UTAH POWER & LIGHT COMPANY
HYDROLOGIC MONITORING PROGRAM
ANNUAL REPORT FOR 1980

SEPTEMBER 1981

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

Jim
To Wayne

UTAH POWER & LIGHT COMPANY

1407 WEST NORTH TEMPLE STREET
P. O. BOX 899
SALT LAKE CITY, UTAH 84110

JIM
OCT 20 1981

October 16, 1981

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

Dear Mr. Daniels:

Transmitted herein is Utah Power & Light Company's annual hydrological report for East Mountain in Emery County, Utah. This report includes the permitted and adjacent lands associated with the Deer Creek, Wilberg and Des-Bee-Dove coal mines.

We are endeavoring to complete and submit the 1981 report by Spring of 1982.

Sincerely,

C. E. Shingleton

C. E. Shingleton
Director of Services
Mining and Exploration

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INTRODUCTION

This 1980 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 third 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 Mining 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.

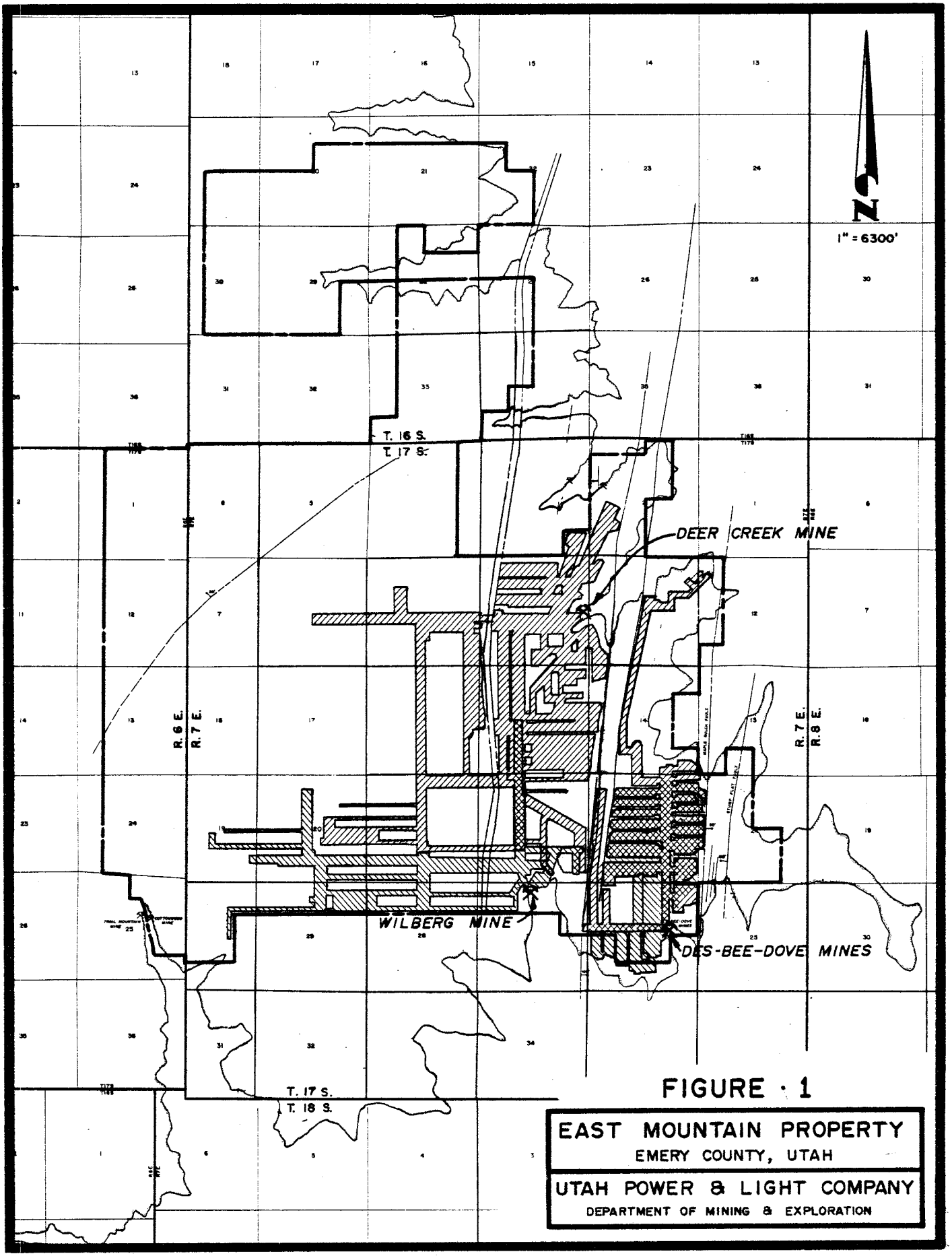


FIGURE · 1

EAST MOUNTAIN PROPERTY
EMERY COUNTY, UTAH

UTAH POWER & LIGHT COMPANY
DEPARTMENT OF MINING & EXPLORATION

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 1980 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

As was the case in 1979, winter precipitation during 1980 was extremely variable throughout the Western United States. Utah, Colorado, New Mexico, Arizona, and Southern California received tremendous amounts of precipitation and associated mountain snowfall. Many areas in Southern Utah and Northern Arizona received snowfall in excess of 300 percent of normal. Northern intermountain states received much less precipitation with areas in Northern Idaho, Western Oregon, and Western Washington receiving less than 70 percent of normal winter precipitation.

The excessive winter moisture in Utah resulted in streamflows which were much above normal during the 1980 runoff period. Summer precipitation was relatively sparce, however, water supplies were generally adequate for all types of use.

LOCAL CLIMATOLOGY

PRECIPITATION

Precipitation in Emery County during 1980 followed a pattern similar to the southern intermountain area, being characterized by scarce fall precipitation (1979), heavy winter snowfall, and light summer rainfall.

Precipitation amounts recorded at the Hunter (Emery) Plant, Huntington Plant, and Electric Lake for the 1980 water year (October, 1979 to September, 1980) 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.

TABLE 1: PRECIPITATION IN EMERY COUNTY, UTAH (1980 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
Oct., 1979	0	0	0.17	14	1.55	82
Nov.	0	0	0.14	24	2.23	110
Dec.	0.41	76	0.15	32	0.37	14
Jan., 1980	1.70	395	2.88	543	4.95	206
Feb.	1.70	415	3.63	1068	6.01	272
Mar.	0.67	160	0.68	110	3.34	158
Apr.	0.75	174	1.13	205	1.27	82
May	1.11	188	1.88	330	3.09	185
June	0	0	0.65	159	0.12	18
July	0.02	3	0.18	19	0.37	35
Aug.	0.51	50	0.38	56	0.38	40
Sept.	2.06	258	2.22	419	1.80	171
Totals	8.93	128	14.09	188	25.48	115
Mean Monthly	0.74	-	1.17	-	2.12	-

A review of Table 1 indicates that the three locations experienced greater than normal precipitation during the winter and spring months and lower than normal levels during the summer. The total annual precipitation was above normal for all locations.

A comparison of precipitation for 1979 and 1980 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 1979-1980 precipitation levels recorded at the three locations.

TABLE 2: COMPARISON OF 1979 AND 1980 PRECIPITATION

Station	1979 Amount	1979 % Of Normal	1980 Amount	1980 % Of Normal	% of 1979
Hunter Plant	8.36	120	8.93	128	107
Huntington Plant	11.65	156	14.09	188	121
Electric Lake	20.00	102	25.48	115	113
Average %		126		144	114

Table 2 indicates that above normal precipitation was recorded at the three locations for 1979 and 1980. Precipitation was greater during 1980, however, as depicted by the higher percent of normal in the table.

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

Weather information from an additional location will be supplied in the 1981 report. A weather station located above the Church Mines at an elevation of 8985 feet on East Mountain (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.

Utah Power & Light approached the Soil Conservation Service to determine the feasibility of establishing a snow course on East Mountain. The SCS indicated that this was not possible since budget constraints have forced the abandonment of some existing snow courses and a ban on the addition of any new ones.

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 1980 in Emery County. A consistent trend in temperature variation was not evident for the three locations. The average monthly temperatures and departures from normal during the 1980 water year are presented in Table 3 on the following page.

TABLE 3: TEMPERATURES IN EMERY COUNTY, UTAH (1980 WATER YEAR)

Month	Hunter Plant		Huntington Plant		Electric Lake	
	Average Temp. (°F)	Departure From Normal	Average Temp. (°F)	Departure From Normal	Average Temp. (°F)	Departure From Normal
Oct.	56.5	+8.1	53.4	+4.0	42.8	+5.3
Nov.	33.1	-2.1	30.1	-5.9	20.9	-4.8
Dec.	29.0	+2.3	27.2	-0.2	15.0	-0.8
Jan.	28.8	+4.7	23.4	-0.2	13.9	-0.7
Feb.	32.7	+4.3	29.2	-1.0	17.4	-1.9
Mar.	37.5	+1.7	30.5	-7.2	16.3	-4.5
Apr.	47.4	+2.8	43.7	-1.4	30.9	+2.2
May	52.9	+0.8	50.8	-4.1	38.3	-1.7
June	66.4	+5.0	66.9	+1.1	50.1	+1.5
July	74.3	+5.9	74.0	+2.3	57.5	+1.8
Aug.	71.3	+4.9	68.5	-0.9	52.4	-1.4
Sept.	60.5	+1.8	60.0	-0.4	48.3	+0.8
Totals	49.2	+3.4	46.5	-1.2	33.7	-0.4

Temperatures recorded at the Hunter Plant were much above normal for all months except for November which was below normal. The Huntington Plant recorded temperatures below normal for all months except October, June and July which were above normal. Likewise, temperatures recorded at Electric Lake were below normal for late fall and winter months while summer temperatures were above normal.

A comparison of 1979 and 1980 temperatures for the three stations is addressed since temperatures also influence water supplies from year to year. Table 4 depicts the variation from 1979 to 1980.

TABLE 4: COMPARISON OF 1979 AND 1980 TEMPERATURES

Station	1979 Average Temp. (°F)	1979 Departure From Normal	1980 Average Temp. (°F)	1980 Departure From Normal	1980 Departure From 1979
Hunter Plant	47.1	+1.2	49.2	+3.4	+2.1
Huntington Plant	47.4	-0.2	46.5	-1.2	-1.0
Electric Lake	35.6	+1.7	33.7	-0.4	-2.1
Average Departure From Normal		+0.9		+0.6	-0.3

Temperatures averaged 0.3° lower for the three locations in 1980 than the temperatures recorded in 1979.

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 1980 water year (October 1979 - September 1980) at the two stations plus the calculated natural flow are found in Appendix B.

TABLE 5: HUNTINGTON CREEK WATER FLOWS (1980 WATER YEAR)

	Huntington Creek Below Electric Lake	Huntington Creek At Plant	Calc. Natural Flow At Plant
Total Yearly Flow (Ac. Ft.)	20,920	81,540	97,975
% Of Normal	96*	116*	139
Average Discharge In Cubic Feet Per Second (CFS)	28.8	112	135
Peak Discharge (CFS)	443	824	836
Date Of Peak Discharge	June 12, 1980	June 11, 1980	June 11, 1980
Minimum Discharge In CFS	9.2	9.5	15
)ate Of Minimum Discharge	May 31, 1980	Nov. 29, 1979	Nov. 29, 1979

* Due to upstream storage in Electric Lake.

During the 1980 spring runoff period (April thru June) approximately 10,000 acre feet of water was impounded behind Electric Lake Dam. The dam filled on June 3 and spill occurred until July 21. Fishery releases, power plant requirements and lake evaporation contributed to lower the lake from a high of 31,000 acre feet to 29,000 acre feet by September 30, 1980. The calculated Huntington Creek natural flow of 97,975 acre feet represents the third highest yearly runoff volume since records were started in 1909.

A comparison of runoff values from 1979 and 1980 is presented in Table 6 to demonstrate the great fluctuation in surface discharges from year to year.

TABLE 6: COMPARISON OF 1979 AND 1980 RUNOFF VALUES

	1979		1980		
	Amount	% Of Normal	Amount	% Of Normal	% Of 1979
Runoff Stored In Electric Lake (Ac. Ft.)	10,000	107	10,000	107	100
Calculated Natural Flow At Plant (Ac. Ft.)	69,000	98	98,000	140	142
Actual Peak* Discharge At Plant (CFS)	360 (May 28, 1979)	-	824 (June 11, 1980)	-	229

* 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 1980 averaged 124 percent of the 1979 values while runoff for 1980 was 142 percent of 1979 (Table 6). This difference can be explained in part by examining Table 1. Precipitation at Huntington Plant and Electric Lake during May was much above normal (330% and 185% respectively). Generally, whenever heavy precipitation occurs during snowmelt periods, runoff is proportionally greater due to the accelerated melting of the snow. Since soil infiltration capacity is relatively limited, greater amounts of water are available for runoff into existing stream channels.

Water quality information on Huntington Creek was compiled on a monthly basis during 1980. Vaughn Hansen Associates conducted the sampling program and the analyses were performed by Ford Chemical Laboratory. 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 C.

TABLE 7: HUNTINGTON CREEK WATER QUALITY (1980 WATER YEAR)

	Below Electric Lake			Right Fork Above Left Fork			Above Power Plant			Below Power Plant		
Parameter	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.
pH (N.U.)	8.0	9.3	7.4	8.1	9.7	7.3	8.2	9.9	7.0	8.2	9.7	7.1
Diss. Oxy.	8.2	11.1	3.5	8.6	10.0	6.5	8.2	10.4	6.1	8.4	10.5	6.4
.fate	-	-	-	-	-	-	49	200	14.4	98	190	36
T. Susp. Solids	3.1	15	.1	20.3	160	1.0	13.9	55	2.0	31	247	1.0
T. Diss. Solids	165	285	130	210	250	180	248	480	189	346	510	210
Sepc. Cond. (umhos)	353	480	280	377	400	350	404	740	290	538	780	320
Turbidity (FTU)	1.4	4.4	0.7	2.1	10	0.8	-	-	-	-	-	-
Alkalinity (TOT)	-	-	-	-	-	-	185	210	132	193	224	158
T. Hardness	-	-	-	-	-	-	293	870	166	355	990	184

In general, the water shows a gradual increase in concentration of dissolved 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 charcteristics 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 1979 and 1980 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 1978-1979

Parameter	Below Electric Lake		Right Fork Above Left Fork		Above Power Plant		Below Power Plant	
	1979	1980	1979	1980	1979	1980	1979	1980
pH (N.U.)	7.6	8.0	8.0	8.1	7.4	8.2	8.1	8.2
Diss. Oxy.	8.8	8.2	9.1	8.6	9.5	8.2	9.3	8.4
Sulfate	53	-	13	-	25	49	52	98
T. Susp. Solids	3.3	3.1	20	20	81	13.9	79	31
T. Diss. Solids	197	165	203	210	232	248	281	346
Spec. Cond. (umhos)	279	353	317	377	364	404	437	538
Turbidity (FTU)	3.6	1.4	5.5	2.1	-	-	-	-
Alkalinity (TOT)	135	-	195	-	154	185	194	193
T. Hardness	153	-	196	-	202	293	233	355

An examination of Table 8 indicates that the values for 1979 and 1980 are fairly consistent and uniform in comparison. TDS, specific conductance, sulfate, and total hardness values were somewhat higher in 1980, 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. Two water samples were obtained during the year 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 distrubed area. Ford Chemical Laboratory and Standard Laboratories conducted the analyses. No flow data were obtained. The results of the analysis and the comparison with 1979 values are shown in Table 9. Values are in milligrams per liter unless otherwise noted. Where two samples were obtained, the values represent the average of two samples. Additional raw data can be found in Appendix D.

TABLE 9: DEER CREEK SURFACE WATER QUALITY (1979 AND 1980)

Parameter	Effluent Limitations (Maximum Allowable)	1980 # Of Samples*	1980 Above The Mine	1980 Below The Mine	1979 # Of Samples	1979 Above The Mine	1979 Below The Mine
pH	6.0 - 9.0	2	7.93	7.97	2	8.1	7.9
Conductivity	-	2	695	830	1	470	730
Total Dissolved Solids	-	2	435	510	2	285	459
Total Suspended Solids	70.0	2	1796	203	2	702	10,290
Iron Total	7.0	2	0.13	0.21	1	0.32	0.65
Maganese	-	2	0.13	0.14	0	-	-

* One sample collected May 28, 1980 and one on July 1, 1980. Both samples taken on clear days which are uneffected by recent storms.

An examination of Table 9 indicates that the concentration of total dissolved solids and conductivity have increased in the 1980 runoff waters. The high total suspended solids concentration above the mine for 1980 indicates greater erosion taking place at that time, particularly in the sample collected in the spring. The lower 1980 total suspended solids concentration below the mine indicates that even though an eroding situation existed above the mine, the water leaving the property had a lower sediment load than the previous year. The samples collected had a pH and total iron content that were well within the effluent limitation standards, but the total suspended solids of the samples at both locations were much higher than the effluent limitations which is 70 mg/L. However, in 1980, the samples taken above the disturbed areas in the natural drainage were 26 times higher than the effluent limitation limits while the samples taken below were only 3 times higher. This shows an improved water quality through the disturbed areas.

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 1980 was acquired from the Emery Water Conservancy District and the Cottonwood Consolidated Irrigation Company. Joe's Valley storage on September 30, 1979, was 45,040 acre feet. Total storage on September 30, 1980, was equal to 50,250 acre feet, which represents a net increase of 5,210 acre feet for the water year.

Joe's Valley Reservoir reached full storage capacity on June 8, 1980, and spill occurred from them until July 14. About 27,000 acre feet of water spilled past existing diversions during the June 8 to July 14 period. Total storage water used amounted to about 13,000 acre feet while total natural flow utilized was equal to 43,000 acre feet. Total runoff from the Cottonwood Creek drainage during the 1980 water year was equal to about 75,000.

COTTONWOOD CREEK

Cottonwood Creek continued to be sampled by UP&L in the vicinity of the proposed Cottonwood Portal (located near the Trail Mtn. Mine) during 1980. Eight 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 July, 1980. These data, in conjunction with the samples collected in 1979, give a complete year of water quality on a monthly basis. Since July 1980, sampling has and will continue on a quarterly basis. Table 10 is a tabulation of the average, maximum and minimum values for water samples collected from August 1979 through July 1980. The maximum values for all parameters presented in Table 10 occurred during the months of March, April, and May. Alkalinity, sulfate and total dissolved solids showed the lowest levels in June while iron and total suspended solids were lowest in October. Complete inorganic

analyses of water samples can be found in Appendix E. Location of the sample stations is shown in the Appendix Map 1.

Maximum flow occurred during June and July with the flow exceeding 6.24 cubic feet per second (CFS). Minimum flow occurred during the winter months, but was not measured due to the frozen surface of the stream. Average flow for 1980 was approximately 0.89 CFS.

TABLE 10: WATER QUALITY OF COTTONWOOD CREEK (1980 WATER YEAR)

	Above Trail Mtn. Mine			Below Trail Mtn. Mine			At USGS Flume			Above Straight Canyon		
Parameter	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.
pH	7.7	8.1	7.1	7.8	8.1	7.1	7.8	8.0	7.4	7.9	8.4	7.5
Alkalinity	277	314	240	273	312	240	263	298	228	276	304	244
Iron	0.360	1.520	0.065	0.530	2.040	0.110	0.600	2.060	0.080	0.640	3.430	0.040
& Grease	4.5	20.4	0.6	3.3	5.6	0.6	3.1	8.8	0.01	18.77	114.0	1.0
Sulfate	64.8	124.0	42.0	87.2	188.0	26.0	72.8	130.0	24.0	86.9	139.0	37.0
TSS	14	54	2	23	70	1	87	642	1	168	1364	1
TDS	386	508	322	418	700	295	373	496	300	369	500	40

GRIMES WASH

Flow information was not obtained during 1980, however, water samples were collected on the right fork of Grimes Wash both above and below the disturbed area of the Wilberg Mine. The sampling point, which is below the disturbed area, is located approximately 3,000 feet downstream from the upper sampling point. The water flows through an underground culvert for 1,800 feet of the distance between these points. Two samples were collected at each location and analyzed by Standard Laboratories.

The first set of samples was collected on May 20, 1980, while the second set was collected on July 1, 1980. In each case the stream was sampled on a clear day without being influenced by storms. The raw data regarding these samples can be found in Appendix F. Table 11 shows the average values of the 1980 water samples taken in Grimes Wash.

TABLE 11: GRIMES WASH WATER QUALITY

Parameter	Effluent Limitation (Maximum Allowable)	Right Fork Above Mine (2 Samples)	Right Fork Below Mine (2 Samples)
pH	6.0 - 9.0	8.3	8.2
Conductivity	-	685	745
Total Dissolved Solids	-	375	406
Total Suspended Solids	70.0	400	487
Total Iron	7.0	2.71	2.17
Manganese	-	0.20	0.20

Table 11 shows the water quality to be relatively unchanged between sample points. It is noteworthy to point out the fact that the total suspended solids of the water flowing down the right fork of Grimes Wash above the disturbed area exceeds the effluent limitations for total suspended solids which is 70 mg/L.

EAST MOUNTAIN SPRINGS

The 1980 water reconnaissance program of East Mountain Springs was initiated in June with routine sampling and flow measurements of the springs identified in 1979 and previous years. To aid in the future identification of springs, foil tags embossed with the spring name or number were placed at the sampling locations.

Emphasis has been placed on water chemistry rather than water quality for 1980. Cation and Anion concentrations were measured and presented as diagrams to help determine the interrelationships of the springs.

SPRING FLOW

Due to the abnormally high precipitation during the winter and spring of 1980, the spring discharges measured in 1980 are much higher than measurements from previous years. Table 12 is a tabulation of the flow data collected during the 1980 season. A number of springs were monitored more than once to record the seasonal variation. Ten new springs were identified and monitored in 1980. These springs are numbered 80-41 through 80-50.

A comparison of the 1979 and 1980 discharges from specific and representative East Mountain springs is presented in Table 13. This table clearly documents the increased flow in 1980 as compared to measurements taken in 1979. A summation of flow data for the respective years indicates an increase in flow of 94% from 1979 to 1980. This increase flow correlates to the higher precipitation levels recorded in 1980. Refer to climatology section for records of precipitation and temperature in 1980.

During 1980, many areas on East Mountain where springs were previously not present were damp or had stagnate water on the surface. Because the water was stagnate, it was not possible to sample or measure water discharges. These areas were photographed to document their occurrence. In future years, these areas will be inspected to further assess their hydrologic significance.

TABLE 12: EAST MOUNTAIN SPRINGS DISCHARGES (1980)

Spring	Sample Date	Flow (GPM)	Sample Date	Flow (GPM)	Sample Date	Flow (GPM)
Sheba Spring	7/2/80	13.0	10/6/80	2.0		
Pine Spring	7/2/80	12.0	8/5/80	Dry	10/6/80	Dry
Pine Spring Trough	7/2/80	Dry	8/5/80	Dry	10/6/80	Dry
Upper Elk Spring	6/30/80	58.3				
Ted's Tub	7/3/80	78.0	10/6/80	6.0		
Cove North Spring	6/10/80	20.0	10/6/80	Dry		
Burnt Tree Spring	6/9/80	26.0	7/2/80	32.0	10/9/80	20.0
79-1	7/2/80	130.0	10/6/80	12.0		
79-2	7/14/80	7.5	11/7/80	2.5		
79-3	7/14/80	15.0	11/7/80	<1.0		
79-4	8/27/80	1.2				
79-5	8/27/80	1.2				
79-6	8/27/80	Damp				
79-7	8/27/80	Damp				
79-8	8/26/80	1.5				
79-9	8/26/80	1.5				
79-11	7/15/80	5.0				
79-15	9/25/80	5.0				
79-17	8/26/80	0.5				
79-18	8/27/80	17.0				
79-19	8/27/80	Dry				
79-20	8/27/80	<1.0				
79-21	9/25/80	Dry				
79-22	9/25/80	Dry				
79-24	7/3/80	60.0	10/6/80	0.8		
79-25	7/15/80	8.0				
79-28	6/9/80	43.0	10/9/80	7.5		
79-29	7/15/80	6.0				
79-30	8/27/80	2.0				
79-31	8/27/80	0.5				
79-32	7/15/80	3.0	10/9/80	1.5		
79-33	7/15/80	Damp	10/9/80	Dry		
79-34	9/25/80	5.0				
79-39	7/3/80	18.0				
80-41	6/10/80	14.0	11/7/80	5.0		
80-42	7/14/80	5.7	11/7/80	Dry		
80-43	7/14/80	10.0	11/7/80	Dry		
80-44	7/14/80	20.0	11/7/80	<1.0		
80-45	7/14/80	12.0				
80-46	7/14/80	31.0	11/7/80	6.0		
80-47	7/14/80	12.0	11/7/80	5.0		
80-48	10/9/80	5.0				
80-49	10/9/80	4.0				
80-50	8/27/80	3.0				
80-51	8/26/80	15.0				

TABLE 13: EAST MOUNTAIN SPRINGS DISCHARGES 1979 - 1980

Spring	Sample Date	Flow (GPM)	Sample Date	Flow (GPM)	Sample Date	Flow (GPM)	Sample Date	Flow (GPM)
Sheba Spring	7/10/79	12.0	7/2/80	13.0	10/22/79	0.95	10/16/80	2.0
Pine Spring	7/10/79	4.1	7/2/80	12.0	10/22/79	Dry	10/6/80	Dry
Pine Spring Trough	7/10/79	6.6	7/2/80	Dry	10/22/70	Dry	10/6/80	Dry
Ted's Tub	7/10/79	65.0	7/3/80	78.0	10/22/79	12.0	10/6/80	6.0
Cove North Spring	7/10/79	0.67	6/10/80	20.0				
Burnt Tree Spring	7/10/79	12.0	7/2/80	32.0	10/22/79	1.9	10/9/80	20.0
79-1	7/10/79	40.0	7/2/80	130.0	10/22/79	5.0	10/6/80	12.0
79-2	7/10/79	0.5	7/14/80	7.5				
79-3	7/10/79	2.6	7/14/80	15.0				
79-11	7/12/79	6.0	7/15/80	5.0				
79-24	7/14/79	34.0	7/3/80	60.0	10/22/79	2.4	10/6/80	0.8
79-25	7/15/79	10.0	7/15/80	8.0				
79-29	7/26/79	4.0	7/15/80	6.0				
79-32	7/26/79	1.4	7/15/80	3.0				
79-33	7/26/79	1.4	7/15/80	Damp	10/22/79	1.3	10/9/80	Dry

The U. S. Forest Service has suggested that UP&L conduct an airborne infrared photography survey to define the location of riparian areas and the health of the riparian vegetation. Due to the fact that most of the springs on East Mountain are in areas shaded by trees and these areas will not be identifiable in the shadows, it is felt that this would not be of benefit in our data collection process. Our present method of visually inspecting the springs on the ground on a regular basis is felt to be the most effective method of monitoring.

GEOLOGIC OCCURRENCE

The springs on East Mountain have been studied to determine the geologic circumstances that cause the springs to occur. The mode of occurrence for each spring has been tabulated on the "Springs Geologic Conditions Inventory" sheets which are located in Appendix G. The springs on East Mountain originate in several different ways. However, many springs share the same mode of occurrence and, in some cases, are related one with another.

The most frequent occurrences of springs are those which are located about 150 to 350 feet below the top of the North Horn Formation (see Figure 2). The drill hole data show a predominance of fluvial siltstone and sandstone at that stratigraphic interval. These sedimentary rocks represent many isolated fluvial systems which are water-bearing. The springs are formed where these fluvial channels intersect the land surface. Because the fluvial channels within this zone are generally not interconnected, the springs in this zone are not interrelated. They do share the same mode of occurrence, however.

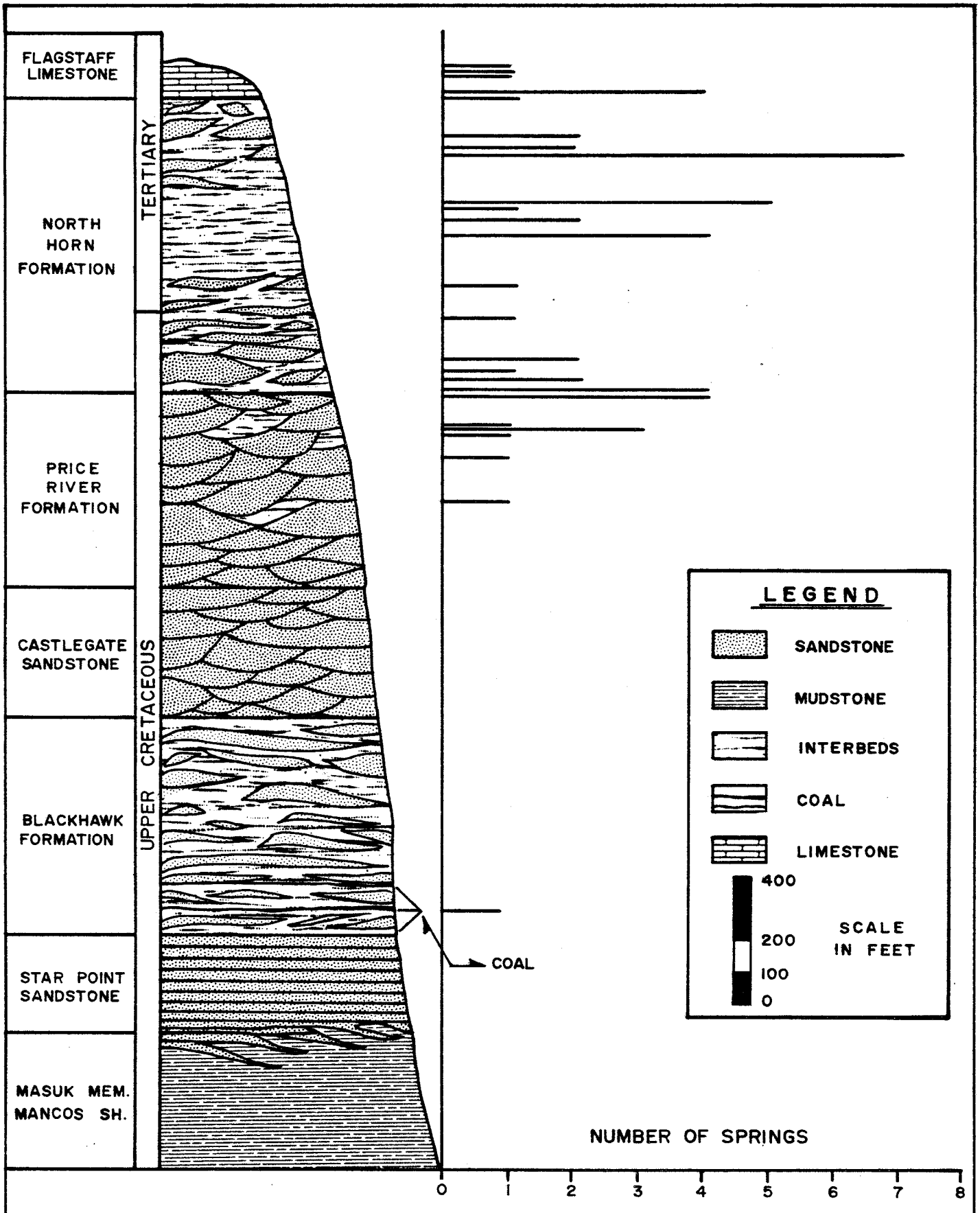


FIGURE · 2

STRATIGRAPHIC LOCATION OF SPRINGS
EAST MOUNTAIN

A high percentage of springs are also located in the lower 50 feet of the North Horn Formation. These springs occur when water flowing through fluvial sandstones which are underlain by a thin zone of impervious mudstone at the base of the North Horn Formation intersect the land surface. The drill hole data indicate that the impervious mudstone unit at the base of the North Horn Formation is a blanket deposit present throughout the East Mountain area. The springs related to this mode of occurrence are not generally interrelated because they are fed by waters flowing through isolated fluvial channel sandstones and siltstones.

Several springs are located along the Roans Canyon fault graben. Generally, the springs are located within the North Horn Formation along the fault zone (see Map 2). Few springs are located in this area below the base of the North Horn Formation below where the impervious mudstone is located. This supports the fact that water percolating down a fracture or fault is stopped from further downward travel when it reaches the impervious clay zone which forms a seal along the fracture. Many of the largest springs on East Mountain (Elk, Sheba and 79-1) are located along this fault system. Because this fault system is located along the trough of the Straight Canyon Syncline, water from both the north and the south flows toward the fault where it is allowed to migrate to the land surface. The springs located along this fault zone are generally interrelated.

A few springs are located within both the Flagstaff and Price River Formations. However, their occurrence is insignificant in comparison to springs located in the North Horn Formation. The mode of occurrence of these springs is individually discussed on the Springs Geologic Conditions Inventory Sheets (see Appendix G).

Table 14 groups the various springs that have similar modes of occurrence. It is probable that some of the springs having the same mode of occurrence are interrelated.

QUALITY

To more closely identify springs which are related, 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 H). In many cases, the diagrams of two or more springs within an area have similar diagrams. For example, the diagram of springs 79-2 and Burnt Tree Springs are similar, therefore, they most likely share the same water source. In most instances, the data collected in 1980 is not sufficient to group families of water together by using water chemistry. Therefore, more samples will be collected in the future to add to the data base.

The quality of the springs sampled in 1980 shows no change from samples collected in previous years. 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 15. The raw data regarding all springs sampled are contained in Appendix I.

TABLE 14: MODES OF OCCURRENCE EAST MOUNTAIN SPRINGS

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

TABLE 15: EAST MOUNTAIN SPRINGS WATER QUALITY (1980 WATER YEAR)

Parameter	Sheba	Elk	Ted's Tub	Cove North	Burnt Tree
Elevation	9740	9350	9290	9080	9260
pH	8.0	7.8	7.8	8.2	7.6
Alkalinity	242	256	270	266	298
Total Suspended Solids	4.0	1.5	4.2	5.0	1.2
Total Dissolved Solids	264	262	324	319	280
Sulfate	5.0	4.0	5.5	14.8	16.3
Iron	0.13	-	0.05	-	1.2
Turbidity (NTU)	0.9	1.8	0.4	1.0	1.7

A comparison of water quality characteristics for 1979 and 1980 for Elk, Burnt Tree, and Sheba Springs are presented in Table 16.

TABLE 16: EAST MOUNTAIN SPRINGS WATER QUALITY 1979 - 1980

Parameter	Elk Spring		Burnt Tree Spring		Sheba Spring	
	1979	1980	1979	1980	1979	1980
pH	8.2	7.8	7.1	7.6	7.3	8.0
Total Suspended Solids	1.9	1.5	6.0	1.2	4.5	4.0
Total Dissolved Solids	250	262	274	280	227	264
Iron	0.16	-	0.03	1.2	0.25	0.13
Sulfate	15.1	4.0	9.5	16.3	6.8	5.0

This table indicates that the water quality characteristics are relatively unchanged between 1979 and 1980.

Wilberg Disch

MINE WATER

The intensive in-mine water monitoring program initiated by Utah Power & Light in 1977 was continued through 1980. The following section discusses the data collected and interpretations made regarding the water encountered in UP&L's coal mines.

CHURCH MINES

The mine workings of the Church Mines have been generally dry since the inception of mining. The water which was encountered in 1979 in the 2nd North off 8th West entry of the Beehive Mine stopped flowing early in 1980 and has since remained dry.

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 area will be inspected at regular intervals in the future to check for any change in the hydrologic condition.

The mine workings within the Church Mine complex have remained dry, except for the cases mentioned, throughout 1980. Because of this lack of water, no water has been discharged from the mine.

The surface run-off waters flowing in the wash below the Church Mines were sampled twice in 1980. The first sample was taken in March prior to the spring run-off while the second sample was taken in May during spring run-off. The data regarding these samples are shown in Table 17.

TABLE 17: NATURAL RUN-OFF WATER QUALITY - CHURCH MINES (1980)

Parameter	March 25, 1980	May 20, 1980
pH	8.2	8.3
Total Alkalinity	218 mg/1	--
TSS	16.0 mg/1	11.5
TDS	934.2 mg/1	10,245
Iron	0.29 mg/1	0.20

The sample collected in March is relatively low in total dissolved solids, while the sample collected in May, during peak run-off, has a high dissolved solid content. The cause of the high concentration of total dissolved solids is not known.

WILBERG MINE

The Wilberg Mine water monitoring program consisted of measuring flows and collecting water samples for quality analyses of in-mine and discharge waters. In previous years, an emphasis was placed on monitoring the various inflow of water throughout the mine. Monitoring each area of water flow proved ineffective in showing the general hydrologic trends of the mine. Therefore, in 1980, more emphasis was placed on measuring the total water production in the mine and where this water was coming from.

IN-MINE MONITORING

The quantity of water flowing into the Wilberg Mine has been monitored since April 1979. Figure 3 shows the quantities of water recorded each month between April 1979 and May 1980. As can be seen on Figure 3, the flow of water into the mine follows a seasonal trend.

