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

JUNE 1987

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DIVISION OF
OIL, GAS & MINING

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

Prepared and submitted for Utah Power & Light Company by:

Hydrologic Section of the Power Operation Department

and

Technical Services Department of the Mining Division

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# I. INTRODUCTION

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

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

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

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

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

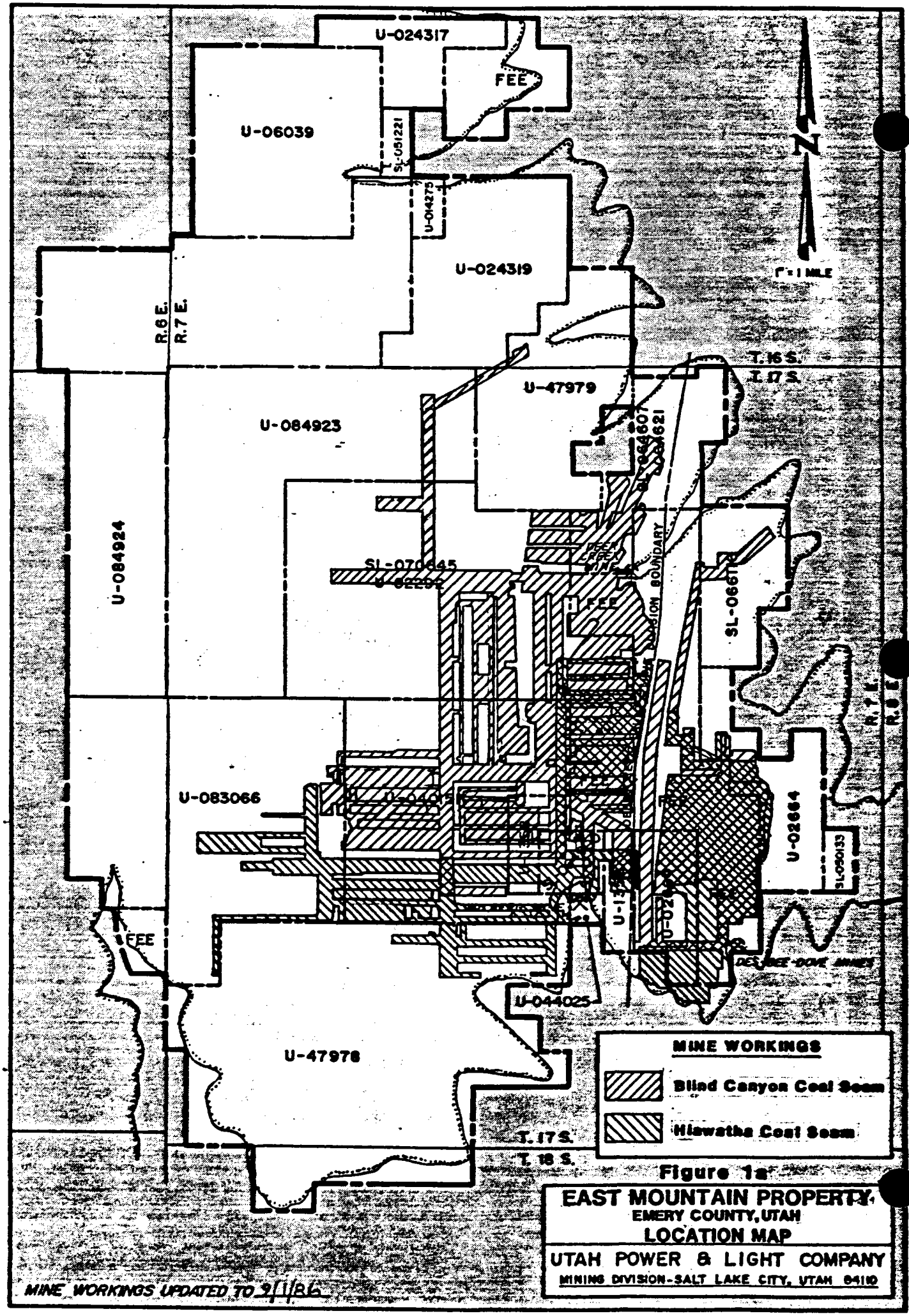
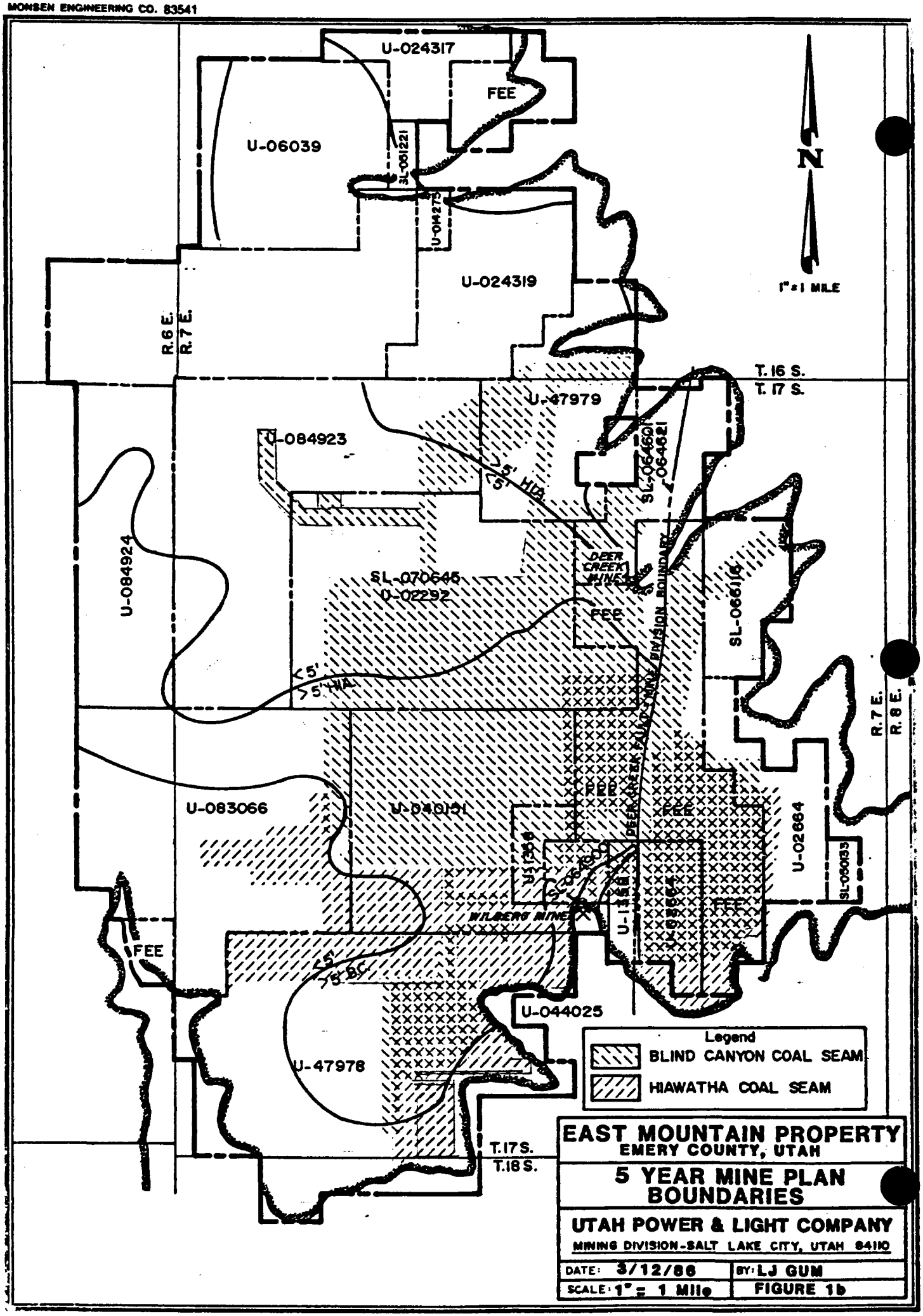



Figure 1a

EAST MOUNTAIN PROPERTY
EMERY COUNTY, UTAH
LOCATION MAP

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

MONSEN ENGINEERING CO. 83541



## II. CLIMATIC OBSERVATIONS

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

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

### A. Regional Climatology

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

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

### B. Local Climatology

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

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

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

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

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

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

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

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

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

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

2. Temperatures

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

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

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

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

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

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

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

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

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

Table 6: EAST MOUNTAIN PRECIPITATION
Elevation 9,005 Feet

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

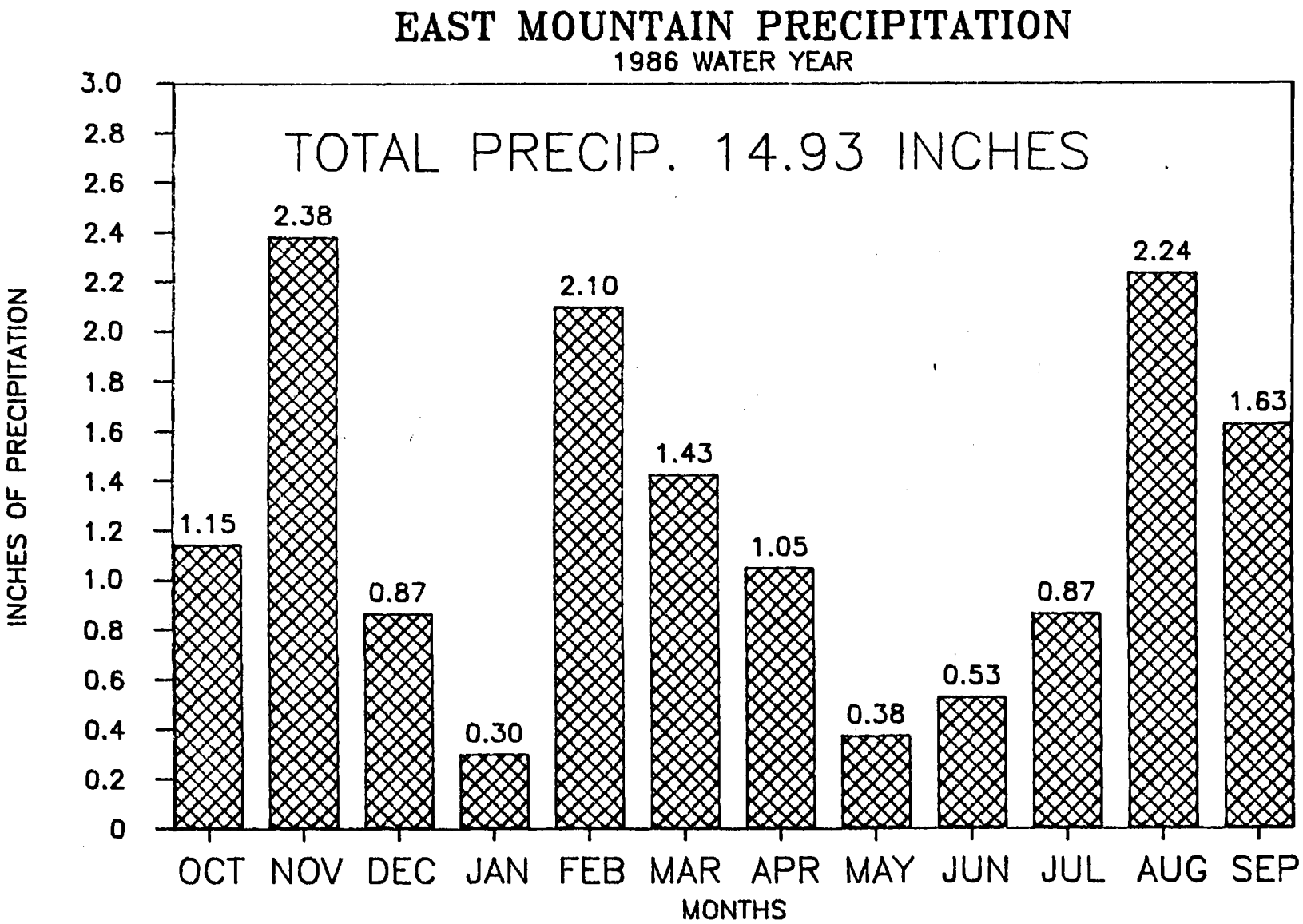

EAST MOUNTAIN PRECIPITATION
1986 WATER YEAR
TOTAL PRECIP. 14.93 INCHES
INCHES OF PRECIPITATION
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
1.15
2.38
0.87
0.30
2.10
1.43
1.05
0.38
0.53
0.87
2.24
1.63
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
MONTHS

FIGURE 2

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

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

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

TABLE 8: COMPARISON OF 1986 AND 1985 TEMPERATURES

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

## III. DRAINAGE SYSTEMS

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

### A. Huntington Creek Drainage System

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

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

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

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

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

* Influenced by upstream storage in Electric Lake.

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

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

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

TABLE 10: COMPARISON OF 1986 AND 1985 RUNOFF VALUES

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

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

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

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

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

| Parameter | Below Electric Lake | | | Right Fork Above Left Fork | | | Above Power Plant | | | Below Power Plant | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. |
| pH (N.U.) | 8.0 | 8.8 | 7.5 | 8.4 | 8.8 | 7.9 | 8.5 | 8.7 | 8.2 | 8.4 | 8.6 | 8.1 |
| Sulfate | 10.4 | 16 | 1.0 | 24 | 71 | 16 | 44 | 72 | 30 | 48 | 75 | 22 |
| Susp. Solids | 4.6 | 17.0 | 1.0 | 19 | 85 | 1.0 | 24 | 63 | 8 | 25 | 64 | 5 |
| Diss. Solids | 161 | 224 | 74 | 201 | 302 | 102 | 264 | 385 | 192 | 350 | 650 | 159 |
| Spec. Cond. (µmhos) | 255 | 468 | 182 | 328 | 496 | 171 | 397 | 596 | 295 | 1079 | 2960 | [illegible] |
| Alkalinity ($CaCO_3$) | -- | -- | -- | -- | -- | -- | 174 | 201 | 140 | 274 | 566 | 146 |

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

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

TABLE 12: HUNTINGTON CREEK WATER QUALITY 1985-1986

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

2. Deer Creek

a. Flow and Sampling Schedule:

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

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

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

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

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

3. Meetinghouse Canyon Creek

a. Flow and Sampling Schedule

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

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

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

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

TABLE 13: DEER CREEK SURFACE WATER QUALITY
ABOVE THE MINE

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

TABLE 14: DEER CREEK SURFACE WATER QUALITY
BELOW THE MINE

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

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

B. Cottonwood Creek Drainage System

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

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

TABLE 15: MEETINGHOUSE CANYON WATER QUALITY

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

2. Grimes Wash

a. Flow and Sampling Schedule

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

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

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

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

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

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

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

TABLE 16: GRIMES WASH SURFACE QUALITY
RIGHT FORK

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

TABLE 17: GRIMES WASH SURFACE QUALITY
LEFT FORK

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

TABLE 18: GRIMES WASH SURFACE QUALITY
BELOW THE MINE

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

## IV. EAST MOUNTAIN SPRINGS

### A. Flow and Sampling Schedule

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

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

### B. Spring Flow

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

TABLE 19: MODES OF OCCURRENCE - EAST MOUNTAIN SPRINGS

Occurrences

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

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

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

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

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

## TABLE 20A: EAST MOUNTAIN SPRINGS DISCHARGE

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

TABLE 20B: EAST MOUNTAIN SPRINGS DISCHARGE (Continued)

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

+ New springs identified in 1986.

TABLE 21: YEARLY SPRING DISCHARGE VARIATIONS (GPM)

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

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

# FIGURE 3

## SPRING DISCHARGE VS. PRECIPITATION

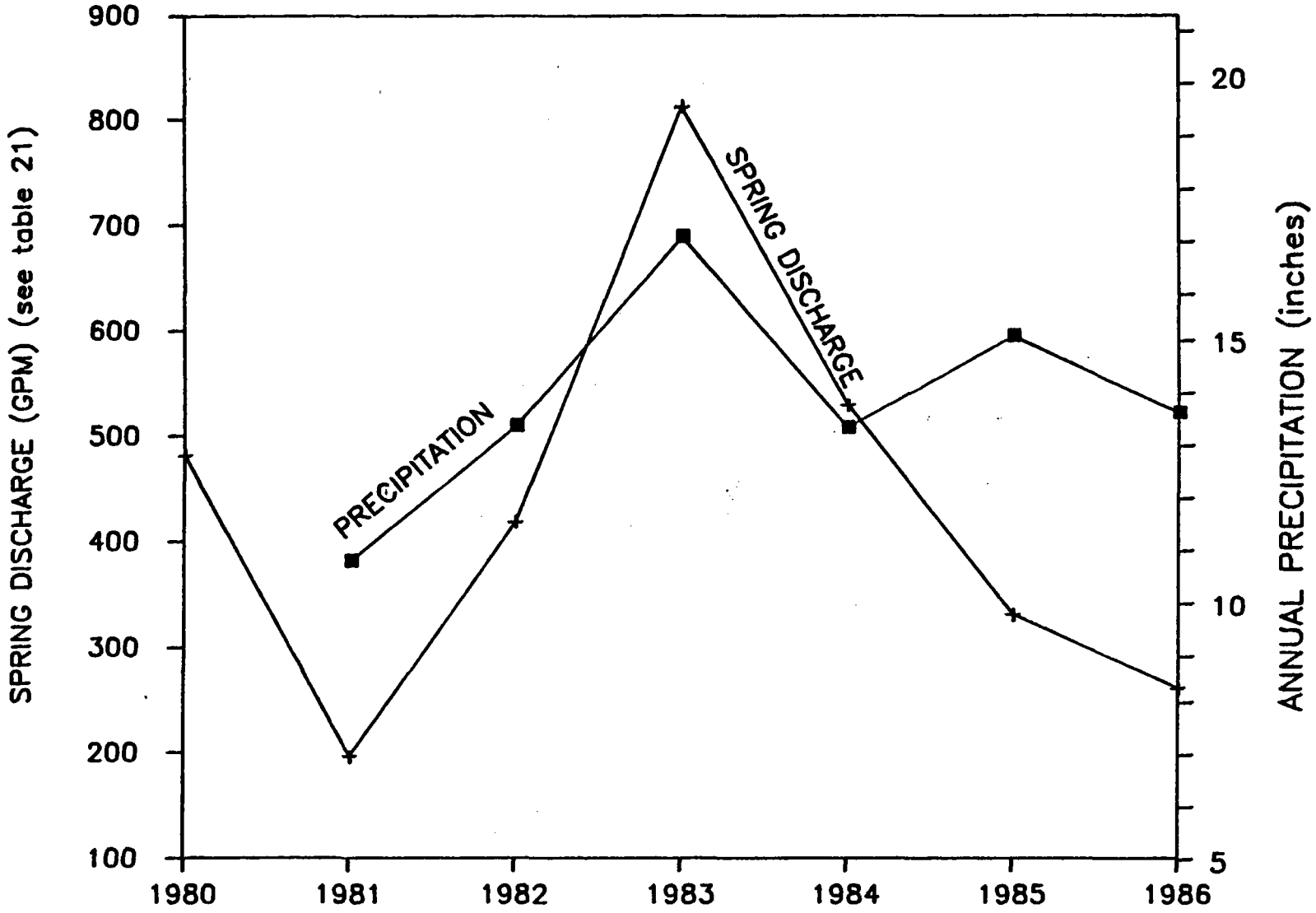


TABLE 22: EAST MOUNTAIN REGRESSION STUDY (FLOW*/TEMP.)

1986

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

*All flow given in gallons per minute

C. Quality

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

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

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

## V. MINE HYDROLOGY

### A. Surface Water Sources in Relation to Mine Workings

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

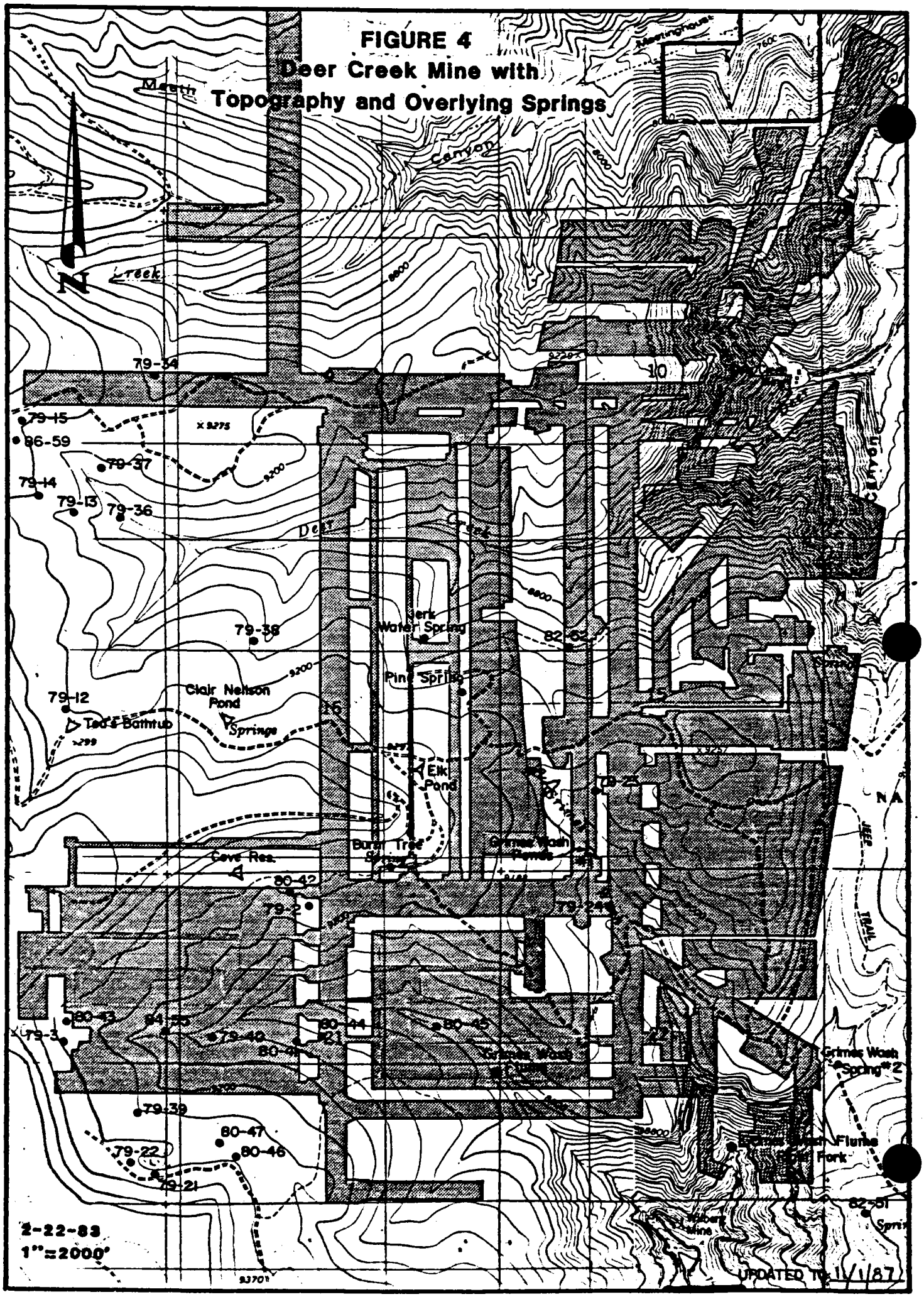
### B. Groundwater Quality and Collection Procedures

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

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

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

# FIGURE 4
## Deer Creek Mine with Topography and Overlying Springs



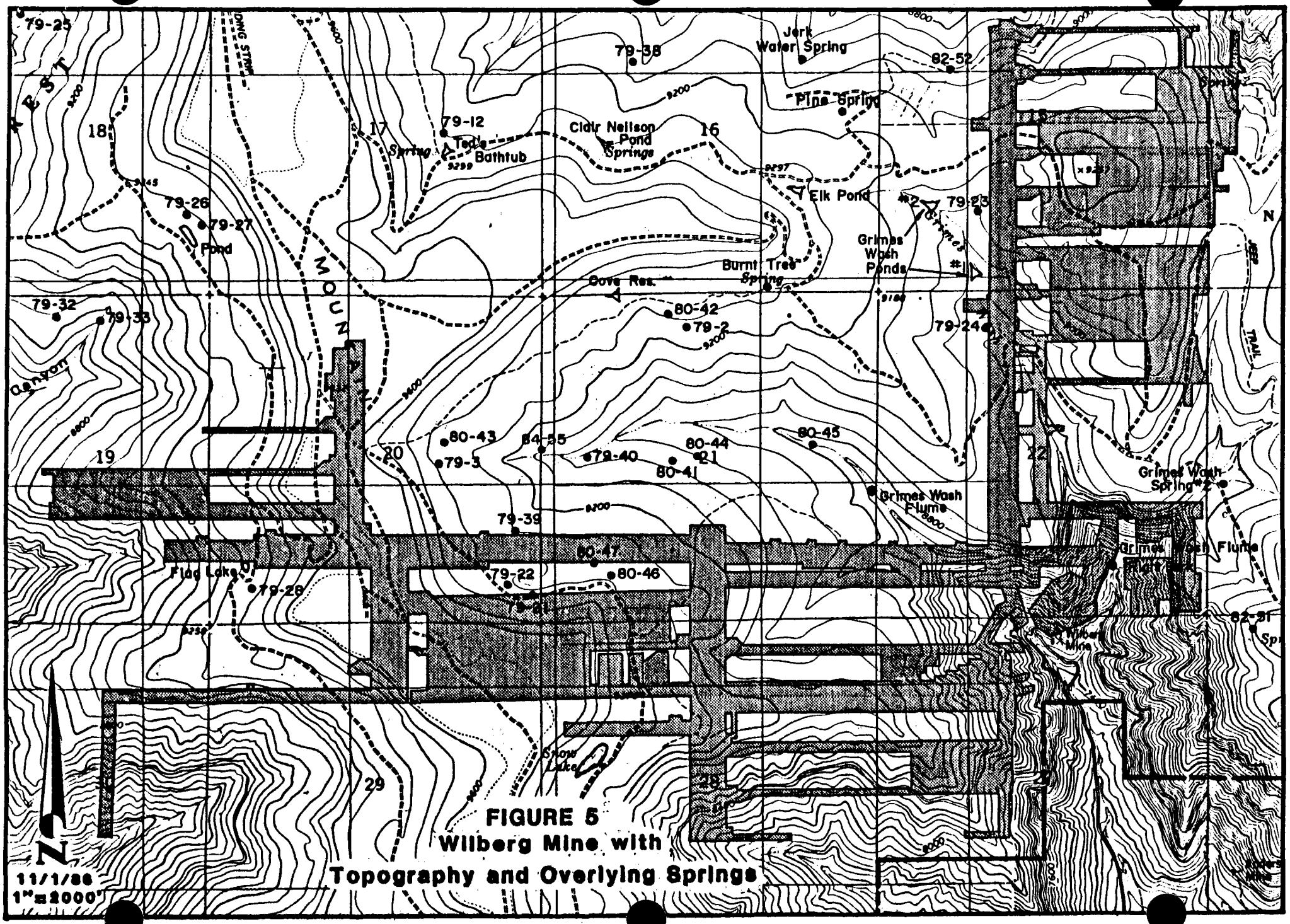



**FIGURE 5**
**Wilberg Mine with Topography and Overlying Springs**

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

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

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

They include:

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

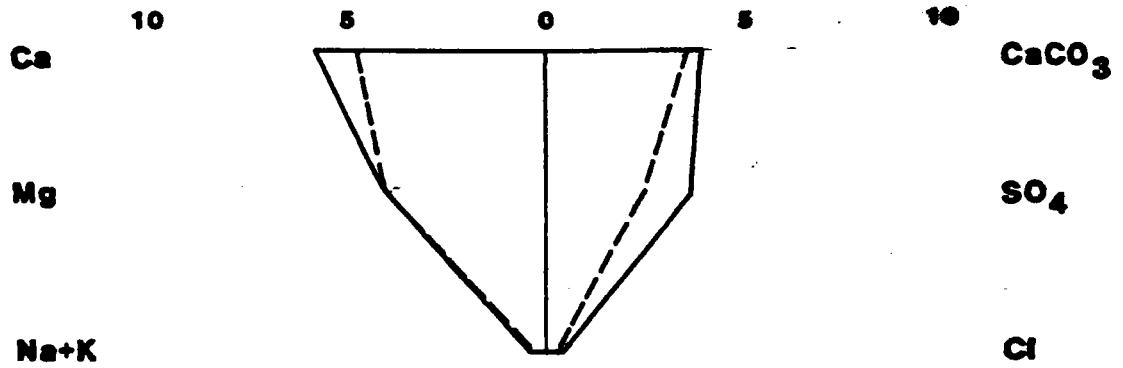
A collection device was installed at each long-term monitoring location. Flow and temperatures collected on a quarterly basis from the long-term sites in both mines were fairly consistent. (See Appendix 6 for the Deer Creek and Wilberg In-Mine hydrographs.)

