ANNUAL HYDROLOGIC MONITORING REPORT
EAST/TRAIL MOUNTAIN PROPERTIES
1994

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PACIFICORP
TECHNICAL SERVICES REPORT
CHUCK A. SEMBORSKI

CENTRAL ENGINEERING

ANNUAL HYDROLOGIC MONITORING REPORT
EAST/TRAIL MOUNTAIN PROPERTIES
1994

APRIL 14, 1995

PACIFICORP - FUEL RESOURCES
HYDROLOGIC MONITORING PROGRAM
ANNUAL REPORT FOR 1994

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Minerals Management Service
Utah Division of Oil, Gas and Mining

Prepared and submitted for PacifiCorp by:

Hydrologic Section of the Power Operations Department

and

Energy West

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I. INTRODUCTION

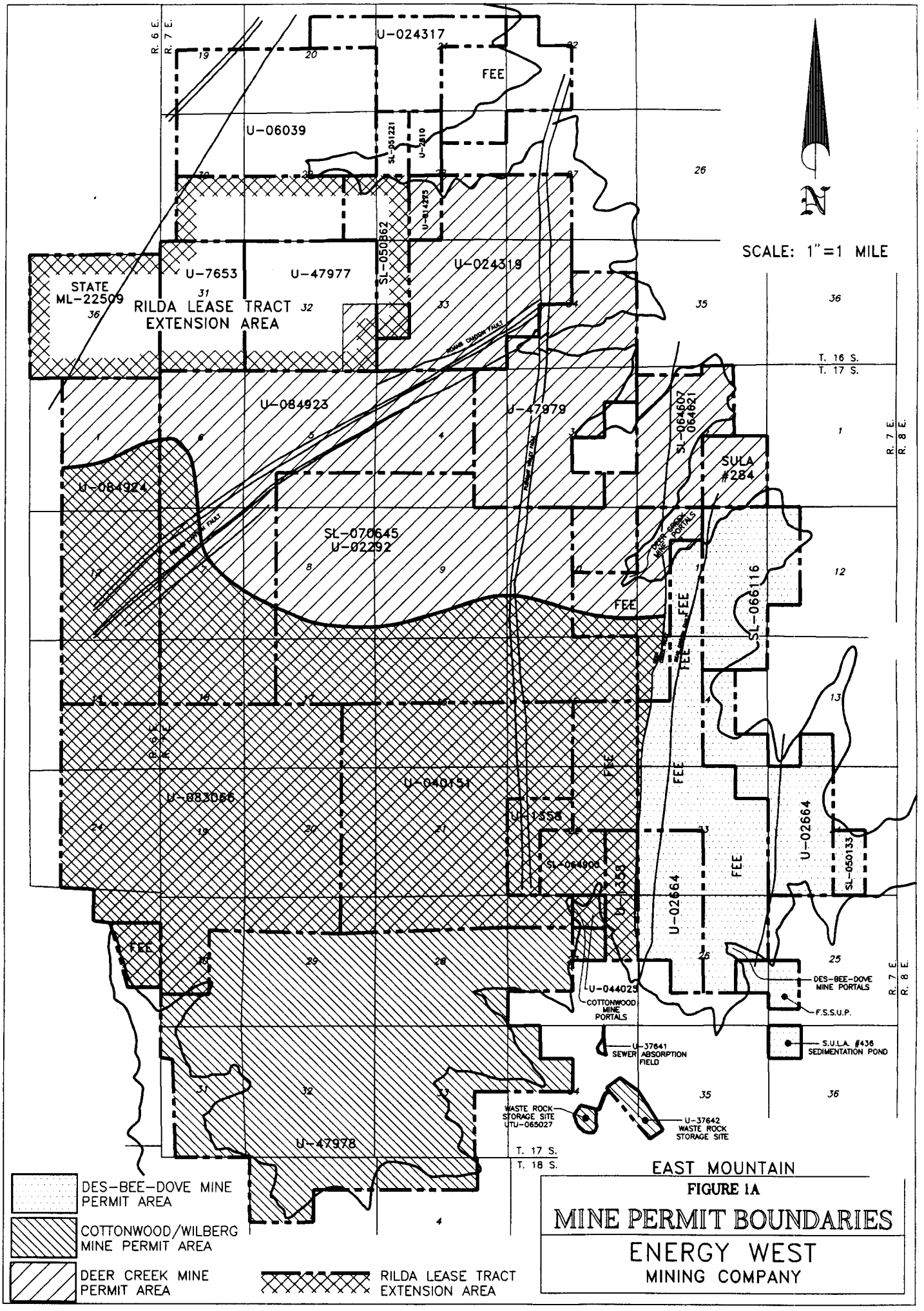
The 1994 Hydrologic Monitoring Report is hereby submitted in accordance with the U. S. Department of Interior, Office of Surface Mining requirements and the Utah State Division of Oil, Gas and Mining guidelines for hydrologic monitoring in areas of and adjacent to coal mining operations.

This is the seventeenth annual hydrologic report submitted by PacifiCorp since the report entitled "Monitoring of the Water Resources in the Mining Areas of East/Trail Mountain, Emery County, Utah" was submitted to the U. S. Geological Survey and the Utah Division of Oil, Gas and Mining in December 1977. It addresses flow observations and water quality characteristics of the water resources adjacent to PacifiCorp's mining areas in Emery County. (See Figure 1, A & B.)

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. As a result, cooperative effort is realized and duplication of effort and expense is substantially reduced.



EAST MOUNTAIN

FIGURE 1A

MINE PERMIT BOUNDARIES

ENERGY WEST
MINING COMPANY

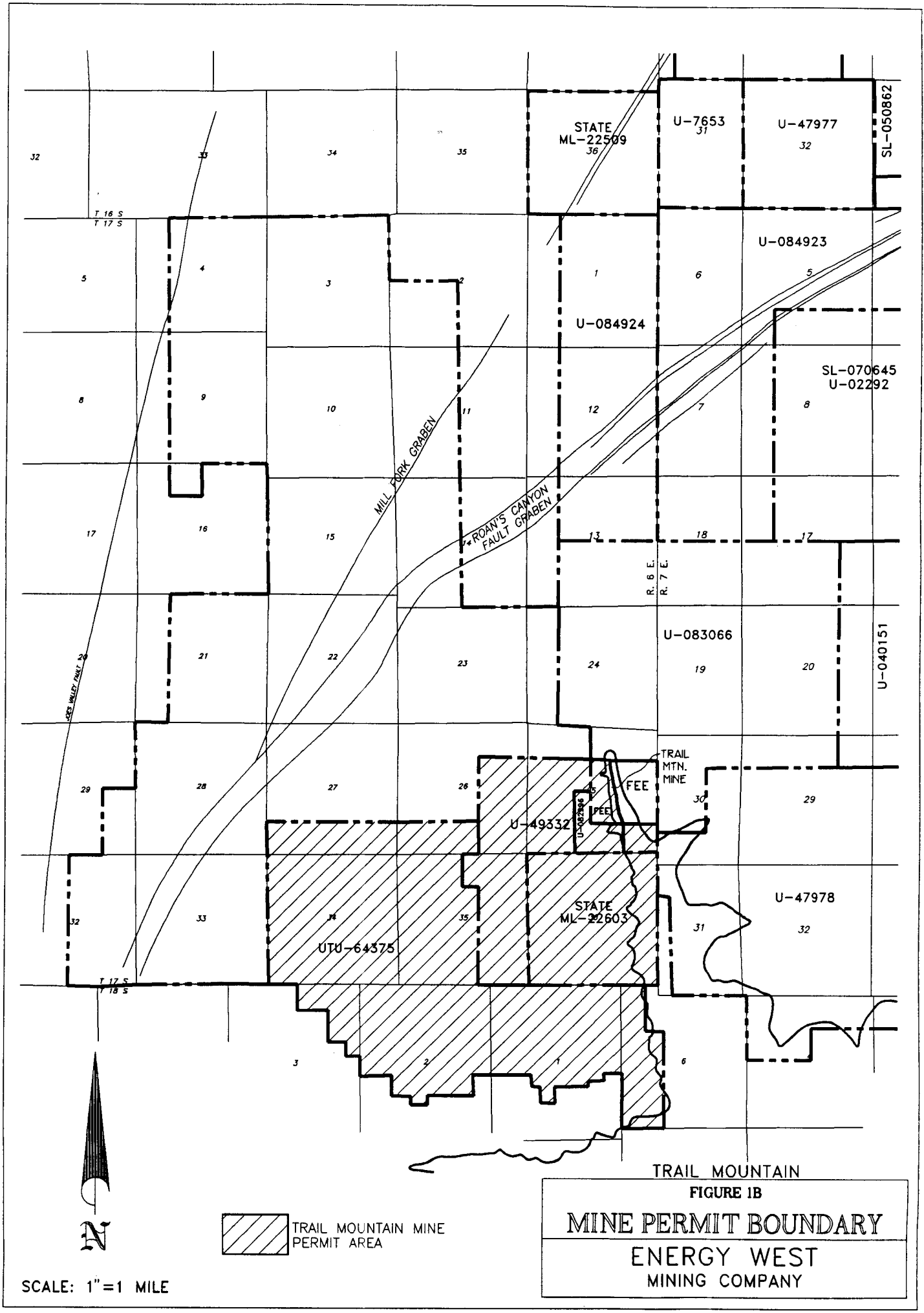


FIGURE 1B

MINE PERMIT BOUNDARY

ENERGY WEST
MINING COMPANY

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/Trail 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

From 1982 to 1984 the Western United States, especially Utah, experienced an unprecedented wet cycle of precipitation. The 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. The 1987 weather pattern changed dramatically with near normal valley precipitation and mountain snowfall much below normal. The resulting 1987 runoff was substantially below normal. The drought continued from 1988 through 1992 with runoff amounts much below normal for six consecutive years. 1993 runoff improved substantially with above average flow conditions occurring in most river basins. 1994 brought the return of drought conditions throughout the West.

B. Local Climatology

1. Precipitation

Valley precipitation in Emery County during 1994 was variable. The mountains in the San Rafael Basin received below normal snowfall during the 1993-94 winter while precipitation at Huntington Plant was above normal.

Precipitation amounts recorded at Hunter Plant, Huntington Plant, Electric Lake, and East Mountain for the 1994 water year (October 1993 to September 1994) 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 1993 and 1994 merits consideration in this study. The intent is to develop a correlation between yearly precipitation and spring discharges on East and Trail mountains. Table 2 is a comparison of the 1993-1994 precipitation levels recorded at the four locations.

TABLE 2: COMPARISON OF 1994 AND 1993 PRECIPITATION (Inches)

Station	1994 Amount	1994 % of Normal	1993 Amount	1993 % of Normal	1994 As % of 1993
Hunter Plant	6.05	87	8.55	123	71
Huntington Plant	11.49	153	14.16	189	81
Electric Lake	18.51	95	27.32	139	68
East Mountain	11.33	83	12.69	91	89
Average %		105		114	77

Table 2 indicates that 1994 precipitation was lower than 1993 at all locations. The overall precipitation at the four stations averaged twenty-three percent (23%) lower in 1994 than in 1993.

TABLE 1: PRECIPITATION IN EMERY COUNTY, UTAH (1994 Water Year)

	Hunter Plant (Elev. 5800')		Huntington Plant (Elev. 6500')		Electric Lake (Elev. 8350')		East Mountain (Elev. 8985')	
Month	Precip (in.)	% Of Normal	Precip (in.)	% Of Normal	Precip. (in.)	% Of Normal	Precip. (in.)	% of Normal
1993								
October	1.54	198	2.11	169	2.10	99	2.23	166
November	0.51	100	0.88	150	2.19	118	1.12	100
December	0.08	15	0.23	49	0.90	31	0.14	15
1994								
January	Tr.	0	0.12	23	1.00	50	0.32	28
February	0.53	130	0.88	259	4.00	230	1.35	120
March	0.01	2	1.17	189	1.10	58	0.34	20
April	0.67	156	1.69	307	2.81	167	2.65	282
May	0.17	29	0.53	93	0.99	67	0.36	39
June	0.31	68	0.05	13	0.10	12	0.39	78
July	0.09	16	Tr.	0	0.25	21	0.10	9
August	0.75	74	2.14	315	0.75	88	0.83	56
September	1.39	174	1.69	319	2.32	221	1.49	107
TOTALS	6.05	177	11.49	106	18.51	95	11.33	85
Mean Monthly	0.51	---	0.96	---	1.54	---	0.94	---

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. The 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 1994 water year.

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

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	0.13	0.25	0.19	0.02	0.40	0.00	0.89	0.84	0.03	0.31	0.08	0.70	3.84
76-77	0.00	0.02	0.00	0.37	0.07	0.00	0.03	1.28	0.07	1.35	0.41	0.50	4.10
77-78	0.01	0.18	0.00	1.28	1.05	1.74	0.34	1.21	0.00	0.69	1.14	0.14	7.78
78-79	0.03	2.22	0.22	1.43	0.53	2.43	0.24	0.47	0.00	0.00	0.79	0.00	8.36
79-80	0.00	0.00	0.41	1.70	1.70	0.67	0.75	1.11	0.00	0.02	0.51	2.06	8.93
80-81	0.66	0.06	0.02	0.00	0.07	1.48	0.16	0.45	0.14	0.20	0.70	2.43	6.37
81-82	0.58	0.27	0.45	0.94	0.45	0.54	0.00	0.02	0.00	0.15	1.06	1.23	5.69
82-83	0.20	1.25	0.45	0.54	0.41	0.84	0.37	0.51	0.00	2.18	1.58	0.88	9.21
83-84	0.53	0.66	1.07	0.03	0.35	0.34	0.34	0.05	1.09	1.80	1.89	2.35	10.50
84-85	1.6	0.06	1.24	0.20	0.95	1.01	0.67	0.64	0.26	1.50	0.03	0.86	9.11
85-86	0.92	1.40	0.42	0.10	0.97	0.40	0.31	0.00	0.31	0.55	1.01	0.57	7.05
86-87	0.92	0.08	0.10	0.32	0.45	0.90	0.12	1.38	1.25	1.65	1.27	0.11	8.55
87-88	1.91	1.02	0.66	0.55	0.00	0.66	1.64	0.59	0.20	0.69	0.44	0.78	9.14
88-89	0.69	0.04	0.48	1.23	0.02	0.23	0.00	0.37	0.14	1.01	1.70	0.35	6.26
89-90	0.20	0.00	0.03	0.31	0.72	0.71	0.51	0.06	0.24	0.56	0.38	1.11	4.73
90-91	0.04	0.00	0.19	0.02	0.29	0.77	0.10	1.09	0.58	0.94	0.53	2.11	6.66
91-92	0.17	0.50	0.14	1.04	2.72	0.87	0.22	1.56	0.34	0.22	1.60	0.52	9.90
92-93	0.81	0.07	0.78	1.44	1.67	1.18	0.50	0.92	0.15	0.05	0.93	0.05	8.55
93-94	1.54	0.51	0.08	Tr.	0.53	0.01	0.67	0.17	0.31	0.09	0.75	1.39	6.05
94-95	1.38	0.22	0.96										

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	---	---	---	---	---	0.08	0.29	0.16	0.11	0.57	0.63	0.43	2.27
71-72	2.26	0.59	1.62	0.04	0.00	0.32	0.28	0.16	0.77	0.40	0.66	1.07	8.17
72-73	4.27	1.28	0.34	0.49	0.80	2.42	0.50	0.17	0.97	1.09	1.94	0.12	14.39
73-74	0.08	0.02	0.37	0.20	0.03	0.01	0.00	0.00	0.00	0.09	0.00	0.07	0.87
74-75	0.68	1.19	1.13	1.01	0.30	0.80	0.03	0.75	1.44	2.62	0.31	0.24	9.50
75-76	0.23	0.95	0.03	0.20	0.23	0.00	2.34	0.86	0.02	0.73	0.19	0.85	6.63
76-77	0.56	0.00	0.00	0.35	0.00	0.00	0.00	1.76	0.00	2.08	0.96	0.70	6.41
77-78	0.66	0.12	0.82	1.45	1.00	1.36	0.94	0.72	0.12	0.05	0.72	0.77	8.73
78-79	0.02	2.65	0.25	1.21	0.52	2.50	0.00	0.84	0.05	0.09	3.32	0.20	11.65
79-80	0.17	0.14	0.15	2.88	3.63	0.68	1.13	1.88	0.65	0.18	0.38	2.22	14.09
80-81	1.20	0.06	0.00	0.00	0.00	0.62	0.08	1.75	0.48	0.00	0.58	1.53	6.30
81-82	1.12	0.25	1.30	1.63	0.20	0.73	0.00	0.17	0.00	0.08	0.71	1.91	8.10
82-83	0.20	0.60	0.67	0.16	0.65	1.87	0.08	0.40	0.00	1.61	0.39	1.15	7.78
83-84	0.76	0.76	2.13	0.10	0.15	1.18	0.72	0.17	1.04	0.74	1.39	0.46	9.60
84-85	2.07	0.34	1.74	0.49	0.27	0.53	0.44	1.08	0.42	3.21	0.04	0.81	11.44
85-86	0.77	1.28	0.64	0.01	0.98	0.28	0.43	0.10	0.17	0.42	0.55	1.08	6.71
86-87	0.38	0.15	0.05	0.81	0.66	0.13	1.22	1.48	1.01	2.14	0.65	0.00	8.68
87-88	1.36	1.35	0.51	1.77	0.00	0.10	1.35	0.94	0.83	0.04	0.13	0.92	9.30
88-89	0.31	0.13	0.83	0.68	0.28	0.21	0.20	0.22	1.28	0.78	1.72	0.74	7.38
89-90	0.21	0.28	0.42	0.51	1.18	0.94	1.30	1.35	0.65	1.30	1.27	2.35	11.76
90-91	0.45	0.03	0.43	0.44	0.37	0.68	0.13	3.13	0.60	1.14	1.87	2.38	11.61
91-92	0.21	0.99	0.37	1.20	1.98	1.55	0.47	1.92	1.97	2.99	1.53	0.60	15.78
92-93	1.93	1.02	1.67	2.32	1.71	1.87	0.46	0.65	0.31	0.08	1.68	0.46	14.16
93-94	2.11	0.88	0.23	0.12	0.88	1.17	1.69	0.53	0.05	Tr.	2.14	1.69	11.49
94-95	1.33	0.89	0.33										

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	0.36	1.05	0.66	0.47	0.40	2.15	0.78	19.88
71-72	3.49	1.69	4.07	3.35	0.58	0.70	1.02	0.28	1.49	0.70	0.80	2.91	21.08
72-73	4.18	3.43	3.27	0.97	2.09	2.74	3.67	1.42	0.85	0.82	1.23	1.15	25.82
73-74	0.79	1.90	3.52	2.70	1.12	1.52	2.49	0.20	0.13	2.09	0.06	0.09	16.61
74-75	2.27	0.62	1.73	2.10	2.37	3.42	1.23	3.21	1.08	1.93	0.49	0.25	20.70
75-76	1.31	2.57	0.82	1.44	2.23	1.35	1.47	2.00	1.23	1.07	0.54	1.19	17.22
76-77	1.00	0.25	0.14	0.76	1.14	2.00	0.05	3.00	0.90	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	0.30	0.10	0.24	0.77	21.40
78-79	0.40	3.18	2.66	2.90	2.18	2.53	0.72	1.67	0.19	0.96	2.29	0.32	20.00
79-80	1.55	2.23	0.37	4.95	6.01	3.34	1.27	3.09	0.12	0.37	0.38	1.80	25.48
10-Year	1.892	2.032	2.619	2.398	2.212	2.112	1.543	1.671	0.666	1.072	0.949	1.052	20.218
80-81	1.45	0.98	0.32	1.30	1.04	3.20	1.45	3.06	0.39	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	0.59	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	0.89	3.04	0.03	4.35	26.41
85-86	4.40	6.62	1.99	1.81	8.54	2.48	3.79	1.62	0.26	1.01	1.68	2.73	36.93
86-87	1.86	1.98	0.55	2.14	2.07	2.47	1.03	2.93	0.79	2.12	1.22	0.49	19.65
87-88	1.39	1.68	3.50	3.06	0.72	3.32	2.14	1.60	0.86	1.04	2.23	1.16	22.70
88-89	1.20	2.68	1.91	1.52	1.99	3.55	0.35	0.06	1.54	1.43	1.37	1.19	18.79
89-90	1.21	1.88	0.70	2.00	4.06	2.30	2.00	0.81	1.87	1.08	0.62	1.87	20.40
90-91	1.32	0.90	1.64	1.49	1.64	4.24	3.06	2.60	0.57	1.04	1.39	2.70	22.56
91-92	1.43	2.10	0.87	0.72	2.21	1.95	0.54	1.55	1.01	0.59	1.64	1.02	15.63
92-93	1.51	1.33	3.60	5.01	4.76	2.25	2.49	2.40	1.57	0.48	1.32	0.60	27.32
93-94	2.10	2.19	0.90	1.00	4.00	1.10	2.81	0.99	0.10	0.25	0.75	2.32	18.51
94-95	2.40	4.26											

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.

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

TABLE 6: EAST MOUNTAIN PRECIPITATION

Elevation - 8,985 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	10.90
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	1.65	1.16	1.77	0.58	2.49	1.16	0.06	13.73
87-88	2.77	1.91	1.29	1.42	0.00	0.99	2.08	1.03	0.81	0.45	0.96	0.91	14.61
88-89	0.61	0.43	1.56	1.00	0.68	1.03	0.26	0.47	0.43	1.19	2.44	0.49	10.59
89-90	0.28	0.39	0.16	0.74	2.08	1.75	1.03	0.26	0.67	0.88	1.03	1.62	10.90
10-Year	1.40	1.27	1.05	1.04	0.99	1.63	0.90	0.79	0.53	1.40	1.71	1.44	14.15
90-91	0.48	0.26	0.66	0.34	0.39	2.34	0.59	1.83	0.21	1.01	1.48	3.11	12.69
91-92	0.49	1.07	0.07	0.61	1.73	2.39	0.56	2.19	0.95	0.85	0.48	0.35	11.74
92-93	1.57	0.57	1.53	4.10	2.34	2.01	0.33	0.72	0.19	0.04	0.82	0.14	14.37
93-94	2.23	1.12	0.14	0.32	1.35	0.34	2.65	0.36	0.39	0.10	0.83	1.49	11.33

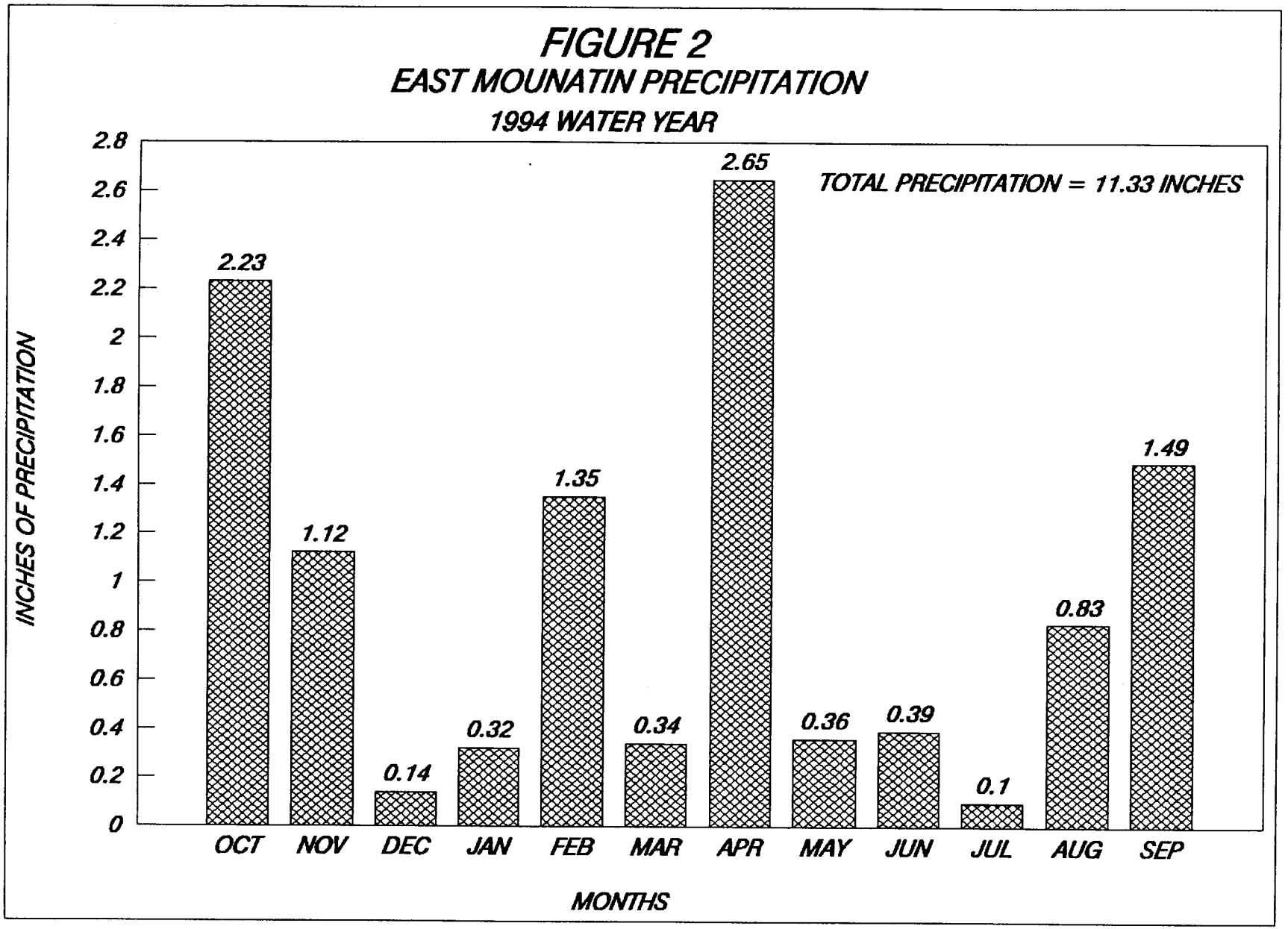


FIGURE 2
EAST MOUNATIN PRECIPITATION
1994 WATER YEAR
TOTAL PRECIPITATION = 11.33 INCHES
INCHES OF PRECIPITATION
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
2.23
1.12
0.14
0.32
1.35
0.34
2.65
0.36
0.39
0.1
0.83
1.49
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
MONTHS

2. Temperatures

During the 1994 water year temperatures were above normal at all stations. Temperatures at the Hunter Plant station were above normal for all months except November and January. At the East Mountain station temperatures were above normal during January, March, and May through September, while the rest of the year was below normal. Temperatures at the Electric Lake station fluctuated from below normal during the winter to much above normal during the summer. (See Table 7.)