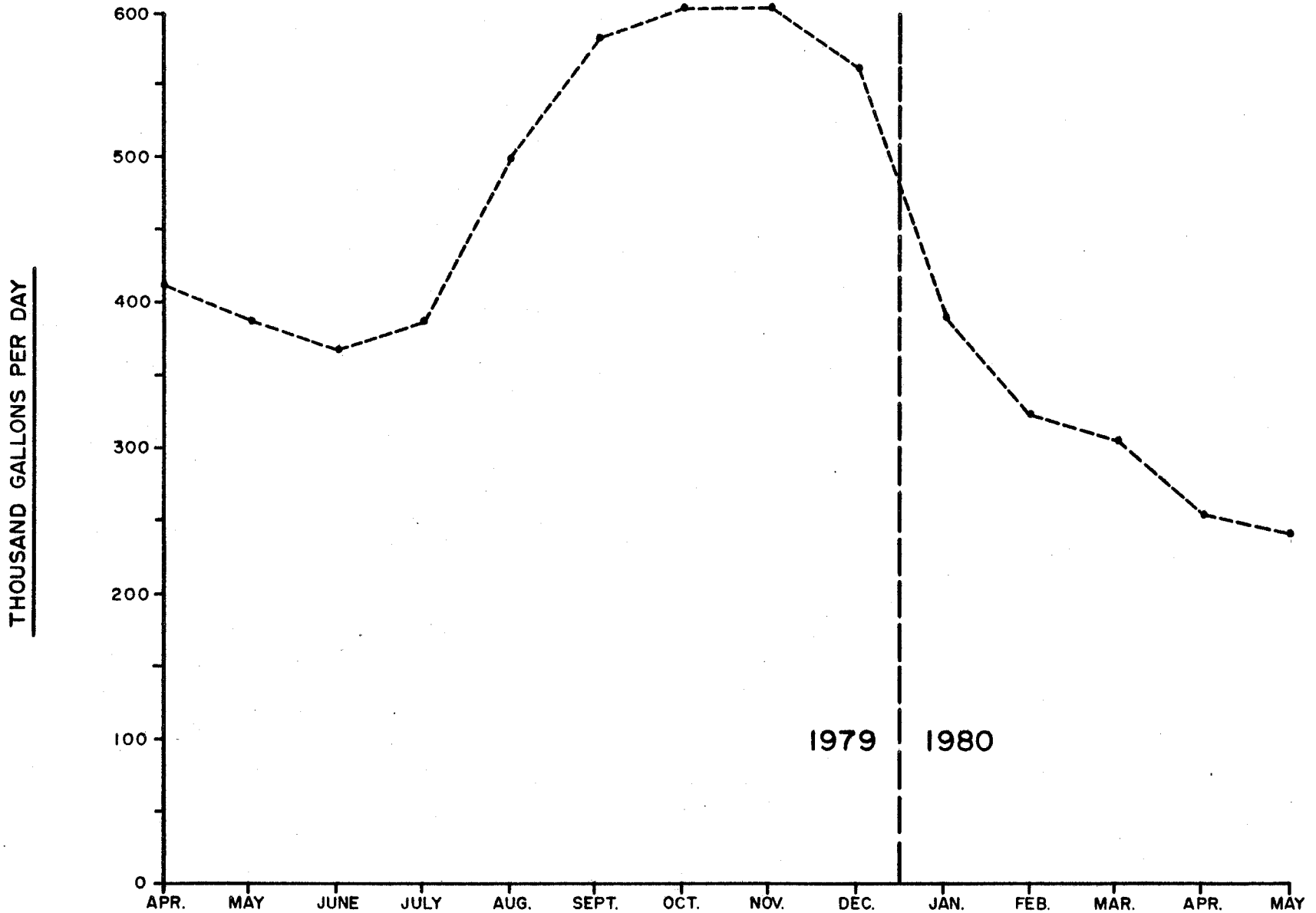


FIGURE · 3

WILBERG MINE WATER PRODUCTION

The minimum flows were recorded between the months of May through July while the maximum flows were recorded between September through October. This suggests that the water bearing strata intersected in the mine may be fed by surface water with a 5 to 6 month lag time for water to flow from the land surface to the mine.

In May of 1980, the water flow meters were removed when the mine water pumping system was modified. The meters were reinstalled in September 1980, but they were installed in different locations, making it impossible to compare with the data shown in Figure 3.

The quantity of water flowing into and out of the sump in the Wilberg Mine and the water discharged is shown in Table 18. Due to the modification of the pumping system, the data are incomplete in the months following May 1980.

The majority of water produced within the mine emanates from roof bolt holes with minor amounts flowing from the floor. The most noticeable source of water flowing from the floor occurs where the Pleasant Valley Fault intersects the mine workings in Main West (Figure 4). This location continues to produce an estimated average flow of 5 gpm.

The largest influx of water originates from the roof when mining advances beneath a sandstone top. The sandstone, which is semipermeable and porous, affords an effective route of water transport. Mudstone, siltstone and interbedded materials generally act as aquicludes which impede water flow unless fracturing of the formation has allowed for secondary permeability. Of the water producing areas, those closest to the active mining face continue to be excessively wet and previously mined wet areas experience a decrease in flow or dry up, generally within one or two months.

Much of the water that flows into the Wilberg Mine seeps into the underlying Starpoint Sandstone. It is not possible to measure the quantity of water flowing into the Starpoint. Significant water also leaves the Wilberg Mine through evaporation. The air being drawn into the mines averages about 10 to 15% while the air leaving the mine averages 98% humidity. Both of these factors effect the accuracy of measuring water flowing into the mine.

TABLE 18

1980 WILBERG MINE WATER PRODUCTION AND CONSUMPTION

	Total Gallons		GPD		GPM	
January						
Into Sump	11,432,400	Gallons	394,221	GPD	274	GPM
Out of Sump	4,721,800	Gallons	162,821	GPD	113	GPM
Discharge	----------	Gallons	-------	GPD	---	GPM
February						
Into Sump	10,739,500	Gallons	325,439	GPD	226	GPM
Out of Sump	5,535,500	Gallons	167,742	GPD	116	GPM
Discharge	20,800	Gallons	630	GPD	0.44	GPM
March						
Into Sump	8,944,000	Gallons	308,414	GPD	214	GPM
Out of Sump	4,444,600	Gallons	153,262	GPD	106	GPM
Discharge	8,640,000	Gallons	297,931	GPD	207	GPM
April						
Into Sump	7,536,500	Gallons	259,879	GPD	180	GPM
Out of Sump	4,120,100	Gallons	142,072	GPD	99	GPM
Discharge	3,007,700	Gallons	97,023	GPD	67	GPM
May						
Into Sump	7,767,900	Gallons	242,747	GPD	169	GPM
Out of Sump	3,507,000	Gallons	109,594	GPD	76	GPM
Discharge	11,232,000	Gallons	362,323	GPD	252	GPM

TABLE 18

1980 WILBERG MINE WATER PRODUCTION AND CONSUMPTION (Cont.)

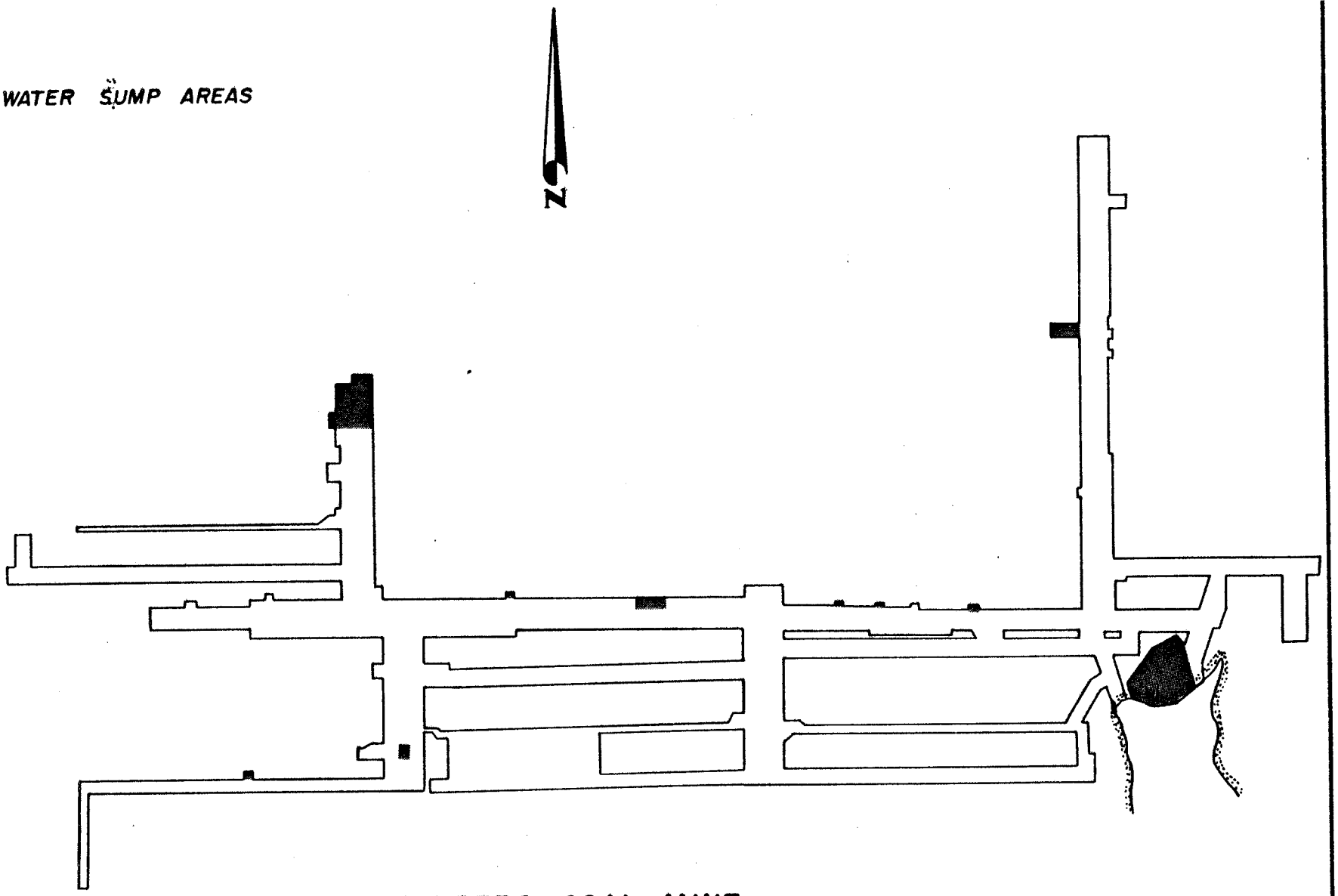
	Total Gallons		GPD		GPM	
June						
Into Sump	----------	Gallons	-------	GPD	---	GPM
Out of Sump	----------	Gallons	-------	GPD	---	GPM
Discharge	12,960,000	Gallons	432,000	GPD	300	GPM
July						
Into Sump	----------	Gallons	-------	GPD	---	GPM
Out of Sump	----------	Gallons	-------	GPD	---	GPM
Discharge	9,072,000	Gallons	292,645	GPD	203	GPM
August						
Into Sump	----------	Gallons	-------	GPD	---	GPM
Out of Sump	----------	Gallons	-------	GPD	---	GPM
Discharge	8,928,000	Gallons	288,000	GPD	200	GPM
September						
Into Sump	----------	Gallons	-------	GPD	---	GPM
Out of Sump	----------	Gallons	-------	GPD	---	GPM
Discharge	15,264,000	Gallons	508,800	GPD	353	GPM
October						
Into Sump	----------	Gallons	-------	GPD	---	GPM
Out of Sump	----------	Gallons	-------	GPD	---	GPM
Discharge	10,081,900	Gallons	325,222	GPD	226	GPM

TABLE 18

1980 WILBERG MINE WATER PRODUCTION AND CONSUMPTION (Cont.)

	Total Gallons		GPD		GPM	
November						
Into Sump	----------	Gallons	-------	GPD	---	GPM
Out of Sump	----------	Gallons	-------	GPD	---	GPM
Discharge	10,515,900	Gallons	350,530	GPD	243	GPM
December						
Into Sump	----------	Gallons	-------	GPD	---	GPM
Out of Sump	----------	Gallons	-------	GPD	---	GPM
Discharge	9,210,200	Gallons	297,103	GPD	206	GPM
Year Total Discharge	98,932,500	Gallons	270,307	GPD	188	GPM

= WATER SUMP AREAS



WILBERG COAL MINE

SCALE: 1" = 2000'

FIGURE · 4

IN-MINE QUALITY

Several water samples were collected in the Wilberg Mine in 1980. Table 19 lists the characteristics of the samples collected. Individual analyses can be found in Appendix J.

TABLE 19: WILBERG MINE WATER QUALITY (1980)

Location	Date	Mg/l						NTU
		pH	Alkalinity	TSS	TDS	SO_4	Iron	Turbitity
1stNx24 1L	7-14-80	8.0	266.6	1.0	496.0	159.3		0.90
1stNx41 1R	3-24-80	7.6	378.6	0.2	594.0	158.8	0.19	0.258
1stNx42 1L	3-24-80	7.6	277.9	3.2	519.0	174.4	1.03	5.40
1stNx46 1R	11-17-80	7.4	314.0	7.0	700.0	211.5		
4Ex41 1R	11-17-80	7.0	534.0	9.5	1598.0	640.7		
4Ex42 1L	7-30-80	7.5	534.4	0.5	1320.0	571.9		
3rd South	11-17-80	7.8	368.0	8.0	602.0	115.2		

Although fewer samples were collected in the Wilberg Mine in 1980 than in 1979, it is evident that the quality of the mine water has remained constant. For comparison, Table 20 lists the average water quality for samples collected both in 1979 and 1980.

TABLE 20: WILBERG MINE WATER QUALITY 1979 AND 1980

Parameter	1979	1980
pH	7.3	7.6
Alkalinity	457.8	381.9
TSS	1.62	4.2
TDS	915.0	832.7
SO_4	313.9	290.3
Iron	0.22	0.61
Turbitity	2.10	2.18

DISCHARGE

Water produced in the Wilberg Mine is pumped to a primary sump located within the old Wilberg workings by a complex pumping and piping system. The sump, which functions as a settling basin, effectively removes settleable solids from the water. A portion of this water is redistributed to various areas of the mine to be utilized in the mining operations. Water from 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. Table 21 presents a history of the amount of water discharged for 1980.

TABLE 21: WILBERG MINE DISCHARGE (1980)

Quarter	Total Discharge Gallons	# Days In Quarter	Avg. Flow During Discharge (GPD)
Jan. - Mar.	8,660,834	91	95,174
Apr. - Jun.	27,199,718	91	298,898
Jul. - Sept.	33,264,000	92	361,565
Oct. - Dec.	29,808,000	92	324,000
TOTAL	98,932,552	366	---

Monthly water quality samples were collected to insure that water was discharged in accordance with the Wilberg coal mine discharge permit. Table 22 depicts the range of water quality for discharge water in 1980. Individual analyses can be found in Appendix K.

TABLE 22: WILBERG MINE DISCHARGE WATER QUALITY

Parameter	No. Of Samples	Quality Data (mg/l) Min.	Ave.	Max.
Flow GPD	12	0	270,308	432,000
pH	12	7.3	7.52	7.7
BOD_5	12	<1.0	4.91	11.0
Coliform: Total	4	<1.0	169.5	2,400
Coliform: Fecal	4	0	<2	<3
Acidity	12	0	11.6	30.0
Alkalinity	12	216.0	269	302
Oil & Grease	12	<1.0	2.17	7.6
TSS	12	<1.0	23.7	108
TDS	12	484	534.2	630
Total Iron	12	0.154	0.21	0.30

A comparison of water quality for mine discharge during 1979 and 1980 is shown in Table 23.

TABLE 23: WILBERG MINE DISCHARGE WATER QUALITY 1979-1980

Parameter	No. Of Samples 1979	No. Of Samples 1980	Ave. Of Quality Data (mg/l) 1979	Ave. Of Quality Data (mg/l) 1980
pH	10	12	7.49	7.52
BOD_5	6	12	2.08	4.91
Coliform: Total	4	4	17.0	169.5
Coliform: Fecal	4	4	2.0	< 2.0
Acidity	9	12	26.0	11.6
Alkalinity	10	12	280.6	269.0
Oil & Grease	14	12	3.14	2.17
TSS	10	12	4.3	23.7
TDS	10	12	576.0	534.2
Total Iron	10	12	0.16	0.21

An examination of Table 23 shows no significant change in quality between samples collected in 1979 and 1980.

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 define 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 comes 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 continue 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.

The best estimate of in-mine water production was arrived at by combining the values of discharge and domestic usage. The amount of water discharged from the mine in 1980 was 102 million gallons and the water consumed in the mine totaled approximately 14.5 million gallons. Therefore, the water flowing into the Deer Creek Mine is approximately 117 million gallons. The discharge and domestic use water accounts for all water leaving the mine with the exception of any water that flows into the floor of the mine and water which evaporates. The amount of water which flows into the floor of the mine cannot be measured under present conditions. It is likely that significant quantities of water leaves the mine workings in this way. The amount of water which evaporates is significant because the air going into the mine averages about 10 to 15% humidity, but the air leaving the mine contains about 98% humidity.

IN-MINE QUALITY

A review of Table 24 indicates a fairly uniform quality of water for the Deer Creek Mine and close similarity to that of the Wilberg Mine. Individual analyses can be found in Appendix L.

TABLE 24: DEER CREEK - IN-MINE WATER QUALITY (1980)

Parameter	2nd Right	3rd South B	EM-3
pH	7.8	7.6	7.0
Conductivity (mmhos/cm)	820	900	1000
TDS	479	473	631.0
TSS	2.5	0.67	1.5
Iron (Total)	0.24	--	0.30
Manganese	0.06	--	0.06

The quality of the Deer Creek in-mine water has remained constant since UP&L began its monitoring program. The average water quality of samples collected in 1979 and 1980 are compared in Table 25.

TABLE 25: DEER CREEK IN-MINE WATER QUALITY 1979-1980

Parameter	1979	1980
pH	7.6	7.5
Alkalinity	452.5	380.3
TSS	1.7	1.2
TDS	612.0	505.0
SO_4	179.7	915.2
Iron	0.19	0.27

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 5. 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 1980 amounted to 102 million gallons. This is equivalent to an average instantaneous flow of 0.43 cubic feet per second or 193 gallons per minute. The peak discharge was recorded on July 14, 1980, when it reached 2.96 CFS. The average monthly discharges are shown in Figure 6.

The recorded flow of 313 acre feet during 1980 is considerably higher than the 1979 estimated discharge of 107 acre feet. Prior to December of 1979, the discharge was measured by a weir and staff gauge. This was felt to be quite inaccurate because of the variability of discharge and the measurement interval of once a month. Therefore, a recorder was installed to continuously document the discharge flow. Due to these circumstances, it is felt that the measurements made prior to 1979 are inaccurate and should be treated as such.

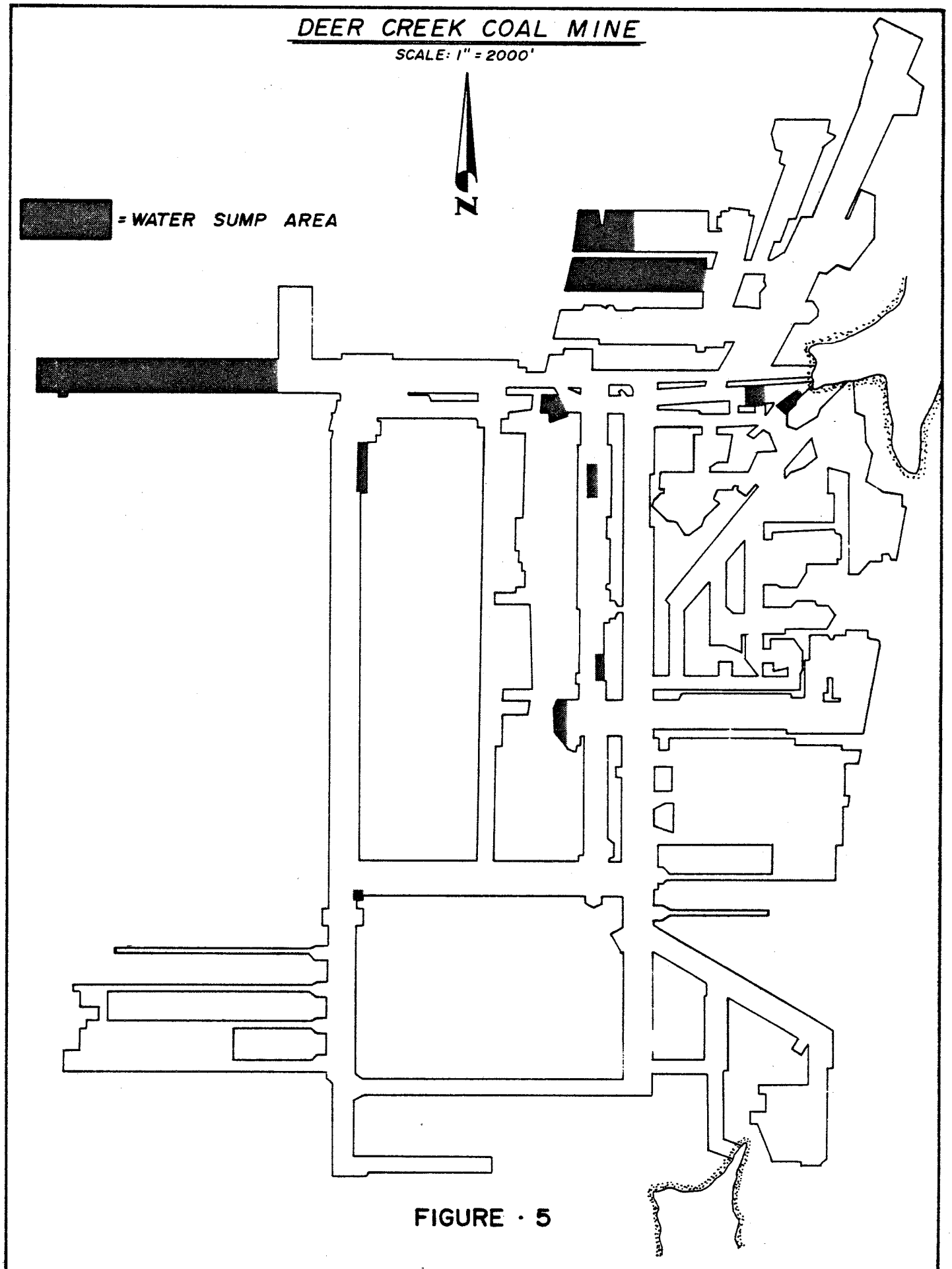


FIGURE - 5

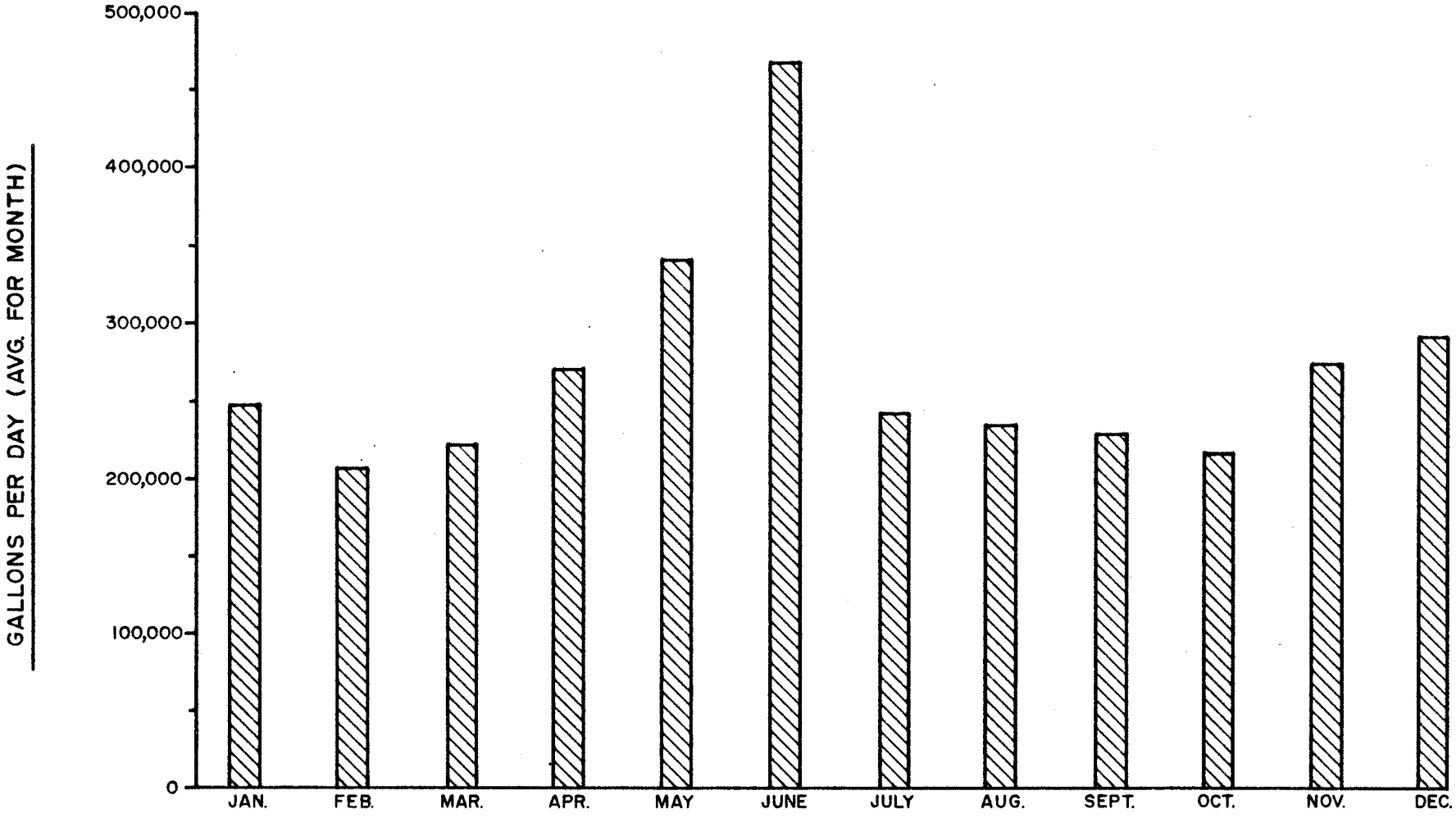


FIGURE • 6

1980 DEER CREEK MINE WATER DISCHARGE

Drill Hole Monitoring

DRILL HOLE MONITORING

In 1978, two surface exploration drill holes (EM-47 in Rilda Canyon and EM-31 in Cottonwood Canyon) were developed into permanent water monitoring stations (Figure 7 and Map 2). An additional in-mine station (A-126) was developed in the Fourth East section of the Wilberg Mine. However, the advancing longwall section permanently blocked access to that point early in 1980.

The surface drill hole monitoring stations were monitored as early in the spring as access would allow. Drill Hole EM-31 in Cottonwood Canyon was monitored seven times between June 11 and December 5, 1980. The water level in this hole was at its highest in June at -36.3 feet and at its lowest point in December at -40.3 feet. This water level is slightly higher than those measured in 1979, which averaged -41.6 feet. Drill Hole EM-47 was also measured seven times in the same interval in 1980. In this hole the water level was highest in June at -187.0 feet and lowest in December at -197.1 feet. This water level is lower than the level measured in 1979 which averaged -188.0 feet.

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 8.

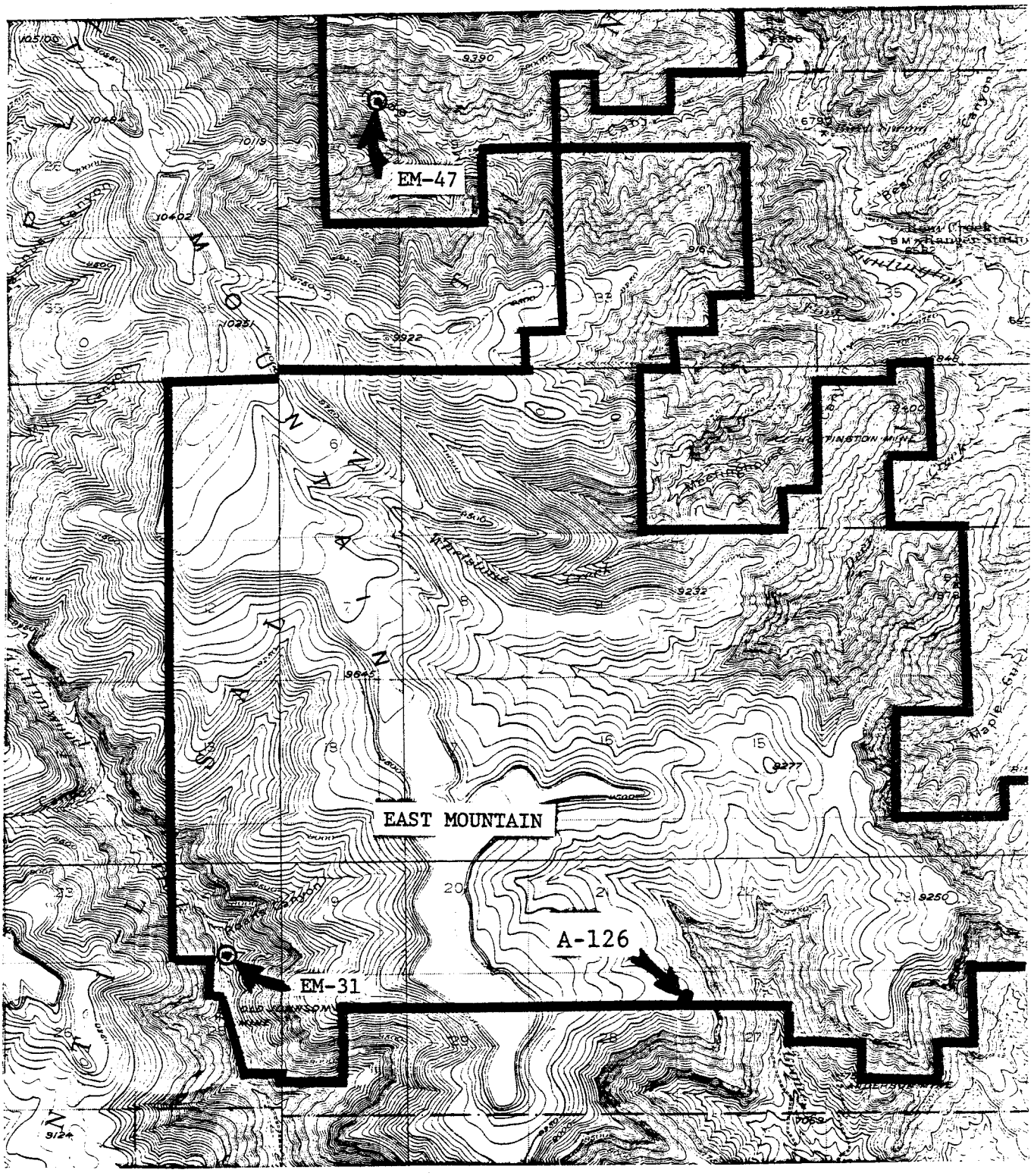
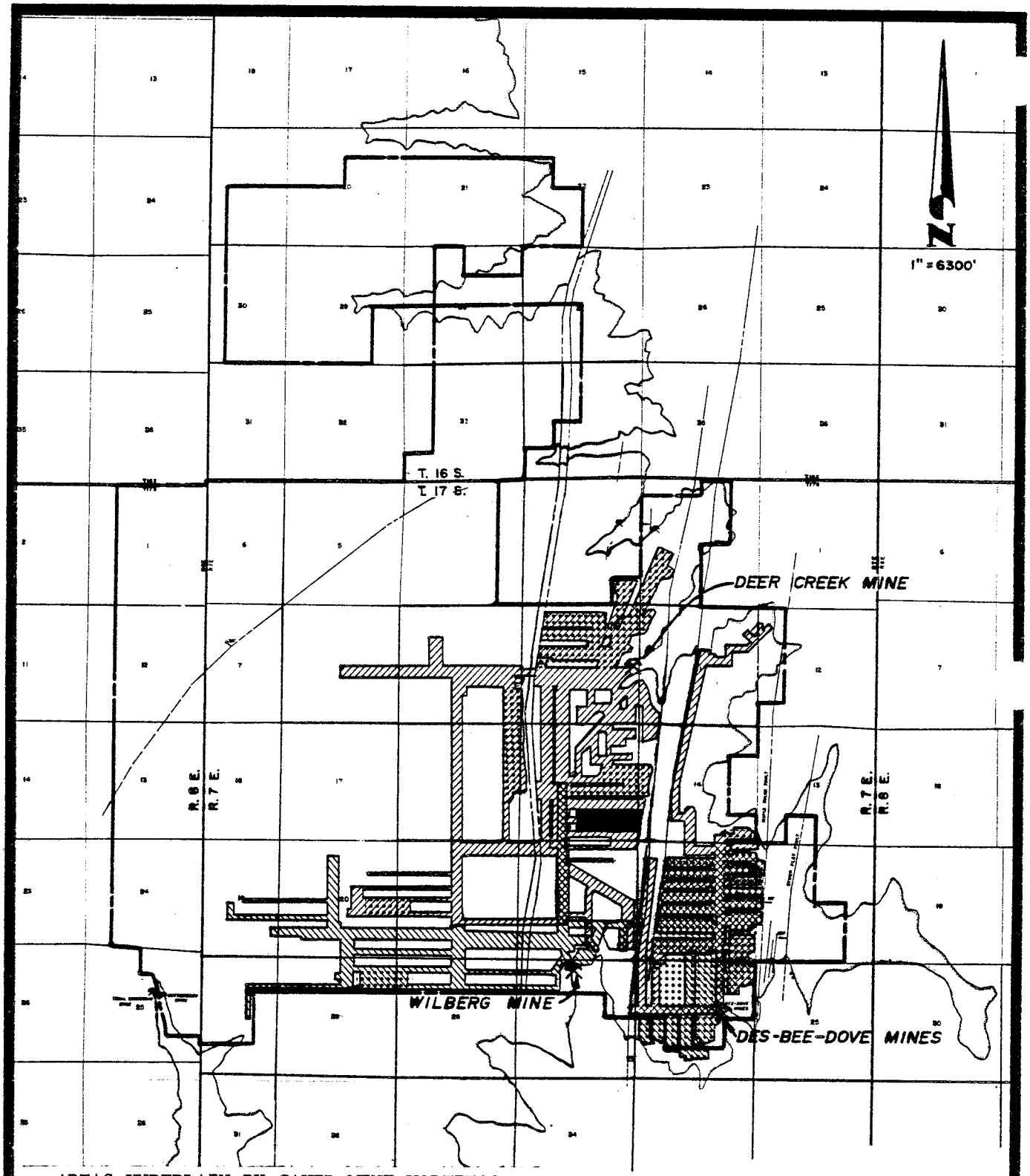


Figure 7

Drill Hole Water Monitoring Stations

Scale 1" = 1 Mile



AREAS UNDERLAIN BY CAVED MINE WORKINGS

= Areas Mined With Observed Subsidence

= Areas Mined by Longwall or Retreat Room and Pillar Without Observed Subsidence

Figure 8

EAST MOUNTAIN PROPERTY
EMERY COUNTY, UTAH

UTAH POWER & LIGHT COMPANY
DEPARTMENT OF MINING & EXPLORATION

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 discharges of these springs in 1979, prior to mining, and in 1980 show an increase in flow of 60% in that time period. This is equivalent to the general increase in spring flow for all springs on East Mountain in 1980 due to the higher precipitation which occurred in the year.

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

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 third annual report submitted concerning hydrology.

Unusually high precipitation throughout 1980 caused high runoff in all drainages on and around East Mountain and high discharges of springs. The high volume of water created some degradation of water

quality due to increased accumulation of suspended solids and sulfates in the water. After peak runoff, the water quality is apparently unchanged from previous years.

The springs on East Mountain were studied in detail to determine the geologic conditions affecting each spring. As a result of this study, 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. Insufficient data were collected in 1980 to positively relate springs together so more data will be collected in 1981 to complete this study. When future interpretation of data indicate a reasonable similarity for grouping of springs, a representative spring of each group will be selected for future monitoring.

To better relate climatic conditions and spring flow on East Mountain, a weather station was installed. Although the station was installed too late to be of benefit in the 1980 water monitoring program, it will be most useful in future years.

The in-mine water monitoring program continued in 1980 as in previous years. The Church Mine workings, with two exceptions, remained dry throughout 1980. The long term monitoring of water flow in the Wilberg Mine showed a seasonal variation in 1980 which had previously been unrecognized. This seasonal variation in flow suggests a

relationship between surface waters and mine waters. Water monitoring in the Deer Creek Mine continued as in previous years. Improvements in water discharge measurements at the Deer Creek Mine showed an increase in flow from previous years' estimates. However, it is believed that estimates from previous years are in error.

The mining activities on East Mountain 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 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.

2) Water flowing into the mines will be monitored as total inflow in each area or section of the mine rather than each individual seep or drip.

APPENDIX A

UP&L
Give to Bailey

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Manti-LaSal NF

REPLY TO: 2800 Minerals

August 18, 1980

SUBJECT: UP&L Monitoring Plan Meeting

TO: Forest Supervisor through Forest Engineer

On Wednesday, June 16, 1980, representatives of Utah Power and Light, the State Division of Oil, Gas, and Mining, the Office of Surface Mining, and the Forest Service met on East Mountain to discuss UP&L's hydrologic monitoring plan and work to date.

Those in attendance included:

Rodger Fry	East Mountain Project Geologist	UP&L
Douglas Sorensen	Ferron Range Conservationist	USFS
John Niebergall	Ferron District Ranger	USFS
W.H. Boley	Forest Engineer	USFS
N.J. Carlile	Geologist	USFS
Joe Helfrich	Reclamation Soil Specialist	OGM
Tom Suchoski	Engineering Geologist	OGM
Ed Agaston	Geologist	UP&L
John Nadolski	Utah Coordinator	OSM
D. Wayne Hedberg	Hydrologist	OGM

The objective of the meeting was to reach a better understanding of what problems remain to be solved to create a resource monitoring program which is acceptable and best meets the needs of all parties.