FIGURE 6

# IN-MINE WATER QUALITY CATION-ANION DIAGRAMS

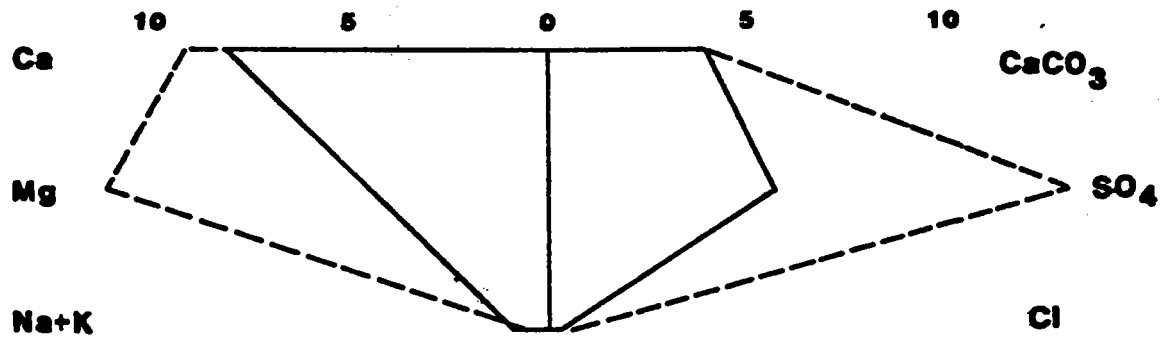
## DEER CREEK IN-MINE

Historical _____
1986 - - - - -



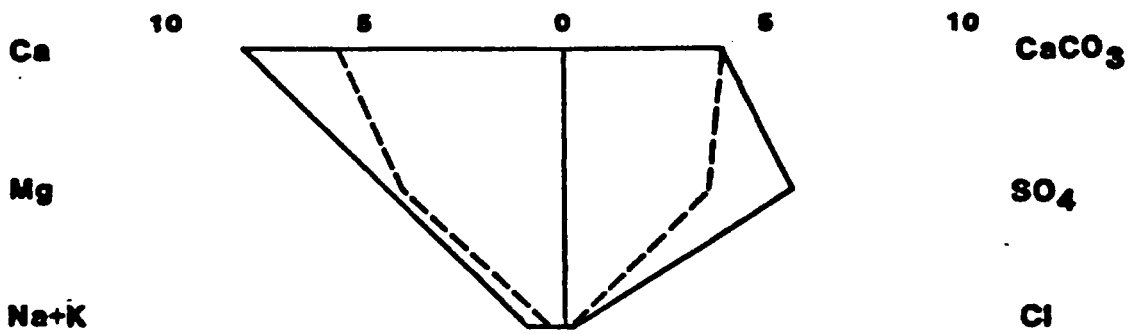

## WILBERG IN-MINE

Historical _____
1986 - - - - -



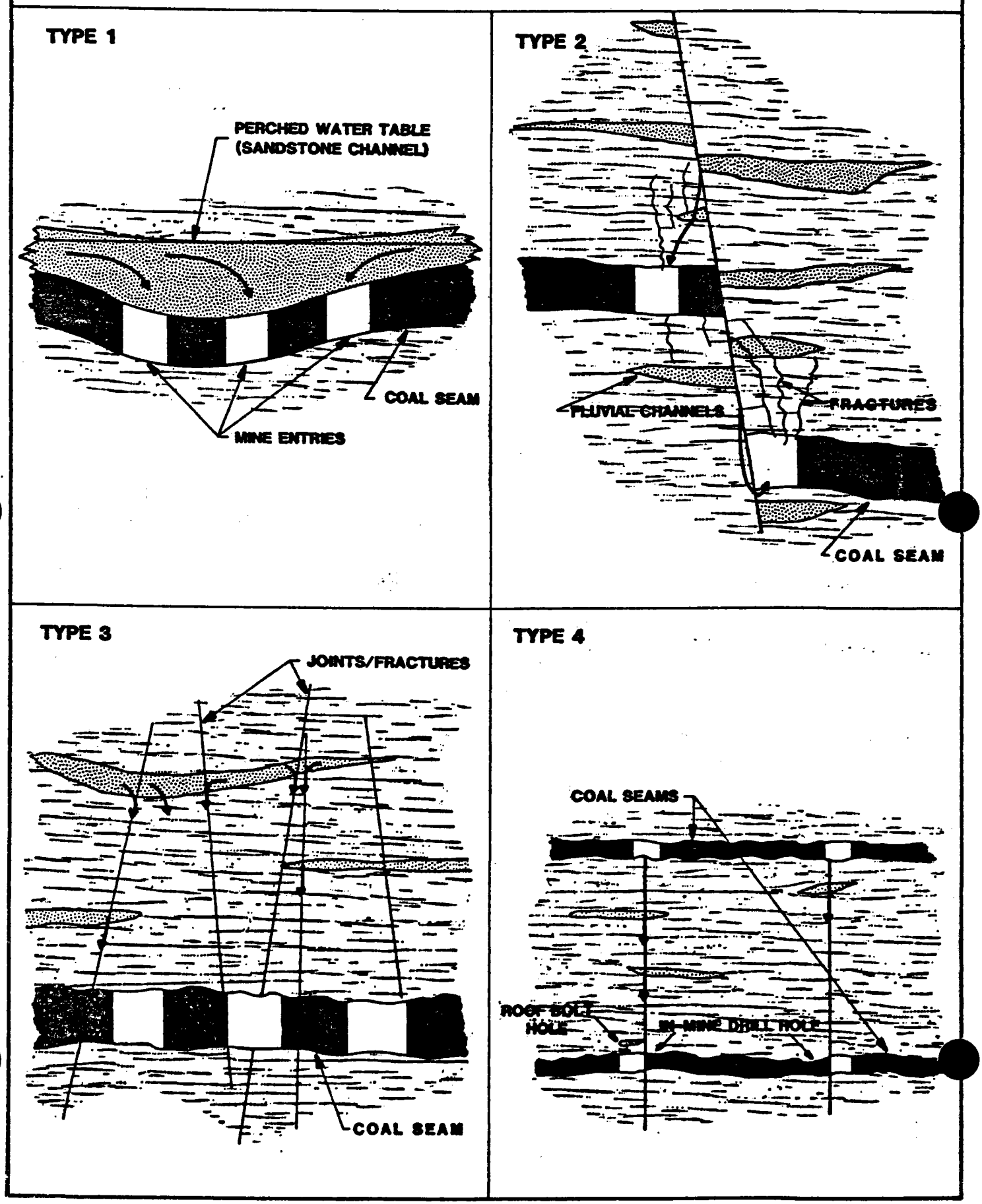

## WILBERG/DEER CREEK HISTORICAL

Wilberg _____
Deer Creek - - - - -



## FIGURE 7

## LONG TERM WATER SOURCES



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

DEER CREEK MINE

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

WILBERG MINE

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

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

C. Mine Water

1. Deer Creek Mine

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

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

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

** See 1981 Hydrologic Monitoring Report

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

TABLE 24: DEER CREEK IN-MINE WATER QUALITY

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

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

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

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

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

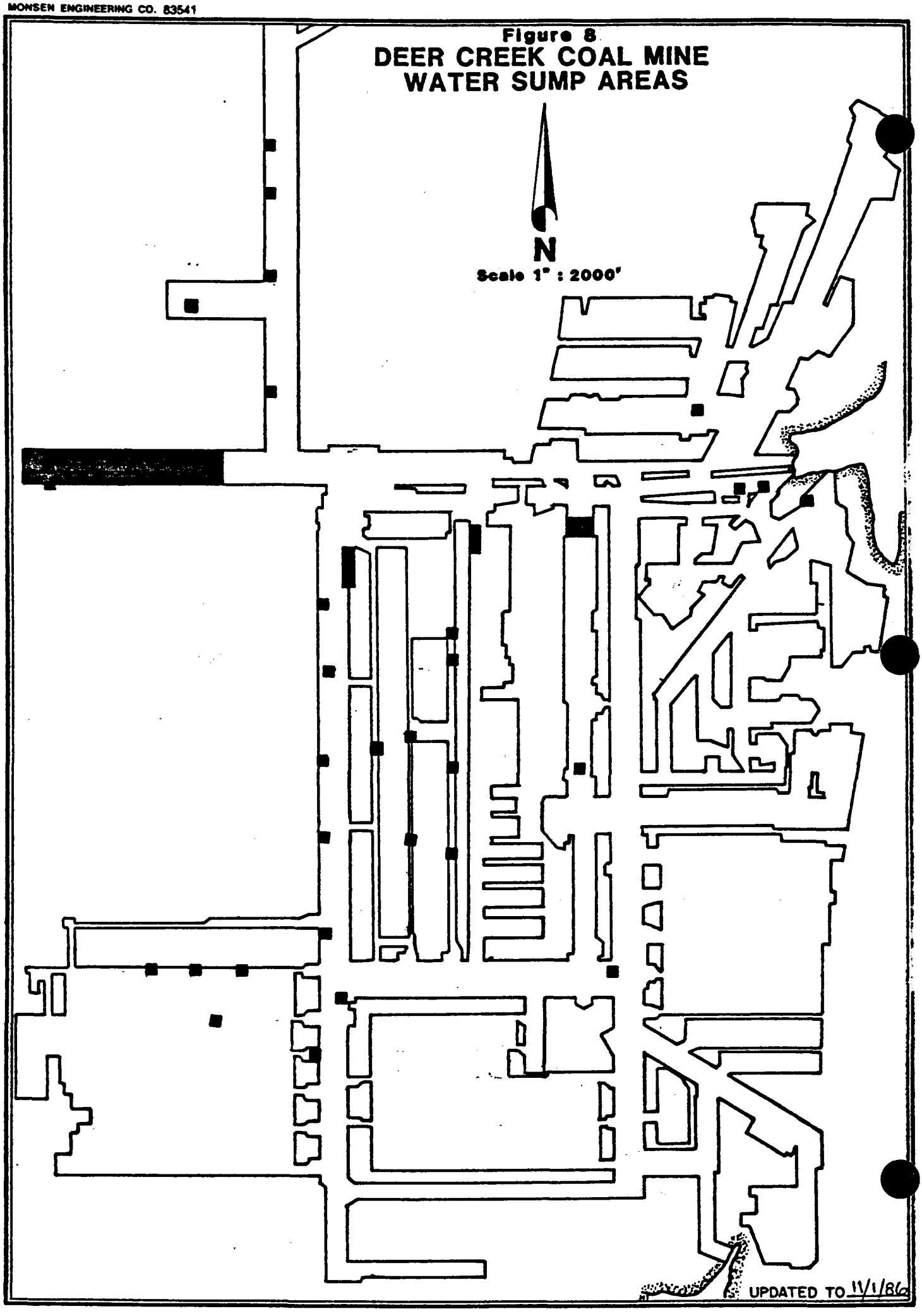


Figure 8
DEER CREEK COAL MINE
WATER SUMP AREAS
N
Scale 1" : 2000'
UPDATED TO 11/1/86

FIGURE 9

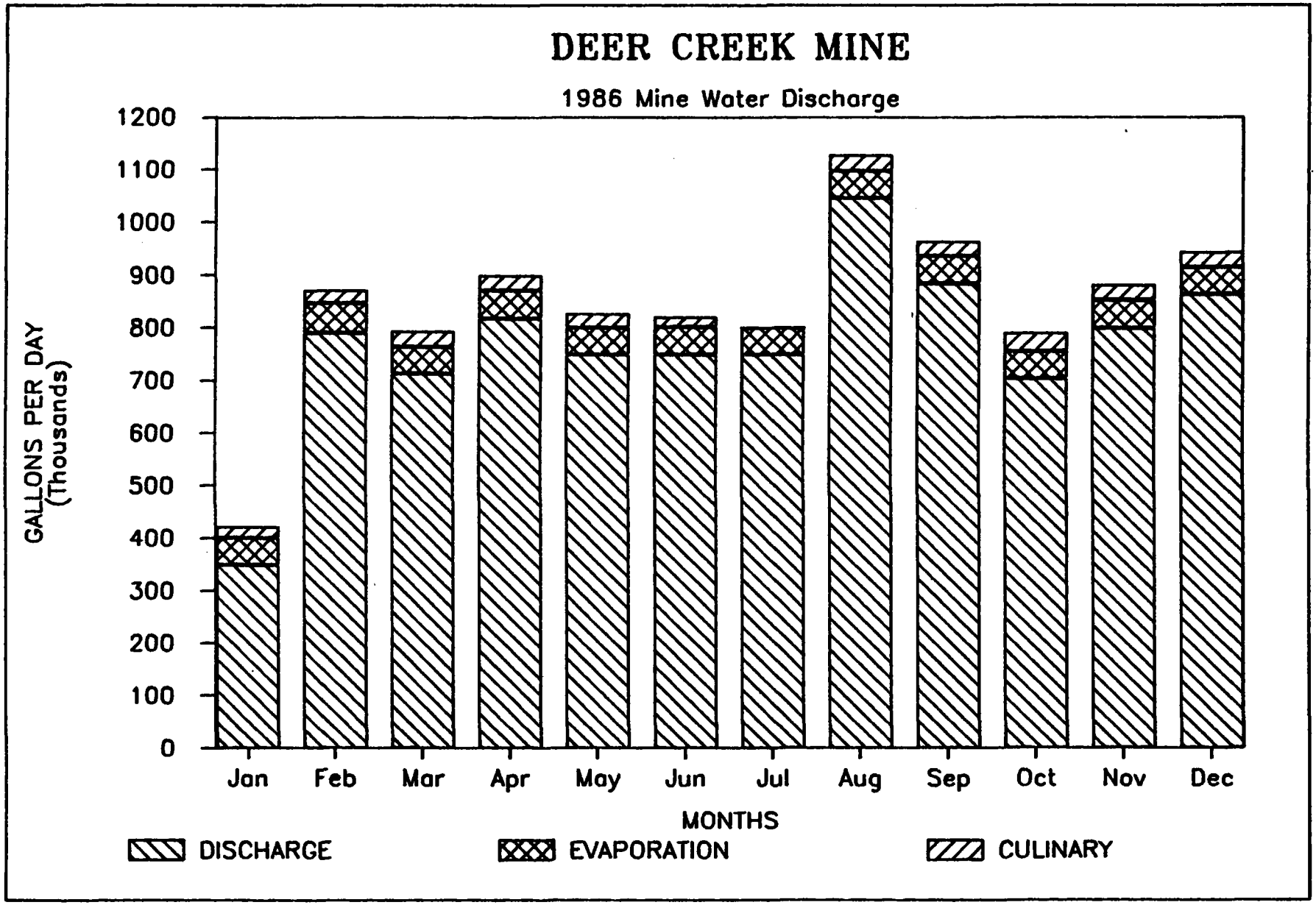

DEER CREEK MINE
1986 Mine Water Discharge
GALLONS PER DAY (Thousands)
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
MONTHS
DISCHARGE
EVAPORATION
CULINARY

FIGURE 10

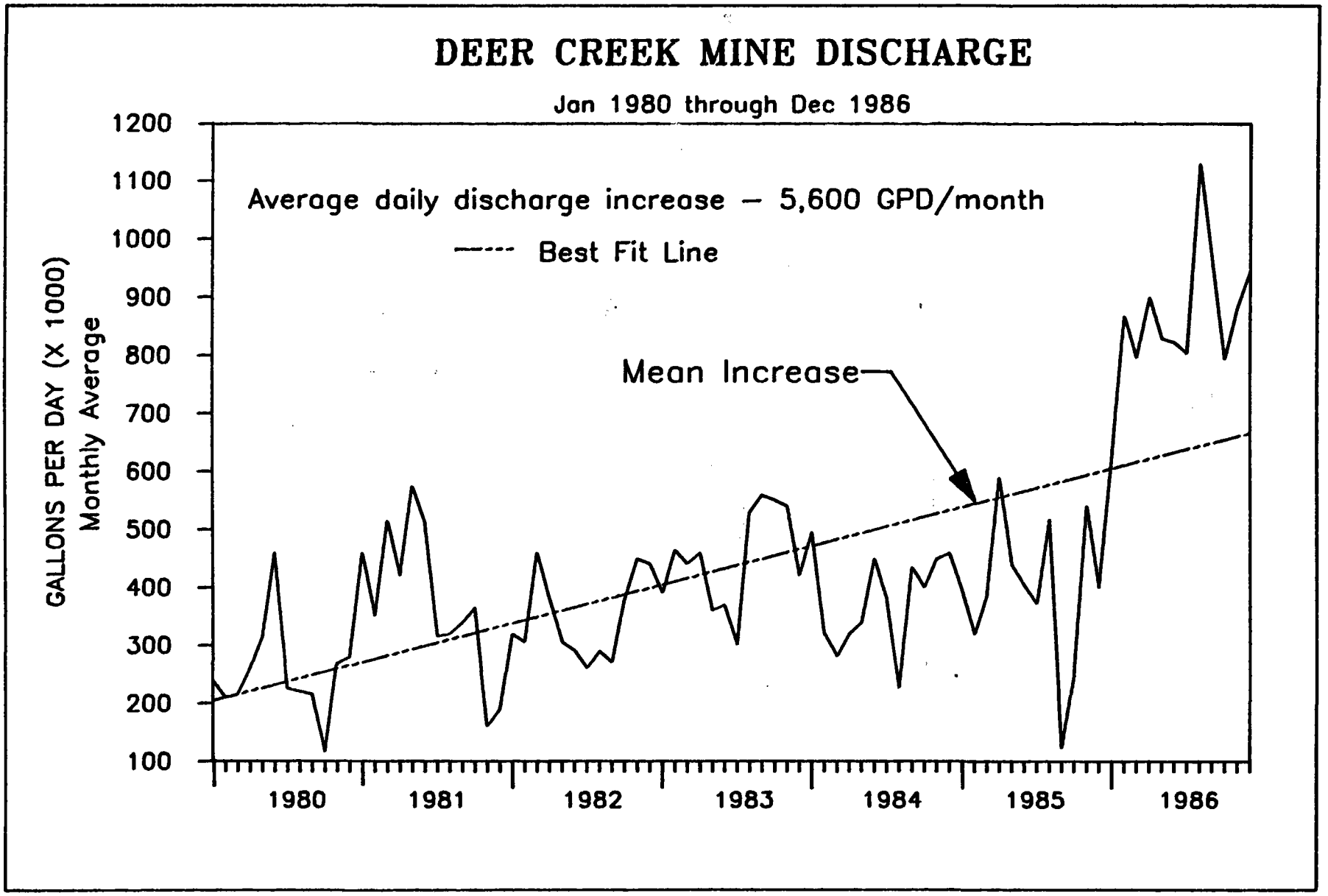

DEER CREEK MINE DISCHARGE
Jan 1980 through Dec 1986
Average daily discharge increase – 5,600 GPD/month
Best Fit Line
Mean Increase
GALLONS PER DAY (X 1000)
Monthly Average
1200
1100
1000
900
800
700
600
500
400
300
200
100
1980
1981
1982
1983
1984
1985
1986

TABLE 25: DEER CREEK MINE - DISCHARGE* WATER QUALITY

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

* Used only in the power plant cooling system.

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

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

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

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

* See 1981 Hydrologic Monitoring Report

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

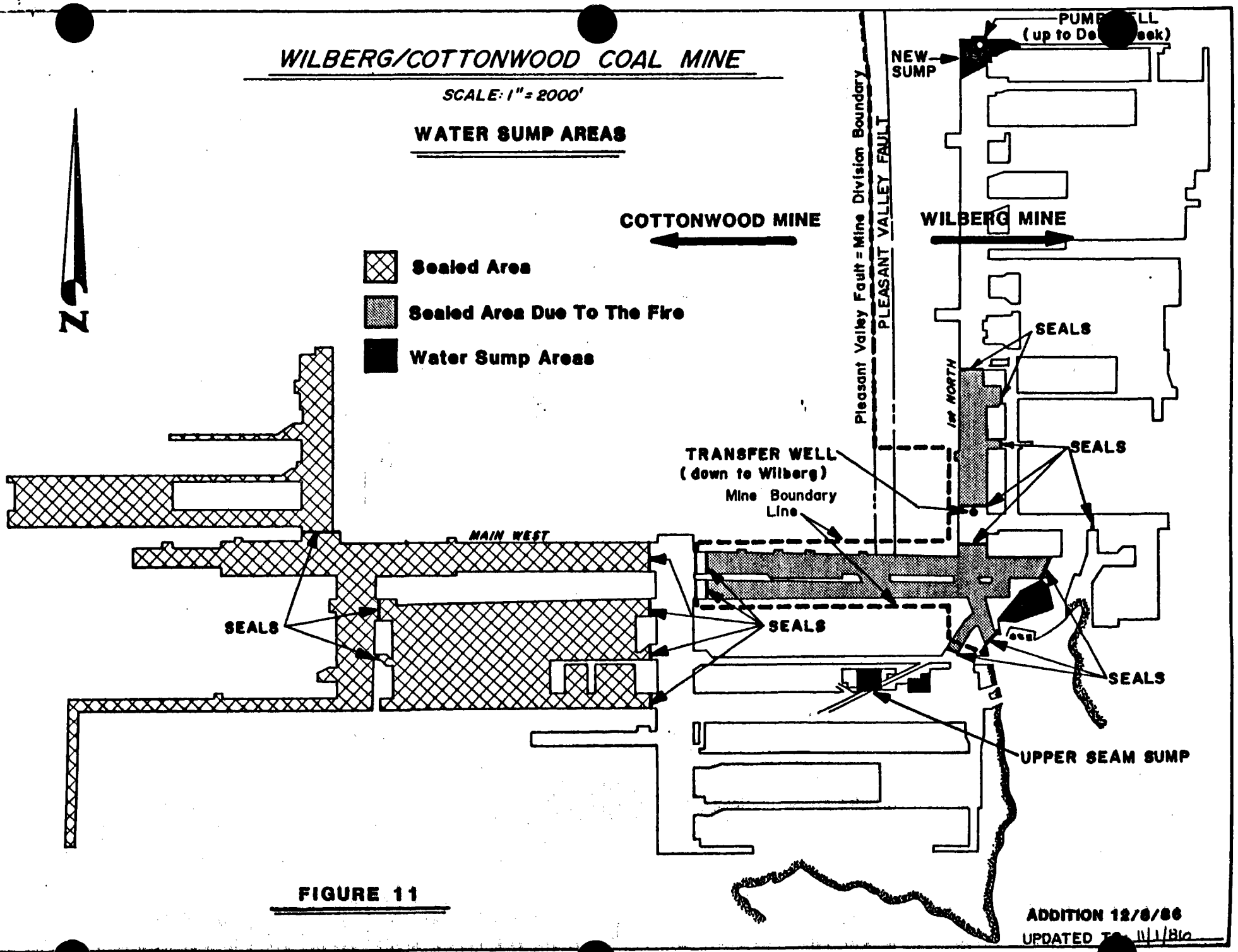
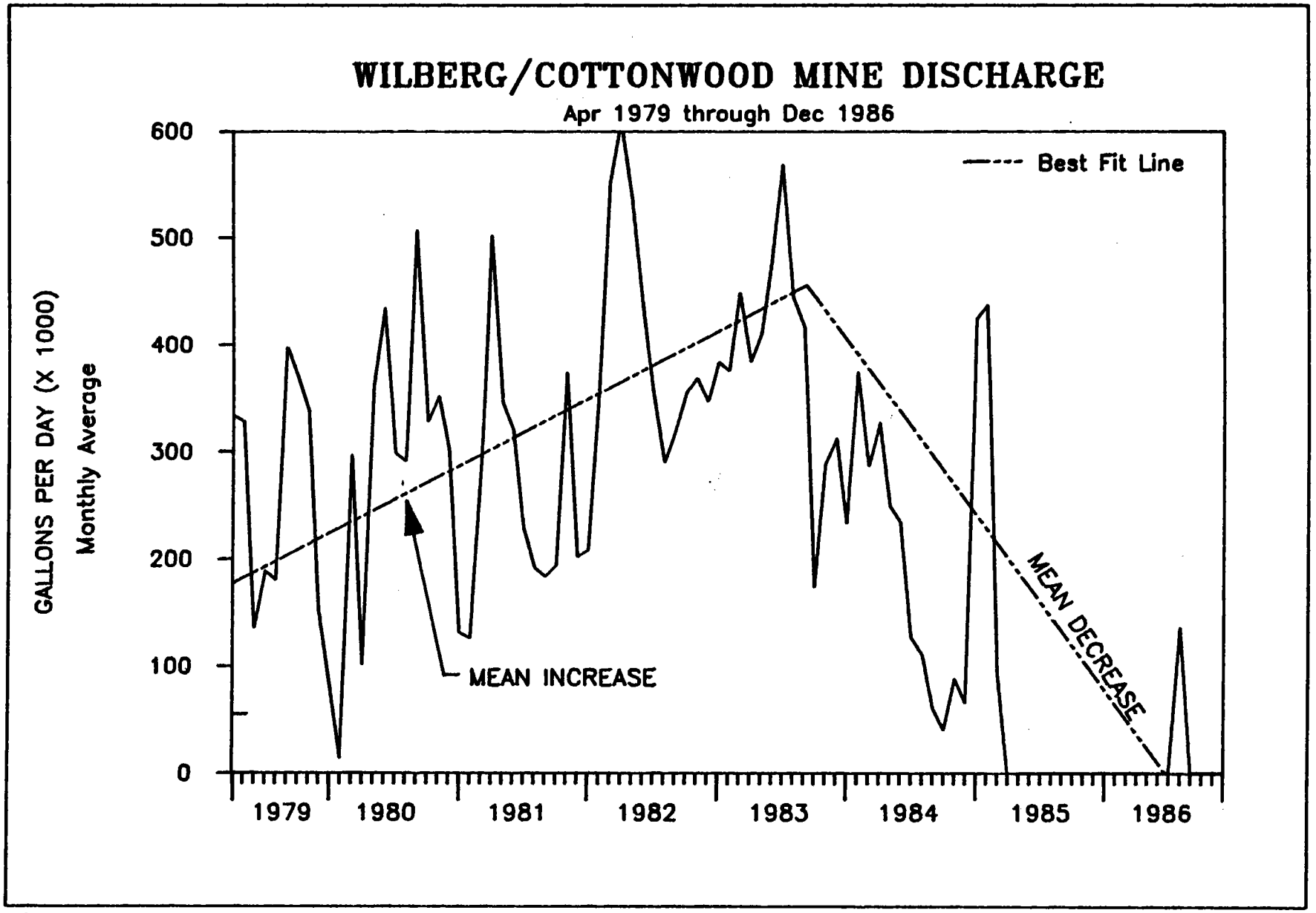

WILBERG/COTTONWOOD COAL MINE
SCALE: 1" = 2000'
WATER SUMP AREAS
N
Sealed Area
Sealed Area Due To The Fire
Water Sump Areas
COTTONWOOD MINE
WILBERG MINE
Pleasant Valley Fault = Mine Division Boundary
PLEASANT VALLEY FAULT
NEW SUMP
(up to De eek)
SEALS
1st NORTH
SEALS
TRANSFER WELL
(down to Wilberg)
Mine Boundary Line
MAIN WEST
SEALS
SEALS
SEALS
UPPER SEAM SUMP
ADDITION 12/6/86
UPDATED

FIGURE 11

FIGURE 12


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

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

TABLE 26: WILBERG IN-MINE WATER QUALITY

| Location | pH | Alka. | Ca | Cl | Cond. | Mg | K | Na | $SO_4$ | TDS | TSS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2Sxc-11, 1L | 7.1 | 391 | 132 | 13.9 | 1600 | 107.0 | 4.8 | 24.7 | 400 | 920 | 2.0 |
| 4Exc-40, 2R | 6.9 | 531 | 236 | 16.7 | 2600 | 164.2 | 5.4 | 24.8 | 750 | 1557 | 8.0 |
| 2Sxc-11, 1L | 7.2 | 342 | 118 | 15.0 | 1400 | 104.5 | 5.0 | 23.8 | 400 | 932 | <0.5 |
| 4Exc-24, 2L | 7.2 | 378 | 238 | 24.0 | 2130 | 139.8 | 8.5 | 35.7 | 800 | 1520 | <0.5 |
| 2Sxc-11, 1L | 7.6 | 390 | 134 | 14.1 | 1480 | 108.2 | 5.5 | 24.7 | 410 | 915 | <0.5 |
| 4Exc-24, 2L | 7.2 | 398 | 236 | 23.0 | 2105 | 153.0 | 9.6 | 37.0 | 840 | 1605 | 1.0 |
| 2Sxc-11, 1L | 7.5 | 335 | 122 | 15.1 | 1400 | 107.0 | 5.2 | 25.0 | 450 | 912 | 16.0 |
| 4Exc-24, 2L | 7.3 | 393 | 252 | 28.4 | 2400 | 189.7 | 9.7 | 43.0 | 980 | 1898 | 17.0 |
| Min | 6.9 | 335 | 118 | 13.9 | 1400 | 104.5 | 4.8 | 23.8 | 400 | 912 | <0.5 |
| 86 Max | 7.6 | 531 | 252 | 28.4 | 2600 | 189.7 | 9.7 | 43.0 | 980 | 1898 | 17.0 |
| Mean | 2.2 | 394.8 | 183.5 | 18.8 | 1889.4 | 134.2 | 6.7 | 29.8 | 628.8 | 1282.4 | 5.7 |
| Hist. Min | 6.6 | 169 | 11.2 | 0.89 | 620 | 4.9 | 1.0 | 16.6 | 78 | 419 | 0.1 |
| (1977-Max | 8.5 | 566 | 356 | 21.9 | 2200 | 163 | 21.0 | 183.8 | 780 | 1610 | 70.1 |
| 1985) Mean | 7.4 | 389.9 | 161.1 | 10.6 | 1182.9 | 54.0 | 6.5 | 41.9 | 272.6 | 724.2 | 3.8 |

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

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

## VI. Piezometric Gradient Information

### A. Surface

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

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

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

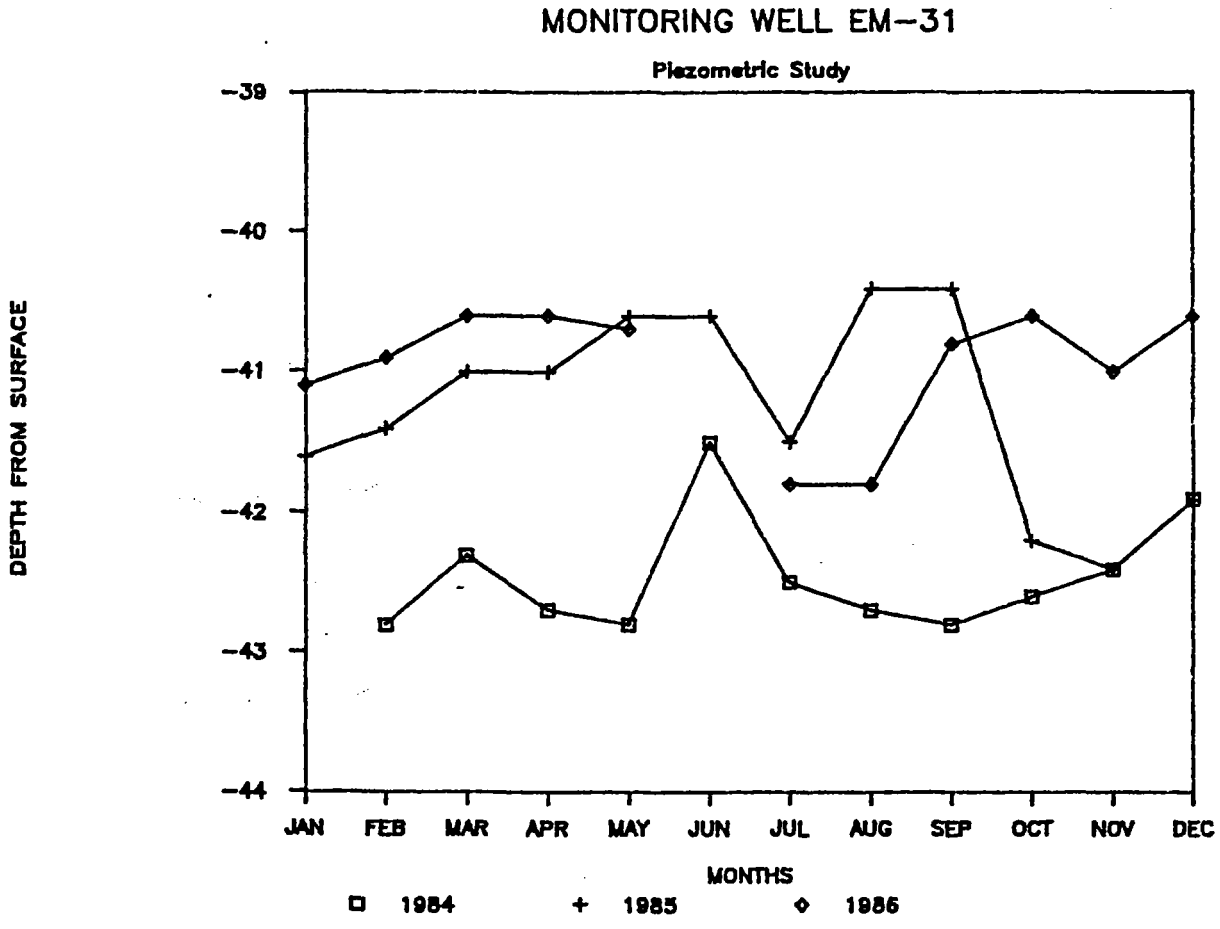
activities in Rilda Canyon to the springs, which are currently utilized as a culinary water source by North Emery Water Users Association (NEWUA). UP&L echoes the same concerns expressed by West Appa Coal Company due to the fact that both the Hiawatha and Blind Canyon Seams are mineable in the region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

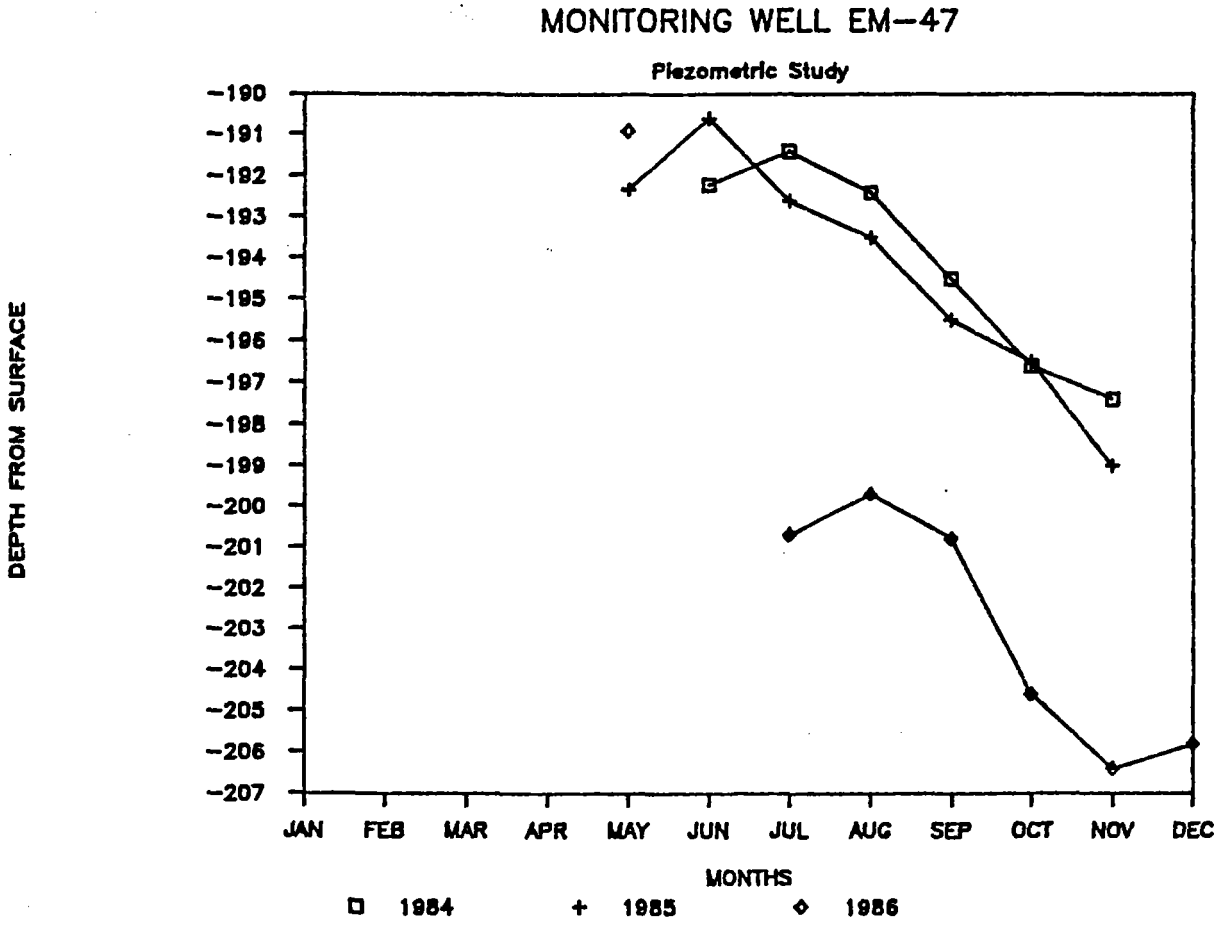
A study performed by Vaughn Hansen Associates indicated the Rilda Canyon Springs lie directly in line with a north-south trending side canyon on the south as well as one to the north. From examination of topographic features it appears that the linear relationship of side drainage channels (or lineament)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

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

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

# FIGURE 13


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


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

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

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

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

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

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

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

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

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

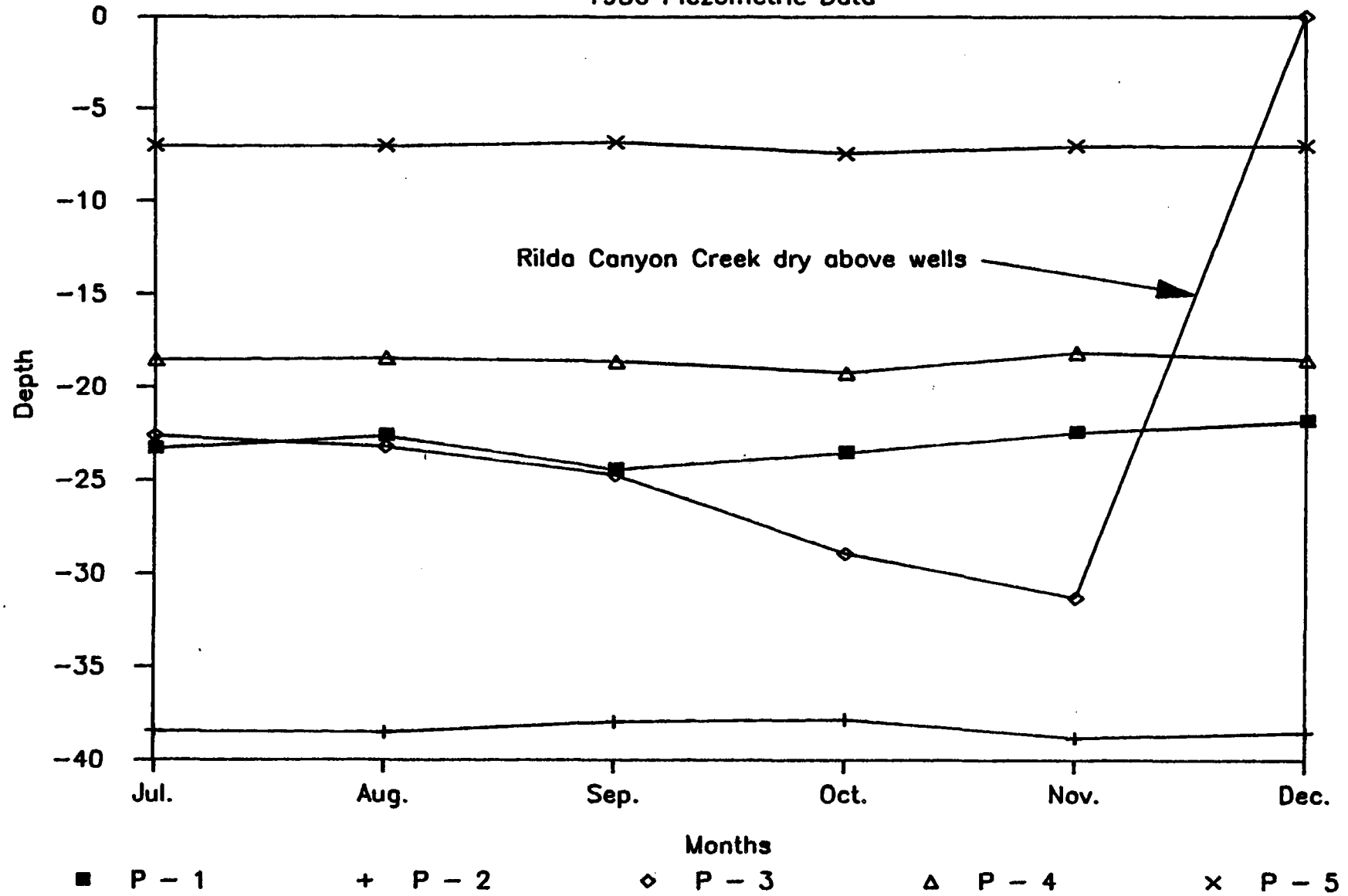
B. In-Mine. All remaining in-mine drill holes located in the Deer Creek Mine were destroyed by mining activities, primarily a diesel roadway construction project. Six new holes are tentatively scheduled to be drilled late in 1987.

