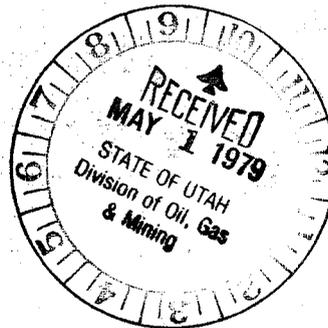


WATER MONITORING REPORT - 1978



WATER MONITORING REPORT - 1978

An Annual Summary of the hydrologic monitoring program that was undertaken on and adjacent to coal lands and mines controlled by Utah Power & Light Company in Emery County, Utah.

MARCH 8, 1979

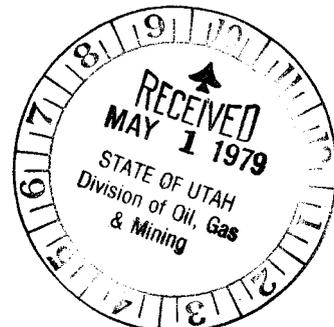
Prepared and submitted for Utah Power & Light Company by:  
Hydrologic Section of the Power Operation Department;  
Mining and Exploration Department.

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## INTRODUCTION

This report is submitted in accordance with the U.S. Geological Survey 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.

The report represents an extension of the document which was submitted on December 31, 1977, entitled "Monitoring of the Water Resources in the Mining Areas of East Mountain, Emery County, Utah." Since the U.S. Geological Survey did not indicate approval or disapproval of the 1977 report during the past year, the 1978 monitoring program followed the future monitoring guidelines which were proposed in the 1977 report.

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

Utah Division of Oil, Gas and Mining

Utah Division of Environmental Health

North Emery Water Users Association

Huntington City

Emery Water Conservancy District

Cottonwood Creek Consolidated Irrigation Company

Information from outside agencies will 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.

Some difficulty was encountered with respect to monitoring at certain locations during 1978. Certain East Mountain springs which were to be monitored

were difficult to locate and identify in the field. As a result, the list of springs monitored during 1978 does not correspond exactly with the springs listed in the 1977 report. In addition, only minimal flow and quality information was obtained by Utah Power & Light personnel during storm events in Grimes Wash during 1978. Either personnel were not available to monitor storm runoff when storm conditions occurred, or no flows were observed when personnel were available to monitor storm runoff events. One sample from Deer Creek was obtained during the runoff period which will be discussed later in this report.

It should be understood that 1978 proved to be a learning experience with regard to certain water monitoring aspects by Utah Power & Light personnel, especially in locating and identifying sampling stations. The occasional difficulties that were encountered during 1978 are expected to be eliminated or minimized as Utah Power & Light personnel gain more experience during future water monitoring programs associated with mining activities.

#### 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 evaluated with respect to resulting spring discharges and associated runoff which occurred in the vicinity of East Mountain, not only for 1978 but for all water monitoring reports submitted in the future.

#### REGIONAL CLIMATOLOGY

Utah and other western states have experienced great fluctuations in climatic conditions the past two years. During 1977, extremely low winter precipitation and associated snowfall was observed while summer precipitation

greatly exceeded normal. The low snowfall during the 1977 winter resulted in the lowest runoff ever experienced at most recording stations. In contrast, the 1978 winter precipitation and mountain snowfall was far above normal while summer and fall precipitation was scarce in most areas of the west. The excessive winter moisture resulted in streamflows much above average during the 1978 spring runoff period, especially in southern and eastern Utah.

LOCAL CLIMATOLOGY

Precipitation in Emery County during 1978 followed a pattern similar to other areas in Utah. Deficient summer and fall moisture followed a winter of excessive precipitation and near record breaking snowfall in the mountains.

Precipitation amounts recorded at the Hunter (Emery) Plant, Huntington Plant and Electric Lake for the 1978 water year 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 following table.

TABLE 1: Precipitation Levels in Emery County, Utah

<u>Month</u>	<u>Hunter Plant (E<sub>L</sub> 5800)</u>		<u>Huntington Plant (E<sub>L</sub> 6500)</u>		<u>Electric Lake (E<sub>L</sub> 8350)</u>	
	<u>Precipitation</u>	<u>% of Normal</u>	<u>Precipitation</u>	<u>% of Normal</u>	<u>Precipitation</u>	<u>% of Normal</u>
October, 1977	.01	1	.66	86	1.47	69
November	.18	46	.12	21	2.10	113
December,	.00	0	.82	152	3.20	110
January, 1978	1.28	298	1.45	354	3.68	182
February	1.05	250	1.00	250	2.74	157
March	1.74	412	1.36	378	3.16	165
April	.34	79	.94	200	2.46	146
May	1.21	46	.72	113	1.18	79
June	0	0	0	0	.30	37
July	.69	119	.05	7	.10	9
August	1.14	113	.72	84	.24	28
September	.14	18	.77	93	.77	73
Total	6.84	98	8.73	127	21.40	109

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 1978 and were generally much warmer than normal. The average monthly temperatures and departures from normal during the 1978 water year at the Hunter (Emery) Plant, Huntington Plant and Electric Lake are shown in the following table.

TABLE 2: Temperature Levels in Emery County, Utah

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
October, 1977	49.5	+1.1	49.7	+2.3	38.8	+1.3
November	35.9	+0.7	37.4	+2.6	26.9	+1.2
December	28.3	+1.6	31.4	+5.3	20.1	+4.3
January, 1978	23.3	-0.8	24.0	+2.2	14.3	-0.3
February	26.0	-2.1	28.8	-1.8	16.7	-2.6
March	41.8	+6.0	41.1	+4.5	25.1	+4.3
April	49.7	+5.1	47.6	+4.1	30.6	+1.9
May	50.9	-1.2	55.0	-0.6	36.0	-3.0
June	67.2	+5.8	69.8	+5.6	51.5	+2.9
July	72.7	+4.3	72.6	+0.7	55.8	+0.1
August	67.9	+1.5	69.4	-0.2	55.4	+1.6
September	59.5	+0.8	64.1	+5.7	47.7	+0.2
Total		+22.8		+30.4		+11.9
Average	48.6	+1.9	49.3	+2.5	34.9	+1.0

WATER MONITORING PROGRAM

Utah Power & Light Company collected sample data pertaining to (1) surface streams; (2) East Mountain springs; (3) other springs in the area; (4) 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 J.

### SURFACE STREAMS

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 - DEER CREEK

Utah Power & Light Company maintains a continuous record of the flow in Huntington Creek at two locations; one station is located near the Huntington Power Plant, the other being below Electric Lake which is 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 3) 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 1978 water year (October 1977 - September 1978) at the two stations plus the calculated natural flow are found in Appendix A.

TABLE 3: Huntington Creek Water Flows

	<u>Huntington Creek Below Electric Lake</u>	<u>Huntington Creek at Plant</u>	<u>Calculated Natural Flow at Plant</u>
Total yearly discharge in acre feet	8,250	66,950	86,000
% of normal	38*	95*	123
Average discharge in cubic feet per second (CFS)	11.4	92.5	121
Peak discharge (CFS)	170	585	784
Date peak discharge	August 2, 1978	June 11, 1978	June 10, 1978
Minimum discharge in CFS	.53	1.20	15
Date of minimum discharge	December 14, 1977	December 17, 1977	December 17, 1977

\*Due to upstream storage in Electric Lake.

During the spring runoff period, approximately 14,000 acre feet of runoff water was impounded behind Electric Lake Dam. This storage volume represents about 150 percent of the normal amount that could be expected during an average spring runoff period. Storage water is released from the lake for Huntington Plant use whenever insufficient water is available in Huntington Creek to provide for plant water needs.

The extremely high streamflow during 1978 resulted from the excessive snowfall received in the mountains during the 1977-78 winter. Above normal temperatures during March and April and below normal temperatures during May, resulted in a much longer runoff period than normal, the duration of which

occurred from early April through early July. Moderate flows were recorded from July through September largely as a result of storage releases from irrigation company reservoirs located on the left fork of Huntington Creek.

A significant amount of water quality information on Huntington Creek was compiled during the year. An intense monitoring program has been initiated by Utah Power & Light Company in order to determine the effects of the Huntington Plant operation upon the existing water quality in Huntington Creek. The water quality sampling stations on the creek that were considered in this report include the following:

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

Specific quality parameters which were evaluated are shown in the following table (Table 4). Additional information regarding inorganic chemical analyses for the four stations is listed in Appendix B. Values are in milligrams per liter unless otherwise noted.

TABLE 4: Water Quality in Huntington Creek

<u>Parameter</u>	<u>Below Electric Lake</u>			<u>Right Fork Above Left Fork</u>			<u>Above Power Plant</u>			<u>Below Power Plant</u>		
	<u>Ave</u>	<u>Max</u>	<u>Min</u>	<u>Ave</u>	<u>Max</u>	<u>Min</u>	<u>Ave</u>	<u>Max</u>	<u>Min</u>	<u>Ave</u>	<u>Max</u>	<u>Min</u>
pH (N.U.)	7.6	8.1	7.1	7.9	8.2	7.5	8.0	8.2	7.5	8.0	8.4	7.5
Diss. Oxy.	9.2	12.8	7.2	9.4	13.2	7.8	9.5	13.6	7.1	9.6	12.3	8.5
Sulfate	17.0	25.0	8.0	27	94	14	25.2	58.0	4.0	42.4	98.0	4.0
Tot. Susp. Solids	-	-	-	-	-	-	27.5	143	1.0	74.2	307	4.0
Tot. Diss. Solids	160	180	145	215	329	188	214	282	136	246	257	170
Spec. Cond. (umhos)	245	275	220	330	508	285	329	435	210	380	550	265

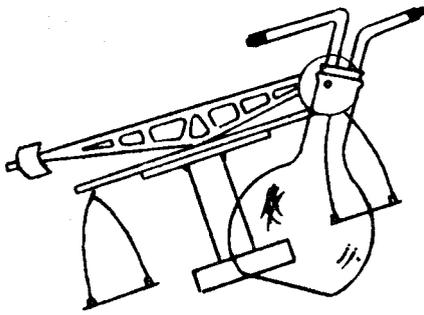
TABLE 4: Water Quality in Huntington Creek - contd.

<u>Parameter</u>	<u>Below Electric Lake</u>			<u>Right Fork Above Left Fork</u>			<u>Above Power Plant</u>			<u>Below Power Plant</u>		
	<u>Ave</u>	<u>Max</u>	<u>Min</u>	<u>Ave</u>	<u>Max</u>	<u>Min</u>	<u>Ave</u>	<u>Max</u>	<u>Min</u>	<u>Ave</u>	<u>Max</u>	<u>Min</u>
Turbidity (FTU)	1.6	2.8	0.6	4.2	19.0	0.95	18.8	83.0	1.0	28.4	130	1.1
Alkalinity	133	152	118	176	196	156	182	204	148	186	208	154
Tot. Hardness	142	166	68	187	218	92	195	224	150	214	286	158

In general, the water shows a gradual increase in concentration of dissolved minerals as flow proceeds down Huntington Canyon. Of particular interest is the marked increase in turbidity at the station above the power plant. The increased turbidity appears to be originating from Bear Canyon which is a small tributary to Huntington Creek located about two miles upstream from the Huntington Plant. Surface runoff from Bear Canyon flows through a highly erodable silt layer and picks up concentrations of fine grained silt which does not readily settle out in Huntington Creek.

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

Deer Creek is a tributary to Huntington Creek and is in the same canyon in which the Deer Creek Coal Mine is located. One sample of surface water discharge in Deer Creek was obtained during 1978. A quality sample above and below the Mine was obtained on May 16, 1978 by Utah Power & Light Company personnel and Ford Chemical Laboratory conducted the analysis. Analytical results are found on the following page. The surface flow in Deer Creek below the mine was estimated to be about 0.5 CFS or 225 gpm. The samples were taken during the spring runoff period and a very high suspended sediment load was evident in the flow, as shown by the extremely high suspended solids concentration shown on the analysis sheet.



# Ford Chemical

**LABORATORY, INC.**  
Bacteriological and Chemical Analysis

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

RECEIVED

JUN 17 1978

MINING AND  
EXPLORATION

June 13, 1978

Utah Power & Light Company  
41 North Redwood Road  
ATTN: Mr. Jerry Vaninetti  
Mining & Exploration Division  
Salt Lake City, UT 84116

**CERTIFICATE OF ANALYSIS**

78-1248

Dear Mr. Vaninetti:

The following analysis is on samples of water received on May 22, 1978:

Sample: Deer Creek Mine dated May 16, 1978:

	Deer Creek Above Mine 5/16/78	Deer Creek Below Mine 5/16/78
pH Units	6.97	6.92
Conductivity umhos/cm	360.0	420.0
Total Dissolved Solids Mg/l	235.0	273.0
Suspended Solids Mg/l	521.0	1,124.0
Iron as Fe (Total) Mg/l	0.289	0.390
Manganese as Mn (Total) Mg/l	0.187	0.208

Sincerely,  
FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

LSF/jms

COTTONWOOD CREEK - GRIMES WASH

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.

The U.S. Geological Survey maintains a continuous record of the stream flow on Cottonwood Creek (see map); however, 1978 streamflow records were not available for inclusion into this report. Limited flow information was acquired from the secretary of the Emery Water Conservancy District. A peak flow of 640 cubic feet per second was noted below Joe's Valley Reservoir on June 23, 1978. Approximately 46,000 acre feet of water was utilized for irrigation purposes during the period from May through October. About 30,000 acre feet of water was stored in Joe's Valley Reservoir during the spring runoff period. The Reservoir filled on June 17 and spill occurred until July 14. Total runoff figures were unavailable but it appears that about 85,000 acre feet or 120 percent of normal runoff was discharged from the Cottonwood Creek drainage during the 1978 water year.

Water quality information for Cottonwood Creek was acquired from Vaughn Hansen Associates and the U.S. Geological Survey. The sample station is located at the U.S. Geological Survey Gaging Station and is shown in the location map in the Appendix. The following table (Table 5) shows a comparison of the water quality characteristics of specific parameters which were sampled

and analyzed by both the U.S. Geological Survey and Vaughn Hansen Associates/  
Ford Chemical Laboratory. Additional inorganic chemical data can be found in  
Appendix C. Values are in milligrams per liter unless otherwise noted.

TABLE 5: Water Quality of Cottonwood Creek

<u>Parameter</u>	<u>USGS</u>			<u>Vaughan Hansen/Ford Chemical</u>		
	<u>Ave</u>	<u>Max</u>	<u>Min</u>	<u>Ave</u>	<u>Max</u>	<u>Min</u>
pH	7.9	8.5	7.5	8.1	8.7	7.7
Dissolved Oxygen	-	-	-	9.7	13.6	8.1
Sulfate (SO <sub>4</sub> )	49	110	21	57	76	31
Total Dissolved Solids	271	372	203	298	420	216
Specific Cond. (umhos.)	447	635	360	459	650	330
Turbidity (FTU)	-	-	-	20.8	120	0.7
Total Hardness	227	290	210	205	234	178

An analysis of the preceding table and lower Huntington Creek water quality indicates that both creeks have similar water quality characteristics. It would appear that the presence of Joe's Valley Reservoir would likely affect the characteristics of upstream runoff in a manner similar to Electric Lake on Huntington Creek. However, no water quality information is available to support that assumption.

As previously stated, no water samples or flow measurements were obtained from Grimes Wash (a tributary of Cottonwood Creek) by Utah Power & Light personnel during 1978. However, the U.S. Forest Service maintained a flow and quality monitoring program in Grimes Wash during the year. The station locations are listed as follows:

1. Left Fork of Grimes Wash
2. Right Fork of Grimes Wash

3. Grimes Wash at the confluence of  
Left and Right Forks

4. Grimes Wash at the Forest Boundary

Water quantity and quality information was only available for input to this report for the right fork of Grimes Wash and Grimes Wash at the forest boundary. The information is summarized on a computer printout and can be found in Appendix D. It should be noted that the printout covers the period of record from 1975 through 1976 for right fork of Grimes Wash and 1975 through 1978 for Grimes Wash at the forest boundary.

Pertinent flow information at the two locations is shown in the following tabulation (Table 6). Values are in cubic feet per second (CFS).

TABLE 6: Grimes Wash Water Flows

	<u>Right Fork Grimes Wash</u>	<u>Grimes Wash at Forest Boundary</u>
Average Flow	0.72	.83
Maximum	1.5	3.0
Minimum	0.3	0.08
# of Measurements	6	46
Period of Records	5/5/75 - 11/8/76	3/17/75 - 10/17/78

EAST MOUNTAIN SPRINGS

A cooperative sampling effort was undertaken between Utah Power & Light Company and the U.S. Geological Survey with respect to monitoring East Mountain springs during the summer of 1978. The locations of springs sampled are shown on Map 1. Pertinent flow data on the springs that were sampled are presented in the following table.

TABLE 7: East Mountain Springs Water Flow Data

<u>Spring</u>	<u>Elevation</u>	<u>No. of Measurements</u>	<u>Flow (gpm)</u>		
			<u>Ave</u>	<u>Max</u>	<u>Min</u>
Burnt Tree	9,225	4	7.8	9.6	6.0
Jerk Water	9,100	2	1.75	2.1	1.4
Elk	9,450	3	164	376	68
Upper Roan Canyon	9,250	3	4.9	10.0	2.12
Pine	10,000	3	1.96	5.5	.08
Trespass	9,425	1	-	-	-
Crawford	9,200	1	0	-	-
Honeymoon	9,375	1	0	-	-
TOTAL FLOW			182.72	403.2	67.6

Elk Spring is undoubtedly the most significant spring on East Mountain. An analysis of the preceding table shows that the minimum flow recorded at Elk Spring accounted for 86% of total minimum flows measured at the spring sites during 1978. Elk Spring also showed the greatest decrease from the highest to the lowest recorded flows during the sampling period.

Water quality samples from several of the springs were obtained twice during the year. The first sample was obtained on July 27, 1978 through a cooperative effort between Utah Power & Light Company and the USGS. The sample was analyzed by the USGS in accordance with Schedule A of the monitoring requirements set forth under the Federal Coal Mine Regulations of 1977. The analytical results of the samples are shown as follows:

TABLE 8: Water Quality of East Mountain Springs (7/27/78)

<u>Parameter</u>	<u>Elk Spring</u>	<u>Upper Roans Canyon Spring</u>	<u>Jerk Water Spring</u>	<u>Burnt Tree Spring</u>	<u>Cottonwood Spring*</u>
Alkalinity	240	220	360	240	90
Total Organic Carbon	1.2	1.7	2.6	1.1	0.7
Chloride	3.2	3.0	8.8	4.2	7.7

TABLE 8: Water Quality of East Mountain Springs (7/27/78) - contd.

<u>Parameter</u>	<u>Elk Spring</u>	<u>Upper Roans Canyon Spring</u>	<u>Jerk Water Spring</u>	<u>Burnt Tree Spring</u>	<u>Cottonwood Spring*</u>
Floride	0.1	0.1	0.2	0.2	0.1
Gross Alpha UG/L	3.2	2.1	7.6	5.7	5.9
Gross Beta	2.1	1.1	3.2	2.4	3.5
Iron UG/L	0	20	30	20	0
Manganese UG/L	10	0	0	10	0
Nitrogen	0.18	0.58	0.24	0.16	0.16
Nitrate-Nitrite	0.79	0.39	0.28	0.28	0.45
pH	7.9	7.1	7.1	6.8	7.3
Phosphorus	0.11	0	0	0	0
Total Dissolved Solids	249	227	380	274	342
Suspended Solids	15.0	4.0	3.0	5.0	0
Silica	5.5	5.5	7.4	6.7	6.8
Sodium	-	10	2.1	9.6	37
Specific Cond. (umhos)	440	400	650	490	595
Sulfate	10	7.6	24	10	44
Temperature °C	4.2	5.8	5.3	6.2	8.1
Calcium	-	74	85	59	69
Magnesium	-	9.2	33	28	35
Total Hardness	-	220	350	260	320
Potassium	-	0.2	0.7	0.6	1.7

\* Cottonwood Spring is not located on East Mountain and is included here for general information.

Additional water samples were collected from some of the East Mountain springs sampled earlier on October 31, 1978 by Utah Power & Light Company

personnel. Samples were not collected at Jerk Water Spring because of difficulties in locating that spring. Cottonwood Spring was not resampled by Utah Power & Light because it is sampled on a regular basis by the USGS. The samples were analyzed by Ford Chemical Laboratory according to Schedule B of the Federal Coal Mining Regulations of 1977. The analytical results of the samples are presented in the following Table. Values are in milligrams per liter unless otherwise noted.

TABLE 9: Water Quality of East Mountain Springs (10/31/78)

<u>Parameter</u>	<u>Elk Spring</u>	<u>Upper Roans Canyon</u>	<u>Burnt Tree Spring</u>	<u>Honeymoon Spring</u>	<u>Unknown</u>
pH	7.44	7.48	7.32	7.39	7.21
Conductivity (umhos/cm)	370	350	410	420	460
Suspended Solids	3.0	5.0	7.0	4.0	9.0
Iron	.025	.489	.036	.032	.062
Sulfate	6.0	6.0	9.0	6.0	12.0
Chloride	1.0	1.0	2.0	2.0	8.0
Oil and Grease	1.0	1.0	1.0	1.0	1.0
Dissolved Oxygen	8.41	8.32	8.3	7.22	8.02
Temperature °C	4.0	7.0	6.5	7.7	7.1

The water at all spring locations appears to be very high in quality. An analysis of the two preceding Tables indicates that the total dissolved solids and total hardness is relatively high for all springs sampled. Both parameters indicate the presence of calcium and magnesium; however, an examination of the Tables show that the calcium fraction is present in much greater concentrations than magnesium. The source of the enriched calcium is from melting snow and rainfall on East Mountain that has percolated through the Flagstaff Limestone which is a highly calcareous material that caps much of the uppermost part of

East Mountain. Most springs emerge as surface water at the interface of the Flagstaff Limestone and the North Horn Formation which is a sedimentary accumulation of sands, silts and clays with a calcium carbonate cementing agent. Because of the high calcium content of the formations in which springs are commonly found, the spring waters are characterized by high concentrations of calcium carbonate present in the dissolved form.

OTHER SPRINGS

HUNTINGTON CITY SPRINGS

Presently, Huntington City utilizes two springs in Huntington Canyon to provide for domestic, industrial and commercial water needs. The City has also constructed a water treatment facility on Huntington Creek which is expected to become operational early in 1979. Since the springs are located in the vicinity of mining activities in Huntington Canyon, pertinent flow and water quality information is presented in the following table (Table 10). Values are in milligrams per liter unless otherwise noted.

TABLE 10: Water Data for the Huntington City Springs

	<u>Big Bear Canyon Springs</u>	<u>Little Bear Canyon Springs</u>
Flow (gpm)	150	200
Elevation	7,300	8,000
Total Diss. Solids	298	315
pH	7.7	7.7
Total Alkalinity	270	214
Total Hardness	296	312
Specific Conductance (umhos)	458	492
Turbidity (NTU)	0.1	2.0

The above listed values were obtained from analyses performed on single samples from each spring collected by the Utah Division of Environmental

Health on November 2, 1977. The raw data sheets showing additional inorganic chemical analyses can be found in Section E of the Appendix.

