UTAH POWER & LIGHT COMPANY
HYDROLOGIC MONITORING PROGRAM
ANNUAL REPORT FOR 1986

JUNE 1987

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DIVISION OF
OIL, GAS & MINING

Submitted to: United States Department of the Interior
Office of Surface Mining
Minerals Management Service
Utah Division of Oil, Gas and Mining

Prepared and submitted for Utah Power & Light Company by:

Hydrologic Section of the Power Operation Department

and

Technical Services Department of the Mining Division

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I. INTRODUCTION

This 1986 Water Monitoring Report is hereby submitted in accordance with the U. S. Department of Interior, Office of Surface Mining requirements and the Utah State Division of Oil, Gas and Mining guidelines for hydrologic monitoring in areas of and adjacent to coal mining operations.

This report is the ninth annual hydrologic report submitted by Utah Power & Light Company since the report entitled "Monitoring of the Water Resources in the Mining Areas of East Mountain, Emery County, Utah" was submitted to the U. S. Geological Survey and the Utah Division of Oil, Gas and Mining in December 1977. This report addresses flow observations and water quality characteristics of the water resources adjacent to Utah Power & Light Company (UP&L) mining areas in Emery County (see Figures 1a and 1b).

Information was compiled the past year from in-house as well as from state and federal agencies and private sources as follow:

U. S. Geological Survey
U. S. Forest Service
U. S. Department of Commerce, National Weather Service
Utah Division of Oil, Gas and Mining
Utah Division of Environmental Health
Huntington-Cleveland Irrigation Company
Emery Water Conservancy District
Cottonwood Creek Consolidated Irrigation Company

Information from outside agencies will continue to be utilized each year for as long as their data gathering programs continue. By using this outside information, a cooperative effort is realized and duplication of effort and expense is substantially reduced.

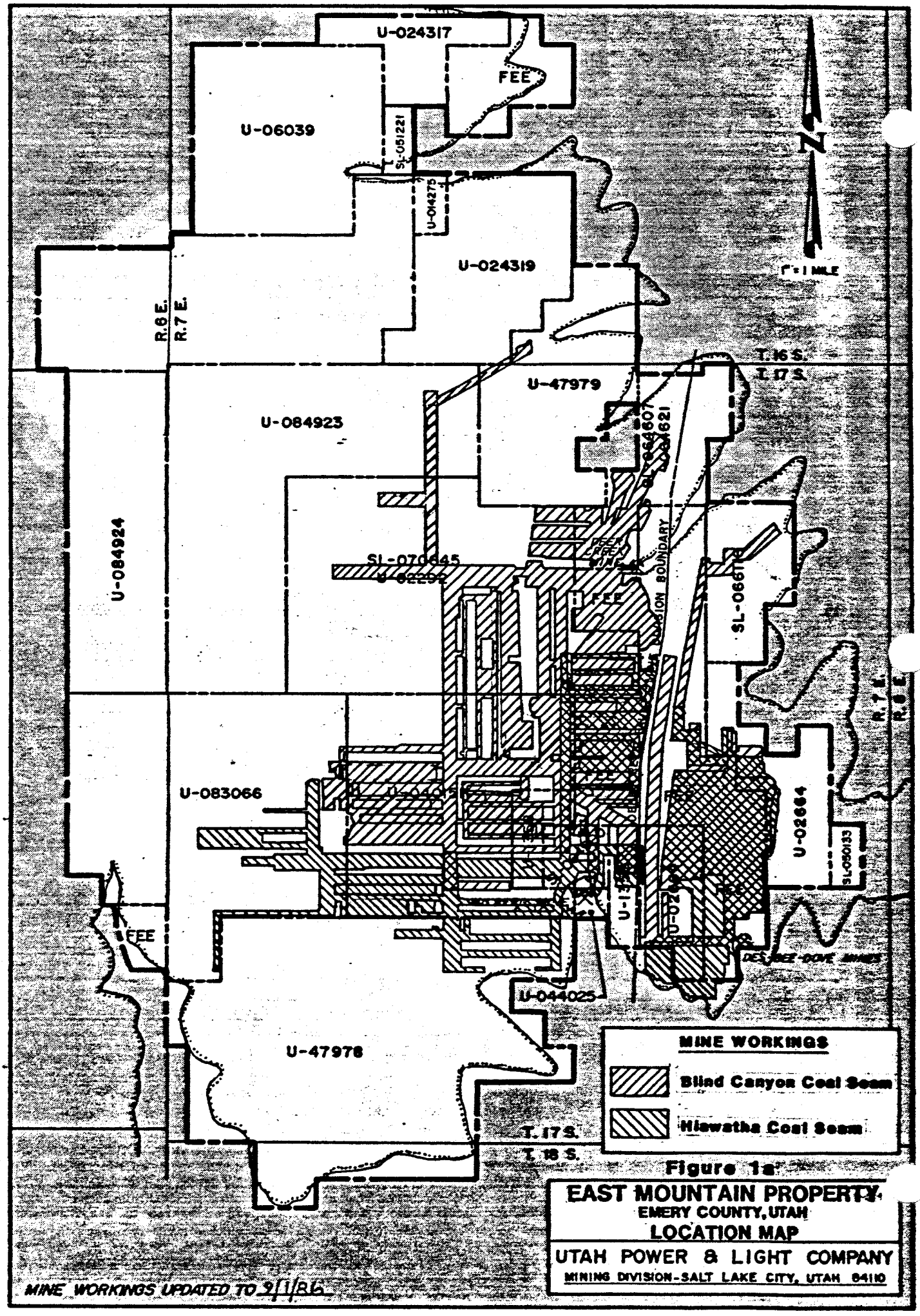
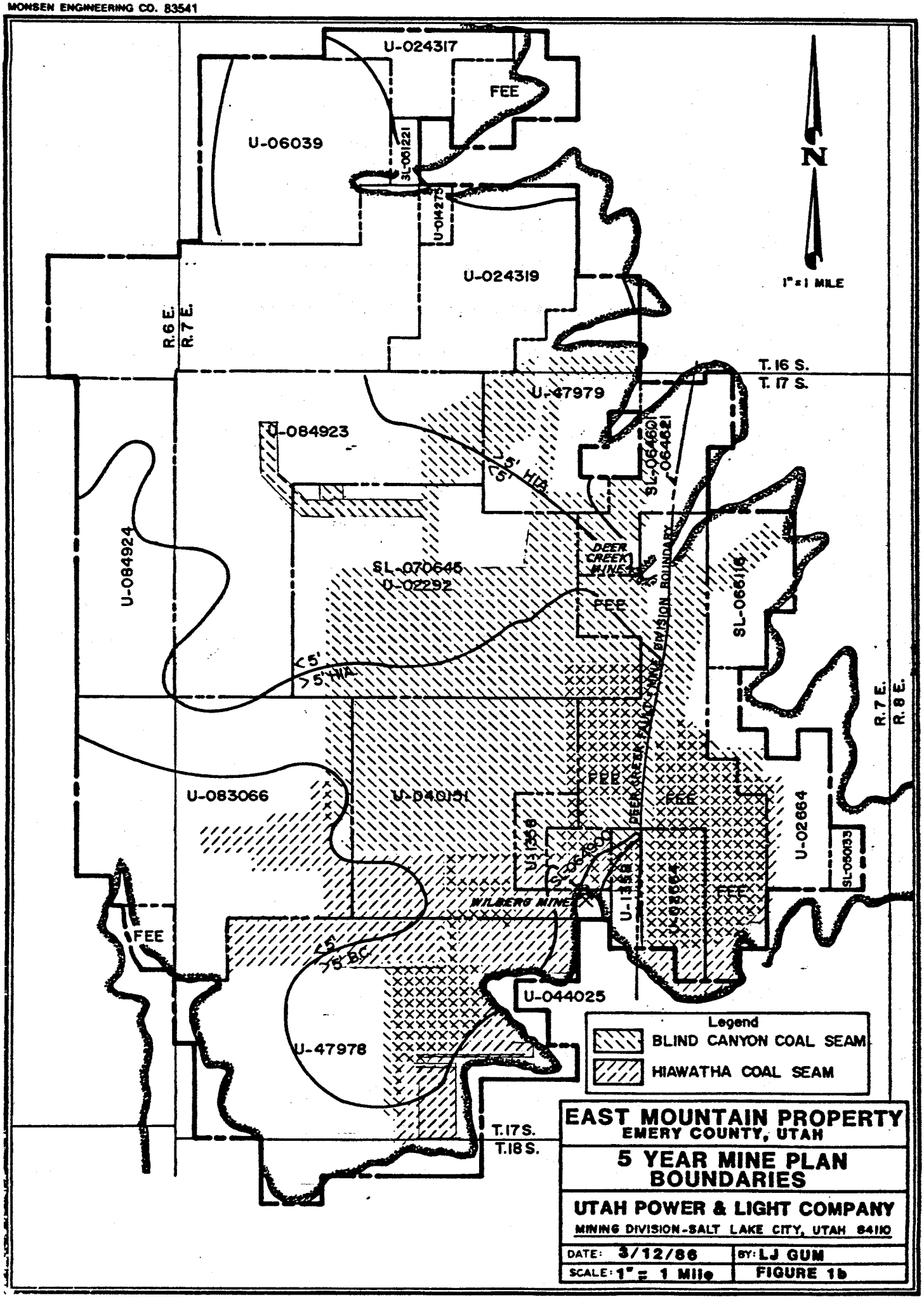


Figure 1a

EAST MOUNTAIN PROPERTY
EMERY COUNTY, UTAH
LOCATION MAP

UTAH POWER & LIGHT COMPANY
MINING DIVISION-SALT LAKE CITY, UTAH 84110



EAST MOUNTAIN PROPERTY
EMERY COUNTY, UTAH

5 YEAR MINE PLAN BOUNDARIES

UTAH POWER & LIGHT COMPANY
MINING DIVISION-SALT LAKE CITY, UTAH 84110

DATE: 3/12/86	BY: LJ GUM
SCALE: 1" = 1 Mile	FIGURE 1b

II. CLIMATIC OBSERVATIONS

In general, runoff and subsequent water supplies are a direct function of the climatic conditions in any given area. Furthermore, the significance of the weather affecting the flow characteristics of the East Mountain springs cannot be overemphasized.

Most of the water supply in the Western United States originates in the high mountain ranges as snowfall during winter periods. Snowmelt augmented by spring precipitation produces runoff which is utilized downstream. Fall precipitation influences soil moisture conditions prior to snowpack accumulation and has a bearing upon runoff the following year.

A. Regional Climatology

Since 1982 the Western United States, and especially Utah, has undergone an unprecedented wet cycle of precipitation. This pattern changed in 1985 with conditions returning to slightly above normal. During the 1986 water year the extremely wet trend returned and the upper Colorado River Basin experienced above average precipitation.

Winter snowpack within Utah was much above normal. Peak runoffs were extreme and the yearly runoff volume approached record maximums, similar to 1983 and 1984.

B. Local Climatology

1. Precipitation. Valley precipitation in Emery County during 1986 was near average. The mountains in the San Rafael Basin received heavy snowfall during the 1985-86 winter, and precipitation at Electric Lake (36.93") was the highest since recordkeeping began in 1970.

Precipitation amounts recorded at Hunter Plant, Huntington Plant, Electric Lake, and East Mountain for the 1986 water year (October 1985 to September 1986) will be presented since these sites include low elevation, intermediate elevation, and two high elevation observation sites in the immediate vicinity of mining activities. The values are shown in Table 1 on the following page.

A comparison of precipitation for 1985 and 1986 merits consideration in this study. The intent is to develop a correlation between yearly precipitation and spring discharges on East Mountain. Table 2 is a comparison of the 1985-1986 precipitation levels recorded at the four locations.

Table 2: COMPARISON OF 1985 AND 1986 PRECIPITATION (INCHES)

	1985		1986		1986 As
Station	Amount	% of Normal	Amount	% of Normal	% of 1985
Hunter Plant	9.11	131	7.05	101	77
Huntington Plant	11.44	153	6.71	90	59
Electric Lake	26.41	135	36.93	188	139
East Mountain	17.02	111	14.92	98	88
Average %		133		119	91

Table 2 indicates that 1986 precipitation was significantly lower than 1985 at the East Mountain, Hunter, and Huntington stations and significantly higher at the Electric Lake station. The overall precipitation at the four stations averaged 9% lower in 1986 than 1985.

TABLE 1: PRECIPITATION IN EMERY COUNTY, UTAH (1986 Water Year)

Month	Hunter Plant (Elev. 5800') Precip. (in.)	Hunter Plant % Of Normal	Huntington Plant (Elev. 6500') Precip. (in.)	Huntington Plant % Of Normal	Electric Lake (Elev. 8350') Precip. (in.)	Electric Lake % Of Normal	East Mountain (Elev. 8985') Precip. (in.)	East Mountain % Of Normal
1985								
Oct.	.92	118	.77	62	4.40	208	1.15	79
Nov.	1.49	292	1.28	217	6.62	356	2.38	149
Dec.	.42	78	.64	136	1.99	69	.87	71
1986								
Jan.	.10	23	.01	2	1.81	90	.30	31
Feb.	.97	237	.98	288	8.54	491	2.10	216
Mar.	.40	95	.28	45	2.48	130	1.43	79
Apr.	.31	72	.43	78	3.79	226	1.05	142
May	.00	0	.10	18	1.62	200	.38	52
June	.31	67	.17	41	.26	32	.53	113
July	.55	95	.42	44	1.01	86	.87	58
Aug.	1.01	100	.55	81	1.68	198	2.24	117
Sept.	.57	71	1.08	204	2.73	260	1.63	86
TOTALS	7.05	101	6.71	90	36.93	188	14.92	98
Mean Monthly	.59	--	.56	--	3.08	--	1.24	--

Tables 3, 4, 5, and 6 indicate monthly precipitation values at Hunter, Huntington, Electric Lake, and East Mountain from the beginning of operation at each site. These tables indicate monthly trends as well as the great fluctuation in yearly totals. Figure 2 shows monthly precipitation at the East Mountain site for the 1986 water year.

The correlation of precipitation levels with spring discharges will be discussed in the East Mountain Springs section of this report.

2. Temperatures

During the 1986 water year, temperatures within Emery County at the lower as well as higher elevations were generally higher than normal. At the Hunter Plant station, temperatures for November, July, and September were below normal while temperatures for the other months were above normal. The Huntington Plant and East Mountain stations were cooler than normal during the months of November, May, July, and September while the rest of the year was above normal. The Electric Lake station was cooler than normal October through December, July, and September while the rest of the year was above normal. During the months of October, December, January, February, March, April, and June, the East Mountain temperatures were +5.1, +4.0, +5.1, +3.1, +7.6, +2.0, and +5.0 degrees warmer than normal, resulting in a yearly average temperature of 1.9° above normal (see Table 7).

TABLE 3: HUNTER PLANT PRECIPITATION
Elevation - 5,800 Feet

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	TOTAL
75-76	.13	.25	.19	.02	.40	.00	.89	.84	.03	.31	.08	.70	3.84
76-77	.00	.02	.00	.37	.07	.00	.03	1.28	.07	1.35	.41	.50	4.10
77-78	.01	.18	.00	1.28	1.05	1.74	.34	1.21	.00	.69	1.14	.14	7.78
78-79	.03	2.22	.22	1.43	.53	2.43	.24	.47	.00	.00	.79	.00	8.36
79-80	.00	.00	.41	1.70	1.70	.67	.75	1.11	.00	.02	.51	2.06	8.93
80-81	.66	.06	.02	.00	.07	1.48	.16	.45	.14	.20	.70	2.43	6.37
81-82	.58	.27	.45	.94	.45	.54	.00	.02	.00	.15	1.06	1.23	5.69
82-83	.20	1.25	.45	.54	.41	.84	.37	.51	.00	2.18	1.58	.88	9.21
83-84	.53	.66	1.07	.03	.35	.34	.34	.05	1.09	1.80	1.89	2.35	10.50
84-85	1.69	.06	1.24	.20	.95	1.01	.67	.64	.26	1.50	.03	.86	9.11
85-86	.92	1.40	.42										

TABLE 4: HUNTINGTON PLANT PRECIPITATION
Elevation - 6,500 Feet

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	TOTAL
70-71	-	-	-	-	-	.08	.29	.16	.11	.57	.63	.43	2.27
71-72	2.26	.59	1.62	.04	.00	.32	.28	.16	.77	.40	.66	1.07	8.17
72-73	4.27	1.28	.34	.49	.80	2.42	.50	.17	.97	1.09	1.94	.12	14.39
73-74	.08	.02	.37	.20	.03	.01	.00	.00	.00	.09	.00	.07	.87
74-75	.68	1.19	.13	1.01	.30	.80	.03	.75	1.44	2.62	.31	.24	9.50
75-76	.23	.95	.03	.20	.23	.00	2.34	.86	.02	.73	.19	.85	6.63
76-77	.56	.00	.00	.35	.00	.00	.00	1.76	.00	2.08	.96	.70	6.41
77-78	.66	.12	.82	1.45	1.00	1.36	.94	.72	.12	.05	.72	.77	8.73
78-79	.02	2.65	.25	1.21	.52	2.50	.00	.84	.05	.09	3.32	.20	11.65
79-80	.17	.14	.15	2.88	3.63	.68	1.13	1.88	.65	.18	.38	2.22	14.09
80-81	1.20	.06	.00	.00	.00	.62	.08	1.75	.48	.00	.58	1.53	6.30
81-82	1.12	.25	1.30	1.63	.20	.73	.00	.17	.00	.08	.71	1.91	8.10
82-83	.20	.60	.67	.16	.65	1.87	.08	.40	.00	1.61	.39	1.15	7.78
83-84	.76	.76	2.13	.10	.15	1.18	.72	.17	1.04	.74	1.39	.46	9.60
84-85	2.07	.34	1.74	.49	.27	.53	.44	1.08	.42	3.21	.04	.81	11.44
85-86	.77	1.28	.64	.01	.98	.28	.43	.10	.17	.42	.55	1.08	6.71
86-87	.38	.15	.05										

TABLE 5: ELECTRIC LAKE PRECIPITATION
Elevation - 8,350 Feet

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	TOTAL
70-71	2.46	2.35	6.41	1.13	1.66	.36	1.05	.66	.47	.40	2.15	.78	19.88
71-72	3.49	1.69	4.07	3.35	.58	.70	1.02	.28	1.49	.70	.80	2.91	21.08
72-73	4.18	3.43	3.27	.97	2.09	2.74	3.67	1.42	.85	.82	1.23	1.15	25.82
73-74	.79	1.90	3.52	2.70	1.12	1.52	2.49	.20	.13	2.09	.06	.09	16.61
74-75	2.27	.62	1.73	2.10	2.37	3.42	1.23	3.21	1.08	1.93	.49	.25	20.70
75-76	1.31	2.57	.82	1.44	2.23	1.35	1.47	2.00	1.23	1.07	.54	1.19	17.22
76-77	1.00	.25	.14	.76	1.14	2.00	.05	3.00	.90	2.28	1.31	1.26	14.09
77-78	1.47	2.10	3.20	3.68	2.74	3.16	2.46	1.18	.30	.10	.24	.77	21.40
78-79	.40	3.18	2.66	2.90	2.18	2.53	.72	1.67	.19	.96	2.29	.32	20.00
79-80	1.55	2.23	.37	4.95	6.01	3.34	1.27	3.09	.12	.37	.38	1.80	25.48
10 Year	1.892	2.032	2.619	2.398	2.212	2.112	1.543	1.671	.666	1.072	.949	1.052	20.218
80-81	1.45	.98	.32	1.30	1.04	3.20	1.45	3.06	.39	1.61	2.73	1.44	18.97
81-82	4.18	1.44	4.79	5.26	1.66	5.06	1.11	1.40	.59	1.26	2.29	5.38	34.42
82-83	1.88	3.68	2.76	2.41	4.00	4.30	2.35	2.81	1.35	1.34	1.50	2.88	31.26
83-84	2.15	4.81	7.43	1.27	1.56	2.77	3.23	1.73	3.41	2.55	2.26	1.47	34.64
84-85	2.92	2.63	3.24	1.54	1.09	3.54	1.95	1.19	.89	3.04	.03	4.35	26.41
85-86	4.40	6.62	1.99	1.81	8.54	2.48	3.79	1.62	.26	1.01	1.68	2.73	36.93
86-87	1.86	1.98	.55										

NOTE: Climatic Station was moved from a point one mile above the dam site to a point 500 feet below dam site on November 15, 1973.

NOTE: October, November, and December 70-71 were estimated by correlation with Clear Creek Weather Station.

Table 6: EAST MOUNTAIN PRECIPITATION
Elevation 9,005 Feet

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	TOTAL
80-81	1.28	0.39	0.05	0.29	0.52	2.77	0.64	0.87	0.11	0.57	0.85	2.55	10.9
81-82	1.93	0.53	0.97	3.22	0.14	1.67	0.00	0.45	0.09	1.86	1.10	2.61	14.57
82-83	0.38	2.90	1.39	1.30	1.81	1.98	0.92	0.71	0.61	1.27	4.83	1.62	19.71
83-84	0.76	2.43	2.42	0.27	0.65	1.22	0.50	0.22	1.18	1.90	2.33	0.64	14.53
84-85	3.27	0.97	1.67	0.49	0.59	1.77	1.35	1.73	0.28	2.47	0.12	2.31	17.02
85-86	1.15	2.38	0.87	0.30	2.10	1.43	1.05	0.38	0.53	0.87	2.24	1.63	14.92
86-87	1.57	0.39	0.16	1.37	1.37								

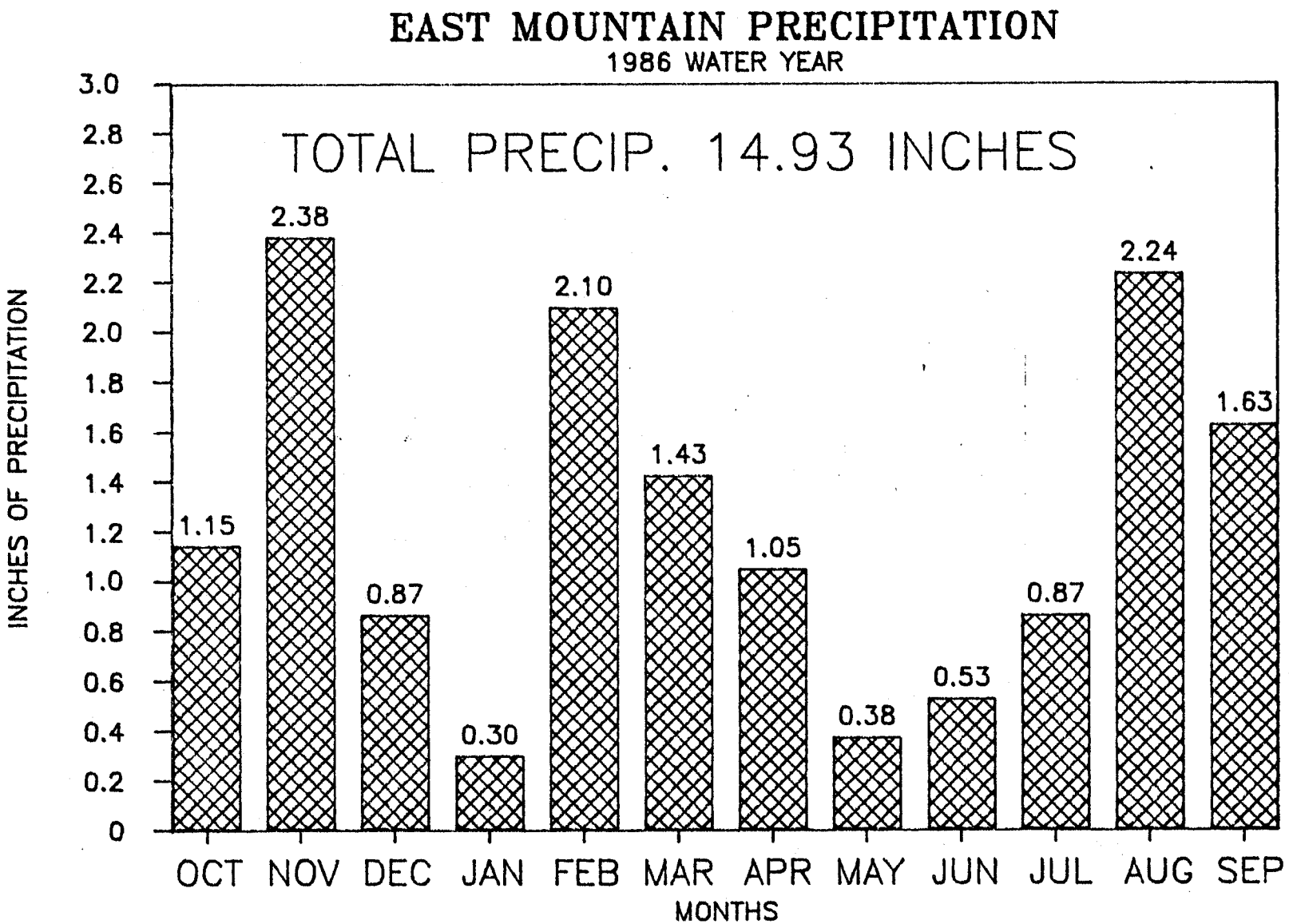

EAST MOUNTAIN PRECIPITATION
1986 WATER YEAR
TOTAL PRECIP. 14.93 INCHES
INCHES OF PRECIPITATION
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
1.15
2.38
0.87
0.30
2.10
1.43
1.05
0.38
0.53
0.87
2.24
1.63
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
MONTHS

FIGURE 2

Table 7: TEMPERATURES IN EMERY COUNTY, UTAH (1986 WATER YEAR)

	Hunter Plant		Huntington Plant		Electric Lake		East Mountain	
Month	Average Temp. (°F)	Departure From Normal	Average Temp. (°F)	Departure From Normal	Average Temp. (°F)	Departure From Normal	Average Temp. (°F)	Departure From Normal
1985								
Oct.	49.6	+1.2	49.6	+0.2	37.3	-0.2	41.5	+5.1
Nov.	34.7	-0.5	33.1	-2.9	24.4	-1.3	25.1	-2.1
Dec.	26.9	+0.2	27.6	+-.2	14.7	-1.1	26.7	+4.0
1986								
Jan.	30.3	+6.2	30.1	+6.5	18.6	+4.0	28.8	+5.1
Feb.	36.3	+7.9	34.0	+3.8	19.9	+0.6	27.3	+3.1
Mar.	45.3	+9.5	43.6	+5.9	30.4	+9.6	35.8	+7.6
Apr.	47.6	+3.0	45.1	0.0	29.5	+0.8	36.0	+2.0
May	55.5	+3.4	54.8	-0.1	39.0	0.0	34.9	-5.6
June	69.1	+7.7	69.1	+3.3	54.1	+5.5	59.1	+5.0
July	70.2	-1.8	69.1	-2.6	54.5	-1.2	59.3	-2.6
Aug.	70.8	+4.4	70.6	+1.2	57.6	+3.8	62.7	+0.9
Sept	56.8	-1.9	56.5	-3.9	43.1	-4.4	45.7	-4.8
TOTALS	49.4	+3.3	48.6	+1.0	35.3	+1.4	40.2	+1.9

A comparison of 1985 and 1986 temperatures for the four stations is addressed since temperatures also influence water supplies from year to year. Table 8 depicts the variation and compares 1985 to 1986.

TABLE 8: COMPARISON OF 1986 AND 1985 TEMPERATURES

	1986		1985		1986
Station	Average Temp. (°F)	Departure From Normal	Average Temp. (°F)	Departure From Normal	Departure From 1985
Hunter Plant	49.4	+3.3	47.8	+1.9	+1.4
Huntington Plant	48.6	+1.0	47.2	-0.4	+1.4
Electric Lake	35.3	+1.4	32.7	-1.3	+2.7
East Mountain	40.2	+1.9	40.0	+1.5	+0.4
Average Departure From Normal		+1.9		+0.4	+1.5

III. DRAINAGE SYSTEMS

The surface drainage system on East Mountain is divided into two major drainages; the southwest portion forms part of the Cottonwood Creek drainage, and the northeast portion of East Mountain contributes to the Huntington Creek drainage (see Map 1). The drainage boundaries, including minor subdivisions to Cottonwood and Huntington Creeks, are designated on the accompanying map. Both Huntington and Cottonwood Creeks flow out of the Wasatch Plateau in a southeasterly direction. The creeks merge with Ferron Creek to form the San Rafael River which is a tributary of the Green River.

A. Huntington Creek Drainage System

1. Huntington Creek. Flow data are recorded on a continuous basis by Utah Power & Light at two locations; one station is located near the UP&L Huntington Plant, the other about 22 miles upstream from the Huntington Plant. Flow records are maintained by Utah Power & Light

Company in order to determine water entitlements and reservoir storage allocation for the various users on the river.

Table 9 shows a summary of actual Huntington Creek flows below Electric Lake and at Huntington Plant, and calculated natural flow at Huntington Plant. The calculated natural flow considers actual flow recorded at the plant, plant diversions, Electric Lake storage change, and lake evaporation. The average daily discharges for the 1986 water year (October 1985 - September 1986) at the two stations plus the calculated natural flow are found in Appendix A.

TABLE 9: HUNTINGTON CREEK WATER FLOWS (1986 WATER YEAR)

	Huntington Creek Below Electric Lake	Huntington Creek At Plant	Calc. Natural Flow At Plant
Total Yearly Flow (Ac. Ft.)	32,040	107,800	111,483
% Of Normal	*148	158	160
Mean Discharge In Cubic Feet Per Second (CFS)	44.3	149	
Maximum Discharge (CFS)	335	847	
Date of Maximum Discharge	6/5/86	6/3/86	
Minimum Discharge In CFS	2.3	19	
Date Of Minimum Discharge	9/23/86	12/4/85	

* Influenced by upstream storage in Electric Lake.

During the 1986 spring runoff period (April thru July) approximately 7,500 acre feet of water was impounded behind Electric Lake Dam. During spring runoff the impoundment reached its highest level on June 5. Total storage on this date amounted to 31,940 acre

feet, which is 668 acre feet into surcharge (above spill level). Reservoir releases for the fishery and Huntington Plant needs plus spill during the water year totaled 32,040 acre feet. The total flow of 107,800 acre feet recorded for Huntington Creek at the Huntington Plant is equal to 158% of normal.

A comparison of runoff values from 1985 and 1986 is presented in Table 10.

TABLE 10: COMPARISON OF 1986 AND 1985 RUNOFF VALUES

	1986		1985		
	Amount	% Of Normal	Amount	% Of Normal	1986 as a % of 1985
Spring Runoff Stored In Electric Lake (Ac. Ft.)	7,500	74	6,000	60	125
Calculated Natural Flow At Plant (Ac. Ft.)	111,483	160	102,600	147	109

The 1986 water quality information on Huntington Creek was compiled on a monthly basis for stations above and below the Huntington Plant, while samples for Huntington Creek below Electric Lake and the Right Fork were taken quarterly. Utah Power & Light's Environmental Department conducted the sampling program and the analyses were performed by Standard Labs, Huntington, Utah, and Ford Lab, Salt Lake City. The location of water quality sampling stations on Huntington Creek that were considered for this report are listed as follow (refer to Map No. 1 in pocket):

1. Below Electric Lake
2. Above the Forks
3. Above the Power Plant Diversion
4. Below the Power Plant

Specific water quality constituents which were analyzed are shown in Table 11. Values are in milligrams per liter unless otherwise noted. Raw data can be found in Appendix A.

TABLE 11: HUNTINGTON CREEK WATER QUALITY (1986 WATER YEAR)

	Below Electric Lake			Right Fork Above Left Fork			Above Power Plant			Below Power Plant		
Parameter	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.
pH (N.U.)	8.0	8.8	7.5	8.4	8.8	7.9	8.5	8.7	8.2	8.4	8.6	8.
Sulfate	10.4	16	1.0	24	71	16	44	72	30	48	75	
Susp. Solids	4.6	17.0	1.0	19	85	1.0	24	63	8	25	64	
Diss. Solids	161	224	74	201	302	102	264	385	192	350	650	15
c. Cond. mhos)	255	468	182	328	496	171	397	596	295	1079	2960	287
Alkalinity ($CaCO_3$)	--	--	--	--	--	--	174	201	140	274	566	146

The values at the station below Electric Lake do not express the actual natural drainage water quality characteristics above Electric Lake because of the lake effect, but it appears that the surface flow in Huntington Canyon is of very high quality in the upper reaches with some natural degradation occurring as the flow proceeds to the canyon mouth.

The comparison of water quality characteristics with the Huntington drainage for 1985 and 1986 is presented in Table 12. This comparison merits consideration in order to evaluate the changes in water quality from year to year. Average values are presented in milligrams per liter unless otherwise noted.

TABLE 12: HUNTINGTON CREEK WATER QUALITY 1985-1986

Parameter	Below Electric Lake 1986	Below Electric Lake 1985	Right Fork Above Left Fork 1986	Right Fork Above Left Fork 1985	Above Power Plant 1986	Above Power Plant 1985	Below Power Plant 1986	Below Power Plant 1985
pH (N.U.)	8.0	7.5	8.4	7.9	8.5	8.0	8.4	8.0
Sulfate	10.4	-	24	-	44	33	48	58
T. Susp. Solids	4.6	4.1	19	24.0	24	30	25	34
T. Diss. Solids	161	178	201	237	264	242	350	295
Alkalinity (TOT)	-	-	-	-	174	197	274	195

2. Deer Creek

a. Flow and Sampling Schedule:

(1) Locations: 1) Above the Mine
2) Below the Mine
(See Map No. 1 in pocket)

(2) Flow: Information is collected during the first or second week of each month.

(3) Water Quality Sampling: Water samples are collected and analyzed during the first or second week of each month throughout the duration of the runoff season. Normal runoff season will be considered from May through October. If runoff persists beyond the month of October, samples will be collected on a quarterly basis until the month of May of the following year.

b. Flow Information. As stated above, flow information is collected monthly throughout the year with the use of three Parshall flumes (see Map No. 1 for flume locations). A hydrograph showing all the data collected for 1986, 1985, and 1984 has been generated for each flume location (See Appendix B). During 1986 the hydrographs show a peak flow of approximately 833.7 GPM in May through June for all monitoring locations. Base flow for 1986 above and below the mine was 0.0 GPM during December.

c. Quality Information. In accordance with the Deer Creek MRP baseline quality analysis was performed twice, once each at low and high flow. Baseline analysis will be repeated once every five (5) years. The results of the 1986 quality analysis are listed in Tables 13 and 14. The minimum, maximum, and mean values, along with the historical results, are given for a five-year period. Values are in milligrams per liter unless otherwise noted. Complete raw data can be found in Appendix B. It is apparent from the tables that the quality of the Deer Creek runoff degradates slightly from the upper to the lower sampling point. The quality of the lower sampling point is thought to be affected by the Mancos Shale which outcrops above the lower sampling location. An examination of Tables 13 and 14 reveals that all parameters tested for both locations follow the historical results closely.

3. Meetinghouse Canyon Creek

a. Flow and Sampling Schedule

(1) Location: South Fork of Meetinghouse 800 N 1500 E of the SW corner of Section 35, T. 16S, R. 7E

(2) Flow: Information is collected during the first or second week of each month.

(3) Water Quality Sampling: Water samples are collected and analyzed during the first or second week of each month throughout the duration of the runoff season. Normal runoff season will be considered from May through October. If runoff persists beyond the month of October, samples will be collected on a quarterly basis until the month of May of the following year.

b. Flow Information. A hydrograph comparing 1986, 1985, and 1984 can be found in Appendix C. The peak flow occurred during the month of May at a rate of 834 GPM. A base flow of 0.0 GPM existed during December.

TABLE 13: DEER CREEK SURFACE WATER QUALITY
ABOVE THE MINE

1986 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY	DISSOLVED OXYGEN	HARDNESS	IRON DISSOLVED	IRON TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH	POTASSIUM	SODIUM	SOLIDS TDS	SOLIDS TSS	SETTLEABLE
1-13						660				< 0.05		< 0.01		7.8			385	4.0	
4-09	< 1.0	317	56.0	< 1.0	7.9	650	9.65	290	< 0.05	< 0.05	36.5	< 0.01	< 0.5	7.9	1.1	24.6	362	6.0	< 0.1
5-13	< 1.0	313	62.0	< 1.0	4.9	520	9.8	270	< 0.05	0.26	28.0	0.03	< 0.5	7.8	0.8	13.9	277	130.0	< 0.1
6-11	< 1.0	296	56.8	< 1.0	4.5	505	9.8	250	< 0.05	< 0.05	26.3	< 0.01	< 0.5	7.3	0.8	15.0	269	38.0	< 0.1
7-07	< 1.0	262	42.0	< 1.0	5.8	470	8.2	232	< 0.05	< 0.05	31.0	< 0.01	< 0.5	7.6	0.8	16.6	275	9.0	< 0.1
8-13	< 1.0	279	44.0	< 1.0	7.0	550	10.2	245	< 0.05	< 0.05	32.8	0.02	< 0.5	7.8	1.1	21.0	284	3.0	< 0.1
9-19	< 1.0	322	46.0	< 1.0	10.1	610	8.8	280	< 0.05	< 0.05	40.1	0.01	< 0.5	7.65	1.3	27.6	353	< 0.5	< 0.1
10-17	< 1.0	309	48.0	< 1.0	10.8	620	9.8	280	< 0.05	< 0.05	38.9	0.01	0.5	7.45	1.12	21.5	338	< 0.5	< 0.5
MIN	< 1.0	262	42	< 1.0	4.5	470	8.2	232	< 0.05	< 0.05	26.3	< 0.01	< 0.5	7.3	0.8	13.9	269	< 0.5	< 0.1
MAX	< 1.0	322	62	< 1.0	10.8	660	10.2	290	< 0.05	0.26	40.1	0.03	0.5	7.9	1.12	27.6	385	130.0	< 0.5
MEAN	< 1.0	299.7	50.7	< 1.0	7.29	573.1	9.46	263.9	< 0.05	0.08	33.4	0.01	0.5	7.66	1.0	20.0	317.9	23.9	0.02
1985																			
MIN						439				< 0.05		< 0.01		7.4			246	1.0	
MAX						685				0.21		0.08		8.0			378	162.0	
MEAN						573.1				0.07		0.02		7.8			317.9	24.3	
1984																			
MIN						480				< 0.05		< 0.01		7.3			231	< 0.5	
MAX						700				< 0.05		< 0.01		8.3			381	41.5	
MEAN						582.5				< 0.05		< 0.01		7.9			319.5	11.5	
1983																			
MIN						525				0.03		< 0.01		7.7			280	< 0.5	
MAX						770				0.74		0.07		8.4			566	164.0	
MEAN						600.6				0.18		0.03		8.1			350.3	31.5	
1982																			
MIN						490				0.15		0.06		7.3			276	< 0.5	
MAX						640				0.87		0.18		8.2			359	92.0	
MEAN						526.7				0.60		0.13		7.9			298.8	27.8	
HISTORICAL 1978-1985																			
MIN	12.0	---	---	---	12.0	360	10.0	---	---	0.03	---	< 0.01	0.9	7.0	---	---	231	< 0.5	---
MAX	12.0	---	---	---	12.0	820	10.0	---	---	40.1	---	0.24	1.0	8.5	---	---	566	3592.0	---
MEAN	12.0	---	---	---	12.0	571.9	10.0	---	---	1.19	---	0.05	0.95	7.94	---	---	330.0	156.9	---

TABLE 14: DEER CREEK SURFACE WATER QUALITY
BELOW THE MINE

1986 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY	DISSOLVED OXYGEN	HARDNESS	IRON DISSOLVED	IRON TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH	POTASSIUM	SODIUM	SOLIDS TDS	SOLIDS TSS	SETTLEABLE
4-09	< 1.0	359	112	< 1.0	290	2300	10.0	750	< 0.05	< 0.05	114.3	< 0.01	0.5	7.72	6.61	192	1315	6.0	< 0.1
5-13	< 1.0	309	66	< 1.0	42.8	780	10.1	320	< 0.05	0.19	37.7	0.03	< 0.5	7.80	1.4	39	402	91.0	< 0.1
6-11	< 1.0	292	56.8	< 1.0	30.3	698	9.35	284	< 0.05	0.06	34.5	< 0.01	< 0.5	7.35	1.3	32.6	358	44.0	< 0.1
7-07	< 1.0	260	46.0	< 1.0	45.0	760	9.75	290	< 0.05	< 0.05	42.6	< 0.01	< 0.5	7.7	1.8	45.0	434	15.0	< 0.1
8-13	< 1.0	288	60.0	< 1.0	94.0	1100	11.0	385	0.06	0.19	57.2	0.02	< 0.5	7.85	3.4	81.2	619	23.0	< 0.1
9-19	< 1.0	312	80.0	< 1.0	237.0	1800	10.1	555	< 0.05	< 0.05	86.3	< 0.01	< 0.5	7.90	6.2	179	1072	< 0.5	< 0.1
10-17	< 1.0	337	90.0	< 1.0	212.0	1700	9.4	565	< 0.05	< 0.05	82.7	0.026	< 0.5	7.65	4.92	160.9	973	< 0.5	< 0.5
MIN	< 1.0	260	46.0	< 1.0	30.3	698	9.35	284	< 0.05	< 0.05	34.5	< 0.01	< 0.5	7.35	1.3	32.6	358	< 0.5	< 0.1
MAX	< 1.0	359	112	< 1.0	290	2300	11.0	750	0.06	0.19	114.3	0.03	0.5	7.90	6.61	192	1315	91.0	< 0.5
MEAN	< 1.0	308.1	73.0	< 1.0	135.9	1306.9	10.0	449.9	0.05	0.09	65.0	0.017	0.5	7.71	3.66	104.2	739.0	25.7	0.02
1985																			
MIN						630				< 0.05		< 0.01		7.4			320	4.0	
MAX						2300				0.39		0.08		8.3			1354	258	
MEAN						1374.7				0.13		0.02		7.9			690.6	44.1	
1984																			
MIN						620				< 0.05		< 0.01		7.8			371	0.5	
MAX						2150				0.18		< 0.01		8.5			637	141	
MEAN						1172.5				0.07		< 0.01		8.1			465.5	29.8	
1983																			
MIN						650				0.05		< 0.01		8.0			367	6.5	
MAX						1150				2.12		0.15		8.6			868	557	
MEAN						830.8				0.55		0.04		8.3			550	129.7	
1982																			
MIN						650				0.10		0.09		7.7			959	2.0	
MAX						1380				1.80		0.23		8.3			1021	183	
MEAN						951.7				1.01		0.17		8.0			990	46.1	
HISTORICAL 1978-1985																			
MIN	14.0	---	---	---	22.0	420	8.84	---	---	< 0.05	---	< 0.01	0.9	6.9	---	---	273	< 0.5	---
MAX	14.0	---	---	---	22.0	2300	8.84	---	---	170	---	0.27	1.0	8.6	---	---	1448	20,540	---
MEAN	14.0	---	---	---	22.0	1105.1	8.84	---	---	4.9	---	0.06	0.95	8.0	---	---	653.1	661.3	---

c. Quality Information. In accordance with the Deer Creek MRP baseline quality analysis was performed twice, once each at low and high flow. Baseline analysis will be repeated once every five (5) years. Quality sampling was initiated during 1986 according to the schedule listed above. The minimum, maximum, and mean values for 1986 are listed in Table 15. Complete raw data can be found in Appendix C.

B. Cottonwood Creek Drainage System

Utah Power & Light monitors two of the tributaries of the Cottonwood Creek Drainage system: 1) Cottonwood Canyon Creek and 2) Grimes Wash (see Map No. 1 in pocket).

1. Cottonwood Canyon Creek. An extensive baseline study conducted on Cottonwood Canyon Creek to determine water characteristics prior to mining at the proposed Cottonwood Mine began in 1979. A property acquisition in 1981 has resulted in mine plan changes. Due to this change, the baseline study was terminated as of January 1, 1984. As agreed upon in both the Deer Creek Mine and Wilberg Mine permit applications, UP&L will continue to monitor the flow at the USGS flume location on a monthly basis. The hydrograph in Appendix C illustrates the flow information collected during 1986, 1985, and 1984. This shows a peak flow of 2563 GPM in June and a baseline flow of approximately 960 GPM from October through December.

TABLE 15: MEETINGHOUSE CANYON WATER QUALITY

1986 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY	DISSOLVED OXYGEN	HARDNESS	IRON DISSOLVED	IRON TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH	POTASSIUM	SODIUM	SOLIDS TDS	SOLIDS TSS	SETTLEABLE
5-13	< 1.0	257	52.0	< 1.0	4.2	450	8.60	240	< 0.05	0.18	26.7	0.02	< 0.5	7.75	1.1	7.5	253	74.0	< 0.1
6-11	< 1.0	257	52.8	< 1.0	3.3	432	9.85	225	< 0.05	0.09	22.6	< 0.01	< 0.5	7.35	0.9	6.5	231	46.0	< 0.1
7-7	< 1.0	231	40.0	< 1.0	4.2	420	8.80	213	< 0.05	< 0.05	27.5	< 0.01	< 0.5	7.90	0.9	8.1	234	14.0	< 0.1
8-13	< 1.0	232	40.0	< 1.0	5.4	450	9.8	225	< 0.05	0.17	30.4	0.02	< 0.5	8.00	1.6	10.1	238	9.0	< 0.1
9-19	< 1.0	254	38.0	< 1.0	5.8	448	9.2	235	< 0.05	< 0.05	34.0	< 0.01	< 0.5	7.5	1.6	11.4	268	< 0.5	< 0.1
10-17	< 1.0	261	44.0	< 1.0	7.6	500	10.3	260	< 0.05	< 0.05	36.5	0.02	0.6	7.45	1.62	13.1	292	< 0.5	< 0.5
MIN	< 1.0	231	38.0	< 1.0	3.3	432	8.6	213	< 0.05	< 0.05	22.6	< 0.01	< 0.5	7.35	0.9	6.5	231	< 0.5	< 0.1
MAX	< 1.0	261	52.8	< 1.0	7.6	500	10.3	260	< 0.05	0.18	36.5	0.02	0.6	8.0	1.6	13.1	292	74.0	< 0.5
MEAN	< 1.0	248.7	44.5	< 1.0	5.1	450	9.4	233	< 0.05	0.10	29.6	0.02	0.5	7.66	1.23	9.5	252.7	24.0	0.2

2. Grimes Wash

a. Flow and Sampling Schedule

(1) Locations: 1) Right Fork
2) Left Fork
3) Below the Mine
(See Map No. 1 in pocket)

(2) Flow: Information is collected during the first or second week of each month.

(3) Water Quality Sampling: Water samples are collected and analyzed during the first or second week of each month throughout the duration of the runoff season. Normal runoff season will be considered from May through October. If runoff persists beyond the month of October, samples will be collected on a quarterly basis until the month of May of the following year.

b. Flow Information. As stated above, flow information is collected monthly throughout the year with the use of two parshall flumes (see Map No. 1 for flume locations). A hydrograph comparing 1986, 1985, and 1984 has been generated for each flume location (See Appendix C). The hydrographs show that during 1986 the Right and Left Forks and Below the Mine locations reached a peak flow of 32,242 and 280, respectively, during the month of May. Base flow for the Right Fork was 0.0 GPM during January - March and the Left Fork was 0.0 GPM in February.

c. Quality Information. In accordance with the Deer Creek MRP baseline quality analysis was performed twice, once each at low and high flow. Baseline analysis will be repeated once every five (5) years. The results of the 1986 quality analysis are listed in Tables 16, 17 and 18. The minimum, maximum and mean values are given for a five-year period along with the historical results. Values are in milligrams per liter unless otherwise noted. Complete raw data can be found in Appendix D.

Grimes Wash drainage quality is greatly affected by the influx of the Right Fork. The Right Fork originates in the North Horn Formation (interbedded shales, siltstones, and sandstones), which is abundant with calcareous material. As a result, the Right Fork contributes a relatively high amount of suspended solids to the Grimes Wash drainage. Under normal conditions concentration of solids decreases at the sampling location below the mine as a result of the Left Fork and Wilberg Mine discharge influx. The greatest factor influencing the suspended solids level in the Right Fork drainage during 1986 was the sudden increase in temperature resulting in a rapid increase in flow which occurred in May.

As reported in 1985, the TDS level increased slightly at the Below the Mine location. Two possible factors stated for the rise were Wilberg Mine Discharge and Mancos Shale seeps. Due to the fact that no water was discharged from the mine during 1985 and only a minimal amount was discharged during 1986, the second factor, seeps emanating from the Mancos Shale, is thought to have the greatest influence upon the level. Periodic sampling during 1986 and early 1987 confirmed the seeps' contribution to the TDS level. The average for the four samples collected was 1,188 mg/l, representing a nearly 3.3 fold increase over the historical averages for the Right and Left Forks.

TABLE 16: GRIMES WASH SURFACE QUALITY
RIGHT FORK

1986 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY	DISSOLVED OXYGEN	HARDNESS	IRON DISSOLVED	IRON TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH	POTASSIUM	SODIUM	SOLIDS TDS	SOLIDS TSS	SETTLEABLE
4-7	< 1.0	259	40.0	< 1.0	9.6	540	8.05	255	< 0.05	0.07	37.7	< 0.01	< 0.5	7.50	2.10	14.40	311	10.0	< 0.1
5-13	< 1.0	284	46.0	< 1.0	11.5	493	9.35	270	< 0.05	0.28	37.7	0.05	2.2	7.80	3.40	3.40	296	257.0	< 0.1
6-10	< 1.0	275	39.2	< 1.0	10.6	510	7.7	255	< 0.05	0.07	38.2	0.04	< 0.5	7.80	1.70	17.80	280	46.0	< 0.1
7-8	< 1.0	242	30.0	< 1.0	10.2	465	9.8	222	< 0.05	0.32	35.7	< 0.01	< 0.5	8.10	1.60	17.20	262	36.0	< 0.1
8-13	< 1.0	240	40.0	< 1.0	8.3	550	9.0	265	< 0.05	0.73	40.1	0.03	< 0.5	8.10	2.50	18.20	296	55.0	< 0.1
9-8	< 1.0	304	44.0	< 1.0	10.5	595	7.6	290	< 0.05	0.13	43.8	< 0.01	< 0.5	7.45	3.30	18.60	375	20.0	< 0.1
10-17	< 1.0	320	52.0	< 1.0	10.5	680	9.8	320	< 0.05	< 0.05	46.2	< 0.01	< 0.5	7.65	2.72	20.44	389	0.5	< 0.5
MIN	< 1.0	240	30.0	< 1.0	8.3	465	7.6	222	< 0.05	< 0.05	35.7	< 0.01	< 0.5	7.45	1.60	3.40	262	0.5	< 0.1
MAX	< 1.0	320	52.0	< 1.0	11.5	680	9.8	320	< 0.05	0.73	46.2	0.05	2.2	8.10	3.30	20.44	389	257.0	< 0.5
MEAN	< 1.0	274.9	41.6	< 1.0	10.2	547.6	8.76	268.1	< 0.05	0.24	39.9	0.02	0.74	7.77	2.47	15.72	315.6	60.6	0.2
1985																			
MIN						200				< 0.05		< 0.01		7.4			125	11.0	
MAX						740				2.9		0.08		8.3			430	7116.0	
MEAN						532.3				0.50		0.02		8.0			304.3	833.8	
1984																			
MIN						470				< 0.05		< 0.01		7.9			246	7.0	
MAX						750				1.05		0.02		8.7			477	1482.0	
MEAN						593.8				0.26		0.01		8.2			332.6	207.7	
1983																			
MIN						525				0.08		< 0.01		8.1			386	10.5	
MAX						650				2.64		0.18		8.6			280	493.0	
MEAN						610				0.69		0.06		8.3			328.2	183.3	
1982																			
MIN						500				0.87		0.08		7.6			280	30.5	
MAX						720				2.02		0.30		8.4			435	485.0	
MEAN						570				1.54		0.21		8.1			334	175.8	
HISTORICAL 1979-1985																			
MIN	0.1	---	---	---	8.0	200	---	---	---	0.01	---	< 0.01	1.0	7.4	---	---	125	1.5	
MAX	14.0	---	---	---	16.0	750	---	---	---	7.20	---	0.30	5.2	8.7	---	---	700	7116.0	
MEAN	7.05	---	---	---	12.0	584.6	---	---	---	1.06	---	0.07	2.1	8.2	---	---	353.2	402.1	

TABLE 17: GRIMES WASH SURFACE QUALITY
LEFT FORK

1986 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY	DISSOLVED OXYGEN	HARDNESS	IRON DISSOLVED	IRON TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH	POTASSIUM	SODIUM	SOLIDS TDS	SOLIDS TSS	SETTLEABLE
4-7	< 1.0	289	40	< 1.0	10.3	605	8.65	260	< 0.05	0.09	38.9	< 0.01	< 0.5	7.40	3.00	34.0	350	39	< 0.1
5-13	< 1.0	331	58	< 1.0	7.9	600	9.20	300	< 0.05	0.22	37.7	0.07	0.6	7.70	2.20	26.1	339	253	< 0.1
6-10	< 1.0	318	48.8	< 1.0	7.7	650	7.70	279	< 0.05	0.07	38.2	< 0.01	< 0.5	7.60	1.30	31.0	344	44	< 0.1
7-8	< 1.0	281	36	< 1.0	7.9	580	9.60	252	< 0.05	0.09	39.4	< 0.01	< 0.5	7.90	1.30	29.9	329	10	< 0.1
8-13	< 1.0	294	42	< 1.0	7.8	410	8.00	275	< 0.05	0.16	41.3	0.02	< 0.5	8.00	1.40	29.0	337	3	< 0.1
9-8	< 1.0	299	42	< 1.0	9.2	600	7.40	270	< 0.05	0.16	40.1	< 0.01	< 0.5	7.40	2.00	29.1	293	19	< 0.1
10-17	< 1.0	318	52	< 1.0	10.9	690	9.40	310	< 0.05	< 0.05	43.8	< 0.01	< 0.5	7.55	2.12	25.2	427	11	< 0.5
MIN	< 1.0	281	36	< 1.0	7.7	410	7.40	252	< 0.05	< 0.05	37.7	< 0.01	< 0.5	7.40	1.30	25.2	293	3	< 0.1
MAX	< 1.0	331	58	< 1.0	10.9	690	9.60	310	< 0.05	0.22	43.8	0.07	0.6	8.00	3.00	34.0	427	253	< 0.5
MEAN	< 1.0	304.3	45.5	< 1.0	8.8	590.7	8.56	278	< 0.05	0.12	39.9	0.02	0.5	7.65	1.90	29.2	345.6	54.1	0.2
1985																			
MIN						473				< 0.05		< 0.01		7.5			283	< 0.5	
MAX						750				0.22		0.08		8.3			438	141	
MEAN						628.2				0.12		0.02		7.9			356	37.1	
1984																			
MIN						600				< 0.05		< 0.01		7.8			278	< 0.5	
MAX						685				0.09		< 0.01		8.5			396	76	
MEAN						639.3				0.06		< 0.01		8.1			343.9	17	
1983																			
MIN						720				0.04		< 0.01		7.4			295	< 0.5	
MAX						650				0.56		0.11		8.3			570	133	
MEAN						676.3				0.19		0.03		8.1			388.1	28.6	
1982																			
MIN						590				0.20		0.09		7.8			339	< 0.5	
MAX						790				0.36		0.15		8.2			448	23.5	
MEAN						645				0.28		0.12		8.1			373.5	6.3	
HISTORICAL 1979-1985																			
MIN	---	---	---	---	---	473	---	---	---	0.04	---	< 0.01	0.1	7.4	---	---	278	< 0.5	---
MAX	---	---	---	---	---	790	---	---	---	0.81	---	0.15	0.1	8.7	---	---	570	141	---
MEAN	---	---	---	---	---	650.5	---	---	---	0.16	---	0.04	0.1	8.1	---	---	372.9	22.2	---

TABLE 18: GRIMES WASH SURFACE QUALITY
BELOW THE MINE

1986 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY	DISSOLVED OXYGEN	HARDNESS	IRON DISSOLVED	IRON TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH	POTASSIUM	SODIUM	SOLIDS TDS	SOLIDS TSS	SETTLEABLE
1-8						1100				< 0.05		< 0.01		7.15			638	2.0	
2-11	< 1.0	362	120	< 1.0	50.5	1300	11.45	590	0.13	0.40	70.5	0.03	< 0.5	7.70	3.50	50.5	805	< 0.5	< 0.1
4-7	< 1.0	359	88	< 1.0	130.0	1500	8.55	535	< 0.05	< 0.05	76.6	0.03	< 0.5	7.40	4.60	96.0	831	13.0	< 0.1
5-13	< 1.0	345	78	< 1.0	41.4	890	10.30	405	< 0.05	0.26	51.1	0.08	< 0.5	7.85	3.10	54.2	523	248.0	< 0.1
6-10	< 1.0	334	72.4	< 1.0	36.3	910	8.05	412	< 0.05	0.07	56.2	0.02	< 0.5	7.50	2.60	47.0	527	38.0	< 0.1
7-8	< 1.0	309	76	< 1.0	40.5	1050	9.80	450	< 0.05	0.07	63.2	0.02	< 0.5	7.80	3.20	64.0	647	6.5	< 0.1
8-13	< 1.0	284	96	< 1.0	50.3	1210	10.00	565	< 0.05	0.10	79.0	0.02	< 0.5	7.95	4.20	56.1	747	7.0	< 0.1
9-8	< 1.0	368	112	< 1.0	80.7	1390	7.85	640	< 0.05	0.09	87.6	< 0.01	< 0.5	7.30	5.80	63.8	902	18.0	< 0.1
10-17	< 1.0	381	150	< 1.0	141.2	1800	9.00	760	< 0.05	< 0.05	93.6	0.05	1.0	7.40	5.77	119.8	1224	< 0.5	< 0.5
MIN	< 1.0	284	72.4	< 1.0	36.3	890	7.85	405	< 0.05	< 0.05	51.1	< 0.01	< 0.5	7.15	2.60	47.0	523	< 0.5	< 0.1
MAX	< 1.0	381	150	< 1.0	141.2	1800	11.45	760	0.13	0.40	87.6	0.08	1.0	7.95	5.80	119.8	1224	248.0	< 0.5
MEAN	< 1.0	342.8	99	< 1.0	71.4	1238.9	9.38	544.6	0.06	0.13	72.2	0.03	0.17	7.56	4.10	68.9	760.4	37.1	0.2
1985																			
MIN						220				< 0.05		< 0.01		7.4			152	2.0	
MAX						1810				2.70		0.13		8.1			1129	9702.0	
MEAN						1182.6				0.37		0.04		7.8			732.9	994.8	
1984																			
MIN						800				< 0.05		< 0.01		7.7			457	1.0	
MAX						1700				0.45		0.07		8.3			923	107.0	
MEAN						1101.3				0.15		0.02		8.1			649.3	24.5	
1983																			
MIN						700				< 0.05		< 0.01		7.7			427	< 1.0	
MAX						1000				1.25		0.06		8.3			643	244.0	
MEAN						851.9				0.28		0.03		8.13			521.9	57.4	
1982																			
MIN						780				0.26		0.09		7.9			435	3.0	
MAX						1000				1.20		0.19		8.2			679	171.0	
MEAN						906.7				0.82		0.12		8.0			554.7	63.92	
HISTORICAL 1979-1985																			
MIN	0.1	---	---	---	12.0	220	---	---	---	0.01	---	< 0.01	1.0	7.35	---	---	152	< 0.5	---
MAX	16.0	---	---	---	13.0	1810	---	---	---	18.90	---	0.30	2.4	8.5	---	---	1129	9702.0	---
MEAN	8.05	---	---	---	14.0	1002.1	---	---	---	0.90	---	0.05	1.73	8.0	---	---	590.2	322.1	---

IV. EAST MOUNTAIN SPRINGS

A. Flow and Sampling Schedule

1. Flow. All springs identified on East Mountain are measured during the month of July. At least one spring from each mode of occurrence (Table 19) is measured a second time during the month of October. In addition to this monitoring, a minimum of eleven springs are monitored to establish a discharge recession curve. Generally, measurements are made on a monthly basis during the months of July through September if weather and reasonable access permit. But, when historical data indicate that a spring is short lived, all efforts are made to measure discharge from that spring at least three times, equally spaced, within its flow period.