## VI. EFFECTS OF MINING AND SUBSIDENCE ON HYDROLOGY

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

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

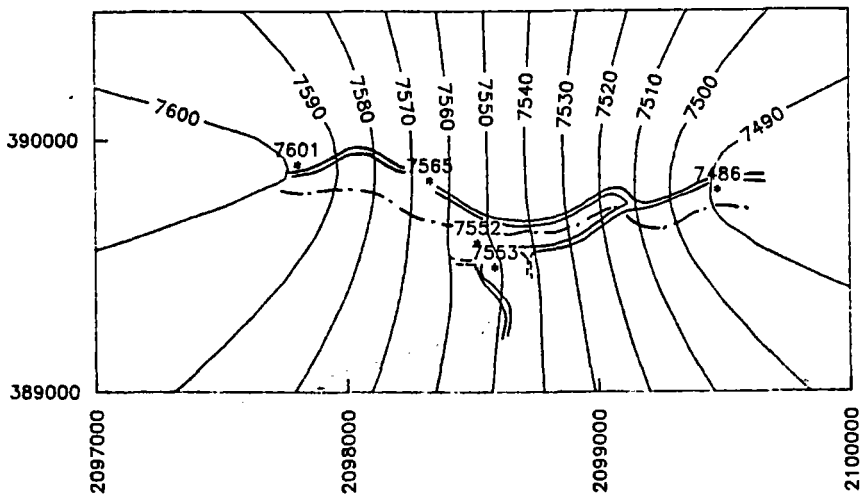
# FIGURE 14
## RILDA CANYON STUDY AREA
### 1986 Piezometric Data



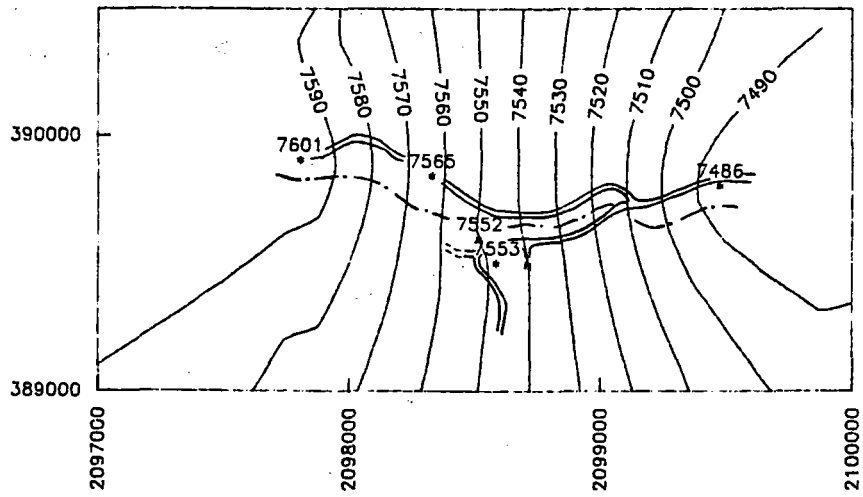
# FIGURE 15

## RILDA CANYON WELLS

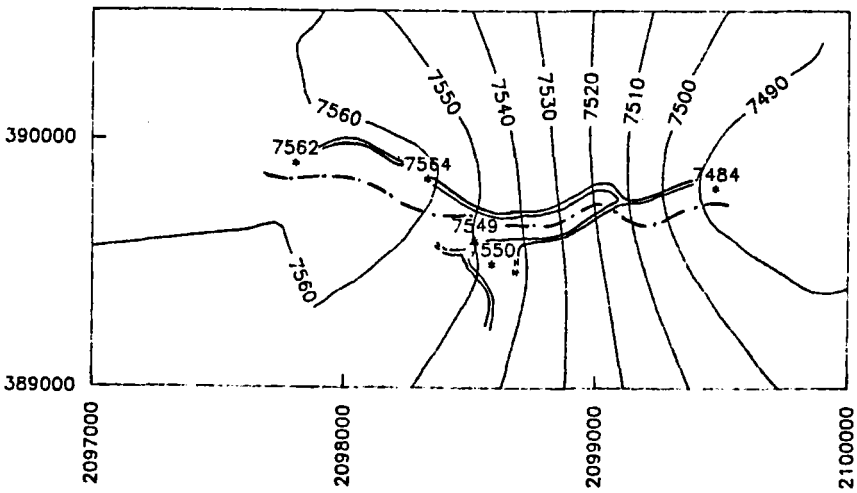
### OCTOBER 1982




### JULY 1986




### DECEMBER 1986

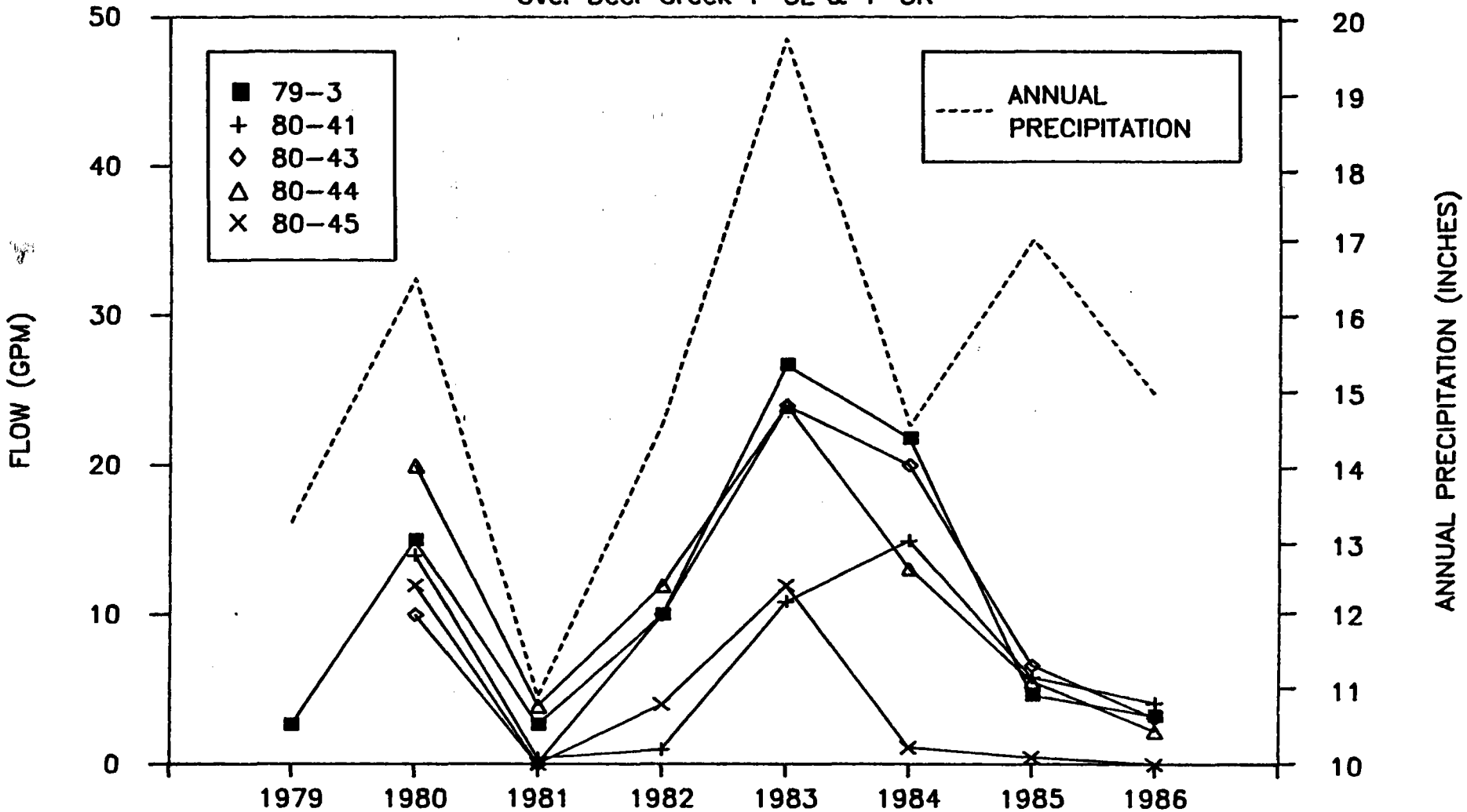


The springs and surface waters above all areas of mine workings are being monitored closely to measure the effects of mining. No mining related changes to the springs or surface waters have been identified in the data collected. The water flowing into the mine workings, although temporarily diverted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

# FIGURE 16

## EAST MOUNTAIN SPRINGS

Over Deer Creek 1–5L & 1–5R



# VIII. SUMMARY

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

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

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

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

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

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

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

# APPENDIX A

## HUNTINGTON CREEK STREAM FLOWS/WATER QUALITY

UTAH POWER & L[illegible] COMPANY

STREAM DISCHARGE RECORDS

DAILY DISCHARGE (CFS)

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

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

TOTAL MEAN MAX MIN TOT ACR FT

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

REMARKS:

01/12/87

UTAH POWER & LIGHT COMPANY

INFLOW AND UTILIZATION RECORDS

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | DAY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 223.28 | 42.32 | 46.24 | 44.58 | 29.69 | 52.66 | 127.95 | 246.28 | 1001.17 | 242.44 | 89.15 | 89.48 | 1 |
| 2 | 52.09 | 41.93 | 45.98 | 34.88 | 37.71 | 51.98 | 158.22 | 321.55 | 986.46 | 236.01 | 84.37 | 103.28 | 2 |
| 3 | 29.60 | 36.74 | 27.68 | 11.75 | 32.89 | 53.30 | 182.87 | 379.34 | 959.93 | 220.16 | 83.81 | 104.53 | 3 |
| 4 | 21.80 | 36.74 | 26.09 | 36.68 | 27.88 | 56.67 | 181.33 | 417.53 | 1062.45 | 204.64 | 82.68 | 86.26 | 4 |
| 5 | 25.73 | 38.08 | 25.62 | 28.77 | 34.80 | 57.28 | 146.93 | 497.42 | 1014.33 | 193.39 | 86.07 | 83.18 | 5 |
| 6 | 36.71 | 27.10 | 19.43 | 15.38 | 29.84 | 56.73 | 121.79 | 562.01 | 787.49 | 194.17 | 90.76 | 82.75 | 6 |
| 7 | 40.32 | 31.65 | 12.16 | 19.63 | 28.46 | 58.82 | 117.41 | 465.95 | 773.15 | 193.87 | 91.97 | 80.81 | 7 |
| 8 | 41.07 | 25.31 | 13.08 | 30.70 | 33.89 | 61.86 | 119.73 | 387.04 | 795.74 | 176.39 | 90.57 | 78.31 | 8 |
| 9 | 75.42 | 23.24 | 21.12 | 22.75 | 29.00 | 61.48 | 126.55 | 335.38 | 711.69 | 167.65 | 94.21 | 78.43 | 9 |
| 10 | 106.51 | 29.11 | 26.87 | 9.39 | 28.55 | 70.26 | 129.70 | 323.10 | 653.30 | 167.23 | 104.44 | 80.22 | 10 |
| 11 | 85.47 | 32.93 | 26.92 | 19.59 | 21.64 | 80.30 | 127.87 | 320.95 | 549.88 | 162.15 | 100.30 | 84.28 | 11 |
| 12 | 66.47 | 26.88 | 22.30 | 29.39 | 20.73 | 67.47 | 124.00 | 269.46 | 478.80 | 154.71 | 97.25 | 78.79 | 12 |
| 13 | 72.55 | 30.49 | 11.80 | 24.32 | 43.51 | 58.96 | 126.76 | 270.92 | 462.15 | 153.73 | 99.36 | 74.71 | 13 |
| 14 | 68.75 | 44.36 | 10.06 | 16.03 | 35.13 | 51.54 | 128.54 | 336.27 | 480.88 | 150.73 | 108.91 | 72.27 | 14 |
| 15 | 66.38 | 39.03 | 39.75 | 21.02 | 38.90 | 42.75 | 139.12 | 336.56 | 487.77 | 149.61 | 132.13 | 80.09 | 15 |
| 16 | 62.06 | 36.01 | 39.60 | 21.43 | 42.55 | 51.47 | 129.14 | 374.53 | 486.33 | 155.70 | 128.38 | 85.31 | 16 |
| 17 | 57.65 | 23.55 | 24.71 | 31.07 | 39.74 | 46.01 | 122.79 | 385.59 | 469.04 | 161.37 | 127.15 | 79.90 | 17 |
| 18 | 49.78 | 29.15 | 15.50 | 26.77 | 44.18 | 53.21 | 134.27 | 370.78 | 445.76 | 174.99 | 128.20 | 82.02 | 18 |
| 19 | 50.95 | 33.98 | 13.67 | 26.55 | 39.54 | 53.22 | 137.52 | 367.78 | 417.42 | 164.77 | 125.80 | 96.45 | 19 |
| 20 | 59.06 | 35.51 | 23.75 | 28.12 | 45.70 | 51.78 | 127.78 | 408.12 | 409.17 | 155.83 | 122.50 | 101.36 | 20 |
| 21 | 56.96 | 18.23 | 22.37 | 24.96 | 44.61 | 54.94 | 119.20 | 505.54 | 402.78 | 155.13 | 125.07 | 93.47 | 21 |
| 22 | 56.22 | 19.88 | 23.43 | 34.08 | 31.08 | 56.55 | 126.34 | 611.30 | 370.00 | 148.21 | 124.57 | 84.00 | 22 |
| 23 | 55.00 | 29.04 | 22.86 | 30.52 | 38.01 | 60.91 | 154.59 | 711.79 | 339.43 | 148.31 | 130.87 | 87.32 | 23 |
| 24 | 54.15 | 26.84 | 27.96 | 21.03 | 44.64 | 66.17 | 197.85 | 779.98 | 315.21 | 148.00 | 132.35 | 88.90 | 24 |
| 25 | 61.35 | 35.50 | 30.63 | 29.33 | 47.55 | 85.59 | 244.85 | 720.23 | 300.26 | 150.84 | 127.31 | 103.73 | 25 |
| 26 | 42.61 | 46.79 | 30.10 | 26.98 | 46.46 | 92.85 | 297.21 | 703.79 | 289.58 | 150.47 | 131.95 | 138.17 | 26 |
| 27 | 33.29 | 55.12 | 30.09 | 23.55 | 48.11 | 87.45 | 286.41 | 764.59 | 286.03 | 148.46 | 124.12 | 131.15 | 27 |
| 28 | 36.94 | 42.97 | 25.86 | 25.06 | 50.56 | 83.72 | 261.24 | 886.24 | 286.42 | 141.22 | 119.39 | 122.47 | 28 |
| 29 | 42.91 | 26.51 | 28.03 | 28.64 | 0.00 | 85.61 | 210.46 | 995.38 | 269.92 | 131.13 | 101.00 | 119.36 | 29 |
| 30 | 47.65 | 28.86 | 29.18 | 29.89 | 0.00 | 99.32 | 206.92 | 1021.09 | 255.71 | 126.60 | 83.72 | 111.11 | 30 |
| 31 | 40.24 | 0.00 | 30.85 | 28.60 | 0.00 | 110.27 | 0.00 | 1009.57 | 0.00 | 119.78 | 94.11 | 0.00 | 31 |
| MONTHLY | | | | | | | | | | | | | |
| TOT | 1818.95 | 993.88 | 793.71 | 801.44 | 1035.34 | 2021.13 | 4815.36 | 16086.17 | 16548.26 | 5147.68 | 3362.47 | 2782.10 | |
| MEA | 58.68 | 33.13 | 25.60 | 25.85 | 36.98 | 65.20 | 160.51 | 518.91 | 551.61 | 166.05 | 108.47 | 92.74 | |
| MAX | 223.28 | 55.12 | 46.24 | 44.58 | 50.56 | 110.27 | 297.21 | 1021.09 | 1062.45 | 242.44 | 132.35 | 138.17 | |
| MIN | 21.80 | 18.23 | 10.06 | 9.39 | 20.73 | 42.75 | 117.41 | 246.28 | 255.71 | 119.78 | 82.68 | 72.27 | |

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

TOTAL MEAN MAX MIN

REMARKS:

01/12/87

UTAH POWER & LIGHT COMPANY

STREAM DISCHARGE RECORDS

DAILY DISCHARGE (CFS)

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

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

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

REMARKS:

12/22/86

# 1986 ELECTRIC LAKE REPORT

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

1986 ELECTRIC LAKE REPORT

| LOCATION | DATE | PARAMETER | CODE | VALUE |
|---|---|---|---|---|

COMMENT = MOSTLY SUNNY, WINDY, COOL

# 1986 ELECTRIC LAKE REPORT

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

1986 ELECTRIC LAKE REPORT

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

1986 ELECTRIC LAKE REPORT

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

1986 ELECTRIC LAKE REPORT

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

1986 ELECTRIC LAKE REPORT

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

1986 ELECTRIC LAKE REPORT

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

1986 ELECTRIC LAKE REPORT

| LOCATION | DATE | PARAMETER | CODE | VALUE |
|---|---|---|---|---|
| UFL9 | 02/10/86 | ALK | | 201.0000 |
| | | FCOND | | 624.0000 |
| | | FPH | | 8.5700 |
| | | SO4 | | 60.0000 |
| | | SUSOLID | | 5.0000 |
| | | TDS | | 290.0000 |
| COMMENT = CLEAR, EXTREMELY ICY | | | | |
| | 06/17/86 | ALK | | 146.0000 |
| | | FCOND | | 444.0000 |
| | | FPH | | 8.3000 |
| | | SO4 | | 22.0000 |
| | | SUSOLID | | 64.0000 |
| | | TDS | | 159.0000 |
| COMMENT = | | | | |
| | 09/09/86 | ALK | | 566.0000 |
| | | FCOND | | 2960.0000 |
| | | FPH | | 8.5400 |
| | | SO4 | | 35.0000 |
| | | SUSOLID | | 21.0000 |
| | | TDS | | 650.0000 |
| COMMENT = | | | | |
| | 11/03/86 | ALK | | 184.0000 |
| | | FCOND | | 287.0000 |
| | | FPH | | 8.1000 |
| | | SO4 | | 75.0000 |
| | | SUSOLID | | 9.0000 |
| | | TDS | | 300.0000 |
| COMMENT = MOSTLY SUNNY, WINDY | | | | |

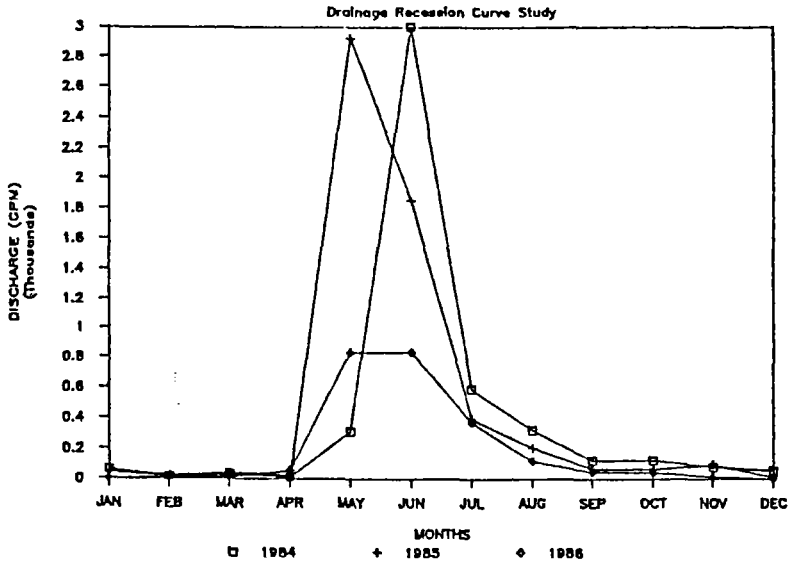
| LOCATION | LOC_DESC |
|---|---|
| H1 | HUNTINGTON CREEK BELOW DIVERSION |
| UPL1 | LEFT FORK HUNTINGTON CREEK |
| UPL3 | HUNTINGTON CR BELOW ELECT. LAKE |
| UPL9 | HUNTINGTON CREEK ABOVE FISH CR |
| UPL3 | HUNTINGTON CREEK - RIGHT FORK |

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

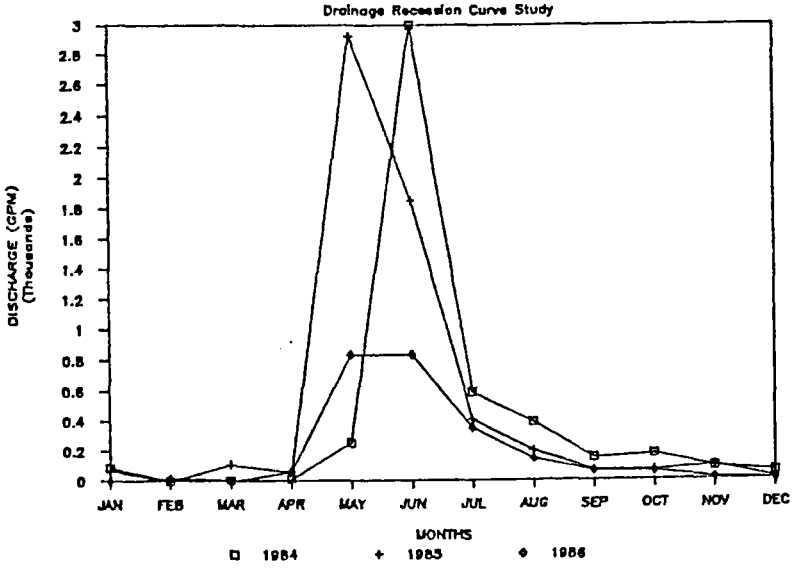
# APPENDIX B

# DEER CREEK SURFACE WATER FLOW AND QUALITY

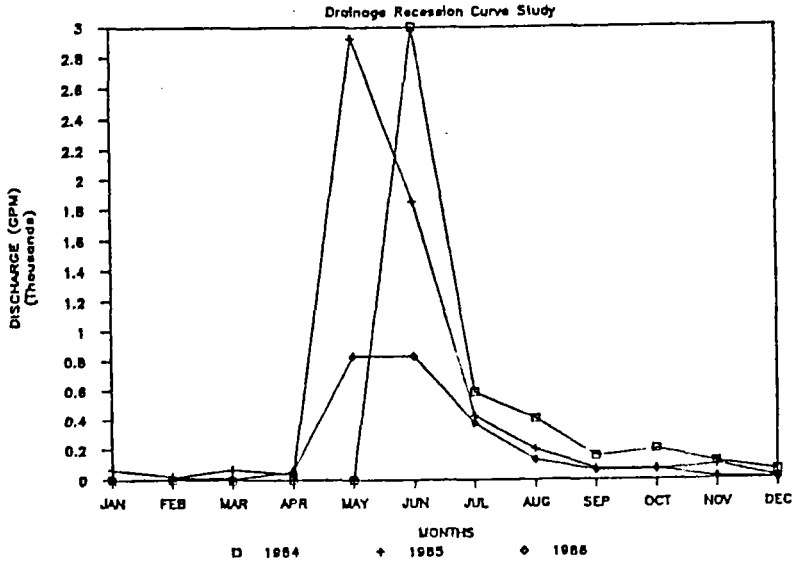
## DEER CREEK ABOVE MINE




## DEER CREEK BELOW MINE




## DEER CREEK @ PERMIT BOUNDARY



# CERTIFICATE OF ANALYSIS

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

Lab. No. 7766
Date Rec'd 1-13-86
Date Sampled 1-13-86
Time Sampled 1055

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

Sample ID: DEER CREEK
ABOVE THE MINE

Temp. 32°  Flow <5.0 GPM

| | | |
|---|---|---|
| Acidity | | mg/l $CaCO_3$ |
| Alkalinity, Total | | mg/l $CaCO_3$ |
| Alkalinity, Bicarbonate | | mg/l $CaCO_3$ |
| Alkalinity, Carbonate | | mg/l $CaCO_3$ |
| Chloride | | mg/l |
| Coliform, Fecal | | MPN/100 ml |
| Coliform, Total | | MPN/100 ml |
| Conductivity 1-15 | 660 | umhos/cm |
| Fluoride | | mg/l |
| Hardness, Total | | mg/l $CaCO_3$ |
| Nitrogen, Ammonia | | mg/l |
| Nitrogen, Nitrate | | mg/l |
| Nitrogen, Nitrite | | mg/l |
| Oil & Grease | | mg/l |
| pH 1-15 | 7.80 | Units |
| Phosphorus, Ortho | | mg/l |
| Phosphorus, Total | | mg/l |
| Solids, Total Dissolved | 385 | mg/l |
| Solids, Total Suspended 1-14 | 4.0 | mg/l |
| Sulfate | | mg/l |
| Sulfide | | mg/l |
| Turbidity | | NTU |

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

Analyst: David L. Janney

Respectfully submitted [signature] 1-20-86

Certified Environmental Laboratory

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 7989

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

Sample ID: DEER CREEK ABOVE THE MINE

Date Rec'd 4-9-86

Date Sampled 4-9-86

Time Sampled 1000

Temp. 35°  Flow 0.27/58.8 GPM

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

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

Analyst: David L. Parsons

Respectfully submitted David L. Parsons

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK BELOW THE MINE

Temp. 44° Flow 0.27/58.8 GPM

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

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

Analyst: David L. Janney

Respectfully submitted David L. Janney

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK ABOVE THE MINE

Temp. 38°  Flow 833.7 GPM

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

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

Analyst: David Janney

Respectfully submitted [signature] 5-27-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

P[illegible]ox 1140, Huntington, Utah 84528 801-653-2314

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

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

Sample ID: DEER CREEK BELOW THE MINE

Temp. 41° Flow 833.7 GPM

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

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

Analyst: David A. [illegible]

Respectfully submitted [illegible] 5-27-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

Sample ID: DEER CREEK ABOVE THE MINE

Temp. 44° Flow 833.7 GPM

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

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

Analyst: David A. Janney

Respectfully submitted David A. Janney

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK BELOW THE MINE

Temp. 49° Flow 1.70/833.7 GPM

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

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

Analyst: David L. Parry

Respectfully submitted David L. Parry

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

Sample ID: DEER CREEK ABOVE THE MINE

Temp. 47°  Flow 0.89/371.6 GPM

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

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

Analyst: David A. Janney

Respectfully submitted David A. Janney

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK BELOW THE MINE

Temp. 58°  Flow 0.85/352.8 GPM

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

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

Analyst: David A. Ramus

Respectfully submitted David A. Ramus

Certified Environmental Laboratory

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK ABOVE THE MINE

Temp. 51° Flow .42/116.7 GPM

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

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

Analyst: David L. Ramsey

Respectfully submitted David L. Ramsey

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK BELOW THE MINE

Temp. 62° Flow 0.48/143.2 GPM

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

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

Analyst: David A. Ramsey

Respectfully submitted David A. Ramsey

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK RUNOFF
ABOVE THE MINE

Temp. 46° Flow 0.23/45.8 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

P[illegible]ox 1140, Huntington, Utah 84528 801-653-2314

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

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

Sample ID: DEER CREEK RUNOFF
BELOW THE MINE

Temp. 44° Flow 0.28/61.9 GPM

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

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

Analyst; Sharon Reiter

Respectfully submitted Bd Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

STANDARD LABORATORIES, INC.
P[illegible]ox 1140, Huntington, Utah 84528 801-653-2314

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

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

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

Temp. 32° Flow 0.22/42.6

| | | | |
|---|---|---|---|
| Acidity | 10-22 | < 1.0 | mg/l $CaCO_3$ |
| Alkalinity, Total | | | mg/l $CaCO_3$ |
| Alkalinity, Bicarbonate | | 309 | mg/l ~~$CaCO_3$~~ $HCO_3$ |
| Alkalinity, Carbonate | | < 1.0 | mg/l $CaCO_3$ |
| Chloride | 10-23 | 1[illegible].8 | mg/l |
| Coliform, Fecal | | | MPN/100 ml |
| Coliform, Total | | | MPN/100 ml |
| Conductivity | 10-22 | 620 | umhos/cm |
| Fluoride | 10-29 | 0.15 | mg/l |
| Hardness, Total | 10-23 | 280 | mg/l $CaCO_3$ |
| Ni[illegible]gen, Ammonia | 11-3 | 0.09 | mg/l |
| N[illegible]gen, Nitrate | 10-21 | 0.03 | mg/l |
| Nitrogen, Nitrite | | 0.01 | mg/l |
| Oil & Grease | 10-23 | 0.5 | mg/l |
| pH | 10-22 | 7.45 | Units |
| Phosphorus, Ortho | | | mg/l |
| Phosphorus, Total | 11-3 | 0.05 | mg/l |
| Solids, Total Dissolved | 10-21 | 338 | mg/l |
| Solids, Total Suspended | 10-20 | < 0.5 | mg/l |
| Sulfate | 10-29 | 90 | mg/l |
| Sulfide | 10-22 | 3.6 | mg/l |
| Turbidity | | | NTU |
| Dissolved Oxygen | 10-17 | 9.8 | mg/l |
| Settleable Solids | 10-20 | < 0.5 | ml/L |
| Total Anions | | 7.25 | meq/l |
| Total Cations | | 6.56 | meq/l |

