UTAH POWER & LIGHT COMPANY
HYDROLOGIC MONITORING PROGRAM
ANNUAL REPORT FOR 1981

AUGUST 1982

Submitted to: United States Department of the Interior
Office of Surface Mining
Geological Survey
Utah Division of Oil, Gas and Mining

Prepared and submitted for Utah Power & Light Company by:

Hydrologic Section of the Power Operation Department

and

Mining and Exploration Department

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August 27, 1982

Mr. Ron Daniels
Utah State Division of Oil, Gas & Mining
1588 West North Temple
Salt Lake City, Utah 84116

Dear Mr. Daniels:

Enclosed find Utah Power & Light Company's 1981 Annual Hydrological Report For Coal Lands on East Mountain in Emery County, Utah.

This report covers work ending December 31, 1981.

We are endeavoring to speed-up the report next year.

Sincerely yours,

C. E. Shingleton

C. E. Shingleton
Director of Services
Mining and Exploration

CES:lh:3551
enclosure

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INTRODUCTION

This 1981 Water Monitoring Report is hereby submitted in accordance with the U. S. Department of Interior, Office of Surface Mining requirements for hydrologic monitoring in areas adjacent to coal mining operations. The specific regulations are set forth in Section 30 CFR 211 of the Coal Mine Operating Regulations of 1977.

This report is the fourth 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 both flow observations as well as water quality characteristics of the water resources adjacent to Utah Power & Light Company (UP&L) mining areas in Emery County (see Figure 1).

Information was compiled the past year from in-house as well as from state, federal and private agencies which are shown as follows:

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.

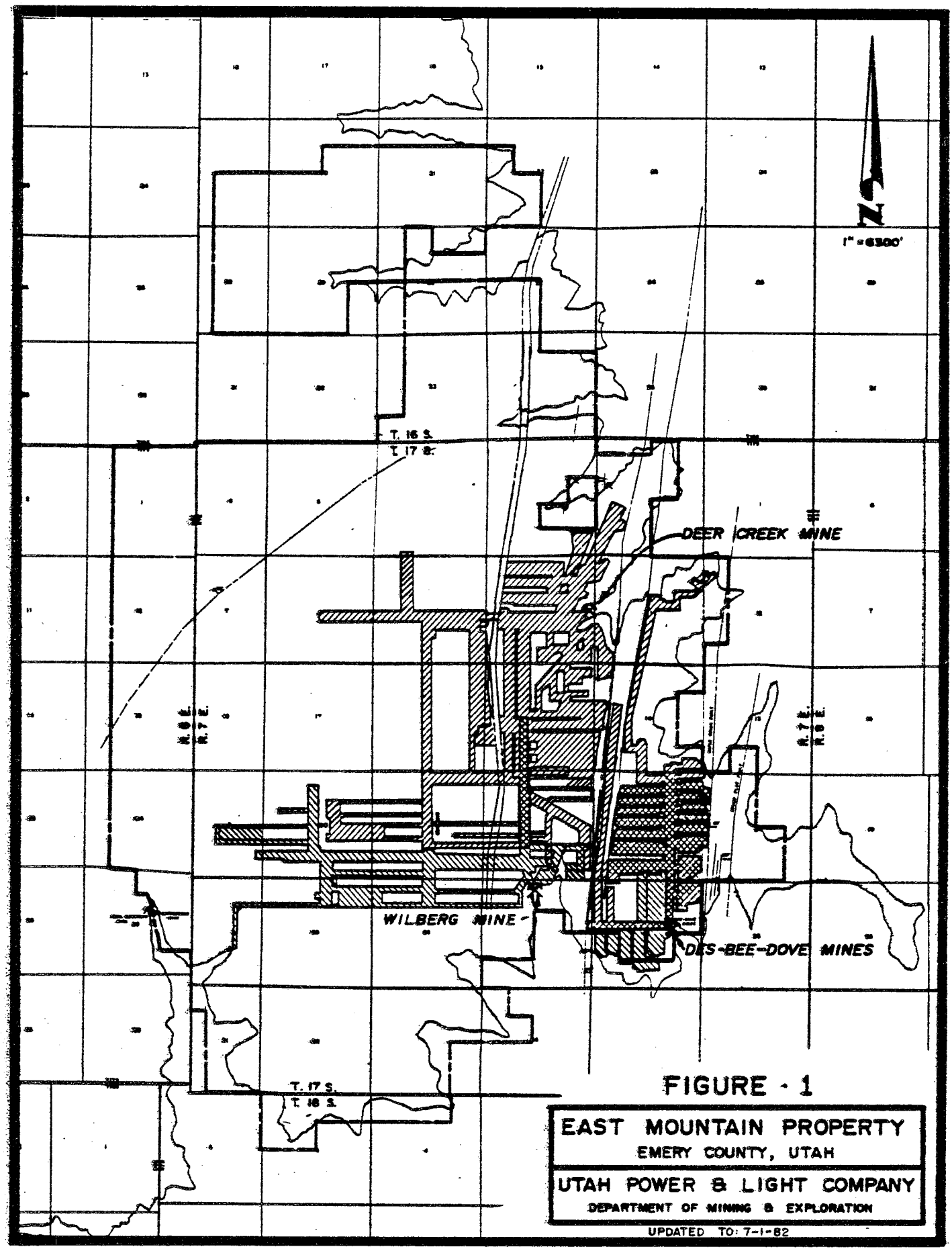


FIGURE - 1

EAST MOUNTAIN PROPERTY
EMERY COUNTY, UTAH

UTAH POWER & LIGHT COMPANY
DEPARTMENT OF MINING & EXPLORATION

UPDATED TO: 7-1-82

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. Consequently, weather observations will be addressed with respect to resulting spring discharges and associated runoff which occurred in the vicinity of East Mountain, not only for 1981 but for all water monitoring reports submitted in the future.

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.

REGIONAL CLIMATOLOGY

Precipitation during the 1981 winter was extremely deficient with most snow stations receiving near record low snow cover throughout the Intermountain West.

The weather pattern during 1981 was a complete reversal of the 1980 winter when near record high amounts of precipitation and associated snowfall accumulated throughout the Intermountain West. Corresponding runoff during 1980 approached all time highs while 1981 runoff was near all time lows for most rivers in Utah. Adequate reservoir holdover storage provided stable water supplies for most uses during 1981.

LOCAL CLIMATOLOGY

PRECIPITATION

Precipitation in Emery County during 1981 followed a pattern similar to the intermountain area, being characterized by scarce fall (1980) precipitation, deficient winter snowfall, and near average rainfall.

A permanent weather monitoring station was installed on East Mountain by UP&L representatives on October 25, 1980. The weather station located above the Church Mines at an elevation of 8985 feet (1060 feet east, 1500 feet south of the Northwest corner of Section 26, Township 17 South, Range 7 East, Emery County, Utah) went into operation on October 25, 1980. The location and orientation of the station followed National Weather Service recommendations. The instrumentation includes: a recording rain gauge, a maximum/minimum thermometer, and a recording hygrothermograph (temperature and relative humidity). The information provided by this station should prove to be valuable in correlating climatological and hydrologic data.

Precipitation amounts recorded at the Hunter (Emery) Plant, Huntington Plant, Electric Lake and East Mountain for the 1981 water year (october, 1980 to September, 1981) will be presented since these sites include low elevation, intermediate elevation and high elevation observation sites in the immediate vicinity of mining activities. The values are shown in the table on the following page. The monthly precipitation levels recorded on East Mountain are shown on Table 1 as well.

A comparison of precipitation for 1980 and 1981 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 1980-1981 precipitation levels recorded at the three locations.

TABLE 1: PRECIPITATION IN EMERY COUNTY, UTAH (1981 WATER YEAR)

Month	Hunter Plant (Elev. 5800') Precip. (in.)	% Of Normal	Huntington Plant (Elev. 6500') Precip. (in.)	% Of Normal	Electric Lake (Elev. 8350') Precip. (in.)	% Of Normal	East Mountain (Elev. 8985') Precip. (in.)	% Of Normal *
1980								
Oct.	0.66	85	1.20	96	1.45	68	1.30	NA
Nov.	0.06	12	.06	10	0.98	53	0.33	NA
Dec.	0.02	4	0	0	0.32	11	0.25	NA
1981								
Jan.	0	0	0	0	1.30	64	0.28	NA
Feb.	0.07	17	0	0	1.04	60	1.45	NA
Mar.	1.48	352	0.62	100	3.20	168	1.60	NA
Apr.	0.16	37	0.08	15	1.45	86	0.61	NA
May	0.45	76	1.75	307	3.06	205	0.85	NA
June	0.14	30	0.48	117	0.39	48	0.75	NA
July	0.20	34	0	0	1.61	138	0.40	NA
Aug.	0.70	69	0.58	85	2.73	321	1.03	NA
Sept.	2.43	304	1.53	289	1.44	137	2.43	NA
Totals	6.37	92	6.30	84	18.97	97	11.28	NA
Mean Monthly	0.53	--	0.53	--	1.58	--	0.94	--

*Historical data not available for the East Mountain weather station

A review of Table 1 indicates that the three locations experienced much lower than normal precipitation during the fall and winter months and higher than normal levels during the late summer. The total annual precipitation was below normal for all locations.

TABLE 2: COMPARISON OF 1980 AND 1981 PRECIPITATION

Station	1980 Amount	1980 % of Normal	1981 Amount	1981 % of Normal	% of 1980
Hunter Plant	8.93	128	6.37	92	72
Huntington Plant	14.09	188	6.30	84	45
Electric Lake	25.48	115	18.97	97	84
Average %		144		91	67

Table 2 indicates that much above normal precipitation was recorded at the three locations for 1980 while precipitation for 1981 was much below normal.

The correlation of precipitation levels with spring discharges will be discussed in the East Mountain Springs section of the report. Figure 2 on the following page shows monthly precipitation totals for the East Mountain weather station.

TEMPERATURES

Temperature variations have a great influence on water supplies from the standpoint of peak flows as well as for duration of runoff from a watershed area. Accordingly, temperature information has been incorporated into this report.

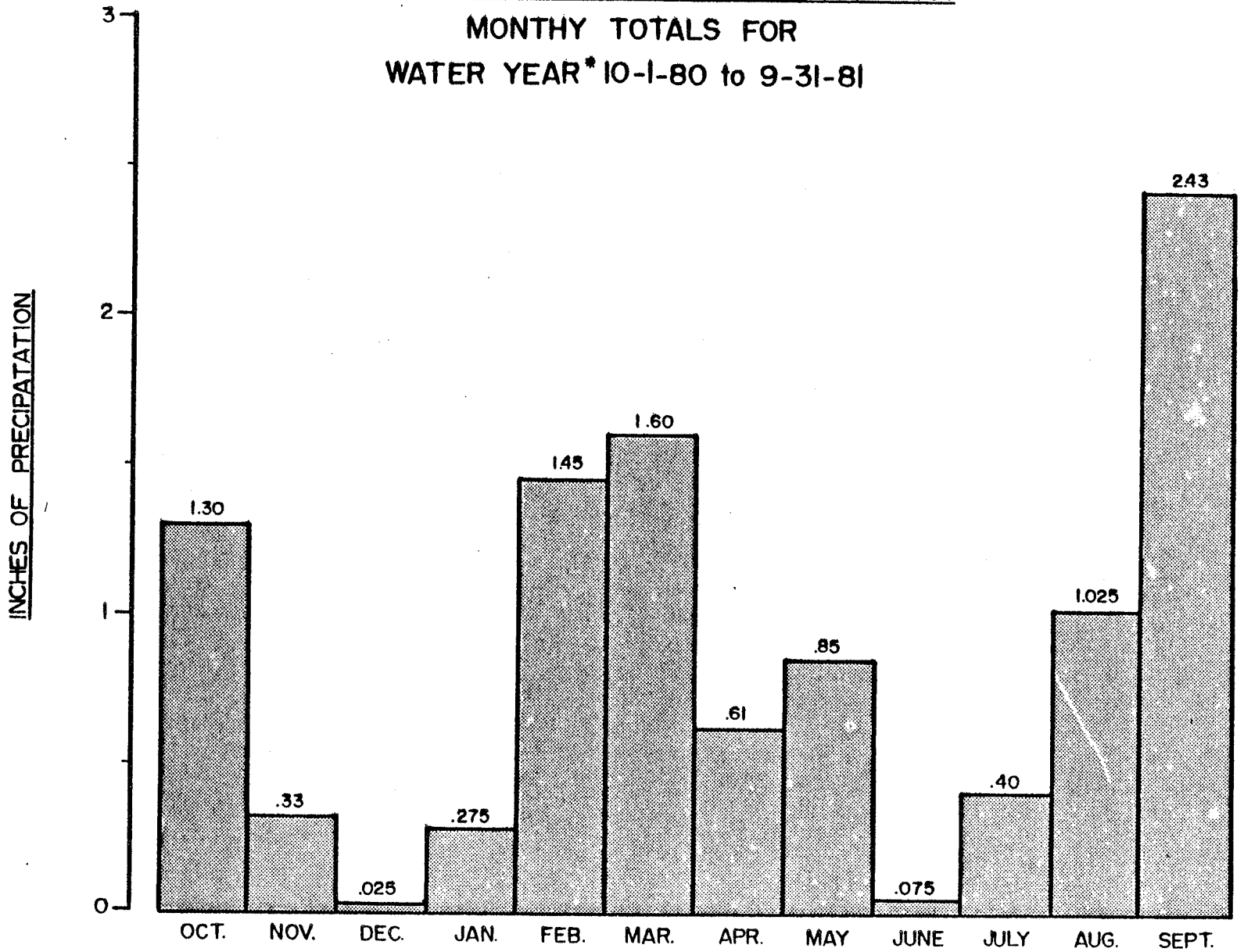
Temperatures were highly variable during 1981 in Emery County (see table on page 8). Every month was warmer than normal at the Hunter and Huntington Plant with the exception of October at Huntington. The Electric Lake station recorded temperatures which were variable with 9 months of above normal temperatures and 3 months of below normal temperatures. Because 1981 constituted the first full year of recorded temperature from East Mountain, no historical comparison could be made but the 1981 data is shown on Figure 3.

FIGURE 2

EAST MOUNTAIN PRECIPATATION

MONTHY TOTALS FOR

WATER YEAR* 10-1-80 to 9-31-81



* YEARLY TOTALS 11.90"

TABLE 3: TEMPERATURES IN EMERY COUNTY, UTAH (1981 WATER YEAR)

	Hunter Plant		Huntington Plant		Electric Lake	
Month	Average Temp. (°F)	Departure From Normal	Average Temp. (°F)	Departure From Normal	Average Temp. (°F)	Departure From Normal
1980						
Oct.	50.5	+2.1	46.4	-3.0	37.1	-0.4
Nov.	37.4	+2.2	36.3	+0.3	27.7	+2.0
Dec.	34.5	+7.8	35.0	+7.6	23.6	+7.8
1981						
Jan.	34.5	+10.4	34.0	+10.4	19.0	+4.4
Feb.	33.4	+5.0	30.4	+0.2	17.4	-1.9
Mar.	38.8	+3.0	39.4	+1.7	19.6	-1.2
Apr.	51.7	+7.1	53.3	+8.2	32.1	+3.4
May	54.9	+2.8	56.3	+1.4	38.6	-0.4
June	69.9	+8.5	70.0	+4.2	52.4	+3.8
July	74.0	+5.6	76.0	+4.3	56.5	+0.8
Aug.	71.3	+4.9	74.4	+5.0	56.4	+2.6
Sept.	65.2	+6.5	66.1	+5.7	50.2	+2.7
Totals	51.3	+5.5	51.5	+3.8	35.9	+2.0

A comparison of 1980 and 1981 temperatures for the three stations is addressed since temperatures also influence water supplies from year to year. Table 4 depicts the variation from 1980 to 1981.

FIGURE 3

EAST MOUNTAIN TEMPERATURES

MONTHLY AVERAGES FOR

WATER YEAR 10-1-80 to 9-31-81

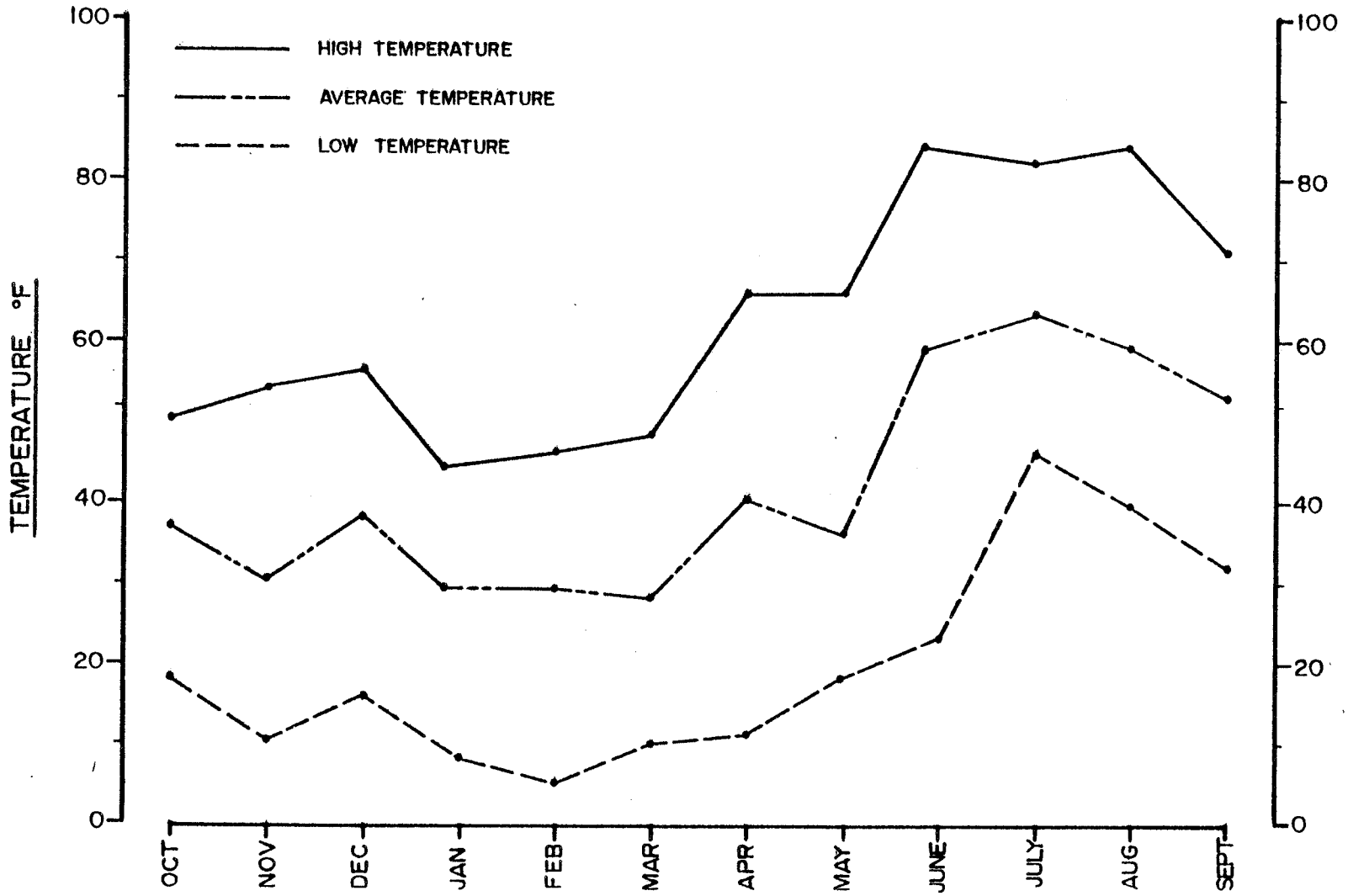


TABLE 4: COMPARISON OF 1980 AND 1981 TEMPERATURES

Station	1980 Average Temp. (°F)	1980 Departure From Normal	1981 Average Temp. (°F)	1981 Departure From Normal	1981 Departure From 1980
Hunter Plant	49.2	+3.4	51.3	+5.5	+2.1
Huntington Plant	46.5	-1.2	51.5	+3.8	+5.0
Electric Lake	33.7	-0.4	35.9	+2.0	+2.4
Average Departure From Normal		+1.7		-0.4	+3.2

Temperatures averaged 3.2° higher for the three locations in 1981 than the temperatures recorded in 1980.

WATER MONITORING PROGRAM

Utah Power & Light Company collected flow and water quality data pertaining to (1) surface drainage systems; (2) East Mountain springs; (3) and from the Utah Power & Light Company coal mines. These data have been collected and interpreted in the following sections of this report. All raw data are included in Appendices A through L.

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). These 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 to the Green River.

HUNTINGTON CREEK DRAINAGE SYSTEM

The Huntington Creek is comprised of many smaller tributary streams that feed the main stream. Deer Creek is the only tributary to Huntington Creek that emanates from within Utah Power & Light's coal mine areas. Data concerning Huntington Creek are addressed, followed by a discussion of Deer Creek.

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 is located 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.

The Utah Power & Light station near the plant was established in the fall of 1973. Prior flow records were obtained from the U. S. Geological Survey Station located about one mile downstream from Utah Power & Light's existing station. The U. S. Geological Survey Station was established in 1909, was discontinued in 1970 and was re-established in 1978. The Utah Power & Light station below Electric Lake was established in 1970 in order to determine available water supply for Electric Lake Dam. The dam was completed in December 1973 and water storage commenced shortly afterward.

The following table (Table 5) shows a summary of actual Huntington Creek flows below Electric Lake, 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 1981 water year (October 1980 - September 1981) at the two stations plus the calculated natural flow are found in Appendix A.

TABLE 5: HUNTINGTON CREEK WATER FLOWS (1981 WATER YEAR)

	Huntington Creek Below Electric Lake	Huntington Creek At Plant	Calc. Natural Flow At Plant
Total Yearly Flow (Ac. Ft.)	12,220	45,640	53,191
% Of Normal	56*	65*	75
Average Discharge In Cubic Feed Per Second (CFS)	16.9	63	73
Peak Discharge (CFS)	43.0	190	201
Date of Peak Discharge	Sept. 23, 1981	July 11, 1981	July 11, 1981
Minimum Discharge In CFS	13.0	8.1	13.0
Date of Minimum Discharge	Oct. 31, 1980	Dec. 8, 1980	Dec. 8, 1980

* Due to upstream storage in Electric Lake

During the 1981 spring runoff period (April thru June) approximately 3,140 acre feet of water was impounded behind Electric Lake Dam. During spring runoff the dam reached its' heighest level on June 13. Total storage on this date amounted to 28,079 acre feet which was 3,193 acre feet below full capacity. Inflows to Electric Lake during 1981 were the second lowest since the dam was constructed in 1973. Reservoir releases for the fishery and Huntington Plant needs during the summer period dropped the lake to 24,075 acre feet by September 30, 1981.

A comparison of runoff values from 1980 and 1981 is presented in Table 6 to demonstrate the great fluctuation in surface discharges from year to year.

TABLE 6: COMPARISON OF 1980 AND 1981 RUNOFF VALUES

	Amount	% Of Normal	Amount	% Of Normal	% Of 1980
Spring Runoff Stored In Electric Lake (Ac. Ft.)	10,000*	107	3,140	31	31
Calculated Natural Flow At Plant (Ac. Ft.)	98,000	140	53,191	75	54
Actual Peak **Discharge At Plant (CFS)	824 (June 11, 1980)	---	190 (July 11, 1981)	--	23

*In addition to 10,000 acre feet of water stored, approximately 12,000 acre feet of water spilled over the spillway during the runoff period.

**Peak flow is the maximum daily flow recorded during the year.

An examination of Table 2 indicates that precipitation recorded at Electric Lake and Huntington Plant during 1981 averaged 65 percent of the 1980 values while natural flow runoff for 1981 was only 54 percent of 1980 (Table 6).

The similarity of deficient precipitation corresponding to low runoff becomes evident in this analysis.

Water quality information on Huntington Creek was compiled on a monthly basis during 1981. Utah Power & Light's Environmental Department conducted the sampling program and the analyses were performed by Standard Labs, Huntington, Utah. The location of water quality sampling stations on Huntington Creek that were considered for this report are listed on the next page (refer to Map #1).

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 7. Values are in milligrams per liter unless otherwise noted. Raw data can be found in Appendix B.

TABLE 7: HUNTINGTON CREEK WATER QUALITY (1981 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.)	7.7	8.9	7.0	8.1	8.5	7.2	8.3	9.5	7.5	8.3	8.8	8.0
Diss. Oxygen	7.4	9.1	3.9	7.9	12.2	6.4	11.1	13.1	8.2	10.0	13.1	6.7
Sulfate	---	---	---	---	---	---	101	189	15	146	221	37.5
Susp. Solids	2.9	15.0	0.9	12.5	85.0	1.0	28.4	64.5	4.5	88.8	821	1.0
Diss. Solids	175	251	135	209	280	153	262	448	170	336	430	229
Spec. Cond. (umhos)	300*			300*			379	620	300	502	710	350
Turbidity (FTU)	1.2	2.5	0.4	7.6	63.0	1.0	---	---	---	---	---	---
Alkalinity (TOT)	---	---	---	---	---	---	158	227	89	186	240	93
Hardness	---	---	---	---	---	---	250	308	181	304	398	210

*1 analysis during the year

In general, the water shows a gradual increase in the concentration of dissolved and suspended minerals as the flow proceeds down Huntington Canyon.

The values at the station below Electric Lake do not express the actual natural drainage water quality characteristics 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 1980 and 1981 is presented in Table 8. 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 8: HUNTINGTON CREEK WATER QUALITY 1980-1981

Parameter	Below Electric Lake		Right Fork Above Left Fork		Above Power Plant		Below Power Plant	
	1980	1981	1980	1981	1980	1981	1980	1981
pH (N.U.)	8.0	7.7	8.1	8.1	8.2	8.3	8.2	8.3
Diss. Oxy.	8.2	7.4	8.6	7.9	8.2	11.1	8.4	10.0
Sulfate	---	---	---	---	49.0	101	98.0	146
T. Susp. Solids	3.1	2.9	20.0	12.5	13.9	28.4	31.0	88.8
T. Diss. Solids	165	175	210	209	248	262	346	336
Spec. Cond. (umhos)	353	300	377	300	404	379	538	502
Turbidity (FTU)	1.4	1.2	2.1	7.6	---	---	---	---
Alkalinity (TOT)	---	---	---	---	185	158	193	186
T. Hardness	---	---	---	---	293	250	355	304

An examination of Table 8 indicates that the values for 1980 and 1981 are fairly consistent and uniform in comparison. Dissolved oxygen, sulfate, suspended sediment, and total hardness values were somewhat higher in 1981, while other constituents were about the same.

DEER CREEK

Deer Creek is a tributary to Huntington Creek and flows from the same canyon in which the Deer Creek Mine is located. Three water samples were obtained during the year from this tributary at locations above and below the mine. In all cases, samples were taken above and below the Deer Creek Mine within an hour interval. The sample point below the mine is located below all disturbed areas and at a point 5500 feet below the sampling point above the mine. The creek flows through an underground culvert through the disturbed area. Only estimated flow data was obtained, this information is typed on the individual analysis in Appendix C. The results of the analysis and the comparison with average historical values are shown in Table 9. Values are in milligrams per liter unless otherwise noted. Where more than one sample was collected, the values represent the averages of those samples. Additional raw data can be found in Appendix C.

TABLE 9 : DEER CREEK SURFACE WATER QUALITY (HISTORICAL TO 1981)

PARAMETER	EFFLUENT LIMITATIONS (Maximum Allowable)	HISTORICAL		1981			
		ABOVE THE MINE	BELOW THE MINE	# OF SAMPLES*	ABOVE THE MINE	# OF SAMPLES*	BELOW THE MINE
pH	6.0 - 9.0	7.8	7.7	3	8.3	2	8.25
Conductivity	-	555	702	3	633	2	1575
Total Dissolved Solids	-	335	441.8	3	.67	2	990
Total Suspended Solids	70.0	1103.62	4,422	3	1.67	2	4.0
Iron Total	7.0	8.2	34.2	3	.13	2	.165
Manganese	-	0.146	.162	3	.01	2	.02

* The samples were collected on the following dates: May 19, June 11, July 21. As of July 21, 1981, the "Below The Mine" location was dry. "Above The Mine" at this time was producing approximately <5 gallons per minute. Due to lack of moisture received during the winter of 1980-81, this in turn caused the water flowing above the mine to be absorbed in the soil or evaporation to take place before the water could reach the lower sampling location. The upper location ceased to flow at the end of July, 1981.

An examination of Table 9 indicates that the data for 1981 follows closely with the historical data, except for total suspended solids, iron and magnesium, in which these parameters show a considerable decrease for both locations. A note worthy point is that all the parameters tested for both locations fall well within set effluent limitations.

COTTONWOOD CREEK DRAINAGE SYSTEM

The western and southern portions of East Mountain are intersected by Cottonwood Creek and its associated tributaries, including Grimes Wash. The Cottonwood Creek drainage is about equal in size to the Huntington drainage and total discharge from each drainage is about 70,000 acre feet per year. The major structural feature on Cottonwood Creek is the Joe's Valley Reservoir which is located about 12 miles west of the town of Orangeville. The 63,000 acre foot reservoir was constructed by the U. S. Bureau of Reclamation and provides storage water for irrigation, industrial and municipal needs in the Emery County area.

Limited flow information for 1981 was acquired from the Emery Water Conservancy District and the Cottonwood Consolidated Irrigation Company. Joe's Valley storage on September 30, 1981 was 50,250 acre feet, which represents a net decrease of 8,150 acre feet for the water year.

Joe's Valley Reservoir reached its' highest storage capacity of 53,920 acre feet active capacity on June 1, 1981, and no spill occurred past existing downstream diversions. Total storage water used amounted to about 6,588 acre feet while total natural flow utilized was equal to 27,800 acre feet. Total runoff from the Cottonwood Creek drainage during the 1981 water year was equal to about 34,000 acre feet which was about 45% of the runoff during the 1980 year.

COTTONWOOD CREEK

Cottonwood Creek continued to be sampled by UP&L in the vicinity of the proposed Cottonwood Portal (located near the Trail Mountain Mine) during 1981. Four sets of samples consisting of samples taken above and below the Trail Mountain Mine, in Cottonwood Canyon, at the USGS Flume and above the confluence with Straight Canyon, were collected during the period January through December, 1981. Since July, 1980 sampling has and will continue on a quarterly basis. Table 10 is a tabulation of the average values for water samples collected for 1981 compared to the historical average. Complete inorganic analysis of water samples can be found in Appendix D. Location of the sample stations is shown in the Appendix, Map 1.

Maximum flow occurred during the month of December with the flow of 763 gallons per minute (GPM) or 1.7 cubic feet per second (CFS). This was a result of the heavy precipitation which occurred during the latter part of September, refer to the East Mountain weather station information on page 6. The minimum flow occurred during the months of August and September with a flow of <40 GPM or <.09 CFS. This is due to the low amount of precipitation which occurred during the spring and summer months of 1981. Average flow for 1981 was approximately 229 GPM or 0.51 CFS.