2. Quality Samples. All springs located within the area covered by the five-year mine plan are sampled for water quality characteristics during the month of July. A representative group of springs is sampled again in October to document quality variations.

B. Spring Flow

Both precipitation and spring discharge rates decreased from 1985 to 1986, whereas temperature, a critical factor on spring discharge rates, was 1.9 degrees higher in 1986 than the historical average. Table 20, A and B, is a tabulation of the flow data collected during the 1986 monitoring season. To record the season variation, at least one spring from each mode of occurrence was monitored more than once. The

TABLE 19: MODES OF OCCURRENCE - EAST MOUNTAIN SPRINGS

Occurrences

Stratigraphic Location	Permeable fluvial channels that intersect the land surface	Flow along permeable strata underlain by impermeable mudstone which intersects the land surface	Contact of permeable beds and the Roans Canyon Fault zone	Mode of occurrence not identified
Base of Flagstaff Limestone		79-6, 79-7, 79-35, 86-58	Sheba Springs 79 -1	
North Horn Formation	Teds Tub, Burnt Tree, 79-2, 79-3, 79-8, 79-9, 79-11, 79-12, 79-13, 79-14, 79-15, 79-16, 79-17, 79-21, 79-22, 79-26, 79-27, 79-28, 79-29, 79-34, 79-39, 80-42, 80-43, 80-46, 80-47, 80-48, 84-53, 84-56, 86-59		Elk Springs, 79-10, 79-18, 79-19, 79-20, 84-54	
Base of North Horn Formation		79-23, 79-25, 79-32, 79-36, 79-37, 79-38, 84-55	79-30, 79-31	
Other Stratigraphic Horizons	Blackhawk Formation 80-50, 84-57		80-49 (Price River) Bear Canyon Fault Zone 82-51 (Price River)	Flagstaff Limestone 79-4, 79-5, Pine Springs Trough, Price River Formation 79-24, 79-33, 79-40, 80-41, 80-44, 80-45, 82-52, Jerk Water

seasonal variation is represented in Table 20, A and B, under the column heading "Seasonal Net Change." The percentage figures represent the amount of change, either positive or negative. The average change reveals a 64 percent decrease from the July to the October measurements.

A five year comparison of spring discharge is shown in Table 21. The table includes a year by year comparison of springs identified from each mode of occurrence (Table 19). The springs utilized in the comparison are underlined in Table 19. The flow values for the individual springs represent the July measurements. October measurements were not utilized because winter weather conditions caused some springs to be inaccessible.

Table 21 has been compared to East Mountain climatology to see how closely spring discharge rates follow local annual precipitation. Figure 3 reflects the direct correlation between spring discharge and precipitation. This comparison is vital in determining mining effects on spring discharge versus general changes in annual precipitation.

An additional flow information study was initiated during the summer of 1985. The purpose of the program is to establish flow recession curves for the following springs: (1) Burnt Tree, (2) Elk Springs, (3) Sheba, (4) 79-10, (5) 79-23, (6) 79-26, (7) 79-29 replaced 79-32 during 1986, (8) 79-35, (9) 80-44, (10) 80-46, (11) 82-52, (12) 84-56. The flow information collected during 1986 is shown below; corresponding spring recession curves comparing 1984, 1985, and 1986 are located in Appendix E.

TABLE 20A: EAST MOUNTAIN SPRINGS DISCHARGE

Spring	Date Sampled	Flow (GPM)	Temperature F°	Date Sampled	Flow (GPM)	Temperature F°	Seasonal Net Change %
Sheba	7-16-86	8.6	43°	10-15-86	2.1	43°	-76
Elk Spring	7-16-86	309.7	38°	10-16-86	67.3	39°	-78
Burnt Tree	7-22-86	17.5	41°	10-15-86	12.5	43°	-29
Jerk Water	7-21-86	2.1	41°	10-15-86	2.0	44°	-5
Pine Springs	7-16-86	2.1	45°	10-16-86	0.3	40°	-86
Pine Springs Trough	7-16-86	6.5	44°	10-16-86	0.15	35°	-98
Ted's Tub	7-16-86	31.6	37°	10-16-86	4.1	40°	-87
79-1	7-16-86	46.2	39°	10-16-86	11.8	39°	-74
79-2	7-22-86	2.9	42°	10-16-86	1.8	41°	-38
79-3	7-22-86	3.2	44°	10-16-86	0.1	53°	-97
79-4	7-17-86	1.4	40°				
79-5	7-16-86	4.3	44°				
79-6	7-16-86	Damp	--				
79-7	7-16-86	0.6	44°				
79-8	7-16-86	2.0	49°				
79-9	7-16-86	1.5	47°				
79-10	7-16-86	26.1	42°	10-15-86	7.5	44°	-71
79-11	7-17-86	2.2	42°	10-15-86	0.81	42°	-63
79-12	7-17-86	2.0	66°				
79-13	7-17-86	10.9	46°				
79-14	7-17-86	Damp					
79-15	7-17-86	18.2	42°	10-16-86	5.1	42°	-72
79-16	7-16-86	10.0	44°				
79-17	7-16-86	4.1	48°				
79-18	7-16-86	5.2	42°	10-16-86	0.65	42°	-88
79-19	7-16-86	23.5	41°	10-16-86	8.8	41°	-63
79-20	7-16-86	2.8	44°	10-16-86	Dry		--
79-21	7-22-86	Damp					
79-22	7-22-86	Damp					
79-23	7-22-86	0.6	50°				
79-24	7-22-86	4.3	53°				
79-26	7-17-86	8.7	49°	10-15-86	1.9	52°	-78
79-27	7-17-86	6.2	43°	10-15-86	2.2	49°	-65
79-28	7-17-86	3.9	41°	10-15-86	3.9	47°	0
79-29	7-17-86	4.7	40°	10-15-86	3.0	39°	-36
79-34	7-17-86	16.7	40°	10-16-86	1.5	42°	-91
79-35	7-17-86	7.8	39°	10-16-86	1.1	40°	-86
79-36	7-17-86	6.7	41°				
79-37	7-17-86	0.4	48°				

TABLE 20B: EAST MOUNTAIN SPRINGS DISCHARGE (Continued)

Spring	Date Sampled	Flow (GPM)	Temperature F°	Date Sampled	Flow (GPM)	Temperature F°	Seasonal Net Change %
79-38	7-21-86	3.6	41°				
79-39	7-22-86	0.6	50°				
79-40	7-22-86	4.7	39°				
80-41	7-22-86	4.1	38°				
80-42	7-22-86	Damp					
80-43	7-22-86	3.1	43°	10-16-86	Dry		
80-44	7-22-86	2.2	46°	10-23-86	0.25	33°	-87
80-45	7-22-86	Damp					
80-46	7-22-86	12.0	42°	10-16-86	4.6	40°	-62
80-47	7-22-86	12.2	42°	10-16-86	8.2	40°	-33
80-48	7-16-86	8.8	45°				
80-49	7-16-86	12.0	42°				
80-50	7-18-86	2.0	44°				
82-51	7-22-86	2.6	49°	10-15-86	0.86	46°	-67
82-52	7-21-86	23.3	40°	10-15-86	10.3	39°	-56
84-53	7-17-86	12.2	39°				
84-54	7-16-86	3.6	39°				
84-55	7-22-86	2.4	39°				
56	7-22-86	3.7	41°	10-23-86	2.2	42°	-41
57	7-18-86	0.75	51°				
86-58+	7-17-86	3.1	41°				
86-59+	7-17-86	38.7	42°				

+ New springs identified in 1986.

TABLE 21: YEARLY SPRING DISCHARGE VARIATIONS (GPM)

Spring	1980	1981	1982	1983	1984	1985	1986
Sheba	13.0	10.7	15.0	22.9	19.7	14.4	8.6
Burnt Tree	26.0	9.2	12.0	30.5	26.6	26.1	17.5
Pine Springs	12.0	2.6	5.3	17.1	4.4	3.9	2.1
Pine Springs Trough	Dry	6.9	8.6	20.9	10.9	7.5	6.5
Ted's Tub	78.0	27.3	60.0	89.0	48.0	39.1	31.6
79-1	130.0	28.3	72.0	106.7	51.6	48.0	46.2
79-2	7.5	10.0	12.0	9.1	9.7	5.5	2.9
79-3	15.0	2.6	10.0	26.7	21.8	4.6	3.2
79-5	1.2	4.6	5.0	5.7	6.7	3.0	4.3
79-6	Damp	Dry	1.0	1.2	1.3	Damp	Damp
79-7	Damp	5.0	1.0	1.8	2.0	0.8	0.6
79-8	1.5	1.7	2.4	5.9	*2.1	2.0	2.0
79-11	5.0	0.5	2.0	8.3	5.5	4.1	2.2
79-15	5.0	7.2	27.5	42.9	26.1	18.2	18.2
79-17	0.5	0.2	4.6	5.0	7.4	3.7	4.1
79-18	17.0	16.0	20.0	25.0	25.5	5.1	5.2
79-19	Dry	3.5	46.0	41.1	35.3	23.1	23.5
79-20	1.0	Dry	4.3	4.3	4.0	2.6	2.8
79-21	Dry	Dry	Dry	Damp	Dry	Dry	Damp
79-22	Dry	Dry	0.5	1.0	2.4	Damp	Damp
79-28	43.0	4.0	4.6	16.7	11.2	8.6	3.9
79-29	6.0	1.3	4.0	10.0	6.2	6.0	4.7
79-34	5.0	2.4	30.0	56.7	42.9	18.5	16.7
80-41	14.0	0.4	1.0	10.9	15.0	5.8	4.1
80-42	5.7	Dry	Dry	27.3	4.3	Damp	Damp
80-43	10.0	Damp	10.0	24.0	20.0	6.6	3.1
80-44	20.0	39.6	12.0	24.0	13.1	5.5	2.2
80-45	12.0	Damp	4.0	12.0	1.1	0.5	Damp
80-46	31.0	1.6	12.0	60.0	28.3	18.2	12.0
80-47	12.0	4.6	12.0	20.0	15.0	12.5	12.2
80-48	5.0	1.8	1.33	26.7	18.8	10.4	8.8
80-49	4.0	1.3	15.0	60.0	42.9	26.8	12.0
TOTALS	481.6	196.3	419.4	813.4	529.8	331.1	261.2

* Monitoring delayed - access blocked by mudslide, date of measurement - 8-22-84

FIGURE 3

SPRING DISCHARGE VS. PRECIPITATION

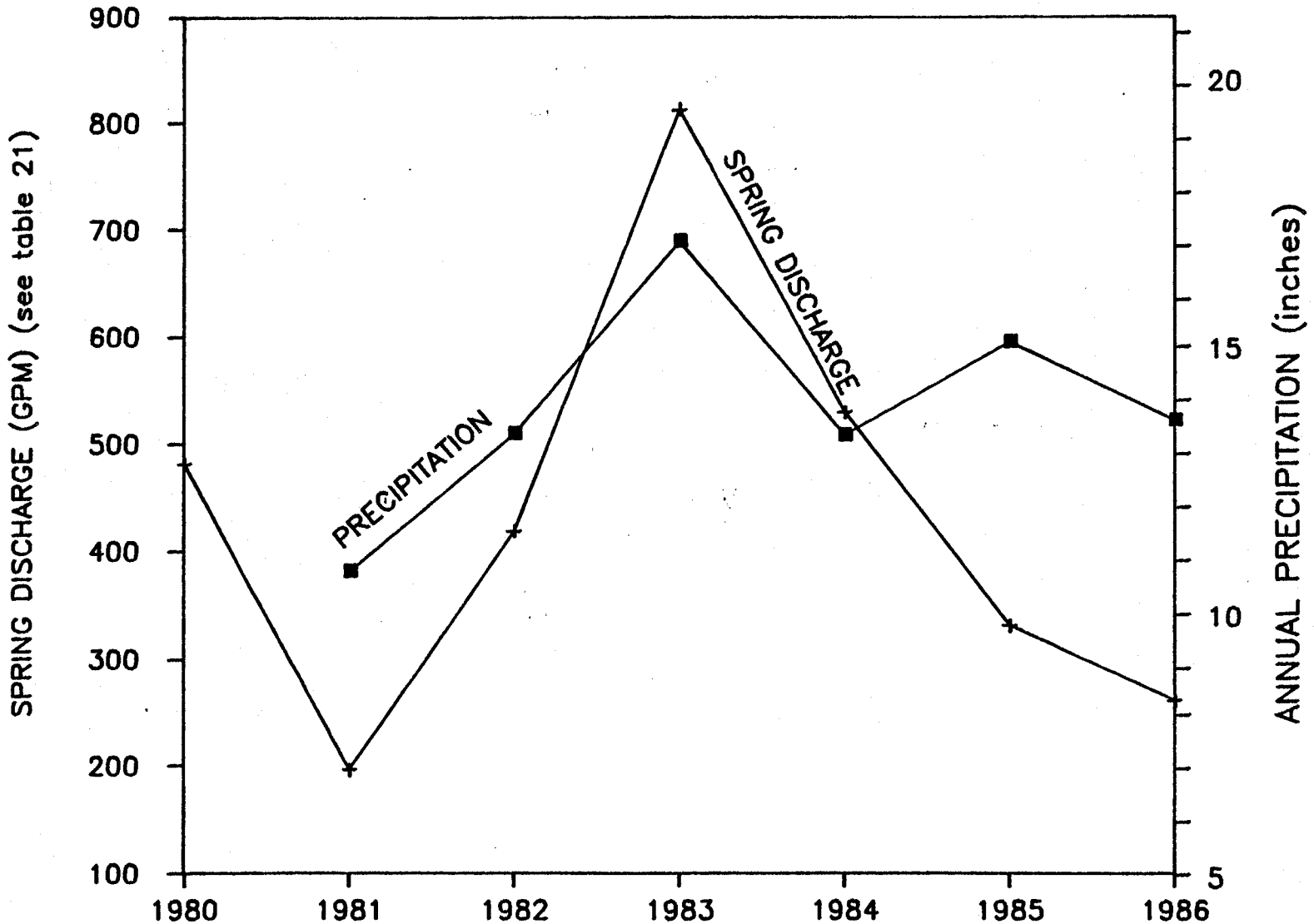


TABLE 22: EAST MOUNTAIN REGRESSION STUDY (FLOW*/TEMP.)

1986

Spring	June	July	August	September	October	November	December
Burnt Tree	14.1/40°	17.5/41°	17.5/44°	13.3/44°	12.5/43°	12.1/32°	12.1/43°
Elk Springs	516.2/39°	309.7/38°	125.7/40°	85.3/39°	67.3/39°	62.8/39°	53.9/39°
Sheba	16.0/42°	8.6/43°	2.5/46°	2.3/44°	2.1/43°	1.7/40°	1.4/43°
79-10	27.3/41°	26.1/42°	12.4/42°	8.5/43°	7.5/44°	5.8/46°	4.8/43°
79-23	7.7/48°	0.6/50°	DAMP				
79-26	12.8/48°	8.7/49°	4.2/48°	2.2/48°	1.9/52°	1.70/40°	1.7/37°
79-29	4.4/40°	3.5/41°	4.3/48°	3.2/44°	3.0/39°	1.67/40°	1.67/40°
79-35	9.4/39°	7.8/39°	3.2/40°	2.2/41°	1.1/40°	0.25/40°	.125/41°
80-44	9.5/44°	2.2/46°	0.22/52°	0.1/49°	.25/33°	0.0/--	--
80-46	15.8/43°	12.0/42°	8.0/42°	5.7/44°	4.6/40°	2.5/41°	2.1/39°
82-52	38.7/41°	23.3/40°	14.3/40°	10.7/40°	10.3/39°	9.8/40°	8.6/39°
84-56	2.5/40°	3.7/41°	3.5/42°	3.1/41°	2.2/42°	3.0/41°	3.0/41°

*All flow given in gallons per minute

C. Quality

To more closely identify springs which are related one with another, samples of their water were analyzed to determine the percentage of cations and anions in solution. The percentages have been graphically represented as cation-anion diagrams (see Appendix E). The purpose of the cation-anion diagrams is to identify groups of related springs by water chemistry. The diagrams clearly show the similarity of water quality of springs originating in the same geologic formation. To better visualize this concept, the cation/anion diagrams are presented by the geologic formation in which it originates.

An error in computing equivalent unit value for alkalinity was discovered in 1986. In the past equivalent weight utilized in the alkalinity ($CaCO_3$) calculation was 61.01 instead of the actual value of 100.1. The error slightly affects the appearance of graphs. Diagrams developed in 1986 should not be compared directly to previous years, but overall shape characteristics are still applicable.

The quality of the springs sampled in 1986 reveals only a slight variation from historical averages. The sulfate content, which showed an unexplainable increase from 1981 through 1982, declined to levels experienced in 1979-80 and 1983-85. A summary of the water quality analysis for a representative group of East Mountain Springs is presented in Table 23. In the table the mean values for 1986 are compared to the historical results for each respective spring. The raw data regarding all springs sampled is contained in Appendix D.

V. MINE HYDROLOGY

A. Surface Water Sources in Relation to Mine Workings

The relationship of the Deer Creek and Wilberg Mine workings with the overlying springs is shown in Figures 4 and 5. Beginning in 1979, UP&L has developed an ambitious spring monitoring program with emphasis to detect changes in the East Mountain hydrologic regime as a result of mining. With the data collected to date, there is no indication of any mine related effects on spring discharge rates. As expected, there is a direct relationship between annual precipitation and spring discharge rates as previously discussed on page 31 and shown in Figure 3.

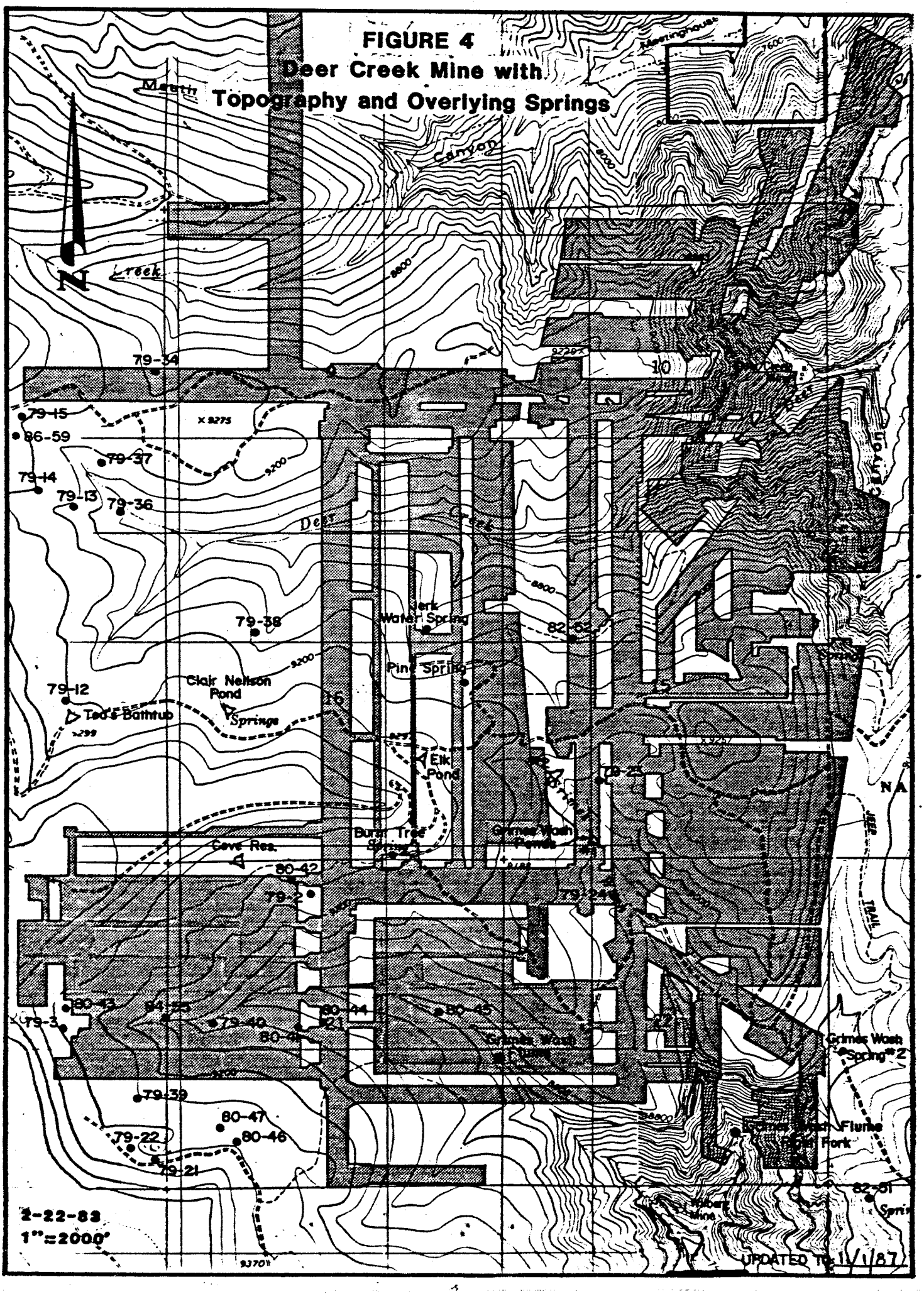
B. Groundwater Quality and Collection Procedures

UP&L began in-mine quality and quantity measurement in 1977 and has continued the measurement through 1986. With the collection of numerous samples throughout the extent of the mine workings the quality

TABLE 23: EAST MOUNTAIN SPRINGS WATER QUALITY (Historical to 1986)

Parameter	Burnt Tree		Ted's Tub		79-15		79-28		80-44	
	Historical	1986	Historical	1986	Historical	1986	Historical	1986	Historical	1986
Elevation	9260		9290		9290		9290		8980	
Geologic Formation	TKN		TKN		TKN		TKN		KPR	
PH	7.5	7.45	7.7	7.2	7.5	7.2	7.5	7.2	7.7	8.0
Alkalinity	276.5	265.0	267.7	253.0	283.3	261.0	262.3	246.0	382.5	313.0
TSS	2.1	0.5	8.9	0.5	4.2	0.5	35.0	0.8	33.8	6.0
TDS	288.2	322.0	295.4	265.0	304.2	284.5	411.1	417.0	525.3	510.0
Sulfate	35.1	21.0	42.1	23.5	104.5	17.0	129.7	117.5	146.6	140.0
Iron	0.30	0.05	0.15	0.05	0.12	0.05	0.38	0.05	0.14	0.06

FIGURE 4
Deer Creek Mine with Topography and Overlying Springs



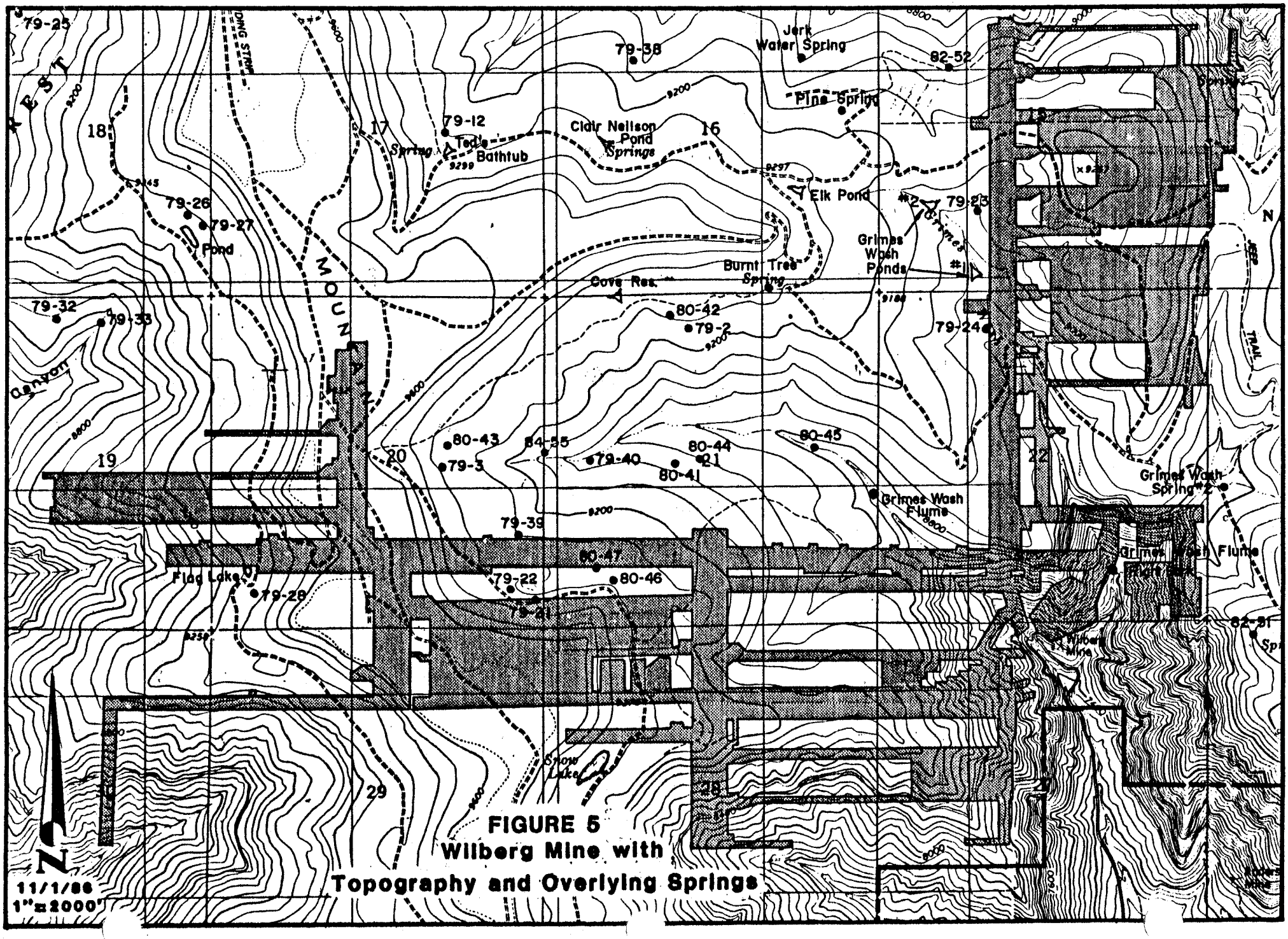


FIGURE 5
Wilberg Mine with
Topography and Overlying Springs

has remained relatively constant. Figure 6 depicts the consistency of the ground water quality by the use of cation and anion diagrams. Wilberg 1986 vs. Historical does not correlate due to the number of sites rendereded inaccessible by the 1984 mine fire. The two sites presently monitored bias the magnesium and sulfate portions of the graph. In the future this will also affect the similarity between Wilberg and Deer Creek in the same manner.

Collection procedures for ground water quality consist of two grab samples collected and analyzed per quarter at each of the mines which produce measurable quantities of water. Sampling according to this established plan began in the first quarter of 1982.

Long-term monitoring locations have been established at each of the mines which produce measurable quantities of water, i.e., Deer Creek and Wilberg Mines (see Maps 3 and 4 in pocket). Four types of occurrences have been recognized to exist within the current mine workings (refer to Figure 7).

They include:

1. Structural rolls with overlying fluvial channels,
2. Fault Systems (Pleasant Valley and Roans Canyon),
3. Fractures and joints (lineaments),
4. Roof bolt and in-mine drill holes.

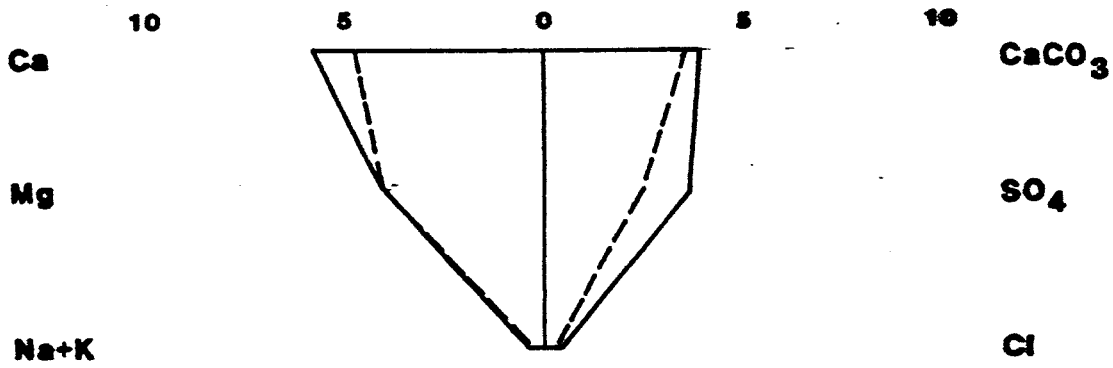
A collection device was installed at each long-term monitoring location. Flow and temperatures collected on a quarterly basis from the long-term sites in both mines were fairly consistent. (See Appendix 6 for the Deer Creek and Wilberg In-Mine hydrographs.)

FIGURE 6

IN-MINE WATER QUALITY CATION-ANION DIAGRAMS

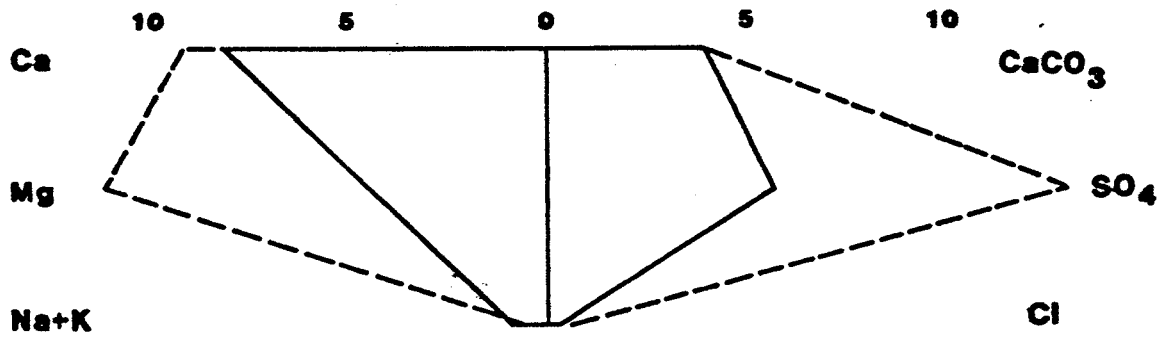
DEER CREEK IN-MINE

Historical _____
1986 - - - - -



WILBERG IN-MINE

Historical _____
1986 - - - - -



WILBERG/DEER CREEK HISTORICAL

Wilberg _____
Deer Creek - - - - -

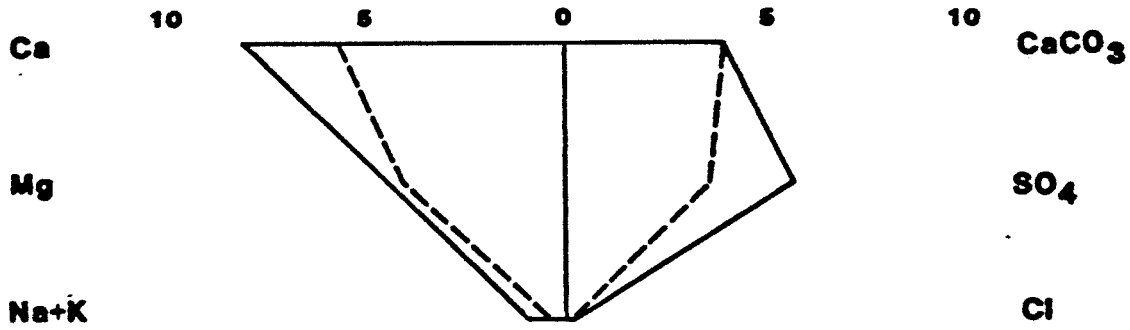
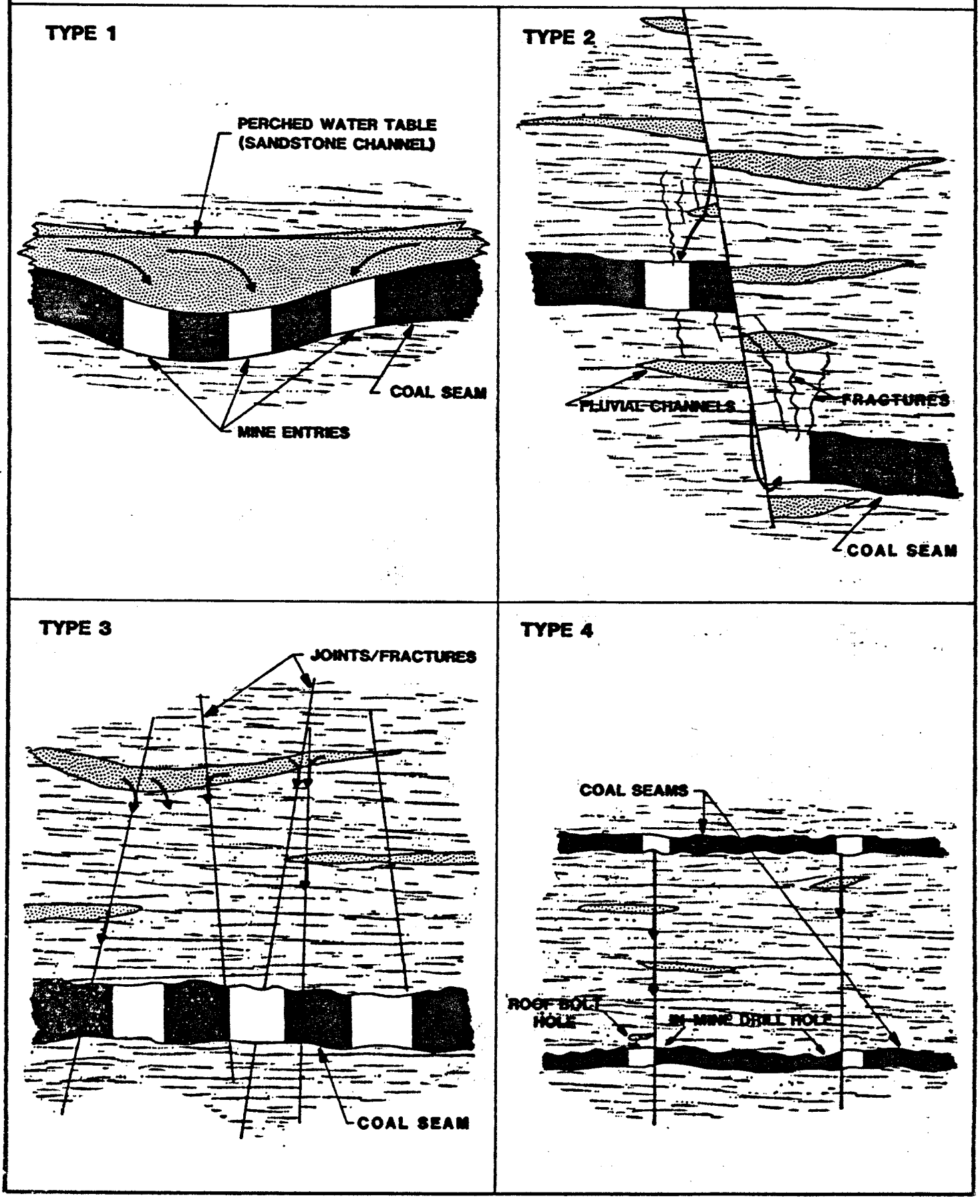


FIGURE 7

LONG TERM WATER SOURCES



Two long-term sites in the Deer Creek Mine, along with one site in Wilberg during 1986, were eliminated. The locations and reasons for termination of monitoring are as follow:

DEER CREEK MINE

1986 ID No.	Location Description	Reason for Termination
5	First South XC-40, 1L	Site will be sealed off during 1987
4	Third South XC-33, 1L	Access eliminated due to diesel roadway construction

WILBERG MINE

1986 ID No.	Location Description	Reason for Termination
2	Fourth East XC-40, 2L	Flow from this site ceased during 1986.

Additional long-term monitoring sites will be added when areas meeting our long-term criteria are opened by mining (i.e., long-term accessibility and water source is such that consistent sampling can be achieved).

C. Mine Water

1. Deer Creek Mine

a. In-Mine Water Production. The best estimate of in-mine water production was arrived at by combining the following values:

Deer Creek Discharge*	237.8 Million Gallons
Estimated Evaporation**	19.0 Million Gallons
Domestic Usage	7.0 Million Gallons
Total Discharge	263.8 Million Gallons

* Alterations in the Deer Creek water systems, along with in-line meter failures, resulted in quantity estimates made for six of the twelve months during 1986. An improved meter design was installed in early 1987 to alleviate the problem.

** See 1981 Hydrologic Monitoring Report

b. In-Mine Quality. A total of eight samples ~~was~~ were collected in the Deer Creek Mine in 1986. Table 24 lists the characteristics of the samples collected and compares the mean, minimum, and maximum results of 1986 to the historical values. It is apparent from Table 24 that the average quality of the in-mine water has remained relatively constant. The consistency was also depicted in the stiff diagrams presented as Figure 6. The complete chemical analysis of samples collected in 1986 can be found in Appendix F.

TABLE 24: DEER CREEK IN-MINE WATER QUALITY

Location		pH	Alka.	Ca	Cl	Cond.	Mg	K	Na	SO_4	TDS	TSS
EM-3		6.9	390	116	9.6	1010	55.9	3.0	18.2	145	574	2.0
3Sxc-33,1L		7.1	395	80	7.4	810	43.8	5.0	19.5	80	416	1.0
1Sxc-40,1L		7.1	357	102	8.0	900	49.8	2.5	18.1	130	520	1.0
3SBxc-21,1R		7.2	359	100	9.0	910	52.3	3.4	20.2	130	526	1.0
3Nxc-41,2R		7.1	313	72	3.9	700	35.3	2.6	17.0	45	328	§0.5
FM-3		7.0	389	112	10.0	1008	59.6	3.6	19.0	160	565	§0.5
Bxc-21,1R		7.5	350	86	9.8	920	51.1	3.5	19.4	130	514	3.0
M-3		7.2	367	112	10.4	1010	57.2	3.3	17.9	150	577	3.0
	Min	6.9	313	72	3.9	700	35.3	2.5	17	45	328	§0.5
1986	Max	7.5	390	116	10.0	1010	59.6	5.0	20.2	160	574	3.0
	Mean	7.1	354.6	95.4	8.2	894.3	49.7	3.4	18.8	117.1	492.4	1.3
Hist.	Min	6.8	214.7	60.8	4.0	470	4.4	2.2	10.2	40.0	263	0.1
(1977-	Max	7.9	554.4	245.0	13.2	1700	79.5	10.0	66.0	915.2	982	26.0
1985)	Mean	7.3	388.6	116.0	9.5	898.6	50.0	4.1	23.7	171.8	548.5	4.2

c. Discharge Quantity. Excess water not utilized in the mining operation or for domestic use was either pumped to storage areas or discharged from the mine. The location of the main sump areas within the mine are shown in Figure 8. The largest volume of water is stored in the western part of Main West, an area that has not been actively mined for several years.

In-line water meters are utilized to record the amount of water that is discharged from the mine, after which the water passes through an oil skimmer before being piped to UP&L's Huntington Power Plant. None of the discharge water leaving the mine enters any of the natural streams in the region but instead is used in the cooling towers at the power plant.

The total water that was discharged from the Deer Creek Mine during 1986 was estimated at 730 acre feet, or 237.8 million gallons. The recorded flow of 730 acre feet during 1986 is a 55% increase from the 1985 discharge of 471 acre feet. The average monthly discharges are shown in Figure 9. A graph displaying the historical discharge rates is included as Figure 10. The rapid variations from month to month could be the result of several factors which include: (1) changes in coal production, (2) increase in the labor force (higher culinary use), (3) improved pumping techniques or changes made to sump capacities, and (4) near portal ground water sources freezing during the winter months resulting in an overall decrease in discharge rates during the period. It is thought that the factor of greatest influence on groundwater is the increase in the annual coal production, especially in areas overlain by sandstone channels.

d. Discharge Quality. Monthly water quality samples were collected for 1986. Table 25 compares the minimum, maximum, and mean values from an historical standpoint to 1986. An examination of Table 25 shows a slight change in chloride, sulfate, and TDS between samples collected in 1986 to the historical results. Individual analysis can be found in Appendix G.

MONSEN ENGINEERING CO. 83541

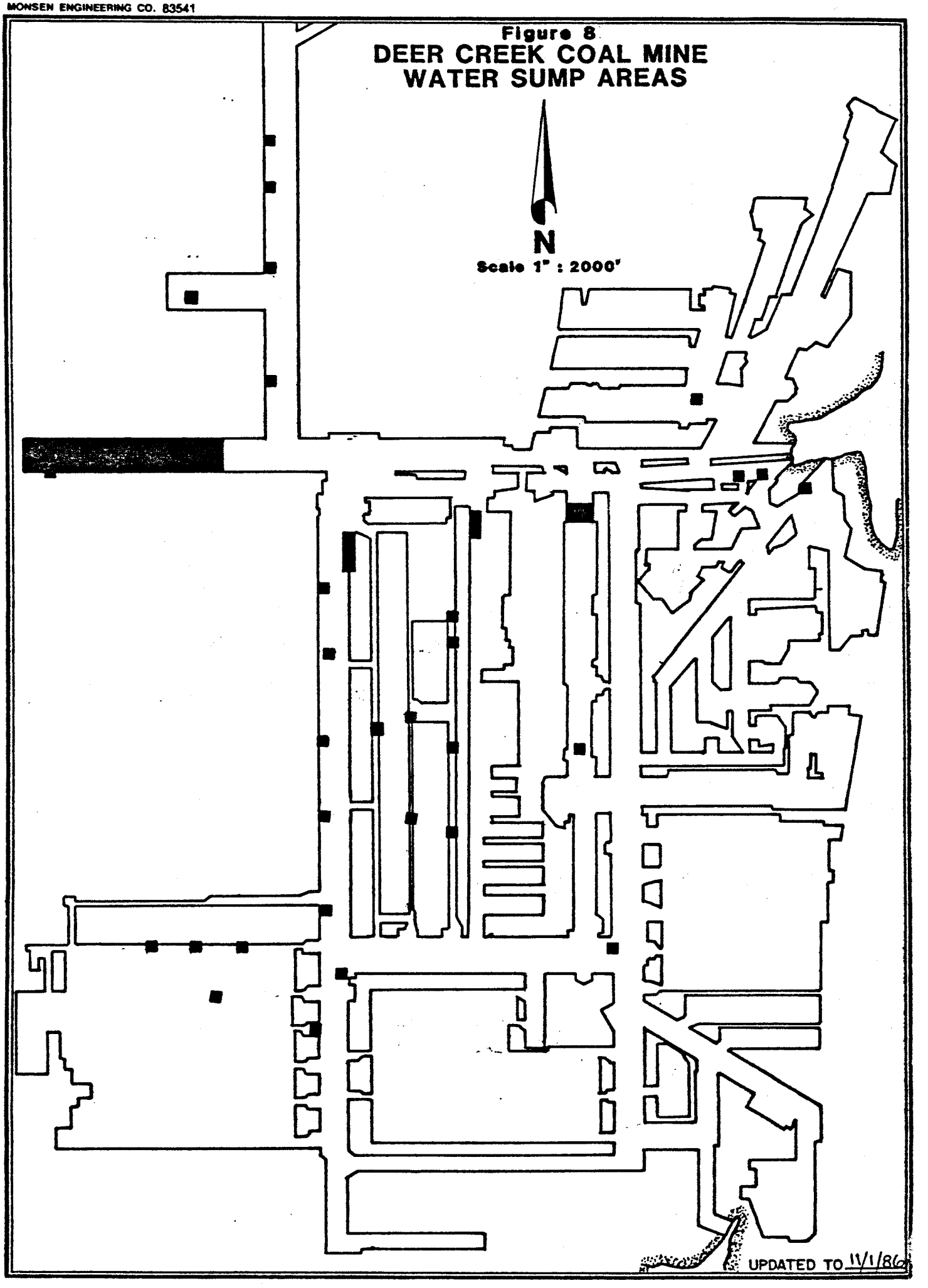


FIGURE 9

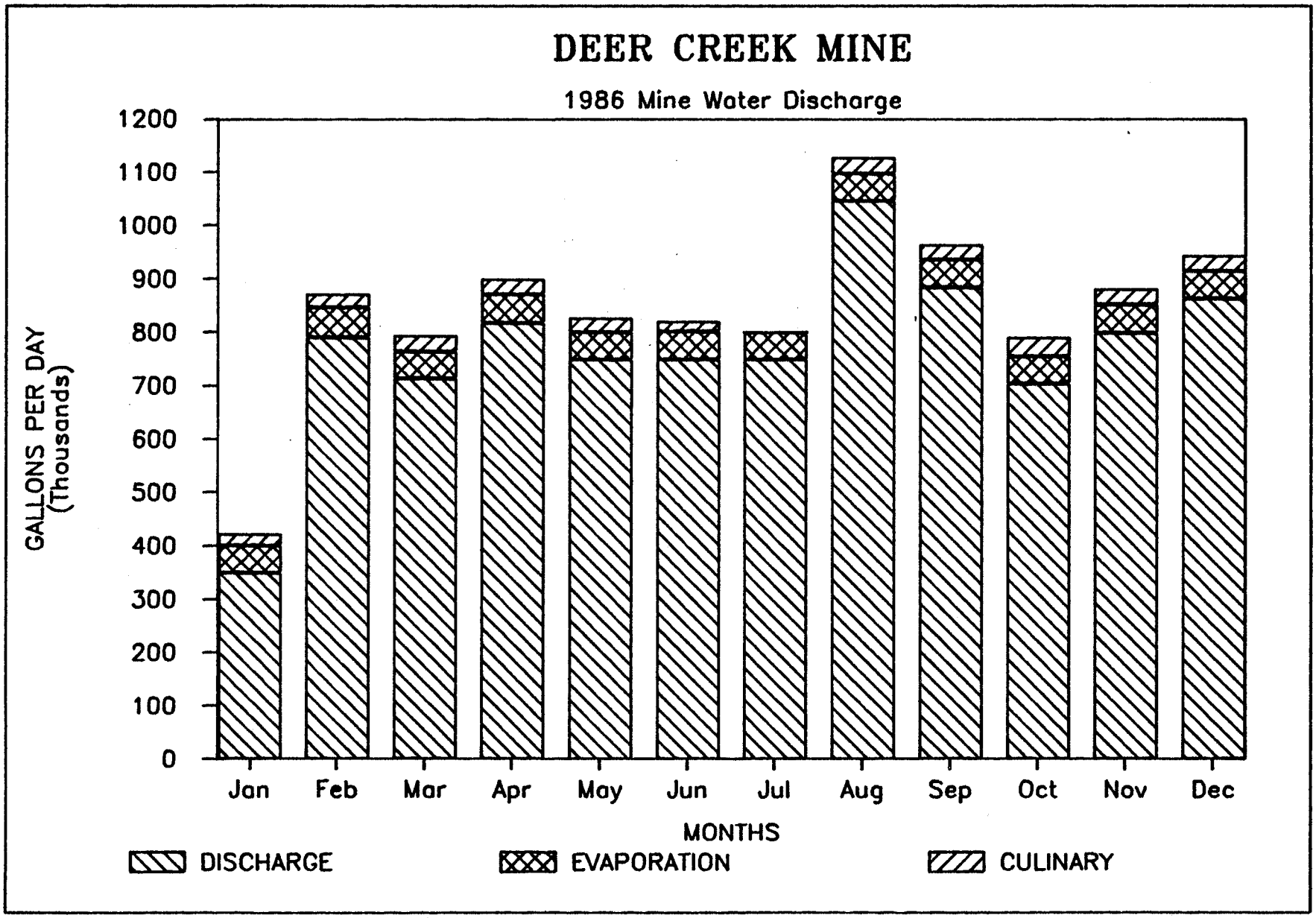

DEER CREEK MINE
1986 Mine Water Discharge
GALLONS PER DAY
(Thousands)
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
MONTHS
DISCHARGE
EVAPORATION
CULINARY

FIGURE 10

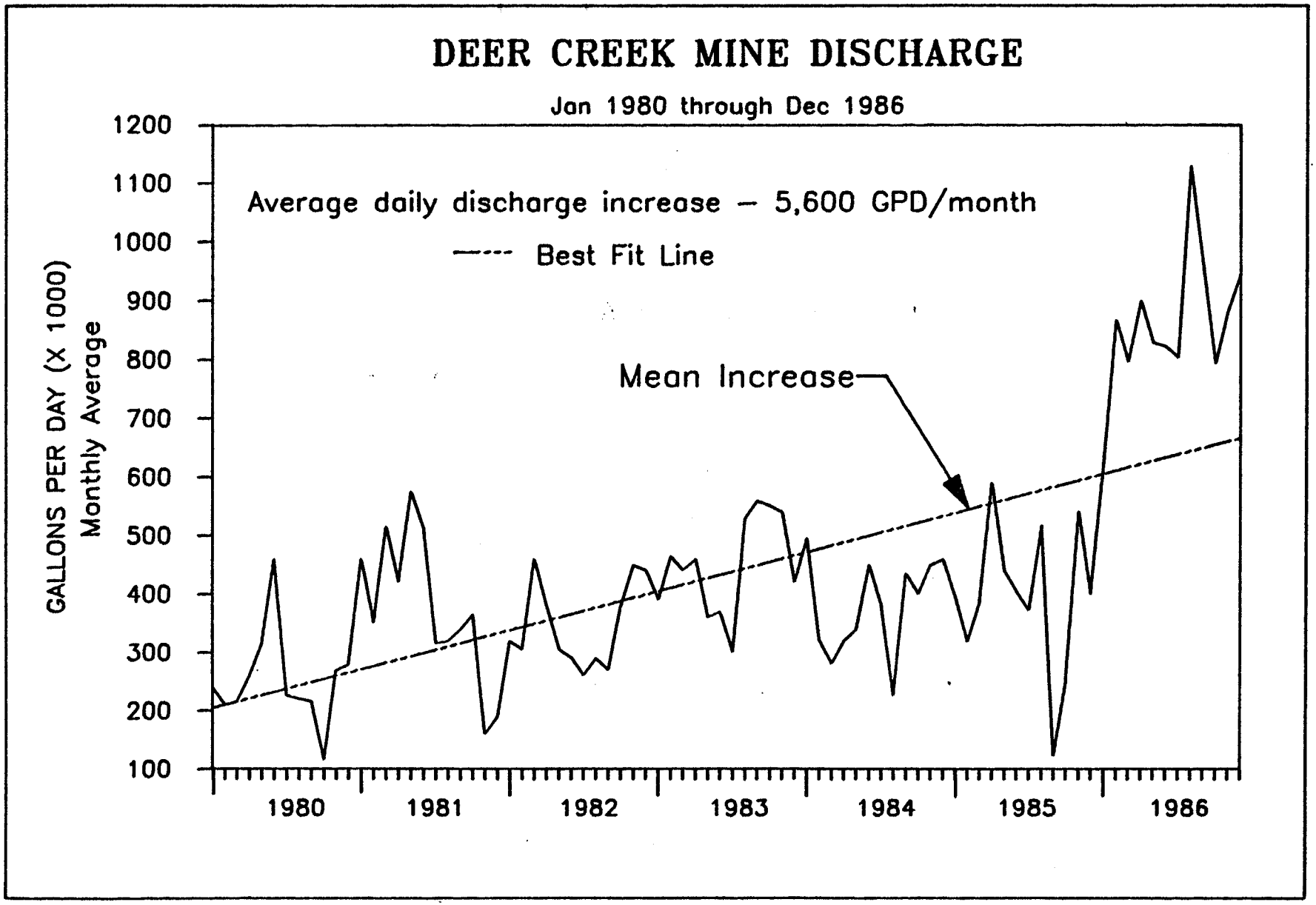

DEER CREEK MINE DISCHARGE
Jan 1980 through Dec 1986
Average daily discharge increase – 5,600 GPD/month
Best Fit Line
Mean Increase
GALLONS PER DAY (X 1000)
Monthly Average
1200
1100
1000
900
800
700
600
500
400
300
200
100
1980
1981
1982
1983
1984
1985
1986

TABLE 25: DEER CREEK MINE - DISCHARGE* WATER QUALITY

Parameters	1986 Minimum	1986 Maximum	1986 Mean	Historical - (1976-1985) Minimum	Historical - (1976-1985) Maximum	Historical - (1976-1985) Mean
pH	7.1	7.9	7.3	6.8	8.1	7.5
Acidity	1.0	1.0	1.0	0.7	52.0	7.3
Alkalinity	216	277	251.2	207	414	297.4
Chloride	11	17.6	13.5	2.4	2700	85.0
Conductivity	975	1200	1089.5	480	10,000	1245.8
Iron	<0.5	3.7	0.7	0.03	7.53	0.70
Oil & Grease	0.1	12.3	3.3	0.01	19.9	1.80
Sulfate	240	360	313	29.8	497.0	211.7
TDS	581	764	685.9	320	5100	533.5
TSS	<0.5	203	57.9	0.5	2019	72.8

* Used only in the power plant cooling system.

2. Des-Bee-Dove Mines. The mine workings of the Des-Bee-Dove Mines have been generally dry since the inception of mining. One minor exception existed during 1986: Deseret Mine, 2nd North entry. As described in the 1982 annual report, the groundwater occurrence in 2nd North was of an unusual nature. Fractures in the Starpoint floor began to produce water at an estimated rate of 10 GPM during mid-1982. As in the case of most multiple seam extraction, mining of the upper seam (Little Dove Mine) precedes the mining of the lower seam (Deseret Mine). During the Little Dove development, a sump was constructed at crosscut 38 for in-mine water storage. As the mine workings of the Deseret were developed below the area in which Little Dove sump is located, fractures in the Starpoint (Deseret floor) began to produce water. It is felt that water from the Little Dove sump was percolating along fractures associated with the Deer Creek Fault and enters the Deseret Mine through fractures in the Starpoint floor. This condition continued in 1986.

3. Wilberg Mine. The mine fire which occurred in late 1984 altered normal hydrologic monitoring at the Wilberg Mine. Normal hydrologic monitoring was reinstated in late 1985 and continued through 1986.

a. In-Mine Water Production. In previous reports the in-mine water production was arrived at by combining mine discharge, domestic use, and evaporation. Due to the fire, normal coal production and usage were not experienced. Pre-fire coal production resumed during late 1985. Much of the mine workings has been sealed since the fire. The location of the sealed areas and sumps are shown on Figure 11. As reported in the 1984 Annual Report, water discharged from the Wilberg Mine complex (includes the area designated as the Cottonwood Mine) decreased substantially from previous years (see Figure 12). The main reason for the large decrease was mining in areas dominated by mudstone roof. Future mining (next 10-15 years) will be centered in the southern reserves which, from surface and drill hole information, will continue the trend of lower in-mine water production. Consistent with previous years, the table below lists the factors involved in estimating in-mine water production:

Wilberg Mine Discharge	2.0 Million Gallons
Des-Bee-Dove Mine Transfer	5.2 Million Gallons
Estimated Evaporation*	19.0 Million Gallons
Domestic Usage	4.3 Million Gallons
Total Discharge	30.5 Million Gallons

* See 1981 Hydrologic Monitoring Report

b. In-Mine Quality. A total of eight samples was collected in the Cottonwood/Wilberg Mine in 1986. Table 26 lists the characteristics of the samples collected and compares the mean, minimum, and maximum results of 1986 to the historical values. The average

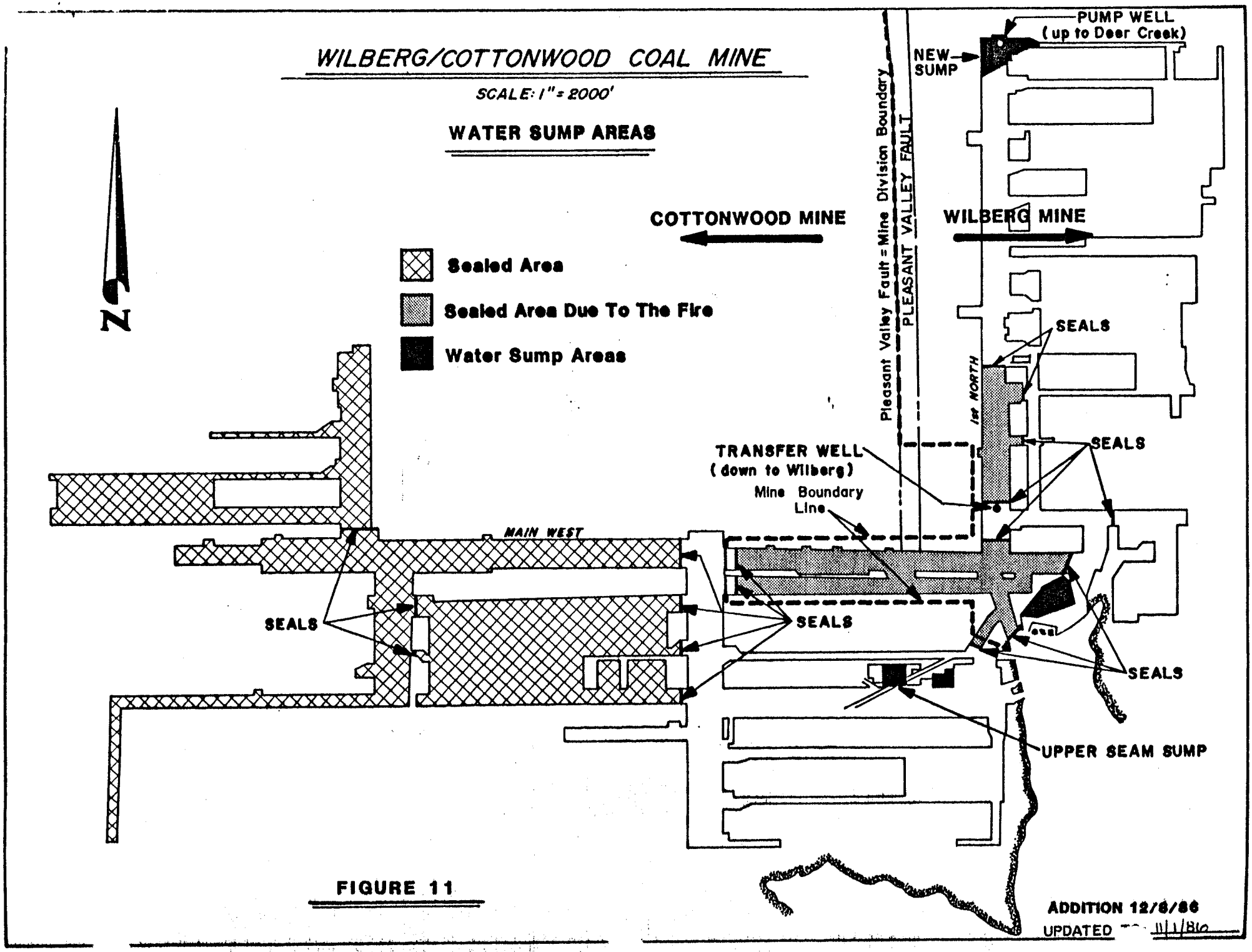
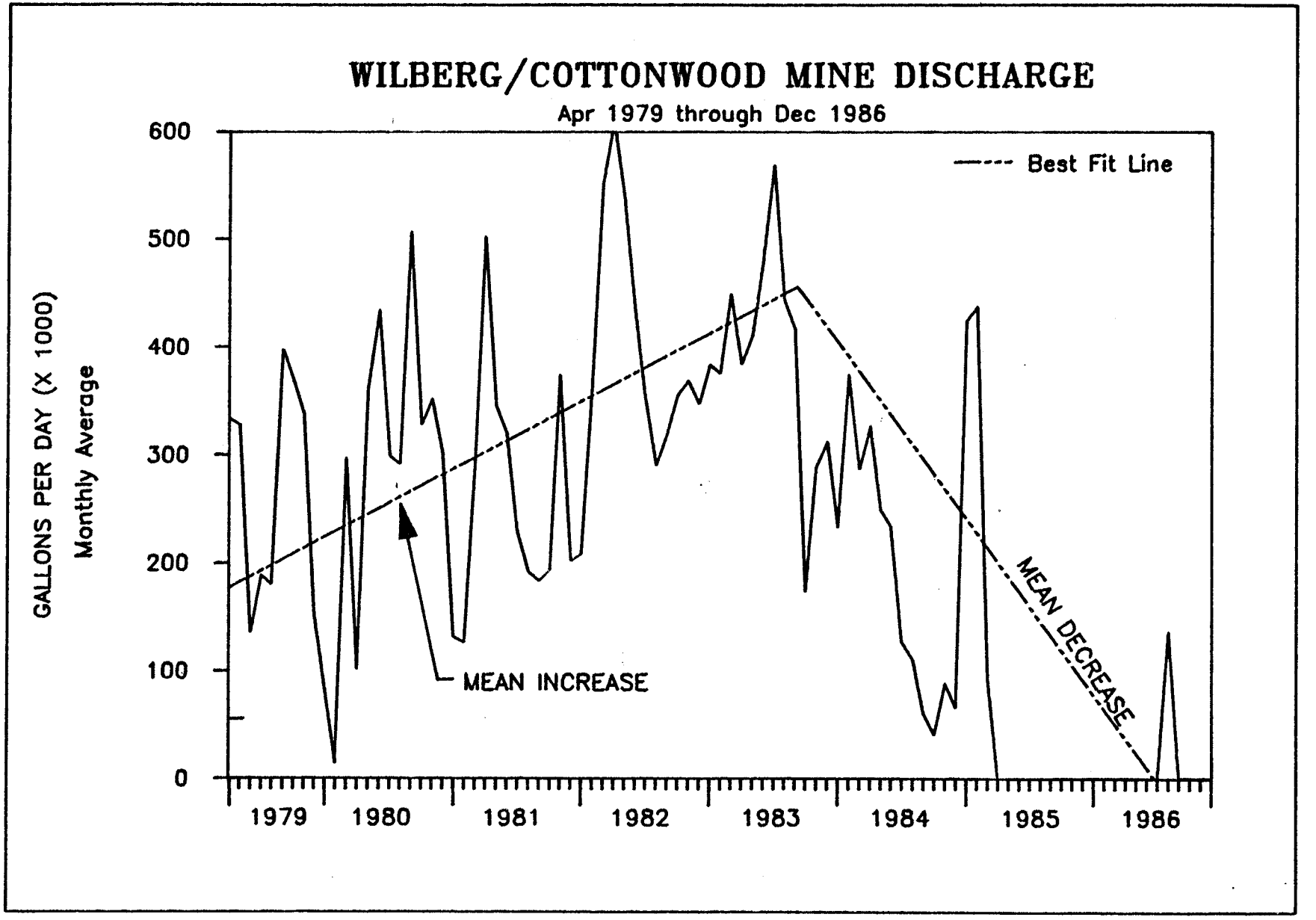

WILBERG/COTTONWOOD COAL MINE
SCALE: 1" = 2000'
WATER SUMP AREAS
N
Sealed Area
Sealed Area Due To The Fire
Water Sump Areas
COTTONWOOD MINE
WILBERG MINE
PUMP WELL
(up to Deer Creek)
NEW SUMP
Pleasant Valley Fault = Mine Division Boundary
PLEASANT VALLEY FAULT
1st NORTH
SEALS
SEALS
TRANSFER WELL
(down to Wilberg)
Mine Boundary Line
MAIN WEST
SEALS
SEALS
SEALS
UPPER SEAM SUMP
ADDITION 12/8/86
UPDATED 11/1/86

FIGURE 11

FIGURE 12


WILBERG/COTTONWOOD MINE DISCHARGE
Apr 1979 through Dec 1986
GALLONS PER DAY (X 1000)
Monthly Average
600
500
400
300
200
100
0
1979
1980
1981
1982
1983
1984
1985
1986
Best Fit Line
MEAN INCREASE
MEAN DECREASE

quality by location has remained relatively constant (refer to past water report for comparison of the individual sites). However, due to the five sites that were eliminated, the overall yearly averages do not correlate with the historical results (see Table 26). A complete chemical analysis of samples can be found in Appendix H.