The philosophy of coal leasing on the Manti-LaSal was discussed in an attempt to point up the importance of a sound resource monitoring program. The view was expressed that many of the questions being asked are for the most part going unanswered. Further, that the inability to truly quantify the impacts of underground mining may lead to stipulations being formulated that are not representative of the problem. Industry has a responsibility to protect the surface resources and to quantify the impacts associated with the activity.

The resource monitoring program, as discussed at this meeting, is seen as the best insurance that mining impacts on non-minerals uses can be accurately evaluated and mining compatibility demonstrated.

The program consists of coordination - from baseline data through final reclamation - of the resource concerns. This is achieved by low level photography (1:4800), ground controlled to produce accuracies sufficient to allow precise vertical and horizontal measurements. Once baseline photography has been flown, successive annual flights are made over the area that may be subjected to subsidence. This information is then digitized and 1 foot contour maps are produced. The photos and maps then make up a precise record, through time, of changes in the topography, vegetation, and surface hydrology, as well as an integrated display of interelated changes.

The use and need for infrared photography was also discussed. It was explained that all surface water must be identified over the lease area and on the adjacent land. The waters and their corresponding riparian vegetation must be located and mapped. Infrared photography is essential in this location process and will be used in determining the health and extent of the riparian vegetation. More detailed information on photogrammetric methods, capabilities and requirements is available on request by UP&L.

UP&L inquired as to what the State and OSM felt as to the appropriateness of photogrammetry and infrared photos in a monitoring program. John Nadolski of OSM responded that the Forest Service recommendations offered the best that technology could supply to help us with data collection and monitoring which would be accurate and comprehensive. Tom Suchoski (OGM) concurred with OSM on the applicability of the proposed program.

UP&L plans to install a weather station on an eastern ridge off East Mountain to give climatological information. This information may be correlated with hydrologic data as monitoring proceeds. Rodger Fry inquired whether the Forest Service had a snow course located on East Mountain. He was told that the Soil Conservation Service had charge of snow courses, but that locating one on East Mountain would be an idea to pursue. USFS agreed to provide the name of an SCS contact person for UP&L.

Mr. Fry then conducted a short tour of representative seeps and ponds located in the North Horn Formation. The location of most springs and seeps on East Mountain appears related to the stratigraphy more than to structure (faults, etc.). All evidence which UP&L has advanced substantiates the theory of a perched water table recharged through the Flagstaff Limestone. Mr. Fry explained that they could not find an accurate method for measuring flow rates due to the dispersed nature of the water source. Following a discussion of methods for estimating rates and volumes, it was suggested that photographing the seeps from one well-defined stake or marker would constitute at least a visual record for those that could not be measured.

The number of water sources to be monitored was discussed. Mr. Fry stated that 75 individual sources had been found and that he would like the Forest Service to choose the ones we wanted monitored. He also requested that the type of monitoring be indicated. It was explained that once all the surface waters had been identified and their interrelationship with each other and the geologic structure had been determined that a representative cross section of waters to be sampled would be made. It is the F.S. opinion that this effort to determine the interrelationship based on water chemistry or other scientific means, is a vital link in understanding the hydrologic regime on the mountain. This must be done before a representative cross section can be determined.

Mr. Fry stated that he was monitoring for water quality. It was determined that water quality samples would not be required at these high elevations; that water chemistry would aid in the formulation of Stiff diagrams, but that water quality sampling served no purpose. Water quality sampling would be required at designated locations where contamination from the mining activity was likely.

Doug Sorensen volunteered the information that poor range management practices could affect the vegetation on the mountain to a great degree. Both the Forest Service and UP&L have much work still to do to define the existing environment on East Mountain, load in the variables which may produce change, and begin monitoring. The Forest Service concern is for perpetuating the present surface resources which are dependent upon the existing waters on East Mountain.

N. J. Carlile

N. J. CARLILE
Geologist

cc: D-2
Utah DOGM
UP&L

APPENDIX B

Exhibit 106

UTAH POWER & LIGHT COMPANY
STREAM DISCHARGE RECORDS

STATION HUNTINGTON CREEK AT PLANT
DATE OCT79TOSEP80

DAILY DISCHARGE (CFS)
MONTHS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	68.00	35.00	32.00	31.00	33.00	34.00	36.00	133.00	325.00	269.00	96.00	57.00
2	64.00	36.00	35.00	29.00	30.00	37.00	40.00	132.00	370.00	266.00	96.00	58.00
3	62.00	36.00	36.00	21.00	28.00	34.00	38.00	146.00	574.00	221.00	96.00	57.00
4	63.00	36.00	34.00	28.00	20.00	31.00	37.00	166.00	616.00	184.00	91.00	59.00
5	60.00	36.00	33.00	28.00	24.00	29.00	39.00	188.00	638.00	155.00	87.00	63.00
6	57.00	36.00	27.00	30.00	29.00	30.00	39.00	258.00	554.00	134.00	84.00	61.00
7	54.00	37.00	24.00	28.00	30.00	29.00	34.00	229.00	624.00	124.00	109.00	66.00
8	51.00	37.00	23.00	28.00	24.00	28.00	35.00	217.00	697.00	120.00	126.00	77.00
9	49.00	37.00	21.00	28.00	20.00	29.00	34.00	218.00	759.00	106.00	126.00	75.00
0	46.00	36.00	21.00	25.00	24.00	29.00	31.00	186.00	795.00	96.00	124.00	83.00
1	49.00	34.00	12.00	12.00	39.00	32.00	30.00	151.00	824.00	101.00	126.00	93.00
2	53.00	31.00	13.00	32.00	29.00	29.00	30.00	124.00	749.00	108.00	138.00	74.00
3	57.00	33.00	24.00	39.00	30.00	29.00	32.00	105.00	681.00	127.00	154.00	73.00
4	56.00	34.00	27.00	38.00	33.00	34.00	37.00	100.00	647.00	121.00	160.00	68.00
5	56.00	34.00	34.00	37.00	29.00	32.00	40.00	106.00	664.00	114.00	164.00	66.00
6	55.00	24.00	31.00	35.00	28.00	29.00	39.00	125.00	636.00	109.00	160.00	66.00
7	55.00	33.00	29.00	38.00	28.00	28.00	46.00	142.00	601.00	105.00	160.00	64.00
8	57.00	33.00	30.00	38.00	32.00	41.00	51.00	131.00	581.00	104.00	157.00	63.00
9	56.00	32.00	30.00	37.00	32.00	35.00	61.00	195.00	582.00	110.00	156.00	61.00
0	62.00	32.00	31.00	28.00	33.00	37.00	66.00	290.00	566.00	105.00	151.00	60.00
1	57.00	20.00	27.00	29.00	27.00	36.00	63.00	366.00	521.00	103.00	103.00	60.00
2	57.00	16.00	25.00	22.00	28.00	36.00	78.00	427.00	480.00	107.00	102.00	61.00
3	67.00	22.00	24.00	31.00	33.00	44.00	83.00	437.00	484.00	109.00	102.00	61.00
4	72.00	30.00	24.00	41.00	30.00	36.00	81.00	375.00	472.00	93.00	110.00	61.00
5	74.00	31.00	25.00	42.00	30.00	37.00	107.00	301.00	429.00	69.00	105.00	61.00
6	71.00	29.00	25.00	31.00	37.00	34.00	114.00	248.00	414.00	70.00	113.00	61.00
7	69.00	19.00	24.00	28.00	36.00	36.00	122.00	262.00	392.00	77.00	70.00	61.00
8	68.00	10.00	15.00	26.00	36.00	37.00	143.00	289.00	359.00	75.00	60.00	61.00
9	67.00	9.50	18.00	23.00	37.00	36.00	173.00	301.00	351.00	70.00	58.00	62.00
0	66.00	19.00	28.00	11.00	0.0	35.00	151.00	299.00	309.00	66.00	58.00	62.00
1	48.00	0.0	28.00	20.00	0.0	37.00	0.0	300.00	0.0	77.00	58.00	0.0
ONTHLY												
OT	1851.00	887.50	810.00	914.00	887.00	1040.00	1910.00	6947.00	16694.00	3715.00	3500.00	1955.00
EA	59.70	29.60	26.10	29.50	30.60	33.50	63.70	224.00	556.00	120.00	113.00	65.20
AX	74.00	37.00	36.00	42.00	39.00	44.00	173.00	437.00	824.00	269.00	164.00	93.00
IN	46.00	9.50	12.00	11.00	20.00	28.00	30.00	100.00	309.00	66.00	58.00	57.00
CR FT	3670.00	1760.00	1610.00	1810.00	1760.00	2060.00	3790.00	13780.00	33110.00	7370.00	6940.00	3880.00

OCT79TOSEP80 TOTAL 41110.50 MEAN 112.00 MAX 824.00 MIN 9.50 TOT ACR FT 81540.00

TOTAL MEAN MAX MIN TOT ACR FT

MAX UNIT DISCHARGE 970.00 CFS (4.36 FT) DATE JUN 11 MIN UNIT DISCHARGE 1.20 CFS DATE JAN 11

REMARKS:

UTAH POWER & LIGHT COMPANY
STREAM DISCHARGE RECORDS

STATION HUNTINGTON PLANT DIVERSION FROM HUNTINGTON CREEK
DATE OCT79TOSEP80

DAILY DISCHARGE (CFS)
MONTHS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28.00	10.00	12.00	22.00	10.00	19.00	17.00	8.60	14.00	19.00	21.00	12.00
2	28.00	10.00	12.00	22.00	10.00	19.00	17.00	8.60	14.00	19.00	21.00	12.00
3	28.00	10.00	12.00	22.00	10.00	19.00	18.00	8.60	10.00	18.00	21.00	6.90
4	28.00	10.00	12.00	22.00	10.00	19.00	18.00	8.60	10.00	21.00	21.00	6.90
5	28.00	10.00	10.00	21.00	10.00	19.00	18.00	8.60	6.90	21.00	21.00	6.90
6	28.00	10.00	10.00	21.00	10.00	22.00	18.00	8.60	6.90	21.00	20.00	6.90
7	28.00	10.00	10.00	21.00	10.00	22.00	18.00	8.60	6.90	21.00	20.00	6.90
8	28.00	10.00	12.00	21.00	10.00	21.00	21.00	8.80	3.40	21.00	20.00	6.90
9	28.00	10.00	14.00	21.00	10.00	21.00	22.00	20.00	3.40	19.00	20.00	6.90
10	22.00	10.00	14.00	21.00	10.00	21.00	21.00	20.00	3.40	21.00	20.00	8.60
11	22.00	10.00	14.00	21.00	10.00	14.00	21.00	20.00	3.40	21.00	20.00	8.60
12	22.00	10.00	14.00	21.00	10.00	21.00	21.00	20.00	9.00	21.00	21.00	8.60
13	22.00	21.00	14.00	21.00	10.00	21.00	20.00	19.00	17.00	18.00	19.00	8.60
14	22.00	21.00	14.00	10.00	10.00	23.00	20.00	20.00	17.00	18.00	20.00	5.20
15	22.00	21.00	14.00	10.00	10.00	23.00	21.00	19.00	17.00	17.00	17.00	5.20
16	22.00	21.00	14.00	10.00	10.00	23.00	19.00	19.00	17.00	17.00	17.00	5.20
17	22.00	21.00	14.00	10.00	10.00	10.00	19.00	19.00	17.00	18.00	13.00	8.60
18	22.00	21.00	14.00	10.00	10.00	16.00	21.00	19.00	17.00	18.00	13.00	8.60
19	22.00	21.00	14.00	10.00	10.00	19.00	21.00	14.00	17.00	18.00	13.00	13.00
20	22.00	21.00	14.00	10.00	10.00	19.00	22.00	12.00	17.00	19.00	19.00	13.00
21	22.00	21.00	14.00	10.00	10.00	19.00	24.00	16.00	17.00	19.00	20.00	13.00
22	22.00	21.00	14.00	10.00	10.00	19.00	24.00	16.00	16.00	20.00	19.00	13.00
23	22.00	21.00	21.00	10.00	10.00	19.00	22.00	14.00	16.00	20.00	14.00	12.00
24	10.00	21.00	21.00	22.00	10.00	18.00	26.00	14.00	16.00	21.00	14.00	12.00
25	10.00	21.00	21.00	22.00	10.00	18.00	26.00	14.00	16.00	21.00	14.00	12.00
26	10.00	21.00	21.00	22.00	10.00	19.00	26.00	14.00	16.00	21.00	12.00	12.00
27	10.00	21.00	21.00	22.00	10.00	16.00	27.00	14.00	16.00	28.00	12.00	12.00
28	10.00	21.00	21.00	22.00	10.00	19.00	27.00	14.00	16.00	28.00	12.00	12.00
29	10.00	21.00	21.00	22.00	10.00	19.00	27.00	14.00	16.00	28.00	12.00	12.00
30	10.00	21.00	21.00	22.00	0.0	19.00	12.00	14.00	21.00	26.00	12.00	12.00
31	10.00	0.0	21.00	19.00	0.0	19.00	0.0	14.00	0.0	22.00	12.00	0.0
MONTHLY												
TOT	640.00	498.00	475.00	550.00	290.00	595.00	634.00	448.00	393.30	640.00	530.00	287.50
MEA	20.60	16.60	15.30	17.70	10.00	19.20	21.10	14.50	13.10	20.60	17.10	9.58
MAX	28.00	21.00	21.00	22.00	10.00	23.00	27.00	20.00	21.00	28.00	21.00	13.00
MIN	10.00	10.00	10.00	10.00	10.00	10.00	12.00	8.60	3.40	17.00	12.00	5.20
ACR FT	1270.00	988.00	942.00	1090.00	575.00	1180.00	1260.00	889.00	780.00	1270.00	1050.00	570.00

OCT79TOSEP80 TOTAL 5980.80 MEAN 16.30 MAX 28.00 MIN 3.40 TOT ACR FT 11860.00

TOTAL MEAN MAX MIN TOT ACR FT

MAX UNIT DISCHARGE 28.00 CFS (18.26 FT) DATE OCT 1 MIN UNIT DISCHARGE 3.40 CFS DATE JUN 8

REMARKS:

UTAH POWER & LIGHT COMPANY
INFLOW AND UTILIZATION RECORDS

TITLE HUNTINGTON CREEK NATURAL FLOW AT PLANT IN C.F.S.
DATE OCT79TOSEP80

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	81.	38.	26.	46.	40.	48.	44.	141.	537.	289.	103.	52.
2	76.	36.	31.	47.	36.	49.	49.	169.	556.	284.	99.	51.
3	73.	35.	37.	39.	33.	46.	48.	251.	687.	236.	102.	44.
4	73.	35.	35.	46.	33.	43.	48.	251.	694.	202.	100.	48.
5	71.	35.	33.	45.	29.	41.	49.	284.	731.	173.	98.	54.
6	69.	35.	28.	47.	34.	44.	49.	295.	687.	157.	92.	52.
7	66.	36.	25.	43.	35.	44.	44.	282.	755.	149.	117.	67.
8	63.	35.	26.	43.	28.	42.	49.	368.	765.	135.	138.	86.
9	61.	35.	26.	44.	23.	42.	48.	330.	790.	121.	136.	82.
10	53.	35.	26.	41.	39.	42.	44.	337.	815.	118.	131.	87.
11	56.	33.	16.	28.	43.	39.	43.	274.	836.	113.	136.	94.
12	65.	30.	17.	48.	32.	43.	44.	224.	756.	121.	146.	72.
13	66.	42.	28.	54.	33.	43.	43.	187.	703.	144.	158.	66.
14	66.	43.	32.	43.	36.	49.	49.	175.	673.	138.	175.	53.
15	67.	43.	39.	42.	32.	48.	53.	179.	677.	131.	179.	52.
16	66.	33.	36.	40.	31.	45.	51.	201.	640.	125.	169.	56.
17	67.	43.	34.	42.	31.	32.	58.	218.	607.	122.	162.	58.
18	70.	42.	34.	43.	35.	49.	67.	205.	593.	118.	155.	55.
19	74.	40.	35.	41.	35.	47.	81.	278.	601.	120.	157.	56.
20	91.	40.	36.	32.	36.	49.	94.	407.	583.	115.	159.	59.
21	79.	29.	31.	34.	30.	47.	97.	547.	533.	114.	106.	52.
22	69.	26.	30.	27.	31.	46.	119.	675.	488.	129.	100.	58.
23	80.	30.	36.	35.	36.	54.	128.	735.	491.	104.	99.	64.
24	72.	34.	36.	56.	34.	46.	131.	667.	480.	97.	109.	57.
25	74.	35.	37.	57.	33.	46.	164.	533.	439.	76.	107.	57.
26	72.	33.	37.	47.	40.	43.	176.	432.	423.	78.	109.	57.
27	70.	23.	37.	43.	40.	42.	188.	420.	399.	94.	64.	58.
28	68.	16.	28.	43.	41.	48.	222.	442.	366.	89.	54.	58.
29	70.	15.	32.	40.	41.	46.	263.	472.	362.	83.	52.	58.
30	73.	24.	41.	29.	0.	44.	229.	485.	328.	83.	52.	57.
31	55.	0.	40.	35.	0.	46.	0.	499.	0.	93.	52.	0.
MONTHLY												
TOT	2157.	1010.	984.	1299.	1000.	1392.	2771.	11201.	17994.	4148.	3617.	1822.
MEA	70.	34.	32.	42.	34.	45.	92.	361.	600.	134.	117.	61.
MAX	91.	43.	41.	57.	43.	54.	263.	735.	836.	289.	179.	94.
MIN	53.	15.	16.	27.	23.	32.	43.	141.	328.	76.	52.	44.

OCT79TOSEP80 TOTAL 49395. MEAN 135. MAX 836. MIN 15.

TOTAL MEAN MAX MIN

REMARKS:

UTAH POWER & LIGHT COMPANY
INFLOW AND UTILIZATION RECORDS

TITLE COMPUTED INFLOW TO ELECTRIC LAKE IN C. F. S.
DATE OCT79TOSEP80

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	-1.	5.	-6.	7.	9.	6.	5.	12.	207.	63.	8.	6.
2	-1.	1.	-4.	10.	8.	6.	6.	40.	258.	59.	5.	4.
3	-2.	0.	1.	9.	7.	5.	6.	108.	309.	52.	7.	-1.
4	-3.	0.	1.	9.	7.	5.	5.	87.	273.	50.	6.	1.
5	-2.	0.	1.	9.	7.	5.	5.	98.	292.	45.	9.	2.
6	-1.	1.	2.	9.	7.	5.	5.	129.	243.	46.	8.	2.
7	-1.	1.	3.	8.	7.	5.	5.	155.	292.	45.	6.	12.
8	-1.	0.	3.	8.	6.	5.	5.	154.	327.	33.	8.	21.
9	-1.	0.	3.	8.	6.	5.	4.	154.	366.	32.	7.	18.
10	-0.	1.	3.	7.	7.	5.	5.	143.	378.	35.	4.	14.
11	-1.	1.	3.	7.	6.	5.	5.	114.	432.	35.	7.	11.
12	-5.	1.	3.	7.	5.	5.	6.	92.	442.	24.	4.	7.
13	-3.	1.	3.	7.	6.	5.	4.	75.	312.	27.	2.	3.
14	-2.	1.	3.	7.	6.	5.	4.	67.	249.	25.	12.	-2.
15	-0.	1.	3.	7.	5.	5.	4.	65.	211.	23.	16.	-1.
16	-1.	1.	3.	7.	5.	5.	4.	68.	175.	20.	10.	2.
17	-0.	1.	3.	7.	5.	5.	4.	68.	159.	17.	6.	3.
18	1.	1.	3.	7.	5.	6.	6.	67.	157.	19.	3.	1.
19	6.	-0.	3.	6.	5.	6.	11.	81.	162.	19.	6.	-0.
20	17.	-0.	3.	6.	5.	6.	16.	118.	156.	16.	6.	3.
21	10.	1.	3.	7.	5.	5.	20.	178.	140.	15.	6.	-4.
22	1.	1.	3.	7.	5.	4.	28.	244.	124.	22.	5.	2.
23	1.	-1.	3.	6.	5.	5.	34.	295.	109.	3.	9.	9.
24	1.	-4.	3.	5.	6.	4.	34.	290.	99.	12.	11.	2.
25	1.	-5.	3.	6.	6.	4.	43.	230.	89.	14.	14.	1.
26	1.	-5.	3.	6.	5.	4.	47.	182.	80.	14.	9.	1.
27	1.	-5.	4.	6.	6.	4.	51.	156.	71.	17.	6.	2.
28	1.	-3.	4.	7.	7.	4.	64.	151.	63.	13.	5.	2.
29	3.	-3.	4.	8.	7.	5.	75.	168.	60.	5.	6.	1.
30	8.	-4.	6.	8.	0.	4.	78.	183.	61.	9.	6.	3.
31	9.	0.	5.	8.	0.	3.	0.	195.	0.	11.	5.	0.
MONTHLY												
TOT	36.	-13.	80.	222.	177.	153.	589.	4167.	6295.	821.	221.	124.
MEA	1.	-0.	3.	7.	6.	5.	20.	134.	210.	26.	7.	4.
MAX	17.	5.	6.	10.	9.	6.	78.	295.	442.	63.	16.	21.
MIN	-5.	-5.	-6.	5.	5.	3.	4.	12.	60.	3.	2.	-4.

OCT79TOSEP80 TOTAL 12871. MEAN 35. MAX 442. MIN -6.

TOTAL MEAN MAX MIN

REMARKS:

UTAH POWER & LIGHT COMPANY
RESERVOIR RECORDS

STATION ELECTRIC LAKE
DATE OCT79TOSEP80

DAILY CONTENTS (ACRE FEET)
MONTHS

AY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25013.	24371.	23596.	23040.	22714.	22340.	21852.	22269.	30470.	31484.	30843.	29865.
2	24982.	24348.	23574.	23033.	22703.	22326.	21835.	22505.	30754.	31469.	30811.	29819.
3	24947.	24325.	23551.	23026.	22692.	22312.	21821.	22649.	30867.	31455.	30773.	29778.
4	24912.	24302.	23529.	23018.	22681.	22295.	21803.	22808.	31008.	31445.	30750.	31131.
5	24881.	24279.	23507.	23011.	22670.	22283.	21789.	22996.	31193.	31431.	30722.	29706.
6	24850.	24257.	23489.	23000.	22659.	22269.	21772.	23275.	31493.	31441.	30694.	29670.
7	24819.	24234.	23470.	22989.	22649.	22255.	21758.	23566.	31671.	31436.	30661.	29674.
8	24788.	24211.	23452.	22979.	22634.	22241.	21740.	23845.	31733.	31407.	30647.	29674.
9	24757.	24188.	23433.	22967.	22623.	22227.	21726.	24132.	31767.	31407.	30610.	29665.
0	24730.	24166.	23415.	22956.	22613.	22212.	21709.	24363.	31786.	31398.	30582.	29652.
1	24695.	24143.	23396.	22945.	22593.	22198.	21695.	24539.	31786.	31364.	30569.	29629.
2	24669.	24120.	23378.	22935.	22584.	22184.	21681.	24694.	31767.	31355.	30517.	29602.
3	24642.	24098.	23359.	22924.	22570.	22170.	21664.	24792.	31791.	31345.	30484.	29562.
4	24619.	24075.	23341.	22913.	22555.	22156.	21650.	24904.	31791.	31335.	30460.	29517.
5	24600.	24052.	23322.	22902.	22541.	22141.	21636.	25005.	31762.	31321.	30433.	29481.
6	24573.	24030.	23304.	22891.	22526.	22127.	21622.	25130.	31728.	31321.	30401.	29450.
7	24558.	24007.	23285.	22880.	22512.	22113.	21608.	25231.	31704.	31312.	30401.	29418.
8	24535.	23985.	23267.	22869.	22498.	22099.	21601.	25349.	31695.	31293.	30369.	29378.
9	24512.	23958.	23249.	22855.	22483.	22085.	21608.	25506.	31695.	31269.	30341.	29342.
0	24562.	23915.	23230.	22844.	22469.	22071.	21622.	25768.	31680.	31250.	30318.	29315.
1	24592.	23913.	23212.	22833.	22455.	22053.	21646.	26164.	31651.	31231.	30267.	29253.
2	24523.	23891.	23194.	22822.	22440.	22035.	21688.	26688.	31637.	31169.	30230.	29249.
3	24504.	23861.	23175.	22808.	22426.	22018.	21737.	27289.	31613.	31122.	30193.	29213.
4	24485.	23837.	23157.	22793.	22412.	22000.	21779.	27789.	31594.	31093.	30166.	29182.
5	24466.	23794.	23139.	22782.	22398.	21982.	21863.	28151.	31575.	31055.	30139.	29142.
6	24447.	23760.	23124.	22769.	22383.	21961.	21923.	28462.	31555.	31027.	30097.	29111.
7	24428.	23726.	23110.	22757.	22373.	21944.	22018.	28724.	31527.	30999.	30061.	29076.
8	24409.	23700.	23095.	22746.	22362.	21926.	22131.	29014.	31509.	30956.	30019.	29045.
9	24401.	23667.	23060.	22739.	22351.	21909.	22269.	29347.	31493.	30928.	29983.	29009.
0	24397.	23637.	23066.	22728.	0.	21888.	22394.	29697.	31488.	30909.	29942.	28974.
1	24390.	0.	23047.	22721.	0.	21866.	0.	30083.	0.	30890.	29901.	0.

MONTHLY CHANGE

0.	-753.	-590.	-326.	-370.	-485.	528.	7689.	1405.	-598.	-989.	-927.

OCT79TOSEP80 TOTAL CHANGE 4584. MAX CONTENTS 31791. AC FT JUN 13 MIN CONTENTS 21601. AC FT APR 18

TOTAL CHANGE MAX CONTENTS MIN CONTENTS

REMARKS:

UTAH POWER & LIGHT COMPANY
RESERVOIR RECORDS

STATION ELECTRIC LAKE
DATE OCT79TOSEP80

EVAPORATION (ACRE FEET)
MONTHS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.	0.	0.	0.	0.	0.	0.	0.	6.	7.	6.	4.
2	0.	0.	0.	0.	0.	0.	0.	0.	6.	7.	6.	4.
3	0.	0.	0.	0.	0.	0.	0.	0.	6.	7.	6.	4.
4	0.	0.	0.	0.	0.	0.	0.	0.	6.	7.	6.	4.
5	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	6.	4.
6	0.	0.	0.	0.	0.	0.	0.	0.	8.	6.	6.	4.
7	0.	0.	0.	0.	0.	0.	0.	0.	8.	6.	6.	4.
8	0.	0.	0.	0.	0.	0.	0.	0.	8.	6.	6.	3.
9	0.	0.	0.	0.	0.	0.	0.	0.	6.	6.	6.	4.
10	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	6.	3.
11	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	6.	3.
12	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	7.	3.
13	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	7.	3.
14	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	7.	3.
15	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	7.	3.
16	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	7.	3.
17	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	7.	3.
18	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	2.	3.
19	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	6.	3.
20	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	3.	3.
21	0.	0.	0.	0.	0.	0.	0.	0.	7.	3.	4.	3.
22	0.	0.	0.	0.	0.	0.	0.	0.	7.	4.	4.	3.
23	0.	0.	0.	0.	0.	0.	0.	0.	7.	4.	4.	3.
24	0.	0.	0.	0.	0.	0.	0.	0.	7.	5.	4.	3.
25	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	4.	3.
26	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	4.	3.
27	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	4.	3.
28	0.	0.	0.	0.	0.	0.	0.	0.	7.	7.	4.	3.
29	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	4.	3.
30	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	4.	3.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	6.	4.	0.
MONTHLY												
TOT	0.	0.	0.	0.	0.	0.	0.	0.	208.	183.	163.	98.
MEA	0.	0.	0.	0.	0.	0.	0.	0.	7.	6.	5.	3.
MAX	0.	0.	0.	0.	0.	0.	0.	0.	8.	7.	7.	4.
MIN	0.	0.	0.	0.	0.	0.	0.	0.	6.	3.	2.	3.

OCT79TOSEP80 TOTAL 652. MEAN 2. MAX 8. MIN 2.

TOTAL MEAN MAX MIN

REMARKS:

UTAH POWER & LIGHT COMPANY
STREAM DISCHARGE RECORDS

STATION HUNTINGTON CREEK BELOW ELECTRIC LAKE
DATE OCT79SEP80

DAILY DISCHARGE (CFS)
MONTHS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15.00	12.00	12.00	13.00	12.00	12.00	14.00	12.00	9.30	61.00	22.00	23.00
2	15.00	12.00	12.00	13.00	12.00	12.00	14.00	12.00	86.00	60.00	22.00	22.00
3	15.00	12.00	12.00	13.00	12.00	12.00	14.00	12.00	206.00	56.00	22.00	17.00
4	15.00	12.00	12.00	13.00	12.00	12.00	13.00	11.00	209.00	53.00	18.00	19.00
5	15.00	12.00	12.00	13.00	12.00	12.00	13.00	11.00	207.00	48.00	19.00	19.00
6	15.00	12.00	12.00	13.00	12.00	12.00	13.00	11.00	116.00	44.00	19.00	18.00
7	15.00	12.00	12.00	13.00	12.00	12.00	13.00	11.00	167.00	40.00	19.00	18.00
8	15.00	12.00	12.00	13.00	12.00	12.00	13.00	11.00	263.00	38.00	16.00	18.00
9	15.00	12.00	12.00	13.00	12.00	12.00	13.00	11.00	339.00	37.00	17.00	18.00
10	15.00	12.00	12.00	13.00	13.00	12.00	13.00	11.00	361.00	35.00	17.00	18.00
11	14.00	12.00	12.00	13.00	13.00	12.00	13.00	11.00	424.00	43.00	17.00	18.00
12	11.00	12.00	12.00	13.00	13.00	12.00	13.00	11.00	443.00	32.00	17.00	18.00
13	11.00	12.00	12.00	13.00	13.00	12.00	12.00	11.00	307.00	29.00	17.00	18.00
14	11.00	12.00	12.00	13.00	13.00	12.00	12.00	12.00	240.00	27.00	18.00	18.00
15	11.00	12.00	13.00	13.00	13.00	12.00	12.00	11.00	214.00	23.00	18.00	18.00
16	11.00	12.00	13.00	13.00	13.00	12.00	12.00	11.00	187.00	21.00	18.00	18.00
17	10.00	12.00	13.00	13.00	13.00	12.00	11.00	11.00	170.00	19.00	18.00	18.00
18	10.00	12.00	13.00	12.00	12.00	13.00	12.00	12.00	161.00	23.00	18.00	18.00
19	10.00	12.00	13.00	12.00	12.00	13.00	11.00	12.00	161.00	26.00	18.00	18.00
20	10.00	12.00	13.00	12.00	12.00	13.00	11.00	12.00	157.00	24.00	17.00	17.00
21	10.00	12.00	13.00	12.00	12.00	13.00	11.00	12.00	145.00	23.00	23.00	17.00
22	10.00	12.00	12.00	12.00	12.00	13.00	11.00	12.00	131.00	40.00	26.00	17.00
23	10.00	12.00	12.00	12.00	12.00	13.00	11.00	12.00	118.00	28.00	26.00	17.00
24	10.00	12.00	12.00	12.00	13.00	13.00	11.00	12.00	106.00	28.00	25.00	17.00
25	10.00	12.00	12.00	12.00	13.00	13.00	11.00	12.00	95.00	28.00	25.00	17.00
26	10.00	12.00	12.00	12.00	13.00	13.00	11.00	12.00	86.00	28.00	25.00	17.00
27	10.00	12.00	11.00	12.00	13.00	13.00	12.00	12.00	79.00	28.00	23.00	17.00
28	10.00	12.00	11.00	12.00	13.00	13.00	11.00	12.00	72.00	28.00	23.00	17.00
29	10.00	12.00	11.00	12.00	12.00	14.00	11.00	11.00	65.00	20.00	23.00	17.00
30	11.00	12.00	13.00	12.00	0.0	14.00	11.00	11.00	62.00	18.00	23.00	19.00
31	12.00	0.0	13.00	12.00	0.0	14.00	0.0	9.20	0.0	18.00	23.00	0.0
MONTHLY												
TOT	372.00	360.00	378.00	389.00	361.00	389.00	363.00	354.20	5383.30	1026.00	632.00	541.00
MEA	12.00	12.00	12.20	12.50	12.40	12.50	12.10	11.40	179.00	33.10	20.40	18.00
MAX	15.00	12.00	13.00	13.00	13.00	14.00	14.00	12.00	443.00	61.00	26.00	23.00
MIN	10.00	12.00	11.00	12.00	12.00	12.00	11.00	9.20	9.30	18.00	16.00	17.00
ACR FT	738.00	714.00	750.00	772.00	716.00	772.00	720.00	703.00	10680.00	2040.00	1250.00	1070.00

OCT79SEP80 TOTAL 10548.50 MEAN 28.80 MAX 443.00 MIN 9.20 TOT ACR FT 20920.00

TOTAL MEAN MAX MIN TOT ACR FT

MAX UNIT DISCHARGE 489.00 CFS (3.33 FT) DATE JUN 12 MIN UNIT DISCHARGE 1.50 CFS DATE SEP 30

REMARKS:

APPENDIX C

UTAH POWER & LIGHT COMPANY

WATER QUALITY DATA

Station UPL-3
Location Huntington Creek below Electric Lake

DATE	TIME	FLOW	TEMPERATURE AIR °C	TEMPERATURE WATER °C	FIELD pH	COLIFORM TOTAL MPN	COLIFORM FECAL /100ml	FECAL STREP MPN	C.O.D MG/L	B.O.D MG/L	T.O.C. MG/L	CHLOROPHYLL — 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 NITRITE + NITRATE as N 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 CaCO3 MG/L	SURFACTANT as MBAS MG/L	SOLIDS TSS MG/L	SOLIDS TOTAL SETTLEABLE SOLIDS M G/L	SOLIDS T.D.S. MG/L	SOLIDS TOTAL SOLIDS MG/L	SOLIDS TOTAL VOLATILE SOLIDS MG/L	SOLIDS VOLATILE SUSP. FENCED SOLIDS MG/L	SPECIFIC COND µ MHOS 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	BETA RADIOACTIVITY pCi/L
1-30-80			In-	acce	ssible																																			
2-14-80	4:05	54	0	4.5	9.3	23.0	<2.0	<2.0					8.2				0.38	0.02			0.040	0.020				<0.1		150				280	0.75							
4-1-80				4.8		23.0	<2.0	5.0					11.1																												
4-2-80						23.0	<2.0	5.0																																	
5-29-80					7.8	50.0	<20.0	20.0					9.3				0.70	<0.01			<0.001	<0.001				15.0		170					2.00							
7-7-80				14	8.2	79.0	<2.0	<20					7.4				0.23	<0.01			0.070	0.060				1.0		135					1.10							
7-30-80				5	7.7	13.0	<2.0	2.0					7.3				0.83	<0.01			0.080	0.030				1.0		140					1.20							
8-31-80		14.0		6	7.4	23.0	<2.0	20.0					8.6				0.60	0.02			0.850	0.080				2.0		130					0.94							
9-28-80				10	8.0	<2.0	<2.0	2.0					9.3				0.82	<0.01			0.660	0.18				1.0		140					0.88							
10-31-80		13.9		7	8.4	2.0	<2.0	<2.0					8.5				0.23	<0.01			0.150	0.180				4.0		160					1.00							
11-11-80		14.4		6	7.7	0	0	0					8.65				0.422	<0.05			1.6	1.6				<2.0		174				300	4.4							
12-2-80					7.5	0	0	0					3.5				0.710	<0.05			2.05	0.20				<2		284.7				480	0.7							
11-11-80	Amended		Analyses		7.7	<3.0	<3.0	<3.0					8.65				0.422	<0.05			*	*				<2.0		174.0				300	4.4							
12-2-80	"		"		7.5	<3.0	<3.0	<3.0					3.5				0.710	<0.05			*	*				2.0		284.7				480	0.7							

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	COMMENTS
1-30-80																															
2-14-80																															
4-1-80																															
4-2-80																															
5-29-80																															
7-7-80																															
7-30-80																															
8-31-80																															
9-28-80																															
10-31-80																															
11-11-80																															
12-2-80																															
11-11-80	Amended		Analyses																											Amended Analyses/*no sample result
12-2-80	"		"																											" " "

UTAH POWER & LIGHT COMPANY

WATER QUALITY DATA

Station UPL-2
Location Right Fork Huntington Creek above Left Fork

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	FIELD pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	T.O.C.	CHLOROPHYLL -a	DISSOLVED OXYGEN	OIL & GREASE	PHENOL
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
1-30-80			Inaccessible.												
2-14-80	13:35	61	1	1	9.7	33.0	<2.0	8.0					9.2		
4-1-80				4.5		33.0	<2.0	<2.0					10.0		
4-2-80						33.0	<2.0	<2.0							
5-29-80				12	7.8	70.0	<20.0	<20.0					9.2		
7-7-80				14	8.4	330	2.0	50.0					7.5		
7-30-80				10	8.0	170	11.0	26.0					7.5		
8-31-80		36.6		8	7.8	310	5.0	20.0					8.4		
9-28-80				7	7.3	490	2.0	11.0					9.6		
10-31-80		78.0		3	8.0	70.0	2.0	<2.0					8.4		
11-11-80				5	8.2	20	0	0					9.55		
12-2-80					8.0	20	0	0					6.5		
					Amended Analyses										
11-11-80					8.2	20	<3.0	<3.0					9.55		
12-2-80					8.0	20	<3.0	<3.0					6.5		