GRIMES WASH

Only estimated flow data was obtained for all three Grimes Wash locations for 1981. The flow information can be found on the individual Analysis in Appendix E. The number of samples and quality can be found in Table 11. The sampling locations are: Left Fork, Right Fork and Below the Mine. All three locations are shown on Map 1 in the Appendix. The

TABLE 2: COTTONWOOD CREEK WATER QUALITY

Parameter	Above The Mine		Below The Mine		U.S.G.S. Flume		Above Straight Canyon	
	Historical	1981	Historical	1981	Historical	1981	Historical	1981
Acidity	9.17	<0.75	8.09	0.75	7.33	0.75	6.67	0.75
Alkalinity	281.3	279.7	267.18	281.48	267.60	269.20	211.55	292.58
Arsenic	0.002	<0.0005	0.0165	0.0006	0.016	0.0005	0.016	0.0006
BOD_5	1.18	1.43	<1.33	8.50	1.11	2.08	1.42	2.88
Bicarbonate	340.9	341.3	326.66	343.30	326.47	319.10	343.49	349.33
Cadmium	0.002	<0.005	0.003	0.005	0.002	<0.005	0.002	<0.005
Calcium	76.0	90.15	81.80	88.15	72.31	85.18	78.92	90.55
Chloride	12.87	13.75	11.96	14.80	11.34	14.60	13.82	20.50
Fluoride	0.16	0.22	0.17	0.22	0.15	0.24	0.15	0.24
Iron	0.57	2.57	0.74	4.11	0.82	4.88	0.84	5.06
Lead	0.005	<0.013	<0.002	<0.013	0.005	<0.013	0.005	0.013
Fecal: Coliform	33.5	2.25	11.54	2.50	24.77	3.75	20.31	2.50
Total: Coliform	301.6	3.75	196.08	34.75	588.54	50.25	548.00	25.25
Magnesium	27.78	37.5	28.72	43.20	30.06	40.63	30.72	48.23
Manganese	0.02	0.08	0.053	0.08	0.04	0.08	0.038	0.068
Nitrite (NO_2-N)	0.013	<0.002	<0.03	<0.002	0.014	<0.002	0.014	<0.002
Oil and Grease	3.22	<0.44	2.68	0.07	15.83	1.68	10.90	1.15
Phosphate: Ortho	0.06	<0.0027	0.048	0.007	0.07	0.003	0.44	0.006
Potassium	2.25	7.5	6.16	4.60	3.12	3.58	3.40	4.88
Selenium	0.006	0.0003	0.025	0.0003	0.003	0.0004	0.017	0.003
Silica	7.56	8.73	8.30	8.58	7.66	8.15	7.95	8.98
Sodium	26.41	38.73	25.20	30.85	23.36	31.13	24.39	41.70
Sulfate	66.10	184.20	77.90	175.15	68.81	162.20	87.90	207.95
TSS	16.16	25.00	23.50	48.00	34.04	46.00	155.46	23.50
TDS	391.15	399.50	405.30	386.50	371.00	370.88	407.54	484.25
TKN	0.17	0.20	0.27	0.21	0.145	0.09	0.16	0.27
Zinc	0.02	0.08	0.038	0.081	0.036	0.10	0.05	0.08
pH	7.64	8.15	7.70	8.13	7.76	8.30	7.86	8.30

TABLE 11: GRIMES WASH SURFACE WATER QUALITY (HISTORICAL TO 1981)

	Left Fork				Right Fork				Below The Mine			
	Historical		1981		Historical		1981		Historical		1981	
Parameter	# Of Samples	Average	# Of Samples	Average	# Of Samples	Average	# Of Samples	Average	# Of Samples	Average	# Of Samples	Average
pH	1	8.7	4	8.2	7	8.11	2	8.35	5	8.06	3	8.15
Conductivity	0	---	4	682.5	2	685	2	650	2	745	3	970
TDS	1	327	4	453	6	473.2	2	427	5	347	3	610
TSS	1	28.2	4	4.75	6	585	2	24.0	5	438.8	3	6.38
Iron Total	1	.81	4	.22	6	3.18	2	.15	5	4.97	3	.03
Manganese	0	---	4	.03	2	.20	2	.02	2	.20	3	.02

The samples were collected on the following dates: May 26, June 11, July 20, August 20. As of July 20, the Right Fork location was dry. The last significant flow for the Left Fork occurred on August 20. It is note worthy to point out that the flow figures for the "Below" location not only include the Right and Left Forks, but also include water that is discharged from the Wilberg Mine. This accounts for the increase in flow at this location.

sampling point, which is below the disturbed area, is located approximately 3,000 feet downstream from the upper most sampling point - Right Fork. The water flows through an underground culvert for 1,800 feet of the distance between the upper and lower sampling locations.

Table 11 shows the water quality to be relatively unchanged between points, along with only a slight variation when compared to the historical data.

EAST MOUNTAIN SPRINGS

The 1981 water reconnaissance program of East Mountain Springs was initiated in July with routine sampling and flow measurements of the springs identified in 1979-1980 and previous years. A small number of springs representing a wide range of flows and locations were sampled a second time in October.

As in 1980, emphasis has again been placed on water chemistry rather than water quality. Cation and anion concentrations were measured and presented as diagrams to help determine the inter-relationships of the springs.

In the 1980 annual water report a geologic description of each spring was presented in detail. This information will serve as a reference guide for all future water reports. In the case of a new spring or springs is identified a geologic description will be explained at that time.

SPRING FLOW

Due to the lower than normal precipitation received during the winter and spring, discharges measured in 1981 were considerably lower than the measurements from 1980. Table 12 is a tabulation of the flow data collected during the 1981 season. A number of springs were monitored more than once to record the seasonal variation.

TABLE 12: EAST MOUNTAIN SPRINGS DISCHARGES

Spring	Date Sampled	Flow (GPM)	°F Temperature	Date Sampled	Flow (GPM)	°F Temperature
Sheba	7-1-81	10.7	50°	11-3-81	2.8	49°
Elk Spring	7-1-81	145.4	38°	11-4-81	60.0	39°
Burnt Tree	7-1-81	9.2	45°	11-3-81	5.0	49°
Right Fork Grimes Wash	7-1-81	51.6	49°			
Pine Springs	7-2-81	2.6	42°	11-4-81	Dry	
Pine Spgs Trough	7-2-81	6.9	42°	11-4-81	Dry	
Cove North	7-2-81	6.9	42°			
Ted's Tub	7-2-81	27.3	40°	11-4-81	2.2	39°
79-1	7-1-81	28.3	45°	11-4-81	5.1	39°
79-2	7-1-81	10.0	41°			
79-3	7-1-81	2.6	50°			
79-4	7-2-81	3.0	42°			
79-5	7-1-81	4.6	44°			
79-6	7-2-81	Dry	--			
79-7	7-3-81	5.0	40°			
79-8	7-3-81	1.7	50°			
79-9						
79-10						
79-11	7-3-81	0.5	40°			
79-12	8-4-81	Dry	--			
79-13	8-4-81	Dry	--			
79-14	8-4-81	Damp	--			
79-15	7-3-81	7.2	42°			
79-16	8-4-81	2-3.0	42°			
79-17	8-4-81	<0.2	--			
79-18	8-4-81	16.0	41°			
79-19	8-4-81	3.5	42°			
79-20	8-4-81	Dry	--			
79-21	8-4-81	Dry	--			
79-22	8-4-81	Dry	--			

Spring	Date Sampled	Flow (GPM)	°F Temperature	Date Sampled	Flow (GPM)	°F Temperature
79-23	7-2-81	0.2	60°			
79-24	7-2-81	6.7	--			
79-25	8-4-81	4.6	52°			
79-26	7-2-81	Sheet Flow	--			
79-27	7-3-81	1.7	42°			
79-28	7-3-81	4.0	40°	11-3-81	3.2	49°
79-29	7-3-81	1.3	40°			
79-30	7-1-81	Damp	--			
79-31	7-2-81	0.4	62°			
79-32	8-4-81	0.45	52°			
79-33						
79-34	7-2-81	2.4	41°			
79-35	8-5-81	0.6	52°			
79-36	8-11-81	Dry	--			
79-37	8-11-81	Damp	52°			
79-38	8-11-81	1.3	44°			
79-39	8-11-81	Dry	--			
79-40	7-2-81	0.13	39°			
80-41	7-2-81	0.4	40°			
80-42	7-2-81	Dry	--			
80-43	7-1-81	Damp	--			
80-44	7-2-81	39.6	44°			
80-45	7-2-81	Damp	--			
80-46	7-2-81	1.6	42°			
80-47	7-2-81	4.6	38°			
80-48	8-4-81	1.8	58°			
80-49	8-4-81	1.3	62°			

A comparison of the 1980 to 1981 discharges from specific and representative East Mountain Springs is presented in Table 13. A summation of flow data for the respective years indicates a decrease in flow of 73% from 1980 to 1981. This correlates to the lower precipitation levels recorded in 1981. Refer to climatology section for records of precipitation and temperature in 1981.

A permanent weather monitoring station was installed on East Mountain by UP&L representatives on October 25, 1980, refer to Map 1 in the Appendix pocket for exact location. The data representing the first complete water year, October 1980 through September 1981, can be found under the climatology section. Information gained from the East Mountain weather station will assist in correlating East Mountain Spring discharge rates with yearly precipitation fluctuations.

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. These percentages have been graphically represented as cation-anion diagrams (see Appendix F). The purpose of the cation-anion diagrams is to identify groups of related springs by water chemistry. These diagrams clearly show the similarity of water quality of springs originating in the same geologic formation. More data will be collected in 1982 to support this hypothesis, and will be used to recognize any additional trends, if possible. The cation and anion diagrams on the following page (Figure 8) are general representatives of the three geologic formations which are present on the East Mountain property, refer to Figure 2 in the 1980 annual water report for stratigraphic locations for each specific formation.

TABLE 13 : EAST MOUNTAIN SPRINGS DISCHARGES 1980 - 1981

SPRING	MEASUREMENT DATE	FLOW (GPM)	MEASUREMENT DATE	FLOW (GPM)	MEASUREMENT DATE	FLOW (GPM)	MEASUREMENT DATE	FLOW (GPM)
Burnt Tree	7-2-80	32.0	7-1-81	9.2	10-9-80	20.0	11-3-81	5.0
Cove North	6-10-80	20.0	7-2-81	6.9				
Elk Springs	6-10-80	583.0	7-1-81	145.4				
Pine Springs	7-2-80	12.0	7-2-81	2.6	10-6-80	Dry	11-4-81	Dry
Pine Sprgs Trough	7-2-80	Dry	7-2-81	6.9	10-6-80	Dry	11-4-81	Dry
Sheba Springs	7-2-80	13.0	7-1-81	10.7	10-16-80	2.0	11-3-81	2.8
Ted's Tub	7-3-80	78.0	7-2-81	27.3	10-6-80	6.0	11-4-81	2.2
79-1	7-2-80	130.0	7-2-81	28.3	10-6-80	12.0	11-4-81	5.1
79-2	7-14-80	7.5	7-1-81	10.0				
79-3	7-14-80	15.0	7-1-81	2.6				
79-11	7-15-80	5.0	7-3-81	0.5				
79-24	7-3-80	60.0	7-2-81	6.7				
79-25	7-15-80	8.0	8-4-81	4.6				
79-28	6-9-80	43.0	7-3-81	4.0	10-9-80	7.5	11-3-81	3.2
79-32	7-15-80	3.0	8-4-81	0.45				
TOTALS.....		1009.5		266.15		47.5		18.3

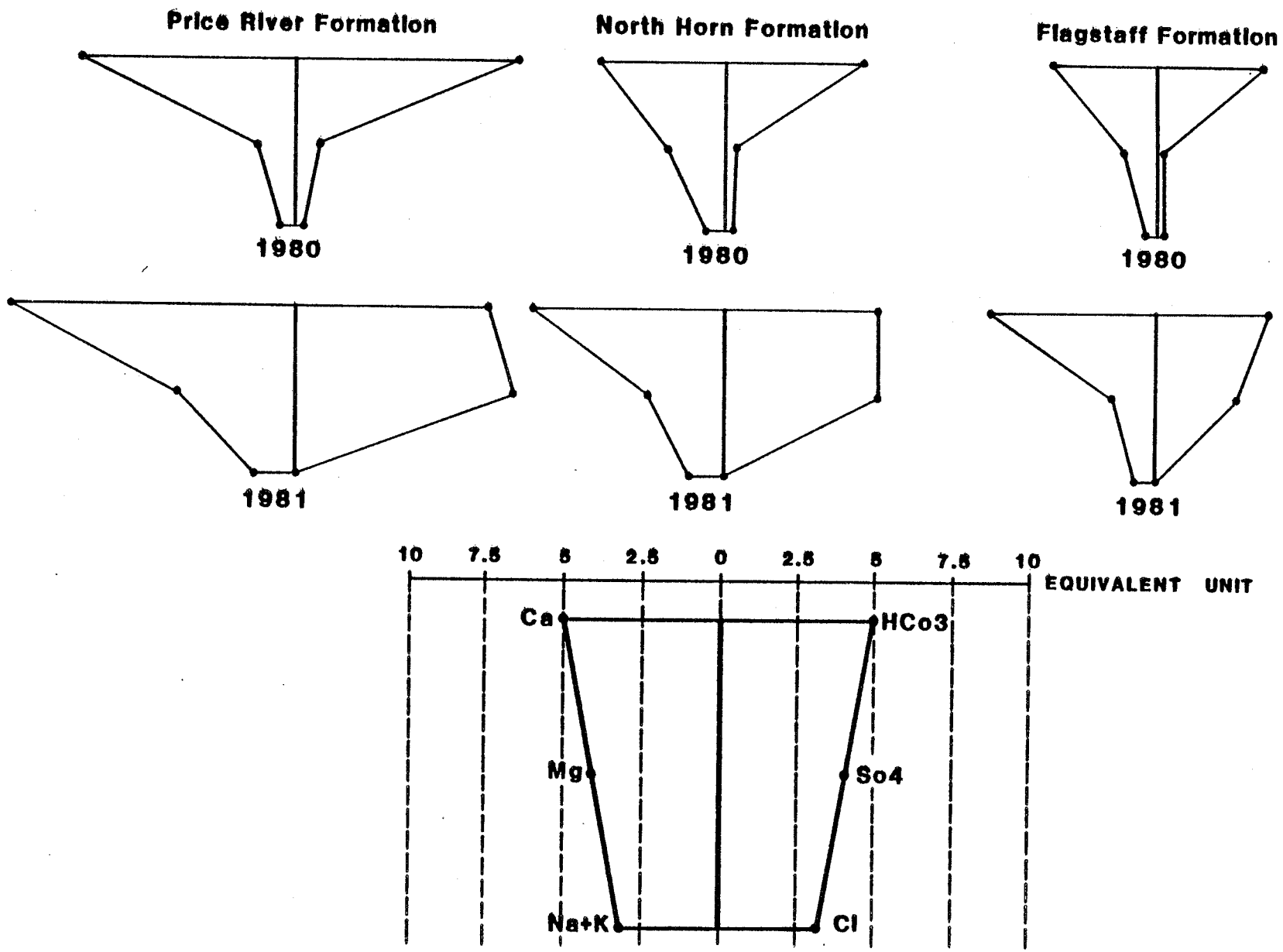


FIGURE 4

GENERALIZED CATION-ANION DIAGRAMS BY GEOLOGIC FORMATION

Wilberg In Mine:
110 mil gal disch + evap
115 Total incl. culinary use

e difference in the cation and anion diagrams shown in Figure 4 1981 is due primarily to the increased sulfate content. The sulfate content corresponds to the rise in total dissolved solids which also occurred during 1981. The lower water flow in 1981 compared with 1980 is felt to have caused these parameters to increase in concentration.

The quality of the springs sampled in 1981 shows no change from samples collected in previous years, except for the increase in the sulfate content as explained earlier. The abundance of calcareous strata in the area caused a high concentration of total dissolved solids in the water. A summary of the average values obtained for a selected group of East Mountain Springs is presented in Table 14. In this table the average values, if more than one sample was taken, are compared to the historical data for each respective spring. The raw data regarding all springs sampled is contained in Appendix G.

MINE WATER

The intensive in-mine water monitoring program initiated by Utah Power & Light in 1977 was continued through 1981. The program was organized so that two samples are taken per quarter for each of the mines which produce water. The following section discusses the data collected and interpretations made regarding the water encountered in UP&L's coal mines.

CHURCH MINES

As mentioned in past annual water reports submitted by UP&L, the mine workings of the Church Mines have been generally dry since the inception of mining, one exception is the 1st North entry of the Little Dove Mine which will be discussed on page 30.

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TABLE 14: EAST MOUNTAIN SPRINGS WATER QUALITY (HISTORICAL TO 1981)

Parameter	Burnt Tree		Elk Springs		Sheba Springs		Ted's Tub		79-28 Flag Lake	
	Historical	1981	Historical	1981	Historical	1981	Historical	1981	Historical	1981
Elevation	9260		9350		9740		9290		9340	
Geologic Formation *	TKN		TKN		TF		TKN		TKN	
pH	7.49	7.7	7.96	7.75	7.88	7.5	7.8	7.9	7.6	7.5
Alkalinity	272.0	266.0	247.0	237.0	254.0	230.5	270.3	256.0	249.0	253.0
Total Suspended Solids	2.42	2.0	3.56	3.0	3.37	1.75	2.6	34.0	4.75	204.3
Total Dissolved Solids	281.0	293.0	251.0	292.0	256.5	309.5	318.5	302.5	389.5	511.0
Sulfate	11.35	101.5	6.2	144.05	3.97	122.65	7.30	94.4	95.7	290.9
Iron	0.54	0.21	0.095	0.20	0.27	0.22	0.085	0.32	0.26	1.25

* TKN = Tertiary North Horn Formation

* TF = Tertiary Flagstaff Formation

The 1st North entry of the Little Dove Mine, which is located in the Deer Creek-Bear Creek Fault graben, intersected minor quantities of water in 1980. Because the occurrence consisted of several damp areas without having areas of noticeable flow, it was not possible to measure the quantity of water flowing into the mine. This condition continued to exist until mid 1981 when overlying fluvial channel sandstone was encountered. Minor quantities of water began to flow, it was estimated by pumping techniques to be less than ten gallons per minute. Because of the minor amounts of water encountered, no water has been discharged.

A sampling program was initiated on October 8, 1981. Two samples per quarter will be collected as long as measurable flow continues. Table 15 represents the water quality results from the Little Dove in-mine quality for 1981. The complete chemical analysis of water samples can be found in Appendix H.

TABLE 15: LITTLE DOVE IN-MINE WATER QUALITY - 1981

Location	Date	pH	Alkalinity	TSS	TDS	SO_4	Flow (GPM)
1st N X 76 2L	10-8-81	7.4	452.0	3.5	1104.0	523.0	.02
1st N X 77 B	10-8-81	7.3	441.0	2.5	1103.0	514.0	.05
1st N X 78 1L	10-8-81	7.6	440.0	3.5	1201.0	557.0	.05
1st N X73 4L	12-9-81	7.2	571.0	4.0	1410.0	704.0	.25
1st N X 80 2R	12-9-81	6.9	576.0	<2.0	1078.0	444.0	.05
$\overline{X}$ (Mean)		7.28	496.0	3.1	1179.2	548.4	.08

As Table 15 establishes, Little Dove in-mine water quality remained relatively constant for 1981.

WILBERG MINE

The Wilberg Mine water monitoring program consisted of measuring flows and collecting water samples for quality analysis of in-mine and discharge waters. Discharge waters are sampled once a month where as in-mine samples are collected on a quarterly basis.

IN-MINE MONITORING

The quality of water flowing into the Wilberg Mine has been monitored since April, 1979. As reported in the 1980 water report the in-mine flow meters were removed when the mine water pumping system was modified. New meters were installed in 1981, but these meters were installed in new locations making it impossible to compare this data to previous years.

The best estimate of in-mine water production was arrived at by combining the values of water leaving the mine and domestic usage. The amount of water discharged from the mine in 1981 was 91 million gallons. It is estimated that an additional 19 million gallons of water evaporated from the mine in 1981. This is based on 570,000 CFM of air being drawn through the mine continuously which averages 45% humidity at a temperature of 50°F on entry into the mine and leaves the mine at 98% humidity. It is likely that some water leaves the mine by flowing downward into the Starpoint Sandstone but this cannot be measured. Therefore, the amount of water leaving the mine in 1981 was about 110 million gallons. The domestic use totalled 5 million gallons. It is therefore estimated that the quantity of water flowing into the Wilberg Mine in 1981 was about 115 million gallons which equates to an instantaneous flow of 220 gallons/minute.

The in-mine water production sources reported in the 1980 year have remained the same for 1981. If an explanation is needed, refer back to the 1980 report.

IN-MINE QUALITY

Several samples were collected in the Wilberg Mine in 1981. Table 16 lists the characteristics of the samples collected, and compares 1981's data to the historical average. It is apparent from Table 16 that the quality of the mine water has remained constant. The complete chemical analysis of water samples can be found in Appendix I.

DISCHARGE

Water produced in the Wilberg Mine is pumped to a primary sump location within the old Wilberg workings by a complex pumping and piping system, Figure 5. The sump, which functions as a settling basin, effectively removes setteable 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 this sump is also used to supply the water treatment plant at the mine which furnishes potable water at the rate of 20 GPM. 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.

The rate of frequency of discharge is dependant upon the water level in the sump. As the sump approaches its' capacity, discharge is initiated until the water is drawn down to a reasonable level.

The total water that was discharged from the Wilberg Mine during 1981 amounted to 279 acre feet or 91 million gallons. This is equivalent to an average instantaneous flow of 0.39 cubic feet per second or 173 gallons per minute. The recorded flow of 279 acre feet during 1981 is slightly lower than the 1980 discharge of 304 acre feet. The average monthly discharges are shown in Figure 6. The asterisk for the months of May through September denotes that this period was estimated from quarterly readings.

TABLE 16 : WILBERG IN-MINE WATER QUALITY

	1st NORTH	1st NORTH	1st NORTH	1st NORTH	3rd EAST	3rd EAST	2nd LEFT	2nd LEFT	2nd LEFT	2nd LEFT	3rd NORTH	HISTOR-ICAL	1981
Location *	1RxC49	1-2LxC66	1LxC68	BxC66	1LxC38	1SxC6	1RxC18	1RxC28	1RxC30	1RxC18	2LxC6	Average	Average
pH	7.6	7.7	7.7	7.8	7.0	7.2	7.2	7.7	7.3	7.3	7.6	7.38	7.46
Alkalinity	192.4	174.0	169.0	169.0	521.9	377.0	343.4	348.6	259.0	269.0	339.0	398.5	287.48
Calcium	126.0	77.5	66.0	118.0	356.0	220.0	210.0	200.0	98.2	110.0	112.0	158.3	154.0
Chloride	10.5	8.4	9.2	9.6	17.7	11.2	10.5	10.8	7.8	9.3	10.2	7.7	10.5
Conductivity	1040.0	890.0	910.0	950.0	2000.0	1000.0	920.0	910.0	620.0	620.0	790.0	1212.9	968.2
Magnesium	47.4	48.0	50.0	26.8	92.5	49.5	50.5	48.0	51.0	54.0	34.0	20.3	50.2
Potassium	4.5	4.0	9.5	10.0	14.5	14.0	14.0	13.5	19.0	15.0	14.0	2.7	12.0
Sodium	28.5	30.5	73.5	43.5	37.5	37.5	36.5	36.5	58.0	52.0	129.0	19.3	51.2
Sulfate	374.6	270.0	369.8	329.2	658.4	460.5	312.8	296.4	269.0	264.0	288.0	226.9	353.8
TDS	697.0	546.0	578.0	587.5	1392.0	795.0	648.0	595.0	494.0	492.0	575.0	692.4	672.7
TSS	1.5	2.0	2.5	1.5	3.0	2.5	1.5	1.0	1.0	< 2.0	<+ 2.0	4.8	1.8

* Example: 1st North 1RxC49 = 1st North, 1st Right Entry, Cross Cut 49.

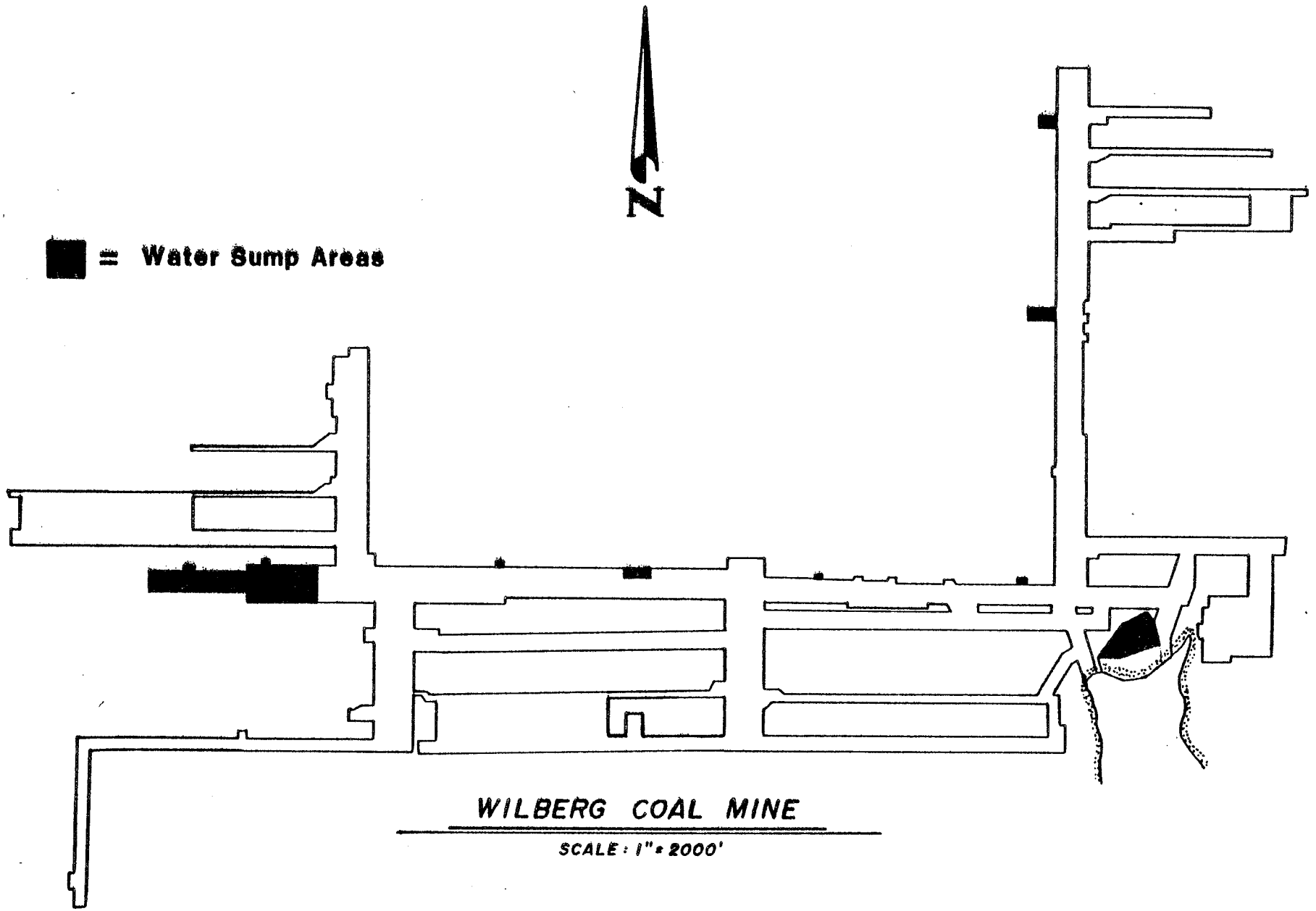

FIGURE 5

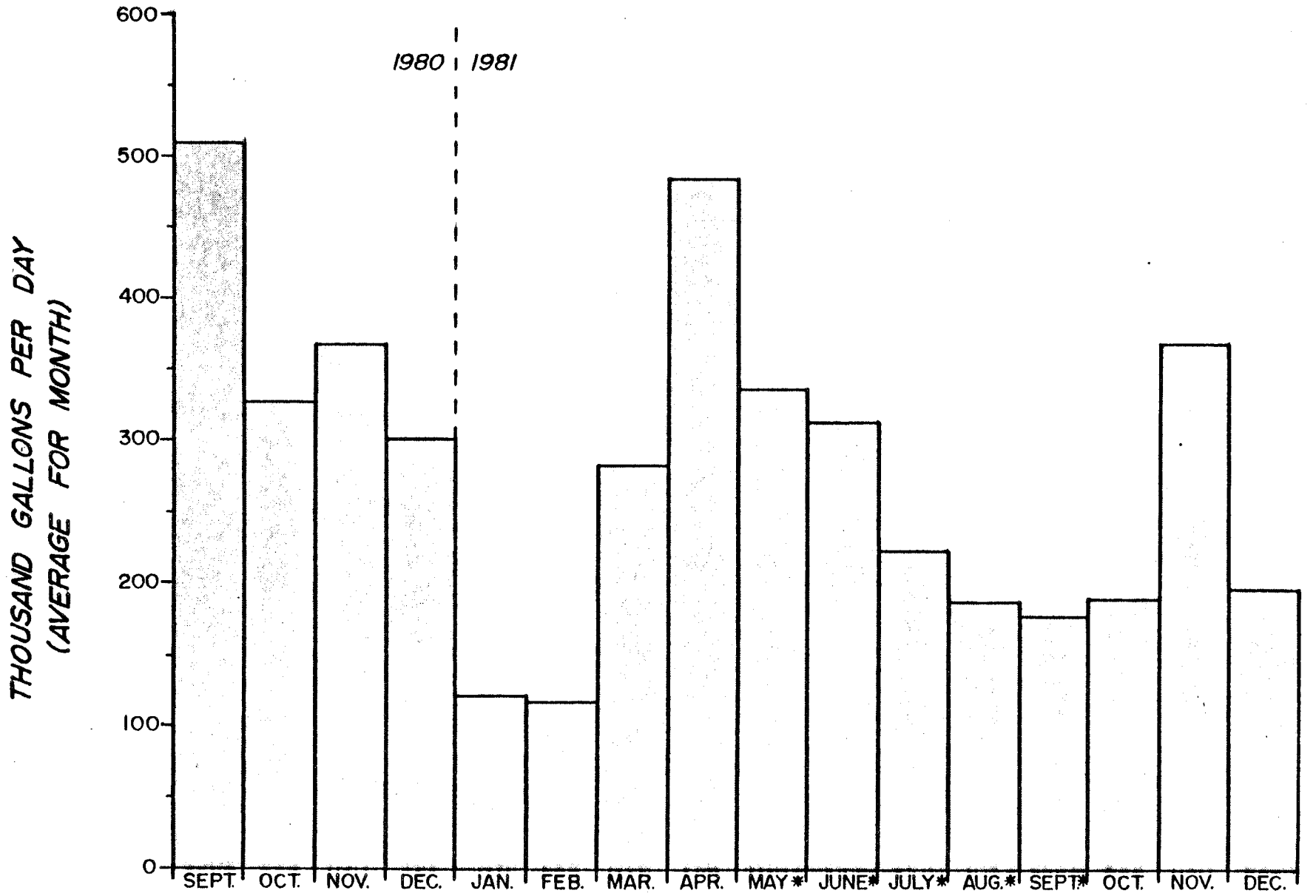

FIGURE 6

1980-1981 WILBERG MINE WATER DISCHARGE

*ESTIMATED
(FROM QUARTERLY READINGS)

During 1981 a drill hole was completed from the Wilberg Mine to the Church Mine complex. This hole was cased and will serve to supply water to the Church Mines for culinary as well as in-mine use. A meter will be installed in this line to measure the amount of water transmitted to the Church Mines. The amount of water transmitted in the future will be included in the total water discharged from the Wilberg Mine.

Monthly water quality samples were collected to insure that water was discharged in accordance with the Wilberg Coal Mine Discharge Permit. Table 17 compares the 1981 average values to the historical values. An examination of Table 17 shows no significant change in quality between samples collected in previous years to 1981. Individual analysis can be found in Appendix J.

DEER CREEK MINE

Because the Deer Creek Mine covers such a large area and has many water producing areas, monitoring water flows into the mine is a most difficult task. However, the current data defines the hydrologic conditions present within the mine.

IN-MINE MONITORING

As is the case in the Wilberg Mine, the majority of water produced within the Deer Creek Mine originates from the roof, in particular those areas having a sandstone top. Water produced from the floor of the mine primarily from the Pleasant Valley Fault. Where the fault is adjacent to the Second South workings of the mine, water flowing from the fault ponds up on the mine floor making it impossible to measure the discharge.

Other water occurrences such as from surface drill hole EM-3 continues to flow water, but at rates that are insignificant in respect to some areas of the mine. The water flow from drill hole EM-3 has stabilized at 10 GPM as was reported in 1979.

TABLE 17: WILBERG MINE - DISCHARGE WATER QUALITY

Parameters	Historical Average	1981 Average
pH	7.5	7.8
Acidity	15.6	<1.0
Alkalinity	272.2	255.1
BOD_5	2.3	0.8
Chloride	14.1	15.9
Coliforms:		
Fecal:	5.2	< 2
Total:	770.0	31.0
Oil & Grease	3.0	2.3
Sulfate	175.2	168.7
TDS	534.2	531.5
TSS	12.4	4.9

The amount of water flowing into the Deer Creek Mine was estimated by measuring the amount of water leaving and consumed in the mine. The amount of water discharged from the mine in 1981 was 125 million gallons, the amount which evaporated is estimated at 70 million gallons and the water consumed in the mine totaled 6 million gallons. Therefore, the water flowing into the Deer Creek Mine is approximately 151 million gallons.

IN-MINE QUALITY

A review of Table 18 indicates a fairly uniform quality of water for the Deer Creek Mine and close similarity to that of the Wilberg Mine. Individual analysis can be found in Appendix K.

DISCHARGE

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 7. The largest volume of water is stored in the western part of First West, an area that has not been actively mined for several years, and the Old McKinnon Mine workings.