A comparison of 1993 and 1994 temperatures for the four stations is addressed since temperatures also influence water supplies from year to year. Table 8 depicts the variation and compares 1993 to 1994.

TABLE 8: COMPARISON OF 1994 AND 1993 TEMPERATURES*

	1994		1993		1994
Station	Average Temp.	Departure From Normal	Average Temp.	Departure From Normal	Departure From 1993
Hunter Plant	51.3	+5.5	49.6	+3.7	+1.7
Huntington Plant	48.7	+1.1	45.6	-2.0	+3.1
Electric Lake	36.4	+2.5	33.2	-0.7	+3.2
East Mountain	41.2	+2.1	38.5	-1.2	+2.7
Average Departure From Normal		+2.8		-0.1	+2.7

* Temperatures reported in degrees Fahrenheit.

TABLE 7: TEMPERATURES IN EMERY COUNTY, UTAH (1994 Water Year)

Month	Hunter Plant		Huntington Plant		Electric Lake		East Mountain	
	Average Temp.*	Departure From Normal	Average Temp.*	Departure From Normal	Average Temp.*	Departure From Normal	Average Temp.*	Departure From Normal
1993								
October	50.0	+1.6	47.1	-2.3	33.5	-4.0	34.5	-4.1
November	32.3	-2.9	30.1	-5.9	24.7	-1.0	23.2	-4.3
December	27.2	+0.5	24.7	-2.7	14.2	-1.6	18.3	-2.0
1994								
January	22.9	-1.2	29.9	+6.3	16.9	+2.3	22.3	+0.8
February	30.0	+1.6	26.7	-3.5	22.5	+3.2	20.2	-3.5
March	45.9	+10.1	42.7	+5.0	27.4	+6.6	34.4	+6.1
April	49.3	+4.7	45.3	+0.2	34.7	+6.0	36.1	0.0
May	61.0	+8.9	57.6	+2.7	46.2	+7.2	48.2	+4.6
June	74.8	+13.4	71.2	+5.4	53.4	+4.8	64.4	+9.1
July	78.5	+10.1	74.0	+2.3	57.4	+1.7	69.2	+7.4
August	76.8	+10.4	73.0	+3.6	58.4	+4.6	66.4	+5.4
September	66.2	+7.5	62.1	+1.7	47.3	-0.2	57.3	+5.3
TOTALS	51.3	+5.5	48.7	+1.1	36.4	+2.5	41.2	+2.1

* Temperatures reported in degrees Fahrenheit.

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 contributes to the Huntington Creek drainage. (See Map 1 in pocket.) The drainage boundaries, including minor subdivisions to Cottonwood and Huntington creeks, are designated on the accompanying map. The surface drainage system on Trail Mountain is totally contained within the Cottonwood Creek drainage system, with minor subdivisions flowing to Indian and Cottonwood Canyon creeks. (see Map 7 in pocket.) 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

Huntington Creek is comprised of many smaller tributary streams that feed the main stream. Deer Creek, Meetinghouse Canyon, and Rilda Canyon creeks are the only tributaries to Huntington Creek that emanate from within PacifiCorp's coal mine permitted area.

1. Huntington Creek

Flow data are recorded on a continuous basis by Utah Power at two locations; one station is located near Utah Power's Huntington Plant, the other about 22 miles upstream from the Huntington Plant. Flow records are maintained by Utah Power 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 1994 water year (October 1993 - September 1994) at the two stations and Electric Lake storage are found in Appendix A.

TABLE 9: HUNTINGTON CREEK WATER FLOWS (1994 Water Year)

	Huntington Creek Below Electric Lake	Huntington Creek At Plant	Calc. Natural Flow at Plant
Total Yearly Flow (Acre Feet)	14,100	34,010	40,655
% of Normal	65	50	58
Mean Discharge in Cubic Feet Per Second (CFS)	19.5	47	
Maximum Discharge (CFS)	49	218	
Date of Maximum Discharge	8/26/94	8/1/94	
Minimum Discharge (CFS)	1.4	3.9	
Date of Minimum Discharge	7/13/94	1/31/94	

*Influenced by upstream storage in Electric Lake.

During the 1994 spring runoff period (April through July) 3,714 acre feet of water were impounded behind Electric Lake Dam. During spring runoff the impoundment reached its highest level on June 9. Total storage on that date amounted to 19,785 acre feet, which is 11,479 acre feet below full. Reservoir releases for fishery, irrigation, and Huntington Plant needs during the water year totaled 14,100 acre feet. The total flow of 34,010 acre feet recorded for Huntington Creek at the Huntington Plant is equal to 49% of average.

A comparison of runoff values from 1993 and 1994 is presented in Table 10.

TABLE 10: COMPARISON OF 1993 AND 1994 RUNOFF VALUES

	1993		1994		
	Amount	% Of Normal	Amount	% Of Normal	1994 as a % of 1993
Spring Runoff Stored in Electric Lake (Acre Feet)	12,916	128	3,714	36	29
Calculated Natural Flow at Plant (Acre Feet)	70,566	101	40,655	58	58

During 1994 water quality information on Huntington Creek near the Deer Creek confluence was compiled on a monthly basis. Locations of water quality sampling stations monitored by PacifiCorp-Energy West Mining Company are listed below (refer to Map 1).

a. HCC01 - Above Power Plant Bridge

b. HCC02 - Below Deer Creek Confluence

c. HCC04 - Below Bridge @ Research Farm Bridge+

+ Not listed on map due to scale.

Specific water quality constituents analyzed are shown in Tables 11, 12, and 13. Values are in milligrams per liter unless otherwise noted. Raw data can be found in Appendix A.

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

TABLE 11: HUNTINGTON CREEK WATER QUALITY *

HCC01 - ABOVE POWER PLANT

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	------ SOLIDS ------ TSS	TDS	SETTLEABLE
1-20	<10.0	244	52.0	3.0	7.0	392	8.67	208	<0.20	0.40	19.00	<0.10	<5.0	8.35	<2.00	6.00	32.0	12.0	278	<0.50
2-18	<10.0	243	55.0	3.0	9.0	443	7.82	220	<0.20	<0.20	20.00	<0.10	7.0	8.40	<2.00	8.00	26.0	27.0	250	<0.50
3-23	<10.0	249	56.0	4.0	30.0	484	9.90	235	<0.20	0.20	23.00	<0.10	<5.0	8.41	<2.00	11.00	40.0	15.0	280	<0.50
4-25	<10.0	208	51.0	2.0	13.0	388	9.70	189	<0.20	0.30	15.00	<0.10	<5.0	8.22	<2.00	5.00	2.0	14.0	190	<0.50
5-24	<10.0	178	48.0	<1.0	3.0	310	8.50	165	<0.20	0.60	11.00	<0.10	<5.0	7.84	<2.00	3.00	9.0	40.0	190	<0.50
6-21	<10.0	207	49.0	<1.0	2.0	339	7.90	180	<0.20	<0.20	14.00	<0.10	<5.0	8.57	<2.00	4.00	10.0	13.0	190	<0.50
7-24	<10.0	184	49.0	<1.0	4.0	316	7.20	168	<0.20	0.30	11.00	<0.20	<5.0	8.56	<5.00	<5.00	9.0	22.0	170	<0.50
8-22	<10.0	173	48.0	<1.0	2.0	321	6.90	169	<0.20	<0.20	12.00	<0.20	<5.0	8.55	<5.00	<5.00	18.0	9.0	170	<0.50
9-13	<10.0	173	40.0	<1.0	9.0	314	7.50	149	<0.20	0.30	12.00	<0.20	<5.0	7.84	<5.00	<5.00	15.0	13.0	180	<0.50
10-31	<10.0	230	47.0	<1.0	8.0	413	6.50	190	<0.20	<0.20	18.00	<0.20	<5.0	7.93	<5.00	6.00	23.0	<4.0	240	<0.50
11-28	<10.0	220	57.0	<1.0	11.0	460	7.40	230	<0.20	<0.20	22.00	<0.20	<5.0	8.17	<5.00	8.00	26.0	8.0	280	<0.50
12-19	<10.0	226	56.0	<5.0	30.0	470	6.20	220	<0.10	0.20	20.00	<0.10	<5.0	8.28	1.00	8.00	27.0	14.0	270	<0.50
1994																				
MIN	10.0	173	40.0	1.0	2.0	310	6.2	149	0.10	0.20	11.00	0.10	5.0	8.17	1.00	3.00	2.0	4.0	170	0.50
MAX	10.0	249	57.0	5.0	30.0	484	9.9	235	0.20	0.60	23.00	0.20	7.0	8.88	5.00	11.00	40.0	40.0	280	0.50
MEAN	10.0	211	50.6	2.0	10.6	379	7.8	193	0.19	0.28	16.42	0.14	5.3	8.60	3.00	6.17	19.7	15.9	224	0.50
No. of Analyses	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	12	12	12
1993																				
MIN	0.0	159	32.7	0.0	1.0	309	4.3	118	<0.05	0.10	9.00	0.00	0.0	7.80	0.00	1.00	3.0	6.0	164	0.50
MAX	3.0	253	76.4	6.0	20.0	640	10.5	275	0.25	1.95	25.60	0.20	5.0	9.17	2.00	19.60	60.0	95.0	330	0.70
MEAN	0.6	210	51.6	1.2	9.7	410	7.1	202	0.14	0.54	17.82	0.60	1.2	8.42	0.71	7.65	26.0	25.9	228	0.33
1992																				
MIN	0.1	189	40.3	0.1	10.0	309	5.8	177	0.01	0.01	11.30	0.01	0.1	8.01	0.01	1.24	5.0	1.0	134	0.01
MAX	17.0	281	80.7	6.0	25.0	475	10.1	289	0.10	0.25	30.00	0.07	3.7	8.90	3.12	23.00	70.0	25.0	269	--
MEAN	2.1	224	60.9	2.4	13.8	385	8.1	234	0.03	0.09	19.80	0.02	0.9	8.58	0.54	8.09	33.7	9.3	210	0.01
1991																				
MIN	1.0	183	46.7	0.0	0.0	210	7.1	189	0.00	0.00	12.30	0.00	0.0	7.1	0.00	1.20	17.0	0.0	170	0.00
MAX	25.0	288	77.9	11.0	45.0	460	10.5	288	0.20	0.33	35.50	0.06	3.9	8.4	4.52	9.03	80.0	85.0	369	0.50
MEAN	4.8	227	64.9	1.9	21.5	341	8.6	245	0.06	0.14	20.03	0.03	1.2	8.1	0.91	4.57	36.8	17.7	243	0.40
1990																				
MIN	1.0	260	68.6	1.0	0.0	300	5.8	252	0.02	0.02	18.10	0.01	1.0	8.1	0.00	6.45	30.0	1.0	172	0.50
MAX	1.0	400	102.6	10.0	40.0	510	9.6	392	0.08	0.08	44.70	0.05	2.7	8.5	4.02	55.00	130.0	31.0	310	1.00
MEAN	1.0	303	79.3	3.4	17.1	425	8.2	300	0.03	0.03	24.70	0.02	1.5	8.3	0.85	18.72	59.7	4.2	248	0.53
HISTORICAL 1990-1993																				
MIN	0.1	159	32.7	0.1	1.0	210	5.7	118	0.01	0.01	9.00	0.01	0.1	7.10	0.01	1.00	3.0	1.0	134	0.01
MAX	25.0	400	102.6	6.0	45.0	640	10.5	392	0.25	1.95	44.70	0.20	5.0	8.90	4.52	55.00	130.0	95.0	369	1.00
MEAN	2.3	233	62.7	1.5	16.6	390	8.1	239	0.07	0.19	20.16	0.04	1.2	8.31	0.87	8.64	36.8	13.9	233	0.39
No. of Analyses	41	43	43	37	42	53	53	43	42	39	43	40	36	53	37	43	43	52	53	46

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 12: HUNTINGTON CREEK WATER QUALITY *

HCC02 - @ POWER PLANT (BELOW DEER CREEK CONFLUENCE)

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	------ SOLIDS ------ TSS	TDS	SETTLEABLE
1-20	<10.0	250	54.0	3.0	9.0	397	10.9	217	<0.20	0.20	20.00	<0.10	<5.0	8.67	2.00	6.0	40.0	9.0	261	<0.5
2-18	<10.0	232	53.0	3.0	9.0	374	8.9	215	<0.20	<0.20	20.00	<0.10	<5.0	8.38	<2.00	9.0	27.0	5.0	240	<0.5
3-23	<10.0	242	58.0	4.0	12.0	490	9.9	240	<0.20	0.20	23.00	<0.10	<5.0	8.41	<2.00	12.0	50.0	8.0	280	<0.5
4-25	<10.0	216	52.0	2.0	6.0	350	9.2	196	<0.20	0.30	16.00	<0.10	<5.0	8.61	<2.00	6.0	18.0	12.0	170	<0.5
5-24	<10.0	184	46.0	3.0	1.0	299	5.8	156	<0.20	0.50	10.00	<0.10	<5.0	8.51	<2.00	3.0	10.0	30.0	200	<0.5
6-21	<10.0	207	50.0	<1.0	2.0	310	8.9	183	<0.20	<0.20	14.00	<0.10	<5.0	8.50	3.00	3.0	12.0	9.0	167	<0.5
7-14	<10.0	182	49.0	<1.0	5.0	256	6.7	164	<0.20	0.30	10.00	<0.20	<5.0	8.68	<5.00	<5.0	11.0	24.0	180	<0.5
8-22	<10.0	181	50.0	<1.0	2.0	294	5.8	174	<0.20	0.20	12.00	<0.20	<5.0	8.81	<5.00	<5.0	12.0	6.0	180	<0.5
9-13	<10.0	176	57.0	<1.0	5.0	302	5.0	197	<0.20	0.30	13.00	<0.20	<5.0	8.80	<5.00	5.0	13.0	18.0	180	<0.5
10-31	<10.0	230	48.0	<1.0	9.0	400	4.2	200	<0.20	<0.20	19.00	<0.20	<5.0	8.98	<5.00	7.0	31.0	8.0	240	<0.5
11-28	<10.0	220	57.0	<1.0	11.0	388	3.3	230	<0.20	<0.20	22.00	<0.20	<5.0	8.64	<5.00	8.0	27.0	4.0	290	<0.5
12-19	<10.0	228	57.0	<5.0	10.0	428	3.5	230	<0.10	0.20	20.00	<0.10	<5.0	8.85	1.00	9.0	29.0	30.0	270	<0.5
1994																				
MIN	10.0	176	46.0	1.0	1.0	313	5.0	156	0.10	0.20	10.00	0.10	5.0	8.30	5.00	3.0	10.0	4.0	167	<0.5
MAX	10.0	250	58.0	5.0	12.0	490	9.9	240	0.20	0.50	23.00	0.20	5.0	8.98	10.00	12.0	50.0	30.0	290	<0.5
MEAN	10.0	212	52.5	2.1	6.7	386	7.5	200	0.19	0.25	16.58	0.14	5.0	8.62	3.36	6.5	23.3	13.5	221	<0.5
1993																				
MIN	0.0	151	32.0	0.0	1.3	413	3.1	129	0.05	0.11	8.00	0.00	0.0	8.24	0.00	3.4	4.0	8.0	161	0.0
MAX	1.0	250	78.1	6.0	35.0	535	8.2	288	0.20	2.00	28.00	0.20	5.0	8.96	4.00	23.0	50.0	98.0	361	0.6
MEAN	0.09	206	53.8	1.4	13.3	418	5.9	209	0.11	0.40	18.23	0.07	1.1	8.67	1.08	11.1	28.4	25.8	254	0.3
1992																				
MIN	0.1	195	40.1	0.1	10.0	328	4.9	183	0.01	0.01	8.40	0.01	0.1	7.89	0.01	1.52	14.0	2.0	185	0.01
MAX	33.0	285	82.9	7.0	25.0	604	9.8	334	0.19	0.25	35.30	0.07	2.7	8.97	3.42	21.85	90.0	28.0	371	--
MEAN	4.5	239	63.2	2.1	17.5	456	7.8	255	0.05	0.09	23.54	0.02	0.6	8.64	0.97	11.25	45.6	12.1	252	0.01
1991																				
MIN	0.0	183	49.1	0.0	10.0	210	5.8	179	0.00	0.00	13.76	0.00	0.0	7.5	0.00	2.00	15.0	3.0	174	0.00
MAX	14.0	300	83.1	1.0	45.0	700	10.3	353	0.21	0.32	35.30	0.7	5.1	8.5	4.90	22.94	130.0	77.0	425	0.50
MEAN	2.1	233	69.6	0.8	25.0	406	8.4	263	0.04	0.13	21.55	0.02	1.5	8.1	1.31	10.00	55.0	19.6	278	0.39
1990																				
MIN	1.0	249	72.4	1.0	5.0	373	5.2	284	0.02	0.02	22.80	0.01	1.0	7.7	0.00	9.07	43.0	1.0	190	0.50
MAX	1.0	310	91.7	6.0	30.0	610	9.1	365	0.18	0.41	39.90	0.04	3.2	8.5	1.23	16.19	150.0	29.0	392	1.00
MEAN	1.0	277	80.8	1.7	17.1	470	8.2	321	0.05	0.14	28.81	0.02	1.6	8.3	0.56	11.30	89.0	6.6	303	0.53
HISTORICAL 1990-1993																				
MIN	0.1	151	32.0	0.1	1.3	210	4.8	129	0.01	0.01	8.00	0.01	0.1	7.14	0.01	1.52	4.0	1.0	161	0.01
MAX	33.0	310	91.7	7.0	45.0	700	10.3	365	0.21	2.00	39.90	0.20	5.1	8.97	4.90	23.00	150.0	98.0	425	1.00
MEAN	2.9	235	65.5	1.5	18.9	438	8.0	256	0.07	0.22	22.46	0.04	1.3	8.33	1.23	10.87	51.0	15.4	273	0.38
No. of Analyses	39	42	42	37	41	52	52	42	41	39	42	38	37	52	35	42	42	52	52	45

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 13: HUNTINGTON CREEK WATER QUALITY *

HCC04 - @ RESEARCH FARM

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	------ SOLIDS ------ TSS	TDS	SETTLEABLE
1-20	<10.0	244	54.0	3.0	15.0	449	11.0	230	<0.20	0.20	23.00	<0.10	<5.0	8.63	<2.0	11.0	50.0	21.0	317	<0.50
2-18	<10.0	236	58.0	4.0	17.0	455	10.5	248	<0.20	<0.20	25.00	<0.10	<5.0	8.29	<2.0	15.0	50.0	7.0	310	<0.50
3-23	<10.0	250	64.0	4.0	30.0	610	9.6	275	<0.20	0.20	28.00	<0.10	<5.0	8.46	<2.0	21.0	80.0	8.0	360	<0.50
4-25	<10.0	217	52.0	3.0	8.0	383	9.1	200	<0.20	0.20	17.00	<0.10	<5.0	8.62	<2.0	8.0	25.0	17.0	200	<0.50
5-24	<10.0	194	52.0	<1.0	2.0	309	7.6	179	<0.20	0.80	12.00	<0.10	<5.0	8.34	<2.0	4.0	14.0	30.0	180	<0.50
6-21	<10.0	203	50.0	<1.0	3.0	332	8.9	183	<0.20	<0.20	14.00	<0.10	<5.0	8.11	<2.0	5.0	17.0	12.0	211	<0.50
7-14	<10.0	176	53.0	<1.0	5.0	294	7.4	178	<0.20	0.40	11.00	<0.20	<5.0	8.94	<5.0	<5.0	13.0	33.0	180	<0.50
8-22	<10.0	182	58.0	<1.0	8.0	319	5.6	210	<0.20	0.50	15.00	<0.20	<5.0	8.70	<5.0	<5.0	16.0	12.0	190	<0.50
9-13	<10.0	182	40.0	<1.0	8.0	329	5.7	150	<0.20	0.30	13.00	<0.20	<5.0	8.89	<5.0	7.0	20.0	17.0	190	<0.50
10-31	<10.0	240	50.0	<1.0	13.0	457	4.2	210	<0.20	<0.20	21.00	<0.20	<5.0	8.86	<5.0	12.0	40.0	10.0	280	<0.50
11-28	<10.0	220	60.0	<1.0	18.0	461	5.6	260	<0.20	<0.20	26.00	<0.20	<5.0	8.59	<5.0	14.0	50.0	9.0	350	<0.50
12-19	<10.0	221	58.0	<5.0	14.0	475	2.4	240	<0.10	0.10	23.00	<0.10	<5.0	8.90	2.0	12.0	40.0	17.0	300	<0.50
1994																				
MIN	10.0	176	40.0	1.0	2.0	324	5.2	150	0.10	0.10	11.00	0.10	5.0	8.11	2.00	4.00	13.0	7.0	180	0.50
MAX	10.0	250	64.0	5.0	30.0	610	9.6	275	0.20	0.80	28.00	0.20	5.0	8.94	5.00	21.00	80.0	33.0	360	0.50
MEAN	10.0	213	54.0	2.1	11.7	432	7.6	213	0.19	0.29	19.00	0.14	5.0	8.61	3.25	9.92	34.5	16.0	255	0.50
1993																				
MIN	0.0	130	35.3	0.0	8.5	297	2.2	149	0.05	0.14	9.90	0.00	0.0	7.82	0.00	4.60	17.0	0.0	170	0.00
MAX	6.0	269	82.3	6.0	61.2	729	7.6	310	0.37	2.46	33.00	0.20	5.0	8.97	5.00	58.60	110.0	80.0	436	0.70
MEAN	0.9	214	57.0	1.8	21.3	462	5.4	235	0.14	0.89	22.67	0.05	0.7	8.66	1.03	16.64	55.8	26.1	285	0.33
1992																				
MIN	0.1	201	42.4	0.1	10.0	354	4.3	194	0.01	0.01	12.80	0.01	0.1	7.35	0.01	3.96	19.0	1.0	197	0.01
MAX	25.0	326	92.0	10.0	30.0	762	9.6	397	0.19	1.12	41.80	0.08	2.8	8.89	3.59	33.35	170.0	37.0	469	---
MEAN	4.0	250	67.2	2.2	19.6	516	7.5	276	0.06	0.18	26.19	0.02	0.6	8.51	0.97	16.61	78.3	15.0	298	0.01
1991																				
MIN	0.0	187	40.4	0.0	10.0	220	6.6	163	0.00	0.00	13.70	0.00	0.0	7.70	0.00	3.79	17.0	2.0	182	0.00
MAX	8.0	317	88.3	1.0	45.0	640	10.0	393	0.15	10.00	42.00	0.08	1.8	8.5	4.70	28.78	170.0	82.0	469	0.50
MEAN	1.6	233	71.2	0.8	25.4	410	8.1	278	0.04	0.94	24.43	0.02	0.8	8.2	1.20	12.78	70.8	22.7	309	0.39
1990																				
MIN	1.00	262	66.4	1.0	10.0	300	5.5	267	0.02	0.02	23.30	0.01	0.0	7.9	0.00	8.19	57.0	1.0	218	0.50
MAX	1.00	315	108.1	7.0	20.0	630	9.6	382	0.17	0.41	29.40	0.03	1.9	8.5	1.13	16.06	120.0	19.0	435	1.00
MEAN	1.00	290	78.7	2.4	16.4	478	8.3	306	0.05	0.19	26.64	0.02	0.9	8.3	0.62	12.13	81.4	5.5	324	0.57
HISTORICAL 1990-1993																				
MIN	0.1	130	35.3	0.1	8.5	220	4.3	149	0.01	0.01	9.90	0.01	0.1	7.35	0.01	3.79	17.0	1.0	170	0.01
MAX	25.0	326	108.1	10.0	61.2	762	10.0	397	0.37	2.46	42.00	0.02	5.0	8.90	10.70	58.60	170.0	82.0	469	1.00
MEAN	2.0	242	67.5	1.6	21.1	466	7.8	271	0.07	0.29	24.84	0.03	1.0	8.36	1.43	14.78	70.8	17.0	305	0.50
NO. OF ANALYSES	39	42	42	37	42	52	52	42	40	38	42	38	31	52	36	42	42	51	52	45

* Quality parameters are reported as mg/l unless otherwise noted.