NORTH EMERY SPRINGS

The North Emery Water Users Association also utilizes springs in Huntington Canyon to provide for domestic and industrial water needs in areas outside of Huntington City. Presently, the Association is utilizing water from three springs in Rilda Canyon as well as from four other springs in the same area which are shown on the Appendix map. Early in 1978, a composite water sample from all springs was obtained by the Utah Division of Environmental Health and analyzed by Ford Chemical Laboratory. The analytical results of the sample are shown as follows. Values are in milligrams per liter unless otherwise noted.

TABLE 11: Water Quality of North Emery Springs Composite

Total Diss. Solids	422
pH	7.5
Total Alkalinity	308
Total Hardness	374
Specific Conductance (umhos)	652
Turbidity (NTU)	0.3

Available data indicate that the combined flow from the seven springs is approximately 230 gallons per minute. However, this flow represents average conditions and does not account for seasonal highs and lows. In addition, flow information from individual springs was not available for input to this report. Water quality information on individual springs can be found in Section F of the Appendix.

MINE WATER

The intensive water monitoring program undertaken by Utah Power & Light in 1977 in Utah Power & Light Company's Wilberg and Deer Creek Mines was continued throughout 1978. No water was encountered in the Church Mines during the year; consequently, no monitoring occurred. The results of water monitoring within each mine will be addressed with respect to in-mine flows as well as mine discharge which occurred during 1978.

CHURCH MINES

As previously stated, the Church Mines are essentially dry and no measureable flows were observed during the year. Water was hauled from Orangeville City's Water Purification Plant to provide for culinary and domestic needs and the water for in-mine operation was hauled from the Mammoth Canal which is owned by the Cottonwood Creek Consolidated Irrigation Company. Total annual water requirements at the Church Mines amounted to 20 million gallons (60 acre-ft/yr.) during 1977 and 1978.

A pipeline has been proposed to transport excess water from the Wilberg Mine to the Church Mines. The project merits consideration because the Wilberg Mine discharge would be reduced and water hauling costs could be essentially eliminated. The plan is presently under study and a decision will be reached during 1979.

WILBERG MINE

The water monitoring system at the Wilberg Mine consisted of collecting samples from within the mine workings at locations that produced more than 0.1 gpm and from the discharge at the mine portal. Both water flows and water quality information was obtained.

In-Mine Monitoring: Mine workings were examined on a bimonthly basis to identify new sources of water and to collect samples in areas where

flows were judged to be significant (exceeding 0.1 gpm). In all cases, with but a single exception, water emanated from roof bolt drill holes. In the exception, water from the floor was encountered about 2,500 feet from the portal of the mine where the Pleasant Valley Fault intersects the mine workings (see Figure 1).

Monitoring of water from roof bolt holes indicates, in almost every instance, that the greatest flows are encountered shortly after mining has occurred in an area and that the flow diminishes rapidly as the active mining face advances away from the monitoring station as illustrated in Figure 2 and Table 12. Flow rates from individual stations usually start from one to four gpm, diminish to less than one-half gpm within one month and eventually dry up.

The collective water influx in each area where mining occurs usually ranges from four to ten gpm. The actual amount that is produced at any one time is a function of the rate of advance, the width of the advancing entries and the degree of mining that has already taken place. The total amount of water that is currently produced within the mine from the three working sections is estimated to average about 26 gpm. Continued monitoring in 1979 will try to ascertain the variability of monthly flows to determine if variations are related to seasons or other factors.

TABLE 12: Wilberg Mine - 2nd South Flow Measurements (gpm)

Location*	5/18/78	6/28/78	7/13/78	12/15/78
13-14, 3L	0.1	-	-	-
14, 3L	0.1	0.1	-	-
15, 3L	5.1	2.0	0.8	0.1
15, 2L	1.65	0.1	-	-
16, 3L	12	-	-	-
16-17, 2L	2.2	-	-	-
16, 2L-3L	5.5	-	-	-
16, 1L-2L	1.25	-	-	-
16, 1L	5.9	-	-	-
15-16, 1L	1.7	0.95	-	-
16, 1L-B	3.2	-	-	-
16, B	0.35	0.1	-	-

# WILBERG COAL MINE

EMERY COUNTY, UTAH

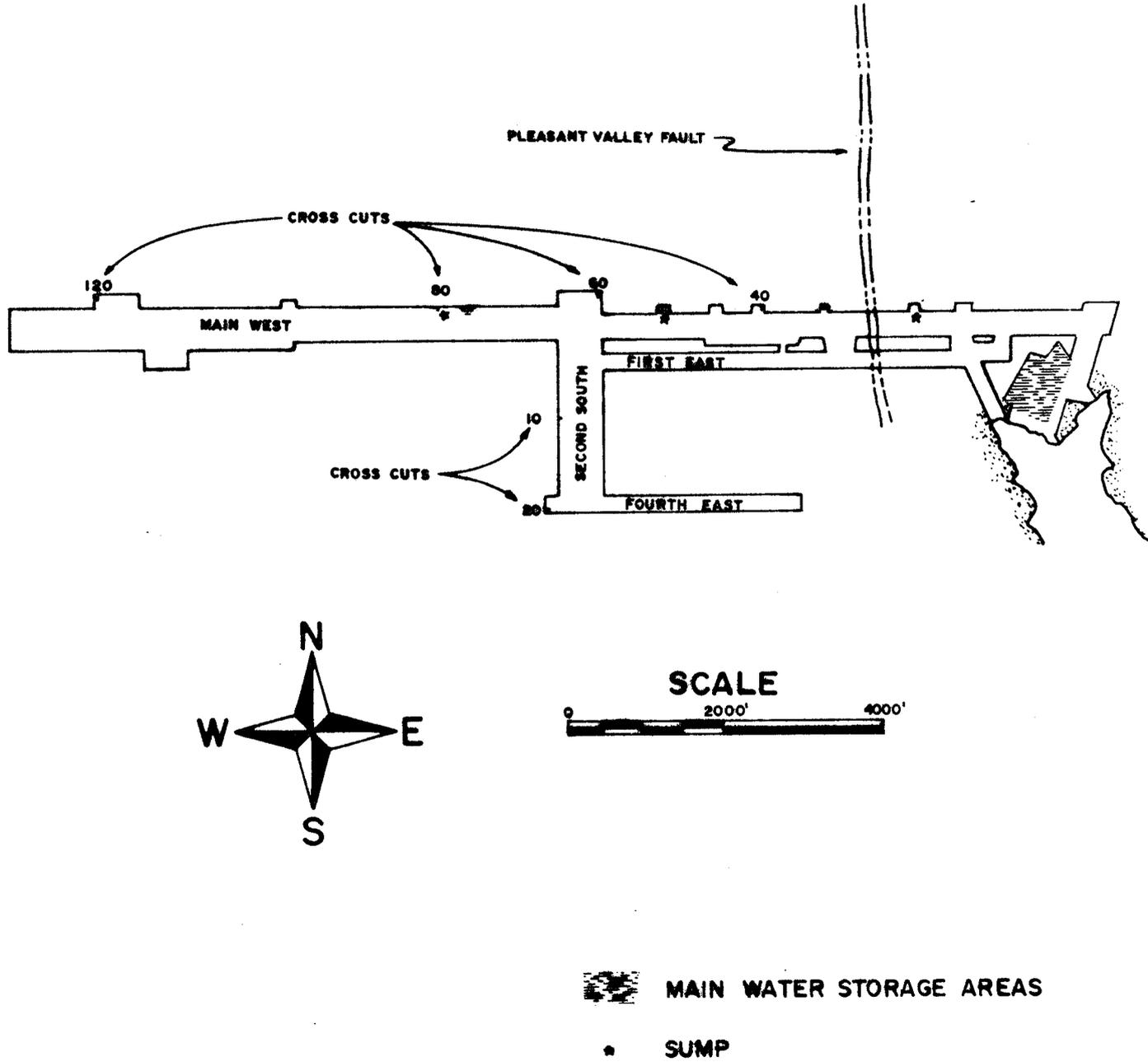


FIGURE 1

# 1978 WATER FLOW DATA FOR THE WILBERG MINE

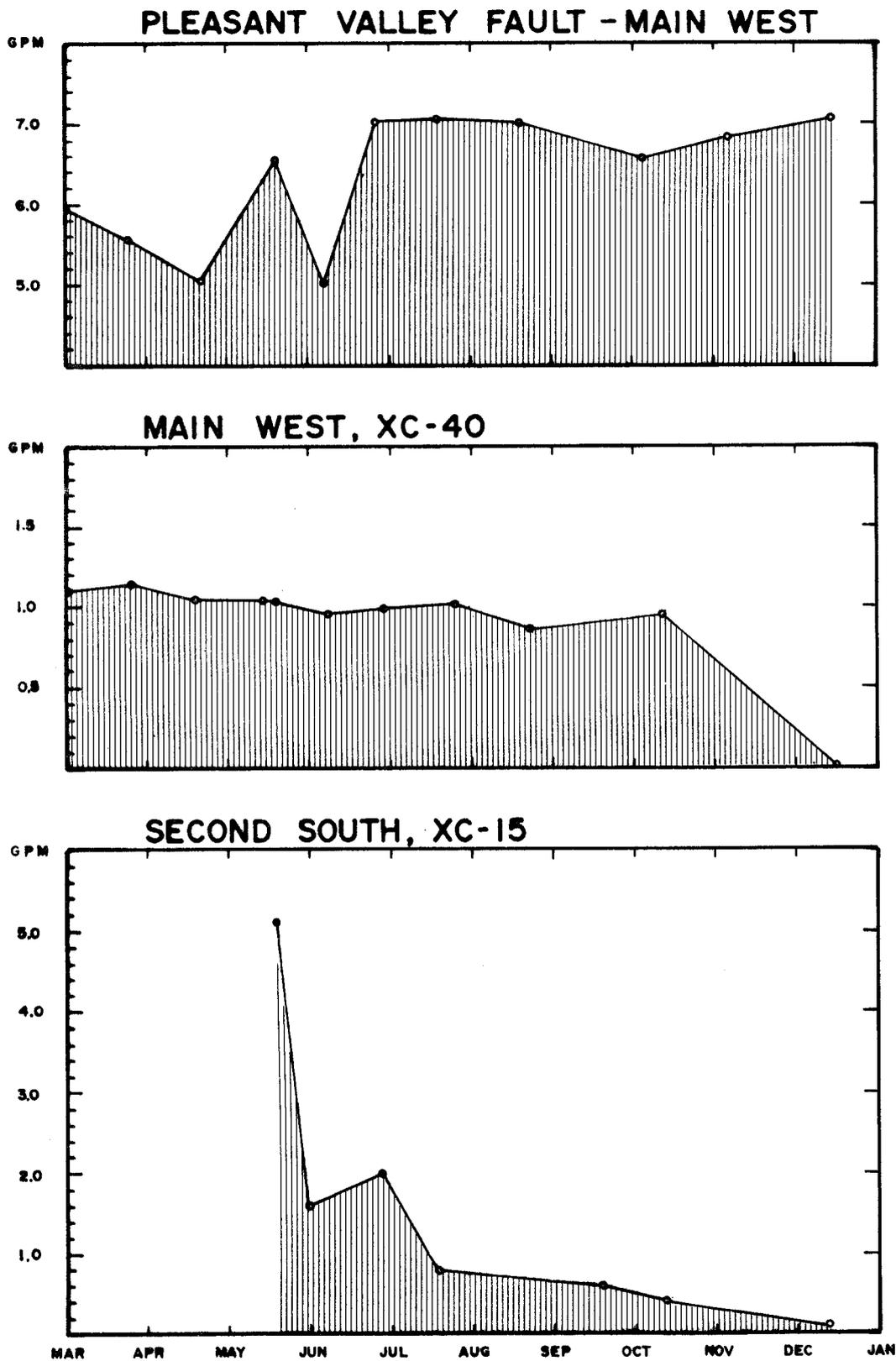


FIGURE 2

TABLE 12: Wilberg Mine - 2nd South Flow Measurements (gpm) - contd.

Location*	5/18/78	6/28/78	7/13/78	12/15/78
16-17, 3L		3.5	0.6	0.1
17, 3L		2.0	0.2	0.1
17, 2L-3L		0.8	0.1	0.1
17, 1R-2R		1.5	0.2	-
17-18, 2L		0.5	0.1	-
18-19, 3L		0.3	-	-
18-19, 2L		1.0	0.2	-
18-19, 1L		0.5	-	-
18, 1L-B		1.0	0.1	0.1
18, B-1R		0.5	-	-
18, 1R-2R		2.5	0.6	-
19, 3L			1.1	0.1
19, B			0.5	0.1
19, 1R			0.5	0.1
19, 1L			4.5	0.1
TOTALS	39.05	17.15	9.5	0.9

\*Cross-cut locations; B = Belt entry; 1R = 1st Right entry; 1L = 1st Left entry; etc.

The Second South section of the mine (see Figure 1) was selected for detailed study inasmuch as advances in that area indicated the presence of a significant body of incoming water. The information coupled in Table 12 illustrates the nature of water flows originating at single monitoring stations as well as the composite water production for the entire section from the time the section was opened in May to the time mining activities ceased in September. The data indicate that the section produced an abnormally high quantity of water when it was opened but that the water flow level decreased rapidly once the section was established even though mining advanced at earlier rates. These data may indicate that abnormally high water flows will be encountered when new sections are opened in areas that have not experienced any previous degree of mining. These data may also indicate that once a section is opened that it attains an equilibrium level within eight to ten weeks once the initial impact of mining in a new area has taken place.

Another area that is of interest is the First East area (see Figure 1) where flows on the order of four gpm characterize the section. It is interesting

to note that the steady flow rate that was in evidence at cross-cut 40 in Main West declined rapidly once mining activities were introduced to the adjacent area in First East (see Figure 2).

The greatest flow rates and the largest cumulative flow rate is characteristic of the Main West entry. Flow rates in excess of 1.0 gpm are commonly encountered within 150 feet of the face where about 60% of the 13 to 17 gpm produced by the section, occurs. These increased flow rates are characteristic of the entry because a majority of the mining occurs in this area (most rapid advance, new territory opened and wider entry) and because of the continuous contribution of from five to seven gpm contributed by the Pleasant Valley Fault Zone (see Figure 2). The fluctuations in the water flow rates at the fault may be related to seasonal water runoff, weather conditions and difficulties in estimating the actual water flow.

A general statement regarding one of the potential controlling factors that affects flow rates would be that the greatest flow rates are found in areas where the roof of the coal is composed of fine grained sandstone. In areas where thinly interbedded materials and mudstones overlie the Hiawatha coal seam, flow rates are generally lower. It is assumed that the semi-permeable porous sandstones provide better avenues for the movement of subsurface waters than do the impermeable mudstones and inter-bedded materials.

In-mine Quality: Eleven samples collected in late 1977 and the first half of 1978 from various monitoring stations from within the Wilberg Mine were analyzed by Ford Chemical (Appendix G). Some of the more important information from these samples are collated in Table 13. As shown by the averages in Table 13, the quality of the water in the Wilberg Mine is generally good. High TDS and hardness values are probably due to the presence of dissolved calcium carbonates which originate from water percolating through the calcareous

TABLE 13: Selected Water Quality Data for Wilberg Mine (1978) (mg/l)

<u>Location*</u>	<u>Date</u>	<u>Temp. (°C)</u>	<u>Alkal- inity</u>	<u>Hard- ness</u>	<u>pH</u>	<u>SO<sub>4</sub></u>	<u>TDS</u>	<u>Turbi- dity</u>	<u>O&amp;G</u>	<u>TSS</u>
<u>Main West</u>										
29-30, 1R	11-23-77	14.5	324	432	7.11	164.0	566.0	1.80	1.4	11.0
40, 1L	4-3-78	11.5	366	422	7.37	88.0	487.0	0.48	1.0	10.0
	6-28-78		366	128	8.18	89.0	510.0	0.43	1.0	3.0
57, B	1-6-78	14.0	336	384	7.45	84.0	460.0	0.55	10.5	1.0
80, 2R	11-23-77	15.3	352	370	7.47	82.0	459.0	0.67	1.0	12.0
	1-6-78	15.0	322	366	7.50	78.0	444.0	0.75	8.7	2.0
96, 2R	11-23-77		342	398	7.04	82.0	440.0	0.30	1.2	6.0
	1-6-78	15.5	318	364	7.49	80.0	452.0	0.86	6.5	2.0
	4-3-78		352	398	7.55	80.0	461.0	0.56	1.0	5.0
103, 3L	4-3-78		402	600	7.41	226.0	721.0	1.20	1.0	7.0
<u>2nd South</u>										
15, 3L	6-28-78	15.0	384	125	8.07	92.0	503.0	0.49	1.0	1.0
AVERAGES		<u>14.4</u>	<u>351</u>	<u>362</u>	<u>7.51</u>	<u>104.1</u>	<u>500.3</u>	<u>0.74</u>	<u>2.8</u>	<u>5.4</u>

\* Cross-cut locations and entries as described in Table 12.

formations that overlie the coal seams. The data indicate that the quality of water in the Wilberg Mine is generally uniform as evidenced by the lack of variability in the analytical data.

Collection Systems:

After water is discharged from the roof, it is collected in low areas and pumped to one of three sumps within the mine. These sumps are located in main west section at cross-cuts 20, 52 and 79 (see Figure 1). From the sumps, water is either pumped to the closest working face or to the primary sump which is located within the old mine workings near the mine portal. Total water storage within the primary sump has been estimated to be 2.25 million gallons. Pumping excess water into the primary sump has drastically reduced the discharge of water from the Wilberg Mine to Grimes Wash.

Discharge: During 1978, water produced in the mine which was not consumed during mining or not pumped into the primary sump was discharged into the Left Fork of Grimes Wash after passing through an oil skimmer. The location of the discharge point can be found on the location map in the Appendix. The water is discharged from the mine in accordance with the Wilberg Coal Mine discharge permit (UT-0011896) which is administered by the U.S. Environmental Protection Agency under the authority of the NPDES permit program.

The discharge from the Wilberg Mine was intermittent in 1978 in that most of the water was either consumed or stored within the mine workings. Water was discharged in the second and fourth quarters of 1978 only. The majority of the 5,340,640 gallons that were discharged in 1978 were discharged in the last quarter of the year. The major discharge occurred near the end of 1978 because of the need to empty the large sump so that its extremities could be surveyed.

<u>Quarter</u>	<u>Total Discharge (Gal.)</u>	<u># Days Discharge</u>	<u>Ave. Flow During Discharge (gpm)</u>
January - March	0		
April - June	523,080	4.64	78
July - August	0	0	
September - December	<u>4,817,600</u>	<u>15.96</u>	210
TOTALS	5,340,680	20.6	

Water quality samples were collected during periods of discharge in accordance with EPA and USGS requirements. An analysis of specific quality parameters is presented in the following Table. Additional information can be found on the analysis sheets from Ford Chemical Laboratory in Section H of the Appendix.

TABLE 14: Water Quality for Wilberg Mine Discharge

<u>Parameter</u>	<u>No. of Samples</u>	<u>Quality Data (mg/l)</u>			<u>Permit Limits</u>		
		<u>Min.</u>	<u>Ave.</u>	<u>Max.</u>	<u>Min.</u>	<u>Ave.</u>	<u>Max.</u>
pH	4	7.18	7.64	8.15	6.5	-	9.0
BOD <sub>5</sub>	5	1.0	2.12	3.4	-	-	-
Coliforms: Total	2	0.2	0.75	1.3	-	-	-
Coliforms: Fecal	2	.2	.2	.2	-	-	-
Acidity	3	10	14.67	20	-	AK7AC	8888
Alkalinity	4	238	251	266	-	AK7AC	-
Oil and Grease	6	1.3	5.25	19.6	-	-	10
TSS	6	1.0	4.8	8.0	-	25	30
TDS	6	461	495.8	552	-	-	879
Iron: Total	6	0.046	0.085	0.165	-	3.5	7.0
SO <sub>4</sub>	3	140	173	206	NA	NA	NA

A single permit violation for the oil and grease content of discharged waters was recorded on March 31, 1978. The violation was caused by an inadvertant

bypass of the oil skimmer during March's discharge. The oil skimmer has since been included in the discharge system.

#### DEER CREEK MINE

The water sampling and monitoring system for the Deer Creek Mine is not advanced to the level of the Wilberg Mine. On the whole, water production in the Deer Creek Mine is not as easily measured as the Wilberg Mine because much of it originates in mined areas that are no longer accessible, instead of at the working faces.

In-mine Monitoring: Nearly all sections in the Deer Creek Mine are producing water at the present time. The wettest areas in the mine include the extreme western portion of First West which has been flooded since <sup>temporary</sup> abandonment several years ago and Second South in the vicinity of the Pleasant Valley Fault (Figure 3). As in the Wilberg Mine, water is discharged from the roof in all areas with the exception of Second South along the Pleasant Valley Fault where water is discharged from the floor. Water is ponded several inches deep in most of this area and discharges are very difficult if not impossible to monitor.

The most significant monitoring station established in the Deer Creek Mine is located in Third South where the advance of mining activities intersected drill hole EM-3 that was drilled from the surface about 1,800 feet above the mine. Flows have been monitored on a weekly basis since the drill hole was encountered in September 1978 and flows have continually been recorded at 15 gpm.