TABLE 26: WILBERG IN-MINE WATER QUALITY

Location		pH	Alka.	Ca	Cl	Cond.	Mg	K	Na	SO_4	TDS	TSS
2Sxc-11, 1L		7.1	391	132	13.9	1600	107.0	4.8	24.7	400	920	2.0
4Exc-40, 2R		6.9	531	236	16.7	2600	164.2	5.4	24.8	750	1557	8.0
2Sxc-11, 1L		7.2	342	118	15.0	1400	104.5	5.0	23.8	400	932	<0.5
4Exc-24, 2L		7.2	378	238	24.0	2130	139.8	8.5	35.7	800	1520	<0.5
2Sxc-11, 1L		7.6	390	134	14.1	1480	108.2	5.5	24.7	410	915	<0.5
4Exc-24, 2L		7.2	398	236	23.0	2105	153.0	9.6	37.0	840	1605	1.0
2Sxc-11, 1L		7.5	335	122	15.1	1400	107.0	5.2	25.0	450	912	16.0
4Exc-24, 2L		7.3	393	252	28.4	2400	189.7	9.7	43.0	980	1898	17.0
	Min	6.9	335	118	13.9	1400	104.5	4.8	23.8	400	912	<0.5
1986	Max	7.6	531	252	28.4	2600	189.7	9.7	43.0	980	1898	17.0
	Mean	2.2	394.8	183.5	18.8	1889.4	134.2	6.7	29.8	628.8	1282.4	5.7
Hist.	Min	6.6	169	11.2	0.89	620	4.9	1.0	16.6	78	419	0.1
(1977-	Max	8.5	566	356	21.9	2200	163	21.0	183.8	780	1610	70.1
1985)	Mean	7.4	389.9	161.1	10.6	1182.9	54.0	6.5	41.9	272.6	724.2	3.8

c. Discharge Quantity. Under normal conditions water produced in the Wilberg Mine is pumped to a primary sump location within the Wilberg Mine workings by a complex pumping and piping system. The sump, which functions as a settling basis, effectively removes settleable solids from the water. A portion of this water is redistributed to various areas of the mine to be utilized in the mining operations. Water from the sump is also used to supply the water treatment plant at the Wilberg Mine and the Des-Bee-Dove mining complex. Excess water is discharged into the Left Fork of Grimes Wash after passing through an

oil skimmer in accordance with stipulations of the Wilberg Mine Discharge Permit UT-0022896. Approximately 2.0 million gallons were discharged during the month of August. Due to the minimal volume discharge, no samples were collected.

VI. Piezometric Gradient Information

A. Surface

1. EM-31 and EM-47. Two surface exploration drill holes which were developed into permanent water monitoring stations in 1978 continued to be monitored on a monthly basis, as access permitted (see Map No. 1).

Drill hole EM-31 in Cottonwood Creek Canyon was monitored monthly throughout 1986 (See Map No. 1 in pocket). The water level in the hole was at its highest, -40.6 feet, during the months of March, April, October, and November, and at it's lowest point, -41.8 feet, in July and August. Drill hole EM-47 in Rilda Canyon was accessible only during the months of May through December. During this time frame, the water was at its highest, -190.9 feet, in May and lowest, -206.4 feet, in November. Hydrographs of 1984, 1985, and 1986 data collected are shown in Figure 13.

2. Rilda Canyon Study Area. Five wells drilled and developed by West Appa Coal Co. were acquired by UP&L through a coal lease purchase agreement. The wells are located on the northeastern side of East Mountain adjacent to the abandoned Helco Mine. West Appa Coal Company's primary concern was the close proximity of proposed mining

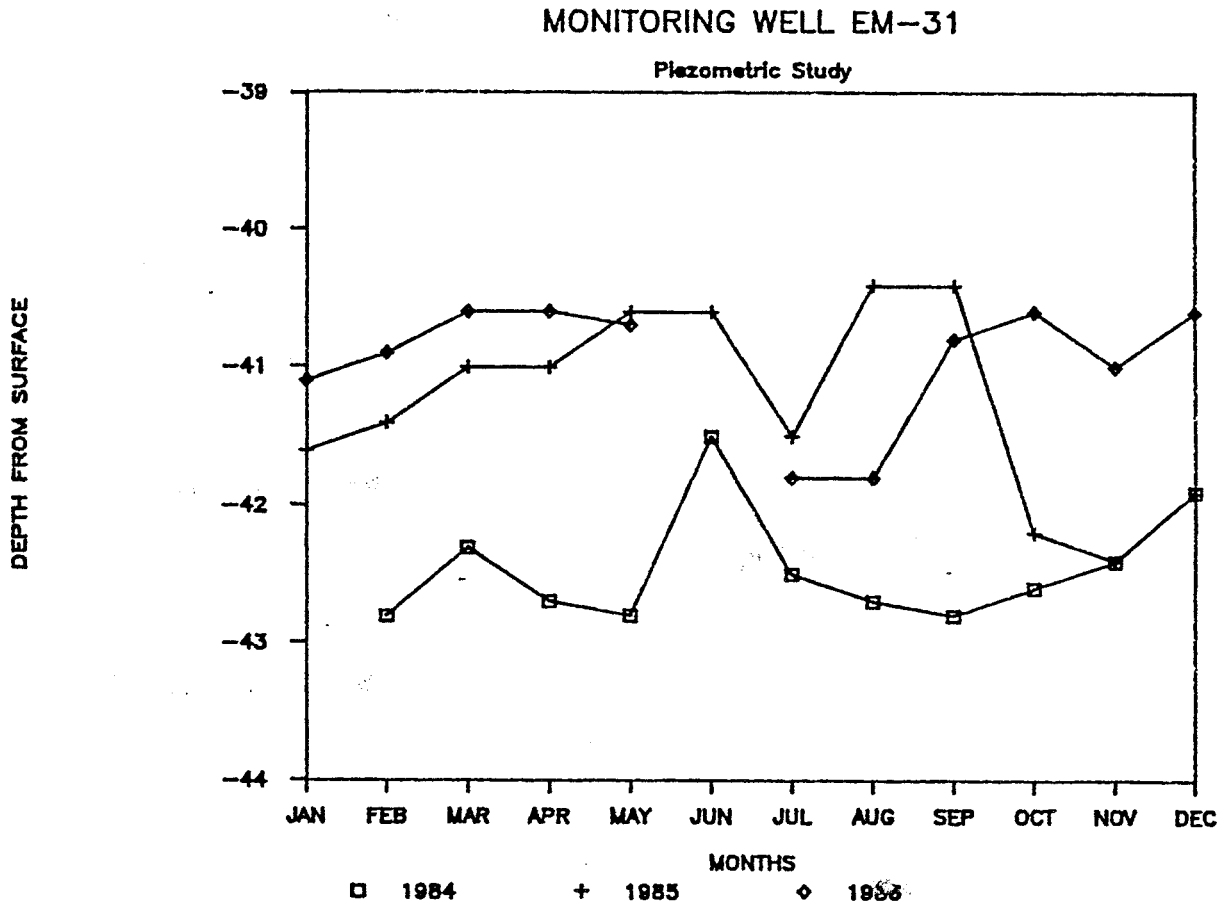
activities in Rilda Canyon to the springs, which are currently utilized as a culinary water source by North Emery Water Users Association (NEWUA). UP&L echoes the same concerns expressed by West Appa Coal Company due to the fact that both the Hiawatha and Blind Canyon Seams are mineable in the region surrounding the NEWUA springs.

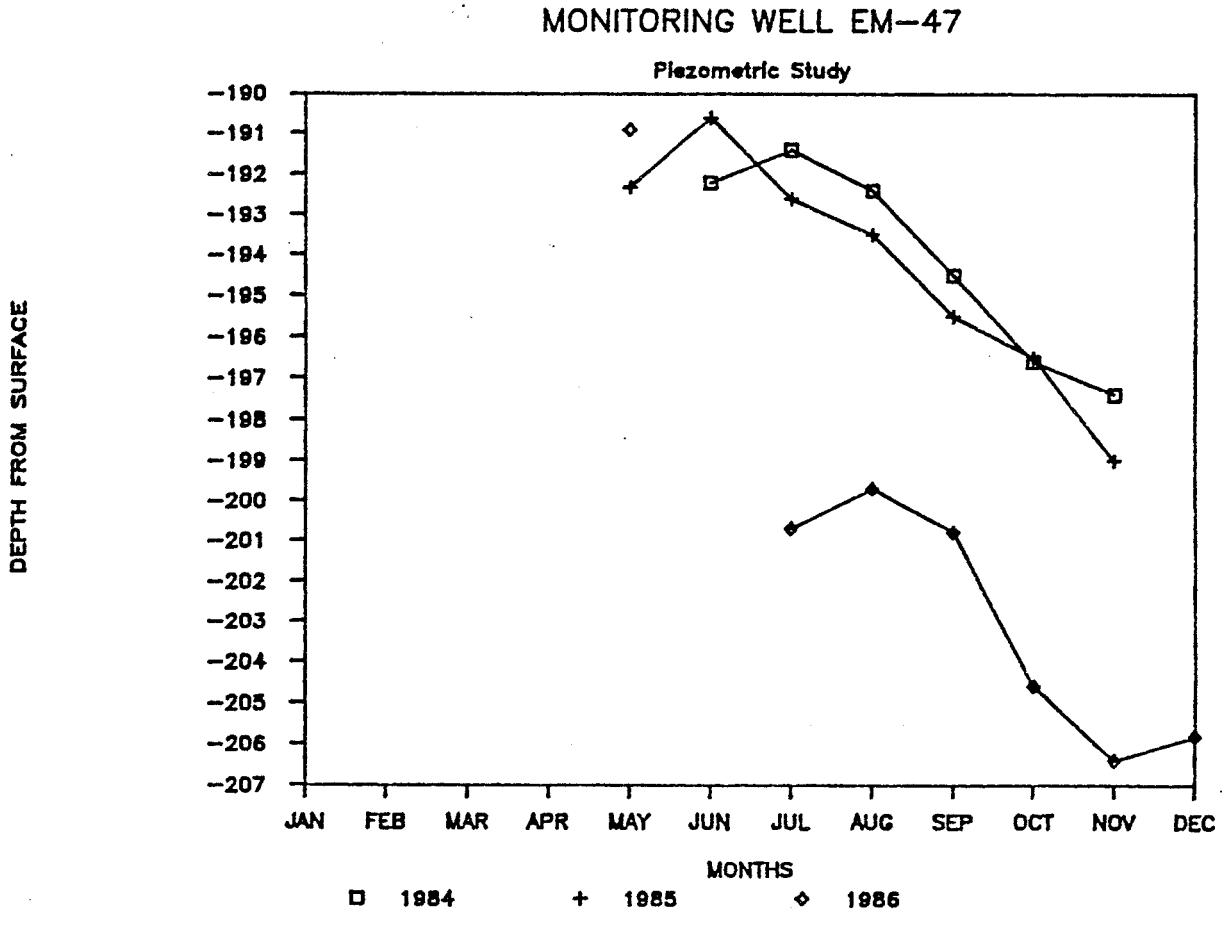
A study performed by Vaughn Hansen Associates indicated the Rilda Canyon Springs lie directly in line with a north-south trending side canyon on the south as well as one to the north. From examination of topographic features it appears that the linear relationship of side drainage channels (or lineament) can be traced on through Mill Fork Canyon to the north, intersecting the northeast-southwest trending graben (encounter by Beaver Creek Coal) near the northern ridge of Mill Fork Canyon. Said lineament could indicate the existence of a fracture system in the Star Point Sandstone extending into Rilda Canyon.

To verify the existence of a fracture zone in line with the lineament traced from Rilda Canyon into Mill Fork Canyon, a subsurface geotechnical technique known as Very Low Frequency analysis (VLF) was used. Two transects were run in an east-west direction across the Rilda Springs area, one along the northern road which bypasses the springs and the other along the road bypassing the springs to the south. In both transects a significant subsurface anomalous condition was encountered in the vicinity of the springs and directly in line with the north and south side canyons.

Evidenced by the location of the principal spring, the positioning of the concrete cutoff wall, the positioning of the performated pipe collection system behind the cutoff wall, and water quality data which will be subsequently discussed, the source of water

FIGURE 13


MONITORING WELL EM-31
Piezometric Study
DEPTH FROM SURFACE
-39
-40
-41
-42
-43
-44
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986


MONITORING WELL EM-47
Piezometric Study
DEPTH FROM SURFACE
-190
-191
-192
-193
-194
-195
-196
-197
-198
-199
-200
-201
-202
-203
-204
-205
-206
-207
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986

for the principal spring is from the north. The principal spring is directly in line with the north-south trending fracture zone identified by the VLF analysis. Therefore, the primary source of water for the Rilda Springs area is from the north via the fractured zone of the Star Point sandstone.

Water elevations from the five existing piezometers were collected on a monthly basis from July through December. Information collected during 1986 correlated well with the data Vaughn Hansen's utilized to construct the piezometric contour of the Rilda Springs area. The Vaughn Hansen study made several significant points concerning Rilda Creek in the vicinity of the springs. In general, one would expect groundwater to be flowing toward and recharging creek flows along its entire reach. However, above the spring area the stream is actually losing water to the groundwater system as evidenced by the fact that the water surface elevation at piezometer P-3 is some eleven (11) feet below the streambed at its nearest point. This phenomenon is due either to the existence of a fracture zone beneath the creek or a significant highly permeable gravel bed beneath the creek which is able to drain inflowing water from either the creek or groundwater system fast enough to prevent complete saturation of the overlying alluvial deposits. In this situation it is felt that the latter possibility is the case since subsequent VLF work revealed no significant anomalous subsurface conditions parallel to the stream and since a coarse water-bearing gravel bed was encountered at a depth of from 35 to 40 feet below ground surface (23 to 28 feet below the stream channel bottom) at piezometer P-3.

As the intersection of the north-south trending fracture system with the Rilda Creek channel is approached, the groundwater

surface elevation gradually approaches the stream channel elevation. At the intersection of the fracture system with the stream channel, which is the location of the principal producing spring area, the groundwater surface elevation has intersected the stream channel, with the creek receiving rather than losing water through this reach. Surfacing of the groundwater at this point could be due to one of two possible conditions: 1) The large inflow from the north may be too great for the gravel drain to handle, creating in essence a condition where the "groundwater reservoir" overflows simply because more water has been poured into the system than the system can handle, or 2) a physical disruption in the gravel drain may be present as the result of the fracture system at this location. This physical disruption may create a barrier or dyke to subsurface flow through the gravel bed, forcing the water to surface.

Below the spring area the stream again loses water to the gravel drain beneath. At piezometer P-1 below the spring area the water surface elevation is some four feet below the nearest stream channel bottom elevation.

Flow within the coarse gravel drain below the stream channel is directly tied into surface stream flow. Between September 24, 1982 and October 15, 1982 the water surface elevation in piezometer P-3 dropped only 0.7 feet with the creek still flowing on October 15. By December 6, 1982 the creek had dried up above the springs and the water level had fallen in piezometer P-3 below the bottom of the piezometer (a fall of at least 7 feet between October 15 and December 6). Below the springs the creek is perennial and between October 15, and December 6, 1982 piezometer P-1 dropped only 0.04 feet.

Data collected by UP&L during 1986 revealed similar trends in both P-1 and P-3 (Figure 14). On December 9, 1986 the stream above P-3 was dry and the water level had fallen below the bottom of the piezometer, whereas the level in P-1 dropped only 0.6 feet. Figure 15 on the following page compares the data collected during 1982 vs. 1986.

Further study is needed in defining the actual direction of the major groundwater influx. Utah Power & Light is currently considering performing a pump test, with permission granted by NEWUA, or geophysical alternatives to better define the actual direction of waterflow.

B. In-Mine. All remaining in-mine drill holes located in the Deer Creek Mine were destroyed by mining activities, primarily a diesel roadway construction project. Six new holes are tentatively scheduled to be drilled late in 1987.

VI. EFFECTS OF MINING AND SUBSIDENCE ON HYDROLOGY

Since the development of the UP&L mining complex on East Mountain, coal has been extracted causing the partial collapse of the immediate overburden strata and, ultimately, surface subsidence. This occurs in areas of retreat mining in room and pillar sections and in areas of longwall mining. All areas with potential for subsidence are monitored annually (see 1986 Subsidence Monitoring Report).

Figure 16 shows a comparison of annual precipitation with flow rates for springs located near one area of subsidence. The correlation is good except for 1984 when record warm temperatures caused peak spring flows to occur before springs were monitored in the summer.

FIGURE 14
RILDA CANYON STUDY AREA
1986 Piezometric Data

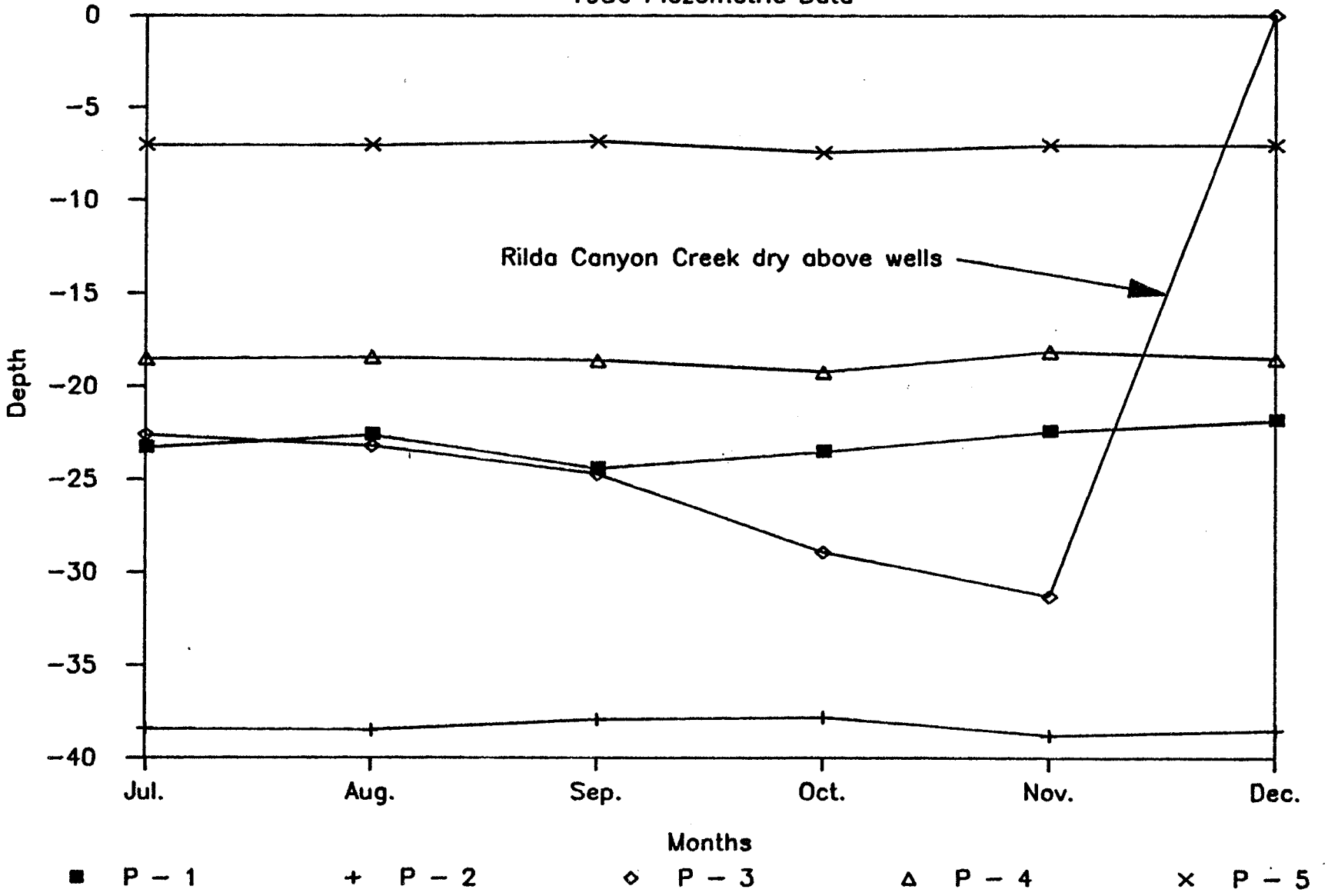
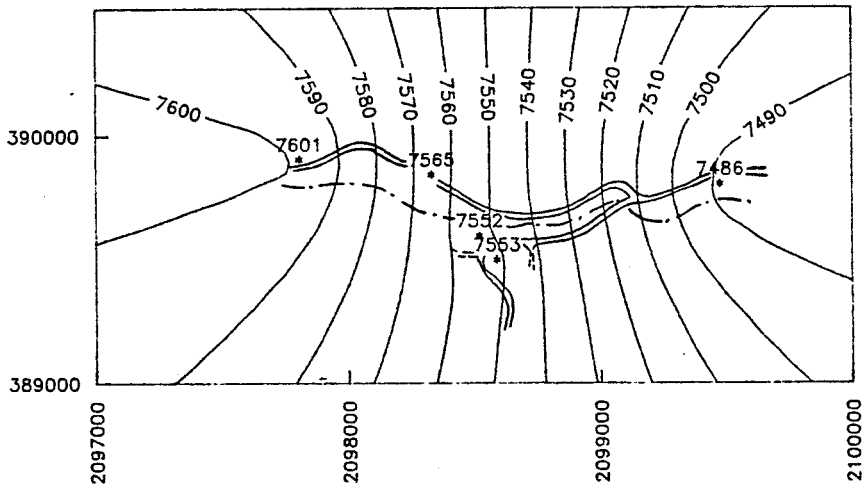


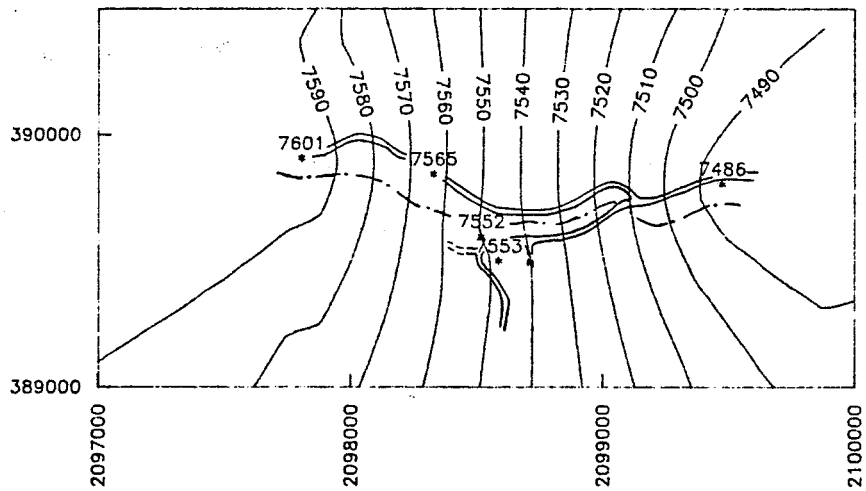
FIGURE 15

RILDA CANYON WELLS

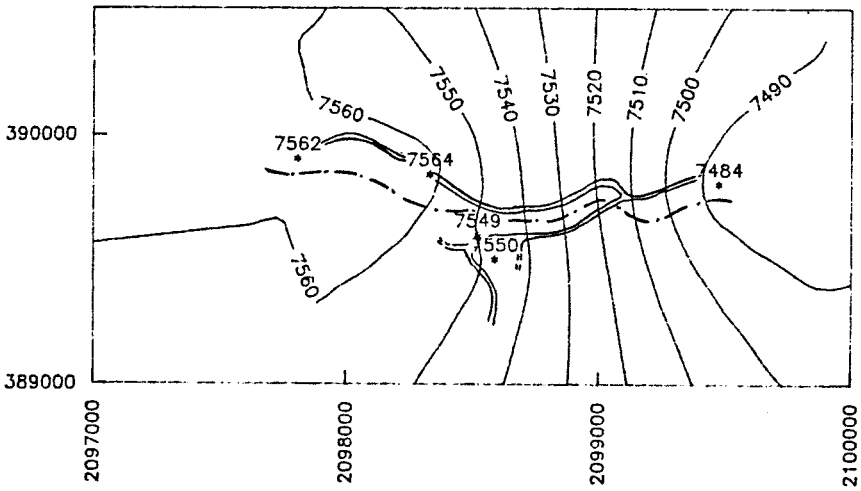
OCTOBER 1982



JULY 1986



DECEMBER 1986

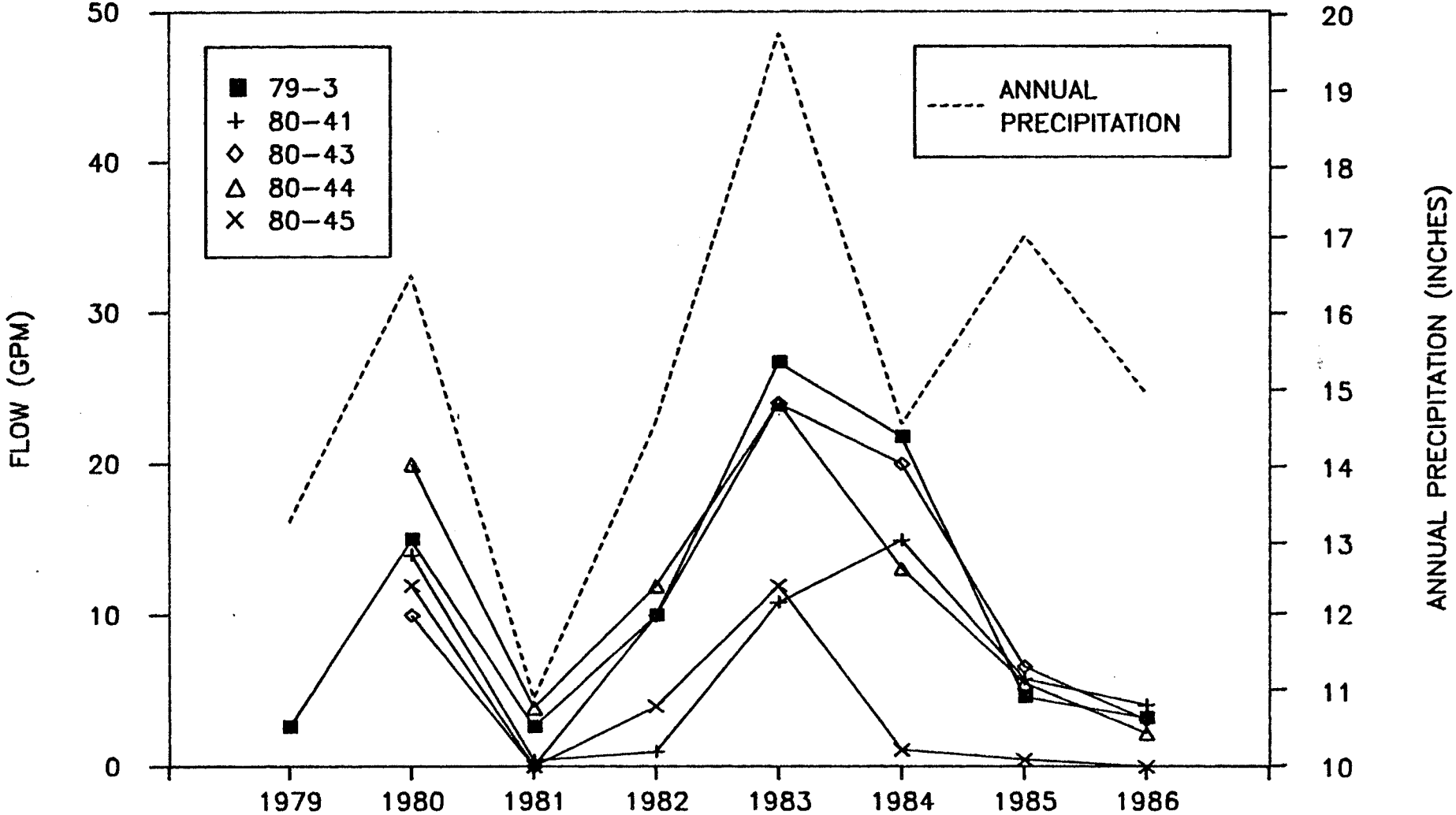


The springs and surface waters above all areas of mine workings are being monitored closely to measure the effects of mining. No mining related changes to the springs or surface waters have been identified in the data collected. The water flowing into the mine workings, although temporarily diverted or detained, has not had an impact on the surface waters of East Mountain or the surrounding area.

FIGURE 16

EAST MOUNTAIN SPRINGS

Over Deer Creek 1-5L & 1-5R



VIII. SUMMARY

Utah Power & Light Company has been conducting a water monitoring program in the area of its underground coal mines in Emery County, Utah in accordance with federal and state regulations. This program has been in existence since 1977, and this is the ninth annual report submitted concerning the hydrology.

Unusually high precipitation throughout 1982 - 1984 caused record level runoff and spring discharge rates for that period. A down trend in the precipitation pattern began in 1985 and continued through 1986 with conditions returning to slightly above normal.

Runoff for drainages surrounding East Mountain did not reach the peak flow levels recorded for previous years. The combined effect of lower precipitation received by East Mountain and above normal temperatures resulted in greater soil absorption and lower flow levels.

In accordance with the Deer Creek MRP, baseline quality analysis was performed on all surrounding drainages twice, once each at low and high flow conditions. Baseline analysis was conducted on in-mine as well as East Mountain springs.

During 1984 an East Mountain Spring Recession Study was initiated. This program continued through 1986 with similar discharge patterns being recorded. Several of the springs show a possible double porosity feature, meaning the springs discharge rate drops rapidly due to the snow pack runoff and the flow rate stabilizes at a lower value, which could be considered the formation porosity. Subsequent years of data will help in distinguishing this form.

The most important factor influencing the collection of hydrologic data pertaining to the mines was the 1984 Wilberg Mine fire. Due to the fire and rescue efforts, in-mine monitoring at Wilberg Mine was temporarily halted until the fourth quarter of 1985. Also, since the fire, average in-mine quality data will not correlate with the historical data due to five monitoring sites which were eliminated when portions of the mine were sealed after the fire. All other data pertaining to the mines remained relatively constant.

The data collected in 1986 continued to show the relationship between the variation in surface water quantity and precipitation, but the hydrologic monitoring completed on East Mountain to date has failed to identify any change in the quantity or quality of ground or surface water which can be attirbuted to mining present on the East Mountain property.

APPENDIX A

HUNTINGTON CREEK STREAM FLOWS/WATER QUALITY

UTAH POWER & L / COMPANY

STREAM DISCHARGE RECORDS

DAILY DISCHARGE (CFS)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	57.00	47.00	33.00	27.00	43.00	59.00	174.00	311.00	781.00	222.00	100.00	120.00	1
2	60.00	45.00	32.00	49.00	43.00	62.00	174.00	344.00	805.00	208.00	99.00	110.00	2
3	60.00	44.00	27.00	41.00	45.00	64.00	163.00	387.00	832.00	198.00	103.00	107.00	3
4	60.00	33.00	24.00	31.00	40.00	66.00	157.00	422.00	753.00	198.00	108.00	107.00	4
5	61.00	36.00	21.00	33.00	43.00	67.00	154.00	354.00	744.00	199.00	109.00	105.00	5
6	61.00	31.00	23.00	41.00	46.00	69.00	156.00	335.00	794.00	181.00	108.00	103.00	6
7	97.00	32.00	34.00	25.00	41.00	69.00	159.00	322.00	731.00	171.00	112.00	103.00	7
8	96.00	35.00	36.00	25.00	42.00	70.00	158.00	322.00	679.00	168.00	122.00	104.00	8
9	71.00	34.00	36.00	45.00	32.00	73.00	157.00	344.00	575.00	162.00	119.00	107.00	9
10	72.00	30.00	37.00	44.00	29.00	65.00	157.00	340.00	501.00	156.00	116.00	98.00	10
11	72.00	33.00	26.00	40.00	52.00	61.00	160.00	363.00	478.00	153.00	117.00	95.00	11
12	68.00	36.00	27.00	34.00	43.00	62.00	162.00	419.00	488.00	147.00	126.00	97.00	12
13	66.00	36.00	58.00	35.00	47.00	66.00	170.00	405.00	489.00	145.00	149.00	102.00	13
14	61.00	44.00	47.00	33.00	50.00	81.00	164.00	423.00	489.00	151.00	147.00	104.00	14
15	61.00	30.00	37.00	43.00	48.00	81.00	163.00	398.00	476.00	157.00	146.00	101.00	15
16	56.00	35.00	34.00	40.00	52.00	85.00	168.00	348.00	455.00	169.00	145.00	104.00	16
17	55.00	38.00	26.00	41.00	48.00	84.00	167.00	340.00	428.00	166.00	144.00	119.00	17
18	64.00	36.00	36.00	41.00	54.00	87.00	165.00	376.00	417.00	160.00	143.00	123.00	18
19	63.00	22.00	35.00	40.00	53.00	91.00	163.00	436.00	409.00	159.00	145.00	114.00	19
20	60.00	28.00	36.00	43.00	39.00	94.00	168.00	463.00	380.00	160.00	143.00	107.00	20
21	60.00	32.00	35.00	41.00	46.00	97.00	185.00	465.00	350.00	162.00	147.00	112.00	21
22	62.00	33.00	41.00	38.00	52.00	101.00	186.00	480.00	326.00	160.00	148.00	112.00	22
23	62.00	43.00	43.00	44.00	55.00	119.00	174.00	443.00	309.00	160.00	145.00	125.00	23
24	44.00	46.00	42.00	41.00	55.00	124.00	191.00	460.00	297.00	158.00	151.00	148.00	24
25	40.00	44.00	43.00	39.00	56.00	117.00	187.00	518.00	292.00	156.00	143.00	137.00	25
26	41.00	39.00	38.00	40.00	58.00	113.00	214.00	591.00	289.00	151.00	139.00	132.00	26
27	46.00	35.00	41.00	43.00	59.00	121.00	207.00	685.00	273.00	145.00	120.00	134.00	27
28	53.00	33.00	42.00	43.00	58.00	144.00	189.00	762.00	261.00	141.00	104.00	130.00	28
29	46.00	41.00	41.00	45.00	0.00	151.00	178.00	780.00	248.00	136.00	112.00	128.00	29
30	47.00	41.00	45.00	44.00	0.00	157.00	236.00	781.00	239.00	107.00	106.00	124.00	30
31	48.00	0.00	39.00	45.00	0.00	168.00	0.00	787.00	0.00	103.00	116.00	0.00	31
MONTHLY													
TOT	1870.00	1092.00	1115.00	1214.00	1329.00	2868.00	5206.00	14204.00	14588.00	5009.00	3932.00	3412.00	
MEA	60.30	36.40	36.00	39.20	47.50	92.50	174.00	458.00	486.00	162.00	127.00	114.00	
MAX	97.00	47.00	58.00	49.00	59.00	168.00	236.00	787.00	832.00	222.00	151.00	148.00	
MIN	40.00	22.00	21.00	25.00	29.00	59.00	154.00	311.00	239.00	103.00	99.00	95.00	
ACR FT	3710.00	2170.00	2210.00	2410.00	2640.00	5690.00	10330.00	28170.00	28930.00	9940.00	7800.00	6770.00	

OCT85-SEPT86 TOTAL 55839.00 MEAN 153.00 MAX 832.00 MIN 21.00 TOT ACR FT 110800.00

TOTAL MEAN MAX MIN TOT ACR FT

MAX UNIT DISCHARGE 933.00 CFS DATE JUN 3 MIN UNIT DISCHARGE 0.00 CFS DATE NOV 15
(4.27 FT)

REMARKS:

01/12/87

UTAH POWER & LIGHT COMPANY

INFLOW AND UTILIZATION RECORDS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	223.28	42.32	46.24	44.58	29.69	52.66	127.95	246.28	1001.17	242.44	89.15	89.48	1
2	52.09	41.93	45.98	34.88	37.71	51.98	158.22	321.55	986.46	236.01	84.37	103.28	2
3	29.60	36.74	27.68	11.75	32.89	53.30	182.87	379.34	959.93	220.16	83.81	104.53	3
4	21.80	36.74	26.09	36.68	27.88	56.67	181.33	417.53	1062.45	204.64	82.68	86.26	4
5	25.73	38.08	25.62	28.77	34.80	57.28	146.93	497.42	1014.33	193.39	86.07	83.18	5
6	36.71	27.10	19.43	15.38	29.84	56.73	121.79	562.01	787.49	194.17	90.76	82.75	6
7	40.32	31.65	12.16	19.63	28.46	58.82	117.41	465.95	773.15	193.87	91.97	80.81	7
8	41.07	25.31	13.08	30.70	33.89	61.86	119.73	387.04	795.74	176.39	90.57	78.31	8
9	75.42	23.24	21.12	22.75	29.00	61.48	126.55	335.38	711.69	167.65	94.21	78.43	9
10	106.51	29.11	26.87	9.39	28.55	70.26	129.70	323.10	653.30	167.23	104.44	80.22	10
11	85.47	32.93	26.92	19.59	21.64	80.30	127.87	320.95	549.88	162.15	100.30	84.28	11
12	66.47	26.88	22.30	29.39	20.73	67.47	124.00	269.46	478.80	154.71	97.25	78.79	12
13	72.55	30.49	11.80	24.32	43.51	58.96	126.76	270.92	462.15	153.73	99.36	74.71	13
14	68.75	44.36	10.06	16.03	35.13	51.54	128.54	336.37	480.88	150.73	108.91	72.27	14
15	66.38	39.03	39.75	21.02	38.90	42.75	139.12	336.56	487.77	149.61	132.13	80.09	15
16	62.06	36.01	39.60	21.43	42.55	51.47	129.14	374.53	486.33	155.70	128.38	85.31	16
17	57.65	23.55	24.71	31.07	39.74	46.01	122.79	385.59	469.04	161.37	127.15	79.90	17
18	49.78	29.15	15.50	26.77	44.18	53.21	134.27	370.78	445.76	174.99	128.20	82.02	18
19	50.95	33.98	13.67	26.55	39.54	53.22	137.52	367.78	417.42	164.77	125.80	96.45	19
20	59.06	35.51	23.75	28.12	45.70	51.78	127.78	408.12	409.17	155.83	122.50	101.36	20
21	56.96	18.23	22.37	24.96	44.61	54.94	119.20	505.54	402.78	155.13	125.07	93.47	21
22	56.22	19.88	23.43	34.08	31.08	56.55	126.34	611.30	370.00	148.21	124.57	84.00	22
23	55.00	29.04	22.86	30.52	38.01	60.91	154.59	711.79	339.43	148.31	130.87	87.32	23
24	54.15	26.84	27.96	21.03	44.64	66.17	197.85	779.98	315.21	148.00	132.35	88.90	24
25	61.35	35.50	30.63	29.33	47.55	85.59	244.85	720.23	300.26	150.84	127.31	103.73	25
26	42.61	46.79	30.10	26.98	46.46	92.85	297.21	703.79	289.58	150.47	131.95	138.17	26
27	33.29	55.12	30.09	23.55	48.11	87.45	286.41	764.59	286.03	148.46	124.12	131.15	27
28	36.94	42.97	25.86	25.06	50.56	83.72	261.24	886.24	286.42	141.22	119.39	122.47	28
29	42.91	26.51	28.03	28.64	0.00	85.61	210.46	995.38	269.92	131.13	101.00	119.36	29
30	47.65	28.86	29.18	29.89	0.00	99.32	206.92	1021.09	255.71	126.60	83.72	111.11	30
31	40.24	0.00	30.85	28.60	0.00	110.27	0.00	1009.57	0.00	119.78	94.11	0.00	31
MONTHLY													
TOT	1818.95	993.88	793.71	801.44	1035.34	2021.13	4815.36	16086.17	16548.26	5147.68	3362.47	2782.10	
MEA	58.68	33.13	25.60	25.85	36.98	65.20	160.51	518.91	551.61	166.05	108.47	92.74	
MAX	223.28	55.12	46.24	44.58	50.56	110.27	297.21	1021.09	1062.45	242.44	132.35	138.17	
MIN	21.80	18.23	10.06	9.39	20.73	42.75	117.41	246.28	255.71	119.78	82.68	72.27	

OCT85-SEPT86 TOTAL 56206. MEAN 154. MAX 1062. MIN 9.

TOTAL MEAN MAX MIN

REMARKS:

01/12/87

ENG0006A HUNTINGTON CREEK BELOW ELECTRIC LAKE OCT85-SEPT86 PAGE 0

UTAH POWER & LIGHT COMPANY

STREAM DISCHARGE RECORDS

DAILY DISCHARGE (CFS)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	29.00	14.00	13.00	21.00	21.00	21.00	81.00	122.00	182.00	43.00	29.00	32.00	1
2	29.00	14.00	14.00	21.00	21.00	20.00	80.00	123.00	133.00	41.00	28.00	32.00	2
3	29.00	14.00	16.00	21.00	21.00	20.00	80.00	119.00	181.00	40.00	28.00	32.00	3
4	29.00	14.00	18.00	21.00	21.00	20.00	80.00	119.00	288.00	39.00	27.00	32.00	4
5	29.00	14.00	19.00	21.00	21.00	20.00	79.00	118.00	323.00	37.00	27.00	32.00	5
6	29.00	14.00	22.00	21.00	21.00	19.00	79.00	113.00	315.00	34.00	27.00	32.00	6
7	29.00	14.00	22.00	21.00	21.00	19.00	79.00	110.00	275.00	33.00	26.00	32.00	7
8	23.00	14.00	22.00	21.00	21.00	19.00	78.00	152.00	245.00	32.00	26.00	32.00	8
9	14.00	14.00	22.00	21.00	21.00	19.00	78.00	184.00	210.00	31.00	25.00	32.00	9
10	14.00	14.00	22.00	21.00	21.00	19.00	78.00	183.00	174.00	30.00	25.00	26.00	10
11	14.00	14.00	22.00	21.00	21.00	23.00	78.00	182.00	153.00	25.00	24.00	29.00	11
12	14.00	14.00	22.00	21.00	20.00	26.00	78.00	181.00	144.00	21.00	24.00	29.00	12
13	14.00	14.00	22.00	21.00	19.00	35.00	77.00	180.00	141.00	20.00	23.00	30.00	13
14	14.00	14.00	22.00	21.00	19.00	45.00	78.00	179.00	133.00	21.00	23.00	30.00	14
15	14.00	14.00	22.00	21.00	19.00	46.00	77.00	119.00	125.00	20.00	22.00	30.00	15
16	14.00	14.00	22.00	21.00	19.00	46.00	77.00	96.00	115.00	21.00	21.00	30.00	16
17	14.00	14.00	22.00	21.00	55.00	46.00	77.00	96.00	106.00	21.00	21.00	30.00	17
18	14.00	14.00	22.00	21.00	21.00	47.00	76.00	95.00	96.00	27.00	21.00	21.00	18
19	14.00	14.00	22.00	21.00	21.00	48.00	76.00	95.00	89.00	30.00	20.00	24.00	19
20	14.00	15.00	22.00	21.00	21.00	48.00	76.00	43.00	85.00	30.00	20.00	27.00	20
21	14.00	17.00	22.00	21.00	21.00	49.00	76.00	18.00	78.00	30.00	22.00	27.00	21
22	14.00	17.00	22.00	21.00	21.00	49.00	42.00	18.00	71.00	30.00	29.00	27.00	22
23	14.00	17.00	22.00	21.00	21.00	49.00	20.00	18.00	65.00	30.00	32.00	27.00	23
24	14.00	17.00	22.00	21.00	21.00	49.00	20.00	27.00	60.00	29.00	32.00	27.00	24
25	14.00	17.00	22.00	21.00	21.00	49.00	37.00	36.00	57.00	29.00	32.00	27.00	25
26	14.00	14.00	22.00	21.00	21.00	49.00	76.00	36.00	56.00	29.00	32.00	24.00	26
27	14.00	13.00	22.00	21.00	21.00	68.00	76.00	118.00	54.00	29.00	32.00	21.00	27
28	14.00	13.00	22.00	21.00	21.00	83.00	24.00	143.00	51.00	29.00	32.00	21.00	28
29	14.00	13.00	22.00	21.00	0.00	83.00	14.00	143.00	49.00	29.00	32.00	21.00	29
30	14.00	13.00	22.00	21.00	0.00	83.00	81.00	172.00	47.00	29.00	32.00	21.00	30
31	14.00	0.00	22.00	21.00	0.00	83.00	0.00	184.00	0.00	29.00	32.00	0.00	31
MONTHLY													
TOT	548.00	432.00	652.00	651.00	613.00	1300.00	2028.00	3522.00	4101.00	918.00	826.00	837.00	
MEA	17.70	14.40	21.00	21.00	21.90	41.90	67.60	114.00	137.00	29.60	26.60	27.90	
MAX	29.00	17.00	22.00	21.00	55.00	83.00	81.00	184.00	323.00	43.00	32.00	32.00	
MIN	14.00	13.00	13.00	21.00	19.00	19.00	14.00	18.00	47.00	20.00	20.00	21.00	
ACR FT	1090.00	857.00	1290.00	1290.00	1220.00	2580.00	4020.00	6990.00	8130.00	1820.00	1640.00	1660.00	

	TOTAL	MEAN	MAX	MIN	TOT ACR FT
OCT85-SEPT86	16428.00	45.00	323.00	13.00	32580.00

MAX UNIT DISCHARGE 434.00 CFS DATE FEB 17 MIN UNIT DISCHARGE 1.60 CFS DATE NOV 20
(4.11 FT)

REMARKS:

12/22/86

1986 ELECTRIC LAKE REPORT

LOCATION	DATE	PARAMETER	CODE	VALUE
H1	01/27/86	FCOND		454.0000
		FPH		8.6700
COMMENT = CLEAR, VERY ICY				
	02/10/86	ALK		201.0000
		FCOND		457.0000
		FPH		8.4700
		SO4		33.0000
		SUSOLID		10.0000
		TDS		250.0000
COMMENT = CLEAR, EXTREMELY ICY				
	03/13/86	FCOND		596.0000
		FPH		8.7200
COMMENT = H2O A LITTLE CLOUDY				
	06/03/86	FCOND		295.0000
		FPH		8.6000
COMMENT =				
	06/16/86	ALK		140.0000
		FCOND		311.0000
		FPH		8.2000
		SO4		39.0000
		SUSOLID		63.0000
		TDS		192.0000
COMMENT =				
	07/30/86	FCOND		372.0000
		FPH		8.6600
COMMENT = DO METER IS IN FOR REPAIR				
	08/20/86	FCOND		371.0000
		FPH		8.6000
COMMENT =				
	09/09/86	ALK		170.0000
		FCOND		328.0000
		FPH		8.3000
		SO4		72.0000
		SUSOLID		13.0000
		TDS		385.0000
COMMENT =				
	11/03/86	ALK		184.0000
		FCOND		385.0000
		FPH		8.3000
		SO4		30.0000
		SUS		8.0000
		TDS		230.0000

1986 ELECTRIC LAKE REPORT

LO ION	DATE	PARAMETER	CODE	VALUE

COMMENT = MOSTLY SUNNY, WINDY, COOL

1986 ELECTRIC LAKE REPORT

LOCATION	DATE	PARAMETER	CODE	VALUE
UPL2	01/27/86	FCOND		486.0000
		FPH		8.6700
		SUSOLID		5.0000
		TDS		302.0000
COMMENT = MONTHLY REPORT				
	02/10/86	FCOND		170.9000
		FPH		8.3600
		SO4		25.0000
		SUSOLID		3.0000
		TDS		288.0000
COMMENT = MONTHLY REPORT				
	03/13/86	FCOND		496.0000
		FPH		8.7000
		SO4		21.0000
		SUSOLID		2.0000
		TDS		210.0000
COMMENT = MONTHLY REPORT				
	04/23/86	SO4		26.0000
		SUSOLID		39.0000
		TDS		232.0000
COMMENT = MONTHLY REPORT				
	06/03/86	FCOND		247.0000
		FPH		8.4000
		SO4		16.0000
		SUSOLID		85.0000
		TDS		132.0000
COMMENT = MONTHLY REPORT				
	06/16/86	FCOND		272.0000
		FPH		8.1000
		SO4		71.0000
		SUSOLID		38.0000
		TDS		102.0000
COMMENT = MONTHLY REPORT				
	07/30/86	FCOND		301.0000
		FPH		8.5400
		SO4		16.0000
		SUSOLID		5.0000
		TDS		206.0000
COMMENT = MONTHLY REPORT				
	08/20/86	FCOND		332.0000
		FPH		8.8000
		SO4		17.0000
		SUSOLID		5.0000

1986 ELECTRIC LAKE REPORT

LOCATION	DATE	PARAMETER	CODE	VALUE
UPL2	08/20/86	TDS		182.0000
COMMENT =	CLEAR			
	09/08/86	FCOND		306.0000
		FPH		8.4000
		SO4		17.0000
		SUSOLID		2.0000
		TDS		184.0000
COMMENT =				
	10/27/86	FCOND		331.0000
		FPH		8.0000
		SO4		19.0000
		SUS	<	1.0000
		TDS		192.0000
COMMENT =				
	11/03/86	FCOND		327.0000
		FPH		8.0000
		SO4		21.0000
		SUS		7.6000
		TDS		204.0000
COMMENT =				
	12/08/86	FCOND		343.0000
		FPH		7.9000
		SO4		17.0000
		SUS		35.0000
		TDS		174.0000
COMMENT =	SUNNY, COLD			

1986 ELECTRIC LAKE REPORT

LOCATION	TEST_DATE	PARAMETER	CODE	VALUE
UPL1	86/01/27	FCOND		384.0000
		FPH		8.5900
		TDS		270.0000
COMMENT = MONTHLY REPORT				
	86/02/10	FCOND		422.0000
		FPH		8.5700
		SO4		20.0000
		TDS		250.0000
COMMENT = MONTHLY REPORT				
	86/03/13	FCOND		596.0000
		FPH		8.5800
		SO4		24.0000
		TDS		238.0000
COMMENT =				
	86/04/23	SO4		28.0000
		TDS		216.0000
COMMENT =				
	86/06/03	FCOND		282.0000
		FPH		8.9000
		SO4		19.0000
		TDS		156.0000
COMMENT =				

1986 ELECTRIC LAKE REPORT

LOCATION	DATE	PARAMETER	CODE	VALUE
UPL1	06/16/86	FCOND		303.0000
		FPH		8.2000
		SO4		5.0000
		SUSOLID		26.0000
		TDS		102.0000
COMMENT = MONTHLY REPORT				
	07/31/86	FCOND		278.0000
		FPH		8.6100
		SO4		8.0000
		SUSOLID		17.0000
		TDS		162.0000
COMMENT = MONTHLY REPORT				
	08/20/86	FCOND		294.0000
		FPH		8.5000
		SO4		8.0000
		SUSOLID		13.0000
		TDS		144.0000
COMMENT = AVE. FLOW				
	09/08/86	FCOND		283.0000
		FPH		8.4000
		SO4		11.0000
		SUSOLID		11.0000
		TDS		162.0000
COMMENT =				
	10/27/86	FCOND		400.0000
		FPH		8.0000
		SO4		14.0000
		SUS	<	1.0000
		TDS		202.0000
COMMENT =				
	11/08/86	FCOND		399.0000
		FPH		8.0000
		SO4		16.0000
		SUS		8.0000
		TDS		232.0000
COMMENT =				
	12/08/86	FCOND		434.0000
		FPH		8.0000
		SO4		16.0000
		SUS		3.0000
		TDS		210.0000
COMMENT =				

1986 ELECTRIC LAKE REPORT

LOCATION	DATE	PARAMETER	CODE	VALUE
UPL3	01/27/86	FCOND		283.0000
		FPH		8.0500
		SUSOLID	<	1.0000
		TDS		204.0000
COMMENT = MONTHLY REPORT				
	02/10/86	FCOND		468.0000
		FPH		8.2700
		SO4		16.0000
		SUSOLID		1.0000
		TDS		224.0000
COMMENT = MONTHLY REPORT				
	03/13/86	FCOND		342.0000
		FPH		7.7100
		SO4		13.0000
		SUSOLID		2.0000
		TDS		156.0000
COMMENT = MONTHLY REPORT				
	04/23/86	SO4	<	1.0000
		SUSOLID		3.0000
		TDS		162.0000
COMMENT = HYDROLAB BROKEN				
	06/03/86	FCOND		182.0000
		FPH		8.8000
		SO4		11.0000
		SUSOLID		17.0000
		TDS		74.0000
COMMENT = MONTHLY REPORT				
	06/16/86	FCOND		218.0000
		FPH		8.3000
		SO4		6.0000
		SUSOLID		15.0000
		TDS		92.0000
COMMENT = MONTHLY REPORT				
	07/31/86	FCOND		252.0000
		FPH		8.2400
		SO4		11.0000
		SUSOLID		2.0000
		TDS		156.0000
COMMENT = MONTHLY REPORT				
	08/20/86	FCOND		255.0000
		FPH		8.0000
		SO4		11.0000
		SUSOLID		3.0000

1986 ELECTRIC LAKE REPORT

LOCATION	DATE	PARAMETER	CODE	VALUE
UPL3	08/20/86	TDS		130.0000
COMMENT =	CLEAR			
	09/08/86	FCOND		295.0000
		FPH		7.7000
		SO4		8.0000
		SUSOLID		2.0000
		TDS		152.0000
COMMENT =	CLEAR			
	10/27/86	FCOND		246.0000
		FPH		7.7000
		SO4		11.0000
		SUS		3.0000
		TDS		138.0000
COMMENT =				
	11/03/86	FCOND		246.0000
		FPH		7.7000
		SO4		15.0000
		SUS		8.0000
		TDS		162.0000
COMMENT =				
	12/08/86	FCOND		261.0000
		FPH		7.5000
		SO4		11.0000
		SUS		1.0000
		TDS		122.0000
COMMENT =				

1986 ELECTRIC LAKE REPORT

LOCATION	DATE	PARAMETER	CODE	VALUE
UPL9	02/10/86	ALK		201.0000
		FCOND		624.0000
		FPH		8.5700
		SO4		60.0000
		SUSOLID		5.0000
		TDS		290.0000
COMMENT = CLEAR, EXTREMELY ICY				
	06/17/86	ALK		146.0000
		FCOND		444.0000
		FPH		8.3000
		SO4		22.0000
		SUSOLID		64.0000
		TDS		159.0000
COMMENT =				
	09/09/86	ALK		566.0000
		FCOND		2960.0000
		FPH		8.5400
		SO4		35.0000
		SUSOLID		21.0000
		TDS		650.0000
COMMENT =				
	11/03/86	ALK		184.0000
		FCOND		287.0000
		FPH		8.1000
		SO4		75.0000
		SUSOLID		9.0000
		TDS		300.0000
COMMENT = MOSTLY SUNNY, WINDY				

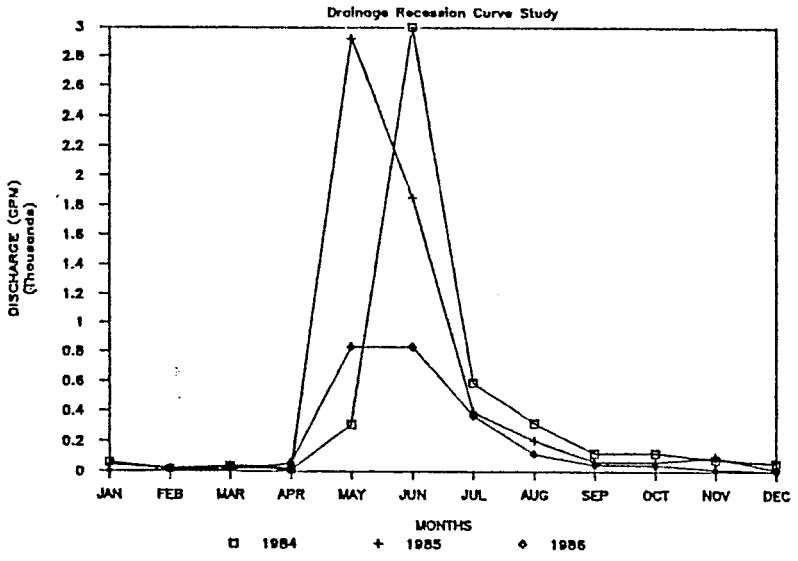
LOCATION	LOC_DESC
H1	HUNTINGTON CREEK BELOW DIVERSION
UPL1	LEFT FORK HUNTINGTON CREEK
UPL3	HUNTINGTON CR BELOW ELECT. LAKE
UPL9	HUNTINGTON CREEK ABOVE FISH CR
UPL3	HUNTINGTON CREEK - RIGHT FORK

