	7	2- 2	2- 4
B	0.050-	0.050-	0.250-	0.250-	0.15	0.12	4	0.05	0.25	2- 2	2- 5
F	0.40	0.48	0.48	0.37	0.43	0.06	4	0.37	0.48	2- 5	2- 4
MG	0.000	11	18	22.60	12.90	9.83	4	0	22.60	2- 1	2- 5
K	8.70	12.50	7	9.30	9.38	2.30	4	7	12.50	2- 4	2- 2
NA	23	41	28	19	27.75	9.57	4	19	41	2- 5	2- 2
SO4	50	55	97	96	74.50	25.49	4	50	97	2- 1	2- 4
AL	0.100-	0.050	0.050-	0.050-	0.06	0.03	4	0.05	0.10	2- 5	2- 1
AS	0.061	0.005-	0.020	0.023	0.03	0.02	4	0.01	0.06	2- 2	2- 1
BA	0.050-	0.050-	0.100-	0.100-	0.08	0.03	[illegible]	0.05	0.10	2- 2	2- 5
CD	0.050-	0.010-	0.010-	0.010-	0.02	0.02	[illegible]	0.01	0.05	2- 5	2- 1
CR	0.050-	0.050-	0.050-	0.050-	0.05	0	4	0.05	0.05	2- 5	2- 5
CU	0.050-	0.050-	0.050-	0.050-	0.05	0	4	0.05	0.05	2- 5	2- 5
FE	0.050-	0.13	0.27	0.23	0.17	0.10	4	0.05	0.27	2- 1	2- 4
PB	0.050-	0.050	0.050-	0.050-	0.05	0	4	0.05	0.05	2- 5	2- 5
MN	0.050-	0.050-	0.050-	0.050-	0.05	0	4	0.05	0.05	2- 5	2- 5
HG	.00100-	.00100-	.00100-	.00100-	.00100	.00000	4	.00100	.00100	2- 5	2- 5
MO	0.100-	0.050-	0.100-	0.100-	0.09	0.03	4	0.05	0.10	2- 2	2- 5
NI	0.050-	0.050-	0.050-	0.050-	0.05	0	4	0.05	0.05	2- 5	2- 5
RA	7.29	3.24	2.30	NA	4.28	2.65	3	2.30	7.29	2- 4	2- 1
RAER	NA	0.75	0.90	NA							
SE	0.005-	0.005-	0.005-	0.005-	0.01	0	4	0.01	0.01	2- 5	2- 5
TH	NA	3.20	1	NA	2.10	1.56	2	1	3.20	2- 4	2- 2
U	0.100-	0.100-	0.100-	0.100-	0.10	0	4	0.10	0.10	2- 5	2- 5
V	0.500-	0.050-	0.100-	0.100-	0.19	0.21	4	0.05	0.50	2- 2	2- 1
ZN	0.050-	0.050-	0.050-	0.050-	0.05	0	4	0.05	0.05	2- 5	2- 5
TDS	334	279	346	341	325	31.06	4	279	346	2- 2	2- 4
CTDS	379.30	326.50	436	424.90	391.68	49.90	4	326.50	436	2- 2	2- 4
CAT	5.51	4.35	5.82	5.52	5.30	0.65	4	4.35	5.82	2- 2	2- 4
AN	4.59	3.94	5.82	5.77	5.03	0.93	4	3.94	5.82	2- 2	2- 4
CB	9.18	5.02	0.008-	2.263-	4.12	3.95	4	0.01	9.18	2- 4	2- 1
USER CODE	100.00										

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20628

WATER QUALITY

WELL NAME MM-2

(Chemical units in mg/l except as noted)

0400872811OE

				W	C	
Date Sampled	7-17-80	4-06-81	6-19-81	7-14-81	7-14-81	10-5-81
Alkalinity ppm as $CaCO_3$				200		170
pH (Units)	7.9	7.5		7.27	7.7	7.99
Conductivity (umhos/cm)	385	508		@ 25°C 469	485	535
Ammonia (NH_3 as N)	<.1	<.1		.21	<.1	
Total NO_2/NO_3 (as N)	<.28	.15			<.1	
Bicarbonate (HCO_3)	190	234		244	216	208
Carbonate (CO_3)	-0-	-0-		-0-	-0-	0
Calcium (Ca)	57	63		63	67	64.9
Chloride (Cl)	8	8		5	5	4.1
Boron (B)	<.25	<.25		<.01	<.25	
Fluoride (F)	.48	.48		.60	.46	
Magnesium (Mg)	7.3	17.4		17	15	15.2
Potassium (K)	9.1	8.3		8	8	8.2
Sodium (Na)	31	28		26	25	25
Sulfate (SO_4)	91	98		88	118	99
Aluminum (Al)	<.05	<.05		<.1	<.1	<.1
Arsenic (As)	.1068	.025		<.001	.036	.042
Barium (Ba)	<.1	<.		<.1	<.1	<.10
Cadmium (Cd)	<.01	<.01		<.002	.01	<.01
Chromium (Cr)	<.05	<.05		<.01	<.05	<.05
Copper (Cu)	<.05	<.05		<.01	<.05	<.05
Iron (Fe)	.57	.16		.27	.32	0.14
Lead (Pb)	<.05	<.05		<.05	<.05	<.05
Manganese (Mn)	.06	<.05		.04	<.05	<.05
Mercury (Hg)	<.001	<.001		<.0002	<.001	
Molybdenum (Mo)	<.05	<.1		<.10	<.1	<.10
Nickel (Ni)	<.05	<.05		<.02	<.05	<.05
Radium 226 (Ra) pCi/l	3.08 ± 0.59		1.5 ± 1.2 *	* 4.2 ± 1.1	* 4.4 ± 3	
Selenium (Se)	<.005	<.005		<.001	<.005	<.01
Thorium 230 (Th) pCi/l	53.8 ± 7.8					
Uranium (U)	<.1	<.1		.025	<.1	
Vanadium (V)	<.05	<.1		<.1	<.1	<.5
Zinc (Zn)	<.01	<.05		.013	<.05	<.01
TDS	335	368		410	340	344
Pb 210 pCi/L	0 ± 2.26					
Nitrate (NO_3) as N				<.05		
Nitrite (NO_2) as N				<.001		
	*	*	* CDM		* CDM	

20628

0400872811OE

ANALYSES FOR WELL
MAP NUMBER PNS-MM4

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

LAB	TETON	TETON	TETON							
JOB	1311	1519	1521							
DS	070580	082080	082080							
DA	070660	082180	082180							
WN	14	14	14	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
SPN	1	2	3							
PH	7.40	7.33	7.22	7.32	0.09	3	7.22	7.40	14- 3	14- 1
TC	13	17	16	15.33	2.08	3	13	17	14- 1	14- 2
CD	519	425	469	471	47.03	3	425	519	14- 2	14- 1
NH3	0.100-	0.100-	0.100-	0.10	0.00	3	0.10	0.10	14- 3	14- 3
NO3	0.30	0.22	0.13	0.22	0.09	3	0.13	0.30	14- 3	14- 1
HCO3	213.50	214	247	224.83	19.20	3	213.50	247	14- 1	14- 3
CO3	0.000	6	6	4	3.46	3	0	6	14- 1	14- 3
CA	58	56	57	57	1	3	56	58	14- 2	14- 1
CL	4	4	7	5	1.73	3	4	7	14- 2	14- 3
B	0.250-	0.250-	0.250-	0.25	0	3	0.25	0.25	14- 3	14- 3
F	0.50	0.46	0.40	0.45	0.05	3	0.40	0.50	14- 3	14- 1
MG	15.20	14	10	13.07	2.72	3	10	15.20	14- 3	14- 1
K	9.50	13	19	13.83	4.80	3	9.50	19	14- 1	14- 3
NA	27	31	31	29.67	2.31	3	27	31	14- 1	14- 3
SO4	97	106	86	96.33	10.02	3	86	106	14- 3	14- 2
AL	0.18	0.030	0.050-	0.10	0.07	3	0.05	0.18	14- 3	14- 1
AS	0.011	0.005-	0.056	0.02	0.03	3	0.01	0.06	14- 2	14- 3
BA	0.100-	0.100-	0.100-	0.10	0.00	3	0.10	0.10	14- 3	14- 3
CD	0.010-	0.010-	0.010-	0.01	0	3	0.01	0.01	14- 3	14- 3
CR	0.070	0.010-	0.010-	0.03	0.03	3	0.01	0.07	14- 3	14- 1
CU	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	14- 3	14- 3
FE	1.12	0.14	0.54	0.60	0.49	3	0.14	1.12	14- 2	14- 1
PB	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	14- 3	14- 3
MN	0.050-	0.15	0.20	0.13	0.08	3	0.05	0.20	14- 1	14- 3
HG	.00100-	.00100-	.00100-	.00100	.00000	3	.00100	.00100	14- 3	14- 3
MO	0.050-	0.050-	0.100-	0.07	0.03	3	0.05	0.10	14- 2	14- 3
NI	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	14- 3	14- 3
RA	220	182.80	255.80	219.53	36.50	3	182.80	255.80	14- 2	14- 3
RAER	6	NA	NA							
SE	0.005-	0.005-	0.005-	0.01	0	3	0.01	0.01	14- 3	14- 3
TH	0.49 13.10	NA	NA	0.49	0	1	0.49	0.49	14- 1	14- 1
U	0.100-	0.100-	0.100-	0.10	0.00	3	0.10	0.10	14- 3	14- 3
V	0.050-	0.100-	0.100-	0.08	0.03	3	0.05	0.10	14- 1	14- 3
ZN	0.24	0.050-	0.050-	0.11	0.11	3	0.05	0.24	14- 3	14- 1
TDS	324	338	338	333.33	8.08	3	324	338	14- 1	14- 3
CTDS	424.20	444	463	443.73	19.40	3	424.20	463	14- 1	14- 3
CAT	5.56	5.63	5.50	5.56	0.06	3	5.50	5.63	14- 3	14- 2
AN	5.63	6.03	6.24	5.96	0.31	3	5.63	6.24	14- 1	14- 3
CB	0.622-	3.434-	6.262-	3.44	2.82	3	0.62	6.26	14- 1	14- 3
USER CODE		100.00								