The best estimate of in-mine water production is based on the amount of water that is discharged from the mine because water flow estimates for each section of the mine are difficult to ascertain due to access problems to water in-flow sites. Discharge data indicates that about 35 million gallons

# DEER CREEK COAL MINE

EMERY COUNTY, UTAH

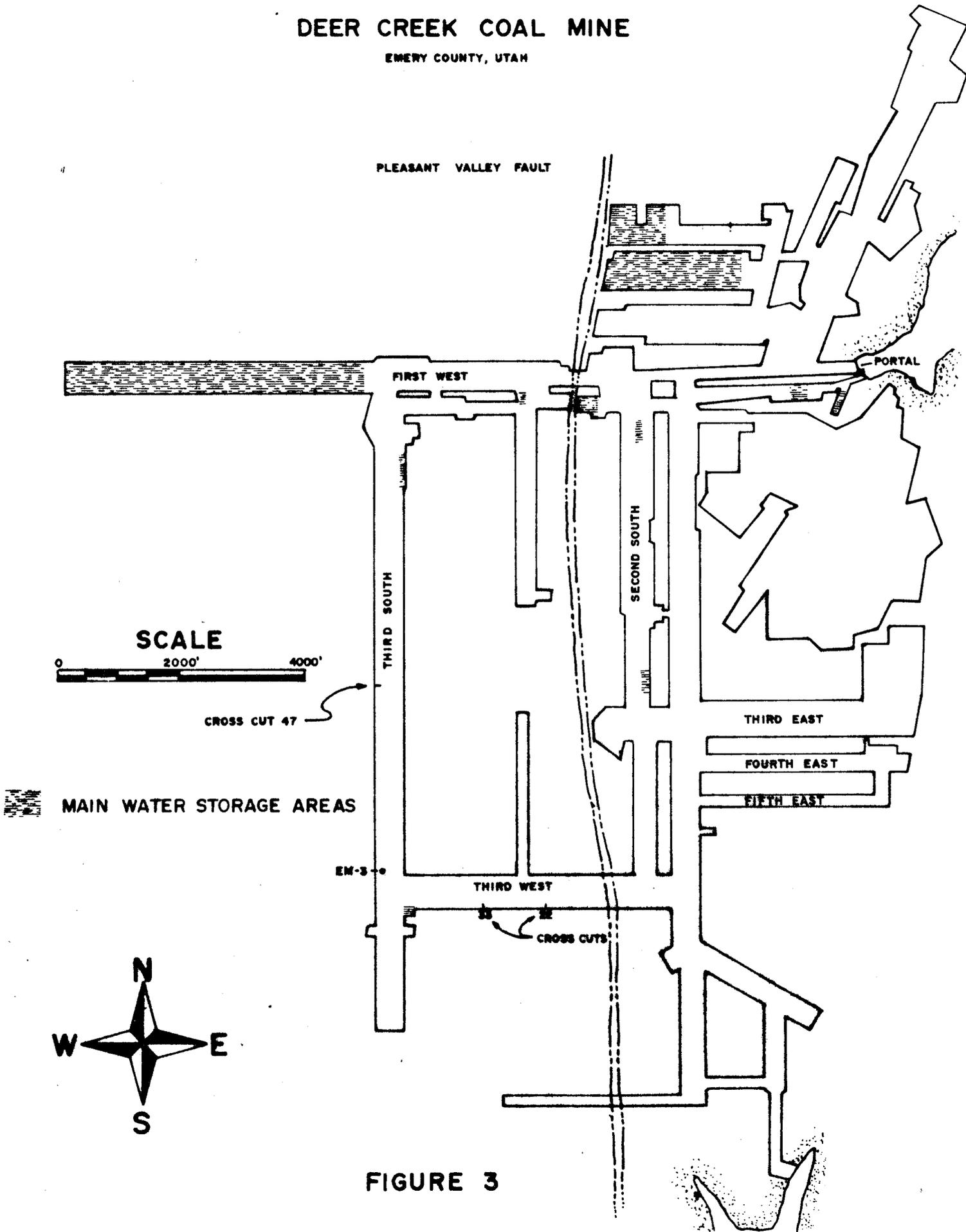


FIGURE 3

of water was discharged from the Deer Creek Mine in 1978. The six to eight advancing sections that were in operation at various times throughout the year each contributed to the discharge which indicates that each section produces on the order of five million gallons per year (9.5 gpm) in excess of that which is consumed in the mine. This flow rate is quite similar to that established for the Wilberg Mine.

As in the case with the Wilberg Mine, the excess of 60% of the total water produced in the Deer Creek Mine probably originates within 500 feet of the working mine face. The greatest flows are usually related to sandstone roof materials that, in places, directly overlie the coal seam (Blind Canyon Seam).

In-Mine Quality: An analysis of the water quality parameters shown in the following table indicates that the chemical quality of the water in Deer Creek is similar to that of the Wilberg Mine. The total dissolved solids concentration is higher in Deer Creek as is the alkalinity and total hardness. Additional quality parameters from the Deer Creek in-mine waters can be found in Section I of the Appendix.

TABLE 15: Selected Water Quality Data for the Deer Creek Mine (1978)

<u>Parameter</u>	<u>Third West</u>		<u>5th East</u>	<u>3rd South</u>
	<u>X22-23</u>	<u>X33-34</u>		
Alkalinity	420	420	554	318
Total Hardness	499	532	-	416
pH	7.38	7.28	7.16	7.65
Sulfate	156	154	155	40
Total Dissolved Solids	633	655	650	583
Turbidity	0.41	0.94	1.7	6.6

The values in Third West at cross-cut 22-23 represent average values for two samples taken during the year. All other values are based on single samples.

Collection System: Excess water that is not needed for operations in either discharged or pumped to inactive workings and sumps within the mine. The locations of the main sump areas within the Deer Creek Mine are shown in Figure 3. A majority of the water in the mine is stored in the western part of First West, an area that has been <sup>temporarily</sup> abandoned for several years, and in the old McKinnon Mine workings.

Discharge: Excess mine water not used for operation or pumped to the sump areas inside existing mine workings is discharged from the mine at the portal. The water passes through an oil skimmer and flows through a two foot rectangular weir prior to being conveyed into a six inch pipeline to Utah Power & Light's Huntington Power Plant raw water settling pond. The mine water is added to Huntington Creek water in the pond and is totally consumed in the power plant cooling process. It should be emphasized that none of the water leaving the mine portal is discharged to Huntington Creek.

Unlike the intermittent discharges that are occurring at the Wilberg Mine, the Deer Creek discharges have been fairly continuous throughout the year. Mine discharge water measurements and water quality samples have been obtained at the flow measuring weir located just outside the mine portal. Measurements have been taken at irregular intervals during the year. However, based on 1978 flow observations and a record of pump capacities and operating time during the year, the discharge from the Deer Creek Mine during 1978 is estimated to be about 35 million gallons. During the day when pumps in the mine are operating, the discharge has been measured at 200 gpm, while at night the flow appears to be much less, the quantity of which is not known.

Three samples of the Deer Creek discharge were obtained during the year by Utah Power & Light personnel and the samples were analyzed by Ford Chemical Laboratory. Analytical results of the samples are shown in the following table and raw data sheets can be found in Section J of the Appendix.

TABLE 16: Water Quality for Deer Creek Mine Discharge

<u>Parameter</u>	<u>Values (mg/l)</u>		
	<u>Ave.</u>	<u>Max.</u>	<u>Min.</u>
pH	7.17	7.19	7.14
Conductivity (umhos)	887	1220	710
Total Suspended Solids	25.0	62.0	4.0
Total Dissolved Solids	587	800	480
Alkalinity (CaCO <sub>3</sub> )	273	332	244
Sulfate	129	140	112

DRILL HOLE MONITORING

Commencing in 1976, Utah Power & Light Company initiated an extensive coal drilling program on East Mountain in order to determine coal reserves on existing coal leases. To date, 36 exploration holes have been drilled. Generally, the well site geologist has been recording pertinent information on geology and hydrology during drilling. However, in most cases, the drilling chemicals or mud injected into the drill holes created unfavorable conditions to collect accurate information concerning the volume of water flow, static water level or water quality data. From the hydrologic information thus far collected in the drill holes, the following generalities can be made:

1. Small quantities of ground water ( 2 gpm) are intersected in the top 100 feet of the holes.
2. Ground water is present in the numerous fractures or "joints" present in the rock which are intersected in the holes.
3. The Castlegate Sandstone, which is usually penetrated in these holes, contains damp to wet zones.
4. The static water level varies from one drill hole to another depending on the fractures intersected in the holes, the structure of the region, distance from outcrops or other geologic factors.

5. The Blackhawk Formation, the formation in which the coal seams occur, contains perched water tables that are intersected by drill holes.

After completion of the exploration drill holes on East Mountain, they are normally sealed from top to bottom with a cement plug. However, two of the shallower holes drilled in late 1978 were developed into permanent water monitoring stations. One hole, EM-31, mentioned in the previous section, is located in Cottonwood Canyon and the other hole, EM-47, is located in Rilda Canyon to the north (See Figure 4). Each of these holes was drilled from the surface with a 9-3/4 inch diameter bit. Four inch I.D. casing, which was perforated, was lowered in each hole and the annular formed between the casing and hole wall was gravel packed. The top 50 feet of the casing annular was sealed with a cement plug. Both sites are designed to permit the collection of hydrologic data. The specific data relating to the development of these water monitoring stations are as follows:

<u>Hole No.</u>	<u>Total Depth</u>	<u>Casing Perforated</u>		<u>Area of Perforations Square Inches</u>	<u>Static Water Level At Time Developed</u>
		<u>From</u>	<u>To</u>		
EM-31	280 feet	190	250	126	55 feet
EM-47	300 feet	210	270	76	145 feet

The type of data to be collected from the two wells includes:

1. Static water level.
2. Recharge time to static water level.
3. Water quality information.

Both drill holes were completed through the Hiawatha Coal Seam and into the underlying Star Point Sandstone.

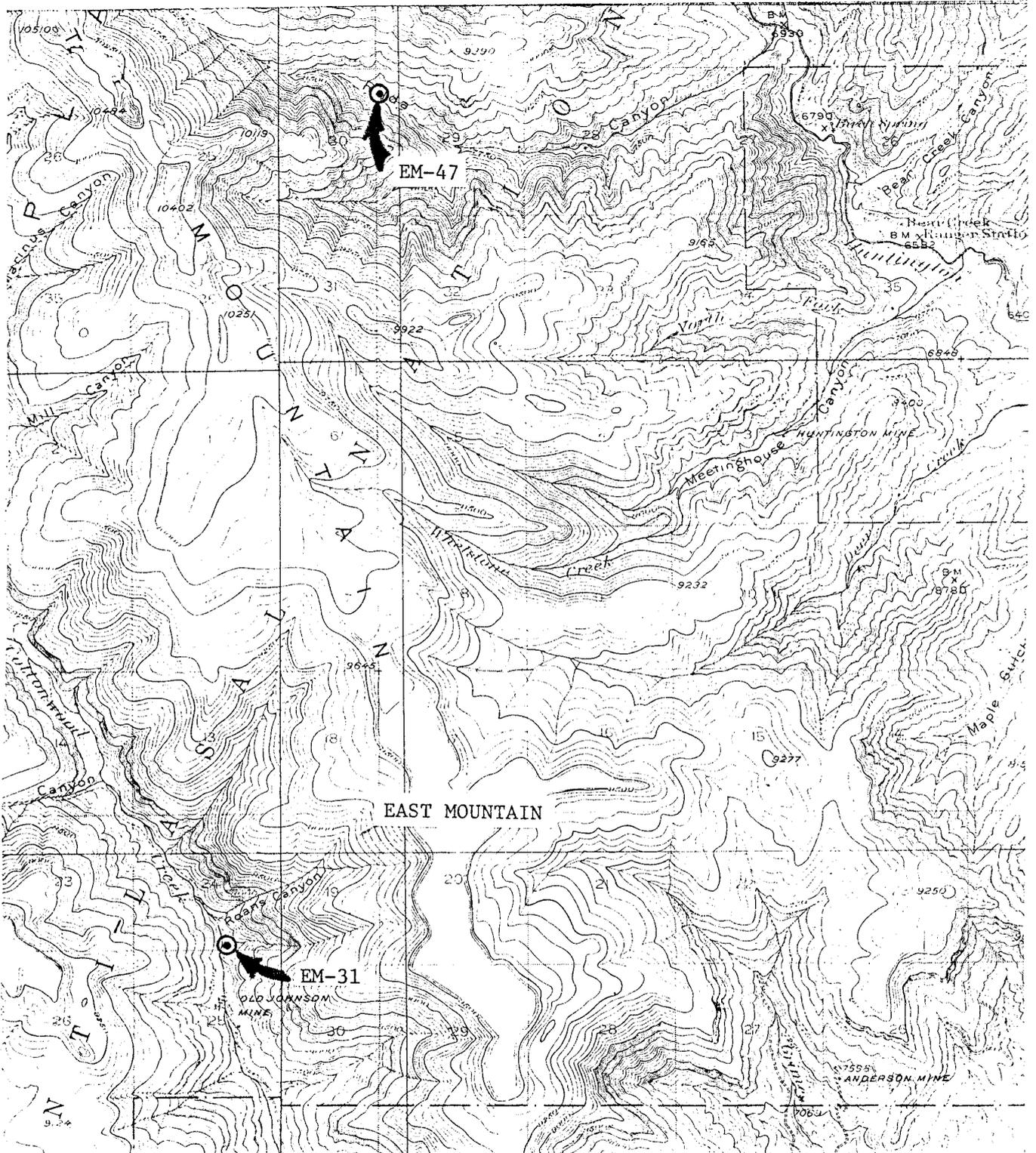


Figure 4  
Drill Hole Water Monitoring Stations  
Scale 1" = 1 Mile

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 second annual report submitted concerning this area. The information compiled and interpreted in this report were obtained from numerous governmental agencies and was supplemented by data collected by Utah Power & Light Company.

Water flow and quality information were collected from both surface and subsurface locations in the area. Samples and measurements were taken from surface streams, springs, mine discharges, underground mine workings and drill holes. The data compiled to date indicates that the streams in the area are characterized by a high quality level, except for local high concentrations of sulfate, high hardness and excessive turbidity. A pronounced progressive decrease in the quality of stream waters is evident in the downstream stations monitored. The springs in the area are characterized by low and extremely variable flows (which is a function of rainfall and climate) and very high quality except for high hardness due to the high calcium content of the earth materials from which the springs emanate.

The underground mine workings produce on the average of about nine gpm per working section for those mines that are wet (the Church Mine is a dry mine). Water is produced primarily from the area within 500 feet of the working face where the greatest disturbance of earth materials is taking place. Constant water flows emanate from faults that intersect the mine workings. In-mine water quality is characterized by moderate dissolved solids and high hardness due to the high  $\text{CaCO}_3$  content of the sediments through which

mine waters percolate. In general, with the exception of hardness and dissolved solids, mine waters are very high in quality, more so than the quality of water normally encountered in the streams in the area.

The quantity of water discharged from the mines is uniform for the Deer Creek Mine (35 million gallons per year) and highly variable from the Wilberg Mine (5.3 million gallons). Water qualities are generally high with the exception of hardness, sulfate and total dissolved solids and occasional minor concentrations of oil and grease.

Utah Power & Light completed two exploration drill holes that were converted to water monitoring stations in 1978. No samples have yet been collected but the drill holes will be monitored on an ongoing basis in the future.

The compilation of the data for this report identified a few locations where an inadequate number of samples were collected. Changes will be made in the 1979 water monitoring program to insure that the monitoring network is complete and that all samples that are necessary to permit a detailed analysis of the hydrology of the area, are collected.

**APPENDIX A**

**Huntington Creek Stream Flows**

UTAH POWER & LIGHT COMPANY  
STREAM DISCHARGE RECORDS

STATION HUNTINGTON CREEK BELOW ELECTRIC LAKE  
DATE OCT77SEP78

DAILY DISCHARGE (CFS)  
MONTHS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.60	6.60	6.60	6.40	6.90	6.60	6.50	6.50	18.00	14.00	65.00	17.00
2	6.60	6.60	6.60	6.40	6.90	6.60	6.40	6.80	19.00	14.00	156.00	17.00
3	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
4	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
5	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
6	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
7	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
8	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
9	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
10	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
11	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
12	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
13	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
14	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
15	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
16	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
17	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
18	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
19	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
20	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
21	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
22	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
23	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
24	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
25	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
26	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
27	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
28	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
29	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
30	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
31	6.60	6.60	6.60	6.40	6.80	6.60	6.40	6.60	19.00	14.00	156.00	17.00
MONTHLY												
TOT	233.50	198.00	198.30	205.90	188.70	204.70	199.40	410.00	493.00	448.00	918.00	461.00
MEA	7.53	6.60	6.40	6.64	6.74	6.60	6.65	13.20	16.40	14.50	29.60	15.40
MAX	13.00	6.60	6.60	6.90	6.90	6.70	7.00	18.00	19.00	19.00	166.00	17.00
MIN	5.20	6.60	5.30	6.40	6.60	6.60	6.40	6.50	13.00	10.00	15.00	14.00
ACR FT	463.00	393.00	393.00	408.00	374.00	406.00	396.00	813.00	978.00	889.00	1820.00	914.00
OCT77SEP78	TOTAL		4158.50	MEAN	11.40	MAX	166.00	MIN	5.20	TOT ACR FT		8250.00
	TOTAL			MEAN		MAX		MIN		TOT ACR FT		
MAX UNIT DISCHARGE			170.00 CFS (2.90 FT)	DATE	AUG 2	MIN UNIT DISCHARGE		0.53 CFS	DATE	DEC 14		

REMARKS:

UTAH POWER & LIGHT COMPANY  
STREAM DISCHARGE RECORDS

STATION HUNTINGTON CREEK AT PLANT  
DATE OCT77TOSEP78

DAILY DISCHARGE (CFS)  
MONTHS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
2	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
3	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
4	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
5	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
6	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
7	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
8	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
9	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
10	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
11	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
12	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
13	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
14	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
15	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
16	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
17	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
18	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
19	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
20	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
21	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
22	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
23	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
24	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
25	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
26	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
27	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
28	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
29	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
30	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00
31	11.00	38.00	5.70	12.00	25.00	25.00	39.00	85.00	318.00	244.00	133.00	81.00

MONTHLY	TOT	MEAN	MAX	MIN	ACR FT
	523.70	16.90	30.00	7.70	1040.00
	593.00	19.80	40.00	5.20	1180.00
	504.20	16.30	29.00	1.20	1000.00
	605.60	19.50	35.00	3.30	1200.00
	618.00	22.10	29.00	12.00	1230.00
	733.00	23.60	36.00	11.00	1450.00
	1292.00	43.10	77.00	31.00	2560.00
	5859.00	189.00	356.00	63.00	11620.00
	12791.00	426.00	585.00	257.00	25370.00
	4769.00	154.00	244.00	112.00	9460.00
	3797.00	122.00	309.00	64.00	7530.00
	1669.00	55.60	81.00	30.00	3310.00

OCT77TOSEP78 TOTAL 33754.50 MEAN 92.50 MAX 585.00 MIN 1.20 TOT ACR FT 66950.00  
 TOTAL MEAN MAX MIN TOT ACR FT  
 MAX UNIT DISCHARGE 610.00 CFS DATE JUN 10 MIN UNIT DISCHARGE 0.0 CFS DATE SEP 14  
 (3.73 FT)

REMARKS:



APPENDIX B

Huntington Creek Water Quality









**APPENDIX C**

**Cottonwood Creek Water Quality**



**APPENDIX D**

**Grimes Wash Water Quality**

LIST \*1

STORET DATE 79/01/09

100200521151 SL17S07E2215  
 39 19 24.0 111 07 11.0 2  
 WILBERG MINE NO. 2  
 49015 UTAH  
 COLORADO RIVER BASIN 14 110691  
 GREEN RIVER BASIN 05  
 113FORS4  
 0000 CLASS 00

/TYPA/AMBNT/STREAM

PARAMETER				NUMBER	MEAN	VARIANCE	STAN DEV	COEF VAR	STAND ER	MAXIMUM	MINIMUM	BEG DATE	END DATE
00011	WATER	TEMP	FAHN	6	50.3333	106.270	10.3087	.204809	4.20851	62.0000	32.0000	75/05/05	76/11/08
00021	AIR	TEMP	FAHN	6	61.6337	179.871	13.4116	.217485	5.47526	78.0000	42.0000	75/05/05	76/11/08
00060	STREAM	FLOW	CFS	6	.716667	.201667	.449073	.626614	.183333	1.50000	.300000	75/05/05	76/11/08
00300	DO		MG/L	6	8.33333	.633333	.816515	.097982	.333341	9.00000	7.00000	75/05/05	76/11/08
00400	PH		SU	6	9.08333	.041699	.204204	.021481	.083366	9.50000	9.00000	75/05/05	76/11/08
00410	T ALK	CAC03	MG/L	6	291.833	1769.42	42.0645	.144139	17.1728	343.000	223.000	75/05/05	76/11/08
00500	OIL-GRSE	TOT-SXLT	MG/L	7	9.45714	63.6228	7.97639	.843425	3.01479	21.8000	1.00000	75/05/05	76/11/08
00650	T P04	P04	MG/L	7	.238571	.027048	.164062	.689364	.062161	.500000	.100000	75/05/05	76/11/08
00900	TOT HARD	CAC03	MG/L	6	348.667	2559.61	50.5926	.145103	20.6543	446.000	308.000	75/05/05	76/11/08
00916	CALCIUM	CA-TOT	MG/L	7	76.3542	2516.78	50.1675	.657037	18.9615	154.000	41.6000	75/05/05	76/11/08
00927	MGNESIUM	MG,TOT	MG/L	7	67.3571	1303.40	36.1027	.535990	13.6455	112.000	34.5000	75/05/05	76/11/08
00940	CHLORIDE	CL	MG/L	7	10.5000	17.0833	4.13120	.391638	1.56290	18.0000	6.00000	75/05/05	76/11/08
00945	SULFATE	S04-TOT	MG/L	7	108.714	3537.67	59.4783	.590566	22.4807	190.000	43.5000	75/05/05	76/11/08
00951	FLUORIDE	F,TOTAL	MG/L	7	.222857	.011557	.107505	.482393	.040633	.390000	.100000	75/05/05	76/11/08
00956	SILICA	TOTAL	MG/L	7	4.25857	10.0500	3.16307	.742754	1.19553	11.0000	2.40000	75/05/05	76/11/08
01002	ARSENIC	AS,TOT	UG/L	7	7.28526	21.5690	4.64425	.637434	1.75536	10.0000	.000000	75/05/05	76/11/08
01032	CHROMIUM	HEX-VAL	UG/L	7	4.85728	34.3079	5.89982	1.21463	2.32902	16.0000	.000000	75/05/05	76/11/08
01042	COPPER	CU,TOT	UG/L	7	7.57828	30.8316	5.51262	.732702	2.09869	15.0000	.048000	75/05/05	76/11/08
01147	SELENIUM	SE,TOT	UG/L	7	7.28526	21.5690	4.64425	.637434	1.75536	10.0000	.000000	75/05/05	76/11/08
31501	TOT COLI	MFIMENDO	/100ML	6	324.167	350500	592.031	1.83765	241.695	1500.00	.000000	75/05/05	76/11/08
31616	FEC COLI	MFIM-FCBR	/100ML	6	480.333	996433	998.215	2.07817	407.519	2500.00	.000000	75/05/05	76/11/08
31673	FECSTREP	MEKFAGAR	/100ML	6	93.6667	16533.9	128.701	1.37403	52.5418	340.000	.000000	75/05/05	76/11/08
70290	RES-SUSP	AT 180 C	MG/L	7	858.028	2523904	1588.68	1.85155	600.465	4376.00	3.00000	75/05/05	76/11/08
71850	NITRATE	TOT-N03	MG/L	7	.222857	.027624	.166205	.745792	.062819	.440000	.040000	75/05/05	76/11/08
74010	IRON	FE	MG/L	7	.312999	.086362	.293873	.938494	.111074	.840000	.050000	75/05/05	76/11/08

1002 521251 SL17S07E2702  
 39 19.09.0 111.07.18.0 2  
 WILBERG MINE NO. 3  
 49015 UTAH  
 COLORADO RIVER BASIN 14 110691  
 GREEN RIVER BASIN 05  
 113FORS4  
 000000 CLASS 00