PARA_CODE	PARAMETER
ALK	ALKALINITY
FCOND	FIELD CONDUCTIVITY
FPH	FIELD PH
SO4	SULFATE
SUS	SOLIDS-SUSPENDED
SUSOLID	SOLIDS-SUSPENDED
TDS	SOLIDS-TOTAL DISSOLVED

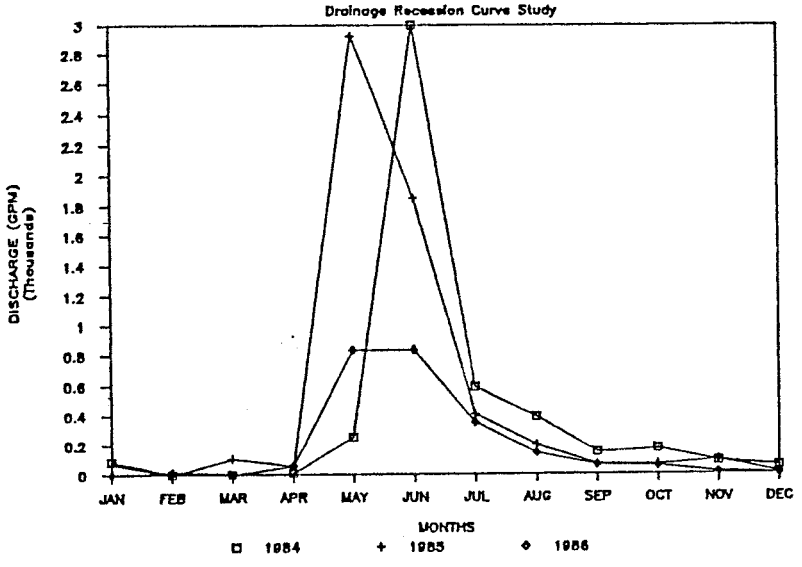
APPENDIX B

DEER CREEK SURFACE WATER FLOW AND QUALITY

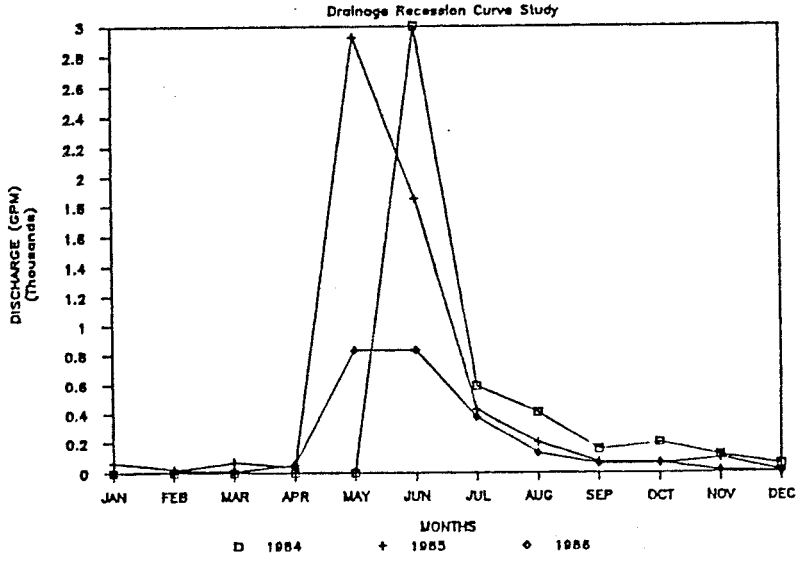
DEER CREEK ABOVE MINE



DEER CREEK BELOW MINE



DEER CREEK @ PERMIT BOUNDARY



CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7766

Date Rec'd 1-13-86

Date Sampled 1-13-86

Time Sampled 1055

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK
ABOVE THE MINE

Temp. 32°

Flow <5.0 GPM

Acidity		mg/l $CaCO_3$	Aluminum		mg/l
Alkalinity, Total		mg/l $CaCO_3$	Arsenic		mg/l
Alkalinity, Bicarbonate		mg/l $CaCO_3$	Barium		mg/l
Alkalinity, Carbonate		mg/l $CaCO_3$	Beryllium		mg/l
Chloride		mg/l	Boron		mg/l
Coliform, Fecal		MPN/100 ml	Cadmium		mg/l
Coliform, Total		MPN/100 ml	Calcium		mg/l
Conductivity 1-15	660	µmhos/cm	Chromium		mg/l
Fluoride		mg/l	Copper		mg/l
Hardness, Total		mg/l $CaCO_3$	Iron 1-17	<0.05	mg/l
Nitrogen, Ammonia		mg/l	Lead		mg/l
Nitrogen, Nitrate		mg/l	Magnesium		mg/l
Nitrogen, Nitrite		mg/l	Manganese 1-17	<0.01	mg/l
Oil & Grease		mg/l	Mercury		µg/l
pH 1-15	7.80	Units	Nickel		mg/l
Phosphorus, Ortho		mg/l	Potassium		mg/l
Phosphorus, Total		mg/l	Selenium		mg/l
Solids, Total Dissolved	385	mg/l	Silica		mg/l
Solids, Total Suspended 1-14	4.0	mg/l	Sodium		mg/l
Sulfate		mg/l	Vanadium		mg/l
Sulfide		mg/l	Zinc		mg/l
Turbidity		NTU			

Respectfully submitted [signature] 1-20-86

Analyst: David A. Janney

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7989
Date Rec'd 4-9-86
Date Sampled 4-9-86
Time Sampled 1000

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK ABOVE THE MINE

Temp. 35° Flow 0.27/58.8 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	4-10		mg/l $CaCO_3$
Alkalinity, Bicarbonate		317	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	4-10	7.9	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	4-10	650	umhos/cm
Fluoride			mg/l
Hardness, Total	4-15	290	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	4-16	<0.5	mg/l
pH	4-10	7.85	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	4-16	362	mg/l
Solids, Total Suspended		6.0	mg/l
Sulfate	4-15	70	mg/l
Sulfide			mg/l
Turbidity			NTU
Settleable Solids	4-9	<0.1	ml/L
Total Cations		6.89	meq/l
Total Anions		6.89	meq/l
Dissolved Oxygen	4-10	9.65	mg/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	4-15	56.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	4-16	<0.05	mg/l
Lead			mg/l
Magnesium	4-15	36.5	mg/l
Manganese	4-16	<0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	4-15	1.1	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	4-15	24.6	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	4-16	<0.05	mg/l

Analyst: David L. Larsen

Respectfully submitted David L. Larsen

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7990
Date Rec'd 4-9-86
Date Sampled 4-9-86
Time Sampled 1030

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UTAH 84528

Sample ID: DEER CREEK BELOW THE MINE

Temp. 44° Flow 0.27/58.8 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	4-10		mg/l $CaCO_3$
Alkalinity, Bicarbonate		359	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	4-10	290	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	4-10	2300	umhos/cm
Fluoride			mg/l
Hardness, Total	4-15	750	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	4-16	0.5	mg/l
pH	4-10	7.72	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	4-16	1315	mg/l
Solids, Total Suspended		6.0	mg/l
Sulfate	4-15	450	mg/l
Sulfide			mg/l
Turbidity			NTU
Settleable Solids	4-9	<0.1	ml/L
Total Cations		23.51	meq/l
Total Anions		23.44	meq/l
Dissolved Oxygen		10.00	mg/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	4-15	112.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	4-16	<0.05	mg/l
Lead			mg/l
Magnesium	4-15	114.3	mg/l
Manganese	4-16	<0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	4-15	6.61	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	4-15	192.0	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	4-16	<0.05	mg/l

Analyst: David A Ramey

Respectfully submitted David A Ramey

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P. O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8045
Date Rec'd 5-13-86
Date Sampled 5-13-86
Time Sampled 1000

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UTAH 84528

Sample ID: DEER CREEK ABOVE THE MINE

Temp. 38° Flow 833.7 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	5-14		mg/l $CaCO_3$
Alkalinity, Bicarbonate		313	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	5-16	4.9	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	5-14	520	umhos/cm
Fluoride	5-16	0.15	mg/l
Hardness, Total	5-14	270	mg/l $CaCO_3$
Nitrogen, Ammonia	5-15	0.07	mg/l
Nitrogen, Nitrate	5-22	0.10	mg/l
Nitrogen, Nitrite	5-22	<0.01	mg/l
Oil & Grease	5-14	<0.5	mg/l
pH	5-14	7.80	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	5-22	0.02	mg/l
Solids, Total Dissolved		277	mg/l
Solids, Total Suspended	5-16	130.0	mg/l
Sulfate	5-16	38	mg/l
Sulfide	5-14	<0.1	mg/l
Turbidity			NTU
Dissolved Oxygen	5-13	9.80	mg/l
Settleable Solids	5-14	<0.1	ml/L
Total Cations		6.02	meq/l
Total Anions		6.08	meq/l

Aluminum	5-21	<0.05	mg/l
Arsenic	5-19	<0.001	mg/l
Barium	5-21	<0.1	mg/l
Beryllium			mg/l
Boron	5-27	0.11	mg/l
Cadmium	5-21	<0.005	mg/l
Calcium	5-14	62.0	mg/l
Chromium	5-21	<0.05	mg/l
Copper	5-21	<0.02	mg/l
Iron	5-21	0.26	mg/l
Lead	5-22	<0.05	mg/l
Magnesium	5-14	28.0	mg/l
Manganese	5-21	0.03	mg/l
Mercury	5-19	<0.2	ug/l
Nickel	5-21	<0.04	mg/l
Potassium	5-16	0.8	mg/l
Selenium	5-19	<0.005	mg/l
Silica			mg/l
Sodium	5-16	13.9	mg/l
Vanadium			mg/l
Zinc	5-22	<0.005	mg/l
Molybdenum	5-22	<0.2	mg/l
Iron (Diss.)	5-21	<0.05	mg/l

Analyst: David A. Jarvis

Respectfully submitted [signature] 5-27-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8046
Date Rec'd 5-13-86
Date Sampled 5-13-86
Time Sampled 0940

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UTAH 84528

Sample ID: DEER CREEK BELOW THE MINE

Temp. 41° Flow 833.7 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	5-14		mg/l $CaCO_3$
Alkalinity, Bicarbonate		309	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	5-16	42.8	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	5-14	780	umhos/cm
Fluoride	5-16	0.15	mg/l
Hardness, Total	5-14	320	mg/l $CaCO_3$
Nitrogen, Ammonia	5-15	<0.05	mg/l
Nitrogen, Nitrate	5-22	0.14	mg/l
Nitrogen, Nitrite	5-22	<0.01	mg/l
Oil & Grease	5-14	<0.5	mg/l
pH	5-14	7.80	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	5-22	0.03	mg/l
Solids, Total Dissolved	5-16	402	mg/l
Solids, Total Suspended		91.0	mg/l
Sulfate	5-16	75	mg/l
Sulfide	5-14	<0.1	mg/l
Turbidity			NTU
Dissolved Oxygen	5-13	10.10	mg/l
Settleable Solids	5-14	<0.1	ml/L
Total Cations		8.13	meq/l
Total Anions		7.83	meq/l

Aluminum	5-21	<0.05	mg/l
Arsenic	5-19	<0.001	mg/l
Barium	5-21	<0.1	mg/l
Beryllium			mg/l
Boron	5-27	0.11	mg/l
Cadmium	5-21	<0.005	mg/l
Calcium	5-14	66.0	mg/l
Chromium	5-21	<0.05	mg/l
Copper	5-21	<0.02	mg/l
Iron	5-21	0.19	mg/l
Lead	5-22	<0.05	mg/l
Magnesium	5-14	37.7	mg/l
Manganese	5-21	0.03	mg/l
Mercury	5-19	<0.2	ug/l
Nickel	5-21	<0.04	mg/l
Potassium	5-16	1.4	mg/l
Selenium	5-19	<0.005	mg/l
Silica			mg/l
Sodium	5-16	39.0	mg/l
Vanadium			mg/l
Zinc	5-22	<0.005	mg/l
Molybdenum	5-22	<0.1	mg/l
Iron (Diss.)	5-21	<0.05	mg/l

Analyst: David A Jaeger

Respectfully submitted [signature] 5-27-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P O Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8127
Date Rec'd 6-11-86
Date Sampled 6-11-86
Time Sampled 0900

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK ABOVE THE MINE

Temp. 44° Flow 833.7 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	6-12		mg/l $CaCO_3$
Alkalinity, Bicarbonate		296	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	6-16	4.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	6-12	505	umhos/cm
Fluoride			mg/l
Hardness, Total	6-13	250	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
gen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	6-16	<0.5	mg/l
pH	6-12	7.30	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	6-16	269	mg/l
Solids, Total Suspended		38.0	mg/l
Sulfate	6-16	30	mg/l
Sulfide			mg/l
Turbidity	6-11		NTU
Dissolved Oxygen		9.80	mg/l
Settleable Solids	6-11	<0.1	ml/L
Total Cations		5.67	meq/l
Total Anions		5.62	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	6-13	56.8	mg/l
Chromium			mg/l
Copper			mg/l
Iron	6-13	<0.05	mg/l
Lead			mg/l
Magnesium	6-13	26.3	mg/l
Manganese	6-13	<0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	6-16	0.8	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	6-16	15.0	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	6-13	<0.05	mg/l

Analyst: David L Parry

Respectfully submitted David L Parry

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8128
Date Rec'd 6-11-86
Date Sampled 6-11-86
Time Sampled 0920

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK BELOW THE MINE

Temp. 49° Flow 1.70/833.7 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate	6-12	292	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	6-16	30.3	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	6-12	698	umhos/cm
Fluoride			mg/l
Hardness, Total	6-13	284	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	6-16	<0.5	mg/l
pH	6-12	7.35	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	6-16	358	mg/l
Solids, Total Suspended		44.0	mg/l
Sulfate	6-16	65	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	6-11	9.35	mg/l
Settleable Solids	6-11	<0.1	ml/L
Total Cations		7.13	meq/l
Total Anions		6.99	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	6-13	56.8	mg/l
Chromium			mg/l
Copper			mg/l
Iron	6-13	0.06	mg/l
Lead			mg/l
Magnesium	6-13	34.5	mg/l
Manganese	6-13	<0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	6-16	1.3	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	6-16	32.6	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	6-13	<0.05	mg/l

Analyst: David L. Parry

Respectfully submitted David L. Parry

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P O Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8319
Date Rec'd 7-7-86
Date Sampled 7-7-86
Time Sampled 1010

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK ABOVE THE MINE

Temp. 47°

Flow 0.89/371.6 GPM

Acidity		< 1.0	mg/l $CaCO_3$
Alkalinity, Total	7-17		mg/l $CaCO_3$
Alkalinity, Bicarbonate		262	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	7-17	5.8	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-17	470	umhos/cm
Fluoride			mg/l
Hardness, Total	7-14	232	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	7-15	< 0.5	mg/l
pH	7-17	7.60	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	7-11	275	mg/l
Solids, Total Suspended		9.0	mg/l
Sulfate	7-21	45	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	7-8	8.20	mg/l
Settleable Solids	7-09	< 0.1	ml/L
Total Cations		5.38	meq/l
Total Anions		5.40	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	7-14	42.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-09	< 0.05	mg/l
Lead			mg/l
Magnesium	7-17	31.0	mg/l
Manganese	7-09	< 0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-15	0.8	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-15	16.6	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	7-09	< 0.05	mg/l

Analyst: David A Janney

Respectfully submitted David A Janney

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STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8320
Date Rec'd 7-7-86
Date Sampled 7-7-86
Time Sampled 1035

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK BELOW THE MINE

Temp. 58° Flow 0.85/352.8 GPM

Acidity		< 1.0	mg/l $CaCO_3$
Alkalinity, Total	7-17		mg/l $CaCO_3$
Alkalinity, Bicarbonate		260	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	7-17	45.0	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-17	760	umhos/cm
Fluoride			mg/l
Hardness, Total	7-14	290	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	7-15	< 0.5	mg/l
pH	7-17	7.70	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	7-11	434	mg/l
Solids, Total Suspended		15.0	mg/l
Sulfate	7-21	110	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	7-8	9.75	mg/l
Settleable Solids	7-9	< 0.1	ml/L
Total Cations		7.80	meq/l
Total Anions		7.82	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	7-14	46.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-9	< 0.05	mg/l
Lead			mg/l
Magnesium	7-17	42.6	mg/l
Manganese	7-9	< 0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-15	1.8	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-15	45.0	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	7-9	< 0.05	mg/l

Analyst: David Parnus

Respectfully submitted David Parnus

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STANDARD LABORATORIES, INC.

P O Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8470
Date Rec'd 8-13-86
Date Sampled 8-13-86
Time Sampled 1120

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK ABOVE THE MINE

Temp. 51° Flow .42/116.7 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	8-14		mg/l $CaCO_3$
Alkalinity, Bicarbonate		279	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-14	7.0	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	8-14	550	umhos/cm
Fluoride			mg/l
Hardness, Total	8-14	245	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	8-15	<0.5	mg/l
pH	8-14	7.80	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-14	284	mg/l
Solids, Total Suspended		3.0	mg/l
Sulfate	8-15	37	mg/l
Sulfide			mg/l
Turbidity	8-13		NTU
Dissolved Oxygen		10.2	mg/l
Settleable Solids	8-13	<0.1	ml/L
Total Cations		5.84	meq/l
Total Anions		5.60	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-14	44.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	8-15	<0.05	mg/l
Lead			mg/l
Magnesium	8-14	32.8	mg/l
Manganese	8-15	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	8-14	1.1	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	8-14	21.0	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	8-15	<0.05	mg/l

Analyst: David G. Ramsey

Respectfully submitted David G. Ramsey

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8471
Date Rec'd 8-13-86
Date Sampled 8-13-86
Time Sampled 1050

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK BELOW THE MINE

Temp. 62° Flow 0.48/143.2 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	8-14		mg/l $CaCO_3$
Alkalinity, Bicarbonate		288	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-14	94.0	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	8-14	1100	umhos/cm
Fluoride			mg/l
Hardness, Total	8-14	385	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	8-15	<0.5	mg/l
pH	8-14	7.85	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-14	619	mg/l
Solids, Total Suspended		23.0	mg/l
Sulfate	8-15	180	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	8-13	11.0	mg/l
Settleable Solids	8-13	<0.1	ml/L
Total Cations		11.32	meq/l
Total Anions		11.13	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8.14	60.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	8-15	0.19	mg/l
Lead			mg/l
Magnesium	8-14	57.2	mg/l
Manganese	8-15	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	8-14	3.4	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	8-14	81.2	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	8-15	0.06	mg/l

Analyst: David A. Ramsey

Respectfully submitted David A. Ramsey

Certified Environmental Laboratory

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STANDARD LABORATORIES, INC.

F Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8538
Date Rec'd 9-19-86
Date Sampled 9-19-86
Time Sampled 0945

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK RUNOFF
ABOVE THE MINE

Temp. 46° Flow 0.23/45.8 GPM

Acidity	9-23	< 1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate		322	mg/l $CaCO_3$ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	9-30	10.1	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	9-23	610	umhos/cm
Fluoride			mg/l
Hardness, Total	9-26	280	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	9-23	< 0.5	mg/l
pH	9-23	7.65	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	9-22	353	mg/l
Solids, Total Suspended		< 0.5	mg/l
Sulfate	9-30	60	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	9-22	8.8	mg/l
Settleable Solids	9-22	< 0.1	ml/L
Total Cations		6.83	meq/l
Total Anions		6.82	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	9-26	46.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	9-30	< 0.05	mg/l
Lead			mg/l
Magnesium	9-26	40.1	mg/l
Manganese	9-30	< 0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	9-29	1.3	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	9-29	27.6	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss)	9-30	< 0.05	mg/l

Analyst: Sharon Reiter

Respectfully submitted Bol Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8539
Date Rec'd 9-19-86
Date Sampled 9-19-86
Time Sampled 1015

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK RUNOFF
BELOW THE MINE

Temp. 44° Flow 0.28/61.9 GPM

Acidity		< 1.0	mg/l $CaCO_3$
Alkalinity, Total	9-23		mg/l $CaCO_3$
Alkalinity, Bicarbonate		312	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	9-30	237.0	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	9-23	1800	umhos/cm
Fluoride			mg/l
Hardness, Total	9-26	555	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	9-23	< 0.5	mg/l
pH	9-23	7.90	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		1072	mg/l
Solids, Total Suspended	9-22	< 0.5	mg/l
Sulfate	9-30	350	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	9-22	10.1	mg/l
Settleable Solids	9-22	< 0.1	ml/L
Total Cations		19.04	meq/l
Total Anions		19.10	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	9-26	80.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	9-30	< 0.05	mg/l
Lead			mg/l
Magnesium	9-26	86.3	mg/l
Manganese	9-30	< 0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	9-29	6.2	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	9-29	179.0	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	9-30	< 0.05	mg/l

Analyst; Sharon Reiter

Respectfully submitted Bd Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8713
Date Rec'd 10-17-86
Date Sampled 10-17-86
Time Sampled 1055

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK ABOVE MINE
(Low Flow Runoff)

Temp. 32° Flow 0.22/42.6

Acidity	10-22	< 1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate		309	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	10-23	10.8	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	620	umhos/cm
Fluoride	10-29	0.15	mg/l
Hardness, Total	10-23	280	mg/l $CaCO_3$
Nitrogen, Ammonia	11-3	0.09	mg/l
Nitrogen, Nitrate	10-21	0.03	mg/l
Nitrogen, Nitrite		0.01	mg/l
Oil & Grease	10-23	0.5	mg/l
pH	10-22	7.45	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	11-3	0.05	mg/l
Solids, Total Dissolved	10-21	338	mg/l
Solids, Total Suspended	10-20	< 0.5	mg/l
Sulfate	10-29	90	mg/l
Sulfide	10-22	3.6	mg/l
Turbidity			NTU
Dissolved Oxygen	10-17	9.8	mg/l
Settleable Solids	10-20	< 0.5	ml/L
Total Anions		7.25	meq/l
Total Cations		6.56	meq/l

Aluminum	11-4	< 0.05	mg/l
Arsenic	10-30	< 1.0	mg/l
Barium	11-4	< 0.1	mg/l
Beryllium			mg/l
Boron	11-7	0.1	mg/l
Cadmium	11-4	< 0.005	mg/l
Calcium	10-23	48	mg/l
Chromium	11-4	< 0.05	mg/l
Copper	11-4	< 0.02	mg/l
Iron	11-3	< 0.05	mg/l
Lead	11-4	< 0.05	mg/l
Magnesium	10-23	38.9	mg/l
Manganese	11-4	< 0.01	mg/l
Mercury	10-30	< 0.2	ug/l
Nickel	11-4	< 0.04	mg/l
Potassium	11-3	1.12	mg/l
Selenium	10-30	< 5.0	mg/l
Silica			mg/l
Sodium	11-3	21.5	mg/l
Vanadium			mg/l
Zinc	11-3	0.030	mg/l
Iron (Diss.)	11-3	< 0.05	mg/l
Molybdenum	11-4	< 0.1	mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8714
Date Rec'd 10-17-86
Date Sampled 10-17-86
Time Sampled 1135

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK BELOW MINE
(Low Flow Runoff)

Temp. 45° Flow -/55

Acidity	10-22	< 1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate		337	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	10-23	212	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	1710	umhos/cm
Fluoride	10-29	0.16	mg/l
Hardness, Total	10-23	565	mg/l $CaCO_3$
Nitrogen, Ammonia	11-3	0.26	mg/l
Nitrogen, Nitrate	10-21	0.05	mg/l
Nitrogen, Nitrite		0.02	mg/l
Oil & Grease	10-23	< 0.5	mg/l
pH	10-22	7.65	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	11-3	0.03	mg/l
Solids, Total Dissolved	10-21	973	mg/l
Solids, Total Suspended	10-20	< 0.5	mg/l
Sulfate	10-29	345	mg/l
Sulfide	10-22	2.8	mg/l
Turbidity			NTU
Dissolved Oxygen	10-17	9.4	mg/l
Settleable Solids	10-20	< 0.5	ml/L
Total Anions		18.69	meq/l
Total Cations		18.41	meq/l

Aluminum	11-4	< 0.05	mg/l
Arsenic	10-30	< 1.0	mg/l
Barium	11-4	< 0.1	mg/l
Beryllium			mg/l
Boron	11-7	0.2	mg/l
Cadmium	11-4	< 0.005	mg/l
Calcium	10-23	90	mg/l
Chromium	11-4	< 0.05	mg/l
Copper	11-4	< 0.02	mg/l
Iron	11-3	< 0.05	mg/l
Lead	11-4	< 0.05	mg/l
Magnesium	10-23	82.7	mg/l
Manganese	11-4	0.026	mg/l
Mercury	10-30	< 0.2	ug/l
Nickel	11-4	< 0.04	mg/l
Potassium	11-4	4.92	mg/l
Selenium	10-30	< 5.0	mg/l
Silica			mg/l
Sodium	11-4	160.9	mg/l
Vanadium			mg/l
Zinc	11-3	0.017	mg/l
Iron (Diss.)	11-3	< 0.05	mg/l
Molybdenum	11-4	< 0.1	mg/l

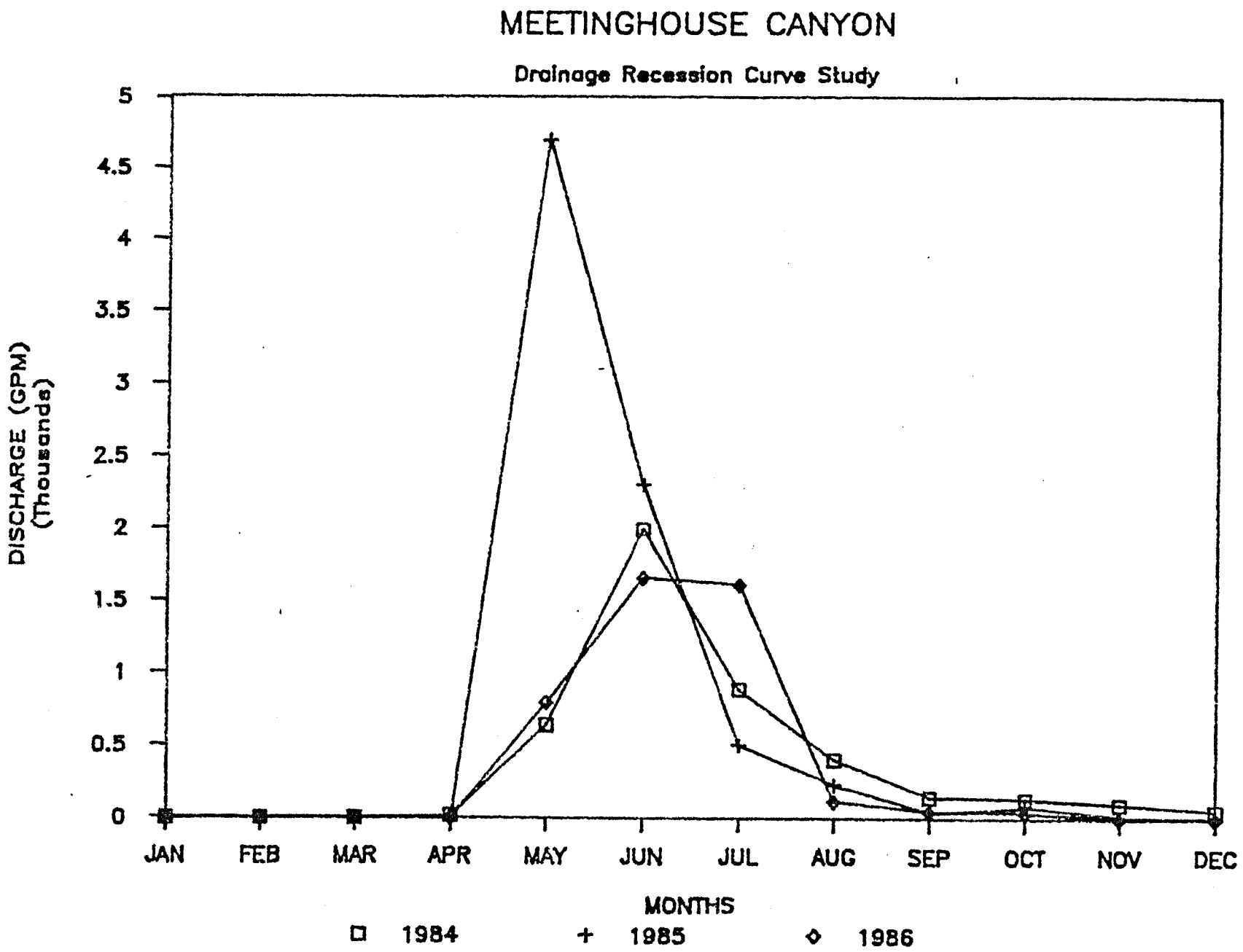
Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

APPENDIX C

MEETINGHOUSE CANYON CREEK WATER FLOW AND QUALITY


MEETINGHOUSE CANYON
Drainage Recession Curve Study
DISCHARGE (GPM)
(Thousands)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8047
Date Rec'd 5-13-86
Date Sampled 5-13-86
Time Sampled 1150

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UTAH 84528

Sample ID: MEETINGHOUSE CANYON

Temp. 45° Flow 0.70/798.9 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	5-14		mg/l $CaCO_3$
Alkalinity, Bicarbonate		257	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	5-16	4.2	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	5-14	450	umhos/cm
Fluoride	5-16	0.14	mg/l
Hardness, Total	5-14	240	mg/l $CaCO_3$
Nitrogen, Ammonia	5-15	<0.05	mg/l
Nitrogen, Nitrate	5-22	0.15	mg/l
Nitrogen, Nitrite	5-22	<0.01	mg/l
Oil & Grease	5-14	<0.5	mg/l
pH	5-14	7.75	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	5-22	0.07	mg/l
Solids, Total Dissolved	5-16	253	mg/l
Solids, Total Suspended		74.0	mg/l
Sulfate	5-16	35	mg/l
Sulfide	5-14	<0.1	mg/l
Turbidity			NTU
Dissolved Oxygen	5-13	8.60	mg/l
Settleable Solids	5-14	<0.1	ml/L
Total Cations		5.15	meq/l
Total Anions		5.08	meq/l

Aluminum	5-21	<0.05	mg/l
Arsenic	5-19	<0.001	mg/l
Barium	5-21	<0.1	mg/l
Beryllium			mg/l
Boron	5-27	0.18	mg/l
Cadmium	5-21	<0.005	mg/l
Calcium	5-14	52.0	mg/l
Chromium	5-21	<0.05	mg/l
Copper	5-21	<0.02	mg/l
Iron	5-21	0.18	mg/l
Lead	5-22	<0.05	mg/l
Magnesium	5-14	26.7	mg/l
Manganese	5-21	0.02	mg/l
Mercury	5-19	<0.2	ug/l
Nickel	5-21	<0.04	mg/l
Potassium	5-16	1.1	mg/l
Selenium	5-19	<0.005	mg/l
Silica			mg/l
Sodium	5-16	7.5	mg/l
Vanadium			mg/l
Zinc	5-22	<0.005	mg/l
Molybdenum	5-22	<0.1	mg/l
Iron (Diss.)	5-21	<0.05	mg/l

Respectfully submitted [signature] 5-27-86

Analyst: David L. Janney

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CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8129
Date Rec'd 6-11-86
Date Sampled 6-11-86
Time Sampled 0840

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: MEETINGHOUSE CANYON

Temp. 44°

Flow 1.13/1660.7 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	6-12		mg/l $CaCO_3$
Alkalinity, Bicarbonate		257	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	6-16	3.3	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	6-12	432	umhos/cm
Fluoride			mg/l
Hardness, Total	6-13	225	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	6-16	<0.5	mg/l
pH	6-12	7.35	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	6-16	231	mg/l
Solids, Total Suspended		46.0	mg/l
Sulfate	6-16	25	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	6-11	9.85	mg/l
Settleable Solids	6-11	<0.1	ml/L
Total Cations		4.81	meq/l
Total Anions		4.84	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	6-13	52.8	mg/l
Chromium			mg/l
Copper			mg/l
Iron	6-13	0.09	mg/l
Lead			mg/l
Magnesium	6-13	22.6	mg/l
Manganese	6-13	<0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	6-16	0.9	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	6-16	6.5	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	6-13	<0.05	mg/l

Analyst: David A. Janusz

Respectfully submitted David A. Janusz

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8321
Date Rec'd 7-7-86
Date Sampled 7-7-86
Time Sampled 1050

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: MEETINGHOUSE CANYON

Temp. 52° Flow 0.59/614.9 GPM

Acidity	7-17	<1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate		231	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	7-17	4.2	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-17	420	umhos/cm
Fluoride			mg/l
Hardness, Total	7-14	213	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	7-15	<0.5	mg/l
pH	7-17	7.90	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	7-11	234	mg/l
Solids, Total Suspended		14.0	mg/l
Sulfate	7-21	35	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	7-8	8.80	mg/l
Settleable Solids	7-9	<0.1	ml/L
Total Cations		4.63	meq/l
Total Anions		4.63	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	7-14	40.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-9	<0.05	mg/l
Lead			mg/l
Magnesium	7-17	27.5	mg/l
Manganese	7-9	<0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-15	0.9	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-15	8.1	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	7-9	<0.05	mg/l

Analyst: David Ramey

Respectfully submitted David Ramey

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8472
Date Rec'd 8-13-86
Date Sampled 8-13-86
Time Sampled 1015

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: MEETINGHOUSE CANYON

Temp. 56° Flow 0.20/116.7 GPM

Acidity	8-14	<1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate		232	mg/l $CaCO_3$ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-14	5.4	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	8-14	450	umhos/cm
Fluoride			mg/l
Hardness, Total	8-14	225	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	8-15	<0.5	mg/l
pH	8-14	8.00	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-14	238	mg/l
Solids, Total Suspended		9.0	mg/l
Sulfate	8-15	34	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	8-13	9.8	mg/l
Settleable Solids	8-13	<0.1	ml/L
Total Cations		4.98	meq/l
Total Anions		4.70	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-14	40.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	8-15	0.17	mg/l
Lead			mg/l
Magnesium	8-14	30.4	mg/l
Manganese	8-15	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	8-14	1.6	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	8-14	10.1	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	8-15	<0.05	mg/l

Analyst: David L. Parry

Respectfully submitted David L. Parry

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8540
Date Rec'd 9-19-86
Date Sampled 9-19-86
Time Sampled 1030

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: MEETINGHOUSE CANYON

Temp. 42° Flow 0.11/44.8 GPM

Acidity		< 1.0	mg/l $CaCO_3$
Alkalinity, Total	9-23		mg/l $CaCO_3$
Alkalinity, Bicarbonate		254	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	9-30	5.8	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	9-23	448	umhos/cm
Fluoride			mg/l
Hardness, Total	9-26	235	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	9-23	< 0.5	mg/l
pH	9-23	7.50	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	9-22	268	mg/l
Solids, Total Suspended		< 0.5	mg/l
Sulfate	9-30	45	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	9-22	9.2	mg/l
Settleable Solids	9-22	< 0.1	ml/L
Total Cations		5.24	meq/l
Total Anions		5.26	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	9-26	38.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	9-30	< 0.05	mg/l
Lead			mg/l
Magnesium	9-26	34.0	mg/l
Manganese	9-30	< 0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	9-29	1.6	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	9-29	11.4	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss)	9-30	< 0.05	mg/l

Analyst; Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8712
Date Rec'd 10-17-86
Date Sampled 10-17-86
Time Sampled 1135

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: MEETINGHOUSE CANYON
(Low Flow Runoff)

Temp. 38° Flow 0.1/40.4

Acidity	10-22	< 1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate		261	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	10-23	7.6	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	500	umhos/cm
Fluoride	10-29	0.14	mg/l
Hardness, Total	10-23	260	mg/l $CaCO_3$
Nitrogen, Ammonia	11-3	0.10	mg/l
Nitrogen, Nitrate	10-21	0.03	mg/l
Nitrogen, Nitrite	10-21	0.01	mg/l
Oil & Grease	10-23	0.6	mg/l
pH	10-22	7.45	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	11-3	0.06	mg/l
Solids, Total Dissolved	10-21	292	mg/l
Solids, Total Suspended	10-20	< 0.5	mg/l
Sulfate	10-29	85	mg/l
Sulfide	10-22	2.8	mg/l
Turbidity			NTU
Dissolved Oxygen	10-17	10.3	mg/l
Settleable Solids	10-20	< 0.5	ml/L
Total Anions		6.27	meq/l
Total Cations		5.81	meq/l

Aluminum	11-4	< 0.05	mg/l
Arsenic	10-30	< 1.0	mg/l
Barium	11-4	< 0.1	mg/l
Beryllium			mg/l
Boron	11-7	0.1	mg/l
Cadmium	11-4	< 0.005	mg/l
Calcium	10-23	44	mg/l
Chromium	11-4	< 0.05	mg/l
Copper	11-4	< 0.02	mg/l
Iron	11-3	< 0.05	mg/l
Lead	11-4	< 0.05	mg/l
Magnesium	10-23	36.5	mg/l
Manganese	11-4	0.02	mg/l
Mercury	10-30	< 0.2	ug/l
Nickel	11-4	< 0.04	mg/l
Potassium	11-3	1.62	mg/l
Selenium	10-30	< 5.0	mg/l
Silica			mg/l
Sodium	11-3	13.1	mg/l
Vanadium			mg/l
Zinc	11-3	0.015	mg/l
Iron (Diss.)	11-3	< 0.05	mg/l
Molybdenum	11-4	< 0.1	mg/l

Analyst: Sharon Reiter

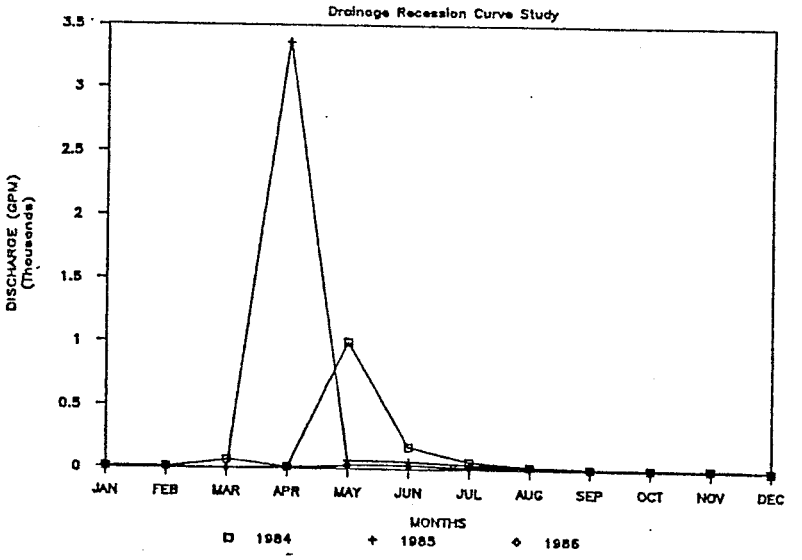
Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

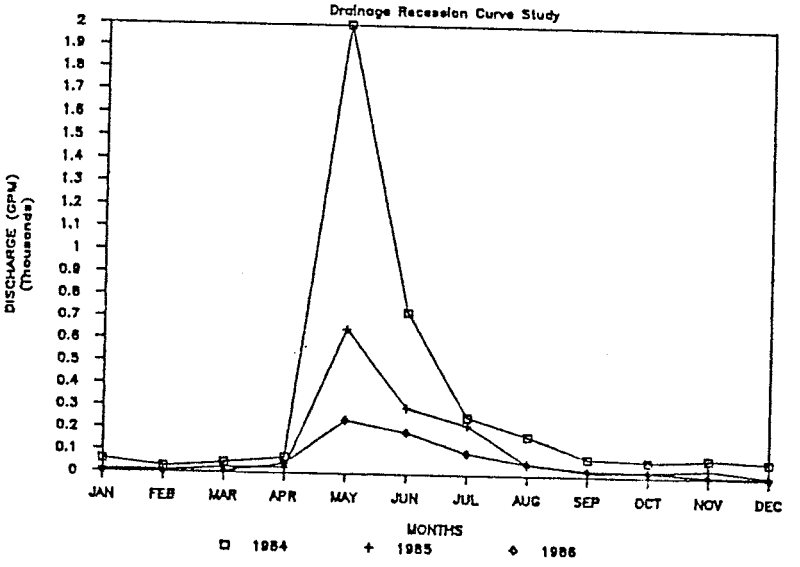
APPENDIX D

GRIMES WASH WATER FLOW AND QUALITY

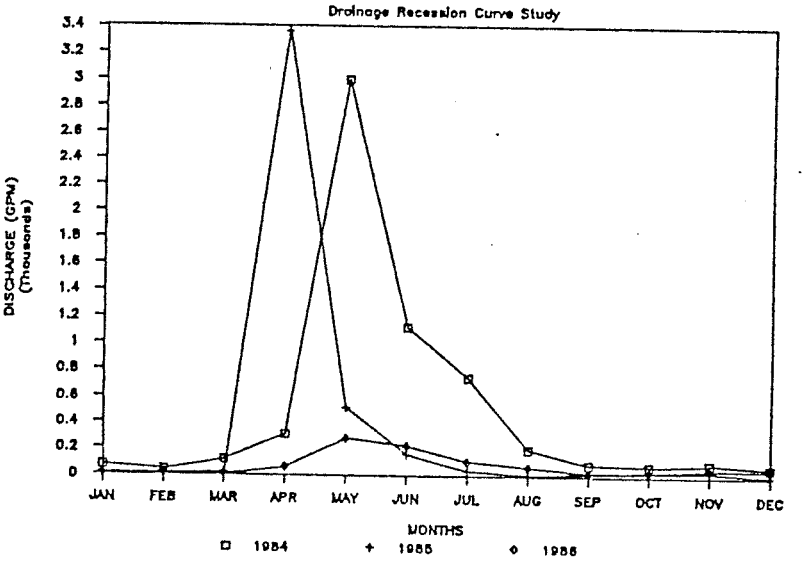
GRIMES WASH RIGHT FORK



GRIMES WASH LEFT FORK



GRIMES WASH BELOW MINE



CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7765
Date Rec'd 1-10-86
Date Sampled 1-8-86
Time Sampled 1630

Client: UTAH POWER & LIGHT CO.
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH
BELOW THE MINE

FIELD OFFICE Temp. 33° Flow 5-10 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate			mg/l $CaCO_3$
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride			mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	1-15	1100	umhos/cm
Fluoride			mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	1-15	7.15	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		638	mg/l
Solids, Total Suspended	1-13	2.0	mg/l
Sulfate			mg/l
Sulfide			mg/l
Turbidity			NTU

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium			mg/l
Chromium			mg/l
Copper			mg/l
Iron	1-17	<0.05	mg/l
Lead			mg/l
Magnesium			mg/l
Manganese	1-17	<0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium			mg/l
Selenium			mg/l
Silica			mg/l
Sodium			mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David A Ganey

Respectfully submitted [signature] 1-20-

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7827
Date Rec'd 2-11-86
Date Sampled 2-11-86
Time Sampled 1005

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH BELOW THE MINE

Temp. 33° Flow 10-15 GPM

Acidity	2-12	< 1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate	2-12	362	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate	2-12	< 1.0	mg/l $CaCO_3$
Chloride	2-13	50.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	2-12	1300	umhos/cm
Fluoride			mg/l
Hardness, Total	2-13	590	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
gen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	2-13	< 0.5	mg/l
pH	2-12	7.70	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		805	mg/l
Solids, Total Suspended	2-11	< 0.5	mg/l
Sulfate	2-13	320	mg/l
Sulfide			mg/l
Turbidity			NTU
Settleable Solids	2-11	< 0.1	ml/L
Total Cations		14.06	meq/l
Total Anions		14.03	meq/l
Dissolved Oxygen	2-11	11.45	mg/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	2-13	120.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	2-13	0.40	mg/l
Lead			mg/l
Magnesium	2-13	70.5	mg/l
Manganese	2-13	0.03	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	2-12	3.5	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	2-12	50.5	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	2-13	0.13	mg/l

Analyst: David A Janus

Respectfully submitted [signature] 2-14-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7969
Date Rec'd 4-7-86
Date Sampled 4-7-86
Time Sampled 1410

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH RIGHT FORK

Temp. 48° Flow 0.10/12.6 GPM

Acidity	4-8	<1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate	4-8	259	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate	4-8	<1.0	mg/l $CaCO_3$
Chloride	4-10	9.6	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	4-8	540	umhos/cm
Fluoride			mg/l
Hardness, Total	4-15	255	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	4-9	<0.5	mg/l
pH	4-8	7.50	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	4-8	311	mg/l
Solids, Total Suspended		10.0	mg/l
Sulfate	4-15	60	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	4-8	8.05	mg/l
Settleable Solids		<0.1	ml/L
Total CAtions		5.77	meq/l
Total Anions		5.79	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium		40.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron		0.07	mg/l
Lead			mg/l
Magnesium		37.7	mg/l
Manganese		<0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium		2.1	mg/l
Selenium			mg/l
Silica			mg/l
Sodium		14.4	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	4-9	<0.05	mg/l

Analyst: David A. Janus

Respectfully submitted David A. Janus

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7968
Date Rec'd 4-7-86
Date Sampled 4-7-86
Time Sampled 1420

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH LEFT FORK

Temp. 49° Flow 0.15/44.9 GPM

Acidity	4-8	<1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate	4-8	289	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate	4-8	<1.0	mg/l $CaCO_3$
Chloride	4-10	10.3	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	4-8	605	umhos/cm
Fluoride			mg/l
Hardness, Total	4-15	260	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	4-9	<0.5	mg/l
pH	4-8	7.40	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	4-8	350	mg/l
Solids, Total Suspended		39.0	mg/l
Sulfate	4-15	80	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	4-8	8.65	mg/l
Settleable Solids		<0.1	ml/L
Total Cations		6.75	meq/l
Total Anions		6.71	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	4-15	40.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	4-9	0.09	mg/l
Lead			mg/l
Magnesium	4-15	38.9	mg/l
Manganese	4-9	<0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	4-8	3.0	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	4-8	34.0	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	4-9	<0.05	mg/l

Analyst: David A. Ramsey

Respectfully submitted David A. Ramsey

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7970
Date Rec'd 4-7-86
Date Sampled 4-7-86
Time Sampled 1430

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH BELOW THE MINE

Temp. 47° Flow 65.0 Est GPM

Acidity	<1.0	mg/l $CaCO_3$
Alkalinity, Total		mg/l $CaCO_3$
Alkalinity, Bicarbonate	359	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate	<1.0	mg/l $CaCO_3$
Chloride	130.0	mg/l
Coliform, Fecal		MPN/100 ml
Coliform, Total		MPN/100 ml
Conductivity	1500	umhos/cm
Fluoride		mg/l
Hardness, Total	535	mg/l $CaCO_3$
Nitrogen, Ammonia		mg/l
Nitrogen, Nitrate		mg/l
Nitrogen, Nitrite		mg/l
Oil & Grease	<0.5	mg/l
pH	7.40	Units
Phosphorus, Ortho		mg/l
Phosphorus, Total		mg/l
Solids, Total Dissolved	831	mg/l
Solids, Total Suspended	13.0	mg/l
Sulfate	260	mg/l
Sulfide		mg/l
Turbidity		NTU
Dissolved Oxygen	8.55	mg/l
Settleable Solids	<0.1	ml/L
Total Cations	14.99	meq/l
Total Anions	14.97	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	4-15	88.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	4-9	<0.05	mg/l
Lead			mg/l
Magnesium	4-15	76.6	mg/l
Manganese	4-9	0.03	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	4-8	4.6	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	4-8	96.0	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	4-9	<0.05	mg/l

Analyst: David A Ramsay

Respectfully submitted David A Ramsay

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STANDARD LABORATORIES, INC.

F Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8049

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UTAH 84528

Sample ID: GRIMES WASH RIGHT FORK

Date Rec'd 5-14-86

Date Sampled 5-13-86

Time Sampled 1530

TEMP. 54°

FLOW 0.18/31.4 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	5-14		mg/l $CaCO_3$
Alkalinity, Bicarbonate		284	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	5-16	11.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	5-14	493	umhos/cm
Fluoride	5-16	0.18	mg/l
Hardness, Total	5-14	270	mg/l $CaCO_3$
Nitrogen, Ammonia	5-15	<0.05	mg/l
Nitrogen, Nitrate	5-22	0.08	mg/l
Nitrogen, Nitrite	5-22	<0.01	mg/l
Oil & Grease	5-14	2.2	mg/l
pH	5-14	7.80	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	5-22	0.03	mg/l
Solids, Total Dissolved	5-16	296	mg/l
Solids, Total Suspended		257.0	mg/l
Sulfate	5-16	55	mg/l
Sulfide	5-14	<0.1	mg/l
Turbidity			NTU
Dissolved Oxygen	5-14	9.35	mg/l
Settleable Solids	5-14	<0.1	ml/L
MBAS	5-14	<0.03	mg/l
Total Cations		6.20	meq/l
Total Anions		6.14	meq/l

Aluminum	5-21	<0.05	mg/l
Arsenic	5-19	<0.001	mg/l
Barium	5-21	<0.1	mg/l
Beryllium			mg/l
Boron	5-27	0.11	mg/l
Cadmium	5-21	<0.005	mg/l
Calcium	5-14	46.0	mg/l
Chromium	5-21	<0.05	mg/l
Copper	5-21	<0.02	mg/l
Iron	5-21	0.28	mg/l
Lead	5-22	<0.05	mg/l
Magnesium	5-14	37.7	mg/l
Manganese	5-21	0.05	mg/l
Mercury	5-19	<0.2	ug/l
Nickel	5-21	<0.04	mg/l
Potassium	5-16	3.4	mg/l
Selenium	5-19	<0.005	mg/l
Silica			mg/l
Sodium	5-16	16.4	mg/l
Vanadium			mg/l
Zinc	5-22	<0.005	mg/l
Molybdenum	5-22	<0.1	mg/l
Iron (Diss.)	5-21	<0.05	mg/l

Analyst: David Dancy

Respectfully submitted [signature] 5-27-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8048
Date Rec'd 5-14-86
Date Sampled 5-13-86
Time Sampled 1515

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UTAH 84528

Sample ID: GRIMES WASH LEFT FORK

Temp. 48° Flow 0.43/242.4 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	5-14		mg/l $CaCO_3$
Alkalinity, Bicarbonate		331	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	5-16	7.9	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	5-14	600	umhos/cm
Fluoride	5-16	0.17	mg/l
Hardness, Total	5-14	300	mg/l $CaCO_3$
Nitrogen, Ammonia	5-15	<0.05	mg/l
Nitrogen, Nitrate	5-22	0.07	mg/l
Nitrogen, Nitrite	5-22	<0.01	mg/l
Oil & Grease	5-14	0.6	mg/l
pH	5-14	7.70	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	5-22	0.06	mg/l
Solids, Total Dissolved	5-16	339	mg/l
Solids, Total Suspended		253.0	mg/l
Sulfate	5-16	70	mg/l
Sulfide	5-14	<0.1	mg/l
Turbidity			NTU
Dissolved Oxygen	5-14	9.20	mg/l
Settleable Solids	5-14	<0.1	ml/L
MBAS	5-14	<0.03	mg/l
Total Cations		7.19	meq/l
Total Anions		7.11	meq/l

Aluminum	5-21	<0.05	mg/l
Arsenic	5-19	<0.001	mg/l
Barium	5-21	<0.1	mg/l
Beryllium			mg/l
Boron	5-27	0.09	mg/l
Cadmium	5-21	<0.005	mg/l
Calcium	5-14	58.0	mg/l
Chromium	5-21	<0.05	mg/l
Copper	5-21	<0.02	mg/l
Iron	5-21	0.22	mg/l
Lead	5-22	<0.05	mg/l
Magnesium	5-14	37.7	mg/l
Manganese	5-21	0.07	mg/l
Mercury	5-19	<0.2	ug/l
Nickel	5-21	<0.04	mg/l
Potassium	5-16	2.2	mg/l
Selenium	5-19	<0.005	mg/l
Silica			mg/l
Sodium	5-16	26.1	mg/l
Vanadium			mg/l
Zinc	5-22	<0.005	mg/l
Molybdenum	5-22	<0.1	mg/l
Iron (Diss.)	5-21	<0.05	mg/l

Analyst: David Janney

Respectfully submitted [signature] 5-27-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8050
Date Rec'd 5-14-86
Date Sampled 5-13-86
Time Sampled 1615

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UTAH 84528

Sample ID: GRIMES WASH BELOW THE MINE

TEMP. 48° Flow 275 GPM Est.

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	5-14		mg/l $CaCO_3$
Alkalinity, Bicarbonate		345	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	5-16	41.4	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	5-14	890	umhos/cm
Fluoride	5-16	0.17	mg/l
Hardness, Total	5-14	405	mg/l $CaCO_3$
Nitrogen, Ammonia	5-15	<0.05	mg/l
Nitrogen, Nitrate	5-22	0.08	mg/l
Nitrogen, Nitrite	5-22	<0.01	mg/l
Oil & Grease	5-14	<0.5	mg/l
pH	5-14	7.85	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	5-22	0.03	mg/l
Solids, Total Dissolved	5-16	523	mg/l
Solids, Total Suspended		248.0	mg/l
Sulfate	5-16	150	mg/l
Sulfide	5-14	<0.1	mg/l
Turbidity			NTU
Dissolved Oxygen	5-14	10.30	mg/l
Settleable Solids	5-14	<0.1	ml/L
MBAS	5-14	<0.03	mg/l
Total Cations		10.14	meq/l
Total Anions		9.95	meq/l

Aluminum	5-21	<0.05	mg/l
Arsenic	5-19	<0.001	mg/l
Barium	5-21	<0.1	mg/l
Beryllium			mg/l
Boron	5-27	0.13	mg/l
Cadmium	5-21	<0.005	mg/l
Calcium	5-14	78.0	mg/l
Chromium	5-21	<0.05	mg/l
Copper	5-21	<0.02	mg/l
Iron	5-21	0.26	mg/l
Lead	5-22	<0.05	mg/l
Magnesium	5-14	51.1	mg/l
Manganese	5-21	0.08	mg/l
Mercury	5-19	<0.2	ug/l
Nickel	5-21	<0.04	mg/l
Potassium	5-16	3.1	mg/l
Selenium	5-19	<0.005	mg/l
Silica			mg/l
Sodium	5-16	54.2	mg/l
Vanadium			mg/l
Zinc	5-22	0.013	mg/l
Molybdenum	5-22	<0.1	mg/l
Iron (Diss.)	5-21	<0.05	mg/l

Analyst: David Ramsey

Respectfully submitted 5-27-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8131
Date Rec'd 6-11-86
Date Sampled 6-10-86
Time Sampled 1320

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH RIGHT FORK

Temp. 48° Flow 0.17/28.7 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	6-12		mg/l $CaCO_3$
Alkalinity, Bicarbonate		275	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	6-16	10.6	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	6-12	510	umhos/cm
Fluoride			mg/l
Hardness, Total	6-13	255	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	6-16	<0.5	mg/l
pH	6-12	7.80	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	6-16	280	mg/l
Solids, Total Suspended		46.0	mg/l
Sulfate	6-16	50	mg/l
Sulfide			mg/l
Turbidity	6-11		NTU
Dissolved Oxygen		7.70	mg/l
Settleable Solids	6-11	<0.1	ml/L
Total Cations		5.92	meq/l
Total Anions		5.85	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	6-13	39.2	mg/l
Chromium			mg/l
Copper			mg/l
Iron	6-13	0.07	mg/l
Lead			mg/l
Magnesium	6-13	38.2	mg/l
Manganese	6-13	0.04	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	6-16	1.7	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	6-16	17.8	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	6-13	<0.05	mg/l

Analyst: David A. Janney

Respectfully submitted David A. Janney

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8130
Date Rec'd 6-11-86
Date Sampled 6-10-86
Time Sampled 1305

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH LEFT FORK

Temp. 46° Flow 0.37/188.5 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	6-12		mg/l $CaCO_3$
Alkalinity, Bicarbonate		318	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	6-16	7.7	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	6-12	650	umhos/cm
Fluoride			mg/l
Hardness, Total	6-13	279	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
ogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	6-16	<0.5	mg/l
pH	6-12	7.60	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	6-16	344	mg/l
Solids, Total Suspended		44.0	mg/l
Sulfate	6-16	70	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	6-11	7.70	mg/l
Settleable Solids	6-11	<0.1	ml/L
Total Cations		6.96	meq/l
Total Anions		6.91	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	6-13	48.8	mg/l
Chromium			mg/l
Copper			mg/l
Iron	6-13	0.07	mg/l
Lead			mg/l
Magnesium	6-13	38.2	mg/l
Manganese	6-13	<0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	6-16	1.3	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	6-16	31.0	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	6-13	<0.05	mg/l

Analyst: David L. Janury

Respectfully submitted David L. Janury

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 · 801-653-2314

Lab. No. 8132
Date Rec'd 6-11-86
Date Sampled 6-10-86
Time Sampled 1300

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH BELOW THE MINE

Temp. 48° Flow 220 GPM Est.

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate	6-12	334	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	6-16	36.3	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	6-12	910	umhos/cm
Fluoride			mg/l
Hardness, Total	6-13	412	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	6-16	<0.5	mg/l
pH	6-12	7.50	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	6-16	527	mg/l
Solids, Total Suspended		38.0	mg/l
Sulfate	6-16	180	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	6-11	8.05	mg/l
Settleable Solids	6-11	<0.1	ml/L
Total Cations		10.35	meq/l
Total Anions		10.26	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	6-13	72.4	mg/l
Chromium			mg/l
Copper			mg/l
Iron	6-13	0.07	mg/l
Lead			mg/l
Magnesium	6-13	56.2	mg/l
Manganese	6-13	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	6-16	2.6	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	6-16	47.0	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	6-13	<0.05	mg/l

Analyst: David A. Janney

Respectfully submitted David A. Janney

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8323
Date Rec'd 7-8-86
Date Sampled 7-8-86
Time Sampled 1330

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH RIGHT FORK

Temp. 61° Flow 0.1/12.6 GPM

Acidity		< 1.0	mg/l $CaCO_3$
Alkalinity, Total	7-17		mg/l $CaCO_3$
Alkalinity, Bicarbonate		242	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	7-17	10.2	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-17	465	umhos/cm
Fluoride			mg/l
Hardness, Total	7-14	222	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	7-15	< 0.5	mg/l
pH	7-17	8.10	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		262	mg/l
Solids, Total Suspended	7-11	36.0	mg/l
Sulfate	7-21	45	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	7-8	9.80	mg/l
Settleable Solids	7-9	< 0.1	ml/L
Total Cations		5.22	meq/l
Total Anions		5.18	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	7-14	30.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-9	0.32	mg/l
Lead			mg/l
Magnesium	7-17	35.7	mg/l
Manganese	7-9	< 0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-15	1.6	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-15	17.2	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	7-9	< 0.05	mg/l

Analyst: David L. Janney

Respectfully submitted David L. Janney

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8322
Date Rec'd 7-8-86
Date Sampled 7-8-86
Time Sampled 1340

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH LEFT FORK

Temp. 58° Flow 0.24/98.7 GPM

Acidity		< 1.0	mg/l $CaCO_3$
Alkalinity, Total	7-17		mg/l $CaCO_3$
Alkalinity, Bicarbonate		281	mg/l $CaCO_3$ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	7-17	7.9	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-17	580	umhos/cm
Fluoride			mg/l
Hardness, Total	7-14	252	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	7-15	< 0.5	mg/l
pH	7-17	7.90	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	7-11	329	mg/l
Solids, Total Suspended		10.0	mg/l
Sulfate	7-21	75	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	7-8	9.60	mg/l
Settleable Solids	7-9	< 0.1	ml/L
Total Cations		6.37	meq/l
Total Anions		6.38	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	7-14	36.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-9	0.09	mg/l
Lead			mg/l
Magnesium	7-17	39.4	mg/l
Manganese	7-9	< 0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-15	1.3	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-15	29.9	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	7-9	< 0.05	mg/l

Analyst: David A Danny

Respectfully submitted David A Danny

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STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8324

Date Rec'd 7-8-86

Date Sampled 7-8-86

Time Sampled 1350

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH BELOW THE MINE

Temp. 54° Flow 110 GPM Est.