2. Deer Creek

Deer Creek is an ephemeral tributary of Huntington Creek and flows from the same canyon in which the Deer Creek Mine is located. PacifiCorp monitors the characteristics of Deer Creek according to the following flow and sampling schedule (see Hydrologic Monitoring Schedule Appendix Q).

a. Flow and Sampling Schedule

(1) Locations:
(a) Above the Mine - DCR01
(b) @ Permit Boundary - DCR04
(c) Below the Mine - DCR06
(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 will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed are those listed in the DOGM Guidelines for Surface Water Operational Quality. (See Appendix Q.) The program was initiated in March 1988 and will continue through 1995; i.e., June, September, and December. Field measurements including pH, specific conductivity, and temperature will be performed monthly in conjunction with quantity measurements.

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 showing all the data collected for 1994 and 1989-1993 has been generated for each location. (See Appendix B.) The hydrographs show that the Deer Creek drainage remained dry throughout 1994 except for minor flows, which occurred at DCR04 due to sediment pond discharge events.

c. Quality Information

In accordance with the Hydrologic Monitoring Plan baseline quality analysis was performed in 1991. Baseline analysis will be repeated once every five (5) years. The results of the historical operational quality analysis are listed in Tables 14 and 15. 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. It is apparent from historical information in 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.

3. Meetinghouse Canyon Creek

Meetinghouse Canyon Creek is an ephemeral tributary of Huntington Creek and is monitored according to the following schedule (see Hydrologic Monitoring Schedule in Appendix Q).

a. Flow and Sampling Schedule

(1) Location: South Fork of Meetinghouse Canyon (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 will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed will be those stated in the DOGM Guidelines for Surface Water Operational Quality. (See Appendix Q.) The program was initiated in March 1988 and will continue through 1995, i.e., June, September, and December. Field measurements including pH, specific conductivity, temperature, and dissolved oxygen will be performed monthly in conjunction with quantity measurements.

TABLE 14: DEER CREEK SURFACE WATER QUALITY *

DCR01 ABOVE THE MINE

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	----- SOLIDS ----- TDS	TSS	SETTLEABLE
No samples taken in 1994 - No flow																				
1993																				
MIN	0.0	241	36.0	0.0	5.6	484	7.2	193	0.05	0.07	19.30	0.03	0.0	8.26	0.94	20.00	36.0	284	1.0	0.5
MAX	2.0	373	94.2	9.0	9.0	580	22.0	343	0.35	8.10	37.00	0.20	1.3	8.73	2.20	45.70	100.0	377	31.0	1.3
MEAN	0.3	307	58.9	1.0	7.6	528	11.2	263	0.18	1.52	28.28	0.08	0.3	8.61	1.59	30.28	54.5	333	13.0	0.6
1992																				
MIN	0.0	335	59.3	0.0	20.0	540	9.1	267	0.00	0.00	29.00	0.10	1.2	8.80	0.00	42.95	43.0	325	2.0	0.0
MAX	0.0	335	59.3	0.0	20.0	540	9.1	267	0.00	0.00	29.00	0.10	1.2	8.80	0.00	42.95	43.0	325	2.0	0.0
MEAN	0.0	335	59.3	0.0	20.0	540	9.1	267	0.00	0.00	29.00	0.10	1.2	8.80	0.00	42.95	43.0	325	2.0	0.0
No flow during 1989-91																				
1988																				
MIN	<1.0	285	56.8	<1.0	6.0	442	5.8	283	<0.02	<0.02	24.8	<0.01	<1.0	8.2	0.68	13.4	22.0	362	<1.0	<0.05
MAX	51.0	397	107.2	8.0	138.0	1300	8.1	599	0.09	0.13	80.5	<0.01	2.6	8.5	3.30	59.0	185.0	663	19.0	<0.1
MEAN	22.5	336.0	76.7	3.2	51.3	794.0	7.0	372.5	0.06	0.07	46.8	<0.01	1.4	7.5	1.37	34.4	100.7	499	9.3	0.08
1987																				
MIN	0	272	2.2	<1.0	3.5	360	5.3	225	0.02	0.04	27.9	<0.01	0.6	7.0	0.50	16.0	24.0	252		0
MAX	137.0	337	82.0	6.0	176.0	1580	8.4	550	0.05	0.31	83.9	0.06	<1.0	8.4	4.33	111.6	255.0	897		<0.1
MEAN	23.5	298.2	48.0	1.8	34.4	647.5	6.94	311.7	0.05	0.11	42.4	0.02	0.84	7.6	1.48	36.2	93.3	395		0.08
1986																				
MIN	1.0	262	42.0	<1.0	4.5	470	8.2	232	<0.05	<0.05	26.3	<0.01	<0.5	7.3	0.80	13.9	30.0	269	<0.5	<0.1
MAX	1.0	322	62.0	<1.0	10.8	660	10.2	290	<0.05	0.26	40.1	0.03	0.5	7.9	1.12	27.6	90.0	385	130.0	<0.5
MEAN	1.0	299.7	50.7	<1.0	7.29	573.1	9.5	263.9	<0.05	0.08	33.4	0.01	0.5	7.7	1.00	20.0	52.9	318	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				318	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				320	11.5	
HISTORICAL 1978-1993																				
MIN	0.1	241	2.2	0.1	3.5	360	5.3	193	0.01	0.01	19.3	0.01	0.1	7.0	0.01	13.4	10.0	231	0.5	0.01
MAX	137.0	397	107.2	9.0	176.0	1580	10.2	599	0.35	40.10	83.9	0.24	2.6	8.7	4.33	111.6	255.0	897	3592.0	1.3
MEAN	11.3	311	59.5	1.8	23.8	597	8.2	305	0.09	0.87	37.2	0.04	0.9	7.9	1.29	30.3	68.9	350	102.9	0.34
NO. OF ANALYSES	26	26	26	23	27	66	27	26	19	67	26	65	24	67	25	26	28	67	67	25

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 15: DEER CREEK SURFACE WATER QUALITY *

DCR06 BELOW THE MINE

SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON DISSOLVED	IRON TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	SOLIDS TDS	SOLIDS TSS	SOLIDS SETTLEABLE
1994																				
No samples taken in 1994 - No flow																				
1993																				
MIN	0.0	274	38.2	0.0	35.4	724	4.6	260	0.04	0.06	34.00	0.00	0.0	7.75	2.20	34.00	90.0	413	1.0	0.00
MAX	1.0	431	95.3	9.0	205.0	1360	10.2	483	0.30	2.70	65.00	0.10	5.0	8.81	10.30	138.00	190.0	862	200.0	1.00
MEAN	0.1	315	68.3	2.5	85.8	961	6.8	375	0.14	0.46	49.61	0.04	1.0	8.43	4.94	68.91	161.8	620	30.7	0.36
1992																				
MIN	0.1	162	46.1	0.1	20.0	692	5.9	313	0.01	0.01	41.20	0.01	0.1	7.80	2.53	28.19	78.0	446	3.0	0.01
MAX	28.0	356	129.8	6.0	60.0	1340	9.8	703	0.23	0.57	91.90	0.09	1.7	8.94	9.23	77.76	600.0	1001	97.0	0.80
MEAN	6.2	296	82.1	0.9	39.6	889	7.9	429	0.04	0.08	54.41	0.02	0.7	8.56	6.09	50.08	219.0	581	26.3	0.08
1991																				
MIN	<1.0	268	53.5	0.0	25.0	520	5.9	278	0.00	0.00	27.14	0.00	0.0	7.4	2.29	28.13	80	304	2.0	0.00
MAX	60.0	456	105.1	6.0	90.0	890	10.8	503	0.25	0.34	62.50	0.05	3.7	8.5	7.36	71.40	230	741	59.0	0.50
MEAN	7.25	316	84.2	1.6	43.5	696	8.0	407	0.06	0.12	47.68	0.02	1.5	8.2	4.74	43.52	170	517	23.8	0.40
NO FLOW DURING 1989-90																				
1988																				
MIN	<1.0	244	88.4	<1.0	75.0	800	7.2	382	0.03	0.04	39.2	<0.01	3.6	8.1	1.70	49.2	130.0	472	<1.0	<0.05
MAX	27.0	442	129.1	11.0	195.0	1450	7.9	700	0.64	0.78	95.1	0.06	9.0	8.4	7.60	145.8	350.0	1164	372.0	1.50
MEAN	15.2	309	113.7	3.5	117.3	1155	7.4	547	0.19	0.27	63.9	0.02	5.6	8.3	5.00	90.9	263.3	832	136.3	0.53
1987																				
MIN	<1.0	255	2.4	<1.0	34.6	620	5.4	285	<0.05	<0.05	40.1	<0.01	<1.0	7.4	1.00	39.0	90.0	429	<4.0	<0.10
MAX	90.0	371	124.0	8.0	420.0	2650	8.2	815	0.07	0.29	122.8	0.02	1.2	8.5	7.31	233.8	500.0	1544	410.0	<1.00
MEAN	15.2	302.3	71.4	2.2	118.9	1303.3	6.8	540.3	0.53	0.10	78.2	0.01	0.8	7.8	4.05	127.3	234.5	806	11.2	0.40
1986																				
MIN	<1.0	260	46.0	<1.0	30.3	698	9.4	284	<0.05	<0.05	34.5	<0.01	<0.5	7.4	1.30	32.6	65.0	358	<0.5	<0.10
MAX	<1.0	359	112.0	<1.0	290	2300	11.0	750	0.06	0.19	114.3	0.03	0.5	7.9	6.61	192.0	450.0	1315	91.0	<0.50
MEAN	<1.0	308.1	73.0	<1.0	135.9	1306.9	10.0	449.9	0.05	0.09	65.0	0.02	0.5	7.7	3.66	104.2	225.0	739	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	258.0	
MEAN						1374.7				0.13		0.02		7.9				690	44.1	
1984																				
MIN						620				0.05		<0.01		7.8				371	0.5	
MAX						2150				0.18		<0.01		8.5				637	141.0	
MEAN						1172.5				0.07		<0.01		8.1				465	29.8	
HISTORICAL 1978-1993																				
MIN	0.1	162	2.4	0.1	5.0	420	5.4	260	0.01	0.01	27.14	0.01	0.1	6.92	1.00	28.13	65.0	273	0.5	0.01
MAX	90.0	456	191.9	11.0	515.0	2400	11.0	990	1.22	170.00	124.00	0.27	9.0	8.94	10.30	272.80	610.0	1544	20540.0	2.30
MEAN	6.2	317	85.0	1.7	78.7	992	7.8	448	0.13	2.08	55.62	0.04	1.3	8.17	4.85	70.41	201.2	623	243.8	0.45
NO. OF ANALYSES	48	50	50	50	51	96	61	50	40	85	50	83	49	97	50	50	52	97	96	55

* Quality parameters are reported as mg/l unless otherwise noted.

b. Flow Information

A hydrograph comparing 1994 and 1989-1993 can be found in Appendix C. Meetinghouse Canyon remained dry throughout 1994.

c. Quality Information

In accordance with the Hydrologic Monitoring Plan baseline quality analysis was performed in 1991. Baseline analysis will be repeated once every five (5) years. Quality sampling was initiated in 1986. Table 16 lists the minimum, maximum, and mean values for 1987-1994 along with historical results.

4. Rilda Canyon Creek

Rilda Canyon Creek is a tributary of Huntington Creek and is monitored according to the following schedule (see Appendix Q). Rilda Canyon Creek is ephemeral from its headwaters to the western border of Section 28, Township 16 South, Range 7 East, and perennial from that point to the confluence of Huntington Creek.

a. Flow and Sampling Schedule

(1) Locations:
- (a) Right Fork of Rilda - RCF1
- (b) Left Fork of Rilda - RCLF1*
- (c) Rilda Canyon - RCF2*
- (d) Rilda Canyon - RCF3
- (e) Rilda Canyon - RCW4 (See Map 1.)

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

(3) Water Quality Sampling:
Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed are those listed in the DOGM Guidelines for Surface Water Operational Quality. (See Appendix Q.) The program was initiated in June 1989 except for RCL1, which was initiated in 1990 and will continue through 1995 on a quarterly basis, i.e., March, June, September, December. Field measurements, including pH, specific conductivity,

TABLE 16: MEETINGHOUSE CANYON WATER QUALITY *

MCH01 LEFT FORK

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	----- SOLIDS ----- TDS	TSS	SETTLEABLE
No samples taken in 1994 - no flow																				
1993																				
MIN	0.0	254	39.0	0.0	4.6	394	4.4	217	<0.05	0.10	18.9	<0.03	0.0	8.3	<0.10	4.8	14.0	219	9.0	<0.5
MAX	0.0	256	65.8	<1.0	5.0	395	7.5	242	0.07	0.27	29.0	<0.03	0.1	8.8	<0.10	14.0	26.0	271	32.0	<0.5
MEAN	0.0	255	52.4	0.5	4.8	395	5.9	229	0.06	0.18	23.9	<0.03	0.1	8.5	<0.10	9.4	20.0	245	20.5	<0.5
1992																				
MIN	0.0	195	33.7	0.0	15.0	344	5.1	175	0.21	0.28	22.1	0.05	1.2	8.8	0.00	5.4	12.0	183	30.0	0.0
MAX	0.0	195	33.7	0.0	15.0	344	5.1	175	0.21	0.28	22.1	0.05	1.2	8.8	0.00	5.4	12.0	183	30.0	0.0
MEAN	0.0	195	33.7	0.0	15.0	344	5.1	175	0.21	0.28	22.1	0.05	1.2	8.8	0.00	5.4	12.0	183	30.0	0.0
1991																				
MIN	<1.0	232	66.6	<1.0	10.0	300	6.4	237	<0.02	<0.02	17.2	0.03	<0.1	8.3	<0.02	4.0	8.0	197	49.0	<0.5
MAX	<1.0	272	80.4	<1.0	25.0	300	6.8	316	0.10	0.21	28.0	0.08	2.0	8.4	0.28	6.7	18.0	238	175.0	<0.5
MEAN	<1.0	252	66.6	<1.0	17.5	300	6.6	277	0.06	0.11	22.6	0.06	1.1	8.4	0.15	5.4	13.0	218	112.0	<0.5
1990																				
MIN	<1.0	229	49.8	6.0	20.0	385	6.3	240	<0.02	<0.02	28.2	0.02	4.2	8.5	0.34	37.5	100.0	201	<1.0	<0.5
MAX	<1.0	229	49.8	6.0	20.0	385	6.3	240	<0.02	<0.02	28.2	0.02	4.2	8.5	0.34	37.5	100.0	201	<1.0	<0.5
MEAN	<1.0	229	49.8	6.0	20.0	385	6.3	240	<0.02	<0.02	28.2	0.02	4.2	8.5	0.34	37.5	100.0	201	<1.0	<0.5
1989	NO FLOW																			
1988																				
MIN	<1.0	215	43.2	<1.0	5.0	380	7.1	222	0.04	0.08	22.5	<0.01	<1.0	7.8	0.96	6.9	22.0	268	<1.0	<0.05
MAX	13.0	267	71.1	7.0	15.0	480	7.9	280	0.19	0.27	27.7	<0.01	1.4	8.5	1.50	12.5	100.0	304	26.0	<0.05
MEAN	9.3	241.7	57.3	2.5	6.7	440	7.5	260	0.10	0.15	28.4	<0.01	1.1	8.1	1.32	9.8	69.0	290	15.0	<0.05
1987																				
MIN	0.0	222	2.2	<1.0	3.0	300	5.4	195	0.04	<0.05	24.3	<0.01	<1.0	7.3	0.60	3.8	20.0	190	<1.0	0.1
MAX	49.0	307	55.6	8.0	47.5	420	7.4	267	0.08	0.90	33.0	0.04	10.9	8.6	1.29	10.7	45.0	259	42.0	<1.0
MEAN	10.4	250.2	33.8	3.2	14.1	366	6.4	226	0.10	0.28	29.4	0.02	2.9	7.9	1.02	8.2	30.8	230	15.8	0.5
1986																				
MIN	<1.0	231	38.0	<1.0	3.3	432	8.6	213	<0.05	<0.05	22.6	<0.01	<0.5	7.4	0.9	6.5	25.0	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	85.0	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	7.7	1.23	9.5	43.2	253	24.0	0.2
HISTORICAL 1986-93																				
MIN	0.1	195	2.2	0.1	3.0	300	5.1	175	0.01	0.02	17.20	0.01	0.1	7.2	0.01	3.80	8.0	183	0.1	0.01
MAX	49.0	307	80.4	8.0	47.5	500	10.3	350	0.30	0.90	36.50	0.08	10.9	8.8	1.62	13.10	100.0	304	175.0	1.0
MEAN	5.1	246	47.0	1.7	9.7	401	7.4	243	0.09	0.10	27.62	0.02	1.3	8.0	0.91	8.53	36.7	244	31.2	0.23
NO. OF ANALYSES	17	19	19	18	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	18

* Quality parameters are reported as mg/l unless otherwise noted.

temperature, and dissolved oxygen, will be performed at the perennial stream locations, i.e., RCF3 and RCW4, monthly in conjunction with quantity measurements.

* Flow and field parameters only.

b. Flow Information

Flow information is collected monthly throughout the year with the use of three Parshall flumes and one V-notch weir. (See Map 1 for locations.) A hydrograph has been generated for each flume-weir location. (See Appendix D.) Springs utilized by North Emery Water Users Association (NEWUA) for culinary purposes are situated between monitoring locations RCF2 and RCF3. Flow above the spring area is ephemeral and below the stream is perennial. For location RCF1 flow occurred only during the month of May with a peak flow of 556 GPM and a base of 0.0 GPM during the months of January through April and June through December. Location RCLF1 remained dry throughout 1994. For location RCF2 flow occurred during the months of May and June, with peak flow of 90 GPM in June and a base flow of 0.0 GPM during the months of January through April and July through December. Below the spring area the stream is perennial and increases in flow from RCF3 to RCW4. During 1994 the peak flow for RCF3 was 103 GPM (June), for RCW4, 184 GPM (October). Baseline flow for 1994 at RCF3 and RCW4 was approximately 78 and 141 GPM, respectively. Data suggest that above the NEWUA springs the stream loses water to the alluvium and below the spring area the alluvium recharges the stream causing the flow to increase.

c. Quality Information

In accordance with the Hydrologic Monitoring Plan baseline quality analysis will be for a two-year period, 1989-90. Thereafter, baseline analysis will be repeated once every five (5) years. Quality sampling was initiated in 1989; results

of the samples collected are presented in Tables 17, 18, and 19. It is apparent from the data that the quality of the water degradates from the upper reaches of Rilda Canyon, i.e., RCF1, to the NEWUA spring area, and from that point to the mouth of the canyon, i.e., RCW4, the water quality is relatively consistent. (See Tables 17, 18, and 19.)

B. Cottonwood Creek Drainage System

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

PacifiCorp monitors two of the tributaries of the Cottonwood Creek drainage system, Cottonwood Canyon Creek and Grimes Wash. (See Map 1 in pocket.)