/TYPA/AMBNT/STREAM

PARAMETER	NUMBER	MEAN	VARIANCE	STAN DEV	COEF VAR	STAND ER	MAXIMUM	MINIMUM	BEG DATE	END DATE
00 11 WATER TEMP FAHN	46	48.8043	81.2736	9.01519	.184721	1.32922	72.0000	36.0000	75/03/17	78/09/12
00 21 AIR TEMP FAHN	46	56.7826	221.597	14.8461	.262160	2.19484	84.0000	39.0000	75/03/17	78/09/12
00 63 STREAM FLOW CFS	46	.829998	.353269	.596044	.718127	.087302	3.0000	.0800	75/03/17	78/09/12
00 300 DO MG/L	44	10.1477	6.33219	2.51642	.247974	.379365	16.0000	7.0000	75/03/17	78/08/22
00 400 PH SU	46	8.98259	.125917	.354840	.039504	.052319	9.5000	8.1000	75/03/17	78/09/12
00 410 T ALK CAC03 MG/L	46	417.652	13451.1	115.979	.277693	17.1002	720.000	137.000	75/03/17	78/09/12
00 530 RESIDUE TOT NFLT MG/L	25	292.080	295534	543.630	1.86124	108.726	250.000	3.0000	77/01/17	78/09/12
00 550 OIL-GRSE TOT-SXLT MG/L	38	3.18947	18.6020	4.32207	1.35517	.701165	22.5000	.1000	75/03/17	78/08/22
00 620 NO3-N TOTAL MG/L	25	.704799	2.98025	1.72634	2.44941	.345268	8.0000	.0300	77/01/17	78/09/12
00 650 T P04 MG/L	22	.133045	.032609	.051077	.383909	.017890	.3000	.0600	75/03/17	76/12/13
00 655 PHOS-TOT MG/L P	25	.024400	.001281	.016963	.694284	.043394	.0700	.0100	77/01/17	78/09/12
00 720 CYANIDE CN-TOT MG/L	1	1.0000					1.0000	1.0000	77/03/15	77/03/15
00 740 SULFITE SO3 MG/L	1	.418000					.418000	.418000	76/10/26	76/10/26
00 900 TOT HARD CAC03 MG/L	46	641.022	48070.4	219.250	.331683	32.3266	1509.00	308.000	75/03/17	78/09/12
00 916 CALCIUM CA-TOT MG/L	19	102.626	4178.62	64.6423	.629801	14.8300	312.000	28.0000	75/03/17	76/12/13
00 927 MANGSIUM MG,TOT MG/L	17	93.1917	7351.29	85.7397	.920135	20.7949	364.000	32.2000	75/03/17	76/12/13
00 940 CHLORIDE CL MG/L	22	15.1000	22.6585	4.76009	.315238	1.01485	26.0000	6.0000	75/03/17	77/02/14
00 945 SULFATE SO4-TOT MG/L	41	271.407	23053.2	151.833	.559428	23.7123	720.000	11.7000	75/03/17	78/08/22
00 951 FLUORIDE F,TOTAL MG/L	39	.243076	.035548	.074185	.306427	.011927	.5000	.0900	75/03/17	78/08/22
00 956 SILICA TOTAL MG/L	19	5.24473	12.6405	3.54126	.675203	.812421	17.0000	1.6500	75/03/17	76/12/13
010 02 ARSENIC AS,TOT UG/L	38	3.36055	16.4732	4.05872	1.20668	.658411	12.0000	.0500	75/03/17	78/08/22
010 07 BARIUM BA,TOT UG/L	1	116.000					116.000	116.000	77/02/14	77/02/14
010 27 CADMIUM CD,TOT UG/L	18	1.0000	.000000	.000000		.000000	1.0000	1.0000	77/01/17	78/08/22
010 32 CHROMIUM HEX-VAL UG/L	19	3.47079	21.4773	4.63456	1.31671	1.06319	20.0000	.0100	75/03/17	76/12/13
010 34 CHROMIUM CR,TOT UG/L	19	1.02632	.013159	.114713	.111771	.026317	1.5000	1.0000	77/01/17	78/08/22
010 42 COPPER CU,TOT UG/L	20	14.9027	111.180	33.3467	2.23743	7.45587	150.000	.0100	75/03/17	77/02/14
010 45 IRON FE,TOT UG/L	20	32.0720	6481.96	80.5106	2.51031	18.0027	254.000	.012000	77/01/17	78/08/22
010 51 LEAD PB,TOT UG/L	20	2.10000	13.1474	3.62593	1.72663	.810733	17.0000	1.0000	77/01/17	78/08/22
010 53 MANGNESE MN UG/L	22	26.1818	920.061	29.8003	1.13821	6.35346	110.000	1.0000	76/06/14	78/08/22
010 47 SELENIUM SE,TOT UG/L	39	3.28267	16.3090	4.03843	1.23023	.640007	13.0000	.0400	75/03/17	78/08/22
31501 TOT COLI MFIMENDO /100ML	45	39.9778	9924.07	94.9051	2.37620	14.1610	520.000	.000000	75/03/17	78/09/12
31616 FEC COLI MEM-FCBR /100ML	45	23.3555	6218.41	78.8569	3.37637	11.7593	450.000	.000000	75/03/17	78/09/12
31673 FECSTREP MKKFAGAR /100ML	20	59.8000	7389.85	85.9642	1.43753	19.2200	280.000	.000000	75/03/17	76/11/08
70290 RES-SUSP AT 180 C MG/L	22	58.2500	4634.99	68.0897	1.16877	14.5149	246.000	1.6000	75/03/17	76/12/13
70300 RESIDUE DISS-180 C MG/L	25	765.400	72780.6	269.779	.352468	53.9508	1400.00	490.000	77/01/17	78/09/12
71850 NITRATE TOT-NO3 MG/L	22	.305909	.054739	.231965	.764819	.049831	1.16000	.010000	75/03/17	76/12/13
71950 ZINC ZN, EXTR UG/L	1	.300000					.300000	.300000	76/11/08	76/11/08
74010 IRON FE MG/L	19	.451315	1.61440	1.27059	2.81531	.291494	5.68000	.030000	75/03/17	76/12/13

**APPENDIX E**

**Huntington City Springs**

**Water Quality**

# Ford Chemical

## LABORATORY, INC.

Bacteriological and Chemical Analysis

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

Lab. Sample No.

701

**F- 778047**

Date Analysis Started 11-4-77

Date Received 11-4-77

Date Collected 11/02/77 Time Collected 7:30 610  
 mo. dy. yr. 714  
 Supply Owned by HUNTINGTON CITY 712  
 Sample Collected by SCANLAN 713  
 Exact Description of Sampling Point BIG BEAR SPRING COMP 646  
OSITE 647 710  
 Name GRANT WILSON 715  
 Address HUNTINGTON CITY 648 717  
 Phone No. 718  
 Water Syst. No. 706 Source No. 704 Water Rights No. 707  
 River Mile Code 706 Merd. 711 Township 716 Range 720 Section 721 QTRSC 726 QTRQR 705  
 TYPE OF SOURCE TABLE  
 01 Spring 15 Tunnel  
 02 Well 03 Stream 18 Artesian well  
 04 Lake 06 Dist. syst. 19 Swimming pool  
 07 Effluent 08 Storm sewer 14 Other  
 WATER USE TABLE  
 1. Culinary 2. Agriculture 3. Industrial 4. Other  
 708 Current 1 709 Proposed  
 COUNTY CODE TABLE  
 01 Beaver 16 Piute 02 Box Elder 17 Rich 03 Cache 18 Salt Lake 04 Carbon 19 San Juan 05 Daggett 20 Sanpete 06 Davis 21 Sevier 07 Duchesne 22 Summit 08 Emery 23 Tooele 09 Garfield 24 Uintah 10 Grand 25 Utah 11 Iron 26 Wasatch 12 Juab 27 Washington 13 Kane 28 Wayne 14 Millard 29 Weber  
 719 Sample Source 01 708 County 07  
 Flows CFS 659

### CHEMICAL ANALYSIS

	mg/l	ug/l	mg/l			
Arsenic		<u>00</u>	723	Bicarbonate	<u>329</u>	758
Barium		<u>660</u>	724	Carbonate		760
Boron		<u>200</u>	725	Chloride		763
Cadmium	<u>00</u>	<u>00</u>	727	Fluoride	<u>014</u>	765
Calcium	<u>00</u>	<u>00</u>	728	Hydroxide	<u>015</u>	767
Chromium		<u>00</u>	729	Nitrate as N	<u>000</u>	605
Chromium, Hex. as Cr		<u>00</u>	730	Nitrite as N		606
Copper		<u>40</u>	732	Phosphorus, Ortho as P		607
Iron	<u>012</u>	<u>270</u>	733	Silica, dissolved as SiO <sub>2</sub>		750
Iron, Total	<u>012</u>	<u>1000</u>	734	Sulfate	<u>29</u>	772
Lead	<u>29</u>		737	pH Units	<u>7.7</u>	782
Magnesium		<u>20</u>	738	TDS @ 180° C	<u>298</u>	786
Manganese		<u>02</u>	739	Phosphorus, Tot.		785
Mercury, Total		<u>00</u>	740	Surfactant as MBAS	<u>00</u>	773
Nickel	<u>1</u>		742	Total Alk. as CaCO <sub>3</sub>	<u>270</u>	752
Potassium		<u>00</u>	743	Total Hardness as CaCO <sub>3</sub>	<u>296.0</u>	754
Selenium		<u>00</u>	744			
Silver	<u>3</u>		745			
Sodium		<u>50</u>	749			
Zinc						
Turbidity, as NTU		<u>0.1</u>	757			
Specific Cond. @ 25° C, $\mu$ mhos/cm		<u>458</u>	762			

### TOTAL METALS ANALYSIS

	mg/l	ug/l	ug/l
Arsenic			660
Barium			661
Cadmium			662
Chromium			663
Copper			664
Iron			665
Lead			666
Manganese			
Mercury			739
Nickel			667
Selenium			668
Silver			669
Zinc			670

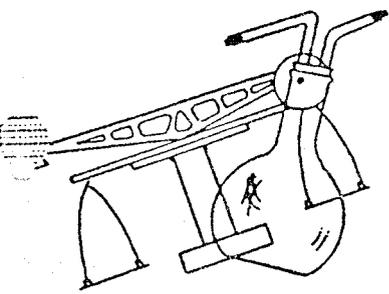
FORD CHEMICAL LABORATORY, INC.



**APPENDIX F**

**North Emery Water Users Association**

**Water Quality of Springs**



# Ford Chemical

LABORATORY, INC.  
Bacteriological and Chemical Analysis

JAN 6 1978

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

Lab. Sample No. 701

**F- 778194**

Date Analysis Started 12-9-77 Date Received 12-9-77

Date Collected <u>12</u> / <u>07</u> / <u>77</u> mo. dy. yr. 754	Time Collected [ ][ ][ ][ ][ ][ ] 610	Water Syst. No. <u>28007</u> 703	Source No. [ ][ ][ ][ ] 704	Water Rights No. [ ][ ][ ][ ][ ][ ][ ][ ] 707
Supply Owned by <u>NORTH EMERY WATER</u> 712	River Mile Code [ ][ ][ ][ ][ ][ ][ ] 706	Merid. [ ] 711	Township [ ][ ][ ] 716	Range [ ][ ] 720
Section [ ][ ] 721	QTRSC [ ][ ] 726	QTRCR [ ][ ] 705	Sample Collected by <u>HARRY HUGHES</u> 713	
Exact Description of Sampling Point <u>SPRING COMPOSITE</u> 646 647 710		TYPE OF SOURCE TABLE 01 Spring 15 Tunnel 02 Well 03 Stream 18 Artesian well 04 Lake 06 Dist. syst. 19 Swimming pool 07 Effluent 08 Storm 14 Other sewer		WATER USE TABLE 1. Culinary 2. Agriculture 3. Industrial 4. Other
Name <u>HARRY HUGHES</u> 715		719 Sample Source <u>01</u>		COUNTY CODE TABLE 01 Beaver 16 Piute 02 Box Elder 17 Rich 03 Cache 18 Salt Lake 04 Carbon 19 San Juan 05 Daggett 20 Sanpete 06 Davis 21 Sevier 07 Duchesne 22 Summit 08 Emery 23 Tooele 09 Garfield 24 Uintah 10 Grand 25 Utah 11 Iron 26 Wasatch 12 Juab 27 Washington 13 Kane 28 Wayne 14 Millard 29 Weber 15 Morgan
Address <u>1055 EAST 3900 SOUTH</u> <u>SAC</u> 648 717		Phone No. <u>2625295</u> 718		Flows CFS [ ][ ][ ][ ][ ][ ] 659

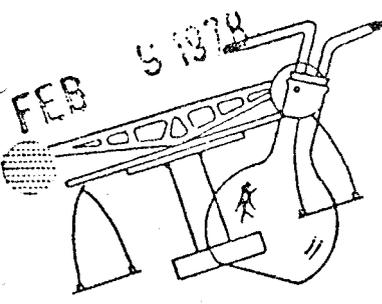
## CHEMICAL ANALYSIS

	mg/l	ug/l		mg/l	
Arsenic		<u>0.0</u>	723	<u>905</u>	758
Barium		<u>600</u>	724	<u>0</u>	760
Boron		<u>500</u>	725	<u>1.2</u>	763
Cadmium		<u>0.0</u>	727	<u>0.17</u>	765
Calcium	<u>28</u>		728	<u>0.00</u>	767
Chromium		<u>0.0</u>	729	<u>0.11</u>	605
Chromium, Hex. as Cr		<u>0.0</u>	730	<u>0.00</u>	606
Copper		<u>9.0</u>	732	<u>1.5</u>	607
Iron		<u>1430</u>	733	<u>75</u>	750
Iron, Total	<u>0.22</u>		755	<u>87</u>	772
Lead		<u>0.0</u>	734		
Magnesium	<u>47</u>		737	<u>190</u>	782
Manganese		<u>3.0</u>	738	<u>442</u>	786
Mercury, Total		<u>0.0</u>	739		785
Nickel		<u>0.0</u>	740	<u>0.0</u>	773
Potassium	<u>2</u>		742	<u>332</u>	752
Selenium		<u>0.0</u>	743	<u>392.0</u>	754
Silver		<u>0.0</u>	744		
Sodium	<u>19</u>		745		
Zinc		<u>400</u>	749		
Turbidity, as NTU		<u>0.4</u>	757		
Specific Cond. @ 25° C, $\mu$ mhos/cm		<u>679</u>	762		

## TOTAL METALS ANALYSIS

	mg/l	ug/l		ug/l
Arsenic			660	
Barium			661	
Cadmium			662	
Chromium			663	
Copper			664	
Iron			755	
Lead			665	
Manganese			666	
Mercury				739
Nickel				667
Selenium				668
Silver				669
Zinc				670

*Mike Ford*  
FORD CHEMICAL LABORATORY, INC.



# Ford Chemical

## LABORATORY, INC.

Bacteriological and Chemical Analysis

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

Lab. Sample No. 701  
**F - 700074**

Date Analysis Started 1-12-78 Date Received 1-12-78

Date Collected <u>12/14/77</u> mo. dy. yr. 714	Time Collected <u>1400</u> 610	Water Syst. No. <u>08007</u> 703	Source No. <u>004</u> 704	Water Rights No. 
Supply Owned by <u>NO EMERY WATER</u> 712	River Mile Code 	Merd. 	Township <u>16S</u> 716	Range <u>2E</u> 720
Section <u>E7E</u> 713	QTRSC <u>E12</u> 726	QTRGR 	707	
Sample Collected by <u>JAMES M STAKER</u> 713	TYPE OF SOURCE TABLE		WATER USE TABLE	
Exact Description of Sampling Point <u>UPPER SPRING NORTH ACROSS THE RIVER</u> 646 647 648 649	01 Spring 02 Well 03 Stream 04 Lake 05 Dist. syst. 07 Effluent 08 Storm sewer	15 Tunnel 18 Artesian well 19 Swimming pool 14 Other	1. Culinary 2. Agriculture 3. Industrial 4. Other	COUNTY CODE TABLE
Name <u>JAMES M STAKER</u> 715	719 Sample Source <u>01</u>		708 Current 709 Proposed	01 Beaver 02 Box Elder 03 Cache 04 Carbon 05 Daggett 06 Davis 07 Duchesne 08 Emery 09 Garfield 10 Grand 11 Iron 12 Juab 13 Kane 14 Millard 15 Morgan
Address <u>BOX 467 EKMO UTAH 84521</u> 648	Phone No. <u>672-677</u> 717	Flows CFS 		611 County <u>08</u> 659

### CHEMICAL ANALYSIS

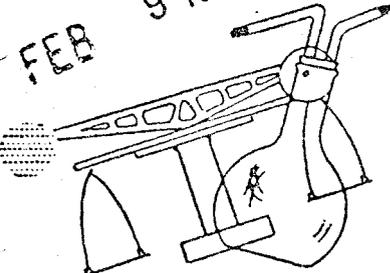
	mg/l	ug/l		mg/l	
Arsenic		<u>0.0</u>	723	Bicarbonate	<u>375</u> 758
Barium		<u>1200</u>	724	Carbonate	<u>0</u> 760
Boron		<u>100</u>	725	Chloride	<u>12</u> 763
Cadmium		<u>0.0</u>	727	Fluoride	<u>0.15</u> 765
Calcium	<u>165</u>		728	Hydroxide	<u>0.00</u> 767
Chromium		<u>0.0</u>	729	Nitrate as N	<u>0.11</u> 605
Chromium, Hex. as Cr		<u>0.0</u>	730	Nitrite as N	<u>0.00</u> 606
Copper		<u>0.0</u>	732	Phosphorus, Ortho as P	<u> </u> 607
Iron		<u>64.0</u>	733	Silica, dissolved as SiO <sub>2</sub>	<u>8</u> 750
Iron, Total	<u>0.28</u>		755	Sulfate	<u>90</u> 772
Lead		<u>0.0</u>	734	pH Units	<u>7.5</u> 782
Magnesium	<u>57</u>		737	TDS @ 180° C	<u>422</u> 786
Manganese		<u>3.0</u>	738	Phosphorus, Tot.	<u> </u> 785
Mercury, Total		<u>0.0</u>	739	Surfactant as MBAS	<u>0.00</u> 773
Nickel		<u>0.0</u>	740	Total Alk. as CaCO <sub>3</sub>	<u>308</u> 752
Potassium	<u>3</u>		742	Total Hardness as CaCO <sub>3</sub>	<u>374.0</u> 754
Selenium		<u>0.0</u>	743		
Silver		<u>0.0</u>	744		
Sodium	<u>78</u>		745		
Zinc		<u>16.0</u>	749		
Turbidity, as NTU		<u>0.3</u>	757		
Specific Cond. @ 25° C, $\mu$ mhos/cm		<u>650</u>	762		

### TOTAL METALS ANALYSIS

	mg/l	ug/l		ug/l	
Arsenic			660	Mercury	
Barium			661	Nickle	
Cadmium			662	Selenium	
Chromium			663	Silver	
Copper			664	Zinc	
Iron			755		
Lead			665		
Manganese			666		

*W. Ford*  
FORD CHEMICAL LABORATORY, INC.

FEB 9 1978



# Ford Chemical

LABORATORY, INC.  
Bacteriological and Chemical Analysis

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

Lab. Sample No. 701

F-783375

Date Analysis Started 1-12-78 Date Received 1-12-78

Date Collected 12/4/77 mo. dy. yr. 714	Time Collected 1900 710	Water Syst. No. 08000 703	Source No. 003 704	Water Rights No.
Supply Owned by NORTH EMERY WATER 712	River Mile Code 706	Merid. 711	Township 16S 716	Range 2E 720
Section 27 721	QTRSC E12 726	QTRR 705		

Sample Collected by  
JAMES M STAKER 713

Exact Description of Sampling Point  
MIDDLE SPRING ACROSS  
THE RIVER 646  
647  
710

Name SEND REPORT TO:  
JAMES M STAKER 715

Address  
BOX 467  
ELM O UTAH 84521 648  
717

TYPE OF SOURCE TABLE	
01 Spring	15 Tunnel
02 Well	
03 Stream	18 Artesian well
04 Lake	
06 Dist. syst.	19 Swimming pool
07 Effluent	
08 Storm sewer	14 Other
719 Sample Source	01

WATER USE TABLE	
1. Culinary	
2. Agriculture	
3. Industrial	
4. Other	
708 Current	1
709 Proposed	1

COUNTY CODE TABLE	
01 Beaver	16 Piute
02 Box Elder	17 Rich
03 Cache	18 Salt Lake
04 Carbon	19 San Juan
05 Daguerre	20 Sanpete
06 Davis	21 Sevier
07 Duchesne	22 Summit
08 Emery	23 Tooele
09 Garfield	24 Uintah
10 Grand	25 Utah
11 Iron	26 Wasatch
12 Juab	27 Washington
13 Kane	28 Wayne
14 Millard	29 Weber
15 Morgan	
611 County	00

Flows CFS  
718 658

### CHEMICAL ANALYSIS

	mg/l	ug/l	
Arsenic		0.0	723
Barium		1800	724
Boron		300	725
Cadmium		00	727
Calcium	067		728
Chromium		00	729
Chromium, Hex. as Cr		00	730
Copper		00	732
Iron		300	733
Iron, Total	0.13		755
Lead		00	734
Magnesium	49		737
Manganese		140	738
Mercury, Total		00	739
Nickel		00	740
Potassium	5		742
Selenium		0.0	743
Silver		0.0	744
Sodium	22		745
Zinc		130	749
Turbidity, as NTU		0.2	757
Specific Cond. @ 25° C, $\mu$ mhos/cm		664	762

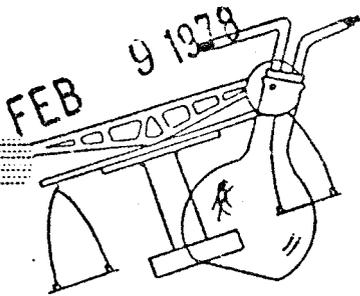
	mg/l	
Bicarbonate	390	758
Carbonate	0	760
Chloride	11	763
Fluoride	0.6	765
Hydroxide	000	767
Nitrate as N	0.0	605
Nitrite as N	0.00	606
Phosphorus, Ortho as P		607
Silica, dissolved as SiO <sub>2</sub>	7	750
Sulfate	40	772
pH Units	7.4	782
TDS @ 180° C	433	786
Phosphorus, Tot.		785
Surfactant as MBAS	0.00	773
Total Alk. as CaCO <sub>3</sub>	520	752
Total Hardness as CaCO <sub>3</sub>	572.0	754

### TOTAL METALS ANALYSIS

	mg/l	ug/l	
Arsenic			660
Barium			661
Cadmium			662
Chromium			663
Copper			664
Iron			755
Lead			665
Manganese			666

	ug/l	
Mercury		739
Nickel		667
Selenium		668
Silver		669
Zinc		670

FORD CHEMICAL LABORATORY, INC.



# Ford Chemical

LABORATORY, INC.  
Bacteriological and Chemical Analysis

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

Lab. Sample No.