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

P[illegible]ox 1140, Huntington, Utah 84528 801-653-2314

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

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

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

Temp. 45° Flow -/55

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

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

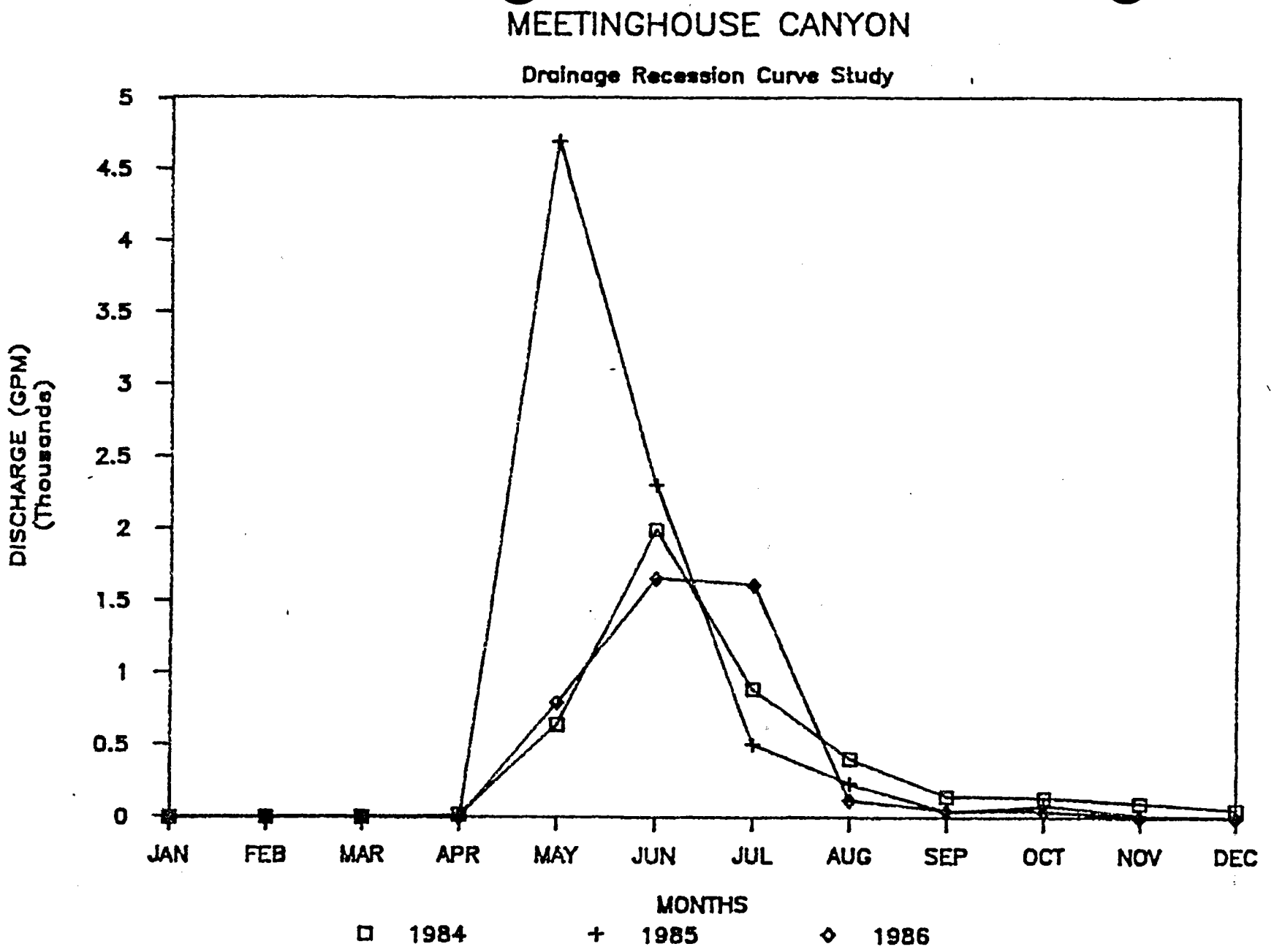
Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# APPENDIX C

## MEETINGHOUSE CANYON CREEK WATER FLOW AND QUALITY


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

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: MEETINGHOUSE CANYON

Temp. 45° Flow 0.70/798.9 GPM

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

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

Analyst: David L. Ramsey

Respectfully submitted [signature] 5-27-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: MEETINGHOUSE CANYON

Temp. 44°  Flow 1.13/1660.7 GPM

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

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

Analyst: David A. Ramsey

Respectfully submitted David A. Ramsey

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: MEETINGHOUSE CANYON

Temp. 52°

Flow 0.59/614.9 GPM

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

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

Analyst: David Ranney

Respectfully submitted David Ranney

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: MEETINGHOUSE CANYON

Temp. 56° Flow 0.20/116.7 GPM

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

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

Analyst: David Ramsey

Respectfully submitted David Ramsey

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

Sample ID: MEETINGHOUSE CANYON

Temp. 42° Flow 0.11/44.8 GPM

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

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

Analyst; Sharon Reiter

Respectfully submitted Bal Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: MEETINGHOUSE CANYON
(Low Flow Runoff)

Temp. 38° Flow 0.1/40.4

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

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

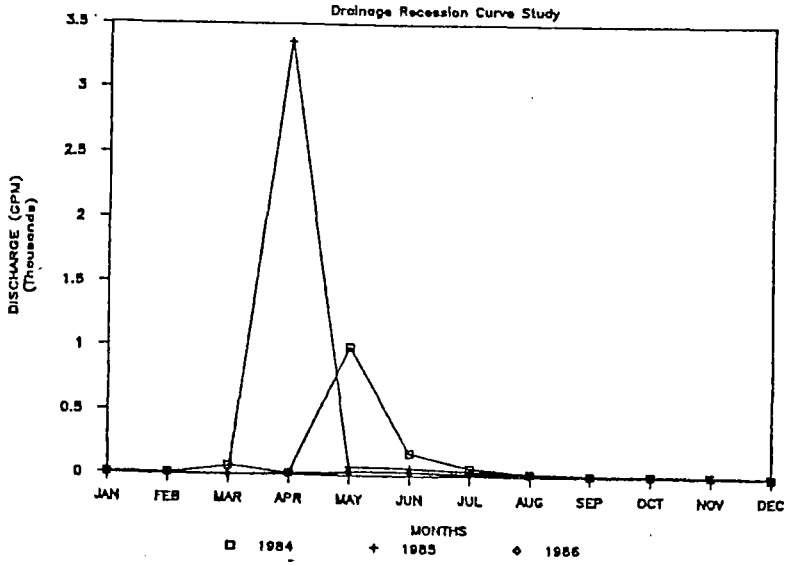
Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

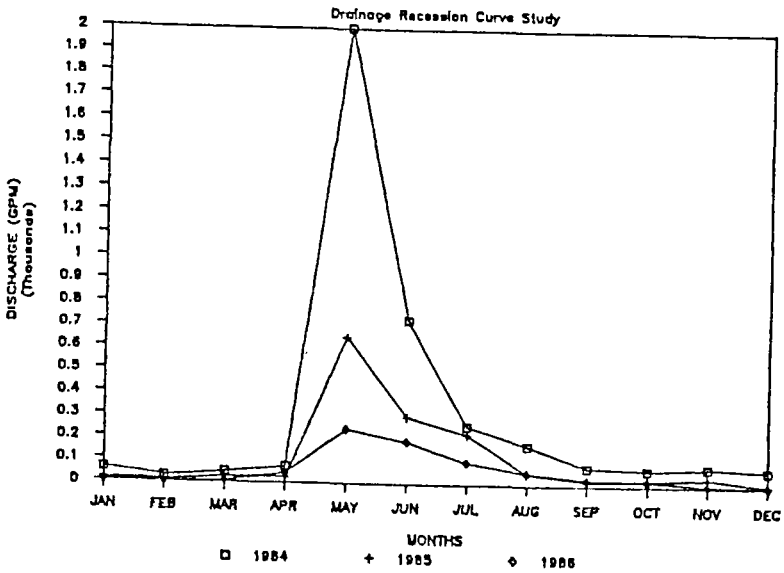
# APPENDIX D

# GRIMES WASH WATER FLOW AND QUALITY

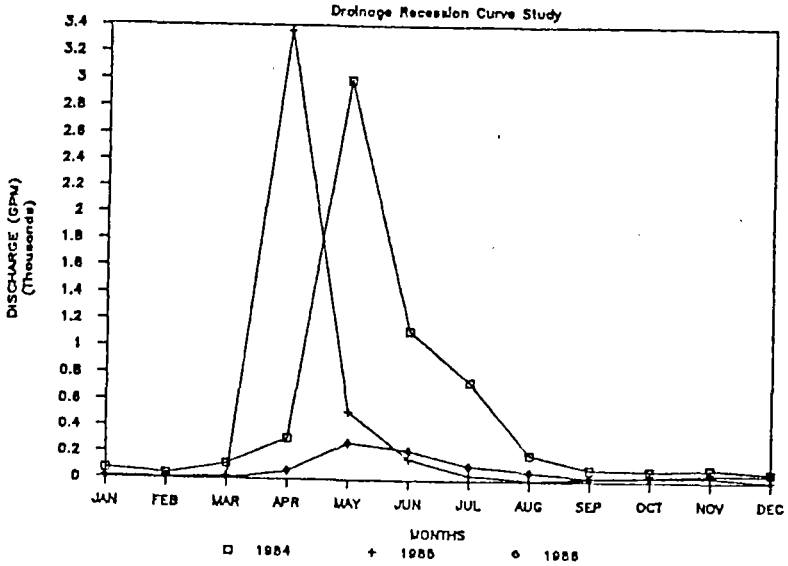
GRIMES WASH RIGHT FORK




GRIMES WASH LEFT FORK




GRIMES WASH BELOW MINE



# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: GRIMES WASH
BELOW THE MINE

FIELD OFFICE Temp. 33° Flow 5-10 GPM

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

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

Analyst: David A. Lamoy

Respectfully submitted [signature] 1-20-

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: GRIMES WASH BELOW THE MINE

Temp. 33° Flow 10-15 GPM

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

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

Analyst: David A Jones

Respectfully submitted [signature] 2-14-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: GRIMES WASH RIGHT FORK

Temp. 48°  Flow 0.10/12.6 GPM

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

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

Analyst: David A Janney

Respectfully submitted David A Janney

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: GRIMES WASH LEFT FORK

Temp. 49°  Flow 0.15/44.9 GPM

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

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

Analyst: David L Garrison

Respectfully submitted David L Garrison

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: GRIMES WASH BELOW THE MINE

Temp. 47° Flow 65.0 Est GPM

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

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

Analyst: David A Janney

Respectfully submitted David A Janney

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

Lab. No. 8049

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

Sample ID: GRIMES WASH RIGHT FORK

Date Rec'd 5-14-86
Date Sampled 5-13-86
Time Sampled 1530

TEMP. 54°  FLOW 0.18/31.4 GPM

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

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

Analyst: David Janzen

Respectfully submitted [signature] 5-27-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: GRIMES WASH LEFT FORK

Temp. 48° Flow 0.43/242.4 GPM

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

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

Analyst: David A. Janney

Respectfully submitted [signature] 5-27-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8050

Date Rec'd 5-14-86

Date Sampled 5-13-86

Time Sampled 1615

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

Sample ID: GRIMES WASH BELOW THE MINE

TEMP. 48° Flow 275 GPM Est.

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

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

Analyst: David Ramsey

Respectfully submitted 5-27-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: GRIMES WASH RIGHT FORK

Temp. 48° Flow 0.17/28.7 GPM

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

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

Analyst: David L. Ramey

Respectfully submitted David L. Ramey

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8130

Date Rec'd 6-11-86

Date Sampled 6-10-86

Time Sampled 1305

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

Sample ID: GRIMES WASH LEFT FORK

Temp. 46° Flow 0.37/188.5 GPM

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

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

Analyst: David A. Ramsey

Respectfully submitted David A. Ramsey

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

Sample ID: GRIMES WASH BELOW THE MINE

Temp. 48° Flow 220 GPM Est.

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

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

Analyst: David L. Janney

Respectfully submitted David L. Janney

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: GRIMES WASH RIGHT FORK

Temp. 61°  Flow 0.1/12.6 GPM

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

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

Analyst: David A. Janney

Respectfully submitted David A. Janney

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8322

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

Sample ID: GRIMES WASH LEFT FORK

Date Rec'd 7-8-86

Date Sampled 7-8-86

Time Sampled 1340

Temp. 58°

Flow 0.24/98.7 GPM

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

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

Analyst: David A. Danny

Respectfully submitted David A. Danny

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

Lab. No. 8324
Date Rec'd 7-8-86
Date Sampled 7-8-86
Time Sampled 1350

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

Sample ID: GRIMES WASH BELOW THE MINE

Temp. 54° Flow 110 GPM Est.

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

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

Analyst: David Ramey

Respectfully submitted David Ramey

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

Sample ID: GRIMES WASH RIGHT FORK

Temp. 52° Flow 0.09/10.70 GPM

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

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

Analyst: David Pomeroy

Respectfully submitted David Pomeroy

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

P[illegible]ox 1140, Huntington, Utah 84528 801-653-2314

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

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

Sample ID: GRIMES WASH LEFT FORK

Temp. 50° Flow 0.17/53.9 GPM

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

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

Analyst: David A. Panuz

Respectfully submitted David A. Panuz

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

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

Temp. 52° Flow 70 GPM Est.

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

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

Analyst: David L. Parsons

Respectfully submitted David L. Parsons

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: GRIMES WASH RIGHT FORK

Temp. 54° Flow 0.02/1.04 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: GRIMES WASH LEFT FORK

Temp. 59° Flow 0.11/26.9 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: GRIMES WASH BELOW THE MINE

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

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

# CERTIFICATE OF ANALYSIS

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

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

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

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

MINING DIVISION Temp. 37.7° Flow 0.03/1.96

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

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

Temp. 36° Flow 0.1/22.4

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

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

Temp. 44° Flow 40 Staff 0.35'

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

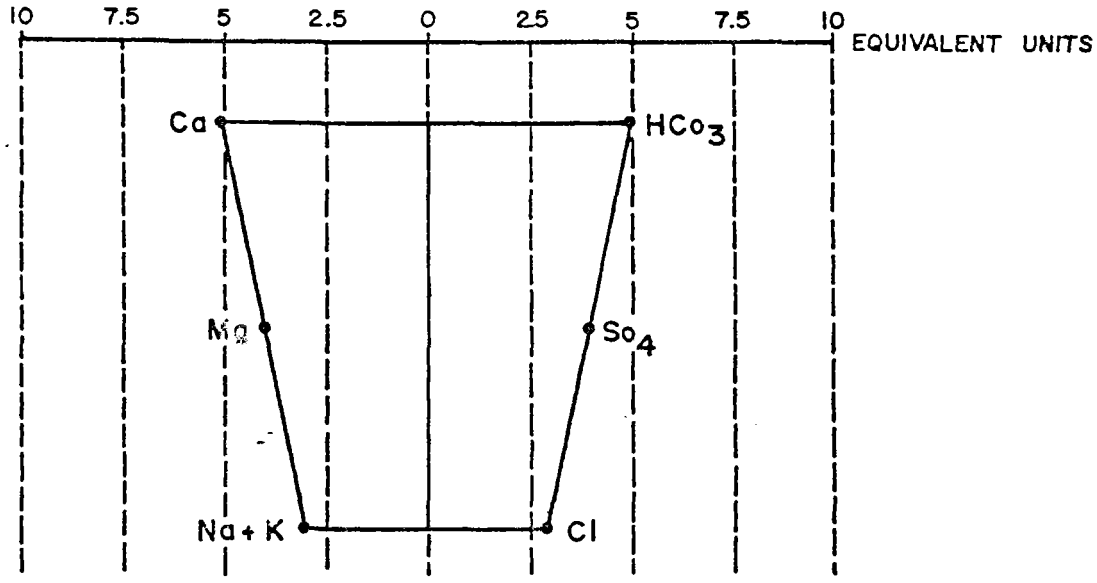
*Certified Environmental Laboratory*

# APPENDIX E

## EAST MOUNTAIN SPRINGS

## CATION-ANION DIAGRAMS/FLOW AND QUALITY

# CATION – ANION DIAGRAMS




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

1" = 5 Equivalent Units

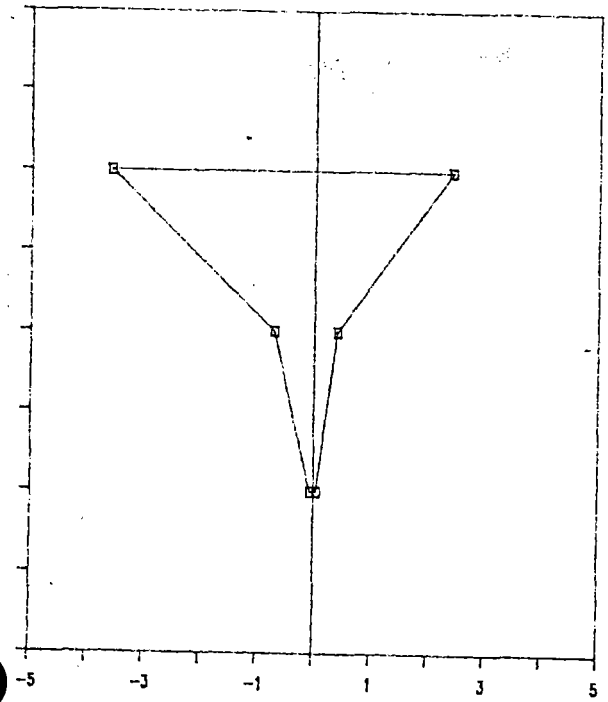
## Equivalent Weights

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

# FLAGSTAFF LIMESTONE

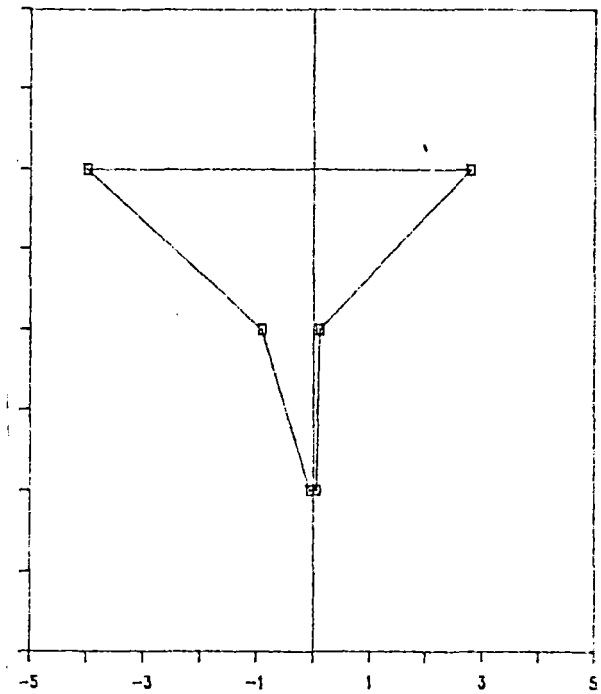
SHEBA SP

07-16-86



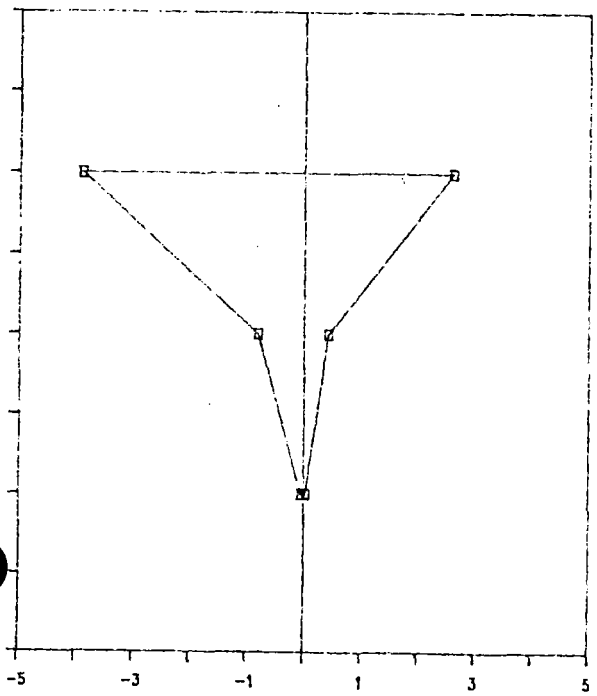

SHEBA SP.

10-15-86



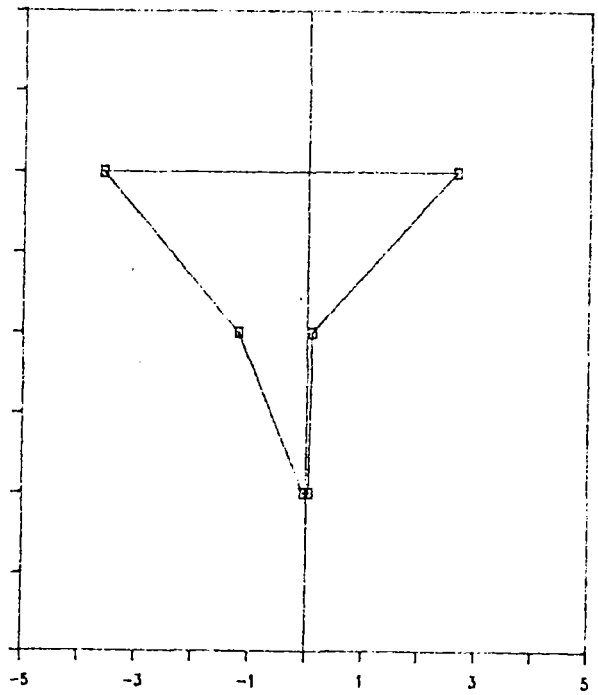

PINE SP

07-16-86




PINE SP.

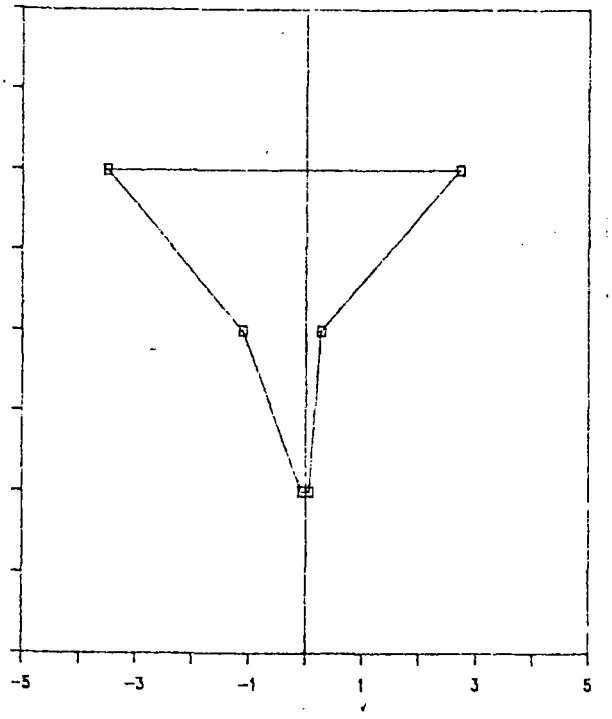
10-16-86



# FLAGSTAFF LIMESTONE

79-35

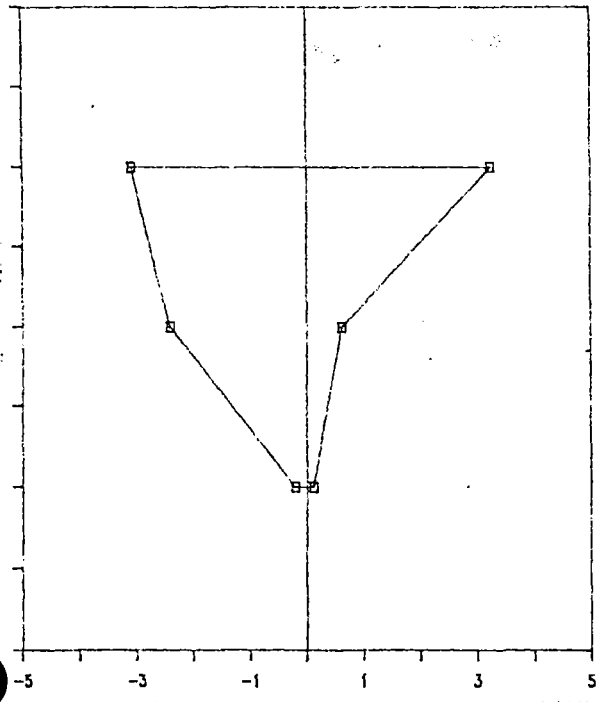
07-17-86



# NORTH HORN FORMATION

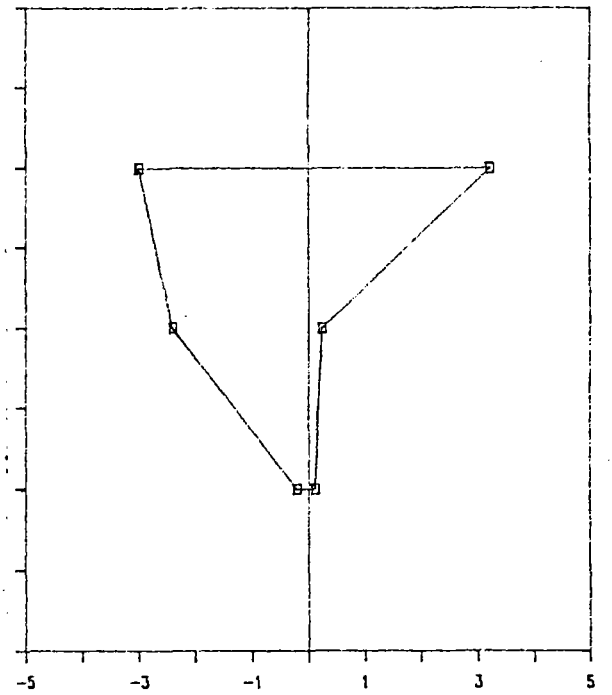
BURNT TREE

07-22-86



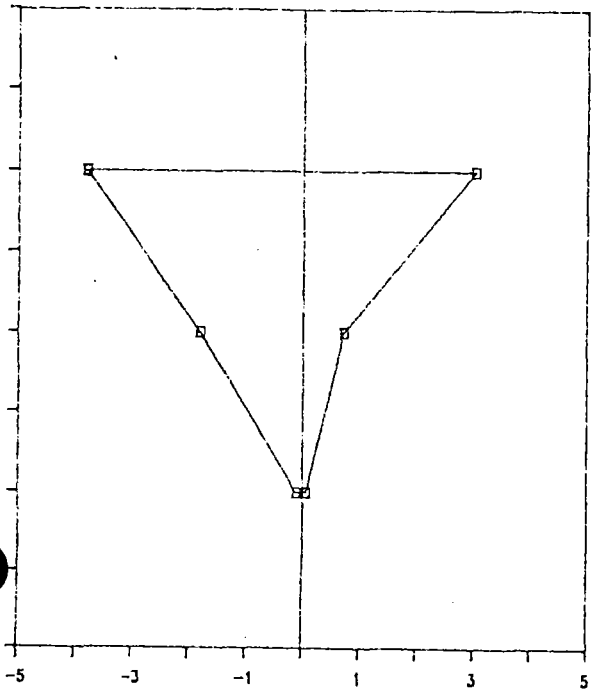

BURNT TREE

10-15-86



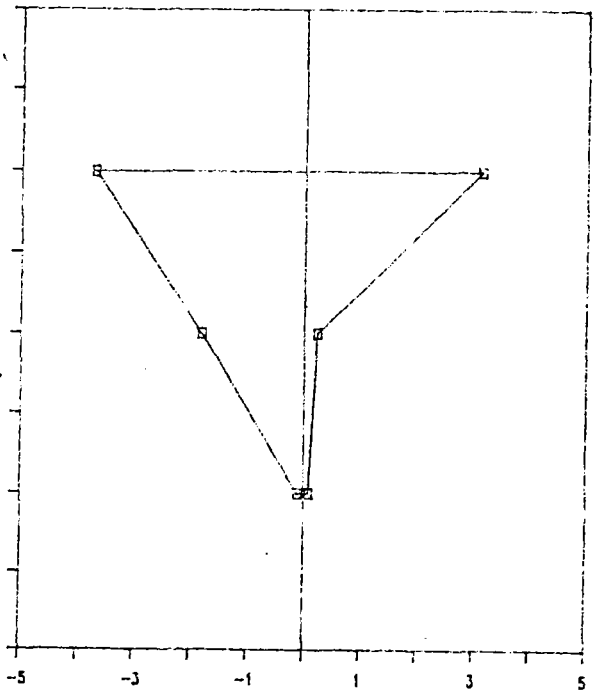

TEDS TUB

07-17-86




TEDS TUB

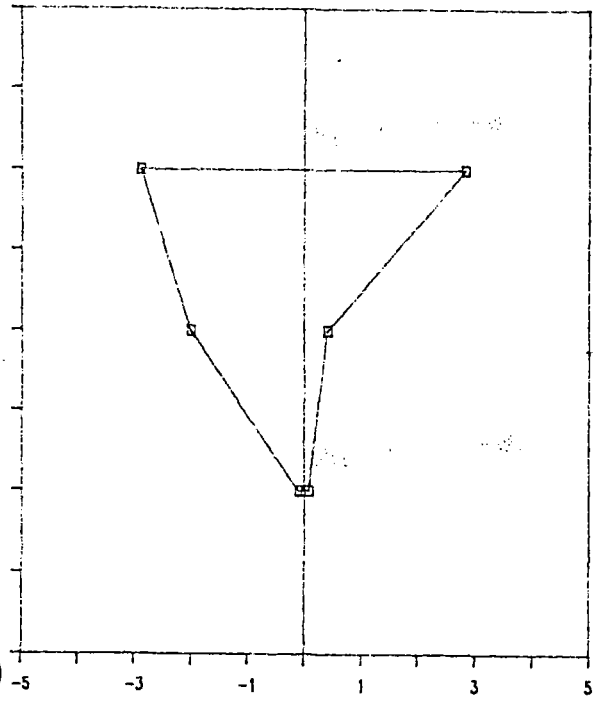
10-16-86



# NORTH HORN FORMATION

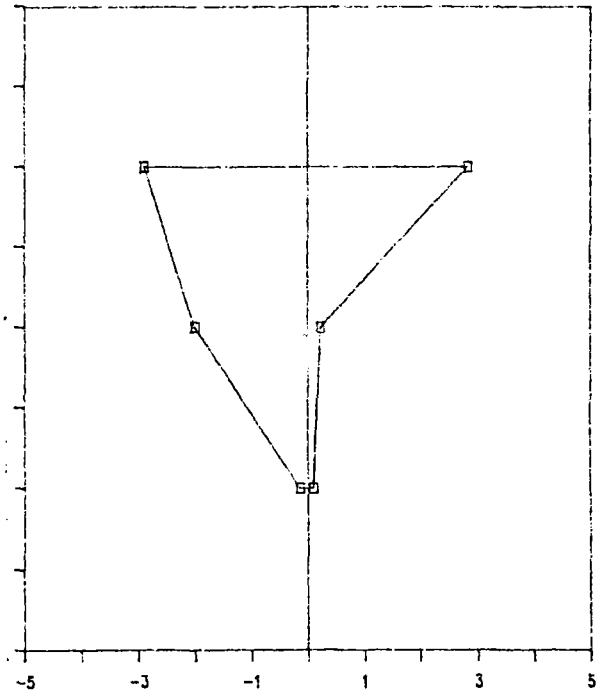
ELK SP.

07-16-86



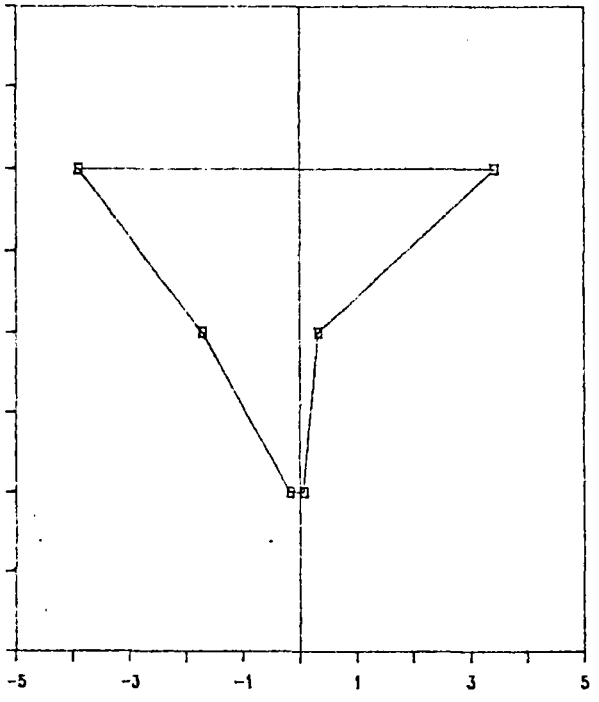

ELK SP.