TABLE 17: RILDA CANYON SURFACE WATER QUALITY *

RCF1 - RILDA CANYON FLUME - RIGHT FORK

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	----- SOLIDS ----- TDS	TSS	SETTLEABLE
6-17	<10.0	239	48	<1.0	<1.0	378	8.9	202	<0.20	<0.20	20.00	<0.10	<5.0	8.73	4.00	8.00	19.0	230	<4	<0.5
1994																				
MIN	10.0	239	48.0	1.0	1.0	378	8.9	202	0.20	0.20	20.00	0.10	5.0	8.73	4.00	8.00	19.0	230	4	0.5
MAX	10.0	239	48.0	1.0	1.0	378	8.9	202	0.20	0.20	20.00	0.10	5.0	8.73	4.00	8.00	19.0	230	4	0.5
MEAN	10.0	239	48.0	1.0	1.0	378	8.9	202	0.20	0.20	20.00	0.10	5.0	8.73	4.00	8.00	19.0	230	4	0.5
1993																				
MIN	0.0	254	54.0	0.0	2.5	399	9.9	238	0.05	0.07	19.20	0.03	0.0	8.69	0.10	4.90	17.0	225	0	0.5
MAX	0.0	290	63.6	1.0	5.0	915	12.5	250	0.12	0.23	28.00	0.03	0.0	8.99	10.00	12.00	23.0	266	41	0.5
MEAN	0.0	272	58.8	0.5	3.7	657	11.2	244	0.08	0.15	23.60	0.03	0.0	8.84	5.05	8.45	20.0	245	20	0.5
1992																				
MIN	0.1	262	63.9	0.1	15.0	371	9.4	255	0.07	0.11	23.10	0.14	0.7	8.9	0.00	6.30	17.0	222	8	0.0
MAX	0.1	262	63.9	0.1	15.0	371	9.4	255	0.07	0.11	23.10	0.14	0.7	8.9	0.00	6.30	17.0	222	8	0.0
MEAN	0.1	262	63.9	0.1	15.0	371	9.4	255	0.07	0.11	23.10	0.14	0.7	8.9	0.00	6.30	17.0	222	8	0.0
1991																				
MIN	<1.0	244	58.2	<1.0	15.0	300	7.4	225	<0.02	<0.02	19.4	<0.02	1.5	8.2	0.12	3.78	7.0	231	2	<0.5
MAX	<1.0	329	108.6	<1.0	15.5	350	7.6	384	0.09	1.13	27.4	0.04	1.9	8.4	1.78	7.48	23.0	242	160	<0.5
MEAN	<1.0	287	83.4	<1.0	15.3	325	7.5	305	0.06	0.58	23.4	0.03	1.7	8.3	0.95	5.63	15.0	237	81	<0.5
1990																				
MIN	<1.0	245	76.1	4.0	10.0	360	6.9	287	0.02	0.05	23.5	<0.02	1.1	8.3	2.10	4.3	80.0	277	2	<0.05
MAX	<1.0	245	76.1	4.0	10.0	360	6.9	287	0.02	0.05	23.5	<0.02	1.1	8.3	2.10	4.3	80.0	277	2	<0.05
MEAN	<1.0	245	76.1	4.0	10.0	360	6.9	287	0.02	0.05	23.5	<0.02	1.1	8.3	2.10	4.3	80.0	277	2	<0.05
1989																				
MIN	<1.0	227	49.8	<1.0	10.0	300	7.1	201	0.02	0.02	18.6	<0.01	<1.0	8.2	0.60	5.6	23.0	222	12	0.05
MAX	<1.0	227	49.8	<1.0	10.0	300	7.1	201	0.02	0.02	18.6	<0.01	<1.0	8.2	0.60	5.6	23.0	222	12	0.05
MEAN	<1.0	227	49.8	<1.0	10.0	300	7.1	201	0.02	0.02	18.6	<0.01	<1.0	8.2	0.60	5.6	23.0	222	12	0.05
HISTORICAL 1989-1993																				
MIN	1.0	227	49.8	0.1	5.0	300	6.9	201	0.02	0.02	18.60	0.01	0.7	8.15	0.01	3.78	7.0	222	2.0	0.01
MAX	1.0	329	108.6	4.0	15.0	439	12.5	384	0.09	1.13	28.00	0.14	1.9	8.88	10.00	12.00	80.0	277	160.0	0.50
MEAN	0.6	260	68.4	1.0	11.6	353	8.4	267	0.05	0.23	23.33	0.04	1.2	8.36	2.44	6.58	28.8	243	36.8	0.27
NO. OF ANALYSES	5	6	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	5	6

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 18: RILDA CANYON SURFACE WATER QUALITY *

RCF3 - RILDA CANYON FLUME - ABOVE NEWUA SPRINGS

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	----- SOLIDS ----- TDS	TSS	SETTLEABLE
6-16	<10.0	375	73.0	<1.0	4.0	563	9.2	335	<0.20	0.40	37.00	<0.10	<5.0	7.86	<0.20	11.00	60.0	380	6.0	<0.50
9-13	<10.0	401	72.0	<1.0	6.0	684	4.0	370	<0.20	0.20	47.00	<0.20	<5.0	8.37	<5.00	13.00	50.0	436	<4.0	<0.50
MIN	10.0	375	72.0	1.0	4.0	631	6.5	335	0.20	0.20	37.00	0.10	5.0	7.86	2.00	11.00	50.0	380	4.0	0.50
MAX	10.0	401	73.0	1.0	6.0	719	7.9	370	0.20	0.40	47.00	0.20	5.0	8.37	5.00	13.00	60.0	436	6.0	0.50
MEAN	10.0	388	72.5	1.0	5.0	675	7.2	352	0.20	0.30	42.00	0.15	5.0	8.12	3.50	12.00	55.0	408	5.0	0.50
1993																				
MIN	0.0	242	67.7	0.0	4.0	437	6.7	265	0.05	0.20	23.30	0.03	1.0	8.34	0.20	11.20	40.0	254	6.0	0.50
MAX	0.0	412	75.0	1.0	5.0	674	7.7	381	0.08	0.31	47.00	0.10	1.2	8.83	2.00	16.00	70.0	469	39.0	0.50
MEAN	0.0	327	71.3	0.5	4.5	555	7.2	323	0.06	0.25	35.15	0.06	1.1	8.59	1.10	13.60	55.0	361	22.5	0.50
1992																				
MIN	0.1	278	58.1	0.1	10.0	476	6.7	268	0.01	0.06	29.90	0.01	0.4	8.16	0.01	8.48	27.0	273	3.0	0.01
MAX	4.0	453	97.6	0.1	20.0	722	9.0	444	0.28	0.34	48.60	0.15	1.1	8.47	1.60	17.55	110.0	430	18.0	--
MEAN	1.4	375	80.1	0.1	13.3	634	7.9	370	0.10	0.19	41.37	0.06	0.7	8.33	0.92	13.86	72.3	377	8.7	0.01
1991																				
MIN	<1.0	340	72.2	0.0	15.0	380	7.1	365	0.01	<0.02	25.0	0.00	0.7	7.50	0.23	5.4	7.0	241	<1.0	0.00
MAX	14.0	422	105.1	<1.0	50.0	620	10.0	453	0.14	2.84	49.8	0.10	3.6	8.30	4.57	14.5	140.0	487	185.0	<0.50
MEAN	5.3	382	91.7	0.8	31.3	525	8.1	401	0.06	0.78	41.8	0.04	2.5	7.90	1.65	11.4	74.3	389	48.5	0.40
1990																				
MIN	<1.0	336	79.9	<1.0	5.0	515	4.5	329	0.06	0.03	31.4	0.02	<1.0	7.90	1.80	2.0	60.0	226	<1.0	<0.50
MAX	2.0	425	112.2	<1.0	15.0	720	7.6	499	0.34	0.34	53.2	0.04	1.7	8.10	2.11	7.6	110.0	493	31.0	2.50
MEAN	1.5	394	97.2	<1.0	10.0	595	6.3	420	0.24	0.13	43.1	0.03	1.2	8.00	1.98	3.9	81.7	391	13.7	1.20
1989																				
MIN	<1.0	338	81.7	<1.0	10.0	500	7.0	379	<0.02	0.08	42.5	<0.01	<1.0	7.90	1.7	10.4	70.0	372	4.0	<0.05
MAX	5.0	500	104.3	<1.0	15.0	855	7.6	479	0.41	0.51	53.1	0.04	2.8	8.00	2.5	15.9	150.0	513	23.0	<1.0
MEAN	3.3	432	94.9	<1.0	12.5	726	7.4	442	0.16	0.22	49.7	0.02	1.6	8.00	2.2	13.3	111.2	464	14.5	0.29
HISTORICAL 1989-1993																				
MIN	0.1	242	58.1	0.1	4.0	380	4.5	265	0.01	0.02	23.30	0.01	0.4	7.50	0.01	5.40	7.0	226	1.0	0.01
MAX	14.0	500	112.2	1.0	50.0	855	10.0	499	0.41	2.84	53.20	0.15	3.6	8.83	4.57	17.55	150.0	513	185.0	2.50
MEAN	2.5	388	88.8	0.5	15.8	620	7.4	399	0.10	0.36	43.10	0.04	1.5	8.07	1.64	12.45	82.1	402	22.7	0.45
NO. OF ANALYSES	13	16	16	15	16	17	17	16	15	16	16	15	16	17	16	16	16	16	16	15

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 19: RILDA CANYON SURFACE WATER QUALITY *

RCW4 - RILDA CANYON WEIR - NEAR HIGHWAY 31

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	----- SOLIDS ----- TDS	TSS	SETTLEABLE
2-16	<10.0	432	75.0	<1.0	10.0	756	8.9	422	<0.20	<0.20	57.00	<0.10	<5.0	8.51	2.00	19.0	130.0	510	4.0	<0.50
9-13	<10.0	416	76.0	<1.0	10.0	796	5.8	440	<0.20	<0.20	61.00	<0.20	<5.0	8.57	<5.00	22.0	140.0	500	9.0	<0.50
MIN	10.0	416	75.0	1.0	10.0	831	6.8	422	0.20	0.20	57.00	0.10	5.0	8.51	2.00	9.00	130.0	500	4.0	0.50
MAX	10.0	432	76.0	1.0	10.0	840	7.5	440	0.20	0.20	61.00	0.20	5.0	8.57	5.00	22.00	140.0	510	9.0	0.50
MEAN	10.0	424	75.5	1.0	10.0	835	7.1	431	0.20	0.20	59.00	0.15	5.0	8.54	3.50	20.50	135.0	505	6.5	0.50
NO. OF ANALYSES	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
1993																				
MIN	0.0	317	69.0	0.0	4.8	486	5.5	290	0.05	0.20	28.50	0.03	0.7	8.62	0.20	7.9	37.0	262	6.0	0.50
MAX	0.0	403	79.0	1.0	14.0	707	7.5	453	0.06	0.71	62.00	0.10	1.0	8.73	10.00	20.0	110.0	642	96.0	0.50
MEAN	0.0	360	74.0	0.5	9.4	596	6.5	371	0.05	0.45	45.25	0.06	0.8	8.67	5.10	13.9	73.5	452	56.0	0.50
1992																				
MIN	0.1	374	77.0	0.1	10.0	585	5.9	338	0.01	0.01	35.3	0.01	0.1	8.6	0.01	11.5	40.0	351	1.0	0.01
MAX	10.0	429	83.0	0.1	20.0	719	10.1	448	0.28	0.40	58.5	0.04	1.9	8.9	7.69	23.1	150.0	437	49.0	--
MEAN	3.4	400	79.9	0.1	13.3	665	8.2	383	0.10	0.14	44.6	0.03	0.9	8.8	2.57	15.9	90.0	380	17.7	0.01
1991																				
MIN	<1.0	298	72.7	0.0	13.5	400	6.9	389	0.00	0.00	36.7	0.00	<1.0	7.7	0.95	7.6	40.0	286	1.0	0.0
MAX	10.0	417	117.0	<1.0	45.0	700	10.9	457	0.18	2.06	58.7	0.15	2.4	8.3	4.71	19.0	100.0	490	505.0	<0.5
MEAN	4.0	373	89.5	0.8	24.6	603	8.5	433	0.06	0.61	51.0	0.05	1.7	8.0	2.64	15.4	80.0	424	131.0	0.4
1990																				
MIN	<1.0	348	91.3	<1.0	12.0	600	5.2	458	<0.02	0.03	40.4	<0.01	<1.0	8.2	0.5	19.1	140.0	300	<1.0	<0.50
MAX	4.0	461	132.7	5.0	20.0	750	7.2	545	0.06	0.04	67.2	0.06	2.1	8.3	2.5	52.0	250.0	538	193.0	<0.50
MEAN	2.0	404.3	113.5	2.3	17.3	683	6.4	503	0.04	0.04	53.2	0.03	1.3	8.2	1.7	34.6	213.3	449	65.3	<0.50
1989																				
MIN	<1.0	320	63.0	<1.0	10.0	450	7.5	336	<0.02	<0.02	43.4	<0.01	<1.0	8.1	1.9	13.9	85.0	413	6.0	<0.05
MAX	<1.0	410	73.2	<1.0	15.0	800	8.7	453	0.10	0.12	65.7	0.02	2.8	8.3	2.8	17.1	150.0	496	7.0	<1.0
MEAN	<1.0	373	69.6	<1.0	13.3	678	7.9	397	0.06	0.05	54.4	0.01	1.8	8.2	2.3	16.0	110.0	462	6.7	0.37
HISTORICAL 1989-1993																				
MIN	0.1	298	63.0	0.1	4.8	400	5.2	290	0.01	0.01	28.5	0.01	0.1	7.70	0.01	7.6	37.0	262	1.0	0.01
MAX	10.0	461	132.7	5.0	700.0	800	10.9	545	0.28	2.06	67.2	0.15	2.8	8.86	10.00	52.0	250.0	642	505.0	1.00
MEAN	2.3	383	86.3	0.8	61.9	649	7.6	421	0.06	0.29	50.0	0.04	1.3	8.30	2.71	19.3	113.8	431	59.6	0.37
NO. OF ANALYSES	13	15	15	14	15	16	16	15	13	14	15	14	15	16	15	15	15	15	15	14

*Quality parameters are reported as mg/l unless otherwise noted.

1. Cottonwood Canyon Creek

Based on data collected PacifiCorp, Cottonwood Canyon Creek is an ephemeral stream from its headwaters to Section 24, Township 17 South, Range 6 East and intermittent from that point to its confluence with Cottonwood Creek. The majority of water moving through Cottonwood Canyon Creek appears to be through the colluvial valley deposits. An extensive hydrogeologic investigation was conducted in Cottonwood Canyon Dreek during 1992. Results can be found in Appendix F of the PAP submitted March 31, 1993. Four (4) permanent runoff sampling sites have been established along Cottonwood Canyon Creek and sampled as listed below. (See Hydrologic Monitoring Plan in Appendix Q).

a. Flow and Sampling Schedule

(1) Locations: (See Map No. 1 in pocket.)
(a) Above Mine - SW-1
(b) Below Mine - SW-2
(c) @ USGS Flume - CCC01*
(d Above Straight Canyon - SW-3

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

(3) Water Quality Sampling:
Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed will be those stated in the DOGM Guidelines for Surface Water Operational Quality. (See Appendix Q.) The program was initiated in December 1992 and will continue through 1995, i.e., June, September, and December. Field measurements including pH, specific conductivity, and temperature will be performed monthly in conjunction with quantity measurements.

* Flow and field parameters only.

b. Flow Information

As stated above, flow information is collected monthly throughout the year. (See Map 1 for flume locations.) A hydrograph for 1994 has been generated

for each sampling location. (See Appendix E.) The hydrographs show the intermittent nature of Cottonwood Canyon Creek. Flow at SW-1, when accessible, occurred from March through October with a peak and base flow of 15 and <5 GPM, respectively. Flow at SW-2 occurred from March through July with a peak and base flow of 30 and 0 GPM, respectively. Flow at SW-3 occurred throughout the year with a peak and base flow of 75 and <20 GPM, respectively.

c. Quality Information

Baseline quality analysis was conducted by Beaver Creek Coal in 1990. Baseline analysis will be incorporated in Energy West's Hydrologic Monitoring Plan and repeated again in 1996. The results of the 1994 operational quality analysis are listed in Tables 20, 21, and 22. 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 E.

The Cottonwood Canyon Creek drainage quality is influenced by the following factors: 1) A relatively high amount of suspended solids during spring runoff from Indian, Roans, Mill, and Marines canyons; 2) Alluvial/colluvial deposit recharge and discharge areas.

TABLE 20: COTTONWOOD CANYON CREEK WATER QUALITY *

SW-1

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	------ SOLIDS ------ TDS	TSS	SETTLEABLE
3-24	<10.0	433	77.0	2.0	17.0	881	9.9	431	<0.20	<0.20	58.00	<0.10	<5.0	8.08	2.00	27.0	140.0	530	<4.0	<0.50
6-22	<10.0	385	80.0	8.0	17.0	883	5.0	447	<0.20	0.20	60.00	<0.10	<5.0	8.04	3.00	38.0	150.0	530	5.0	<0.50
MIN	10.0	385	77.1	2.0	17.0	881	5.0	431	0.20	0.20	58.00	0.10	5.0	8.04	2.00	27.0	140.0	530	4.0	0.50
MAX	10.0	433	80.0	8.0	17.0	883	9.9	447	0.20	0.20	60.00	0.10	5.0	8.08	3.00	38.0	150.0	530	5.0	0.50
MEAN	10.0	409	78.5	5.0	17.0	882	7.4	439	0.20	0.20	59.00	0.10	5.0	8.06	2.50	32.5	145.0	530	4.5	0.50
HISTORICAL 1977-1993																				
MIN	1.0	231	15.1	1.0	0.7	380	7.2	210	0.05	0.02	2.40	0.01	0.5	7.10	1.00	6.0	20.0	226	0.5	0.10
MAX	22.0	416	152.3	1.0	25.2	930	9.7	466	0.43	15.90	61.61	1.31	358.0	8.72	21.00	60.0	238.7	610	1298.0	1.50
MEAN	3.9	333	66.5	1.0	12.3	644	8.1	320	0.12	1.01	37.29	0.08	12.1	7.83	3.41	21.1	71.6	364	81.6	0.30
NO. OF ANALYSES	36	57	56	11	57	18	4	24	12	55	57	50	35	52	55	56	57	57	55	10

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 21: COTTONWOOD CANYON CREEK WATER QUALITY *

SW-2

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	------ SOLIDS ------ TDS	TSS	SETTLEABLE
3-24	<10.0	409	71.0	6.0	24.0	959	10.9	461	<0.20	<0.20	69.00	<0.10	<5.0	8.42	3.00	36.00	150.0	590	<4.0	<0.50
6-22	<10.0	320	57.0	20.0	27.0	910	5.3	426	<0.20	0.20	69.00	<0.10	<5.0	8.69	4.00	41.00	170.0	560	10.0	<0.50
MIN	10.0	320	57.0	6.0	24.0	910	5.3	426	0.20	0.20	69.00	0.10	5.0	8.42	3.00	36.00	150.0	560	4.0	0.50
MAX	10.0	409	71.0	20.0	27.0	949	10.9	461	0.20	0.20	69.00	0.10	5.0	8.69	4.00	41.00	170.0	590	10.0	0.50
MEAN	10.0	364	64.0	13.0	25.5	929	8.1	443	0.20	0.20	69.00	0.10	5.0	8.56	3.50	38.50	160.0	575	7.0	0.50
HISTORICAL 1977-1993																				
MIN	0.1	261	11.1	1.0	1.5	410	5.3	250	0.05	0.05	2.40	0.01	0.1	7.00	1.00	8.00	19.5	267	1.0	0.1
MAX	22.0	458	136.9	1.0	33.8	933	10.9	488	1.25	16.20	69.25	1.37	9.0	8.91	25.60	53.10	246.9	700	1004.0	1.5
MEAN	3.8	328	66.6	1.0	13.9	717	8.6	336	0.20	1.27	38.58	0.10	1.9	7.89	4.69	24.27	88.0	382	82.8	0.3
NO. OF ANALYSES	35	54	54	11	54	15	5	21	11	53	54	50	42	49	53	53	54	54	53	10

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 22: COTTONWOOD CANYON CREEK WATER QUALITY *

SW-3

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	------ SOLIDS ------ TDS	TSS	SETTLEABLE
3-24	<10.0	442	93.0	5.0	50.0	1381	9.9	574	<0.20	<0.20	83.00	<0.10	<5.0	8.30	4.00	84.00	320.0	880	<4.0	<0.50
6-22	<10.0	381	91.0	<1.0	47.0	1330	5.2	561	<0.20	0.30	81.00	<0.10	<5.0	8.43	4.00	86.00	290.0	880	26.0	<0.50
9-16	<10.0	414	103.0	<1.0	53.0	1355	9.4	600	<0.20	<0.20	84.00	<0.20	<5.0	8.29	<5.00	87.00	330.0	909	<4.0	<0.50
MIN	10.0	381	91.0	1.0	47.0	1330	5.2	561	0.20	0.20	81.00	0.10	5.0	8.29	4.00	84.00	290.0	880	4.0	0.50
MAX	10.0	442	103.0	5.0	53.0	1381	9.9	600	0.20	0.30	84.00	0.20	5.0	8.43	5.00	87.00	330.0	909	26.0	0.50
MEAN	10.0	412	95.6	2.3	50.0	1355	8.1	578	0.20	0.23	82.67	0.13	5.0	8.34	4.33	85.67	313.3	889	11.3	0.50
HISTORICAL 1977-1993																				
MIN	0.1	253	14.3	0.1	1.7	510	5.7	245	0.05	0.04	2.40	0.01	0.2	7.20	1.62	3.00	22.0	40	1.0	0.1
MAX	18.0	451	159.0	14.0	59.2	1350	9.5	614	0.43	19.00	96.37	2.48	114.0	8.69	30.00	88.80	386.0	976	5024.0	1.5
MEAN	3.4	335	74.6	1.9	22.5	1073	7.4	433	0.12	1.38	44.68	0.14	4.4	7.93	4.58	35.91	137.4	473	175.6	0.3
NO. OF ANALYSES	36	57	56	13	56	18	5	24	12	54	57	46	50	52	55	56	57	57	54	10

* Quality parameters are reported as mg/l unless otherwise noted.

2. Grimes Wash

Grimes is an ephemeral tributary of Cottonwood Creek and flows in the same canyon in which the Wilberg/Cottonwood Mine is located. Three permanent runoff sampling sites were established in 1980 and are sampled as listed below (see Hydrologic Monitoring Plan in Appendix Q).

a. Flow and Sampling Schedule

(1) Locations: (See Map No. 1 in pocket.)
(a) Right Fork - GWR01
(b) Left Fork - GWR02
(c) Below the Mine - GWR03

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

(3) Water Quality Sampling:
Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed will be those stated in the DOGM Guidelines for Surface Water Operational Quality. (See Appendix Q.) The program was initiated in March 1988 and will continue through 1995 i.e., June, September, and December. Field measurements including pH, specific conductivity, and temperature will be performed monthly in conjunction with quantity measurements.

b. Flow Information

As stated above, flow information is collected monthly throughout the year with the use of two Parshall flumes. (See Map 1 for flume locations.) A hydrograph comparing 1994 to the data collected from 1988 through 1993 has been generated for each flume location. (See Appendix F.) The hydrographs show that the Right and Left forks remained dry throughout 1994. Flow at the Below the Mine location continued throughout the year due to the influence of the springs emanating from the Starpoint Sandstone/Mancos Shale formational contact and

Wilberg/Cottonwood Mine discharge. Peak flow occurred during the month of May at 1050 GPM, and baseline flow averaged approximately 50 GPM.

c. Quality Information

In accordance with the Hydrologic Monitoring Plan baseline quality analysis was performed in 1991. Baseline analysis will be repeated once every five (5) years. The results of the 1994 operational quality analysis are listed in Tables 23, 24, and 25. 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 F.

The Grimes Wash drainage quality is influenced by two factors: 1) Under normal conditions the Right Fork contributes a relatively high amount of suspended solids during spring runoff due to the fact that it is a south facing canyon dominated by argillaceous sediments; 2) Mancos Shale/Starpoint Sandstone interface seeps and springs elevate the TDS at the Below the Mine location.