701

**F- 783377**

Date Analysis Started 1-12-78

Date Received 1-12-78

Date Collected <u>12/14/77</u>	Time Collected <u>1920</u> 610	Water Syst. No. <u>07007</u> 703	Source No. <u>045</u> 704	Water Rights No.
mo. dy. yr. 714 <u>12 14 77</u>	Supply Owned by <u>NORTH EMERY WAT</u> 712	River Mile Code 706	Merd. Township <u>045</u> 711 716	Range 720
Sample Collected by <u>JAMES M STAKER</u> 713	Exact Description of Sampling Point <u>SPRING ON RIGHT SIDE OF THE ROAD IN THE MAIN CANYON</u> 646 647 710	TYPE OF SOURCE TABLE 01 Spring 15 Tunnel 02 Well 03 Stream 18 Artesian well 04 Lake 06 Dist. syst. 19 Swimming pool 07 Effluent 08 Storm sewer	WATER USE TABLE 1. Culinary 2. Agriculture 3. Industrial 4. Other	COUNTY CODE TABLE 01 Beaver 16 Piute 02 Box Elder 17 Rich 03 Cache 18 Salt Lake 04 Carbon 19 San Juan 05 Daggett 20 Sanpete 06 Davis 21 Sevier 07 Duchesne 22 Summit 08 Emery 23 Tooele 09 Garfield 24 Uinta 10 Grand 25 Utah 11 Iron 26 Wasatch 12 Juab 27 Washington 13 Kane 28 Wayne 14 Millard 29 Weber 15 Morgan
Name <u>JAMES M STAKER</u> 715	SEND REPORT TO:	719 Sample Source <input checked="" type="checkbox"/>	708 Current <input checked="" type="checkbox"/>	709 Proposed <input checked="" type="checkbox"/>
Address <u>BOX 467 ELMO UTAH 84521</u> 648 717	Phone No. <u>4532677</u> 718	Flows CFS	611 County <u>08</u>	

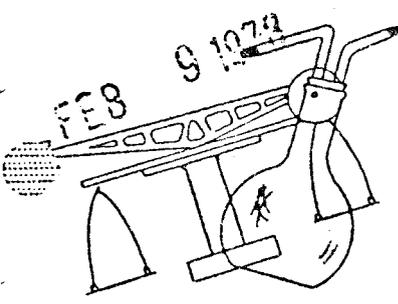
### CHEMICAL ANALYSIS

	mg/l	us/l		mg/l	
Arsenic		<u>00</u>	723	<u>375</u>	758
Barium		<u>120.0</u>	724	<u>0</u>	760
Boron		<u>40.0</u>	725	<u>10</u>	763
Cadmium		<u>0.0</u>	727	<u>0.2</u>	765
Calcium	<u>60</u>		728	<u>0.0</u>	767
Chromium		<u>00</u>	729	<u>0.05</u>	605
Chromium, Hex. as Cr		<u>00</u>	730	<u>0.00</u>	606
Copper		<u>50</u>	732		607
Iron		<u>290.0</u>	733	<u>7</u>	750
Iron, Total	<u>0.30</u>		755	<u>67</u>	772
Lead		<u>0.0</u>	734		
Magnesium	<u>43</u>		737	<u>7.0</u>	782
Manganese		<u>220</u>	738	<u>340</u>	786
Mercury, Total		<u>0.0</u>	739		785
Nickel		<u>0.0</u>	740	<u>0.00</u>	773
Potassium	<u>3</u>		742	<u>258</u>	752
Selenium		<u>00</u>	743	<u>3280</u>	754
Silver		<u>100</u>	744		
Sodium	<u>6</u>		745		
Zinc		<u>100</u>	749		
Turbidity, as NTU		<u>31</u>	757		
Specific Cond. @ 25° C, $\mu$ mhos/cm		<u>525</u>	762		

### TOTAL METALS ANALYSIS

	mg/l	ug/l		ug/l
Arsenic			660	
Barium			661	
Cadmium			662	
Chromium			663	
Copper			664	
Iron			755	
Lead			665	
Manganese			666	
Mercury			739	
Nickel			667	
Selenium			668	
Silver			669	
Zinc			670	

*M. G. Ford*  
FORD CHEMICAL LABORATORY, INC.



# Ford Chemical

## LABORATORY, INC.

Bacteriological and Chemical Analysis

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

Lab. Sample No. 701

**F - 788373**

Date Analysis Started 1-12-78 Date Received 1-12-78

Date Collected <u>12/19/77</u> mo. dy. yr. 714	Time Collected <u>7:40 A</u> 610	Water Syst. No. <u>QJKR07</u> 703	Source No. <u>006</u> 704	Water Rights No.
Supply Owned by <u>MO EMERY WATER</u> 712	River Mile Code <u>706</u>	Merid. <u>711</u>	Township <u>16S</u> 716	Range <u>7E</u> 720
Sample Collected by <u>JAMES M STAKER</u> 713	Section <u>29</u> 721	QTRSC <u>E2</u> 726	QTRQR <u>707</u>	
Exact Description of Sampling Point <u>LOWER SPRING SOUTH</u> <u>CROSS THE RIVER</u> 646 647 710	TYPE OF SOURCE TABLE		WATER USE TABLE	
Name <u>JAMES M STAKER</u> 715	SEND REPORT TO:		1. Culinary	
Address <u>BOX 467</u> <u>ELMO UTAH 84521</u> 648 717	Phone No. <u>485-7167</u> 718		2. Agriculture	
			3. Industrial	
			4. Other	
			708 Current <input checked="" type="checkbox"/>	
			709 Proposed <input type="checkbox"/>	
			611 County <u>02</u>	
			Flows CFS	
			<u>658</u>	

### CHEMICAL ANALYSIS

	mg/l	ug/l		mg/l	
Arsenic		<u>0.0</u>	723	Bicarbonate	<u>388</u> 758
Barium		<u>140.0</u>	724	Carbonate	<u>0</u> 760
Boron		<u>50.0</u>	725	Chloride	<u>10</u> 763
Cadmium		<u>0.0</u>	727	Fluoride	<u>0.16</u> 765
Calcium	<u>170</u>		728	Hydroxide	<u>0.00</u> 767
Chromium		<u>0.0</u>	729	Nitrate as N	<u>0.08</u> 605
Chromium, Hex. as Cr		<u>0.0</u>	730	Nitrite as N	<u>0.00</u> 606
Copper		<u>3.0</u>	732	Phosphorus, Ortho as P	<u>0.00</u> 607
Iron		<u>216.0</u>	733	Silica, dissolved as SiO <sub>2</sub>	<u>7</u> 750
Iron, Total	<u>0.25</u>		755	Sulfate	<u>88</u> 772
Lead		<u>0.0</u>	734	pH Units	<u>7.6</u> 782
Magnesium	<u>48</u>		737	TDS @ 18°C	<u>428</u> 786
Manganese		<u>17.0</u>	738	Phosphorus, Tot.	<u>0.00</u> 785
Mercury, Total		<u>0.0</u>	739	Surfactant as MBAS	<u>0.00</u> 773
Nickel		<u>0.0</u>	740	Total Alk. as CaCO <sub>3</sub>	<u>518</u> 752
Potassium	<u>5</u>		742	Total Hardness as CaCO <sub>3</sub>	<u>570.0</u> 754
Selenium		<u>0.0</u>	743		
Silver		<u>0.0</u>	744		
Sodium	<u>18</u>		745		
Zinc		<u>17.0</u>	749		
Turbidity, as NTU		<u>1.5</u>	757		
Specific Cond. @ 25°C, u mhos/cm		<u>660</u>	762		

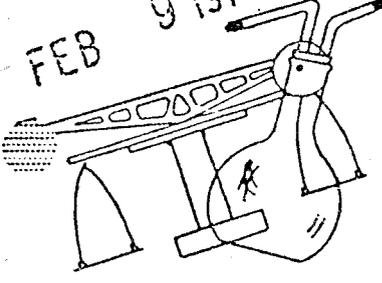
### TOTAL METALS ANALYSIS

	mg/l	ug/l		ug/l	
Arsenic			660	Mercury	
Barium			661	Nickel	
Cadmium			662	Selenium	
Chromium			663	Silver	
Copper			664	Zinc	
Iron			755		
Lead			665		
Manganese			666		

*Angelo Ford*  
FORD CHEMICAL LABORATORY, INC.

FEB

9 13/79



# Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

Lab. Sample No. 701

F - 783375

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

Date Analysis Started 1-12-74 Date Received 1-12-74

Date Collected 12/4/74 mo. dy. yr. 74	Time Collected 1330 610	Water Syst. No. 09607 703	Source No. 002 704	Water Rights No.
Supply Owned by MCM EMERY WATER 712	River Mile Code	Merd. Township 711 169 716	Range 7E1 720	Section QTRSC QTRTR 28 SW 4 721 726 705
Sample Collected by JAMES M STAKER 713	Exact Description of Sampling Point RILDA UPPER SPRING LEFT HAND PIPE IN THE OVERFLOW BOX 710	TYPE OF SOURCE TABLE 01 Spring 15 Tunnel 02 Well 03 Stream 18 Artesian well 04 Lake 06 Dist. syst. 19 Swimming pool 07 Effluent 08 Storm sewer	WATER USE TABLE 1. Culinary 2. Agriculture 3. Industrial 4. Other 708 Current 1 709 Proposed 1	COUNTY CODE TABLE 01 Beaver 16 Piute 02 Box Elder 17 Rich 04 Cache 18 Salt Lake 05 Carbon 19 San Juan 06 Daggett 20 Sanpete 07 Davis 21 Sevier 08 Duchesne 22 Summit 09 Emery 23 Tooele 10 Garfield 24 Uintah 11 Grand 25 Utah 12 Iron 26 Wasatch 13 Juab 27 Washington 14 Kane 28 Wayne 15 Millard 29 Weber 611 County 08
Name SEND REPORT TO: JAMES M STAKER 715	Address BOX 467 ELMO UTAH 84221 717	Phone No. 653 2467 718	Flows CFS	659

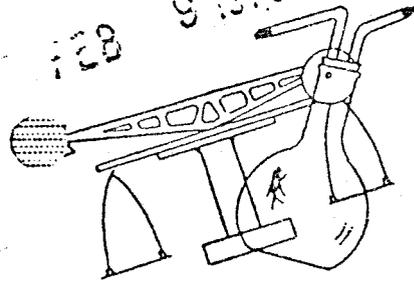
### CHEMICAL ANALYSIS

	mg/l	ug/l		mg/l	
Arsenic		0.0	723	Bicarbonate	429 758
Barium		130.0	724	Carbonate	0 760
Boron		50.0	725	Chloride	10 763
Cadmium		0.0	727	Fluoride	0.13 765
Calcium	79		728	Hydroxide	0.00 767
Chromium		0.0	729	Nitrate as N	0.11 605
Chromium, Hex. as Cr		0.0	730	Nitrite as N	0.00 606
Copper		0.0	732	Phosphorus, Ortho as P	
Iron		132.0	733	Silica, dissolved as SiO <sub>2</sub>	8 750
Iron, Total	020		755	Sulfate	87 772
Lead		0.0	734	pH Units	7.2 782
Magnesium	51		737	TDS @ 180° C	455 786
Manganese		35.0	738	Phosphorus, Tot.	
Mercury, Total		0.0	739	Surfactant as MBAS	0.00 773
Nickel		0.0	740	Total Alk. as CaCO <sub>3</sub>	35.2 752
Potassium	4		742	Total Hardness as CaCO <sub>3</sub>	410.0 754
Selenium		0.0	743		
Silver		0.0	744		
Sodium	16		745		
Zinc		12.0	749		
Turbidity, as NTU		5.7	757		
Specific Cond. @ 25° C, $\mu$ mhos/cm		700	762		

### TOTAL METALS ANALYSIS

	mg/l	ug/l		ug/l	
Arsenic			660	Mercury	
Barium			661	Nickel	
Cadmium			662	Selenium	
Chromium			663	Silver	
Copper			664	Zinc	
Iron			755		
Lead			665		
Manganese			666		

*James Ford*  
FORD CHEMICAL LABORATORY, INC.



# Ford Chemical

## LABORATORY, INC.

Bacteriological and Chemical Analysis

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

Lab. Sample No. 701

**F - 703573**

Date Analysis Started 1-12-78 Date Received 1-12-78

Date Collected <u>12/19/77</u> mo. dy. yr. 714	Time Collected <u>1330</u> 610	Water Syst. No. <u>08007</u> 703	Source No. <u>0017</u> 704	Water Rights No.
Supply Owned by <u>NO CEMERY WATER</u> 712	River Mile Code 706	Merid. 711	Township <u>16S</u> 716	Range <u>7E</u> 720
Section <u>28</u> 721	QTRSC <u>SW</u> 726	QTRR <u>1</u> 705		
Sample Collected by <u>JAMES M STAKER</u> 713	TYPE OF SOURCE TABLE	WATER USE TABLE	COUNTY CODE TABLE	
Exact Description of Sampling Point <u>RILDA LOWER SPRING</u> <u>RIGHT PIPE IN EVERFL</u> <u>BOX</u> 646 647 710	01 Spring 02 Well 03 Stream 04 Lake 06 Dist. syst. 07 Effluent 08 Storm 15 Tunnel 18 Artesian well 19 Swimming pool 14 Other sewer	1. Culinary 2. Agriculture 3. Industrial 4. Other 708 Current 709 Proposed	01 Beaver 02 Box Elder 03 Cache 04 Carbon 05 Daggatt 06 Davis 07 Duchesne 08 Emery 09 Garfield 10 Grand 11 Iron 12 Juab 13 Kane 14 Millard 15 Morgan 16 Piute 17 Rich 18 Salt Lake 19 San Juan 20 Sanpete 21 Sevier 22 Summit 23 Tooele 24 Uintah 25 Utah 26 Wasatch 27 Washington 28 Wayne 29 Weber 611 County <u>KE</u>	
Name <u>JAMES M STAKER</u> 715	SEND REPORT TO:	719 Sample Source <u>SV</u>	Flows CFS	
Address <u>BOX 464</u> <u>ELMO VINTA 84521</u> 648 717	Phone No. <u>1253266</u> 718			

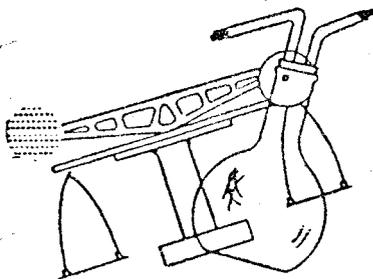
### CHEMICAL ANALYSIS

	mg/l	ug/l		mg/l	
Arsenic		<u>0.0</u>	723	Bicarbonate	<u>354</u> 758
Barium		<u>500</u>	724	Carbonate	<u>0</u> 760
Bromine		<u>500</u>	725	Chloride	<u>8</u> 763
Cadmium		<u>0.0</u>	727	Fluoride	<u>0.13</u> 765
Calcium	<u>58</u>		728	Hydroxide	<u>0.00</u> 767
Chromium		<u>0.0</u>	729	Nitrate as N	<u>0.32</u> 605
Chromium, Hex. as Cr		<u>0.0</u>	730	Nitrite as N	<u>0.00</u> 606
Copper		<u>2.0</u>	732	Phosphorus, Ortho as P	<u>0.00</u> 607
Iron		<u>510</u>	733	Silica, dissolved as SiO <sub>2</sub>	<u>9</u> 750
Iron, Total	<u>0.12</u>		755	Sulfate	<u>46</u> 772
Lead		<u>0.0</u>	734	pH Units	<u>7.3</u> 792
Magnesium	<u>43</u>		737	TDS @ 180° C	<u>371</u> 786
Manganese		<u>0.0</u>	738	Phosphorus, Tot.	<u>0.00</u> 785
Mercury, Total		<u>0.0</u>	739	Surfactant as MBAS	<u>0.00</u> 773
Nickel		<u>0.0</u>	740	Total Alk. as CaCO <sub>3</sub>	<u>290</u> 752
Potassium	<u>2</u>		742	Total Hardness as CaCO <sub>3</sub>	<u>326</u> 754
Selenium		<u>0.0</u>	743		
Silver		<u>0.0</u>	744		
Sodium	<u>10</u>		745		
Zinc		<u>50</u>	749		
Turbidity, as NTU		<u>0.2</u>	757		
Specific Cond. @ 25° C, $\mu$ mhos/cm		<u>534</u>	762		

### TOTAL METALS ANALYSIS

	mg/l	ug/l		ug/l	
Arsenic			660	Mercury	
Barium			661	Nickle	
Cadmium			662	Selenium	
Chromium			663	Silver	
Copper			664	Zinc	
Iron			755		
Lead			665		
Manganese			666		

*John Ford*  
FORD CHEMICAL LABORATORY, INC.



# Ford Chemical

LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

PHONE 485-5761

JAN 6 1978

Lab. Sample No.

701

F - 778193

Date Analysis Started

12-9-77

Date Received

12-9-77

Date Collected 12/9/77 mo. dy. yr. 714	Time Collected [ ][ ][ ][ ][ ] 610	Water Syst. No. 08087 703	Source No. [ ][ ][ ] 704	Water Rights No. [ ][ ][ ][ ][ ][ ] 707
Supply Owned by NORTH EMERY WATER 712	River Mile Code [ ][ ][ ][ ][ ][ ] 706	Merid. [ ][ ] 711	Township [ ][ ][ ] 716	Range [ ][ ] 720
Sample Collected by HARRY HUGHES 713	Section [ ][ ] 721	QTRSC [ ][ ] 726	QTRQR [ ][ ] 705	

Exact Description of Sampling Point RILDA CANYON SPRING 646 647 648 649 710	TYPE OF SOURCE TABLE 01 Spring 02 Well 03 Stream 04 Lake 06 Dist. syst. 07 Effluent 08 Storm sewer 15 Tunnel 18 Artesian well 19 Swimming pool 14 Other	WATER USE TABLE 1. Culinary 2. Agriculture 3. Industrial 4. Other 708 Current 709 Proposed	COUNTY CODE TABLE 01 Beaver 02 Box Elder 03 Cache 04 Carbon 05 Daggett 06 Davis 07 Duchesne 08 Emery 09 Garfield 10 Grand 11 Iron 12 Juab 13 Kane 14 Millard 15 Morgan 16 Piute 17 Rich 18 Salt Lake 19 San Juan 20 Sanpete 21 Sevier 22 Summit 23 Tooele 24 Uintan 25 Utah 26 Wasatch 27 Washington 28 Wayne 29 Weber
Name HARRY HUGHES 715	719 Sample Source 51	611 County 38	
Address 1055 EAST 3900 SO SAC 8/1/79 648 717	Phone No. 262 2951 718	Flows CFS [ ][ ][ ][ ] 659	

### CHEMICAL ANALYSIS

	mg/l	ug/l		mg/l	
Arsenic		00	723	Bicarbonate	458 758
Barium		500	724	Carbonate	0 760
Bismuth		300	725	Chloride	10 763
Cadmium		00	727	Fluoride	0.4 765
Calcium	135		728	Hydroxide	0.00 767
Chromium		00	729	Nitrate as N	0.11 605
Chromium, Hex. as Cr		00	730	Nitrite as N	0.00 606
Copper		80	732	Phosphorus, Ortho as P	0.00 607
Iron		270	733	Silica, dissolved as SiO2	1.5 750
Iron, Total	0.20		755	Sulfate	1.88 772
Lead		00	734	pH Units	7.3 782
Magnesium	23		737	TDS @ 180° C	503 786
Manganese		130	738	Phosphorus, Tot.	0.00 785
Mercury, Total		00	739	Surfactant as MBAS	00 773
Nickel		00	740	Total Alk. as CaCO3	376 752
Potassium	2		742	Total Hardness as CaCO3	436.0 754
Selenium		00	743		
Silver		00	744		
Sodium	119		745		
Zinc		400	749		
Turbidity, as NTU		1.4	757		
Specific Cond. @ 25° C, $\mu$ mhos/cm		725	762		

### TOTAL METALS ANALYSIS

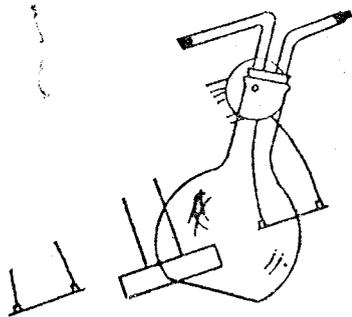
	mg/l	ug/l		ug/l	
Arsenic			660	Mercury	
Barium			661	Nickle	
Cadmium			662	Selenium	
Chromium			663	Silver	
Copper			664	Zinc	
Iron			755		
Lead			665		
Manganese			666		

FORD CHEMICAL LABORATORY, INC.

APPENDIX G

Wilberg Mine

In-Mine Water Quality



# Ford Chemical

LABORATORY, INC.  
Bacteriological and Chemical Analysis

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

January 3, 1978

RECEIVED

JAN 5 - 1978

MINING AND  
EXPLORATION

Utah Power & Light Co.  
41 No. Redwood Rd.  
Mining & Exploration Div.  
ATTN: Mr. Jerry Vaninetti  
Salt Lake City, UT 84116

CERTIFICATE OF ANALYSIS

78-2442

Dear Mr. Vaninetti:

The following analysis is on sample of water received on November 30, 1977:

Sample: Water Wilberg Mine

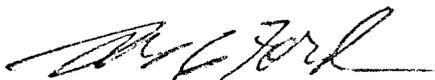
	WMW-X 802 R 11/23/77	WMW-X 962 R 11/23/77	WMW-X 29-30 IR 11/23/77
Alkalinity as CaCO <sub>3</sub> Mg/l	352.0	342.0	324.0
Chloride as Cl Mg/l	4.0	12.0	12.0
Fluoride as F Mg/l	0.15	0.15	0.16
Hardness as CaCO <sub>3</sub> Mg/l	370.0	398.0	432.0
pH Units	7.47	7.04	7.11
Sulfate as SO <sub>4</sub> Mg/l	82.0	82.0	164.0
Total Dissolved Solids Mg/l	459.0	440.0	566.0
Turbidity JTU	0.67	0.30	1.80
Nitrate as NO <sub>3</sub> -N Mg/l	< 0.01	0.04	0.04
Phosphate as PO <sub>4</sub> -P Mg/l	0.150	0.013	0.015
Arsenic as As Mg/l	< 0.001	< 0.001	< 0.001
Barium as Ba Mg/l	0.070	0.060	0.030
Cadmium as Cd Mg/l	< 0.001	< 0.001	< 0.001

Utah Power & Light Co.  
Mining & Exploration Div.  
78-2442  
January 3, 1978  
Page Two

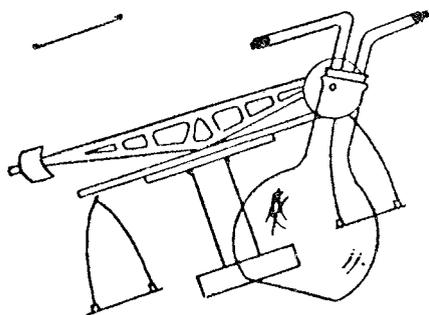
	WMW-X 802 R 11/23/77	WMW-X 962 R 11/23/77	WMW-X 29-30 IR 11/23/77
Chromium as Cr Mg/l	< 0.001	< 0.001	< 0.001
Iron as Fe Mg/l	0.143	0.118	0.246
Lead as Pb Mg/l	0.002	< 0.001	0.007
Manganese as Mn Mg/l	0.016	0.023	0.021
Mercury as Hg Mg/l	< 0.0002	< 0.0002	< 0.0002
Selenium as Se Mg/l	< 0.001	< 0.001	< 0.001
Silver as Ag Mg/l	< 0.001	< 0.001	< 0.001
Zinc as Zn Mg/l	0.020	0.020	0.005
Bio-Chemical Oxygen Demand Mg/l	1.3	1.5	1.2
Chemical Oxygen Demand Mg/l	6.0	5.0	3.0
Oil and Grease	< 1.0	1.2	1.4
Phenol Mg/l	< 0.001	< 0.001	< 0.001
Suspended Solids Mg/l	12.0	6.0	11.0
Dissolved Oxygen Mg/l	7.50	7.45	6.95

Sincerely,

FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

LSF/jms



# Ford Chemical

## LABORATORY, INC.

Bacteriological and Chemical Analysis

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

January 30, 1978

JAN 30 1978

MINING AND  
EXPLORATION

Utah Power & Light Co.  
41 North Redwood Road  
Mining & Exploration Div.  
ATTN: Mr. J. Vaninetti  
Salt Lake City, UT 84116