DATE	NITROGEN AMMONIA as NH_3-N	NITRATE as NO_3-N	NITRITE as NO_2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	HYDROXIDE as ON	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SOLIDS VOLATILE SUSPENDED SOLIDS	SPECIFIC COND.	TURBIDITY
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	µMHOS CM	NTU
2-14-80		0.34	<0.01			0.060	0.020				1.0		180				350	1.30
4-1-80																		
4-2-80																		
5-29-80		0.46	<0.01			<0.010	0.100				160		220					10.00
7-7-80		0.14	<0.01			0.100	0.030				3.0		180					0.84
7-30-80		0.39	<0.01			0.100	0.030				4.0		230					0.80
8-31-80		0.41	0.01			0.980	0.090				1.0		200					0.80
9-28-80		0.33	<0.01			0.200	0.04				1.0		203					1.20
10-31-80		0.16	<0.01			0.280	0.030				6.0		250					1.20
11-11-80		0.491	<0.05			1.2	1.2				<2.0		195				380	1.4
12-2-80		0.669	<0.05			1.85	0.20				5.3		229.4				400	1.7
11-11-80		0.491	<0.05			*	*				<2.0		195.0				380	1.4
12-2-80		0.669	<0.05			*	*				5.3		229.4				400	1.7

DATE	ALUMINUM TOTAL	ANTIMONY TOTAL	ARSENIC TOTAL	BARIUM TOTAL	BERYLLIUM TOTAL	BORON TOTAL	CADMIUM TOTAL	CALCIUM TOTAL	CHLORIDE DISS.	CHROMIUM HEX as Cr	COBALT TOTAL	COPPER TOTAL	CYANIDE as CN	FLUORIDE DISS.	GERMANIUM TOTAL	IRON DISS.	IRON TOTAL	LEAD TOTAL	MAGNESIUM TOTAL	MANGANESE TOTAL	MERCURY TOTAL	MOLYBDENUM TOTAL	NICKEL TOTAL	POTASSIUM TOTAL	SELENIUM TOTAL	SILICA as SiO_2	SILVER TOTAL	SODIUM TOTAL	ZINC TOTAL	VANADIUM TOTAL	COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	
1-30-80																															
2-14-80																															
4-1-80																															
4-2-80																															
5-29-80																															
7-7-80																															
7-30-80																															
8-31-80																															
9-28-80																															
10-31-80																															
11-11-80																															Staff guage 1.15
12-2-80																															
				Amended Analyses																											Amended Analyses/*no sample result
11-11-80																															" " " "
12-2-80																															" " " "

UTAH POWER & LIGHT COMPANY

WATER QUALITY DATA

Station H-1
Location Huntington Creek above Huntington Plant diversion

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	FIELD pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	T.O.C.	CHLOROPHYLL -a	DISSOLVED OXYGEN	OIL & GREASE	PHENOLS
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
1-30-80	14:00	63	0	1.5	9.7								10.4		
2-14-80	12:55	68	1	1	9.9								9.7		
4-1-80				1.5	8.8								7.8		
4-8-80	In-accessible														
5-29-80				11									8.0		
7-7-80				12	8.3								7.0		
7-30-80				13	8.8								6.9	8.60	
8-31-80		90		11	6.95								9.5		
9-29-80				8	8.2								8.8		
11-1-80		106.6		2	7.1								8.5	0.20	0.005
11-11-80				2	8.1								8.45		
12-1-80	2:50			6	7.8								6.1		
11-11-80	Amended Analyses				8.1								8.45		
12-1-80	"			"	7.8								6.1		

DATE	NITROGEN AMMONIA as NH_3-N MG/L	NITRATE as NO_3-N MG/L	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
1-30-80		0.82				0.090	0.060	28.0			1.5		245		
2-14-80		0.22				0.160	0.050	20.0			1.0		238		
4-1-80		0.16				0.100	0.080	40.0			42.0		199		
4-8-80															
5-29-80															
7-7-80		0.16				0.170	0.080	52.0			55.0		197		
7-30-80		0.27				0.090	0.020	200			5.0		480		
8-31-80		0.22				0.125	0.085	15.0			7.0		196		
9-29-80		0.09				0.360	0.50	20.0			2.0		189		
11-1-80		0.09				0.610	<0.001	78.0			11.0		288		
11-11-80		0.321				1.4	1.4	14.40			7.0		195		
12-1-80		0.735				0.80	0.80	24.69			7.30		254.9		
11-11-80		0.321				*	*	14.40			7.0		195		
12-1-80		*				*	*	24.69			7.30		254.9		

DATE	SPECIFIC CONDUCTANCE µMHOS/CM	TURBIDITY NTU	CARBONATE ALK. as CO_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	BETA RADIOACTIVITY pCi/L
1-30-80	420			248.8	204	292			
2-14-80	435			229.4	188	220			
4-1-80	300			231.8	210	234			
4-8-80									
5-29-80									
7-7-80	310			211.3	132	870			
7-30-80	740			219.6	180	178			
8-31-80	300			202.5	170	186			
9-29-80	290			217.6	174	166			
11-1-80	440			236.6	194	270			
11-11-80	400			245.6	201.2	298.9			
12-1-80	400			235.4	193	279.7			
11-11-80	400			245.5	201.2	*			
12-1-80	400			234.2	193	*			

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
1-30-80			<0.001		0.001	0.065	<0.001	41.00	2.0	<0.001		0.015			
2-14-80			<0.001		<0.001	0.040	<0.001	54.40	14.0			0.005			
4-1-80			<0.001		<0.001	0.050	<0.001	55.20	8.0			0.003			
4-8-80															
5-29-80															
7-7-80			<0.001		<0.001	0.020	<0.001	45.60	6.0			0.020			
7-30-80	0.040	<0.001	<0.001	0.050	<0.001	<0.010	<0.001	53.00	4.0			<0.001			
8-31-80			<0.001		<0.001	0.013	<0.001	49.60	10.0			0.003			
9-29-80			<0.001		<0.001	0.005	<0.001	48.00	<0.1			0.004			
11-1-80	<0.001	<0.001	0.001	0.050	<0.001	0.030	<0.001	56.00	3.4			0.010			
11-11-80			0.0003		<0.02		<0.03	86.0	0.68			<0.03			
12-1-80			0.0004		<0.03	512	<0.03	84.0	4.96			<0.03			
11-11-80			0.0003		<0.02	0.09	<0.02	*	0.68			<0.03			
12-1-80			0.0004		<0.03	512	<0.02	*	4.96			<0.03			

DATE	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	COMMENTS
1-30-80		0.720	<0.001	17.28	0.011	<0.0002		<0.001	1.50	<0.001			4.30	0.010			
2-14-80		0.650	<0.001	20.16	0.015	<0.0002	0.015	<0.001	8.30	<0.001			4.50	0.012			
4-1-80		0.450	<0.001	23.04	0.010	<0.0002		<0.001	1.35	<0.001			5.10	0.003			
4-8-80																	In-accessible
5-29-80																	
7-7-80		0.014	<0.001	14.40	0.010	<0.0002		<0.001	0.76	<0.001			3.60	0.011			
7-30-80		0.140	<0.001	15.20	0.030	<0.0002	<0.001	<0.001	12.05	<0.001		<0.001	8.840	0.005		<0.001	Sample not marked completely
8-31-80	0.150		<0.001	14.88	0.031	<0.0002		<0.001	1.05	<0.001			5.40	0.012		<0.001	
9-29-80		0.185	<0.001	11.04	0.040	<0.0002		<0.001	0.91	<0.001			9.40	0.015		<0.001	
11-1-80	0.010		<0.001	31.20	0.010	<0.0002	<0.001	<0.001	0.92	<0.001		<0.001	6.60	<0.001		<0.001	Flow 50% too high
11-11-80		2.0	<0.05	19.0	0.02	<0.0005		<0.04	<0.5	0.0004			6.0	<0.005		<0.05	
12-1-80		2.5	<0.05	17.0	<0.03	<0.0005		<0.04	<0.5	0.0021			5.0	<0.005		<0.05	
11-11-80		*	<0.05	*	0.02	<0.0005		<0.04	*	0.0004			*	<0.005		<0.05	Amended Analyses/*no sample result
12-1-80		*	<0.05	*	<0.02	0.005		<0.04	*	0.0008			*	<0.005		<0.05	" " " " "

UTAH POWER & LIGHT COMPANY

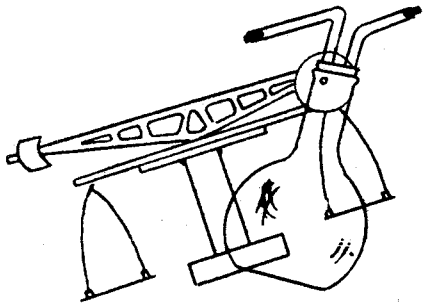
WATER QUALITY DATA

Station UPL-8
Location Huntington Creek at Wooden Bridge

DATE	TIME	FLOW	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	NITROGEN AMMONIA OS NH_3-N MG/L	NITROGEN NITRATE OS NO_3-N MG/L	NITROGEN NITRITE OS NO_2-N MG/L	NITROGEN TOTAL KJELDAHL MG/L	NITROGEN ORGANIC MG/L	PHOSPHATE TOTAL OS PO_4-P MG/L	PHOSPHATE ORTHO OS PO_4-P MG/L	SULFATE OS SO_4 MG/L	HYDROXIDE OS OH MG/L	SURFACTANT OS MBAS MG/L	SOLIDS TSS MG/L	SOLIDS TOTAL SETTLE ABLE SOLIDS ML/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 MICROMHOS CM	TURBIDITY NTU	CARBONATE ALK CO_3 MG/L	BICARBONATE ALK OS HCO_3 MG/L	TOTAL ALK OS $CaCO_3$ MG/L	TOTAL HARDNESS OS $CaCO_3$ MG/L	ACIDITY OS $CaCO_3$ MG/L	ALPHA RADIO-ACTIVITY pCi/L	BETA RADIO-ACTIVITY pCi/L
1-30-80	11:53	24	-3	0.5	9.5								11.0	2.4			0.86				0.085	0.040	516			7.0		935				610			265.94	210	750			
2-14-80	12:05	41	1	2.0	9.7								9.8				0.30				0.510	0.050	70.0			2.0		305				610			234.24	192	344			
4-1-80				5.0	8.0								7.8	<1.0				<0.01			0.300	0.160	298			24.0		695				1050		24.0	258.48	232	478			
4-2-80			Inaccessible																																						
5-29-80				10	7.4								9.4	2.80			0.42				0.200	<0.001	112			269		350				540			213.28	190	200			
7-7-80				18	8.2								7.6	2.50			0.28				0.420	0.060	53.0			19.0		304				300			151.38	140	180			
8-1-80				16	8.2								7.8	9.8			0.32				0.300	<0.010	80.0			16.0		370				570			204.96	168	194			
8-31-80		81		10	7.4								8.9				0.23				0.060	0.030	52.0			1.0		270				410			224.48	188	240			
9-29-80				10	8.1								8.5				0.11	0.18			0.450	<0.01	70.0					259				390			209.96	180	234			
11-1-80		42		7	8.0								8.9	<0.01			0.13				0.150	0.030	640			28.0		1110				1700			944	800	850			
11-11-80				7	8.1								8.95				0.445				1.34	1.20	95.88			6.5		365				600			268.89	220.4	342.9			
12-1-80	1:29			3	7.4								7.1				0.79				1.20	0.20	82.59			8.6		347				500			234.24	192	332.2			
11-11-80	Amended	Analyses			8.1								8.95				0.445				*	*	95.88			6.5		365				600			268.9	220.4	*			
12-1-80	"	"			7.4								7.1				*				*	*	82.59			8.6		347				500			234.2	192	*			

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 OS CR MG/L	COBALT TOTAL MG/L	COPPER TOTAL MG/L	CYANIDE OS 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 OS SiO_2 MG/L	SILVER TOTAL MG/L	SODIUM TOTAL MG/L	ZINC TOTAL MG/L	VANADIUM TOTAL MG/L	Chromium Total MG/L	COMMENTS
1-30-80			0.003		0.004	0.135	<0.001	153	20.0			0.030		0.15			0.960	0.015	88.80	0.003	<0.0002		0.005	2.50	<0.001			20.20	0.013				
2-14-80			<0.001		0.003	0.100	<0.001	63.40	12.0			0.010		0.13			0.880	<0.001	21.12	0.014	<0.0002		<0.001	2.50	<0.001			15.80	0.010				snowing
4-1-80			0.001		0.004		<0.001	96.80	34.0			0.009		0.20			0.650	<0.001	56.64	0.014	<0.0002		0.008	13.10	<0.001			50.00	0.044				
4-2-80			Inaccessible																														
5-29-80			<0.001		<0.01	0.160	<0.001	49.60	4.0			0.010		0.20			0.665	<0.001	13.44	0.036	<0.0002	<0.010	<0.010	14.20	0.001		<0.001	48.30	0.051		<0.001		
7-7-80			<0.001		<0.001	0.010	<0.001	45.60	6.0			0.002		0.15			0.004	<0.001	14.88	0.010	<0.0002		<0.010	0.87	<0.001			6.90	0.014				
8-1-80			<0.001		<0.001	0.010	<0.001	77.60	10.0		<0.001	0.010		0.09			0.010	<0.002	15.36	0.003	<0.0002	<0.001	<0.001	0.93	<0.001		<0.001	5.50	0.012		<0.001		
8-31-80			<0.001		<0.001		<0.001	60.00	18.0			<0.001		0.16		0.141		<0.001		0.014	<0.0002		<0.001	1.20	<0.001			8.50	0.025		<0.001		
9-29-80			<0.001		<0.001	0.016	<0.001	50.40	1.3			0.002		0.05		0.240		<0.001	25.92	0.013			<0.010	1.05	<0.001			7.90	0.020		<0.001		
11-1-80			<0.001		<0.001	0.060	<0.001	308	3.5		<0.001	0.010		0.12		0.010		<0.001	23.04	0.010	<0.0002	<0.001	<0.001	1.09	0.001		<0.001	9.20	<0.001		<0.001		
11-11-80			0.0002		<0.002		<0.002	106.0	1.58			<0.03		0.182			2.0	<0.05	19.0	0.04	0.0052		<0.04	<0.5	<0.0002			11.0	<0.005		<0.05		
12-1-80			<0.0002		<0.002	341.5	<0.002	105	11.1			<0.03		0.154			2.0	<0.05	17.0	<0.04	<0.0005		<0.04	<0.5	0.0003			10.0	<0.005		<0.05		Field ph 7.2 staff gauge 1.71'
11-11-80			0.0002		<0.002	0.19	<0.002	*	1.58			<0.03		0.182			*	<0.05	*	0.04	*		<0.04	*	<0.0002			*	<0.005		<0.05		Amended Analyses/ No sample result
12-1-80			<0.0002		<0.002	341.5	<0.002	*	11.1			<0.03		0.154			*	<0.05	*	<0.04	<0.005		<0.04	*	0.0003			*	<0.005		<0.05		" " "

APPENDIX D



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 05/28/80

CERTIFICATE OF ANALYSIS

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

80-009877

SAMPLE: WATERS FROM DEER CREEK DATED 5-12-80 RECEIVED 5-15-80.

	DEER CR ABOVE MINE RUNOFF	DEER CR BELOW MINE RUNOFF
Conductivity umhos/cm	820	870
Iron as Fe mg/l	.195	.250
Manganese as Mn mg/l	.240	.268
Suspended Solids mg/l	3,592	396
Total Dissolved Solids mg/l	533	567
pH Units	7.85	7.94

FORD CHEMICAL LABORATORY, INC.

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

CERTIFICATE OF ANALYSES

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

Lab. No. 1278

SAMPLE ID: Deer Creek Below Mine
Temp. 54°F

Date Rec'd. 07-07-80

Date Sampled 07-01-80

PARAMETER	VALUE	
pH	8.0	
Conductivity	790	Umhos/cm
Total Dissolved Solids	452	mg/l
Total Suspended Solids	9.5	mg/l
Iron Total	0.16	mg/l
Manganese	0.01	mg/l

Respectfully Submitted

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

CERTIFICATE OF ANALYSES

For UP&L Mining & Exploration
Field Office
Industrial Training Center
Huntington, Utah 84528

Lab. No. 1279

SAMPLE ID: Deer Creek Above Mine
Temp. 50°F

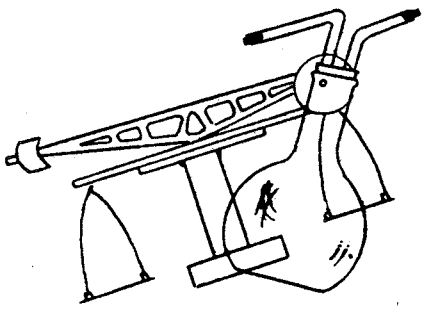
Date Rec'd. 07-07-80

Date Sampled 07-01-80

PARAMETER	VALUE	
pH	8.0	
Conductivity	570	µmhos/cm
Total Dissolved Solids	337	mg/l
Total Suspended Solids	0.5	mg/l
Iron Total	0.07	mg/l
Manganese	0.01	mg/l

Respectfully Submitted

APPENDIX E



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 10/17/80

CERTIFICATE OF ANALYSIS

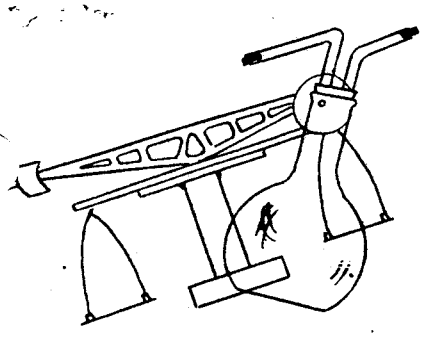
UTAH POWER & LIGHT
MINING & EXPLORATION
BOX 1005
HUNTINGTON, UT 84528

80-002602

SAMPLE: WATER RECEIVED 9/12/80 FROM COTTONWOOD CREEK.

	PORTAL DISCHARGE	ABOVE TRAIL MTN MINE	ABOVE PORTAL DISCHARGE	BELOW PORTAL DISCHARGE
Iron as Fe (Total) mg/l	2.130	.010	.010	3.870
Manganese as Mn (Tot) mg/l	.180	.030	.090	1.070
Suspended Solids mg/l	240	1,306	2,000	1,696
pH Units	7.00	7.60	8.00	8.20

FORD CHEMICAL LABORATORY, INC.



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 01/10/80

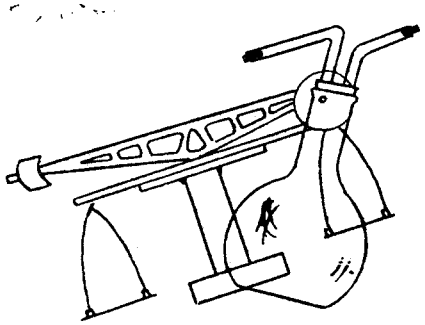
CERTIFICATE OF ANALYSIS

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

80-008310

SAMPLE: WATER FROM COTTONWOOD CREEK DATED 12/17/79 RECEIVED 12/19/79 FOR ANALYSIS.

	ABOVE TRAIL MTN MINE	BELOW TRAIL MTN MINE	USGS FLUME	ABOVE STRAIGHT CANYON FORK
idity as CaCO3 mg/l	20.0	14.0	8.0	18.0
Alkalinity as CaCO3 mg/l	280.00	264.00	270.00	274.00
Arsenic as As mg/l	<.001	<.001	<.001	<.001
BOD 5 Day mg/l	<1.0	<1.0	<1.0	<1.0
Bicarbonate as HCO3 mg/l	341.60	322.08	329.40	334.28
Cadmium as Cd mg/l	<.001	<.001	<.001	<.001
Calcium as Ca mg/l	63.20	59.20	60.00	56.00
Chloride as Cl mg/l	14.0	12.0	12.0	12.0
Fluoride as F mg/l	.10	.11	.11	.11
Iron as Fe (Total) mg/l	.130	.750	1.080	.590
Lead as Pb mg/l	<.001	<.001	<.001	<.001
MPN Fecal Coliform MPN/100 ml	<2.0	5.0	13.0	2.0
MPN Total Coliform MPN/100 ml	33.0	79.0	170	1,100



Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis

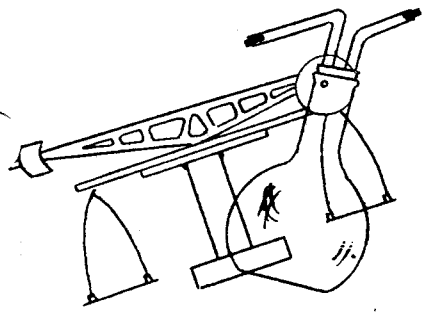
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

CERTIFICATE OF ANALYSIS

79-008310

	ABOVE TRAIL MTN MINE	BELOW TRAIL MTN MINE	USGS FLUME	ABOVE STRAIGHT CANYON FORK
Magnesium as Mg mg/l	36.00	38.88	36.48	46.08
Manganese as Mn mg/l	.009	.020	.031	.010
Nitrite as NO2-N mg/l	<.01	<.01	<.01	<.01
Oil and Grease mg/l	2.8	2.8	2.2	6.2
Phosphate PO4-P Ortho mg/l	.120	.040	.040	.080
Potassium as K mg/l	1.80	2.03	2.19	2.54
Selenium as Se mg/l	<.001	<.001	<.001	<.001
Silica as SiO2 mg/l	10.00	10.00	10.50	11.00
Sodium as Na mg/l	19.00	15.45	15.82	24.30
Sulfate as SO4 mg/l	50.0	55.0	55.0	89.0
Suspended Solids mg/l	2.0	23.0	22.0	34.0
Total Dissolved Solids mg/l	350	346	340	398
Zinc as Zn mg/l	.012	.023	.025	.019
pH Units	7.20	7.60	7.60	7.70

FORD CHEMICAL LABORATORY, INC.



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 03/14/80

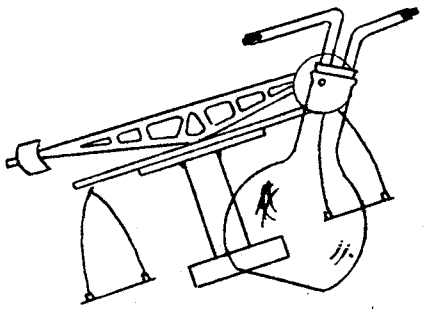
CERTIFICATE OF ANALYSIS

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

80-008974

SAMPLE: COTTONWOOD CREEK WATER SAMPLES DATED 2/25/80 RECEIVED 2/27/80 FOR ANALYSIS.

	ABOVE TRAIL MOUNTAIN MINE	BELOW TRAIL MOUNTAIN MINE	USGS FLUME	ABOVE STRAIGHT CANYON FORK
idity as CaCO3 mg/l	4.0	16.0	10.0	12.0
Alkalinity as CaCO3 mg/l	280.00	284.00	280.00	286.00
Arsenic as As mg/l	<.001	.002	<.001	<.001
BOD 5 Day mg/l	<1.0	1.3	<1.0	<1.0
Bicarbonate as HCO3 mg/l	341.60	346.48	341.60	348.92
Cadmium as Cd mg/l	<.001	.003	<.001	<.001
Calcium as Ca mg/l	65.20	61.85	59.20	67.20
Chloride as Cl mg/l	8.0	16.0	6.0	10.0
Fluoride as F mg/l	.12	.40	.18	.15
Iron as Fe (Total) mg/l	.110	.285	.220	.200
Lead as Pb mg/l	<.001	.005	.002	.002
MPN Fecal Coliform MPN/100 ml	<2.0	<2.0	23.0	<2.0
MPN Total Coliform MPN/100 ml	49.0	49.0	130	330



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

CERTIFICATE OF ANALYSIS

79-008974

	ABOVE TRAIL MOUNTAIN MINE	BELOW TRAIL MOUNTAIN MINE	USGS FLUME	ABOVE STRAIGHT CANYON FORK
Magnesium as Mg mg/l	30.60	45.40	61.20	49.65
Manganese as Mn mg/l	.012	.245	.160	.129
Nitrite as NO2-N mg/l	<.01	<.01	<.01	<.01
Oil and Grease mg/l	<1.00	3.20	<1.00	<1.00
Phosphate PO4-P Ortho mg/l	.020	.060	.080	.030
Potassium as K mg/l	2.85	24.50	10.60	8.95
Selenium as Se mg/l	<.001	<.001	<.001	<.001
Silica as SiO2 mg/l	6.80	7.05	7.30	7.60
Sodium as Na mg/l	28.00	46.90	24.70	21.80
Sulfate as SO4 mg/l	63.0	154	92.0	123
Suspended Solids mg/l	18.0	46.0	642	320
Total Dissolved Solids mg/l	370	512	425	459
Total Kjeldahl Nitrogen mg/l	.10	.45	.15	.12
Zinc as Zn mg/l	.019	.150	.166	.127
pH Units	7.98	8.05	8.00	8.12

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

DATE: 04/07/80

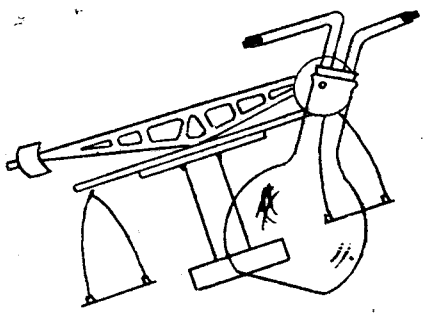
CERTIFICATE OF ANALYSIS

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

80-009285

SAMPLE: COTTONWOOD CREEK WATER SAMPLES DATED 3/25/80 RECEIVED 3/27/80 FOR ANALYSIS.

	ABOVE TRAIL MOUNTAIN MINE	BELOW TRAIL MOUNTAIN MINE	USGS FLUME	ABOVE STRAIGHT CANYON FORK
Acidity as CaCO3 mg/l	<1.0	6.0	<1.0	<1.0
Alkalinity as CaCO3 mg/l	276.00	284.00	290.00	296.00
Arsenic as As mg/l	<.001	.003	<.001	<.001
BOD 5 Day mg/l	1.9	3.8	1.5	3.5
Bicarbonate as HCO3 mg/l	322.08	346.48	344.04	331.84
Cadmium as Cd mg/l	<.001	.005	<.001	<.001
Calcium as Ca mg/l	52.80	56.80	52.00	56.80
Chloride as Cl mg/l	22.0	16.0	16.0	16.0
Fluoride as F mg/l	.19	.20	.20	.21
Iron as Fe (Total) mg/l	.130	.300	.250	.220
Lead as Pb mg/l	<.001	.004	.003	<.001
MPN Fecal Coliform MPN/100 ml	<2.0	<2.0	2.0	5.0
MPN Total Coliform MPN/100 ml	17.0	22.0	49.0	330



Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis

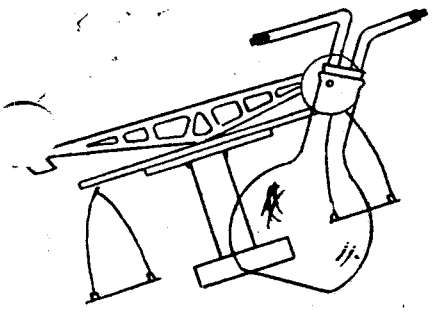
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

CERTIFICATE OF ANALYSIS

80-009285

	ABOVE TRAIL MOUNTAIN MINE	BELOW TRAIL MOUNTAIN MINE	USGS FLUME	ABOVE STRAIGHT CANYON FORK
Magnesium as Mg mg/l	52.80	51.36	57.60	56.16
Manganese as Mn mg/l	.011	.250	.142	.130
Nitrite as NO2-N mg/l	<.01	<.01	<.01	<.01
Oil and Grease mg/l	20.40	.60	<.01	114.00
Phosphate PO4-P Ortho mg/l	.022	.075	.046	.030
Potassium as K mg/l	2.90	25.60	9.50	8.95
Selenium as Se mg/l	<.001	<.001	<.001	<.001
Silica as SiO2 mg/l	9.10	7.00	6.95	7.10
Sodium as Na mg/l	21.50	53.10	22.50	20.40
Sulfate as SO4 mg/l	94.0	188	114	124
Suspended Solids mg/l	2.0	70.0	212	1,364
Total Dissolved Solids mg/l	400	700	442	445
Total Kjeldahl Nitrogen mg/l	.11	.46	.10	.08
Zinc as Zn mg/l	.010	.130	.110	.125
pH Units	8.10	7.90	8.00	8.10

FORD CHEMICAL LABORATORY, INC.



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 05/10/80

CERTIFICATE OF ANALYSIS

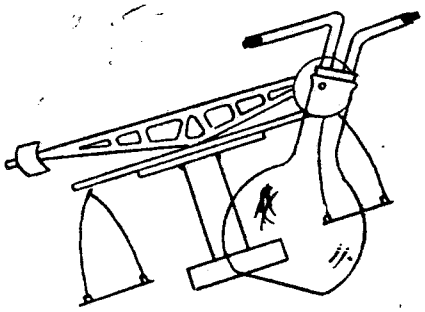
UTAH POWER & LIGHT
MINING & EXPLORATION
BOX 1005
HUNTINGTON, UT 84528

80-009528

SAMPLE: COTTONWOOD CREEK WATER SAMPLES DATED 4-15-80 RECEIVED 4-17-80.

Flow 406 GPM

	ABOVE TRAIL MOUNTAIN MINE	BELOW TRAIL MOUNTAIN MINE	ABOVE STRAIGHT CANYON FORK	USGS FLUME
Acidity as CaCO3 mg/l	4.0	8.0	4.0	6.0
Alkalinity as CaCO3 mg/l	314.00	312.00	298.00	304.00
Arsenic as As mg/l	<.001	<.001	<.001	<.001
BOD 5 Day mg/l	<1.0	<1.0	<1.0	<1.0
Bicarbonate as HCO3 mg/l	383.08	380.64	363.56	370.68
Cadmium as Cd mg/l	<.001	<.001	<.001	<.001
Calcium as Ca mg/l	67.20	67.20	57.60	60.80
Chloride as Cl mg/l	20.0	20.0	20.0	22.0
Fluoride as F mg/l	.17	.17	.17	.17
Iron as Fe (Total) mg/l	.330	.300	1.200	.640
Lead as Pb mg/l	.002	.003	.001	.001
MPN Fecal Coliform MPN/100 ml	<2.0	<2.0	<2.0	<2.0
MPN Total Coliform MPN/100 ml	26.0	130	220	49.0



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

CERTIFICATE OF ANALYSIS

80-009320

	ABOVE TRAIL MOUNTAIN MINE	BELOW TRAIL MOUNTAIN MINE	ABOVE STRAIGHT CANYON FORK	USGS FLUME
Magnesium as Mg mg/l	48.00	48.00	51.84	46.08
Manganese as Mn mg/l	.020	.020	.030	.020
Nitrite as NO2-N mg/l	<.01	<.01	<.01	<.01
Oil and Grease mg/l	<1.00	2.20	<1.00	<1.00
Phosphate PO4-P Ortho mg/l	.060	<.010	.280	.070
Potassium as K mg/l	2.23	4.44	2.54	2.48
Selenium as Se mg/l	.001	.001	.002	.001
Silica as SiO2 mg/l	6.90	7.10	7.70	7.25
Sodium as Na mg/l	45.00	45.00	48.00	55.00
Sulfate as SO4 mg/l	124	127	139	130
Suspended Solids mg/l	54.0	34.0	86.0	42.0
Total Dissolved Solids mg/l	508	510	500	496
Total Kjeldahl Nitrogen mg/l	.12	.50	.15	.10
Zinc as Zn mg/l	<.001	<.001	<.001	<.001
pH Units	8.00	8.00	7.90	8.00

FORD CHEMICAL LABORATORY, INC.

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

DATE: 06/03/80

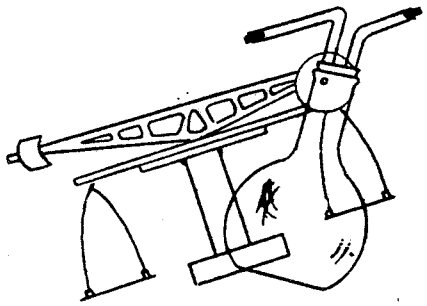
CERTIFICATE OF ANALYSIS

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

80-009879

SAMPLE: COTTONWOOD CREEK WATER SAMPLES DATED 5-13-80 RECEIVED 5-15-80.

	ABOVE UP&L DISCHARGE	ABOVE TRAIL MTN MINE	BELOW UP&L DISCHARGE
idity as CaCO3 mg/l	18.0	10.0	18.0
Alkalinity as CaCO3 mg/l	304.00	306.00	306.00
Arsenic as As mg/l	<.001	<.001	<.001
BOD 5 Day mg/l	<1.0	1.9	2.5
Bicarbonate as HCO3 mg/l	370.88	373.32	373.32
Cadmium as Cd mg/l	<.001	<.001	<.001
Calcium as Ca mg/l	60.00	64.00	68.00
Chloride as Cl mg/l	23.1	19.8	19.8
Fluoride as F mg/l	.22	.23	.20
Iron as Fe (Total) mg/l	.620	.315	1.450
Lead as Pb mg/l	<.001	.005	.006
Magnesium as Mg mg/l	24.00	31.20	26.40
Manganese as Mn mg/l	.021	.025	.036



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

CERTIFICATE OF ANALYSIS

80-009879

	ABOVE UP&L DISCHARGE	ABOVE TRAIL MTN MINE	BELOW UP&L DISCHARGE
Nitrite as NO2-N mg/l	<.01	<.01	<.01
Oil and Grease mg/l	<1.00	1.40	1.60
Phosphate PO4-P Ortho mg/l	.025	.100	.030
Potassium as K mg/l	2.30	2.50	4.50
Selenium as Se mg/l	<.001	<.001	.002
Silica as SiO2 mg/l	7.45	7.25	7.35
Sodium as Na mg/l	76.00	60.00	61.00
Sulfate as SO4 mg/l	87.0	84.0	84.0
Suspended Solids mg/l	52.0	36.0	30.0
Total Dissolved Solids mg/l	460	450	456
Total Kjeldahl Nitrogen mg/l	.15	.38	.40
Zinc as Zn mg/l	.001	.002	.005
pH Units	7.60	7.70	7.60

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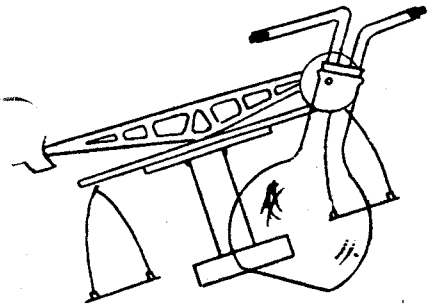


Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 06/23/80

CERTIFICATE OF ANALYSIS

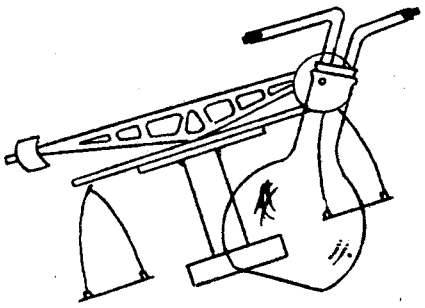
UTAH POWER & LIGHT
MINING & EXPLORATION
BOX 1005
HUNTINGTON, UT 84528

80-009962

SAMPLE: WATER FROM COTTONWOOD CREEK DATED 5/20/80 RECEIVED 5/20/80.

Flow 1336 GPM

	ABOVE TRAIL MTN. MINE	BELOW TRAIL MTN. MINE	ABOVE STRAIGHT CANYON FORK	USGS FLUME
:idity as CaCO3 mg/l	18.0	<.1	<.1	<.1
Alkalinity as CaCO3 mg/l	314.00	284.00	298.00	286.00
Arsenic as As mg/l	<.001	<.001	<.001	<.001
BOD 5 Day mg/l	<1.0	1.2	<1.0	<1.0
Bicarbonate as HCO3 mg/l	383.08	341.60	344.04	348.92
Cadmium as Cd mg/l	<.001	<.001	<.001	<.001
Calcium as Ca mg/l	60.00	64.80	80.80	68.00
Chloride as Cl mg/l	20.0	20.0	20.0	20.0
Fluoride as F mg/l	.15	.16	.16	.18
Iron as Fe (Total) mg/l	1.520	1.750	3.430	2.060
Lead as Pb mg/l	.002	<.001	.002	<.001
MPN Fecal Coliform MPN/100 ml	<2.0	4.0	2.0	2.0
MPN Total Coliform MPN/100 ml	49.0	490	330	490



Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

CERTIFICATE OF ANALYSIS

80-009962

	ABOVE TRAIL MTN. MINE	BELOW TRAIL MTN. MINE	ABOVE STRAIGHT CANYON FORK	USGS FLUME
Magnesium as Mg mg/l	41.76	39.84	29.28	37.44
Manganese as Mn mg/l	.060	.050	.090	.060
Nitrite as NO2-N mg/l	<.01	<.01	<.01	<.01
Oil and Grease mg/l	.60	1.60	9.80	8.80
Phosphate PO4-P Ortho mg/l	<.001	<.001	<.001	<.001
Potassium as K mg/l	1.90	2.03	2.23	2.02
Selenium as Se mg/l	<.001	<.001	<.001	<.001
Silica as SiO2 mg/l	6.80	6.90	6.90	6.65
Sodium as Na mg/l	34.00	24.20	35.00	33.00
Sulfate as SO4 mg/l	58.5	66.0	90.0	84.0
Suspended Solids mg/l	54.0	58.0	128	52.0
Total Dissolved Solids mg/l	410	388	433	419
Total Kjeldahl Nitrogen mg/l	<.01	<.01	<.01	<.01
Zinc as Zn mg/l	.014	.060	.015	.044
pH Units	7.90	8.00	8.00	8.00

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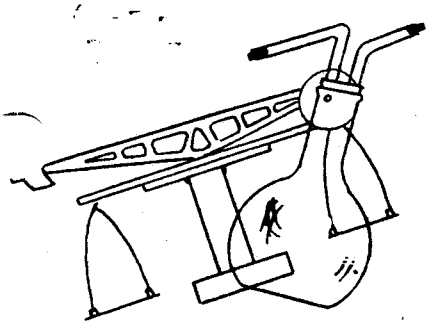


Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 07/21/80

CERTIFICATE OF ANALYSIS

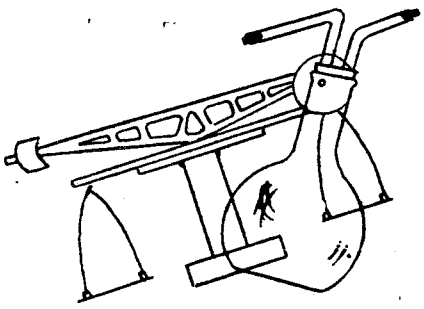
UTAH POWER & LIGHT
MINING & EXPLORATION
BOX 1005
HUNTINGTON, UT 84528

80-000259

SAMPLE: COTTONWOOD CREEK WATER SAMPLES DATED 6-11-80 RECEIVED 6-13-80.