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20628

04008728110E

ANALYSES FOR WELL
MAP NUMBER PNS-MM5

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

LAB	TETON	TETON	TETON
JOB	1335	1525	1526
DS	070380	082380	082480
DA	070980	082680	082680

WN	15	15	15	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
SPN	1	2	3							
PH	7.75	7.43	7.65	7.61	0.16	3	7.43	7.75	15- 2	15- 1
TC	13	13.50	12.50	13	0.50	3	12.50	13.50	15- 3	15- 2
CD	615	485	472	524	79.00	3	472	615	15- 3	15- 1
NH3	0.100-	0.100-	0.100-	0.10	0.00	3	0.10	0.10	15- 3	15- 3
NO3	0.37	0.10	0.17	0.21	0.14	3	0.10	0.37	15- 2	15- 1
HCO3	234.20	220	220	224.73	8.20	3	220	234.20	15- 3	15- 1
CO3	0.000	0.000	17.10	5.70	9.87	3	0	17.10	15- 2	15- 3
CA	75	70	72	72.33	2.52	3	70	75	15- 2	15- 1
CL	3.60	6	10	6.53	3.23	3	3.60	10	15- 1	15- 3
B	0.250-	0.250-	0.250-	0.25	0	3	0.25	0.25	15- 3	15- 3
F	0.48	0.43	0.46	0.46	0.03	3	0.43	0.48	15- 2	15- !
MG	15.40	15	13	14.47	1.29	3	13	15.40	15- 3	15- 1
K	8.50	14	15	12.50	3.50	3	8.50	15	15- 1	15- 3
NA	25	29	30	28	2.65	3	25	30	15- 1	15- 3
SO4	112	128	120	120	8	3	112	128	15- 1	15- 2
AL	0.030	0.050	0.050-	0.06	0.02	3	0.05	0.08	15- 3	15- 1
AS	0.005-	0.005-	0.009	0.01	0.00	3	0.01	0.01	15- 2	15- 3
BA	0.070	0.100-	0.100-	0.09	0.02	3	0.07	0.10	15- 1	15- 3
CD	0.010-	0.010-	0.010-	0.01	0	3	0.01	0.01	15- 3	15- 3
CR	0.050-	0.010-	0.010-	0.02	0.02	3	0.01	0.05	15- 3	15- 1
CU	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	15- 3	15- 3
FE	0.80	0.24	0.12	0.39	0.36	3	0.12	0.80	15- 3	15- 1
PB	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	15- 3	15- 3
MN	0.030	0.10	0.090	0.09	0.01	3	0.08	0.10	15- 1	15- 2
HG	.00100-	.00100-	.00100-	.00100	.00000	3	.00100	.00100	15- 3	15- 3
MO	0.050-	0.010-	0.100-	0.05	0.05	3	0.01	0.10	15- 2	15- 3
NI	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	15- 3	15- 3
RA	61.20	36.32	61.24	52.92	14.38	3	36.32	61.24	15- 2	15- 3
RAER	3.60	NA	NA							
SE	0.005-	0.005-	0.005-	0.01	0	3	0.01	0.01	15- 3	15- 3
TH	0.45	NA	NA	0.46	0	1	0.46	0.46	15- 1	15- 1
U	0.100-	0.100-	0.100-	0.10	0.00	3	0.10	0.10	15- 3	15- 3
V	0.050-	0.100-	0.100-	0.08	0.03	3	0.05	0.10	15- 1	15- 3
ZN	0.010-	0.62	0.050-	0.23	0.34	3	0.01	0.62	15- 1	15- 2
TDS	398	374	610	460.67	129.88	3	374	610	15- 2	15- 3
CTDS	473.70	482	497.10	484.27	11.86	3	473.70	497.10	15- 1	15- 3
CAT	6.31	6.35	6.35	6.34	0.02	3	6.31	6.35	15- 1	15- 3
AN	6.27	6.44	6.96	6.56	0.36	3	6.27	6.96	15- 1	15- 3
CB	0.34	0.732-	4.550-	1.87	2.33	3	0.34	4.55	15- 1	15- 3
USER CODE		100.00								

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OFFICIAL DOCKET COPY

20628

0400872811OE

ANALYSES FOR WELL
MAP NUMBER PNS-LMM6

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

LAB	TETON	TETON	TETON
JOB	1347	1380	1331
DS	071180	072180	072280
DA	071480	072280	072280

WN	16	16	16	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
SPN	1	2	3							
PH	7.62	7.32	7.30	7.41	0.18	3	7.30	7.62	16- 3	16- 1
TC	17	13	13	14.33	2.31	3	13	17	16- 3	16- 1
CD	560	502	479	513.67	41.74	3	479	560	16- 3	16- 1
NH3	0.100-	0.15	0.100-	0.12	0.03	3	0.10	0.15	16- 3	16- 2
NO3	0.11	0.29	0.29	0.23	0.10	3	0.11	0.29	16- 1	16- 3
HCO3	251	257	257	255	3.46	3	251	257	16- 1	16- 3
CO3	0.000	0.000	0.000	0	0	3	0	0	16- 3	16- 3
CA	75.90	76	76	75.97	0.06	3	75.90	76	16- 1	16- 3
CL	4.40	5	4.60	4.67	0.31	3	4.40	5	16- 1	16- 2
B	0.250-	0.250-	0.250-	0.25	0	3	0.25	0.25	16- 3	16- 3
F	0.44	0.45	0.45	0.45	0.01	3	0.44	0.45	16- 1	16- 3
MG	17.50	18.20	18.90	18.20	0.70	3	17.50	18.90	16- 1	16- 3
K	9.10	8.70	8.50	8.77	0.31	3	8.50	9.10	16- 3	16- 1
NA	27.50	26	25	26.17	1.26	3	25	27.50	16- 3	16- 1
SO4	96	121	110	109	12.53	3	96	121	16- 1	16- 2
AL	0.500-	0.050-	0.050-	0.20	0.26	3	0.05	0.50	16- 3	16- 1
AS	0.005-	0.005-	0.005-	0.01	0	3	0.01	0.01	16- 3	16- 3
BA	0.14	0.100-	0.100-	0.11	0.02	3	0.10	0.14	16- 3	16- 1
CD	0.010-	0.010-	0.010-	0.01	0	3	0.01	0.01	16- 3	16- 3
CR	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	16- 3	16- 3
CU	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	16- 3	16- 3
FE	0.40	0.72	0.57	0.56	0.16	3	0.40	0.72	16- 1	16- 2
PB	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	16- 3	16- 3
MN	0.060	0.050-	0.050-	0.05	0.01	3	0.05	0.06	16- 3	16- 1
HG	.00100-	.00100-	.00100-	.00100	.00000	3	.00100	.00100	16- 3	16- 3
MO	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	16- 3	16- 3
NI	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	16- 3	16- 3
RA	1208	832.10	919.80	986.63	196.65	3	832.10	1208	16- 2	16- 1
RAER	17	NA	NA							
SE	0.005-	0.005-	0.005-	0.01	0	3	0.01	0.01	16- 3	16- 3
TH	1.83	NA	NA	1.83	0	1	1.83	1.83	16- 1	16- 1
U	0.100-	0.100-	0.100-	0.10	0.00	3	0.10	0.10	16- 3	16- 3
V	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	16- 3	16- 3
ZN	0.010-	0.019	0.018	0.02	0.00	3	0.01	0.02	16- 1	16- 2
TDS	390	393	401	394.67	5.69	3	390	401	16- 1	16- 3
CTDS	481.40	511.90	500	497.77	15.37	3	481.40	511.90	16- 1	16- 2
CAT	6.66	6.64	6.65	6.65	0.01	3	6.64	6.66	16- 2	16- 1
AN	6.24	6.87	6.63	6.58	0.32	3	6.24	6.87	16- 1	16- 2
CB	3.25	1.698-	0.15	1.70	1.55	3	0.15	3.25	16- 3	16- 1

USER CODE 100.00

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ANALYSES FOR WELL
MAP NUMBER PN5-MM7

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

LAB	TETON	TETON	TETON
JOB	1312	1522	1523
DS	070780	082180	082280
DA	070580	032280	082580

WN	17	17	17	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
SPN	1	2	3							
PH	7.60	7.25	7.15	7.33	0.24	3	7.15	7.60	17- 3	17- 1
TC	13	14.50	16	14.50	1.50	3	13	16	17- 1	17- 3
CD	530	300	430	420	115.33	3	300	530	17- 2	17- 1
NH3	0.100-	0.100-	0.100-	0.10	0.00	3	0.10	0.10	17- 3	17- 3
NO3	0.29	0.20	0.11	0.20	0.09	3	0.11	0.29	17- 3	17- 1
HCO3	219.60	268	230	239.20	25.48	3	219.60	268	17- 1	17- 2
CO3	0.000	0.000	0.000	0	0	3	0	0	17- 3	17- 3
CA	70	63	63	65.33	4.04	3	63	70	17- 3	17- 1
CL	5	4	4	4.33	0.58	3	4	5	17- 3	17- 1
B	0.250-	0.250-	0.250-	0.25	0	3	0.25	0.25	17- 3	17- 3
F	0.52	0.46	0.43	0.47	0.05	3	0.43	0.52	17- 3	17- 1
MG	15.20	16	14	15.07	1.01	3	14	16	17- 3	17- 2
K	7.70	11	10	9.57	1.69	3	7.70	11	17- 1	17- 2
NA	24.30	29	29	27.43	2.71	3	24.30	29	17- 1	17- 3
SO4	99	94	96	96.33	2.52	3	94	99	17- 2	17- 1
AL	0.20	1.13	1.20	0.84	0.56	3	0.20	1.20	17- 1	17- 3
AS	0.005-	0.005-	0.007	0.01	0.00	3	0.01	0.01	17- 2	17- 3
BA	0.100-	0.100-	0.100-	0.10	0.00	3	0.10	0.10	17- 3	17- 3
CD	0.010-	0.010-	0.010-	0.01	0	3	0.01	0.01	17- 3	17- 3
CR	0.050-	0.010-	0.010-	0.02	0.02	3	0.01	0.05	17- 3	17- 1
CU	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	17- 3	17- 3
FE	1.72	2.45	2.60	2.26	0.47	3	1.72	2.60	17- 1	17- 3
PB	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	17- 3	17- 3
MN	0.050-	0.18	0.13	0.12	0.07	3	0.05	0.18	17- 1	17- 2
HG	.00100-	.00100-	.00100-	.00100	.00000	3	.00100	.00100	17- 3	17- 3
MO	0.050-	0.100-	0.100-	0.08	0.03	3	0.05	0.10	17- 1	17- 3
NI	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	17- 3	17- 3
RA	187	191.60	178.10	185.57	6.86	3	178.10	191.60	17- 3	17- 2
RAER	0.50	NA	NA							
SE	0.005-	0.005-	0.005-	0.01	0	3	0.01	0.01	17- 3	17- 3
TH	0.35	NA	NA	0.35	0	1	0.35	0.35	17- 1	17- 1
U	0.100-	0.100-	0.100-	0.10	0.00	3	0.10	0.10	17- 3	17- 3
V	0.050-	0.100-	0.100-	0.08	0.03	3	0.05	0.10	17- 1	17- 3
ZN	0.010-	0.050-	0.050-	0.04	0.02	3	0.01	0.05	17- 1	17- 3
TDS	402	344	341	362.33	34.39	3	341	402	17- 3	17- 1
CTDS	440.80	485	446	457.27	24.16	3	440.80	485	17- 1	17- 2
CAT	6.00	6.00	5.81	5.94	0.11	3	5.81	6.00	17- 3	17- 2
AN	5.80	6.46	5.88	6.05	0.36	3	5.80	6.46	17- 1	17- 2
CB	1.66	3.688-	0.587-	1.98	1.57	3	0.59	3.69	17- 3	17- 2

USER CODE 100.00

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ANA[illegible]ES FOR WELL
MAP NUMBER PN5-MN9