### CERTIFICATE OF ANALYSIS

78-42

Dear Mr. Vaninetti:

The following analysis is on samples of water received on January 7, 1978:

Sample: Wilberg Mine Waters Collected on January 6, 1978:

	WMW X962R 15.5°C 3pm	WMW X802R 15°C 2:30pm	WMW X57B 14°C
Alkalinity as CaCO <sub>3</sub> Mg/l	318.0	322.0	336.0
Chloride as Cl Mg/l	12.0	12.0	12.0
Fluoride as F Mg/l	0.16	0.15	0.16
Hardness as CaCO <sub>3</sub> Mg/l	364.0	366.0	384.0
pH Units	7.49	7.50	7.45
Sulfate as SO <sub>4</sub> Mg/l	80.0	78.0	84.0
Total Dissolved Solids Mg/l	452.0	444.0	460.0
Turbidity JTU	0.86	0.75	0.55
Nitrate as NO <sub>3</sub> -N Mg/l	< 0.01	< 0.01	< 0.01
Phosphate as PO <sub>4</sub> -P Mg/l	< 0.01	< 0.01	0.02
Arsenic as As Mg/l	< 0.001	< 0.001	< 0.001
Barium as Ba Mg/l	0.060	0.060	0.070
Cadmium as Cd Mg/l	< 0.001	< 0.001	< 0.001
Chromium as Cr Mg/l	< 0.001	< 0.001	< 0.001

Utah Power & Light Co.  
78-42  
January 30, 1978  
Page Two

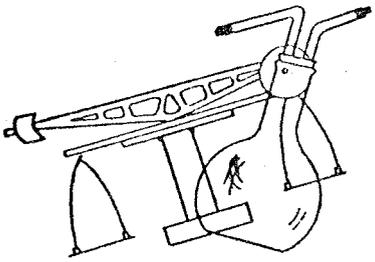
	WMW X962R 15.5°C 3pm	WMW X802R 15°C 2:30PM	WMW X57B 14°C
Iron as Fe Mg/l	0.420	0.186	0.173
Lead as Pb Mg/l	< 0.001	< 0.001	< 0.001
Manganese as Mn Mg/l	0.021	0.022	0.017
Mercury as Hg Mg/l	< 0.0002	< 0.0002	< 0.0002
Selenium as Se Mg/l	< 0.001	< 0.001	< 0.001
Silver as Ag Mg/l	< 0.001	< 0.001	< 0.001
Zinc as Zn Mg/l	0.120	0.155	0.090
Bio-Chemical Oxygen Demand Mg/l	1.5	2.8	2.0
Chemical Oxygen Demand Mg/l	2.0	6.0	4.0
Oil and Grease Mg/l	6.5	8.7	10.5
Phenol Mg/l	< 0.001	< 0.001	< 0.001
Suspended Solids Mg/l	2.0	2.0	< 1.0
Dissolved Oxygen Mg/l	8.35	8.40	8.65

Sincerely,

FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

LSF/jms



# Ford Chemical LABORATORY

Bacteriological and Chemical Analysis  
40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

## WATER SAMPLE FOR BACTERIOLOGIC EXAMINATION

Lab No. 112  
Name UP&L Co.  
Address \_\_\_\_\_  
Date of Collection 1/6/78 Time \_\_\_\_\_  
Send Report To Same  
Sample Collected By Lloyd

Volume ml	Presumptive		Confirmed (BGL BB)					Fecal @ 44.5° C.				
	24	48	24	48	24	48	T	24	48	24	48	T
10.0	5	5	/	/	/	/	5	/	/	/	/	5
1.0	5	5	/	/	/	/	5	/	/	/	/	5
10 -1	5	5	/	/	/	/	5	/	/	/	/	5
10 -2	5	5	/	/	/	/	5	/	/	/	/	5
10 -3	5	5	/	/	/	/	5	/	/	/	/	5
10 -4	5	5	/	/	/	/	5	/	/	/	/	5

TO BE FILLED OUT BY SAMPLER

Sample collected from \_\_\_\_\_ Name \_\_\_\_\_

Check one  
 Waterworks System  
 Stream  
 Other, Describe Private Well, etc.

Exact Description of Sampling Point WAW X 96 2R

County \_\_\_\_\_

Unchlorinated  Chlorinated

Residual \_\_\_\_\_ ppm

MPN Coliform Results \_\_\_\_\_ /100 ml.      MPN Fecal Results \_\_\_\_\_ /100ml.

Volume ml.		10	10	10	10	10
Presumptive	24 hr.	—	—	—	—	—
	48 hr.	—	—	—	—	—
Confirmed	24 hr.					
	48 hr.					

Examine For

Coliforms in 10 ml Portions       Fecal Coliform in 10 ml Portion  
 MPN Coliforms per 100 ml       MPN Fecal Coliforms per 100 ml  
 Membrane Filter (MF)       Plate Count-24 hrs. @ 35°C.

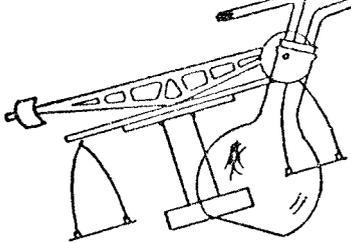
SATISFACTORY       UNSATISFACTORY

MPN Coliform Results in 10 ml. volume 2.2/100ml

Date Received January 7, 1978  
Date Reported January 10, 1978

M.F. Ml. Sample \_\_\_\_\_ ml Colonies \_\_\_\_\_ Coliform \_\_\_\_\_ /100 ml.  
Plate Count \_\_\_\_\_ /ml.

*[Signature]*  
Ford Chemical Lab



# Ford Chemical

## LABORATORY

*Bacteriological and Chemical Analysis*

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

### WATER SAMPLE FOR BACTERIOLOGIC EXAMINATION

Lab No. 113  
 Name UP&L Co.  
 Address \_\_\_\_\_  
 Date of Collection 1/6/78 Time \_\_\_\_\_  
 Send Report To Same  
 Sample Collected By \_\_\_\_\_

TO BE FILLED OUT BY SAMPLER

Volume ml	Presumptive		Confirmed (BGL BB)					Fecal @ 44.5° C.					
	24	48	24	48	24	48	T	24	48	24	48	T	
10.0	/5	/5	/	/	/	/	/	5	/	/	/	/	5
1.0	/5	/5	/	/	/	/	/	5	/	/	/	/	5
10 -1	/5	/5	/	/	/	/	/	5	/	/	/	/	5
10 -2	/5	/5	/	/	/	/	/	5	/	/	/	/	5
10 -3	/5	/5	/	/	/	/	/	5	/	/	/	/	5
10 -4	/5	/5	/	/	/	/	/	5	/	/	/	/	5

Sample collected from	Name
Check one	<input type="checkbox"/> Waterworks System
	<input type="checkbox"/> Stream
	<input type="checkbox"/> Other, Describe Private Well, etc.

Exact Description of Sampling Point WMW X 57B

County \_\_\_\_\_

Unchlorinated  Chlorinated

Residual \_\_\_\_\_ ppm

MPN Coliform Results	/100 ml.	MPN Fecal Results	/100ml.
Volume ml.	10	10	10
Presumptive	24 hr.	—	—
	48 hr.	—	—
Confirmed	24 hr.		
	48 hr.		

Examine For

Coliforms in 10 ml Portions  Fecal Coliform in 10 ml Portion

MPN Coliforms per 100 ml  MPN Fecal Coliforms per 100 ml

Membrane Filter (MF)  Plate Count-24 hrs. @ 35°C.

Date Received January 7, 1978

Date Reported January 10, 1978

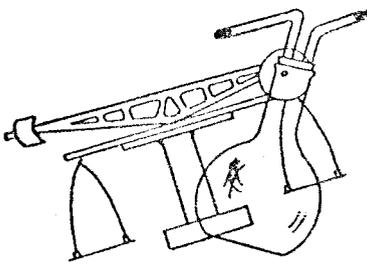
SATISFACTORY  UNSATISFACTORY

MPN Coliform Results in 10 ml. volume 6.2/100ml

*[Signature]*  
Ford Chemical Lab

M.F. Ml. Sample \_\_\_\_\_ ml Colonies \_\_\_\_\_ Coliform \_\_\_\_\_ /100 ml.

Plate Count          /ml.



# Ford Chemical

## LABORATORY

*Bacteriological and Chemical Analysis*

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

### WATER SAMPLE FOR BACTERIOLOGIC EXAMINATION

Lab No. 114  
 Name UP&L Co.  
 Address \_\_\_\_\_  
 Date of Collection 1/6/78 Time \_\_\_\_\_  
 Send Report To Same  
 Sample Collected By T. Lloyd

TO BE FILLED OUT BY SAMPLER

Volume ml	Presumptive		Confirmed (BGL BB)					Fecal @ 44.5° C.					
	24	48	24	48	24	48	T	24	48	24	48	T	
10.0	/5	/5	/	/	/	/	/	/5	/	/	/	/	/5
1.0	/5	/5	/	/	/	/	/	/5	/	/	/	/	/5
10 -1	/5	/5	/	/	/	/	/	/5	/	/	/	/	/5
10 -2	/5	/5	/	/	/	/	/	/5	/	/	/	/	/5
10 -3	/5	/5	/	/	/	/	/	/5	/	/	/	/	/5
10 -4	/5	/5	/	/	/	/	/	/5	/	/	/	/	/5

Sample collected from	Name
<input type="checkbox"/> Waterworks System <input type="checkbox"/> Stream <input type="checkbox"/> Other, Describe Private Well, etc.	
Exact Description of Sampling Point	WMW 80 2R WBM X 802L
County	
Unchlorinated <input type="checkbox"/>	Chlorinated <input type="checkbox"/>
Residual _____ ppm	

MPN Coliform Results	/100 ml.	MPN Fecal Results	/100ml.
Volume ml.	10	10	10
Presumptive	24 hr.	—	—
	48 hr.	—	—
Confirmed	24 hr.		
	48 hr.		

Examine For

Coliforms in 10 ml Portions     Fecal Coliform in 10 ml Portion  
 MPN Coliforms per 100 ml     MPN Fecal Coliforms per 100 ml  
 Membrane Filter (MF)     Plate Count-24 hrs. @ 35°C.

Date Received January 7, 1978

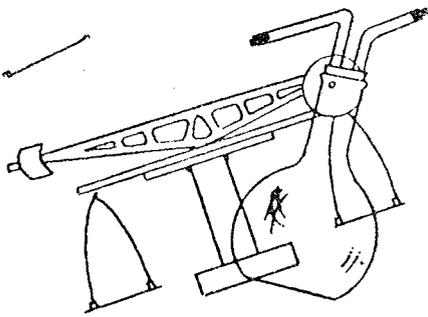
Date Reported January 10, 1978

SATISFACTORY     MPN Coliform Results in 10 ml. volume 2.2/100ml  
 UNSATISFACTORY

M.F. Ml. Sample \_\_\_\_\_ ml Colonies \_\_\_\_\_ Coliform \_\_\_\_\_ /100 ml.

Plate Count \_\_\_\_\_ /ml.

Ford Chemical Lab



# Ford Chemical

LABORATORY, INC.  
Bacteriological and Chemical Analysis

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

April 20, 1978

RECEIVED

APR 24 1978

MINING AND  
EXPLORATION

Utah Power & Light Co.  
41 No. Redwood Road  
ATTN: Mr. Jerry Vaninetti  
Mining & Exploration Div.  
Salt Lake City, UT 84116

CERTIFICATE OF ANALYSIS

78-725

Dear Mr. Vaninetti:

The following analysis is on samples of water received on April 4, 1978:

Sample: Waters dated April 3, 1978: (WILBERG MINE - IN-MINE)

	WMW 401L	WMW 103 3L	WMW 962 R
Alkalinity as CaCO <sub>3</sub> Mg/l	366.0	402.0	352.0
Chloride as Cl Mg/l	8.0	14.0	10.0
Fluoride as F Mg/l	0.17	0.18	0.17
Hardness as CaCO <sub>3</sub> Mg/l	422.0	600.0	398.0
pH Units	7.37	7.41	7.55
Sulfate as SO <sub>4</sub> Mg/l	88.0	226.0	80.0
Total Dissolved Solids Mg/l	487.0	721.0	461.0
Turbidity JTU	0.48	1.20	0.56
Nitrate as NO <sub>3</sub> -N Mg/l	< 0.01	< 0.01	< 0.01
Phosphate as PO <sub>4</sub> -P Mg/l	< 0.01	0.02	< 0.01
Arsenic as As Mg/l	< 0.001	< 0.001	< 0.001
Barium as Ba Mg/l	0.05	0.11	0.02
Cadmium as Cd Mg/l	< 0.001	< 0.001	< 0.001
Chromium as Cr Mg/l	< 0.001	< 0.001	< 0.001
Iron as Fe Mg/l	0.087	0.088	0.076
Lead as Pb Mg/l	< 0.001	< 0.001	< 0.001
Manganese as Mn Mg/l	0.063	0.039	0.026

Utah Power & Light Co.  
78-725  
April 20, 1978  
Page Two

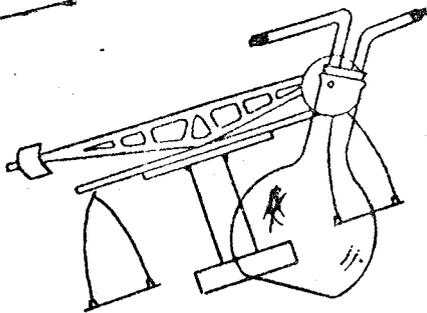
	WMW 401L	WMW 103 3L	WMW 962 R
Mercury as Hg Mg/l	< 0.0002	< 0.0002	< 0.0002
Selenium as Se Mg/l	< 0.001	< 0.001	< 0.001
Silver as Ag Mg/l	< 0.001	< 0.001	< 0.001
Zinc as Zn Mg/l	0.063	0.007	< 0.001
Bio-Chemical Oxygen Demand Mg/l	9.8	7.3	5.3
Chemical Oxygen Demand Mg/l	11.2	10.5	6.5
Oil and Grease Mg/l	< 1.0	< 1.0	< 1.0
Phenol Mg/l	< 0.01	< 0.01	< 0.01
Suspended Solids Mg/l	10.0	7.0	5.0
Dissolved Oxygen Mg/l	5.75	7.00	7.35

Sincerely,  
FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

LSF/jms

CC: Mr. Carly Burton



# Ford Chemical

LABORATORY, INC.  
*Bacteriological and Chemical Analysis*

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

August 1, 1978

1978

MINING AND  
EXPLORATION

Utah Power & Light Co.  
41 North Redwood Road  
ATTN: Mr. Jerry Vaninetti  
Mining & Exploration Div.  
Salt Lake City, UT 84116

## CERTIFICATE OF ANALYSIS

78-1710-2

Dear Mr. Vaninetti:

The following analysis is on samples of water received on June 30, 1978:

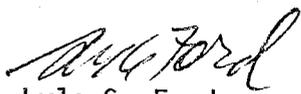
Sample: Water:

	W2SXL153L 6/28/78	WMWX401L 6/28/78
Alkalinity as CaCO <sub>3</sub> Mg/l	384.0	366.0
Chloride as Cl Mg/l	6.0	10.0
Fluoride as F Mg/l	0.15	0.15
Hardness as CaCO <sub>3</sub> Mg/l	125.0	128.0
pH Units	8.07	8.18
Sulfate as SO <sub>4</sub> Mg/l	92.0	89.0
Tot. DiSS. Solids Mg/l	503.0	510.0
Turbidity JTU	0.49	0.43
Nitrate as NO <sub>3</sub> -N Mg/l	0.02	0.03
Phosphate as PO <sub>4</sub> -P Mg/l	0.050	0.052
Arsenic as As Mg/l	< 0.001	< 0.001
Barium as Ba Mg/l	0.02	0.02
Cadmium as Cd Mg/l	< 0.001	< 0.001
Chromium as Cr Mg/l	< 0.001	< 0.001
Iron as Fe Mg/l	0.122	0.027
Lead as Pb Mg/l	< 0.001	< 0.001
Manganese as Mn Mg/l	0.031	0.051
Mercury as Hg Mg/l	< 0.0002	< 0.0002

Utah Power & Light Co.  
78-1710=2  
Page Two  
August 1, 1978

	W2SXL153L 6/28/78	WMWX401L 6/28/78
Selenium as Se Mg/l	< 0.001	< 0.001
Silver as Ag Mg/l	< 0.001	< 0.001
Zinc as Zn Mg/l	0.020	0.019
Bio-Chemical Oxy. Dmd. Mg/l	< 1.0	< 1.0
Chemical Oxy. Dmd. Mg/l	4.0	4.0
Oil and Grease Mg/l	< 1.0	< 1.0
Phenol Mg/l	< 0.001	< 0.001
Suspended Solids Mg/l	1.0	3.0
Dissolved Oxygen Mg/l	7.60	7.65

Sincerely,  
FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

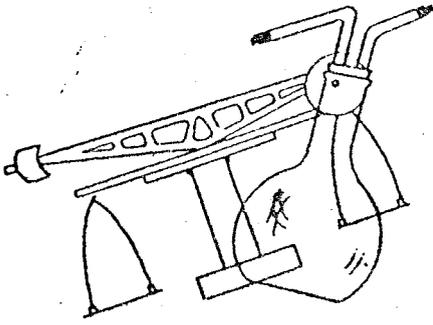
LSF/jms



APPENDIX H

Wilberg Mine Discharge

Water Quality



# Ford Chemical

LABORATORY, INC.  
Bacteriological and Chemical Analysis

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

*ck*  
**RECEIVED**

JAN 18 1978

MINING AND  
EXPLORATION

January 17, 1978

American Coal Company  
P.O. Box 310  
Huntington, UT 84528

CERTIFICATE OF ANALYSIS

78-2635

Gentlemen:

The following analysis is on sample of wastewater received on December 23, 1977:

Sample: Wilberg Mine Discharge, Quarterly; Wastewater Dated December 22, 1977:

Analysis Started: December 23, 1977 at 2:00 p.m.:

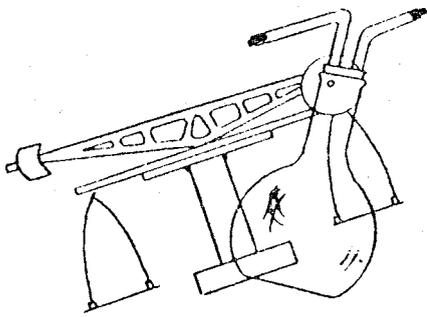
	Results
Bio-Chemical Oxygen Demand	<1.0 Mg/l X
Total Suspended Solids	5.0 Mg/l
Total Dissolved Solids	486.0 Mg/l
Cadmium as Cd	<0.001 Mg/l
Chromium as Cr (Total)	<0.001 Mg/l
Chromium as Cr (Hex)	<0.001 Mg/l X
Iron as Fe	0.065 Mg/l
Lead as Pb	<0.001 Mg/l
Magnesium as Mg	26.4 Mg/l
Oil and Grease	3.5 Mg/l

Sincerely,

FORD CHEMICAL LABORATORY, INC.

*Lyle S. Ford*  
Lyle S. Ford

LSF/jms



# Ford Chemical LABORATORY, INC.

*Bacteriological and Chemical Analysis*

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

February 22, 1978

**RECEIVED**

FEB 24 1978

MINING AND  
EXPLORATION

American Coal Company  
P.O. Box 310  
Huntington, UT 84528

CERTIFICATE OF ANALYSIS

78-214

Gentlemen:

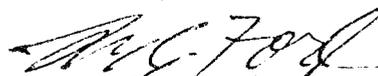
The following analysis is on sample of wastewater received on January 30, 1978.

Sample: Water (for quarterly analysis):

	Results
Total Suspended Solids	< 1.0 Mg/l
Total Dissolved Solids	482.0 Mg/l
Cadmium as Cd	< 0.001 Mg/l
Chromium as Cr (Hex)	< 0.001 Mg/l
Chromium as Cr (Total)	< 0.001 Mg/l
Iron as Fe	0.061 Mg/l
Lead as Pb	< 0.001 Mg/l
Magnesium as Mg	52.32 Mg/l
Oil and Grease	1.3 Mg/l
Bio-Chemical Oxygen Demand	2.0 Mg/l

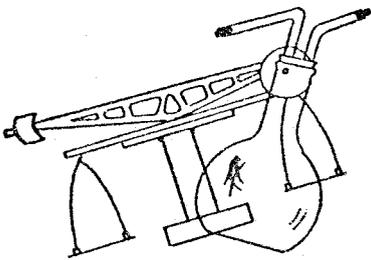
Sincerely,

FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

LSF/jms

CC: Mr. Vaninetti, UPL  
SLC, UT



# Ford Chemical

## LABORATORY

*Bacteriological and Chemical Analysis*

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

WATER SAMPLE FOR  
BACTERIOLOGIC EXAMINATION

887

Lab No. UP&L  
Name UP&L  
Address \_\_\_\_\_  
Date of Collection 3/2/78 Time \_\_\_\_\_  
Send Report To Carly Burton  
Sample Collected By John Mercier

TO BE FILLED OUT BY SAMPLER

Volume ml	Presumptive		Confirmed (BGL BB)					Fecal @ 44.5° C.				
	24	48	24	48	24	48	T	24	48	24	48	T
10.0	1/5	3/5	0/1	0/1	1/3	0/2	1/5	0/1	/	0/3	/	0/5
1.0	0/5	1/5	/	/	0/1	0/1	0/5	/	/	0/1	/	0/5
10 -1	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -2	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -3	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -4	/	5/5	/	/	/	/	5/5	/	/	/	/	5/5

Sample collected from \_\_\_\_\_ Name \_\_\_\_\_

Check one  
 Waterworks System  
 Stream  
 Other, Describe Private Well, etc. \_\_\_\_\_

Exact Description of Sampling Point Wilberg Mine Discharge

County \_\_\_\_\_

Unchlorinated  Chlorinated

Residual \_\_\_\_\_ ppm

MPN Coliform Results 2 /100 ml.      MPN Fecal Results 2 /100ml.

Volume ml.	24 hr.	48 hr.	10	10	10	10	10
Presumptive							
Confirmed							

Examine For  
 Coliforms in 10 ml Portions     Fecal Coliform in 10 ml Portion  
 MPN Coliforms per 100 ml     MPN Fecal Coliforms per 100 ml  
 Membrane Filter (MF)     Plate Count-24 hrs. @ 35°C.

Date Received March 2, 1978

Date Reported March 4, 1978

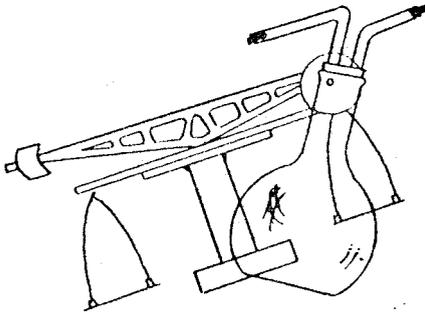
SATISFACTORY       MPN Coliform Results in 10 ml. volume \_\_\_\_\_  
 UNSATISFACTORY

M.F. Ml. Sample \_\_\_\_\_ ml Colonies \_\_\_\_\_ Coliform \_\_\_\_\_ /100 ml.