10-16-86



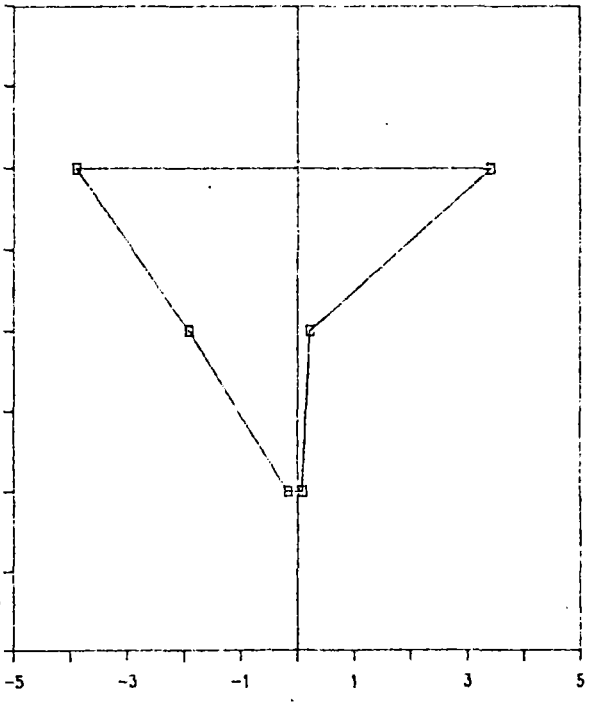

79-2

07-22-86




79-2

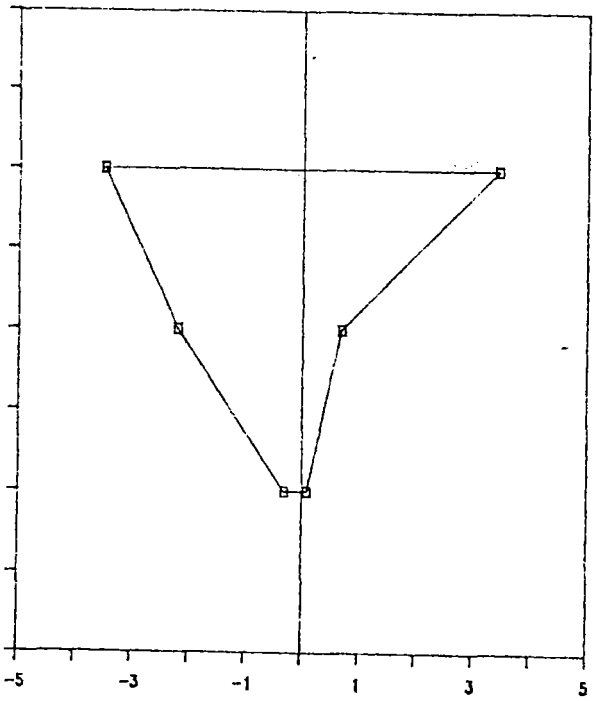
10-16-86



# NORTH HORN FORMATION

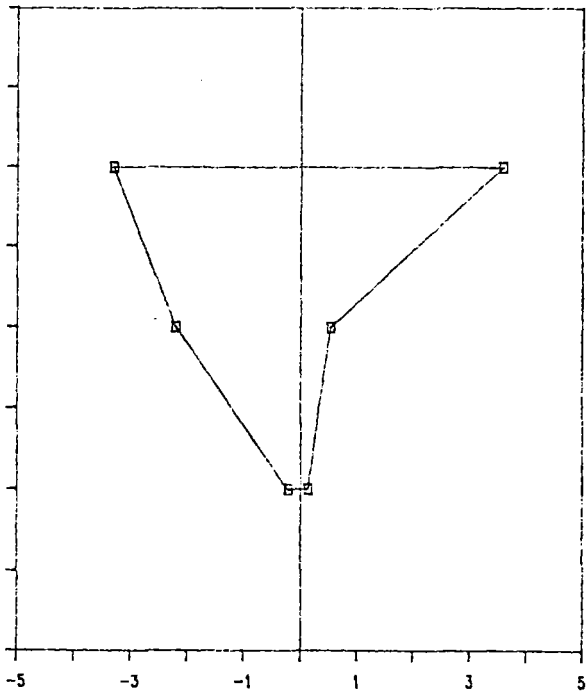
79-3

07-22-86



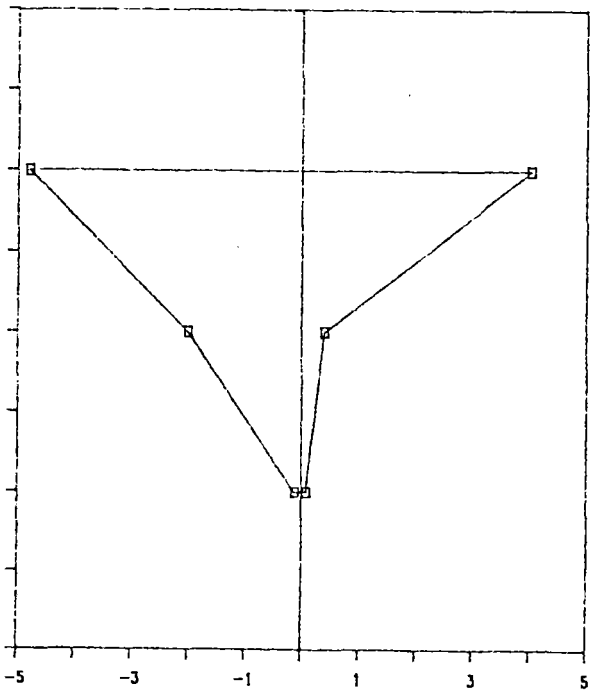

79-3

10-16-86



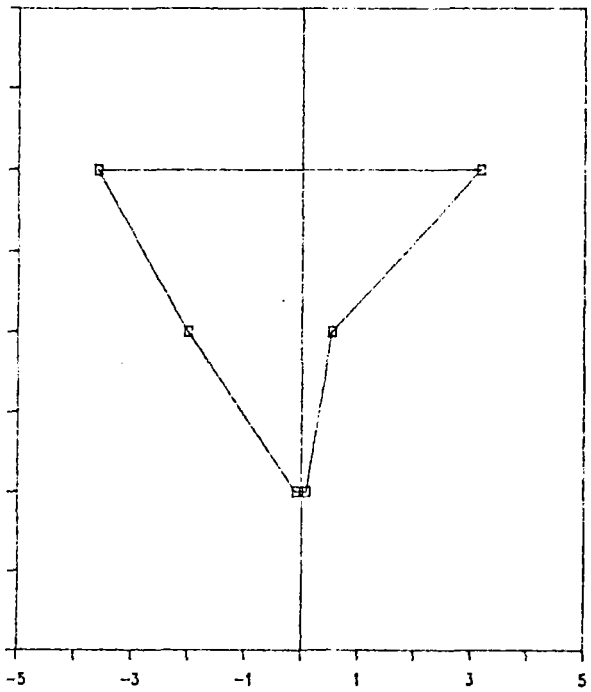

79-13

07-17-86




79-15

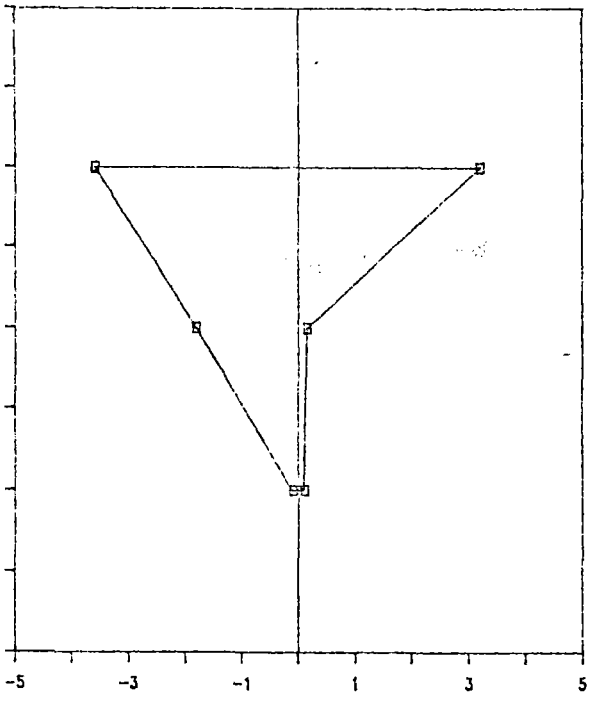
07-17-86



# NORTH HORN FORMATION

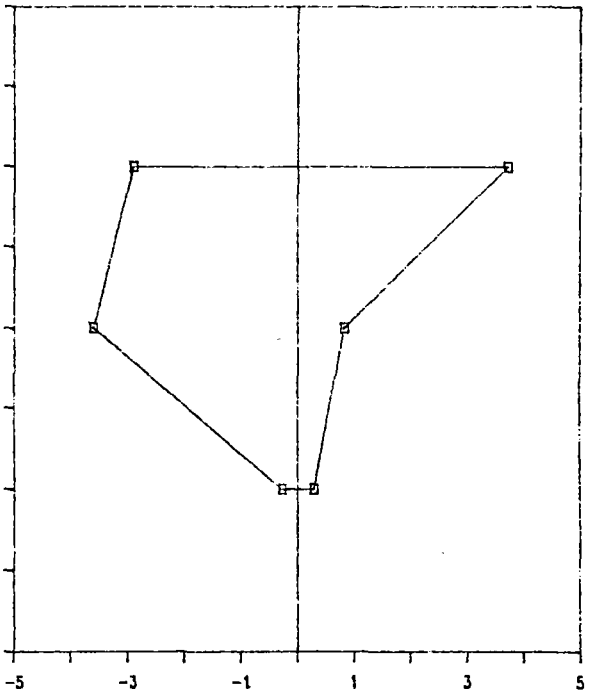
79-15

10-16-86



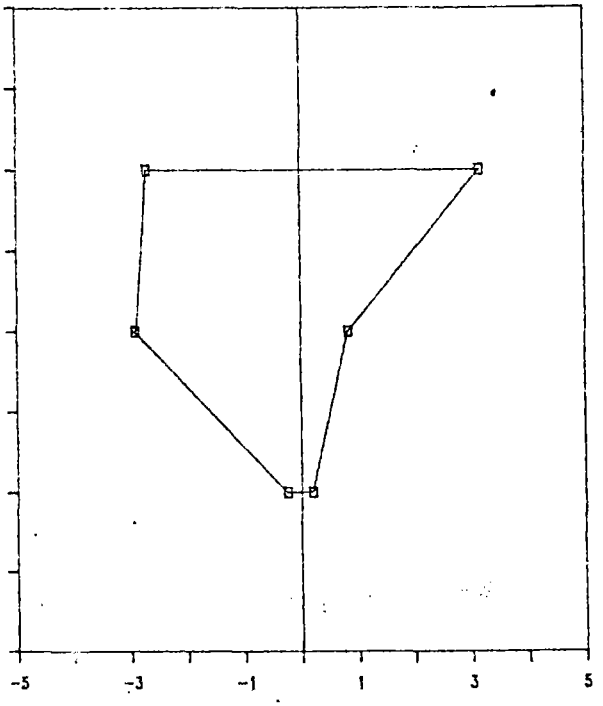

79-23

07-22-86



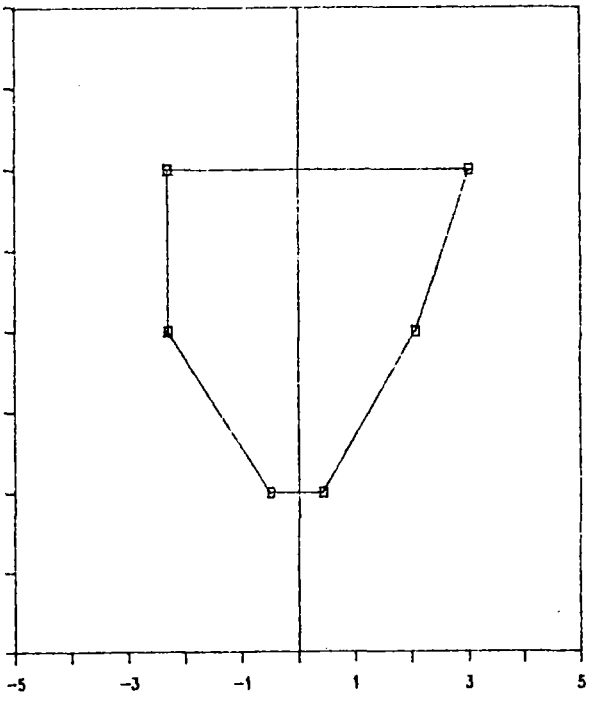

79-26

07-17-86




79-28

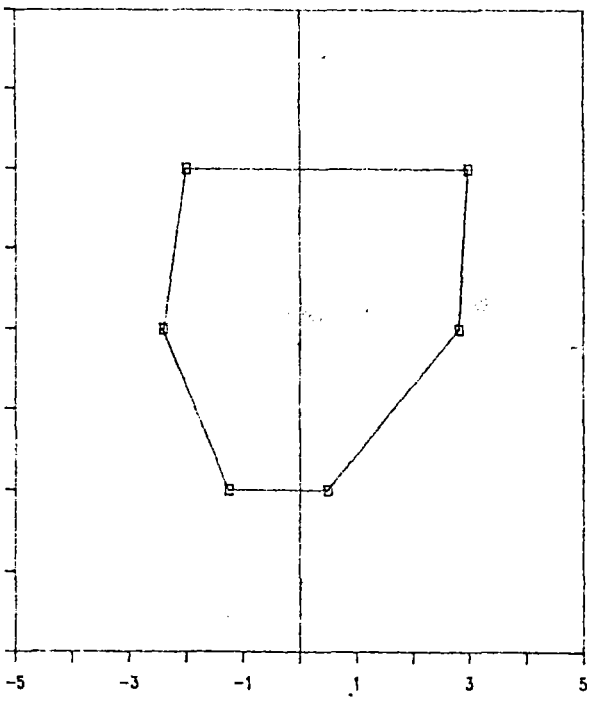
07-17-86



# NORTH HORN FORMATION

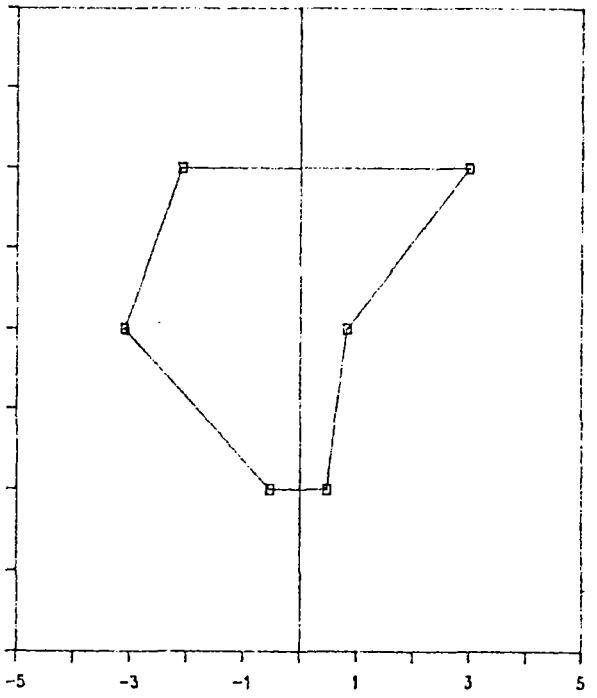
79-28

10-15-86



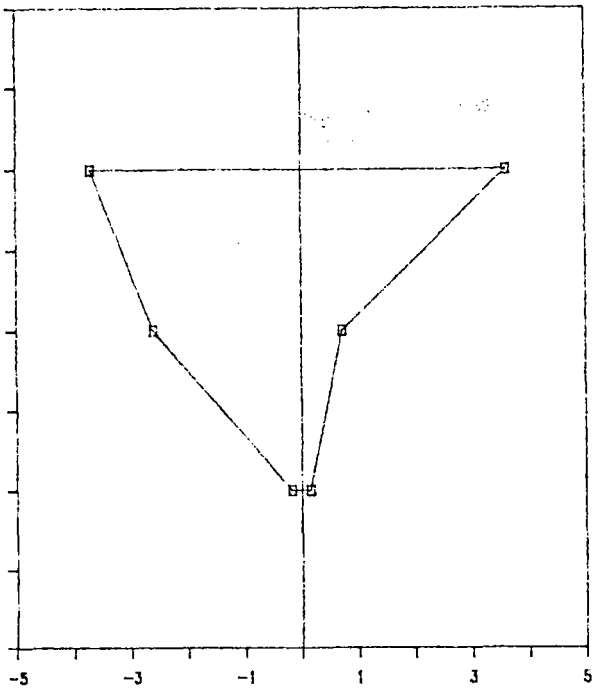

79-29

07-17-86



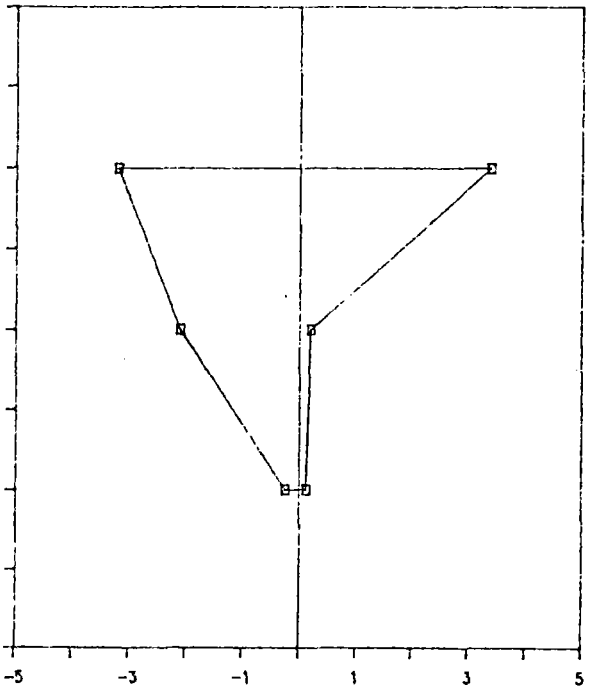

79-34

07-17-86




79-36

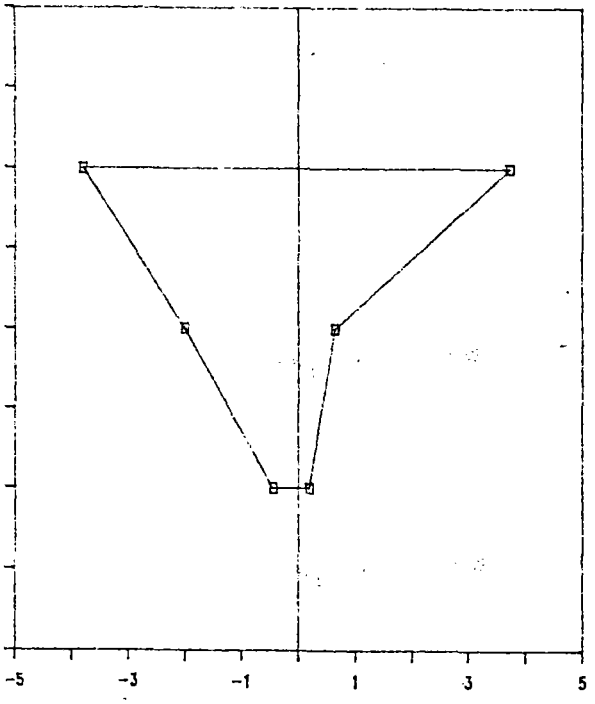
07-17-86



# NORTH HORN FORMATION

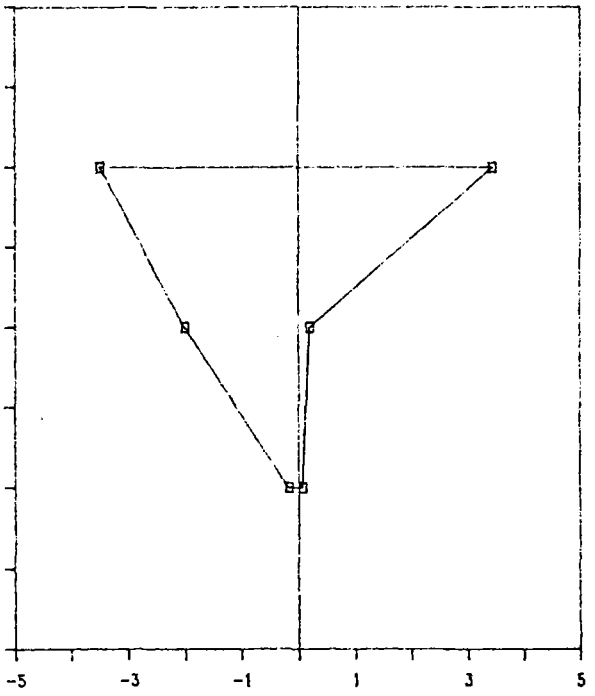
79-38

07-21-86



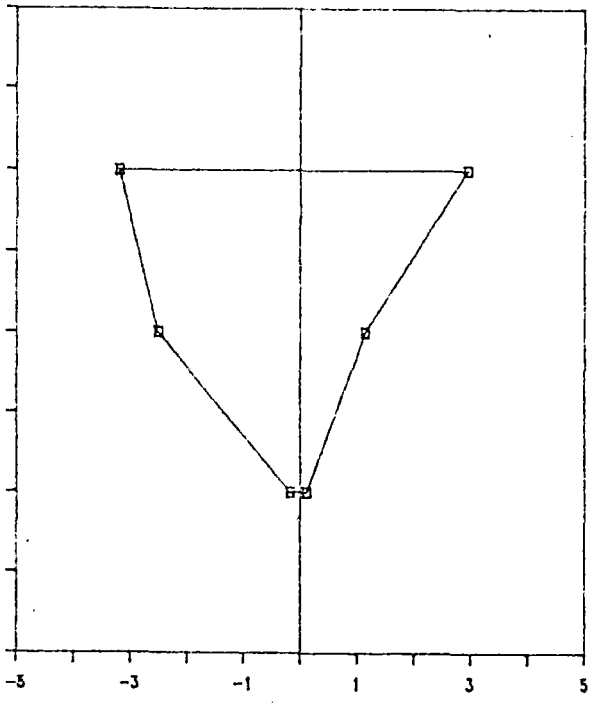

80-43

07-22-86



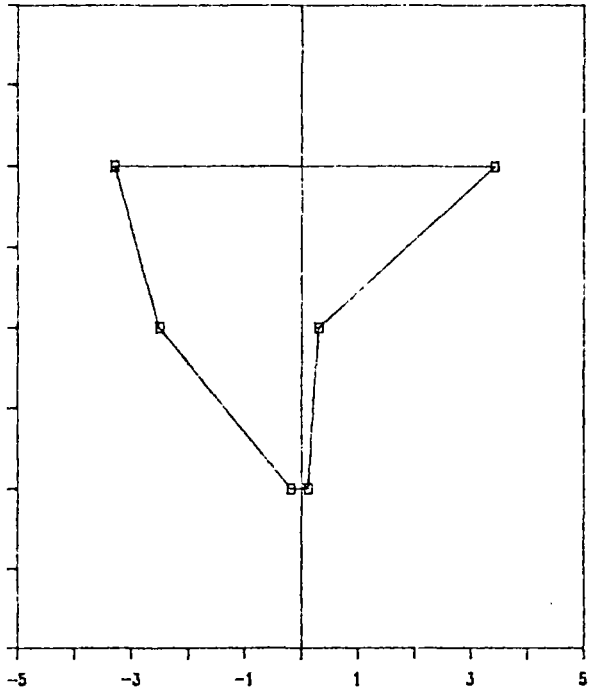

80-46

07-22-86




80-46

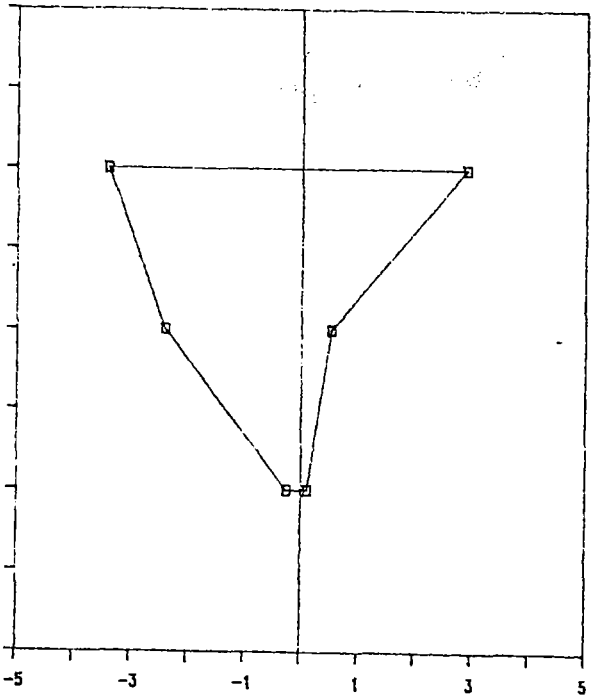
10-16-86



# NORTH HORN FORMATION

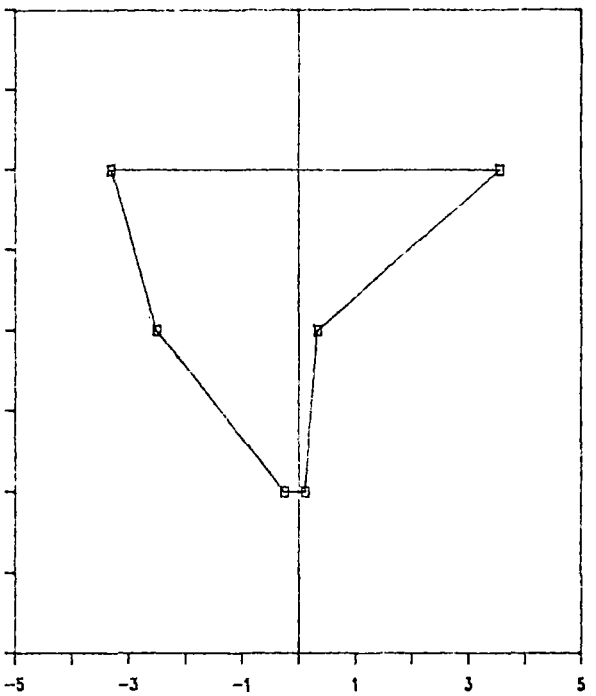
80-47

07-22-86



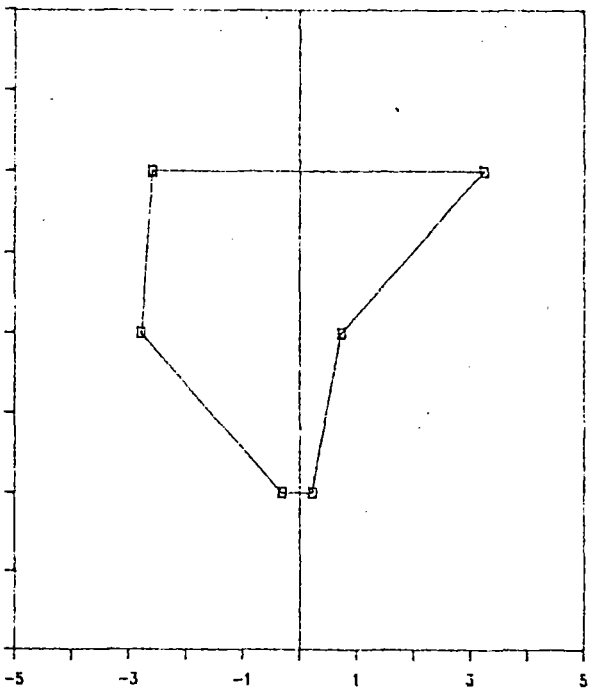

80-47

10-16-86