Flow 2800 GPM

	ABOVE STRAIGHT CANYON FORK	ABOVE TRAIL MT. MINE	BELOW TRAIL MT. MINE	USGS FLUME
Acidity as CaCO3 ms/l	2.0	2.0	2.0	<.1
Alkalinity as CaCO3 ms/l	252.00	258.00	254.00	262.00
Arsenic as As ms/l	<.001	<.001	<.001	<.001
BOD 5 Day ms/l	<1.0	<1.0	<1.0	<1.0
Bicarbonate as HCO3 ms/l	307.44	314.76	309.88	319.64
Cadmium as Cd ms/l	<.001	<.001	<.001	<.001
Calcium as Ca ms/l	59.20	60.00	62.40	62.40
Chloride as Cl ms/l	10.0	10.0	10.0	10.0
Fluoride as F ms/l	.22	.22	.21	.21
Iron as Fe (Total) ms/l	1.070	1.130	2.040	1.980
Lead as Pb ms/l	<.001	.001	<.001	<.001
MPN Fecal Coliform MPN/100 ml	2.0	<2.0	<2.0	2.0
N Total Coliform MPN/100 ml	490	49.0	490	230



Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis

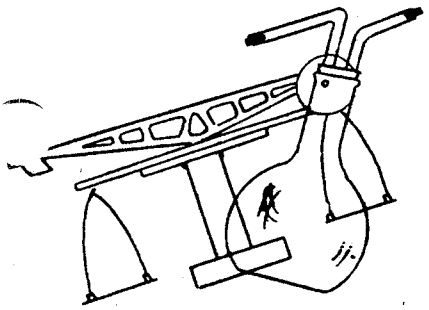
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

CERTIFICATE OF ANALYSIS

80-000229

	ABOVE STRAIGHT CANYON FORK	ABOVE TRAIL MT. MINE	BELOW TRAIL MT. MINE	USGS FLUME
Magnesium as Mg mg/l	30.24	33.60	27.36	29.28
Manganese as Mn mg/l	.013	.015	.017	.012
Nitrite as NO2-N mg/l	.02	<.01	.25	.02
Oil and Grease mg/l	1.40	1.80	4.80	1.20
Phosphate PO4-P Ortho mg/l	<.010	<.010	<.010	<.010
Potassium as K mg/l	2.60	3.50	4.10	.05
Selenium as Se mg/l	<.001	<.001	<.001	<.001
Silica as SiO2 Dissolved mg/l	7.70	7.50	6.80	7.20
Sodium as Na mg/l	14.90	12.40	12.30	12.50
Sulfate as SO4 mg/l	37.0	42.0	26.0	24.0
Suspended Solids mg/l	38.0	8.0	24.0	30.0
Total Dissolved Solids mg/l	315	322	293	300
Total Kjeldahl Nitrogen mg/l	.16	.12	.55	.11
Zinc as Zn mg/l	.035	.140	.020	.005
pH Units	7.20	7.10	7.12	7.60

FORD CHEMICAL LABORATORY, INC.



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

CERTIFICATE OF ANALYSIS

80-000832

	SAMPLE #1	SAMPLE #2	SAMPLE #3	SAMPLE #4
Magnesium as Mg mg/l	42.24	43.68	43.20	43.68
Manganese as Mn mg/l	.011	.012	<.001	<.001
Nitrite as NO2-N mg/l	<.01	<.01	<.01	<.01
Oil and Grease mg/l	2.40	4.80	5.80	1.60
Phosphate PO4-P Ortho mg/l	.070	<.001	<.001	<.001
tassium as K mg/l	1.48	1.50	1.45	1.62
Selenium as Se mg/l	<.001	<.001	<.001	<.001
Silica as SiO2 Dissolved mg/l	7.30	7.45	6.75	7.45
Sodium as Na mg/l	21.00	21.50	21.60	24.40
Sulfate as SO4 mg/l	70.0	85.0	86.0	80.0
Suspended Solids mg/l	3.0	6.0	3.0	4.0
Total Dissolved Solids mg/l	330	345	340	345
Total Kjeldahl Nitrogen mg/l	.20	.13	.16	.20
Zinc as Zn mg/l	.003	<.001	<.001	.010
pH Units	7.50	7.65	7.60	7.49

FORD CHEMICAL LABORATORY, INC.

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

DATE: 08/19/80

CERTIFICATE OF ANALYSIS

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

80-000832

SAMPLE: WATER FROM COTTONWOOD CREEK DATED 7/21/80 RECEIVED 7/23/80.

	Above Trail mtn. mine SAMPLE #1	Below Trail mtn. mine SAMPLE #2	USGS Flume SAMPLE #3	Above Straight Canyon Fork SAMPLE #4
Acidity as CaCO3 mg/l	<1.0	<1.0	<1.0	<1.0
Alkalinity as CaCO3 mg/l	240.00	240.00	228.00	244.00
Arsenic as As mg/l	<.001	<.001	<.001	<.001
BOD 5 Day mg/l	<1.0	<1.0	1.1	<1.0
Bicarbonate as HCO3 mg/l	278.16	268.40	263.52	278.16
Cadmium as Cd mg/l	.002	<.001	<.001	<.001
Calcium as Ca mg/l	44.00	42.40	41.60	42.40
Chloride as Cl mg/l	16.0	16.0	14.0	16.0
Fluoride as F mg/l	.10	<.11	.10	.10
Iron as Fe (Total) mg/l	.200	.250	.240	.300
Lead as Pb mg/l	<.001	<.001	<.001	<.001
MPN Fecal Coliform MPN/100 ml	31.0	49.0	23.0	21.0
MPN Total Coliform MPN/100 ml	460	130	490	460

CERTIFICATE OF ANALYSIS

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

539GPM Lab. No. 1381

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

FLOW 0.54 ~~GPM~~ Date Rec. 11/10/80

TEMP 41·F Date Sampled 11/10/80

Sample ID Cottonwood Creek below Trail Mt. Mine

pH	8.0 Units	Arsenic	* mg/l
Alkalinity, Total	221.4 mg/l $CaCo_3$	Beryllium	mg/l
Alkalinity, Bicarbonate	221.4 mg/l $CaCo_3$	Boron	mg/l
Calcium	102.0 mg/l	Cadmium	less than 0.02 mg/l
Chloride	1.48 mg/l	Chromium	mg/l
Conductivity	µmhos/cm	Copper	mg/l
Dissolved Oxygen	mg/l	Iron	3.0 mg/l
Hardness	mg/l $CaCo_3$	Lead	less than 0.05 mg/l
Magnesium	20.0 mg/l	Manganese	0.02 mg/l
Nitrogen, Nitrate	mg/l	Mercury	µg/l
Phosphorus, Total	3.4 mg/l	Nickel	mg/l
Phosphorus, Ortho	mg/l	Selenium	* mg/l
Potassium	5.0 mg/l	Zinc	0.01 mg/l
Sodium	13.0 mg/l	Flouride	0.171 mg/l
Solids, Total Dissolved	392.0 mg/l	Nitrogen, Nitrite	0.983 mg/l
Solids, Total Suspended	7.5 mg/l	Oil & Grease	less than 0.5 mg/l
Sulfate	61.73 mg/l	Silica	17.33 mg/l
Acidity	0 mg/l	Nitrogen, Total Kjeldahl	* mg/l
BOD	NA		
Coliform, Fecal	0 MPN/100ml		
Coliform, Total	23 MPN/100ml		

*to be reported at a later date.

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
Huntington, Utah 84528

539 GPM
FLOW 0.54" ~~GPM~~

Lab. No. 1381
Date Rec. 11/10/80
TEMP 41°F
Date Sampled 11/10/80

Sample ID Cottonwood Creek below Trail Mt. Mine

pH	Units	Arsenic, Total (less than) 0.2	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, Total 0.3	mg/l
Potassium	mg/l	Zinc	mg/l
Sodium	mg/l	Total Kjeldahl Nitrogen 0.83	mg/l
Solids, Total Dissolved	mg/l		
Solids, Total Suspended	mg/l		
Sulfate	mg/l		

Respectfully submitted

Certified Environmental Laboratory

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

CERTIFICATE OF ANALYSES

For Utah Power & LightCo.
Environmental Department

Lab. No. As noted below

Date Rec'd. 11/10/80

Date Sampled 11/10/80

Lab #	Sample ID	Nitrite, Nitrogen	
1381	Cottonwood Creek below Trail mt. Mine	(less than) 0.05	mg/l
1382	Cottonwood Creek above Trail Mt. Mine	(less than) 0.05	"
1383	Cottonwood Creek USGS Flume	(less than) 0.05	"
1384	Cottonwood Creek above Straight Canyon Fork	(less than) 0.05	"

Respectfully Submitted

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

Lab. No. 1382
Date Rec. 11/10/80
Date Sampled 11/10/80

Sample ID
Cottonwood Creek Above Trail Mt. Mine

pH	8.0	Units	Arsenic	*	mg/l
Alkalinity, Total	341.2	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate	341.2	mg/l $CaCo_3$	Boron		mg/l
Calcium	108.0	mg/l	Cadmium	less than 0.02	mg/l
Chloride	1.47	mg/l	Chromium		mg/l
Conductivity		µmhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	3.0	mg/l
Hardness		mg/l $CaCo_3$	Lead	less than 0.05	mg/l
Magnesium	20.0	mg/l	Manganese	0.04	mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total	3.2	mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium	*	mg/l
Potassium	3.0	mg/l	Zinc	0.006	mg/l
Sodium	13.0	mg/l	Nitrogen, Nitrite	0.969	mg/l
Solids, Total Dissolved	402.0	mg/l	Nitrogen, Total Kjeldahl	*	mg/l
Solids, Total Suspended	less than 0.5	mg/l	Oil & Grease	358.0	mg/l
Sulfate	62.96	mg/l	Silica	8.34	mg/l
Acidity	0	mg/l			
BOD	NA	mg/l			
Coliform, Fecal	0	MPN/100ml			
Coliform, Total	0	MPN/100ml			
Flouride	0.135	mg/l			

Respectfully submitted

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 1382

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

Date Rec. 11/10/80

Date Sampled 11/10/80

Sample ID Cottonwood Creek Above Trail Mt. Mine

pH	Units	Arsenic, Total (less than) 0.2	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, Total 0.6	mg/l
Potassium	mg/l	Zinc	mg/l
Sodium	mg/l		
Solids, Total Dissolved	mg/l		
Solids, Total Suspended	mg/l		
Sulfate	mg/l		

Total Kjeldahl Nitrogen 0.67 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

Lab. No. 1383

Date Rec. 11/10/80

Date Sampled 11/10/80

Sample ID Cottonwood Creek USGS Flume

pH	8.1 Units	Arsenic	* mg/l
Alkalinity, Total	338.8 mg/l $CaCo_3$	Beryllium	mg/l
Alkalinity, Bicarbonate	338.8 mg/l $CaCo_3$	Boron	mg/l
Calcium	108.0 mg/l	Cadmium	less than 0.02 mg/l
Chloride	1.48 mg/l	Chromium	mg/l
Conductivity	µmhos/cm	Copper	mg/l
Dissolved Oxygen	mg/l	Iron	3.0 mg/l
Hardness	mg/l $CaCo_3$	Lead	less than 0.05 mg/l
Magnesium	20.0 mg/l	Manganese	0.04 mg/l
Nitrogen, Nitrate	mg/l	Mercury	µg/l
Phosphorus, Total	2.6 mg/l	Nickel	mg/l
Phosphorus, Ortho	mg/l	Selenium	* mg/l
Potassium	3.0 mg/l	Zinc	0.012 mg/l
Sodium	13.0 mg/l	Nitrogen, Nitrite	0.958 mg/l
Solids, Total Dissolved	400 mg/l	Nitrogen, Total Kjeldahl	* mg/l
Solids, Total Suspended	9.5 mg/l	Oil & Grease	180.8 mg/l
Sulfate	60.49 mg/l	Silica	8.77 mg/l
Acidity	0 mg/l		
BOD	NA mg/l		
Coliform, Fecal	0 MPN/100ml		
Coliform, Total	43 MPN/100ml		
Flouride	0.133 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
Huntington, Utah 84528

Lab. No. 1383

Date Rec. 11/10/80

Date Sampled 11/10/80

Sample ID Cottonwood Creek USGS Flume

pH	Units	Arsenic, Total (less than) 0.2	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, Total (less than) 0.2	mg/l
Potassium	mg/l	Zinc	mg/l
Sodium	mg/l	Total Kjeldahl Nitrogen 0.83	mg/l
Solids, Total Dissolved	mg/l		
Solids, Total Suspended	mg/l		
Sulfate	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. 1384

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

Date Rec. 11/10/80

Date Sampled 11/10/80

Sample ID Cottonwood Creek above Straight Canyon Fork

pH	8.2	Units	Arsenic	*	mg/l
Alkalinity, Total	352.1	mg/l $CaCo_3$	Beryllium		mg/l
Alkalinity, Bicarbonate	352.1	mg/l $CaCo_3$	Boron		mg/l
Calcium	103.0	mg/l	Cadmium	less than 0.02	mg/l
Chloride	1.67	mg/l	Chromium		mg/l
Conductivity		umhos/cm	Copper		mg/l
Dissolved Oxygen		mg/l	Iron	3.0	mg/l
Hardness		mg/l $CaCo_3$	Lead	less than 0.05	mg/l
Magnesium	21.0	mg/l	Manganese	0.04	mg/l
Nitrogen, Nitrate		mg/l	Mercury		µg/l
Phosphorus, Total	3.0	mg/l	Nickel		mg/l
Phosphorus, Ortho		mg/l	Selenium	*	mg/l
Potassium	3.0	mg/l	Zinc	0.006	mg/l
Sodium	15.0	mg/l	Nitrogen, Nitrite	0.987	mg/l
Solids, Total Dissolved	446	mg/l	Nitrogen, Total Kjeldahl	*	mg/l
Solids, Total Suspended	6.0	mg/l	Oil & Grease	less than 0.5	mg/l
Sulfate	82.71	mg/l	Silica	8.56	mg/l
Acidity	0	mg/l			
BOD	NA	mg/l			
Coliform, Fecal	0	MPN/100ml			
Coliform, Total	4	MPN/100ml			
Flouride	0.124	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. 1384

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

Date Rec. 11/10/80

Date Sampled 11/10/80

Sample ID Cottonwood Creek above Straight Canyon Fork

pH	Units	Arsenic, Total (less than) 0.2	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, Total (less than) 0.2	mg/l
Potassium	mg/l	Zinc	mg/l
Sodium	mg/l	Total Kjeldahl Nitrogen 1.00	mg/l
Solids, Total Dissolved	mg/l		
Solids, Total Suspended	mg/l		
Sulfate	mg/l		

Respectfully submitted

Certified Environmental Laboratory

APPENDIX F

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

CERTIFICATE OF ANALYSES

For Utah Power & Light
Mining & Exploration
Field Offic3
Huntington, Utah 84528

Grimes Wash Below Wilberg Mine

Lab. No. W-1229

Date Rec'd. 05-20-80

Date Sampled 05-20-80

Analysis Date: 05-21-80

Parameter	
pH	8.2
Conductivity	710 µmhos/cm
Total Dissolved Solids	363.0 mg/l
Total Suspended Solids	738.5 mg/l
Iron	0.13 mg/l
Manganese	0.30 mg/l

Respectfully Submitted

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

CERTIFICATE OF ANALYSES

For

Utah Power & LIght
Mining & Exploration
Field Office
Huntington, Utah 84528

Grimes Wash Above Wilberg Mine

Lab. No. W-1230

Date Rec'd. 05-20-80

Analysis Date: 05-21-80

Date Sampled 05-20-80

Parameter	
pH	8.3
Condustivity	690 µmhos/cm
Total Dissolved Solids	339.0 mg/l
Total Suspended Solids	576.0 mg/l
Iron	0.12 mg/l
Manganese	0.28 mg/l

Respectfully Submitted

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

CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1280

SAMPLE ID: Grimes Wash Below Wilberg Mine Temp. 54° F

Date Rec'd. 07-07-80

Date Sampled 07-01-80

PARAMETER	VALUE	
pH	8.1	
Conductivity	780	Umhos/cm
Total Dissolved Solids	448	mg/l
Total Suspended Solids	234.7	mg/l
Iron Total	4.20	mg/l
Manganese	0.09	mg/l

Respectfully Submitted

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

CERTIFICATE OF ANALYSES

For UP&L Mining & Exploration
Field Office
Industrial Training Center
Huntington, Utah 84528

Lab. No. 1281

SAMPLE ID: Grimes Wash Above
Wilberg Mine
Temp. 56°F

Date Rec'd. 07-07-80

Date Sampled 07-01-80

PARAMETER	VALUE	
pH	8.2	
Conductivity	680	Umhos/cm
Total Dissolved Solids	410	mg/l
Total Suspended Solids	224.7	mg/l
Iron Total	5.30	mg/l
Manganese	0.11	mg/l

Respectfully Submitted

APPENDIX G

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: Burnt Tree Springs

Location: 120 Feet N [redacted] 1450 Feet [redacted] W of the Southeast Corner of Section 16 Township 17 South Range 7 East

Elevation: 9260 Feet above mean sea level

Location Comments:

Spring located on a south facing slope vegetated with brush grasses and some aspen groves. The spring has been developed for culinary use for a nearby cabin and for livestock use.

Formation: North Horn Formation 200 Feet from Top [redacted]

Probable Recharge Area: Highland area to the northwest.

Relationship to Adjacent Springs:

This spring is associated with Spring 79-2 and 80-42.

Geologic Circumstances of Spring:

Waters flowing through channel sands in the North Horn Formation intersect the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: Cove North Spring

Location: 3100 Feet N [redacted] 1540 Feet [redacted] W of the Southeast Corner

of Section 16 Township 17 South Range 7 East

Elevation: 9080 Feet above mean sea level

Location Comments:

Located on gentle conifer covered slope.

Formation: North Horn Formation 20 Feet from [redacted] Bottom

Probable Recharge Area: Highland area to the south.

Relationship to Adjacent Springs:

Spring 79-38 occurs in the same manner as Cove North Spring.

Geologic Circumstances of Spring:

Waters which percolate downward through the North Horn Formation by way of fractures and permeable beds, then flows laterally above an impermeable mudstone bed at the base of the formation. A spring is formed when these waters intersect the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: Elk Springs

Location: 1580 Feet N [redacted] 2180 Feet E [redacted] of the Southwest Corner of Section 5 Township 17 South Range 7 East

Elevation: 9350 Feet above mean sea level

Location Comments:

Located on the eastern flanks of East Mountain within a heavily timbered slope.

Formation: North Horn Formation 350 Feet from [redacted] Bottom

Probable Recharge Area:

A large portion of the northwest area of UP&L's property may provide recharge to this spring. The spring is located in the base of the Straight Canyon Syncline. Waters from both the north and south can flow downdip to the spring.

Relationship to Adjacent Springs:

Elk Springs is located along the same fault as springs 79-1, 79-18, 79-19, and 79-20.

Geologic Circumstances of Spring:

Water flowing through channel sands in the North Horn Formation intersect the southern fault of the Roans Canyon fault graben and flows to the surface. Because this spring is located in the trough of the Straight Canyon Syncline water will flow toward the spring both from the north and south.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: Pine Springs

Location: 3140 Feet N [redacted] 400 Feet [redacted] W of the Southeast Corner of Section 1 Township 17 South Range 6 East

Elevation: 9940 Feet above mean sea level

Location Comments:

Located on top of East Mountain.

Formation: Flagstaff Limestone 150 Feet from [redacted] Bottom

Probable Recharge Area:

Limited recharge of waters flowing southeast from higher elevations.

Relationship to Adjacent Springs:

Not related to other springs.

Geologic Circumstances of Spring:

Water flowing down dip in the Flagstaff Limestone intersect the surface along a joint system trending northeast.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: Sheba Springs

Location: 1540 Feet [redacted]S 500 Feet E[redacted] of the Northwest Corner

of Section 7 Township 17 South Range 7 East

Elevation: 9740 Feet above mean sea level

Location Comments:

Spring developed for livestock. Water flows from spring through an underground pipe to a trough.

Formation: Flagstaff 0 Feet from [redacted] Bottom

Probable Recharge Area: Top of East Mountain

Relationship to Adjacent Springs: Located along same fault as spring 79-10.

Geologic Circumstances of Spring:

Spring located along the northern fault of the Roans's Canyon fault graben. Water percolating down fractures along the fault within the Flagstaff Formation intersect the NorthHorn formation and flows laterally to the surface (fractures within the North Horn Formation usually won't transmit water because of the abundant clays which swell when wet).

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: Ted's Tub

Location: 2240 Feet N[redacted] 1600 Feet [redacted]W of the Southeast Corner of Section 17 Township 17 South Range 7 East

Elevation: 9290 Feet above mean sea level

Location Comments:

Spring located in gently rolling to flat terrain. Area vegetated with aspen and conifer trees and grassy meadows.

Formation: North Horn Formation 150 Feet from Top[redacted]

Probable Recharge Area:

Highlands of East Mountain located to the south and west.

Relationship to Adjacent Springs:

Numerous springs associated with this occurrence. The major springs are 79-12 through 79-15.

Geologic Circumstances of Spring:

Water flows down from the Flagstaff Limestone along vertical fractures which intersect a moderately permeable lenticular sandstone channel in the North Horn Formation. The spring is formed where this channel sandstone intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-1

Location: 700 Feet [redacted]S 480 Feet [redacted]W of the Northeast Corner

of Section 7 Township 17 South Range 7 East

Elevation: 9610 Feet above mean sea level

Location Comments:

Spring located slightly below the top of the East Mountain cap at the head of the south fork of Meetinghouse Canyon.

Formation: North Horn Formation 10 Feet from Top[redacted]

Probable Recharge Area: Top of East Mountain to the west.

Relationship to Adjacent Springs:

This spring is located along the same fault as springs 79-18 through 79-20 and Elk Springs.

Geologic Circumstances of Spring:

Spring located along the southern fault of the Roans Canyon fault graben. Water flowing through the Flagstaff limestone along this fault interesects the North Horn Formation and then flows laterally to the surface (fractures within the upper portion of the North Horn Formation usually won't transmit water because of the abundant clay beds which swell when wet).

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-2 (Surging Spring)

Location: 280 Feet [redacted]S 2080 Feet E[redacted] of the Northwest Corner

of Section 21 Township 17 South Range 7 East

Elevation: 9290 Feet above mean sea level

Location Comments:

Located in an area with gently sloping terrain vegetated with moderately dense patches of aspen with some spruce trees. Located on land owned by Mr. Ted Crawford. Spring developed as livestock watering trough.

Formation: North Horn Formation 220 Feet from Top[redacted]

Probable Recharge Area: Highland area to north and west.

Relationship to Adjacent Springs:

This spring related to Burnt Tree Spring and 80-42.

Geologic Circumstances of Spring:

Waters flowing through channel sands in the North Horn Formation intersect the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-3

Location: 2500 Feet [redacted]S 1660 Feet [redacted]W of the Northeast Corner

of Section 20 Township 17 South Range 7 East

Elevation: 9340 Feet above mean sea level

Location Comments:

Located immediately east of road. A small pond has been dug at this spring in order that water can be stored for livestock.

Formation: North Horn Formation 175 Feet from Top[redacted]

Probable Recharge Area: Highland areas to the west.

Relationship to Adjacent Springs:

This spring occurs in the same manner as spring 80-43.

Geologic Circumstances of Spring:

Waters flowing through channel sands in the North Horn Formation form a spring when it intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-4

Location: 480 Feet [redacted] S 1860 Feet [redacted] W of the Northeast Corner of Section 12 Township 17 South Range 6 East

Elevation: 9910 Feet above mean sea level

Location Comments:

Spring located in a small gully which is vegetated with sagebrush and some groves of aspen trees.

Formation: Flagstaff Limestone 50 Feet from [redacted] Bottom

Probable Recharge Area:

Limited area of higher ground located to the northwest.

Relationship to Adjacent Springs:

This spring related to 79-5.

Geologic Circumstances of Spring:

Water flowing downdip through permeable beds in the Flagstaff Limestone intersect the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-5

Location: 20 Feet N [redacted] 1920 Feet [redacted] W of the Southeast Corner

of Section 1 Township 17 South Range 6 East

Elevation: 9910 Feet above mean sea level

Location Comments:

Spring located in a small gully which is vegetated with sagebrush and some groves of aspen trees.

Formation: Flagstaff Limestone 70 Feet from [redacted] Bottom

Probable Recharge Area:

Limited area of higher ground located to the northwest.

Relationship to Adjacent Springs:

This spring related to 79-4.

Geologic Circumstances of Spring:

Water flowing downdip through permeable beds in the Flagstaff Limestone intersect the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-6

Location: 1600 Feet [redacted]S 1680 Feet [redacted]W of the Northeast Corner

of Section 12 Township 17 South Range 7 East

Elevation: 9720 Feet above mean sea level

Location Comments:

Located on a moderately steep aspen covered slope.

Formation: Flagstaff Limestone 0 Feet from [redacted]Bottom

Probable Recharge Area:

Limited recharge from areas of higher elevation to the north.

Relationship to Adjacent Springs:

This spring related to spring 79-7.

Geologic Circumstances of Spring:

Water flows downdip through the lower strata of the Flagstaff Limestone which overlies impermeable strata of the North Horn Formation. A spring is formed when these waters flow laterally to intersect the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-7

Location: 1540 Feet [redacted]S 1540 Feet [redacted]W of the Northeast Corner

of Section 12 Township 17 South Range 6 East

Elevation: 9710 Feet above mean sea level

Location Comments:

Spring located on a moderately steep aspen covered slope.

Formation: Flagstaff Limestone 0 Feet from [redacted]Bottom

Probable Recharge Area:

Limited recharge from areas of higher elevation located to the north.

Relationship to Adjacent Springs:

This spring related to spring 79-6.

Geologic Circumstances of Spring:

Water flows downdip through the lower strata of the Flagstaff Limestone which overlies impermeable strata of the North Horn Formation. A spring is formed when these waters flow laterally to intersect the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-8

Location: 2080 Feet [redacted]S 820 Feet [redacted]W of the Northeast Corner of Section 12 Township 17 South Range 6 East

Elevation: 9490 Feet above mean sea level

Location Comments:

Spring located on a gentle slope which is densely vegetated with aspen trees.

Formation: North Horn Formation 250 Feet from Top[redacted]

Probable Recharge Area:

Highland areas to the northwest.

Relationship to Adjacent Springs:

This spring occurs in a similar manner as spring 79-9

Geologic Circumstances of Spring:

Water flowing through channel sandstones in the North Horn Formation form a spring when it intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-9 (Dill Springs)

Location: 2480 Feet [redacted]S 2470 Feet [redacted]W of the Northeast Corner

of Section 12 Township 17 South Range 6 East

Elevation: 9650 Feet above mean sea level

Location Comments:

Spring located on a gentle sagebrush covered slope.

Formation: North Horn Formation 200 Feet from Top[redacted]

Probable Recharge Area:

Highland areas to the northwest.

Relationship to Adjacent Springs:

This spring occurs in similar manner as spring 79-8.

Geologic Circumstances of Spring:

Waters flowing through a channel sandstone in the North Horn Formation intersect the land surface forming a spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-10

Location: 2400 Feet [redacted]S 280 Feet E[redacted] of the Northeast Corner of Section 12 Township 17 South Range 6 East

Elevation: 9430 Feet above mean sea level

Location Comments:

Spring located on a gentle slope which is heavily vegetated with aspens.

Formation: North Horn Formation 300 Feet from Top[redacted]

Probable Recharge Area:

Highland areas to the northwest.

Relationship to Adjacent Springs:

This spring occurs in a similar manner as Sheba Springs.

Geologic Circumstances of Spring:

Water percolating down fractures along the Roans Canyon faulted graben within the Flagstaff Limestone intersects impervious zones in the North Horn Formation and flows laterally to form a spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-11

Location: 60 Feet [redacted]S 1900 Feet E[redacted] of the Northwest Corner of Section 8 Township 17 South Range 7 East

Elevation: 9220 Feet above mean sea level

Location Comments:

Spring located on a gentle slope which is heavily vegetated with aspen trees.

Formation: North Horn Formation 300 Feet from Top[redacted]

Probable Recharge Area:

Highland areas to the north and east.

Relationship to Adjacent Springs:

This spring occurs in a similar manner as springs 79-8, 79-9.

Geologic Circumstances of Spring:

Waters flowing through a channel sandstone in the North Horn Formation intersects the land surface forming a spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-12

Location: 2480 Feet N[redacted] 1700 Feet [redacted]W of the Southeast Corner of Section 17 Township 17 South Range 7 East

Elevation: 9290 Feet above mean sea level

Location Comments:

Spring located in gently rolling terrain. Area vegetated with aspen and conifer trees and grassy meadows. Spring is 200 feet north of Ted's Tub Spring.

Formation: North Horn Formation 150 Feet from Top[redacted]

Probable Recharge Area:

Highlands of East Mountain.

Relationship to Adjacent Springs:

Numerous springs are associated with this occurrence. The major springs are 79-13 through 79-15.

Geologic Circumstances of Spring:

Water flows down from the Flagstaff Limestone along vertical fractures which intersect a moderately permeable lenticular sandstone channel in the North Horn Formation. The spring is formed where this channel sandstone intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-13

Location: 800 Feet N [redacted] 2,600 Feet [redacted] W of the Southeast Corner of Section 8 Township 17 South Range 7 East

Elevation: 9290 Feet above mean sea level

Location Comments: Spring located on a densely vegetated slope

Formation: North Horn formation 250 Feet from Top [redacted]

Probable Recharge Area: Highland areas of East Mountain located to West.

Relationship to Adjacent Springs: This spring is associated with springs 79-12, 79-14, 79-15 and Teds Tub.

Geologic Circumstances of Spring: Water flows down from the Flagstaff limestone along vertical fractures which intersect a moderately permeable lenticular sandstone channel in the North Horn formation. The spring is formed where this channel sandstone intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-14

Location: 1,000 Feet N [redacted] 2,320 Feet E [redacted] of the Southwest Corner of Section 8 Township 17 South Range 7 East

Elevation: 9,340 Feet above mean sea level

Location Comments: Spring located on a slope densely vegetated with aspen trees.

Formation: North Horn formation 270 Feet from [redacted] Bottom

Probable Recharge Area: Highland areas of East Mountain located to the west.

Relationship to Adjacent Springs: This spring is associated with springs 79-12, 79-13, 79-15 and Teds Tub.

Geologic Circumstances of Spring: Water flows down from the Flagstaff limestone along vertical fractures which intersect a moderately permeable lenticular sandstone channel in the North Horn formation. This spring is formed where this channel sandstone intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-15

Location: 1,900 Feet N [redacted] 2,420 Feet [redacted] W of the Southeast Corner of Section 8 Township 17 South Range 7 East

Elevation: 9,290 Feet above mean sea level

Location Comments: Spring located in a meadow which is surrounded by thick groves of aspen and spruce trees. The spring is developed as a culinary water supply for a cabin site immediately adjacent to the spring.

Formation: North Horn 350 Feet from Top [redacted]

Probable Recharge Area: Highland areas of East Mountain which are located to the west.

Relationship to Adjacent Springs: This spring is associated with springs 79-12 through 79-14 and Teds Tub.

Geologic Circumstances of Spring: Water flows down from the Flagstaff limestone along vertical fractures which intersect moderately permeable lenticular sandstone channels in the North Horn formation. The spring is formed where this channel sandstone intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-16

Location: 1,200 Feet [redacted] S 2,400 Feet E [redacted] of the Northwest Corner of Section 6 Township 17 South Range 7 East

Elevation: 9600 Feet above mean sea level

Location Comments: Spring is located in a meadow surrounded by spruce trees.

Formation: North Horn Formation 200 Feet from Top [redacted]

Probable Recharge Area: Highland areas of East Mountain which is to the west.

Relationship to Adjacent Springs:

Geologic Circumstances of Spring: Water flows down from the Flagstaff limestone along vertical fractures which intersect moderately permeable lenticular sandstone channels in the North Horn formation. The spring is formed where this channel intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-17

Location: 360 Feet [redacted]S 2,820 Feet E[redacted] of the Northwest Corner of Section 6 Township 17 South Range 7 East

Elevation: 9,450 Feet above mean sea level

Location Comments: Located at the head of a small stock reservoir. Water from this spring feeds the reservoir in part.

Formation: North Horn formation 350 Feet from Top[redacted]

Probable Recharge Area: Highland areas located to the west.

Relationship to Adjacent Springs:

Geologic Circumstances of Spring: Water flows down from the Flagstaff limestone along vertical fractures which intersect moderately permeable fluvial sandstones in the North Horn formation. The spring is formed where this channel sandstone intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-18

Location: 320 Feet N [redacted] 680 Feet E [redacted] of the southwest Corner

of Section 5 Township 17 South Range 7 East

Elevation: 9,500 Feet above mean sea level

Location Comments: This spring is located along an ephemeral stream which is at the head of the south fork of Meetinghouse Canyon.

Formation: North Horn formation 220 Feet from Top [redacted]

Probable Recharge Area: Highland areas of East Mountain located at the west.

Relationship to Adjacent Springs: This spring associated with Elk Springs, 79-19 and 79-20.

Geologic Circumstances of Spring: Water flowing through channel sandstone deposits in the North Horn formation intersect the southern fault of the Roans Canyon fault graben and flow to the surface forming the spring. Because this spring is located in the trough of the straight canyon syncline, water from both the north and south will flow toward the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-19

Location: 80 Feet N[redacted] 940 Feet E[redacted] of the Southwest Corner of Section 5 Township 17 South Range 7 East

Elevation: 9,460 Feet above mean sea level

Location Comments: This spring is located along an ephemeral stream which is at the head of the south fork of Meetinghouse Canyon.

Formation: North Horn formation 230 Feet from Top[redacted]

Probable Recharge Area: Highland areas of East Mountain located to the west.

Relationship to Adjacent Springs: This spring associated with Elk Springs, 79-1, 79-18, 79-20.

Geologic Circumstances of Spring: Water flowing through channel sandstone deposits in the North Horn formation intersects the southern fault of the Roans Canyon fault graben and flow to the surface forming this spring. Because the spring is located in the trough of the straight canyon syncline, water from both the north and south will flow toward the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-20

Location: 500 Feet N[redacted] 700 Feet E[redacted] of the Southwest Corner of Section 5 Township 17 South Range 7 East

Elevation: 9,500 Feet above mean sea level

Location Comments: This spring is located along an ephemeral stream which is at the head of the south fork of Meetinghouse Canyon.

Formation: North Horn formation 220 Feet from Top[redacted]

Probable Recharge Area: Highland areas of East Mountain which are located to the west.

Relationship to Adjacent Springs: This spring associated with springs 79-18, 79-19 and Elk Springs.

Geologic Circumstances of Spring: Water flowing through channel sandstone deposits in the North Horn formation intersect the southern fault of the Roans Canyon fault graben and flow to the surface forming this spring. Because the spring is located in the trough of the straight canyon syncline, water from both the north and south will flow toward the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-21

Location: 610 Feet N [redacted] 180 Feet [redacted] W of the Southeast Corner of Section 20 Township 17 South Range 7 East

Elevation: 9,375 Feet above mean sea level

Location Comments: Spring located in meadow adjacent to pond.

Formation: North Horn Formation 350 Feet from Top [redacted]

Probable Recharge Area: Top of East Mountain to the west.

Relationship to Adjacent Springs: This spring associated with Spring 79-22, 80-46 and 80-47.

Geologic Circumstances of Spring: Water flows down from the Flagstaff limestone along vertical fractures which intersect a moderately permeable lenticular sandstone channel in the North Horn formation. The spring is formed where this channel sandstone intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-22

Location: 620 Feet N [redacted] 400 Feet [redacted]W of the Southeast Corner of Section 20 Township 17 South Range 7 East

Elevation: 9,375 Feet above mean sea level

Location Comments: Spring located in meadow adjacent to pond.