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

LAB	TETON	TETON	TETON
JOB	1344	1531	1600
DS	071080	082580	082680
DA	071180	082680	082780

WN	19	19	19	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
SPN	1	2	3							
PH	7.55	8.60	7.50							
TC	18	16.50	13.50	7.95	0.74	3	7.50	8.80	19- 3	19- 2
CD	560	295	385	16	2.29	3	13.50	18	19- 3	19- 1
NH3	0.100-	0.100-	0.100-	413.33	134.75	3	295	560	19- 2	19- 1
NO3	0.12	0.11	0.12	0.10	0.00	3	0.10	0.10	19- 3	19- 3
HCO3	244	192	250	0.12	0.01	3	0.11	0.12	19- 2	19- 3
CO3	0.000	24	0.000	228.67	31.90	3	192	250	19- 2	19- 3
CA	72	64	74	8	13.86	3	0	24	19- 3	19- 2
CL	5.60	4	6	70	5.29	3	64	74	19- 2	19- 3
B	0.250-	0.250-	0.250-	5.20	1.06	3	4	6	19- 2	19- 3
F	0.42	0.41	0.38	0.25	0	3	0.25	0.25	19- 3	19- 3
MG	16.50	7	13	0.40	0.02	3	0.38	0.42	19- 3	19- 1
K	8.30	16	10	12.17	4.80	3	7	16.50	19- 2	19- 1
NA	25.90	29	25	11.43	4.05	3	8.30	16	19- 1	19- 2
SO4	110	120	122	26.63	2.10	3	25	29	19- 3	19- 2
AL	0.070	0.10	0.050-	117.33	6.43	3	110	122	19- 1	19- 3
AS	0.005-	0.005-	0.008	0.07	0.03	3	0.05	0.10	19- 3	19- 2
BA	0.100-	0.13	0.14	0.01	0.00	3	0.01	0.01	19- 2	19- 3
CD	0.010-	0.010-	0.010-	0.12	0.02	3	0.10	0.14	19- 1	19- 3
CR	0.050-	0.010-	0.010-	0.01	0	3	0.01	0.01	19- 3	19- 3
CU	0.050-	0.050-	0.050-	0.02	0.02	3	0.01	0.05	19- 3	19- 1
FE	0.55	0.32	0.35	0.05	0.00	3	0.05	0.05	19- 3	19- 3
PB	0.050-	0.050-	0.050-	0.41	0.13	3	0.32	0.55	19- 2	19- 1
MN	0.050-	0.050-	0.10	0.05	0.00	3	0.05	0.05	19- 3	19- 3
HG	.00100-	.00100-	.00100-	0.07	0.03	3	0.05	0.10	19- 2	19- 3
MO	0.050-	0.100-	0.100-	.00100	.00000	3	.00100	.00100	19- 3	19- 3
NI	0.050-	0.050-	0.050-	0.08	0.03	3	0.05	0.10	19- 1	19- 3
RA	920	624.40	427.56	0.05	0.00	3	0.05	0.05,	19- 3	19- 3
RAER	15	NA	NA	657.32	247.86	3	427.56	920	19- 3	19- 1
SE	0.005-	0.005-	0.005-	0.01	0	3	0.01	0.01	19- 3	19- 3
TH	0.92	NA	NA	0.92	0	1	0.92	0.92	19- 1	19- 1
U	0.100-	0.100-	0.100-	0.10	0.00	3	0.10	0.10	19- 3	19- 3
V	0.050-	0.100-	0.100-	0.08	0.03	3	0.05	0.10	19- 1	19- 3
ZN	0.010-	0.050-	0.050-	0.04	0.02	3	0.01	0.05	19- 1	19- 3
TDS	482	328	404	404.67	77.00	3	328	482	19- 2	19- 1
CTDS	482.30	456	500	479.43	22.14	3	456	500	19- 2	19- 3
CAT	6.29	5.44	6.11	5.94	0.45	3	5.44	6.29	19- 2	19- 1
AN	6.45	6.56	6.81	6.60	0.18	3	6.45	6.81	19- 1	19- 3
CB	1.243-	9.318-	5.433-	5.33	4.04	3	1.24	9.32	19- 1	19- 2
USER CODE	100.00									

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ANALYSES FOR WELL
MAP NUMBER PNS-MM10

IF A PARAMETER IS PRESENT AT BELOW DETECTABLE LEVELS THEN
THE DETECTION LIMIT IS USED IN THE STATISTICAL CALCULATIONS

LAB	TETON	TETON	TETON
JOB	1337	1429	1467
DS	070780	073080	090180
DA	071080	073180	080280

WN	20	20	20	MEAN	STDV	NSMP	MIN	MAX	MINL	MAXL
SPN	1	2	3							
PH	7.50	7.30	7.30	7.37	0.12	3	7.30	7.50	20- 3	20- 1
TC	20	17	NA	18.50	2.12	2	17	20	20- 2	20- 1
CD	480	445	530	485	42.72	3	445	530	20- 2	20- 3
NH3	0.100-	0.100-	0.100-	0.10	0.00	3	0.10	0.10	20- 3	20- 3
NO3	0.30	0.18	0.15	0.21	0.08	3	0.15	0.30	20- 3	20- 1
HCO3	221	207	204	210.67	9.07	3	204	221	20- 3	20- 1
CO3	0.000	0.000	0.000	0	0	3	0	0	20- 3	20- 3
CA	55	58	54	55.67	2.08	3	54	58	20- 3	20- 2
CL	1.80	2	2	1.93	0.12	3	1.80	2	20- 1	20- 3
B	0.250-	0.250-	0.250-	0.25	0	3	0.25	0.25	20- 3	20- 3
F	0.49	0.49	0.48	0.49	0.01	3	0.48	0.49	20- 3	20- 2
MG	20.40	10.20	16	15.53	5.12	3	10.20	20.40	20- 2	20- 1
K	7.20	7	7.50	7.23	0.25	3	7	7.50	20- 2	20- 3
NA	27	27	28	27.33	0.58	3	27	28	20- 2	20- 3
SO4	93	101	100	98	4.36	3	93	101	20- 1	20- 2
AL	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	20- 3	20- 3
AS	0.005-	0.005-	0.005-	0.01	0	3	0.01	0.01	20- 3	20- 3
BA	0.11	0.100-	0.050-	0.09	0.03	3	0.05	0.11	20- 3	20- 1
CD	0.010-	0.010-	0.010-	0.0	0	3	0.01	0.01	20- 3	20- 3
CR	0.050-	0.050-	0.010-	0.04	0.02	3	0.01	0.05	20- 3	20- 2
CU	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	20- 3	20- 3
FE	1	0.050-	0.12	0.39	0.53	3	0.05	1	20- 2	20- 1
PB	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	20- 3	20- 3
MN	0.070	0.050-	0.18	0.10	0.07	3	0.05	0.18	20- 2	20- 3
HG	.00100-	.00100-	.00100-	.00100	.00000	3	.00100	.00100	20- 3	20- 3
MO	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	20- 3	20- 3
NI	0.050-	0.050-	0.050-	0.05	0.00	3	0.05	0.05	20- 3	20- 3
RA	29	31.43	24.23	28.22	3.66	3	24.23	31.43	20- 3	20- 2
RAER	2.30	NA	NA							
SE	0.005-	0.005-	0.005-	0.01	0	3	0.01	0.01	20- 3	20- 3
TH	0.67	NA	NA	0.67	0	1	0.67	0.67	20- 1	20- 1
U	0.100-	0.100-	0.100-	0.10	0.00	3	0.10	0.10	20- 3	20- 3
V	0.050-	0.050-	0.100-	0.07	0.03	3	0.05	0.10	20- 2	20- 3
ZN	0.010-	0.010-	0.050-	0.02	0.02	3	0.01	0.05	20- 2	20- 3
TDS	328	330	328	328.67	1.15	3	328	330	20- 3	20- 2
CTDS	425.40	412.20	411.50	416.37	7.83	3	411.50	425.40	20- 3	20- 1
CAT	5.78	5.09	5.42	5.43	0.35	3	5.09	5.78	20- 2	20- 1
AN	5.61	5.55	5.48	5.55	0.06	3	5.48	5.61	20- 3	20- 1
CB	1.51	4.373-	0.563-	2.15	1.98	3	0.56	4.37	20- 3	20- 2
USER CODE	100.00									

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APPENDIX "E"

M-ZONE RESTORATION STABILITY
ANALYTICAL DATA

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MI-1

DATE SMPLD	INITIAL 1-8-82	MONTH 1 2-1-82	MONTH 2 3-2-82	MONTH 3 3-29-82	MONTH 4 4-26-82	MONTH 5 5-24-82
ANALYSIS DATES	1-12-82 ↓ 2-16-82 *	2-2-82 ↓ 3-15-82	3-3-82 ↓ 4-16-82	3-30-82 ↓ 5-28-82	4-27-82 ↓ 5-28-82	5-25-82 ↓
HCO_3^- mg/l	93	112.2	131.3	134.9	143.5	157.4
$CO_3^=$ mg/l	-0-	-0-	-0-	-0-	-0-	-0-
Cl^- mg/l	ND	1.6	3.4	3.8	3.4	4.3
$SO_4^=$ mg/l	28	40.0	49.0	56.0	50.2	59.0
Anion eq.	2.11	2.72	3.27	3.49	3.49	3.93
Ca^{++} mg/l	15	19.8	22.0	24.2	24.6	27.5
Mg^{++} mg/l	3	4.73	5.4	5.9	6.1	6.8
Na^+ mg/l	25.0	30.0	34.1	36.3	36.8	41.6
K^+ mg/l	2	3.1	3.9	4.4	3.9	5.2
Cation eq.	2.14	2.77	3.13	3.39	3.44	3.88
-/+balance	98.60	98.19	104.36	102.73	101.62	101.21
Sum TDS	166	211	249	266	269	302
Cond um/cm	240	275	314	338	349	395
TDS mg/l	119	150	424	110	220	168
pH unit	7.44	7.1	6.92	6.93	7.22	7.33
U mg/l	0.007	0.25	0.32	0.35	0.28	0.34
[illegible] mg/l	77	92	107.6	110.6	117.6	129.0
[illegible] mg/l	<0.05	<0.10	0.13	<0.10	<0.10	<0.05
NH_4^+ mg/l	<0.05	* <0.05	* <0.05	* <0.05	* <0.05	* 0.22
As mg/l	<0.005	* 0.030	* 0.044	* 0.056	* 0.021	* 0.020
Ba mg/l	<0.03	<0.10	<0.10	<0.10	<0.10	<0.10
B mg/l	<0.01	* <0.01	* 0.20	* 0.10	* 0.23	* 0.13
Cd mg/l	<0.002	<0.01	<0.01	<0.01	<0.01	<0.01
Cr mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05
Cu mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05
F mg/l	0.27	* 0.36	* 0.45	* 0.30	* 0.24	* 0.22
Fe mg/l	<0.01	0.22	0.29	0.20	0.17	<0.05
Pb mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05
Mn mg/l	0.01	<0.05	<0.05	<0.05	<0.05	0.05
Hg mg/l	<0.0005	* <0.0005	* <0.0005	* <0.0002	* <0.0002	* <0.0002
Mo mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10
Ni mg/l	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05
NO_2/NO_3 "	<0.05	* <0.05	* 0.33	* <0.05	* <0.05	* <0.05
Se mg/l	<0.005	<0.001	* 0.018	* 0.006	* <0.001	* <0.001
V mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10
Zn mg/l	<0.005	<0.10	<0.01	<0.01	<0.01	0.01
Ra^{226} pci/l	75±5	* 72±5	* 124±6	* 117±6	* 112±6	* 117±5.3
Th^{230} pci/l	2.5±0.8	* 2.7±1.0	* 2.7±1.2	* 20.7±2.8	* 13.3±2.3	*
Gross A "	NA	NA	NA	NA	NA	NA
Gross B "	NA	NA	NA	NA	NA	NA