TABLE 23: GRIMES WASH WATER QUALITY *

GWR01 RIGHT FORK

SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	------ SOLIDS ------ TDS	TSS	SETTLEABLE
No flow during 1989-94																				
1988																				
MIN	39.0	112	43.8	<1.0	26.4	225	9.7	154	0.61	0.78	10.9	0.04	9.0	8.2	5.2	1.9	27.0	196	8.0	<1.0
MAX	39.0	112	43.8	<1.0	26.4	225	9.7	154	0.61	0.78	10.9	0.04	9.0	8.2	5.2	1.9	27.0	196	8.0	<1.0
MEAN	39.0	112	43.8	<1.0	26.4	225	9.7	154	0.61	0.78	10.9	0.04	9.0	8.2	5.2	1.9	27.0	196	8.0	<1.0
1987																				
MIN	<1.0	104	34.4	<1.0	3.0	190	6.8	112	3.31	20.60	6.3	0.05	---	7.2	7.6	2.0	20.0	115	2000.0	3.3
MAX	<1.0	104	34.4	<1.0	3.0	190	6.8	112	3.31	20.60	6.3	0.05	---	7.2	7.6	2.0	20.0	115	2000.0	3.3
MEAN	<1.0	104	34.4	<1.0	3.0	190	6.8	112	3.31	20.60	6.3	0.05	---	7.2	7.6	2.0	20.0	115	2000.0	3.3
1986																				
MIN	<1.0	240	30.0	<1.0	8.3	465	7.6	222	<0.05	<0.05	35.7	<0.01	<0.5	7.5	1.6	3.4	40.0	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	8.1	3.3	20.4	120.0	389	257.0	<0.5
MEAN	<1.0	275	41.6	<1.0	10.2	547.6	8.8	268	<0.05	0.24	39.9	0.02	0.74	7.8	2.5	15.7	61.3	316	60.6	0.2
1985																				
MIN						200				<0.05		<0.01		7.4				125	11.0	
MAX						740				2.90		0.08		8.3				430	7116.0	
MEAN						532.3				0.50		0.02		8.0				304	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				333	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	183.3	
HISTORICAL 1979-1993																				
MIN	0.1	104	30.0	<1.0	3.0	190	6.8	112	<0.05	0.01	6.3	<0.01	<0.5	7.2	1.6	1.9	20.0	115	0.5	<0.1
MAX	39.0	320	52.0	<1.0	26.4	750	9.8	320	3.31	20.60	46.2	0.30	9.0	8.7	7.6	20.4	161.7	700	7116.0	3.3
MEAN	5.6	238	41.0	<1.0	11.3	560	8.6	238	0.47	1.36	33.0	0.06	1.9	8.1	3.4	14.1	64.4	342	376.3	0.6
NO. OF ANALYSES	11	9	9	9	11	42	9	9	9	46	9	42	12	46	9	9	13	46	46	9

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 24: GRIMES WASH WATER QUALITY *

GWR02 LEFT FORK

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	------ SOLIDS ------ TDS	TSS	SETTLEABLE
No flow during 1994																				
1993																				
MIN	3.0	276	88.9	0.0	8.9	470	11.7	327	0.22	2.52	25.4	0.10	0.6	8.7	1.9	13.2	80.0	366	294	0.60
MAX	3.0	276	88.9	0.0	8.9	470	11.7	327	0.22	2.52	25.4	0.10	0.6	8.7	1.9	13.2	80.0	366	294	0.60
MEAN	3.0	276	88.9	0.0	8.9	470	11.7	327	0.22	2.52	25.4	0.10	0.6	8.7	1.9	13.2	80.0	366	294	0.60
No flow during 1989-92																				
1988																				
MIN	34.0	312	71.5	<1.0	10.0	600	7.0	337	<0.02	<0.02	38.5	<0.01	2.0	8.4	1.1	24.2	105.0	428	4.0	<0.05
MAX	34.0	312	71.5	<1.0	10.0	600	7.0	337	<0.02	<0.02	38.5	<0.01	2.0	8.4	1.1	24.2	105.0	428	4.0	<0.05
MEAN	34.0	312	71.5	<1.0	10.0	600	7.0	337	<0.02	<0.02	38.5	<0.01	2.0	8.4	1.1	24.2	105.0	428	4.0	<0.05
1987																				
MIN	<1.0	188	2.3	<1.0	6.0	412	5.0	337	<0.05	<0.05	23.8	<0.01	<0.5	7.6	1.0	11.1	45.0	212	<1.0	0
MAX	<1.0	482	71.1	15.0	156.0	610	7.8	460	0.12	0.62	68.5	0.06	3.5	8.6	2.5	34.0	90.0	382	48.0	0.20
MEAN	<1.0	317	38.1	3.8	56.6	526	7.0	296	0.07	0.17	43.4	0.02	1.7	7.8	1.4	28.5	73.6	307	14.6	0.10
1986																				
MIN	<1.0	281	36.0	<1.0	7.7	410	7.4	252	<0.05	<0.05	37.7	<0.01	<0.5	7.4	1.3	25.2	67.0	293	3.0	<0.10
MAX	<1.0	331	58.0	<1.0	10.9	690	9.6	310	<0.05	0.22	43.8	0.07	0.6	8.0	3.0	34.0	115.0	427	253.0	<0.50
MEAN	<1.0	304	45.5	<1.0	8.8	591	8.6	278	<0.05	0.12	39.9	0.02	0.5	7.7	1.9	29.2	77.9	346	54.1	0.20
1985																				
MIN						473				<0.05		<0.01		7.5				283	<0.5	
MAX						750				0.22		0.08		8.3				438	141.0	
MEAN						628				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	76.0	
MEAN						639				0.06		<0.01		8.1				344	17.0	
HISTORICAL 1979-1993																				
MIN	1.0	188	2.3	1.0	6.0	410	5.0	196	0.02	0.02	23.8	0.01	0.1	7.3	1.0	11.1	30.4	212	0.5	0.05
MAX	34.0	482	88.9	15.0	156.0	790	11.7	460	0.22	2.52	68.5	0.15	3.5	8.7	3.0	34.0	115.0	570	1428.0	<0.60
MEAN	3.3	307	47.5	2.0	18.9	624	8.0	291	0.08	0.20	40.2	0.03	1.0	8.0	1.6	27.5	74.1	362	56.6	0.17
NO. OF ANALYSES	15	15	15	14	15	50	15	15	7	52	15	51	15	52	15	15	16	52	53	14

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 25: GRIMES WASH WATER QUALITY *

GWR03 BELOW MINE

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	------ SOLIDS ------ TDS	TSS	SETTLEABLE
3-24	<10.0	398	101.0	4.0	27.0	1047	8.2	499	<0.20	1.90	60.00	<0.10	<5.0	8.20	8.00	41.0	230.0	650	40.0	<0.50
6-16	<10.0	367	108.0	<1.0	60.0	1560	6.5	607	<0.20	<0.20	82.00	<0.10	<4.0	8.28	9.00	100.0	310.0	980	<4.0	<0.50
9-12	<10.0	342	90.0	<1.0	19.0	941	6.1	459	<0.20	0.60	57.00	<0.20	<5.0	8.36	8.00	37.0	190.0	579	5.0	<0.50
12-19	<10.0	325	86.0	<5.0	140.0	1250	8.2	430	<0.10	0.90	53.00	<0.10	<5.0	8.18	8.00	144.0	180.0	810	15.0	<0.50
MIN	10.0	325	86.0	1.0	19.0	941	5.7	430	0.10	0.20	53.00	0.10	5.0	8.06	8.00	37.0	180.0	579	4.0	0.50
MAX	10.0	398	108.0	5.0	140.0	1560	8.2	607	0.20	1.90	82.00	0.20	5.0	8.81	9.00	114.0	310.0	980	40.0	0.50
MEAN	10.0	358	96.2	2.7	61.5	1199	6.6	498	0.18	0.90	63.00	0.13	5.0	8.42	8.25	73.0	227.5	754	16.0	0.50
1993																				
MIN	0.0	249	95.8	0.0	17.4	590	5.2	364	0.05	0.23	30.40	0.06	0.0	7.76	2.10	27.1	120	444	2.0	0.5
MAX	10.0	362	163.0	1.0	103.7	3280	10.3	736	0.22	5.10	93.00	0.10	5.0	8.61	10.00	60.0	370	2109	280.0	0.7
MEAN	2.5	320	127.0	0.3	46.2	1640	8.3	578	0.16	1.90	63.35	0.09	1.6	8.28	6.40	42.6	247	1079	78.5	0.6
1992																				
MIN	0.1	214	96.0	0.1	25.0	1230	5.3	488	0.01	0.07	60.20	0.04	0.1	8.20	3.41	60.8	340	955	8.0	0.01
MAX	50.0	369	190.8	0.1	365.0	2190	9.0	766	0.30	0.34	74.00	0.11	1.1	8.70	10.70	283.7	450	1393	58.0	--
MEAN	12.4	313	154.2	0.1	252.6	1754	6.7	665	0.11	0.22	67.86	0.06	0.8	8.42	7.14	207.8	400	1201	22.2	0.01
1991																				
MIN	<1.0	295	71.4	0.0	25	710	6.9	385	<0.02	0.09	26.9	<0.02	0.6	7.6	<0.01	25.7	200	565	3.0	0.0
MAX	22.0	338	205.6	<1.0	735	3000	9.9	849	0.85	0.86	81.6	0.12	2.3	8.2	12.8	460.5	420	2080	247.0	<0.5
MEAN	7.0	313	151.7	0.8	236	1510	7.9	629	0.20	0.35	60.7	0.06	1.4	7.9	4.67	148.3	312	1131	64.0	0.4
1990																				
MIN	<1.0	366	132.8	<1.0	126	1200	5.5	646	<0.02	0.13	76.4	<0.02	<1.0	8.1	1.3	95.9	250.0	909	<1.0	0.50
MAX	8.0	486	222.9	<1.0	1450	3900	9.0	1043	0.13	0.19	89.4	0.06	1.1	8.2	8.0	780.0	600.0	2827	16.0	2.00
MEAN		391	194.6	<1.0	654	2563	6.6	829	0.06	0.15	83.4	0.04	1.0	8.2	4.5	373.3	417.5	1697	8.3	1.00
1989																				
MIN	<1.0	340	84.9	<1.0	10.0	900	6.3	420	0.09	0.10	50.6	0.01	<1.0	7.7	3.5	19.3	120.0	594	<1.0	<0.05
MAX	6.0	425	184.9	<1.0	515.0	4290	9.5	906	0.33	0.44	115.5	0.90	8.3	8.2	7.1	376.5	580.0	1877	91.0	<0.05
MEAN	3.2	395	146.3	<1.0	202.5	2113	7.5	741	0.16	0.20	91.2	0.26	3.2	7.4	5.4	153.9	450.0	1314	36.2	<0.05
1988																				
MIN	2.0	205	91.5	<1.0	142.0	1200	5.1	356	0.04	0.06	30.9	<0.01	0.6	7.7	0.5	85.1	135.0	673	1.0	<0.05
MAX	114.0	398	274.0	3.0	4531.0	12000	8.9	1165	0.48	0.76	116.8	0.13	27.0	8.3	12.5	3181.0	462.0	7160	36.0	1.00
MEAN	35.8	330	156.9	1.3	1054.1	3783	7.5	702	0.25	0.38	75.3	0.04	8.5	8.0	6.7	717.8	356.2	2375	13.2	0.37
1987																				
MIN	<1.0	117	5.1	<1.0	9.0	295	4.5	146	<0.05	<0.05	10.7	0.04	<0.5	7.1	5.0	9.0	46.0	155	<1.0	<0.10
MAX	127.0	400	191.5	<1.0	154.0	1700	7.8	855	2.25	22.60	102.0	0.17	5.2	8.2	7.8	121.0	593.0	1201	3295.0	4.00
MEAN	22.0	331	99.1	<1.0	67.5	1254	6.5	598	0.43	3.98	75.4	0.10	2.2	7.6	6.6	83.1	340.7	883	552.2	1.05
1986																				
MIN	<1.0	284	72.4	<1.0	36.3	890	7.9	405	<0.05	<0.05	51.1	<0.01	<0.5	7.2	2.6	47.0	150.0	523	<0.5	<0.10
MAX	<1.0	381	150.0	<1.0	141.2	1800	11.4	760	0.13	0.40	87.6	0.08	1.0	8.0	5.8	119.8	320.0	1224	248.0	<0.50
MEAN	<1.0	343	99.0	<1.0	71.4	1239	9.4	545	0.06	0.13	72.2	0.03	0.2	7.6	4.1	68.9	243.3	760	37.1	0.20
1985																				
MIN						220				0.05		0.01		7.4				152	2.0	
MAX						1810				2.70		0.13		8.1				1129	9702.0	
MEAN						1183				0.37		0.04		7.8				733	994.8	
HISTORICAL 1979-1993																				
MIN	0.1	117	5.1	0.1	10.0	220	4.5	146	0.01	0.01	10.70	0.01	0.1	7.1	0.01	9.0	46.0	152	0.5	0.01
MAX	127.0	486	274.0	3.0	4531.0	12000	11.4	1165	2.26	22.60	116.80	0.90	27.0	8.7	12.80	3181.0	600.0	7160	9702.0	4.00
MEAN	11.6	339	136.4	0.8	306.4	1506	7.6	648	0.19	0.91	73.23	0.06	2.4	8.0	5.64	224.2	331.1	934	212.5	0.46
NO. OF ANALYSES	44	42	42	39	44	82	44	42	43	84	42	81	43	86	42	42	45	84	84	36

* Quality parameters are reported as mg/l unless otherwise noted.

IV. SPRINGS

A. East Mountain

Between the time PacifiCorp began monitoring springs on East Mountain and 1986 the number of springs measured increased from less than fifty (50) to nearly eighty (80). PacifiCorp believed that more benefit could be realized by concentrating its monitoring to selective springs in the areas that will be undermined within the next five years. (See Map 5 in pocket.) A meeting was held on March 25, 1987 with the U. S. Forest Service and the Utah State Division of Oil, Gas and Mining to determine the most effective plan for PacifiCorp's monitoring. A subsequent meeting was held on April 15, 1987 with the State Division of Oil, Gas and Mining to finalize the monitoring plan revisions. In addition to major revisions made in 1987, each year a meeting is held with State and Federal agencies to adjust the monitoring schedule based on field investigations.

During the meetings it was resolved that the following springs will be monitored. Eight additional springs (denoted with a plus [+] symbol below) were added in 1989 after the annual field verification process jointly conducted by DOGM and PacifiCorp.

*	Burnt Tree Springs		79-40
*	Elk Spring		80-41
*	Sheba Springs		80-43
	Ted's Tub	*	80-44
	79-2	*	80-46
*	79-10		80-47
	79-15	+	80-48
*	79-23		82-51
	79-24	*	82-52
*	79-26	*	84-56
+	79-28	+	89-60 (Alpine Spring)
*	79-29	+	89-61
	79-32	+	89-65
	79-34	+	89-66
*	79-35	+	89-67
	79-38	+	89-68

Of these springs, twelve will be monitored on a monthly basis, weather permitting, and have been denoted on the above list with asterisks (*).

1. Flow and Sampling Schedule

a. Flow

All springs on the preceding list are measured during the months of July and October. In addition, a minimum of twelve springs are monitored to establish a discharge recession curve. Generally, measurements are made on a monthly basis during the months of July through October 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.

b. Quality Samples

All springs listed above are sampled for water quality characteristics during the months of July and October. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Operational Quality. (See Appendix Q.) In addition, the twelve discharge recession springs denoted by asterisks in the preceding list will be monitored monthly, access permitting, each year between July and October for the following parameters: 1) discharge quantity, 2) specific conductivity [field], 3) temperature [field], 4) pH [field], 5) total hardness, 6) carbonate, and 7) total manganese. Due to the consistency of the samples collected from 1987-93, the 1995 sampling schedule has been updated to reflect monitoring of the springs for field parameters only, except in July and October when operational parameters will be tested.

2. Spring Flow

Both precipitation and spring discharge rates decreased from 1993 to 1994, whereas temperature, a critical factor on spring discharge rates, was 4.2 degrees higher in 1994 than the historical average. Table 26, A and B, is a tabulation of the flow data collected during the 1994 monitoring season. To record the season variation, all springs measured in July are measured again in October. The seasonal variation is represented in Table 26, 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 twenty-six percent (26%) [thirty-seven percent (37%) by volume] decrease from the July to the October measurements.

A twelve-year comparison of spring discharge is shown in Table 27. The table includes a year by year comparison of springs identified from each mode of occurrence (Table 28). The springs utilized in the comparison are underlined in Table 28. 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 27 has been compared to East Mountain climatology to see how closely spring discharge rates follow local annual precipitation. Figure 3 reveals good correlation between spring discharge and precipitation. Along with precipitation, temperature plays a critical role in yearly discharge variations, especially during the early stages of the runoff period. Listed in Table 29 is a comparison of January through June temperature data from surrounding weather stations for the period

TABLE 26A: EAST MOUNTAIN SPRINGS DISCHARGE
1994

Spring	Date Sampled	Flow (GPM)	Temp. ° F	Date Sampled	Flow (GPM)	Temp. ° F	Seasonal Net Change %
Sheba	7-22-94	0.9	8.8	11-3-94	0.2	6.5	-75.56
Elk Spring	7-22-94	46.2	6.2	11-3-94	24.3	3.5	-47.36
Burnt Tree	7-22-94	7.5	6.0	11-7-94	4.6	6.8	-38.67
Jerk Water							
Pine Springs							
Pine Sp. Trough							
Ted's Tub	7-22-94	6.0	12.6	11-7-94	2.0	2.7	-66.67
79-1							
79-2	7-22-94	1.7	6.0	11-7-94	0.9	4.8	-47.06
79-3							
79-4							
79-5							
79-6							
79-7							
79-8							
79-9							
79-10	7-22-94	4.0	7.2	11-3-94	1.2	6.8	-70.00
79-11							
79-12	7-22-94	dry		11-7-94	dry		
79-13							
79-14							
79-15	7-22-94	2.0	9.0	11-7-94	1.0	7.7	-50.00
79-16							
79-17							
79-18							
79-19							
79-20							
79-21							
79-22							
79-23	7-22-94	dry		11-7-94	dry		
79-24	7-22-94	dry		11-7-94	dry		
79-25							
79-26	7-22-94	dry		11-7-94	dry		
79-27							
79-28	7-22-94	1.3	6.0	11-7-94	no flow	- standing water	
79-29	7-22-94	0.7	6.0	11-7-94	0.7	4.3	-1.41
79-30							
79-31							
79-32	7-22-94	damp		11-7-94	damp		
79-33							
79-34	7-22-94	dry		11-7-94	dry		
79-35	7-22-94	0.5	7.6	11-7-94	damp		
79-36							
79-37							
79-38	7-22-94	0.5	13.3	11-7-94	flow <0.1	- standing water	
79-39							
79-40	7-22-94	dry		11-7-94	dry		
80-41	7-22-94	dry		11-7-94	dry		

TABLE 26B: EAST MOUNTAIN SPRINGS DISCHARGE
1994

Spring	Date Sampled	Flow (GPM)	Temp. ° F	Date Sampled	Flow (GPM)	Temp. ° F	Seasonal Net Change %
80-42							
80-43	7-22-94	dry		11-7-94	dry		
80-44	7-22-94	dry		11-7-94	dry		
80-45							
80-46	7-22-94	dry		11-7-94	dry		
80-47	7-22-94	2.2	12.0	11-7-94	3.0	3.4	36.36
80-48	7-22-94	damp		11-7-94	damp		
80-49							
80-50							
82-51	7-22-94	damp		11-7-94	damp		
82-52	7-22-94	2.0	6.3	11-7-94	1.0	4.5	-50.00
84-53	7-22-94	dry		11-7-94	dry		
84-54							
84-55							
84-56	7-22-94	0.3	5.0	11-7-94	0.6	4.9	83.33
85-57							
86-58							
86-59							
89-60	7-22-94	dry		11-7-94	dry		
89-61	7-22-94	20.1	4.0	11-7-94	20.0	5.1	-0.50
89-62							
89-63							
89-64							
89-65	7-22-94	dry		11-7-94	dry		
89-66	7-22-94	dry		11-7-94	dry		
89-67	7-22-94	1.9	4.0	11-7-94	1.7	5.1	-10.53
89-68	7-22-94	damp		11-7-94	damp		
89-69							
89-70							
89-71							
91-72	7-22-94	6.3	13.0	11-7-94	5.5	7.2	-12.70
91-73	7-22-94	1.1	14.1	11-7-94	1.3	5.1	18.18
TOTAL FLOW FOR JULY 1993		97.8			61.2		
(Without 91-72 & 73)				Net Change - Average			-26.00
				Net Change - By Volume			-37.45

TOTAL FOR JULY 1993 = 764.7 GPM
JULY 1994 87% LOWER THAN JULY 1993

TABLE 27: EAST MOUNTAIN YEARLY SPRING DISCHARGE VARIATIONS (GPM)

JULY FLOW DATA

Spring	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Burnt Tree	30.5	26.6	26.1	17.5	10.2	12.0	6.4	4.1	2.0	4.0	8.6	7.5
Elk Spring	642.3	427.9	390.5	309.7	217.0	217.4	78.5	130.8	176.0	116.8	369.9	46.2
Sheba	22.9	19.7	14.4	8.6	11.4	10.4	1.1	8.1	10.1	6.3	11.0	0.9
Ted's Tub	89.0	48.0	39.1	31.6	69.0	60.0	5.0	13.0	21.0	13.6	51.0	6.0
79-2	9.1	9.7	5.5	2.9	4.0	2.1	2.7	3.9	2.4	2.3	7.5	1.7
79-10	37.1	20.0	33.3	26.1	26.1	25.0	7.0	10.2	12.5	10.5	30.0	4.0
79-15	42.9	26.1	18.2	18.2	14.6	12.7	2.9	3.0	5.0	4.1	20.7	2.0
79-23	20.0	3.6	6.8	0.6	damp	damp	dry	dry	damp	dry	damp	day
79-24	9.3*	6.1*	5.0	4.3	damp	0.8	dry	dry	dry	dry	damp	dry
79-26	20.7	20.0	10.9	8.7	1.5	3.3	0.3	dry	damp	damp	10.0	dry
79-29	10.0	6.2	6.0	4.7	2.5	2.6	1.1	1.3	1.7	0.8	2.9	0.7
79-32	3.3	3.1	2.7	1.3*	1.0	0.6	0.5	damp	standing water no flow	standing water no flow	1.3	damp
79-34	356.7	42.9	18.5	16.7	10.5	13.3	dry	dry	0.3	damp	13.0	dry
79-35	15.0	10.5	10.5	7.8	6.3	2.7	dry	1.9	4.3	4.4	8.9	0.5
79-38	10.9	9.2	4.7	3.6	8.3	10.0	1.1	7.8	6.5	2.3	6.4	0.5
79-40	15.0	8.3	5.6	4.7	2.0	5.4	dry	dry	dry	dry	4.0	dry
80-41	10.9	15.0	5.8	4.1	2.5	3.9	dry	dry	dry	dry	4.0	dry
80-43	24.0	20.0	6.6	3.1	0.4	1.8	dry	dry	dry	dry	2.7	dry
80-44	24.0	13.1	5.5	2.2	dry	0.5	dry	dry	dry	dry	1.4	dry
80-46	60.0	28.3	18.2	12.0	4.0	6.7	dry	dry	dry	dry	7.5	dry
80-47	20.0	15.0	12.5	12.2	7.4	9.9	4.6	2.0	1.3	3.3	13.3	2.2
80-51	10.0	5.9	3.8	2.6	damp	damp	dry	dry	<0.1	damp	3.2	damp
82-52	80.0	48.0	32.1	23.3	20.1	21.5	2.6	1.3	1.0	1.0	16.7	2.0
84-56	9.6*	6.3	4.7	3.7	2.5	2.9	1.6	1.0	0.5	0.6	1.0	0.3
TOTALS	1,293.2	839.5	687.0	530.2	421.3	425.5	115.4	188.4	244.7	170.0	595.0	74.5

* No measurement - utilized yearly comparison.