Acidity		< 1.0	mg/l $CaCO_3$
Alkalinity, Total	7-17		mg/l $CaCO_3$
Alkalinity, Bicarbonate		309	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	7-17	40.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-17	1050	umhos/cm
Fluoride			mg/l
Hardness, Total	7-14	450	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	7-15	< 0.5	mg/l
pH	7-17	7.80	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		647	mg/l
Solids, Total Suspended	7-11	6.5	mg/l
Sulfate	7-21	260	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	7-8	9.80	mg/l
Settleable Solids	7-9	< 0.1	ml/L
Total Cations		11.86	meq/l
Total Anions		11.62	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	7-14	76.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-9	0.07	mg/l
Lead			mg/l
Magnesium	7-17	63.2	mg/l
Manganese	7-9	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-15	3.2	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-15	64.0	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	7-9	< 0.05	mg/l

Analyst: David Ramey

Respectfully submitted David Ramey

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STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8474
Date Rec'd 8-13-86
Date Sampled 8-13-86
Time Sampled 0940

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH RIGHT FORK

Temp. 52° Flow 0.09/10.70 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	8-14		mg/l $CaCO_3$
Alkalinity, Bicarbonate		240	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-14	8.3	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	8-14	550	umhos/cm
Fluoride			mg/l
Hardness, Total	8-14	265	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	8-15	<0.5	mg/l
pH	8-14	8.10	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-14	296	mg/l
Solids, Total Suspended		55.0	mg/l
Sulfate	8-15	40	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	8-13	9.0	mg/l
Settleable Solids	8-13	<0.1	ml/L
Total Cations		6.16	meq/l
Total Anions		5.90	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-14	40.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	8-15	0.73	mg/l
Lead			mg/l
Magnesium	8-14	40.1	mg/l
Manganese	8-15	0.03	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	8-14	2.5	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	8-14	18.2	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss)	8-15	<0.05	mg/l

Analyst: David Spencer

Respectfully submitted David Spencer

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STANDARD LABORATORIES, INC.

P Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8473
Date Rec'd 8-13-86
Date Sampled 8-13-86
Time Sampled 0930

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH LEFT FORK

Temp. 50° Flow 0.17/53.9 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	8-14		mg/l $CaCO_3$
Alkalinity, Bicarbonate		294	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-14	7.8	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	8-14	410	umhos/cm
Fluoride			mg/l
Hardness, Total	8-14	275	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	8-15	<0.5	mg/l
pH	8-14	8.00	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-14	337	mg/l
Solids, Total Suspended		3.0	mg/l
Sulfate	8-15	67	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	8-13	8.0	mg/l
Settleable Solids	8-13	<0.1	ml/L
Total Cations		6.80	meq/l
Total Anions		6.44	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-14	42.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	8-15	0.16	mg/l
Lead			mg/l
Magnesium	8-14	41.3	mg/l
Manganese	8-15	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	8-14	1.4	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	8-14	29.0	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	8-15	<0.05	mg/l

Analyst: David Ramun

Respectfully submitted David Ramun

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CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8475
Date Rec'd 8-13-86
Date Sampled 8-13-86
Time Sampled 0915

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH BELOW THE MINE
STAFF GAUGE 0.3'

Temp. 52° Flow 70 GPM Est.

Acidity	8-14	<1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate		284	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-14	50.3	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	8-14	1210	umhos/cm
Fluoride			mg/l
Hardness, Total	8-14	565	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	8-15	<0.5	mg/l
pH	8-14	7.95	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-14	747	mg/l
Solids, Total Suspended		7.0	mg/l
Sulfate	8-15	290	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	8-13	10.0	mg/l
Settleable Solids	8-13	<0.1	ml/L
Total Cations		13.85	meq/l
Total Anions		13.15	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-14	96.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	8-15	0.10	mg/l
Lead			mg/l
Magnesium	8-14	79.0	mg/l
Manganese	8-15	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	8-14	4.2	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	8-14	56.1	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	8-15	<0.05	mg/l

Analyst: David L. Ramsey

Respectfully submitted David L. Ramsey

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CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8508
Date Rec'd 9-9-86
Date Sampled 9-8-86
Time Sampled 1150

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH RIGHT FORK

Temp. 54° Flow 0.02/1.04 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate	9-9	304	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	9-11	10.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	9-9	595	umhos/cm
Fluoride			mg/l
Hardness, Total	9-10	290	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	9-15	<0.5	mg/l
pH	9-9	7.45	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	9-11	375	mg/l
Solids, Total Suspended		20.0	mg/l
Sulfate	9-10	59	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	9-9	7.60	mg/l
Settleable Solids	9-9	<0.1	ml/L
Total Cations		6.69	meq/l
Total Anions		6.52	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	9-10	44.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	9-11	0.13	mg/l
Lead			mg/l
Magnesium	9-10	43.8	mg/l
Manganese	9-11	<0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	9-11	3.3	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	9-11	18.6	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	9-11	<0.05	mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8507
Date Rec'd 9-9-86
Date Sampled 9-8-86
Time Sampled 1140

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH LEFT FORK

Temp. 59° Flow 0.11/26.9 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	9-9		mg/l $CaCO_3$
Alkalinity, Bicarbonate		299	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	9-11	9.2	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	9-9	600	umhos/cm
Fluoride			mg/l
Hardness, Total	9-10	270	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	9-15	< 0.5	mg/l
pH	9-9	7.40	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	9-11	293	mg/l
Solids, Total Suspended		19.0	mg/l
Sulfate	9-10	68	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	9-9	7.40	mg/l
Settleable Solids	9-9	<0.1	ml/L
Total Cations		6.72	meq/l
Total Anions		6.59	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	9-10	42.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	9-11	0.16	mg/l
Lead			mg/l
Magnesium	9-10	40.1	mg/l
Manganese	9-11	< 0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	9-11	2.0	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	9-11	29.1	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	9-11	< 0.05	mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8509
Date Rec'd 9-9-86
Date Sampled 9-8-86
Time Sampled 1040

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH BELOW THE MINE

Temp. 52° Flow 30 GPM Est. Staff Gauge 0.30

Acidity		< 1.0	mg/l $CaCO_3$
Alkalinity, Total	9-9		mg/l $CaCO_3$
Alkalinity, Bicarbonate		368	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	9-11	80.7	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	9-9	1390	umhos/cm
Fluoride			mg/l
Hardness, Total	9-10	640	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	9-15	< 0.5	mg/l
pH	9-9	7.30	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	9-11	902	mg/l
Solids, Total Suspended		18.0	mg/l
Sulfate	9-10	305	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	9-9	7.85	mg/l
Settleable Solids	9-9	< 0.1	ml/L
Total Cations		15.71	meq/l
Total Anions		14.68	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	9-10	112.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	9-11	0.09	mg/l
Lead			mg/l
Magnesium	9-10	87.6	mg/l
Manganese	9-11	< 0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	9-11	5.8	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	9-11	63.8	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	9-11	< 0.05	mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8709
Date Rec'd 10-17-86
Date Sampled 10-17-86
Time Sampled 1000

Client: UTAH POWER & LIGHT CO.
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH RT FORK
(Low Flow Runoff)

MINING DIVISION

Temp. 37.7° Flow 0.03/1.96

Acidity	10-22	<1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate		320	mg/l $CaCO_3$
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	10-23	10.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	680	umhos/cm
Fluoride	10-29	0.17	mg/l
Hardness, Total	10-23	320	mg/l $CaCO_3$
Nitrogen, Ammonia	11-3	0.46	mg/l
Nitrogen, Nitrate	10-21	0.03	mg/l
Nitrogen, Nitrite	10-21	0.01	mg/l
Oil & Grease	10-23	< 0.5	mg/l
pH	10-22	7.65	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	11-3	0.07	mg/l
Solids, Total Dissolved	10-21	389	mg/l
Solids, Total Suspended	10-20	< 0.5	mg/l
Sulfate	10-29	120	mg/l
Sulfide	10-22	1.2	mg/l
Turbidity			NTU
Dissolved Oxygen	10-17	9.8	mg/l
Settleable Solids	10-20	<0.5	ml/L
Total Cations		7.35	meq/l
Total Anions		8.04	meq/l

Aluminum	11-4	< 0.05	mg/l
Arsenic	10-30	< 1.0	mg/l
Barium	11-4	< 0.1	mg/l
Beryllium			mg/l
Boron	11-7	0.1	mg/l
Cadmium	11-4	< 0.005	mg/l
Calcium	10-23	52	mg/l
Chromium	11-4	< 0.05	mg/l
Copper	11-4	< 0.02	mg/l
Iron	11-3	< 0.05	mg/l
Lead	11-4	< 0.05	mg/l
Magnesium	10-23	46.2	mg/l
Manganese	11-4	<0.01	mg/l
Mercury	10-30	1.68	ug/l
Nickel	11-4	< 0.04	mg/l
Potassium	11-3	2.72	mg/l
Selenium	10-30	< 5.0	mg/l
Silica			mg/l
Sodium	11-3	20.44	mg/l
Vanadium			mg/l
Zinc	11-3	< 0.005	mg/l
Iron (Diss.)	11-3	< 0.05	mg/l
Molybdenum	11-4	< 0.1	mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8710
Date Rec'd 10-17-86
Date Sampled 10-17-86
Time Sampled 0900

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO DRAWER PMC
PRICE, UT 84501

Sample ID: GRIMES WASH LEFT FORK
(low flow runoff)

Temp. 36° Flow 0.1/22.4

Acidity	10-22	< 1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate		318	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	10-23	10.9	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	690	umhos/cm
Fluoride	10-29	0.15	mg/l
Hardness, Total	10-23	310	mg/l $CaCO_3$
Nitrogen, Ammonia	11-3	0.22	mg/l
Nitrogen, Nitrate	10-21	0.03	mg/l
Nitrogen, Nitrite	10-21	0.01	mg/l
Oil & Grease	10-23	< 0.5	mg/l
pH	10-22	7.55	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	11-3	0.12	mg/l
Solids, Total Dissolved	10-21	427	mg/l
Solids, Total Suspended	10-20	11	mg/l
Sulfate	10-29	115	mg/l
Sulfide	10-22	1.2	mg/l
Turbidity			NTU
Dissolved Oxygen	10-17	9.4	mg/l
Total Settleable Solids	10-20	< 0.5	ml/L
Total Anions		7.93	meq/l
Total Cations		7.34	meq/l

Aluminum	11-4	0.07	mg/l
Arsenic	10-30	< 1.0	mg/l
Barium	11-4	< 0.1	mg/l
Beryllium			mg/l
Boron	11-7	0.3	mg/l
Cadmium	11-4	< 0.005	mg/l
Calcium	10-23	52	mg/l
Chromium	11-4	< 0.05	mg/l
Copper	11-4	< 0.02	mg/l
Iron	11-4	< 0.05	mg/l
Lead	11-4	< 0.05	mg/l
Magnesium	10-23	43.8	mg/l
Manganese	11-4	< 0.01	mg/l
Mercury	10-30	< 0.2	ug/l
Nickel	11-4	< 0.04	mg/l
Potassium	11-3	2.12	mg/l
Selenium	10-30	< 5.0	mg/l
Silica			mg/l
Sodium	11-3	25.2	mg/l
Vanadium			mg/l
Zinc	11-3	< 0.005	mg/l
Iron(Diss.)	11-4	< 0.05	mg/l
Molybdenum	11-4	< 0.1	mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8711
Date Rec'd 10-17-86
Date Sampled 10-17-86
Time Sampled 1005

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: GRIMES WASH BELOW MINE
(Low Flow Runoff)

Temp. 44° Flow 40 Staff 0.35'

Acidity	10-22	< 1.0	mg/l $CaCO_3$
Alkalinity, Total			mg/l $CaCO_3$
Alkalinity, Bicarbonate		381	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	10-23	141.2	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	1800	umhos/cm
Fluoride	10-29	0.16	mg/l
Hardness, Total	10-23	760	mg/l $CaCO_3$
Nitrogen, Ammonia	11-3	0.15	mg/l
Nitrogen, Nitrate	10-21	0.03	mg/l
Nitrogen, Nitrite	10-21	0.01	mg/l
Oil & Grease	10-23	1.0	mg/l
pH	10-22	7.40	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	11-3	0.07	mg/l
Solids, Total Dissolved	10-21	1224	mg/l
Solids, Total Suspended	10-20	< 0.5	mg/l
Sulfate	10-29	550	mg/l
Sulfide	10-22	2.8	mg/l
Turbidity			NTU
Dissolved Oxygen	10-17	9.0	mg/l
Settleable Solids	10-20	< 0.5	ml/L
Total Anions		21.69	meq/l
Total Cations		20.54	meq/l

Aluminum	11-4	< 0.05	mg/l
Arsenic	10-30	< 1.0	mg/l
Barium	11-4	< 0.1	mg/l
Beryllium			mg/l
Boron	11-7	0.3	mg/l
Cadmium	11-4	< 0.005	mg/l
Calcium	10-23	150	mg/l
Chromium	11-4	< 0.05	mg/l
Copper	11-4	< 0.02	mg/l
Iron	11-3	< 0.05	mg/l
Lead	11-4	< 0.05	mg/l
Magnesium	10-23	93.6	mg/l
Manganese	11-4	0.05	mg/l
Mercury	10-30	< 0.2	ug/l
Nickel	11-4	< 0.04	mg/l
Potassium	11-3	5.77	mg/l
Selenium	10-30	< 5.0	mg/l
Silica			mg/l
Sodium	11-3	119.8	mg/l
Vanadium			mg/l
Zinc	11-3	0.024	mg/l
Iron (Diss.)	11-3	< 0.05	mg/l
Molybdenum	11-4	< 0.1	mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

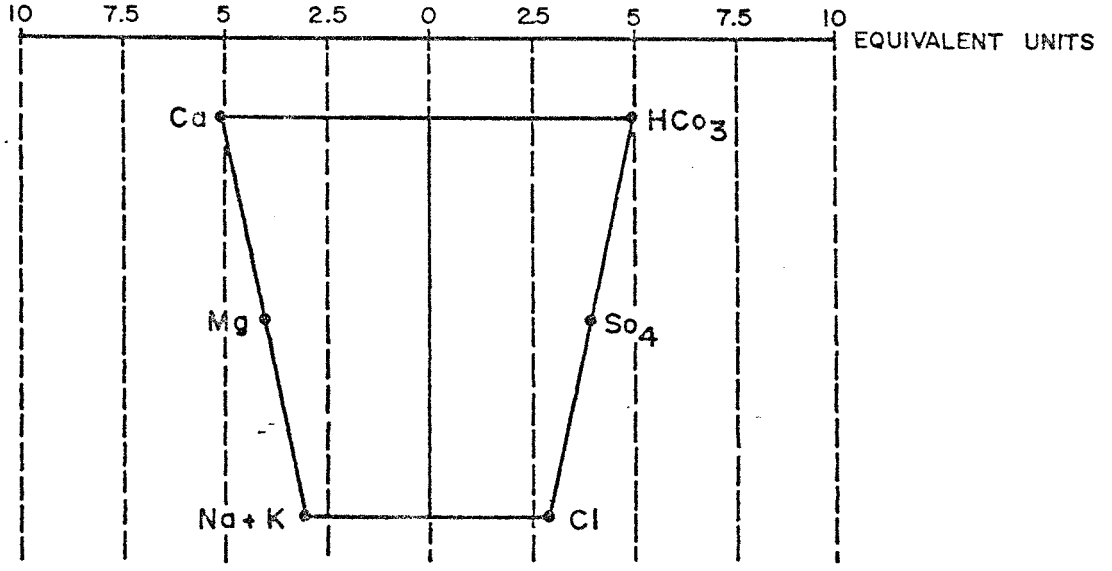
Certified Environmental Laboratory

APPENDIX E

EAST MOUNTAIN SPRINGS

CATION-ANION DIAGRAMS/FLOW AND QUALITY

CATION – ANION DIAGRAMS



$$\frac{\text{P P M}}{\text{Equivalent Weight}} = \text{Equivalent Unit}$$

1" = 5 Equivalent Units

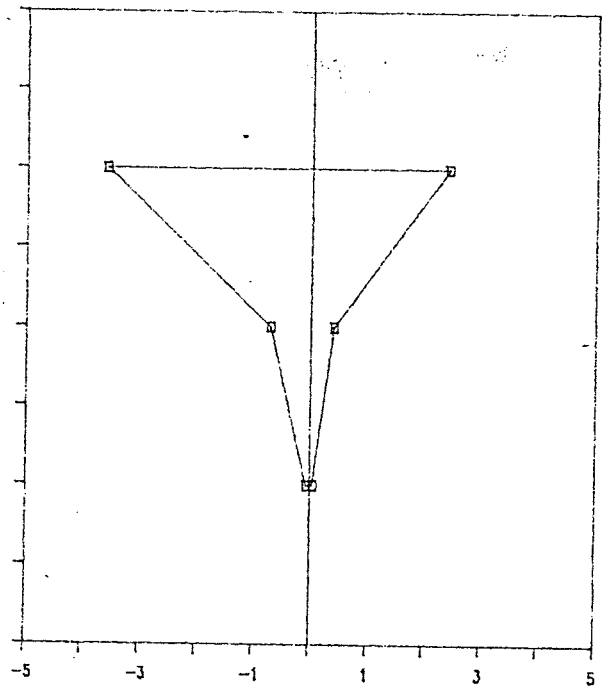
Equivalent Weights

Mg	12.16	(Magnesium)
Ca	20.04	(Calcium)
Na	23.00	(Sodium)
K	39.10	(Potassium)
So_4	48.03	(Sulfate)
$CaCO_3$	100.1	(Total Alkalinity)
Cl	35.46	(Chloride)

FLAGSTAFF LIMESTONE

SHEBA SP

07-16-86



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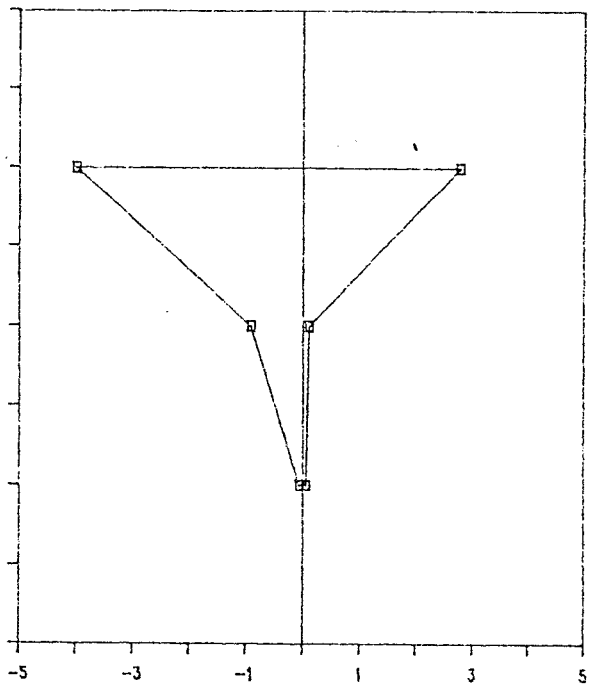
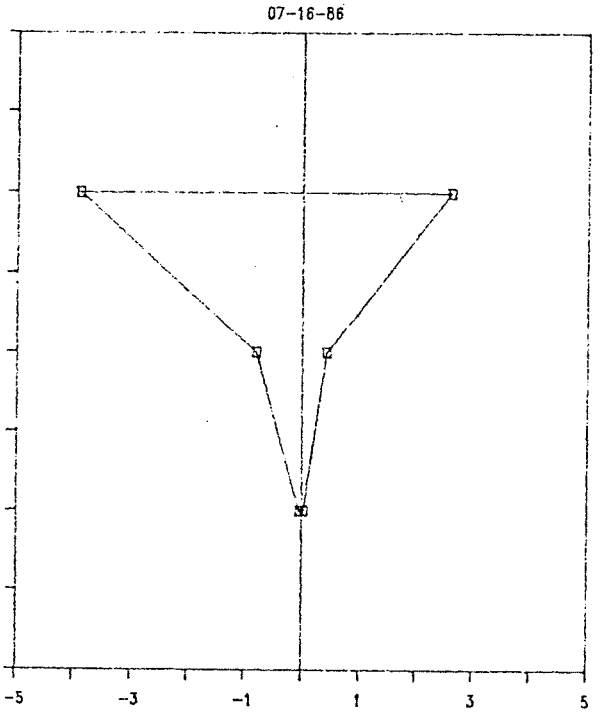
10-15-86



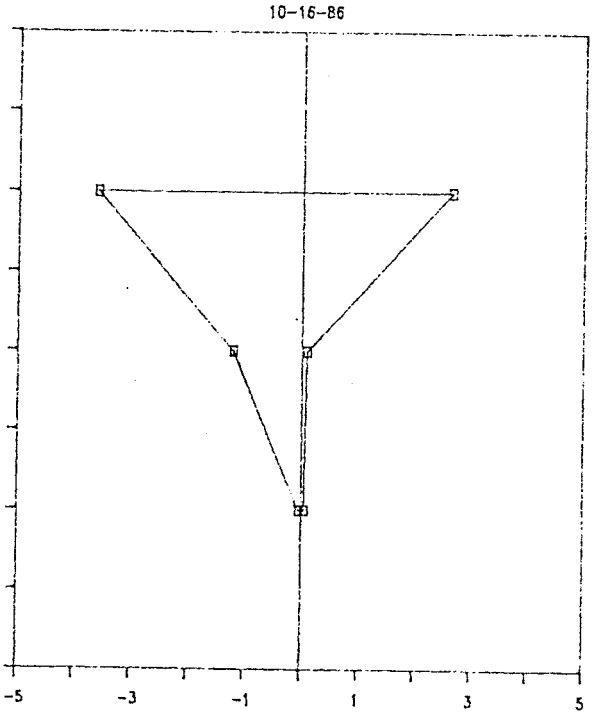
PINE SP

07-16-86

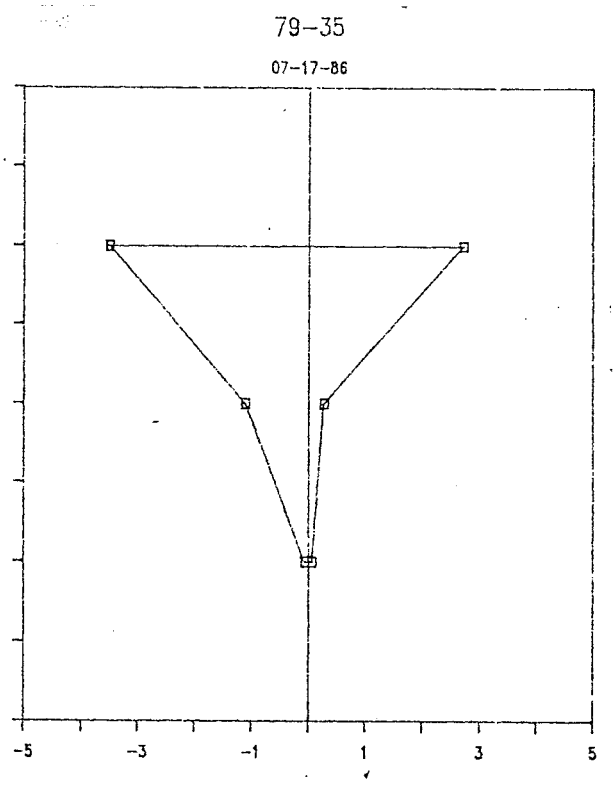


PINE SP.

10-16-86



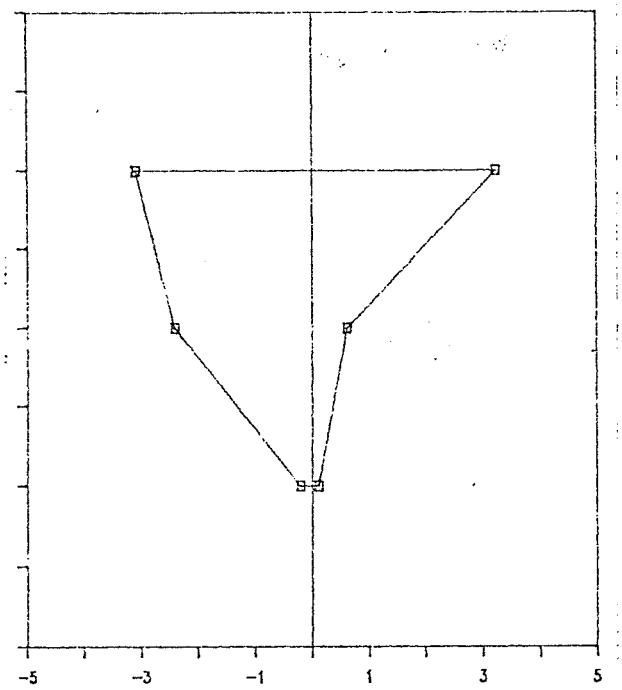
FLAGSTAFF LIMESTONE



NORTH HORN FORMATION

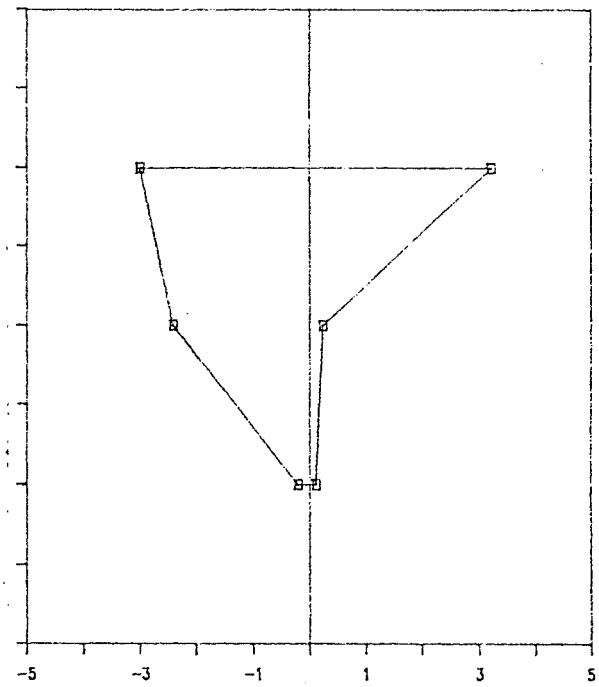
BURNT TREE

07-22-86



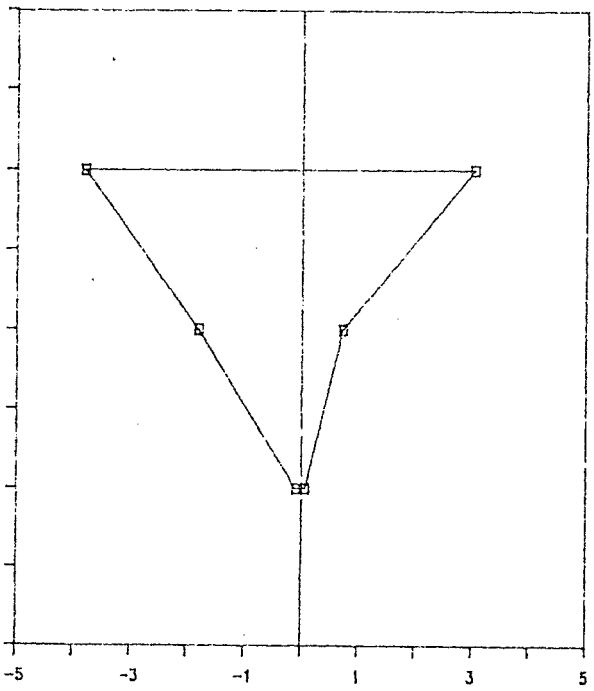
BURNT TREE

10-15-86



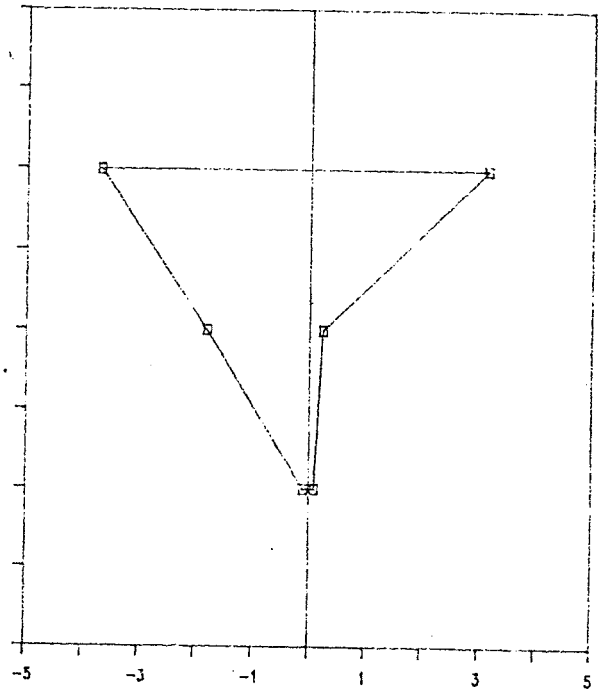
TEDS TUB

07-17-86



TEDS TUB

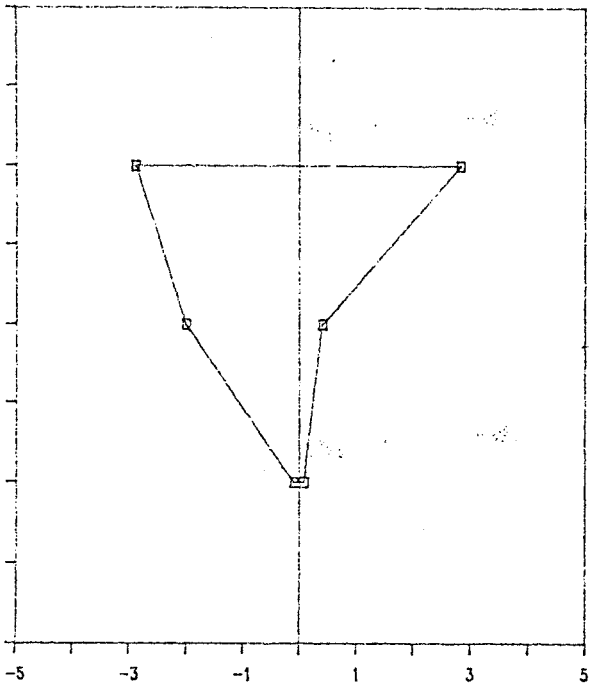
10-16-86



NORTH HORN FORMATION

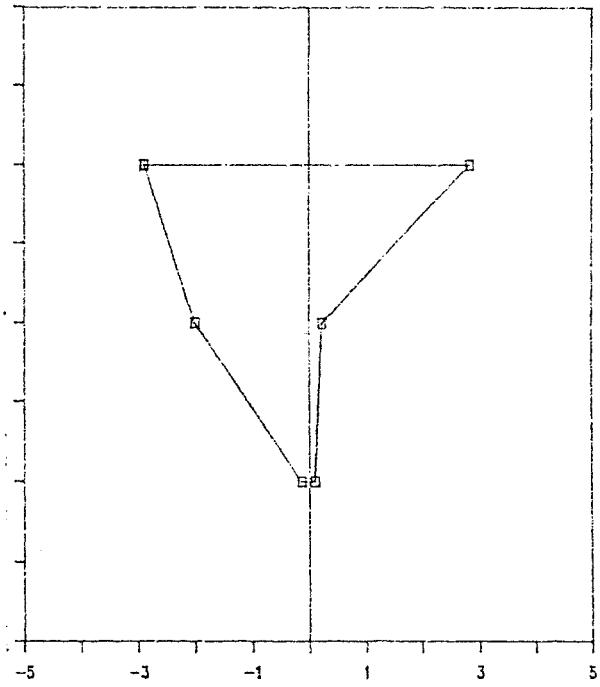
ELK SP.

07-16-86



ELK SP.

10-16-86



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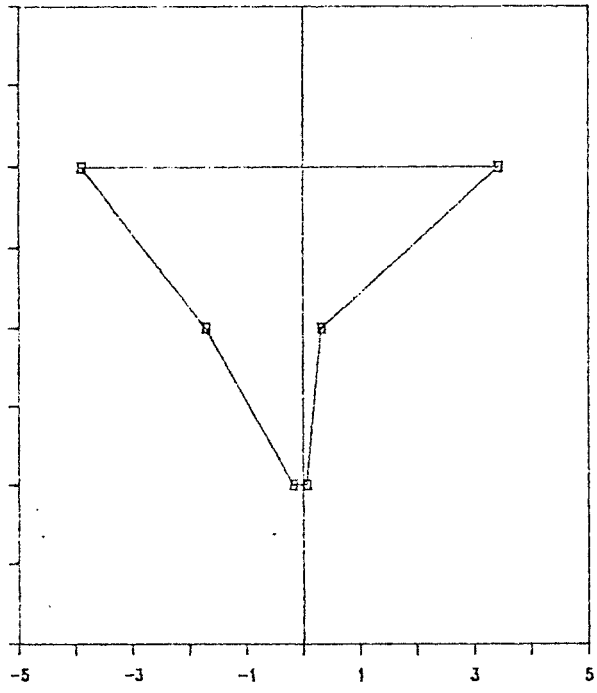

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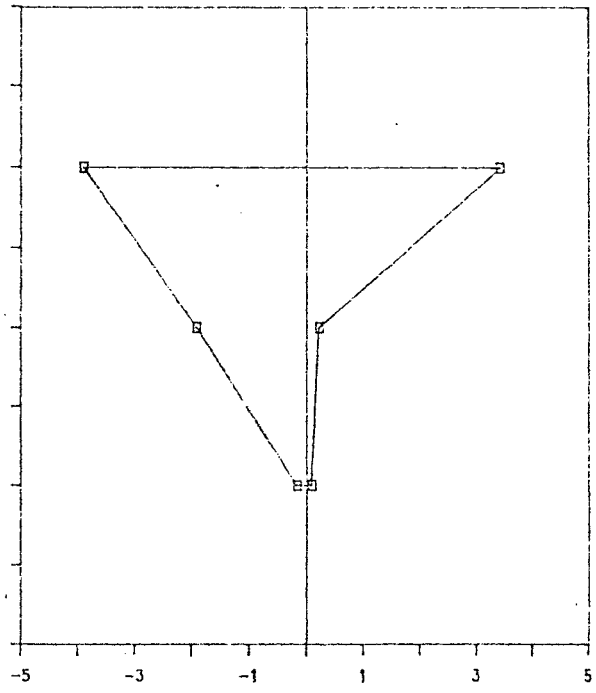
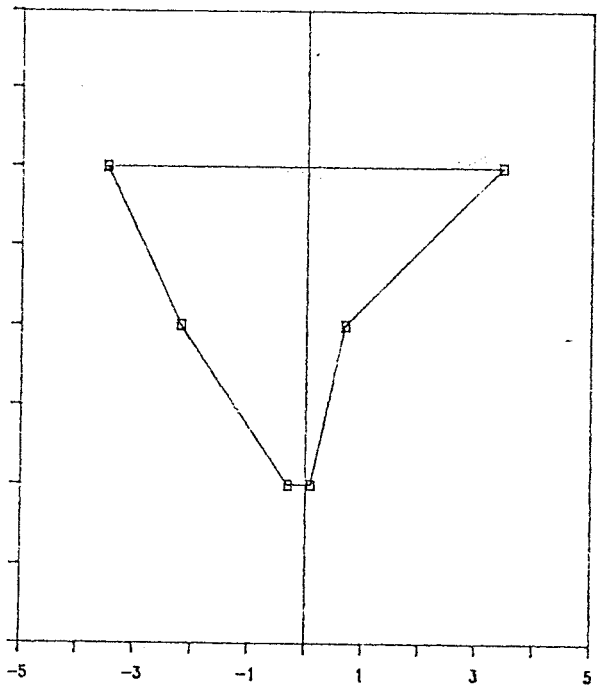


NORTH HORN FORMATION

79-3

07-22-86



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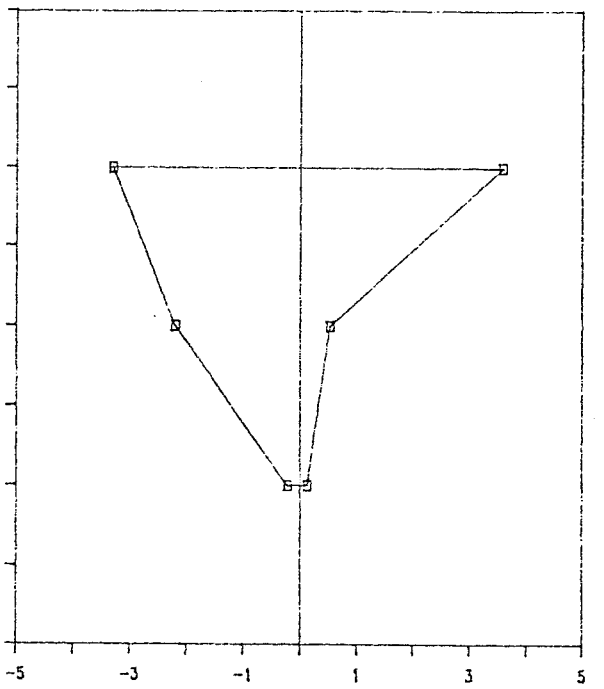

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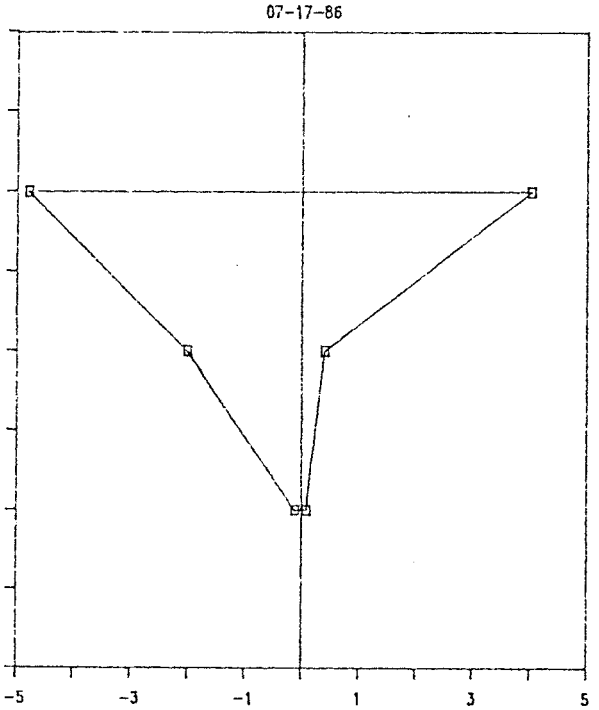

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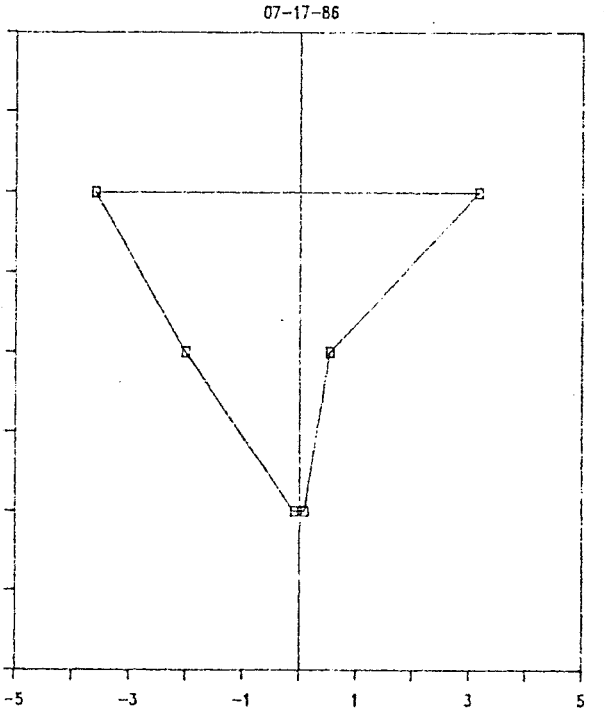

NORTH HORN FORMATION

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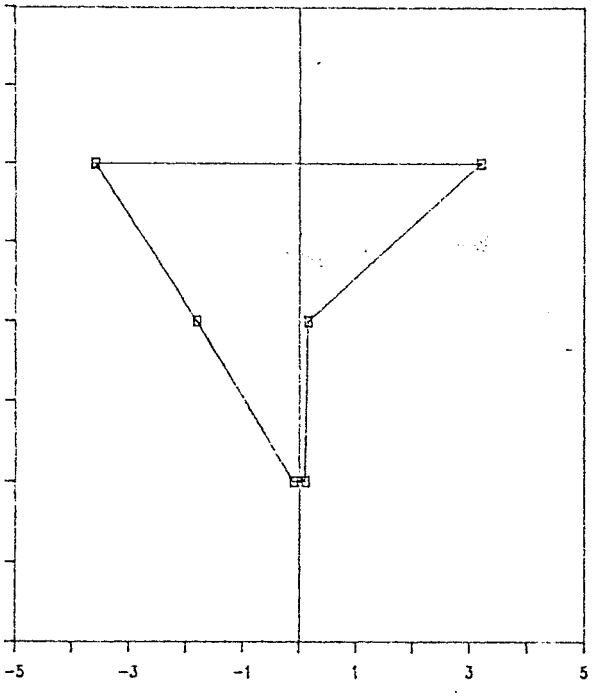
10-16-86



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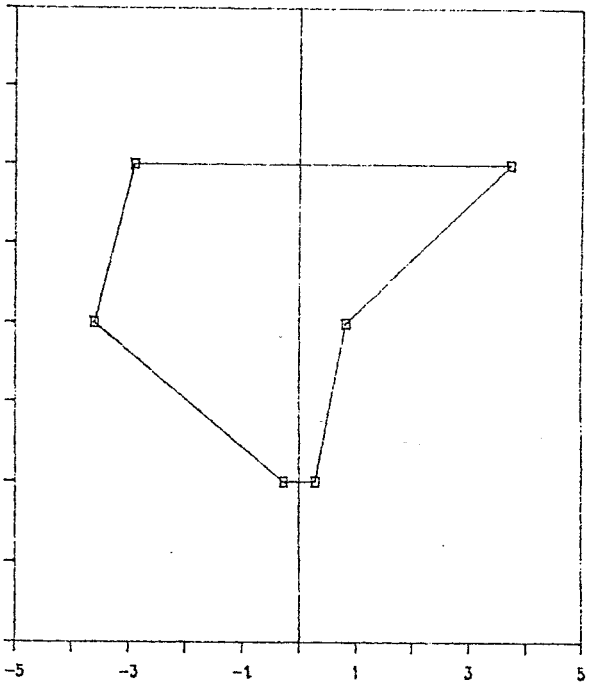

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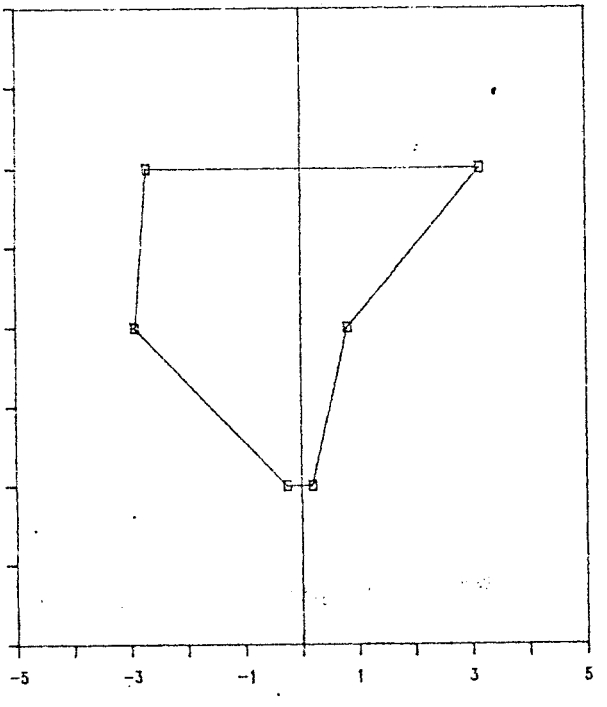
07-17-86



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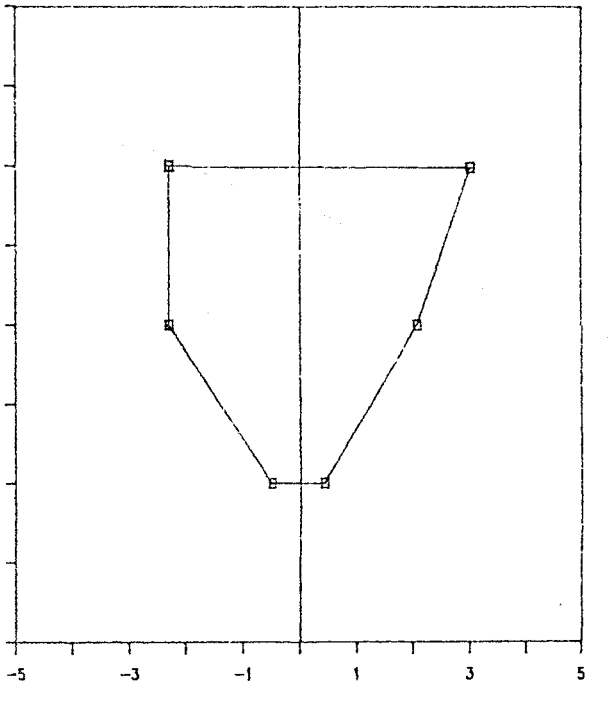
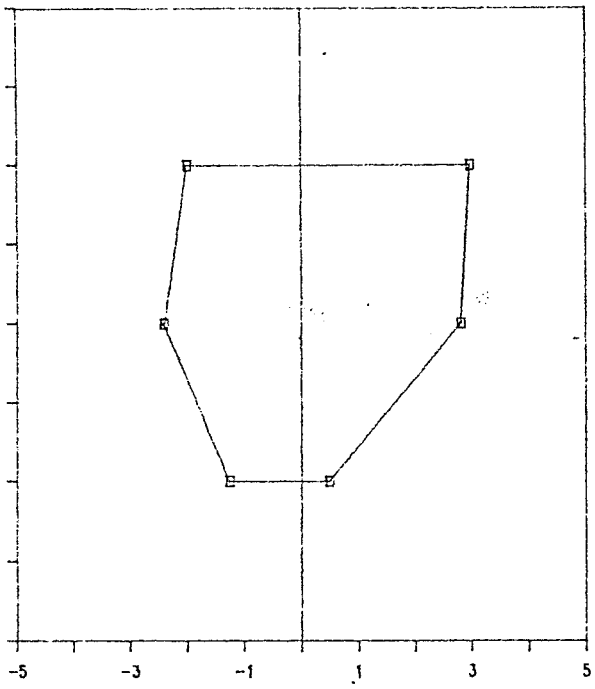
07-17-86



NORTH HORN FORMATION

79-28

10-15-86



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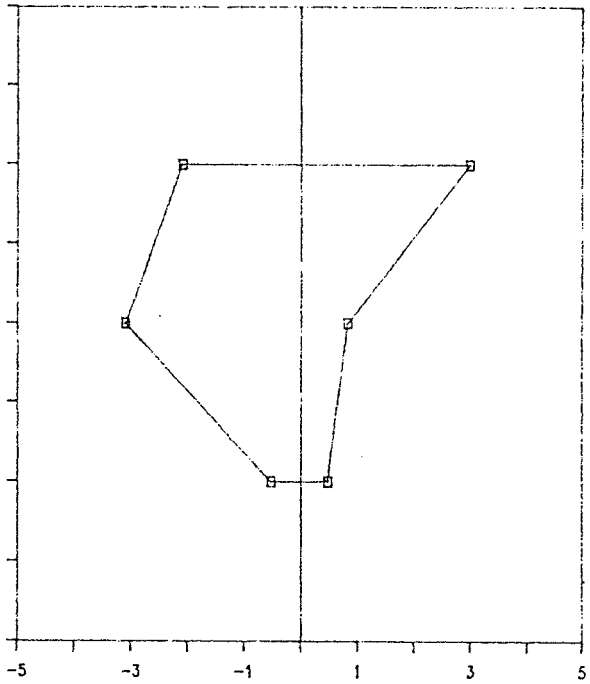

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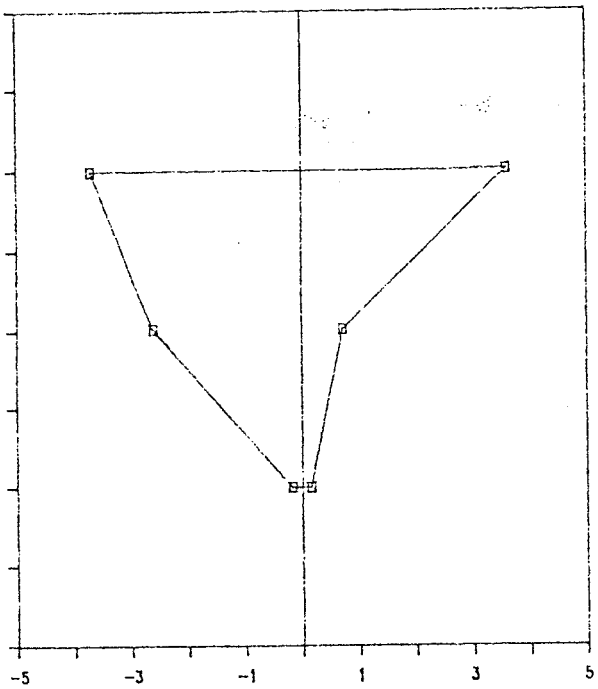

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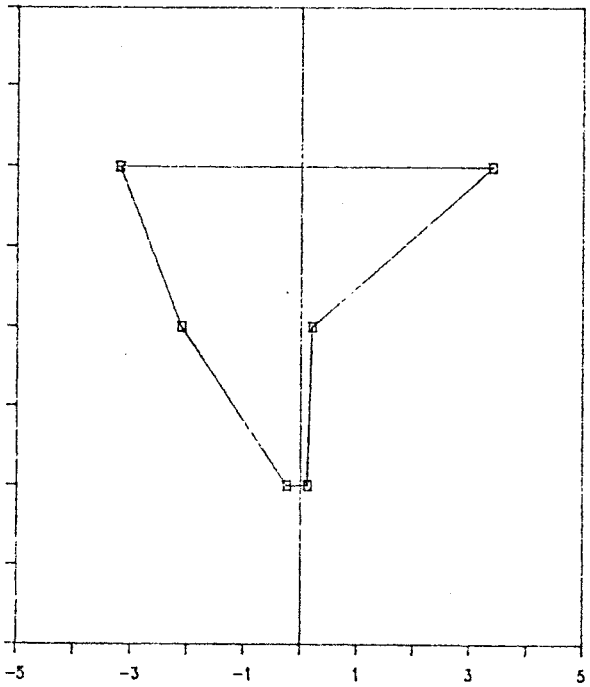

NORTH HORN FORMATION

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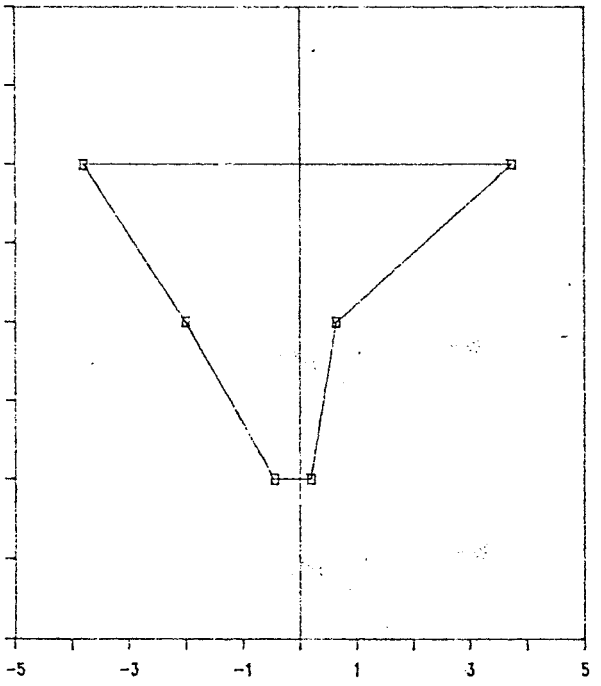
07-21-86



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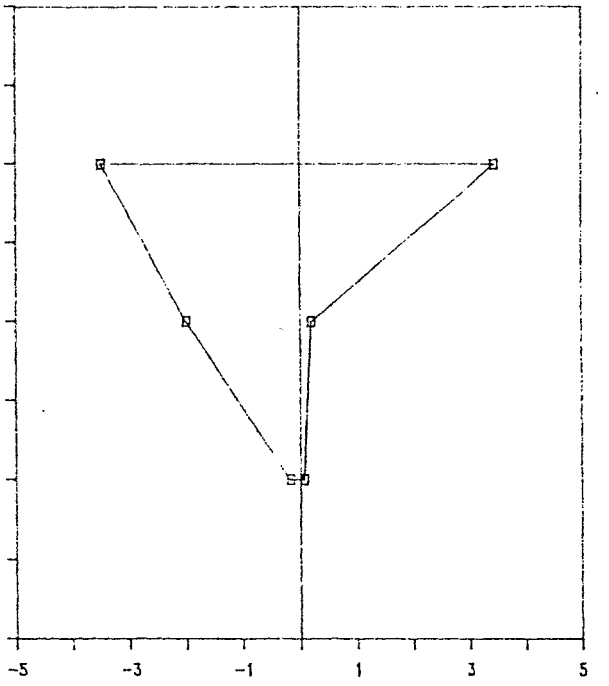

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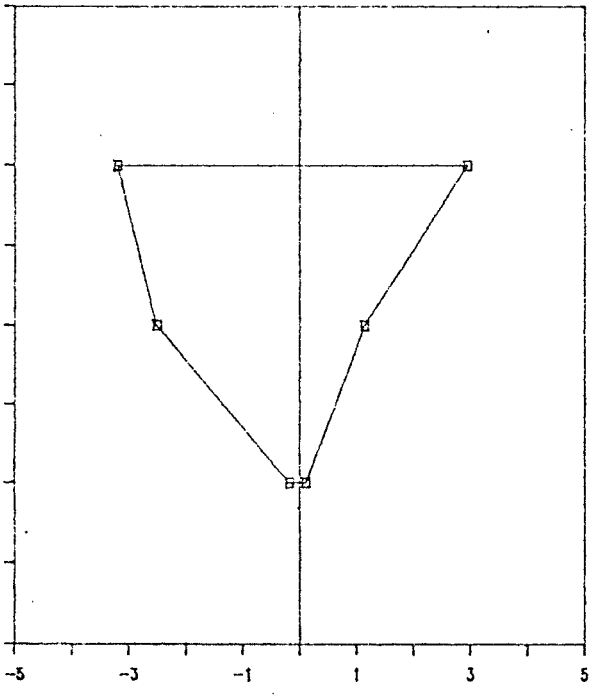

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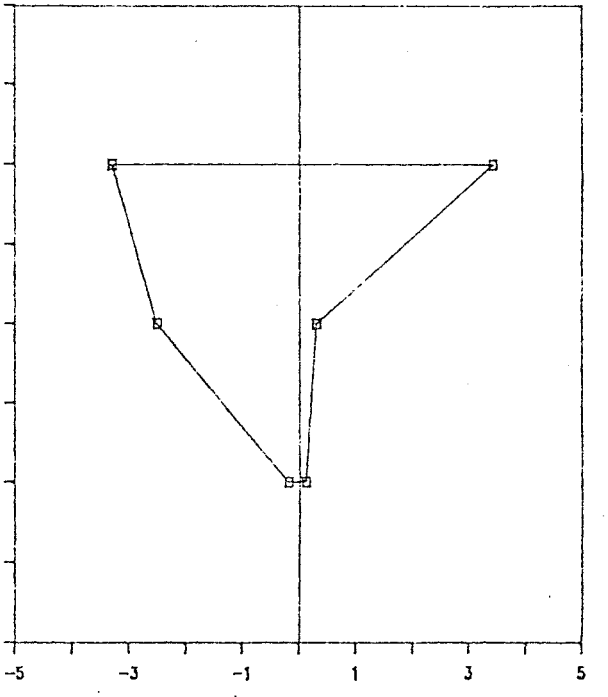
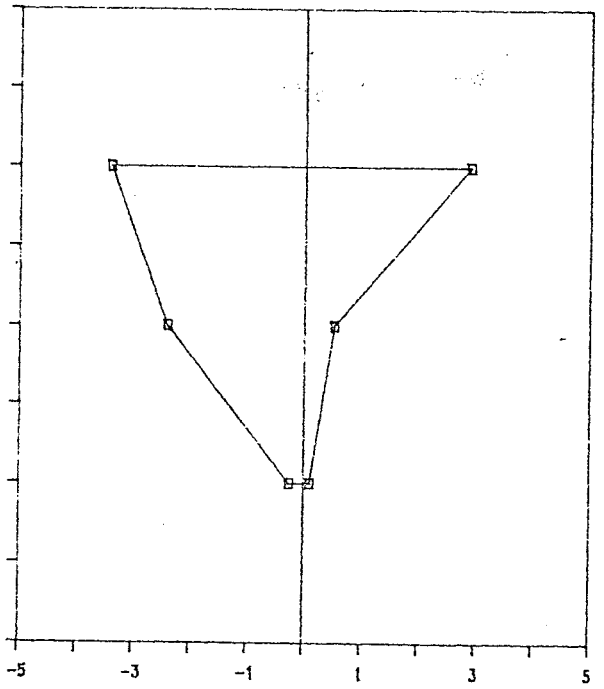
10-16-86



NORTH HORN FORMATION

80-47

07-22-86



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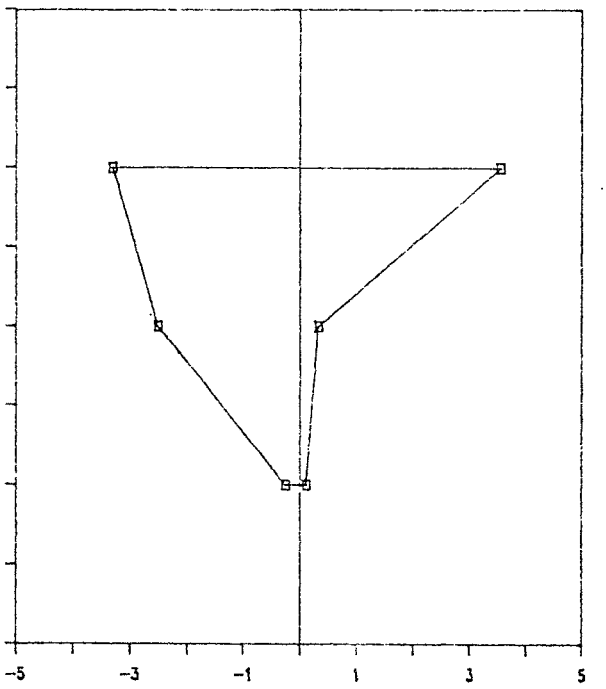