* ANALYZED BY OUTSIDE LABORATORY

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MI-6

	INITIAL	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	
[illegible]ATE SMPLD	1-8-82	2-1-82	3-2-82	3-29-82	4-26-82	5-24-82	
ANALYSIS DATES	1-12-82 ↓ 2-16-82 *	2-2-82 ↓ 3-30-82	3-3-82 ↓ 4-16-82	3-30-82 ↓ 5-28-82	4-27-82 ↓ 5-28-82	5-25-82 ↓	
HCO_3^- mg/l	240	244.0	241.8	244.5	253.8	250.3	
$CO_3^=$ mg/l	-0-	-0-	-0-	-0-	-0-	-0-	
Cl^- mg/l	8	8.5	8.0	9.2	8.8	8.8	
$SO_4^=$ mg/l	77	76.1	77	80	84.1	82	
Anion eq.	5.76	5.83	5.79	5.93	6.16	6.06	
Ca^{++} mg/l	54	44.0	46.2	46.2	49.5	44.0	
Mg^{++} mg/l	4	11.2	11.1	11.2	11.7	10.9	
Na^+ mg/l	59	61.0	59.3	58.0	59.2	60.9	
K^+ mg/l	5	5.8	6.3	6.4	6.0	7.4	
Cation eq.	5.72	5.93	5.97	5.93	6.18	5.95	
-/+balance	100.70	98.16	96.97	100.09	99.73	101.92	
Sum TDS	447	451	450	457	473	464	
Cond um/cm	500	565	573	574	588	583	
TDS mg/l	328	330	552	290	370	306	
pH unit	7.17	7.0	6.93	7.12	7.15	7.51	
U mg/l	0.036	0.62	0.59	0.54	0.50	0.37	
[illegible] mg/l	197	200.0	198.2	200.4	208.0	205.2	
[illegible] mg/l	<0.05	<0.10	<0.10	<0.10	0.44	<0.05	
[illegible]4+ mg/l	<0.05	* <0.05	* <0.05	* <0.05	* <0.05	* 0.22	
As mg/l	<0.005	* 0.014	* 0.050	* 0.046	* 0.063	* 0.174	
Ba mg/l	<0.03	<0.10	<0.10	<0.10	<0.10	<0.10	
B mg/l	<0.01	* <0.01	* 0.26	* 0.18	* 0.28	* 0.11	
Cd mg/l	<0.002	<0.01	<0.01	<0.01	<0.01	<0.01	
Cr mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Cu mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
F mg/l	0.30	* 0.36	* 0.40	* 0.36	* 0.24	* 0.27	
Fe mg/l	<0.01	0.10	<0.05	0.08	0.32	0.21	
Pb mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Mn mg/l	0.01	<0.05	<0.05	<0.05	0.07	0.08	
Hg mg/l	<0.0005	* <0.0005	* <0.0005	* <0.0002	* <0.0002	* <0.0002	
Mo mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Ni mg/l	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	
NO_2/NO_3 "	0.30	* 0.34	* 0.29	* 0.14	* <0.05	* <0.05	
Se mg/l	<0.005	* 0.009	* 0.026	* 0.014	* <0.001	* 0.002	
V mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Zn mg/l	<0.005	0.02	<0.01	<0.01	<0.01	<0.01	
Ra^{226} pci/l	326 ± 10	* 275 ± 9	* 338 ± 10	* 238 ± 8	* 278 ± 9	* 362 ± 9.4	
T[illegible]0 pci/l	14.1 ± 1.8	* 10.8 ± 1.9	* 0.9 ± 1	* 21.8 ± 2.8	* 24.1 ± 2.9	*	
Gross A "	NA	NA	NA	NA	NA	*	
Gross B "	NA	NA	NA	NA	NA	NA	

* ANALYZED BY OUTSIDE LABORATORY

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MI-10

	INITIAL	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	
DATE SMPLD	1-8-82	2-1-82	3-2-82	3-29-82	4-26-82	5-24-82	
ANALYSIS DATES	1-12-82 ↓ 2-16-82 *	2-2-82 ↓ 3-30-82	3-3-82 ↓ 4-16-82	3-30-82 ↓ 5-28-82	4-27-82 ↓ 5-28-82	5-25-82 ↓	
HCO_3^- mg/l	236	238.9	239.9	244.2	246.9	247.4	
$CO_3^=$ mg/l	-0-	-0-	-0-	-0-	-0-	-0-	
Cl mg/l	6	7.9	7.2	8.5	8.3	8.4	
$SO_4^=$ mg/l	82	76.1	79	85	85.1	86	
Anion eq.	5.74	5.72	5.78	6.01	6.05	6.08	
Ca^{++} mg/l	44	46.2	46.2	46.2	47.3	44.0	
Mg^{++} mg/l	10	11.0	11.0	10.9	11.2	10.6	
Na^+ mg/l	61	60	59.3	57.3	58.4	60.1	
K^+ mg/l	5	6.0	6.7	6.6	6.0	7.6	
Cation eq.	5.80	5.99	5.98	5.88	5.99	5.89	
-/+balance	98.97	95.58	96.74	102.30	101.06	103.28	
Sum TDS	444	446	449	459	463	464	
Cond μm/cm	490	555	566	572	579	576	
TDS mg/l	324	330	570	282	372	296	
pH unit	7.32	6.9	6.94	7.14	7.07	7.99	
U mg/l	0.015	0.51	0.48	0.41	0.35	0.28	
A[illegible] mg/l	193	195.8	196.6	200.2	202.4	202.8	
A[illegible] mg/l	<0.05	<0.10	0.25	<0.10	<0.10	<0.05	
[illegible]$_4^+$ mg/l	<0.05	* <0.05	* <0.05	* <0.05	* <0.05	* 0.33	
As mg/l	<0.005	* 0.014	* 0.045	* 0.054	* 0.034	* 0.108	
Ba mg/l	<0.03	<0.10	<0.10	<0.10	<0.10	<0.10	
B mg/l	<0.01	* <0.01	* 0.21	* 0.18	* 0.22	* 0.16	
Cd mg/l	<0.002	<0.01	<0.01	<0.01	<0.01	<0.01	
Cr mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Cu mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
F mg/l	0.30	* 0.36	* 0.36	* 0.33	* 0.33	* 0.27	
Fe mg/l	<0.01	0.22	0.30	0.40	0.36	<0.05	
Pb mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Mn mg/l	0.01	0.05	0.09	0.10	0.10	0.11	
Hg mg/l	<0.0005	* <0.0005	* <0.0005	* <0.0002	* <0.0002	* <0.0002	
Mo mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Ni mg/l	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	
NO_2/NO_3 "	0.10	* 0.11	* 0.21	* <0.05	* <0.05	* <0.05	
Se mg/l	<0.005	* 0.006	* 0.014	* 0.006	* <0.001	* <0.0001	
V mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Zn mg/l	<0.005	<0.01	<0.01	<0.01	<0.01	<0.01	
Ra^{226} pci/l	199 ± 8	* 223 ± 8	* 376 ± 10	* 419 ± 11	* 394 ± 11	* 321 ± 8.8	
T[illegible]0 pci/l	4.3 ± 1.0	* 1.8 ± 0.8	* 2.8 ± 1.2	* 12.6 ± 2.2	* 10.8 ± 1.9	*	
Gross A "	NA	NA	NA	NA	NA	NA	
Gross B "	NA	NA	NA	NA	NA	NA	

* ANALYZED BY OUTSIDE LABORATORY

20628

0400 8728 110E

UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MR-1

DATE SMPLD	INITIAL 1-8-82	MONTH 1 2-1-82	MONTH 2 3-2-82	MONTH 3 3-29-82	MONTH 4 4-26-82	MONTH 5 5-24-82	
ANALYSIS DATES	1-12-82 ↓ 2-16-82 *	2-2-82 ↓ 3-30-82	3-3-82 ↓ 4-16-82	3-30-82 ↓ 5-28-82	4-27-82 ↓ 5-28-82	5-25-82 ↓	
HCO_3^- mg/l	244	236.7	239.1	246.4	263.3	257.9	
$CO_3^=$ mg/l	-0-	-0-	-0-	-0-	-0-	-0-	
Cl^- mg/l	7	7.1	8.5	7.7	7.8	7.8	
$SO_4^=$ mg/l	82	87.8	93	96	95.6	101	
Anion eq.	5.91	5.91	6.10	6.26	6.53	6.55	
Ca^{++} mg/l	40	44.0	47.3	46.2	49.5	47.3	
Mg^{++} mg/l	11	10.7	10.6	10.3	11.4	11.2	
Na^+ mg/l	64	61	64.9	62.4	63.8	65.1	
K^+ mg/l	5	6.1	6.7	6.8	6.7	6.8	
Cation eq.	5.81	5.90	6.24	6.06	6.37	6.30	
-/+balance	101.72	100.16	97.68	103.32	102.47	103.95	
Sum TDS	453	453	470	476	498	497	
Cond um/cm	500	577	589	600	626	618	
TDS mg/l	339	340	570	328	392	342	
pH unit	7.02	7.0	6.78	6.79	7.09	7.39	
U mg/l	0.007	0.15	0.15	0.18	0.20	0.15	
A[illegible] mg/l	200	194.0	196.0	202.0	215.8	211.4	
Al mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.05	
[illegible]$_4^+$ mg/l	<0.05	* <0.05	* 0.24	* 0.24	* <0.05	* 0.36	
As mg/l	<0.005	* 0.020	* 0.025	* 0.034	* 0.008	* 0.025	
Ba mg/l	<0.03	0.10	<0.10	<0.10	<0.10	<0.10	
B mg/l	<0.01	* <0.01	* 0.23	* 0.12	* 0.42	* 0.16	
Cd mg/l	<0.002	<0.01	<0.01	<0.01	<0.01	<0.01	
Cr mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Cu mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
F mg/l	0.30	* 0.33	* 0.30	* 0.40	* 0.30	* 0.30	
Fe mg/l	<0.01	0.77	1.13	1.54	2.05	0.70	
Pb mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Mn mg/l	0.02	0.06	0.10	0.09	0.10	0.11	
Hg mg/l	<0.0005	*<0.0005	*<0.0005	*<0.0002	*<0.0002	*<0.0002	
Mo mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Ni mg/l	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	
NO_2/NO_3 "	0.10	* <0.05	* <0.05	* <0.05	* <0.05	* <0.05	
Se mg/l	<0.005	* 0.018	* <0.001	* 0.004	* 0.006	* 0.003	
V mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Zn mg/l	<0.005	<0.01	<0.01	<0.01	<0.01	<0.01	
Ra^{226} pci/l	391 ± 11	*462 ± 12	* 564 ± 12	* 453 ± 11	* 491 ± 12	*641 ± 12.5	
T[illegible]0 pci/l	8.0 ± 1.4	* 7.4 ± 1.6	* 3.6 ± 1.4	* 24.3 ± 3.0	* 20.4 ± 2.8	*	
Gross A "	NA	NA	NA	NA	NA	NA	
Gross B "	NA	NA	NA	NA	NA	NA	