The water that is discharged from the mine flows through an oil skimmer and then a recording weir 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 1981 amounted to 384 acre feet or 125 million gallons. This is equivalent to an average instantaneous flow of 0.53 cubic feet per second or 237 gallons per minute. The recorded flow of 384 acre feet during 1981

TABLE 18: DEER CREEK IN-MINE WATER QUALITY

Parameters	3rd South	EM-3	4th Right	4th Right	3rd North	3rd North	Historical	1981 Average
pH	7.3	7.2	7.4	7.2	7.2	7.3	7.54	7.27
Alkalinity	398	422	393	399	480	478	404	428
Calcium	180	160	160	167	140	245	70	175
Chloride	10	10.7	11.4	12	13.1	7.2	10.9	10.7
Conductivity	800	820	1090	1100	730	1700	896	1040
Magnesium	53.0	51.0	52.5	52.5	75.3	79.5	24.5	60.6
Potassium	5.0	4.5	5.0	6.5	5.9	6.5	3.0	5.5
Sodium	31.0	39.0	21.0	22.5	61.0	66.0	28.1	40.1
Sulfate	274	231	249	246	288	576	192.1	310.6
TDS	551	613	625	628	578	982	584.7	662.8
TSS	2.0	2.5	1.0	1.0	5.5	<2.0	6.2	2.3

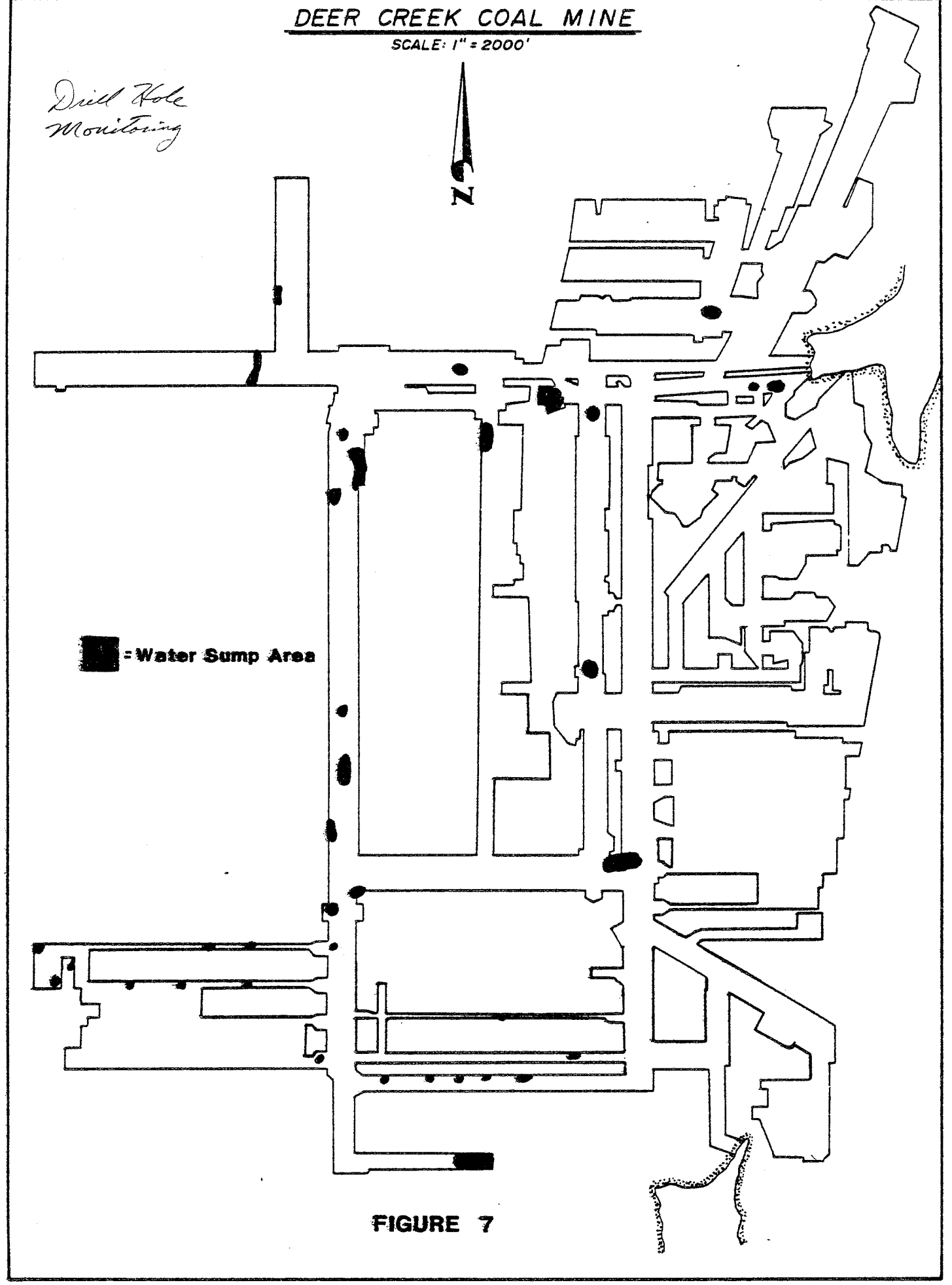
DEER CREEK COAL MINE
SCALE: 1" = 2000'
Drill Hole Monitoring
N
= Water Sump Area

FIGURE 7

is slightly higher than the 1980 discharge of 313 acre feet. The peak discharge was recorded in May, 1981 when it reached 2.2 CFS. The average monthly discharges are shown in Figure 8. The November asterisk denotes that this period was estimated due to an adjustment in the water meter. The meter was only out of adjustment for the month of November.

Monthly water quality samples were collected for 1981. Table 19 compares the 1981 averages to the historical averages. Individual analysis can be found in Appendix L.

DRILL HOLE MONITORING

In 1978, two surface exploration drill holes (EM-47 in Rilda Canyon and EM-31 in Cottonwood Canyon) were developed as permanent water monitoring stations, Figure 9 and Map 2. The two monitoring stations were visited once a month throughout the year with one exception. This exception was due to the winter weather conditions.

Drill hole EM-31 in Cottonwood Canyon was monitored eleven times with the average level at -41.73 feet. The water level in this hole was at its' highest in January and February at -40.7 feet and the lowest point was in October at -42.4 feet. The average level for 1981 compares very close to the 1979 level of -41.6 feet and is slightly lower than the 1980's level of -38.7 feet. Drill hole EM-47 in Rilda Canyon was also measured eleven times during 1981, with the average level of -202.16 feet. The highest water level was recorded in July at -194.8 feet and the lowest in May 15 -228.0 feet. The average 1981 level is the lowest average recorded, with 1979 and 1980's at -188.0 feet and -191.43 feet respectively.

A program developed during 1981 in the Deer Creek Mine included drilling a sequence of holes to determine the peizometric gradient of the west side of the Pleasant Valley Fault. A series of East/West drill holes

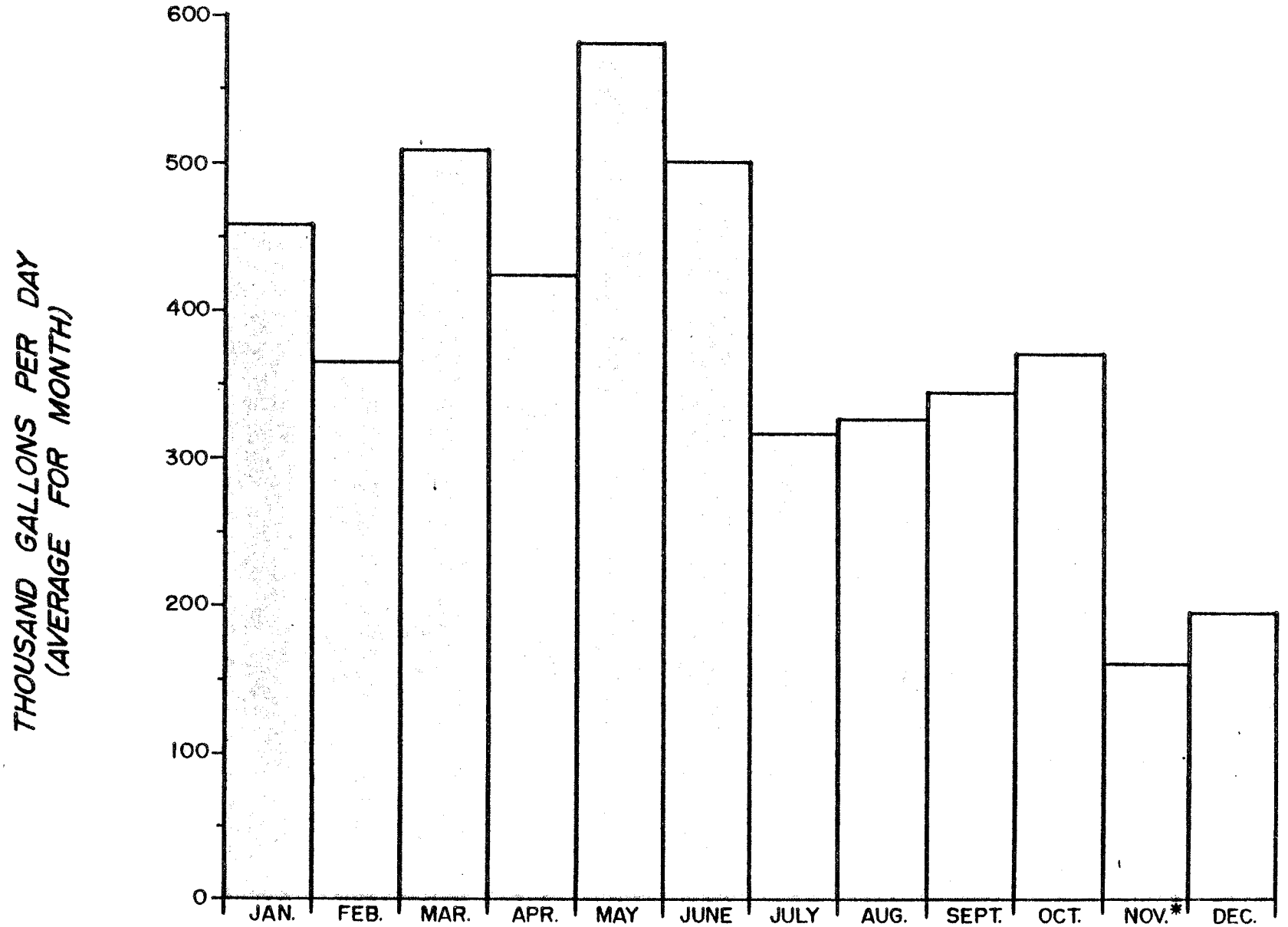

FIGURE 14

1981 DEER CREEK MINE WATER DISCHARGE

*ESTIMATED

TABLE 19 : DEER CREEK MINE - DISCHARGE* WATER QUALITY

PARAMETERS	HISTORICAL AVERAGE	1981 AVERAGE
pH	7.4	7.7
Acidity	20.0	<1.0
Alkalinity	286.0	293.6
Chloride	157.1	15.7
Conductivity	1269.4	870.8
Iron	0.65	0.47
Oil & Grease	2.57	0.84
Sulfate	181.8	211.8
TDS	827.5	579.3
TSS	34.6	15.7

* Used only in the Power Plant Cooling System.

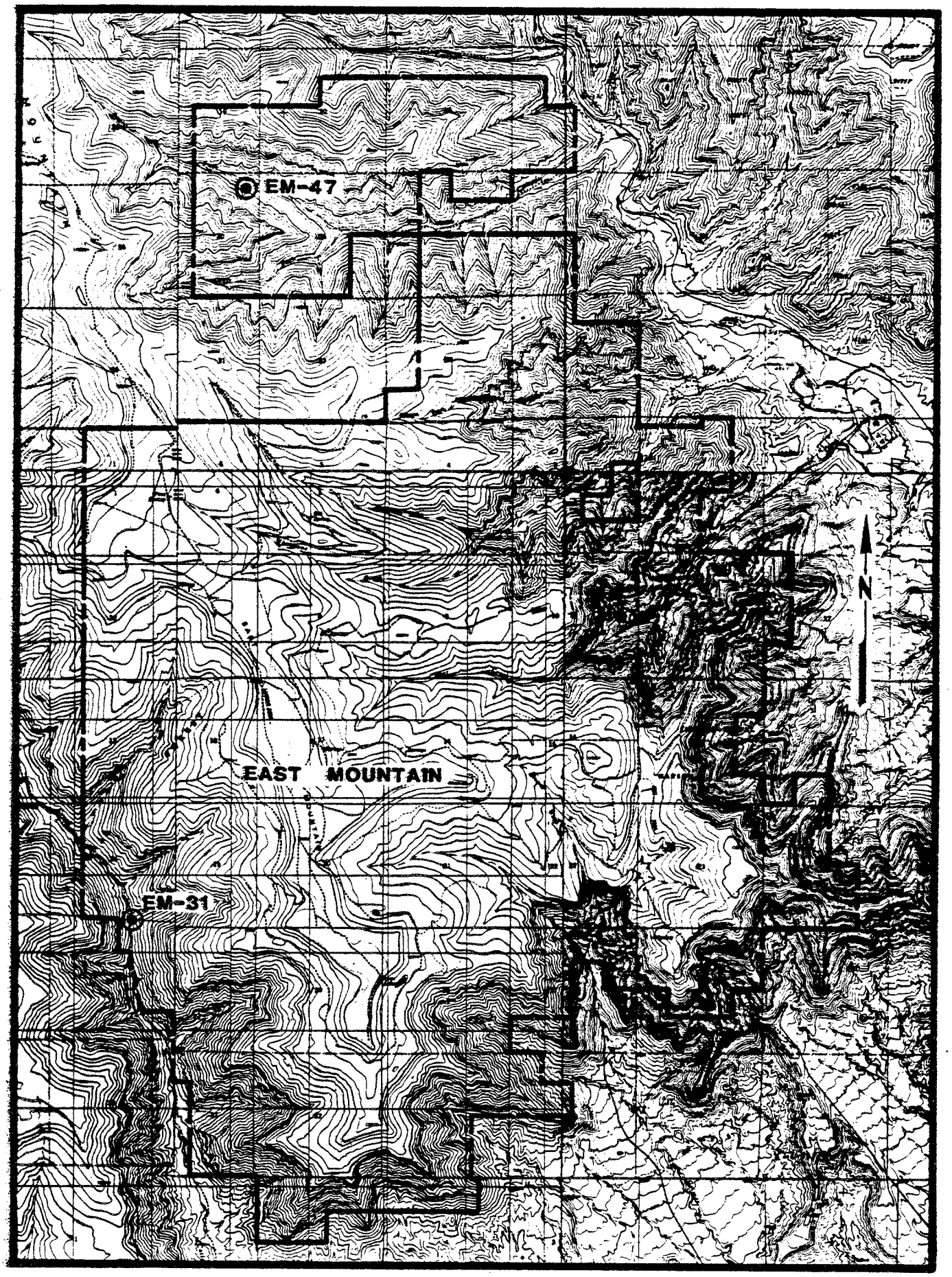

FIGURE 9

Drill Hole Water Monitoring Stations

Scale: 1" = 1 Mile

were completed in late 1981. An additional series of holes in a North/South direction will hopefully be completed during 1981. These holes when completed will be cased and monitored once a quarter. The data collected will be discussed in future reports.

EFFECTS OF MINING AND SUBSIDENCE ON HYDROLOGY

Since the development of the UP&L mining complex on East Mountain, coal in several areas of the property has been extracted causing the partial collapse of the immediate overburden strata. The areas where the partial collapse of roof strata occurs is in areas of retreat mining in room and pillar sections and in areas of longwall mining. The areas of East Mountain where partial roof collapse has occurred are shown in Figure 10.

Subsidence of the land surface may have occurred in some areas underlain by partially caved mine workings. In one area underlain by the Deer Creek longwall sections up to 2.8 feet of subsidence has occurred. No other subsidence has been observed within the property. Two springs are present adjacent to this area, these are 79-23 and 79-24. A comparison of the discharge of these springs from previous years to 1981 shows a significant decrease which is proportional to the general decrease in spring flow for all springs on East Mountain in 1981 due to the low precipitation which occurred in the year.

The springs and surface waters above all areas of mine workings are being monitored closely to measure the affects 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.

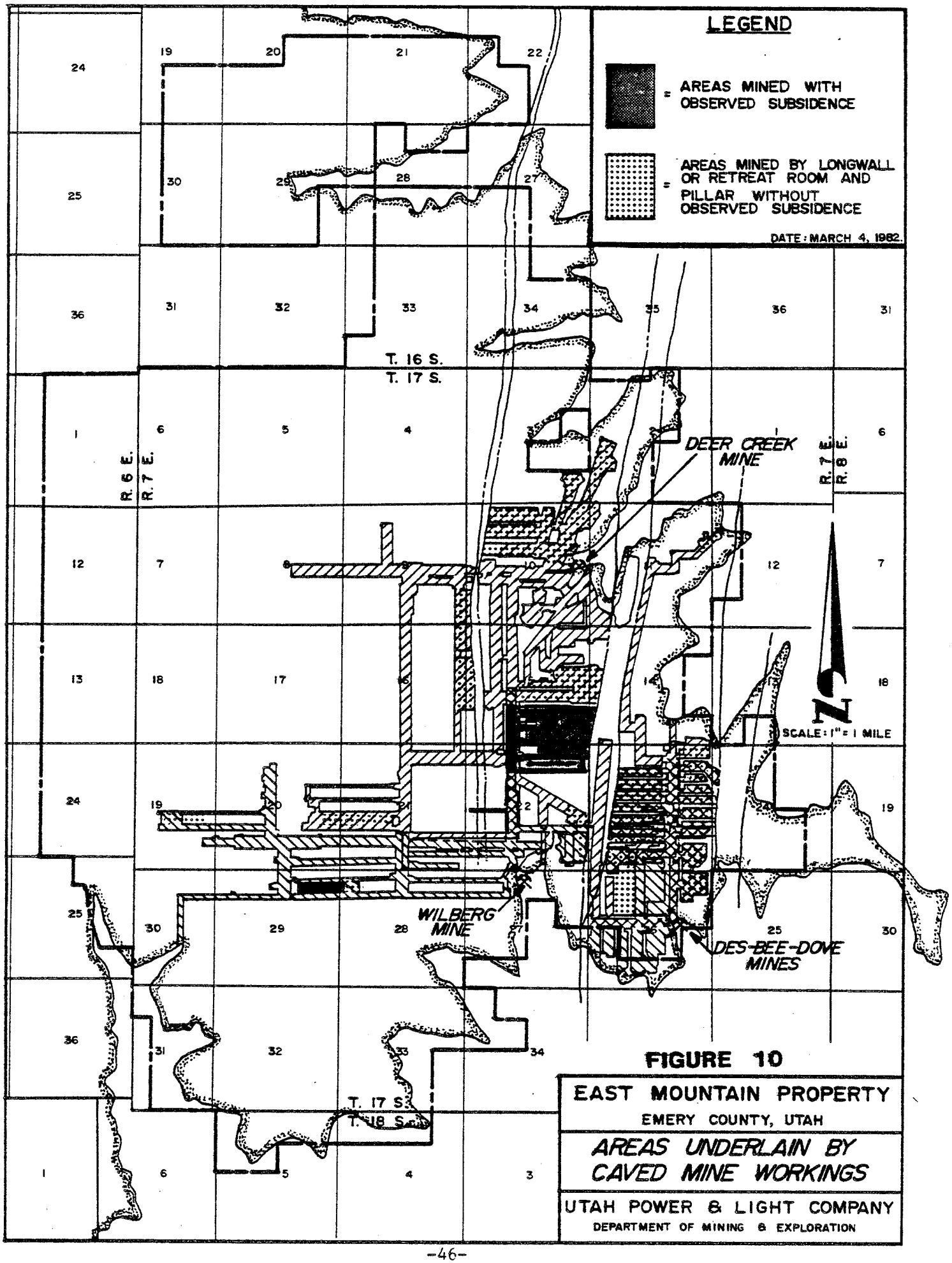

FIGURE 10

EAST MOUNTAIN PROPERTY

EMERY COUNTY, UTAH

AREAS UNDERLAIN BY CAVED MINE WORKINGS

UTAH POWER & LIGHT COMPANY

DEPARTMENT OF MINING & EXPLORATION

SUMMARY AND CONCLUSIONS

Utah Power & Light Company has been conducting a water monitoring program in the area of their underground coal mines in Emery County, Utah in accordance with regulations set forth in Section 30 CFR 211 of the Coal Mine Operating Regulations of 1977. This program has been in existence since 1977 and this is the fourth annual report submitted concerning hydrology.

Unusually low precipitation throughout 1981 caused low runoff in all drainages on and around East Mountain and low discharges of springs. Water quality for 1981 when compared to the historical averages appears unchanged.

The springs on East Mountain were studied in detail to determine the geologic conditions affecting each spring. As reported in the 1980 report, four main modes of spring occurrence have been identified on East Mountain. These are: 1) the base of the Flagstaff Limestone, 2) fluvial channels within the North Horn Formation, 3) the base of the North Horn Formation, and 4) the Roans Canyon Fault graben. The chemistry of the spring water was also studied to determine springs which appear to share the same water source. The data collected in 1980-81 clearly shows a similarity of water quality of springs originating in the same geologic formation. Spring chemistry data which will be collected in 1982 will help to further this hypothesis. A general cation/anion diagram for each geologic formation was presented along with individual spring diagrams.

The first complete year of data from the East Mountain weather station was included in this years report. In the future this information will be used to help correlate annual spring discharges to the amount of precipitation received for the water year.

The in-mine water monitoring program continued in 1981 as in previous years. Each mine which produces water is sampled once a quarter. The Little Dove Mine, which is part of the Church Mine complex, encountered an overlying fluvial channel which produced approximately 10 gallons of water per minute. A sampling program was initiated consisting of 2 samples taken per quarter. This program will continue as long as this condition exists.

The mining activities on East Mountain apparently have not affected the hydrologic regime. Close monitoring of all surface and subsurface waters on East Mountain has revealed flow trends which are related to seasonal climatic trends, but no apparent mining related changes have been observed.

It is proposed that Utah Power & Light Company continue its' water monitoring program as has been done since 1977 with the exception of the following changes:

1) After springs on East Mountain have been related one with another by the geologic conditions and water chemistry, representative springs of each group will be monitored instead of all springs currently identified.

APPENDIX A

UTAH POWER & LIGHT COMPANY
RESERVOIR RECORDS

STATION ELECTRIC LAKE
DATE OCT80-SEPT81

DAILY CONTENTS (ACRE FEET)
MONTHS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	28912.	27984.	27376.	26741.	26160.	25573.	25067.	25891.	27624.	27014.	26754.	25887.	1
2	28929.	28010.	27355.	26721.	26140.	25561.	25052.	26031.	27725.	27384.	26725.	25843.	2
3	28772.	27939.	27334.	26704.	26116.	25546.	25035.	26176.	27801.	27746.	26692.	25759.	3
4	28728.	27972.	27313.	26684.	26099.	25534.	25021.	26257.	27857.	27717.	26659.	25756.	4
5	28689.	27955.	27292.	26663.	26075.	25518.	25005.	26326.	27908.	27678.	26623.	25732.	5
6	28649.	27933.	27271.	26647.	26055.	25506.	24990.	26382.	27946.	27657.	26586.	25692.	6
7	28614.	27912.	27250.	26627.	26031.	25494.	24974.	26419.	27989.	27624.	26553.	25650.	7
8	28575.	27891.	27229.	26610.	26011.	25478.	24958.	26459.	28014.	27590.	26520.	25613.	8
9	28527.	27859.	27208.	26590.	25991.	25467.	24939.	26484.	28035.	27569.	26484.	25569.	9
10	28497.	27849.	27189.	26569.	25971.	25451.	24943.	26520.	28053.	27543.	26504.	25510.	10
11	28449.	27827.	27167.	26553.	25947.	25439.	24947.	26573.	28066.	27522.	26488.	25447.	11
12	28436.	27823.	27146.	26533.	25927.	25419.	24955.	26602.	28074.	27501.	26472.	25398.	12
13	28406.	27806.	27125.	26512.	25907.	25404.	24958.	26623.	28079.	27468.	26447.	25325.	13
14	28376.	27784.	27104.	26495.	25887.	25384.	24952.	26651.	28079.	27438.	26419.	25259.	14
15	28353.	27759.	27084.	26476.	25863.	25358.	24956.	26653.	28079.	27405.	26419.	25192.	15
16	28332.	27739.	27063.	26455.	25843.	25349.	24990.	26696.	28074.	27376.	26394.	25133.	16
17	28298.	27717.	27042.	26439.	25823.	25333.	25036.	26725.	28070.	27346.	26382.	25071.	17
18	28268.	27691.	27022.	26419.	25803.	25313.	25087.	26745.	28061.	27313.	26366.	24986.	18
19	28242.	27665.	27001.	26403.	25780.	25298.	25122.	26766.	28057.	27279.	26338.	24924.	19
20	28229.	27645.	26980.	26382.	25760.	25278.	25130.	26632.	28044.	27233.	26305.	24885.	20
21	28207.	27619.	26960.	26362.	25740.	25258.	25137.	26859.	28031.	27200.	26277.	24799.	21
22	28182.	27592.	26939.	26346.	25720.	25243.	25153.	26906.	28014.	27163.	26261.	24723.	22
23	28164.	27594.	26918.	26326.	25696.	25223.	25196.	26943.	27997.	27121.	26233.	24642.	23
24	28143.	27586.	26898.	26305.	25676.	25208.	25266.	26980.	27980.	27080.	26204.	24565.	24
25	28113.	27569.	26877.	26289.	25656.	25188.	25357.	27022.	27955.	27038.	26172.	24485.	25
26	28104.	27552.	26856.	26269.	25633.	25172.	25431.	27109.	27942.	26997.	26132.	24401.	26
27	28087.	27527.	26836.	26253.	25613.	25153.	25502.	27200.	27916.	26955.	26087.	24317.	27
28	28066.	27510.	26815.	26233.	25593.	25137.	25577.	27300.	27891.	26914.	26047.	24238.	28
29	28044.	27485.	26795.	26212.	0.	25118.	25660.	27392.	27861.	26873.	26011.	24154.	29
30	28023.	27464.	26774.	26196.	0.	25102.	25791.	27472.	27831.	26832.	25975.	24075.	30
31	28002.	0.	26754.	26176.	0.	25083.	0.	27552.	0.	26791.	25931.	0.	31
MONTHLY CHANGE	-972.	-538.	-710.	-578.	-583.	-510.	708.	1761.	279.	-1040.	-860.	-1856.	

OCT80-SEPT81 TOTAL CHANGE -4899. MAX CONTENTS 29045. AC FT SEP 28 MIN CONTENTS 24075. AC FT SEP 30

TOTAL CHANGE MAX CONTENTS MIN CONTENTS

REMARKS:

UTAH POWER & LIGHT COMPANY
STREAM DISCHARGE RECORDS

STATION HUNTINGTON PLANT MAKE-UP WATER (DIVERSION FROM HUNTINGTON CREEK)
DATE OCT80-SEPT81

DAILY DISCHARGE (CFS)
MONTHS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	12.00	24.00	14.00	15.00	21.00	9.30	17.00	4.10	5.20	28.00	24.00	12.00	1
2	24.00	25.00	19.00	16.00	21.00	9.90	16.00	3.40	5.20	28.00	24.00	12.00	2
3	24.00	25.00	18.00	16.00	17.00	10.00	15.00	3.40	5.20	28.00	24.00	12.00	3
4	22.00	26.00	17.00	17.00	20.00	11.00	14.00	3.40	5.20	28.00	24.00	12.00	4
5	26.00	24.00	17.00	17.00	9.30	13.00	14.00	4.10	5.20	28.00	24.00	12.00	5
6	26.00	22.00	16.00	17.00	9.30	15.00	13.00	4.10	5.20	28.00	24.00	12.00	6
7	26.00	21.00	15.00	15.00	9.30	17.00	12.00	4.10	8.60	28.00	24.00	12.00	7
8	24.00	19.00	15.00	15.00	9.30	17.00	11.00	3.40	8.60	28.00	25.00	21.00	8
9	24.00	17.00	14.00	15.00	9.30	17.00	9.80	3.40	8.60	28.00	25.00	21.00	9
10	24.00	16.00	15.00	15.00	9.30	17.00	8.90	3.40	9.70	28.00	25.00	21.00	10
11	22.00	14.00	17.00	15.00	9.30	17.00	7.90	3.40	22.00	28.00	25.00	21.00	11
12	22.00	12.00	18.00	15.00	9.30	17.00	7.80	3.40	22.00	14.00	24.00	21.00	12
13	17.00	10.00	20.00	15.00	9.30	17.00	7.60	3.40	23.00	14.00	24.00	21.00	13
14	17.00	8.60	21.00	15.00	9.30	17.00	7.40	3.40	23.00	14.00	22.00	21.00	14
15	11.00	11.00	23.00	15.00	9.30	17.00	7.20	3.40	23.00	14.00	22.00	21.00	15
16	24.00	13.00	24.00	15.00	9.30	17.00	7.10	3.40	22.00	22.00	22.00	21.00	16
17	24.00	15.00	24.00	15.00	9.30	17.00	6.90	3.40	22.00	22.00	22.00	21.00	17
18	25.00	15.00	23.00	15.00	9.30	17.00	6.90	3.40	22.00	22.00	22.00	21.00	18
19	25.00	15.00	22.00	15.00	9.30	17.00	6.90	3.40	22.00	22.00	22.00	21.00	19
20	25.00	15.00	17.00	15.00	9.30	17.00	6.90	3.40	22.00	22.00	22.00	21.00	20
21	25.00	15.00	21.00	14.00	9.30	17.00	6.90	3.40	22.00	22.00	22.00	21.00	21
22	26.00	14.00	21.00	13.00	9.30	17.00	6.90	3.40	22.00	22.00	22.00	21.00	22
23	26.00	14.00	14.00	12.00	9.30	17.00	6.90	3.40	22.00	22.00	22.00	26.00	23
24	25.00	14.00	14.00	14.00	9.30	17.00	6.90	3.40	28.00	22.00	22.00	26.00	24
25	25.00	14.00	15.00	16.00	9.30	17.00	6.90	3.40	28.00	22.00	22.00	26.00	25
26	25.00	14.00	15.00	19.00	9.30	17.00	6.90	3.40	28.00	14.00	22.00	26.00	26
27	24.00	14.00	15.00	21.00	9.30	17.00	6.90	3.40	28.00	14.00	22.00	26.00	27
28	24.00	14.00	15.00	21.00	9.30	17.00	6.90	3.40	28.00	24.00	12.00	26.00	28
29	24.00	14.00	15.00	21.00	0.0	17.00	6.90	3.40	28.00	24.00	12.00	21.00	29
30	24.00	14.00	15.00	21.00	0.0	17.00	6.90	3.40	28.00	24.00	12.00	21.00	30
31	24.00	0.0	15.00	21.00	0.0	17.00	0.0	3.40	0.0	31.00	12.00	0.0	31
MONTHLY													
TOT	716.00	483.60	544.00	501.00	302.20	493.20	272.30	108.20	551.70	715.00	672.00	597.00	
MEA	23.10	16.30	17.50	16.20	10.80	15.90	9.08	3.49	18.40	23.10	21.70	19.90	
MAX	26.00	26.00	24.00	21.00	21.00	17.00	17.00	4.10	28.00	31.00	25.00	26.00	
MIN	11.00	8.60	14.00	12.00	9.30	9.30	6.90	3.40	5.20	14.00	12.00	12.00	
ACR FT	1420.00	969.00	1080.00	994.00	599.00	978.00	540.00	215.00	1090.00	1420.00	1330.00	1180.00	

OCT80-SEPT81 TOTAL 5961.20 MEAN 16.30 MAX 31.00 MIN 3.40 TOT ACR FT 11820.00

TOTAL MEAN MAX MIN TOT ACR FT

MAX UNIT DISCHARGE 31.00 CFS DATE JUL 31 MIN UNIT DISCHARGE 3.40 CFS DATE MAY 2
(20.05 FT)

REMARKS:

UTAH POWER & LIGHT COMPANY
STREAM DISCHARGE RECORDS

STATION HUNTINGTON CREEK AT PLANT
DATE OCT80-SEP81

DAILY DISCHARGE (CFS)
MONTHS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	82.00	62.00	40.00	31.00	22.00	30.00	31.00	128.00	98.00	107.00	81.00	58.00	1
2	82.00	61.00	36.00	31.00	14.00	30.00	32.00	135.00	97.00	103.00	86.00	57.00	2
3	75.00	62.00	30.00	30.00	14.00	29.00	34.00	121.00	84.00	95.00	85.00	57.00	3
4	75.00	62.00	33.00	29.00	18.00	30.00	31.00	112.00	67.00	90.00	81.00	57.00	4
5	73.00	42.00	33.00	29.00	16.00	30.00	31.00	92.00	66.00	90.00	79.00	85.00	5
6	72.00	36.00	37.00	22.00	29.00	30.00	35.00	87.00	69.00	92.00	81.00	71.00	6
7	76.00	35.00	32.00	24.00	30.00	28.00	35.00	106.00	72.00	111.00	77.00	60.00	7
8	70.00	34.00	8.10	27.00	32.00	22.00	31.00	110.00	69.00	172.00	86.00	56.00	8
9	67.00	33.00	16.00	27.00	40.00	22.00	31.00	99.00	65.00	177.00	84.00	59.00	9
10	71.00	33.00	12.00	30.00	27.00	23.00	37.00	99.00	60.00	107.00	95.00	68.00	10
11	72.00	35.00	27.00	27.00	22.00	23.00	37.00	115.00	65.00	190.00	110.00	55.00	11
12	85.00	35.00	28.00	30.00	37.00	23.00	39.00	95.00	79.00	183.00	94.00	59.00	12
13	84.00	42.00	24.00	27.00	33.00	23.00	39.00	68.00	85.00	163.00	105.00	56.00	13
14	82.00	38.00	27.00	23.00	35.00	24.00	42.00	103.00	79.00	159.00	93.00	55.00	14
15	97.00	34.00	37.00	30.00	34.00	25.00	57.00	116.00	83.00	153.00	104.00	55.00	15
16	85.00	33.00	33.00	29.00	34.00	28.00	60.00	109.00	73.00	157.00	115.00	55.00	16
17	75.00	28.00	29.00	32.00	33.00	30.00	66.00	96.00	83.00	162.00	96.00	55.00	17
18	73.00	30.00	30.00	29.00	32.00	28.00	62.00	91.00	87.00	158.00	93.00	54.00	18
19	70.00	35.00	30.00	30.00	31.00	30.00	75.00	99.00	84.00	155.00	102.00	54.00	19
20	65.00	39.00	29.00	29.00	30.00	30.00	57.00	91.00	90.00	148.00	110.00	54.00	20
21	65.00	39.00	29.00	27.00	30.00	29.00	54.00	93.00	89.00	142.00	116.00	54.00	21
22	67.00	41.00	29.00	26.00	31.00	29.00	52.00	84.00	86.00	122.00	119.00	53.00	22
23	63.00	41.00	29.00	28.00	32.00	30.00	60.00	77.00	87.00	130.00	105.00	53.00	23
24	63.00	41.00	32.00	27.00	31.00	31.00	83.00	77.00	95.00	132.00	90.00	53.00	24
25	62.00	35.00	33.00	22.00	31.00	31.00	124.00	83.00	112.00	130.00	83.00	53.00	25
26	61.00	39.00	33.00	16.00	31.00	31.00	146.00	82.00	111.00	135.00	59.00	52.00	26
27	61.00	37.00	35.00	18.00	29.00	32.00	123.00	112.00	110.00	134.00	59.00	52.00	27
28	61.00	43.00	32.00	29.00	30.00	30.00	114.00	93.00	105.00	124.00	59.00	52.00	28
29	61.00	40.00	31.00	27.00	0.0	30.00	114.00	95.00	103.00	97.00	59.00	52.00	29
30	62.00	40.00	30.00	26.00	0.0	31.00	124.00	94.00	103.00	99.00	58.00	51.00	30
31	62.00	0.0	32.00	22.00	0.0	29.00	0.0	97.00	0.0	90.00	58.00	0.0	31
MONTHLY													
TOT	2225.00	1199.00	932.10	834.00	810.00	871.00	1856.00	3106.00	2566.00	4187.00	2722.00	1703.00	
MEA	71.80	40.00	30.10	26.90	28.90	28.10	61.90	100.00	85.50	135.00	87.80	56.80	
MAX	97.00	62.00	40.00	32.00	40.00	32.00	146.00	171.00	112.00	190.00	119.00	85.00	
MIN	61.00	28.00	8.10	16.00	14.00	22.00	31.00	68.00	60.00	90.00	58.00	51.00	
ACR FT	4410.00	2380.00	1850.00	1650.00	1610.00	1730.00	3680.00	6160.00	5090.00	8300.00	5400.00	3380.00	

OCT80-SEPT81 TOTAL 23011.10 MEAN 63.00 MAX 190.00 MIN 8.10 TOT ACR FT 45640.00

TOTAL MEAN MAX MIN TOT ACR FT

MAX UNIT DISCHARGE 265.00 CFS (2.69 FT) DATE OCT 7 MIN UNIT DISCHARGE 0.0 CFS DATE NOV 18

REMARKS:

APPENDIX B

UTAH POWER & LIGHT COMPANY

WATER QUALITY DATA

Station UPL-3
Location Huntington Creek below Electric Lake

DATE	TIME	FLOW CFS	TEMPERATURE AIR °C	TEMPERATURE WATER °C	FIELD pH	COLIFORM TOTAL MPN	COLIFORM FECAL MPN	FECAL STREP MPN	COD MG/L	BOD MG/L	TOC MG/L	CHLOROPHYLL-a MG/L	DISSOLVED OXYGEN MG/L	OIL & GREASE MG/L	PHENOL MG/L	NITROGEN AMMONIA AS NH3-N MG/L	NITROGEN NITRATE AS NO3-N MG/L	NITROGEN NITRITE AS NO2-N MG/L	NITROGEN TOTAL KJELDAHL MG/L	NITROGEN ORGANIC MG/L	PHOSPHATE TOTAL AS PO4-P MG/L	PHOSPHATE ORTHO AS PO4-P MG/L	SULFATE AS SO4 MG/L	HYDROXIDE AS OH MG/L	SURFACTANT AS MBAS MG/L	SOLIDS TSS MG/L	SOLIDS TOTAL SETTLEABLE SOLIDS MG/L	SOLIDS T.D.S. MG/L	SOLIDS TOTAL SOLIDS MG/L	SOLIDS TOTAL VOLATILE SOLIDS MG/L	SOLIDS VOLATILE SUSPENDED SOLIDS MG/L	SPECIFIC COND µ MHOS CM	TURBIDITY NTU	CARBONATE ALK. AS CaCO3 MG/L	BICARBONATE ALK. AS HCO3 MG/L	TOTAL ALK AS CaCO3 MG/L	TOTAL HARDNESS AS CaCO3 MG/L	ACIDITY AS CaCO3 MG/L	ALPHA RADIOACTIVITY pCi/L
1-2-81					7.0	<3.0	<3.0	<3.0					3.9				0.005	<0.05			<0.002	<0.002				0.9		250.6					1.8						
1-30-81					7.3	<3.0	<3.0	<3.0					6.2				0.501	0.012			0.100	0.070				<1.0		189.9					1.7						
3-10-81					7.0	<3.0	<3.0	<3.0					8.0				0.004	0.008			<0.002	<0.002				3.0		206.0					1.3						
4-1-81				4	7.9	13.0	<2.0	<2.0					7.0				0.73	<0.01			0.190	0.050				15.0		155					0.42						
4-30-81	10:00			5	7.7	8.0	<2.0	<2.0					6.5				0.33	<0.01			0.170	0.060				4.0		435					0.63						
6-30-81	12:41			10	7.7	<3	<3	<3					9.6				<0.01	<0.01			0.093	<0.002				1.0		147.0					0.9						
7-9-81	16:04			10	7.6	9	<3	<3					8.0				0.500	<0.010			0.012	0.008				0.5		207					0.9						
8-13-81	09:15			9.0	7.8	8	<2	<2					6.8				0.313	<0.010			0.009	0.005				4.0		175					1.3						
9-2-81	12:30				7.9	8	<2	<2					9.1				0.014	<0.002			<0.002	<0.002				1.5		150.0					1.0						
10-14-81	13:48			9	8.9	8	<2	<2					7.9				<0.002	<0.002			0.057	0.024				1.5		150.0					1.1						
11-12-81	10:15			5	7.7	<2	<2	<2					8.4				0.022	<0.002			0.020	0.018				1.0		161.0					1.0						
12-9-81	15:30				8.1	23	<2	<2									0.014	<0.002			0.024	<0.002				1.5		178.0				300	2.5						
					7.7								7.4													2.9		175				300	1.2						

DATE	ALUMINUM TOTAL MG/L	ANTIMONY TOTAL MG/L	ARSENIC TOTAL MG/L	BARIUM TOTAL MG/L	BERYLLIUM TOTAL MG/L	BORON TOTAL MG/L	CADMIUM TOTAL MG/L	CALCIUM TOTAL MG/L	CHLORIDE DISS. MG/L	CHROMIUM HEX AS Cr MG/L	COBALT TOTAL MG/L	COPPER TOTAL MG/L	CYANIDE AS CN MG/L	FLUORIDE DISS. MG/L	GERMANIUM TOTAL MG/L	IRON DISS. MG/L	IRON TOTAL MG/L	LEAD TOTAL MG/L	MAGNESIUM TOTAL MG/L	MANGANESE TOTAL MG/L	MERCURY TOTAL MG/L	MOLYBDENUM TOTAL MG/L	NICKEL TOTAL MG/L	POTASSIUM TOTAL MG/L	SELENIUM TOTAL MG/L	SILICA AS SiO_2 MG/L	SILVER TOTAL MG/L	SODIUM TOTAL MG/L	ZINC TOTAL MG/L	VANADIUM TOTAL MG/L	CHROMIUM TOTAL MG/L	WELL DEPTH	COMMENTS
1-2-81																																	13
1-30-81																																	13
3-10-81																																	13
4-1-81																																staff 1.28	13
4-30-81																																staff 1.28	13
6-30-81																																staff 1.35	26
7-9-81																																	24
8-13-81																																see Hydro	15
9-2-81																																	39
10-14-81																																	12
11-12-81																																	12
12-9-81																																	12

UTAH POWER & LIGHT COMPANY

WATER QUALITY DATA

Station UPL
Location Right Fork, Huntington Creek above Left Fork

DATE	TIME	FLOW CFS	TEMPERATURE AIR °C	TEMPERATURE WATER °C	FIELD pH	COLIFORM TOTAL MPN	COLIFORM FECAL MPN	FECAL STREP MPN	COD MG/L	BOD MG/L	T.O.C. MG/L	CHLOROPHYLL-a MG/L	DISSOLVED OXYGEN MG/L	OIL & GREASE MG/L	PHENOL MG/L	NITROGEN AMMONIA AS NH3-N MG/L	NITROGEN NITRATE AS NO3-N MG/L	NITROGEN NITRITE AS NO2-N MG/L	NITROGEN TOTAL KELDAHL MG/L	NITROGEN ORGANIC MG/L	PHOSPHATE TOTAL AS PO4-P MG/L	PHOSPHATE ORTHO AS PO4-P MG/L	SULFATE AS SO4 MG/L	HYDROXIDE AS OH MG/L	SURFACTANT AS MBAS MG/L	SOLIDS TSS MG/L	SOLIDS TOTAL SETTLEABLE SOLIDS MG/L	SOLIDS T.D.S. MG/L	SOLIDS TOTAL SOLIDS MG/L	SOLIDS TOTAL VOLATILE SOLIDS MG/L	SOLIDS VOLATILE SUSPENDED SOLIDS MG/L	SPECIFIC COND. µmhos/cm	TURBIDITY NTU	CARBONATE ALK AS CO3 MG/L	BICARBONATE ALK AS HCO3 MG/L	TOTAL ALK AS CaCO3 MG/L	TOTAL HARDNESS AS CaCO3 MG/L	ACIDITY AS CaCO3 MG/L	ALPHA RADIOACTIVITY pCi/L
1-2-81					7.2	9	<3.0	<3.0					9.8				0.011	<0.05			0.038	0.037				2.5		226.0					4.9						
1-30-81					7.8	<3.0	<3.0	<3.0					8.0				0.479	0.035			0.070	0.061				4.9		187.8					5.8						
3-3-81					7.9	<3.0	<3.0	<3.0					6.4				0.004	0.002			0.020	0.011				<2.0		226.0					1.4						
4-1-81					7.9	49.0	<2.0	<2.0					7.1				0.24	<0.01			0.290	0.020				7.0		280					0.47						
4-30-81	12:00			6	8.5	49.0	<2.0	<2.0					6.8				0.16	<0.01			0.180	0.090				11.0		185					2.30						
6-30-81	13:10			14.5	8.3	43.0	<3	<3					10.6				<0.01	<0.01			0.003	<0.002				12.0		153.0					2.3						
7-9-81	17:50				8.3	93	<3	<3									0.439	<0.010			0.020	0.016				5.5		232					1.7						
8-13-81	08:47			9	8.0	17	<2	<2					8.2				0.314	<0.010			0.014	0.006				85.0		212					63						
9-2-81	13:12	24.8			8.2	11	<2	<2					8.7				<0.002	<0.002			0.025	<0.002				5.0		189.0					3.3						
10-14-81	14:18			7	8.3	220	17	<2					12.2				<0.002	<0.002			0.037	0.025				7.0		198.0					2.5						
11-12-81	10:47			3	8.2	79	<2	<2					8.6				0.021	<0.002			0.023	0.013				1.0		231.0					1.0						
12-9-81	15:00				8.2	7	<2	<2									0.024	<0.002			<0.002	<0.002				7.0		192.0				300	3.1						
					8.1								7.9													12.5		209					7.6						

DATE	ALUMINUM TOTAL MG/L	ANTIMONY TOTAL MG/L	ARSENIC TOTAL MG/L	BARIUM TOTAL MG/L	BERYLLIUM TOTAL MG/L	BORON TOTAL MG/L	CADMIUM TOTAL MG/L	CALCIUM TOTAL MG/L	CHLORIDE DISS MG/L	CHROMIUM HEX AS CR MG/L	COBALT TOTAL MG/L	COPPER TOTAL MG/L	CYANIDE AS CN MG/L	FLUORIDE DISS. MG/L	GERMANIUM TOTAL MG/L	IRON DISS MG/L	IRON TOTAL MG/L	LEAD TOTAL MG/L	MAGNESIUM TOTAL MG/L	MANGANESE TOTAL MG/L	MERCURY TOTAL MG/L	MOLYBDENUM TOTAL MG/L	NICKEL TOTAL MG/L	POTASSIUM TOTAL MG/L	SELENIUM TOTAL MG/L	SILICA AS SiO_2 MG/L	SILVER TOTAL MG/L	SODIUM TOTAL MG/L	ZINC TOTAL MG/L	VANADIUM TOTAL MG/L	CHROMIUM TOTAL MG/L	WELL DEPTH	COMMENTS
1-2-81																																	
1-30-81																																	
3-3-81																																	
4-1-81																																	staff 1.1 23.5
4-30-81																																	
6-30-81																																	staff 2.77, Ford Split 90
7-9-81																																	staff 1.17' 25.0
8-13-81																																	staff 1.12', Turbid from rain
9-2-81																																	staff 1.22 25.0
10-14-81																																	staff 1.09' 22.5
11-12-81																																	staff 1.04 22.5
12-9-81																																	staff - frozen

UTAH POWER & LIGHT COMPANY

WATER QUALITY DATA

Station H-1
Location Huntington Creek above Huntington Plant Diversion

DATE	TIME	FLOW CFS	TEMPERATURE AIR °C	TEMPERATURE WATER °C	FIELD pH	COLIFORM TOTAL MPN	COLIFORM FECAL MPN	FECAL STREP MPN	C.O.D. MG/L	B.O.D. MG/L	T.O.C. MG/L	CHLORO-PHYLL-a MG/L	DISSOLVED OXYGEN MG/L	OIL & GREASE MG/L	PHENOL MG/L
1-9-81	3:15				7.5								11.0	<0.5	
2-2-81	12:45				7.6								11.4		
3-4-81	12:45			3	8.7								13.2		
4-16-81	11:05			7	8.4								12.2	1.50	
5-22-81	1418			10	8.3								13.1		
6-30-81	13:34			17	8.4								11.6		
7-9-81	18:18				8.3									0.5	<0.005
8-13-81	08:02			12	9.5								9.3		
9-2-81	13:38				8.3								8.6		
10-14-81	14:56			6	8.6								12.2	<0.5	<0.005
11-12-81	11:02				8.2								8.2		
12-9-81					8.2										
					8.3								11.1		

DATE	NITROGEN AMMONIA AS NH_3-N MG/L	NITROGEN NITRATE AS NO_3-N MG/L	NITROGEN NITRITE AS NO_2-N MG/L	NITROGEN ORGANIC TOTAL MG/L	NITROGEN TOTAL MG/L	PHOSPHATE TOTAL AS PO_4-P MG/L	PHOSPHATE ORTHO AS PO_4-P MG/L	SULFATE AS SO_4 MG/L	HYDROXIDE AS OH MG/L	SURFACTANT AS MBAS MG/L	SOLIDS TSS MG/L	SOLIDS TOTAL SETTLEABLE SOLIDS MG/L	SOLIDS T.D.S. MG/L	SOLIDS TOTAL SOLIDS MG/L	SOLIDS TOTAL VOLATILE SOLIDS MG/L	SOLIDS SUSPENDED SOLIDS MG/L
1-9-81		0.616				0.012	0.010	73.58			5.7		239.4			
2-2-81		0.519				0.041	0.002	57.05			10.2		217.7			
3-4-81		0.005				0.154	0.012	187.3			9.5		343.0			
4-16-81		0.13				0.180	0.080	15.0			132		199			
5-22-81		<0.002				0.040	0.024	98.8			20.0		235			
6-30-81		0.010				0.003	<0.002	131.7			19.5		240.0			
7-9-81		0.015				0.017	0.007	189.0			4.5		330.0			
8-13-81		<0.002				<0.002	<0.002	140.0			64.5		260.0			
9-2-81		<0.002				0.052	<0.002	120.0			16.5		230.0			
10-14-81		0.049				0.082	0.049	91.3			24.5		200.0			
11-12-81		0.097				0.022	0.019	37.0			18.0		170.0			
12-9-81		0.014				0.054	<0.002	107.0			16.0		249.0			
								101			28.4		262			

DATE	SPECIFIC COND. µMHOS CM	TURBIDITY NTU	CARBONATE ALK. AS $CaCO_3$ MG/L	BICARBONATE ALK. AS HCO_3 MG/L	TOTAL ALK. AS $CaCO_3$ MG/L	TOTAL HARDNESS AS $CaCO_3$ MG/L	ACIDITY AS $CaCO_3$ MG/L	ALPHA RADIOACTIVITY PCI/L
1-9-81	465			225.7	185.0	212.9		
2-2-81	620			242.8	199.0	224.3		
3-4-81	430			233.7	*	208.18		
4-16-81	300			204.96	172.0	188		
5-22-81	359			217.8	178.5	280.2		
6-30-81	311			108.9	89.3	180.9		
7-9-81	420			181.0	148.4	300.0		
8-13-81	350			201.0	165.0	271.0		
9-2-81	300			185.0	152.0	265.0		
10-14-81	300			187.0	153.0	233.0		
11-12-81	300			277	227.0	230.0		
12-9-81	390			277	227.0	307.0		
	379				158	250		

DATE	ALUMINUM TOTAL MG/L	ANTIMONY TOTAL MG/L	ARSENIC TOTAL MG/L	BARIUM TOTAL MG/L	BERYLLIUM TOTAL MG/L	BORON TOTAL MG/L	CADMIUM TOTAL MG/L	CALCIUM TOTAL MG/L	CHLORIDE DISS. MG/L	CHROMIUM HEX. AS CR MG/L	COBALT TOTAL MG/L	COPPER TOTAL MG/L	CYANIDE AS CN MG/L	FLUORIDE DISS. MG/L	GERMANIUM TOTAL MG/L	IRON DISS. MG/L
1-9-81			<0.0005		<0.02	0.025	<0.02	50.00	7.80			0.006				
2-2-81			*		<0.02	0.071	<0.02	52.1	10.0			0.005				
3-4-81			*		<0.005	0.17	0.006	86.2	4.9			<0.02				
4-16-81			<0.001		<0.001	0.016	<0.001	52.0	12.00			0.005				
5-22-81			0.0060		<0.005	0.049	0.016	76.0	4.4			<0.02				
6-30-81			<0.0003		<0.005	0.090	<0.005	33.0	3.7			<0.02				
7-9-81	0.07	<0.2	<0.0003	<0.1	<0.005	0.059	<0.005	78.0	3.4			<0.02				
8-13-81			<0.0003		<0.005	0.050	<0.005	70.0	3.4			<0.02				
9-2-81			<0.0003		<0.005	0.143	<0.005	81.0	3.5			<0.02				
10-14-81			<0.0003		<0.005	0.092	<0.005	66.0	4.6			<0.02				
11-12-81			<0.0003		<0.005	0.136	<0.005	65.7	5.2			<0.02				
12-9-81			<0.0003		<0.005	0.050	<0.005	100.0	7.1			<0.02				

DATE	IRON TOTAL MG/L	LEAD TOTAL MG/L	MAGNESIUM TOTAL MG/L	MANGANESE TOTAL MG/L	MERCURY TOTAL MG/L	MOLYBDENUM TOTAL MG/L	NICKEL TOTAL MG/L	POTASSIUM TOTAL MG/L	SELENIUM TOTAL MG/L	SILICA AS SiO_2 MG/L	SILVER TOTAL MG/L	SODIUM TOTAL MG/L	ZINC TOTAL MG/L	VANADIUM TOTAL MG/L	CHROMIUM TOTAL MG/L	WELL DEPTH
1-9-81	0.22	<0.05	21.4	0.006	<0.005	<0.1	<0.04	2.2	<0.0005			7.1	<0.005		<0.05	27
2-2-81	0.25	<0.05	22.9	0.007	*		<0.04	2.5	*			6.5	<0.005		<0.05	14
3-4-81	0.06	<0.05	22.50	0.05	*		<0.04	3.00	*			21.50	0.086		0.05	30
4-16-81	0.210	<0.001	13.98	0.030	<0.0002	<0.001	<0.001	1.10	<0.001			5.40	0.045		<0.001	60
5-22-81	7.00	<0.001	21.00	0.04	<0.0002		<0.04	3.00	<0.0003			23.00	0.028		<0.05	84
6-30-81	9.00	<0.001	20.00	0.05	<0.0002		<0.04	4.00	0.0002			26.00	0.032		<0.05	103
7-9-81	7.80	<0.001	22.00	0.04	<0.0002	<0.1	<0.04	4.50	<0.0003		<0.01	27.50	0.033		<0.05	177
8-13-81	7.95	<0.001	20.00	0.04	<0.0002		<0.04	5.00	0.0003			29.00	0.030		<0.05	105
9-2-81	0.39	<0.001	15.00	0.12	<0.0002		<0.04	4.00	<0.0003			12.00	0.029		<0.05	57
10-14-81	0.36	<0.001	16.50	0.12	<0.0002	<0.1	<0.04	0.91	<0.0003			15.50	0.025		<0.05	37
11-12-81	0.47	<0.001	16.00	0.16	<0.0002		<0.04	0.90	<0.0003			16.10	0.031		<0.05	41
12-9-81	0.42	<0.001	14.00	0.10	<0.0002		<0.04	1.00	<0.0003			16.50	0.029		<0.05	32

DATE	COMMENTS
1-9-81	DO, pH, Temp. probe broken
2-2-81	DO, pH, Temp. broken
3-4-81	
4-16-81	
5-22-81	BICARB, CACO3 178.5
6-30-81	
7-9-81	
8-13-81	
9-2-81	stream muddier than normal d ra
10-14-81	
11-12-81	
12-9-81	

* no analysis given

UTAH POWE & LIGHT COMPANY

WATER QUALITY DATA

Station UP.
Location Huntington Creek above Fish Creek

DATE	TIME	FLOW CFS	TEMPERATURE AIR °F	TEMPERATURE WATER °F	FIELD pH	COLIFORM TOTAL MPN	COLIFORM FECAL MPN	FECAL STREP MPN	C.O.D. MG/L	B.O.D. MG/L	T.O.C. MG/L	CHLORO-PHYLL-a MG/L	DIS-SOLVED OXYGEN MG/L	OIL & GREASE MG/L	PHENOL MG/L	NITROGEN AMMONIA AS NH_3-N MG/L	NITROGEN NITRATE AS NO_3-N MG/L	NITROGEN NITRITE AS NO_2-N MG/L	NITROGEN TOTAL KJELDAHL MG/L	NITROGEN ORGANIC MG/L	PHOSPHATE TOTAL AS PO_4-P MG/L	PHOSPHATE ORTHO AS PO_4-P MG/L	SULFATE AS SO_4 MG/L	HYDROXIDE AS OH MG/L	SURFACTANT AS MBAS MG/L	SOLIDS TSS MG/L	SOLIDS TOTAL SETTLEABLE SOLIDS MG/L	SOLIDS T.D.S. MG/L	SOLIDS TOTAL VOLATILE SOLIDS MG/L	SOLIDS VOLATILE SUSPENDED SOLIDS MG/L	SPECIFIC COND. µmhos CN	TURBIDITY NTU	CARBONATE ALK. AS $CaCO_3$ MG/L	BICARBONATE ALK. AS HCO_3 MG/L	TOTAL ALK AS $CaCO_3$ MG/L	TOTAL HARDNESS AS $CaCO_3$ MG/L	ACIDITY AS $CaCO_3$ MG/L	ALPHA RADIOACTIVITY pCi/L
1-9-81	2:30			0	8.0								9.7				0.510				0.020	<0.008	88.14			12.9		362.3			630			255.0	209.0	315.0		
2-2-81	1:00				8.0								9.3				0.419				0.040	0.002	118.2			6.3		396.6			600			253.8	208.0	278.3		
3-5-81	12:43			4	8.2								6.7				<0.002				0.015	<0.002	220.9			8.0		430.0			550			236.0	183.5	328.63		
4-16-81	12:30			10	8.7								11.2				0.15				0.810	0.020	37.5			90.0		230			350			207.40	174.0	210		
5-22-81	11:36			11	8.2								13.1				<0.002				0.037	0.037	98.8			15.0		229.0			410			209.9	182.7	304.9		
6-30-81	18:35			16.5	8.3								11.2				0.015				0.012	0.002	205.8			31.0		350.0			450			112.7	92.4	324.7		
7-29-81	12:57				2.1 out												0.054				0.310	0.002	227.0			11.5		425.0			*			*	* (240.0)	? out		
8-13-81					8.2												0.012				0.006	<0.002	134.0			821.0		300.0			400			226.0	185.0	300.0		
9-2-81	10:30	40		13	8.2								8.1				0.027				<0.002	<0.002	154.0			25.5		300.0			390			203.0	166.0	304.0		
10-14-81	18:51			7	8.8								12.0				<0.002				0.085	0.008	115.0			36.5		265.0			440			201.0	165.0	304.0		
11-12-81					8.0								8.5				<0.002				0.032	0.021	218.0			1.0		423.0			710			288	236.0	398.0		
12-9-81	13:45				8.2												0.040				<0.002	<0.002	140.0			7.0		390.0			590			293	240.0	345.0		
					8.3								10.0										146			88.8		336			502				186	304		

DATE	ALUMINUM TOTAL MG/L	ANTIMONY TOTAL MG/L	ARSENIC TOTAL MG/L	BARIUM TOTAL MG/L	BERYLLIUM TOTAL MG/L	BORON TOTAL MG/L	CADMIUM TOTAL MG/L	CALCIUM TOTAL MG/L	CHLORIDE DISS MG/L	CHROMIUM HEX AS CR MG/L	COBALT TOTAL MG/L	COPPER TOTAL MG/L	CYANIDE AS CN MG/L	FLUORIDE DISS. MG/L	GERMANIUM TOTAL MG/L	IRON DISS MG/L	IRON TOTAL MG/L	LEAD TOTAL MG/L	MAGNESIUM TOTAL MG/L	MANGANESE TOTAL MG/L	MERCURY TOTAL MG/L	MOLYBDENUM TOTAL MG/L	NICKEL TOTAL MG/L	POTASSIUM TOTAL MG/L	SELENIUM TOTAL MG/L	SILICA AS SiO_2 MG/L	SILVER TOTAL MG/L	SODIUM TOTAL MG/L	ZINC TOTAL MG/L	VANADIUM TOTAL MG/L	CHROMIUM TOTAL MG/L	WELL DEPTH	COMMENTS
1-9-81			<0.0005		<0.002	0.230	<0.002	55.6	11.0			0.003					0.1	<0.05	25.8	0.012	<0.005	<0.10	<0.04	3.0	<0.0005			12.6	<0.005		<0.05	315	* No sample month given; Hydrobrokon, staff 0.69'
2-2-81			0.0004		<0.002	0.080	<0.002	69.1	12.7			<0.002					0.19	<0.05	25.7	0.02	<0.005		<0.04	3.2	<0.0003			13.1	<0.005		<0.05	275	pH, Temp broken - staff 0.59
3-5-81			*		<0.005	0.30	<0.005	74.0	8.1			<0.02					0.28	<0.05	35.0	0.09	*		<0.04	4.50	*			28.0	0.084		<0.05	350	Dobrokon - staff 0.76'
4-16-81			<0.001		<0.001	0.011	<0.001	56.0	12.0			0.008					0.088	<0.001	16.80	0.017	<0.0002	<0.001	<0.001	1.30	<0.001		0.031	6.90	0.018		0.004	500	staff 1.10'
5-22-81			<0.0003		<0.005	0.0380	0.016	80.0	7.9			<0.02					15.00	<0.001	19.00	0.02	<0.0002		<0.04	5.00	<0.0003			22.00	0.014		<0.05	580	staff 1.21-1827 CaCO3
6-30-81			<0.0003		<0.005	0.049	<0.005	87.0	6.3			<0.02					14.00	<0.001	20.00	0.03	<0.0002		<0.04	6.00	<0.0003			25.00	0.015		<0.05	660	staff 1.32, River stages is up
7-29-81	0.06	<0.2	<0.0003	<0.1	<0.005	0.000	<0.005	96.0	11.2			<0.02					12.90	<0.001	21.00	0.03	<0.0002	<0.1	<0.04	5.00	0.0019		<0.01	29.00	0.024		<0.05	2	staff 2.98' * All bottles need wc Acidified.
8-13-81			<0.0003		<0.005	0.059	<0.005	81.0	6.1			<0.02					9.00	<0.001	20.00	0.03	<0.0002		<0.04	7.00	0.0017			24.50	0.010		<0.05		-
9-2-81			<0.0003		<0.005	0.143	<0.005	89.5	8.5			<0.02					0.09	<0.001	19.50	0.09	<0.0002		<0.04	4.00	0.0010			14.00	0.009		<0.05	40	staff 1.08'
10-14-81			<0.0003		<0.005	0.158	<0.005	85.5	13.3			<0.02					0.60	<0.001	22.00	0.15	<0.0002	<0.1	<0.04	1.10	0.0010			18.50	0.005		<0.05		
11-12-81			<0.0003		<0.005	0.079	<0.005	118.0	21.4			<0.02					0.67	<0.001	25.00	0.16	<0.0002		<0.04	1.12	0.0006			36.80	0.013		<0.05		
12-9-81			<0.0003		<0.005	0.006	<0.005	96.0	19.2			<0.02					0.72	<0.001	25.50	0.18	<0.0002		<0.04	1.10	<0.0003			37.90	0.019		<0.05		

APPENDIX C

CERTIFICATE OF ANALYSIS

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

Lab. No. 1822

FOR Utah Power & Light
Field Office

Date Rec. 05-19-81

.1 CFS

Sample ID D.C. Runoff Above Mine Flow 45 GPM

Date Sampled 05-19-81

pH	8.3	Units	Arsenic		mg/l
Alkalinity, Total		mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride		mg/l	Chromium		mg/l
Conductivity	600	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.20	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese	<0.01	mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	332.0	mg/l			
Solids, Total Suspended	3.5	mg/l			
Sulfate		mg/l			

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 1821

FOR Utah Power & Light
Field Office

Date Rec. 05-19-81

Date Sampled 05-19-81

Sample ID D.C. Runoff Below Mine Flow 40 GPM

pH	8.2	Units	Arsenic		mg/l
Alkalinity, Total		mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride		mg/l	Chromium		mg/l
Conductivity	1500	umhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.24	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese	< 0.01	mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	959.0	mg/l			
Solids, Total Suspended	5.5	mg/l			
Sulfate		mg/l			

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 1888

FOR
Utah Power & Light
Field Office

Date Rec. 06-11-81

FLOW: 15 GPM
TEMP. 58°F

Date Sampled 06-11-81

Sample ID Deer Creek Above Mine

pH	8.3	Units
Alkalinity, Total		mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride		mg/l
Conductivity	700	umhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	482.0	mg/l
Solids, Total Suspended	<1.0	mg/l
Sulfate		mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.09	mg/l
Lead		mg/l
Manganese	0.02	mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

FOR Utah Power & Light
Field Office

Lab. No. 1889

Date Rec. 06-11-81

FLOW: 10 GPM
TEMP. 63°F

Sample ID Deer Creek Below Mine

Date Sampled 06-11-81

pH	8.3	Units
Alkalinity, Total		mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride		mg/l
Conductivity	1650	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	1021.0	mg/l
Solids, Total Suspended	2.5	mg/l
Sulfate		mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.09	mg/l
Lead		mg/l
Manganese	0.03	mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

FOR Utah Power & Light Co.
Mining & Exploration Field Office
Industrial Training Center
Huntington, Utah 84528
Sample ID Deer Creek Above Mine