Formation: North Horn formation. 350 Feet from Top[redacted]

Probable Recharge Area: Top of East Mountain to the west.

Relationship to Adjacent Springs: This spring associated with spring 79-21, 80-46 and 80-47.

Geologic Circumstances of Spring: Water flows down from the Flagstaff limestone along vertical fractures which intersect a moderately permeable lenticular sandstone channel in the North Horn formation. The spring is formed where this channel sandstone intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-23 (Grimes wash spring #1)

Location: 1,460 Feet N [redacted] 1,610 Feet E [redacted] of the Southwest Corner of Section 15 Township 17 South Range 7 East

Elevation: 9,035 Feet above mean sea level

Location Comments: Spring located in a grassy meadow in a broad flat-bottom wash.

Formation: North Horn formation 10 Feet from [redacted] Bottom

Probable Recharge Area: Highland to northeast.

Relationship to Adjacent Springs: This spring shares the same mode of occurrence as many springs on East Mountain. However, it is not directly associated with any other spring.

Geologic Circumstances of Spring: Water flowing laterally through a channel sandstone underlain by a thin impermeable mudstone at the base of the North Horn formation intersect the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-24

Location: 500 Feet [redacted] S 1,840 Feet E [redacted] of the Northwest Corner of Section 22 Township 17 South Range 7 East

Elevation: 8,870 Feet above mean sea level

Location Comments: Spring located in the middle fork of Grimes wash within a broad sagebush covered valley.

Formation: Price River formation 200 Feet from Top [redacted]

Probable Recharge Area: Highland areas to north

Relationship to Adjacent Springs: Spring occurs in same manner as springs 80-41, 80-44 and 80-45.

Geologic Circumstances of Spring: Springs located within the Price River formation are rare on East Mountain. Where they do occur it is in the bottom of washes. It is believed that this spring is formed when water flowing in the alluvium in this wash, reached the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-25 (Roan Spring)

Location: 510 Feet [redacted] S 310 Feet E [redacted] of the Northwest Corner of Section 8 Township 17 South Range 7 East

Elevation: 8,920 Feet above mean sea level

Location Comments: Spring is located in a thick grove of aspen trees located on the north side of the south fork of Roans Canyon.

Formation: North Horn formation 10 Feet from [redacted] Bottom

Probable Recharge Area: Top of East Mountain to the northwest

Relationship to Adjacent Springs: This spring occurs in the same manner as springs 79-32 and 79-33.

Geologic Circumstances of Spring: Water flowing laterally through a channel sandstone underlain by a thin impermeable mudstone at the base of the North Horn formation intersect the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-26

Location: 1,300 Feet N [redacted] 400 Feet [redacted] W of the Southeast Corner of Section 18 Township 17 South Range 7 East

Elevation: 9,340 Feet above mean sea level

Location Comments: Spring located east of pond in aspen grove. Spring waters flow into pond.

Formation: North Horn formation 210 Feet from Top [redacted]

Probable Recharge Area: Top of East Mountain to the east

Relationship to Adjacent Springs: This spring associated with springs 79-27, 79-28 and 79-29.

Geologic Circumstances of Spring: Water flowing down through fractures in the North Horn formation intersects channel sandstones and flows laterally through the formation. A spring is formed when the sandstone channel intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-27

Location: 980 Feet N [redacted] 40 Feet [redacted] W of the Southeast Corner of Section 18 Township 17 South Range 7 East

Elevation: 9,330 Feet above mean sea level

Location Comments: Spring located east of pond in aspen grove. Spring waters flow into pond.

Formation: North Horn formation 200 Feet from Top [redacted]

Probable Recharge Area: Top of East Mountain to the east.

Relationship to Adjacent Springs: This spring associated with springs 79-26, 79-28 and 79-29.

Geologic Circumstances of Spring: Water flowing down through fractures in the North Horn formation intersect a channel sandstones and flows laterally through the formation. A spring is formed when the sandstone channel intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-28 (Flag Lake)

Location: 820 Feet N [redacted] 770 Feet E [redacted] of the Southwest Corner of Section 20 Township 17 South Range 7 East

Elevation: 9,340 Feet above mean sea level

Location Comments: Spring located immediately east of Flag Lake in an area fenced off by a log fence.

Formation: North Horn formation 20 Feet from [redacted] Bottom

Probable Recharge Area: East Mountain highlands to the east.

Relationship to Adjacent Springs: This spring associated with springs 79-26, 79-27 and 79-29.

Geologic Circumstances of Spring: Water flowing down through fractures in the North Horn formation intersects channel sandstones and flows laterally through the formation. A spring is formed when the sandstone intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-29

Location: 200 Feet [redacted] S 860 Feet [redacted] W of the Northeast Corner of Section 18 Township 17 South Range 7 East

Elevation: 9,410 Feet above mean sea level

Location Comments: Spring located immediately east of small pond. The spring feeds the pond.

Formation: North Horn formation 200 Feet from Top/Bottom

Probable Recharge Area: The highland areas of East Mountain to the east.

Relationship to Adjacent Springs: This spring associated with springs 79-26, 79-27, and 79-28.

Geologic Circumstances of Spring: Water flowing down through fractures in the North Horn formation intersects channel sandstones and flows laterally through the formation. A spring is formed when the channel intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-30

Location: 520 Feet [redacted] S 3,690 Feet [redacted] W of the Northeast Corner of Section 13 Township 17 South Range 7 East

Elevation: 8,950 Feet above mean sea level

Location Comments: Spring located near the uphill side of a small aspen grove.

Formation: North Horn formation 0 Feet from [redacted] Bottom

Probable Recharge Area: Highland areas of East Mountain located to the north and east.

Relationship to Adjacent Springs: This spring associated with spring 79-31.

Geologic Circumstances of Spring: The spring is located near the northern fault of the Roans Canyon faulted graben. Water traveling downward along the fractures associated with this fault intersects the impermeable base of the North Horn formation and flows laterally along the fracture until it intersects the land surface forming the spring. Water will not flow down the fracture below the base of the North Horn formation because of the abundance of clays that swell when wet.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-31

Location: 200 Feet [redacted]S 3,380 Feet [redacted]W of the Northeast Corner of Section 13 Township 17 South Range 7 East

Elevation: 9,050 Feet above mean sea level

Location Comments: Spring located in a wash within sagebrush covered slope.

Formation: North Horn formation 50 Feet from [redacted] Bottom

Probable Recharge Area: Areas of higher elevation on East Mountain located to the North.

Relationship to Adjacent Springs: This spring related to spring 79-30.

Geologic Circumstances of Spring: This spring is located near the northern fault of the Roans Canyon faulted graben. Water traveling downward along the fractures associated with this fault intersect the impermeable base of the North Horn formation which is a zone that fractures are readily sealed by swelling clays. The water then flows laterally along the fracture to intersect the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-32

Location: 280 Feet [redacted]S 1100 Feet E[redacted] of the Northwest Corner

of Section 19 Township 17 South Range 7 East

Elevation: 8845 Feet above mean sea level

Location Comments: Spring located at the edge of aspen grove slightly east of drill site EM-32C.

Formation: North Horn 0 Feet from [redacted] Bottom

Probable Recharge Area: Highland areas of East Mountain located to the North.

Relationship to Adjacent Springs: This spring occurs in the same manner as Spring 79-25.

Geologic Circumstances of Spring: Water flowing laterally through a channel sandstone underlain by a thin impermeable mudstone at the base of the North Horn Formation intersect the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-33

Location: 430 Feet [redacted]S 1470 Feet [redacted]W of the Northwest Corner of Section 19 Township 17 South Range 7 East

Elevation: 8700 Feet above mean sea level

Location Comments: Spring located at the base of a steep hillside which is covered with spruce and aspen trees.

Formation: Price River Formation 120 Feet from Top[redacted]

Probable Recharge Area: Area by Springs 79-26 and 79-27.

Relationship to Adjacent Springs: This spring related to Spring 79-26 and 79-27.

Geologic Circumstances of Spring: Water from Springs 79-26 and 79-27 flow underground and then reamerge as Spring 79-33.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-34

Location: 2760 Feet N[redacted] 1820 Feet E[redacted] of the Southwest Corner of Section 9 Township 17 South Range 7 East

Elevation: 9160 Feet above mean sea level

Location Comments: Spring located immediately to the northeast of jeep trail.

Formation: North Horn Formation 80 Feet from [redacted] Bottom

Probable Recharge Area: Areas of higher elevation to the south and west.

Relationship to Adjacent Springs: Spring occurs in same manner as many other springs in the area such as 79-15 and 79-37.

Geologic Circumstances of Spring: Water flows down from the Flagstaff Limestone along vertical fractures which intersect moderately permeable lenticular channel sandstones in the North Horn Formation. The spring is formed where this channel sandstone intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-35

Location: 1980 Feet N[redacted] 1510 Feet E[redacted] of the Southwest Corner of Section 8 Township 17 South Range 7 East

Elevation: 9585 Feet above mean sea level

Location Comments: Spring located on hillside covered with aspen and spruce trees.

Formation: Flagstaff Limestone 0 Feet from [redacted] Bottom

Probable Recharge Area: Areas of higher elevation located to the west.

Relationship to Adjacent Springs: Spring occurs in same manner as Springs 79-6 and 79-7.

Geologic Circumstances of Spring: Water flows downdip through the lower strata of the Flagstaff Limestone which overlies impermeable strata of the North Horn Formation. A spring is formed when these waters intersect the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-36

Location: 740 Feet N [redacted] 610 Feet [redacted] W of the Southeast Corner

of Section 8 Township 17 South Range 7 East

Elevation: 9085 Feet above mean sea level

Location Comments: Spring located near the base of a sagebrush covered slope.

Formation: North Horn Formation 0 Feet from [redacted] Bottom

Probable Recharge Area: Areas of higher elevation to the north.

Relationship to Adjacent Springs: Spring occurs in same manner as several springs on East Mountain, such as Spring 79-38.

Geologic Circumstances of Spring: Water flowing laterally through a channel sandstone underlain by a thin impermeable mudstone at the base of the North Horn Formation intersects the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-37

Location: 1120 Feet N [redacted] 1090 Feet [redacted] W of the Southeast Corner of Section 8 Township 17 South Range 7 East

Elevation: 9135 Feet above mean sea level

Location Comments: Spring located in aspen trees near the bottom of the slope.

Formation: North Horn Formation 50 Feet from [redacted] Bottom

Probable Recharge Area: Areas of higher elevations which are located to the north and west.

Relationship to Adjacent Springs: Spring occurs in same manner as several springs on East Mountain.

Geologic Circumstances of Spring: Water flowing laterally through a channel sandstone underlain by a thin impermeable mudstone at the base of the North Horn Formation intersects the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-38

Location: 1430 Feet [redacted] S 1430 Feet E[redacted] of the Northwest Corner of Section 16 Township 17 South Range 7 East

Elevation: 9100 Feet above mean sea level

Location Comments: Spring located in small meadow surrounded by aspen trees.

Formation: North Horn 0 Feet from [redacted] Bottom

Probable Recharge Area: Areas of higher elevation.

Relationship to Adjacent Springs: This spring occurs in the same manner as Spring 79-36.

Geologic Circumstances of Spring: Water flowing laterally through a channel sandstone underlain by impermeable mudstone at the base of the North Horn Formation intersects the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-39

Location: 1520 Feet N [redacted] 410 Feet [redacted] W of the Southeast Corner of Section 20 Township 17 South Range 7 East

Elevation: 9290 Feet above mean sea level

Location Comments: Spring located near the base of a gentle slope which is densely populated with spruce trees.

Formation: North Horn Formation 120 Feet from [redacted] Bottom

Probable Recharge Area: Higher areas of East Mountain which are located to the west.

Relationship to Adjacent Springs: This spring occurs in same manner as numerous springs on East Mountain such as 79-3, 80-46, and 80-47.

Geologic Circumstances of Spring: Water flowing laterally through permeable sandstone within the North Horn Formation intersects the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 79-40

Location: 2620 Feet [redacted]S 470 Feet E[redacted] of the Northwest Corner of Section 21 Township 17 South Range 7 East

Elevation: 9030 Feet above mean sea level

Location Comments: Spring located in the bottom of a draw at the northern edge of a dense population of spruce trees.

Formation: Price River 100 Feet from Top[redacted]

Probable Recharge Area: Areas of higher elevation.

Relationship to Adjacent Springs: This spring not related to other springs within the immediate area.

Geologic Circumstances of Spring: It is possible that this spring occurs as a re-emergence of water from Springs 79-3 and 80-43 which flows underground. However, the temperature of the water in this spring (39-41°F) does not support this fact. No other explanation of the spring is apparent.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 80-41

Location: 2520 Feet [redacted] S 1700 Feet E [redacted] of the Northwest Corner

of Section 21 Township 17 South Range 7 East

Elevation: 9000 Feet above mean sea level

Location Comments: Spring located in thick population of spruce trees immediately north of fence line.

Formation: Price River 120 Feet from Top [redacted]

Probable Recharge Area: Areas of higher elevations on East Mountain which are located to the southwest.

Relationship to Adjacent Springs: This spring associated with Spring 80-44.

Geologic Circumstances of Spring: The geologic occurrence of this spring has not been determined. It is possible that water flowing along fractures in the Price River Formation intersects the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 80-42

Location: 100 Feet [redacted] S 1920 Feet E [redacted] of the Northwest Corner of Section 21 Township 17 South Range 7 East

Elevation: 9305 Feet above mean sea level

Location Comments: Spring located in area densely populated with aspen trees. The spring has been surrounded by a log fence. Flow measurements can be easily made where the water flows through a pipe beneath the road adjacent to the spring.

Formation: North Horn 180 Feet from Top [redacted]

Probable Recharge Area: Areas of higher elevation to the north and west.

Relationship to Adjacent Springs: This spring related to Burnt Tree Spring and Spring 79-2.

Geologic Circumstances of Spring: Water flowing through channel sands in the North Horn Formation intersect the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 80-43

Location: 2120 Feet [redacted] S 1500 Feet [redacted] W of the Northeast Corner of Section 20 Township 17 South Range 7 East

Elevation: 9330 Feet above mean sea level

Location Comments: Spring located approximately 150 feet southeast of road at the western edge of a group of large spruce trees.

Formation: North Horn Formation 190 Feet from Top[redacted]

Probable Recharge Area: Areas of higher elevation to the north and west.

Relationship to Adjacent Springs: This spring associated with Spring 79-3.

Geologic Circumstances of Spring: Waters flowing through channel sands in the North Horn Formation form a spring when it intersects the land surface.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 80-44

Location: 2500 Feet [redacted]S 1950 Feet E[redacted] of the Northwest Corner of Section 21 Township 17 South Range 7 East

Elevation: 8980 Feet above mean sea level

Location Comments: Spring located in meadow which is surrounded by spruce trees. Fence line runs immediately to the south of the spring.

Formation: Price River 120 Feet from Top[redacted]

Probable Recharge Area: Areas of higher elevations on East Mountain which are located to the southwest.

Relationship to Adjacent Springs: This spring associated with Spring 80-41.

Geologic Circumstances of Spring: The geologic occurrence of this spring has not been determined. It is possible that water flowing along fractures in the Price River Formation intersects the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 80-45

Location: 2540 Feet [redacted] S 870 Feet [redacted] W of the Northeast Corner of Section 21 Township 17 South Range 7 East

Elevation: 8785 Feet above mean sea level

Location Comments: Spring located near the bottom of the left fork of Grimes Wash.

Formation: Price River 340 Feet from Top[redacted]

Probable Recharge Area: Water in the Left Fork of Grimes to the west of the spring.

Relationship to Adjacent Springs: This spring is related to the water flowing in the Left Fork of Grimes Wash.

Geologic Circumstances of Spring: Water flowing in the Left Fork of Grimes Wash saturates the alluvium in the area of the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 80-46

Location: 800 Feet N [redacted] 1150 Feet E [redacted] of the Southwest Corner of Section 21 Township 17 South Range 7 East

Elevation: 9350 Feet above mean sea level

Location Comments: Spring located in group of spruce trees located downhill from Spring 80-47.

Formation: North Horn 250 Feet from Top [redacted]

Probable Recharge Area: Areas of higher elevation located to the west.

Relationship to Adjacent Springs: Spring occurs in same manner as Spring 80-47 and several other springs in the area.

Geologic Circumstances of Spring: Water flowing laterally through a channel sandstone in the North Horn Formation intersects the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 80-47

Location: 950 Feet N [redacted] 1010 Feet E [redacted] of the Southwest Corner of Section 21 Township 17 South Range 7 East

Elevation: 9335 Feet above mean sea level

Location Comments: This spring is located at the end of a diversion ditch within an aspen and spruce covered slope.

Formation: North Horn Formation 250 Feet from Top [redacted]

Probable Recharge Area: Areas of higher elevation located to the west.

Relationship to Adjacent Springs: Spring occurs in same manner as Spring 80-46 and several other springs on East Mountain.

Geologic Circumstances of Spring: Water flowing laterally through a channel sandstone in the North Horn Formation intersects the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 80-48

Location: 750 Feet N[redacted] 250 Feet E[redacted] of the Southwest Corner

of Section 33 Township 16 South Range 7 East

Elevation: 9425 Feet above mean sea level

Location Comments: Spring located between several small groups of aspen trees on a gently sloping hill.

Formation: North Horn Formation 250 Feet from[redacted] Bottom

Probable Recharge Area: Areas of higher elevation located to the west.

Relationship to Adjacent Springs: Spring occurs in same manner as several springs in the East Mountain area.

Geologic Circumstances of Spring: Water flowing laterally through channel sandstones in the North Horn Formation intersect the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 80-49

Location: 250 Feet N[redacted] 1940 Feet E[redacted] of the Southwest Corner of Section 33 Township 16 South Range 7 East

Elevation: 9025 Feet above mean sea level

Location Comments: Spring located midway up a sagebrush covered slope. The spring feeds a trough which is located about 200 feet downhill from the spring.

Formation: Price River 130 Feet from Top[redacted]

Probable Recharge Area: Areas of higher elevations on East Mountain which are located to the north and west.

Relationship to Adjacent Springs: This spring occurs in same manner as several springs on East Mountain such as Elk Springs and Spring 79-1.

Geologic Circumstances of Spring: Water flowing along the north fault of the Roans Canyon Fault Graben intersects the land surface forming the spring.

SPRINGS GEOLOGIC CONDITIONS INVENTORY

Spring Name/Number: 80-50

Location: 2850 Feet [redacted] S 2230 Feet [redacted] W of the Northwest Corner

of Section 29 Township 16 South Range 7 East

Elevation: 7810 Feet above mean sea level

Location Comments: Spring located on hillside which is densely populated with spruce trees.

Formation: Blackhawk 250 Feet from [redacted] Bottom

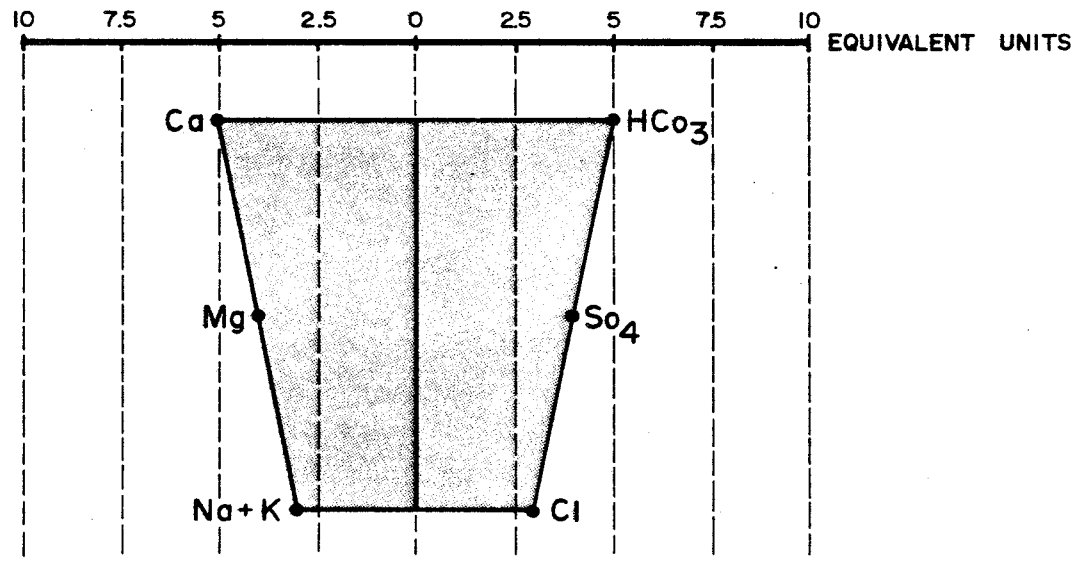
Probable Recharge Area: Areas of higher elevations which are located to the west.

Relationship to Adjacent Springs: Spring not associated with any other springs on East Mountain.

Geologic Circumstances of Spring: Water flowing along fractures in the Blackhawk Formation intersect the land surface forming the spring.

APPENDIX H

CATION – ANION DIAGRAMS



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

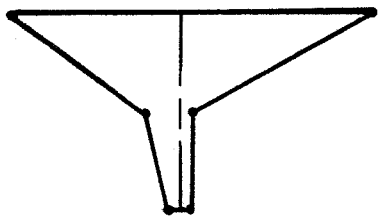
1" = 5 Equivalent Units

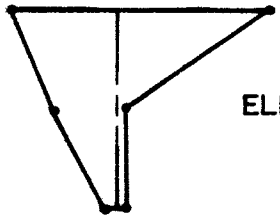
Equivalent Weights

Mg	12.16	(Magnesium)
Ca	20.04	(Calcium)
Na	23.00	(Sodium)
K	39.10	(Potassium)
So_4	48.03	(Sulfate)
HCO_3	61.01	(Bicarb. Alkalinity)
Cl	35.46	(Chloride)

CATION-ANION DIAGRAMS

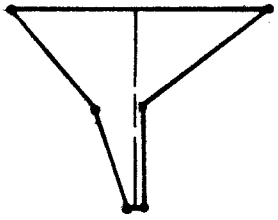
ELK SPRING
10/9/80

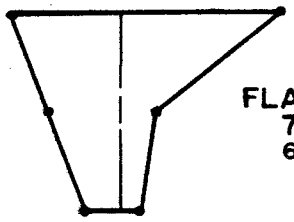




ELK SPRING
6/30/80

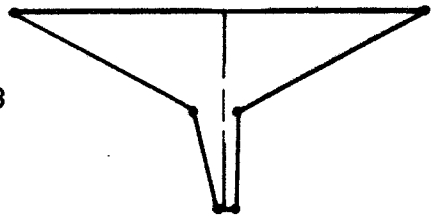
PINE SPRING
6/30/80

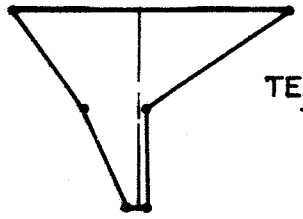




FLAG LAKE
79-28
6/9/80

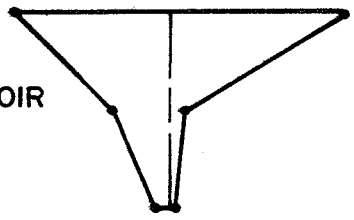
TED'S TUB
10/6/80

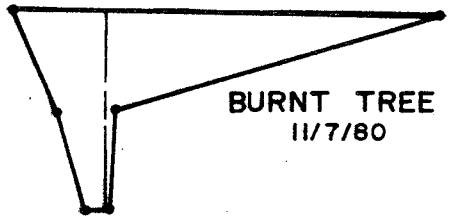




TED'S TUB
7/3/80

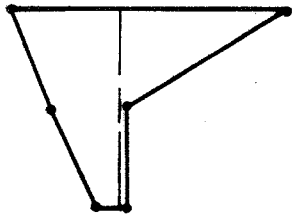
COVE RESERVOIR
6/10/80

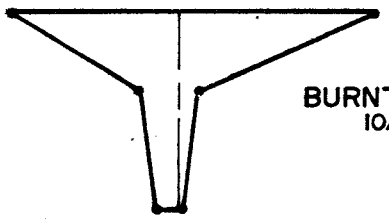




BURNT TREE
11/7/80

BURNT TREE
6/9/80

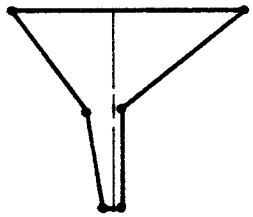


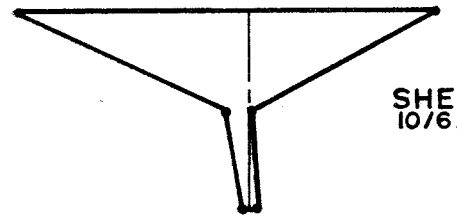


BURNT TREE
10/9/80

CATION-ANION DIAGRAMS

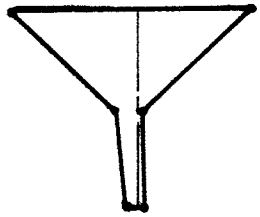
SHEBA
6/9/80

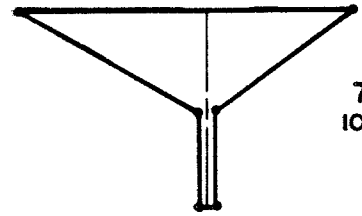




SHEBA
10/6/80

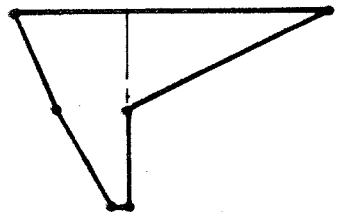
79-1
6/30/80

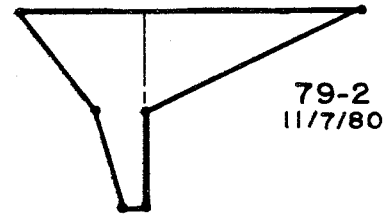




79-1
10/6/80

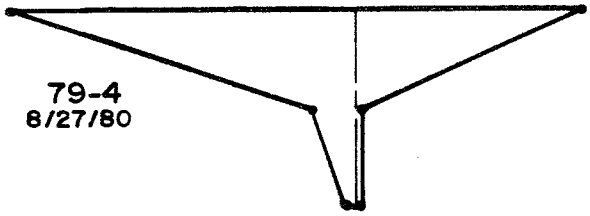
79-2
7/14/80

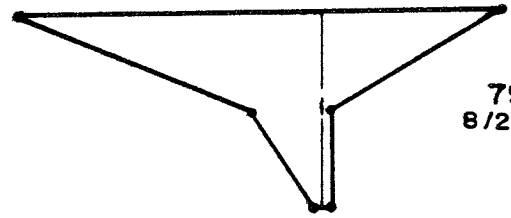




79-2
11/7/80

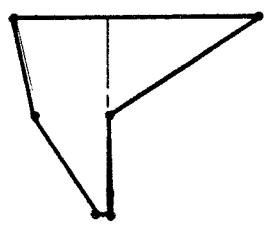
79-4
8/27/80

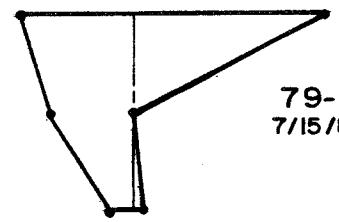




79-8
8/26/80

79-9
8/26/80

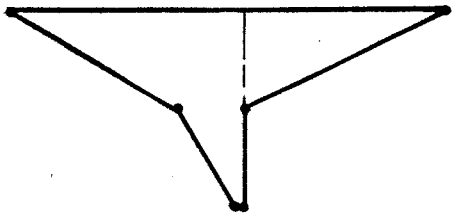


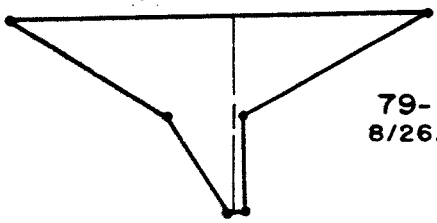


79-11
7/15/80

CATION-ANION DIAGRAMS

79-15
9/25/80





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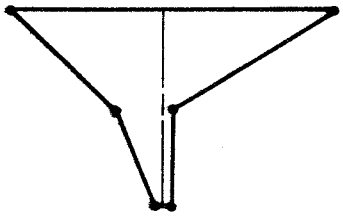
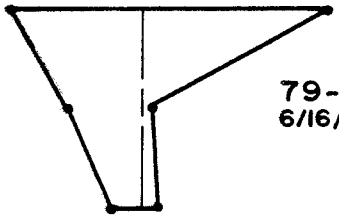
8/26/80

79-18
8/27/80





79-23
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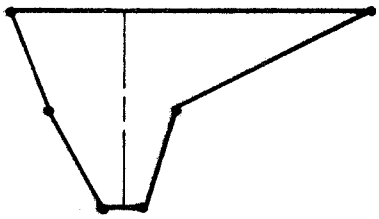
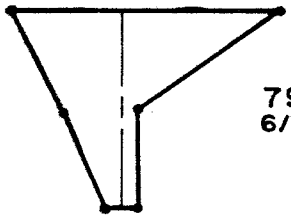
79-25
7/15/80





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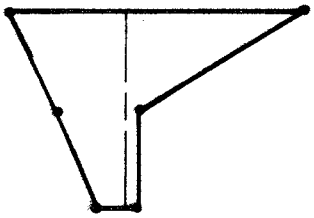
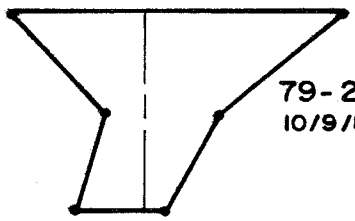
6/9/80

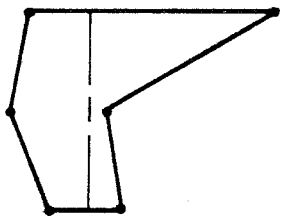
79-27
6/9/80

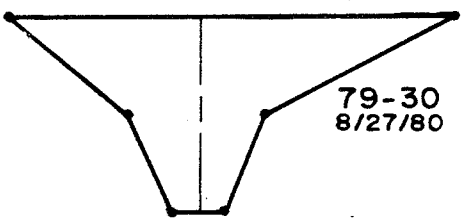




79-28
10/9/80

79-29
7/15/80

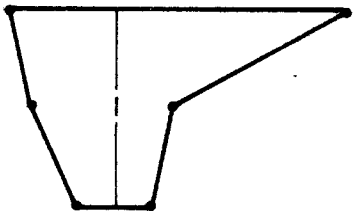


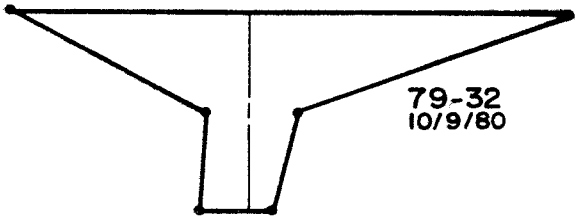


79-30
8/27/80

CATION-ANION DIAGRAMS

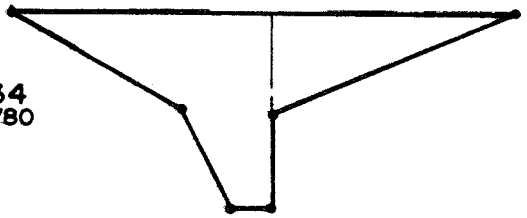
79-32
7/15/80

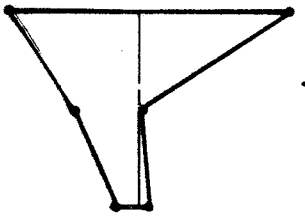




79-32
10/9/80

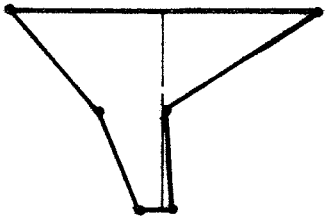
79-34
9/25/80

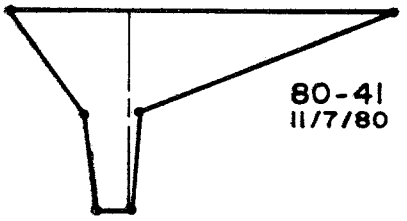




79-39
7/3/80

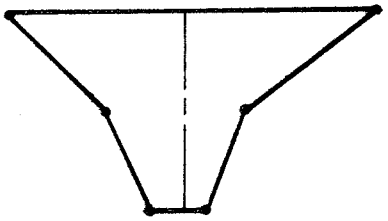
79-40
6/10/80

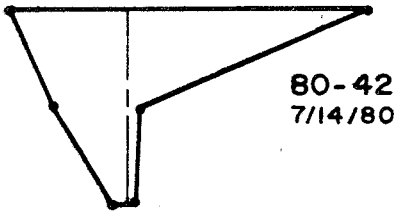




80-41
11/7/80

80-41
6/10/80





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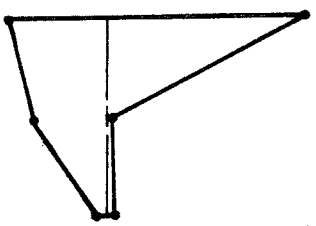
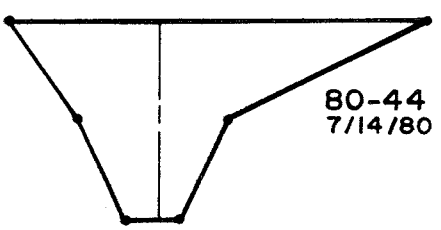
7/14/80

80-43
7/14/80

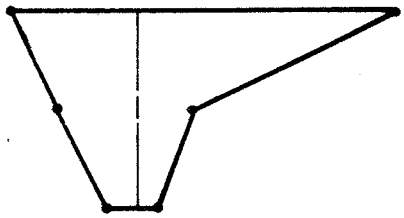


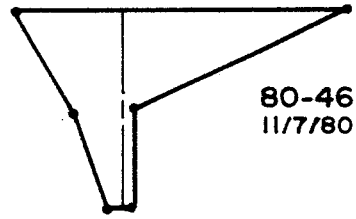


80-44
7/14/80

CATION-ANION DIAGRAMS

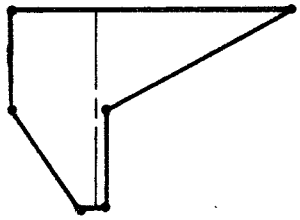
80-45
7/14/80

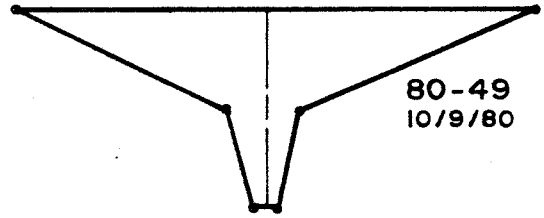




80-46
11/7/80

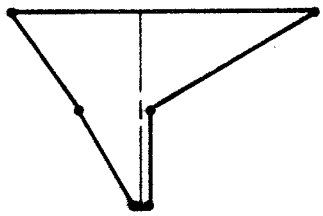
80-46
7/14/80





80-49
10/9/80

80-51
8/26/80



APPENDIX I

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 East Mt. Springs Burnt tree

Lab. No. 1371
Date Rec. 11/07/80
Date Sampled 11/07/80

	pH	7.2 Units		Arsenic	____ mg/l
	Alkalinity, Total	325.5 mg/l $CaCO_3$		Beryllium	____ mg/l
	Alkalinity, Bicarbonate	____ mg/l $CaCO_3$		Boron	____ mg/l
2.4	Calcium	48.0 mg/l		Cadmium	____ mg/l
0.10	Chloride	3.50 mg/l		Chromium	____ mg/l
	Conductivity	480 umhos/cm		Copper	____ mg/l
	Dissolved Oxygen	____ mg/l		Iron, Dissolved	3.0 mg/l
	Hardness	____ mg/l $CaCO_3$		Lead	____ mg/l
1.25	Magnesium	15.0 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
0.05	Potassium	2.0 mg/l		Zinc	____ mg/l
0.43	Sodium	10.0 mg/l			
	Solids, Total Dissolved	299.0 mg/l			
	Solids, Total Suspended	0.5 mg/l			
	Sulfate	____ mg/l			
	Flouride	0.207 mg/l			
0.20	Sulfate	9.46 mg/l			
	Turbidity	0.3 NTU			
5.34	Bicarb. Alkalinity	325.5 mg/l			

Flow 17 GPM

Temp 48° F

Respectfully submitted

Certified Environmental Laboratory

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

CERTIFICATE OF ANALYSES

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

Sample ID: East Mt. Springs
Burnt tree

Lab. No. 1347
Date Rec'd. 10/09/80
Date Sampled 10/09/80

FLOW: 20 GPM
TEMP: 46°F

	PARAMETER	VALUE	
	pH	7.7	
	Total Alkalinity	303.7	mg $CaCO_3$/L
0.14	Chloride	5.08	mg/l
	Conductivity	490	µmhos/cm
	Flouride	0.217	mg/l
	Total Dissolved Solids	258	mg/l
	Total Suspended Solids	2.5	mg/l
0.47	Sulfate	22.63	mg/l
	Turbidity	0.3	NTU
4.98	Bicarb. Alkalinity	303.7	mg/l
4.28	Calcium	85.6	mg/l
2.98	Magnesium	11.8	mg/l
0.87	Sodium	13.2	mg/l
0.88 0.02	Potassium	0.60	mg/l
	Iron, Dissolved less than	0.05	mg/l