* ANALYZED BY OUTSIDE LABORATORY

20628

04008728110E

UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MR-3

DATE SMPLD / ANALYSIS DATES	INITIAL	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	
DATE SMPLD	1-8-82	2-1-82	3-2-82	3-29-82	4-26-82	5-24-82	
ANALYSIS DATES	1-12-82 ↓ 2-16-82*	2-2-82 ↓ 3-30-82	3-3-82 ↓ 4-16-82	3-30-82 ↓ 5-28-82	4-27-82 ↓ 5-28-82	5-25-82 ↓	

HCO_3^- mg/l	268	260.8	254.2	263.5	269.6	260.6	
$CO_3^=$ mg/l	-0-	-0-	-0-	-0-	-0-	-0-	
Cl^- mg/l	8	8.1	8.2	8.6	9.6	9.1	
$SO_4^=$ mg/l	82	84.9	88	87	85.1	86	
Anion eq.	6.34	6.27	6.23	6.37	6.46	6.32	
Ca^{++} mg/l	42	41.0	44.0	44.0	46.2	42.9	
Mg^{++} mg/l	10	10.1	9.9	9.6	10.1	9.8	
Na^+ mg/l	74	70	71.8	68.5	69.7	69.3	
K^+ mg/l	6	7.3	8.0	8.1	7.7	8.0	
Cation eq.	6.29	6.27	6.35	6.19	6.38	6.18	
-/+balance	100.95	100.00	98.11	103.05	101.31	102.28	
Sum TDS	490	485	484	489	498	486	
Cond um/cm	540	607	614	603	621	604	
TDS mg/l	358	362	526	332	386	334	
pH unit	7.12	7.0	6.98	7.18	7.46	7.96	
U mg/l	0.002	0.13	0.10	0.11	0.08	0.05	
A[illegible] mg/l	220	213.8	208.4	216.0	221.0	213.6	
[illegible] mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.05	
[illegible]$_4^+$ mg/l	<0.05	* <0.05	* <0.05	* <0.05	* <0.05	* 0.22	
As mg/l	<0.005	* 0.020	* 0.019	* 0.030	* 0.012	* 0.025	
Ba mg/l	<0.03	<0.10	<0.10	<0.10	<0.10	<0.10	
B mg/l	<0.01	* <0.01	* 0.22	* 0.12	* 0.24	* 0.17	
Cd mg/l	<0.002	<0.01	<0.01	<0.01	<0.01	<0.01	
Cr mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Cu mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
F mg/l	0.33	* 0.33	* 0.30	* 0.30	* 0.27	* 0.24	
Fe mg/l	<0.01	<0.05	<0.05	<0.05	0.08	<0.05	
Pb mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Mn mg/l	0.03	<0.05	<0.05	<0.05	0.08	0.06	
Hg mg/l	<0.0005	*<0.0005	*<0.0005	*<0.0002	*<0.0002	*<0.0002	
Mo mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Ni mg/l	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	
NO_2/NO_3 "	0.10	* 0.08	* 0.07	* <0.05	* <0.05	* <0.05	
Se mg/l	<0.005	* 0.026	*<0.001	* 0.026	* 0.010	* 0.005	
V mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Zn mg/l	<0.005	<0.01	<0.01	<0.01	<0.01	<0.01	
Ra^{226} pci/l	* 18.6 ± 2.4	* 17 ± 2	* 15.5 ± 2.1	* 16.3 ± 2.2	* 15.3 ± 2.2	* 18.5 ± 2.3	
[illegible]0 pci/l	9.2 ± 1.5	* 10.5 ± 1.9	* 3.5 ± 1.4	* 21.6 ± 2.8	* 17.2 ± 2.6	*	
Gross A "	NA	NA	NA	NA	NA	NA	
Gross B "	NA	NA	NA	NA	NA	NA	

* ANALYZED BY OUTSIDE LABORATORY

20628

04008728 110E

UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # MR-5

DATE SMPLD	INITIAL 1-8-82	MONTH 1 2-1-82	MONTH 2 3-2-82	MONTH 3 3-29-82	MONTH 4 4-26-82	MONTH 5 5-24-82	
ANALYSIS DATES	1-12-82 ↓ 2-16-82 *	2-2-82 ↓ 3-30-82	3-3-82 ↓ 4-16-82	3-30-82 ↓ 5-28-82	4-27-82 ↓ 5-28-82	5-25-82 ↓	
HCO_3^- mg/l	268	263.8	264.7	266.7	267.2	274.7	
$CO_3^=$ mg/l	-0-	-0-	-0-	-0-	-0-	-0-	
Cl^- mg/l	9	10.1	10.9	10.3	10.4	10.0	
$SO_4^=$ mg/l	82	90.7	94	95	93.7	93	
Anion eq.	6.36	6.50	6.61	6.64	6.63	6.72	
Ca^{++} mg/l	43	47.3	47.3	48.4	49.5	47.3	
Mg^{++} mg/l	10	11.4	10.7	10.9	11.0	11.0	
Na^+ mg/l	72	71	73.0	69.1	69.3	69.9	
K^+ mg/l	6	7.9	8.0	8.1	7.6	7.8	
Cation eq.	6.25	6.60	6.64	6.54	6.60	6.52	
-/+balance	101.76	98.40	99.54	101.55	100.40	103.10	
Sum TDS	490	502	509	509	509	514	
Cond um/cm	550	633	628	633	646	634	
TDS mg/l	364	374	530	350	402	356	
pH unit	7.02	7.0	6.83	7.26	7.50	7.65	
U mg/l	0.005	0.18	0.29	0.19	0.15	0.11	
A[illegible] mg/l	220	216.2	217.0	218.6	219.0	225.2	
Al mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.05	
[illegible]$_4^+$ mg/l	<0.05	*<0.05	*<0.05	*<0.05	*<0.05	*0.27	
As mg/l	<0.005	*0.022	*0.078	*0.150	*0.059	*0.108	
Ba mg/l	<0.03	<0.10	<0.10	<0.10	<0.10	<0.10	
B mg/l	<0.01	*<0.01	*0.19	*0.11	*0.18	*0.08	
Cd mg/l	<0.002	<0.01	<0.01	<0.01	<0.01	<0.01	
Cr mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Cu mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
F mg/l	0.27	*0.33	*0.27	*0.27	*0.27	*0.27	
Fe mg/l	<0.01	<0.05	<0.05	0.32	0.34	0.09	
Pb mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Mn mg/l	0.02	0.06	0.08	0.09	0.10	0.09	
Hg mg/l	<0.0005	*<0.0005	*<0.0005	*<0.0002	*<0.0002	*<0.0002	
Mo mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Ni mg/l	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	
NO_2/NO_3 "	<0.05	*<0.05	*<0.05	*<0.05	*<0.05	*<0.05	
Se mg/l	<0.005	*0.014	*<0.001	*0.013	*<0.001	*0.005	
V mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Zn mg/l	<0.005	<0.01	<0.01	<0.01	<0.001	<0.01	
Ra^{226} pci/l	215 ± 8	*174. ± 7	*164 ± 7	*169 ± 6.9	*171 ± 7	*192 ± 7.4	
T[illegible] pci/l	5.5 ± 1.1	*2.5 ± 1.0	*0.8 ± 0.8	*16.9 ± 2.6	*12.4 ± 2.2	*	
Gross A "	NA	NA	NA	NA	NA	NA	
Gross B "	NA	NA	NA	NA	NA	NA	

* ANALYZED BY OUTSIDE LABORATORY

20628

0400872811OE

UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # 301

	INITIAL	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	
DATE SMPLD	1-8-82	2-1-82	3-2-82	3-29-82	4-26-82	5-24-82	
ANALYSIS DATES	1-12-82 ↓ 2-16-82 *	2-2-82 ↓ 3-30-82	3-3-82 ↓ 4-16-82	3-30-82 ↓ 5-28-82	4-27-82 ↓ 5-28-82	5-25-82 ↓	
HCO_3^- mg/l	211	207.6	211.8	210.3	217.2	218.9	
$CO_3^=$ mg/l	-0-	-0-	-0-	-0-	-0-	-0-	
Cl mg/l	6	7.8	8.3	8.2	8.3	8.2	
$SO_4^=$ mg/l	84	85.9	96	97	92.7	98	
Anion eq.	5.38	5.41	5.71	5.70	5.73	5.86	
Ca^{++} mg/l	45	39	44.0	41.0	45.1	44	
Mg^{++} mg/l	6	10.3	10.5	10.6	10.5	11.0	
Na^+ mg/l	57	58	57.1	55.4	54.6	56.9	
K^+ mg/l	5	6.2	6.4	6.4	5.9	6.3	
Cation eq.	5.35	5.49	5.72	5.66	5.66	5.75	
-/+balance	100.56	98.61	99.73	100.77	101.25	101.90	
Sum TDS	414	415	434	432	434	443	
Cond um/cm	470	541	553	558	654	561	
TDS mg/l	311	320	456	302	348	316	
pH unit	7.45	7.0	6.87	7.33	7.43	7.59	
U mg/l	0.008	0.34	0.33	0.30	0.38	0.30	
[illegible] mg/l	173	170.2	173.6	172.4	178.0	179.4	
Al mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.05	
NH_4^+ mg/l	<0.05	* 0.20	*<0.05	* <0.05	* <0.05	* 0.20	
As mg/l	<0.005	* 0.031	* 0.052	* 0.284	* 0.095	* 0.150	
Ba mg/l	<0.03	<0.10	<0.10	<0.10	<0.10	<0.10	
B mg/l	<0.01	*<0.01	* 0.24	* 0.30	* 0.23	* 0.07	
Cd mg/l	<0.002	<0.01	<0.01	<0.01	<0.01	<0.01	
Cr mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Cu mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
F mg/l	0.30	* 0.27	* 0.36	* 0.36	* 0.30	* 0.30	
Fe mg/l	<0.01	0.79	1.25	0.99	1.19	0.56	
Pb mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Mn mg/l	0.02	0.05	0.06	0.06	0.08	0.08	
Hg mg/l	<0.0005	*<0.0005	*<0.0005	*<0.0002	*<0.0002	*<0.0002	
Mo mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Ni mg/l	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	
NO_2/NO_3 "	0.10	*<0.05	*<0.05	* <0.05	* <0.05	* <0.05	
Se mg/l	<0.005	*<0.001	*<0.001	* <0.001	*<0.001	*<0.001	
V mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Zn mg/l	<0.005	<0.01	<0.01	<0.01	<0.01	<0.010	
Ra^{226} pci/l	709 ± 15	* 786 ± 15	* 787 ± 15	* 836 ± 15	* 631 ± 14	* 824 ± 15.2	
Th^{230} pci/l	5.5 ± 1.1	* 6.3 ± 1.5	* 23 ± 3	* 16.2 ± 2.5	* 16.7 ± 2.6	*	
Gross A "	NA	NA	NA	NA	NA	NA	
Gross B "	NA	NA	NA	NA	NA	NA	