FLOW: < 5 GPM
TEMP. 62°F

Lab. No. 2016
Date Rec. 07-21-81
Date Sampled 07-21-81

pH	8.3	Units
Alkalinity, Total		mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride		mg/l
Conductivity	600	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	340.0	mg/l
Solids, Total Suspended	< 0.5	mg/l
Sulfate		mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.11	mg/l
Lead		mg/l
Manganese	0.01	mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory

APPENDIX D

CERTIFICATE OF ANALYSIS

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

Lab. No. 1624

FOR Utah Power & light
Mining & Exploration

Date Rec. 02-23-81

Sample ID Cottonwood Cr. Above Trail Mt. Mine

Date Sampled 02-23-81

pH	8.0	Units
Alkalinity, Total	259.4	~~mg/l $CaCo_3$~~
Alkalinity, Bicarbonate	316.5	~~mg/l $CaCo_3$~~ HCO_3
Calcium	66.1	mg/l
Chloride	11.8	mg/l
Conductivity		umhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium	25.50	mg/l
Nitrogen, ~~Nitrate~~ *** Nitrite	< 0.002	mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho	< 0.002	mg/l
Potassium	10.00	mg/l
Sodium	54.40	mg/l
Solids, Total Dissolved	410.0	mg/l
Solids, Total Suspended	1.0	mg/l
Sulfate	192.1	mg/l
BOD_5	1.1	mg/l
TKN	*	mg/l
Oil & Grease	< 0.5	mg/l
Acidity	0	mg/l
Flouride	0.23	mg/l

Arsenic	*	mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium	< 0.005	mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.60	mg/l
Lead	< 0.05	mg/l
Manganese	0.07	mg/l
Mercury		µg/l
Nickel		mg/l
Selenium	*	mg/l
Zinc	0.214	mg/l
Coliform, T.	9	MPN/100ml
Coliform, F.	< 3	MPN/100ml
Silica	12.2	mg/l

*Analysis forthcoming

Respectfully submitted PS

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 1623

FOR Utah Power & Light
Mining & Exploratiom

Date Rec. 02-23-81

Date Sampled 02-23-81

Sample ID Cottonwood Cr. Below Trail Mt. Mien

pH	7.9	Units	Arsenic	*	mg/l
Alkalinity, Total	256.5	~~mg/l CaCo~~$_3$	Beryllium		mg/l
Alkalinity, Bicarbonate	312.9	~~mg/l CaCo~~$_3$ HCO_3	Boron		mg/l
Calcium	75.6	mg/l	Cadmium	0.006	mg/l
Chloride	11.1	mg/l	Chromium		mg/l
Conductivity		µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.60	mg/l
Hardness		mg/l $CaCo_3$	Lead	< 0.05	mg/l
Magnesium	38.80	mg/l	Manganese	0.06	mg/l
Nitrogen, ~~Nitrate~~ Nitrite	< 0.002	mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho	< 0.002	mg/l	Selenium	*	mg/l
Potassium	2.80	mg/l	Zinc	0.250	mg/l
Sodium	25.20	mg/l	Silica	11.2	mg/l
Solids, Total Dissolved	375.0	mg/l	Coliform, T	64	MPN/100ml
Solids, Total Suspended	10.0	mg/l	Coliform, F	4	MPN/100ml
Sulfate	160.7	mg/l	Fluoride	0.23	mg/l
BOD_5	2.9	mg/l			
TKN	*	mg/l			
Oil & Grease	< 0.5	mg/l			
Acidity	0	mg/l			

*Analysis forthcoming

Respectfully submitted [illegible]

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CERTIFICATE OF ANALYSIS

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

FOR Utah Power & Light
Mining & Exploartion

Lab. No. 1621
Date Rec. 02-23-81
Date Sampled 02-23-81

Sample ID CottonWood Cr. USGS Flume

pH	8.0	Units
Alkalinity, Total	248.0	mg/l ~~Ca Co$_3$~~ HCO$_3$
Alkalinity, Bicarbonate	302.5	mg/l Ca Co$_3$
Calcium	78.2	mg/l
Chloride	11.0	mg/l
Conductivity		µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l Ca Co$_3$
Magnesium	26.70	mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho	< 0.002	mg/l
Potassium	4.40	mg/l
Sodium	30.80	mg/l
Solids, Total Dissolved	389.5	mg/l
Solids, Total Suspended	18.0	mg/l
Sulfate	164.4	mg/l
BOD$_5$	1.3	mg/l
Oil & Grease	< 0.5	mg/l
Nitrogen, Nitrite	< 0.002	mg/l
Acidity	0	mg/l
TKN	*	mg/l

Arsenic	*	mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium	< 0.005	mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.60	mg/l
Lead	< 0.05	mg/l
Manganese	0.07	mg/l
Mercury		µg/l
Nickel		mg/l
Selenium	*	mg/l
Zinc	0.228	mg/l
Silica	10.4	mg/l
Coliform, Total	150	MPN/100ml
Coliform, Fecal	9	MPN/100ml
Fluoride	0.34	mg/l

*Analysis forthcoming

Respectfully submitted RS

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

FOR Utah Power & Light
MINING & EXPLORATION

Lab. No. 1622

Date Rec. 02-23-81

Date Sampled 02-23-81

Sample ID Cottonwoood Cr. Above Straight Canyon

pH	8.0	Units	Arsenic	*	mg/l
Alkalinity, Total	256.5	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate	312.9	~~mg/l $CaCo_3$~~ HCO_3	Boron		mg/l
Calcium	82.2	mg/l	Cadmium	< 0.005	mg/l
Chloride	11.9	mg/l	Chromium		mg/l
Conductivity		µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.50	mg/l
Hardness		mg/l $CaCo_3$	Lead	< 0.05	mg/l
Magnesium	29.20	mg/l	Manganese	0.03	mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho	0.011	mg/l	Selenium	*	mg/l
Potassium	4.50	mg/l	Zinc	0.156	mg/l
Sodium	40.00	mg/l	Coliform, Toal	93	MPN/100ml
Solids, Total Dissolved	418.0	mg/l	Coliform, Fecal	4	MPN/100ml
Solids, Total Suspended	4.0	mg/l	Flouride	0.24	mg/l
Sulfate	183.2	mg/l			
Oil & Grease	< 0.5	mg/l			
Nitrogen, Nitrite	< 0.002	mg/l			
Acidity	0	mg/l			
Silica	9.5	mg/l			
TKN	*	mg/l			

*Analysis forthcoming

BOD 3.1

Respectfully submitted [illegible]

Certified Environmental Laboratory

STANDARD LABORATORIES, INC.
BOX 1140 HUNTINGTON, UTAH 84528 (801) 653-2314

CERTIFICATE OF ANALYSES

For Utah Power & Light
Mining & Exploration

Lab. No. As shown below
Date Rec'd. 02-23-81
Date Sampled 02-23-81

Lab #	Sample ID	Arsenic	Selenium	TKN
1621	Cottonwood Cr. USGS Flume	0.0005 mg/l	0.0009 mg/l	0.07 mg/l
1622	Cottonwood Cr. Above Staight Canyon	0.0006 mg/l	0.0013 mg/l	0.29 mg/l
1623	Cottonwood Cr. Below Trail Mt. Mine	0.0006 mg/l	< 0.0005 mg/l	0.22 mg/l
1624	Cottonwood Cr. Above Trail Mt. Mine	< 0.0005 mg/l	< 0.0005 mg/l	0.14 mg/l

Respectfully Submitted

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

UTAH POWER & LIGHT
FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: COTTONWOOD CR. ABOVE TRAIL MT. MINE
LAB NUMBER W-1826
DATE SAMPLED: 05/19/81 DATE REC'D: 05/19/81
REPORT DATE: 06/02/81 SAMPLED BY: UP&L

WASTEWATER ANALYSIS

PH	8.1	UNITS
BOD-5	1.9	MG/L
TSS	20.5	MG/L
OIL & GREASE	<0.5	MG/L
T. COLIFORM	<2	MPN/100ML
F. COLIFORM	<2	MPN/100ML

CHEMICAL ANALYSIS

CALCIUM	107.0	MG/L	
MAGNESIUM	45.00	MG/L	
POTASSIUM	5.00	MG/L	
SODIUM	32.00	MG/L	
SP. COND	630	UHMOS/CM	
TDS	472.0	MG/L	
BICARB. ALK	282.5	MG/L CACO3	344.6 HCO_3
CHLORIDE	15.2	MG/L	
FLOURIDE	0.22	MG/L	
NO2-N	<0.002	MG/L	
ORHTO-PHOS.	<0.002	MG/L	
SULFATE	238.7	MG/L	
SILICA	7.6	MG/L	
T. ALK	282.5	MG/L CACO3	
Acidity	<1.0		

METALLIC ANALYSIS

CADMIUM	<0.005	MG/L
IRON	9.00	MG/L
LEAD	<0.001	MG/L
MANGANESE	0.03	MG/L
ZINC	0.022	MG/L

*Analyses forthcoming for Arsenic, Selenium, TKN

T. CATION 10.6 MEQ/L T. ANION 11.1 MEQ/L
TDS/COND 0.749 TDS BAL 472: 438

RAY A. SIM, MANAGER

STANDARD LABORATORIES, INC.
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UTAH POWER & LIGHT
FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: COTTONWOOD CR. BELOW TRAIL MT. MINE
LAB NUMBER W-1825
DATE SAMPLED: 05/19/81 DATE REC'D: 05/19/81
REPORT DATE: 06/02/81 SAMPLED BY: UP&L

WASTEWATER ANALYSIS

PH	8.1	UNITS
BOD-5	20.0	MG/L
TSS	95.0	MG/L
OIL/GREASE	1.2	MG/L
T. COLI	28	MPN/100ML
F. COLIFORM	<2	MPN/100ML

CHEMICAL ANALYSIS

CALCIUM	94.0	MG/L	
MAGNESIUM	46.00	MG/L	
POTASSIUM	5.00	MG/L	
SODIUM	32.00	MG/L	
SP. COND	630	UHMOS/CM	
TDS	466.0	MG/L	
BICARB. ALK	281.4	MG/L CACO3	343.3 HCO_3
CHLORIDE	17.7	MG/L	
FLOURIDE	0.23	MG/L	
NO2-N	<0.002	MG/L	
O. PHOS	0.020	MG/L	
SULFATE	246.9	MG/L	
SILICA	7.5	MG/L	
T. ALK	281.4	MG/L CACO3	

Acidity 1.0

METALLIC ANALYSIS

CADMIUM	<0.005	MG/L
IRON	15.00	MG/L
LEAD	<0.001	MG/L
MANGANESE	0.03	MG/L
ZINC	0.016	MG/L

*Analyses forthcoming for Arsenic, Selenium, TKN

T. CATION 10.0 MEQ/L T. ANION 11.3 MEQ/L
TDS/COND 0.740 TDS BAL 466: 437

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UTAH POWER & LIGHT
FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: COTTONWOOD CR. USGS FLUME 1824
LAB NUMBER W-1824
DATE SAMPLED: 05/19/81
DATE REC'D: 05/19/81
REPORT DATE: 06/02/81
SAMPLED BY: UP&L

WASTEWATER ANALYSIS

PH	8.3	UNITS
BOD-5	2.9	MG/L
TSS	33.0	MG/L
OIL/GREASE	5.2	MG/L
T. COLI	20	MPN/100ML
F. COLIFORM	<2	MPN/100ML

CHEMICAL ANALYSIS

CALCIUM	81.0	MG/L
MAGNESIUM	45.00	MG/L
POTASSIUM	3.00	MG/L
SODIUM	32.00	MG/L
SP. COND	610	UHMOS/CM
TDS	364.0	MG/L
BICARB. ALK	268.8	MG/L CACO3 327.9 HCO_3
CHLORIDE	16.8	MG/L
FLOURIDE	0.23	MG/L
NO2-N	<0.002	MG/L
ORHTO-PHOS.	<0.002	MG/L
SULFATE	156.4	MG/L
SILICA	4.4	MG/L
T. ALK	268.8	MG/L CACO3
Acidity	<1.0	

METALLIC ANALYSIS

CADMIUM	<0.005	MG/L
IRON	18.00	MG/L
LEAD	<0.001	MG/L
MANGANESE	0.02	MG/L
ZINC	0.058	MG/L

*Analyses forthcoming for Arsenic, [redacted], Selenium, TKN

T. CATION	9.2 MEQ/L	T. ANION	9.1 MEQ/L
TDS/COND	0.597	TDS BAL	364: 331

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FIELD OFFICE
HUNTINGTON UTAH. 84528

SAMPLE ID: COTTONWOOD CR. ABOVE STR. CANY. FORK
LAB NUMBER W-1823
DATE SAMPLED: 05/19/81 DATE REC'D: 05/19/81
REPORT DATE: 06/02/81 SAMPLED BY: UP&L

WASTEWATER ANALYSIS

PH	8.3	UNITS
BOD-5	1.5	MG/L
TSS	4.0	MG/L
OIL/GREASE	2.4	MG/L
T. COLI	4	MPN/100ML
F. COLIFORM	<2	MPN/100ML

CHEMICAL ANALYSIS

CALCIUM	104.0	MG/L
MAGNESIUM	65.00	MG/L
POTASSIUM	5.00	MG/L
SODIUM	50.00	MG/L
SP. COND	1030	UHMOS/CM
TDS	660.0	MG/L
BICARB. ALK	352.8	MG/L CACO3 430.4 HCO_3
CHLORIDE	33.1	MG/L
FLOURIDE	0.31	MG/L
NO2-N	<0.002	MG/L
ORHTO-PHOS.	<0.002	MG/L
SULFATE	264.6	MG/L
SILICA	10.7	MG/L
T. ALK	352.8	MG/L CACO3
Acidity	< 1.0	

METALLIC ANALYSIS

CADMIUM	<0.005	MG/L
IRON	19.00	MG/L
LEAD	<0.001	MG/L
MANGANESE	0.02	MG/L
ZINC	0.026	MG/L

*Analyses forthcoming for Arsenic, [redacted], Selenium, TKN

T. CATION 12.8 MEQ/L T. ANION 13.5 MEQ/L
TDS/COND 0.641 TDS BAL 660: 517

RAY A. SIM, MANAGER

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BOX 1140 HUNTINGTON, UTAH 84528 (801) 653-2314

CERTIFICATE OF ANALYSES

For Utah Power & Light Co.
Mining & Exploration
Field Office
Huntington, Utah 84528

Lab. No. See Below

Date Rec'd. 05-19-81

Date Sampled 05-19-81

Lab No.	Sample ID	TKN	As (mg/l)	Se (mg/l)
1823	Cottonwood Cr. St. Cnyn Fork	*	<0.0010	0.0002
1824	Cottonwood Cr USGS Flume	*	<0.0010	<0.0002
1825	Cottonwood Cr Below Tr. Mtn.	*	<0.0010	0.0002
1826	Cottonwood Cr. Above TR. Mtn.	*	<0.0010	0.0002

Laboratory repeated testing twice with unsatisfactory results. Unable to continue testing.

Respectfully Submitted

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UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: COTTONWOOD CANYON-A. TR. MT. MINE LAB NUMBER W-2152
DATE SAMPLED: 09. 02. 81 DATE REC'D: 09. 02. 81
REPORT DATE: 09. 25. 81 SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	8. 2 UNITS
BOD-5	0. 9 MG/L
TSS	1. 5 MG/L
OIL & GREASE	<0. 5 MG/L
T. COLIFORM	<2 MPN/100ML
F. COLIFORM	<2 MPN/100ML

CHEMICAL ANALYSIS

CALCIUM	91. 5 MG/L	
MAGNESIUM	37. 50 MG/L	
POTASSIUM	5. 50 MG/L	
SODIUM	21. 00 MG/L	
SP. COND	600 UHMOS/CM	
TDS	369. 0 MG/L	
BICARB. ALK	263. 0 MG/L CACO3	(321 HCO_3)
CHLORIDE	15. 4 MG/L	
FLOURIDE	0. 21 MG/L	
NO2-N	<0. 002 MG/L	
ORHTO-PHOS.	<0. 002 MG/L	
SULFATE	187. 0 MG/L	
SILICA	6. 9 MG/L	
T. ALK	263. 0 MG/L CACO3	

Acidity <1.0
T.K.N. to follow

T. CATION 8. 7 MEQ/L T. ANION 9. 6 MEQ/L
TDS/COND 0. 615 TDS BAL 369: 352

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UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: COTTONWOOD CANYON-A. TR. MT. MINE LAB NUMBER W-2152
DATE SAMPLED: 09. 02. 81 DATE REC'D: 09. 02. 81
REPORT DATE: 09. 25. 81 SAMPLED BY: UPL

METALLIC ANALYSIS

ARSENIC	<0. 0003 MG/L
CADMIUM	<0. 005 MG/L
IRON	0. 11 MG/L
LEAD	<0. 001 MG/L
MANGANESE	0. 10 MG/L
SELENIUM	<0. 0003 MG/L
ZINC	0. 031 MG/L

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UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: COTTONWOOD CANYON-B. TR. MT. MINE LAB NUMBER W-2153
DATE SAMPLED: 09. 02. 81 DATE REC'D: 09. 02. 81
REPORT DATE: 09. 28. 81 SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	8. 2	UNITS
BOD-5	9. 9	MG/L
TSS	47. 0	MG/L
OIL/GREASE	0. 6	MG/L
T. COLI	21	MPN/100ML
F. COLIFORM	<2	MPN/100ML

CHEMICAL ANALYSIS

CALCIUM	84. 0	MG/L
MAGNESIUM	39. 00	MG/L
POTASSIUM	5. 50	MG/L
SODIUM	21. 50	MG/L
SP. COND	600	UHMOS/CM
TDS	347. 0	MG/L
BICARB. ALK	265. 0	MG/L CACO3 (323 mg/l HCO_3)
CHLORIDE	17. 0	MG/L
FLOURIDE	0. 20	MG/L
NO2-N	<0. 002	MG/L
ORHTO-PHOS.	<0. 002	MG/L
SULFATE	173. 0	MG/L
SILICA	7. 8	MG/L
T. ALK	265. 0	MG/L CACO3

T.K.N. to follow
Acidity <1.0

METALLIC ANALYSIS

ARSENIC	<0. 0003	MG/L
CADMIUM	<0. 005	MG/L
IRON	0. 30	MG/L
LEAD	<0. 001	MG/L
MANGANESE	0. 12	MG/L
SELENIUM	<0. 0003	MG/L
ZINC	0. 010	MG/L

T. CATION 8. 5 MEQ/L T. ANION 8. 4 MEQ/L
TDS/COND 0. 578 TDS BAL 347: 335

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UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: COTTONWOOD CANYON-USGS FLUME LAB NUMBER W-2154
DATE SAMPLED: 09. 02. 81 DATE REC'D: 09. 02. 81
REPORT DATE: 09. 25. 81 SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	8. 5 UNITS
BOD-5	1. 7 MG/L
TSS	4. 0 MG/L
OIL & GREASE	<0. 5 MG/L
T. COLI	17 MPN/100ML
F. COLIFORM	<2 MPN/100ML

CHEMICAL ANALYSIS

CALCIUM	68. 5 MG/L
MAGNESIUM	38. 50 MG/L
POTASSIUM	5. 00 MG/L
SODIUM	21. 00 MG/L
SP. COND	500 UHMOS/CM
TDS	345. 0 MG/L
BICARB. ALK	200. 0 MG/L CACO3 (244 HCO_3)
CHLORIDE	16. 3 MG/L
FLOURIDE	0. 19 MG/L
NO2-N	<0. 002 MG/L
ORHTO-PHOS.	<0. 002 MG/L
SULFATE	165. 0 MG/L
SILICA	7. 5 MG/L
T. ALK	226. 0 MG/L CACO3

Acidity <1.0
Phenolphthalein Alk. 13.2 as $CaCo_3$
TKN to follow

METALLIC ANALYSIS

ARSENIC	<0. 0003 MG/L
CADMIUM	<0. 005 MG/L
IRON	0. 10 MG/L
LEAD	<0. 001 MG/L
MANGANESE	0. 10 MG/L
SELENIUM	<0. 0003 MG/L
ZINC	0. 051 MG/L

T. CATION 7. 6 MEQ/L T. ANION 7. 9 MEQ/L
TDS/COND 0. 690 TDS BAL 345: 309

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UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: COTTONWOOD CANYON-A. STRAIGHT CANYON
LAB NUMBER W-2155
DATE SAMPLED: 09. 02. 81 DATE REC'D: 09. 02. 81
REPORT DATE: 09. 25. 81 SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	8. 5	UNITS
BOD-5	3. 9	MG/L
TSS	21. 0	MG/L
OIL/GREASE	1. 2	MG/L
T. COLIFORM	<2	MPN/100ML
F. COLIFORM	<2	MPN/100ML

CHEMICAL ANALYSIS

CALCIUM	71. 0	MG/L
MAGNESIUM	41. 00	MG/L
POTASSIUM	6. 00	MG/L
SODIUM	26. 50	MG/L
SP. COND	600	UHMOS/CM
TDS	396. 0	MG/L
BICARB. ALK	224. 0	MG/L CACO3 (273 HCO_3)
CHLORIDE	19. 9	MG/L
FLOURIDE	0. 19	MG/L
NO2-N	<0. 002	MG/L
ORHTO-PHOS.	<0. 002	MG/L
SULFATE	192. 0	MG/L
SILICA	7. 6	MG/L
T. ALK	242. 0	MG/L CACO3

Acidity <1.0
Phenolphthalein Alk. 8.8 as $CaCo_3$
T.K.N. to follow

METALLIC ANALYSIS

ARSENIC	<0. 0003	MG/L
CADMIUM	<0. 005	MG/L
IRON	0. 17	MG/L
LEAD	<0. 001	MG/L
MANGANESE	0. 12	MG/L
SELENIUM	<0. 0003	MG/L
ZINC	0. 029	MG/L

T. CATION 8. 2 MEQ/L T. ANION 9. 1 MEQ/L
TDS/COND 0. 660 TDS BAL 396: 350

RAY A. SIM, MANAGER

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BOX 1140 HUNTINGTON, UTAH 84528 (801) 653-2314

CERTIFICATE OF ANALYSES

For Utah Power & Light co.
P.O. Box 899
Salt Lake City, Utah 84110

Sample ID: Cottonwood Creek

Lab. No. As Noted Below

Date Rec'd. 09-02-81

Date Sampled 09-02-81

Lab No.	Sample ID:	T.K.N.
W-2152	Above Trail Mt. Mine	0.25 mg/l
W-2153	Below Trail Mt. Mine	0.20 mg/l
W-2154	USGS Flume	0.10 mg/l
W-2155	Above Straight Canyon	0.22 mg/l

Respectfully Submitted

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UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: COTTONWOOD CR. A. TRAIL MT. LAB NUMBER W-2238
DATE SAMPLED: 12. 01. 91 DATE RCV'D: 12. 02. 91
REPORT DATE: 12. 15. 91 SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	8. 3	UNITS
BOD-5	1. 8	MG/L
TSS	77. 0	MG/L
TKN	0. 2	MG/L
OIL/GREASE	1. 6	MG/L
T. COLIFORM	<2	MPN/100ML
F. COLIFORM	<2	MPN/100ML

CHEMICAL ANALYSIS

CALCIUM	96. 0	MG/L	
MAGNESIUM	41. 96	MG/L	
POTASSIUM	9. 58	MG/L	
SODIUM	47. 50	MG/L	
TDS	347. 0	MG/L	
BICARB. ALK	314. 0	MG/L	CACO2
CHLORIDE	12. 6	MG/L	
FLOURIDE	0. 21	MG/L	
NO2-N	<0. 002	MG/L	
O. PHOS	0. 005	MG/L	
SULFATE	119. 0	MG/L	
SILICA	6. 2	MG/L	
T. ALK	314. 0	MG/L	CACO3

Acidity <1.0 mg/l

(HCO_3 383mg/l)

METALLIC ANALYSIS

ARSENIC	<0. 0003	MG/L
CADMIUM	<0. 005	MG/L
IRON	0. 57	MG/L
LEAD	<0. 001	MG/L
MANGANESE	0. 13	MG/L
SELENIUM	<0. 0063	MG/L
ZINC	0. 035	MG/L

T. CATION 10. 5 MEQ/L T. ANION 8. 8 MEQ/L
TDS/COND 0. 351 TDS BAL 347: 317

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UTAH POWER & LIGHT CO.
MAG FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: COTTONWOOD CR B. TAHIL MT. LAB NUMBER W-2329
DATE SAMPLED: 12 02 92 DATE REC'D: 12 02 92
REPORT DATE: 12 15 92 SAMPLED BY JPL

WASTEWATER ANALYSIS

PH	8.3 UNITS
BOD-5	1.2 MG/L
TSS	40.0 MG/L
TKN	0.2 MG/L
OIL & GREASE	<0.5 MG/L
T. COLI	26 MPN/100ML
F. COLIFORM	<2 MPN/100ML

CHEMICAL ANALYSIS

CALCIUM	98.9 MG/L	
MAGNESIUM	49.08 MG/L	
POTASSIUM	5.10 MG/L	
SODIUM	44.70 MG/L	
TDS	358.0 MG/L	
BICARB. ALK	323.0 MG/L CACO3	(HCO$_3$ 394 mg/l)
CHLORIDE	12.4 MG/L	
FLOURIDE	0.21 MG/L	
NO2-N	<0.002 MG/L	
O. PHOS	0.002 MG/L	
SULFATE	120.0 MG/L	
SILICA	7.8 MG/L	
T. ALK	322.0 MG/L CACO3	

Acidity 1.0 mg/l

METALLIC ANALYSIS

ARSENIC	<0.002 MG/L
CADMIUM	<0.005 MG/L
IRON	0.56 MG/L
LEAD	<0.001 MG/L
MANGANESE	0.11 MG/L
SELENIUM	<0.003 MG/L
ZINC	0.049 MG/L

T. CATION 11.0 MEQ/L T. ANION 9.1 MEQ/L
TDS/COND 0.352 TDS BAL 308. 326

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UTAH POWER & LIGHT CO.
MAE FIELD OFFICE
HUNTINGTON UTAH 84528.

SAMPLE ID: COTTONWOOD CR. TRAIL MT. CANYON U605
LAB NUMBER W-2340
DATE SAMPLED: 12. 01. 91 DATE REC'D: 12. 02. 91
REPORT DATE: 12. 15. 91 SAMPLER: BY UP.

WASTEWATER ANALYSIS

PH	8. 4	UNITS
BOD-5	2. 4	MG/L
TSS	129. 0	MG/L
TKN	0. 1	MG/L
OIL & GREASE	<0. 5	MG/L
T. COLI	14	MPN/100ML
F. COLIFORM	<2	MPN/100ML

CHEMICAL ANALYSIS

CALCIUM	113. 0	MG/L	
MAGNESIUM	52. 30	MG/L	
POTASSIUM	1. 90	MG/L	
SODIUM	40. 70	MG/L	
TDS	385. 0	MG/L	
BICARB. ALK	334. 0	MG/L	CACO3
CHLORIDE	14. 3	MG/L	
FLOURIDE	0. 21	MG/L	
NO2-N	<0. 002	MG/L	
O. PHOS	0. 006	MG/L	
SULFATE	153. 0	MG/L	
SILICA	10. 3	MG/L	
T ALK	334. 0	MG/L	CACO3

Acidity 1.0 mg/l
Phenolphthalein Alk. 2.30 mg/l $CaCo_3$

(HCO_3 402 mg/l)

METALLIC ANALYSIS

ARSENIC	<0. 0003	MG/L
CADMIUM	<0. 005	MG/L
IRON	0. 81	MG/L
LEAD	<0. 001	MG/L
MANGANESE	0. 12	MG/L
SELENIUM	<0. 0003	MG/L
ZINC	0. 056	MG/L

T. CATION 11. 9 MEQ/L T. ANION 10. 2 MEQ/L
TDS/COND 0. 385 TDS BAL 385 / 383

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UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: COTTONWOOD CR @ STRAIGHT CANYON
LAB NUMBER W-2341
DATE SAMPLED: 12.01.81 DATE REC'D: 12.02.81
REPORT DATE 12.15.81 SAMPLED BY: [illegible]

WASTEWATER ANALYSIS

PH	8.4 UNITS
BOD-5	3.9 MG/L
TSS	65.0 MG/L
TKN	0.3 MG/L
OIL & GREASE	<0.5 MG/L
T. COLIFORM	<2 MPN/100ML
F. COLIFORM	<2 MPN/100ML

CHEMICAL ANALYSIS

CALCIUM	105.0 MG/L	
MAGNESIUM	57.70 MG/L	
POTASSIUM	4.00 MG/L	
SODIUM	50.30 MG/L	
TDS	463.0 MG/L	
BICARB. ALK	319.0 MG/L CACO3	(HCO_3 381 mg/l)
CHLORIDE	17.1 MG/L	
FLOURIDE	0.22 MG/L	
NO2-N	<0.002 MG/L	
O. PHOS	0.057 MG/L	
SULFATE	192.0 MG/L	
SILICA	8.1 MG/L	
T. ALK	319.0 MG/L CACO3	

Acidity 1.0 mg/l
Phenolphthalein Alk. 3.45 mg/l $CaCo_3$

METALLIC ANALYSIS

ARSENIC	<0.0002 MG/L
CADMIUM	<0.005 MG/L
IRON	0.56 MG/L
LEAD	<0.001 MG/L
MANGANESE	0.10 MG/L
SELENIUM	<0.0002 MG/L
ZINC	0.093 MG/L

T. CATION 12.3 MEQ/L T. ANION 10.6 MEQ/L
TDS/COND 0.468 TDS BAL 463. 422

APPENDIX E

CERTIFICATE OF ANALYSIS

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

FOR Utah Power & Light
Field Office

FLOW:< 5 GPM
TEMP: 60°F

Lab. No. 1845
Date Rec. 05-26-81
Date Sampled 05-26-81

Sample ID Right Fork Grimes Wash Above Wilberg Mine

pH	8.2	Units	Arsenic		mg/l
Alkalinity, Total		mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride		mg/l	Chromium		mg/l
Conductivity	600	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.01	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese	0.02	mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	379.0	mg/l			
Solids, Total Suspended	46.5	mg/l			
Sulfate		mg/l			

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 1844

FOR Utah Power & Light
Field Office

FLOW: 25-30 GPM
TEMP: 56°F

Date Rec. 05-26-81

Date Sampled 05-26-81

Sample ID Left Fork Grimes Wash Above Wilberg Mine

pH	8.2	Units
Alkalinity, Total		mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride		mg/l
Conductivity	610	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	379.0	mg/l
Solids, Total Suspended	< 2.0	mg/l
Sulfate		mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.07	mg/l
Lead		mg/l
Manganese	0.02	mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

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

Lab. No. 1846

FOR Utah Power & Light
Field Office

FLOW: 150-200 GPM
TEMP: 60°F

Date Rec. 05-26-81

Date Sampled 05-26-81

Sample ID Grimes Wash Below Wilberg Mine

pH	8.2	Units
Alkalinity, Total		mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride		mg/l
Conductivity	790	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	434.0	mg/l
Solids, Total Suspended	<2.0	mg/l
Sulfate		mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.02	mg/l
Lead		mg/l
Manganese	0.03	mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

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

Lab. No. 1885

FOR Utah Power & Light
Field Office

FLOW: <5 GPM
TEMP: 63°F

Date Rec. 06-11-81

Date Sampled 06-11-81

Sample ID Grimes Wash Above Mine-Right Fork

pH	8.5	Units	Arsenic		mg/l
Alkalinity, Total		mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride		mg/l	Chromium		mg/l
Conductivity	700	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.29	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese	0.02	mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	475.0	mg/l			
Solids, Total Suspended	1.5	mg/l			
Sulfate		mg/l			

Respectfully submitted

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

Lab. No. 1886

FOR Utah Power & Light
Field Office

FLOW: 10-15 GPM
TEMP: 59°F

Date Rec. 06-11-81

Date Sampled 06-11-81

Sample ID Grimes Wash Above Mine-Left Fork

pH	8.3	Units	Arsenic		mg/l
Alkalinity, Total		mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride		mg/l	Chromium		mg/l
Conductivity	750	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.23	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese	0.02	mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	518.0	mg/l			
Solids, Total Suspended	8.0	mg/l			
Sulfate		mg/l			

Respectfully submitted

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

Lab. No. 1887

FOR Utah Power & Light
Field Office

FLOW: 100-150 GPM
TEMP: 61°F

Date Rec. 06-11-81

Date Sampled 06-11-81

Sample ID Grimes Wash Below Mine

pH	8.0	Units	Arsenic		mg/l
Alkalinity, Total		mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride		mg/l	Chromium		mg/l
Conductivity	950	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.01	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese	0.01	mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	655.0	mg/l			
Solids, Total Suspended	3.5	mg/l			
Sulfate		mg/l			