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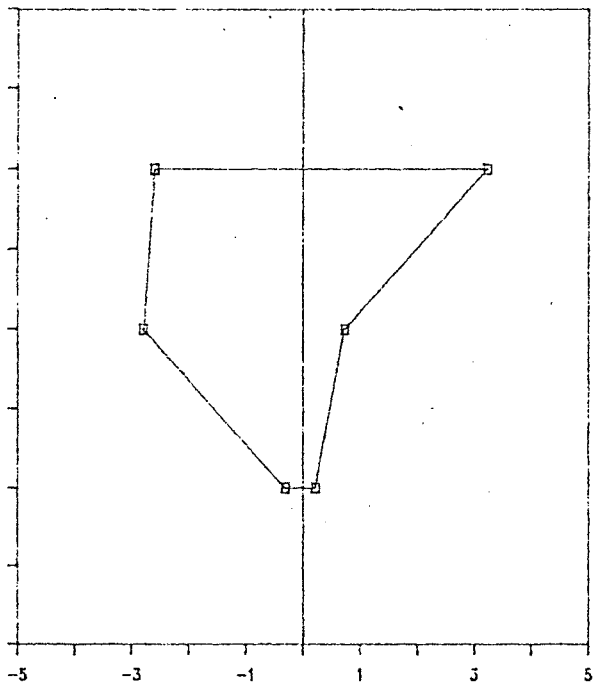
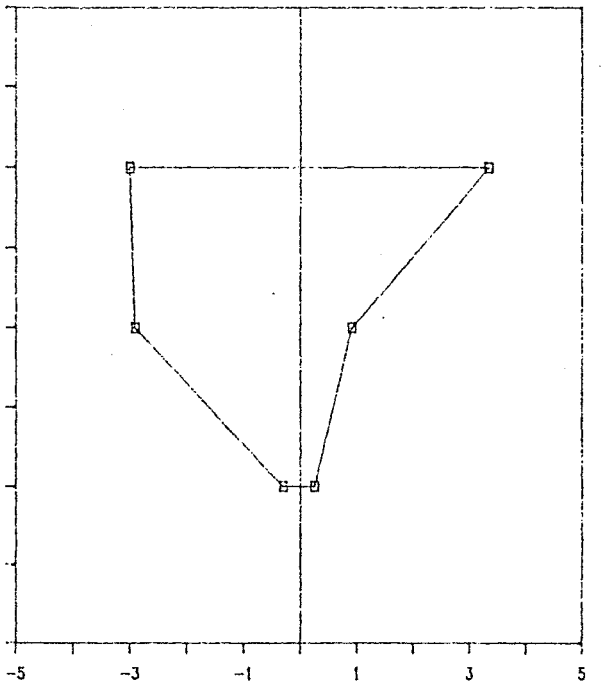
07-17-86



84-56

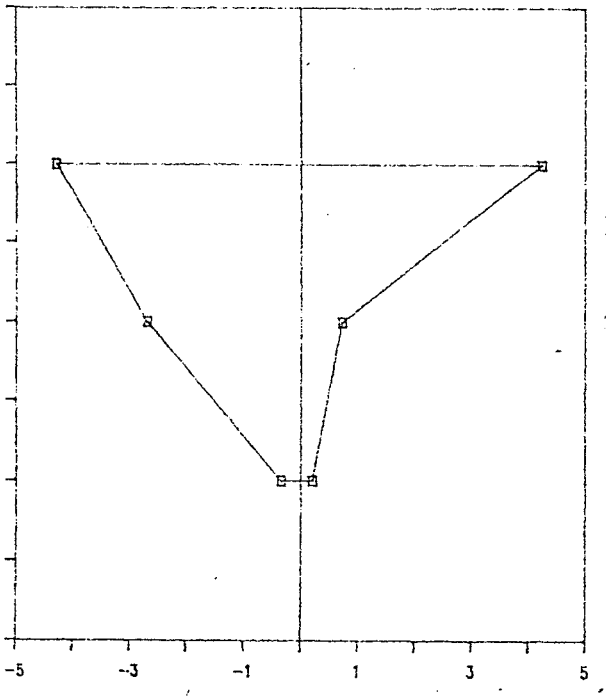
07-22-86



PRICE RIVER FORMATION

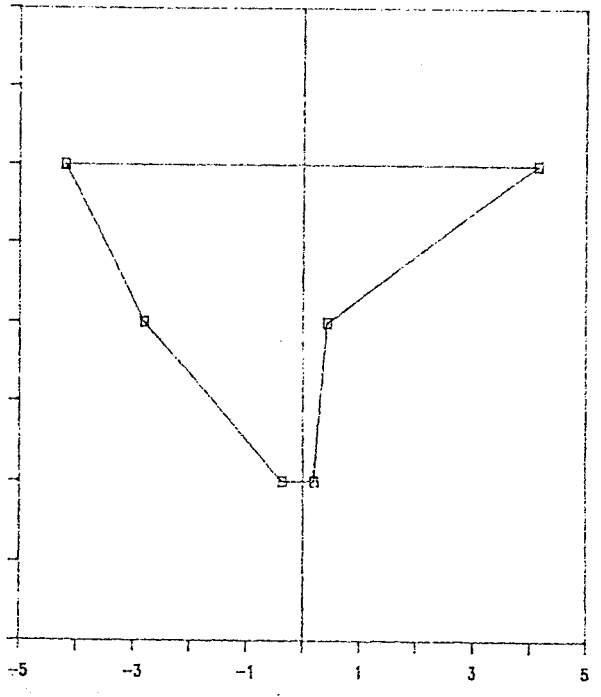
JERKWATER

07-21-86



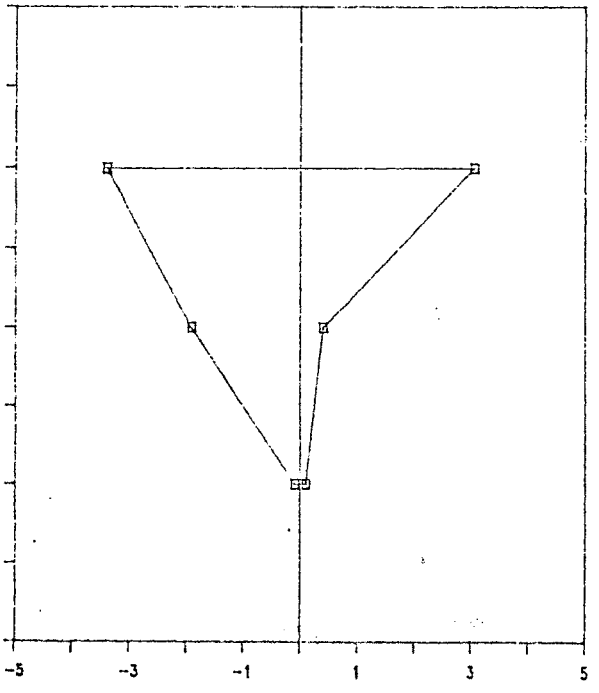
JERKWATER

10-15-86



79-10

07-16-86



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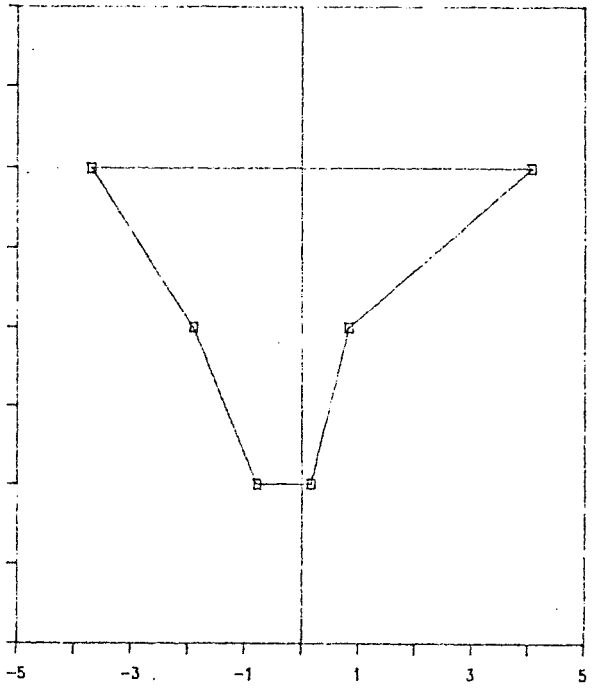
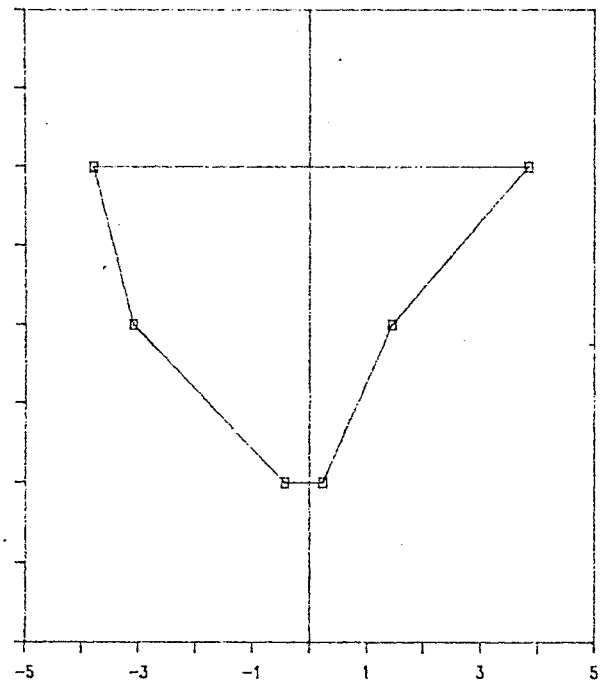
07-22-86



PRICE RIVER FORMATION

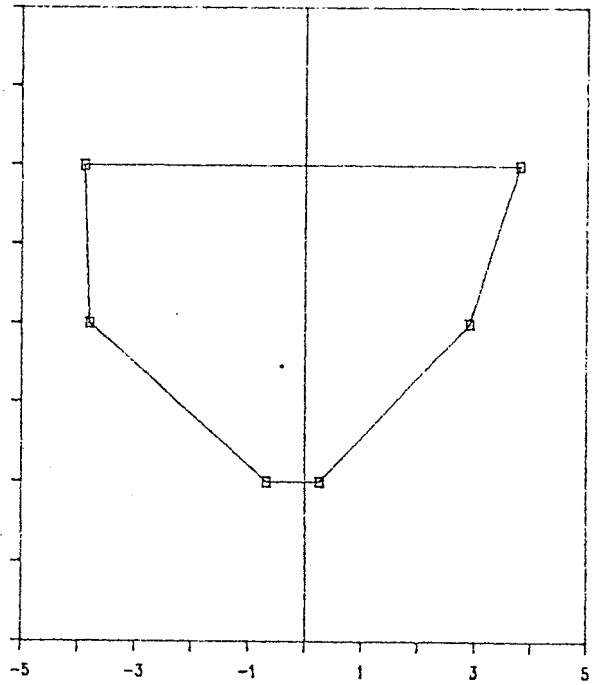
80-41

07-22-86



80-44

07-22-86



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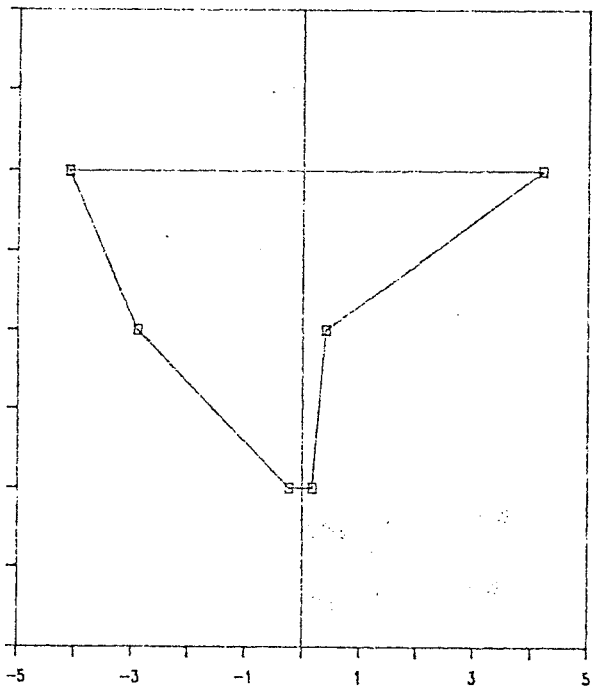
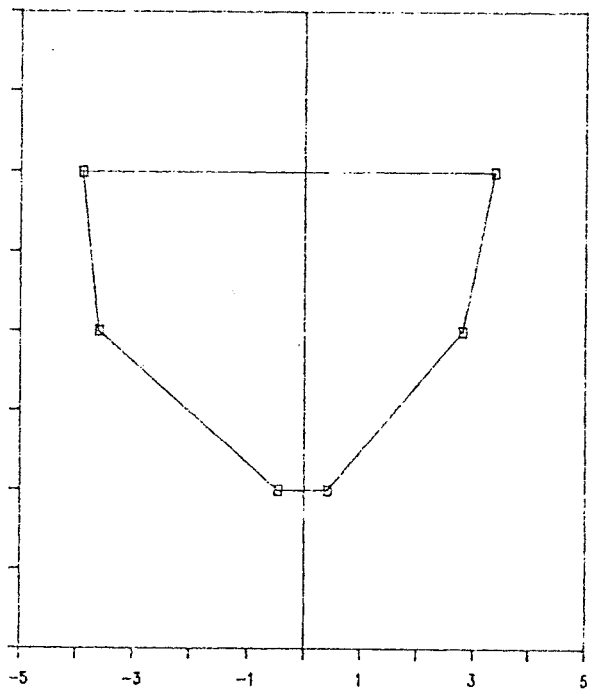
07-16-86



82-51

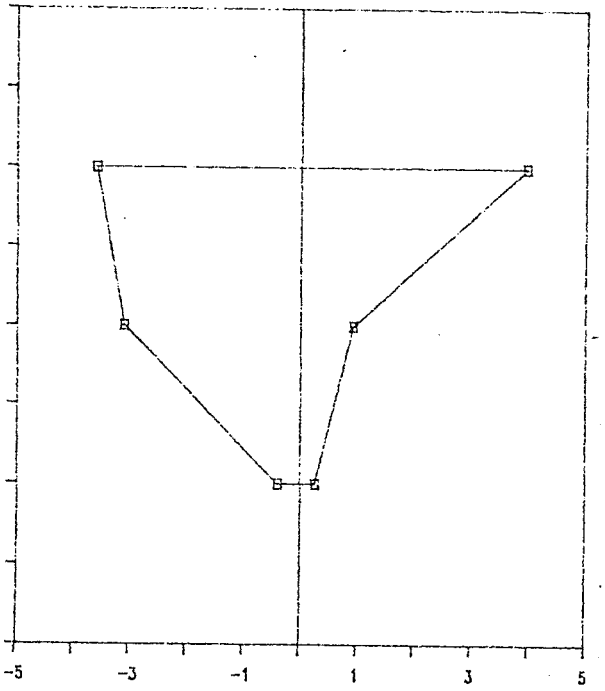
07-22-86



PRICE RIVER FORMATION

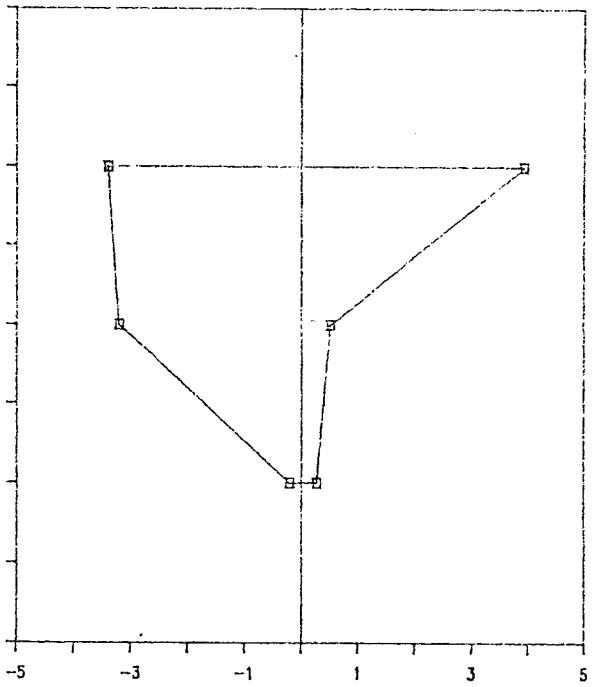
82-52

07-21-86



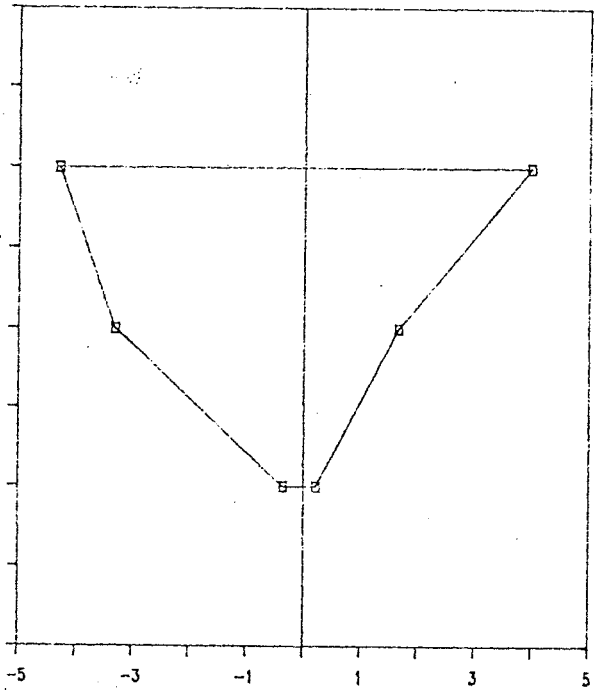
SHEEP HERDER

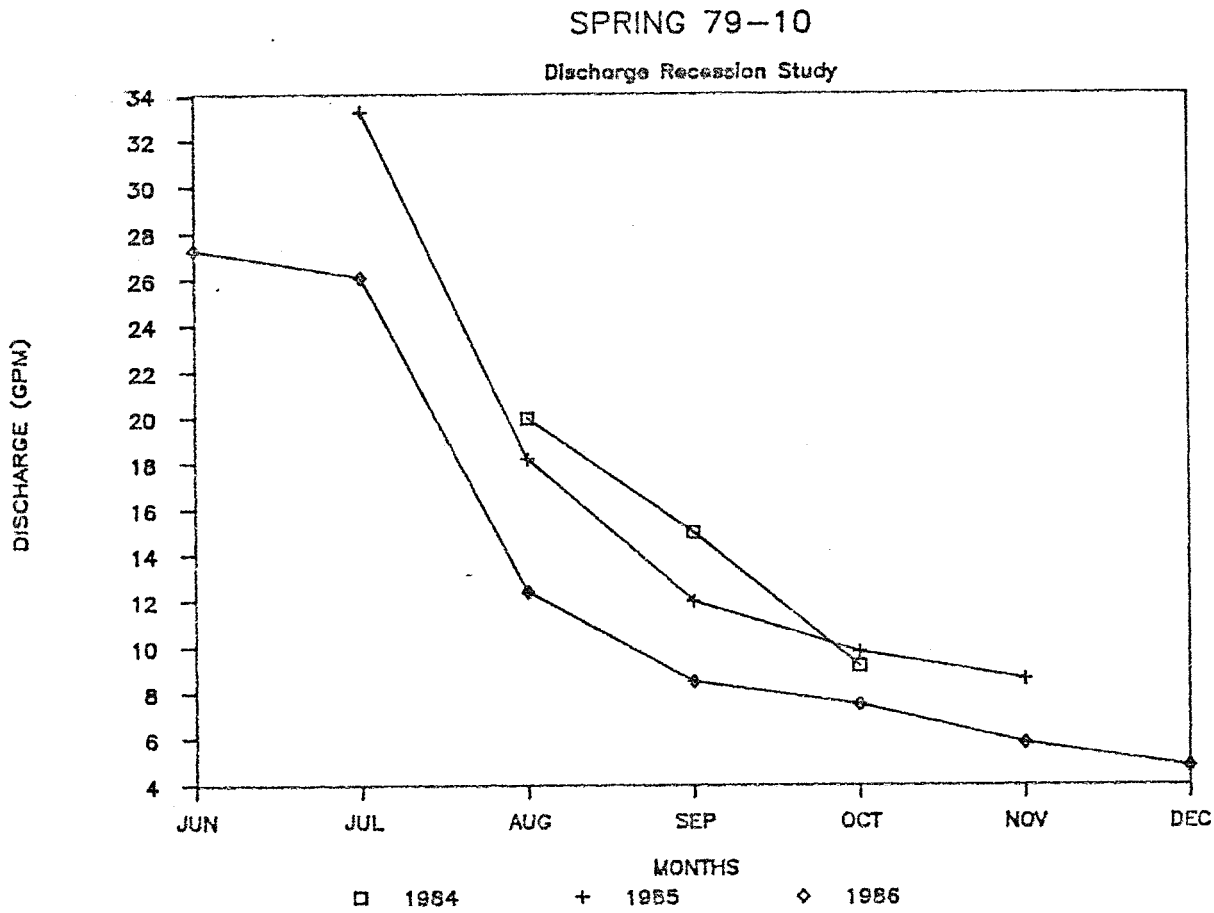
10-15-86



84-55

07-22-86




SPRING 79-10
Discharge Recession Study
DISCHARGE (GPM)
34
32
30
28
26
24
22
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18
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MONTHS
1984
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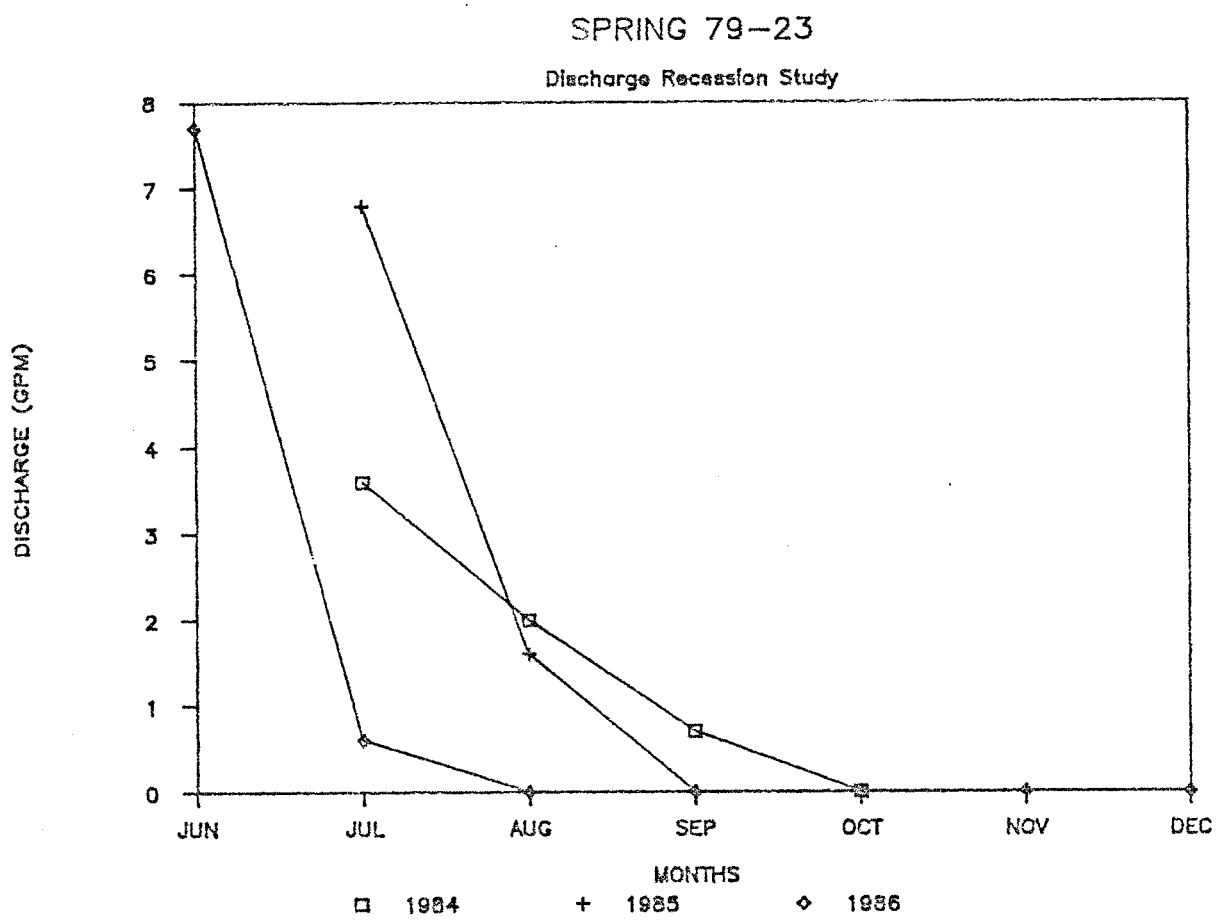
SPRING 79-23
Discharge Recession Study
DISCHARGE (GPM)
8
7
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DEC
MONTHS
1984
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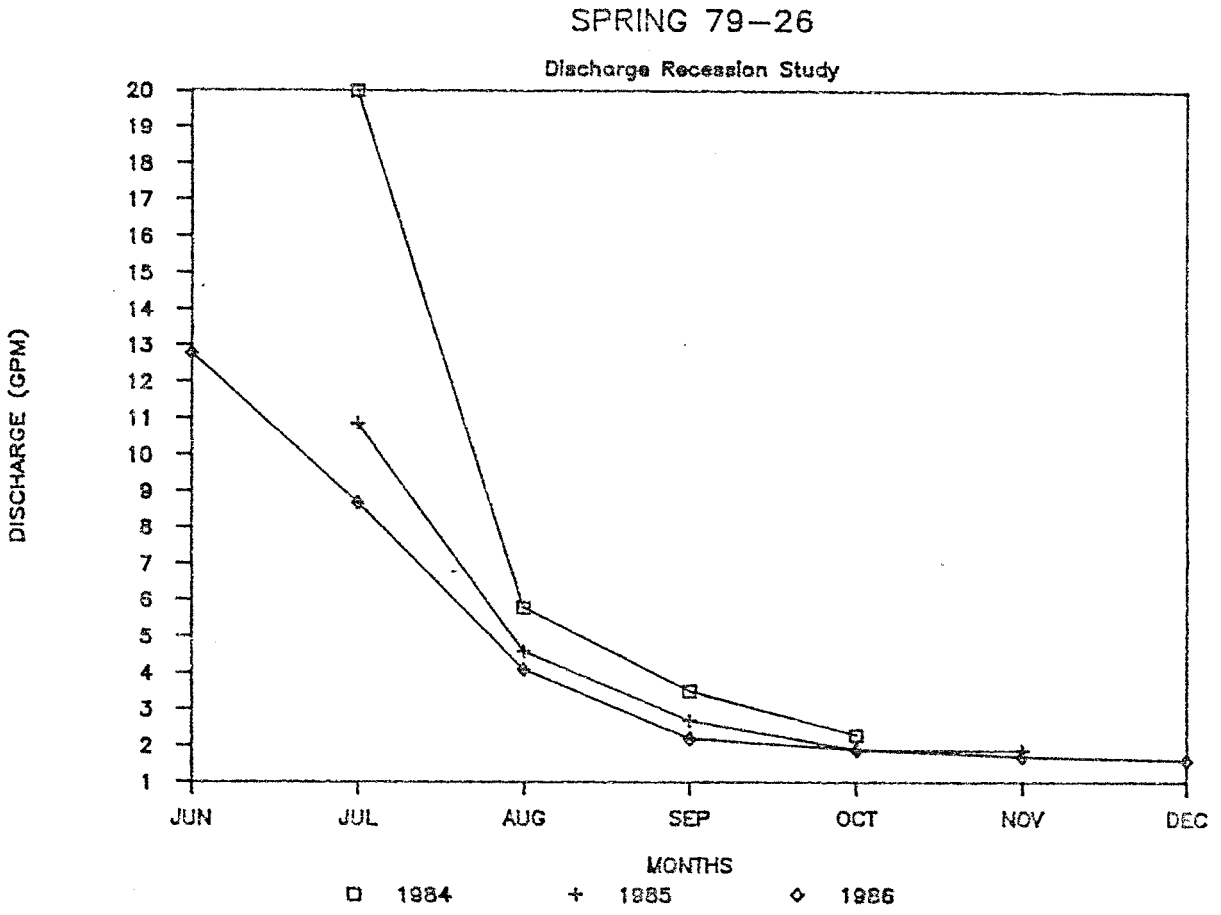
SPRING 79-26
Discharge Recession Study
DISCHARGE (GPM)
20
19
18
17
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MONTHS
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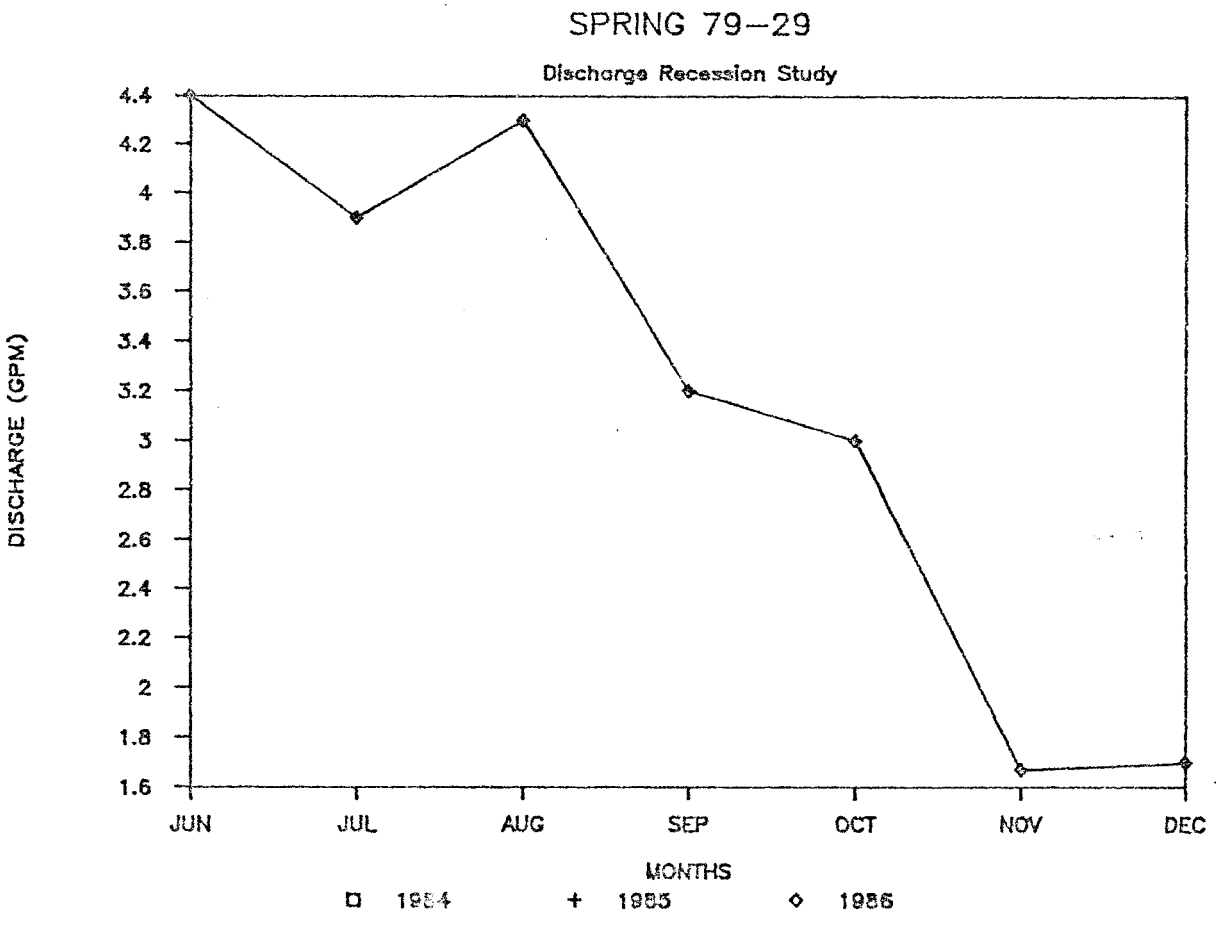
SPRING 79-29
Discharge Recession Study
DISCHARGE (GPM)
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
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MONTHS
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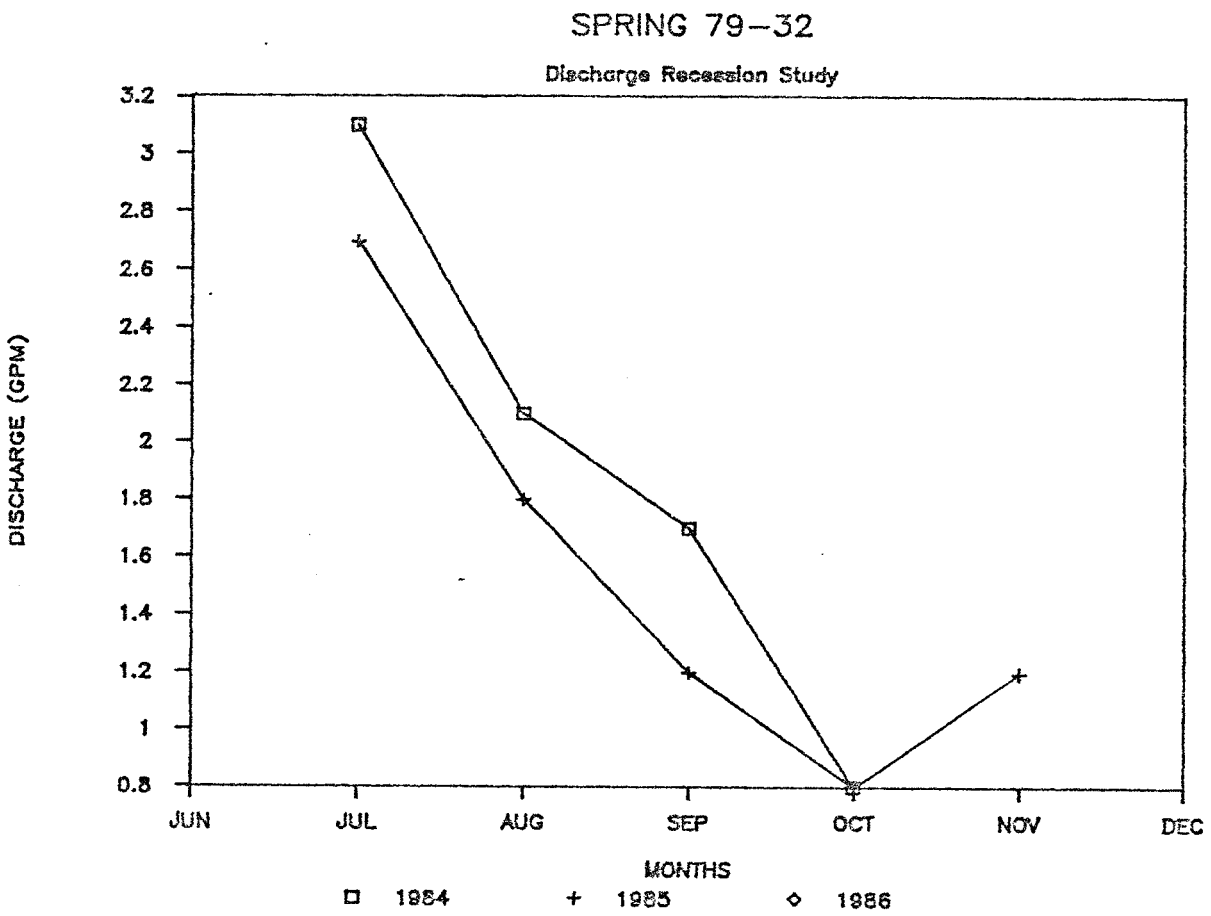
SPRING 79-32
Discharge Recession Study
DISCHARGE (GPM)
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
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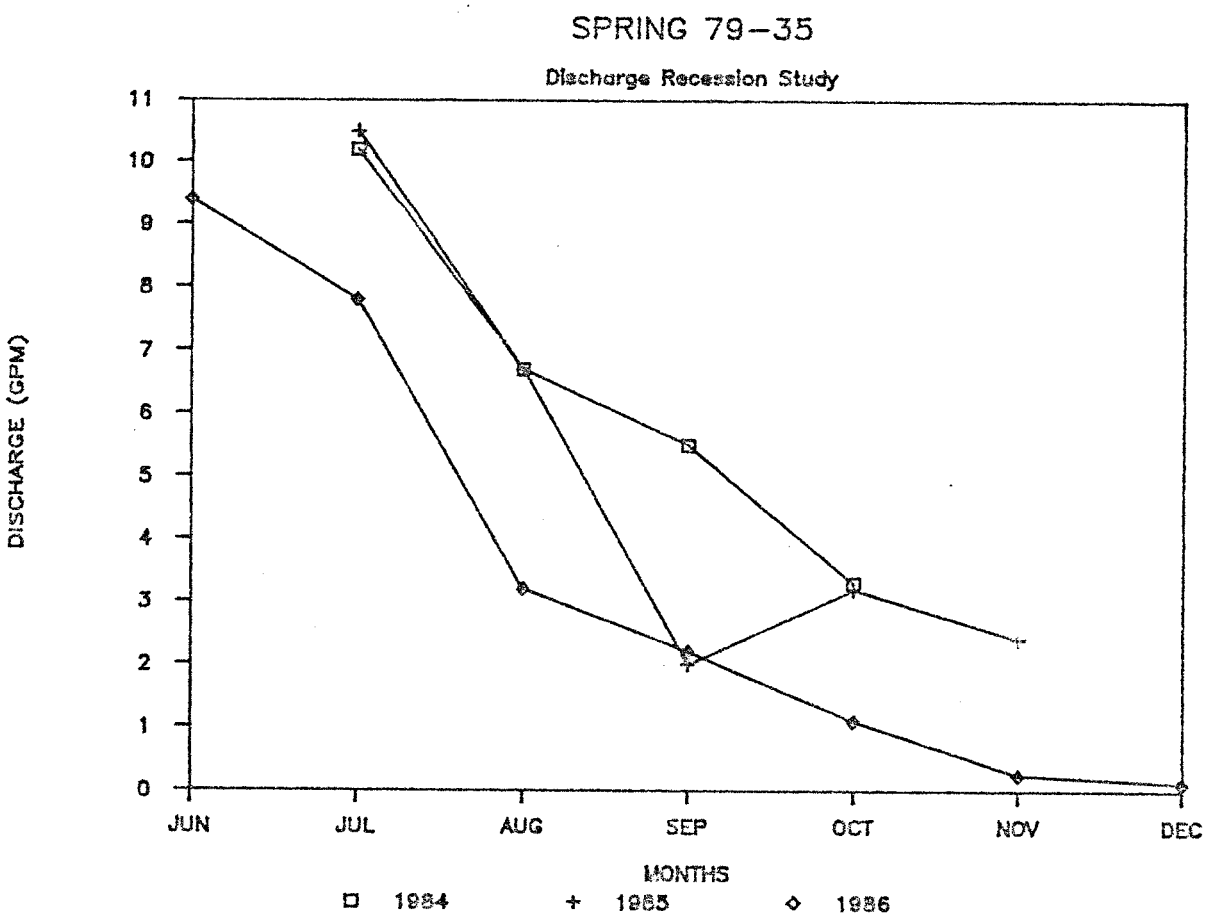
SPRING 79-35
Discharge Recession Study
DISCHARGE (GPM)
11
10
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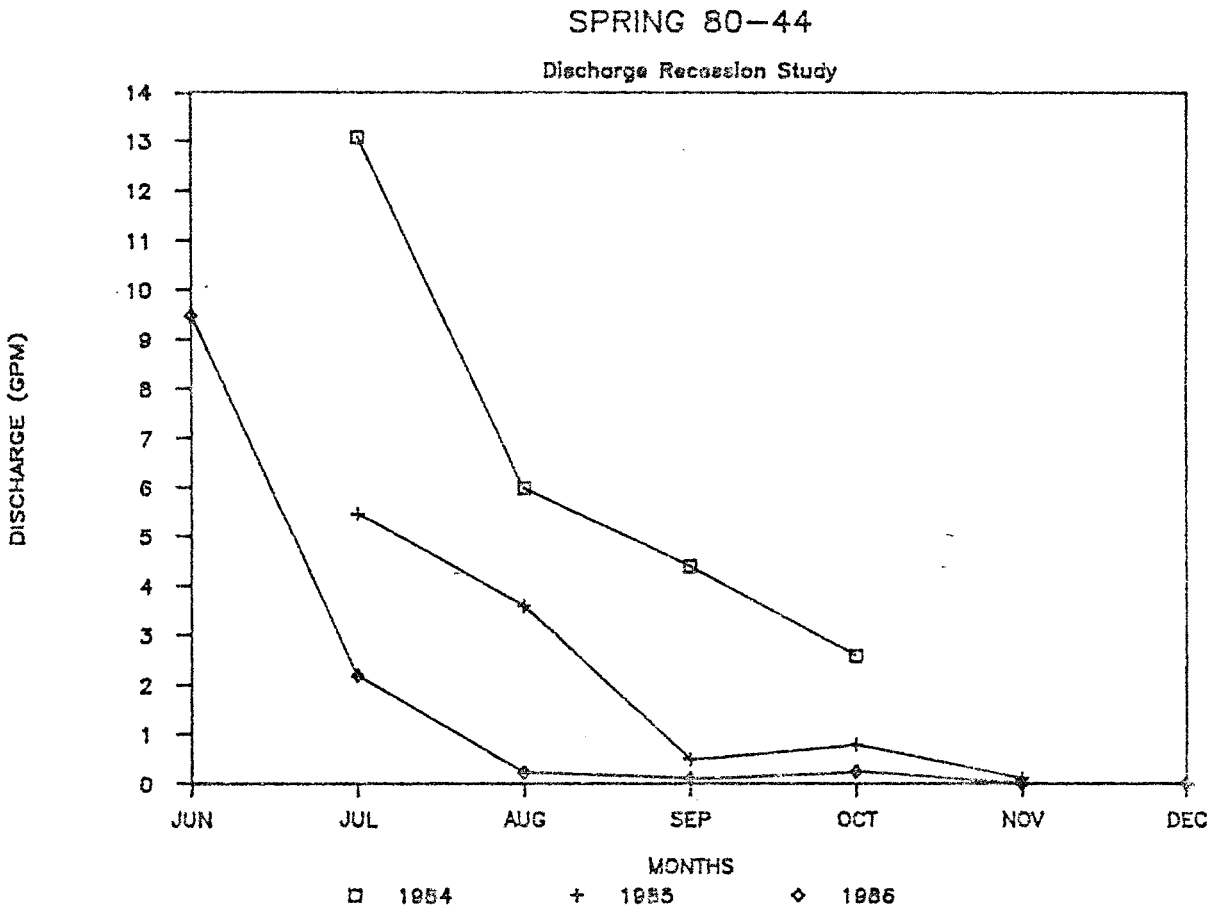
SPRING 80-44
Discharge Recession Study
DISCHARGE (GPM)
14
13
12
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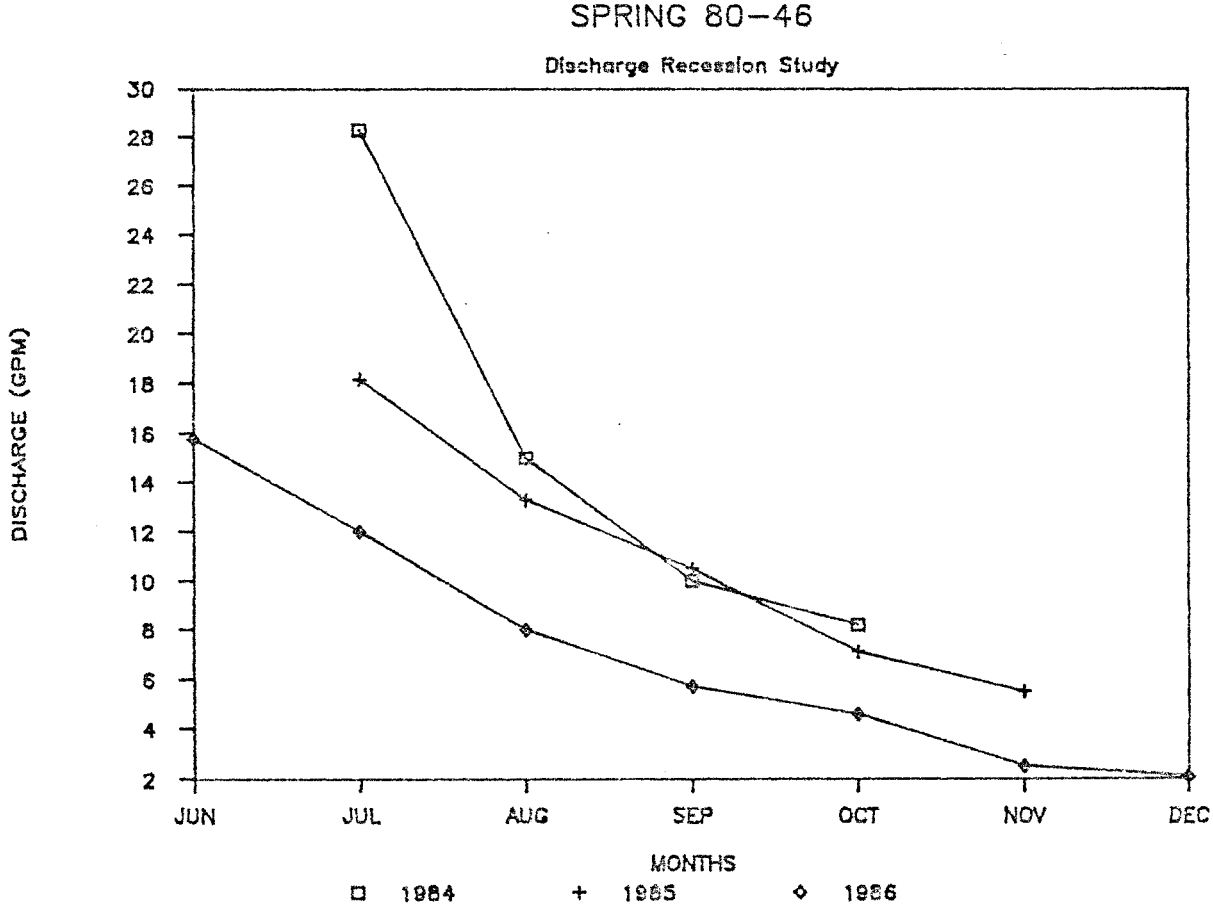
SPRING 80-46
Discharge Recession Study
DISCHARGE (GPM)
30
28
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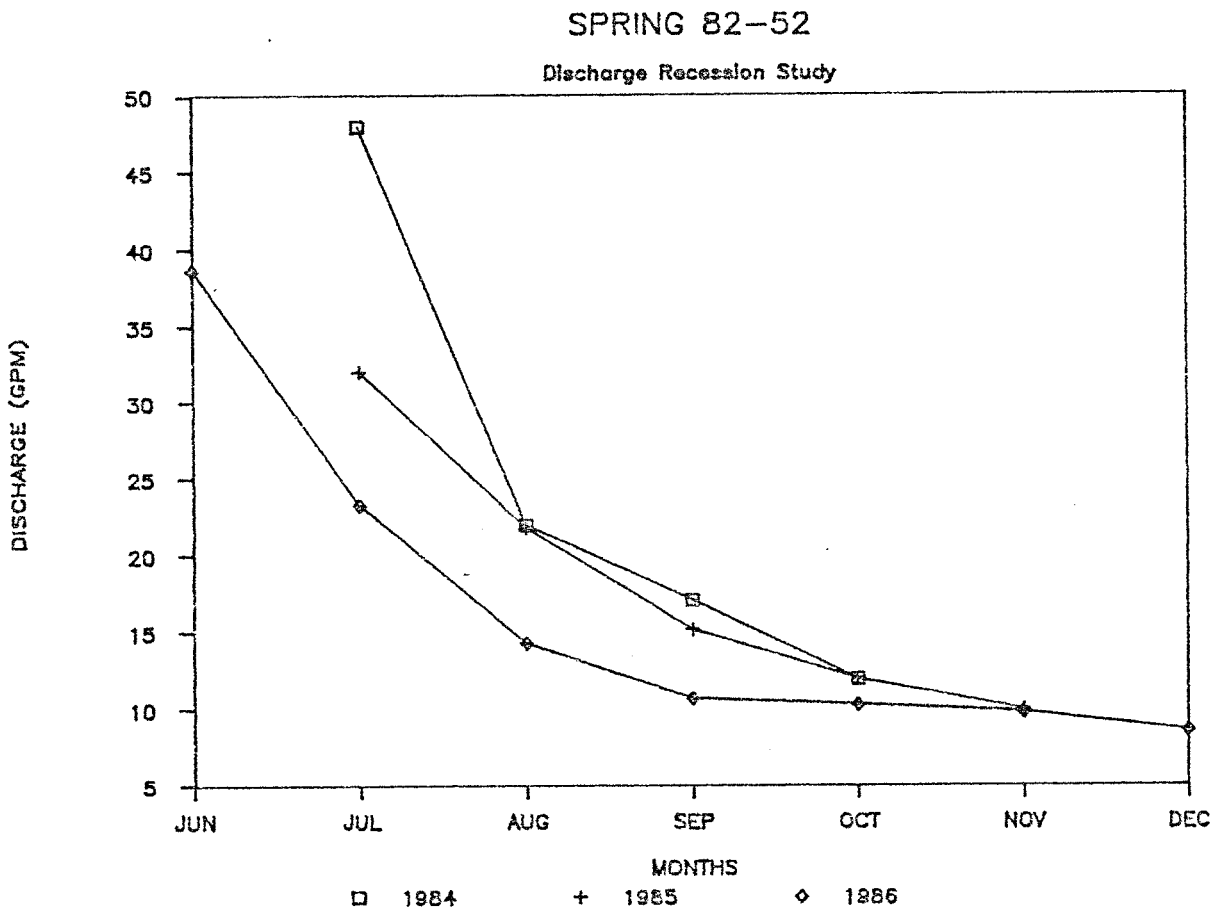
SPRING 82-52
Discharge Recession Study
DISCHARGE (GPM)
50
45
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MONTHS
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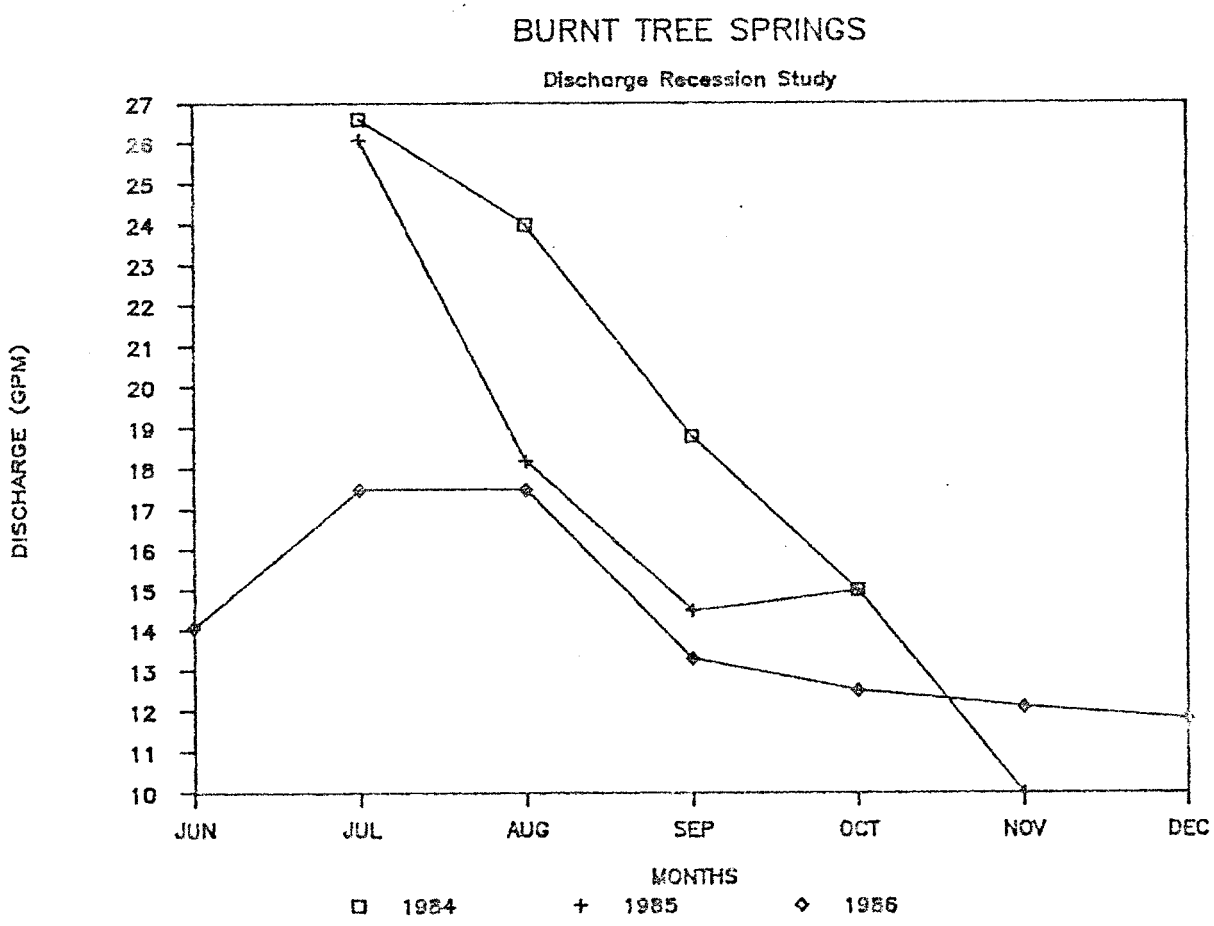
BURNT TREE SPRINGS
Discharge Recession Study
DISCHARGE (GPM)
27
26
25
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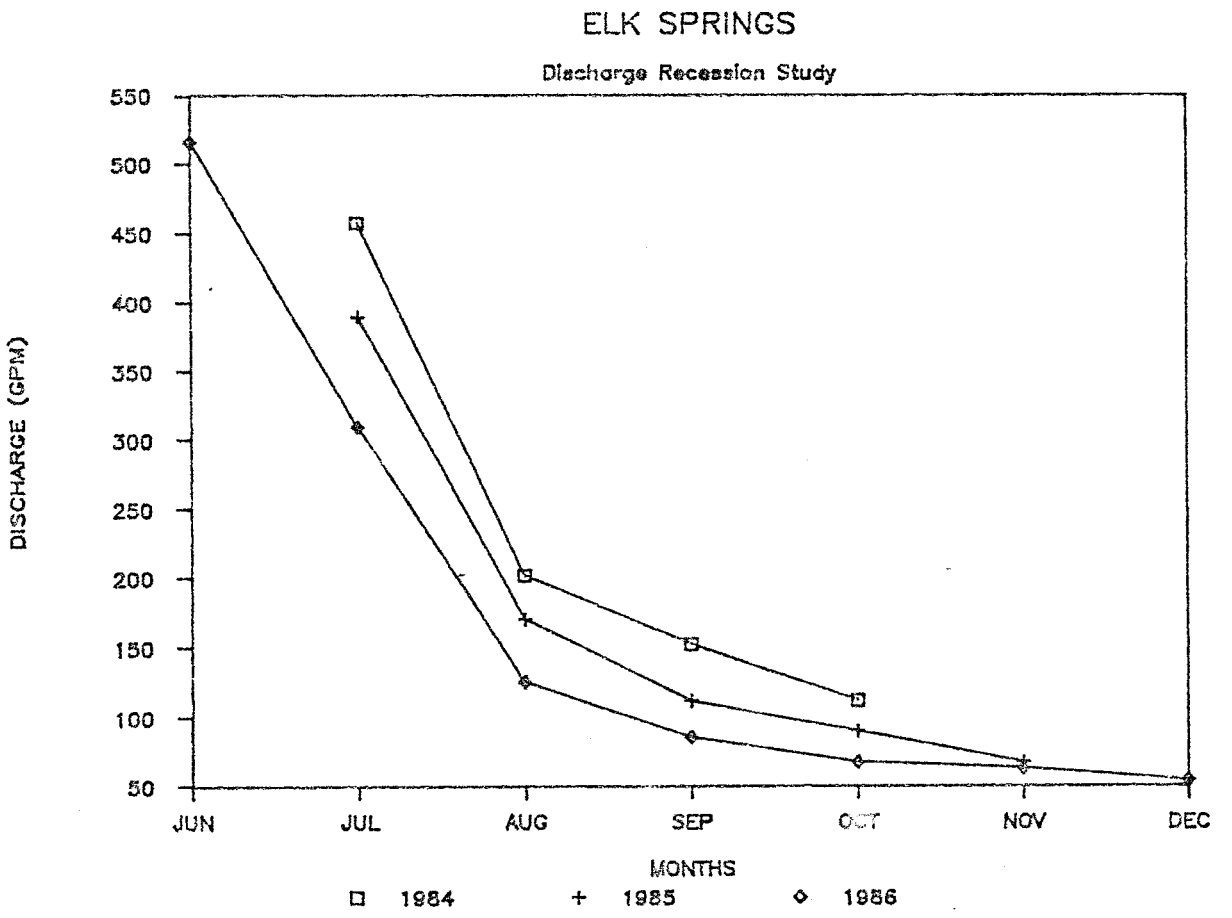
ELK SPRINGS
Discharge Recession Study
DISCHARGE (GPM)
550
500
450
400
350
300
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50
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MONTHS
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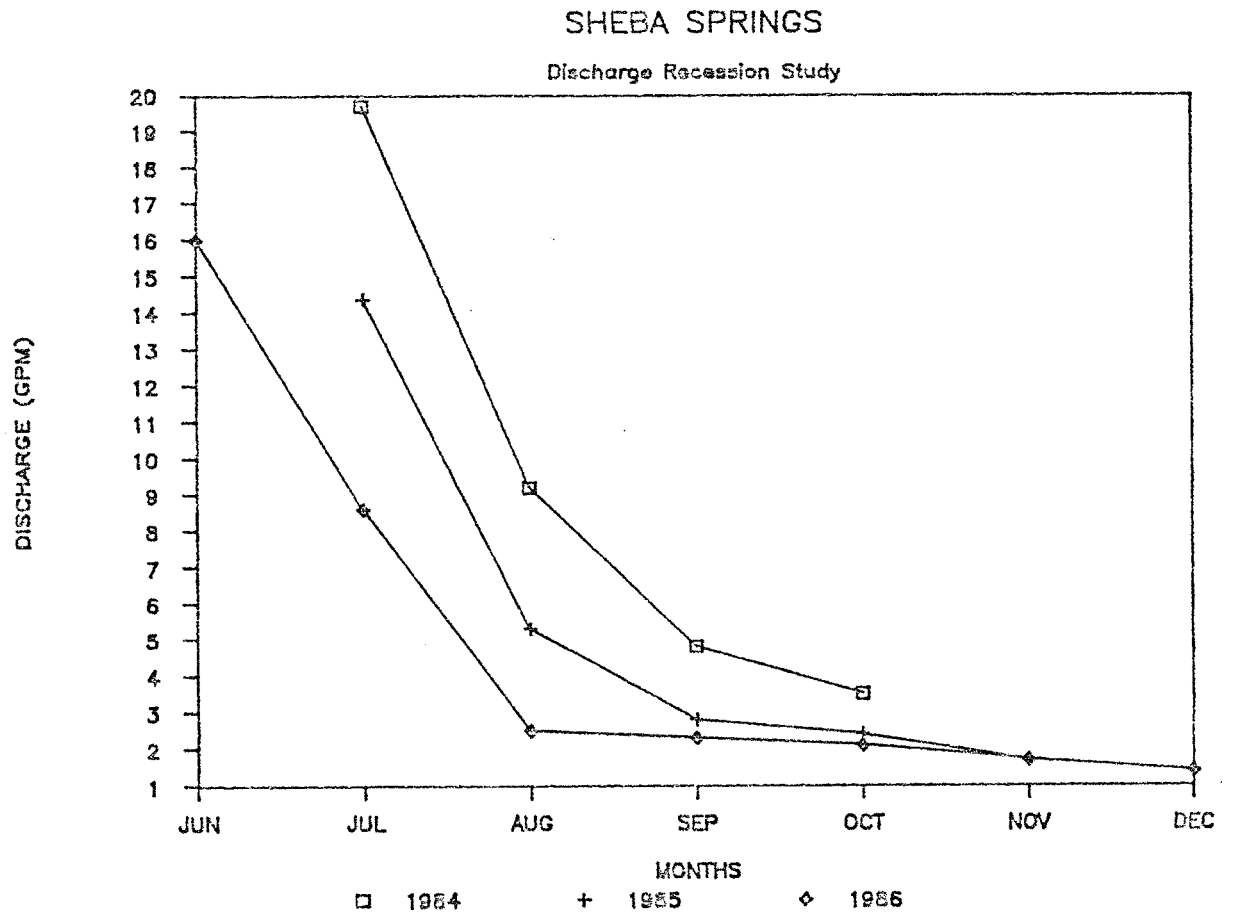
SHEBA SPRINGS
Discharge Recession Study
DISCHARGE (GPM)
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19
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JUN
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SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8405
Date Rec'd 7-23-86
Date Sampled 7-22-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
BURNT TREE