* ANALYZED BY OUTSIDE LABORATORY

20628

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # 306

	INITIAL	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	
DATE SMPLD	1-8-82	2-1-82	3-2-82	3-29-82	4-26-82	5-24-82	
ANALYSIS DATES	1-12-82 ↓ 2-16-82*	2-2-82 ↓ 3-30-82	3-3-82 ↓ 4-16-82	3-30-82 ↓ 5-28-82	4-27-82 ↓ 5-28-82	5-25-82 ↓	
HCO_3^- mg/l	281	322.8	317.2	317.7	303.5	309.4	
$CO_3^=$ mg/l	-0-	9.1	9.4	7.9	11.5	8.6	
Cl mg/l	8	8.5	8.0	9.3	8.5	8.0	
$SO_4^=$ mg/l	135	124.9	128	129	121.8	124	
Anion eq.	7.50	8.44	8.41	8.42	8.14	8.17	
Ca^{++} mg/l	85	90	100.1	99.0	95.7	92.4	
Mg^{++} mg/l	20	24.2	23.0	22.8	23.3	22.4	
Na^+ mg/l	32	33	31.5	32.6	32.3	32.1	
K^+ mg/l	7	8.7	8.8	8.7	8.7	8.5	
Cation eq.	7.45	8.17	8.52	8.49	8.35	8.10	
-/+balance	100.67	103.21	98.69	99.19	97.39	100.83	
Sum TDS	568	621	626	629	605	605	
Cond um/cm	600	763	752	744	730	728	
TDS mg/l	428	476	570	432	458	424	
pH unit	7.84	8.2	8.21	8.19	8.32	8.23	
U mg/l	0.093	1.64	1.51	1.56	1.36	1.30	
[illegible] mg/l	230	279.8	275.6	273.6	268.0	268.0	
Al mg/l	<0.05	0.10	0.28	0.20	0.10	<0.05	
NH_4^+ mg/l	<0.05	*<0.05	*<0.05	*<0.05	*<0.05	*0.20	
As mg/l	<0.005	*0.009	*0.014	*0.036	*0.012	*0.021	
Ba mg/l	<0.03	<0.10	<0.10	<0.10	<0.10	<0.10	
B mg/l	<0.01	*<0.01	*0.24	*0.12	*0.10	*0.08	
Cd mg/l	<0.002	<0.01	<0.01	<0.01	<0.01	<0.01	
Cr mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Cu mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
F mg/l	0.57	*0.57	*0.51	*0.65	*0.45	*0.51	
Fe mg/l	<0.01	0.44	0.19	0.42	0.53	<0.05	
Pb mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Mn mg/l	<0.01	0.06	0.08	0.08	0.09	0.06	
Hg mg/l	<0.0005	*<0.0005	*<0.0005	*<0.0002	*<0.0002	*<0.0002	
Mo mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Ni mg/l	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	
NO_2/NO_3 "	<0.05	*<0.05	*<0.05	*<0.05	*<0.05	*<0.05	
Se mg/l	<0.005	*<0.001	*0.009	*<0.001	*<0.001	*<0.001	
V mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Zn mg/l	<0.005	<0.01	<0.01	<0.01	<0.01	<0.01	
Ra^{226} pci/l	1229±20	*1175±18	*1203±18	*1267±19	*1164±19	*926±16.2	
Th^{230} pci/l	6.7±1.3	*8.1±1.7	*5.4±1.6	*14.4±2.4	*16.2±2.6	*	
Gross A "	NA	NA	NA	NA	NA	NA	
Gross B "	NA	NA	NA	NA	NA	NA	

* ANALYZED BY OUTSIDE LABORATORY

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UNC TETON EXPLORATION DRILLING, INC.

ANALYTICAL WELL HISTORY

WELL # 308

	INITIAL	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	
DATE SMPLD	1-8-82	2-1-82	3-2-82	3-29-82	4-26-82	5-24-82	
ANALYSIS DATES	1-12-82 ↓ 2-16-82	2-2-82 ↓ 3-30-82	3-3-82 ↓ 4-16-82	3-30-82 ↓ 5-28-82	4-27-82 ↓ 5-28-82	5-25-82 ↓	
HCO_3^- mg/l	211	207.4	209.1	211.8	212.0	216.9	
$CO_3^=$ mg/l	-0-	11.5	7.0	9.8	6.7	7.2	
Cl mg/l	ND	1.5	1.8	1.8	2.5	2.0	
$SO_4^=$ mg/l	280	298.5	323	319	312.5	311	
Anion eq.	9.28	10.04	10.44	10.50	10.28	10.33	
Ca^{++} mg/l	123	128	128.7	129.8	129.8	129.8	
Mg^{++} mg/l	20	27.8	26.4	27.4	27.2	27.5	
Na^+ mg/l	32	33	32.1	33.6	32.1	33.4	
K^+ mg/l	9	10.8	10.6	10.5	10.3	10.2	
Cation eq.	9.40	10.43	10.30	10.50	10.42	10.50	
-/+balance	98.72	96.32	101.35	99.92	98.69	98.44	
Sum TDS	675	719	739	744	733	738	
Cond um/cm	750	931	921	933	917	917	
TDS mg/l	569	656	760	608	664	624	
pH unit	7.88	8.3	8.16	8.17	8.26	8.22	
U mg/l	0.004	1.69	0.12	0.33	0.09	0.04	
[illegible] mg/l	173	189.2	183.0	190.0	185.0	189.8	
Al mg/l	<0.05	0.10	2.10	0.85	0.44	<0.05	
NH_4 mg/l	<0.05	*<0.05	*<0.05	* <0.05	* <0.05	*<0.05	
As mg/l	<0.0005	*0.002	*<0.005	* 0.014	*0.003	*0.007	
Ba mg/l	< 0.03	<0.10	<0.10	<0.10	<0.10	<0.10	
B mg/l	<0.01	*<0.01	* 0.22	* 0.10	* 0.25	* 0.13	
Cd mg/l	<0.002	<0.01	<0.01	<0.01	<0.01	<0.01	
Cr mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Cu mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
F mg/l	0.65	*0.74	* 0.65	* 0.65	* 0.65	* 0.65	
Fe mg/l	<0.01	0.33	2.39	1.73	0.24	<0.05	
Pb mg/l	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
Mn mg/l	0.02	0.06	0.10	0.10	0.09	0.06	
Hg mg/l	<0.0005	*<0.0005	*<0.0005	*<0.0002	*<0.0002	*<0.0002	
Mo mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Ni mg/l	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	
NO_2/NO_3 "	<0.05	*<0.05	* 0.06	* <0.05	* <0.05	* 0.20	
Se mg/l	<0.005	*<0.001	* 0.006	* <0.001	*<0.001	*<0.001	
V mg/l	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	
Zn mg/l	<0.005	<0.01	0.068	0.01	<0.01	<0.01	
Ra 226 pci/l	13.1±2.1	* 9.5±1.7	* 52±4	*32±2.9	* 11.7±1.9	*33.6±3.1	
Th 230 pci/l	2.5±0.8	* 7.2±1.6	* 9.5±0.6	*17.1±2.6	* 14.3±2.4	*	
Gross A "	NA	NA	NA	NA	NA	NA	
Gross B "	NA	NA	NA	NA	NA	NA	

* ANALYZED BY OUTSIDE LABORATORY

20628

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WAMCO LAB

P.O. BOX 3632 • CASPER, WYOMING 82602

ANALYSIS REPORT

COMPANY: TETON EXPLORATION DRILLING, INC. DATE: February 16, 1982

WAMCO NO.	SAMPLE DESCRIPTION						Mg/L
2981	Water	6	7	8	9	10	Detection
	Analysis reported in Milligrams Per Liter except where noted:						Limit
	Total Dissolved Solids *	569	532	498	339	358	
	Sodium (Na)	31	38	37	64	74	
	Potassium (K)	8	9	8	5	6	
	Calcium (Ca)	112	96	93	40	42	
	Magnesium (Mg)	26	23	21	11	10	
	Sulfate (SO_4)	270	254	245	82	82	
	Chloride (Cl)	5	2	0	7	8	
	Carbonate (CO_3)	0	0	0	0	0	
	Bicarbonate (HCO_3)	224	203	187	244	268	
	Hydroxide (OH)						
	pH, Units	7.79	8.13	7.67	7.02	7.12	
	Conductivity, Micromhos/cm @25°C.	730	700	680	500	540	
	Total Milliequiv. Major Cations	9.28	8.56	8.18	5.81	6.29	
	Total Milliequiv. Major Anions	9.42	8.67	8.16	5.91	6.34	
	Absolute Value, Charged Bal.	0.75	-.64	0.12	-.85	-.40	
	Ammonia (NH_3 as N)	LT.05	LT.05	LT.05	LT.05	LT.05	
	Nitrate (NO_3 as N)	0.5	LT.05	LT.05	0.1	0.1	0.05
	Nitrite (NO_2 as N)	LT.001	LT.001	LT.001	LT.001	LT.001	0.001
	Floride (F)	0.74	0.40	0.51	0.30	0.33	0.1
	Total Alkalinity as $CaCO_3$	183	167	153	200	220	
	Total Hardness as $CaCO_3$	387	334	319	145	146	
	Boron (B)	LT.01	LT.01	LT.01	LT.01	LT.01	0.01

REMARKS: *Determined by evaporation @ 180° C

6. 570
7. 574
8. 317
9. MR-1
10. MR-3

*Samples received on 1/12/82

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WAMCO LAB

P.O. BOX 3632 • CASPER, WYOMING 82602

ANALYSIS REPORT

COMPANY: TETON EXPLORATION DRILLING, INC. DATE: February 16, 1982

WAMCO NO.	SAMPLE DESCRIPTION	510	574	317			Mg/l
2981	Water	6	7	8	9	10	Detection
	Analysis in Milligrams per Liter except where noted:						Limit
	Aluminum (Al)	LT.10	LT.10	LT.10	LT.10	LT.10	0.10
	Arsenic (As)	LT.001	LT.001	LT.001	LT.001	LT.001	0.001
	Barium (Ba)	LT.10	LT.10	LT.10	LT.10	LT.10	0.10
	Cadmium (Cd)	LT.002	LT.002	LT.002	LT.002	LT.002	0.002
	Chromium (Cr)	LT.01	LT.01	LT.01	LT.01	LT.01	0.01
	Copper (Cu)	LT.01	LT.01	LT.01	LT.01	LT.01	0.01
	Iron (Fe)	LT.01	LT.01	LT.01	LT.01	LT.01	0.01
	Lead (Pb)	LT.01	LT.01	LT.01	LT.01	LT.01	0.05
	Manganese (Mn)	0.01	0.05	0.07	0.02	0.03	0.01
	Mercury (Hg)	LT.0002	LT.0002	LT.0002	LT.0002	LT.0002	0.0002
	Nickel (Ni)	LT.02	LT.02	LT.02	LT.02	LT.02	0.02
	Selenium (Se)	LT.001	LT.001	LT.001	LT.001	LT.001	0.001
	Zinc (Zn)	LT.005	LT.005	LT.005	LT.005	LT.005	0.005
	Molybdenum (Mo)	LT.10	LT.10	LT.10	LT.10	LT.10	0.10
	Uranium (U_3O_8) PPB	2	28	44	7	2	1 PPB
	Vanadium (V_2O_5)	LT.10	LT.10	LT.10	LT.10	LT.10	0.10
	Radium (Ra-226) piC/l ± Prec.	2.8 ±	46 ±	738 ±	391 ±	18.6 ±	0.2 piC/l
		.9	4	15	11	2.4	
	Thorium-230	12.3 ±	17.2 ±	9.2 ±	8.0 ±	9.2 ±	
		1.7	2.0	1.5	1.4	1.5	

REMARKS: Analysis performed according to EPA Manual, 1979 and/or Standard Methods for Examination of Water and Wastewater, 14th Edition.