Respectfully submitted

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

FOR Utah Power & Light
Mining & Exploration Field Office
Industrial Training Center
Huntington, Utah 84528

Sample ID Grimes Wash Left Fork

FLOW: 5-10 GPM
TEMP: 62°F

Lab. No. 2015
Date Rec. 07-20-81
Date Sampled 07-20-81

pH	8.3	Units
Alkalinity, Total		mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride		mg/l
Conductivity	680	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	514.0	mg/l
Solids, Total Suspended	8.5	mg/l
Sulfate		mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.29	mg/l
Lead		mg/l
Manganese	0.03	mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

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CERTIFICATE OF ANALYSIS

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

Lab. No. 2014

FOR Utah Power & Light Co.
Mining & Exploration Field Office
Industrial Training Center
Huntington, Utah 84528

FLOW: ~~8200~~ 10-15 GPM
TEMP: 59°F

Date Rec. 07-20-81

Date Sampled 07-20-81

Sample ID Grimes Wash Below Mine

pH	8.1 Units	Arsenic	mg/l
Alkalinity, Total	mg/l $CaCo_3$	Beryllium	mg/l
Alkalinity, Bicarbonate	mg/l $CaCo_3$	Boron	mg/l
Calcium	mg/l	Cadmium	mg/l
Chloride	mg/l	Chromium	mg/l
Conductivity	1040 µmhos/cm	Copper	mg/l
Dissolved Oxygen	mg/l	Iron	0.04 mg/l
Hardness	mg/l $CaCo_3$	Lead	mg/l
Magnesium	mg/l	Manganese	0.01 mg/l
Nitrogen, Nitrate	mg/l	Mercury	µg/l
Phosphorus, Total	mg/l	Nickel	mg/l
Phosphorus, Ortho	mg/l	Selenium	mg/l
Potassium	mg/l	Zinc	mg/l
Sodium	mg/l		
Solids, Total Dissolved	635.0 mg/l		
Solids, Total Suspended	19.5 mg/l		
Sulfate	mg/l		

Respectfully submitted

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

Lab. No. 2101

FOR Utah Power & Light co.
Mining & Exploration

Date Rec. 08-21-81

FLOW: 5 GPM
TEMP: 63°F

Date Sampled 08-20-81

Sample ID Grimes Wash (Left Fork)

pH	8.0	Units	Arsenic		mg/l
Alkalinity, Total		mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride		mg/l	Chromium		mg/l
Conductivity	690	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.30	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese	0.05	mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	401	mg/l			
Solids, Total Suspended	< 0.5	mg/l			
Sulfate		mg/l			

Respectfully submitted

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

Lab. No. 2100

FOR Utah Power & Light Co.
Mining & Exploration

Date Rec. 08-21-81

FLOW: 100-150 GPM
TEMP: 63°F

Date Sampled 08-20-81

Sample ID Grimes Wash (below mine)

pH	8.3 Units	Arsenic	mg/l
Alkalinity, Total	mg/l $CaCo_3$	Beryllium	mg/l
Alkalinity, Bicarbonate	mg/l $CaCo_3$	Boron	mg/l
Calcium	mg/l	Cadmium	mg/l
Chloride	mg/l	Chromium	mg/l
Conductivity	1100 µmhos/cm	Copper	mg/l
Dissolved Oxygen	mg/l	Iron	0.06 mg/l
Hardness	mg/l $CaCo_3$	Lead	mg/l
Magnesium	mg/l	Manganese	0.01 mg/l
Nitrogen, Nitrate	mg/l	Mercury	µg/l
Phosphorus, Total	mg/l	Nickel	mg/l
Phosphorus, Ortho	mg/l	Selenium	mg/l
Potassium	mg/l	Zinc	mg/l
Sodium	mg/l		
Solids, Total Dissolved	715 mg/l		
Solids, Total Suspended	< 0.5 mg/l		
Sulfate	mg/l		

Respectfully submitted

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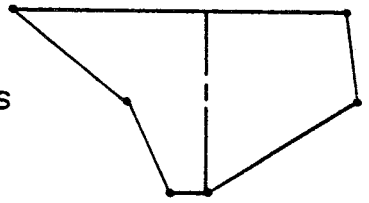
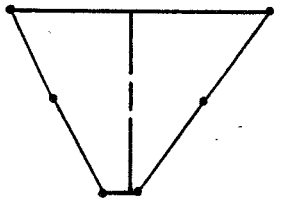
APPENDIX F

CATION-ANION DIAGRAMS

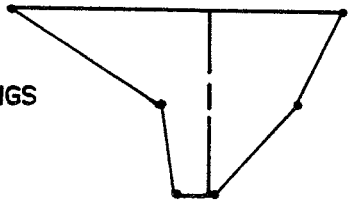
ELK SPRINGS
7/1/81
TDS 351

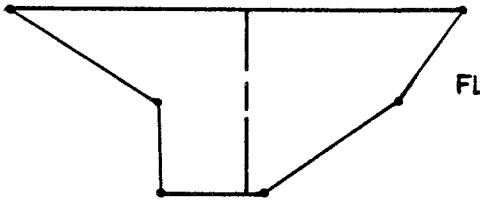




ELK SPRINGS
11/4/81
TDS 233

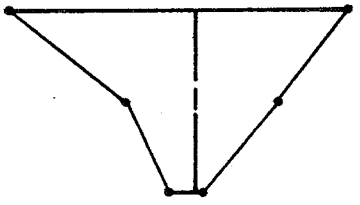
PINE SPRINGS
7/2/81
TDS 310

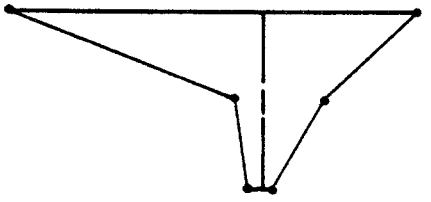




FLAG LAKE
11/3/81
TDS 522

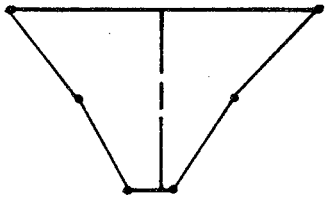
TED'S TUB
7/2/81
TDS 316

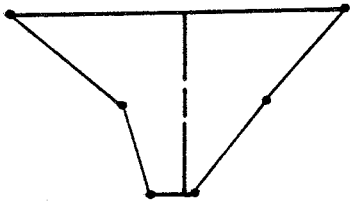




TED'S TUB
11/4/81
TDS 289

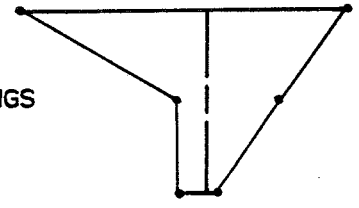
BURNT TREE
7/1/81
TDS 286

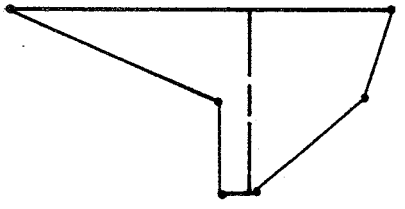




BURNT TREE
11/4/81
TDS 300

SHEBA SPRINGS
7/1/81
TDS 271

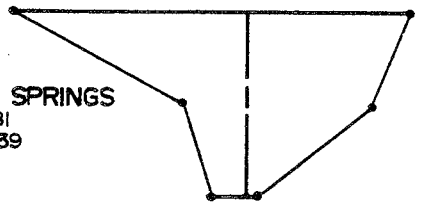


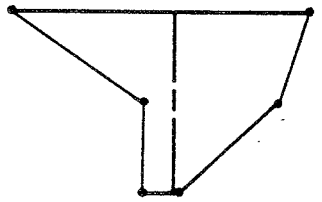


SHEBA SPRINGS
11/4/81
TDS 348

CATION-ANION DIAGRAMS

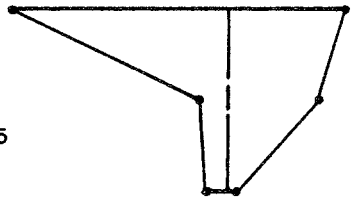
COVE NORTH SPRINGS
7/2/81
TDS 339

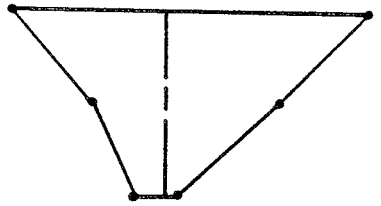




79-1
7/1/81
TDS 267

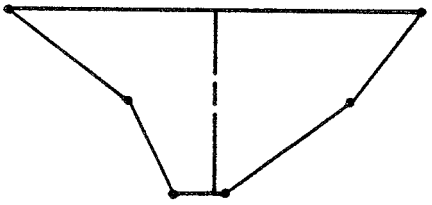
79-1
11/4/81
TDS 265

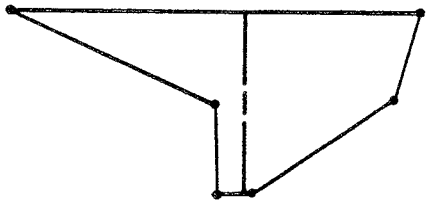




79-2
7/1/81
TDS 290

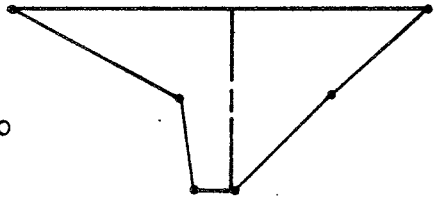
79-3
7/1/81
TDS 359

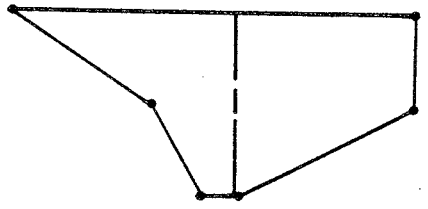




79-5
7/1/81
TDS 340

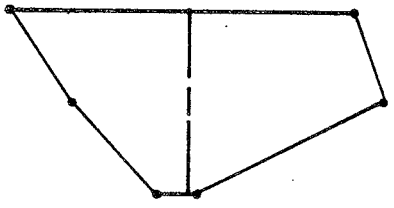
79-7
7/2/81
TDS 280

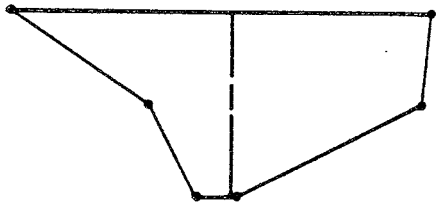




79-8
7/1/81
TDS 390

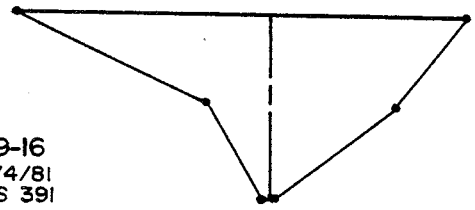
79-15
7/3/81
TDS 430



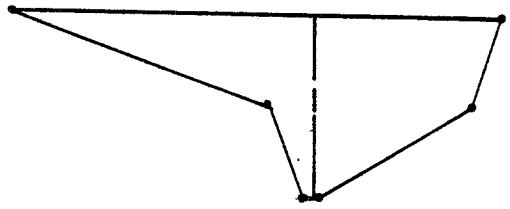


79-15
8/4/81
TDS 430

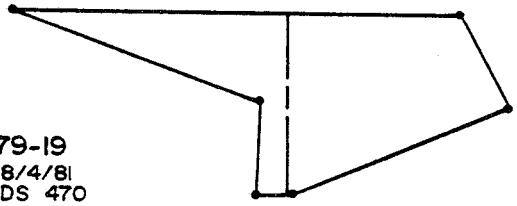
CATION-ANION DIAGRAM



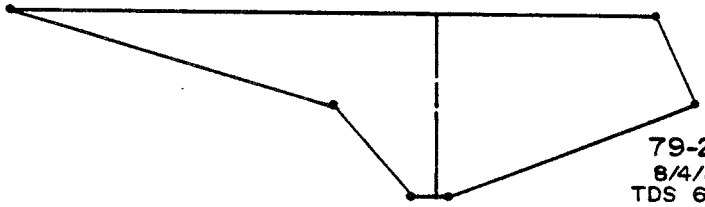
79-16
8/4/81
TDS 391



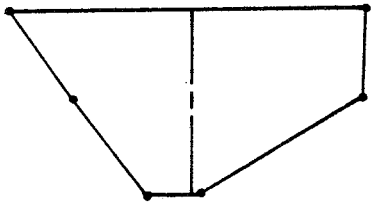
79-18
8/4/81
TDS 400



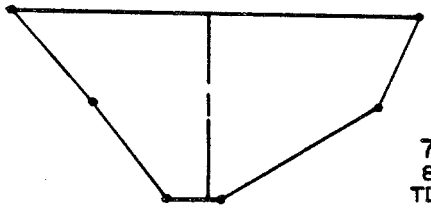
79-19
8/4/81
TDS 470



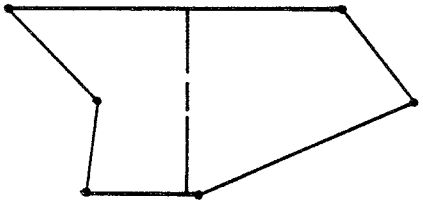
79-25
8/4/81
TDS 610



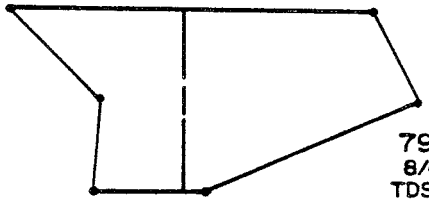
79-27
7/3/81
TDS 420



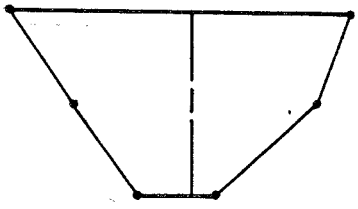
79-27
8/4/81
TDS 420



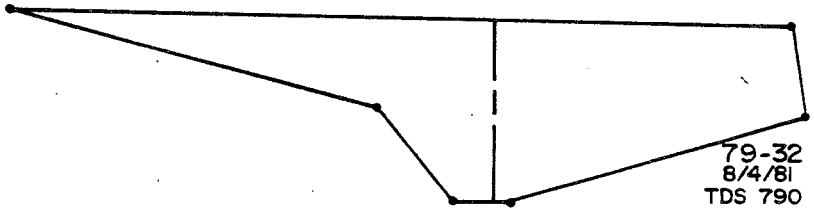
79-28
7/3/81
TDS 500



79-28
8/4/81
TDS 500

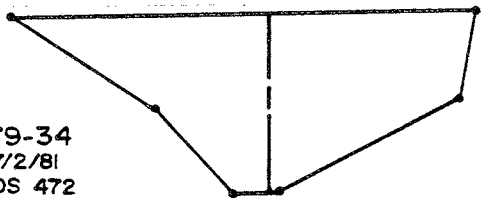


79-29
7/3/81
TDS 397

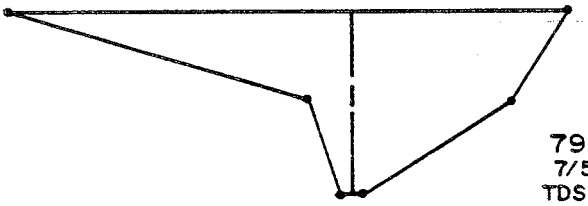


79-32
8/4/81
TDS 790

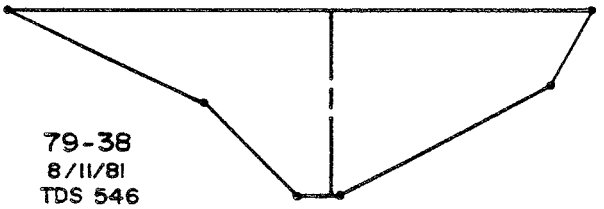
CATION-ANION DIAGRAMS



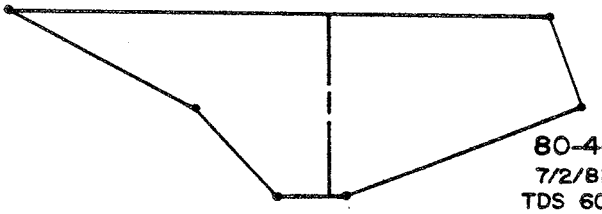
79-34
7/2/81
TDS 472



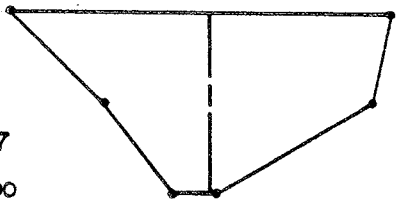
79-35
7/5/81
TDS 607



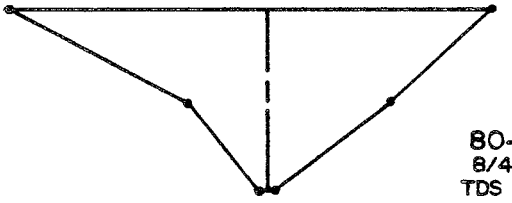
79-38
8/11/81
TDS 546



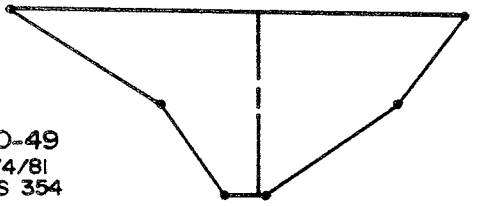
80-44
7/2/81
TDS 607



80-47
7/2/81
TDS 390



80-48
8/4/81
TDS 356



80-49
8/4/81
TDS 354

APPENDIX G

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

UTAH POWER & LIGHT CO.
P. O. BOX 899
SLAT LAKE CITY UTAH 84110

SAMPLE ID: PINE SPRING
DATE SAMPLED: 07. 02. 81
REPORT DATE: 07. 20. 81

LAB NUMBER W-1993
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 7	UNITS
TSS	0. 5	MG/L

CHEMICAL ANALYSIS

CALCIUM	108. 2	MG/L
DISS. FE	0. 360	MG/L
MAGNESIUM	16. 00	MG/L
POTASSIUM	8. 00	MG/L
SODIUM	12. 00	MG/L
SP. COND	460	UHMOS/CM
TDS	310. 0	MG/L
BICARB. ALK	218. 5	MG/L CACO3
CHLORIDE	3. 2	MG/L
FLOURIDE	0. 26	MG/L
SULFATE	120. 1	MG/L
T. ALK	218. 5	MG/L CACO3
TURBIDITY	0. 5	NTU

T. CATION 7. 4 MEQ/L T. ANION 7. 0 MEQ/L
TDS/COND 0. 674 TDS BAL 310: 260

Flow 2.6 gpm
Temp. 42° F
5.56 °C

RAY A. SIM, MANAGER

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UTAH POWER & LIGHT CO.
P. O. BOX 899
SLAT LAKE CITY UTAH 84110

SAMPLE ID: BURNT TREE SPRG
DATE SAMPLED: 07. 01. 81
REPORT DATE: 07. 20. 81

LAB NUMBER W-1992
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 6	UNITS
TSS	<2	MG/L

CHEMICAL ANALYSIS

CALCIUM	79. 5	MG/L
DISS. FE	0. 240	MG/L
MAGNESIUM	27. 00	MG/L
POTASSIUM	8. 50	MG/L
SODIUM	17. 50	MG/L
SP. COND	500	UHMOS/CM
TDS	286. 0	MG/L
BICARB. ALK	269. 1	MG/L CACO3
CHLORIDE	5. 8	MG/L
FLOURIDE	0. 26	MG/L
SULFATE	96. 1	MG/L
T. ALK	269. 1	MG/L CACO3
TURBIDITY	0. 7	NTU

T. CATION 7. 2 MEQ/L
TDS/COND 0. 572

T. ANION 7. 6 MEQ/L
TDS BAL 286: 226

Flow 9.2 gpm
Temp 45° F
7.22° C

RAY A. SIM, MANAGER

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UTAH POWER & LIGHT CO.
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SLAT LAKE CITY UTAH 84110

SAMPLE ID: SHEBA SPRING
DATE SAMPLED: 07. 01. 81
REPORT DATE: 07. 20. 81

LAB NUMBER W-1991
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7.5	UNITS
TSS	2.0	MG/L

CHEMICAL ANALYSIS

CALCIUM	101.0	MG/L
DISS. FE	0.260	MG/L
MAGNESIUM	11.50	MG/L
POTASSIUM	9.00	MG/L
SODIUM	14.00	MG/L
SP. COND	490	UHMOS/CM
TDS	271.0	MG/L
BICARB. ALK	223.1	MG/L CACO3
CHLORIDE	3.4	MG/L
FLOURIDE	0.23	MG/L
SULFATE	91.3	MG/L
T. ALK	223.1	MG/L CACO3
TURBIDITY	1.2	NTU

T. CATION 6.8 MEQ/L T. ANION 6.5 MEQ/L
TDS/COND 0.553 TDS BAL 271: 221

Flow 10.7 gpm
Temp. 50 °F
10 °C

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SLAT LAKE CITY UTAH 84110

SAMPLE ID: ELK SPRING
DATE SAMPLED: 07. 01. 81
REPORT DATE: 07. 20. 81

LAB NUMBER W-1990
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 6	UNITS
TSS	1. 0	MG/L

CHEMICAL ANALYSIS

CALCIUM	105. 0	MG/L
DISS. FE	0. 200	MG/L
MAGNESIUM	25. 00	MG/L
POTASSIUM	9. 00	MG/L
SODIUM	15. 50	MG/L
SP. COND	500	UHMOS/CM
TDS	351. 0	MG/L
BICARB. ALK	236. 9	MG/L CACO3
CHLORIDE	4. 0	MG/L
FLOURIDE	0. 25	MG/L
SULFATE	196. 9	MG/L
T. ALK	236. 9	MG/L CACO3
TURBIDITY	0. 6	NTU

T. CATION 8. 2 MEQ/L T. ANION 9. 0 MEQ/L
TDS/COND 0. 702 TDS BAL 351: 346

Flow 145.4 gpm
Temp. 38° F
3.33° C

RAY A. SIM, MANAGER

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UTAH POWER & LIGHT CO.
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SLAT LAKE CITY UTAH 84110

SAMPLE ID: TEDS BATH TUB
DATE SAMPLED: 07. 02. 81
REPORT DATE: 07. 20. 81

LAB NUMBER W-1989
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

· PH	7. 7	UNITS
· TSS	2. 0	MG/L

CHEMICAL ANALYSIS

· CALCIUM	100. 2	MG/L
· DISS. FE	0. 240	MG/L
· MAGNESIUM	22. 00	MG/L
· POTASSIUM	8. 00	MG/L
· SODIUM	14. 50	MG/L
· SP. COND	520	UHMOS/CM
· TDS	316. 0	MG/L
· BICARB. ALK	251. 9	MG/L CACO3
· CHLORIDE	5. 0	MG/L
· FLOURIDE	0. 26	MG/L
· SULFATE	110. 5	MG/L
· T. ALK	251. 9	MG/L CACO3
· TURBIDITY	1. 1	NTU

T. CATION 7. 6 MEQ/L T. ANION 7. 5 MEQ/L
TDS/COND 0. 608 TDS BAL 316: 252

Flow 27.3 gpm
Temp. 40° F
4.44° C

RAY A. SIM. MANAGER

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SLAT LAKE CITY UTAH 84110

SAMPLE ID: COVE NO. SPRG.
DATE SAMPLED: 07. 02. 81
REPORT DATE: 07. 20. 81

LAB NUMBER W-1988
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 6	UNITS
TSS	<2	MG/L

CHEMICAL ANALYSIS

CALCIUM	128. 0	MG/L
DISS. FE	0. 300	MG/L
MAGNESIUM	21. 00	MG/L
POTASSIUM	8. 00	MG/L
SODIUM	19. 50	MG/L
SP. COND	590	UHMOS/CM
TDS	339. 0	MG/L
BICARB. ALK	264. 5	MG/L CACO3
CHLORIDE	6. 6	MG/L
FLOURIDE	0. 27	MG/L
SULFATE	163. 3	MG/L
T. ALK	264. 5	MG/L CACO3
TURBIDITY	0. 7	NTU

T. CATION 9. 2 MEQ/L T. ANION 8. 9 MEQ/L
TDS/COND 0. 575 TDS BAL 339: 338

Flow 6.9 gpm
Temp. 42° F
5.56° C

RAY A. SIM, MANAGER

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UTAH POWER & LIGHT CO.
P. O. BOX 899
SALT LAKE CITY UTAH 84110

SAMPLE ID: EMS 80-47
DATE SAMPLED: 07. 02. 81
REPORT DATE: 07. 20. 81

LAB NUMBER W-1987
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 6	UNITS
TSS	1. 5	MG/L

CHEMICAL ANALYSIS

CALCIUM	110. 2	MG/L
DISS. FE	0. 280	MG/L
MAGNESIUM	33. 50	MG/L
POTASSIUM	7. 50	MG/L
SODIUM	20. 50	MG/L
SP. COND	610	UHMOS/CM
TDS	390. 0	MG/L
BICARB. ALK	295. 6	MG/L CACO3
CHLORIDE	5. 1	MG/L
FLOURIDE	0. 31	MG/L
SULFATE	220. 9	MG/L
T. ALK	295. 6	MG/L CACO3
TURBIDITY	0. 8	NTU

T. CATION 9. 3 MEQ/L
TDS/COND 0. 639

T. ANION 10. 7 MEQ/L
TDS BAL 390: 390

Flow 4.6 gpm
Temp. 38° F
3.33° C

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UTAH POWER & LIGHT CO.
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SALT LAKE CITY UTAH 84110

SAMPLE ID: EMS 80-44
DATE SAMPLED: 07. 02. 81
REPORT DATE: 07. 20. 81

LAB NUMBER W-1986
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 9	UNITS
TSS	47. 5	MG/L

CHEMICAL ANALYSIS

CALCIUM	174. 3	MG/L
DISS. FE	0. 300	MG/L
MAGNESIUM	43. 50	MG/L
POTASSIUM	7. 50	MG/L
SODIUM	26. 00	MG/L
SP. COND	850	UHMOS/CM
TDS	607. 0	MG/L
BICARB. ALK	356. 5	MG/L CACO3
CHLORIDE	12. 3	MG/L
FLOURIDE	0. 03	MG/L
SULFATE	335. 8	MG/L
T. ALK	356. 5	MG/L CACO3
TURBIDITY	20. 0	NTU

T. CATION 13. 6 MEQ/L
TDS/COND 0. 714

T. ANION 14. 5 MEQ/L
TDS BAL 607: 592

Flow 39.6 gpm
Temp. 44° F
6.67° C

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SALT LAKE CITY UTAH 84110

SAMPLE ID: EMS 79-34
DATE SAMPLED: 07. 02. 81
REPORT DATE: 07. 20. 81

LAB NUMBER W-1985
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 6	UNITS
TSS	14. 5	MG/L

CHEMICAL ANALYSIS

CALCIUM	144. 0	MG/L
DISS. FE	0. 360	MG/L
MAGNESIUM	38. 00	MG/L
POTASSIUM	7. 50	MG/L
SODIUM	19. 50	MG/L
SP. COND	710	UHMOS/CM
TDS	472. 0	MG/L
BICARB. ALK	335. 8	MG/L CACO3
CHLORIDE	8. 4	MG/L
FLOURIDE	0. 03	MG/L
SULFATE	251. 0	MG/L
T. ALK	335. 8	MG/L CACO3
TURBIDITY	2. 7	NTU

T. CATION 11. 4 MEQ/L
TDS/COND 0. 665

T. ANION 12. 2 MEQ/L
TDS BAL 472: 461

Flow 2.4 gpm
Temp. 41° F
5.° C

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SALT LAKE CITY UTAH 84110

SAMPLE ID: EMS 79-29
DATE SAMPLED: 07. 03. 81
REPORT DATE: 07. 20. 81

LAB NUMBER W-1984
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 7	UNITS
TSS	37. 0	MG/L

CHEMICAL ANALYSIS

CALCIUM	100. 2	MG/L
DISS. FE	0. 240	MG/L
MAGNESIUM	38. 50	MG/L
POTASSIUM	8. 00	MG/L
SODIUM	31. 50	MG/L
SP. COND	610	UHMOS/CM
TDS	397. 0	MG/L
BICARB. ALK	261. 1	MG/L CACO3
CHLORIDE	19. 6	MG/L
FLOURIDE	0. 39	MG/L
SULFATE	158. 8	MG/L
T. ALK	261. 1	MG/L CACO3
TURBIDITY	6. 6	NTU

T. CATION 9. 7 MEQ/L T. ANION 9. 1 MEQ/L
TDS/COND 0. 651 TDS BAL 397: 349

Flow 1.3 gpm
Temp. 40° F
4.44° C

RAY A. SIM, MANAGER

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

UTAH POWER & LIGHT
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: EMS 79-28
DATE SAMPLED: 07. 03. 81
REPORT DATE: 07. 17. 81

LAB NUMBER W-1983
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7.4	UNITS
TSS	2.5	MG/L

CHEMICAL ANALYSIS

CALCIUM	97.5	MG/L	
DISS. FE	0.260	MG/L	
MAGNESIUM	29.50	MG/L	
POTASSIUM	9.00	MG/L	
SODIUM	51.50	MG/L	
SP. COND	730	UHMOS/CM	
TDS	500.0	MG/L	
BICARB. ALK	250.7	MG/L CACO3	(305.9 mg/l HCO_3)
CHLORIDE	16.7	MG/L	
FLOURIDE	0.45	MG/L	
SULFATE	293.8	MG/L	
T. ALK	250.7	MG/L CACO3	
TURBIDITY	0.5	NTU	

T. CATION 9.8 MEQ/L
TDS/COND 0.685

T. ANION 11.6 MEQ/L
TDS BAL 500: 489

Flow 4. gpm
Temp. 40° F
4.44° C

RAY A. SIM, MANAGER

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

UTAH POWER & LIGHT
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: EMS 79-27
DATE SAMPLED: 07. 03. 81
REPORT DATE: 07. 17. 81

LAB NUMBER W-1982
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 9	UNITS
TSS	196. 0	MG/L

CHEMICAL ANALYSIS

CALCIUM	110. 0	MG/L	
DISS. FE	0. 320	MG/L	
MAGNESIUM	39. 00	MG/L	
POTASSIUM	7. 00	MG/L	
SODIUM	21. 50	MG/L	
SP. COND	550	UHMOS/CM	
TDS	420. 0	MG/L	
BICARB. ALK	280. 6	MG/L CACO3	(342.3 mg/l HCO_3)
CHLORIDE	8. 4	MG/L	
FLOURIDE	0. 03	MG/L	
SULFATE	220. 6	MG/L	
T. ALK	280. 6	MG/L CACO3	
TURBIDITY	25. 0	NTU	

T. CATION 9. 8 MEQ/L T. ANION 10. 5 MEQ/L
TDS/COND 0. 764 TDS BAL 420: 400

Flow 1.7 gpm
Temp. 42° F
5.56 °C

RAY A. SIM, MANAGER

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

UTAH POWER & LIGHT
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: EMS 79-15
DATE SAMPLED: 07. 03. 81
REPORT DATE: ~~0010220~~ 7/7/81

LAB NUMBER W-1981
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 5	UNITS
TSS	2. 0	MG/L

CHEMICAL ANALYSIS

CALCIUM	120. 5	MG/L	
DISS. FE	0. 200	MG/L	
MAGNESIUM	25. 50	MG/L	
POTASSIUM	6. 00	MG/L	
SODIUM	15. 00	MG/L	
SP. COND	550	UHMOS/CM	
TDS	430. 0	MG/L	
BICARB. ALK	272. 6	MG/L CACO3	(332.6 mg/l HCO_3)
CHLORIDE	4. 7	MG/L	
FLOURIDE	0. 26	MG/L	
SULFATE	246. 9	MG/L	
T. ALK	272. 6	MG/L CACO3	
TURBIDITY	0. 5	NTU	

T. CATION 8. 9 MEQ/L T. ANION 10. 7 MEQ/L
TDS/COND 0. 782 TDS BAL 430: 413

FLOW 4.5 gpm
TEMP. 42° F
5.56 °C

RAY A. SIM, MANAGER

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UTAH POWER & LIGHT
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: EMS 79-8
DATE SAMPLED: 07. 03. 81
REPORT DATE: ~~0ST0220~~ 7-17-81

LAB NUMBER W-1980
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 8	UNITS
TSS	376. 0	MG/L