Temp. 41° Flow 17.5 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	266	mg/l $CaCO_3$
Alkalinity, Bicarbonate		324	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-4	4.2	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	560	umhos/cm
Fluoride	8-5	0.17	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia	7-31	<0.05	mg/l
Nitrogen, Nitrate	8-4	<0.01	mg/l
Nitrogen, Nitrite	8-4	<0.01	mg/l
Oil & Grease			mg/l
pH	7-25	8.00	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	8-5	0.04	mg/l
Solids, Total Dissolved	7-30	300	mg/l
Solids, Total Suspended		<0.5	mg/l
Sulfate	8-13	30	mg/l
Sulfide	7-31	<0.1	mg/l
Turbidity	7-29	0.1	NTU
Total Cations		6.04	meq/l
Total Anions		6.06	meq/l

Aluminum	8-4	<0.05	mg/l
Arsenic	8-11	<0.001	mg/l
Barium	8-4	<0.1	mg/l
Beryllium			mg/l
Boron	8-6	0.11	mg/l
Cadmium	8-4	<0.005	mg/l
Calcium	8-12	62.0	mg/l
Chromium	8-4	<0.05	mg/l
Copper	8-4	<0.02	mg/l
Iron	7-29	<0.05	mg/l
Lead	8-4	<0.05	mg/l
Magnesium	8-12	29.2	mg/l
Manganese	7-29	<0.01	mg/l
Mercury	9-11	<0.2	ug/l
Nickel	8-4	<0.04	mg/l
Potassium	7-31	0.6	mg/l
Selenium	8-11	<0.005	mg/l
Silica			mg/l
Sodium	7-31	12.0	mg/l
Vanadium			mg/l
Zinc	8-4	<0.005	mg/l
Molybdenum	8-4	<0.1	mg/l

Analyst: David A. Powers

Respectfully submitted 8-14-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P O Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8365
Date Rec'd 7-18-86
Date Sampled 7-16-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
ELK SPRING

Temp. 38° Flow 309.7 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	233	mg/l $CaCO_3$
Alkalinity, Bicarbonate		284	mg/l ~~Ca/CO3~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-4	3.0	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	463	umhos/cm
Fluoride	8-5	0.14	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia	7-31	<0.05	mg/l
gen, Nitrate	8-4	0.05	mg/l
Nitrogen, Nitrite	8-4	<0.01	mg/l
Oil & Grease			mg/l
pH	7-25	7.65	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	8-5	0.06	mg/l
Solids, Total Dissolved		250	mg/l
Solids, Total Suspended	7-30	<0.5	mg/l
Sulfate	8-13	20	mg/l
Sulfide	7-31	<0.1	mg/l
Turbidity	7-29	0.2	NTU
Total Cations		5.16	meq/l
Total Anions		5.16	meq/l

Aluminum	8-4	<0.05	mg/l
Arsenic	8-11	<0.001	mg/l
Barium	8-4	<0.1	mg/l
Beryllium			mg/l
Boron	8-6	0.16	mg/l
Cadmium	8-4	<0.005	mg/l
Calcium	8-12	58.0	mg/l
Chromium	8-4	<0.05	mg/l
Copper	8-4	<0.02	mg/l
Iron	7-29	<0.05	mg/l
Lead	8-4	<0.05	mg/l
Magnesium	8-12	24.3	mg/l
Manganese	7-29	<0.01	mg/l
Mercury	8-11	<0.2	ug/l
Nickel	8-4	<0.04	mg/l
Potassium	7-31	0.7	mg/l
Selenium	8-11	<0.005	mg/l
Silica			mg/l
Sodium	7-31	5.7	mg/l
Vanadium			mg/l
Zinc	8-4	<0.005	mg/l
Molybdenum	8-4	<0.1	mg/l

Analyst: David A Panizzi

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8396
Date Rec'd 7-23-86
Date Sampled 7-21-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
JERK WATER

Temp. 42° Flow 2.1 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	348	mg/l $CaCO_3$
Alkalinity, Bicarbonate		425	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	7.4	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	700	µmhos/cm
Fluoride	8-5	0.18	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.30	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		390	mg/l
Solids, Total Suspended	8-1	<0.5	mg/l
Sulfate	8-4	35	mg/l
Sulfide			mg/l
Turbidity	7-29	0.1	NTU
Total Cations		7.89	meq/l
Total Anions		7.90	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	86.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	32.8	mg/l
Manganese			mg/l
Mercury			µg/l
Nickel			mg/l
Potassium	7-31	0.8	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	20.0	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David Ramos

Respectfully submitted 8-12-

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P. O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8371
Date Rec'd 7-18-86
Date Sampled 7-16-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
PINE SPRINGS

Temp. 45° Flow 2.1 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	215	mg/l $CaCO_3$
Alkalinity, Bicarbonate		262	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	1.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	425	umhos/cm
Fluoride	8-5	0.13	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.20	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	241	mg/l
Solids, Total Suspended		1.0	mg/l
Sulfate	8-4	21	mg/l
Sulfide			mg/l
Turbidity	7-29	0.8	NTU
Total Cations		4.78	meq/l
Total Anions		4.78	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	78.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	9.7	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	0.1	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	2.0	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David Ramsey

Respectfully submitted 8-12-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8367
Date Rec'd 7-18-86
Date Sampled 7-16-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
SHEBA

Temp. 43° Flow 8.6 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	198	mg/l $CaCO_3$
Alkalinity, Bicarbonate		242	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-4	2.4	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	410	umhos/cm
Fluoride	8-5	0.10	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia	7-31	<0.05	mg/l
Nitrogen, Nitrate	8-4	0.03	mg/l
Nitrogen, Nitrite	8-4	<0.01	mg/l
Oil & Grease			mg/l
pH	7-25	7.65	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	8-5	0.06	mg/l
Solids, Total Dissolved	7-30	225	mg/l
Solids, Total Suspended		8.0	mg/l
Sulfate	8-13	20	mg/l
Sulfide	7-31	<0.1	mg/l
Turbidity	7-29	3.5	NTU
Total Cations		4.43	meq/l
Total Anions		4.44	meq/l

Aluminum	8-4	<0.05	mg/l
Arsenic	8-11	<0.001	mg/l
Barium	8-4	<0.1	mg/l
Beryllium			mg/l
Boron	8-6	0.07	mg/l
Cadmium	8-4	<0.005	mg/l
Calcium	8-12	72.0	mg/l
Chromium	8-4	<0.05	mg/l
Copper	8-4	<0.02	mg/l
Iron	7-29	<0.05	mg/l
Lead	8-4	<0.05	mg/l
Magnesium	8-12	8.5	mg/l
Manganese	7-29	<0.01	mg/l
Mercury	8-11	<0.2	ug/l
Nickel	8-4	<0.04	mg/l
Potassium	7-31	0.2	mg/l
Selenium	8-11	<0.005	mg/l
Silica			mg/l
Sodium	7-31	2.9	mg/l
Vanadium			mg/l
Zinc	8-4	<0.005	mg/l
Molybdenum	8-4	<0.1	mg/l

Analyst: David Parrish

Respectfully submitted 8-14-8

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8373
Date Rec'd 7-18-86
Date Sampled 7-17-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
TED'S TUB

Temp. 37° Flow 31.6GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	249	mg/l $CaCO_3$
Alkalinity, Bicarbonate		304	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	2.9	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	500	umhos/cm
Fluoride	8-5	0.13	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
ogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.30	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	291	mg/l
Solids, Total Suspended		<0.5	mg/l
Sulfate	8-4	35	mg/l
Sulfide			mg/l
Turbidity	7-29	0.4	NTU
Total Cations		5.83	meq/l
Total Anions		5.79	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	76.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	21.9	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	0.4	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	5.1	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David Ramirez

Respectfully submitted 8-12-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8391
Date Rec'd 7-23-86
Date Sampled 7-22-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
79-2

Temp. 42° Flow 2.9 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	281	mg/l $CaCO_3$
Alkalinity, Bicarbonate		343	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	2.8	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	550	umhos/cm
Fluoride	8-5	0.14	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.30	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	297	mg/l
Solids, Total Suspended		<0.5	mg/l
Sulfate	8-4	16	mg/l
Sulfide			mg/l
Turbidity	7-29	0.2	NTU
Total Cations		6.03	meq/l
Total Anions		6.03	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	78.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	0.57	mg/l
Lead			mg/l
Magnesium	8-7	20.7	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	0.4	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	9.6	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: [signature]

Respectfully submitted [signature] 8-12-

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STANDARD LABORATORIES, INC.
P O Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8392
Date Rec'd 7-23-86
Date Sampled 7-22-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
79-3

Temp. 44° Flow 3.2 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	283	mg/l $CaCO_3$
Alkalinity, Bicarbonate		345	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	3.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	600	umhos/cm
Fluoride	8-5	0.14	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.40	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	323	mg/l
Solids, Total Suspended		6.0	mg/l
Sulfate	8-4	33	mg/l
Sulfide			mg/l
Turbidity	7-29	3.1	NTU
Total Cations		6.50	meq/l
Total Anions		6.44	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	70.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	26.7	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	0.7	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	18.0	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Darrell Lamoreaux

Respectfully submitted 8-12-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

OK

Lab. No. 8366
Date Rec'd 7-18-86
Date Sampled 7-16-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
79-10

Temp. 42° Flow 26.1 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	251	mg/l $CaCO_3$
Alkalinity, Bicarbonate		306	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-4	3.9	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	510	umhos/cm
Fluoride	8-5	0.15	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia	7-31	<0.05	mg/l
Nitrogen, Nitrate	8-4	0.04	mg/l
Nitrogen, Nitrite	8-4	<0.01	mg/l
Oil & Grease			mg/l
pH	7-25	7.85	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	8-5	0.14	mg/l
Solids, Total Dissolved		278	mg/l
Solids, Total Suspended	7-30	<0.5	mg/l
Sulfate		20	mg/l
Sulfide		<0.1	mg/l
Turbidity		0.1	NTU
Total Cations		5.50	meq/l
Total Anions		5.55	meq/l

Aluminum	8-4	<0.05	mg/l
Arsenic	8-11	<0.001	mg/l
Barium	8-4	<0.1	mg/l
Beryllium			mg/l
Boron	8-6	0.16	mg/l
Cadmium	8-4	<0.005	mg/l
Calcium	8-12	68.0	mg/l
Chromium	8-4	<0.05	mg/l
Copper	8-4	<0.02	mg/l
Iron	7-29	0.06	mg/l
Lead	8-4	<0.05	mg/l
Magnesium	8-12	23.1	mg/l
Manganese	7-29	<0.01	mg/l
Mercury	8-11	<0.2	ug/l
Nickel	8-4	<0.04	mg/l
Potassium	7-31	0.5	mg/l
Selenium	8-11	<0.005	mg/l
Silica			mg/l
Sodium	7-31	4.4	mg/l
Vanadium			mg/l
Zinc	8-4	<0.005	mg/l
Molybdenum	8-4	<0.1	mg/l

Analyst: David Parnwa

Respectfully submitted 8-14-

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P O Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8372
Date Rec'd 7-18-86
Date Sampled 7-17-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
79-13

Temp. 46° Flow 10.9 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	330	mg/l $CaCO_3$
Alkalinity, Bicarbonate		403	mg/l $CaCO_3$ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	3.1	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	610	umhos/cm
Fluoride	8-5	0.14	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.70	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	348	mg/l
Solids, Total Suspended		3.0	mg/l
Sulfate	8-4	20	mg/l
Sulfide			mg/l
Turbidity	7-29	2.4	NTU
Total Cations		7.08	meq/l
Total Anions		7.10	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	96.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	24.3	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	0.7	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	6.1	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David L. Brown

Respectfully submitted 8-12-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8374
Date Rec'd 7-18-86
Date Sampled 7-17-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
79-15

TEMP. 42° Flow 18.2 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	260	mg/l $CaCO_3$
Alkalinity, Bicarbonate		317	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	3.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	510	µmhos/cm
Fluoride	8-5	0.15	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.40	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	289	mg/l
Solids, Total Suspended		<0.5	mg/l
Sulfate	8-4	26	mg/l
Sulfide			mg/l
Turbidity	7-29	0.2	NTU
Total Cations		5.83	meq/l
Total Anions		5.84	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	72.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	24.3	mg/l
Manganese			mg/l
Mercury			µg/l
Nickel			mg/l
Potassium	7-31	0.5	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	5.0	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David Dorney

Respectfully submitted 8-12-8

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8401
Date Rec'd 7-23-86
Date Sampled 7-22-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
79-23

Temp. 50°

Flow 0.6 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	306	mg/l $CaCO_3$
Alkalinity, Bicarbonate		373	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-4	10.6	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	690	umhos/cm
Fluoride	8-5	0.23	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia	7-31	<0.05	mg/l
Nitrogen, Nitrate	8-4	<0.01	mg/l
Nitrogen, Nitrite	8-4	<0.01	mg/l
Oil & Grease			mg/l
pH	7-25	7.95	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	8-5	0.06	mg/l
Solids, Total Dissolved	7-30	355	mg/l
Solids, Total Suspended		16.0	mg/l
Sulfate	8-13	40	mg/l
Sulfide	7-31	<0.1	mg/l
Turbidity	7-29	13	NTU
Total Cations		7.19	meq/l
Total Anions		7.25	meq/l

Aluminum	8-4	<0.05	mg/l
Arsenic	8-11	<0.001	mg/l
Barium	8-4	<0.1	mg/l
Beryllium			mg/l
Boron	8-6	0.20	mg/l
Cadmium	8-4	<0.005	mg/l
Calcium	8-12	58.0	mg/l
Chromium	8-4	<0.05	mg/l
Copper	8-4	0.02	mg/l
Iron	7-29	0.08	mg/l
Lead	8-4	<0.05	mg/l
Magnesium	8-12	43.8	mg/l
Manganese	7-29	0.01	mg/l
Mercury	8-11	<0.2	ug/l
Nickel	8-4	<0.04	mg/l
Potassium	7-31	0.8	mg/l
Selenium	8-11	<0.005	mg/l
Silica			mg/l
Sodium	7-31	15.4	mg/l
Vanadium			mg/l
Zinc	8-4	<0.005	mg/l
Molybdenum	8-4	<0.1	mg/l

Analyst: Darrell Davis

Respectfully submitted 8-14-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8368
Date Rec'd 7-18-86
Date Sampled 7-17-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
79-26

Temp. 49° Flow 8.7 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	260	mg/l $CaCO_3$
Alkalinity, Bicarbonate		317	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-4	7.3	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	590	umhos/cm
Fluoride	8-5	0.17	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia	7-31	<0.05	mg/l
Nitrogen, Nitrate	8-4	<0.01	mg/l
Nitrogen, Nitrite	8-4	<0.01	mg/l
Oil & Grease			mg/l
pH	7-25	8.05	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	8-5	0.06	mg/l
Solids, Total Dissolved	7-30	310	mg/l
Solids, Total Suspended		10.0	mg/l
Sulfate	8-13	40	mg/l
Sulfide	7-31	<0.1	mg/l
Turbidity	7-29	5.0	NTU
Total Cations		6.22	meq/l
Total Anions		6.24	meq/l

Aluminum		<0.05	mg/l
Arsenic		<0.001	mg/l
Barium		<0.1	mg/l
Beryllium			mg/l
Boron		0.22	mg/l
Cadmium		<0.005	mg/l
Calcium		54.0	mg/l
Chromium		<0.05	mg/l
Copper		<0.02	mg/l
Iron		0.17	mg/l
Lead		<0.05	mg/l
Magnesium		35.3	mg/l
Manganese		0.02	mg/l
Mercury		<0.2	ug/l
Nickel		<0.04	mg/l
Potassium		0.7	mg/l
Selenium		<0.005	mg/l
Silica			mg/l
Sodium		14.0	mg/l
Vanadium			mg/l
Zinc		<0.005	mg/l
Molybdenum	8-4	<0.1	mg/l

Analyst: David A. Ramsay

Respectfully submitted [signature] 8-14-8

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8375
Date Rec'd 7-18-86
Date Sampled 7-17-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
79-28

TEMP. 41° FLOW 3.9 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	248	mg/l $CaCO_3$
Alkalinity, Bicarbonate		303	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	15.2	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	710	umhos/cm
Fluoride	8-5	0.30	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.50	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	408	mg/l
Solids, Total Suspended		1.0	mg/l
Sulfate	8-4	100	mg/l
Sulfide			mg/l
Turbidity	7-29	0.5	NTU
Total Cations		7.61	meq/l
Total Anions		7.47	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	46.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	27.9	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	2.4	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	67.8	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: [signature]

Respectfully submitted [signature] 8-12-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8364
Date Rec'd 7-18-86
Date Sampled 7-17-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
79-29

Temp. 40° Flow 4.7 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	264	mg/l $CaCO_3$
Alkalinity, Bicarbonate		300	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-4	17.1	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	600	umhos/cm
Fluoride	8-5	0.24	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia	7-31	<0.05	mg/l
Nitrogen, Nitrate	8-4	0.04	mg/l
Nitrogen, Nitrite	8-4	<0.01	mg/l
Oil & Grease			mg/l
pH	7-25	7.95	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	8-5	0.12	mg/l
Solids, Total Dissolved		325	mg/l
Solids, Total Suspended	7-30	1.0	mg/l
Sulfate	8-13	40	mg/l
Sulfide	7-31	<0.1	mg/l
Turbidity	7-29	0.3	NTU
Total Cations		6.59	meq/l
Total Anions		6.59	meq/l

Aluminum	8-4	<0.05	mg/l
Arsenic	8-11	<0.001	mg/l
Barium	8-4	<0.1	mg/l
Beryllium			mg/l
Boron	8-6	0.53	mg/l
Cadmium	8-4	<0.005	mg/l
Calcium	8-12	42.0	mg/l
Chromium	8-4	<0.05	mg/l
Copper	8-4	<0.02	mg/l
Iron	7-29	<0.05	mg/l
Lead	8-4	<0.05	mg/l
Magnesium	8-12	37.7	mg/l
Manganese	7-29	<0.01	mg/l
Mercury	8-11	<0.2	ug/l
Nickel	8-4	<0.04	mg/l
Potassium	7-31	1.7	mg/l
Selenium	8-11	<0.005	mg/l
Silica			mg/l
Sodium	7-31	31.0	mg/l
Vanadium			mg/l
Zinc	8-4	<0.005	mg/l
Molybdenum	8-4	<0.1	mg/l

Analyst: David Ramirez

Respectfully submitted 8-14-86

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STANDARD LABORATORIES, INC.

Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8376

Date Rec'd 7-18-86

Date Sampled 7-17-86

Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
79-34

Temp. 40° Flow 16.7 GPM

Acidity		mg/l $CaCO_3$
Alkalinity, Total	295	mg/l $CaCO_3$
Alkalinity, Bicarbonate	360	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		mg/l $CaCO_3$
Chloride	5.5	mg/l
Coliform, Fecal		MPN/100 ml
Coliform, Total		MPN/100 ml
Conductivity	600	umhos/cm
Fluoride	0.18	mg/l
Hardness, Total		mg/l $CaCO_3$
Nitrogen, Ammonia		mg/l
Nitrogen, Nitrate		mg/l
Nitrogen, Nitrite		mg/l
Oil & Grease		mg/l
pH	7.45	Units
Phosphorus, Ortho		mg/l
Phosphorus, Total		mg/l
Solids, Total Dissolved	334	mg/l
Solids, Total Suspended	2.0	mg/l
Sulfate	35	mg/l
Sulfide		mg/l
Turbidity	0.9	NTU
Total Cations	6.73	meq/l
Total Anions	6.78	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	74.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	0.09	mg/l
Lead			mg/l
Magnesium	8-7	31.6	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	0.9	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	9.4	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David A. Parnell

Respectfully submitted 8-12-86

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STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8363
Date Rec'd 7-18-86
Date Sampled 7-17-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
79-35

Temp. 39° Flow 8.8 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	223	mg/l $CaCO_3$
Alkalinity, Bicarbonate		272	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-4	2.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	430	umhos/cm
Fluoride	8-5	0.12	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia	7-31	<0.05	mg/l
Nitrogen, Nitrate	8-4	0.04	mg/l
Nitrogen, Nitrite	8-4	<0.01	mg/l
Oil & Grease			mg/l
pH	7-25	8.00	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	8-5	0.18	mg/l
Solids, Total Dissolved	7-30	240	mg/l
Solids, Total Suspended		1.0	mg/l
Sulfate	8-13	13	mg/l
Sulfide	7-31	<0.1	mg/l
Turbidity	7-29	0.5	NTU
Total Cations		4.75	meq/l
Total Anions		4.80	meq/l

Aluminum	8-4	<0.05	mg/l
Arsenic	8-11	<0.001	mg/l
Barium	8-4	<0.1	mg/l
Beryllium			mg/l
Boron	8-6	0.12	mg/l
Cadmium	8-4	<0.005	mg/l
Calcium	8-12	70.0	mg/l
Chromium	8-4	<0.05	mg/l
Copper	8-4	<0.02	mg/l
Iron	7-29	<0.05	mg/l
Lead	8-4	<0.05	mg/l
Magnesium	8-12	13.4	mg/l
Manganese	7-29	<0.01	mg/l
Mercury	8-11	<0.2	ug/l
Nickel	8-4	<0.04	mg/l
Potassium	7-31	0.2	mg/l
Selenium	8-11	<0.005	mg/l
Silica			mg/l
Sodium	7-31	3.3	mg/l
Vanadium			mg/l
Zinc	8-4	<0.005	mg/l
Molybdenum	8-4	<0.1	mg/l

Analyst; David A. Parker

Respectfully submitted 8-14-86

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CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8377
Date Rec'd 7-18-86
Date Sampled 7-17-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
79-36

Temp. 41° Flow 6.7 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	279	mg/l $CaCO_3$
Alkalinity, Bicarbonate		340	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	4.7	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	550	umhos/cm
Fluoride	8-5	0.15	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.60	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	287	mg/l
Solids, Total Suspended		1.0	mg/l
Sulfate	8-4	10	mg/l
Sulfide			mg/l
Turbidity	7-29	1.1	NTU
Total Cations		5.91	meq/l
Total Anions		5.92	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	64.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	25.5	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	0.6	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	13.8	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst; David Ramos

Respectfully submitted 8-12-86

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STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8393
Date Rec'd 7-23-86
Date Sampled 7-21-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
79-38

Temp. 41° Flow 3.6 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	306	mg/l $CaCO_3$
Alkalinity, Bicarbonate		373	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	7.2	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	620	umhos/cm
Fluoride	8-5	0.20	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.55	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	350	mg/l
Solids, Total Suspended		2.0	mg/l
Sulfate	8-4	31	mg/l
Sulfide			mg/l
Turbidity	7-29	0.9	NTU
Total Cations		6.96	meq/l
Total Anions		6.97	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	76.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	24.3	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	0.8	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	26.3	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David A. Bauman

Respectfully submitted 8-12-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8398
Date Rec'd 7-23-86
Date Sampled 7-22-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
PO BOX 1005
HUNTINGTON, UTAH 84528

FIELD OFFICE

Sample ID: EAST MOUNTAIN SPRINGS
79-40

Temp. 39°

Flow 4.1 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	334	mg/l $CaCO_3$
Alkalinity, Bicarbonate		407	mg/l ~~Ca/CO3~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	6.1	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	700	umhos/cm
Fluoride	8-5	0.23	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.60	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	392	mg/l
Solids, Total Suspended		<0.5	mg/l
Sulfate	8-4	40	mg/l
Sulfide			mg/l
Turbidity	7-29	0.3	NTU
Total Cations		7.67	meq/l
Total Anions		7.68	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	74.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	23.1	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	1.1	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	47.0	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David A. Ramos

Respectfully submitted [signature] 8-12-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8399
Date Rec'd 7-23-86
Date Sampled 7-22-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
80-41

Temp. 38° Flow 4.1 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	315	mg/l $CaCO_3$
Alkalinity, Bicarbonate		384	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	8.8	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	750	umhos/cm
Fluoride	8-5	0.18	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.50	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	408	mg/l
Solids, Total Suspended		1.0	mg/l
Sulfate	8-4	70	mg/l
Sulfide			mg/l
Turbidity	7-29	0.6	NTU
Total Cations		8.02	meq/l
Total Anions		8.00	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	76.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	37.7	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	0.9	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	25.3	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David A. Pinson

Respectfully submitted [signature] 8-12

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P. O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8397
Date Rec'd 7-23-86
Date Sampled 7-22-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
80-43

Temp. 43° Flow 3.1 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	284	mg/l $CaCO_3$
Alkalinity, Bicarbonate		346	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	2.9	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	560	umhos/cm
Fluoride	8-5	0.13	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.50	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	288	mg/l
Solids, Total Suspended		<0.5	mg/l
Sulfate	8-4	10	mg/l
Sulfide			mg/l
Turbidity	7-29	0.3	NTU
Total Cations		5.93	meq/l
Total Anions		5.97	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	70.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	24.3	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	0.6	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	9.6	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David A. Ramsey

Respectfully submitted [signature] 8-12-86

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CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8404
Date Rec'd 7-23-86
Date Sampled 7-22-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
80-44

Temp. 46° Flow 2.2 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	313	mg/l $CaCO_3$
Alkalinity, Bicarbonate		382	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-4	9.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	885	umhos/cm
Fluoride	8-5	0.18	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia	7-31	<0.05	mg/l
Nitrogen, Nitrate	8-4	<0.01	mg/l
Nitrogen, Nitrite	8-4	<0.01	mg/l
Oil & Grease			mg/l
pH	7-25	8.00	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	8-5	0.04	mg/l
Solids, Total Dissolved	7-30	510	mg/l
Solids, Total Suspended		6.0	mg/l
Sulfate	8-13	140	mg/l
Sulfide	7-31	<0.1	mg/l
Turbidity	7-29	3.5	NTU
Total Cations		9.48	meq/l
Total Anions		9.44	meq/l

Aluminum	8-4	<0.05	mg/l
Arsenic	8-11	<0.001	mg/l
Barium	8-4	<0.1	mg/l
Beryllium			mg/l
Boron	8-6	0.17	mg/l
Cadmium	8-4	<0.005	mg/l
Calcium	8-12	78.0	mg/l
Chromium	8-4	<0.05	mg/l
Copper	8-4	<0.02	mg/l
Iron	7-29	0.06	mg/l
Lead	8-4	<0.05	mg/l
Magnesium	8-12	46.2	mg/l
Manganese	7-29	<0.01	mg/l
Mercury	8-11	<0.2	ug/l
Nickel	8-4	<0.04	mg/l
Potassium	7-31	1.0	mg/l
Selenium	8-11	<0.005	mg/l
Silica			mg/l
Sodium	7-31	40.3	mg/l
Vanadium			mg/l
Zinc	8-4	<0.005	mg/l
Molybdenum	8-4	<0.1	mg/l

Analyst: Darrell Ramsey

Respectfully submitted 8-14-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P. O. Box 1140, Huntington, Utah 84528 801-653-2314

OK

Lab. No. 8403
Date Rec'd 7-23-86
Date Sampled 7-22-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
80-46

Temp. 42° Flow 12.0 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	243	mg/l $CaCO_3$
Alkalinity, Bicarbonate		296	mg/l $CaCO_3$ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-4	4.3	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	595	umhos/cm
Fluoride	8-5	0.36	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia	7-31	<0.05	mg/l
Nitrogen, Nitrate	8-4	0.02	mg/l
Nitrogen, Nitrite	8-4	<0.01	mg/l
Oil & Grease			mg/l
pH	7-25	8.00	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	8-5	0.03	mg/l
Solids, Total Dissolved	7-30	312	mg/l
Solids, Total Suspended		<0.5	mg/l
Sulfate	8-13	55	mg/l
Sulfide	7-31	<0.1	mg/l
Turbidity	7-29	0.2	NTU
Total Cations		6.15	meq/l
Total Anions		6.13	meq/l

Aluminum	8-4	<0.05	mg/l
Arsenic	8-11	<0.001	mg/l
Barium	8-4	<0.1	mg/l
Beryllium			mg/l
Boron	8-6	0.11	mg/l
Cadmium	8-4	<0.005	mg/l
Calcium	8-12	64.0	mg/l
Chromium	8-4	<0.05	mg/l
Copper	8-4	<0.02	mg/l
Iron	7-29	<0.05	mg/l
Lead	8-4	<0.05	mg/l
Magnesium	8-12	30.4	mg/l
Manganese	7-29	<0.01	mg/l
Mercury	8-11	<0.2	ug/l
Nickel	8-4	<0.04	mg/l
Potassium	7-31	0.6	mg/l
Selenium	8-11	<0.005	mg/l
Silica			mg/l
Sodium	7-31	10.0	mg/l
Vanadium			mg/l
Zinc	8-4	<0.005	mg/l
Molybdenum	8-4	<0.1	mg/l

Analyst: David Dancer

Respectfully submitted 8-14-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8394
Date Rec'd 7-23-86
Date Sampled 7-22-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
80-47

Temp. 42° Flow 12.2 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	290	mg/l $CaCO_3$
Alkalinity, Bicarbonate		354	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	4.0	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	600	umhos/cm
Fluoride	8-5	0.17	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.35	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	316	mg/l
Solids, Total Suspended		1.0	mg/l
Sulfate	8-4	25	mg/l
Sulfide			mg/l
Turbidity	7-29	0.4	NTU
Total Cations		6.45	meq/l
Total Anions		6.43	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	68.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	29.2	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	0.8	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	14.6	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David A. Ramos

Respectfully submitted 8-12

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8369

Date Rec'd 7-18-86

Date Sampled 7-16-86

Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
80-49

Temp. 42° Flow 12 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	345	mg/l $CaCO_3$
Alkalinity, Bicarbonate		421	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	6.7	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	700	umhos/cm
Fluoride	8-5	0.13	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.20	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	364	mg/l
Solids, Total Suspended		<0.5	mg/l
Sulfate	8-4	20	mg/l
Sulfide			mg/l
Turbidity	7-29	0.3	NTU
Total Cations		7.56	meq/l
Total Anions		7.51	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	82.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	35.2	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	1.3	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	12.2	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: [signature]

Respectfully submitted [signature] 8-12-86

Certified Environmental Laboratory

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STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8400
Date Rec'd 7-23-86
Date Sampled 7-22-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
82-51

Temp. 49° Flow 2.6 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	278	mg/l $CaCO_3$
Alkalinity, Bicarbonate		339	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	15.0	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	800	umhos/cm
Fluoride	8-5	0.17	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.60	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	467	mg/l
Solids, Total Suspended		7.0	mg/l
Sulfate	8-4	135	mg/l
Sulfide			mg/l
Turbidity	7-29	3.8	NTU
Total Cations		8.69	meq/l
Total Anions		8.79	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	78.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	0.08	mg/l
Lead			mg/l
Magnesium	8-7	43.8	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	0.9	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	27.0	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David A. Ramirez

Respectfully submitted 8-12

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STANDARD LABORATORIES, INC.
P Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8402
Date Rec'd 7-23-86
Date Sampled 7-21-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UTAH 84528

Sample ID: EAST MOUNTAIN SPRINGS
82-52

Temp. 39° Flow 23.3 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	325	mg/l $CaCO_3$
Alkalinity, Bicarbonate		397	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-4	9.6	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	705	umhos/cm
Fluoride	8-5	0.22	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia	7-31	<0.05	mg/l
Nitrogen, Nitrate	8-4	<0.01	mg/l
Nitrogen, Nitrite	8-4	<0.01	mg/l
Oil & Grease			mg/l
pH	7-25	7.90	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	8-5	0.13	mg/l
Solids, Total Dissolved	7-30	380	mg/l
Solids, Total Suspended		1.0	mg/l
Sulfate	8-13	45	mg/l
Sulfide	7-31	<0.1	mg/l
Turbidity	7-29	0.6	NTU
Total Cations		7.74	meq/l
Total Anions		7.71	meq/l

Aluminum	8-4	<0.05	mg/l
Arsenic	8-11	<0.001	mg/l
Barium	8-4	<0.1	mg/l
Beryllium			mg/l
Boron	8-6	0.68	mg/l
Cadmium	8-4	<0.005	mg/l
Calcium	8-12	72.0	mg/l
Chromium	8-4	<0.05	mg/l
Copper	8-4	<0.02	mg/l
Iron	7-29	<0.05	mg/l
Lead	8-4	<0.05	mg/l
Magnesium	8-12	37.7	mg/l
Manganese	7-29	<0.01	mg/l
Mercury	8-11	<0.2	ug/l
Nickel	8-4	<0.04	mg/l
Potassium	7-31	1.0	mg/l
Selenium	8-11	<0.005	mg/l
Silica			mg/l
Sodium	7-31	23.5	mg/l
Vanadium			mg/l
Zinc	8-4	<0.005	mg/l
Molybdenum	8-4	<0.1	mg/l

Analyst: David A. Parsons

Respectfully submitted 8-14-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8370
Date Rec'd 7-18-86
Date Sampled 7-17-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
84-53

Temp. 39° Flow 12.2 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	265	mg/l $CaCO_3$
Alkalinity, Bicarbonate		323	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	7.7	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	550	umhos/cm
Fluoride	8-5	0.18	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.10	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-1	307	mg/l
Solids, Total Suspended		<0.5	mg/l
Sulfate	8-4	35	mg/l
Sulfide			mg/l
Turbidity	7-29	0.4	NTU
Total Cations		6.21	meq/l
Total Anions		6.24	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	52.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	34.0	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	1.1	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	18.1	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David Romney

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P O Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8395
Date Rec'd 7-23-86
Date Sampled 7-22-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
84-55

Temp. 39° Flow 2.4 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	327	mg/l $CaCO_3$
Alkalinity, Bicarbonate		399	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	8-4	8.3	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	790	umhos/cm
Fluoride	8-5	0.18	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	7-25	7.40	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		432	mg/l
Solids, Total Suspended	8-1	1.0	mg/l
Sulfate	8-4	80	mg/l
Sulfide			mg/l
Turbidity	7-29	0.7	NTU
Total Cations		8.51	meq/l
Total Anions		8.44	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-6	86.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-29	<0.05	mg/l
Lead			mg/l
Magnesium	8-7	40.1	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-31	1.1	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-31	20.2	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David Pruitt

Respectfully submitted [signature] 8-12-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8406
Date Rec'd 7-23-86
Date Sampled 7-22-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
84-56

Temp. 41° Flow 3.7 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	7-25	275	mg/l $CaCO_3$
Alkalinity, Bicarbonate		335	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-4	9.2	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-25	603	umhos/cm
Fluoride	8-5	0.21	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia	7-31	<0.05	mg/l
Nitrogen, Nitrate	8-4	<0.01	mg/l
Nitrogen, Nitrite	8-4	<0.01	mg/l
Oil & Grease			mg/l
pH	7-25	8.10	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	8-5	0.07	mg/l
Solids, Total Dissolved	7-30	330	mg/l
Solids, Total Suspended		<0.5	mg/l
Sulfate	8-13	44	mg/l
Sulfide	7-31	<0.1	mg/l
Turbidity	7-29	0.2	NTU
Total Cations		6.68	meq/l
Total Anions		6.67	meq/l

Aluminum	8-4	<0.05	mg/l
Arsenic	8-11	<0.001	mg/l
Barium	8-4	<0.1	mg/l
Beryllium			mg/l
Boron	8-6	0.17	mg/l
Cadmium	8-4	<0.005	mg/l
Calcium	8-12	60.0	mg/l
Chromium	8-4	<0.05	mg/l
Copper	8-4	<0.02	mg/l
Iron	7-29	<0.05	mg/l
Lead	8-4	<0.05	mg/l
Magnesium	8-12	35.3	mg/l
Manganese	7-29	<0.01	mg/l
Mercury	8-11	<0.2	ug/l
Nickel	8-4	<0.04	mg/l
Potassium	7-31	1.0	mg/l
Selenium	8-11	<0.005	mg/l
Silica			mg/l
Sodium	7-31	17.3	mg/l
Vanadium			mg/l
Zinc	8-4	<0.005	mg/l
Molybdenum	8-4	<0.1	mg/l

Respectfully submitted 8-14-86

Analyst: David A Pagnuat

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8697
Date Rec'd 10-16-86
Date Sampled 10-15-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRING
BURNT TREE SPRING

Temp. 43° Flow 12.5 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	10-22	264	mg/l $CaCO_3$
Alkalinity, Bicarbonate		322	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	10-23	4.2	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	550	umhos/cm
Fluoride	10-29	0.18	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	10-22	6.90	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-21	344	mg/l
Solids, Total Suspended	10-20	< 0.5	mg/l
Sulfate	10-29	12	mg/l
Sulfide			mg/l
Turbidity	10-17	< 0.1	NTU
Total Cations		5.92	meq/l
Total Anions		5.66	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-23	60	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-29	< 0.05	mg/l
Lead			mg/l
Magnesium		29.2	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	10-29	0.5	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	10-28	11.9	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8707
Date Rec'd 10-17-86
Date Sampled 10-16-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
ELK SPRING

TEMP. 39° FLOW 67.3 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	10-22	233	mg/l $CaCO_3$
Alkalinity, Bicarbonate		284	mg/l ~~Ca/CO~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	10-23	3.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	470	umhos/cm
Fluoride	10-29	0.14	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	10-22	7.25	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-21	266	mg/l
Solids, Total Suspended	10-20	<0.5	mg/l
Sulfate	10-29	11	mg/l
Sulfide			mg/l
Turbidity	10-17	1.0	NTU
Total Cations		5.21	meq/l
Total Anions		5.00	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-23	58	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-29	<0.5	mg/l
Lead			mg/l
Magnesium	10-23	24.3	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	10-29	1.2	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	10-28	7.0	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P ^ Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8695
Date Rec'd 10-16-86
Date Sampled 10-15-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRINGS
JERK WATER SPRING

Temp. 44° Flow 2.0 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	10-22	341	mg/l $CaCO_3$
Alkalinity, Bicarbonate		416	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	10-23	7.1	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	720	umhos/cm
Fluoride	10-29	0.20	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
gen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	10-22	6.65	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-21	323	mg/l
Solids, Total Suspended	10-20	< 0.5	mg/l
Sulfate	10-29	21	mg/l
Sulfide			mg/l
Turbidity	10-17	< 0.1	NTU
Total Cations		7.94	meq/l
Total Anions		7.46	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-23	84	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-29	< 0.05	mg/l
Lead			mg/l
Magnesium	10-23	34	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	10-29	0.7	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	10-28	21.6	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

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Lab. No. 8703
Date Rec'd 10-17-86
Date Sampled 10-16-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRING
PINE SPRING

Temp. 40° Flow 0.3 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	10-22	217	mg/l $CaCO_3$
Alkalinity, Bicarbonate		265	mg/l $CaCO_3$ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	10-23	2.1	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	430	umhos/cm
Fluoride	10-29	0.14	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	10-22	6.95	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-21	238	mg/l
Solids, Total Suspended	10-20	<0.5	mg/l
Sulfate	10-29	5	mg/l
Sulfide			mg/l
Turbidity	10-17	<0.1	NTU
Total Cations		4.88	meq/l
Total Anions		4.51	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-23	72	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-29	< 0.05	mg/l
Lead			mg/l
Magnesium	10-23	14.6	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	10-29	0.1	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	10-28	2.0	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Gunningham

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D

Lab. No. 8699

Date Rec'd 10-16-86

Date Sampled 10-15-86

Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRING
SHEBA SPRING

Temp. 43° Flow 2.1 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	10-22	229	mg/l $CaCO_3$
Alkalinity, Bicarbonate		279	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	10-23	2.6	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	450	umhos/cm
Fluoride	10-29	0.13	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	10-22	6.95	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-21	294	mg/l
Solids, Total Suspended	10-20	< 0.5	mg/l
Sulfate	10-29	6	mg/l
Sulfide			mg/l
Turbidity	10-17	< 0.1	NTU
Total Cations		5.03	meq/l
Total Anions		4.79	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-23	80	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-29	< 0.05	mg/l
Lead			mg/l
Magnesium	10-23	10.9	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	10-29	0.1	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	10-28	3.3	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

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OK

Lab. No. 8696
Date Rec'd 10-16-86
Date Sampled 10-15-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRING
SHEEP HERDER SPRING

Temp. 39° Flow 10.3 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	10-22	324	mg/l $CaCO_3$
Alkalinity, Bicarbonate		395	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	10-23	9.8	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	700	umhos/cm
Fluoride	10-29	0.21	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	10-22	6.95	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-21	443	mg/l
Solids, Total Suspended	10-20	< 0.5	mg/l
Sulfate	10-29	25	mg/l
Sulfide			mg/l
Turbidity	10-17	< 0.1	NTU
Total Cations		7.11	meq/l
Total Anions		7.28	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-23	68	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-29	< 0.05	mg/l
Lead			mg/l
Magnesium	10-23	38.9	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	10-29	0.3	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	10-28	12.0	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

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Lab. No. 8706
Date Rec'd 10-17-86
Date Sampled 10-16-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRING TUB

Temp. 40° Flow 4.1

Acidity			mg/l $CaCO_3$
Alkalinity, Total	10-22	257	mg/l $CaCO_3$
Alkalinity, Bicarbonate		314	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	10-23	3.6	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	510	umhos/cm
Fluoride	10-29	0.14	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
gen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	10-22	7.15	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-21	239	mg/l
Solids, Total Suspended	10-20	<0.5	mg/l
Sulfate	10-29	12	mg/l
Sulfide			mg/l
Turbidity	10-17	1.0	NTU
Total Cations		5.74	meq/l
Total Anions		5.50	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-23	74	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-29	<0.05	mg/l
Lead			mg/l
Magnesium	10-23	21.9	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	10-29	0.6	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	10-28	5.3	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bol Geoningham

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P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8700
Date Rec'd 10-17-86
Date Sampled 10-16-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRING
79-2

Temp. 41° Flow 1.8 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	10-22	281	mg/l $CaCO_3$
Alkalinity, Bicarbonate		343	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	10-23	3.2	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	590	umhos/cm
Fluoride	10-29	0.16	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	10-22	6.95	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-21	316	mg/l
Solids, Total Suspended	10-20	<0.5	mg/l
Sulfate	10-29	11	mg/l
Sulfide			mg/l
Turbidity	10-17	0.5	NTU
Total Cations		6.21	meq/l
Total Anions		5.95	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-23	78	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-29	<0.05	mg/l
Lead			mg/l
Magnesium	10-23	23.1	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	10-29	0.3	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	10-29	9.7	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

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P. O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8702
Date Rec'd 10-17-86
Date Sampled 10-16-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRING
79-3

Temp. 53° Flow 0.1 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	10-22	295	mg/l $CaCO_3$
Alkalinity, Bicarbonate		360	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	10-23	5.1	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	610	µmhos/cm
Fluoride	10-29	0.17	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	10-22	7.30	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-21	351	mg/l
Solids, Total Suspended	10-20	<0.5	mg/l
Sulfate	10-29	26	mg/l
Sulfide			mg/l
Turbidity	10-17	3.5	NTU
Total Cations		6.03	meq/l
Total Anions		6.59	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-23	66	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-29	<0.5	mg/l
Lead			mg/l
Magnesium	10-23	26.7	mg/l
Manganese			mg/l
Mercury			µg/l
Nickel			mg/l
Potassium	10-29	1.3	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	10-28	12.1	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

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Lab. No. 8701
Date Rec'd 10-17-86
Date Sampled 10-16-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRING
79-15

Temp. 42° Flow 5.1 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	10-22	262	mg/l $CaCO_3$
Alkalinity, Bicarbonate		320	mg/l $CaCO_3$
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	10-23	3.8	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	510	umhos/cm
Fluoride	10-29	0.16	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	10-22	7.00	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-21	280	mg/l
Solids, Total Suspended	10-20	<0.5	mg/l
Sulfate	10-29	8	mg/l
Sulfide			mg/l
Turbidity	10-17	<0.1	NTU
Total Cations		5.63	meq/l
Total Anions		5.53	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-23	72	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-29	<0.05	mg/l
Lead			mg/l
Magnesium	10-23	21.9	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	10-29	0.5	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	10-28	5.3	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

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Lab. No. 8704
Date Rec'd 10-17-86
Date Sampled 10-16-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRING
80-46

Temp. 40° Flow 4.6

Acidity			mg/l $CaCO_3$
Alkalinity, Total	10-22	281	mg/l $CaCO_3$
Alkalinity, Bicarbonate		343	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	10-23	4.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	600	umhos/cm
Fluoride	10-29	0.16	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
ogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	10-22	7.30	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-21	357	mg/l
Solids, Total Suspended	10-20	<0.5	mg/l
Sulfate	10-29	15	mg/l
Sulfide			mg/l
Turbidity	10-17	< 0.1	NTU
Total Cations		6.26	meq/l
Total Anions		6.07	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-23	66	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-29	< 0.05	mg/l
Lead			mg/l
Magnesium	10-23	30.4	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	10-29	1.0	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	10-28	10.3	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

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Lab. No. 8705
Date Rec'd 10-17-86
Date Sampled 10-16-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRING
80-47

Temp. 40° Flow 8.2 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	10-22	293	mg/l $CaCO_3$
Alkalinity, Bicarbonate		357	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	10-23	4.2	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	600	umhos/cm
Fluoride	10-29	0.17	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	10-22	7.60	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-21	265	mg/l
Solids, Total Suspended	10-20	< 0.5	mg/l
Sulfate	10-29	16	mg/l
Sulfide			mg/l
Turbidity	10-17	< 0.10	NTU
Total Cations		6.45	meq/l
Total Anions		6.30	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-23	66	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-29	< 0.5	mg/l
Lead			mg/l
Magnesium	10-23	30.4	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	10-29	1.2	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	10-28	14.4	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bel Cunningham

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STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8698

Date Rec'd 10-16-86

Date Sampled 10-15-86

Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: EAST MOUNTAIN SPRING
FLAG LAKE 79-28

Temp. 47° Flow 3.9 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	10-22	244	mg/l $CaCO_3$
Alkalinity, Bicarbonate		298	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate			mg/l $CaCO_3$
Chloride	10-23	17.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-22	700	umhos/cm
Fluoride	10-29	0.33	mg/l
Hardness, Total			mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
›gen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	10-22	6.90	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-21	426	mg/l
Solids, Total Suspended	10-20	<0.5	mg/l
Sulfate	10-29	135	mg/l
Sulfide			mg/l
Turbidity	10-17	< 0.1	NTU
Total Cations		7.73	meq/l
Total Anions		8.19	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-23	40	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-29	<0.05	mg/l
Lead			mg/l
Magnesium	10-23	29.2	mg/l
Manganese			mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	10-29	2.0	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	10-28	75.6	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Earl Cunningham

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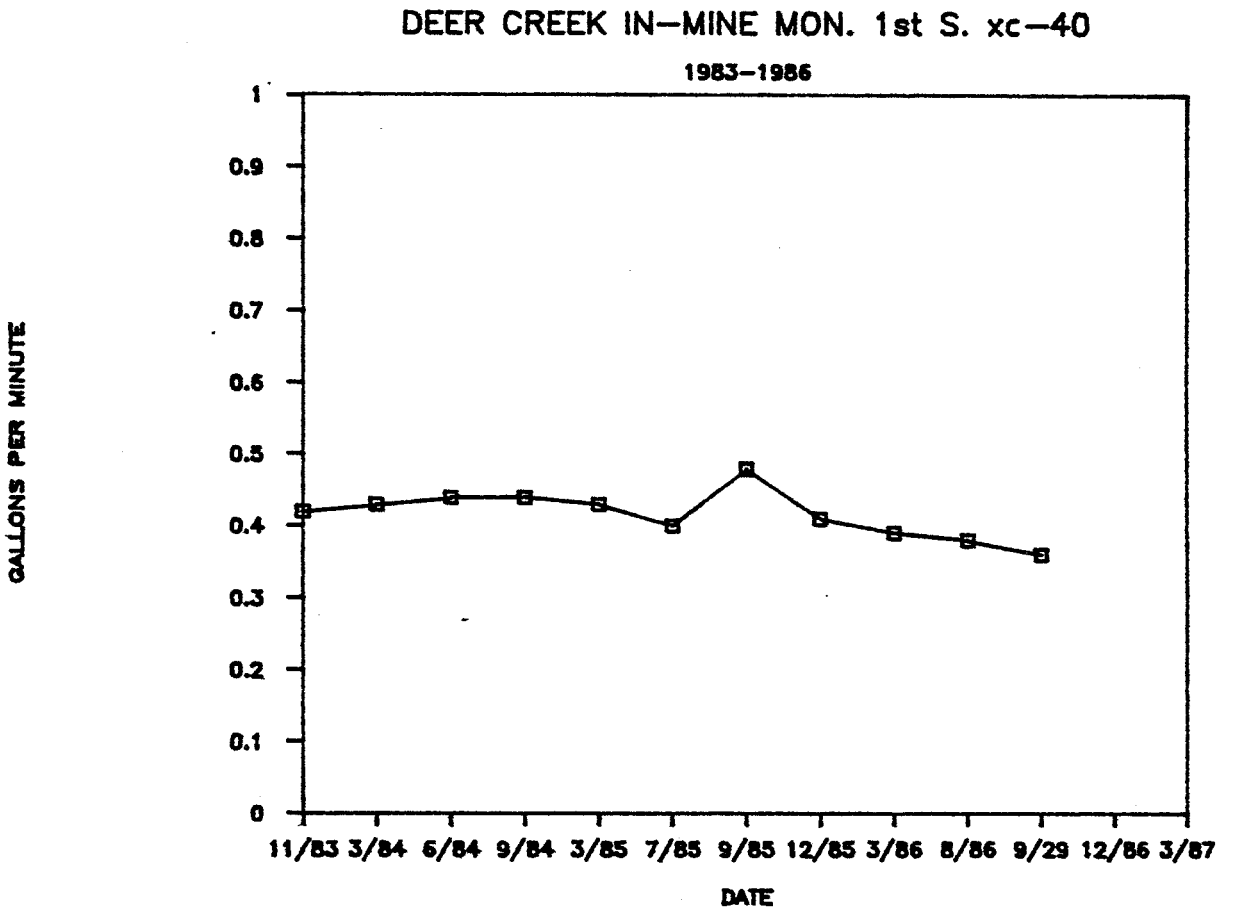
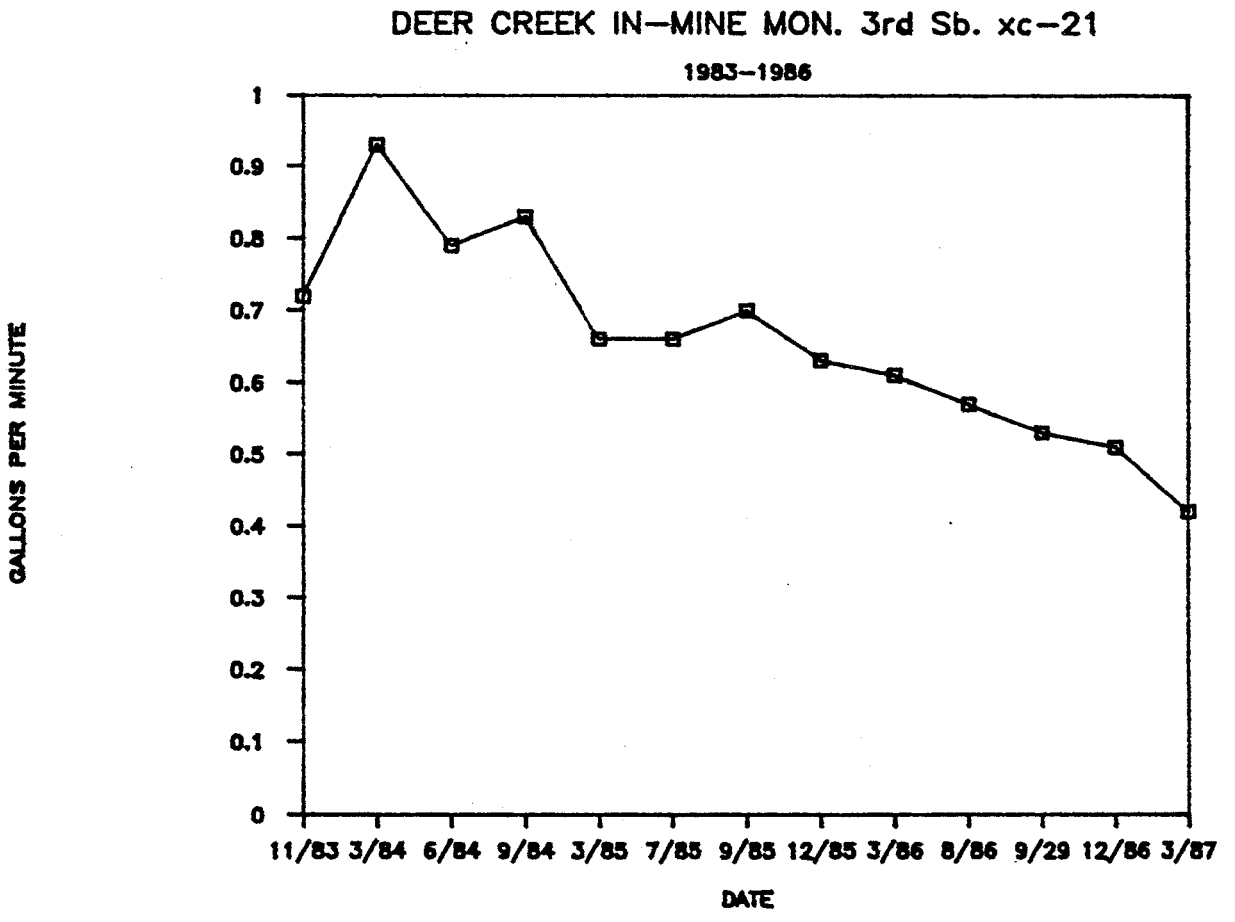
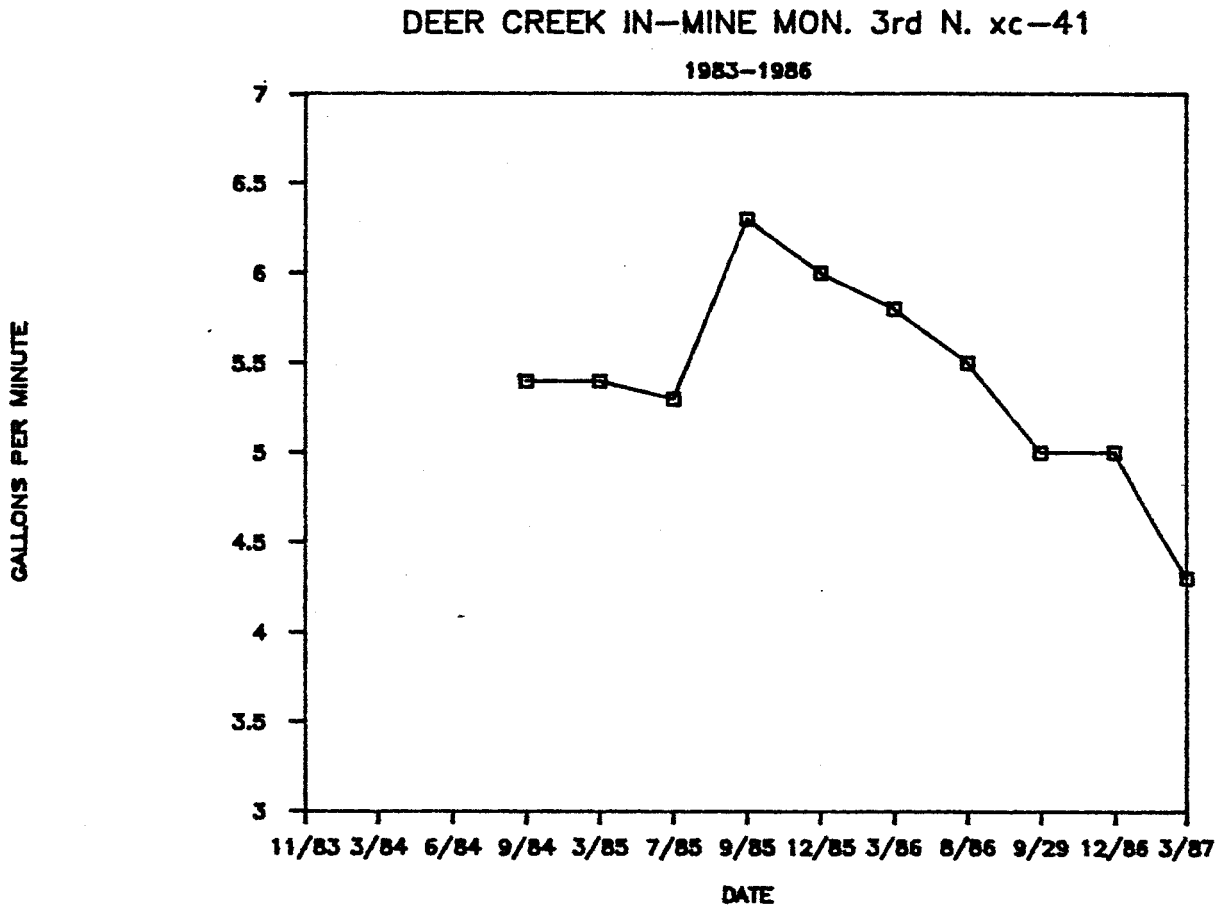
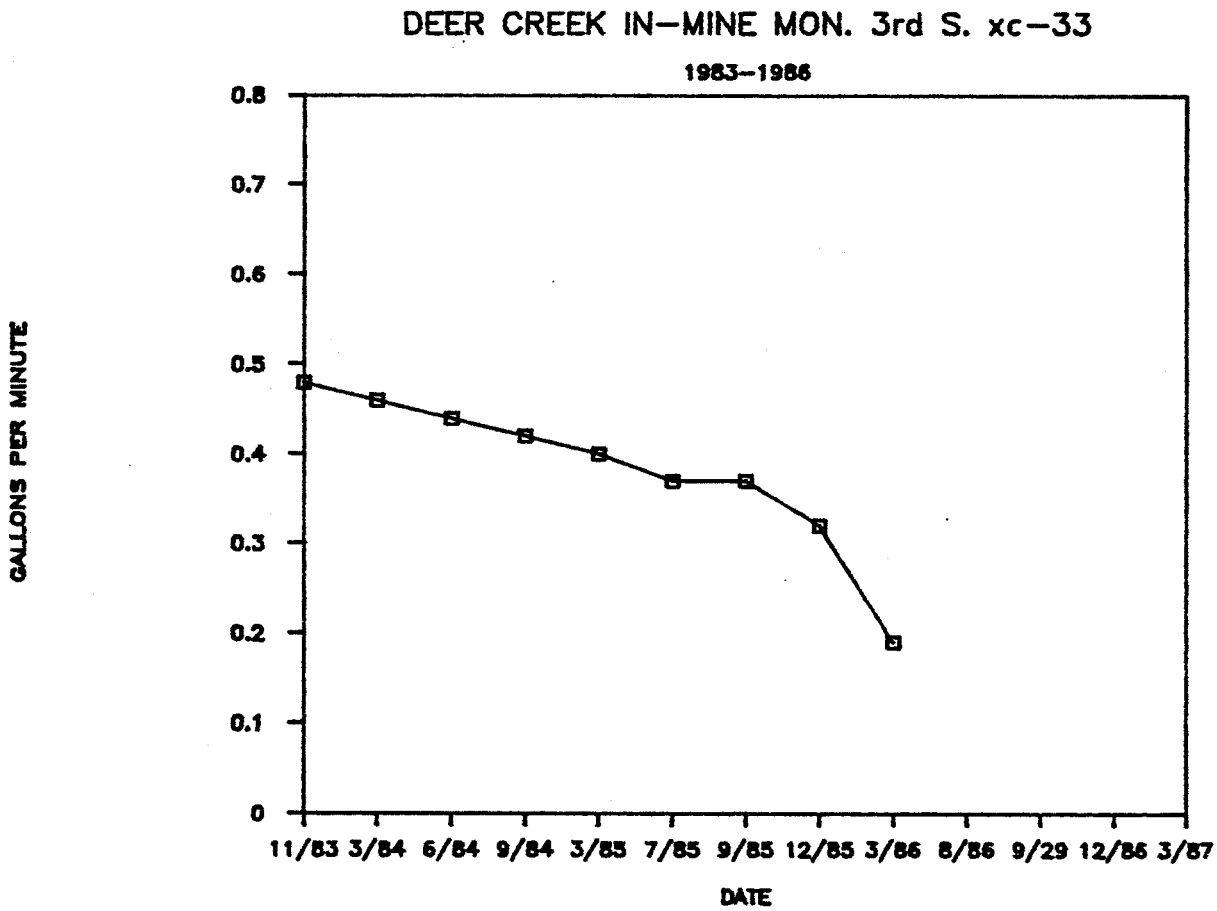
APPENDIX F