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WAMCO LAB

P.O. BOX 3632 • CASPER, WYOMING 82602

ANALYSIS REPORT

COMPANY: TETON EXPLORATION DRILLING, INC. DATE: February 16, 1982

WAMCO NO.	SAMPLE DESCRIPTION						Mg/L
2981	Water	11	12	13	14	15	Detection
	Analysis reported in Milligrams Per Liter except where noted:						Limit
	Total Dissolved Solids *	364	119	328	324	311	
	Sodium (Na)	72	25	59	61	57	
	Potassium (K)	6	2	5	5	5	
	Calcium (Ca)	43	15	54	44	45	
	Magnesium (Mg)	10	3	4	10	6	
	Sulfate (SO_4)	82	28	77	82	84	
	Chloride (Cl)	9	0	8	6	6	
	Carbonate (CO_3)	0	0	0	0	0	
	Bicarbonate (HCO_3)	268	93	240	236	211	
	Hydroxide (OH)						
	pH, Units	7.02	7.44	7.17	7.32	7.45	
	Conductivity, Micromhos/cm @25°C.	550	240	500	490	470	
	Total Milliequiv. Major Cations	6.25	2.14	5.72	5.80	5.35	
	Total Milliequiv. Major Anions	6.36	2.11	5.76	5.74	5.38	
	Absolute Value, Charged Bal.	-.87	0.71	-.35	0.52	-.28	
	Ammonia (NH_3 as N)	LT.05	LT.05	LT.05	LT.05	LT.05	
	Nitrate (NO_3 as N)	LT.05	LT.05	0.3	0.1	0.1	0.05
	Nitrite (NO_2 as N)	LT.001	LT.001	LT.001	LT.001	LT.001	0.001
	Floride (F)	0.27	0.27	0.30	0.30	0.30	0.1
	Total Alkalinity as $CaCO_3$	220	77	197	193	173	
	Total Hardness as $CaCO_3$	149	50	151	151	137	
	Boron (B)	LT.01	LT.01	LT.01	LT.01	LT.001	0.01

REMARKS: *Determined by evaporation @ 180° C

11. MR-5
12. MI-1
13. MI-6
14. MI-10
15. 301

* Samples received on 1/12/82

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WAMCO LAB

P.O. BOX 3632 • CASPER, WYOMING 82602

ANALYSIS REPORT

COMPANY: TETON EXPLORATION DRILLING, INC. DATE: February 16, 1982

WAMCO NO.	SAMPLE DESCRIPTION						Mg/1
2981	Water	11	12	13	14	15	Detection
	Analysis in Milligrams per Liter except where noted:						Limit
	Aluminum (Al)	LT.10	LT.10	LT.10	LT.10	LT.10	0.10
	Arsenic (As)	LT.001	LT.001	LT.001	LT.001	LT.001	0.001
	Barium (Ba)	LT.10	LT.10	LT.10	LT.10	LT.10	0.10
	Cadmium (Cd)	LT.002	LT.002	LT.002	LT.002	LT.002	0.002
	Chromium (Cr)	LT.01	LT.01	LT.01	LT.01	LT.01	0.01
	Copper (Cu)	LT.01	LT.01	LT.01	LT.01	LT.01	0.01
	Iron (Fe)	LT.01	LT.01	LT.01	LT.01	LT.01	0.01
	Lead (Pb)	LT.01	LT.01	LT.01	LT.01	LT.01	0.05
	Manganese (Mn)	0.02	0.01	0.01	0.01	0.02	0.01
	Mercury (Hg)	LT.0002	LT.0002	LT.0002	LT.0002	LT.0002	0.0002
	Nickel (Ni)	LT.02	LT.02	LT.02	LT.02	LT.02	0.02
	Selenium (Se)	LT.005	LT.001	LT.001	LT.001	LT.001	0.001
	Zinc (Zn)	LT.005	LT.005	LT.005	LT.005	LT.005	0.005
	Molybdenum (Mo)	LT.10	LT.10	LT.10	LT.10	LT.10	0.10
	Uranium (U_3O_8) PPB	5	7	36	15	8	1 PPB
	Vanadium (V_2O_5)	LT.10	LT.10	LT.10	LT.10	LT.10	0.10
	Radium (Ra-226) piC/l ± Prec.	215 ±	75 ±	326 ±	199 ±	709 ±	0.2 piC/l
		8	5	10	8	15	
	Thorium-230 pCi/l	5.5 ±	2.5 ±	14.1 ±	4.3 ±	5.5 ±	
		1.1	0.8	1.8	1.0	1.1	

REMARKS: Analysis performed according to EPA Manual, 1979 and/or Standard Methods for Examination of Water and Wastewater, 14th Edition.

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WAMCO LAB

P.O. BOX 3632 • CASPER, WYOMING 82602

ANALYSIS REPORT

COMPANY: TETON EXPLORATION DRILLING, INC. DATE: February 16, 1982

WAMCO NO.	SAMPLE DESCRIPTION						Mg/L
2981	Water	16	17				Detection
	Analysis reported in Milligrams Per Liter except where noted:						Limit
	Total Dissolved Solids *	428	569				
	Sodium (Na)	32	32				
	Potassium (K)	7	9				
	Calcium (Ca)	85	123				
	Magnesium (Mg)	20	20				
	Sulfate (SO_4)	135	280				
	Chloride (Cl)	8	0				
	Carbonate (CO_3)	0	0				
	Bicarbonate (HCO_3)	281	211				
	Hydroxide (OH)						
	pH, Units	7.84	7.88				
	Conductivity, Micromhos/cm @25°C.	600	750				
	Total Milliequiv. Major Cations	7.45	9.40				
	Total Milliequiv. Major Anions	7.50	9.28				
	Absolute Value, Charged Bal.	-.33	0.64				
	Ammonia (NH_4 as N)	LT.05	LT.05				
	Nitrate (NO_3 as N)	LT.05	LT.05				0.05
	Nitrite (NO_2 as N)	LT.001	LT.001				0.001
	Floride (F)	0.57	0.65				0.1
	Total Alkalinity as $CaCO_3$	230	173				
	Total Hardness as $CaCO_3$	294	389				
	Boron (B)	LT.01	LT.01				0.01

REMARKS: *Determined by evaporation @ 180° C

16. 306

17. 308

* Samples received on 1/12/82

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WAMCO LAB

P.O. BOX 3632 • CASPER, WYOMING 82602

ANALYSIS REPORT

COMPANY: TETON EXPLORATION DRILLING, INC.

DATE: February 16, 1982

WAMCO NO.	SAMPLE DESCRIPTION						Mg/l
2981	Water	16	17				Detection Limit
	Analysis in Milligrams per Liter except where noted:						
	Aluminum (Al)	LT.10	LT.10				0.10
	Arsenic (As)	LT.001	LT.001				0.001
	Barium (Ba)	LT.10	LT.10				0.10
	Cadmium (Cd)	LT.002	LT.002				0.002
	Chromium (Cr)	LT.01	LT.01				0.01
	Copper (Cu)	LT.01	LT.01				0.01
	Iron (Fe)	LT.01	LT.01				0.01
	Lead (Pb)	LT.01	LT.01				0.05
	Manganese (Mn)	LT.01	0.02				0.01
	Mercury (Hg)	LT.0002	LT.0002				0.0002
	Nickel (Ni)	LT.02	LT.02				0.02
	Selenium (Se)	LT.001	LT.001				0.001
	Zinc (Zn)	LT.005	LT.005				0.005
	Molybdenum (Mo)	LT.10	LT.10				0.10
	Uranium (U_3O_8) PPB	93	4				1 PPB
	Vanadium (V_2O_5)	LT.10	LT.10				0.10
	Radium (Ra-226) piC/l ± Prec.	1229 ±	13.1 ±				0.2 piC/l
		20	2.1				
	Thorium-230 pCi/l	6.7 ±	2.5 ±				
		1.3	0.8				

REMARKS: Analysis performed according to EPA Manual, 1979 and/or Standard Methods for Examination of Water and Wastewater, 14th Edition.

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WAMCO LAB

P. O. Box 2953 - Casper, WY 82602

ANALYSIS REPORT

COMPANY: Teton Exploration Drilling Co. DATE: March 30, 1982

Sample type Water W. O. No. 3026

Analysis in Milligrams per Liter except where Noted

Sample No.	1	2	3	4	5
Ammonia (NH3 as N)	0.20	<.05	<.05	<.05	<.05
Nitrate (NO3 as N)	<.05	<.05	<.05	<.05	0.34
Nitrite (NO2 as N)	<.001	<.001	<.001	<.001	<.001
Floride (F)	0.27	0.57	0.74	0.36	0.36
Arsenic (As)	0.031	0.009	0.002	0.030	0.014
Barium (Ba)	<.10	<.10	<.10	<.10	<.10
Mercury (Hg)	<.0002	<.0002	<.0002	<.0002	<.0002
Selenium (Se)	<.001	<.001	<.001	<.001	0.009
Radium-226 pCi/L +- Prec	786+-15	1175+-18	9.5+-1.7	72+-5	275+-9
Thorium-230 pCi/L +- Prec	6.3+-1.5	8.1+-1.7	7.2+-1.6	3.7+-1.0	10.8+-1.9
Sodium (Na)	58	33	33	30	61
Calcium (Ca)	39	90	128	20	44

Sample Description

3026-1	301	2-1-82
3026-2	306	2-1-82
3026-3	308	2-1-82
3026-4	MI-1	2-1-82
3026-5	MI-6	2-1-82

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D4008728110E WAMCO LAB

P. O. Box 2953 - Casper, WY 82602

ANALYSIS REPORT

COMPANY: Teton Exploration Drilling Co. DATE: March 30, 1982

Sample type Water W. O. No. 3026

Analysis in Milligrams per Liter except where Noted

Sample No.	6	7	8	9
Ammonia (NH3 as N)	<.05	<.05	<.05	<.05
Nitrate (NO3 as N)	0.11	<.05	0.08	<.05
Nitrite (NO2 as N)	<.001	<.001	<.001	<.001
Floride (F)	0.36	0.33	0.33	0.33
Arsenic (As)	0.014	0.020	0.020	0.022
Barium (Ba)	<.10	<.10	<.10	<.10
Mercury (Hg)	<.0002	<.0002	<.0002	<.0002
Selenium (Se)	0.006	0.018	0.026	0.014
Radium-226 pCi/L +- Prec	223+-8	462+-12	17+-2	174+-7
Thorium-230 pCi/L +- Prec	1.8+-0.8	7.4+-1.6	10.5+-1.9	2.5+-1.0
Sodium (Na)	60	61	70	71
Calcium (Ca)	49	43	51	47