Plate Count \_\_\_\_\_ /ml.

Form #7A

*[Signature]*  
Ford Chemical Lab



# Ford Chemical

## LABORATORY, INC.

*Bacteriological and Chemical Analysis*

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

March 10, 1978

Utah Power & Light Co.  
41 North Redwood Road  
ATTN: Mr. Jerry Vaninetti  
Mining & Exploration Division  
Salt Lake City, UT 84116

CERTIFICATE OF ANALYSIS  
78-431

Dear Mr. Vaninetti:

The following analysis is on sample of water received on March 2, 1978:

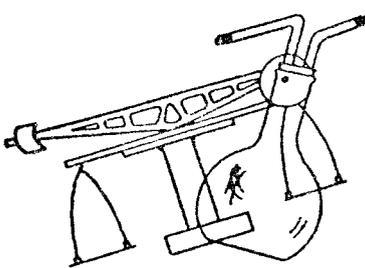
Sample: Wilberg Mine Discharge:

	RESULTS
Bio-Chemical Oxygen Demand	3.4 Mg/l
Suspended Solids	6.0 Mg/l
pH	7.53 Units
Iron as Fe	0.165 Mg/l
Alkalinity	238.0 Mg/l
Total Dissolved Solids	552.0 Mg/l
Oil and Grease	1.5 Mg/l

Sincerely,  
FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

LSF/jms



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

WATER SAMPLE FOR  
 BACTERIOLOGIC EXAMINATION

Lab No. 1335  
 Name UPL Company  
 Address \_\_\_\_\_  
 Date of Collection 3/31/78 Time 1230P  
 Send Report To Same  
 Sample Collected By Mercier

TO BE FILLED OUT BY SAMPLER

Volume ml	Presumptive		Confirmed (BGL BB)					Fecal @ 44.5° C.				
	24	48	24	48	24	48	T	24	48	24	48	T
10.0	0/5	5/5	/	/	3/3	1/2	4/5	/	/	0/5	/	0/5
1.0	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -1	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -2	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -3	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -4	/	5/5	/	/	/	/	5/5	/	/	/	/	5/5

Sample collected from \_\_\_\_\_ Name \_\_\_\_\_

Check one  
 Waterworks System  
 Stream  
 Other, Describe Private Well, etc.

Exact Description of Sampling Point Oil Skimmer

County \_\_\_\_\_

Unchlorinated  Chlorinated   
 Residual \_\_\_\_\_ ppm

MPN Coliform Results 13 /100 ml.      MPN Fecal Results 2 /100ml.

Volume ml.	10	10	10	10	10
Presumptive	24 hr.				
	48 hr.				
Confirmed	24 hr.				
	48 hr.				

Examine For

Coliforms in 10 ml Portions       Fecal Coliform in 10 ml Portion  
 MPN Coliforms per 100 ml       MPN Fecal Coliforms per 100 ml  
 Membrane Filter (MF)       Plate Count-24 hrs. @ 35°C.

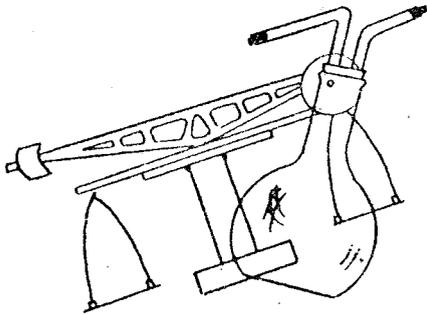
Date Received April 4, 1978

SATISFACTORY       MPN Coliform Results in 10 ml. volume            /100ml.  
 UNSATISFACTORY

Date Reported April 6, 1978

*Steve Ford*  
 Ford Chemical Lab.

M.F. Ml. Sample \_\_\_\_\_ ml Colonies \_\_\_\_\_ Coliform \_\_\_\_\_ /100 ml.  
 Plate Count            /ml.  
 Form #7A



# Ford Chemical

LABORATORY, INC.

Bacteriological and Chemical Analysis

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

April 20, 1978

RECEIVED

APR 24 1978

MINING AND  
EXPLORATION

Utah Power & Light Co.  
41 North Redwood Road  
ATTN: Mr. Jerry Vaninetti  
Mining & Exploration Division  
Salt Lake City, UT 84116

### CERTIFICATE OF ANALYSIS

78-726

Dear Mr. Vaninetti:

The following analysis is on sample of water received on April 4, 1978:

Sample: Wilberg Mine Discharge dated March 31, 1978:

	RESULTS
Total Suspended Solids	8.0 Mg/l
Iron as Fe (Total)	0.046 Mg/l
Alkalinity as CaCO <sub>3</sub>	240.0 Mg/l
Acidity	14.0 Mg/l
Total Dissolved Solids	494.0 Mg/l
Oil and Grease	19.6 Mg/l
pH	7.18 Units
Sulfate as SO <sub>4</sub>	174.0 Mg/l
Chloride as Cl	12.0 Mg/l
Bio-Chemical Oxygen Demand	3.2 Mg/l

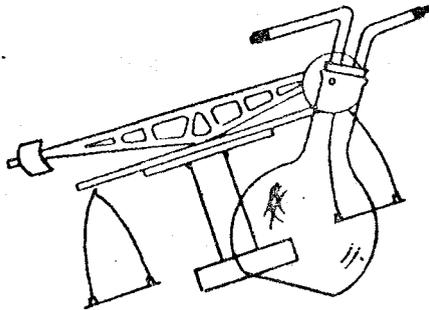
Sincerely,

FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

LSF/jms

CC: Mr. Carly Burton



# Ford Chemical

LABORATORY, INC.  
*Bacteriological and Chemical Analysis*

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

PHONE 485-5761

August 1, 1978

CK

Utah Power & Light Co.  
41 North Redwood Road  
ATTN: Mr. Jerry Vaninetti  
Mining & Exploration Div.  
Salt Lake City, UT 84116

## CERTIFICATE OF ANALYSIS

78-1710-1

Dear Mr. Vaninetti:

The following analysis is on samples of water received on June 30, 1978:

Sample: Wilberg Mine Discharge dated June 19, 1978:

	RESULTS
Suspended Solids Mg/l	6.0
Iron as Fe Mg/l	0.076
Alkalinity as CaCO <sub>3</sub> Mg/l	266.0
Acidity Mg/l	20.0
Total Dissolved Solids Mg/l	461.0
Oil and Grease Mg/l	4.2
pH Units	8.15
Sulfate as SO <sub>4</sub> Mg/l	140.0
Chloride as Cl Mg/l	16.0
Bio-Chemical Oxygen Demand Mg/l	< 1.0 X
Calcium as Ca Mg/l	66.4
Magnesium as Mg Mg/l	53.76
Sodium as Na Mg/l	20.0
Potassium as K Mg/l	3.37
Fluoride as F Mg/l	0.17
Manganese as Mn Mg/l	0.020
Bicarbonate as HCO <sub>3</sub> Mg/l	324.52
Nitrite as NO <sub>2</sub> -N Mg/l	0.06

Utah Power & Light Co.  
78-1710-1  
August 1, 1978  
Page Two

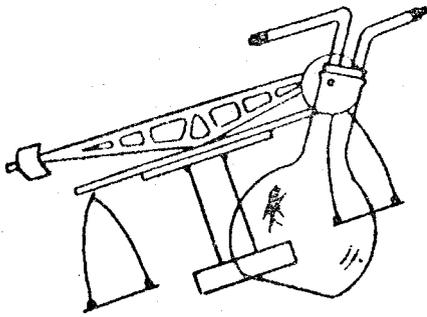
*ck*

	RESULTS
Total Kjeldahl Nitrogen Mg/l	0.10 <i>X</i>
Phosphate as P04-P Mg/l	0.055 <i>X</i>
Silica as Si02 Mg/l	8.15
Arsenic as As Mg/l	< 0.001
Cadmium as Cd Mg/l	< 0.001
Zinc as Zn Mg/l	0.009
Lead as Pb Mg/l	< 0.001
Selenium as Se Mg/l	< 0.001
Total Organic Carbon Mg/l	43.0

Sincerely,  
FORD CHEMICAL LABORATORY, INC.

*Lyle S. Ford*  
Lyle S. Ford

LSF/jms



# Ford Chemical

LABORATORY, INC.  
Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

PHONE 485-5761

December 6, 1978

OK

Utah Power & Light Co.  
Mining & Exploration  
41 North Redwood Rd.  
Salt Lake City, Utah

**CERTIFICATE OF ANALYSIS**  
78-3283

Attn: Jerry Vaninetti

Gentlemen:

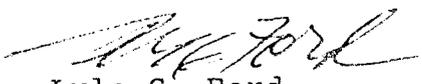
The following analysis is on sample of water received on November 13, 1978.

Sample: Welberg Mine discharge at oil skimmer, dated 11/10/78 at 11:20 a.m.

	Results
Suspended Solids mg/l	3.0
Iron as Fe (total)	0.096
Alkalinity as CaCO <sub>3</sub> mg/l	260.0
Acidity as CaCO <sub>3</sub> mg/l	10.0
Total Dissolved Solids mg/l	500
Oil and Grease mg/l	1.4
pH Units	7.69
Sulfate as SO <sub>4</sub> mg/l	206.0
Chloride as Cl mg/l	20.0

Sincerely,

FORD CHEMICAL LABORATORY, INC.

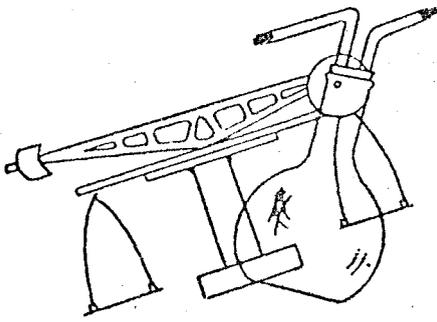
  
Lyle S. Ford

LSF/do

APPENDIX I

Deer Creek Mine

In-Mine Water Quality



# Ford Chemical

LABORATORY, INC.

Bacteriological and Chemical Analysis

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

January 3, 1978

RECEIVED

JAN 5 - 1978

MINING AND  
EXPLORATION

Utah Power & Light Co.  
41 No. Redwood Rd.  
Mining & Exploration Div.  
ATTN: Mr. Jerry Vaninetti  
Salt Lake City, UT 84116

## CERTIFICATE OF ANALYSIS

78-2442-2

Dear Mr. Vaninetti:

The following analysis is on sample of water received on November 30, 1977:

Sample: Water - Deer Creek:

	DC 3W-X 22-23 2L 11/21/77	DC 3W-x 33-34 3L 11/21/77
Alkalinity as CaCO <sub>3</sub> Mg/l	408.0	420.0
Chloride as Cl Mg/l	12.0	12.0
Fluoride as F Mg/l	0.18	0.15
Hardness as CaCO <sub>3</sub> Mg/l	508.0	532.0
pH Units	7.20	7.28
Sulfate as SO <sub>4</sub> Mg/l	158.0	154.0
Total Dissolved Solids Mg/l	636.0	655.0
Turbidity JTU	0.36	0.94
Nitrate as NO <sub>3</sub> -N Mg/l	< 0.01	< 0.01
Phosphate as PO <sub>4</sub> -P Mg/l	0.010	0.012
Arsenic as As Mg/l	< 0.001	< 0.001
Barium as Ba Mg/l	0.030	0.004
Cadmium as Cd Mg/l	< 0.001	< 0.001

Utah Power & Light Co.  
Mining & Exploration Div.  
78-2442-2  
January 3, 1978  
Page Two

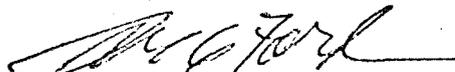
DC 3W-X  
22-23 2L  
11/21/77

DC 3W-X  
33-34 3L  
11/21/77

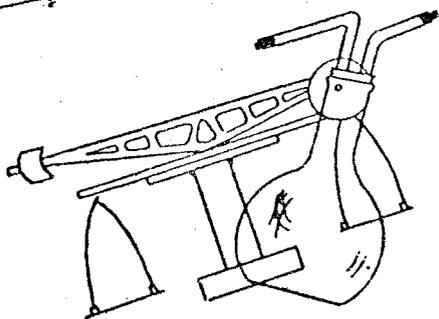
Chromium as Cr Mg/l	0.001	0.001
Iron as Fe Mg/l	0.129	0.147
Lead as Pb Mg/l	0.003	0.004
Manganese as Mn Mg/l	0.032	0.030
Mercury as Hg Mg/l	0.0002	0.0002
Selenium as Se Mg/l	0.001	0.001
Silver as Ag Mg/l	0.001	0.001
Zinc as Zn Mg/l	0.001	0.001
Bio-Chemical Oxygen Demand Mg/l	1.4	1.3
Chemical Oxygen Demand Mg/l	4.0	10.0
Oil and Grease Mg/l	1.0	1.0
Phenol Mg/l	0.001	0.001
Suspended Solids Mg/l	6.0	18.0
Dissolved Oxygen Mg/l	7.50	7.65

Sincerely,

FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

LSF/jms



# Ford Chemical

LABORATORY, INC.  
Bacteriological and Chemical Analysis

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

January 18, 1978

RECEIVED

JAN 19 1978

MINING AND  
EXPLORATION

Utah Power & Light Co.  
41 No. Redwood Rd.  
Mining & Exploration Div.  
ATTN: Mr. J. Vaninetti  
Salt Lake City, UT 84116

CERTIFICATE OF ANALYSIS

78-2633

Dear Mr. Vaninetti:

The following analysis is on sample of waters received on December 23, 1977:

Sample: Water:

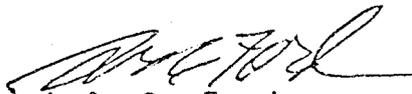
	Deer Creek Culinary 12/8/77	DC 3WX 22-23 2L 11/1/77	Deer Creek Culinary 11/30/77
Alkalinity as CaCO <sub>3</sub> Mg/l	230.0	332.0	234.0
Chloride as Cl Mg/l	16.0	10.0	16.0
fluoride as F Mg/l	0.30	0.16	0.26
Hardness as CaCO <sub>3</sub> Mg/l	600.0	490.0	520.0
pH Units	7.80	7.55	7.80
Sulfate as SO <sub>4</sub> Mg/l	350.0	154.0	320.0
Total Dissolved Solids Mg/l	788.0	629.0	727.0
Turbidity JTU	1.60	0.46	11.00
Nitrate as NO <sub>3</sub> -N Mg/l	0.05	< 0.01	0.06
Phosphate as PO <sub>4</sub> -P mg/l	0.02	0.03	0.02
Arsenic as As Mg/l	< 0.001	< 0.001	< 0.001
Barium as Ba Mg/l	0.06	0.06	0.05

Utah Power & Light Co.  
78-2633  
January 18, 1978  
Page Two

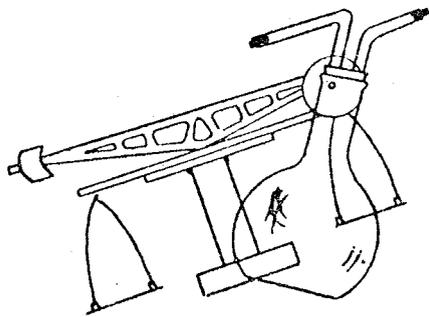
	Deer Creek Culinary 12/8/77	DC 3WX 22-23 2L 11/1/77	Deer Creek Culinary 11/30/77
Cadmium as Cd Mg/l	<0.001	<0.001	<0.001
Chromium as Cr Mg/l	<0.001	<0.001	<0.001
Iron as Fe Mg/l	0.177	0.120	0.181
Lead as Pb Mg/l	<0.001	<0.001	<0.001
Manganese as Mn Mg/l	0.017	0.047	0.015
Mercury as Hg Mg/l	<0.0002	<0.0002	<0.0002
Selenium as Se Mg/l	<0.001	<0.001	<0.001
Silver as Ag Mg/l	<0.001	<0.001	0.001
Zinc as Zn Mg/l	0.084	0.056	0.080
Bio-Chemical Oxygen Demand Mg/l	<1.0	1.2	<1.0
Chemical Oxygen Demand Mg/l	<1.0	3.0	<1.0
Oil and Grease Mg/l	<1.0	<1.0	<1.0
Phenol Mg/l	<0.001	<0.001	<0.001
Suspended Solids Mg/l	15.0	4.0	15.0
Dissolved Oxygen Mg/l	8.90	9.05	8.92

Sincerely,

FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

LSF/jms



# Ford Chemical

LABORATORY, INC.  
Bacteriological and Chemical Analysis

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

January 3, 1978

RECEIVED

JAN 5 - 1978

MINING AND  
EXPLORATION

Utah Power & Light Co.  
41 No. Redwood Rd.  
Mining & Exploration Div.  
ATTN: Mr. Jerry Vaninetti  
Salt Lake City, UT 84116

CERTIFICATE OF ANALYSIS

78-2442-2

Dear Mr. Vaninetti:

The following analysis is on sample of water received on November 30, 1977:

Sample: Water - Deer Creek:

DC 3W-X  
22-23 2L  
11/21/77

DC 3W-x  
33-34 3L  
11/21/77

	DC 3W-X 22-23 2L 11/21/77	DC 3W-x 33-34 3L 11/21/77
Alkalinity as CaCO <sub>3</sub> Mg/l	408.0	420.0
Chloride as Cl Mg/l	12.0	12.0
Fluoride as F Mg/l	0.18	0.15
Hardness as CaCO <sub>3</sub> Mg/l	508.0	532.0
pH Units	7.20	7.28
Sulfate as SO <sub>4</sub> Mg/l	158.0	154.0
Total Dissolved Solids Mg/l	636.0	655.0
Turbidity JTU	0.36	0.94
Nitrate as NO <sub>3</sub> -N Mg/l	< 0.01	< 0.01
Phosphate as PO <sub>4</sub> -P Mg/l	0.010	0.012
Arsenic as As Mg/l	< 0.001	< 0.001
Barium as Ba Mg/l	0.030	0.004
Cadmium as Cd Mg/l	< 0.001	< 0.001

Utah Power & Light Co.  
Mining & Exploration Div.  
78-2442-2  
January 3, 1978  
Page Two

DC 3W-X  
22-23 2L  
11/21/77

DC 3W-X  
33-34 3L  
11/21/77

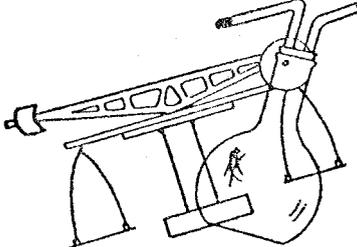
Chromium as Cr Mg/l	0.001	0.001
Iron as Fe Mg/l	0.129	0.147
Lead as Pb Mg/l	0.003	0.004
Manganese as Mn Mg/l	0.032	0.030
Mercury as Hg Mg/l	0.0002	0.0002
Selenium as Se Mg/l	0.001	0.001
Silver as Ag Mg/l	0.001	0.001
Zinc as Zn Mg/l	0.001	0.001
Bio-Chemical Oxygen Demand Mg/l	1.4	1.3
Chemical Oxygen Demand Mg/l	4.0	10.0
Oil and Grease Mg/l	1.0	1.0
Phenol Mg/l	0.001	0.001
Suspended Solids Mg/l	6.0	18.0
Dissolved Oxygen Mg/l	7.50	7.65

Sincerely,

FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

LSF/jms



# Ford Chemical

## LABORATORY

*Bacteriological and Chemical Analysis*

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

### WATER SAMPLE FOR BACTERIOLOGIC EXAMINATION

Lab No. 4185  
 Name Utah power & Light Co.  
 Address \_\_\_\_\_  
 Date of Collection 11/23/77 Time \_\_\_\_\_  
 Send Report To Same  
 Sample Collected By \_\_\_\_\_

Volume ml	Presumptive		Confirmed (BGL BB)					Fecal @ 44.5° C.				
	24	48	24	48	24	48	T	24	48	24	48	T
10.0	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
1.0	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
0.1	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -2	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -3	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -4	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5

TO BE FILLED OUT BY SAMPLER

Sample collected from	Name
<input type="checkbox"/> Waterworks System <input type="checkbox"/> Stream <input type="checkbox"/> Other, Describe Private Well, etc.	
Exact Description of Sampling Point	<u>DC 3W X22-232L</u>
County	
Unchlorinated <input type="checkbox"/>	Chlorinated <input type="checkbox"/>
Residual _____ ppm	

APN Coliform Results 22 /100 ml.      MPN Fecal Results 22 /100ml.

Volume ml.	24 hr.	10	10	10	10	10
Presumptive						
Confirmed	24 hr.					
	48 hr.					

Examine For

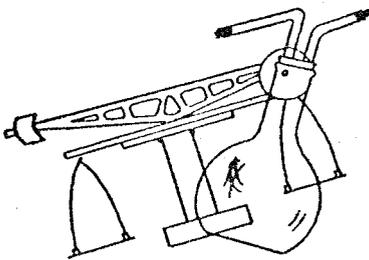
Coliforms in 10 ml Portions       Fecal Coliform in 10 ml Portion  
 MPN Coliforms per 100 ml       MPN Fecal Coliforms per 100 ml  
 Membrane Filter (MF)       Plate Count-24 hrs. @ 35°C.

Date Received \_\_\_\_\_  
 Date Reported December 2, 1977

*M. G. Ford*  
Ford Chemical Lab

SATISFACTORY       MPN Coliform Results in 10 ml. volume \_\_\_\_\_  
 UNSATISFACTORY

M.F. Ml. Sample \_\_\_\_\_ ml Colonies \_\_\_\_\_ Coliform \_\_\_\_\_ /100 ml.  
 Plate Count \_\_\_\_\_ /ml.



# Ford Chemical

## LABORATORY

Bacteriological and Chemical Analysis  
 40 WEST LOUISE AVENUE  
 SALT LAKE CITY, UTAH 84115

### WATER SAMPLE FOR BACTERIOLOGIC EXAMINATION

Lab No. 4188  
 Name Utah Power & Light Co.  
 Address \_\_\_\_\_  
 Date of Collection 11/23/77 Time \_\_\_\_\_  
 Send Report To Same  
 Sample Collected By \_\_\_\_\_

TO BE FILLED OUT BY SAMPLER

Volume ml	Presumptive		Confirmed (BGL BB)					Fecal @ 44.5° C.				
	24	48	24	48	24	48	T	24	48	24	48	T
10.0	5	5	5	5	5	5	5	5	5	5	5	5
1.0	5	5	5	5	5	5	5	5	5	5	5	5
10 -1	5	5	5	5	5	5	5	5	5	5	5	5
10 -2	5	5	5	5	5	5	5	5	5	5	5	5
10 -3	5	5	5	5	5	5	5	5	5	5	5	5
10 -4	5	5	5	5	5	5	5	5	5	5	5	5

Sample collected from	Name
<input type="checkbox"/> Waterworks System <input type="checkbox"/> Stream <input type="checkbox"/> Other, Describe Private Well, etc.	
Exact Description of Sampling Point	<u>DC 3L X33-34 3 L</u>
County	
Unchlorinated <input type="checkbox"/>	Chlorinated <input type="checkbox"/>
Residual _____	ppm

MPN Coliform Results 2 /100 ml.      MPN Fecal Results 20 /100ml.