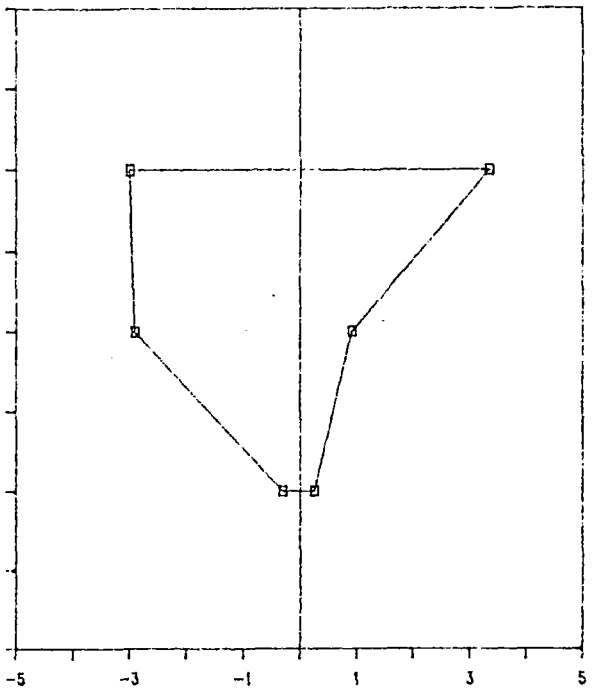

84-53

07-17-86




84-56

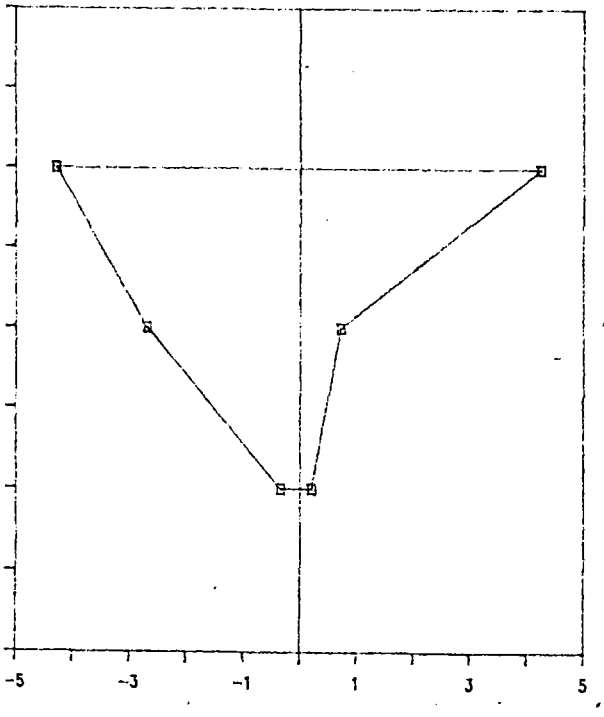
07-22-86



# PRICE RIVER FORMATION

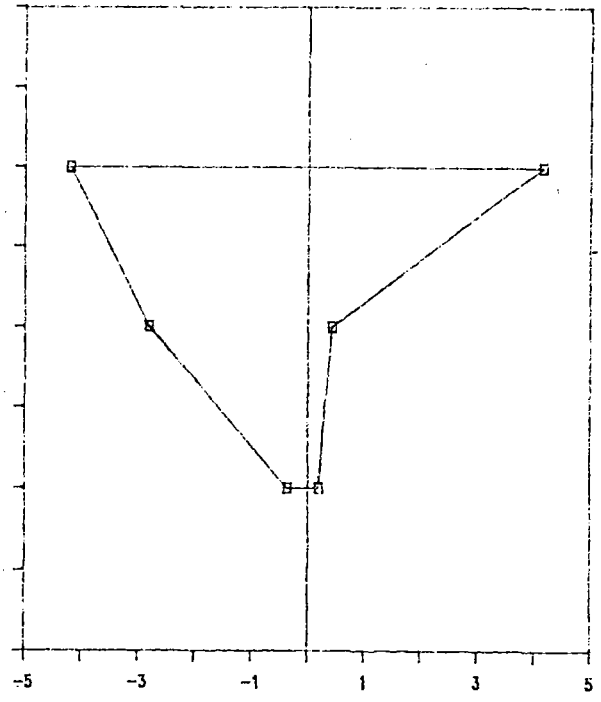
JERKWATER

07-21-86



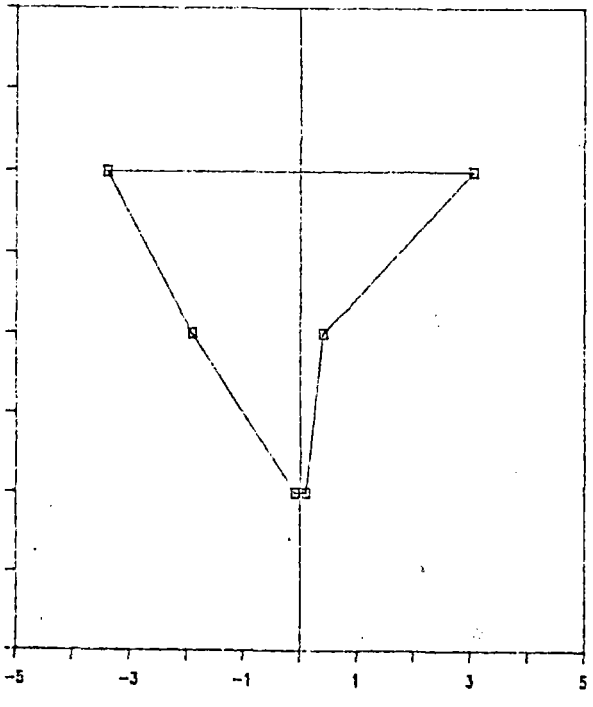

JERKWATER

10-15-86



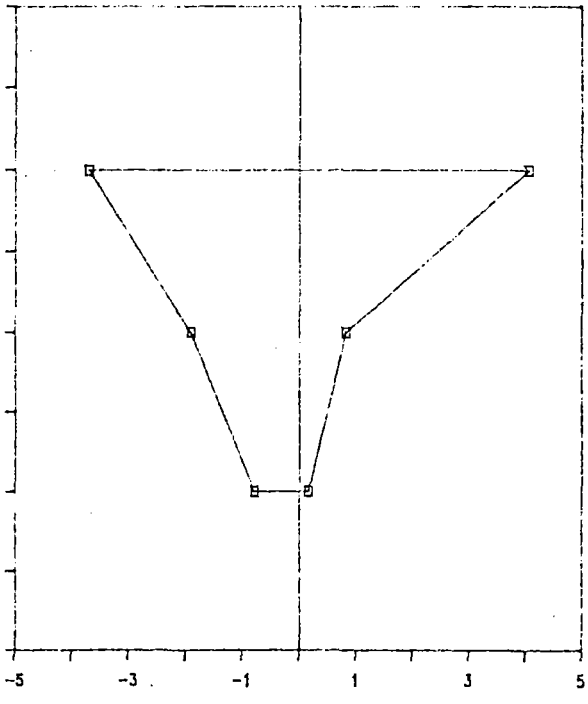

79-10

07-16-86




79-40

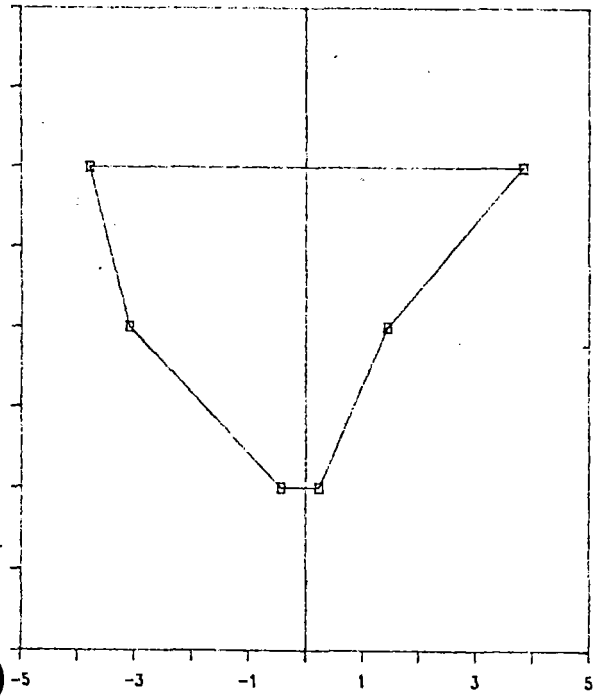
07-22-86



# PRICE RIVER FORMATION

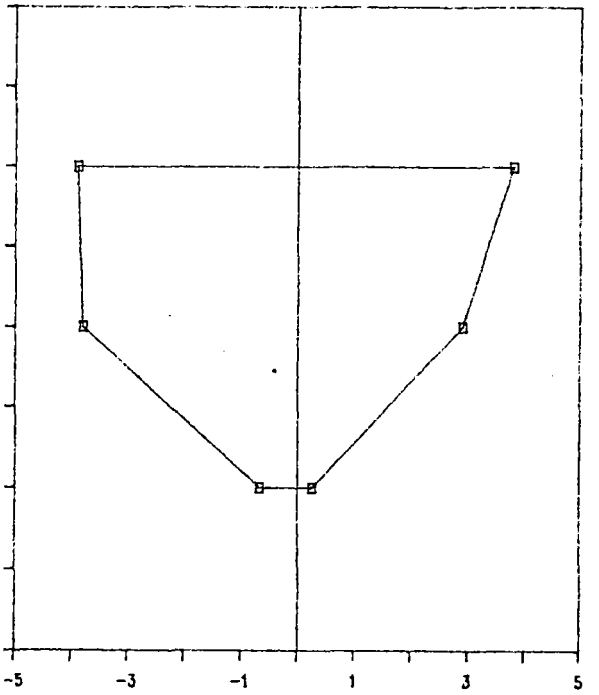
80-41

07-22-86



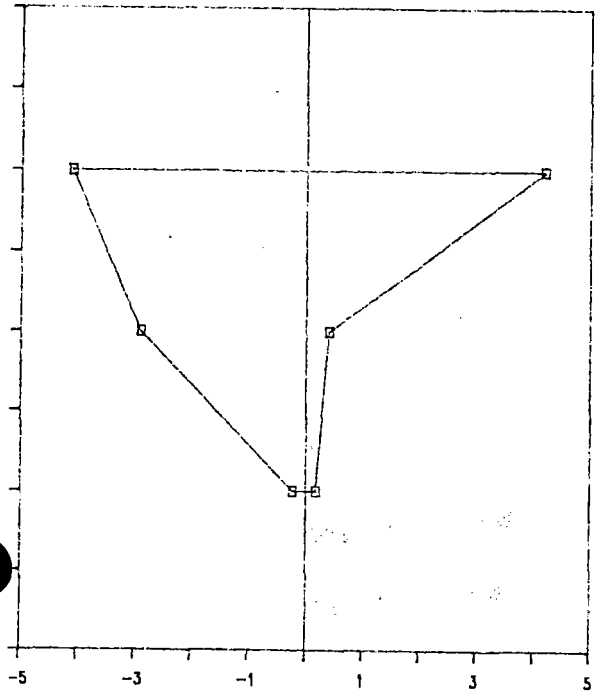

80-44

07-22-86



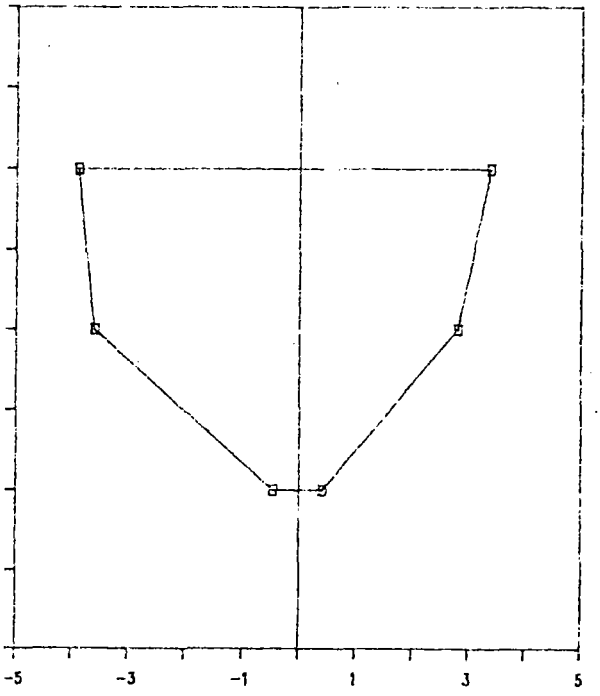

80-49

07-16-86




82-51

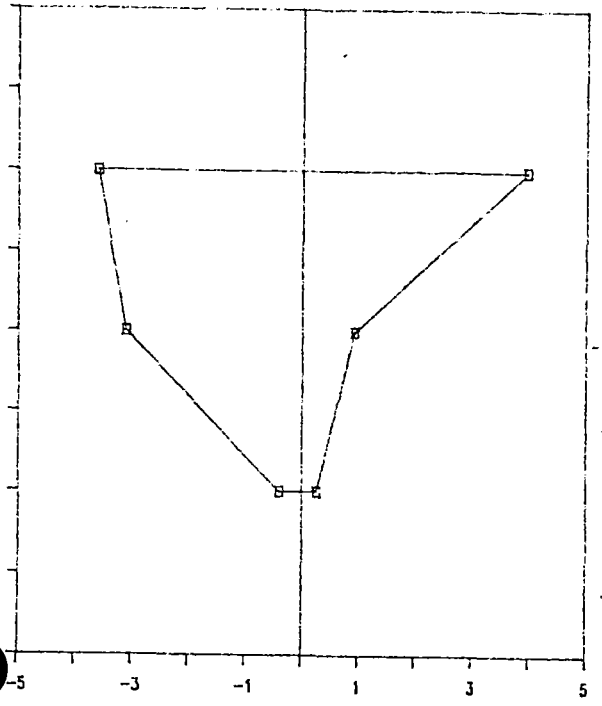
07-22-86



# PRICE RIVER FORMATION

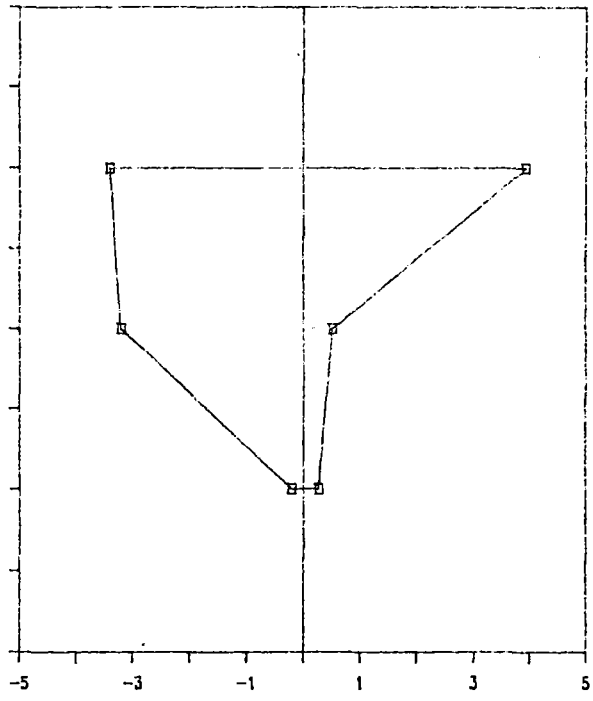
82-52

07-21-86



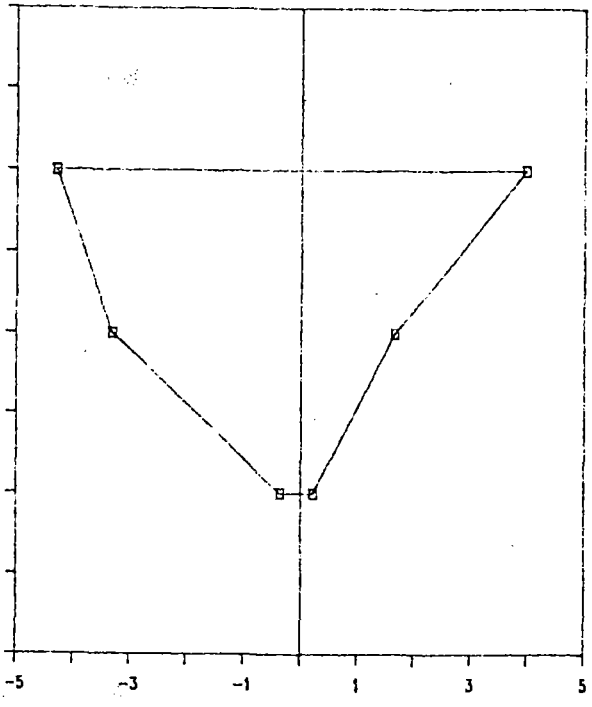

SHEEP HERDER

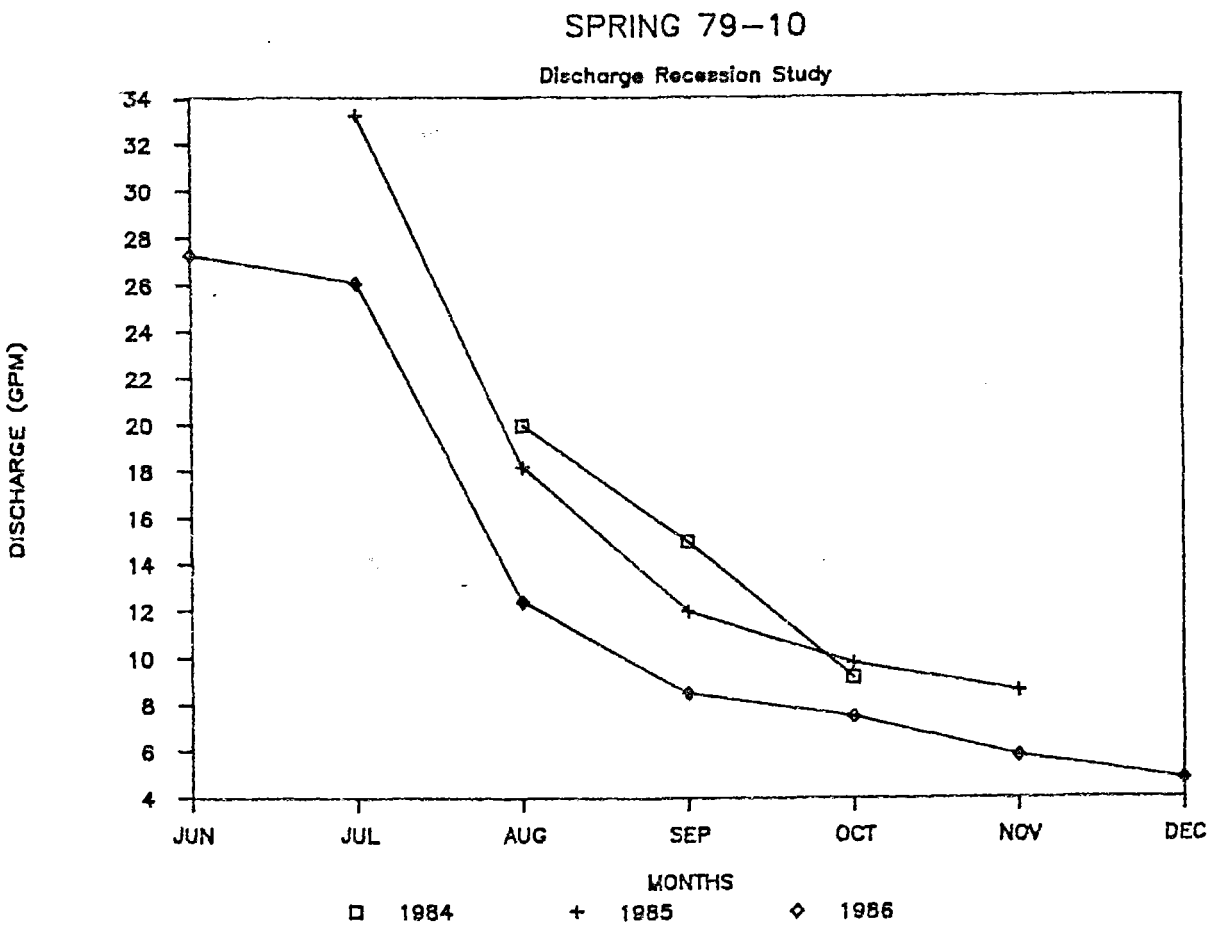
10-15-86

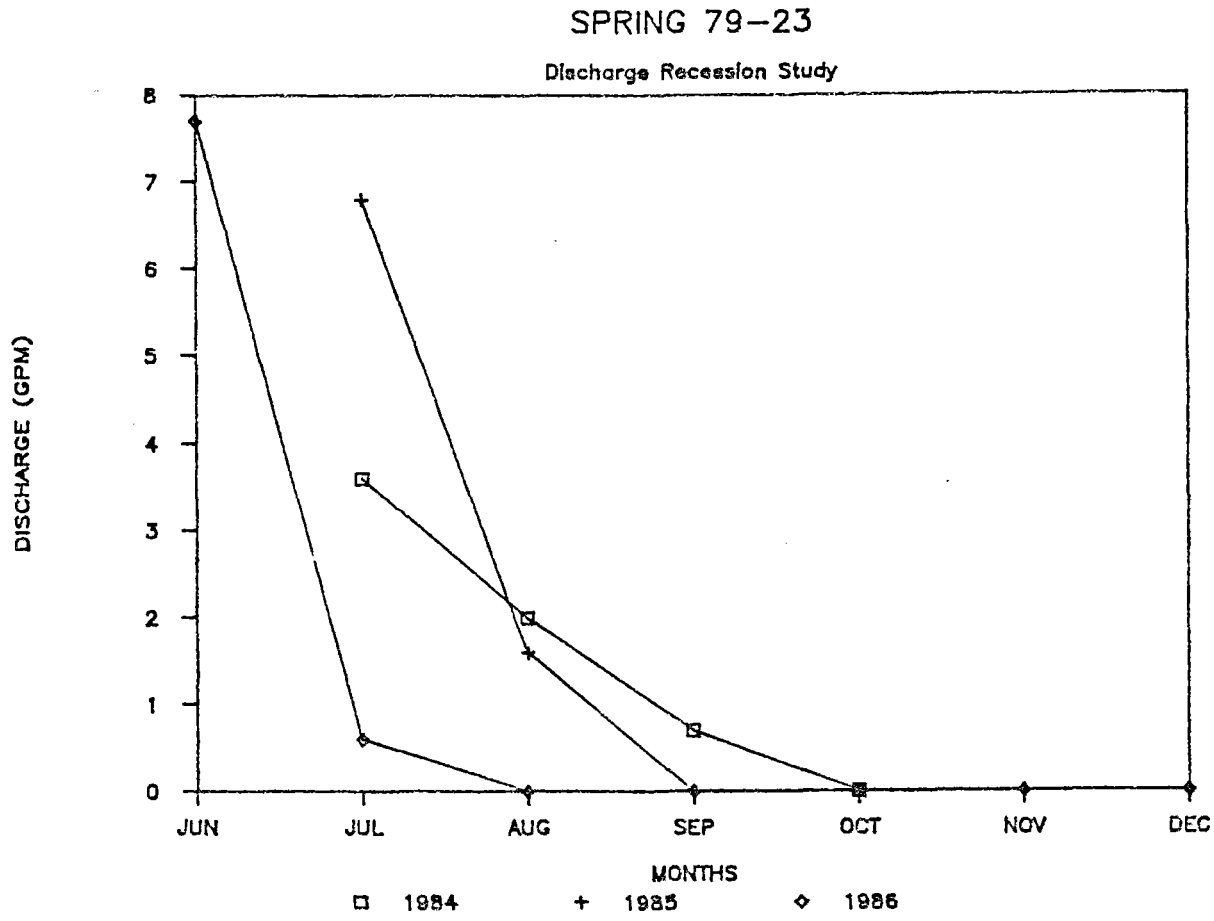


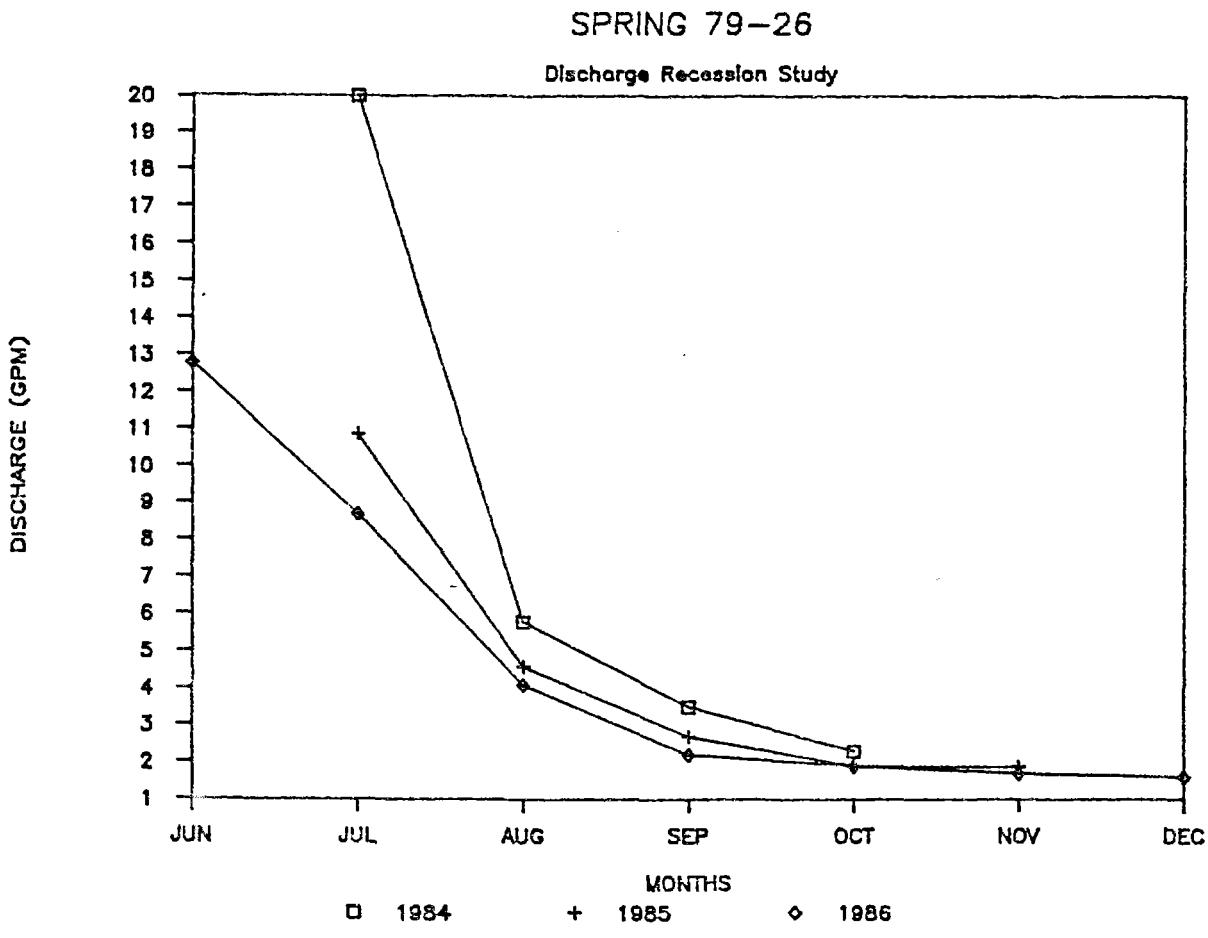

84-55

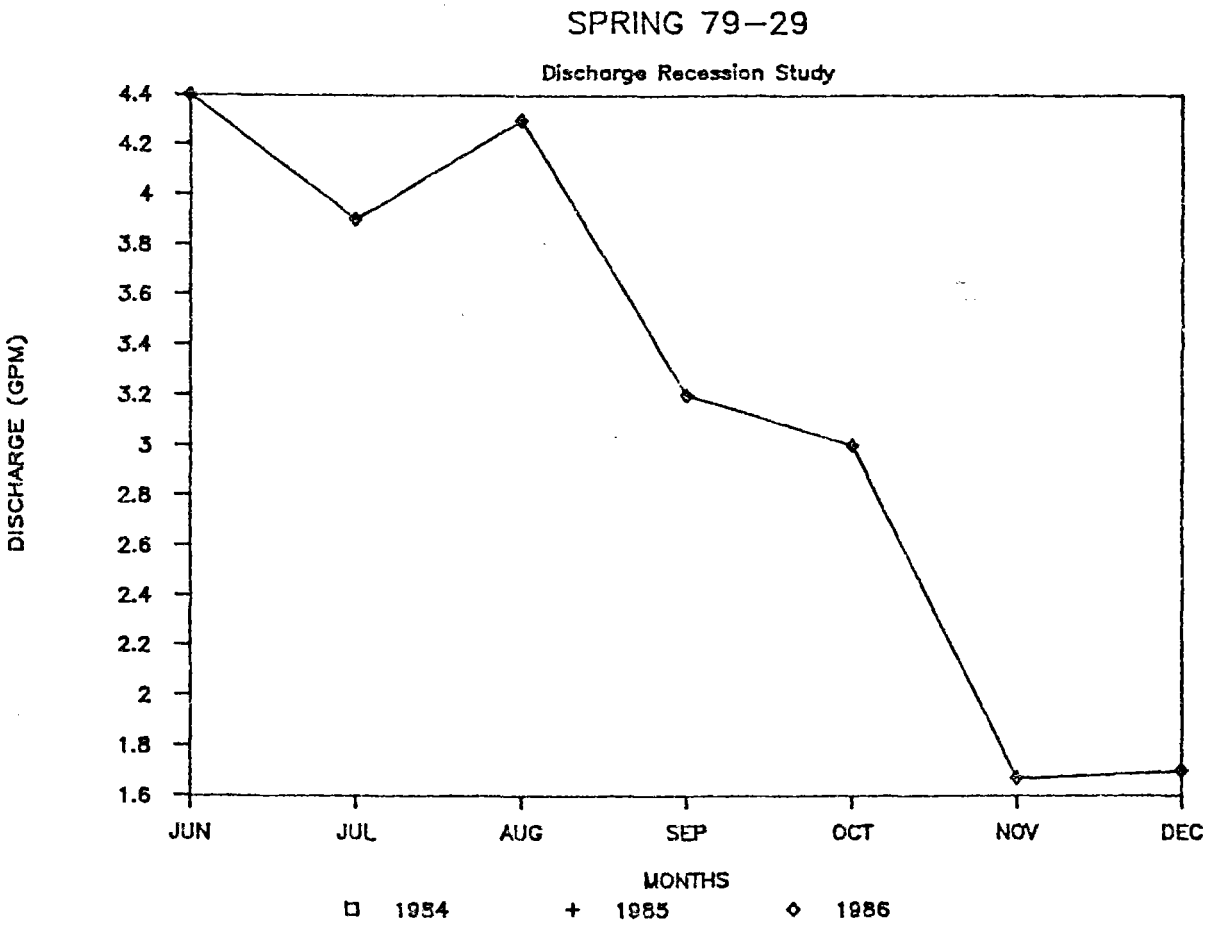
07-22-86

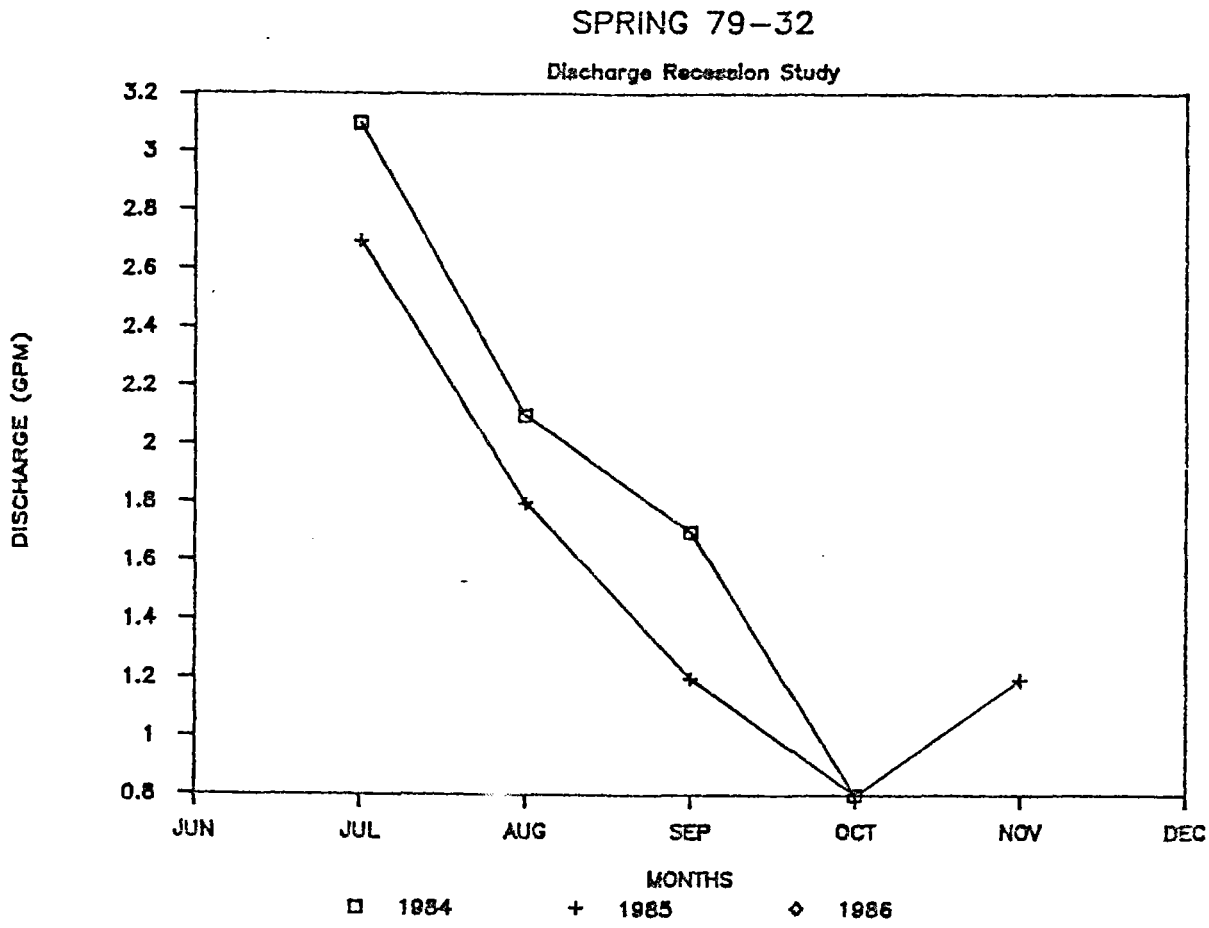


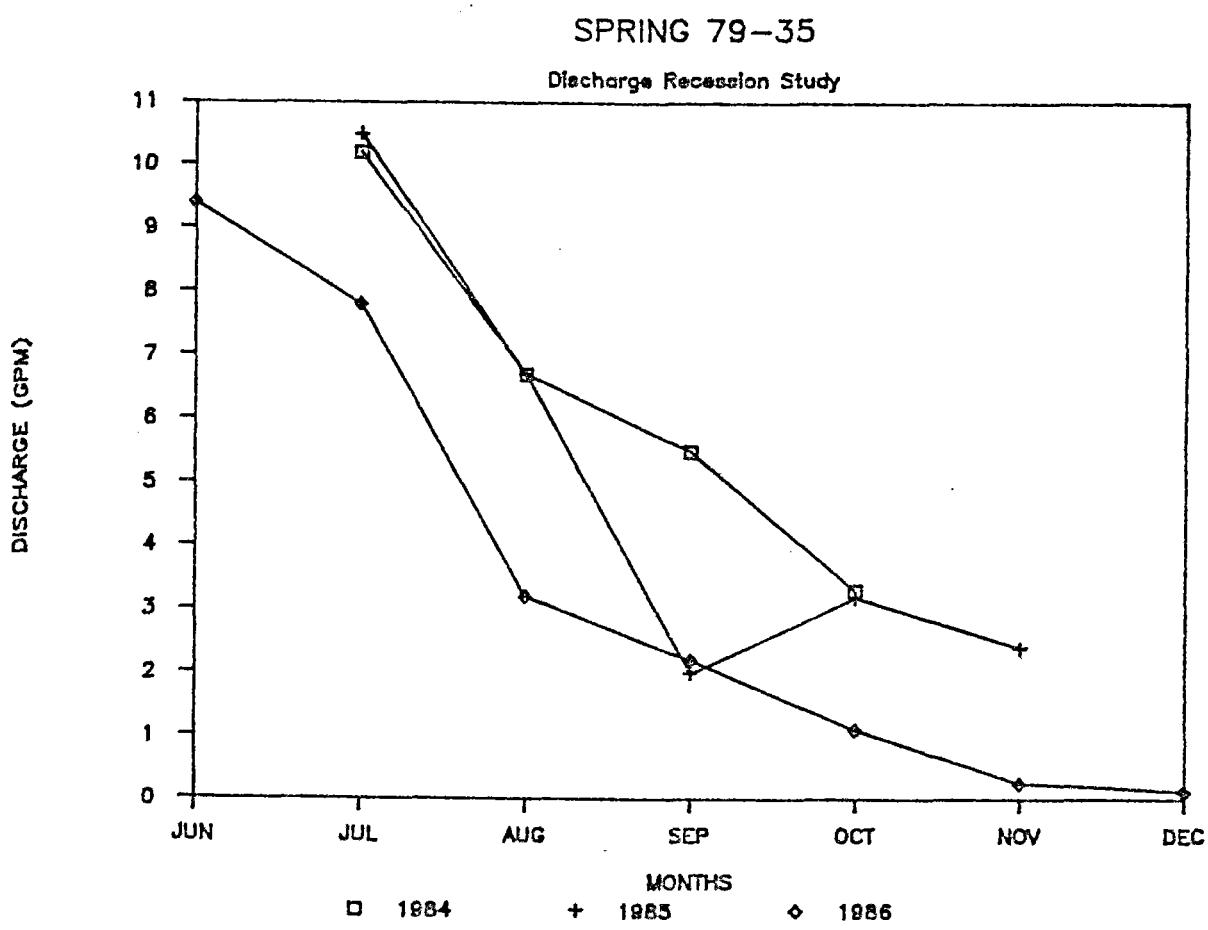

SPRING 79-10
Discharge Recession Study
DISCHARGE (GPM)
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986

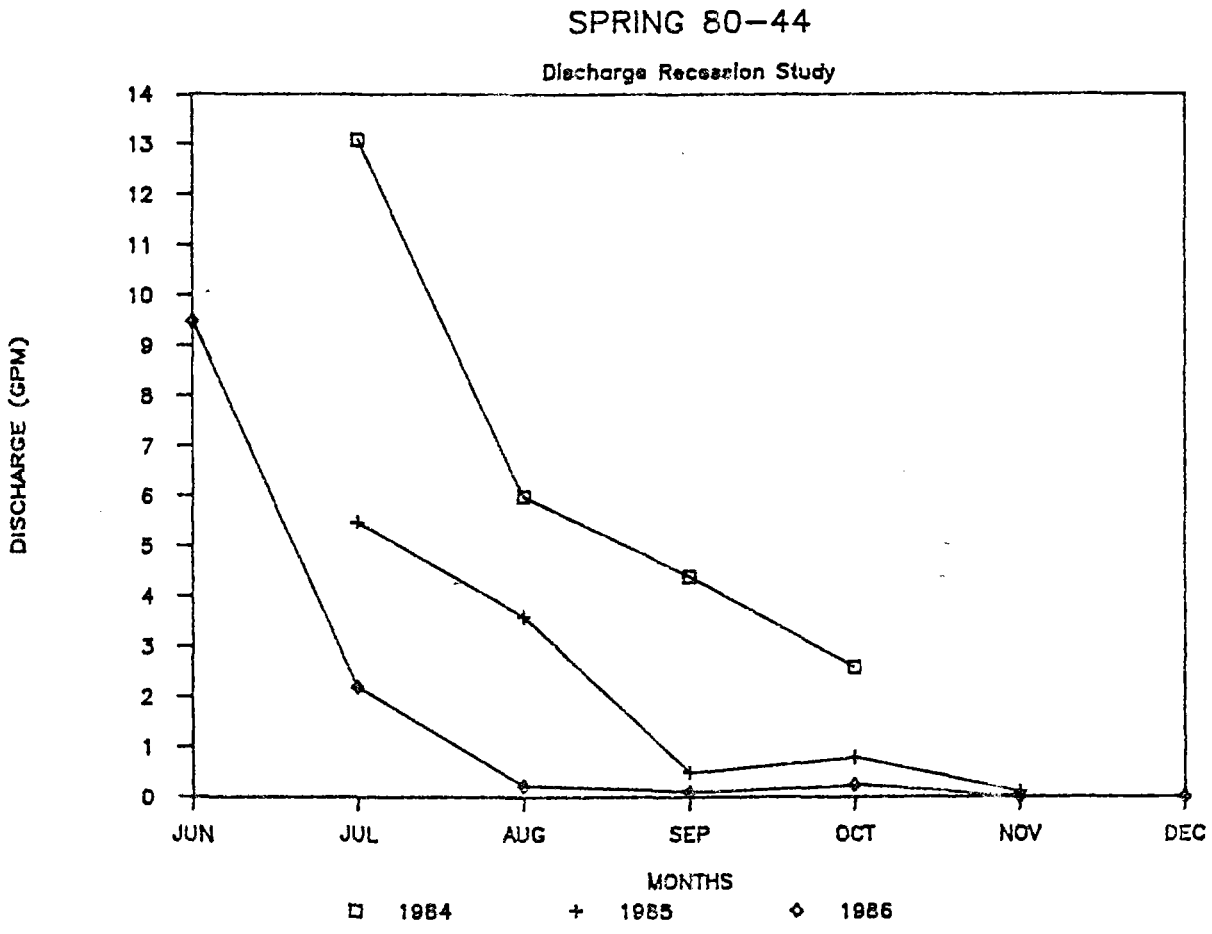

SPRING 79-23
Discharge Recession Study
DISCHARGE (GPM)
8
7
6
5
4
3
2
1
0
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986