Respectfully Submitted

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1266

SAMPLE ID: E. MT. SPRINGS
BURNT TREE

Date Rec'd. 06-09-80

Date Sampled 6-9-80

Flow 26?
Temp 55

	PARAMETER	VALUE	
	pH	8.0	
	Total Alkalinity	264.4	$mgCaCo_3/L$
0.18	Chloride	6.36	mg/l
	Conductivity	439	Umhos/cm
	Flouride	4.22	mg/l
	Total Dissolved Solids	283	mg/l
	Total Suspended Solids	0.5	mg/l
0.21	Sulfate	9.9	mg/l
	Turbidity	1.9	NTU
4.33	Bicarb. Alkalinity	264.4	mg/l
	Dissolved Iron	HOLD *	
2.65	Calcium	52.9	mg/l
1.66	Magnesium	19.9	mg/l
0.54	Sodium	12.5	mg/l
0.56 0.02	Potassium	0.7	mg/l

*= insufficient sample

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1271
Date Rec'd. 6-10-80 ~~06-09-80~~
Date Sampled 6-10-80

SAMPLE ID: E. MT. SPRINGS
COVE RESEVOIR

Flow 20
Temp 60

	PARAMETER	VALUE	
	pH	8.2	
	Total Alkalinity	265.5	mgCaCo3/L
0.12	Cloride	4.38	mg/l
	Conductivity	580	umhos/cm
	Flouride	4.40	mg/l
	Total Dissolved Solids	319	mg/l
	Total Suspended Solids	5.0	mg/l
0.31	Sulfate	14.8	mg/l
	Turbidity	1.0	NTU
4.35	Bicarb. Alkalinity	265.5	mg/l
	Dissolved Iron	HOLD*	
4.02	Calcium	80.4	mg/l
1.49	Magnesium	17.9	mg/l
0.34	Sodium	7.8	mg/l
0.36 0.02	Potassium	0.8	mg/l

*= insufficient sample

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1287

SAMPLE ID: ELK SPRING
EAST MT. SPRINGS

Date Rec'd. 07-14-80
6-30-80

Date Sampled 07-02-80

FLOW: 583

TEMP: 38°F

	PARAMETER		VALUE	
	pH		7.8	
	Total Alkalinity		228.4	mgCaCo3/L
3% 0.15	Chloride		5.28	mg/l
	Conductivity		490	µmhos/cm
	Flouride		8.30	mg/l
	Total Dissolved Solids		293	mg/l
	Total Suspended Solids		0.5	mg/l
1% 0.02	Sulfate	Less Than	1.0	mg/l
	Turbidity		0.3	NTU
96% 3.74	Bicarb. Alkalinity		228.4	mg/l
58% 2.81	Calcium		56.2	mg/l
34% 1.65	Magnesium		19.8	mg/l
0.37	Sodium		8.5	mg/l
8% 0.40 0.03	Potassium		1.2	mg/l
	Dissolved Iron		0.03	mg/l

Respectfully Submitted

124%

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CERTIFICATE OF ANALYSES

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

Sample ID: East Mt. Springs
Elk Spring

Lab. No. 1348
Date Rec'd. 10/09/80
Date Sampled 10/09/80

FLOW: --
TEMP: 40°F

	PARAMETER	VALUE	
	pH	7.8	
	Total Alkalinity	284.4	mgCaCo$_3$/L
0.11	Chloride	3.96	mg/l
	Conductivity	490	umhos/cm
	Flouride	0.164	mg/l
	Total Dissolved Solids	231	mg/l
	Total Suspended Solids	2.5	mg/l
0.15	Sulfate	7.00	mg/l
	Turbidity	0.2	NTU
4.66	Bicarb. Alkalinity	284.4	mg/l
4.31	Calcium	86.1	mg/l
0.89	Magnesium	10.7	mg/l
0.37	Sodium	8.5	mg/l
0.39 0.02	Potassium	0.73	mg/l
	Iron, Dissolved	0.32	mg/l

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CERTIFICATE OF ANALYSES

For

UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1288

SAMPLE ID: PINE SPRING EAST MT. SPRINGS

Date Rec'd. 07-14-80

Date Sampled 07-02-80

FLOW: 12 GPM
Temp 37° F

	PARAMETER		VALUE	
	pH		7.9	
	Total Alkalinity		200.3	$mgCaCo_3/L$
0.11	Chloride		4.00	mg/l
	Conductivity		410	µmhos/cm
	Flouride		8.22	mg/l
	Total Dissolved Solids		271	mg/l
	Total Suspended Solids		0.5	mg/l
0.02	Sulfate	Less Than	1.0	mg/l
	Turbidity		0.4	NTU
3.28	Bicarb. Alkalinity		200.3	mg/l
3.2	Calcium		63.9	mg/l
0.99	Magnesium		11.9	mg/l
0.28	Sodium		6.5	mg/l
0.30 0.02	Potassium		0.8	mg/l
	Dissolved Iron		0.04	mg/l

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CERTIFICATE OF ANALYSES

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

Lab. No. 1342

Sample ID: East Mt. Springs
Sheba

Date Rec'd. 10/06/80

Date Sampled 10/06/80

FLOW: 2 GPM
TEMP: 44°F

	PARAMETER		VALUE	
	pH		7.6	
	Total Alkalinity		284.4	$mgCaCo_3/L$
0.09	Chloride		3.03	mg/l
	Conductivity		490	µmhos/cm
	Flouride		0.169	mg/l
	Total Dissolved Solids		263	mg/l
	Total Suspended Solids		6.5	mg/l
0.02	Sulfate	less than	1.00	mg/l
	Turbidity		0.4	NTU
4.66	Bicarb. Alkalinity		284.4	mg/l
5.8	Calcium		116.0	mg/l
0.46	Magnesium		5.5	mg/l
0.20	Sodium		4.6	mg/l
0.21 0.01	Potassium		0.26	mg/l
	Iron, Dissolved		0.13	mg/l

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CERTIFICATE OF ANALYSES

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

Lab. No. 1341

Sample ID: East Mt. Springs
Ted's Tub

Date Rec'd. 10/06/80

Date Sampled 10/06/80

FLOW: 6 GPM
TEMP: 40°F

	PARAMETER	VALUE	
	pH	7.8	
	Total Alkalinity	307.3	$mgCaCo_3/L$
0.11	Chloride	3.98	mg/l
	Conductivity	510	umhos/cm
	Flouride	0.198	mg/l
	Total Dissolved Solids	288	mg/l
	Total Suspended Solids	8.0	mg/l
0.21	Sulfate	10.29	mg/l
	Turbidity	0.4	NTU
5.04	Bicarb. Alkalinity	307.3	mg/l
5.26	Calcium	105.1	mg/l
0.79	Magnesium	9.5	mg/l
0.30	Sodium	6.9	mg/l
0.31 0.01	Potassium	0.56	mg/l
	Iron, Dissolved	0.05	mg/l

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For

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FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1285

SAMPLE ID: TEDS TUB EAST MT. SPRINGS

Date Rec'd. 07-14-80

Date Sampled 07-03-80

FLOW: 78 GPM

TEMP: 39° F

	PARAMETER		VALUE	
	pH		7.8	
	Total Alkalinity		231.8	$mgCaCo_3/L$
0.13	Chloride		4.60	mg/l
	Conductivity		500	µmhos/cm
	Flouride		7.87	mg/l
	Total Dissolved Solids		359	mg/l
	Total Suspended Solids		0.5	mg/l
0.08	Sulfate	LESS THAN	1.0	mg/l
	Turbidity		0.3	NTU
3.8	Bicarb. Alkalinity		231.8	mg/l
3.29	Calcium		65.7	mg/l
1.45	Magnesium		17.4	mg/l
0.36	Sodium		8.3	mg/l
0.39 0.03	Potassium		1.0	mg/l
	Dissolved Iron		0.04	mg/l

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CERTIFICATE OF ANALYSES

For

UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1289

SAMPLE ID: 79-1 EAST MT. SPRINGS

Date Rec'd. 07-14-80

Date Sampled ~~07-02-80~~ 6 30 80

FLOW: 130 GPM

TEMP: 40°F

PARAMETER		VALUE	
pH		7.9	
95% 2.77 Total Alkalinity		168.8	$mgCaCo_3/L$
4% 0.12 Chloride		4.38	mg/l
Conductivity		390	µmhos/cm
Flouride		7.98	mg/l
Total Dissolved Solids		285	mg/l
Total Suspended Solids		1.0	mg/l
1% 0.02 Sulfate	Less Than	1.0	mg/l
Turbidity		0.4	NTU
Bicarb. Alkalinity		168.8	mg/l
79% 3.23 Calcium		64.5	mg/l
13% 0.53 Magnesium		6.3	mg/l
0.30 Sodium		6.8	mg/l
5% 0.31 0.02 Potassium		0.6	mg/l
Dissolved Iron		0.02	mg/l

Respectfully Submitted

140 %

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CERTIFICATE OF ANALYSES

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

Sample ID: East Mt. Springs
79-1

Lab. No. 1443
Date Rec'd. 10/06/80
Date Sampled 10/06/80

FLOW: 12 GPM
TEMP: 41°F

	PARAMETER	VALUE	
	pH	7.8	
	Total Alkalinity	220.2	mg $CaCO_3$/L
0.09	Chloride	3.03	mg/l
	Conductivity	390	µmhos/cm
	Flouride	0.146	mg/l
	Total Dissolved Solids	209	mg/l
	Total Suspended Solids	1.5	mg/l
0.09	Sulfate	4.53	mg/l
	Turbidity	0.7	NTU
3.61	Bicarb. Alkalinity	220.2	mg/l
4.84	Calcium	96.8	mg/l
0.31	Magnesium	3.7	mg/l
0.17	Sodium	3.8	mg/l
0.01	Potassium	0.23	mg/l
	Iron, Dissolved	0.05	mg/l

Respectfully Submitted

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1294

SAMPLE ID: EAST MT. SPRINGS
SURGING SPRING
79-2

Date Rec'd. 07-14-80

Date Sampled 07-14-80

FLOW: 7.5 GPM

TEMP: 42°F

	PARAMETER	VALUE	
	pH	7.9	
5.13	Total Alkalinity	312.8	mg$CaCo_3$/L
0.14	Chloride	5.00	mg/l
	Conductivity	510	µmhos/cm
	Flouride	8.04	mg/l
	Total Dissolved Solids	279	mg/l
	Total Suspended Solids	Less Than 0.5	mg/l
0.06	Sulfate	2.9	mg/l
	Turbidity	0.4	NTU
	Bicarb. Alkalinity		
	Dissolved Iron	.03	mg/l
2.78	Calcium	55.5	mg/l
1.60	Magnesium	19.2	mg/l
0.34	Sodium	7.8	mg/l
0.03	Potassium	1.2	mg/l

Respectfully Submitted

CERTIFICATE OF ANALYSIS

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

Lab. No. 1374

Date Rec. 11/07/80

Date Sampled 11/07/80

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

Sample ID East Mt. Springs 79-2

	pH	7.0 Units	
	Alkalinity, Total	335.2 mg/l $CaCo_3$	
5.5	Alkalinity, Bicarbonate	335.2 mg/l $CaCo_3$	
.05	Calcium	61.0 mg/l	
<.10	Chloride	3.46 mg/l	
	Conductivity	490 umhos/cm	
	Dissolved Oxygen	____ mg/l	
	Hardness	____ mg/l $CaCo_3$	
	Magnesium	14.0 mg/l	
	Nitrogen, Nitrate	____ mg/l	
	Phosphorus, Total	____ mg/l	
	Phosphorus, Ortho	____ mg/l	
0.05	Potassium	2.0 mg/l	
.39	Sodium	9.0 mg/l	
	Solids, Total Dissolved	292.0 mg/l	
	Solids, Total Suspended	0.5 mg/l	
.09	Sulfate	4.12 mg/l	
	Flouride	0.141 mg/l	
	Turbidity	0.3 NTU	

Arsenic	____	mg/l
Beryllium	____	mg/l
Boron	____	mg/l
Cadmium	____	mg/l
Chromium	____	mg/l
Copper	____	mg/l
Iron, Dissolved	3.0	mg/l
Lead	____	mg/l
Manganese	____	mg/l
Mercury	____	µg/l
Nickel	____	mg/l
Selenium	____	mg/l
Zinc	____	mg/l

Flow 2.5 GPM

Temp 44° F

Respectfully submitted

Certified Environmental Laboratory

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CERTIFICATE OF ANALYSES

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

Lab. No. 1320

Sample ID: UP&L East Mountain Springs
Flow: 1.2 GPM 79-4
Temp: 48°F

Date Rec'd. 08/27/80

Date Sampled 08/27/80

	PARAMETER	VALUE	
	pH	7.5	
	Total Alkalinity	340.2	mgCaCo3/L
0.08	Chloride	2.71	mg/l
	Conductivity	400	µmhos/cm
	Flouride	.227	mg/l
	Total Disolved Solids	237	mg/l
	Total Suspended Solids	842	mg/l
0.13	Sulfate	6.17	mg/l
	Turbidity (Greater Than)	1,000	NTU
5.58	Bicarb. Alkalinity	340.2	mg/l
8.78	Calcium	175.5	mg/l
0.98	Magnesium	11.7	mg/l
0.08	Sodium	1.90	mg/l
0.14 0.05	Potassium	2.10	mg/l
	Dissolved Iron	4.07	mg/l

Respectfully Submitted Day A Jim IE

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CERTIFICATE OF ANALYSES

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

Lab. No. 1321

Sample ID: UP&L East Mountain Springs
Flow: 1.5 GPM 79-8
Temp: 46°F

Date Rec'd. 08/27/80

Date Sampled 08/26/80

	PARAMETER	VALUE	
	pH	7.9	
	Total Alkalinity	271.8	$mgCaCo_3/L$
0.14	Chloride	4.93	mg/l
	Conductivity	460	μmhos/cm
	Flouride	.212	mg/l
	Total Dissolved Solids	206	mg/l
	Total Suspended Solids	247	mg/l
0.18	Sulfate	8.64	mg/l
	Turbidity	56	NTU
4.46	Bicarb. Alkalinity	271.8	mg/l
7.59	Calcium	151.7	mg/l
1.78	Magnesium	21.4	mg/l
0.15	Sodium	3.50	mg/l
0.17 0.02	Potassium	0.70	mg/l
	Dissolved Iron	1.23	mg/l

Respectfully Submitted [signature]

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CERTIFICATE OF ANALYSES

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

Lab. No. 1322
Date Rec'd. 08/27/80
Date Sampled 08/26/80

Sample ID: UP&L East Mountain Springs
Flow: 1.5 GPM 79-9
Temp: 48°F

	PARAMETER	VALUE	
	pH	7.4	
	Total Alkalinity	230.1	$mgCaCo_3/L$
0.20	Chloride	7.18	mg/l
	Conductivity	490	µmhos/cm
	Flouride	.198	mg/l
	Total Dissolved Solids	240	mg/l
	Total Suspended Solids	4.0	mg/l
0.04	Sulfate	2.06	mg/l
	Turbidity	.34	NTU
3.77	Bicarb. Alkalinity	230.1	mg/l
2.42	Calcium	48.3	mg/l
1.68	Magnesium	20.1	mg/l
0.24	Sodium	5.60	mg/l
0.25 0.01	Potassium	0.30	mg/l
	Dissolved Iron (Less Than)	0.05	mg/l

Respectfully Submitted [illegible]

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CERTIFICATE OF ANALYSES

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

Lab. No. 1326

Sample ID: UP&L East Mountain Springs 80-[redacted]10
Flow: 15 GPM
Temp: 42°F

Date Rec'd. 08/27/80

Date Sampled 08/26/80

	PARAMETER	VALUE	
	pH	7.8	
	Total Alkalinity	270.7	mg $CaCo_3$/L
0.20	Chloride	7.04	mg/l
	Conductivity	500	umhos/cm
	Flouride	.135	mg/l
	Total Dissolved Solids	265	mg/l
	Total Suspended Solids	22.0	mg/l
0.24	Sulfate	11.52	mg/l
	Turbidity	5.0	NTU
4.44	Bicarb. Alkalinity	270.7	mg/l
3.32	Calcium	66.4	mg/l
1.45	Magnesium	17.4	mg/l
0.20	Sodium	4.70	mg/l
0.12	Potassium	1.50	mg/l
0.32	Total Dissolved Iron		

Respectfully Submitted [signature]

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1301

SAMPLE ID: EAST MT. SPRINGS
79-11

Date Rec'd. 07-15-80

Date Sampled 07-15-80

FLOW: 5 GPM

TEMP: 40°F

PARAMETER		VALUE	
pH		8.2	
Total Alkalinity		318.4	$mgCaCo_3/L$
Chloride		10.9	mg/l
Conductivity		510	umhos/cm
Flouride		8.46	mg/l
Total Dissolved Solids		276	mg/l
Total Suspended Solids		120.5	mg/l
Sulfate	less than	0.3	mg/l
Turbidity		6.3	NTU
Dissolved Iron		.54	mg/l
Calcium		53.1	mg/l
Magnesium		24.1	mg/l
Sodium		10.4	mg/l
Potassium		3.5	mg/l

Respectfully Submitted

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CERTIFICATE OF ANALYSES

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

Lab. No. 1333

Sample ID: UP&L East Mountain Springs 79-15

Date Rec'd. 09/26/80

Date Sampled 09/25/80

Flow: 5 GPM
Temp: 43°F

PARAMETER		VALUE	
pH		7.7	
Total Alkalinity		319.4	mg $CaCO_3$/L
Conductivity		490	µmhos/cm
Flouride		0.219	mg/l
Total Dissolved Solids		285	mg/l
Total Suspended Solids		0.5	mg/l
Sulfate	Less Than	1.0	mg/l
Turbidity		0.4	NTU
Bicarb. Alkalinity		319.4	mg/l
Calcium		118.0	mg/l
Magnesium		20.0	mg/l
Sodium		5.8	mg/l
Potassium		0.45	mg/l
Dissolved Iron		0.04	mg/l

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CERTIFICATE OF ANALYSES

For Utah Power & Light co.
Mining & Exploration Field Office
Industrial Training Center
Huntington, Utah 84528

Lab. No. 1323

Sample ID: UP&L East Mountain Springs
Flow: 0.5 GPM 79-17
Temp: 44°F

Date Rec'd. 08/27/80

Date Sampled 08/26/80

	PARAMETER	VALUE	
	pH	8.0	
	Total Alkalinity	298.5	$mgCaCo_3/L$
0.14	Chloride	4.94	mg/l
	Conductivity	500	µmhos/cm
	Flouride	.114	mg/l
	Total Dissolved Solids	269	mg/l
	Total Suspended Solids	242	mg/l
0.23	Sulfate	11.11	mg/l
	Turbidity (Greater than)	1,000	NTU
4.89	Bicarb. Alkalinity	298.5	mg/l
5.53	Calcium	110.6	mg/l
1.60	Magnesium	19.2	mg/l
0.16	Sodium	3.60	mg/l
0.17 0.02	Potassium	0.60	mg/l
	Dissolved Iron	2.06	mg/l

Respectfully Submitted

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CERTIFICATE OF ANALYSES

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

Lab. No. 1324

Sample ID: UP&L East Mountain Springs 79-18
Flow: 17 GPM
Temp: 42°F

Date Rec'd. 08/27/80

Date Sampled 08/27/80

	PARAMETER	VALUE	
	pH	7.6	
	Total Alkalinity	262.2	$mgCaCo_3/L$
0.12	Chloride	4.13	mg/l
	Conductivity	490	µmhos/cm
	Flouride	.212	mg/l
	Total Dissolved Solids	228	mg/l
	Total Suspended Solids	10.0	mg/l
0.20	Sulfate	9.46	mg/l
	Turbidity	1.6	NTU
4.30	Bicarb. Alkalinity	262.2	mg/l
3.7	Calcium	73.9	mg/l
1.23	Magnesium	14.7	mg/l
0.12	Sodium	2.70	mg/l
0.14 / 0.02	Potassium	0.70	mg/l
	Dissolved Iron	0.10	mg/l

Respectfully Submitted

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1272

SAMPLE ID: E. MT. SPRINGS 79-23

Date Rec'd. ~~06-09-80~~ 6-10-80

Date Sampled 6-10-80

	PARAMETER	VALUE	
	pH	8.3	
4.67	Total Alkalinity	284.6	$mgCaCo_3/L$
0.39	Chloride	13.9	mg/l
	Conductivity	419	µmhos/cm
	Flouride	4.41	mg/l
	Total Dissolved Solids	331	mg/l
	Total Suspended Solids	8.5	mg/l
0.19	Sulfate	9.0	mg/l
	Turbidity	3.7	NTU
	Bicarb. Alkalinity	284.6	mg/l
	Dissolved Iron	HOLD*	
3.32	Calcium	66.3	mg/l
1.88	Magnesium	22.5	mg/l
0.65	Sodium	14.9	mg/l
0.07 0.03	Potassium	0.7	mg/l

*= insufficient sample

Respectfully Submitted

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1302

SAMPLE ID: EAST MT. SPRINGS
79-25

Date Rec'd. 07-15-80

Date Sampled 07-15-80

FLOW: 8 GPM

TEMP: 42°F

PARAMETER	VALUE	
pH	7.8	
Total Alkalinity	379.1	mgCaCo3/L
Chloride	15.2	mg/l
Conductivity	690	umhos/cm
Flouride	8.78	mg/l
Total Dissolved Solids	387	mg/l
Total Suspended Solids	less than 0.5	mg/l
Sulfate	55.1	mg/l
Turbidity	0.4	NTU
Dissolved Iron	.03	mg/l
Calcium	57.1	mg/l
Magnesium	22.9	mg/l
Sodium	10.8	mg/l
Potassium	1.6	mg/l

20% 6.21
6% 0.43
15% 1.15
54% 2.86
36% 1.91
0.47
10% 0.51
0.04

Respectfully Submitted

GEK

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1265

SAMPLE ID: E. MT. SPRINGS
79-26

Date Rec'd. 06-09-80

Date Sampled 6-9-80

Temp 54°F

	PARAMETER	VALUE	
	pH	8.2	
3.95	Total Alkalinity	240.8	mgCaCo3/L
0.25	Chloride	8.95	mg/l
	Conductivity	432	Umhos/cm
	Flouride	4.29	mg/l
	Total Dissolved Solids	242	mg/l
	Total Suspended Solids	9.0	mg/l
0.28	Sulfate	13.6	mg/l
	Turbidity	2.0	NTU
	Bicarb Alkalinity	240.8	mg/l
	Dissolved Iron	HOLD*	
2.98	Calcium	59.6	mg/l
1.60	Magnesium	19.2	mg/l
0.51	Sodium	11.7	mg/l
0.55 0.04	Potassium	1.6	mg/l

*= insufficient sample

Respectfully Submitted

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CERTIFICATE OF ANALYSES

For UTAH POWER & LIGHT CO.
MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1264

SAMPLE ID: E. MT. SPRINGS
79-27

Date Rec'd. 06-09-80

Date Sampled 6-5-80

Temp 55°F

	PARAMETER	VALUE	
	pH	8.1	
	Total Alkalinity	280.1	mgCaCo3/L
0.22	Chloride	7.98	mg/l
	Conductivity	440	µmhos/cm
	Flouride	4.36	mg/l
	Total Dissolved Solids	255	mg/l
	Total Suspended Solids	40.5	mg/l
0.28	Sulfate	13.6	mg/l
	Turbidity	6.5	NTU
4.59	Bicarb. Alkalinity	280.1	mg/l
	Dissolved Iron	HOLD *	
2.99	Calcium	59.7	mg/l
1.78	Magnesium	21.3	mg/l
0.66	Sodium	15.1	mg/l
0.71 0.05	Potassium	2.1	mg/l

*= insufficient sample

Respectfully Submitted

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1267

sample ID: E. MT. SPRINGS
FLAG LAKE 79-28

Date Rec'd. 06-09-80

Date Sampled 6-9-80

Flow 43
Temp 4C

	PARAMETER	VALUE	
	pH	8.4	
4.19	TOTAL ALKALINITY	255.4	mg$CaCo_3$/L
0.48	CHLORIDE	17.0	mg/l
	CONDUCTIVITY	590	Umhos/cm
	FLOURIDE	4.42	mg/l
	TOTAL DISSOLVED SOLIDS	354	mg/l
	TOTAL SUSPENDED SOLIDS	2.0	mg/l
0.81	SULFATE	39.1	mg/l
	TURBIDITY	2.6	NTU
4.08	BICARB. ALKALINITY	248.64	mg/l
	DISSOLVED IRON	HOLD*	
2.67	CALCIUM	53.4	mg/l
1.75	MAGNESIUM	21.0	mg/l
0.96	SODIUM	22.1	
0.99 0.03	POTASSIUM	1.0	mg/l

*= insufficient sample

Respectfully Submitted

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CERTIFICATE OF ANALYSES

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

Sample ID: East Mt. Springs
79-28

Lab. No. 1346
Date Rec'd. 10/09/80
Date Sampled 10/09/80

FLOW: 7.5 GPM
TEMP: 42° F

	PARAMETER		VALUE	
	pH		7.7	
	Total Alkalinity		301.3	mg $CaCO_3$/L
0.47	Chloride		16.6	mg/l
	Conductivity		690	µmhos/cm
	Flouride		0.367	mg/l
	Total Dissolved Solids		380	mg/l
	Total Suspended Solids		7.0	mg/l
1.82	Sulfate		87.24	mg/l
	Turbidity		0.5	NTU
4.94	Bicarb. Alkalinity		301.3	mg/l
3.42	Calcium		68.4	mg/l
0.98	Magnesium		11.8	mg/l
1.77	Sodium		40.6	mg/l
0.04	Potassium		1.6	mg/l
	Iron, Dissolved	less than	0.05	mg/l

Respectfully Submitted

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

SAMPLE ID: EAST MT. SPRINGS
79-29

Lab. No. 1296
Date Rec'd. ~~07-14-80~~ 7-15-80
Date Sampled ~~07-14-80~~ 7-15-80

FLOW: 6 GPM

TEMP: 40°F

PARAMETER	VALUE	
pH	8.3	
Total Alkalinity	284.6	mgCaCo3/L
Chloride	25.2	mg/l
Conductivity	580	µmhos/cm
Flouride	8.31	mg/l
Total Dissolved Solids	297	mg/l
Total Suspended Solids	12.5	mg/l
Sulfate	17.7	mg/l
Turbidity	2.2	NTU
Dissolved Iron	.11	mg/l
Calcium	31.9	mg/l
Magnesium	24.5	mg/l
Sodium	21.8	mg/l
Potassium	2.0	mg/l

89% 4.67
c 4% 0.20
7% 0.37
34% 1.60
44% 2.04
0.95
22% 1.0
0.05

Respectfully Submitted

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CERTIFICATE OF ANALYSES

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

Lab. No. 1325

Sample ID: UP&L East Mountain Springs
Flow: 2.0 GPM 79-30
Temp: 55°F

Date Rec'd. 08/27/80

Date Sampled 08/27/80

	PARAMETER	VALUE	
	pH	8.0	
	Total Alkalinity	390.6	$mgCaCo_3/L$
0.50	Chloride	17.8	mg/l
	Conductivity	800	umhos/cm
	Flouride	.122	mg/l
	Total Dissolved Solids	461	mg/l
	Total Suspended Solids	41.0	mg/l
1.51	Sulfate	72.42	mg/l
	Turbidity	16.0	NTU
6.40	Bicarb. Alkalinity	390.6	mg/l
4.96	Calcium	99.1	mg/l
1.94	Magnesium	23.3	mg/l
0.65	Sodium	15.0	mg/l
0.70 0.04	Potassium	1.90	mg/l
	Total Dissolved Iron	0.19	mg/l

Respectfully Submitted

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CERTIFICATE OF ANALYSES

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

Lab. No. 1345

Sample ID: East Mt. Springs
79-32

Date Rec'd. 10/09/80

Date Sampled 10/09/80

FLOW: 1.5 GPM
TEMP: 46°F

	PARAMETER	VALUE	
	pH	7.6	
8.03	Total Alkalinity	490.1	mg$CaCo_3$/L
0.58	Chloride	20.6	mg/l
	Conductivity	910	umhos/cm
	Flouride	0.280	mg/l
	Total Dissolved Solids	506	mg/l
	Total Suspended Solids	19.0	mg/l
1.13	Sulfate	54.32	mg/l
	Turbidity	14.0	NTU
	Bicarb. Alkalinity	490.1	mg/l
6.19	Calcium	123.7	mg/l
1.18	Magnesium	14.2	mg/l
1.21	Sodium	27.9	mg/l
1.27 0.05	Potassium	2.1	mg/l
	Iron, Dissolved	0.15	mg/l

Respectfully Submitted

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

CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1303

SAMPLE ID: EAST MT. SPRINGS
79-32

Date Rec'd. 07-15-80

Date Sampled 07-15-80

FLOW: 3 GPM

TEMP: 52°F

PARAMETER	VALUE	
pH	7.9	
Total Alkalinity	364.5	$mgCaCo_3/L$
Chloride	28.70	mg/l
Conductivity	890	umhos/cm
Flouride	8.36	mg/l
Total Dissolved Solids	494	mg/l
Total Suspended Solids	7.5	mg/l
Sulfate	65.0	mg/l
Turbidity	2.6	NTU
Dissolved Iron	.08	mg/l
Calcium	54.7	mg/l
Magnesium	26.6	mg/l
Sodium	23.1	mg/l
Potassium	2.5	mg/l

Respectfully Submitted

STANDARD LABORATORIES, INC.
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CERTIFICATE OF ANALYSES

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

Lab. No. 1334

Sample ID: UP&L East Mountain Springs 79-34

Date Rec'd. 09/26/80

Date Sampled 09/25/80

Flow: 5 GPM
Temp: 44 F

	PARAMETER	VALUE	
	pH	7.4	
	Total Alkalinity	376.3	$mgCaCo_3/L$
	Conductivity	610	µmhos/cm
	Flouride	0.214	mg/l
	Total Dissolved Solids	352	mg/l
	Total Suspended Solids	14.0	mg/l
0.41	Sulfate	19.75	mg/l
	Turbidity	2.7	NTU
6.17	Bicarb. Alkalinity	376.3	mg/l
6.5	Calcium	130.0	mg/l
2.18	Magnesium	26.2	mg/l
0.88	Sodium	20.3	mg/l
0.91			
0.02	Pottassium	0.93	mg/l
	Dissolved Iron	0.10	mg/l

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1286

SAMPLE ID: [redacted] 79-39 EAST MT. SPRINGS

Date Rec'd. 07-14-80

Date Sampled 07-03-80

FLOW: 18 GPM

TEMP: 54° F

	PARAMETER		VALUE	
	pH		8.1	
	Total Alkalinity		241.9	$mgCaCo_3/L$
0.18	Chloride		6.31	mg/l
	Conductivity		500	µmhos/cm
	Flouride		7.83	mg/l
	Total Dissolved Solids		367	mg/l
	Total Suspended Solids		2.0	mg/l
0.02	Sulfate	LESS THAN	1.0	mg/l
	Turbidity		2.1	NTU
3.97	Bicarb. Alkalinity		241.9	mg/l
3.14	Calcium		63.1	mg/l
1.53	Magnesium		18.3	mg/l
0.45	Sodium		10.4	mg/l
0.50 0.04	Potassium		1.7	mg/l
	Dissolved Iron		0.03	mg/l

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1269

SAMPLE ID: E. MT. SPRINGS
LEFT FORK GRIMES WASH
ABOVE 79-40

Date Rec'd. ~~06-09-80~~ 6-10-80

Date Sampled 6-10-80

	PARAMETER	VALUE	
	pH	8.4	
	Total Alkalinity	250.9	mg$CaCo_3$/L
0.17	Chloride	6.19	mg/l
	Conductivity	590	Umhos/cm
	Flouride	4.48	mg/l
	Total Dissolved Solids	333	mg/l
	Total Suspended Solids	2.0	mg/l
0.09	Sulfate	4.1	mg/l
	Turbidity	1.9	NTU
4.0	Bicarb. Alkalinity	244.1	mg/l
	Dissolved Iron	HOLD*	
3.58	Calcium	71.6	mg/l
1.53	Magnesium	18.3	mg/l
0.51	Sodium	11.8	mg/l
0.54			
0.03	Potassium	1.0	mg/l

*= insufficient sample

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CERTIFICATE OF ANALYSIS

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

Lab. No. 1372

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

Date Rec. 11/07/80

Date Sampled 11/07/80

Sample ID East Mt. Springs 80-41

pH	7.4 Units	Arsenic	mg/l
Alkalinity, Total	405.4 mg/l $CaCO_3$	Beryllium	mg/l
Alkalinity, Bicarbonate	mg/l $CaCO_3$	Boron	mg/l
.15 Calcium	63.0 mg/l	Cadmium	mg/l
.016 Chloride	5.66 mg/l	Chromium	mg/l
Conductivity	600 umhos/cm	Copper	mg/l
Dissolved Oxygen	mg/l	Iron, Dissolved	3.0 mg/l
Hardness	mg/l $CaCO_3$	Lead	mg/l
Magnesium	14.0 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
.005 Potassium	2.0 mg/l	Zinc	mg/l
61 Sodium	14.0 mg/l		
Solids, Total Dissolved	396.0 mg/l		
Solids, Total Suspended	1.0 mg/l		
Sulfate	mg/l		
Flouride	0.208 mg/l		
.42 Sulfate	20.16 mg/l		
Turbidity	0.3 NTU		
65 Bicarb. Alkalinity	405.4 mg/l		

Flow 5 GPM

Temp 40° F

Respectfully submitted

Certified Environmental Laboratory

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1270
Date Rec'd. 6-10-80 ~~06-09-80~~
Date Sampled 6-10-80

SAMPLE ID: E. MT. SPRINGS 80-41

Flow 14 GPM
Temp 36

	PARAMETER	VALUE	
	pH	8.0	
4.81	Total Alkalinity	293.6	mgCaCo$_3$/L
0.37	Chloride	13.3	mg/l
	Conductivity	800	umhos/cm
	Flouride	4.35	mg/l
	Total Dissolved Solids	448	mg/l
	Total Suspended Solids	32.5	mg/l
1.46	Sulfate	70.0	mg/l
	Turbidity	4.3	NTU
	Bicarb. Alkalinity	293.6	mg/l
	Dissolved Iron	HOLD*	
4.48	Calcium	89.5	mg/l
1.97	Magnesium	23.6	mg/l
0.76	Sodium	17.4	mg/l
0.77 0.03	Potassium	0.6	mg/l

*= insufficient sample

Respectfully Submitted

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1297

SAMPLE ID: EAST MT. SPRINGS
80-42

Date Rec'd. 07-14-80

Date Sampled 07-14-80

FLOW: 5.7 GPM

TEMP: 67°F

PARAMETER	VALUE	
pH	8.1	
Total Alkalinity	369.0	mg$CaCo_3$/L
Chloride	7.64	mg/l
Conductivity	600	umhos/cm
Flouride	8.35	mg/l
Total Dissolved Solids	329	mg/l
Total Suspended Solids	Less Than 0.5	mg/l
Sulfate	12.8	mg/l
Turbidity	0.5	NTU
Dissolved Iron	105	mg/l
Calcium	59.4	mg/l
Magnesium	21.2	mg/l
Sodium	7.3	mg/l
Potassium	2.2	mg/l

Respectfully Submitted

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For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1298

SAMPLE ID: EAST MT. SPRINGS
80-43

Date Rec'd. 07-14-80

Date Sampled 07-14-80

FLOW: 10 GPM

TEMP: 42°F

	PARAMETER		VALUE	
	pH		7.9	
5.11	Total Alkalinity		311.6	mgCaCo3/L
0.19	Chloride		6.67	mg/l
	Conductivity		505	µmhos/cm
	Flouride		8.40	mg/l
	Total Dissolved Solids		279	mg/l
	Total Suspended Solids	less than	0.5	mg/l
0.17	Sufate		8.2	mg/l
	Turbidity		0.4	NTU
	Dissolved Iron		102	mg/l
2.42	Calcium		48.3	mg/l
1.70	Magnesium		20.4	mg/l
0.25	Sodium		5.7	mg/l
0.29	0.05 Potassium		1.8	mg/l

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FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1299

SAMPLE ID: EAST MT. SPRINGS
80-44

Date Rec'd. 07-14-80

Date Sampled 07-14-80

FLOW: 20 GPM

TEMP: 41°F

PARAMETER	VALUE	
pH	8.1	
6.73 Total Alkalinity	410.6	mgCaCo3/L
0.46 Chloride	16.4	mg/l
Conductivity	820	µmhos/cm
Flouride	8.51	mg/l
Total Dissolved Solids	476	mg/l
Total Suspended Solids	1.0	mg/l
1.66 Sulfate	79.8	mg/l
Turbidity	0.6	NTU
Dissolved Iron	.08	mg/l
3.39 Calcium	67.8	mg/l
2.09 Magnesium	25.1	mg/l
0.77 Sodium	17.7	mg/l
0.85 0.06 Potassium	2.2	mg/l

Respectfully Submitted _____

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For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1300

SAMPLE ID: EAST MT. SPRINGS
80-45

Date Rec'd. 07-14-80

Date Sampled 07-14-80

FLOW: 12 GPM

TEMP: 42°F

	PARAMETER	VALUE	
	pH	7.8	
6.46	Total Alkalinity	393.8	mgCaCo3/L
0.50	Chloride	17.9	mg/l
	Conductivity	790	µmhos/cm
	Flouride	8.55	mg/l
	Total Dissolved Solids	445	mg/l
	Total Suspended Solids	45.0	mg/l
1.0	Sulfate	48.1	mg/l
	Turbidity	5.4	NTU
	Dissolved Iron	.28	mg/l
3.30	Calcium	66.0	mg/l
2.02	Magnesium	24.2	mg/l
0.65	Sodium	15.0	mg/l
0.72 0.07	Potassium	2.7	mg/l