Sample Description:

3026-6	MI-10	2-1-82
3026-7	MR-1	2-1-82
3026-8	MR-3	2-1-82
3026-9	MR-5	2-1-82

2628

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WAMCO LAB

P. O. Box 2923 - Casper, WY 82602

ANALYSIS REPORT

COMPANY: Teton Exploration Drilling Co. DATE: April 16, 1982

Sample type Water W. O. No. 3089

Analysis in Milligrams per Liter except where Noted

Sample No.	1	2	3	4	5
Ammonia (NH3 as N)	0.24	<.05	<.05	<.05	<.05
Nitrate (NO3 as N)	<.05	0.07	<.05	<.05	<.05
Nitrite (NO2 as N)	<.001	<.001	<.001	<.001	<.001
Floride (F)	0.30	0.30	0.27	0.36	0.51
Arsenic (As)	0.251	0.019	0.078	0.052	0.014
Boron (B)	0.23	0.22	0.19	0.24	0.24
Mercury (Hg)	<.0002	<.0002	<.0002	<.0002	<.0002
Selenium (Se)	<.001	<.001	<.001	<.001	0.009
Radium-226 pCi/L +- Prec	564+-12	15.5+-2.1	164+-7	787+-15	1203+-18
Thorium-230 pCi/L +- Prec	3.6+-1.4	3.5+-1.4	0.8+-.8	23+-3	5.4+-1.6

Sample Description

3089-1 MR-1
3089-2 MR-3
3089-3 MR-5
3089-4 301
3089-5 306

3-2-82

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WAMCO LAB

P. O. Box 2953 - Casper, WY 82602

ANALYSIS REPORT

COMPANY: Teton Exploration Drilling Co. DATE: April 16, 1981

Sample type Water W. O. No. 3089

Analysis in Milligrams per Liter except where Noted

Sample No.	6	7	8	9
Ammonia (NH3 as N)	<.05	<.05	<.05	<.05
Nitrate (NO3 as N)	0.06	0.33	0.29	0.21
Nitrite (NO2 as N)	<.001	<.001	<.001	<.001
Floride (F)	0.65	0.45	0.40	0.36
Arsenic (As)	<.001	0.044	0.050	0.045
Boron (B)	0.22	0.20	0.26	0.2[illegible]
Mercury (Hg)	<.0002	<.0002	<.0002	<.0002
Selenium (Se)	0.006	0.018	0.026	0.014
Radium-226 pCi/L +- Prec	52+-4	124+-6	332+-10	376+-10
Thorium-230 pCi/L +- Prec	95+-6	2.7+-1.2	0.9+-1	2.8+-1.2

Sample Description:

3089-6 308
3089-7 MI-1
3089-8 MI-6
3089-9 MI-10

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WAMCO LAB

P. O. Box 3632 - Casper, WY 82602

ANALYSIS REPORT

COMPANY: Teton Exploration Drilling DATE: May 28, 1982

Sample type Water W. O. No. 3165

Analysis in Milligrams per Liter except where Noted
Limits of Detection are Noted Following Less Than Mark (<)

Sample No.	1	2	3	4	5
Ammonia (NH3 as N)	<.05	<.05	<.05	0.24	<.05
Nitrate (NO3 as N)	<.05	<.05	<.05	<.05	<.05
Nitrite (NO2 as N)	<.001	<.001	0.005	<.001	<.001
Fluoride (F)	0.36	0.65	0.65	0.40	0.30
Boron (B)	0.30	0.12	0.10	0.12	0.12
Arsenic (As)	0.284	0.036	0.014	0.034	0.030
Mercury (Hg)	<.0002	<.0002	<.0002	<.0002	<.0002
Selenium (Se)	<.001	<.001	<.001	0.004	0.026
Uranium (as U) PPB	127	1230	63	142	41

Analysis in Picocuries per Liter except where Noted

Radium 226 +- Prec	838+-15	1267+-19	32+-2.9	453+-11	16.3+-2.2
Thorium 230 +- Prec	16.2+-2.5	14.4+-2.4	17.1+-2.6	24.3+-3.0	21.6+-2.8

Sample Description:

3165-1 301 3-29-82
3165-2 306 3-29-82
3165-3 308 3-29-82
3165-4 MR-1 3-29-82
3165-5 MR-3 3-29-82

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WAMCO LAB

P. O. Box 3632 - Casper, WY 82602

ANALYSIS REPORT

COMPANY: Teton Exploration Drilling DATE: May 28, 1982

Sample type Water W. O. No. 3165

Analysis in Milligrams per Liter except where Noted
Limits of Detection are Noted Following Less Than Mark (<)

Sample No.	6	7	8	9
Ammonia (NH_3 as N)	<.05	<.05	<.05	<.05
Nitrate (NO_3 as N)	<.05	<.05	0.14	<.05
Nitrite (NO_2 as N)	<.001	<.001	<.001	<.001
Fluoride (F)	0.27	0.30	0.36	0.33
Boron (B)	0.11	0.10	0.18	0.18
Arsenic (As)	0.150	0.056	0.046	0.054
Mercury (Hg)	<.0002	<.0002	<.0002	<.0002
Selenium (Se)	0.013	0.006	0.014	0.006
Uranium (U_3O_8) PPB	106	288	254	263

Analysis in Picocuries per Liter except where Noted

Radium 226 +- Prec	169+-6.9	117+-6	238+-8	419+-11
Thorium 230 +- Prec	16.9+-2.6	20.7+-2.8	21.8+-2.8	12.6+-2.2

Sample Description:

3165-6 MR-5 3-29-82
3165-7 MI-1 3-29-82
3165-8 MI-6 3-29-82
3165-9 MI-10 3-29-82

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WAMCO LAB

P. O. Box 2953 - Casper, WY 82602

ANALYSIS REPORT

COMPANY: Teton Exploration Drilling DATE: May 28, 1982

Sample type Water W. O. No. 3214

Analysis in Milligrams per Liter except where Noted
Limits of Detection are Noted Following Less Than Mark (<)

Sample No.	1	2	3	4	5
Ammonia (NH_3 as N)	<.05	<.05	<.05	<.05	<.05
Nitrate (NO_3 as N)	<.05	<.05	<.05	<.05	<.05
Nitrite (NO_2 as N)	<.001	<.001	<.001	<.001	<.001
Floride (F)	0.30	0.45	0.65	0.30	0.27
Boron (B)	0.23	0.10	0.25	0.42	0.24
Arsenic (As)	0.095	0.012	0.003	0.008	0.012
Mercury (Hg)	<.0002	<.0002	<.0002	<.0002	<.0002
Uranium (U_3O_8) PPB	240	1200	46	1550	105

Analysis in Picocuries per Liter except where Noted

	1	2	3	4	5
Radium 226 +- Prec	631+-14	1164+-19	11.7+-1.9	491+-12	15.3+-2.2
Thorium 230 +- Prec	16.7+-2.6	16.2+-2.6	14.3+-2.4	20.4+-2.8	17.2+-2.6

Sample Description:

3214-1 301, 4/26/82
3214-2 306, 4/26/82
3214-3 308, 4/26/82
3214-4 MR-1, 4/26/82
3214-5 MR-3, 4/26/82

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WAMCO LAB

P. O. Box 2953 - Casper, WY 82602

ANALYSIS REPORT

COMPANY: Teton Exploration Drilling DATE: May 28, 1982

Sample type Water W. O. No. 3214

Analysis in Milligrams per Liter except where Noted
Limits of Detection are Noted Following Less Than Mark (<)

Sample No.	6	7	8	9
Ammonia (NH3 as N)	<.05	<.05	<.05	<.05
Nitrate (NO3 as N)	<.05	<.05	<.05	<.05
Nitrite (NO2 as N)	<.001	<.001	<.001	<.001
Floride (F)	0.27	0.24	0.24	0.33
Boron (B)	0.18	0.23	0.28	0.22
Arsenic (As)	0.059	0.021	0.063	0.034
Mercury (Hg)	<.0002	<.0002	<.0002	<.0002
Selenium (Se)	<.001	<.001	<.001	<.001
Uranium (U3O8) PPB	185	360	780	340

Analysis in Picocuries per Liter except where Noted

Radium 226 +- Prec	171+-7	112+-6	278+-9	394+-11
Thorium 230 +- Prec	12.4+-2.2	13.3+-2.3	24.1+-2.9	10.8+-1.9

Sample Descriptions:

3214-6 MR-5, 4/26/82
3214-7 MI-1, 4/26/82
3214-8 MI-6, 4/26/82
3214-9 MI-10, 4/26/82

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WAMCO LAB

P.O. BOX 3632 • CASPER, WYOMING 82602

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ANALYSIS REPORT

COMPANY: Teton Expl. & Drilling DATE: 5-25-82

WAMCO NO.	SAMPLE DESCRIPTION	1	2	3	4	5	6
3259		✓	✓	✓	✓	✓	✓
	Flor. li	98	96	90	35	30	63
	NH3	0.22	0.22	0.32	0.36	0.22	0.37
	H2S	0.020	0.174	0.108	0.174	0.025	0.108
	B	0.13	0.11	0.16	0.16	0.17	0.08
	F	0.22	0.27	0.27	0.30	0.24	0.27
	Hg	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
	NO2 as N	<0.001	<0.001	<0.001	<0.001	<0.001	[illegible]
	NO3 as N	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Se	<.001	0.002	<.001	0.003	0.011	0.005
	Rad-226	117±5.3	36.2±9.4	321±8.8	641±12.5	19.5±2.3	190±7.4
	Thor-230						

REMARKS: 1 Well # MI-1
2 MI-6
3 MI-10
4 MR-1
5. MR-3
6. MR-5

5-24-82

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WAMCO LAB

P.O. BOX 3632 • CASPER, WYOMING 82602

ANALYSIS REPORT

COMPANY:

DATE:

WAMCO NO.	SAMPLE DESCRIPTION	7	8	9			
		✓					
	Flour U ppB	50	410	20			
	NH3	0.20	0.20	<0.05			
	As	0.150	0.031	0.007			
	B	0.07	0.08	0.13			
	F	0.30	0.51	0.45			
	Hg	<.0002	<.0002	<.0002			
	NO2 as N	<0.001	<0.001	<0.001			
	NO3 as N	<0.05	<0.05	0.20			
	Se	<.001	<.001	<.001			
	Rad-226	824 ± 15.2	921 ± 14.2	33.1 ± 3.1			
	Thor-230						

EMARKS: 7. Well # 301
8 ↓ 306 5-24-82
9 ↓ 308

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