SPRING 79-26
Discharge Recession Study
DISCHARGE (GPM)
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986


SPRING 79-29
Discharge Recession Study
DISCHARGE (GPM)
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986


SPRING 79-32
Discharge Recession Study
DISCHARGE (GPM)
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986


SPRING 79-35
Discharge Recession Study
DISCHARGE (GPM)
11
10
9
8
7
6
5
4
3
2
1
0
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986


SPRING 80-44
Discharge Recession Study
DISCHARGE (GPM)
14
13
12
11
10
9
8
7
6
5
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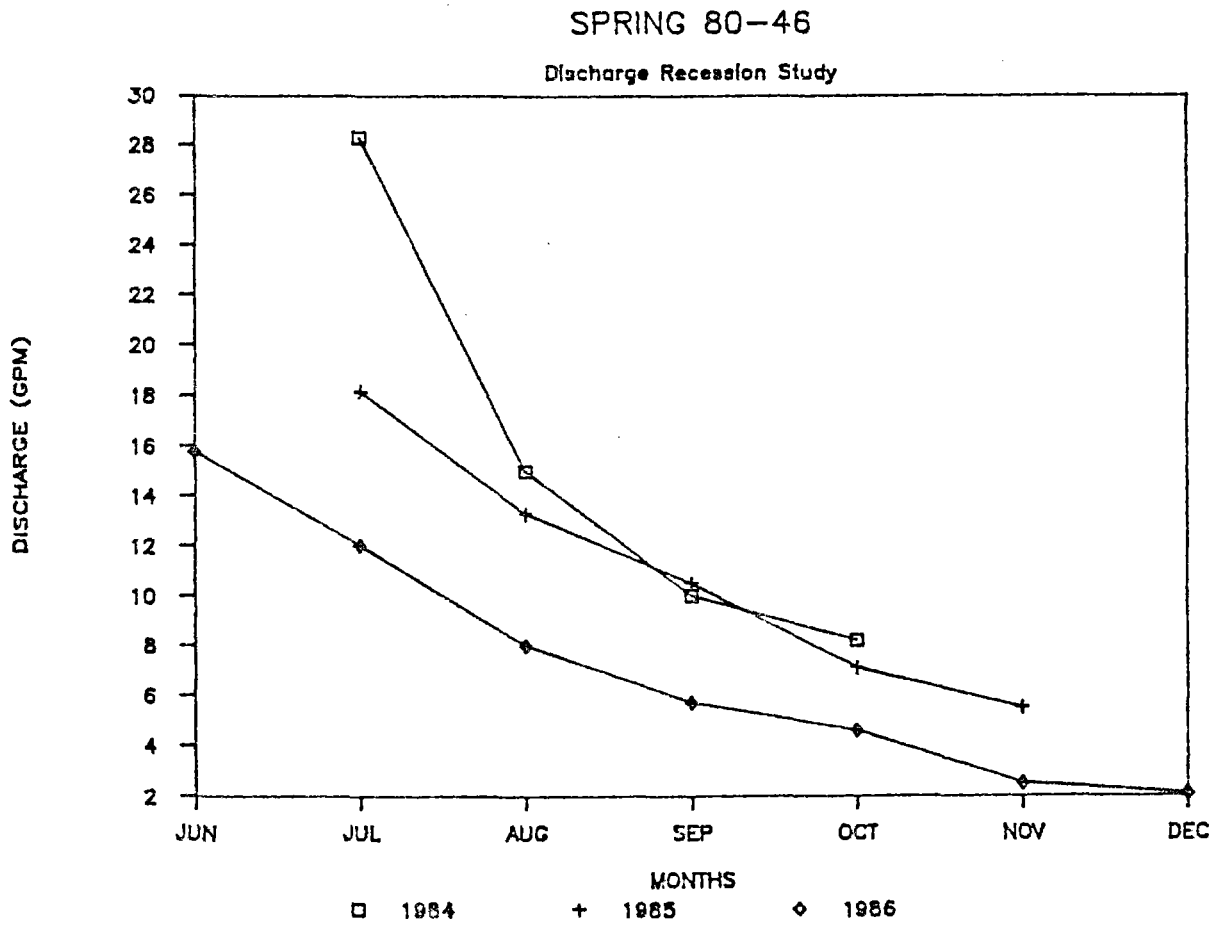
1
0
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986


SPRING 80-46
Discharge Recession Study
DISCHARGE (GPM)
30
28
26
24
22
20
18
16
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12
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8
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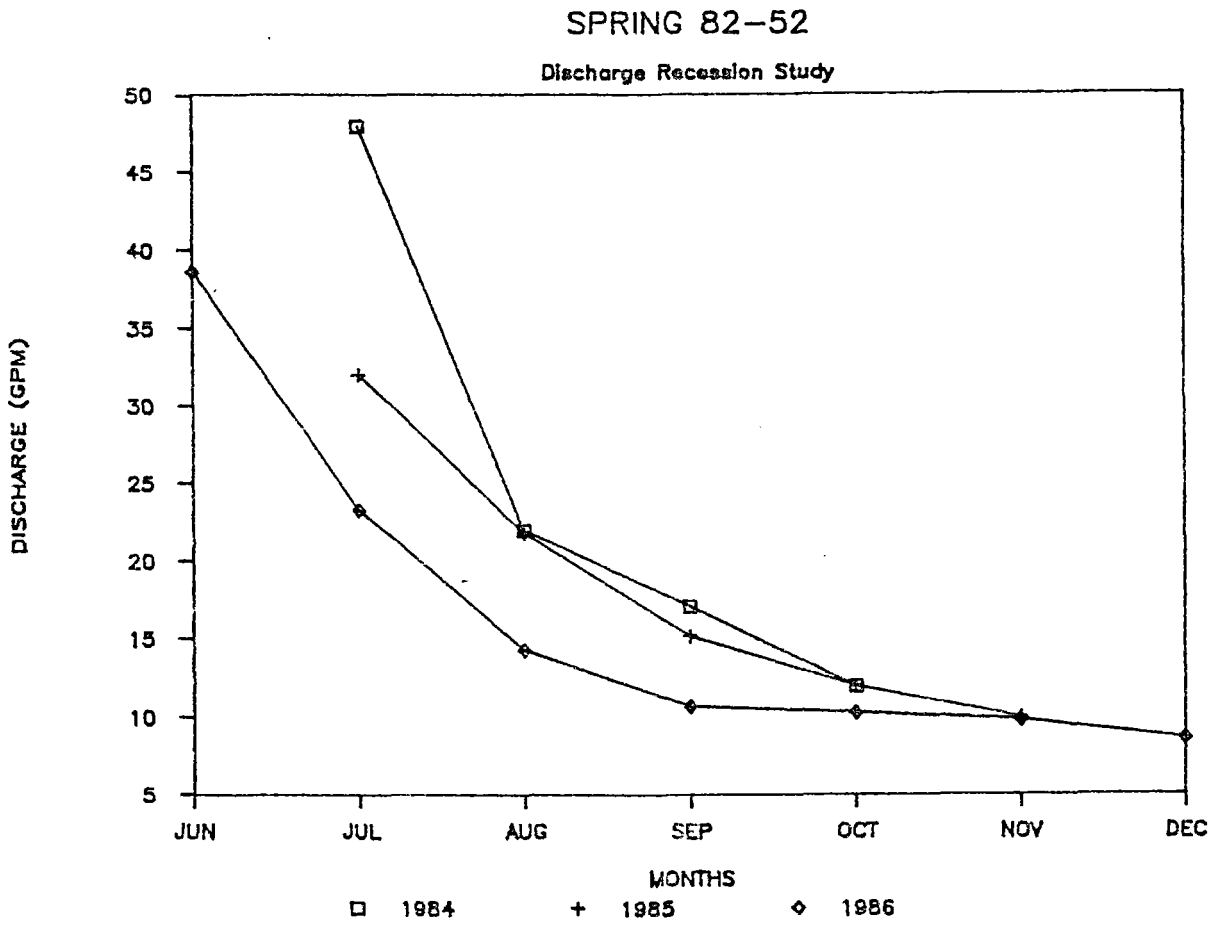
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986


SPRING 82-52
Discharge Recession Study
DISCHARGE (GPM)
50
45
40
35
30
25
20
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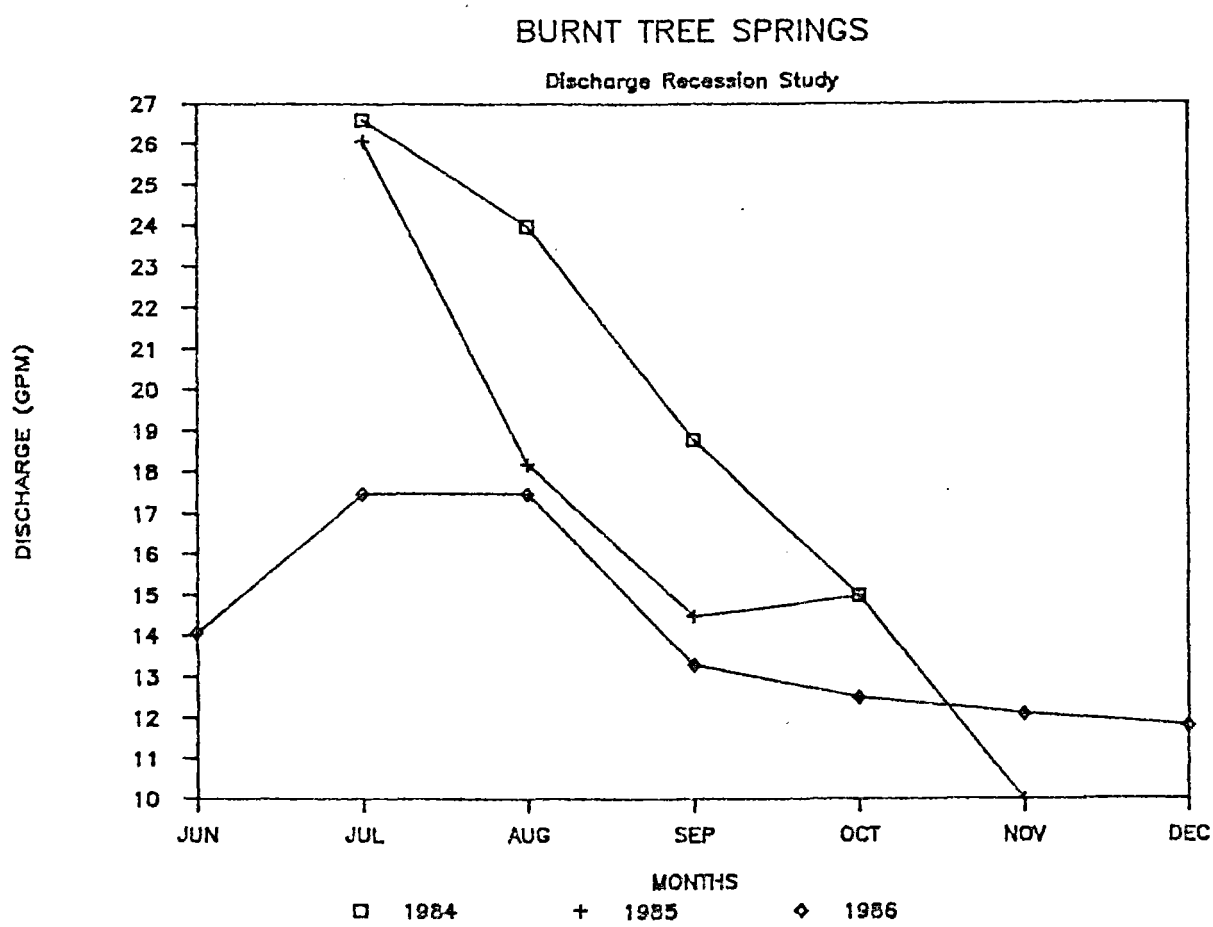
5
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986


BURNT TREE SPRINGS
Discharge Recession Study
DISCHARGE (GPM)
27
26
25
24
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22
21
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16
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14
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12
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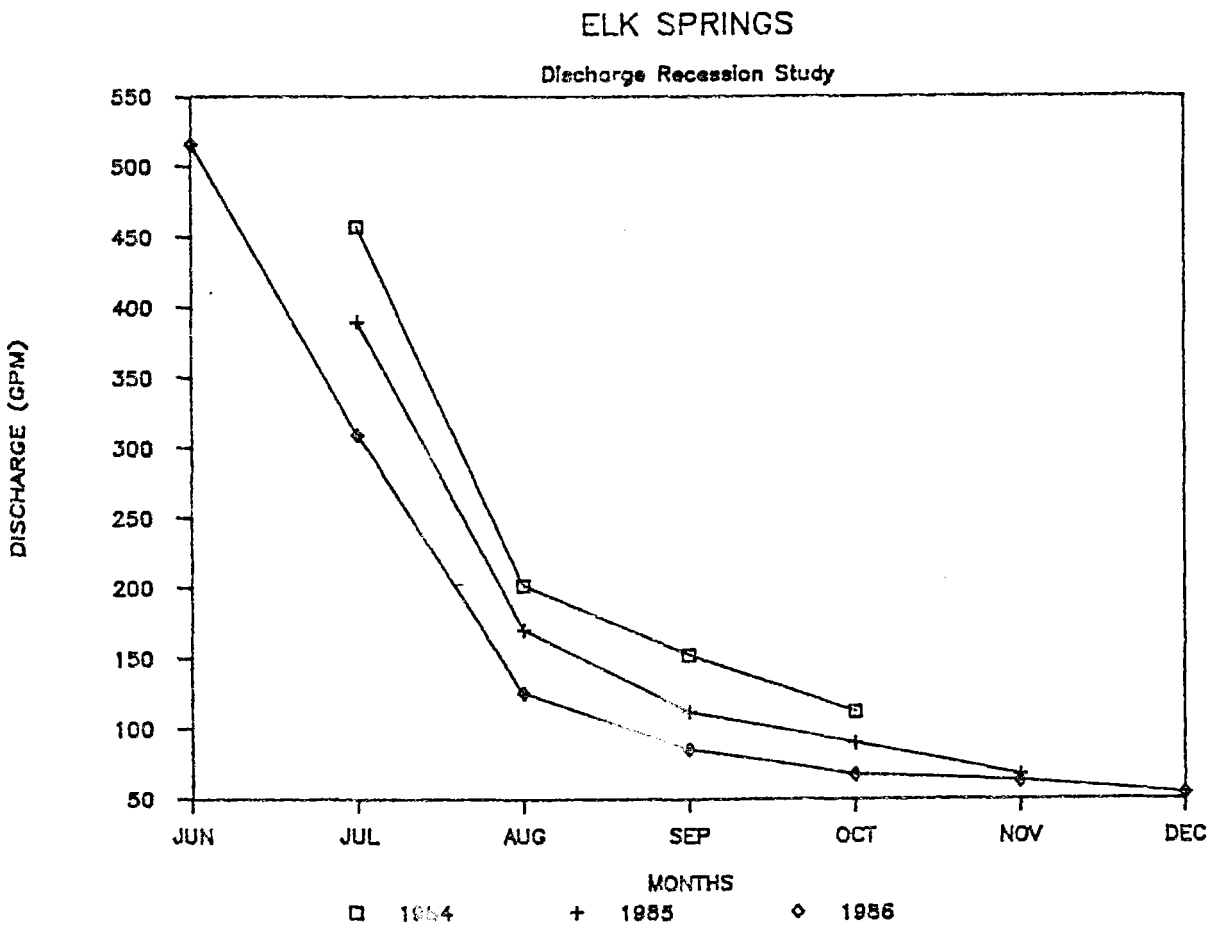
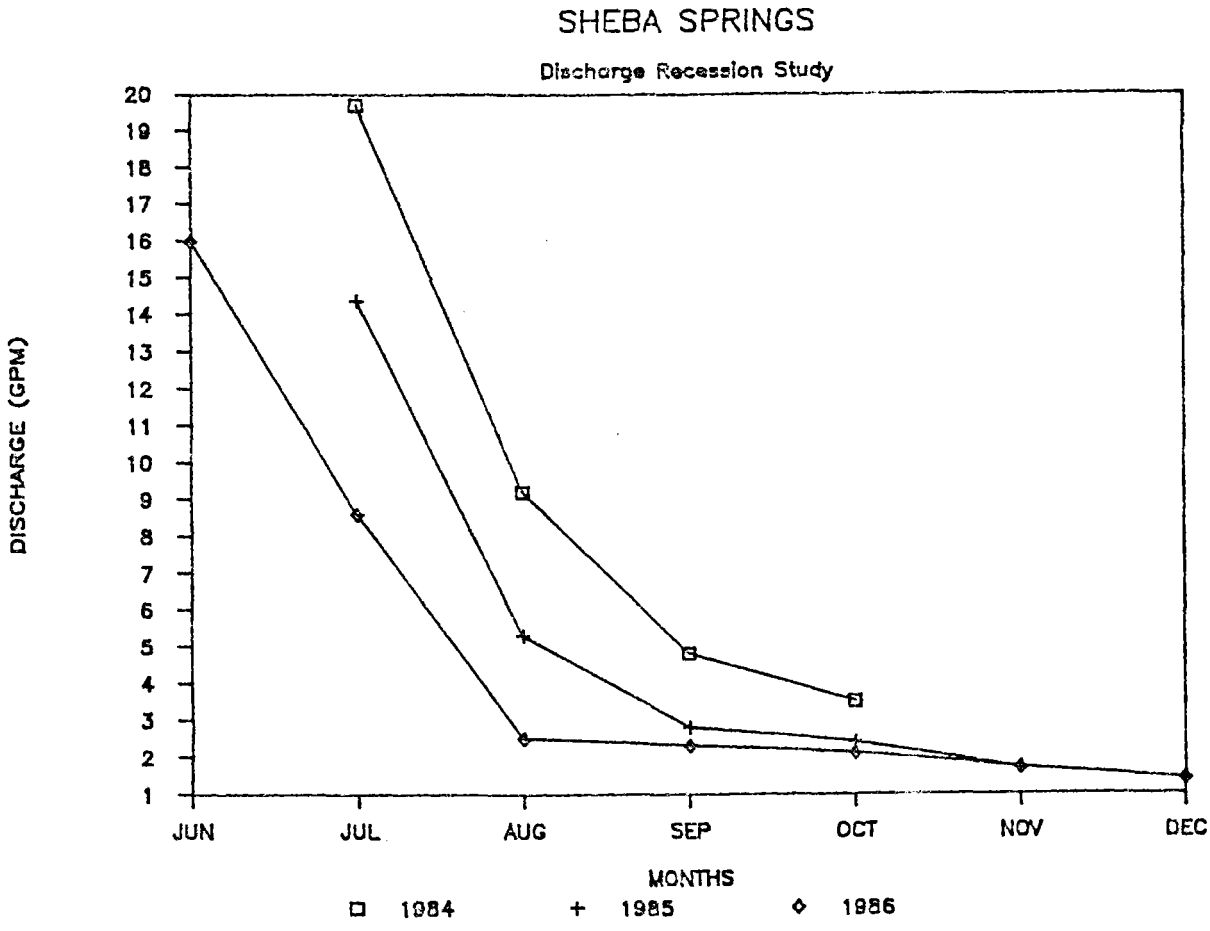
10
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986


ELK SPRINGS
Discharge Recession Study
DISCHARGE (GPM)
550
500
450
400
350
300
250
200
150
100
50
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986


SHEBA SPRINGS
Discharge Recession Study
DISCHARGE (GPM)
20
19
18
17
16
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1
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
1984
1985
1986

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8405

Date Rec'd 7-23-86

Date Sampled 7-22-86

Time Sampled

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

Sample ID: EAST MOUNTAIN SPRINGS
BURNT TREE

Temp. 41°  Flow 17.5 GPM

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

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

Analyst: David A. Pinney

Respectfully submitted 8-14-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
ELK SPRING

Temp. 38°  Flow 309.7 GPM

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

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

Analyst: David A. Ramsey

Respectfully submitted

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8396

Date Rec'd 7-23-86

Date Sampled 7-21-86

Time Sampled

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

Sample ID: EAST MOUNTAIN SPRINGS
JERK WATER

Temp. 42° Flow 2.1 GPM

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

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

Analyst: Donald L. Powers

Respectfully submitted 8-12-

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8371

Date Rec'd 7-18-86

Date Sampled 7-16-86

Time Sampled

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

Sample ID: EAST MOUNTAIN SPRINGS
PINE SPRINGS

Temp. 45° Flow 2.1 GPM

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

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

Analyst: David Romero

Respectfully submitted 8-12-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8367

Date Rec'd 7-18-86

Date Sampled 7-16-86

Time Sampled

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

Sample ID: EAST MOUNTAIN SPRINGS
SHEBA

Temp. 43° Flow 8.6 GPM

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

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

Analyst: David Parrish

Respectfully submitted 8-14-8

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8373

Date Rec'd 7-18-86

Date Sampled 7-17-86

Time Sampled

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

Sample ID: EAST MOUNTAIN SPRINGS
TED'S TUB

Temp. 37° Flow 31.6GPM

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

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

Analyst: David A. Romney

Respectfully submitted 8-12-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
79-2

Temp. 42° Flow 2.9 GPM

| | | | |
|---|---|---|---|
| Acidity | | | mg/l $CaCO_3$ |
| Alkalinity, Total | 7-25 | 281 | mg/l $CaCO_3$ |
| Alkalinity, Bicarbonate | | 343 | mg/l ~~$CaCO_3$~~ $CO_3$ |
| Alkalinity, Carbonate | | | mg/l $CaCO_3$ |
| Chloride | 8-4 | 2.8 | mg/l |
| Coliform, Fecal | | | MPN/100 ml |
| Coliform, Total | | | MPN/100 ml |
| Conductivity | 7-25 | 550 | umhos/cm |
| Fluoride | 8-5 | 0.14 | mg/l |
| Hardness, Total | | | mg/l $CaCO_3$ |
| Nitrogen, Ammonia | | | mg/l |
| Nitrogen, Nitrate | | | mg/l |
| Nitrogen, Nitrite | | | mg/l |
| Oil & Grease | | | mg/l |
| pH | 7-25 | 7.30 | Units |
| Phosphorus, Ortho | | | mg/l |
| Phosphorus, Total | | | mg/l |
| Solids, Total Dissolved | 8-1 | 297 | mg/l |
| Solids, Total Suspended | | <0.5 | mg/l |
| Sulfate | 8-4 | 16 | mg/l |
| Sulfide | | | mg/l |
| Turbidity | 7-29 | 0.2 | NTU |
| Total Cations | | 6.03 | meq/l |
| Total Anions | | 6.03 | meq/l |

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

Analyst: David Parker

Respectfully submitted [signature] 8-12-

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8392

Date Rec'd 7-23-86

Date Sampled 7-22-86

Time Sampled

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

Sample ID: EAST MOUNTAIN SPRINGS
79-3

Temp. 44°  Flow 3.2 GPM

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

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

Analyst: David Romero

Respectfully submitted 8-12-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
79-10

Temp. 42° Flow 26.1 GPM

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

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

Analyst: David Ramos

Respectfully submitted 8-14-

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8372

Date Rec'd 7-18-86

Date Sampled 7-17-86

Time Sampled

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

Sample ID: EAST MOUNTAIN SPRINGS
79-13

Temp. 46°  Flow 10.9 GPM

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

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

Analyst: David Brown

Respectfully submitted 8-12-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8374

Date Rec'd 7-18-86

Date Sampled 7-17-86

Time Sampled

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

Sample ID: EAST MOUNTAIN SPRINGS
79-15

TEMP. 42°  Flow 18.2 GPM

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

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

Analyst: [signature]

Respectfully submitted [signature] 8-12-8

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
79-23

Temp. 50°  Flow 0.6 GPM

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

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

Analyst: Darrell Orrin

Respectfully submitted 8-14-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8368

Date Rec'd 7-18-86

Date Sampled 7-17-86

Time Sampled

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

Sample ID: EAST MOUNTAIN SPRINGS
79-26

Temp. 49°  Flow 8.7 GPM

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

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

Analyst: David A. Romney

Respectfully submitted [signature] 8-14-8

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
79-28

TEMP. 41° FLOW 3.9 GPM

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

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

Analyst: David Damron

Respectfully submitted 8-12-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
79-29

Temp. 40° Flow 4.7 GPM

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

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

Analyst: David Ramos

Respectfully submitted 8-14-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

Lab. No. 8376
Date Rec'd 7-18-86
Date Sampled 7-17-86
Time Sampled

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

Sample ID: EAST MOUNTAIN SPRINGS
79-34

Temp. 40°  Flow 16.7 GPM

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

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

Analyst: Donald Pagan

Respectfully submitted 8-12-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
79-35

Temp. 39° Flow 8.8 GPM

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

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

Analyst; [signature]

Respectfully submitted [signature] 8-14-86

*Certified Environmental Laboratory*

*CERTIFICATE OF ANALYSIS*

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8377

Date Rec'd 7-18-86

Date Sampled 7-17-86

Time Sampled

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

Sample ID: EAST MOUNTAIN SPRINGS
79-36

Temp. 41°  Flow 6.7 GPM

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

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

Analyst; Darrell Parrish

Respectfully submitted [signature] 8-12-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
79-38

Temp. 41° Flow 3.6 GPM

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

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

Analyst: [signature]

Respectfully submitted [signature] 8-12-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
79-40

Temp. 39°  Flow 4.1 GPM

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

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

Analyst: David A. Rowe

Respectfully submitted [signature] 8-12-86

Certified Environmental Laboratory

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
80-41

Temp. 38° Flow 4.1 GPM

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

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

Analyst: David A. Ramos

Respectfully submitted [signature] 8-12-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
80-43

Temp. 43° Flow 3.1 GPM

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

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

Analyst: David Ramos

Respectfully submitted [signature] 8-12-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
80-44

Temp. 46° Flow 2.2 GPM

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

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

Analyst: [signature]

Respectfully submitted [signature] 8-14-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
80-46

Temp. 42° Flow 12.0 GPM

| | | | |
|---|---|---|---|
| Acidity | | | mg/l $CaCO_3$ |
| Alkalinity, Total | 7-25 | 243 | mg/l $CaCO_3$ |
| Alkalinity, Bicarbonate | | 296 | mg/l $CaCO_3$ $HCO_3$ |
| Alkalinity, Carbonate | | <1.0 | mg/l $CaCO_3$ |
| Chloride | 8-4 | 4.3 | mg/l |
| Coliform, Fecal | | | MPN/100 ml |
| Coliform, Total | | | MPN/100 ml |
| Conductivity | 7-25 | 595 | umhos/cm |
| Fluoride | 8-5 | 0.16 | mg/l |
| Hardness, Total | | | mg/l $CaCO_3$ |
| Nitrogen, Ammonia | 7-31 | <0.05 | mg/l |
| Nitrogen, Nitrate | 8-4 | 0.02 | mg/l |
| Nitrogen, Nitrite | 8-4 | <0.01 | mg/l |
| Oil & Grease | | | mg/l |
| pH | 7-25 | 8.00 | Units |
| Phosphorus, Ortho | | | mg/l |
| Phosphorus, Total | 8-5 | 0.03 | mg/l |
| Solids, Total Dissolved | 7-30 | 312 | mg/l |
| Solids, Total Suspended | | <0.5 | mg/l |
| Sulfate | 8-13 | 55 | mg/l |
| Sulfide | 7-31 | <0.1 | mg/l |
| Turbidity | 7-29 | 0.2 | NTU |
| Total Cations | | 6.15 | meq/l |
| Total Anions | | 6.13 | meq/l |

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

Analyst: David Panny

Respectfully submitted 8-14-86

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
80-47

Temp. 42° Flow 12.2 GPM

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

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

Analyst: [signature]

Respectfully submitted [signature] 8-12-

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

Lab. No. 8369
Date Rec'd 7-18-86
Date Sampled 7-16-86
Time Sampled

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

Sample ID: EAST MOUNTAIN SPRINGS
80-49

Temp. 42°  Flow 12 GPM

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

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

Analyst:

Respectfully submitted 8-12-86

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# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
82-51

Temp. 49°  Flow 2.6 GPM

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

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

Analyst: [signature]

Respectfully submitted [signature] 7-12

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
82-52

Temp. 39° Flow 23.3 GPM

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

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

Analyst: [signature]

Respectfully submitted [signature] 8-14-86

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
84-53

Temp. 39°  Flow 12.2 GPM

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

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

Analyst: David Rimmer

Respectfully submitted [illegible]

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
84-55

Temp. 39° Flow 2.4 GPM

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

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

Analyst: David Lowry

Respectfully submitted [signature] 8-12-86

*Certified Environmental Laboratory*

*CERTIFICATE OF ANALYSIS*

# STANDARD LABORATORIES, INC.

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

Lab. No. 8406

Date Rec'd 7-23-86

Date Sampled 7-22-86

Time Sampled

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

Sample ID: EAST MOUNTAIN SPRINGS
84-56

Temp. 41° Flow 3.7 GPM

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

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

Analyst: [signature]

Respectfully submitted [signature] 8-14-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8697

Date Rec'd 10-16-86

Date Sampled 10-15-86

Time Sampled

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

Sample ID: EAST MOUNTAIN SPRING
BURNT TREE SPRING

Temp. 43°  Flow 12.5 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
ELK SPRING

TEMP. 39° FLOW 67.3 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRINGS
JERK WATER SPRING

Temp. 44° Flow 2.0 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRING
PINE SPRING

Temp. 40° Flow 0.3 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bal Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

Lab. No. 8699
Date Rec'd 10-16-86
Date Sampled 10-15-86
Time Sampled

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

Sample ID: EAST MOUNTAIN SPRING
SHEBA SPRING

Temp. 43° Flow 2.1 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8696

Date Rec'd 10-16-86

Date Sampled 10-15-86

Time Sampled

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

Sample ID: EAST MOUNTAIN SPRING
SHEEP HERDER SPRING

Temp. 39°  Flow 10.3 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRING
TUB

Temp. 40° Flow 4.1

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRING
79-2

Temp. 41° Flow 1.8 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRING
79-3

Temp. 53° Flow 0.1 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRING
79-15

Temp. 42° Flow 5.1 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRING
80-46

Temp. 40° Flow 4.6

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: EAST MOUNTAIN SPRING
80-47