Volume ml.	10	10	10	10	10
Presumptive	24 hr.				
	48 hr.				
Confirmed	24 hr.				
	48 hr.				

Examine For

Coliforms in 10 ml Portions     Fecal Coliform in 10 ml Portion  
 MPN Coliforms per 100 ml     MPN Fecal Coliforms per 100 ml  
 Membrane Filter (MF)     Plate Count-24 hrs. @ 35°C.

Date Received \_\_\_\_\_

November 30, 1977

SATISFACTORY       MPN Coliform Results in 10 ml. volume

UNSATISFACTORY

Date Reported \_\_\_\_\_

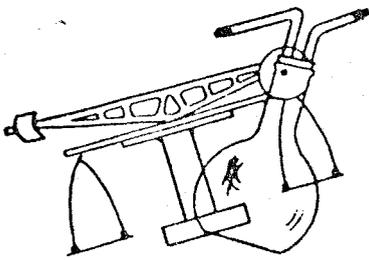
December 2, 1977

M.F. Ml. Sample \_\_\_\_\_ ml Colonies \_\_\_\_\_ Coliform \_\_\_\_\_ /100 ml.

Plate Count  /ml.

Form #7A

*[Signature]*  
 Ford Chemical Lab



# Ford Chemical

LABORATORY

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

RECEIVED

SEP 13 1977

MINING AND  
EXPLORATION

Date: September 14, 1977

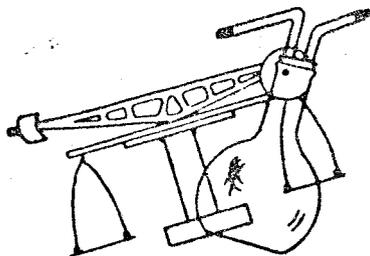
Name Utah Power & Light Company  
41 North Redwood Road  
Address Mining and Exploration Division  
ATTN: Mr. Jerry Vaninetti  
Salt Lake City, UT 84116

CERTIFICATE OF ANALYSIS

77-4710

Sample Water DCM 3S XC47 Received on August 29, 1977:

	DCM 3S XC47			
Alkalinity as CaCO3 mg/l	318.0			
Bicarbonate as HCO3 mg/l				
Calcium as Ca mg/l				
Carbonate as CO3 mg/l				
Chloride as Cl mg/l				
Conductivity umhos/cm				
Fluoride as F mg/l	0.12			
Hardness as CaCO3 mg/l	416.0			
Hydroxide as OH mg/l				
Magnesium as Mg mg/l				
pH	7.65			
Potassium as K mg/l				
Sodium as Na mg/l				
Sulfate as SO4 mg/l	40.0			
Total Dissolved Solids mg/l	583.0			
Turbidity FTU	6.60			
Total Kjeldahl Nitrogen mg/l				
Ammonia as NH3-N mg/l				
Nitrate as NO3-N mg/l	0.08			
Nitrite as NO2-N mg/l				
Total Phosphate as PO4-P mg/l	0.04			
Ortho Phosphate as PO4-P mg/l				
Aluminum as Al mg/l				
Antimony as Sb mg/l				
Arsenic as As mg/l	<0.001			



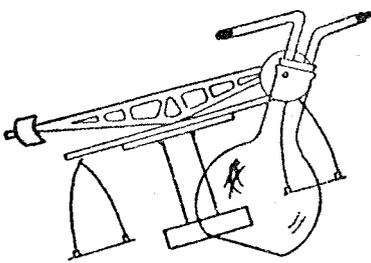
# Ford Chemical

LABORATORY

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

	DCM 3S XC47			
Barium as Ba mg/l	0.020			
Beryllium as Be mg/l				
Boron as B mg/l				
Cadmium as Cd mg/l	<0.001			
Chromium as Cr mg/l	<0.001			
Cobalt as Co mg/l				
Copper as Cu mg/l				
Germanium as Ge mg/l				
Iron as Fe (Total) mg/l	0.230			
Lead as Pb mg/l	<0.001			
Manganese as Mn mg/l	0.010			
Mercury as Hg mg/l	<0.0002			
Molybdenum as Mo mg/l				
Nickel as Ni mg/l				
Selenium as Se mg/l	<0.001			
Silver as Ag mg/l	<0.001			
Vanadium as V mg/l				
Zinc as Zn mg/l	0.036			
Bio-Chemical Oxygen Demand mg/l				
Chemical Oxygen Demand mg/l	2.0			
Total Organic Carbon mg/l				
Cyanide as CN mg/l				
Silica as SiO <sub>2</sub> mg/l				
Oil and Grease mg/l	<1.0			
Phenol mg/l				
Surfactants mg/l				
Settleable Solids ml/l				
Suspended Solids mg/l	23.0			
Total Solids mg/l				
Dissolved Oxygen Mg/l	7.60			



# Ford Chemical

## LABORATORY

*Bacteriological and Chemical Analysis*  
 40 WEST LOUISE AVENUE  
 SALT LAKE CITY, UTAH 84115

### WATER SAMPLE FOR BACTERIOLOGIC EXAMINATION

Lab No. 4486  
 Name UP&L Co.  
 Address Mining Div.  
 Date of Collection 11/1/77 Time \_\_\_\_\_  
 Send Report To Same, Mr. Vaninetta  
 Sample Collected By \_\_\_\_\_

TO BE FILLED OUT BY SAMPLER

Volume ml	Presumptive		Confirmed (BGL BB)					Fecal @ 44.5° C.					
	24	48	24	48	24	48	T	24	48	24	48	T	
10.0	/5	/5	/	/	/	/	/	/	/	/	/	/	5
1.0	/5	/5	/	/	/	/	/	/	/	/	/	/	5
10 -1	/5	/5	/	/	/	/	/	/	/	/	/	/	5
10 -2	/5	/5	/	/	/	/	/	/	/	/	/	/	5
10 -3	/5	/5	/	/	/	/	/	/	/	/	/	/	5
10 -4	/5	/5	/	/	/	/	/	/	/	/	/	/	5

Sample collected from \_\_\_\_\_ Name \_\_\_\_\_

Check one  
 Waterworks System  
 Stream  
 Other, Describe Private Well, etc. \_\_\_\_\_

Exact Description of Sampling Point \_\_\_\_\_

County \_\_\_\_\_

Unchlorinated  Chlorinated

Residual \_\_\_\_\_ ppm

MPN Coliform Results \_\_\_\_\_ /100 ml.      MPN Fecal Results \_\_\_\_\_ /100ml.

Volume ml.	24 hr.	48 hr.	10	10	10	10	10
Presumptive	—	—	—	—	—	—	—
Confirmed	—	—	—	—	—	—	—

Examine For

Coliforms in 10 ml Portions     Fecal Coliform in 10 ml Portion  
 MPN Coliforms per 100 ml     MPN Fecal Coliforms per 100 ml  
 Membrane Filter (MF)     Plate Count-24 hrs. @ 35°C.

Date Received December 23, 1977

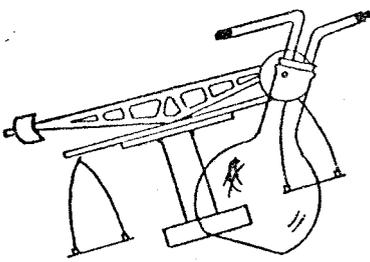
SATISFACTORY       MPN Coliform Results in 10 ml. volume 2.2/100ml  
 UNSATISFACTORY

Date Reported December 27, 1977

M.F. Ml. Sample \_\_\_\_\_ ml Colonies \_\_\_\_\_ Coliform \_\_\_\_\_ /100 ml.  
 Plate Count \_\_\_\_\_ /ml.

OLD SAMPLE *[Signature]*  
 Ford Chemical Lab

Form #7A



# Ford Chemical LABORATORY

Bacteriological and Chemical Analysis  
 40 WEST LOUISE AVENUE  
 SALT LAKE CITY, UTAH 84115

## WATER SAMPLE FOR BACTERIOLOGIC EXAMINATION

Lab No. 417  
 Name Ed. Focht & Light Co.  
 Address \_\_\_\_\_  
 Date of Collection 11/30/77 Time \_\_\_\_\_  
 Send Report To \_\_\_\_\_

Volume ml	Presumptive		Confirmed (BGL BB)					Fecal @ 44.5° C.				
	24	48	24	48	24	48	T	24	48	24	48	T
10.0	5	5	/	/	/	/	5	/	/	/	/	5
1.0	5	5	/	/	/	/	5	/	/	/	/	5
10 -1	5	5	/	/	/	/	5	/	/	/	/	5
10 -2	5	5	/	/	/	/	5	/	/	/	/	5
10 -3	5	5	/	/	/	/	5	/	/	/	/	5
10 -4	5	5	/	/	/	/	5	/	/	/	/	5

Sample Collected By \_\_\_\_\_  
 TO BE FILLED OUT BY SAMPLER

Sample collected from \_\_\_\_\_ Name \_\_\_\_\_

Check one  
 Waterworks System  
 Stream  
 Other, Describe Private Well, etc. \_\_\_\_\_

Exact Description of Sampling Point SC 52 K30-34 3 L

County \_\_\_\_\_

Unchlorinated  Chlorinated   
 Residual \_\_\_\_\_ ppm

MPN Coliform Results \_\_\_\_\_ /100 ml. MPN Fecal Results \_\_\_\_\_ /100ml.

Volume ml.	24 hr.	10	10	10	10	10
Presumptive						
Confirmed						

Examine For

Coliforms in 10 ml Portions  Fecal Coliform in 10 ml Portion  
 MPN Coliforms per 100 ml  MPN Fecal Coliforms per 100 ml  
 Membrane Filter (MF)  Plate Count-24 hrs. @ 35°C.

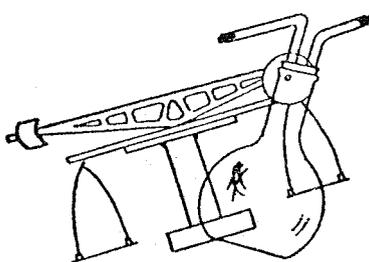
NOVEMBER 30, 1977

Date Received \_\_\_\_\_  
 Date Reported December 2, 1977

SATISFACTORY  UNSATISFACTORY  MPN Coliform Results in 10 ml. volume \_\_\_\_\_

M.F. Ml. Sample \_\_\_\_\_ ml Colonies \_\_\_\_\_ Coliform \_\_\_\_\_ /100 ml.  
 Plate Count \_\_\_\_\_ /ml.

*[Signature]*  
 Ford Chemical Lab



# Ford Chemical LABORATORY

Bacteriological and Chemical Analysis  
40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

## WATER SAMPLE FOR BACTERIOLOGIC EXAMINATION

Lab No. 4155  
 Name BEAR POWER & ASSOCIATES  
 Address \_\_\_\_\_  
 Date of Collection 11-2-77 Time \_\_\_\_\_  
 Send Report To SOBY  
 Sample Collected By \_\_\_\_\_

TO BE FILLED OUT BY SAMPLER

Volume ml	Presumptive		Confirmed (BGL BB)					Fecal @ 44.5° C.				
	24	48	24	48	24	48	T	24	48	24	48	T
10.0	5	5	/	/	/	/	5	/	/	/	/	5
1.0	5	5	/	/	/	/	5	/	/	/	/	5
10 -1	5	5	/	/	/	/	5	/	/	/	/	5
10 -2	5	5	/	/	/	/	5	/	/	/	/	5
10 -3	5	5	/	/	/	/	5	/	/	/	/	5
10 -4	5	5	/	/	/	/	5	/	/	/	/	5

Sample collected from \_\_\_\_\_ Name \_\_\_\_\_

Waterworks System  
 Stream  
 Other, Describe Private Well, etc.

Exact Description of Sampling Point BEAR POWER & ASSOCIATES

County \_\_\_\_\_

Unchlorinated  Chlorinated   
 Residual \_\_\_\_\_ ppm

MPN Coliform Results 5 /100 ml.      MPN Fecal Results 5 /100ml.

Volume ml.	24 hr.	48 hr.	24 hr.	48 hr.
10				
10				
10				
10				
10				

Examine For

Coliforms in 10 ml Portions       Fecal Coliform in 10 ml Portion  
 MPN Coliforms per 100 ml       MPN Fecal Coliforms per 100 ml  
 Membrane Filter (MF)       Plate Count-24 hrs. @ 35°C

Date Received November 30, 1977

SATISFACTORY       MPN Coliform Results in 10 ml. volume \_\_\_\_\_  
 UNSATISFACTORY

Date Reported \_\_\_\_\_

M.F. Ml. Sample \_\_\_\_\_ ml Colonies \_\_\_\_\_ Coliform \_\_\_\_\_ /100 ml.

Plate Count \_\_\_\_\_ /ml.

*[Signature]*  
Ford Chemical Lab

#7A

OK

STANDARD LABORATORIES, INC.  
UTAH POWER & LIGHT

DATE 11/29/78  
DATE SAMPLED 11/28/78

LAB NUMBER 1003  
DATE RECEIVED 11/29/78

SAMPLE ID:  
DEER CREEK  
EM-3  
11/28/78

ND MEANS NOT DETERMINED

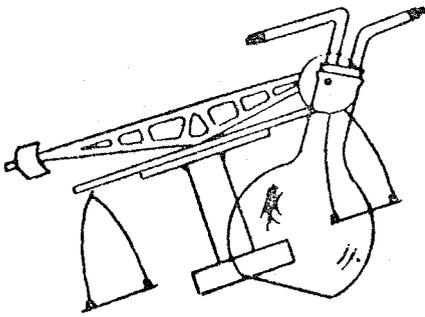
WATER ANALYSIS REPORT

PH UNITS	7.16
TOTAL ALKALINITY MG/L CaCO3	554.40
TOTAL SUSPENDED SOLIDS MG/L	0.00
TOTAL DISSOLVED SOLIDS MG/L	650.00
SETTLABLE SOLIDS, 1HR, MG/L	0.00
TOTAL SULFATE MG/L	155.00
TOTAL FLUORIDE MG/L	0.28
TOTAL DISSOLVED IRON MG/L	0.26
OIL AND GREASE MG/L	0.00
TURBIDITY, NTU'S	1.70

*Sharon Hale*

MANAGER

~~Table A Quality of Water from FA 3~~



# Ford Chemical

LABORATORY, INC.  
*Bacteriological and Chemical Analysis*

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

December 6, 1978

Utah Power & Light Co.  
Mining & Exploration  
41 No. Redwood Rd.  
SLC, UT

## CERTIFICATE OF ANALYSIS

78-3322

Attn: Jerry Vaninetti

Gentlemen:

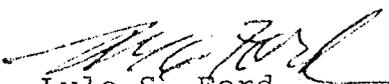
The following analysis is on samples of water received on November 17, 1978.

Sample: Water labeled Deer Creek Mine, 5th East Water supply line, dated November 14, 1978.

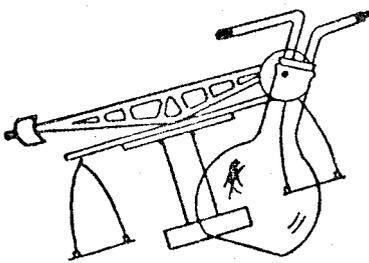
	Results
pH	8.10 units
Conductivity	620.0 umhos/cm
Suspended Solids	2.0 mg/l
Total Dissolved Solids	612.0 mg/l
Iron as Fe	0.158 mg/l
Alkalinity as CaCO <sub>3</sub>	290.0 mg/l
Acidity as CaCO <sub>3</sub>	20.0 mg/l
Sulfate as SO <sub>4</sub>	214.0 mg/l
Chloride as Cl	12.0 mg/l
Oil and Grease	2.0 mg/l
Dissolved Oxygen	8.80 mg/l

Sincerely,

FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

LSF/do



# Ford Chemical

## LABORATORY

*Bacteriological and Chemical Analysis*  
 40 WEST LOUISE AVENUE  
 SALT LAKE CITY, UTAH 84115  
 485-5761

### WATER SAMPLE FOR BACTERIOLOGIC EXAMINATION

Lab No. 5424  
 Name Utah Power & Light Co.  
 Address \_\_\_\_\_  
 Date of Collection 12/19/78 Time \_\_\_\_\_  
 Send Report To \_\_\_\_\_  
 Sample Collected By \_\_\_\_\_

TO BE FILLED OUT BY SAMPLER

Volume ml	Presumptive		Confirmed (BGL BB)					Fecal @ 44.5° C.				
	24	48	24	48	24	48	T	24	48	24	48	T
10.0	0/5	4/5	/	/	1/4	3/3	4/5	/	/	0/0	/	0/5
1.0	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -1	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -2	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -3	0/5	0/5	/	/	/	/	0/5	/	/	/	/	0/5
10 -4	/	5/5	/	/	/	/	5/5	/	/	/	/	5/5

Sample collected from	Name
<input type="checkbox"/> Waterworks System	<u>Bear Creek Mine</u>
<input type="checkbox"/> Stream	<u>near road</u>
<input type="checkbox"/> Other, Describe Private Well, etc.	
Exact Description of Sampling Point	
County	
Unchlorinated <input type="checkbox"/>	Chlorinated <input type="checkbox"/>
Residual _____ ppm	

MPN Coliform Results 13 /100 ml.      MPN Fecal Results 22 /100ml.

Volume ml.	24 hr.	48 hr.	24 hr.	48 hr.
10				
10				
10				
10				
10				

Examine For

Coliforms in 10 ml Portions       Fecal Coliform in 10 ml Portion

MPN Coliforms per 100 ml       MPN Fecal Coliforms per 100 ml

Membrane Filter (MF)       Plate Count-24 hrs. @ 35°C.

Date Received 12/19/78

SATISFACTORY       MPN Coliform Results in 10 ml. volume            /100ml.

UNSATISFACTORY

Date Reported 12/22

M.F. Ml. Sample \_\_\_\_\_ ml Colonies \_\_\_\_\_ Coliform \_\_\_\_\_ /100 ml.

Plate Count            /ml.

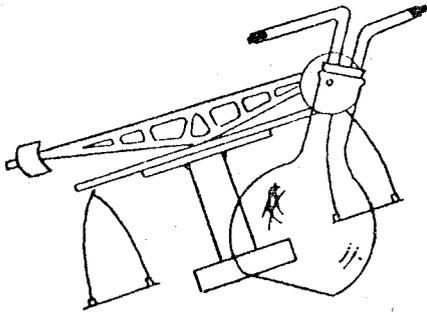
Form #7A

*Steve Ford*  
 Ford Chemical Lab.

APPENDIX J

Deer Creek Mine Discharge

Water Quality



# Ford Chemical

LABORATORY, INC.

Bacteriological and Chemical Analysis

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

April 20, 1978

OK

REGISTERED

APR 24 1978

MINING AND  
EXPLORATION

Utah Power & Light Co.  
41 No. Redwood Rd.  
ATTN: Mr. Jerry Vaninetti  
Mining & Exploration Division  
Salt Lake City, UT 84116

### CERTIFICATE OF ANALYSIS

78-727

Dear Mr. Vaninetti:

The following analysis is on sample of water received on April 4, 1978:

Sample: Deer Creek Mine Water dated April 3, 1978: (DISCHARGE)

	RESULTS
pH	7.14 Units
Conductivity	710.0 umhos/cm
Total Suspended Solids	4.0 Mg/l
Total Dissolved Solids	480.0 Mg/l
Iron as Fe	0.259 Mg/l
Alkalinity as CaCO <sub>3</sub>	332.0 Mg/l
Acidity	10.0 Mg/l
Sulfate as SO <sub>4</sub>	112.0 Mg/l
Chloride as Cl	10.0 Mg/l
Oil and Grease	2.6 Mg/l
Dissolved Oxygen	7.40 Mg/l

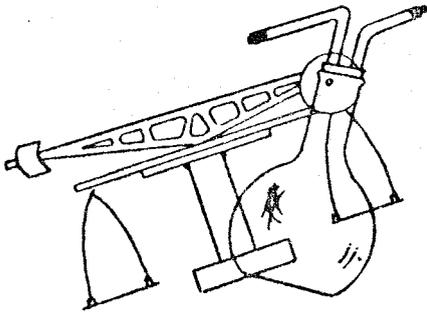
Sincerely,

FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

LSF/jms

CC: Mr. Carly Burton



# Ford Chemical

LABORATORY, INC.

Bacteriological and Chemical Analysis

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

RECEIVED

JUN 5 1978

MINING AND  
EXPLORATION

June 1, 1978

CERTIFICATE OF ANALYSIS

78-1126

Utah Power & Light Co.  
41 North Redwood Road  
ATTN: Mr. Jerry Vaninetti  
Mining & Exploration Div.  
Salt Lake City, UT 84116

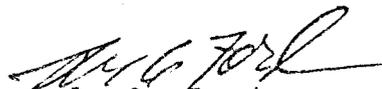
Dear Mr. Vaninetti:

The following analysis is on a sample of water received on May 9, 1978:

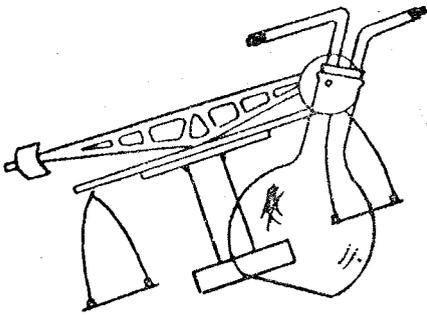
Sample: Deer Creek Discharge dated May 1, 1978:

	RESULTS
pH	7.19 Units
Conductivity	730.0 umhos/cm
Total Suspended Solids	62.0 Mg/l
Total Dissolved Solids	480.0 Mg/l
Iron as Fe	0.292 Mg/l
Alkalinity as CaCO <sub>3</sub>	244.0 Mg/l
Acidity	26.0 Mg/l
Sulfate as SO <sub>4</sub>	140.0 Mg/l
Chloride as Cl	16.0 Mg/l
Dissolved Oxygen	7.80 Mg/l
Oil and Grease	4.6 Mg/l

Sincerely,  
FORD CHEMICAL LABORATORY, INC.

  
Lyle S. Ford

LSF/jms



# Ford Chemical

LABORATORY, INC.  
Bacteriological and Chemical Analysis

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

RECEIVED

JUL 10 - 1978

MINING AND  
EXPLORATION

July 6, 1978

Utah Power & Light Co.  
41 North Redwood Road  
Mining & Exploration Div.  
ATTN: Mr. Jerry Vaninetti  
Salt Lake City, UT 84116

CERTIFICATE OF ANALYSIS

78-1363

Dear Mr. Vaninetti:

The following analysis is on sample of water received on June 1, 1978:

Sample: Deer Creek Discharge:

	RESULTS
pH	7.19 Units
Conductivity	1220 mic/cm
Total Suspended Solids	9.0 Mg/l
Total Dissolved Solids	800.0 Mg/l
Iron as Fe	0.272 Mg/l
Alkalinity as CaCO <sub>3</sub>	244.0 Mg/l
Acidity	30.0 Mg/l
Sulfate as SO <sub>4</sub>	134.0 Mg/l
Chloride as Cl	102.0 Mg/l
Oil and Grease	2.2 Mg/l
Dissolved Oxygen	8.00 Mg/l

Sincerely,  
FORD CHEMICAL LABORATORY, INC.

Lyle S. Ford

LSF/jms