Respectfully Submitted

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 East Mt. Springs 80-46

Lab. No. 1373

Date Rec. 11/07/80

Date Sampled 11/07/80

pH	7.1 Units	Arsenic	mg/l
Alkalinity, Total	341.2 mg/l $CaCO_3$	Beryllium	mg/l
Alkalinity, Bicarbonate	mg/l $CaCO_3$	Boron	mg/l
75 Calcium	55.0 mg/l	Cadmium	mg/l
0.10 Chloride	3.69 mg/l	Chromium	mg/l
Conductivity	490 umhos/cm	Copper	mg/l
Dissolved Oxygen	mg/l	Iron, Dissolved	3.0 mg/l
Hardness	mg/l $CaCO_3$	Lead	mg/l
Magnesium	15.0 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
0.6 Potassium	2.0 mg/l	Zinc	mg/l
0.13 Sodium	10.0 mg/l		
Solids, Total Dissolved	310.0 mg/l		
Solids, Total Suspended	6.5 mg/l		
0.22 Sulfate	10.70 mg/l		
Flouride	0.154 mg/l		
Turbidity	0.8 NTU		
5.59 Bicarb. Alkalinity	341.2 mg/l		

Flow 6 GPM

Temp 41 °F

Respectfully submitted

Certified Environmental Laboratory

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1295

SAMPLE ID: EAST MT. SPRINGS
~~79-21~~
80-46

Date Rec'd. 07-14-80

Date Sampled 07-14-80

FLOW: 31 GPM

TEMP: 40°F

	PARAMETER	VALUE	
	pH	7.9	
4.98	Total Alkalinity	303.8	mgCaCo3/L
0.24	Chloride	8.46	mg/l
	Conductivity	505	µmhos/cm
	Flouride	8.31	mg/l
	Total Dissolved Solids	281	mg/l
	Total Suspended Solids	2.5	mg/l
<.21	Sulfate	10.3	mg/l
	Turbidity	0.6	NTU
	Dissolved Iron	.03	mg/l
2.27	Calcium	45.3	mg/l
2.13	Magnesium	25.5	mg/l
0.37	Sodium	8.5	mg/l
0.42 0.05	Potassium	1.8	mg/l

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CERTIFICATE OF ANALYSES

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

Sample ID: East Mt. Springs
80-49

Lab. No. 1344
Date Rec'd. 10/09/80
Date Sampled 10/09/80

FLOW: 4 GPM
TEMP: 44°F

	PARAMETER	VALUE	
	pH	7.7	
	Total Alkalinity	404.1	mg $CaCO_3$/L
0.19	Chloride	6.91	mg/l
	Conductivity	700	µmhos/cm
	Flouride	0.169	mg/l
	Total Dissolved Solids	392	mg/l
	Total Suspended Solids	14.0	mg/l
0.82	Sulfate	39.50	mg/l
	Turbidity	3.5	NTU
6.62	Bicarb. Alkalinity	404.1	mg/l
6.41	Calcium	128.1	mg/l
1.10	Magnesium	13.2	mg/l
0.41	Sodium	9.5	mg/l
0.44 0.03	Potassium	1.09	mg/l
	Iron, Dissolved	0.08	mg/l

Respectfully Submitted

APPENDIX J

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

CERTIFICATE OF ANALYSES

For Utah Power & Light
Mining & Exploration Field Offic3
Industrial Training Center
Huntington, Utah 84528

Lab. No. W - 1148

Date Rec'd. 03-24-80

Date Sampled

Wilberg INx41 IR
[redacted] Flow 1.3 gpm
Temp. 54 F

Parameter	Value	
pH	7.6	
Alkalinity, Tot.	378.6	mg/l
Oil & Grease	0.6	mg/l
TDS	594.0	mg/l
TSS	0.2	mg/l
Sulfate	158.8	mg/l
Turbidity	0.258	NTU
Iron	0.19	mg/l

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CERTIFICATE OF ANALYSES

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

Wilberg IN x 42 IL

Lab. No. W - 1149

Date Rec'd. 03-24-80

Date Sampled

Parameter	Value	
pH	7.6	
Alkalinity, Tot.	277.9	mg/l
Oil & Grease	< 0.1	mg/l
TDS	519.0	mg/l
TSS	3.2	mg/l
Sulfate	174.4	mg/l
Turbidity	5.4	NTU
Iron	1.03	mg/l

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CERTIFICATE OF ANALYSES

For UP&L MINING & EXPLORATION
FIELD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1283

SAMPLE ID: In 23-24 IL
Wilberg In-Mine

Date Rec'd. 07-14-80

Date Sampled 07-07-80

FLOW: 0.5 GPM

TEMP: 51° F

	PARAMETER	VALUE	
	pH	8.0	
0.38	Chloride	13.4	mg/l
	Conductivity	890	µmhos/cm
	Oil & Grease	0.8	mg/l
	Total Dissolved Solids	496	mg/l
	Total Suspended Solids	1.0	mg/l
3.32	Sulfate	159.3	mg/l
	Turbidity	0.9	NTU
4.37	Bicarb. Alkalinity	266.6	mg/l
3.75	Calcium	75.0	mg/l
2.28	Magnesium	27.3	mg/l
1.06	Sodium	24.3	mg/l
0.10	Potassium	3.9	mg/l

1.16

Respectfully Submitted

89%

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CERTIFICATE OF ANALYSES

For

UP&L Mining & Exploration
Field Office
Industrial Training Center
Huntington, Utah 84528

Lab. No. 1309

Sample ID: Wilberg In Mine
4EX42 IL

Date Rec'd. 07-30-80

Date Sampled 07-30-80

	Parameter	Value	
	pH	7.5	
	Total Alkalinity	534.38	$mgCaCo_3/L$
0.47	Chloride	16.6	mg/l
	Conductivity	1810	µmhos/cm
	Total Dissolved Solids	1320.0	mg/l
	Total Suspended Solids	0.5	mg/l
11.92	Sulfate	571.99	mg/l
8.76	Bicarb. Alkalinity	534.38	mg/l
10.43	Calcium	208.6	mg/l
2.69	Magnesium	32.3	mg/l
0.76	Sodium	17.4	mg/l
0.86			
0.10	Potassium	3.9	mg/l

Respectfully Submitted

1 day off

CERTIFICATE OF ANALYSIS

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

Lab. No. 1405

FOR Utah Power & Light Co.
Mining & Exploration

Date Rec. 11-17-80

Date Sampled 11-17-80

Sample ID Wilberg Mine 4E x 41 1R

pH	7.0 Units	Arsenic	____ mg/l
Alkalinity, Total	____ mg/l $CaCo_3$	Beryllium	____ mg/l
8.7 Alkalinity, Bicarbonate	534.0 mg/l $CaCo_3$	Boron	____ mg/l
13.05 Calcium	261.0 mg/l	Cadmium	____ mg/l
0.05 Chloride	1.60 mg/l	Chromium	____ mg/l
Conductivity	2000 umhos/cm	Copper	____ mg/l
Dissolved Oxygen	____ mg/l	Iron	____ mg/l
Hardness	____ mg/l $CaCo_3$	Lead	____ mg/l
1.25 Magnesium	15.0 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
0.83 0.05 Potassium	2.0 mg/l	Zinc	____ mg/l
0.78 Sodium	18.0 mg/l		
Solids, Total Dissolved	1598.0 mg/l	Temperature	47 F
Solids, Total Suspended	9.5 mg/l	Flow	0.2 GPM
13.35 Sulfate	640.7 mg/l		

68 %

Respectfully submitted Roy A. [illegible]

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 1406

FOR Utah power & Light Co.
Mining & Exploration

Date Rec. 11-17-80

Date Sampled 11-17-80

Sample ID Wilberg Mine 3S Drill Hole

pH	7.8 Units	Arsenic	____ mg/l
Alkalinity, Total	____ mg/l $CaCo_3$	Beryllium	____ mg/l
6.03 Alkalinity, Bicarbonate	368.0 mg/l $CaCo_3$	Boron	____ mg/l
.4 Calcium	108.0 mg/l	Cadmium	____ mg/l
0.03 Chloride	0.89 mg/l	Chromium	____ mg/l
Conductivity	920 µmhos/cm	Copper	____ mg/l
Dissolved Oxygen	____ mg/l	Iron	____ mg/l
Hardness	____ mg/l $CaCo_3$	Lead	____ mg/l
Magnesium	13.0 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
0.08 Potassium	3.0 mg/l	Zinc	____ mg/l
.87 Sodium	20.0 mg/l		
Solids, Total Dissolved	602.0 mg/l		
Solids, Total Suspended	8.0 mg/l		
2.4 Sulfate	115.2 mg/l		

Temperature 58 F

Flow 0.2 GPM

Respectfully submitted

88%

Certified Environmental Laboratory

CERTIFICATE OF ANALYSIS

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

Lab. No. 1407

FOR Utah Power & Light Co.
Mining & Exploration

Date Rec. 11-17-80

Date Sampled 11-17-80

Sample ID Wilberg Mine 1N x 46 1R

pH	7.4 Units	Arsenic	mg/l
Alkalinity, Total	mg/l $CaCO_3$	Beryllium	mg/l
5.15 Alkalinity, Bicarbonate	314.0 mg/l $CaCO_3$	Boron	mg/l
6.95 Calcium	139.0 mg/l	Cadmium	mg/l
0.04 Chloride	1.27 mg/l	Chromium	mg/l
Conductivity	1000 umhos/cm	Copper	mg/l
Dissolved Oxygen	mg/l	Iron	mg/l
Hardness	mg/l $CaCO_3$	Lead	mg/l
1.17 Magnesium	14.0 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
0.003 Potassium	1.0 mg/l	Zinc	mg/l
0.74 Sodium	17.0 mg/l		
Solids, Total Dissolved	700.0 mg/l	Temperature	45 F
Solids, Total Suspended	7.0 mg/l	Flow	0.6 GPM
4.41 Sulfate	211.5 mg/l		

Respectfully submitted

93.90

Certified Environmental Laboratory

APPENDIX K

STANDARD LABORATORIES, INC.
UTAH POWER & LIGHT

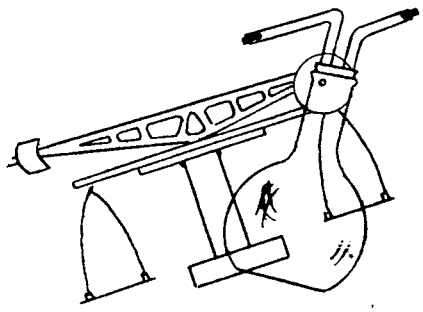
DATE: 01/15/80
DATE SAMPLED: 01/14/80

LAB NUMBER: 1117
DATE RECEIVED: 01/14/80

SAMPLE ID:

Wilberg Mine
Water Sample

Oil & Grease	Less than 0.1 mg/L



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 02/05/80

CERTIFICATE OF ANALYSIS

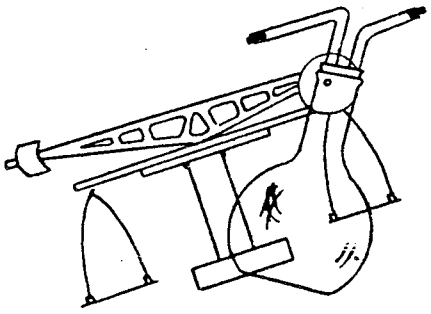
UTAH POWER & LIGHT
MINING & EXPLORATION
BOX 1005
HUNTINGTON, UT 84528

80-008670

SAMPLE: WATER DATED 1/21/80 RECEIVED 1/24/80 LABELED WILBERG MINE DISCHARGE.

	WILBERG MINE DISCHARGE
Acidity as CaCO3 mg/l	14.0
Alkalinity as CaCO3 mg/l	264.00
BOD 5 Day mg/l	<1.0
Chloride as Cl mg/l	10.0
Iron as Fe (Total) mg/l	.154
Oil and Grease mg/l	1.0
Sulfate as SO4 mg/l	188
Suspended Solids mg/l	<1.0
Total Dissolved Solids mg/l	498
pH Units	7.62

FORD CHEMICAL LABORATORY, INC.



Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 02/12/80

CERTIFICATE OF ANALYSIS

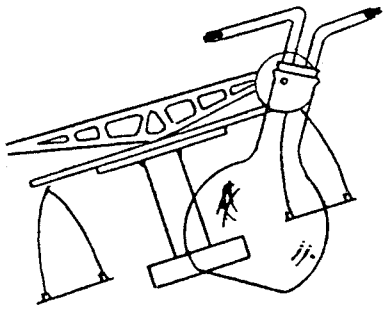
UTAH POWER & LIGHT
MINING & EXPLORATION
BOX 1005
HUNTINGTON, UT 84528

80-008780

SAMPLE: MINE WATER DATED 2/4/80 RECEIVED 2/6/80 FOR ANALYSIS.

	DEER CREEK MINE DISCHARGE	WILBERG MINE DISCHARGE
Acidity as CaCO3 mg/l	16.0	20.0
Alkalinity as CaCO3 mg/l	260.00	254.00
BOD 5 Day mg/l	5.2	5.3
Chloride as Cl mg/l	19.0	10.0
Conductivity umhos/cm	1,000	760
Iron as Fe (Total) mg/l	.165	.240
Oil and Grease mg/l	<1.00	<1.00
Sulfate as SO4 mg/l	186	197
Suspended Solids mg/l	8.0	2.0
Total Dissolved Solids mg/l	662	496
pH Units	7.51	7.35

FORD CHEMICAL LABORATORY, INC.



Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 04/02/80
CERTIFICATE OF ANALYSIS

UTAH POWER & LIGHT
INING & EXPLORATION
OX 1005
HUNTINGTON, UT 84528

80-009122

AMPLE: WATER SAMPLES DATED 3/11/80 RECEIVED 3/13/80 FOR ANALYSIS.

	WILBERG MINE DISCHARGE	DEER CRK MINE DISCHARGE
Acidity as CaCO3 mg/l	10.0	8.0
linity as CaCO3 mg/l	264.00	254.00
BOD 5 Day mg/l	<1.0	<1.0
hloride as Cl mg/l	16.0	24.0
onductivity umhos/cm	815	610
Iron as Fe (Total) mg/l	.170	.168
il and Grease mg/l	1.60	<1.00
Sulfate as SO4 mg/l	166	120
uspended Solids mg/l	6.0	8.0
Total Dissolved Solids mg/l	530	400
H Units	7.60	7.90

FORD CHEMICAL LABORATORY, INC.

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

DATE: 04/18/80

CERTIFICATE OF ANALYSIS

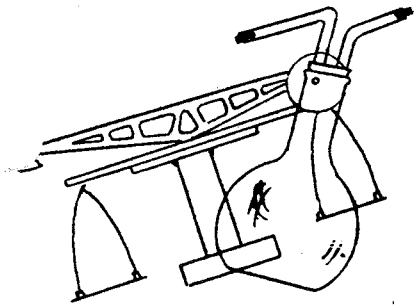
UTAH POWER & LIGHT
MINING & EXPLORATION
BOX 1005
HUNTINGTON, UT 84528

80-009464

SAMPLE: MINE WATER DISCHARGE SAMPLES FROM WILBERG MINE AND DEER CREEK MINE DATED 4-7-80 RECEIVED 4-10-80.

	WILBERG MINE DISCHARGE 4-7-80	DEER CREEK MINE DISCHARGE 4-7-80
Acidity as CaCO3 mg/l	<.1	8.0
Alkalinity as CaCO3 mg/l	302.00	328.00
BOD 5 Day mg/l	1.5	1.8
Chloride as Cl mg/l	18.0	18.0
Conductivity umhos/cm		790
Iron as Fe (Total) mg/l	.285	.199
Oil and Grease mg/l	7.60	2.00
Sulfate as SO4 mg/l	32.5	29.8
Suspended Solids mg/l	108	106
Total Dissolved Solids mg/l	550	520
pH Units	7.70	7.50

FORD CHEMICAL LABORATORY, INC.



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 04/24/80

CERTIFICATE OF ANALYSIS

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

80-009541

SAMPLE: WATER FROM WILBERG AND DEERCREEK MINE DISCHARGE RECEIVED 4/7/80 FOR RECHECK ON SUSPENDED SOLIDS.

		Suspended Solids mg/l
1	WILBERG MINE DISCHARGE	102
	DEER CREEK MINE DISCHARGE	98.0

FORD CHEMICAL LABORATORY, INC.

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

CERTIFICATE OF ANALYSES

For Utah Power & Light
Enviromental Services

Lab. No. As Noted Below

Sample ID: Wilberg Disc.

Date Rec'd. 04/07/80

Date Sampled ____

Lab. No.	Test		Result	
W-1171	pH		7.98	
W-1171	Total Alkalinity		286.9	mg/L $CaCO_3$
W-1171	Total Dissolved Solids		549.0	mg/L
W-1171	Total Suspended Solids		7.0	mg/L
W-1171	Sulfate		169.6	mg/L
W-1172	Oil & Grease	less than	0.5	mg/L
W-1173	Total Iron		0.14	mg/L

Respectfully Submitted

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

DATE: 05/10/80

CERTIFICATE OF ANALYSIS

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

80-009641

SAMPLE: WATER SAMPLES DATED 4-23-80 RECEIVED 4-25-80 FROM WILBERG MINE DISCHARGE AND DEER CREEK MINE DISCHARGE.

	DEER CREEK MINE DISCHARGE	WILBERG MINE DISCHARGE
Sulfate as SO4 mg/l	142	158
Suspended Solids mg/l	99.0	41.5

FORD CHEMICAL LABORATORY, INC.

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

CERTIFICATE OF ANALYSES

For **Utah Power and Light**

Wilberg Mine Disch.

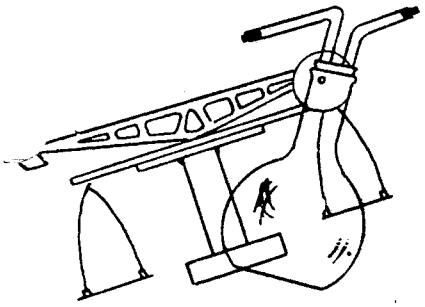
Lab. No. 1195

Date Rec'd. 4/23/80

Date Sampled 4/23/80

TEST	RESULT
Total Suspended Solids	7.0mg/L
Sulfate	176.6mg/L

Respectfully Submitted



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 05/27/80

CERTIFICATE OF ANALYSIS

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

80-009799

SAMPLE: WATER FROM WILBERG MINE DISCHARGE DATED 5-6-80 RECEIVED 5-8-80.

	WILBERG MINE DISCHARGE
idity as CaCO3 mg/l	30.0
Alkalinity as CaCO3 mg/l	302.00
BOD 5 Day mg/l	<1.0
Chloride as Cl mg/l	10.0
Iron as Fe (Total) mg/l	.185
Oil and Grease mg/l	3.20
Sulfate as SO4 mg/l	157
Suspended Solids mg/l	24.0
Total Dissolved Solids mg/l	532
pH Units	7.40

FORD CHEMICAL LABORATORY, INC.

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

CERTIFICATE OF ANALYSES

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

Wilberg Mine Discharge

Lab. No. W-1221

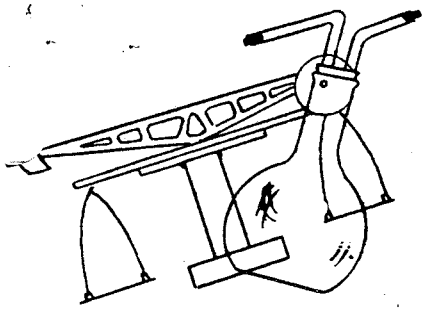
Date Rec'd. 05-06-80

Date Sampled 05-06-80

Analysis date: 05-06-80

Parameter	
pH	7.8
Alkalinity, Total	256.5 mg/l
Acidity	0 mg/l
BOD- 5 day	2.1 mg/l
Oil & Grease	< 0.5 mg/l
Total Dissolved Solids	532.0 mg/l
Total Suspended Solids	1.5 mg/l
Sulfate	157.64 mg/l
Iron	0.09 mg/l

Respectfully Submitted



Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 06/17/80

CERTIFICATE OF ANALYSIS

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

80-009963

SAMPLE: WATER FROM WILBERG MINE DISCHARGE DATED 5/20/80 RECEIVED 5/20/80 FOR ANALYSIS.

	RESULTS
Acidity as CaCO3 mg/l	30.0
Alkalinity as CaCO3 mg/l	290.00
BOD 5 Day mg/l	<1.0
Chloride as Cl mg/l	10.0
Iron as Fe (Total) mg/l	.180
Oil and Grease mg/l	2.60
Sulfate as SO4 mg/l	165
Suspended Solids mg/l	2.0
Total Dissolved Solids mg/l	500
pH Units	7.20

FORD CHEMICAL LABORATORY, INC.

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

CERTIFICATE OF ANALYSES

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

Wilberg Mine Discharge

Lab. No. W-1228

Date Rec'd. 05-20-80

Date Sampled 05-20-80

Analysis date: 05-21-80

Parameter	
pH	8.1
Alkalinity, Total	303.8 mg/l
Acidity	0 mg/l
Chloride	14.0 mg/l
Oil & Grease	4.0 mg/l
Total Dissolved Solids	538.0 mg/l
Total Suspended Solids	11.0 mg/l
Sulfate	29.22 mg/l
Iron	0.07 mg/l

Respectfully Submitted

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

DATE: 07/07/80

CERTIFICATE OF ANALYSIS

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

80-000195

SAMPLE: WATERS DATED 6-3-80 RECEIVED 6-5-80.

	WILBERG MINE DISCHARGE	DEER CR. MINE DISCHARGE
Acidity as CaCO3 mg/l	14.0	18.0
Alkalinity as CaCO3 mg/l	216.00	276.00
BOD 5 Day mg/l	1.7	1.5
Chloride as Cl mg/l	20.0	12.0
Conductivity umhos/cm	970	750
Iron as Fe (Total) mg/l	.290	1.130
Oil and Grease mg/l	1.60	2.65
Sulfate as SO4 mg/l	235	160
Suspended Solids mg/l	46.0	14.0
Total Dissolved Solids mg/l	630	490
pH Units	7.60	7.70

FORD CHEMICAL LABORATORY, INC.

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

CERTIFICATE OF ANALYSES

For Utah Power and Light

Lab. No. 1240

Wilberg Mine Discharge

Date Rec'd. 06-06-80

Date Sampled 06-03-80

Solids, Total Dissolved	484.0
Solids, Total Suspended	2.8

Respectfully Submitted

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

CERTIFICATE OF ANALYSES

For UTAH POWER & LIGHT CO.
MINING & EXPLORATION
FEILD OFFICE
INDUSTRIAL TRAINING CENTER
HUNTINGTON, UTAH 84528

Lab. No. 1282

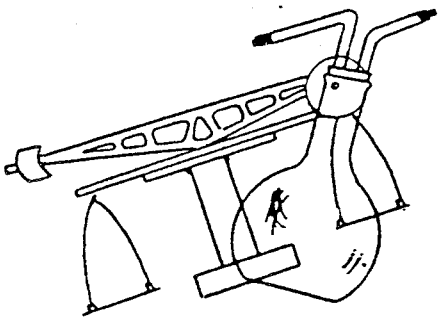
SAMPLE ID: WILBERG MINE DISCHARGE

Date Rec'd. 07-07-80

Date Sampled 07-01-80

PARAMETER	VALUE
TOTAL SUSPENDED SOLIDS	0.5 mg/l

Respectfully Submitted



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 07/07/80

CERTIFICATE OF ANALYSIS

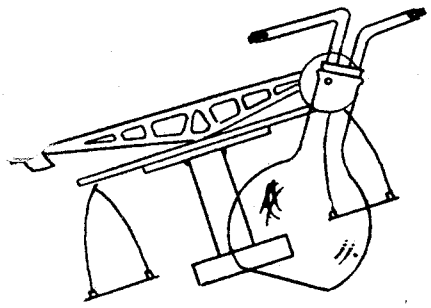
UTAH POWER & LIGHT
MINING & EXPLORATION
BOX 1005
HUNTINGTON, UT 84528

80-000195

SAMPLE: WATERS DATED 6-3-80 RECEIVED 6-5-80.

	WILBERG MINE DISCHARGE	DEER CR. MINE DISCHARGE
Acidity as CaCO3 mg/l	14.0	18.0
Alkalinity as CaCO3 mg/l	216.00	276.00
BOD 5 Day mg/l	1.7	1.5
Chloride as Cl mg/l	20.0	12.0
Conductivity umhos/cm	970	750
Iron as Fe (Total) mg/l	.290	1.130
Oil and Grease mg/l	1.60	2.65
Sulfate as SO4 mg/l	235	160
Suspended Solids mg/l	46.0	14.0
Total Dissolved Solids mg/l	630	490
pH Units	7.60	7.70

FORD CHEMICAL LABORATORY, INC.



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 08/05/80

CERTIFICATE OF ANALYSIS

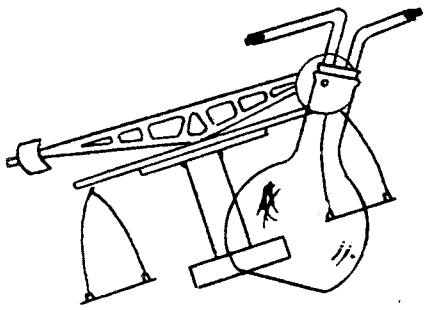
UTAH POWER & LIGHT
MINING & EXPLORATION
BOX 1005
HUNTINGTON, UT 84528

80-000545

SAMPLE: WATERS RECEIVED 7-3-80 FROM DEER CREEK AND WILBERG MINE.

	DEER CREEK MINE	WILBERG MINE
idity as CaCO3 mg/l	28.0	8.0
Alkalinity as CaCO3 mg/l	362.00	286.00
BOD 5 Day mg/l	5.9	<1.0
Chloride as Cl mg/l	12.0	8.0
Iron as Fe (Total) mg/l	7.530	.110
Oil and Grease mg/l	7.60	1.60
Sulfate as SO4 mg/l	315	195
Suspended Solids mg/l	46.0	12.0
Total Dissolved Solids mg/l	850	510
pH Units	6.80	7.20

FORD CHEMICAL LABORATORY, INC.



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

RECEIVED
SEP 5 - 1980
MINING AND EXPLORATION

DATE: 09/02/80

CERTIFICATE OF ANALYSIS

UTAH POWER & LIGHT
MINING & EXPLORATION
41 NO. REDWOOD ROAD
SLC, UT 00000

80-014250

SAMPLE: WATER FROM WILBERG DISHCARGE SPECIAL STUDY #A-101
DATED 8-18-80 RECEIVED 8-20-80.

RESULTS

Suspended Solids mg/l	49.0

EPA True Value 67.44 mg/l

FORD CHEMICAL LABORATORY, INC.

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

CERTIFICATE OF ANALYSES

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

Lab. No. 1312

Sample ID: Wilberg Mine Discharge

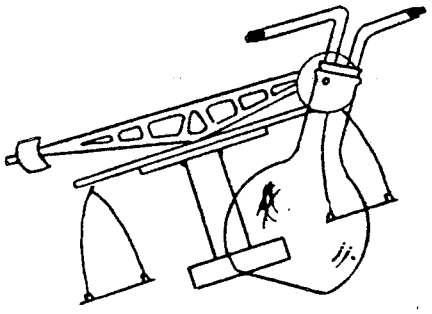
Date Rec'd. 08-14-80

Date Sampled 08-14-80

PARAMETER	VALUE	
Total Suspended Solids	184.6	mg/l

EPA test sample 202.32 mg/l

Respectfully Submitted



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 10/06/80

CERTIFICATE OF ANALYSIS

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

80-002353

SAMPLE: WATER RECEIVED 8/28/80 FOR ANALYSIS.

Date Sampled 8/25/80

	WILBERG MINE DISCHARGE	DEER CREEK MINE DISCHARGE
Acidity as CaCO3 mg/l	22.0	42.0
Alkalinity as CaCO3 mg/l	298.00	324.00
BOD 5 Day mg/l	<1.0	<.1
Chloride as Cl mg/l	12.0	26.0
Conductivity umhos/cm		1,150
Iron as Fe (Total) mg/l	.220	.450
Oil and Grease mg/l	7.00	<.01
Sulfate as SO4 mg/l	184	225
Suspended Solids mg/l	5.0	6.0
Total Dissolved Solids mg/l	520	750
pH Units	7.70	7.60

FORD CHEMICAL LABORATORY, INC.

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

DATE: 10/22/80

CERTIFICATE OF ANALYSIS

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

80-002478

SAMPLE: WATERS RECEIVED 09/05/80 FOR ANALYSIS.

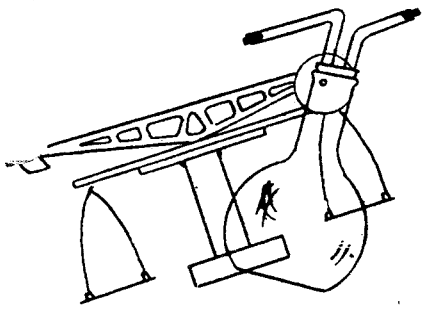
	DEER CREEK MINE	WILBURG MINE
Acidity as CaCO3 mg/l	22.0	5.0
Alkalinity as CaCO3 mg/l	256.00	300.00
Arsenic as As mg/l	<.001	<.001
BOD 5 Day mg/l	4.4	1.4
Bicarbonate as HCO3 mg/l	312.32	366.00
Cadmium as Cd mg/l	<.001	<.001
Calcium as Ca mg/l	684.00	120.00
Chloride as Cl mg/l	2,700	26.0
Conductivity umhos/cm	7,850	1,030
Dissolved Oxygen mg/l	6.9	6.8
Fluoride as F mg/l	.26	.17
Gross Alpha pci/l	<.1	<.1
Gross Beta pci/l	1.5	1.3

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

CERTIFICATE OF ANALYSIS

80-002473

	DEER CREEK MINE	WILBURG MINE
Iron as Fe (Total) mg/l	.110	.020
Lead as Pb mg/l	.003	<.002
MPN Fecal Coliform MPN/100 ml	<2.0	5.0
MPN Total Coliform MPN/100 ml	<2.0	70.0
Magnesium as Mg mg/l	290.40	60.00
Manganese as Mn mg/l	.020	.010
Nitrite as NO2-N mg/l	<.01	<.01
Oil and Grease mg/l	8.40	.40
Phosphate PO4-P Ortho mg/l	.040	.050
Potassium as K mg/l	7.90	3.32
Selenium as Se mg/l	<.001	<.001
Silica as SiO2 Dissolved mg/l	11.30	12.00
Sodium as Na mg/l	769.00	22.90
Sulfate as SO4 mg/l	497	250
Suspended Solids mg/l	90.0	222
Total Dissolved Solids mg/l	5,100	669
Total Organic Carbon mg/l	5.80	4.10



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

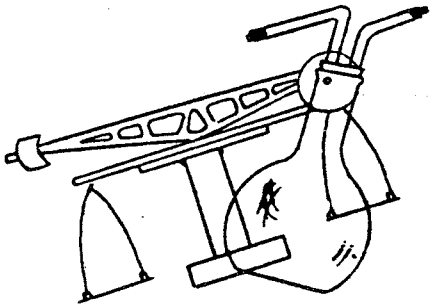
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

CERTIFICATE OF ANALYSIS

80-002478

	DEER CREEK MINE	WILBURO MINE
Zinc as Zn mg/l	.014	.010
pH Units	7.00	7.40

FORD CHEMICAL LABORATORY, INC.



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

DATE: 11/15/80

CERTIFICATE OF ANALYSIS

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

80-001156

SAMPLE: WATERS FROM WILBERG MINE AND DEER CREEK MINE RECEIVED 10-15-80.

	WILBERG MINE DISCHARGE	DEER CR. MINE DISCHARGE
Acidity as CaCO3 mg/l	4.0	4.0
Alkalinity as CaCO3 mg/l	262.00	240.00
BOD 5 Day mg/l	11.0	9.5
Chloride as Cl mg/l	3.6	6.7
Conductivity umhos/cm		720
Iron as Fe (Total) mg/l	.186	.200
Oil and Grease mg/l	.20	2.60
Sulfate as SO4 mg/l	177	210
Suspended Solids mg/l	26.0	24.0
Total Dissolved Solids mg/l	504	504
pH Units	7.20	7.50

FORD CHEMICAL LABORATORY, INC.

CERTIFICATE OF ANALYSIS

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

Lab. No. 1425

FOR Utah Power & Light Co.
Mining & Exploration

Date Rec. 11-24-80

Date Sampled 11-24-80

Sample ID Wilberg Mine Discharge

pH	7.4 Units	Arsenic	____ mg/l
Alkalinity, Total	271.0 mg/l $CaCo_3$	Beryllium	____ mg/l
Alkalinity, Bicarbonate	____ mg/l $CaCo_3$	Boron	____ mg/l
Calcium	____ mg/l	Cadmium	____ mg/l
Chloride	11.8 mg/l	Chromium	____ mg/l
Conductivity	____ umhos/cm	Copper	____ mg/l
Dissolved Oxygen	____ mg/l	Iron	3.0 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	593.0 mg/l		
Solids, Total Suspended	6.0 mg/l		
Sulfate	185.6 mg/l		
Acidity	0 mg/l $CaCO_3$		
Oil & Grease	3.8 mg/l		

Respectfully submitted

Certified Environmental Laboratory

TIFICATE OF ANALYSIS

S,INC.
3-2314

Office

Lab. No. 1470

Date Rec. 12/09/80

Date Sampled 12/09/80

Arsenic	_____	mg/l
Beryllium	_____	mg/l
Boron	_____	mg/l
Cadmium	_____	mg/l
Chromium	_____	mg/l
Copper	_____	mg/l
Iron	3.0	mg/l
Lead	_____	mg/l
Manganese	_____	mg/l
Mercury	_____	µg/l
Nickel	_____	mg/l
Selenium	_____	mg/l
Zinc	_____	mg/l

Respectfully submitted RS/mm

d Environmental Laboratory

APPENDIX L

STANDARD LABORATORIES, INC.
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

Lab. No. 1245

Sample ID: Deer Creek In Mine

Date Rec'd. 06-05-80

3SB x21 B-1R

Date Sampled 06-1 -80

PARAMETER	VALUE	
pH	7.6	
Chloride	10.05	mg/l
Conductivity	900	Mmhas/cm
Total Solids, Dissolved	473.0	mg/l
Total Solids, Suspended	0.67	mg/l
Sulfate	915.2	mg/l
Bicarb. Alk	380.3	mg/l
Na	10.22	mg/l
K	4.0	mg/l
Ca	60.8	mg/l
Mg	4.42	mg/l

Respectfully Submitted

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

CERTIFICATE OF ANALYSES

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

Sample ID: Deer Creek EM-3
Sampled by: UP&L

Lab. No. 1356
Date Rec'd. 10/27/80
Date Sampled 10/27/80

PARAMETER	VALUE	
pH	7.0	
Conductivity	1000	µmhos/cm
Total Dissolved Solids	631.0	mg/l
Total Suspended Solids	1.5	mg/l
Total Iron	0.30	mg/l
Manganese	0.06	mg/l

Respectfully Submitted

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

CERTIFICATE OF ANALYSES

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

Lab. No. 1357

Sample ID: Deer Creek Mine 2RxC151R
Sampled By: UP&L

Date Rec'd. 10/27/80

Date Sampled 10/27/80

PARAMETER	VALUE	
pH	7.9	
Conductivity	810	µmhos/cm
Total Dissolved Solids	467.0	mg/l
Total Suspended Solids	0.5	mg/l
Total Iron	0.12	mg/l
Manganese	0.06	mg/l

Respectfully Submitted

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CERTIFICATE OF ANALYSES

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

Lab. No. 1358

Sample ID: Deer Creek Mine 2RxC251R
Sampled By: UP&L

Date Rec'd. 10/27/80

Date Sampled 10/27/80

PARAMETER	VALUE	
pH	7.9	
Conductivity	750	µmhos/cm
Total Dissolved Solids	445.0	mg/l
Total Suspended Solids	6.5	mg/l
Total Iron	0.36	mg/l
Manganese	0.06	mg/l

Respectfully Submitted

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CERTIFICATE OF ANALYSES

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

Lab. No. 1359

Sample ID: Deer Creek 2RxC201R
Sampled By: UP&L

Date Rec'd. 10/27/80

Date Sampled 10/27/80

PARAMETER	VALUE	
pH	7.7	
Conductivity	900	µmhos/cm
Total Dissolved Solids	525.0	mg/l
Total Suspended Solids	0.5	mg/l
Total Iron	0.24	mg/l
Manganese	0.06	mg/l

Respectfully Submitted

...NDARD LABORATORIES, INC.
OX 1140 HUNTINGTON, UTAH 84528 (801) 653-2314

CERTIFICATE OF ANALYSES

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

Lab. No. 1360

Sample ID: Deer Creek Mine 35BxC21B-1R
Sampled By: UP&L

Date Rec'd. 10/27/80

Date Sampled 10/27/80

PARAMETER	VALUE	
pH	7.3	
Conductivity	910	µmhos/cm
Total Dissolved Solids	563.0	mg/l
Total Suspended Solids	2.5	mg/l
Total Iron	0.12	mg/l
Manganese	0.06	mg/l

Respectfully Submitted