TABLE 28: MODES OF OCCURRENCE - EAST MOUNTAIN SPRINGS

Occurrences

Stratigraphic Location	Permeable fluvial channels that intersect the land surface	Flow along permeable strata underlain by impermeable mudstone which intersects the land surface	Contact of permeable beds and the Roans Canyon Fault zone	Mode of occurrence not identified
Base of Flagstaff Limestone		79-6, 79-7, 79-35, 86-58	Sheba Springs, 79-1	
North Horn Formation	Teds Tub, Burnt Tree, 79-2, 79-3, 79-8, 79-9, 79-11, 79-12, 79-13, 79-14, 79-15, 79-16, 79-17, 79-21, 79-22, 79-26, 79-27, 79-28, 79-29, 79-34, 79-39, 80-42, 80-43, 80-46, 80-47, 80-48, 84-53, 84-56, 86-59, 89-62, 89-63, 89-64, 89-65, 89-66, 89-67, 89-68		Elk Springs, 79-10, 79-18, 79-19, 79-20, 84-54, 89-61	
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 Locations	Blackhawk Formation 80-50, 84-57, 91-73 Bear Canyon Fault Zone 82-51 (Price River)	Price River Formation 79-24, 79-33, 79-40, 80-41, 80-44, 80-45, 82-52, Jerk Water, 89-60 (Alpine)	80-49 (Price River) 91-72 (Blackhawk)	Flagstaff Limestone 79-4, 79-5, Pine Springs Trough

TABLE 29: TEMPERATURE COMPARISON

MONTH	EAST MOUNTAIN DEPARTURE FROM NORMAL	ELECTRIC LAKE DEPARTURE FROM NORMAL	HUNTER PLANT DEPARTURE FROM NORMAL	HUNTINGTON PLANT DEPARTURE FROM NORMAL
1986				
JAN	+5.1	+4.0	+6.2	+6.5
FEB	+3.1	+0.6	+7.9	+3.8
MAR	+7.6	+9.6	+9.5	+5.9
APR	+2.0	+0.8	+3.0	0.0
MAY	-5.6	0.0	+3.4	-0.1
JUN	+5.0	+5.5	+7.7	+3.3
1987				
JAN	-4.2	-4.8	-2.6	+0.8
FEB	-1.4	-6.3	+3.0	+1.7
MAR	-2.2	-2.7	+0.5	-3.1
APR	+7.3	+5.5	+6.2	+5.1
MAY	+5.4	+3.6	+4.4	+0.3
JUN	+5.3	+2.0	+7.7	+1.8
1988				
JAN	-3.7	-4.2	-7.1	-3.1
FEB	+0.7	-3.0	+3.0	+0.7
MAR	-1.8	-3.4	+2.6	-1.5
APR	+2.6	+4.1	+4.5	+2.2
MAY	+4.2	+1.2	+4.9	+0.9
JUN	+3.2	+4.5	+9.6	+2.4
1989				
JAN	-2.1	-4.3	-7.8	-4.8
FEB	-3.5	-6.6	-1.4	-5.7
MAR	+5.7	+8.1	+9.5	+3.8
APR	+6.0	+6.9	+9.5	+5.7
MAY	+4.4	+4.0	+6.8	+0.7
JUN	-4.5	-6.4	+5.0	-1.8
1990				
JAN	-2.4	-0.8	+3.7	+0.9
FEB	-1.1	-4.9	+5.2	-2.0
MAR	+1.9	+7.0	+8.7	+2.6
APR	+2.1	+6.3	+10.9	+4.6
MAY	+0.8	+3.0	+6.8	-1.3
JUN	+3.3	+4.8	+10.9	+1.0
1991				
JAN	-1.9	-2.2	-4.5	-4.4
FEB	+5.8	+0.6	+7.5	+3.7
MAR	-13.3	-2.5	+2.8	-5.8
APR	-5.5	-3.0	+1.9	-3.3
MAY	-0.7	-1.8	+5.1	-5.1
JUN	-1.2	-0.6	+7.7	-2.8
1992				
JAN	-0.4	+0.8	-6.2	-1.6
FEB	+0.8	+7.8	+5.5	+0.9
MAR	+2.2	+8.0	+8.5	+2.9
APR	+4.9	+11.8	+12.6	+8.6
MAY	+4.5	+7.0	+11.8	+3.3
JUN	-0.5	+3.6	+7.6	-3.3
1993				
JAN	-3.8	+2.7	+0.9	-0.8
FEB	-3.5	-2.9	+0.5	-4.3
MAR	+4.2	-3.6	+7.2	-0.5
APR	-2.2	+0.1	+4.4	-2.0
MAY	+4.1	+2.8	+8.9	+1.6
JUN	-3.9	-2.2	+5.8	-4.1
1994				
JAN	+0.8	+2.3	-1.2	+6.3
FEB	-3.5	+3.2	+1.6	-3.5
MAR	+6.1	+6.6	+10.1	+5.0
APR	0.0	+6.0	+4.7	+0.2
MAY	+4.6	+7.2	+8.9	+2.7
JUN	+9.1	+4.8	+13.4	+5.4

YEAR	EAST MOUNTAIN	ELECTRIC LAKE	HUNTER PLANT	HUNTINGTON PLANT	TOTAL
1982		-2.8	-0.03	+1.2	-0.8
1983		-2.7	2.5	+1.0	+0.3
1984		-2.2	0.5	0.13	-0.5
1985	3.1	0.3	3.0	0.9	+1.8
1986	2.9	3.4	6.3	3.2	+4.0
1987	1.7	-0.5	3.2	1.1	+1.4
1988	-0.2	-0.1	3.5	0.5	+0.9
1989	0.0	-0.1	4.1	0.3	+1.1
1990	2.3	1.8	7.3	1.2	+3.2
1991	-1.9	-1.4	3.8	-2.5	-0.5
1992	+1.9	+6.5	+6.6	+1.8	+5.0
1993	-0.9	-0.5	+4.6	-1.7	+0.4
1994	+2.9	+5.0	+6.3	+2.7	+4.2

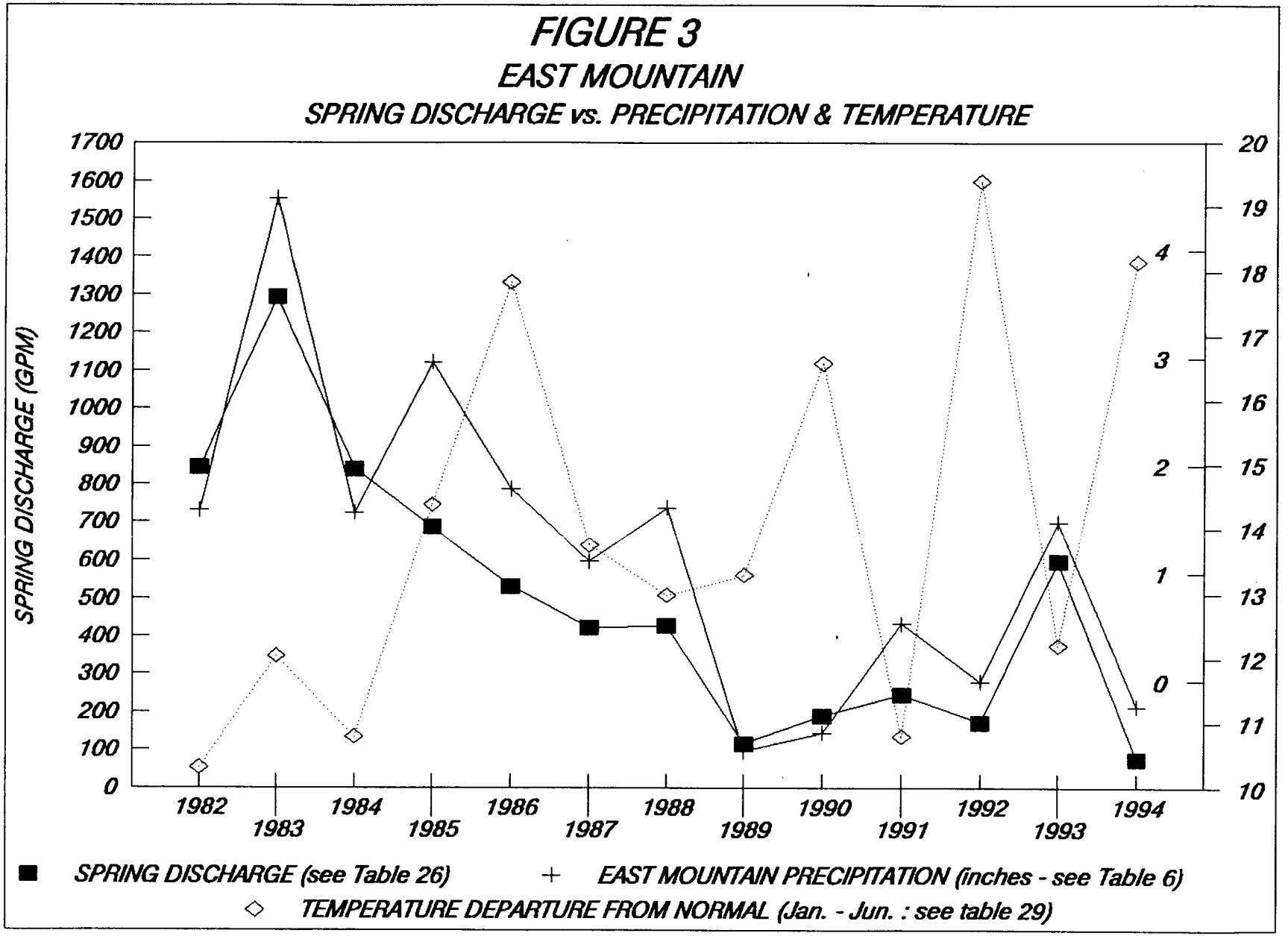


FIGURE 3
EAST MOUNTAIN
SPRING DISCHARGE vs. PRECIPITATION & TEMPERATURE
SPRING DISCHARGE (GPM)
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
20
19
18
17
16
15
14
13
12
11
10
4
3
2
1
0
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
SPRING DISCHARGE (see Table 26)
EAST MOUNTAIN PRECIPITATION (inches - see Table 6)
TEMPERATURE DEPARTURE FROM NORMAL (Jan. - Jun. : see table 29)

1986-94 versus departure from normal. The comparison is vital in determining mining effects on spring discharge versus general changes in annual precipitation.

Table 29 clearly demonstrates near average temperatures between 1982 and 1984, but starting in 1985 and continuing through 1994 (except for 1991) positive departure from normal has been significant. In 1994 the temperatures were 4.2 degrees above average. Comparison between spring discharge rate and general changes in annual precipitation patterns correlated well in the past due to relatively normal temperatures experienced during the early runoff period (January through June). Figure 3 not only includes a comparison of spring discharge rate and precipitation as in the past but also temperature departure due to critical influence temperature has on peak discharge occurrence.

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, (8) 79-35, (9) 80-44, (10) 80-46, (11) 82-52, (12) 84-56. The flow information collected during 1994 is shown in Table 30; corresponding spring recession curves comparing 1994 to 1988-1993 are located in Appendix G.

TABLE 30: EAST MOUNTAIN REGRESSION STUDY(FLOW*/TEMP.**)

1994

Spring	July	August	September	October
Burnt Tree	7.5/6	7.0/16	4.0/7	4.6/7
Elk Spring	46.2/6	24.3/8	32.4/6	24.3/4
Sheba	0.9/9	0.2/12	0.1/11	0.2/7
79-10	4.0/7	2.4/8	1.5/8	1.2/7
79-23	Dry	Dry	Dry	Dry
79-26	Dry	Dry	Dry	Dry
79-29	0.7/6	0.6/6	0.4/7	0.7/4
79-35	0.5/8	0.5/10	0.8/8	Damp
80-44	Dry	Dry	Dry	Dry
80-46	Dry	Dry	Dry	Dry
82-52	2.0/6	1.5/7	0.7/8	1.0/5
84-56	0.3/6	0.1/10	0.2/7	0.6/5

* All flow given in gallons per minute
** Temperatures reported in degrees centigrade
*** Pond level above diversion

3. Quality

To more closely identify springs which are related one with another, water samples were analyzed to determine the percentage of cations and anions in solution. The percentages have been graphically represented as cation-anion diagrams. (See Appendix G.) The purpose of the cation-anion diagrams is to identify groups of related springs by water chemistry. To better visualize the concept, the cation-anion diagrams are presented by the geologic formation in which the spring originates. A general pattern for the Flagstaff and Price River formations can be recognized for each year in which the cations/anions were analyzed. A consistent pattern for the North Horn is less obvious due to the complex geology of the formation itself. One aspect the cation-anion diagrams demonstrate is that, even though the quality varies slightly from individual sites as well as from different formations, seasonal variations do not exist.

The quality of the springs sampled in 1994 reveals an excellent correlation with historical averages. A summary of the water quality analysis for a representative group of East Mountain Springs is presented in Table 31. In the table the mean values for 1994 are compared to the historical results for each respective spring. The raw data regarding all springs sampled is contained in Appendix G.

*Table 31: East Mountain Springs Water Quality (Historical vs. 1994) **

PARAMETER	Burnt Tree Historical	Burnt Tree 1994	Elk Spring Historical	Elk Spring 1994	Sheba Spring Historical	Sheba Spring 1994	79-10 Historical	79-10 1994	79-23 Historical	79-23 1994	79-26 Historical	79-26 1994
Elevation	9260		9350		9740		9350		9035		9310	
Geologic Formation	TKn		TKn		Tf		Kpr		TKn		TKn	
Bicarbonate	331	332	291	291	290	298	320	305	413	no	334	no
Calcium	63.9	55.2	65.4	63.5	86.7	77.0	74.0	69.7	79.6	flow	64.0	flow
Carbonate	<1	<1	<1	<1	<1	<1	<1	<1	<1	during	<1	during
Chloride	7.2	5.0	6.2	8.0	6.6	8.3	8.1	4.3	11.3	1994	7.8	1994
Cond.(umhos/cm)	494	524	426	460	425	487	456	492	691		517	
Hardness	270	260	252	241	248	247	276	266			278	
Iron	0.18	0.20	0.11	0.20	0.12	0.20	0.10	0.20	0.09		0.19	
Magnesium	27.16	29.75	22.65	19.75	9.94	13.25	21.64	22.25	38.30		27.38	
Mangenese	0.02	0.20	0.02	0.20	0.02	0.20	0.02	0.20	0.01		0.03	
pH(units)	7.54	7.68	7.77	8.05	7.55	7.54	7.61	7.87	7.72		8.02	
Potassium	1.18	5.00	2.19	5.00	1.53	9.33	2.55	5.00	1.54		2.06	
Sodium	14.14	15.00	8.50	6.67	4.72	4.67	4.84	6.00	14.90		15.84	
Sulfate	26.3	7.6	26.3	6.3	26.5	5.6	19.0	7.6	27.2		36.6	
TDS	289	296	256	253	260	266	275	276	364		316	

PARAMETER	79-29 Historical	79-29 1994	79-35 Historical	79-35 1994	80-44 Historical	80-44 1994	80-46 Historical	80-46 1994	82-52 Historical	82-52 1994	84-56 Historical	84-56 1994
Elevation	9410		9585		8980		9350		8995		9335	
Geologic Formation	TKn		Tf		Kpr		TKn		Kpr		TKn	
Bicarbonate	326	327	302	303	444	no	363	no	418	422	345	350
Calcium	47.0	56.7	86.3	80.0	100.1	flow	62.0	flow	76.1	75.0	63.8	61.0
Carbonate	<1	<1	<1	<1	<1	during	<1	during	1.30	<1	<1	<1
Chloride	20.20	15.30	7.60	3.00	11.10	1994	4.90	1994	12.00	7.30	11.60	7.30
Cond.(umhos/cm)	533	587	425	447	868		553		634	728	530	588
Hardness	250	310	273	272	386		290		321	340	297	289
Iron	0.11	0.20	0.12	0.20	0.11		0.26		0.09	0.20	0.05	0.20
Magnesium	33.74	41.00	15.39	18.00	41.60		28.79		33.86	37.25	32.48	33.50
Mangenese	0.02	9.15	0.02	0.20	0.02		0.02		0.02	0.20	0.02	0.20
pH(units)	7.73	7.59	7.71	7.89	7.84		7.43		7.66	7.77	7.48	7.50
Potassium	2.75	5.00	1.01	5.00	35.90		0.83		1.40	5.00	0.92	5.00
Sodium	32.40	32.33	5.93	5.00	138.80		9.78		23.95	27.67	16.76	16.33
Sulfate	46.7	26.0	33.7	9.0	138.8		17.8		38.2	46.0	29.1	26.0
TDS	333	343	269	265	532		307		371	416	324	346

** Quality parameters reported as mg/l unless otherwise noted*

B. Rilda Canyon - North Emery Water Users Association (NEWUA)

Of concern to PacifiCorp Fuel Resources is the proximity of proposed mining activities in Rilda Canyon to the Rilda Canyon Springs which currently serve as a culinary water source to the North Emery Water Users Association (NEWUA). The NEWUA spring system consists of a series of collection lines extending westward up Rilda Canyon and southward up a small side drainage (shown on Map HM-8 in Volume 9 of the PAP). The NEWUA spring system is metered at four locations. Meter 1 (Side Canyon Spring) is located at the downstream end of a collection line which enters Rilda Canyon from the South. Meter 2 (Side Canyon Spring plus South Spring) is located near the bottom of the main east-west trending collection line which lies to the south of Rilda Canyon Creek at a point just upstream (west) of the main spring collection box. Meter 2 records combined flows from both the Side Canyon (Meter 1) as well as additional inflows known as South Spring which enter the system below Meter 1. Meter 3 (North Spring) records flows for the east-west central collection line which was constructed through the central portions of the valley near Rilda Canyon Creek. Meter 4 (North Spring) collects data from the north collection line located on the north side of Rilda Canyon Creek.

1. Spring Flow

Through the cooperative efforts of PacifiCorp and NEWUA flow meters were installed in September 1990 to isolate individual spring areas for quantity and quality (see Map HM-8 in Volume 9 of the PAP). Table 32 below lists the individual flow rates for meters 2-4 (flow from Meter 1 is included in Meter 2).

TABLE 32: NEWUA - RILDA CANYON SPRING FLOW (GPM)

DATE	METER 2	METER 3	METER 4	TOTAL
09-06-90	20.0	75.0	120.0	215.0
09-18-90	15.8	78.9	91.0	186.0
11-07-90	13.3	37.5*	20.0	71.0
11-14-90	14.5	67.4	9.3	91.0
11-19-90**	13.6	57.7	6.3	78.0
04-08-91	10.9	56.5	4.7	72.0
06-11-91	10.9	107.0	136.0	253.9
07-17-91	12.5	95.0	160.0	267.5
08-19-91	9.3	95.0	160.0	264.3
09-10-91	9.2	105.0	140.0	254.2
10-21-91	7.5	85.0	55.0	147.5
11-20-91	8.0	80.0	16.2	104.2
04-07-92	8.0	46.0	7.7	61.7
05-18-92	7.5	110.0	140.0	257.5
06-12-92	7.0	100.0	180.0	287.0
07-20-92	7.0	80.0	150.0	237.0
08-14-92	7.1	90.0	110.0	207.1
09-03-92	6.0	35.0	75.0	116.0
10-30-92	5.5	45.0	2.6	53.1
05-13-93	6.0	25.0	13.0	44.0
06-11-93	8.6	90.0	150.0	248.6
07-29-93	6.0	110.0	170.0	286.0
08-27-93	4.0	96.0	170.0	270.0
09-28-93	2.0	60.0	110.0	172.0
10-22-93	3.0	30.0	55.0	88.0
05-24-94	4.6	65.0	75.0	144.6
06-16-94	5.0	100.0	160.0	265.0
07-18-94	5.5	100.0	130.0	235.5
08-24-94	2.0	70.0	80.0	152.0
09-13-94	2.7	30.0	20.0	52.7
10-23-94	2.0	30.0	1.5	33.5

* Flow not stabilized.
** Data collected during pump test.

The seasonal variation of the monthly average flow from NEWUA's Rilda Canyon Springs is shown in Figure 4. With the installation of flow meters, individual spring contribution to the total flow can be plotted over time.

2. Quality

Baseline quality sampling of the individual springs was initiated upon completion of the spring meter system in September 1990 and continued quarterly throughout 1994. The minimum, maximum, and mean results of the 1994 spring flow compared to historical quality analysis are listed in Table 33. The raw data regarding the Rilda Springs sampled are contained in Appendix G. Values are in milligrams per liter unless otherwise noted. As stated in Volume 9 of the PAP, differences in the groundwater the quality data reflect differences in the groundwater source or the origin of groundwater for the various springs issuing within the Rilda Springs area. The higher sulfate and TDS concentrations from the Meter 2 samples are characteristic of waters associated with the Blackhawk Formation. Waters issuing from the North Spring collection system (Meters 3 and 4) area are of a better quality than waters from the Side Canyon and South Spring collection areas. Water issuing from the North Spring originates primarily from water moving within the alluvial valley sediments and fracture systems of the Starpoint Sandstone and is not derived from the Blackhawk Formation.

FIGURE 4
NORTH EMERY WATER USERS ASSOCIATION

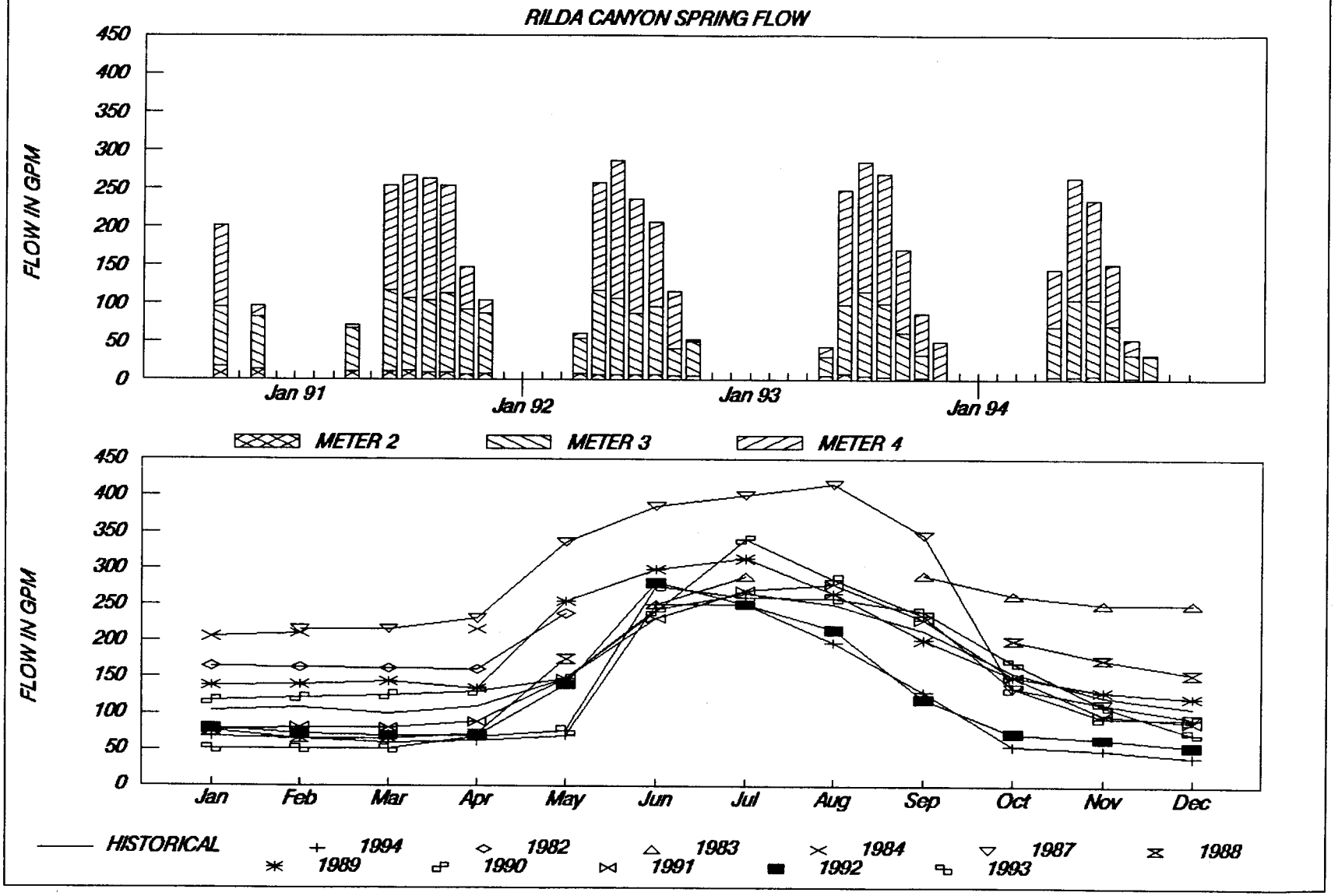


TABLE 33
NEWUA – RILDA CANYON SPRINGS
AVERAGE WATER QUALITY*

PARAMETER	METER 2		METER 3		METER 4	
	1994	Historical	1994	Historical	1994	Historical
Bicarbonate	437	441	392	398	363	355
Calcium	79.5	96.6	69.0	83.3	66.5	70.8
Carbonate	1.0	0.6	1.0	0.6	1.0	0.6
Chloride	6.0	15.1	4.5	14.5	4.0	14.3
Cond.(umhos/cm)	788	719	691	595	625	522
Hardness	400	453	351	395	372	344
Iron	0.20	0.08	0.20	0.09	0.20	0.04
Magnesium	48.50	51.66	43.50	45.55	50.00	40.70
Mangenese	0.15	0.03	0.15	0.06	0.15	0.07
pH(units)	7.32	7.19	7.39	7.34	7.44	7.40
Potassium	3.50	2.78	3.50	1.50	4.50	1.70
Sodium	15.00	14.81	12.50	13.42	16.50	12.45
Sulfate	75.0	97.1	60.0	75.9	40.0	57.6
TDS	465	476	400	411	365	365

* Quality parameters reported as mg/l unless otherwise noted

C. Trail Mountain

PacifiCorp began monitoring springs on Trail Mountain in 1993. Monitoring prior to 1993 was completed by the previous lease holders. The nine (9) springs listed below are monitored.