Temp. 40° Flow 8.2 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

Lab. No. 8698
Date Rec'd 10-16-86
Date Sampled 10-15-86
Time Sampled

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

Sample ID: EAST MOUNTAIN SPRING
FLAG LAKE 79-28

Temp. 47° Flow 3.9 GPM

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

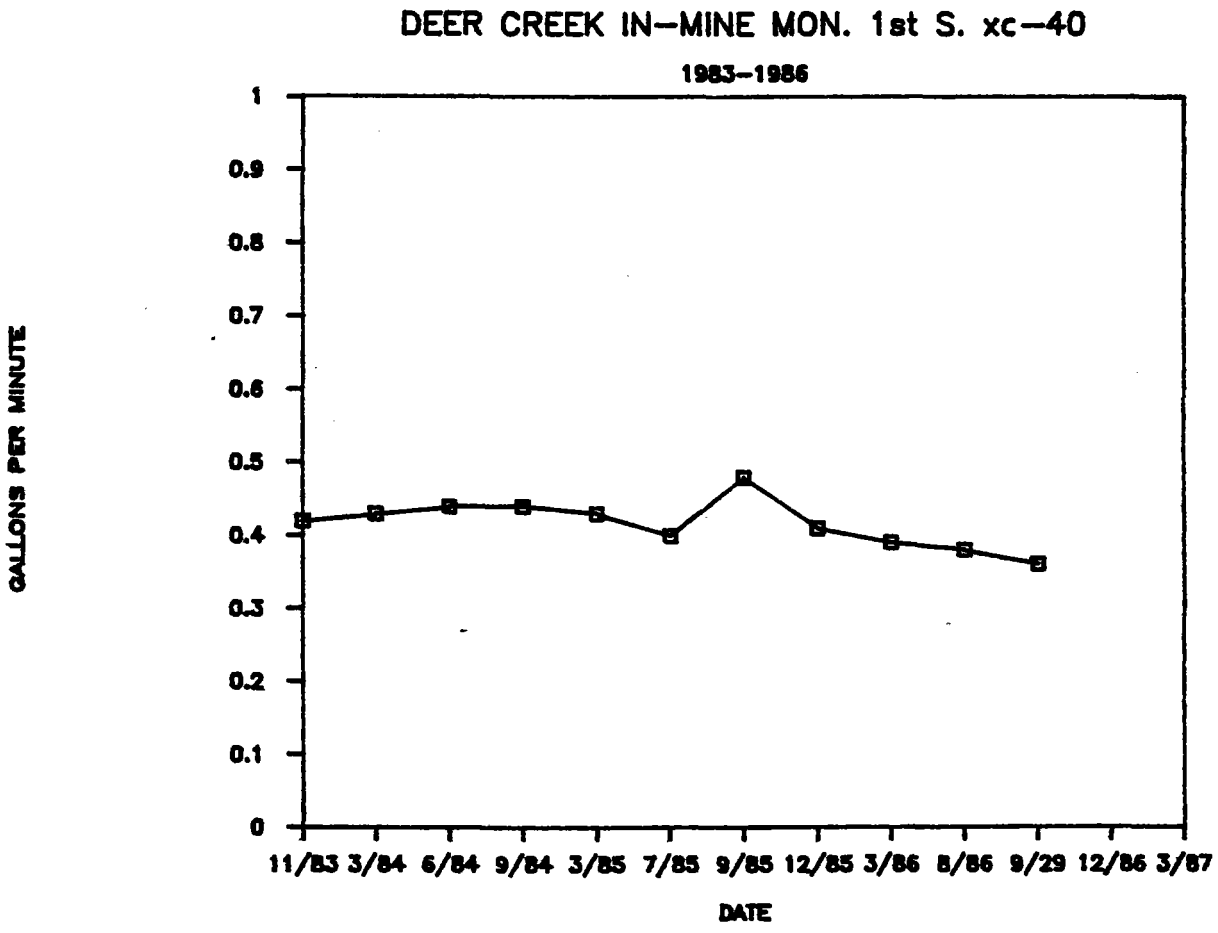
| | | | |
|---|---|---|---|
| Aluminum | | | mg/l |
| Arsenic | | | mg/l |
| Barium | | | mg/l |
| Beryllium | | | mg/l |
| Boron | | | mg/l |
| Cadmium | | | mg/l |
| Calcium | 10-23 | 40 | mg/l |
| Chromium | | | mg/l |
| Copper | | | mg/l |
| Iron | 10-29 | <0.05 | mg/l |
| Lead | | | mg/l |
| Magnesium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

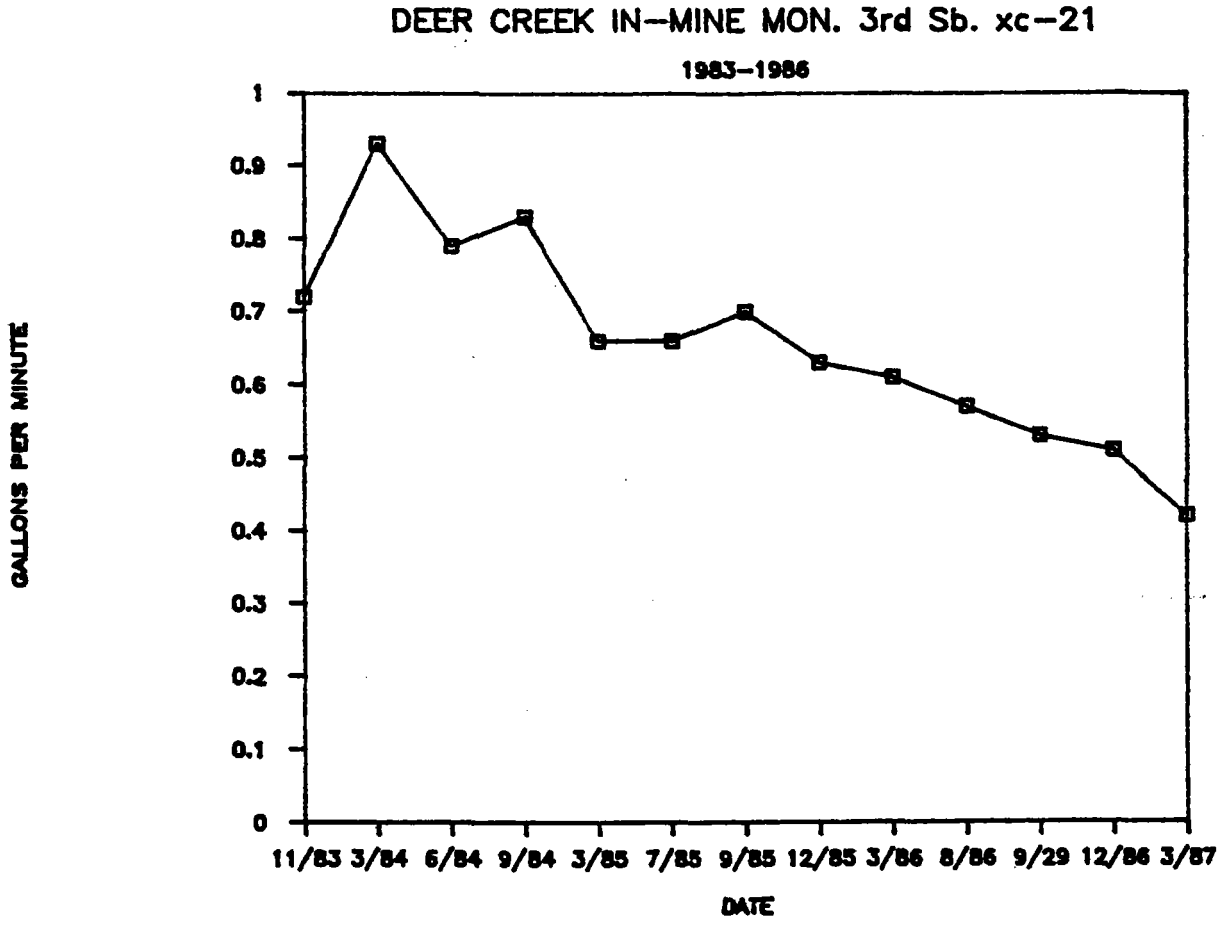
Analyst: Sharon Reiter

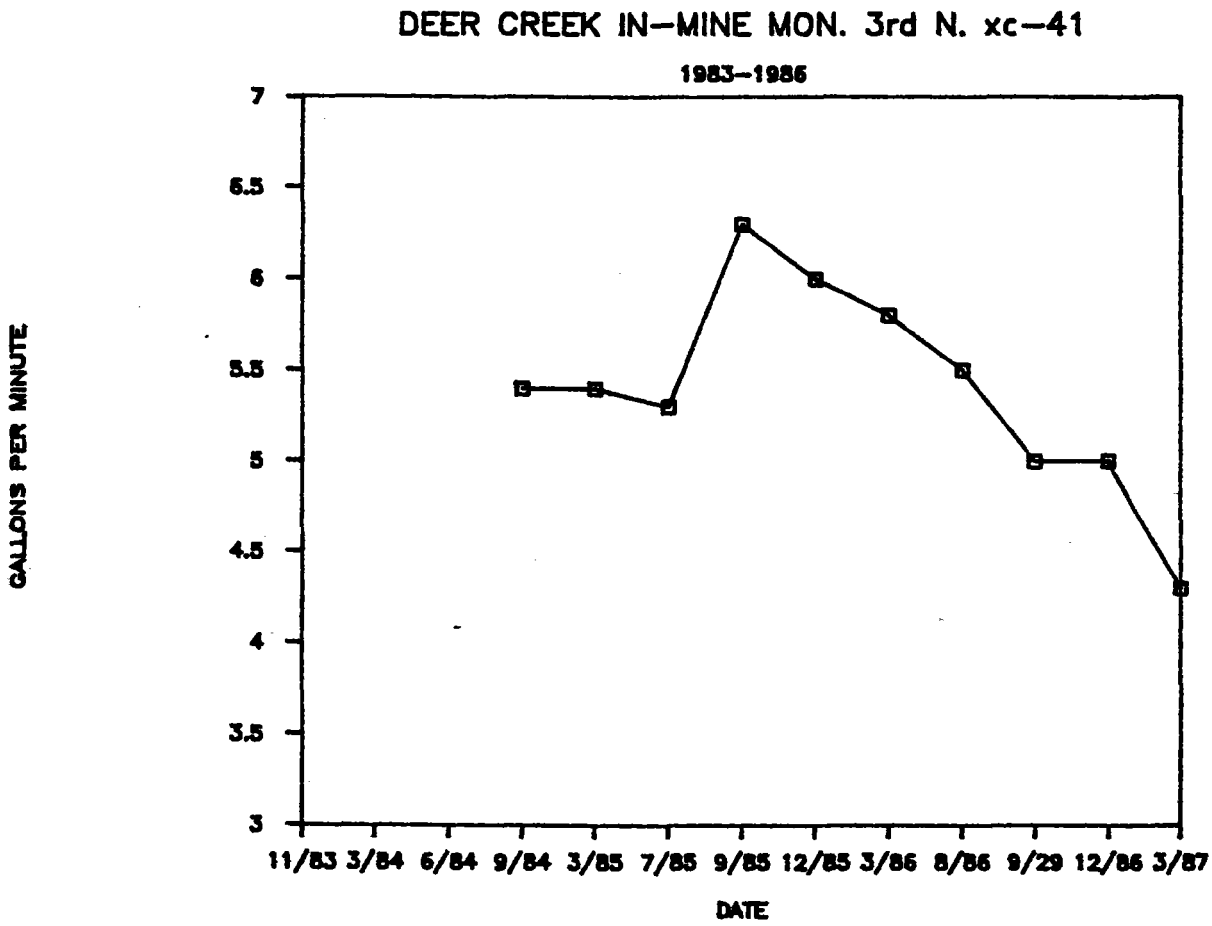
Respectfully submitted Bal Cunningham

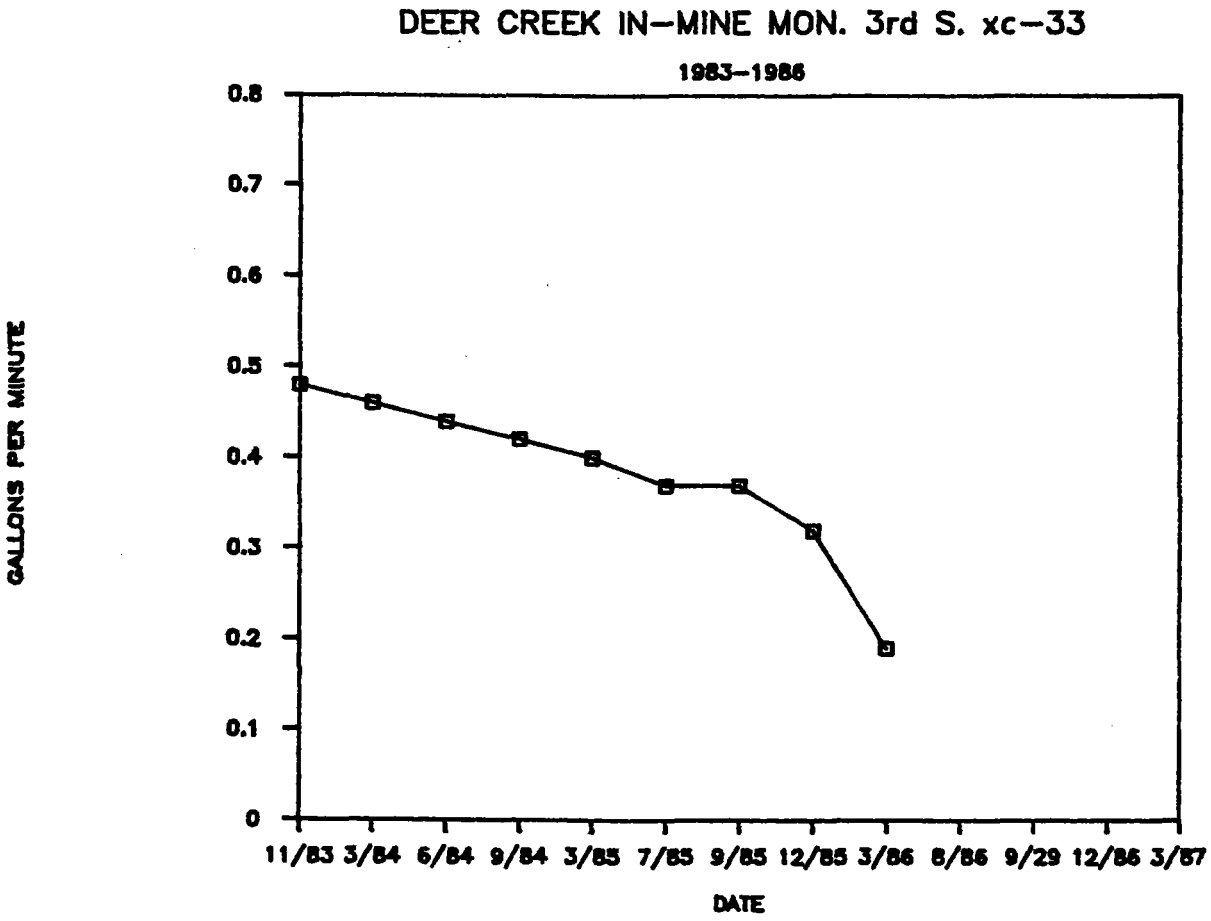
# APPENDIX F

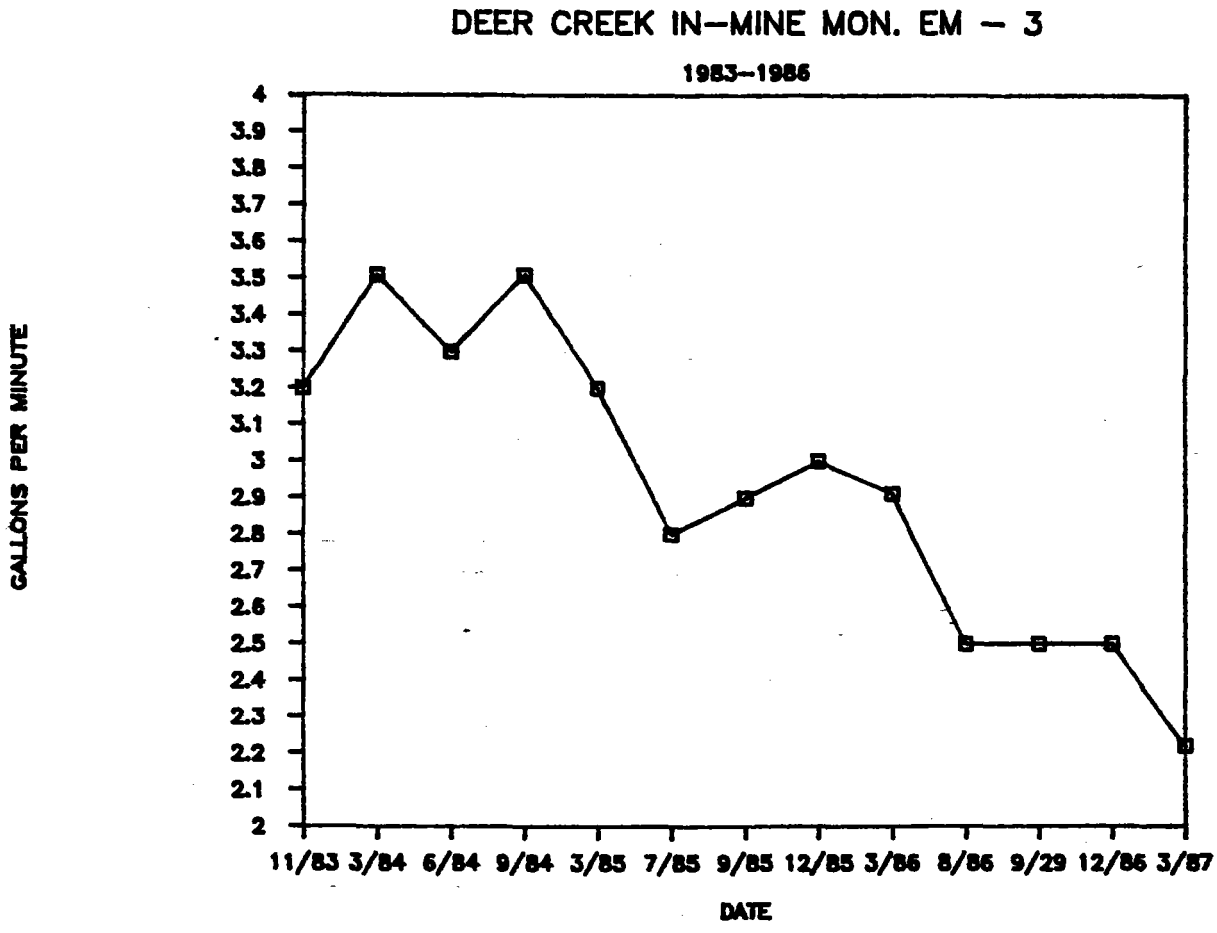
# DEER CREEK IN-MINE WATER QUALITY


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


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


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


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


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

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: SPECIAL DEER CREEK IN-MINE
EM3

Temp. 54° Flow 2.91 GPM

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

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

Analyst: Donald Ramsey

Respectfully submitted 4-4-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 7951

Date Rec'd 3-25-86

Date Sampled 3-25-86

Time Sampled 1220

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

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

Temp. 56° Flow 0.20 GPM

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

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

Analyst: David A. Ramos

Respectfully submitted 4-4-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

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

Temp. 55°  Flow 0.38 GPM

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

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

Analyst: David L. Pomeroy

Respectfully submitted [signature] 8-15-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8442 6

Date Rec'd 8-5-86

Date Sampled 8-4-86

Time Sampled 1330

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

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

Temp. 53°  Flow 0.57 GPM

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

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

Analyst: David Dannis

Respectfully submitted [signature] 8-15-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

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

Temp. 54° Flow 5.0 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8557

Date Rec'd 9-26-86

Date Sampled 9-26-86

Time Sampled 1045

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

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

Temp. 56°  Flow 2.5 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

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

Temp. 52° Flow 0.5 GPM

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

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

RECEIVED
JAN 13 1987
MINING & EXPLORATION
FIELD OFFICE

Analyst: Sharon Reiter

Respectfully submitted [signature] 1-12-87

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

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

Temp. 56° Flow 2.5 GPM

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

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

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FIELD OFFICE

Analyst: Sharon Reiter

Respectfully submitted [signature] 1-12-87

*Certified Environmental Laboratory*

# APPENDIX G

## DEER CREEK MINE DISCHARGE WATER QUALITY

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK DISCHARGE

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

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

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

Analyst: David A. Janney

Respectfully submitted David A. Janney

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK DISCHARGE

TEmp. 52°  Flow 0.29/453.3 GPM

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

Analyst: David A Janusz

Respectfully submitted David A Janusz

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

Lab. No. 7871
Date Rec'd 2-29-86
Date Sampled 2-26-86
Time Sampled 1330

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

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

Temp. 52°  Flow 0.29/453.3 GPM

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

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

Analyst: David L Janney

Respectfully submitted David L Janney

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# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK DISCHARGE

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

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

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

Analyst: David Dorsey

Respectfully submitted David Dorsey

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# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK DISCHARGE

Temp. 52°

Flow 0.29/453.3 GPM

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

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

Analyst: David Jones

Respectfully submitted 4-30-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

Lab. No. 8106
Date Rec'd 5-30-86
Date Sampled 5-29-86
Time Sampled

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

Sample ID: DEER CREEK DISCHARGE

Temp. 56°

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

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

Analyst: David A. Janus

Respectfully submitted 6-5-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

Sample ID: DEER CREEK DISCHARGE

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

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

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

Analyst: David L. Janney

Respectfully submitted David L. Janney

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

Sample ID: DEER CREEK DISCHARGE (JULY)

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

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

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

Analyst: David Ramey

Respectfully submitted [signature] 8-15-8

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

Lab. No. 8498
Date Rec'd 8-28-86
Date Sampled 8-28-86
Time Sampled 0930

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

Sample ID: DEER CREEK DISCHARGE

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

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

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

Analyst; Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK DISCHARGE (ANNUAL)

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

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

Analyst: Sharon Reiter

Respectfully submitted Bel G Winningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

Sample ID: DEER CREEK DISCHARGE

Temp. 53°

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK DISCHARGE

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

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

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Respectfully submitted 12-31-86

Analyst: Sharon Reiter

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

Sample ID: DEER CREEK MINE DISCHARGE

Temp. 52° Flow 668 GPM

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

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

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FIELD OFFICE

Analyst: Sharon Reiter

Respectfully submitted [signature] 1-8-87

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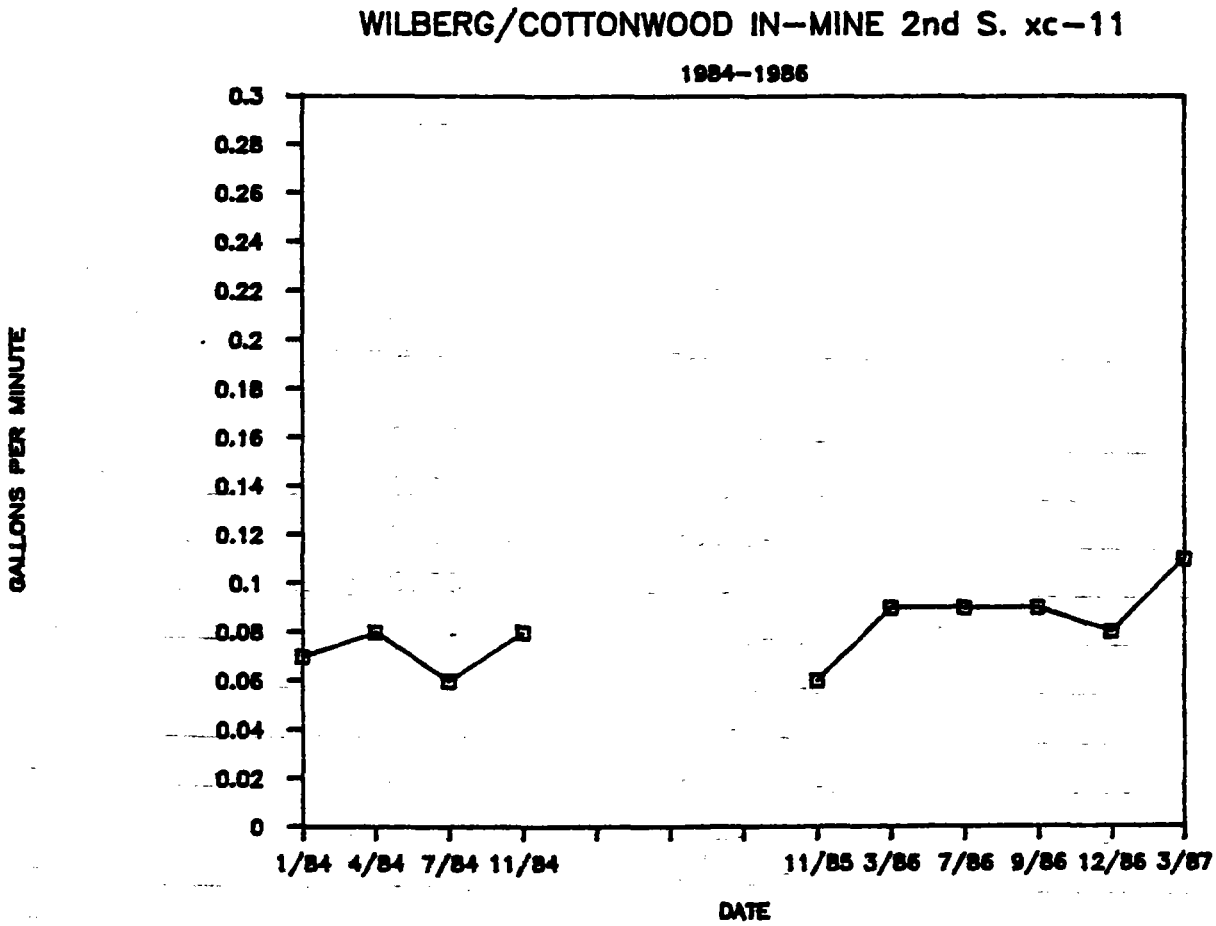
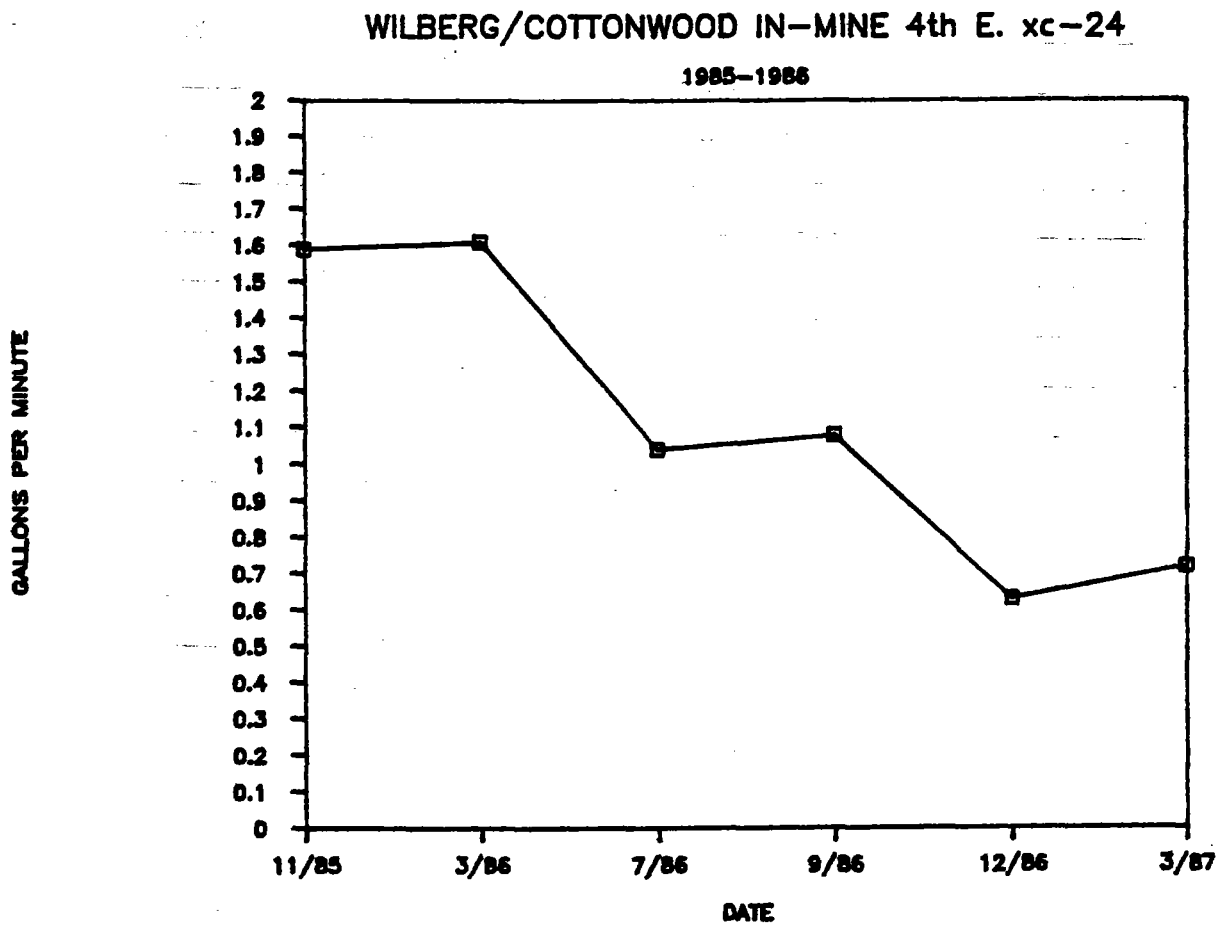
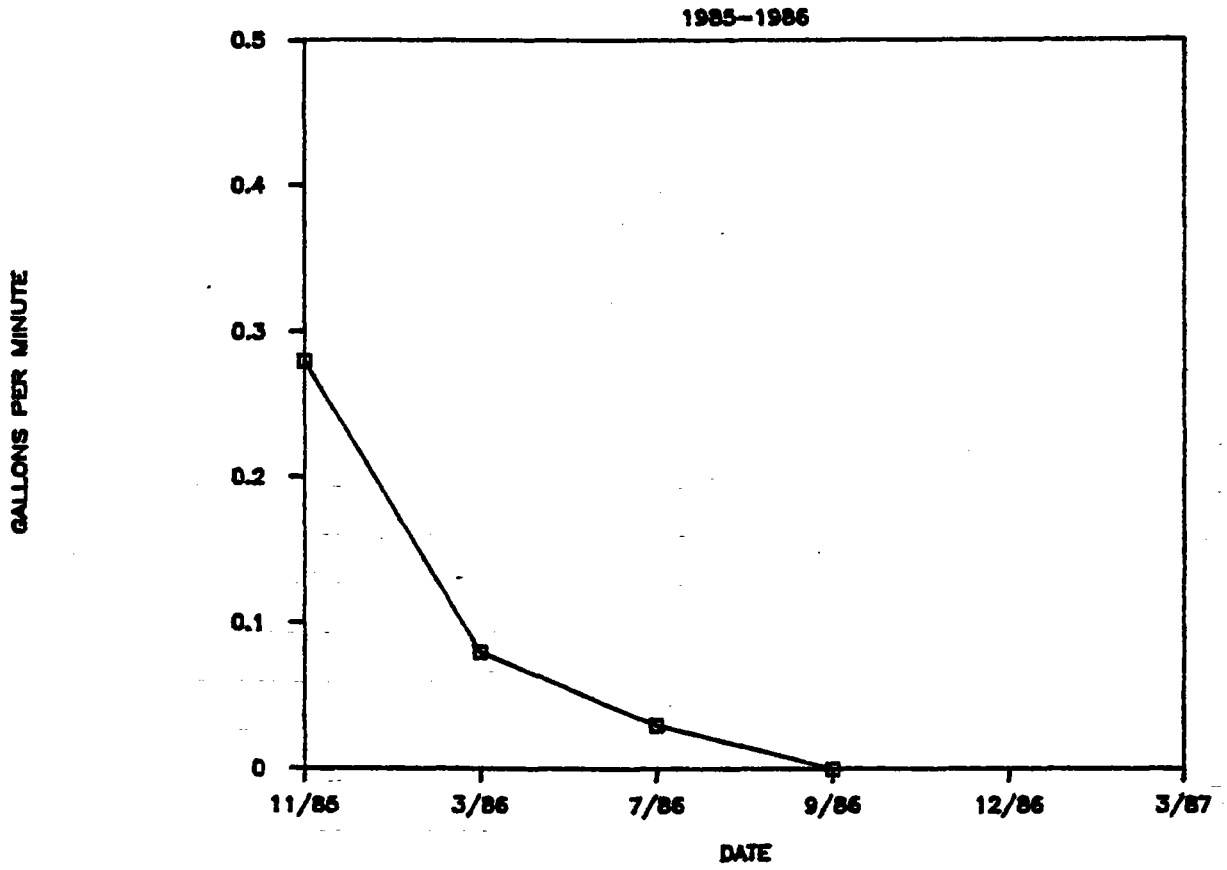
# APPENDIX H

# WILBERG MINE IN-MINE WATER QUALITY


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


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

WILBERG/COTTONWOOD IN-MINE 4th E. xc-40



# CERTIFICATE OF ANALYSIS

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

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

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

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

Temp. 57° Flow 0.09 GPM

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

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

Analyst: David A. Ramsey

Respectfully submitted [signature] 3/25/86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

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

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

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

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

Temp. 54°  Flow 0.08 GPM

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

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

Analyst: David A. Ramos

Respectfully submitted 3/25/8

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

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

Temp. 52° Flow 0.09 GPM

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

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

Analyst: David A. Ramos

Respectfully submitted [signature] 8-15-86

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

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

Temp. 54° Flow 1.04 GPM

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

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

Analyst: David Ramsey

Respectfully submitted [signature] 8-15-86

**Certified Environmental Laboratory**

**CERTIFICATE OF ANALYSIS**

# STANDARD LABORATORIES, INC.

P[illegible]ox 1140, Huntington, Utah 84528 801-653-2314

Lab. No. 8556

Date Rec'd 9-28-86

Date Sampled 9-~~26~~ 27-86

Time Sampled 1350

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

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

Temp. 56° Flow 0.09 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bob Cunningham

**Certified Environmental Laboratory**

# CERTIFICATE OF ANALYSIS

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

Lab. No. 8555
Date Rec'd 9-28-86
Date Sampled 9-27-86
Time Sampled 1430

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

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

Temp. 56° Flow 1.08 GPM

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

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

Analyst: Sharon Reiter

Respectfully submitted Bd Cunningham

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# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

Lab. No. 8790

Date Rec'd 12-30-86

Date Sampled 12-29-86

Time Sampled 1255

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

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

Temp. 56° Flow 0.08 GPM

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

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

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FIELD OFFICE

Analyst: Sharon Reiter

Respectfully submitted [signature] 1-12-87

*Certified Environmental Laboratory*

# CERTIFICATE OF ANALYSIS

**STANDARD LABORATORIES, INC.**

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

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

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

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

Temp. 54° Flow 0.63 GPM

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

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

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FIELD OFFICE

Respectfully submitted [signature] 1-12-87

Analyst: Sharon Reiter

*Certified Environmental Laboratory*