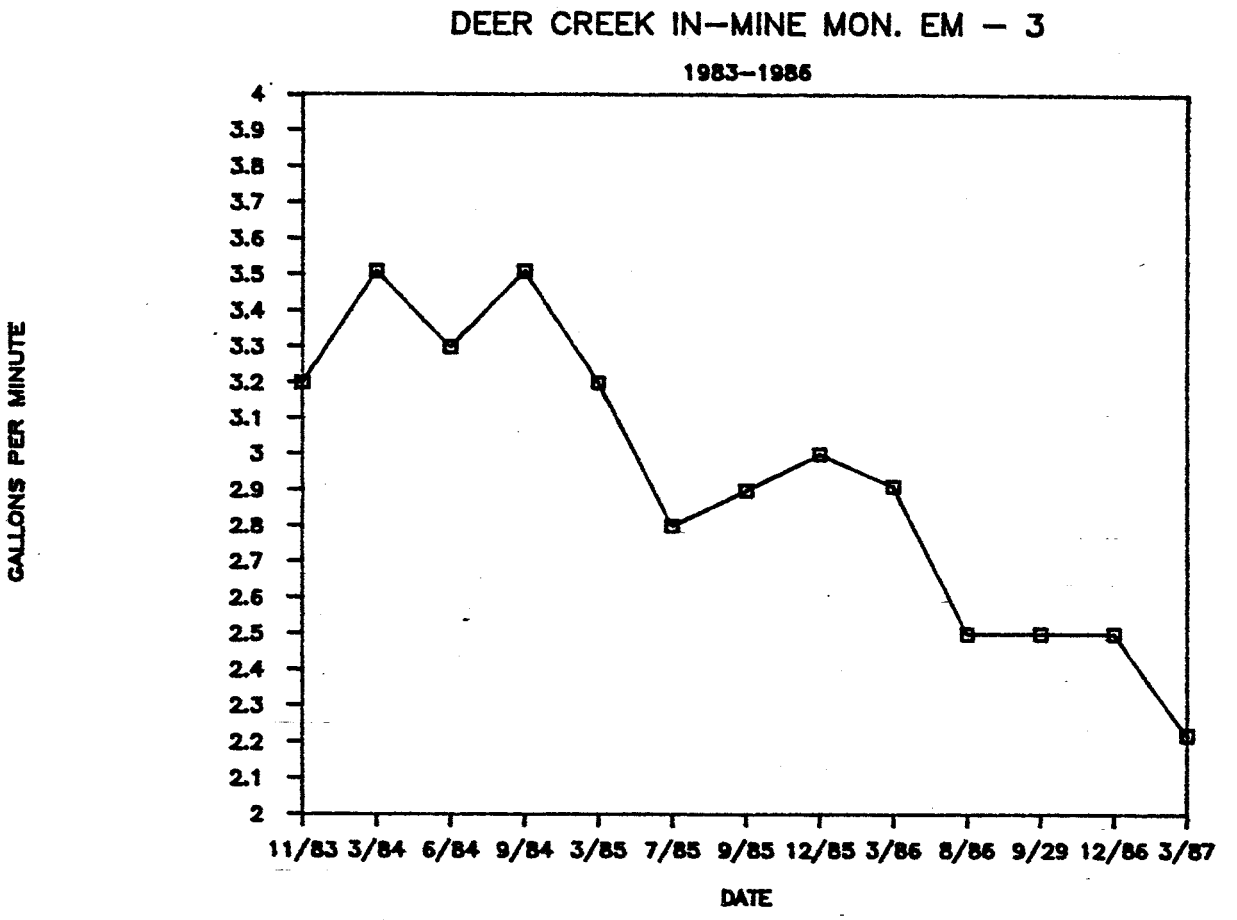
DEER CREEK IN-MINE WATER QUALITY


DEER CREEK IN-MINE MON. 1st S. xc-40
1983-1986
GALLONS PER MINUTE
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
11/83 3/84 6/84 9/84 3/85 7/85 9/85 12/85 3/86 8/86 9/29 12/86 3/87
DATE


DEER CREEK IN-MINE MON. 3rd Sb. xc-21
1983-1986
GALLONS PER MINUTE
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
11/83 3/84 6/84 9/84 3/85 7/85 9/85 12/85 3/86 8/86 9/29 12/86 3/87
DATE


DEER CREEK IN-MINE MON. 3rd N. xc-41
1983-1986
GALLONS PER MINUTE
7
6.5
6
5.5
5
4.5
4
3.5
3
11/83 3/84 6/84 9/84 3/85 7/85 9/85 12/85 3/86 8/86 9/29 12/86 3/87
DATE


DEER CREEK IN-MINE MON. 3rd S. xc-33
1983-1986
GALLONS PER MINUTE
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
11/83 3/84 6/84 9/84 3/85 7/85 9/85 12/85 3/86 8/86 9/29 12/86 3/87
DATE


DEER CREEK IN-MINE MON. EM - 3
1983-1986
GALLONS PER MINUTE
4
3.9
3.8
3.7
3.6
3.5
3.4
3.3
3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2
11/83 3/84 6/84 9/84 3/85 7/85 9/85 12/85 3/86 8/86 9/29 12/86 3/87
DATE

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7950
Date Rec'd 3-25-86
Date Sampled 3-25-86
Time Sampled 1138

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: SPECIAL DEER CREEK IN-MINE
EM3

Temp. 54° Flow 2.91 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	3-27	390	mg/l $CaCO_3$
Alkalinity, Bicarbonate		476	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	4-1	9.6	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	3-27	1010	umhos/cm
Fluoride	4-1	0.15	mg/l
Hardness, Total	3-31	520	mg/l $CaCO_3$
Nitrogen, Ammonia	3-31	<0.05	mg/l
Nitrogen, Nitrate	3-31	0.01	mg/l
Nitrogen, Nitrite	3-31	0.02	mg/l
Oil & Grease			mg/l
pH	3-27	6.90	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	3-31	0.04	mg/l
Solids, Total Dissolved		574	mg/l
Solids, Total Suspended	4-1	2.0	mg/l
Sulfate	4-2	145	mg/l
Sulfide	3-31	<0.1	mg/l
Turbidity			NTU
Total Cations		11.26	meq/l
Total Anions		11.10	meq/l

Aluminum	4-1	<0.05	mg/l
Arsenic	4-4	<0.001	mg/l
Barium	4-1	<0.1	mg/l
Beryllium			mg/l
Boron	4-2	0.22	mg/l
Cadmium	3-31	<0.005	mg/l
Calcium	3-31	116.0	mg/l
Chromium	4-1	<0.05	mg/l
Copper	3-31	<0.02	mg/l
Iron	3-31	0.40	mg/l
Lead	3-31	<0.05	mg/l
Magnesium	3-31	55.9	mg/l
Manganese	3-31	0.02	mg/l
Mercury	4-4	<0.2	ug/l
Nickel	3-31	<0.04	mg/l
Potassium	4-1	3.0	mg/l
Selenium	4-4	<0.005	mg/l
Silica			mg/l
Sodium	4-1	18.2	mg/l
Vanadium			mg/l
Zinc	3-31	0.020	mg/l
Iron (Diss.)	3-31	0.09	mg/l
Molybdenum	3-31	<0.1	mg/l

Analyst: David Ramsey

Respectfully submitted [signature] 4-4-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7951

Date Rec'd 3-25-86

Date Sampled 3-25-86

Time Sampled 1220

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: SPECIAL DEER CREEK IN-MINE
3rd S XC-33 1L

Temp. 56° Flow 0.20 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	3-27	324	mg/l $CaCO_3$
Alkalinity, Bicarbonate		395	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	4-1	7.4	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	3-27	810	umhos/cm
Fluoride	4-1	0.21	mg/l
Hardness, Total	3-31	380	mg/l $CaCO_3$
Nitrogen, Ammonia	3-31	<0.05	mg/l
Nitrogen, Nitrate	3-31	0.06	mg/l
Nitrogen, Nitrite	3-31	0.02	mg/l
Oil & Grease			mg/l
pH	3-27	7.10	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	3-31	0.09	mg/l
Solids, Total Dissolved	4-1	416	mg/l
Solids, Total Suspended		1.0	mg/l
Sulfate	4-2	80	mg/l
Sulfide	3-31	<0.1	mg/l
Turbidity			NTU
Total Cations		8.57	meq/l
Total Anions		8.38	meq/l

Aluminum	4-1	<0.05	mg/l
Arsenic	4-4	<0.001	mg/l
Barium	4-1	<0.1	mg/l
Beryllium			mg/l
Boron	4-2	0.08	mg/l
Cadmium	3-31	<0.005	mg/l
Calcium	3-31	80.0	mg/l
Chromium	4-1	<0.05	mg/l
Copper	3-31	<0.02	mg/l
Iron	3-31	0.22	mg/l
Lead	3-31	<0.05	mg/l
Magnesium	3-31	43.8	mg/l
Manganese	3-31	<0.01	mg/l
Mercury	4-4	<0.2	ug/l
Nickel	3-31	<0.05	mg/l
Potassium	4-1	5.0	mg/l
Selenium	4-4	<0.005	mg/l
Silica			mg/l
Sodium	4-1	19.5	mg/l
Vanadium			mg/l
Zinc	3-31	0.019	mg/l
Iron (Diss.)	3-31	0.07	mg/l
Molybdenum	3-31	<0.1	mg/l

Analyst: David L. Ramsey

Respectfully submitted 4-9-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8441
Date Rec'd 8-5-86
Date Sampled 8-4-86
Time Sampled 1430

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK IN-MINE
1st S. XC-40 2R

Temp. 55° Flow 0.38 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	8-7	357	mg/l $CaCO_3$
Alkalinity, Bicarbonate		435	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-14	8.0	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	8-7	900	umhos/cm
Fluoride			mg/l
Hardness, Total	8-13	460	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	8-7	7.10	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-8	520	mg/l
Solids, Total Suspended		1.0	mg/l
Sulfate	8-14	130	mg/l
Sulfide			mg/l
Turbidity			NTU
Total Cations		10.05	meq/l
Total Anions		10.07	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-13	102.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron (Diss.)	8-12	0.12	mg/l
Lead			mg/l
Magnesium	8-13	49.8	mg/l
Manganese	8-12	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	8-14	2.5	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	8-14	18.1	mg/l
Vanadium			mg/l
Zinc			mg/l

Respectfully submitted [signature] 8-15-86

Analyst: [signature]

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8442
Date Rec'd 8-5-86
Date Sampled 8-4-86
Time Sampled 1330

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK IN-MINE
3rd S. XC-21

Temp. 53° Flow 0.57 GPM

Acidity		mg/l $CaCO_3$
Alkalinity, Total	359	mg/l $CaCO_3$
Alkalinity, Bicarbonate	438	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate	<1.0	mg/l $CaCO_3$
Chloride	9.0	mg/l
Coliform, Fecal		MPN/100 ml
Coliform, Total		MPN/100 ml
Conductivity	910	umhos/cm
Fluoride		mg/l
Hardness, Total	465	mg/l $CaCO_3$
Nitrogen, Ammonia		mg/l
Nitrogen, Nitrate		mg/l
Nitrogen, Nitrite		mg/l
Oil & Grease		mg/l
pH	7.15	Units
Phosphorus, Ortho		mg/l
Phosphorus, Total		mg/l
Solids, Total Dissolved	526	mg/l
Solids, Total Suspended	1.0	mg/l
Sulfate	130	mg/l
Sulfide		mg/l
Turbidity		NTU
Total Cations	10.26	meq/l
Total Anions	10.14	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-13	100.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron (Diss.)	8-12	0.05	mg/l
Lead			mg/l
Magnesium	8-13	52.3	mg/l
Manganese	8-12	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	8-14	3.4	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	8-14	20.2	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David A. Ramsay

Respectfully submitted [signature] 8-15-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8558
Date Rec'd 9-26-86
Date Sampled 9-26-86
Time Sampled 0950

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK IN-MINE
3RD N XC 41 B

Temp. 54° Flow 5.0 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	9-29	313	mg/l $CaCO_3$
Alkalinity, Bicarbonate		382	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	9-30	3.9	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	9-29	700	umhos/cm
Fluoride			mg/l
Hardness, Total	10-1	325	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	9-29	7.10	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-2	328	mg/l
Solids, Total Suspended		< 0.5	mg/l
Sulfate	10-1	45	mg/l
Sulfide			mg/l
Turbidity			NTU
Total Cations		7.30	meq/l
Total Anions		7.32	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-1	72.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron (Diss.)	9-30	0.16	mg/l
Lead			mg/l
Magnesium	10-1	35.3	mg/l
Manganese	9-30	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	9-29	2.6	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	9-29	17.0	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8557
Date Rec'd 9-26-86
Date Sampled 9-26-86
Time Sampled 1045

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK IN-MINE EM3
3 S x 77 1R

Temp. 56° Flow 2.5 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	9-29	389	mg/l $CaCO_3$
Alkalinity, Bicarbonate		474	mg/l $CaCO_3$
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	9-30	10	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	9-29	1010	umhos/cm
Fluoride			mg/l
Hardness, Total	10-1	525	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	9-29	7.00	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		569	mg/l
Solids, Total Suspended	10-2	< 0.5	mg/l
Sulfate	10-1	160	mg/l
Sulfide			mg/l
Turbidity			NTU
Total Cations		11.42	meq/l
Total Anions		11.41	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-1	112.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron (Diss.)	9-30	0.19	mg/l
Lead			mg/l
Magnesium	10-1	59.6	mg/l
Manganese	9-30	0.04	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	9-29	3.6	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	9-29	19.0	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8787
Date Rec'd 12-22-86
Date Sampled 12-22-86
Time Sampled 1120

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK IN MINE
3RD S "B" XC-21 1R

Temp. 52° Flow 0.5 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	1-7	350	mg/l $CaCO_3$
Alkalinity, Bicarbonate	1-7	427	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate	1-7	< 1.0	mg/l $CaCO_3$
Chloride	1-5	9.8	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	1-7	920	umhos/cm
Fluoride			mg/l
Hardness, Total	1-12	425	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	1-7	7.45	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	1-5	514	mg/l
Solids, Total Suspended	1-5	3	mg/l
Sulfate	1-5	130	mg/l
Sulfide			mg/l
Turbidity			NTU
Total Cations		9.43	meq/l
Total Anions		9.99	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	1-12	86	mg/l
Chromium			mg/l
Copper			mg/l
Iron (Diss.)	1-2	0.06	mg/l
Lead			mg/l
Magnesium	1-12	51.1	mg/l
Manganese	1-2	< 0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	1-2	3.46	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	1-2	19.4	mg/l
Vanadium			mg/l
Zinc			mg/l

RECEIVED
JAN 13 1987
MINING & EXPLORATION
FIELD OFFICE

Respectfully submitted [signature] 1-12-87

Analyst: Sharon Reiter

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8786
Date Rec'd 12-22-86
Date Sampled 12-22-86
Time Sampled 1050

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK IN-MINE
EM-3 3RD S XC-77 2R

Temp. 56° Flow 2.5 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	1-7	367	mg/l $CaCO_3$
Alkalinity, Bicarbonate		448	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate	1-7	< 1.0	mg/l $CaCO_3$
Chloride	1-5	10.4	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	1-7	1010	umhos/cm
Fluoride			mg/l
Hardness, Total	1-12	515	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	1-7	7.20	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		577	mg/l
Solids, Total Suspended	1-5	3	mg/l
Sulfate	1-5	150	mg/l
Sulfide			mg/l
Turbidity			NTU
Total Cations		11.16	meq/l
Total Anions		10.77	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	1-12	112	mg/l
Chromium			mg/l
Copper			mg/l
Iron (Diss.)	1-2	0.07	mg/l
Lead			mg/l
Magnesium	1-12	57.2	mg/l
Manganese	1-2	< 0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	1-2	3.3	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	1-2	17.9	mg/l
Vanadium			mg/l
Zinc			mg/l

RECEIVED
JAN 13 1987
MINING & EXPLORATION
FIELD OFFICE

Analyst: Sharon Reiter

Respectfully submitted [signature] 1-12-87

Certified Environmental Laboratory

APPENDIX G

DEER CREEK MINE DISCHARGE WATER QUALITY

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7805
Date Rec'd 1-29-86
Date Sampled 1-29-86
Time Sampled 1000

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK DISCHARGE

Temp. 52° Flow 200 GPM Est. Meter 893,333

Acidity 1-30	<1.0	mg/l $CaCO_3$	
Alkalinity, Total	272	mg/l $CaCO_3$	
Alkalinity, Bicarbonate		mg/l $CaCO_3$	
Alkalinity, Carbonate		mg/l $CaCO_3$	
Chloride 1-31	14.2	mg/l	
Coliform, Fecal		MPN/100 ml	
Coliform, Total		MPN/100 ml	
Conductivity 1-30	975	umhos/cm	
Fluoride		mg/l	
Hardness, Total		mg/l $CaCO_3$	
Nitrogen, Ammonia		mg/l	
gen, Nitrate		mg/l	
Nitrogen, Nitrite		mg/l	
Oil & Grease 1-30	1.5	mg/l	
pH 1-30	7.60	Units	
Phosphorus, Ortho		mg/l	
Phosphorus, Total		mg/l	
Solids, Total Dissolved 1-29	581	mg/l	
Solids, Total Suspended	51.0	mg/l	
Sulfate 1-31	240	mg/l	
Sulfide		mg/l	
Turbidity		NTU	
Dissolved Oxygen 1-30	9.60	mg/l	

Aluminum		mg/l
Arsenic		mg/l
Barium		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Calcium		mg/l
Chromium		mg/l
Copper		mg/l
Iron 1-30	0.31	mg/l
Lead		mg/l
Magnesium		mg/l
Manganese 1-30	0.02	mg/l
Mercury		ug/l
Nickel		mg/l
Potassium		mg/l
Selenium		mg/l
Silica		mg/l
Sodium		mg/l
Vanadium		mg/l
Zinc		mg/l

Analyst: David A. Janus

Respectfully submitted David A. Janus

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7871
Date Rec'd 2-27-86
Date Sampled 2-26-86
Time Sampled 1330

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK DISCHARGE

TEmp. 52° Flow 0.29/453.3 GPM

Acidity		<1.0	mg/l $CaCO_3$	Aluminum	mg/l
Alkalinity, Total	2-27	251	mg/l $CaCO_3$	Arsenic	mg/l
Alkalinity, Bicarbonate		306	mg/l ~~$CaCO_3$~~ HCO_3	Barium	mg/l
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$	Beryllium	mg/l
Chloride	2-28	17.6	mg/l	Boron	mg/l
Coliform, Fecal			MPN/100 ml	Cadmium	mg/l
Coliform, Total			MPN/100 ml	Calcium	2-28 120.0 mg/l
Conductivity			umhos/cm	Chromium	mg/l
Fluoride			mg/l	Copper	mg/l
Hardness, Total	2-28	525	mg/l $CaCO_3$	Iron	2-27 0.42 mg/l
Nitrogen, Ammonia			mg/l	Lead	mg/l
Nitrogen, Nitrate			mg/l	Magnesium	2-28 54.7 mg/l
Nitrogen, Nitrite			mg/l	Manganese	2-27 0.03 mg/l
Oil & Grease	2-28	0.7	mg/l	Mercury	ug/l
pH	2-27	7.90	Units	Nickel	mg/l
Phosphorus, Ortho			mg/l	Potassium	3-3 5.7 mg/l
Phosphorus, Total			mg/l	Selenium	mg/l
Solids, Total Dissolved		697	mg/l	Silica	mg/l
Solids, Total Suspended	2-27	68.0	mg/l	Sodium	3-3 31.0 mg/l
Sulfate	3-3	305	mg/l	Vanadium	mg/l
Sulfide			mg/l	Zinc	mg/l
Turbidity			NTU	Iron (Diss.)	<0.05 mg/l
Dissolved Oxygen		12.3	mg/l		
Total Cations		11.99	meq/l		
Total Anions		11.88	meq/l		

Analyst: David A Janusz

Respectfully submitted David A Janusz

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7871

Date Rec'd 2-29-86

Date Sampled 2-26-86

Time Sampled 1330

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UTAH 84528

Sample ID: DEER CREEK DISCHARGE
Ammended Report 4-2-86

Temp. 52°

Flow 0.29/453.3 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	2-27	251	mg/l $CaCO_3$
Alkalinity, Bicarbonate		306	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	2-28	17.6	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	2/28	1050	umhos/cm
Fluoride			mg/l
Hardness, Total	2/28	525	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	2-28	0.7	mg/l
pH	2-27	7.90	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		697	mg/l
Solids, Total Suspended	2-27	68.0	mg/l
Sulfate	3-3	305	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	2-27	12.3	mg/l
Total Cations		11.99	meq/l
Total Anions		11.88	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	2-28	120.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	2-27	0.42	mg/l
Lead			mg/l
Magnesium	2-28	54.7	mg/l
Manganese	2-27	0.03	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	3-3	5.7	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	3-3	31.0	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)		<0.05	mg/l

Analyst: David L. Ramsey

Respectfully submitted David L. Ramsey

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7952
Date Rec'd 3-25-86
Date Sampled 3-25-86
Time Sampled 1440

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UTAH 84528

Sample ID: DEER CREEK DISCHARGE

Temp. 56° Flow 364 GPM Meter Reading 954,594

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	3-27	277	mg/l $CaCO_3$
Alkalinity, Bicarbonate		338	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	4-1	11.0	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	3-27	1090	umhos/cm
Fluoride			mg/l
Hardness, Total	3-31	500	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	3-27	<0.5	mg/l
pH	3-27	7.25	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		621	mg/l
Solids, Total Suspended	3-31	32.0	mg/l
Sulfate	4-1	260	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	3-26	9.80	mg/l
Total Cations		11.23	meq/l
Total Anions		11.27	meq/l
Calculated TDS		631	mg/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	3-31	106.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	3-31	0.30	mg/l
Lead			mg/l
Magnesium	3-31	57.1	mg/l
Manganese		0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	4-1	5.5	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	4-1	25.2	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	3-31	<0.05	mg/l

Analyst: David Parnes

Respectfully submitted David Parnes

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8023
Date Rec'd 4-25-86
Date Sampled 4-25-86
Time Sampled 0900

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UTAH 84528

Sample ID: DEER CREEK DISCHARGE

Temp. 52° Flow 0.29/453.3 GPM

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	4-28	247	mg/l $CaCO_3$
Alkalinity, Bicarbonate		301	mg/l $CaCO_3$ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	4-29	12.6	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	4-28	1080	umhos/cm
Fluoride			mg/l
Hardness, Total	4-29	515	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
N[illegible]en, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	4-29	<0.5	mg/l
pH	4-28	7.05	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	4-29	660	mg/l
Solids, Total Suspended		27.0	mg/l
Sulfate	4-28	305	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	4-25	8.15	mg/l
Total Cations		11.71	meq/l
Total Anions		11.66	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	4-29	110.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	4-29	0.19	mg/l
Lead			mg/l
Magnesium	4-29	58.4	mg/l
Manganese	4-29	0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	4-29	5.1	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	4-29	29.5	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	4-29	<0.05	mg/l

Respectfully submitted [signature] 4-30-86

Analyst: [signature]

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STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8106

Date Rec'd 5-30-86

Date Sampled 5-29-86

Time Sampled

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UTAH 84528

Sample ID: DEER CREEK DISCHARGE

Temp. 56°

Acidity		<1.0	mg/l $CaCO_3$
Alkalinity, Total	6-2	232	mg/l $CaCO_3$
Alkalinity, Bicarbonate		283	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	6-4	14.0	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	6-2	1110	umhos/cm
Fluoride			mg/l
Hardness, Total	6-3	539	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	5-30	1.2	mg/l
pH	6-2	7.10	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	6-2	717	mg/l
Solids, Total Suspended		66.0	mg/l
Sulfate		350	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	5-30	8.80	mg/l
Total Cations		12.31	meq/l
Total Anions		12.33	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	6-3	114.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	6-3	0.52	mg/l
Lead			mg/l
Magnesium	6-3	61.8	mg/l
Manganese	6-3	0.03	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	6-3	6.0	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	6-3	31.7	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	6-3	<0.05	mg/l

Analyst: David L. Ramos

Respectfully submitted [signature] 6-5-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P O Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8318
Date Rec'd 7-7-86
Date Sampled 7-7-86
Time Sampled 1020

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK DISCHARGE

Temp. 56° Flow 300 GPM Est. Meter Reading (91965 acre ft.) x .001

Acidity	7-17	< 1.0	mg/l $CaCO_3$
Alkalinity, Total		216	mg/l $CaCO_3$
Alkalinity, Bicarbonate		264	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	7-17	12.2	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	7-17	1100	umhos/cm
Fluoride			mg/l
Hardness, Total	7-14	544	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	7-15	<0.5	mg/l
pH	7-17	7.20	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		719	mg/l
Solids, Total Suspended	7-11	< 0.5	mg/l
Sulfate	7-21	360	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	7-8	9.90	mg/l
Total Cations		12.53	meq/l
Total Anions		12.12	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	7-14	112.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	7-9	0.05	mg/l
Lead			mg/l
Magnesium	7-17	64.2	mg/l
Manganese	7-9	< 0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	7-15	6.7	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	7-15	34.1	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	7-9	< 0.05	mg/l

Analyst: David L Janusz

Respectfully submitted David L Janusz

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8443
Date Rec'd 8-5-86
Date Sampled 8-4-86
Time Sampled 1500

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK DISCHARGE (JULY)

Temp. 56° Flow 650 GPM Est. METER READING 149370 (.001) acre ft.

Acidity	8-7	<1.0	mg/l $CaCO_3$
Alkalinity, Total		241	mg/l $CaCO_3$
Alkalinity, Bicarbonate		294	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-14	12.0	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	8-7	1110	umhos/cm
Fluoride			mg/l
Hardness, Total	8-13	520	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	8-11	2.4	mg/l
pH	8-7	7.20	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-8	720	mg/l
Solids, Total Suspended		39.0	mg/l
Sulfate	8-14	340	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	8-5	7.10	mg/l
Total Cations		12.35	meq/l
Total Anions		12.23	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-13	102	mg/l
Chromium			mg/l
Copper			mg/l
Iron	8-12	0.37	mg/l
Lead			mg/l
Magnesium	8-13	64.4	mg/l
Manganese	8-12	0.03	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	8-14	7.1	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	8-14	40.6	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	8-12	<0.05	mg/l

Respectfully submitted [signature] 8-15-86

Analyst: David Ramey

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8498

Date Rec'd 8-28-86

Date Sampled 8-28-86

Time Sampled 0930

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK DISCHARGE

Meter #1 186.892 280 GPM Meter #2 003.520 400 GPM Flow 680 GPM 53°

Acidity	8-29	<1.0	mg/l $CaCO_3$
Alkalinity, Total	8-29	260	mg/l $CaCO_3$
Alkalinity, Bicarbonate	8-29	317	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate	8-29	<1.0	mg/l $CaCO_3$
Chloride	9-3	13.4	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	9-2	1080	umhos/cm
Fluoride			mg/l
Hardness, Total	9-3	515	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	9-3	12.0	mg/l
pH	8-29	7.25	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	9-2	680	mg/l
Solids, Total Suspended		44.0	mg/l
Sulfate	9-4	300	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	8-28	8.80	mg/l
Total Cations	9-4	11.77	meq/l
Total Anions	9-4	11.82	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	9-3	112.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	9-2	0.42	mg/l
Lead			mg/l
Magnesium	9-3	57.1	mg/l
Manganese	9-2	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	9-4	6.9	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	9-4	29.8	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	9-2	< 0.05	mg/l

Analyst; Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8596
Date Rec'd 10-1-86
Date Sampled 10-1-86
Time Sampled

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK DISCHARGE (ANNUAL)

Acidity		< 1.0	mg/l $CaCO_3$
Alkalinity, Total	10-3	269	mg/l $CaCO_3$
Alkalinity, Bicarbonate		328	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	10-9	13.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	10-3	1200	umhos/cm
Fluoride	10-9	0.24	mg/l
Hardness, Total	10-9	560	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite	10-3	0.02	mg/l
Oil & Grease	10-2	2.1	mg/l
pH	10-3	7.40	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	10-7	0.04	mg/l
Solids, Total Dissolved	10-7	700	mg/l
Solids, Total Suspended		42.0	mg/l
Sulfate	10-3	320	mg/l
Sulfide			mg/l
Turbidity	10-2		NTU
Dissolved Oxygen		10.40	mg/l
TKN	10-3	0.14	mg/l
Total Cations		12.69	meq/l
Total Anions		12.43	meq/l

Aluminum			mg/l
Arsenic	10-15	< 0.001	mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium	10-14	< 0.005	mg/l
Calcium	10-9	112.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron	10-16	0.58	mg/l
Lead	10-14	< 0.05	mg/l
Magnesium	10-9	68.0	mg/l
Manganese	10-16	0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	10-15	7.3	mg/l
Selenium	10-15	< 0.005	mg/l
Silica	10-9	3.8	mg/l
Sodium	10-15	29.9	mg/l
Vanadium			mg/l
Zinc	10-14	0.027	mg/l
Iron (Diss.)	10-16	0.09	mg/l

Analyst: Sharon Reiter

Respectfully submitted Bel G Winingham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8726
Date Rec'd 10-29-86
Date Sampled 10-28-86
Time Sampled 1030

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK DISCHARGE

Temp. 53°

Acidity	11-3	<1.0	mg/l $CaCO_3$
Alkalinity, Total	11-3	247	mg/l $CaCO_3$
Alkalinity, Bicarbonate		301	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	11-3	14	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	11-3	1100	umhos/cm
Fluoride			mg/l
Hardness, Total	11-3	585	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	10-31	12.3	mg/l
pH	11-3	7.15	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-31	764	mg/l
Solids, Total Suspended		203	mg/l
Sulfate	11-3	350	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	10-29	6.6	mg/l
Total Cations		13.08	meq/l
Total Anions		12.63	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	11-3	116	mg/l
Chromium			mg/l
Copper			mg/l
Iron	11-4	3.65	mg/l
Lead			mg/l
Magnesium	11-3	71.7	mg/l
Manganese	11-4	0.04	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	11-4	7.19	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	11-4	27.9	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	11-4	<0.05	mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

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STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8756
Date Rec'd 11-26-86
Date Sampled 11-26-86
Time Sampled 0920

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK DISCHARGE

Acidity	12-1	< 1.0	mg/l $CaCO_3$
Alkalinity, Total	12-1	222	mg/l $CaCO_3$
Alkalinity, Bicarbonate	12-1	271	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate	12-1	< 1.0	mg/l $CaCO_3$
Chloride	12-5	11.1	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	12-3	1000	umhos/cm
Fluoride	12-11	0.24	mg/l
Hardness, Total	12-2	490	mg/l $CaCO_3$
Nitrogen, Ammonia	11-26	0.16	mg/l
Nitrogen, Nitrate	11-26	0.045	mg/l
Nitrogen, Nitrite	11-26	0.02	mg/l
Oil & Grease	12-5	6	mg/l
pH	12-1	7.90	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	12-22	0.08	mg/l
Solids, Total Dissolved	11-26	694	mg/l
Solids, Total Suspended		108	mg/l
Sulfate	12-10	280	mg/l
Sulfide	12-1	4	mg/l
Turbidity			NTU
Settleable Solids	11-26	< 0.5	mg/l
Dissolved Oxygen	11-26	9.30	mg/l
Total Cations		11.34	meq/l
Total Anions		10.59	meq/l
Calculated TDS		619.5	mg/l

Aluminum	12-16	< 0.05	mg/l
Arsenic	12-22	< 0.001	mg/l
Barium	12-16	< 0.1	mg/l
Beryllium			mg/l
Boron	12-22	0.3	mg/l
Cadmium	12-16	< 0.005	mg/l
Calcium	12-2	96	mg/l
Chromium	12-16	< 0.05	mg/l
Copper	12-16	< 0.02	mg/l
Iron	12-18	1.9	mg/l
Lead	12-16	< 0.05	mg/l
Magnesium	12-2	60.8	mg/l
Manganese	12-18	0.02	mg/l
Mercury	12-22	< 0.2	ug/l
Nickel	12-16	< 0.04	mg/l
Potassium	12-18	6.5	mg/l
Selenium	12-22	< 0.005	mg/l
Silica			mg/l
Sodium	12-18	31.9	mg/l
Vanadium			mg/l
Zinc	12-16	0.027	mg/l
Iron (Diss.)	12-18	0.17	mg/l
Molybdenum	12-16	< 0.1	mg/l

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DEC 31 1986
MINING & EXPLORATION
FIELD OFFICE

Respectfully submitted 12-31-86

Analyst: Sharon Reiter

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STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8777
Date Rec'd 12-15-86
Date Sampled 12-15-86
Time Sampled 0930

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: DEER CREEK MINE DISCHARGE

Temp. 52° Flow 668 GPM

Acidity	12-18	< 1.0	mg/l $CaCO_3$
Alkalinity, Total	12-18	249	mg/l $CaCO_3$
Alkalinity, Bicarbonate	12-18	304	mg/l $CaCO_3$ HCO_3
Alkalinity, Carbonate	12-18	< 1.0	mg/l $CaCO_3$
Chloride	1-5	12.5	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	12-15	950	umhos/cm
Fluoride			mg/l
Hardness, Total		510	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease	1-2	< 0.5	mg/l
pH	12-18	7.40	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	12-15	712	mg/l
Solids, Total Suspended		19	mg/l
Sulfate	1-5	320	mg/l
Sulfide			mg/l
Turbidity			NTU
Dissolved Oxygen	12-15	8.6	mg/l
Total Anions		11.79	meq/l
Total Cations		11.61	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	12-22	102	mg/l
Chromium			mg/l
Copper			mg/l
Iron	12-18	0.31	mg/l
Lead			mg/l
Magnesium	12-22	62.0	mg/l
Manganese	12-18	0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	12-18	7.4	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	12-18	28.4	mg/l
Vanadium			mg/l
Zinc			mg/l
Iron (Diss.)	12-18	0.13	mg/l

RECEIVED
JAN 13 1987
MINING & EXPLORATION
FIELD OFFICE

Analyst: Sharon Reiter

Respectfully submitted [signature] 1-8-87

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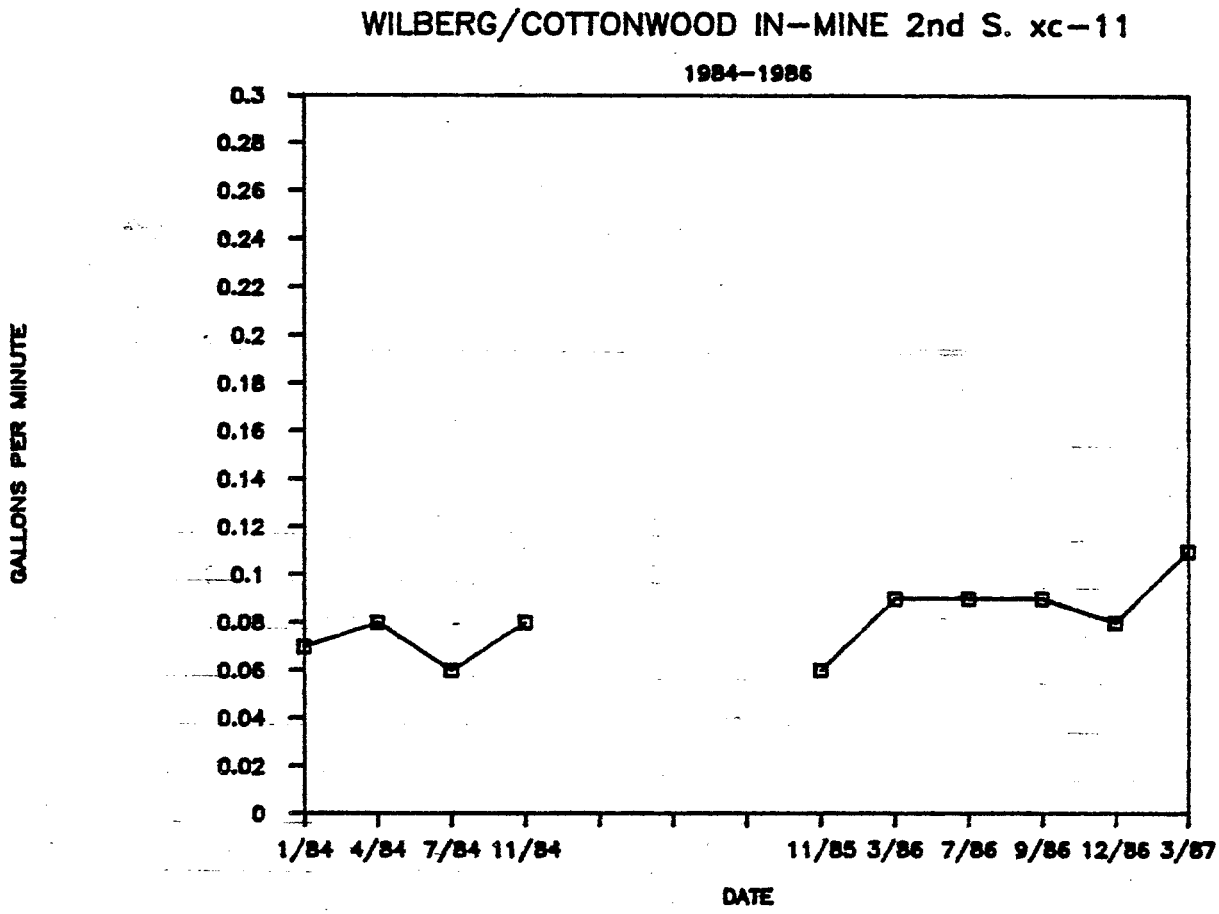
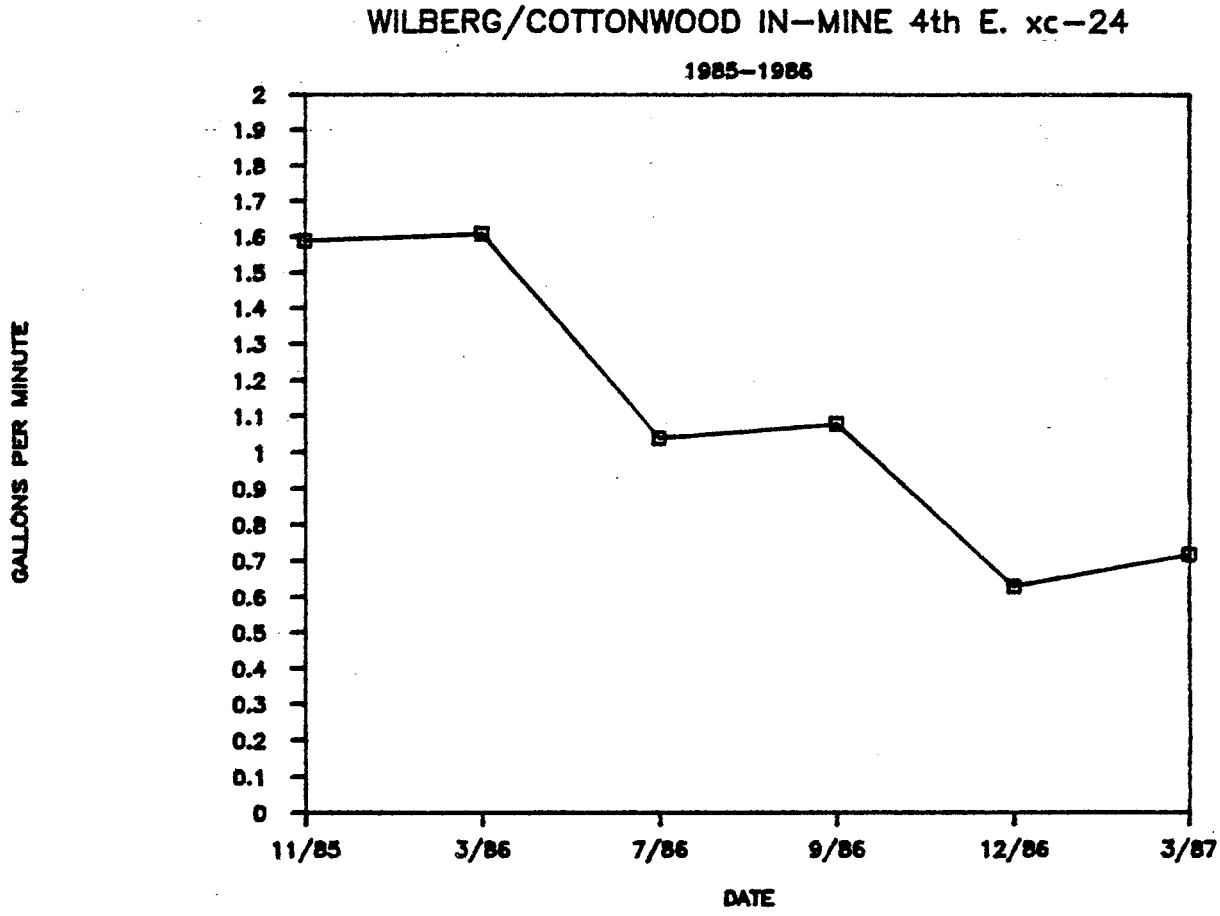
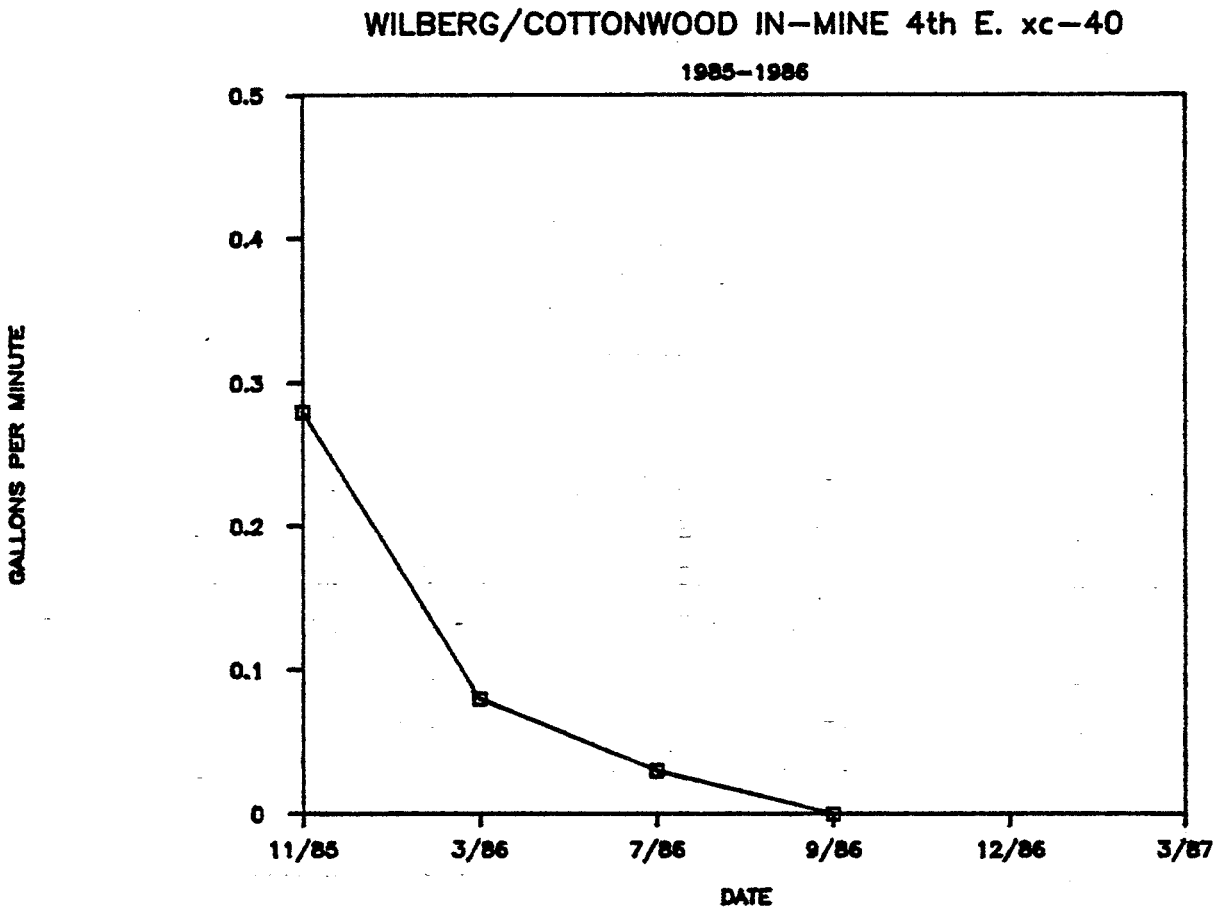
APPENDIX H

WILBERG MINE IN-MINE WATER QUALITY


WILBERG/COTTONWOOD IN-MINE 2nd S. xc-11
1984-1986
GALLONS PER MINUTE
0.3
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
1/84 4/84 7/84 11/84 11/85 3/86 7/86 9/86 12/86 3/87
DATE


WILBERG/COTTONWOOD IN-MINE 4th E. xc-24
1985-1986
GALLONS PER MINUTE
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
11/85 3/86 7/86 9/86 12/86 3/87
DATE


WILBERG/COTTONWOOD IN-MINE 4th E. xc-40
1985-1986
GALLONS PER MINUTE
0.5
0.4
0.3
0.2
0.1
0
11/85
3/86
7/86
9/86
12/86
3/87
DATE

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7920
Date Rec'd 3-17-86
Date Sampled 3-14-86
Time Sampled 1400

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: WILBERG IN-MINE
2ND S XC-11 IL

Temp. 57° Flow 0.09 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	3-18	391	mg/l $CaCO_3$
Alkalinity, Bicarbonate		477	mg/l $CaCO_3$ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	3-25	13.9	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	3-18	1600	umhos/cm
Fluoride	3-18	0.14	mg/l
Hardness, Total	3-20	770	mg/l $CaCO_3$
Nitrogen, Ammonia	3-18	<0.05	mg/l
Nitrogen, Nitrate	3-18	0.04	mg/l
Nitrogen, Nitrite	3-18	<0.01	mg/l
Oil & Grease			mg/l
pH	3-18	7.05	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	3-20	0.08	mg/l
Solids, Total Dissolved		920	mg/l
Solids, Total Suspended	3-20	2.0	mg/l
Sulfate	3-25	400	mg/l
Sulfide	3-24	<0.1	mg/l
Turbidity			NTU
Total Cations		16.59	meq/l
Total Anions		16.55	meq/l
Calculated TDS		918	mg/l

Aluminum	3-18	<0.05	mg/l
Arsenic	3-24	<0.001	mg/l
Barium	3-18	<0.1	mg/l
Beryllium			mg/l
Boron	3-21	0.12	mg/l
Cadmium	3-18	<0.005	mg/l
Calcium	3-20	132.0	mg/l
Chromium	3-18	<0.05	mg/l
Copper	3-18	<0.02	mg/l
Iron	3-17	0.12	mg/l
Lead	3-18	<0.05	mg/l
Magnesium	3-20	107.0	mg/l
Manganese	3-17	0.02	mg/l
Mercury	3-24	<0.2	ug/l
Nickel	3-18	<0.04	mg/l
Potassium	3-25	4.8	mg/l
Selenium	3-24	<0.005	mg/l
Silica			mg/l
Sodium	3-25	24.7	mg/l
Vanadium			mg/l
Zinc	3-18	0.022	mg/l
Iron (Diss.)	3-17	<0.05	mg/l
Molybdenum	3-18	<0.1	mg/l

Analyst: David L. Janney

Respectfully submitted 3/25/86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 7921
Date Rec'd 3-17-86
Date Sampled 3-14-86
Time Sampled 1510

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
P.O. BOX 1005
HUNTINGTON, UT 84528

Sample ID: WILBERG IN-MINE
4TH E XC-40 2R

Temp. 54° Flow 0.08 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	3-18	531	mg/l $CaCO_3$
Alkalinity, Bicarbonate		648	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	3-25	16.7	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	3-18	2600	umhos/cm
Fluoride	3-18	0.16	mg/l
Hardness, Total	3-18	1265	mg/l $CaCO_3$
Nitrogen, Ammonia	3-18	<0.05	mg/l
Nitrogen, Nitrate	3-18	<0.01	mg/l
Nitrogen, Nitrite	3-18	<0.01	mg/l
Oil & Grease			mg/l
pH	3-18	6.85	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total	3-20	0.13	mg/l
Solids, Total Dissolved	3-20	1557	mg/l
Solids, Total Suspended		8.0	mg/l
Sulfate	3-25	750	mg/l
Sulfide	3-24	<0.1	mg/l
Turbidity			NTU
Total Cations		26.52	meq/l
Total Anions		26.72	meq/l
Calculated TDS		1516	mg/l

Aluminum	3-18	<0.05	mg/l
Arsenic	3-24	<0.001	mg/l
Barium	3-18	<0.1	mg/l
Beryllium			mg/l
Boron	3-21	0.16	mg/l
Cadmium	3-18	<0.005	mg/l
Calcium	3-20	236.0	mg/l
Chromium	3-18	<0.05	mg/l
Copper	3-18	<0.02	mg/l
Iron	3-17	0.26	mg/l
Lead	3-18	<0.05	mg/l
Magnesium	3-20	164.2	mg/l
Manganese	3-17	0.02	mg/l
Mercury	3-24	<0.2	ug/l
Nickel	3-18	<0.04	mg/l
Potassium	3-25	5.4	mg/l
Selenium	3-24	<0.005	mg/l
Silica			mg/l
Sodium	3-25	24.8	mg/l
Vanadium			mg/l
Zinc	3-18	0.022	mg/l
Iron (Diss.)	3-17	<0.05	mg/l
Molybdenum	3-18	<0.1	mg/l

Analyst: David A. Ramos

Respectfully submitted 3/25/86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8428
Date Rec'd 7-29-86
Date Sampled 7-29-86
Time Sampled 1300

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: WILBERG IN-MINE
2nd S. XC-11 B-124

Temp. 52° Flow 0.09 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	8-7	342	mg/l $CaCO_3$
Alkalinity, Bicarbonate		417	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		<1.0	mg/l $CaCO_3$
Chloride	8-14	15.0	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	8-7	1400	umhos/cm
Fluoride			mg/l
Hardness, Total	8-13	725	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
gen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	8-7	7.20	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	8-8	932	mg/l
Solids, Total Suspended		<0.5	mg/l
Sulfate	8-14	400	mg/l
Sulfide			mg/l
Turbidity			NTU
Total Cations		15.66	meq/l
Total Anions		15.59	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-13	118.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron (Diss.)	8-12	<0.05	mg/l
Lead			mg/l
Magnesium	8-13	104.5	mg/l
Manganese	8-12	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	8-14	5.0	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	8-14	23.8	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David A. Ramirez

Respectfully submitted [signature] 8-15-86

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8429
Date Rec'd 7-29-86
Date Sampled 7-29-86
Time Sampled 1245

Client: UTAH POWER & LIGHT CO.
FIELD OFFICE
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: WILBERG IN-MINE
4TH E. XC-24 EM-25

Temp. 54° Flow 1.04 GPM

Acidity		mg/l $CaCO_3$
Alkalinity, Total	378	mg/l $CaCO_3$
Alkalinity, Bicarbonate	461	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate	<1.0	mg/l $CaCO_3$
Chloride	24.0	mg/l
Coliform, Fecal		MPN/100 ml
Coliform, Total		MPN/100 ml
Conductivity	2130	umhos/cm
Fluoride		mg/l
Hardness, Total	1170	mg/l $CaCO_3$
Nitrogen, Ammonia		mg/l
Nitrogen, Nitrate		mg/l
Nitrogen, Nitrite		mg/l
Oil & Grease		mg/l
pH	7.15	Units
Phosphorus, Ortho		mg/l
Phosphorus, Total		mg/l
Solids, Total Dissolved	1520	mg/l
Solids, Total Suspended	<0.5	mg/l
Sulfate	800	mg/l
Sulfide		mg/l
Turbidity		NTU
Total Cations	25.17	meq/l
Total Anions	24.89	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	8-13	238.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron (Diss.)	8-12	<0.05	mg/l
Lead			mg/l
Magnesium	8-13	139.8	mg/l
Manganese	8-12	0.04	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	8-14	8.5	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	8-14	35.7	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: David Pomeroy

Respectfully submitted [signature] 8-15-86

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CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P. O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8556

Date Rec'd 9-28-86

Date Sampled 9-27-86

Time Sampled 1350

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: WILBERG IN-MINE
2ND S XC 11-1L

Temp. 56° Flow 0.09 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	9-29	390	mg/l $CaCO_3$
Alkalinity, Bicarbonate		476	mg/l ~~$CaCO_3$~~ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	9-30	14.1	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	9-29	1480	umhos/cm
Fluoride			mg/l
Hardness, Total	10-1	780	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	9-29	7.60	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-2	915	mg/l
Solids, Total Suspended		< 0.5	mg/l
Sulfate	10-1	410	mg/l
Sulfide			mg/l
Turbidity			NTU
Total Cations		16.81	meq/l
Total Anions		16.75	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-1	134.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron (Diss.)	9-30	< 0.05	mg/l
Lead			mg/l
Magnesium	10-1	108.2	mg/l
Manganese	9-30	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	9-29	5.5	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	9-29	24.7	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8555

Date Rec'd 9-28-86

Date Sampled 9-26-86 27

Time Sampled 1430

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: WILBERG IN-MINE
4th E XC 24-2R

Temp. 56° Flow 1.08 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	9-29	398	mg/l $CaCO_3$
Alkalinity, Bicarbonate		485	mg/l $CaCO_3$ HCO_3
Alkalinity, Carbonate		< 1.0	mg/l $CaCO_3$
Chloride	9-30	23.0	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	9-29	2105	umhos/cm
Fluoride			mg/l
Hardness, Total	10-1	1220	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	9-29	7.20	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved	10-2	1605	mg/l
Solids, Total Suspended		1.0	mg/l
Sulfate	10-1	840	mg/l
Sulfide			mg/l
Turbidity			NTU
Total Cations		26.25	meq/l
Total Anions		26.11	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	10-1	236.0	mg/l
Chromium			mg/l
Copper			mg/l
Iron (Diss.)	9-30	< 0.05	mg/l
Lead			mg/l
Magnesium	10-1	153.0	mg/l
Manganese	9-30	0.06	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	9-29	9.6	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	9-29	37.0	mg/l
Vanadium			mg/l
Zinc			mg/l

Analyst: Sharon Reiter

Respectfully submitted Bd Cunningham

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8790
Date Rec'd 12-30-86
Date Sampled 12-29-86
Time Sampled 1255

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: WILBERG IN MINE
2ND S XC-11 1 L

Temp. 56° Flow 0.08 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	1-7	335	mg/l $CaCO_3$
Alkalinity, Bicarbonate		409	mg/l $CaCO_3$
Alkalinity, Carbonate	1-7	<1.0	mg/l $CaCO_3$
Chloride	1-5	15.1	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	1-7	1400	umhos/cm
Fluoride			mg/l
Hardness, Total	1-12	745	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	1-7	7.45	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		912	mg/l
Solids, Total Suspended	1-5	16	mg/l
Sulfate	1-5	450	mg/l
Sulfide			mg/l
Turbidity			NTU
Total Cations		16.11	meq/l
Total Anions		16.51	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	1-12	122	mg/l
Chromium			mg/l
Copper			mg/l
Iron (Diss.)	1-2	0.05	mg/l
Lead			mg/l
Magnesium	1-12	107	mg/l
Manganese	1-2	<0.01	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	1-2	5.17	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	1-2	25	mg/l
Vanadium			mg/l
Zinc			mg/l

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FIELD OFFICE

Analyst: Sharon Reiter

Respectfully submitted [signature] 1-12-87

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CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

P.O. Box 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8791
Date Rec'd 12-30-86
Date Sampled 12-29-86
Time Sampled 1300

Client: UTAH POWER & LIGHT CO.
MINING DIVISION
PO BOX 1005
HUNTINGTON, UT 84528

Sample ID: WILBERG IN MINE
EM-25 4TH E XC-24

Temp. 54° Flow 0.63 GPM

Acidity			mg/l $CaCO_3$
Alkalinity, Total	1-7	393	mg/l $CaCO_3$
Alkalinity, Bicarbonate		479	mg/l $CaCO_3$ / HCO_3
Alkalinity, Carbonate	1-7	<1.0	mg/l $CaCO_3$
Chloride	1-5	28.4	mg/l
Coliform, Fecal			MPN/100 ml
Coliform, Total			MPN/100 ml
Conductivity	1-7	2400	umhos/cm
Fluoride			mg/l
Hardness, Total	1-12	1410	mg/l $CaCO_3$
Nitrogen, Ammonia			mg/l
Nitrogen, Nitrate			mg/l
Nitrogen, Nitrite			mg/l
Oil & Grease			mg/l
pH	1-7	7.25	Units
Phosphorus, Ortho			mg/l
Phosphorus, Total			mg/l
Solids, Total Dissolved		1898	mg/l
Solids, Total Suspended	1-5	17	mg/l
Sulfate	1-5	980	mg/l
Sulfide			mg/l
Turbidity			NTU
Total Cations		30.29	meq/l
Total Anions		29.08	meq/l

Aluminum			mg/l
Arsenic			mg/l
Barium			mg/l
Beryllium			mg/l
Boron			mg/l
Cadmium			mg/l
Calcium	1-12	252	mg/l
Chromium			mg/l
Copper			mg/l
Iron (Diss.)	1-2	0.05	mg/l
Lead			mg/l
Magnesium	1-12	189.7	mg/l
Manganese	1-2	0.02	mg/l
Mercury			ug/l
Nickel			mg/l
Potassium	1-2	9.72	mg/l
Selenium			mg/l
Silica			mg/l
Sodium	1-2	43	mg/l
Vanadium			mg/l
Zinc			mg/l

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MINING & EXPLORATION
FIELD OFFICE

Respectfully submitted [signature] 1-12-87

Analyst: Sharon Reiter

Certified Environmental Laboratory