T-6 (18-2-1)	T-14 (17-25-1)
T-8 (17-21-1)	T-14A (17-26-5)
T-9 (17-22-1)	T-15 (17-35-1)
T-10 (17-26-4)	T-16 (17-35-2)
	TM-23 (17-14-4)

1. Flow and Sampling Schedule

a. Flow

All springs on the preceding list are measured during the months of July through October if weather and reasonable access permit.

b. Quality Samples

All springs listed above are sampled for water quality characteristics during the months of July through October. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Operational Quality. (See Appendix Q.)

2. Spring Flow

As indicated early, precipitation and spring discharge rates decreased from 1993 to 1994. Table 34 is a tabulation of the flow data collected during the 1994 monitoring season. The seasonal variation is represented in Table 34 under the column heading "Seasonal Net Change %." The percentage figures represent the amount of change, either positive or negative. The average change reveals a twenty-four percent (24%) [forty percent (40%) by volume] decrease from the July to the October measurements (similar to East Mountain, see Table 26).

TABLE 34: TRAIL MOUNTAIN SPRINGS DISCHARGE (FLOW*/TEMP.**)

1994

Spring	July	August	September	October	Seasonal Net Change %
T-6 (18-2-1)	1.6/8	0.5/13	0.3/10	0.1/2	-94
T-8 (17-21-1)	0.2/13	0.2/12	0.2/10	0.3/4	50
T-9 (17-22-1)	4.0/8	3.0/8	3.6/8	2.9/6	-28
T-10 (17-26-4)	damp	damp	damp	damp	
T-14 (17-25-1)	damp	damp	damp	damp	
T-14A (17-26-5)	dry	dry	dry	dry	
T-15 (17-35-1)	0.5/9	0.3/13	0.4/11	0.5/7	0
T-16 (17-35-2)	dry	dry	dry	dry	
TM-23	dry	dry	dry	dry	
			Net Change by Average		-24
			Net Change by Volume		-40

* All flow given in gallons per minute
** Temperatures reported in degrees centigrade

A seven-year comparison of spring discharge is shown in Table 35. 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 35: TRAIL MOUNTAIN YEARLY SPRING DISCHARGE VARIATIONS (GPM)

JULY FLOW DATA

Spring	1988	1989	1990	1991	1992	*** 1993	1994
T-6 (18-2-1)	11.0	0.5	0.50	1.20	0.03	6.0	1.6
T-8 (17-21-1)	4.7	0.2	0.25	Dry	0.14	1.7	0.2
T-9 (17-22-1)	8.0	0.2	0.10	Dry	2.50	40.0	4.0
T-10 (17-26-4)	4.7	Dry	0.15	Dry	Dry	0.4	Damp
T-14 (17-25-1)	5.0	Dry	Dry	Dry	Dry	1.6	Damp
T-14A (17-26-5)	10.0	Dry	Dry	Dry	Dry	Dry	Dry
T-15 (17-35-2)	2.1	0.2	0.50	0.75	0.33	1.6	0.5
T-16 (17-35-2)	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T-23 (17-14-4)	22**	4.0*	Dry	Dry	Dry	Dry	Dry
TOTAL	67.5	5.1	1.50	1.95	2.67	51.3	6.3

* August measurement
** September measurement
*** First year monitored by PacifiCorp

3. Quality

To more closely identify springs which are related one with another, water samples were analyzed to determine the percentage of cations and anions in solution. The percentages have been graphically represented as cation-anion diagrams. (See Appendix H.) The purpose of the cation-anion diagram is to identify groups of related springs by water chemistry. To better visualize the concept, the cation-anion diagrams are presented by the geologic formation in which the spring originates. A general pattern for the geologic formations can be recognized for each year in which the cations/anions were analyzed. A consistent pattern for the North Horn is less obvious due to the complex geology of the formation itself. One aspect the cation-anion diagrams demonstrate is that, even though the quality varies slightly from individual sites as well as from different formations, seasonal variations do not exist.

The quality of the springs sampled in 1994 reveals an excellent correlation with historical averages. A summary of the water quality analysis for springs monitored on Trail Mountain is presented in Table 36. In the table the mean values for 1994 are compared to the historical results for each respective spring. The raw data regarding all springs sampled are contained in Appendix H.

Table 36: Trail Mountain Springs Water Quality (Historical vs. 1994) *

PARAMETER	18-2-1 Historical	18-2-1 1994	17-21-1 Historical	17-21-1 1994	17-22-1 Historical	17-22-1 1994	17-26-4 Historical	17-26-4 1994	17-25-1 Historical	17-25-1 1994	17-26-5 Historical	17-26-5 1993
Elevation	8395		9320		9210		8880		8155		9080	
Geologic Formation	TKn		TKn		TKn		TKn		Kcg		TKn	
Bicarbonate	405	381	401	383	363	290	393	No	473	No	398	No
Calcium	62.2	58.0	51.9	53.2	52.6	46.3	53.5	Flow	72.7	Flow	77.5	Flow
Carbonate	0.40	1.00	0.30	1.00	4.40	<1	4.00	During	2.00	During	0.00	During
Chloride	47.7	41.5	33.3	24.0	11.5	11.0	27.6	1994	43.9	1994	20.0	1994
Cond.(umhos/cm)	947	937	712	698	586	505	708		1414		848	
Hardness	391	365	249	245	287	249	332		485		429	
Iron	0.07	0.20	0.08	0.20	0.09	0.20	0.13		0.14		0.45	
Magnesium	57.07	53.50	30.15	27.00	37.65	32.17	48.11		66.30		58.68	
Mangenese	0.02	0.20	0.03	0.20	0.04	0.20	0.12		0.03		0.02	
pH(units)	7.84	7.70	7.66	7.93	7.75	8.04	8.03		7.86		7.79	
Potassium	1.26	5.00	1.89	5.00	1.26	5.00	1.80		3.17		1.84	
Sodium	67.60	66.25	61.15	57.50	26.47	17.83	33.64		110.72		31.70	
Sulfate	137.3	120.0	19.0	17.2	25.3	17.8	34.1		292.5		141.6	
TDS	573	570	393	390	326	281	390		846		511	

PARAMETER	17-35-1 Historical	17-35-1 1993	17-35-2 Historical	17-35-2 1993	17-14-4 Historical	17-14-4 1993
Elevation	8880		9000		7880	
Geologic Formation	TKn		TKn		Alluvium	
Bicarbonate	381	360	No	No	362	No
Calcium	40.9	40.7	Flow	Flow	65.8	Flow
Carbonate	7.60	1.00		During	0.00	During
Chloride	43.10	39.70		1994	13.90	1994
Cond.(umhos/cm)	758	787			641	
Hardness	262	229			346	
Iron	0.91	0.20			0.19	
Magnesium	39.33	30.75			43.95	
Mangenese	0.06	0.20			0.02	
pH(units)	8.10	8.01			7.77	
Potassium	1.31	5.00			1.95	
Sodium	72.09	86.25			15.83	
Sulfate	44.1	45.5			61.8	
TDS	433	390			385	

TRAIL MOUNTAIN SPRINGS CROSS REFERENCE

ARCOS'S	ENERGY WEST
T-6	18-2-1
T-8	17-21-1
T-9	17-22-1
T-10	17-26-4
T-14	17-25-1
T-14A	17-26-5
T-15	17-35-1
T-16	17-35-2
TM-23	17-14-4

* Quality parameters reported as mg/l unless otherwise noted

V. MINE HYDROLOGY

A. Groundwater and Surface Water Sources in Relation to Mine Workings

The relationship of the Deer Creek, Cottonwood/Wilberg, and Trail Mountain mine workings with the overlying springs is shown in Map 5 (in pocket). Beginning in 1979 (Trail Mountain - 1992), PacifiCorp has developed an ambitious spring monitoring program with emphasis to detect changes in the East and Trail Mountain hydrologic regime as a result of mining. The data collected to date reveal no indication of any mine-related effects on spring discharge or surface flow rates. As expected, there is a direct relationship between annual precipitation, temperature, and spring discharge rates as previously discussed on pages 42 through 63 and shown in Figure 3.

B. Groundwater Quality and Collection Procedures

PacifiCorp began in-mine quality and quantity measurement in 1977 and has continued the measurement through 1994. With the collection of numerous samples throughout the extent of the mine workings the quality has remained relatively constant. (Refer to Cation/Anion dmagrams in Appendices G and H.

Collection procedures for groundwater quality consist of two grab samples collected and analyzed per quarter at each of the mines which produces measurable quantities of water. Sampling according to this established plan began in the first quarter of 1982. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Operational Quality except when new sites are established. In that case baseline information will be collected for two (2) years. (See Appendix Q.)

Long-term monitoring locations have been established at each of the mines which produces measurable quantities of water, i.e., Deer Creek, Cottonwood/Wilberg, and Trail

Mountain mines. (See Maps 3, 4, and 6 in pocket.) Four types of occurrences have been recognized to exist within the current mine workings. (Refer to Figure 5.)

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 appendices I, K, and M for the Deer Creek, Cottonwood/Wilberg, and Trail Mountain In-Mine hydrographs.)

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	247.9 Million Gallons
Estimated Evaporation*	18.9 Million Gallons
Domestic Usage	5.3 Million Gallons
Total Discharge	272.1 Million Gallons

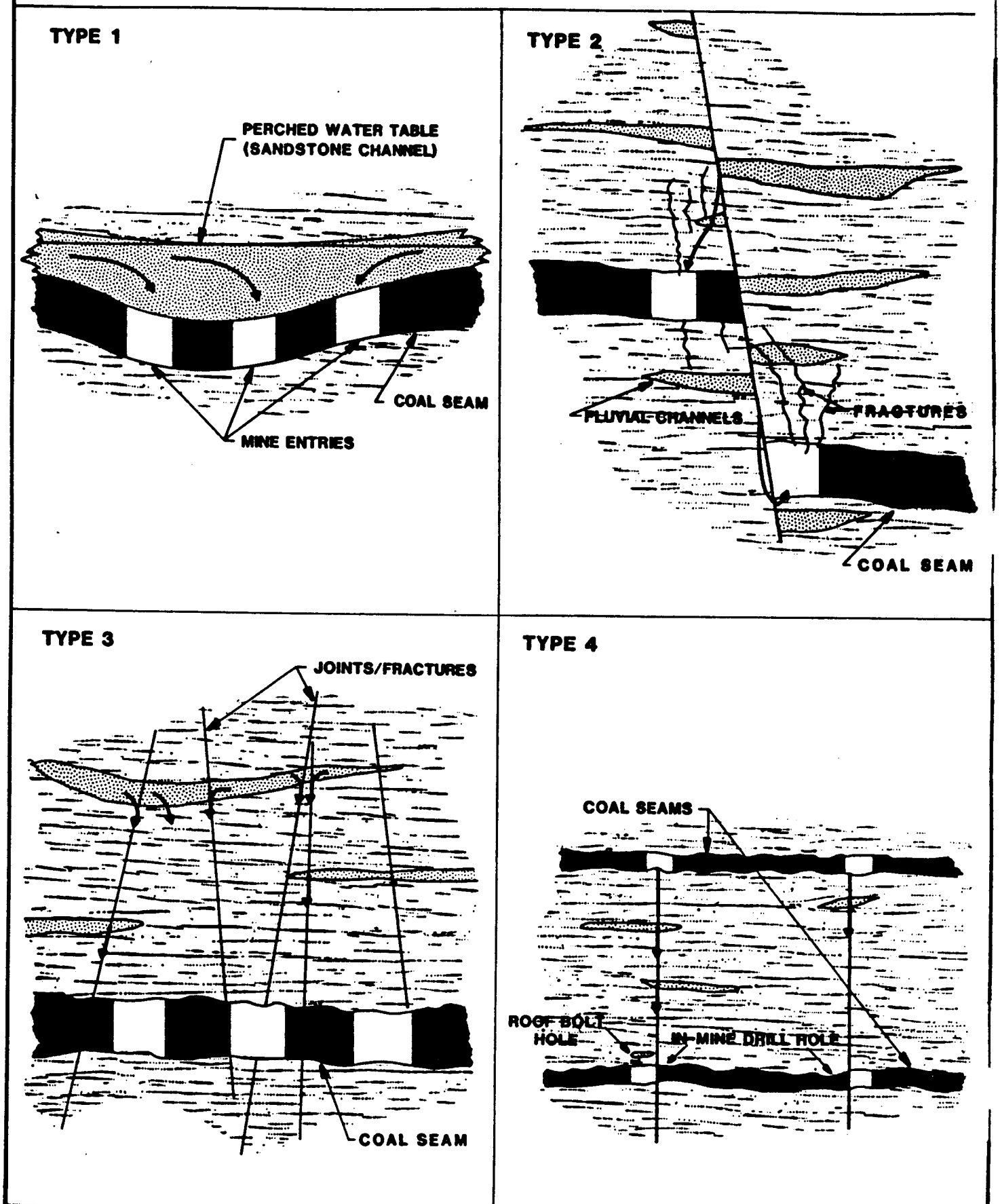
* See 1981 Hydrologic Monitoring Report

b. In-Mine Quality

Twelve samples were collected in the Deer Creek Mine in 1994. (See Map No. 2 in pocket for locations.) Parameters analyzed in 1994 are those listed in the DOGM Guidelines for Groundwater Baseline or Operational Quality. (See

FIGURE 5

LONG TERM WATER SOURCES



Appendix I.) Table 37 lists the characteristics of the samples collected and compares the mean, minimum, and maximum results of 1994 to the historical values for each location. It is apparent from Table 37 that the average quality of the in-mine water has remained relatively constant. (Refer to Cation/Anion diagrams in Appendix I.) The complete chemical analysis of samples collected in 1994 can be found in Appendix I.

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 locations of the main sump areas within the mine are shown in Figure 6. The largest volume of water is stored in the western part of Main West, which has not been actively mined for several years.

In-line flow meters are utilized to record the amount of water discharged from the mine, after which it passes through underground sedimentation sumps. Discharge from Deer Creek is either shipped directly to Huntington Power Plant or to the Deer Creek drainage in accordance with stipulations of the Deer Creek Discharge Permit UT-0023604-002.

The total water discharged from the Deer Creek Mine during 1994 was estimated at 761 acre feet, or 247.9 million gallons. The recorded flow of 761 acre feet during 1994 is a forty-one percent (41%) decrease from the 1993 discharge of 427.4 acre feet. The average monthly discharges are shown in Figure 7.

TABLE 37: DEER CREEK IN-MINE WATER QUALITY* - 1994

LOCATION	1994 SAMPLE DATES	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON DISSOLVED	MAGNESIUM	MANGANESE	pH (units)	POTASSIUM	SODIUM	SULFATE	TDS
4S SEALS															
HISTORICAL (1992)	MIN	424	98.8	0.0	10.0	710	471	0.00	49.30	0.02	7.38	1.98	16.93	78.0	535
	MAX	436	118.0	0.0	35.0	900	498	2.53	54.40	0.06	7.42	7.60	29.40	220.0	606
	MEAN	430	108.4	0.0	22.5	805	484	1.26	51.80	0.04	7.40	4.79	23.16	149.0	570
TW-10	3-24	382	65.0	<1.0	4.0	644	311	<0.20	36.00	<0.10	7.28	2.00	15.00	40.0	380
	6-14	391	68.0	<1.0	3.0	632	314	<0.20	35.00	<0.10	7.45	<2.00	16.00	40.0	360
	9-21	372	70.0	<1.0	8.0	631	670	<0.20	34.00	<0.20	7.47	<5.00	13.00	36.0	360
	12-20	342	67.0	<5.0	6.0	641	310	<0.10	34.00	<0.10	7.42	2.00	15.00	40.0	370
	MIN	342	65.0	1.0	3.0	631	310	0.00	34.00	0.10	7.28	2.00	13.00	36.0	360
	MAX	391	70.0	5.0	8.0	644	670	0.20	36.00	0.20	7.47	5.00	16.00	40.0	380
	MEAN	371	67.5	2.0	5.2	637	401	0.18	34.75	0.13	7.41	2.75	14.75	39.0	367
HISTORICAL (1988-93)	MIN	279	61.3	0.1	0.4	450	279	0.01	18.70	0.01	6.60	0.01	9.81	27.0	313
	MAX	714	211.0	1.0	30.0	950	732	1.17	77.10	1.21	8.40	5.00	55.03	350.0	439
	MEAN	390	92.5	0.7	12.3	585	380	0.18	36.20	0.09	7.38	1.50	17.23	64.8	377
	NO. OF ANALYSES	23	23	20	22	23	23	21	23	22	21	21	23	23	23
MN-ME**	3-24	420	77.0	1.0	6.0	759	369	<0.20	43.00	<0.10	8.50	2.00	18.00	70.0	470
	6-14	442	79.0	<1.0	4.0	760	366	<0.20	41.00	<0.10	7.38	2.00	19.00	90.0	440
	9-21	421	86.0	<1.0	9.0	760	390	<0.20	42.00	<0.20	7.56	<5.00	16.00	60.0	470
	12-20	376	80.0	<5.0	9.0	764	370	<0.10	42.00	<0.10	7.50	3.00	19.00	70.0	460
	MIN	376	77.0	1.0	4.0	759	366	0.10	41.00	0.10	7.37	2.00	16.00	60.0	440
	MAX	442	86.0	5.0	9.0	764	390	0.20	43.00	0.20	7.56	5.00	19.00	90.0	470
	MEAN	414	80.5	2.0	7.0	760	373	0.18	42.00	0.13	7.45	3.00	18.00	72.5	460
HISTORICAL (1991-93)	MIN	355	72.6	0.1	6.8	500	343	0.01	38.60	0.01	6.90	0.74	17.00	40.0	366
	MAX	427	100.0	1.0	25.0	757	432	2.81	49.60	0.10	7.59	14.00	37.16	110.0	453
	MEAN	397	89.7	0.3	13.7	653	398	0.36	42.35	0.03	7.21	4.19	21.66	80.3	423
	NO. OF ANALYSES	10	10	7	10	10	10	9	10	9	9	10	10	10	10

* Quality parameters are reported as mg/l unless otherwise noted.

** Sample site intiated during 1991.

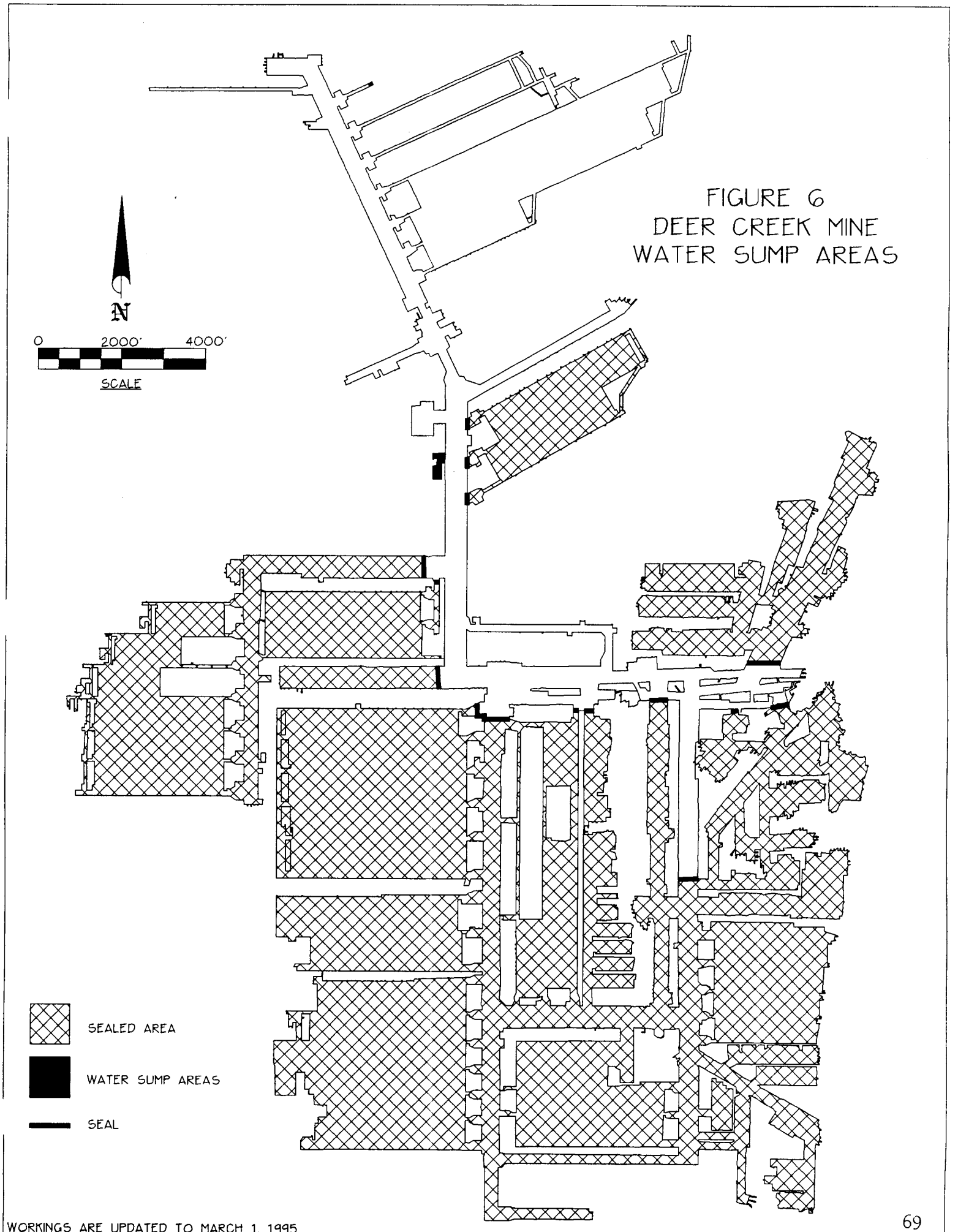


FIGURE 6
DEER CREEK MINE
WATER SUMP AREAS
N
0
2000'
4000'
SCALE
SEALED AREA
WATER SUMP AREAS
SEAL
WORKINGS ARE UPDATED TO MARCH 1. 1995