CHEMICAL ANALYSIS

CALCIUM	121. 5	MG/L	
DISS. FE	0. 340	MG/L	
MAGNESIUM	28. 00	MG/L	
POTASSIUM	6. 50	MG/L	
SODIUM	16. 50	MG/L	
SP. COND	490	UHMOS/CM	
TDS	390. 0	MG/L	
BICARB. ALK	236. 9	MG/L CACO3	(289.0 mg/l HCO_3)
CHLORIDE	4. 8	MG/L	
FLOURIDE	0. 27	MG/L	
SULFATE	230. 4	MG/L	
T. ALK	236. 9	MG/L CACO3	
TURBIDITY	50. 0	NTU	

T. CATION	9. 3 MEQ/L	T. ANION	9. 7 MEQ/L
TDS/COND	0. 796	TDS BAL	390: 401

Flow 1.7 gpm
Temp. 50 °F
10 °C

RAY A. SIM, MANAGER

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UTAH POWER & LIGHT
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: EMS 79-7
DATE SAMPLED: 07. 03. 81
REPORT DATE: ~~G8T6228~~ 7/17/81

LAB NUMBER W-1979
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 6	UNITS
TSS	27. 0	MG/L

CHEMICAL ANALYSIS

CALCIUM	117. 5	MG/L	
DISS. FE	0. 340	MG/L	
MAGNESIUM	15. 50	MG/L	
POTASSIUM	5. 50	MG/L	
SODIUM	14. 00	MG/L	
SP. COND	500	UHMOS/CM	
TDS	280. 0	MG/L	
BICARB. ALK	268. 0	MG/L CACO3	(327.0 mg/l HCO_3)
CHLORIDE	3. 2	MG/L	
FLOURIDE	0. 25	MG/L	
SULFATE	128. 4	MG/L	
T. ALK	268. 0	MG/L CACO3	
TURBIDITY	4. 4	NTU	

T. CATION 7. 9 MEQ/L T. ANION 8. 1 MEQ/L
TDS/COND 0. 560 TDS BAL 280: 279

FLOW 5 gpm
TEMP 40° F
4.44° C

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UTAH POWER & LIGHT
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HUNTINGTON UTAH 84528

SAMPLE ID: EMS 79-5
DATE SAMPLED: 07. 01. 81
REPORT DATE: 07. 17. 81

LAB NUMBER W-1978
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 9	UNITS
TSS	20. 5	MG/L

CHEMICAL ANALYSIS

CALCIUM	126. 0	MG/L	
DISS. FE	0. 280	MG/L	
MAGNESIUM	10. 00	MG/L	
POTASSIUM	6. 50	MG/L	
SODIUM	13. 00	MG/L	
SP. COND	430	UHMOS/CM	
TDS	340. 0	MG/L	
BICARB. ALK	225. 4	MG/L CACO3	(275.0 mg/l HCO_3)
CHLORIDE	2. 5	MG/L	
FLOURIDE	0. 27	MG/L	
SULFATE	192. 1	MG/L	
T. ALK	225. 4	MG/L CACO3	
TURBIDITY	40. 0	NTU	

T. CATION 7. 8 MEQ/L T. ANION 8. 6 MEQ/L
TDS/COND 0. 791 TDS BAL 340: 344

Flow 4.6 gpm
Temp. 44° F
6.67 °C

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HUNTINGTON UTAH 84528

SAMPLE ID: EMS 79-3
DATE SAMPLED: 07. 01. 81
REPORT DATE: 07. 17. 81

LAB NUMBER W-1977
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 3 UNITS
TSS	<2 MG/L

CHEMICAL ANALYSIS

CALCIUM	112. 0	MG/L	
DISS. FE	0. 260	MG/L	
MAGNESIUM	27. 50	MG/L	
POTASSIUM	5. 50	MG/L	
SODIUM	19. 50	MG/L	
SP. COND	600	UHMOS/CM	
TDS	359. 0	MG/L	
BICARB. ALK	282. 9	MG/L CACO3	(345.1 mg/l HCO_3)
CHLORIDE	9. 4	MG/L	
FLOURIDE	0. 29	MG/L	
SULFATE	173. 7	MG/L	
T. ALK	282. 9	MG/L CACO3	
TURBIDITY	0. 7	NTU	

T. CATION 8. 8 MEQ/L T. ANION 9. 6 MEQ/L
TDS/COND 0. 598 TDS BAL 359: 342

Flow 2.6 gpm
Temp. 50° F
10 °C

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SAMPLE ID: EMS 79-2
DATE SAMPLED: 07. 01. 81
REPORT DATE: 07. 17. 81

LAB NUMBER W-1976
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 4	UNITS
TSS	<2	MG/L

CHEMICAL ANALYSIS

CALCIUM	95. 5	MG/L	
DISS. FE	0. 180	MG/L	
MAGNESIUM	24. 50	MG/L	
POTASSIUM	5. 50	MG/L	
SODIUM	17. 50	MG/L	
SP. COND	390	UHMOS/CM	
TDS	290. 0	MG/L	
BICARB. ALK	280. 6	MG/L CACO3	(342.3 mg/l HCO_3)
CHLORIDE	4. 1	MG/L	
FLOURIDE	0. 32	MG/L	
SULFATE	144. 8	MG/L	
T. ALK	280. 6	MG/L CACO3	
TURBIDITY	0. 4	NTU	

T. CATION 7. 7 MEQ/L
TDS/COND 0. 744

T. ANION 8. 8 MEQ/L
TDS BAL 290: 286

Flow 10. gpm
Temp. 41 °F
5 °C

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SAMPLE ID: EMS 79-1
DATE SAMPLED: 07. 01. 81
REPORT DATE: 07. 17. 81

LAB NUMBER W-1975
DATE REC'D: 07. 06. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 8	UNITS
TSS	11. 0	MG/L

CHEMICAL ANALYSIS

CALCIUM	88. 5	MG/L	
DISS. FE	0. 360	MG/L	
MAGNESIUM	10. 00	MG/L	
POTASSIUM	4. 50	MG/L	
SODIUM	18. 00	MG/L	
SP. COND	362	UHMOS/CM	
TDS	267. 0	MG/L	
BICARB. ALK	181. 7	MG/L CACO3	(221.7 mg/l HCO_3)
CHLORIDE	3. 2	MG/L	
FLOURIDE	0. 31	MG/L	
SULFATE	140. 7	MG/L	
T. ALK	181. 7	MG/L CACO3	
TURBIDITY	1. 7	NTU	

T. CATION 6. 1 MEQ/L T. ANION 6. 7 MEQ/L
TDS/COND 0. 738 TDS BAL 267: 260

Flow 28.3
Temp. 45° F
7.22° C

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FOR Utah Power & Light Co.
Field Office

Lab. No. 2055

Date Rec. 08-05-81

Date Sampled 08-04-81

Sample ID East Mt. 79-16

pH	7.9	Units	Arsenic		mg/l
Alkalinity, Total	261	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate	318	mg/l ~~$CaCo_3$~~ HCO_3	Boron		mg/l
Calcium	140	mg/l	Cadmium		mg/l
Chloride	3.3	mg/l	Chromium		mg/l
Conductivity	510	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron, dissol.	0.23	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium	21.5	mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium	1.50	mg/l	Zinc		mg/l
Sodium	2.50	mg/l	Temperature	45°F	7.22 C
Solids, Total Dissolved	391	mg/l	Flow, GPM	3.0	
Solids, Total Suspended	63.5	mg/l			
Sulfate	163	mg/l			
Flouride	0.24	mg/l			
Turbidity	40.0	NTU			

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FOR Utah Power & Light Co.
Field Office

Lab. No. 2054
Date Rec. 08-05-81
Date Sampled 08-04-81

Sample ID East Mt. 79-18

pH	7.3	Units
Alkalinity, Total	254	mg/l $CaCo_3$
Alkalinity, Bicarbonate	310	mg/l ~~$CaCo_3$~~ HCO_3
Calcium	168	mg/l
Chloride	2.6	mg/l
Conductivity	510	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium	16.0	mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium	2.50	mg/l
Sodium	3.00	mg/l
Solids, Total Dissolved	400	mg/l
Solids, Total Suspended	13.0	mg/l
Sulfate	206	mg/l
Iron, dissoved	0.21	mg/l
Flouride	0.25	mg/l
Turbidity	1.9	NTU

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron, Dissol.	0.21	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l
Temperature	41°F 5°C	
Flow, GPM	16.0	

Respectfully submitted

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Lab. No. 2053

Date Rec. 08-05-81

Date Sampled 08-04-81

FOR Utah Power & Light Co.
Field Office

Sample ID East Mt. 79-19

pH	7.6	Units
Alkalinity, Total	230	mg/l $CaCo_3$
Alkalinity, Bicarbonate	281	mg/l ~~$CaCo_3$~~ HCO_3
Calcium	154	mg/l
Chloride	2.2	mg/l
Conductivity	500	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium	8.50	mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium	23.5	mg/l
Sodium	3.00	mg/l
Solids, Total Dissolved	470	mg/l
Solids, Total Suspended	14.0	mg/l
Sulfate	288	mg/l
Flouride	0.34	mg/l
Turbidity	2.1	~~mg/l~~ NTU

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron, Dissol.	0.07	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l
Temperature	42 °F 5.56	
Flow, GPM	3.5	

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FOR Utah Power & Light Co.
Field Office

Sample ID East Mt. 79-25

Lab. No. 2056
Date Rec. 08-05-81
Date Sampled 08-04-81

pH	8.0	Units
Alkalinity, Total	348	mg/l $CaCo_3$
Alkalinity, Bicarbonate	425	mg/l ~~$CaCo_3$~~ HCO_3
Calcium	228	mg/l
Chloride	7.9	mg/l
Conductivity	800	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium	32.0	mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium	2.00	mg/l
Sodium	9.00	mg/l
Solids, Total Dissolved	610	mg/l
Solids, Total Suspended	275	mg/l
Sulfate	336	mg/l
Flouride	0.28	mg/l
Turbidity	47	NTU

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron, Dissol.	0.79	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l
Temperature	52°F	
Flow, GPM	4.6	

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Lab. No. 2057
Date Rec. 08-05-81
Date Sampled 08-04-81

Sample ID East Mt. 79-32

pH	7.6	Units	Arsenic		mg/l
Alkalinity, Total	396	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate	483	mg/l ~~$CaCo_3$~~ HCO_3	Boron		mg/l
Calcium	261	mg/l	Cadmium		mg/l
Chloride	16.7	mg/l	Chromium		mg/l
Conductivity	1000	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron, Diss.	0.24	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium	37.5	mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium	7.50	mg/l	Zinc		mg/l
Sodium	21.0	mg/l	Temperature	52°F	N/A
Solids, Total Dissolved	790	mg/l	Flow, GPM	0.5	
Solids, Total Suspended	< 0.5	mg/l			
Sulfate	412	mg/l			
Flouride	0.33	mg/l			
Turbidity	0.6	NTU			

Respectfully submitted

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FOR Utah Power & Light Co.
Field Office

Lab. No. 2060

Date Rec. 08-05-81

Date Sampled 08-05-81

Sample ID East Mt. 79-35

pH	8.3	Units
Alkalinity, Total	291	mg/l $CaCo_3$
Alkalinity, Bicarbonate	355	mg/l ~~$CaCo_3$~~ HCO_3
Calcium	192	mg/l
Chloride	3.6	mg/l
Conductivity	580	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium	14.5	mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium	1.50	mg/l
Sodium	3.50	mg/l
Solids, Total Dissolved	430	mg/l
Solids, Total Suspended	84.5	mg/l
Sulfate	206	mg/l
Flouride	0.23	mg/l
Turbidity	49	NTU

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron, Dissol.	0.46	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l
Temperature	52°F	
Flow, GPM	0.6	

Respectfully submitted

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Lab. No. 2064

FOR Utah Power & Light Co.
Field Office

Date Rec. 08-12-81

Sample ID 79-38 East Mt.

Date Sampled 08-11-81

pH	7.7	Units
Alkalinity, Total	349	mg/l $CaCo_3$
Alkalinity, Bicarbonate	426	mg/l ~~$CaCo_3$~~ HCO_3
Calcium	181	mg/l
Chloride	7.1	mg/l
Conductivity	690	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium	42.5	mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium	7.50	mg/l
Sodium	10.5	mg/l
Solids, Total Dissolved	546	mg/l
Solids, Total Suspended	89.5	mg/l
Sulfate	283	mg/l
Flouride	0.33	mg/l
Turbidity	38.0	NTU

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron, Dissolved	0.29	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

TEMP. 44°F 6.67°C

FLOW 1.3

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FOR Utah Power & Light Co.
Field Office

Lab. No. 2058
Date Rec. 08-05-81
Date Sampled 08-04-81

Sample ID East Mt. 80-48

pH	7.8	Units	Arsenic		mg/l
Alkalinity, Total	297	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate	362	mg/l ~~$CaCo_3$~~ HCO_3	Boron		mg/l
Calcium	141	mg/l	Cadmium		mg/l
Chloride	4.3	mg/l	Chromium		mg/l
Conductivity	450	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron		mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium	27.5	mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium	3.00	mg/l	Zinc		mg/l
Sodium	4.00	mg/l	Temperature	58°F 14.44	
Solids, Total Dissolved	356	mg/l	Flow, GPM	1.8	
Solids, Total Suspended	15.5	mg/l			
Sulfate	158	mg/l			
Flouride	0.28	mg/l			
Turbidity	2.8	NTU			
Dissolved Iron	0.84	mg/l			

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FOR Utah Power & Light Co.
Field Office

Lab. No. 2059

Date Rec. 08-05-81

Date Sampled 08-04-81

Sample ID East Mt. 80-49

pH	8.1	Units	Arsenic		mg/l
Alkalinity, Total	270	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate	329	mg/l ~~$CaCo_3$~~ HCo_3	Boron		mg/l
Calcium	136	mg/l	Cadmium		mg/l
Chloride	7.0	mg/l	Chromium		mg/l
Conductivity	600	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron		mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium	31.5	mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium	10.0	mg/l	Zinc		mg/l
Sodium	6.50	mg/l	Temperature	62°F	16.6°C
Solids, Total Dissolved	354	mg/l	Flow, GPM	13.0	
Solids, Total Suspended	74.0	mg/l			
Sulfate	173	mg/l			
Flouride	0.24	mg/l			
Turbidity	41	NTU			
Dissolved Iron	0.33	mg/l			

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HUNTINGTON UTAH 84528

SAMPLE ID: EAST MT. 79-1
DATE SAMPLED: 11. 04. 81
REPORT DATE: 11. 11. 81

LAB NUMBER W-2275
DATE REC'D: 11. 04. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 6	UNITS
TSS	32. 0	MG/L

CHEMICAL ANALYSIS

CALCIUM	117. 0	MG/L
DISS. FE	0. 380	MG/L
MAGNESIUM	7. 50	MG/L
POTASSIUM	0. 18	MG/L
SODIUM	11. 50	MG/L
SP. COND	390	UHMOS/CM
TDS	265. 0	MG/L
BICARB. ALK	185. 0	MG/L CACO3 (HCO_3 226. mg/l)
CHLORIDE	4. 2	MG/L
FLOURIDE	0. 21	MG/L
SULFATE	120. 0	MG/L
T. ALK	185. 0	MG/L CACO3
TURBIDITY	4. 5	NTU

T. CATION 7. 0 MEQ/L T. ANION 6. 0 MEQ/L
TDS/COND 0. 679 TDS BAL 265 : 260

RAY A. SIM, MANAGER

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UTAH POWER & LIGHT CO.
J&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: E. MT. SHEBA SPRING LAB NUMBER W-2279
DATE SAMPLED: 11. 03. 81 DATE REC'D: 11. 04. 81
REPORT DATE: 11. 11. 81 SAMPLED BY: UPL

WASTEWATER ANALYSIS

*PH	7.5	UNITS
*TSS	1.5	MG/L

CHEMICAL ANALYSIS

*CALCIUM	137.0	MG/L
*DISS. FE	0.180	MG/L
*MAGNESIUM	9.00	MG/L
*POTASSIUM	0.10	MG/L
*SODIUM	14.00	MG/L
*SP. COND	500	UHMOS/CM
*TDS	348.0	MG/L
*BICARB. ALK	238.0	MG/L CACO3 (HCO_3 290.mg/l)
*CHLORIDE	4.1	MG/L
*FLOURIDE	0.20	MG/L
*SULFATE	154.0	MG/L
*T. ALK	238.0	MG/L CACO3
*TURBIDITY	0.7	NTU

T. CATION 8.2 MEQ/L T. ANION 7.8 MEQ/L
TDS/COND 0.696 TDS BAL 348: 318

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UTAH POWER & LIGHT CO.
I&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: E. MT. BURNT TREE SPRING LAB NUMBER W-2278
DATE SAMPLED: 11. 04. 91 DATE REC'D: 11. 04. 91
REPORT DATE: 11. 11. 91 SAMPLED BY: UPL

WASTEWATER ANALYSIS

• PH	7. 8	UNITS
• TSS	2. 0	MG/L

CHEMICAL ANALYSIS

• CALCIUM	92. 0	MG/L
• DISS. FE	0. 170	MG/L
• MAGNESIUM	19. 50	MG/L
• POTASSIUM	0. 46	MG/L
• SODIUM	20. 00	MG/L
SP. COND	510	UHMOS/CM
• TDS	300. 0	MG/L
• BICARB. ALK	262. 0	MG/L CACO3 (HCO_3 320mg/l)
• CHLORIDE	6. 6	MG/L
• FLOURIDE	0. 27	MG/L
• SULFATE	105. 0	MG/L
• T. ALK	262. 0	MG/L CACO3
• TURBIDITY	0. 5	NTU

T. CATION 7. 1 MEQ/L T. ANION 7. 3 MEQ/L
TDS/COND 0. 588 TDS BAL 300: 244

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UTAH POWER & LIGHT CO.
J&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: E. MT. FLAG LAKE 79-28 LAB NUMBER W-2274
DATE SAMPLED: 11. 03. 91 DATE REC'D: 11. 04. 91
REPORT DATE: 11. 11. 91 SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7.6	UNITS
TSS	406.0	MG/L

CHEMICAL ANALYSIS

CALCIUM	126.0	MG/L
DISS. FE	2.230	MG/L
MAGNESIUM	29.50	MG/L
POTASSIUM	1.76	MG/L
SODIUM	49.50	MG/L
SP. COND	700	UHMOS/CM
TDS	522.0	MG/L
BICARB. ALK	255.0	MG/L CACO3 (HCO_3 311 mg/l)
CHLORIDE	16.7	MG/L
FLOURIDE	0.50	MG/L
SULFATE	286.0	MG/L
T. ALK	255.0	MG/L CACO3
TURBIDITY	70.0	NTU

T. CATION 10.9 MEQ/L T. ANION 11.3 MEQ/L
TDS/COND 0.746 TDS BAL 522: 519

RAY A. SIM, MANAGER

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

UTAH POWER & LIGHT CO.
J&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: E. MT. TEDS TUB
DATE SAMPLED: 11. 04. 81
REPORT DATE: 11. 11. 81

LAB NUMBER W-2277
DATE REC'D: 11. 04. 81
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	8. 1	UNITS
TSS	66. 0	MG/L

CHEMICAL ANALYSIS

CALCIUM	140. 0	MG/L
DISS. FE	0. 400	MG/L
MAGNESIUM	7. 00	MG/L
POTASSIUM	0. 43	MG/L
SODIUM	7. 50	MG/L
SP. COND	510	UHMOS/CM
TDS	289. 0	MG/L
BICARB. ALK	260. 0	MG/L CACO3 (HCO_3 317mg/l)
CHLORIDE	5. 6	MG/L
FLOURIDE	0. 24	MG/L
SULFATE	78. 2	MG/L
T. ALK	260. 0	MG/L CACO3
TURBIDITY	9. 7	NTU

T. CATION 7. 9 MEQ/L T. ANION 6. 7 MEQ/L
TDS/COND 0. 567 TDS BAL 289: 238

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UTAH POWER & LIGHT CO.
J&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: E MT. ELK SPRING
DATE SAMPLED: 11. 04 91
REPORT DATE: 11. 11. 91

LAB NUMBER W-2276
DATE REC'D: 11. 04. 91
SAMPLED BY: UPL

WASTEWATER ANALYSIS

PH	7. 9	UNITS
TSS	5. 0	MG/L

CHEMICAL ANALYSIS

CALCIUM	66. 0	MG/L
DISS. FE	0. 190	MG/L
MAGNESIUM	25. 50	MG/L
POTASSIUM	0. 51	MG/L
SODIUM	14. 50	MG/L
SP. COND	400	UHMOS/CM
TDS	232. 0	MG/L
BICARB. ALK	236. 0	MG/L CACO3 (HCO_3 288. mg/l)
CHLORIDE	4. 9	MG/L
FLOURIDE	0. 25	MG/L
SULFATE	91. 2	MG/L
T. ALK	236. 0	MG/L CACO3
TURBIDITY	1. 9	NTU

T. CATION 6. 0 MEQ/L T. ANION 6. 5 MEQ/L
TDS/COND 0. 583 TDS BAL 233: 202

RAY A. SIM, MANAGER

APPENDIX H

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

UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: LITTLE DOVE IN-MINE IN X 76 2L
W-2211
DATE SAMPLED: 10. 08. 81
REPORT DATE: 10. 15. 81

LAB NUMBER W-2211

DATE REC'D: 10. 09. 81
SAMPLED BY: UPL

FLOW .02 GPM
TEMP. 62°F
17°C

WASTEWATER ANALYSIS

PH	7. 6 UNITS
TSS	3. 5 MG/L

CHEMICAL ANALYSIS

CALCIUM	263. 0 MG/L
MAGNESIUM	73. 50 MG/L
POTASSIUM	6. 50 MG/L
SODIUM	57. 00 MG/L
SP. COND	1950 UHMOS/CM
TDS	1201. 0 MG/L
CHLORIDE	32. 6 MG/L
SULFATE	557. 0 MG/L
T. ALK	440. 0 MG/L CACO3

T. CATION 21. 8 MEQ/L T. ANION 21.3 MEQ/L
TDS/COND 0. 616 TDS BAL 1201: 983

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UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: LITTLE DOVE IN-MINE IN X 77 BELT ENTRY
LAB NUMBER W-W-2213
DATE SAMPLED: 10. 08. 81
REPORT DATE: 10. 15. 81

DATE REC'D: 10. 09. 81
SAMPLED BY: UPL

FLOW .05 GPM
TEMP. 61°F
16°C

WASTEWATER ANALYSIS

PH	7. 4	UNITS
TSS	3. 5	MG/L

CHEMICAL ANALYSIS

CALCIUM	245. 0	MG/L
MAGNESIUM	73. 00	MG/L
POTASSIUM	7. 00	MG/L
SODIUM	59. 00	MG/L
SP. COND	1900	UHMOS/CM
TDS	1104. 0	MG/L
CHLORIDE	33. 1	MG/L
SULFATE	523. 0	MG/L
T. ALK	452. 0	MG/L CACO3

T. CATION 21. 0 MEQ/L
TDS/COND 0. 581

T. ANION 20. 9 MEQ/L
TDS BAL 1104: 933

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UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: LITTLE DOVE IN-MINE IN X 78 1L
W-2212
DATE SAMPLED: 10. 08. 81
REPORT DATE: 10. 15. 81

LAB NUMBER W-2212

DATE REC'D: 10. 09. 81
SAMPLED BY: UPL

FLOW .05 GPM
TEMP. 60°F
16°C

WASTEWATER ANALYSIS

PH	7. 3	UNITS
TSS	2. 5	MG/L

CHEMICAL ANALYSIS

CALCIUM	243. 0	MG/L
MAGNESIUM	72. 50	MG/L
POTASSIUM	6. 50	MG/L
SODIUM	59. 00	MG/L
SP. COND	1900	UHMOS/CM
TDS	1103. 0	MG/L
CHLORIDE	34. 2	MG/L
SULFATE	514. 0	MG/L
T. ALK	441. 0	MG/L CACO3

T. CATION 20. 8 MEQ/L T. ANION 20. 5 MEQ/L
TDS/COND 0. 581 TDS BAL 1103: 923

RAY A. SIM, MANAGER

STANDARD LABORATORIES, INC.
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UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: LITTLE DOVE IN MINE 1N M 89 2R LAB NUMBER H- 2367
2367
DATE SAMPLED: 12 09 91 DATE REC'D: 12 09 91
REPORT DATE: 12 18 91 SAMPLED BY: UPL

FLOW .05 GPM
TEMP. 62°F
17°C

WASTEWATER ANALYSIS

PH 6.9 UNITS
TSS <2 MG/L

CHEMICAL ANALYSIS

CALCIUM	252.0	MG/L
MAGNESIUM	71.50	MG/L
POTASSIUM	6.70	MG/L
SODIUM	60.00	MG/L
SP. COND	1900	UMHOS/CM
TDS	1078.0	MG/L
BICARB. ALK	576.0	MG/L CACO3
CHLORIDE	20.0	MG/L
SULFATE	444.0	MG/L
T. ALK	576.0	MG/L CACO3

702.72

T. CATION 21.3 MEQ/L T. ANION 21.7 MEQ/L
TDS/COND 0.567 TDS BAL 1079: 862

RAY A. SIMS MANAGER

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UTAH POWER & LIGHT CO.
MINE FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: LITTLE DOVE IN MINE 1 IN 1 TO 4. LAB NUMBER W- 2368
DISP
DATE SAMPLED: 12.09.91 DATE RECEIVED: 12.09.91
REPORT DATE: 12.19.91 SAMPLED BY: UPL

FLOW .25 GPM
TEMP. 62°F
17°C

WASTEWATER ANALYSIS

PH	7.2	UNITS
TSS	4.0	MG/L

CHEMICAL ANALYSIS

CALCIUM	365.0	MG/L	
MAGNESIUM	70.00	MG/L	
POTASSIUM	6.50	MG/L	
SODIUM	59.50	MG/L	
SP. COND	2010	UHMOS/CM	
TDS	1410.0	MG/L	
BICARB ALK	571.0	MG/L CACO3	696.62
CHLORIDE	32.5	MG/L	
SULFATE	764.0	MG/L	
T. ALK	571.0	MG/L CACO3	

T. CATION 26.7 MEQ/L T. ANION 27.0 MEQ/L
TDS/COND 0.701 TDS BAL 1.010: 1.230

[illegible]
[illegible]

APPENDIX I

CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

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

FOR Utah Power & Light
Mining & Exploration

Lab. No. 1681

Date Rec. 03-27-81

Date Sampled 03-26-81

Sample ID Flow, GPM 0.2
1N x49 IR Wilberg In Mine

pH	7.6	Units
1.22 HCO_3 Alkalinity, Total	192.4	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium	126.0	mg/l
Chloride	10.5	mg/l
Conductivity	1040	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium	47.42	mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium	4.50	mg/l
Sodium	28.50	mg/l
Solids, Total Dissolved	697.0	mg/l
Solids, Total Suspended	1.5	mg/l
Sulfate	374.6	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron		mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted RS

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

Lab. No. 1682

FOR Utah Poer & Light
Mining & Exploration

Date Rec. 03-27-81

Date Sampled 03-26-81

Sample ID, WX66 1-2L Wilberg In Mine Flwo, GPM 3.0

pH	7.7	Units	Arsenic		mg/l
Alkalinity, Total	174.0	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium	77.5	mg/l	Cadmium		mg/l
Chloride	8.4	mg/l	Chromium		mg/l
Conductivity	890	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron		mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium	48.00	mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium	4.00	mg/l	Zinc		mg/l
Sodium	30.50	mg/l			
Solids, Total Dissolved	546.0	mg/l			
Solids, Total Suspended	2.0	mg/l			
Sulfate	270.0	mg/l			

Respectfully submitted R.S. [illegible]

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STANDARD LABORATORIES, INC.
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Lab. No. 1683

FOR
Utah Power & Light
Mining & Exploration

Date Rec. 03-27-81

Date Sampled 03-26-81

Sample ID 10 X68 IL Wilberg In Mine Folw, GPM 7.0

pH	7.7	Units	Arsenic		mg/l
Alkalinity, Total	169.0	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium	66.0	mg/l	Cadmium		mg/l
Chloride	9.2	mg/l	Chromium		mg/l
Conductivity	910	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron		mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium	50.00	mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium	9.50	mg/l	Zinc		mg/l
Sodium	73.50	mg/l			
Solids, Total Dissolved	578.5	mg/l			
Solids, Total Suspended	2.5	mg/l			
Sulfate	369.8	mg/l			

Respectfully submitted DS

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Lab. No. 1684

Date Rec. 03-27-81

Date Sampled 03-26-81

FOR
Utah Power & Light
Mining & Exploration

Sample ID IN X66 B Wilberg In Mine Flow, GPM 2.0

pH	7.8	Units
Alkalinity, Total	169.0	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium	118.2	mg/l
Chloride	9.6	mg/l
Conductivity	950	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium	26.80	mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium	10.00	mg/l
Sodium	43.50	mg/l
Solids, Total Dissolved	587.5	mg/l
Solids, Total Suspended	1.5	mg/l
Sulfate	329.2	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron		mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted RS DH

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FOR Utah Power & Light
Field Office

Lab. No. 1879

Date Rec. 06-09-81

Date Sampled 06-09-81

Sample ID Wilberg In Mine 3rd East, 1st Left x 38

pH	7.0	Units
Alkalinity, Total	521.9	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium	356.0	mg/l
Chloride	17.7	mg/l
Conductivity	2000	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium	92.50	mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium	14.50	mg/l
Sodium	37.50	mg/l
Solids, Total Dissolved	1392.0	mg/l
Solids, Total Suspended	3.0	mg/l
Sulfate	658.4	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron		mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

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Lab. No. 1880

FOR Utah Power & Light
Field Office

Date Rec. 06-09-81

Date Sampled 06-09-81

Sample ID Wilberg In Mine 3rd East, 1st South Neck off

pH	7.2	Units
Alkalinity, Total	377.0	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium	220.0	mg/l
Chloride	11.2	mg/l
Conductivity	1000	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium	49.50	mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium	14.00	mg/l
Sodium	37.50	mg/l
Solids, Total Dissolved	795.0	mg/l
Solids, Total Suspended	2.5	mg/l
Sulfate	460.5	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron		mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

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Lab. No. 1891

FOR Utah Power & Lihgt
Field Office

Date Rec. 06-12-81

Date Sampled 06-12-81

Sample ID Wilberg In Mine 2L x 18 1R

pH	7.2	Units
Alkalinity, Total	343.4	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium	210.0	mg/l
Chloride	10.5	mg/l
Conductivity	920	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium	50.50	mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium	14.00	mg/l
Sodium	36.50	mg/l
Solids, Total Dissolved	648.0	mg/l
Solids, Total Suspended	1.5	mg/l
Sulfate	312.8	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron		mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

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FOR Utah Power & Light
Field Office

Lab. No. 1892

Date Rec. 06-12-81

Date Sampled 06-12-81

Sample ID Wilberg In Mine 2L x 2B 1R

pH	7.7	Units
Alkalinity, Total	348.6	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium	200.0	mg/l
Chloride	10.8	mg/l
Conductivity	910	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium	48.00	mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium	13.50	mg/l
Sodium	36.50	mg/l
Solids, Total Dissolved	595.0	mg/l
Solids, Total Suspended	1.0	mg/l
Sulfate	296.4	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron		mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

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UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: WILBERG IN MINE 3 @ 1 L
DATE SAMPLED: 11. 19. 81
REPORT DATE: 11. 25. 81

LAB NUMBER W-2316
DATE REC'D: 11. 20. 81
SAMPLED BY: UPL

FLOW: .5 GPM
TEMP: 64°F

WASTEWATER ANALYSIS

PH	7. 6 UNITS
TSS	<2 MG/L

CHEMICAL ANALYSIS

CALCIUM	112. 0	MG/L
MAGNESIUM	34. 00	MG/L
POTASSIUM	14. 00	MG/L
SODIUM	129. 00	MG/L
SP. COND	790	UHMOS/CM
TDS	575. 0	MG/L
BICARB. ALK	339. 0	MG/L CACO3
CHLORIDE	10. 2	MG/L
SULFATE	288. 0	MG/L
T. ALK	339. 0	MG/L CACO3

T. CATION 14. 4 MEQ/L T. ANION 13. 1 MEQ/L
TDS/COND 0. 728 TDS BAL 575: 573

RAY A. SIM, MANAGER

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

UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: WILBERG IN MINE 2L X 18 1R 2315
LAB NUMBER W- 2315
DATE SAMPLED: 11. 19. 81
REPORT DATE: 11. 25. 81
DATE REC'D: 11. 20. 81
SAMPLED BY: UPL
FLOW: .08 GPM
TEMP: 62°F

WASTEWATER ANALYSIS

PH	7. 3 UNITS
TSS	<2 MG/L

CHEMICAL ANALYSIS

CALCIUM	110. 0	MG/L
MAGNESIUM	54. 00	MG/L
POTASSIUM	15. 00	MG/L
SODIUM	52. 00	MG/L
SP. COND	620	UHMOS/CM
TDS	492. 0	MG/L
BICARB. ALK	269. 0	MG/L CACO3
CHLORIDE	9. 3	MG/L
SULFATE	264. 0	MG/L
T. ALK	269. 0	MG/L CACO3

T. CATION 12. 6 MEQ/L T. ANION 11. 2 MEQ/L
TDS/COND 0. 794 TDS BAL 492: 489

RAY A. SIM, MANAGER

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UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: WILBERG IN MINE 2L X 30 1R
2314
DATE SAMPLED: 11. 19. 81
REPORT DATE: 11. 25. 81

LAB NUMBER W- 2314

DATE REC'D: 11. 20. 81
SAMPLED BY: UPL

FLOW: .2125 GPM
TEMP: 62°F

WASTEWATER ANALYSIS

PH	7. 3	UNITS
TSS	1. 0	MG/L

CHEMICAL ANALYSIS

CALCIUM	98. 2	MG/L
MAGNESIUM	51. 00	MG/L
POTASSIUM	19. 00	MG/L
SODIUM	58. 00	MG/L
SP. COND	620	UHMOS/CM
TDS	494. 0	MG/L
BICARB. ALK	259. 0	MG/L CACO3
CHLORIDE	7. 8	MG/L
SULFATE	269. 0	MG/L
T. ALK	259. 0	MG/L CACO3

T. CATION 12. 1 MEQ/L T. ANION 11. 0 MEQ/L
TDS/COND 0. 797 TDS BAL 494: 484

RAY A. SIM, MANAGER

APPENDIX J

CERTIFICATE OF ANALYSIS

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

FOR Utah Power & Light Co.
Mining & Exploration Field Office
Huntington, Utah 84528

Lab. No. 1508

Date Rec. 01/06/81

Date Sampled 01/06/81

Sample ID Wilberg Mine Discharge

pH	7.5	Units
Alkalinity, Total	272.0	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	10.9	mg/l
Conductivity		µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	554.8	mg/l
Solids, Total Suspended	2.85	mg/l
Sulfate	166.6	mg/l
Acidity	0	mg/l
Oil & Grease	0.56	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.2	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 1579

FOR Utah Power & Light
~~Environmental Department~~ M&E Field Office

Date Rec. 02-09-81

Sample ID Wilberg Mine Discharge

Date Sampled 02-09-81

pH	7.4	Units
Alkalinity, Total	255.0	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	2.7	mg/l
Conductivity	920	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	610.3	mg/l
Solids, Total Suspended	6.2	mg/l
Sulfate	264.9	mg/l
Acidity	-0-	mg/l
Oil & Grease	0.4	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.96	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted [signature]

Certified Environmental Laboratory

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

FOR Utah Power & Light
Mining & Exploration

Lab. No. 1620

Date Rec. 02-23-81

Date Sampled 02-23-18

Sample ID Wilberg Discharge

pH	7.8	Units
Alkalinity, Total	260.3	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	11.1	mg/l
Conductivity		µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	537.0	mg/l
Solids, Total Suspended	13.5	mg/l
Sulfate	185.6	mg/l
Oil & Grease	<0.5	mg/l
Acidity	0	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.30	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 1670

Date Rec. 03-19-81

Date Sampled 03-19-18

FOR Utah Power & Light
Mining & Exploration
Huntin gton, Utah 84528

Sample ID Wilberg Mine Discharge

pH	7.6	Units
Alkalinity, Total	237.5	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	13.0	mg/l
Conductivity	870	µmhos/cm
Dissolved Oxygen	6.2	mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	559.0	mg/l
Solids, Total Suspended	5.0	mg/l
Sulfate	170.4	mg/l
Oil & Grease	<0.5	mg/l
Acidity	0	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.06	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 1696

Date Rec. 04-08-81

Date Sampled 04-08-81

FOR Utah Power & Light
Mining & Exploration

Sample ID Wilberg Mine Discharge

pH	8.1	Units
Alkalinity, Total	242.3	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	12.1	mg/l
Conductivity		µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	517.0	mg/l
Solids, Total Suspended	3.5	mg/l
Sulfate	162.5	mg/l
Oil & Grease	17.6	mg/l
Acidity	0	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.01	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. W-1856

FOR Utah Power & Light Co.
Mining & Exploration
Field Office

Discharge pipe –
Sampled by Ed Agoston

Date Rec. 05/27/81

Date Sampled 05/27/81

Sample ID Wilberg Discharge 12:00-12:40:13:40

pH	7.9	Units	Arsenic		mg/l
Alkalinity, Total	289.0	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride	13.6	mg/l	Chromium		mg/l
Conductivity		µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.08	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	510.0	mg/l			
Solids, Total Suspended	1.0	mg/l			
Sulfate	74.1	mg/l			
BOD-5 day	0.7 mg/l				
Oil & Grease	< 0.5 mg/l				
Acidity	< 1.0 mg/l				

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 1872

FOR Utah Power & Light
Field Office

Discharge pipe - 9:05 am
Sampled by Mike Weigand

Date Rec. 06-05-81

Date Sampled 06-04-81

Sample ID Wilberg Mine Discharge

pH	8.0	Units
Alkalinity, Total	264.6	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	12.5	mg/l
Conductivity		µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	518.0	mg/l
Solids, Total Suspended	< 1.0	mg/l
Sulfate	74.1	mg/l
Acidity	< 1.0	mg/l
Oil & Grease	< 0.5	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.12	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory

Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 08/11/81

CERTIFICATE OF ANALYSIS

UTAH POWER & LIGHT
MINING & EXPLORATION
BOX 1005
HUNTINGTON, UT 84528

81-006057

SAMPLE: WATER SAMPLES DATED 7-6-81 RECEIVED 7-7-81 FOR ANALYSIS.
Discharge pipe - 2:30 pm Sampled by Chuck Semborski

	DEER CREEK MINE	WILBERG MINE
Alkalinity as CaCO3 mg/l	308.00	244.00
Arsenic as As mg/l	<.001	<.001
Bicarbonate as HCO3 mg/l	375.76	297.68
Cadmium as Cd mg/l	<.001	<.001
Calcium as Ca mg/l	96.00	76.00
Chloride as Cl mg/l	23.20	16.20
Conductivity umhos/cm	870	780
Dissolved Oxygen mg/l	8.5	8.4
Fluoride as F mg/l	.28	.20
Gross Alpha pci/l	1.4	1.2
Gross Beta pci/l	2.9	2.5
Lead as Pb mg/l	<.001	<.001
MPN Fecal Coliform MPN/100 ml	<2	<2

All reports are submitted as the confidental property of clients. Authorization for publication of our reports, conclusions, or, extracts from or regarding them, is reserved pending our written approval as a mutual protection to clients, the public and ourselves.

Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

CERTIFICATE OF ANALYSIS
81-006057

	DEER CREEK MINE	WILBERG MINE
MPN Total Coliform MPN/100 ml	33.0	49.0
Magnesium as Mg mg/l	55.20	53.80
Manganese as Mn mg/l	.010	.005
Nitrate as NO3-N mg/l	.36	.02
Oil and Grease mg/l	.60	.20
Phosphate PO4-P Ortho mg/l	.040	.100
Potassium as K mg/l	4.80	3.95
Selenium as Se mg/l	.001	<.001
Silica as SiO2 Diss. Mg/l	7.85	9.05
Sodium as Na mg/l	27.50	23.00
Sulfate as SO4 mg/l	181	184
Total Kjeldahl Nitrogen mg/l	.20	.15
Total Organic Carbon mg/l	28.90	16.70
Zinc as Zn mg/l	.005	.006

FORD CHEMICAL LABORATORY, INC.

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Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 08/11/81

CERTIFICATE OF ANALYSIS

81-006057-01

FORD CHEMICAL LABORATORIES

BALANCE SHEET FOR SAMPLE: (1) DEER CREEK MINE

C A T I O N S	mg/l	meq/l
Calcium as Ca mg/l	96.000	4.790
Magnesium as Mg mg/l	55.200	4.540
Sodium as Na mg/l	27.500	1.196
Potassium as K mg/l	4.800	.123

A N I O N S	mg/l	meq/l
Bicarbonate as HCO3 mg/l	375.760	6.162
Sulfate as SO4 mg/l	181.500	3.779
Chloride as Cl mg/l	23.200	.654
Nitrate as NO3-N mg/l	.360	.006

B A L A N C E I N F O R M A T I O N

CATIONS:	10.649
ANIONS:	10.601
TOTAL:	21.250
DIFFERENCE:	.048
SIGMA:	.002

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Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 08/11/81

CERTIFICATE OF ANALYSIS

81-006057-02

FORD CHEMICAL LABORATORIES

BALANCE SHEET FOR SAMPLE: (2) WILBERG MINE

C A T I O N S	ms/l	meq/l
Calcium as Ca ms/l	76.000	3.792
Magnesium as Mg ms/l	53.800	4.425
Sodium as Na ms/l	23.000	1.001
Potassium as K ms/l	3.950	.101

N I O N S	ms/l	meq/l
Bicarbonate as HCO3 ms/l	297.680	4.882
Sulfate as SO4 ms/l	184.000	3.831
Chloride as Cl ms/l	16.200	.457
Nitrate as NO3-N ms/l	.020	.000

B A L A N C E I N F O R M A T I O N

CATIONS:	9.319
ANIONS:	9.170
TOTAL:	18.489
DIFFERENCE:	.149
SIGMA:	.008

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CERTIFICATE OF ANALYSIS

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

Lab. No. 2061

FOR Utah Power & Light Co.
Field Office

Discharge pipe - 11:00 am
Sampled by Mike Weigand

Date Rec. 08-07-81

Date Sampled ????????? 8-6-81

Sample ID Wilberg Mine Discharge

pH	8.0	Units	Arsenic		mg/l
Alkalinity, Total	243	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride	13.1	mg/l	Chromium		mg/l
Conductivity		µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.81	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	521	mg/l			
Solids, Total Suspended	16.0	mg/l			
Sulfate	128	mg/l			
Acidity	< 1.0	mg/l $CaCO_3$			
Oil & Grease	< 0.5	mg/l			

Respectfully submitted [signature]

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 2102

FOR Utah Power & Light Co.
Field Office

Discharge pipe - 2:30 pm
Sampled by Chuck Semborski

Date Rec. 08-21-81

Date Sampled 08-20-81

Sample ID Wilberg Discharge (Special)

pH	8.0 Units	Arsenic	mg/l
Alkalinity, Total	mg/l $CaCo_3$	Beryllium	mg/l
Alkalinity, Bicarbonate	mg/l $CaCo_3$	Boron	mg/l
Calcium	mg/l	Cadmium	mg/l
Chloride	mg/l	Chromium	mg/l
Conductivity	µmhos/cm	Copper	mg/l
Dissolved Oxygen	mg/l	Iron	0.79 mg/l
Hardness	mg/l $CaCo_3$	Lead	mg/l
Magnesium	mg/l	Manganese	mg/l
Nitrogen, Nitrate	mg/l	Mercury	µg/l
Phosphorus, Total	mg/l	Nickel	mg/l
Phosphorus, Ortho	mg/l	Selenium	mg/l
Potassium	mg/l	Zinc	mg/l
Sodium	mg/l		
Solids, Total Dissolved	509 mg/l		
Solids, Total Suspended	6.5 mg/l	BOD-5 day	0.8 mg/l
Sulfate	mg/l	Acidity	<1.0 mg/l $CaCO_3$

Respectfully submitted

Certified Environmental Laboratory

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

UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: WILBERG DISCHG
DATE SAMPLED: 08. 31. 81
REPORT DATE: 09. 21. 81

LAB NUMBER W-2131
DATE REC'D: 08. 31. 81
SAMPLED BY: UPL - Mike Weigand
Discharge pipe - 10:00 am

WASTEWATER ANALYSIS

PH	8.1	UNITS
TSS	2.0	MG/L
OIL/GREASE	1.8	MG/L

CHEMICAL ANALYSIS

TDS	486.0	MG/L
CHLORIDE	13.1	MG/L
SULFATE	305.0	MG/L
T. ALK	256.0	MG/L CACO3

Acidity <1.0

METALLIC ANALYSIS

IRON	1.03	MG/L

T. CATION 0.0 MEQ/L
TDS/COND 0.180

T. ANION 6.7 MEQ/L
TDS BAL 486: 318

RAY A. SIM, MANAGER

CERTIFICATE OF ANALYSIS

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

Lab. No. W-2199

FOR Utah Power & Light Co.
M & E Field Office

Discharge pipe - 10:00 am
Sampled by Chuck Semborski

Date Rec. 09-30-81

Date Sampled 09-28-81

Sample ID Wilberg Discharge Quarterly

pH	8.0	Units
Alkalinity, Total	233.	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	63.3	mg/l
Conductivity		µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	526	mg/l
Solids, Total Suspended	2.5	mg/l
Sulfate	140.	mg/l
Acidity	<1.0	mg/l $CaCo_3$
B.O.D.-5 day	0.9	mg/l
Coliforms, Total	13	MPN/100ml
Coliforms, Fecal	<2	MPN/100ml
O & G	3.6	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.99	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. W-2282

FOR Utah Power & Light Co.
M&E Field Office

Discharge pipe - 1:30 pm
Sampled by Chuck Semborski

Date Rec. 11-09-81

Date Sampled 11-06-81

Sample ID Wilberg Mine Discharge

pH	7.9	Units	Arsenic		mg/l
Alkalinity, Total	245	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride	13.4	mg/l	Chromium		mg/l
Conductivity		µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.99	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	528.	mg/l			
Solids, Total Suspended	4.0	mg/l			
Sulfate	210	mg/l			
O & G	2.4	mg/l			
Acidity	<1.0	mg/l $CaCo_3$			

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. W-2333

Date Rec. 11-30-81

Date Sampled 11-30-81

FOR Utah Power & Light Co.
M & E Field Office
Huntington, Utah 84528

Discharge pipe - 3:45 pm

Sample ID Wilberg Discharge

Sampled by Chuck Semborski

pH	8.0	Units	Arsenic		mg/l
Alkalinity, Total	275	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride	12.5	mg/l	Chromium		mg/l
Conductivity		µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.73	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	533	mg/l			
Solids, Total Suspended	0.5	mg/l			
Sulfate	128	mg/l			
O & G	< 0.5	mg/l			
Acidity	< 1.0	mg/l $CaCo_3$			

Respectfully submitted

Certified Environmental Laboratory

APPENDIX K

CERTIFICATE OF ANALYSIS

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

FOR Utah Power & Light Co.
Field Office

Lab. No. 2082

Date Rec. 08-14-81

Date Sampled 08-14-81

Sample ID 3rd S x 21 AB-50 - Deer Creek In-mine

pH	7.3	Units	Arsenic		mg/l
Alkalinity, Total	398 ~~234~~	mg/l $CaCo_3$ Rbl	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium	180	mg/l	Cadmium		mg/l
Chloride	10.0	mg/l	Chromium		mg/l
Conductivity	800	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron		mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium	53.0	mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium	5.00	mg/l	Zinc		mg/l
Sodium	31.0	mg/l			
Solids, Total Dissolved	551	mg/l			
Solids, Total Suspended	2.0	mg/l			
Sulfate	274	mg/l			

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 2081

FOR Utah Power & Light Co.
Field Office

Date Rec. 08-14-81

Date Sampled 08-14-81

Sample ID EM-3 - Deer Creek In-mine

pH	7.2	Units
Alkalinity, Total	422	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium	160	mg/l
Chloride	10.7	mg/l
Conductivity	820	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium	51.0	mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium	450	mg/l
Sodium	39.0	mg/l
Solids, Total Dissolved	613	mg/l
Solids, Total Suspended	2.5	mg/l
Sulfate	231	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron		mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory

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

UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: DEER CREEK #2 3RD [illegible] X 19 2L LAB NUMBER W-2382
DATE SAMPLED: 12. 21. 81
REPORT DATE: 12. 30. 81

DATE REC'D: 12. 22. 81
SAMPLED BY: UPL

FLOW: .167 GPM
TEMP: 55°F

WASTEWATER ANALYSIS

PH	7. 3 UNITS
TSS	<2 MG/L

CHEMICAL ANALYSIS

CALCIUM	245. 0	MG/L
MAGNESIUM	79. 50	MG/L
POTASSIUM	6. 50	MG/L
SODIUM	66. 00	MG/L
SP. COND	1700	UHMOS/CM
TDS	982. 0	MG/L
BICARB. ALK	478. 0	MG/L CACO3
CHLORIDE	7. 2	MG/L
SULFATE	576. 0	MG/L
T. ALK	478. 0	MG/L CACO3

T. CATION 21. 8 MEQ/L T. ANION 21. 8 MEQ/L
TDS/COND 0. 578 TDS BAL 982: 974

Ray A. Sim/BH
RAY A. SIM, MANAGER

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

UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: DEER CREEK #1 3RD N X 22 IL LAB NUMBER W-2381
DATE SAMPLED: 12. 21. 81
REPORT DATE: 12. 30. 81

DATE REC'D: 12. 22. 81
SAMPLED BY: UPL

FLOW: .125 GPM
TEMP: 55°F

WASTEWATER ANALYSIS

PH	7. 2 UNITS
TSS	5. 5 MG/L

CHEMICAL ANALYSIS

CALCIUM	140. 0 MG/L
MAGNESIUM	75. 30 MG/L
POTASSIUM	5. 90 MG/L
SODIUM	61. 00 MG/L
SP. COND	730 UHMOS/CM
TDS	578. 0 MG/L
BICARB. ALK	480. 0 MG/L CACO3
CHLORIDE	13. 1 MG/L
SULFATE	288. 0 MG/L
T. ALK	480. 0 MG/L CACO3

T. CATION 16. 0 MEQ/L T. ANION 16. 0 MEQ/L
TDS/COND 0. 792 TDS BAL 578: 577

Ray A Sim / RAS
RAY A. SIM. MANAGER

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

UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: DEER CR. IN-MINE 4R X 14
W-2209
DATE SAMPLED: 10. 08. 81
REPORT DATE: 10. 15. 81

LAB NUMBER W-2209

DATE REC'D: 10. 09. 81
SAMPLED BY: UPL

FLOW: .125 GPM
TEMP: 54°F

WASTEWATER ANALYSIS

PH	7.2 UNITS
TSS	1.0 MG/L

CHEMICAL ANALYSIS

CALCIUM	167.0 MG/L
MAGNESIUM	52.50 MG/L
POTASSIUM	6.50 MG/L
SODIUM	22.50 MG/L
SP. COND	1100 UHMOS/CM
TDS	628.0 MG/L
CHLORIDE	12.0 MG/L
SULFATE	246.0 MG/L
T. ALK	399.0 MG/L CACO3

T. CATION 13.8 MEQ/L T. ANION 13.4 MEQ/L
TDS/COND 0.571 TDS BAL 628: 500

RAY A. SIM, MANAGER

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

UTAH POWER & LIGHT CO.
M&E FIELD OFFICE
HUNTINGTON UTAH 84528

SAMPLE ID: DEER CR. IN-MINE 4R X 32.5 W-2210
LAB NUMBER W-2210
DATE SAMPLED: 10.08.81
REPORT DATE: 10.15.81
DATE REC'D: 10.09.81
SAMPLED BY: UPL

FLOW: .125 GPM
TEMP: 51°F

WASTEWATER ANALYSIS

PH	7.4 UNITS
TSS	1.0 MG/L

CHEMICAL ANALYSIS

CALCIUM	160.0 MG/L
MAGNESIUM	52.50 MG/L
POTASSIUM	5.00 MG/L
SODIUM	21.00 MG/L
SP. COND	1090 UHMOS/CM
TDS	625.0 MG/L
CHLORIDE	11.4 MG/L
SULFATE	249.0 MG/L
T. ALK	393.0 MG/L CACO3

T. CATION 13.3 MEQ/L
T. ANION 13.4 MEQ/L
TDS/COND 0.573
TDS BAL 625: 494

RAY A. SIM, MANAGER

APPENDIX L

CERTIFICATE OF ANALYSIS

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

FOR Utah Power & Light Co.
Mining & Exploration Field Office
Huntington, Utah 84528

Lab. No. 1507
Date Rec. 01/06/81
Date Sampled 01/06/81

Sample ID Deer Creek Mine Discharge

pH	7.4	Units
Alkalinity, Total	309.0	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	8.96	mg/l
Conductivity	900	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	551.0	mg/l
Solids, Total Suspended	10.3	mg/l
Sulfate	139.9	mg/l
Acidity	0	mg/l
Oil & Grease	1.04	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.8	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

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STANDARD LABORATORIES, INC.

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

Lab. No. 1580

FOR Utah Power ¢ Light
~~Environmental Department~~ M&E Field Office

Date Rec. 02-09-81

Date Sampled 02-09-81

Sample ID Deer Creek Mine Discharge

pH	7.5	Units	Arsenic		mg/l
Alkalinity, Total	207.0	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride	2.4	mg/l	Chromium		mg/l
Conductivity	10000	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.11	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	793.5	mg/l			
Solids, Total Suspended	7.1	mg/l			
Sulfate	338.1	mg/l			
Oil & Grease	0.1	mg/l			
Acidity	-0-	mg/l			

Respectfully submitted [signature]

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

FOR Utah Power & Light
Mining & Exploration

Lab. No. 1671

Date Rec. 03-19-81

Date Sampled 03-19-18

Sample ID Deer Creek Mine Discharge

pH	7.8	Units
Alkalinity, Total	275.5	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	10.0	mg/l
Conductivity	900	µmhos/cm
Dissolved Oxygen	7.1	mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	551.0	mg/l
Solids, Total Suspended	10.5	mg/l
Sulfate	148.1	mg/l
Oil & Grease	<0.5	mg/l
Acidity	0	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.06	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 1697

Date Rec. 04-08-81

Date Sampled 04-08081

FOR Utah Power & Light
Mining & Exploration

Sample ID Deer Creek Discharge

pH	8.0	Units
Alkalinity, Total	254.6	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	12.5	mg/l
Conductivity	700	µmhos/cm
Dissolved Oxygen	7.6	mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	544.0	mg/l
Solids, Total Suspended	3.5	mg/l
Sulfate	189.3	mg/l
Acidity	0	mg/l
Oil & Grease	< 0.5	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.03	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

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CERTIFICATE OF ANALYSIS

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

FOR Utah Power & Light
Mining & Exploration

Lab. No. 1788

Date Rec. 05-04-81

Date Sampled 05-04-81

Sample ID Deer Creek Discharge

pH	7.8	Units
Alkalinity, Total	253.7	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	12.0	mg/l
Conductivity	860	µmhos/cm
Dissolved Oxygen	8.0	mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	560.0	mg/l
Solids, Total Suspended	51.5	mg/l
Sulfate	181.1	mg/l
Oil & Grease	0.6	mg/l
Acidity	< 1.0	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	1.40	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 1903

Date Rec. 06-22-81

Date Sampled 06-22-81

FOR Utah Power & Light Co.
M & E Field Office
Huntington, Utah 84528

Sample ID Deer Creek Mine Discharge

pH	7.7	Units	Arsenic		mg/l
Alkalinity, Total	287.7	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride	13.8	mg/l	Chromium		mg/l
Conductivity	980	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.27	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	577.0	mg/l			
Solids, Total Suspended	4.5	mg/l			
Sulfate	74.1	mg/l			
Acidity	< 1.0 mg/l $CaCO_3$				
Oil & Grease	4.2 mg/l				

Respectfully submitted

Certified Environmental Laboratory

Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 08/11/81

CERTIFICATE OF ANALYSIS

UTAH POWER & LIGHT
MINING & EXPLORATION
BOX 1005
HUNTINGTON, UT 84528

81-006057

SAMPLE: WATER SAMPLES DATED 7-6-81 RECEIVED 7-7-81 FOR ANALYSIS.

	DEER CREEK MINE	WILBERG MINE
Alkalinity as CaCO3 mg/l	308.00	244.00
Arsenic as As mg/l	<.001	<.001
Bicarbonate as HCO3 mg/l	375.76	297.68
Cadmium as Cd mg/l	<.001	<.001
Calcium as Ca mg/l	96.00	76.00
Chloride as Cl mg/l	23.20	16.20
Conductivity umhos/cm	870	780
Dissolved Oxygen mg/l	8.5	8.4
Fluoride as F mg/l	.28	.20
Gross Alpha pci/l	1.4	1.2
Gross Beta pci/l	2.9	2.5
Lead as Pb mg/l	<.001	<.001
MPN Fecal Coliform MPN/100 ml	<2	<2

All reports are submitted as the confidential property of clients. Authorization for publication of our reports, conclusions, or, extracts from or regarding them, is reserved pending our written approval as a mutual protection to clients, the public and ourselves.

Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

CERTIFICATE OF ANALYSIS

81-006057

	DEER CREEK MINE	WILBERG MINE
MPN Total Coliform MPN/100 ml	33.0	49.0
Magnesium as Mg mg/l	55.20	53.80
Manganese as Mn mg/l	.010	.005
Nitrate as NO3-N mg/l	.36	.02
Oil and Grease mg/l	.60	.20
Phosphate PO4-P Ortho mg/l	.040	.100
Potassium as K mg/l	4.80	3.95
Selenium as Se mg/l	.001	<.001
Silica as SiO2 Diss. Mg/l	7.85	9.05
Sodium as Na mg/l	27.50	23.00
Sulfate as SO4 mg/l	181	184
Total Kjeldahl Nitrogen mg/l	.20	.15
Total Organic Carbon mg/l	28.90	16.70
Zinc as Zn mg/l	.005	.006

FORD CHEMICAL LABORATORY, INC.

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Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 08/11/81

CERTIFICATE OF ANALYSIS

81-006057-01

FORD CHEMICAL LABORATORIES

BALANCE SHEET FOR SAMPLE: (1) DEER CREEK MINE

C A T I O N S	mg/l	meq/l
Calcium as Ca mg/l	96.000	4.790
Magnesium as Mg mg/l	55.200	4.540
Sodium as Na mg/l	27.500	1.196
Potassium as K mg/l	4.800	.123

A N I O N S	mg/l	meq/l
Bicarbonate as HCO3 mg/l	375.760	6.162
Sulfate as SO4 mg/l	181.500	3.779
Chloride as Cl mg/l	23.200	.654
Nitrate as NO3-N mg/l	.360	.006

B A L A N C E I N F O R M A T I O N

CATIONS:	10.649
ANIONS:	10.601
TOTAL:	21.250
DIFFERENCE:	.048
SIGMA:	.002

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Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 08/11/81

CERTIFICATE OF ANALYSIS

81-006057-02

FORD CHEMICAL LABORATORIES

BALANCE SHEET FOR SAMPLE: (2) WILBERG MINE

C A T I O N S	mg/l	meq/l
Calcium as Ca mg/l	76.000	3.792
Magnesium as Mg mg/l	53.800	4.425
Sodium as Na mg/l	23.000	1.001
Potassium as K mg/l	3.950	.101

A N I O N S	mg/l	meq/l
Bicarbonate as HCO3 mg/l	297.680	4.882
Sulfate as SO4 mg/l	184.000	3.831
Chloride as Cl mg/l	16.200	.457
Nitrate as NO3-N mg/l	.020	.000

B A L A N C E I N F O R M A T I O N

CATIONS:	9.319
ANIONS:	9.170
TOTAL:	18.489
DIFFERENCE:	.149
SIGMA:	.008

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CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.

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

Lab. No. W2113

Date Rec. 08-25-81

Date Sampled 08-24-81

7-6-81

OR

Utah Power & Light Co.
M&E Field Office
Huntington, Utah 84528

Sample ID

Deer Creek Special

pH	7.5	Units	Arsenic		mg/l
Alkalinity, Total		mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride		mg/l	Chromium		mg/l
Conductivity		µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron		mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l	Iron, Total	0.13	mg/l
Solids, Total Dissolved	576	mg/l			
Solids, Total Suspended	9.5	mg/l			
Sulfate		mg/l			
B.O.D.-5 day	0.6	mg/l			
Acidity	<1.0	mg/l			

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

FOR Utah Power & Light Co.
~~Environmental~~ FIELD OFFICE

Lab. No. 2088

Date Rec. 08-20-81

Sample ID Deer Creek Discharge

Date Sampled 08-19-81

pH	7.5	Units	Arsenic		mg/l
Alkalinity, Total	366	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate		mg/l $CaCo_3$	Boron		mg/l
Calcium		mg/l	Cadmium		mg/l
Chloride	13.6	mg/l	Chromium		mg/l
Conductivity	1080	µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	0.13	mg/l
Hardness		mg/l $CaCo_3$	Lead		mg/l
Magnesium		mg/l	Manganese		mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total		mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium		mg/l
Potassium		mg/l	Zinc		mg/l
Sodium		mg/l			
Solids, Total Dissolved	679	mg/l			
Solids, Total Suspended	11.0	mg/l			
Sulfate	263	mg/l			
Oil & Grease	< 0.5	mg/l	Acidity	< 1.0 mg/l $CaCO_3$	

Respectfully submitted [signature]

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CERTIFICATE OF ANALYSIS

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

FOR Utah Power & Light Co.
Environmental Division
Salt Lake City, Utah 84110

Lab. No. W-2188

Date Rec. 09-28-81

Date Sampled 09-24-81

Sample ID Deer Creek Discharge

pH	7.6	Units
Alkalinity, Total	289.	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	52.7	mg/l
Conductivity	900	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	575.	mg/l
Solids, Total Suspended	24.0	mg/l
Sulfate	263.	mg/l
Acidity	<1.0	mg/l $CaCo_3$
O & G	<0.5	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.54	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

FOR Utah Power & Light Co.
M & E Field Office
Huntington, Utah 84528

Lab. No. 2263

Date Rec. 10-28-81

Sample ID Deer Creek Mine Discharge

Date Sampled 10-28-81

pH	8.1	Units
Alkalinity, Total	259	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	15.6	mg/l
Conductivity	480	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
olids, Total Dissolved	339	mg/l
olids, Total Suspended	12.5	mg/l
ulfate	193	mg/l

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	0.32	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Acidity < 1.0 mg/l $CaCO_3$

Oil & Grease < 0.5 mg/l

Respectfully submitted

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

R Utah Power & Light Co.
M&E Field Office

Lab. No. W-2321

Date Rec. 11-25-81

Date Sampled 11-25-81

Sample ID Deer Creek Mine Discharge

pH	7.8 Units	Arsenic	____ mg/l
Alkalinity, Total	311 mg/l $CaCo_3$	Beryllium	____ mg/l
Alkalinity, Bicarbonate	____ mg/l $CaCo_3$	Boron	____ mg/l
Calcium	____ mg/l	Cadmium	____ mg/l
Chloride	11.2 mg/l	Chromium	____ mg/l
Conductivity	800 µmhos/cm	Copper	____ mg/l
Dissolved Oxygen	8.4 mg/l	Iron	0.43 mg/l
Hardness	____ mg/l $CaCo_3$	Lead	____ mg/l
Magnesium	____ mg/l	Manganese	____ mg/l
Nitrogen, Nitrate	____ mg/l	Mercury	____ µg/l
Phosphorus, Total	____ mg/l	Nickel	____ mg/l
Phosphorus, Ortho	____ mg/l	Selenium	____ mg/l
Potassium	____ mg/l	Zinc	____ mg/l
Sodium	____ mg/l		
Solids, Total Dissolved	606 mg/l		
Solids, Total Suspended	13.0 mg/l		
Sulfate	300 mg/l		
Acidity	< 1.0 mg/l $CaCo_3$		
O & G	< 0.5 mg/l		

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. W-2379

Date Rec. 12-17-81

Date Sampled 12-17-81

FOR Utah Power & Light Co.
M&E Field Office
Huntington, Utah 84528

Sample ID Deer Creek Discharge

pH	7.9	Units
Alkalinity, Total	403	mg/l $CaCo_3$
Alkalinity, Bicarbonate		mg/l $CaCo_3$
Calcium		mg/l
Chloride	13.3	mg/l
Conductivity	980	µmhos/cm
Dissolved Oxygen		mg/l
Hardness		mg/l $CaCo_3$
Magnesium		mg/l
Nitrogen, Nitrate		mg/l
Phosphorus, Total		mg/l
Phosphorus, Ortho		mg/l
Potassium		mg/l
Sodium		mg/l
Solids, Total Dissolved	600	mg/l
Solids, Total Suspended	31.0	mg/l
Sulfate	272	mg/l
O&G	<0.5 mg/l	
Acidity	<1.0 mg/l $CaCo_3$	

Arsenic		mg/l
Beryllium		mg/l
Boron		mg/l
Cadmium		mg/l
Chromium		mg/l
Copper		mg/l
Iron	1.40	mg/l
Lead		mg/l
Manganese		mg/l
Mercury		µg/l
Nickel		mg/l
Selenium		mg/l
Zinc		mg/l

Respectfully submitted

Certified Environmental Laboratory