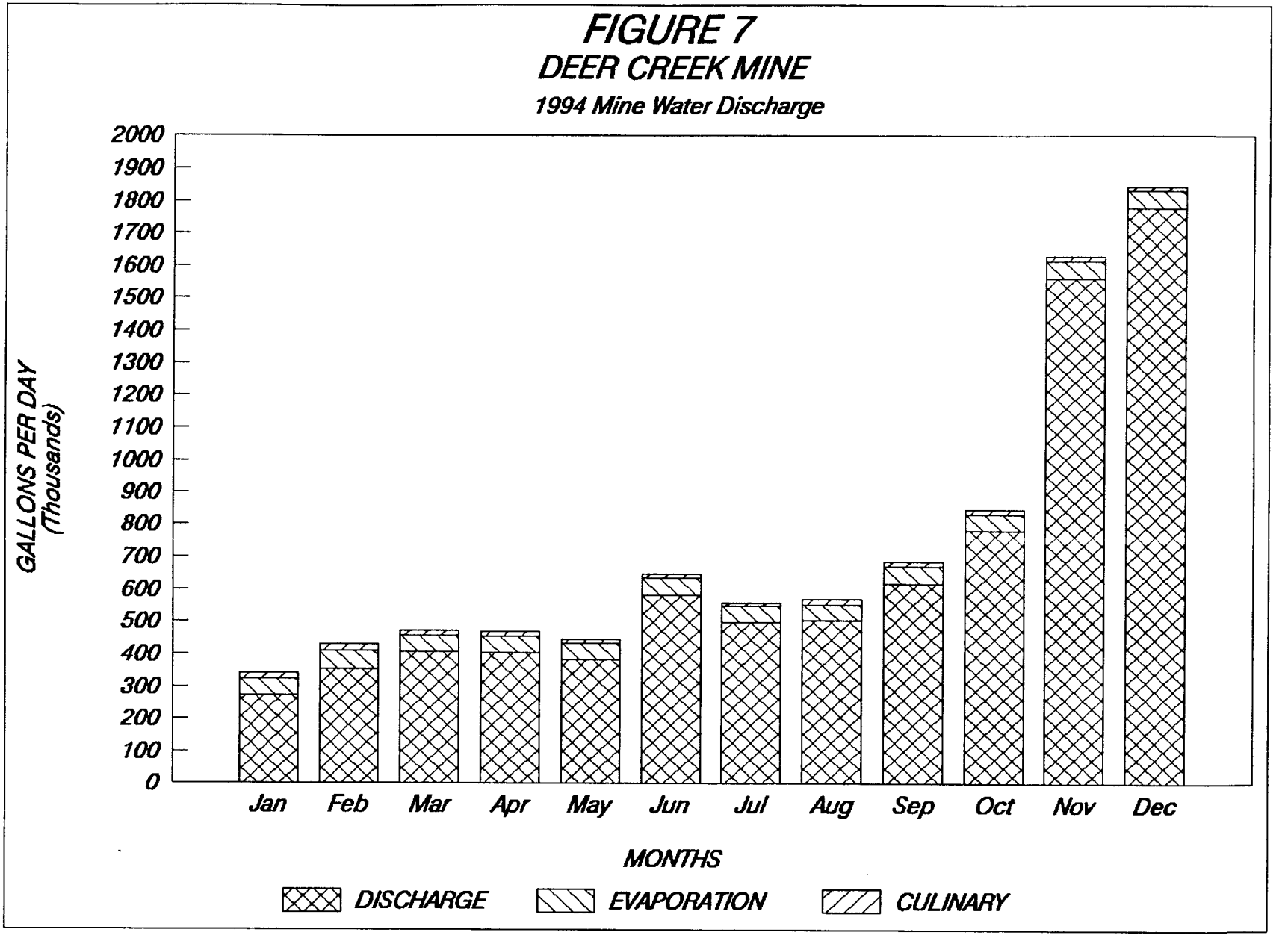


FIGURE 7
DEER CREEK MINE
1994 Mine Water Discharge
GALLONS PER DAY
(Thousands)
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
MONTHS
DISCHARGE
EVAPORATION
CULINARY

A graph displaying the historical discharge rates is included as Figure 8. The volume of water discharged from the mine has increased at a significant rate from 1988 through 1991 due to at least five factors. First, in previous years water discharged was measured with a Stevens Recorder installed in a Parshall flume. It was difficult to maintain calibration of the recorder and, in 1985, in-line flow meters (totalizer and instantaneous flow) were installed, allowing for a more accurate measurement of discharge. Second, mining has progressed into areas largely dominated by sandstone roof. The inflow from those areas is greater per acre of exposed area than areas of mudstone top. Third, mining has progressed into the bottom of the Straight Canyon Syncline, the lowest part of the mine, where a significant amount of water has been intersected. Fourth, mining has intersected the Roans Canyon Fault Graben which has released additional water into the mine workings. Last, prior to 1985 water used in mining was pumped directly from the in-mine sumps. Since that time all water has been pumped from the mine through the metering system. Mining water is then pumped back into the mine through a high-pressure steel line to the mining faces where it is utilized. Water production decreased significantly in 1992 with the sealing of the 4th South area.

d. Discharge Quality

Monthly water quality samples were collected for 1994. Table 38 compares the minimum, maximum, and mean values from an historical standpoint to 1994. An examination of Table 38 reveals excellent correlation with historical results. Individual analysis can be found in Appendix J.

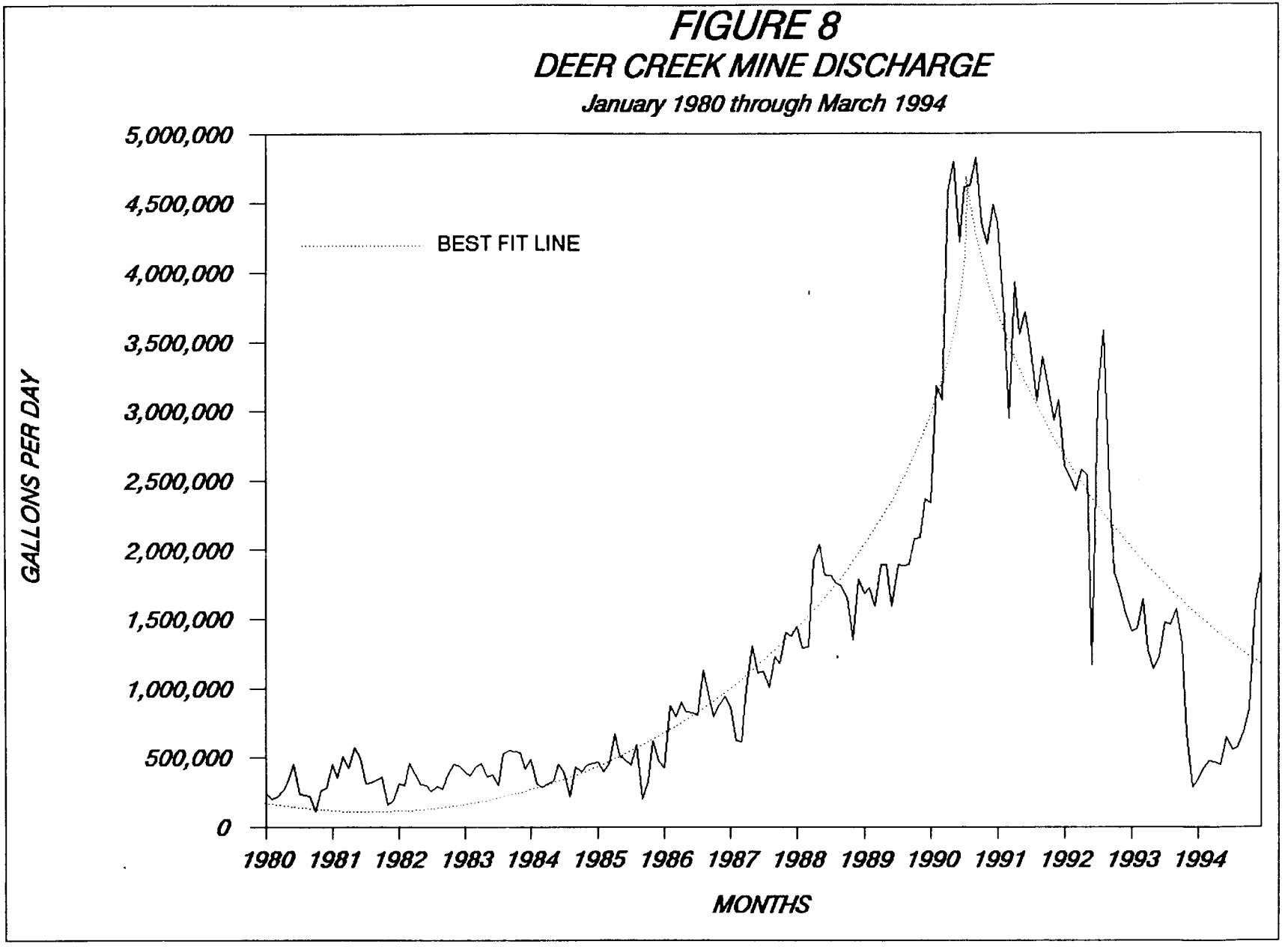


FIGURE 8
DEER CREEK MINE DISCHARGE
January 1980 through March 1994
BEST FIT LINE
GALLONS PER DAY
5,000,000
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994
MONTHS

TABLE 38: DEER CREEK MINE - DISCHARGE WATER QUALITY*

Parameters	1994 Minimum	1994 Maximum	1994 Mean	Historical - (1976-1993) Minimum	Historical - (1976-1993) Maximum	Historical - (1976-1993) Mean
pH (units)	7.29	8.51	7.73	6.8	8.3	7.6
Acidity	10.0	10.0	10.0	0.1	97.0	11.1
Alkalinity	252	379	323.5	207	459	303.4
Chloride	3.0	57.0	23.2	0.7	60.0	16.8
Conductivity (umhos/cm)	879	1255	1040	480	1900	885
Iron (Total)	<0.2	1.40	0.81	0.01	7.53	0.48
Oil & Grease	<5.0	<5.0	<5.0	0.1	48.8	2.9
Sulfate	140	380	225.4	13.0	460	204.6
TDS	580	910	695	289	1088	589
TSS	9.0	79	27.3	0.10	2784	63.6

* Quality parameters reported as mg/l unless otherwise noted.

2. Des-Bee-Dove Mine

Production at the Des-Bee-Dove Mine was terminated indefinitely as of February 14, 1987. The portals were sealed and underground hydrologic monitoring was discontinued.

3. Wilberg/Cottonwood 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 1994.

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. A large part of the mine workings have been sealed since the fire. The locations of the sealed areas and sumps are shown on Figure 9. As reported

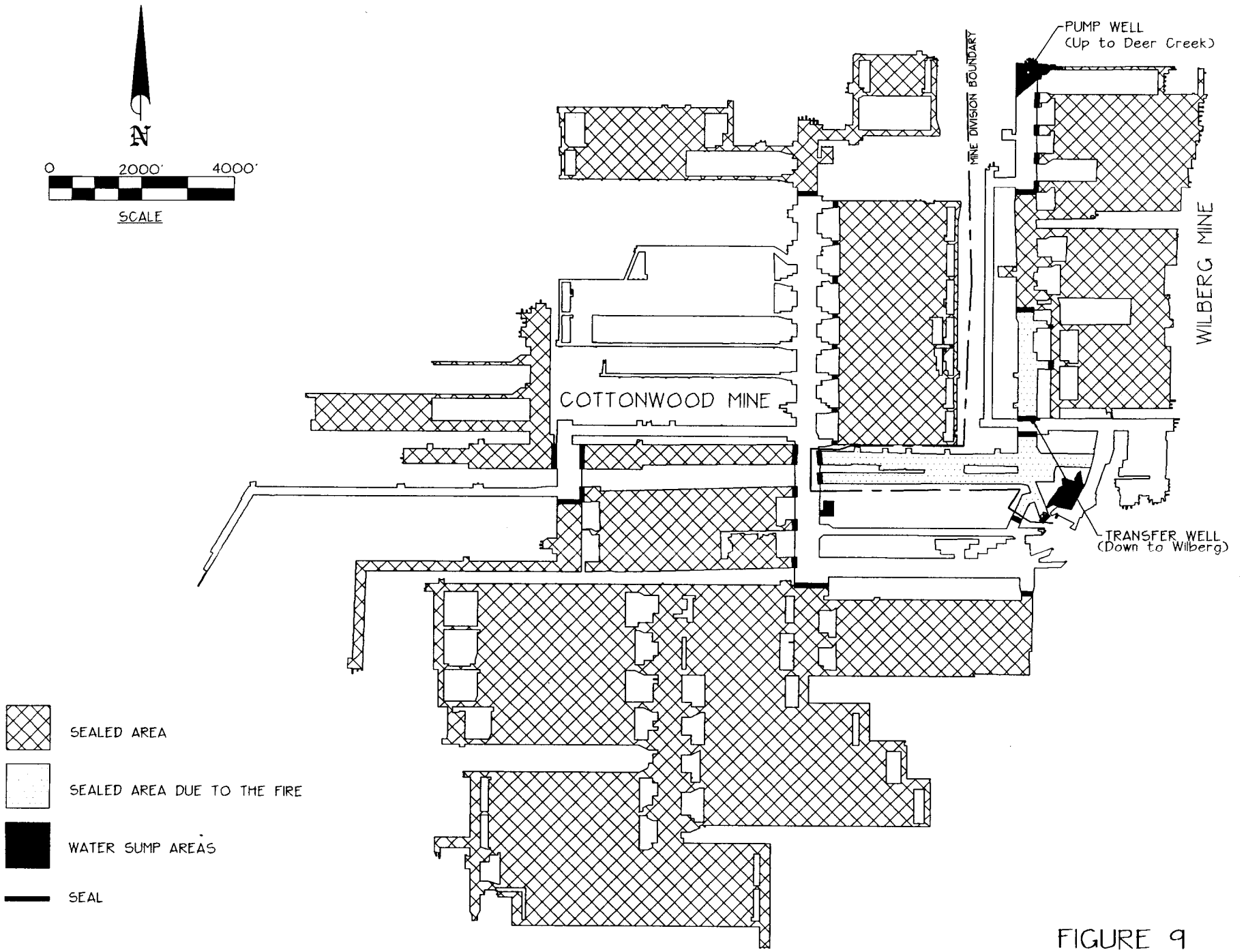


FIGURE 9
COTTONWOOD/WILBERG MINE
WATER SUMP AREAS

WORKINGS ARE UPDATED TO MARCH 1, 1995

in the 1984 Annual Report, water discharged from the Wilberg Mine complex includes the area designated as the Cottonwood Mine. (See Figure 10.) Consistent with previous years, the following table lists the factors involved in estimating in-mine water production.

Wilberg/Cottonwood Discharge

Grimes Wash	552.9 Million Gallons
Miller Canyon*	2.7 Million Gallons
Estimated Evaporation**	19.0 Million Gallons
Domestic Usage	2.5 Million Gallons
Total Discharge	577.1 Million Gallons

* Sealed ventilation breakout which intermittently discharges.
** See 1981 Hydrologic Monitoring Report.

b. In-Mine Quality

Eight samples were collected in the Wilberg/Cottonwood Mine in 1994. (See Map 5 in pocket for locations.) Parameters analyzed in 1994 are those listed in the DOGM Guidelines for Groundwater Operational Quality. (See Appendix Q.) Table 39 lists the characteristics of the samples collected and compares the mean, minimum, and maximum results of 1994 to the historical values. The average quality by location has remained relatively constant for each individual location. A complete chemical analysis of samples can be found in Appendix K.

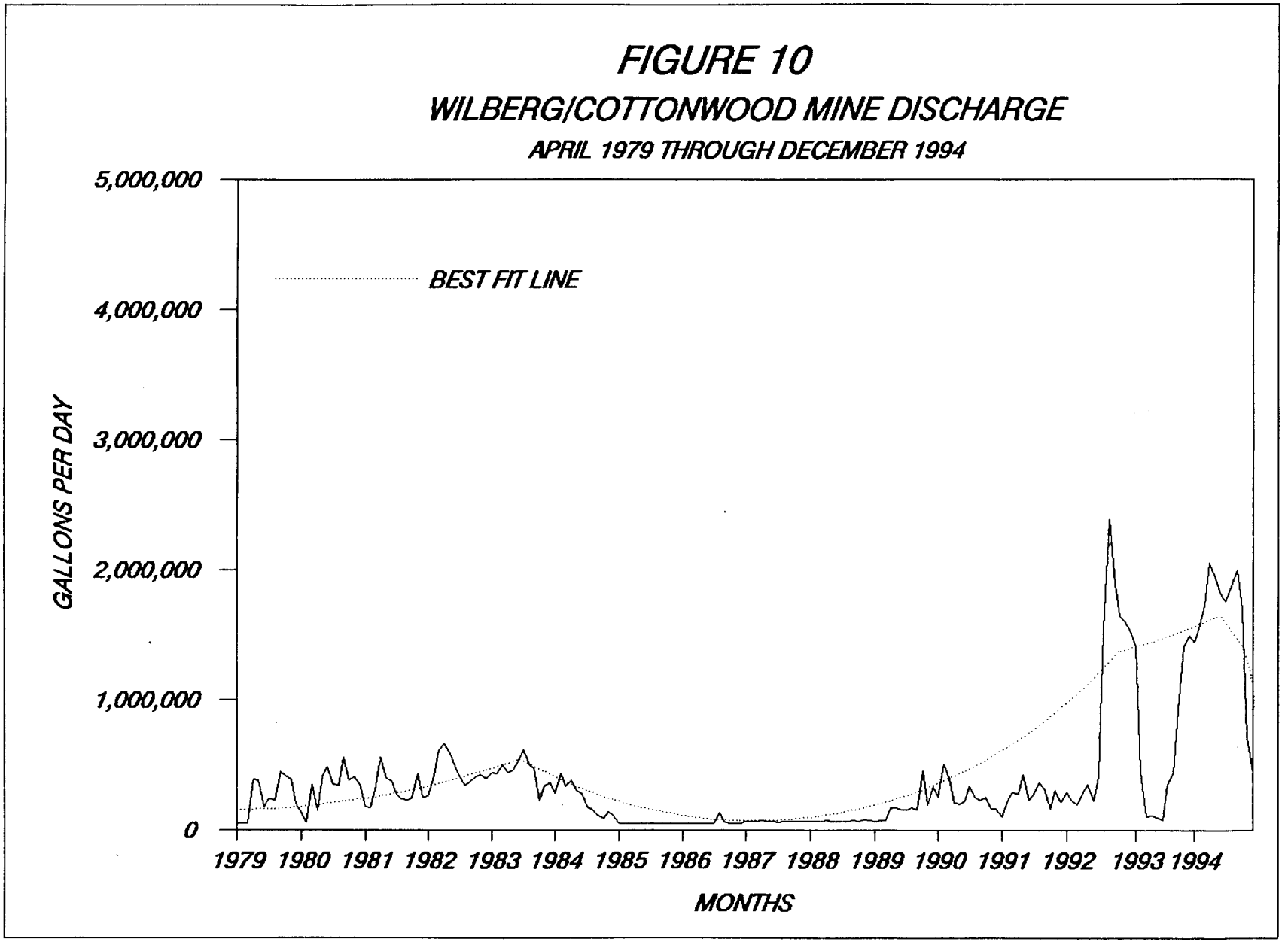


FIGURE 10
WILBERG/COTTONWOOD MINE DISCHARGE
APRIL 1979 THROUGH DECEMBER 1994
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
GALLONS PER DAY
BEST FIT LINE
1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994
MONTHS

TABLE 39: WILBERG/COTTONWOOD IN-MINE WATER QUALITY* - 1994

LOCATION	SAMPLE DATES	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON DISSOLVED	MAGNESIUM	MANGANESE	pH (units)	POTASSIUM	SODIUM	SULFATE	TDS
2S XC-11	3-28	609	166.0	1.0	15.0	1479	880	<0.20	113.00	<0.10	7.41	4.00	23.00	400	1010
	6-21	551	190.0	<1.0	13.0	1517	907	<0.20	105.00	<0.10	7.27	5.00	24.00	500	1040
	9-21	608	175.0	<1.0	17.0	1524	870	<0.20	106.00	<0.20	7.23	<5.00	21.00	410	1130
	12-21	545	166.0	<5.0	16.0	1528	860	<0.10	107.00	<0.10	7.13	5.00	24.00	350	1070
	MIN	545	166.0	1.0	13.0	1479	860	0.10	105.00	0.10	7.13	4.00	21.00	350	1010
	MAX	609	190.0	5.0	17.0	1528	907	0.20	113.00	0.20	7.41	5.00	24.00	500	1130
	MEAN	578	174.2	2.0	15.2	1512	879	0.18	107.75	0.13	7.26	4.75	23.00	415	1062
HISTORICAL (1983-93)	MIN	403	116.0	0.1	9.6	1000	725	0.01	5.40	0.01	6.50	0.30	5.80	250	664
	MAX	676	330.0	1.0	160.0	2600	1022	0.30	134.40	0.10	8.05	7.40	36.90	690	1328
	MEAN	527	173.1	0.9	25.9	1458	872	0.09	104.57	0.03	7.32	4.12	22.51	421	1002
	NO. OF ANALYSES	29	32	25	31	32	29	28	32	29	32	31	32	32	32
TMA XC-32	3-28	425	127.0	<1.0	13.0	1333	688	<0.20	90.00	<0.10	7.39	7.00	35.00	400	960
	6-21	393	133.0	<1.0	12.0	1319	678	<0.20	84.00	<0.10	7.13	7.00	35.00	350	960
	9-21	431	132.0	<1.0	17.0	1330	670	<0.20	82.00	<0.20	8.06	8.00	33.00	410	930
	12-21	379	126.0	<5.0	16.0	1334	630	<0.10	77.00	<0.10	7.30	8.00	35.00	390	920
	MIN	379	126.0	1.0	12.0	1319	630	0.10	77.00	0.10	7.13	7.00	33.00	350	920
	MAX	431	133.0	5.0	17.0	1334	688	0.20	90.00	0.20	8.06	8.00	35.00	410	960
	MEAN	407	129.5	2.0	14.5	1329	666	0.18	83.25	0.13	7.47	7.50	34.50	387	942

* Quality parameters are reported as mg/l unless otherwise noted.

c. Discharge Quantity

Water produced in the Wilberg Mine gravity flows to the northern area of 1st North. At that point it can either be pumped by a vertical turbine located in the Deer Creek Mine which picks up the water and pumps it back to the south and down to the Wilberg Mine main sump or pumped directly to the main sump utilizing submersible pumps. Water produced in the Cottonwood Mine (2nd North area) is transferred to the Wilberg Mine sump. The sump, which functions as a settling basin, effectively removes settleable solids from the water. A portion of the water is redistributed to various areas of the mine to be utilized in the mining operations. A total of 552.9 million gallons was discharged to Grimes Wash during 1994; and intermittent small quantity discharges did occur at the Miller Canyon breakouts, which were developed for ventilation purposes but sealed in 1987. (See Figure 11.) Intermittent discharges usually occur throughout the year with a flow rate ranging from 4 to 6 GPM. Discharge from Miller Canyon is monitored in accordance with stipulations of the Wilberg Mine Discharge Permit UT-0022896-04. Approximately 2.7 million gallons were discharged during 1994.

d. Discharge Quality

Samples are collected each month from Grimes Wash and Miller Canyon breakouts whenever discharge occurs. Monthly samples were collected from both the Grimes Wash and Miller Canyon locations during 1994. Table 40 compares the minimum, maximum, and mean values from 1994 to the historical values.

TABLE 40: WILBERG/COTTONWOOD - DISCHARGE WATER QUALITY*

GRIMES WASH

Parameters	1994 Minimum	1994 Maximum	1994 Mean	Historical - (1976-1993) Minimum	Historical - (1976-1993) Maximum	Historical - (1976-1993) Mean
pH (units)	7.1	8.5	7.6	6.9	8.5	7.67
Acidity	10.0	10.0	10.0	0.1	62.0	7.3
Alkalinity	273	360	320.4	163	442	279.7
Chloride	10.0	40.0	14.0	0.6	80.0	17.0
Conductivity (umhos/cm)	882	1088	965	490	1590	963
Iron, Total	<0.2	2.0	0.65	0.01	3.0	0.26
Oil & Grease	<5.0	<5.0	<5.0	0.1	23.8	1.7
Sulfate	150	270	191.5	29.2	600	238.6
TDS	550	716	626	407	1287	607
TSS	<4.0	6.0	4.2	0.1	222	7.6

MILLER CANYON

Parameters	1994 Minimum	1994 Maximum	1994 Mean	Historical - (1976-1993) Minimum	Historical - (1976-1993) Maximum	Historical - (1976-1993) Mean
pH (units)	6.8	8.25	7.44	6.4	8.5	7.23
Acidity	10.0	10.0	10.0	0.1	98	21.2
Alkalinity	240	370	322.3	219	445	335.0
Chloride	13	40	20.5	10	155	23.9
Conductivity (umhos/cm)	1242	1379	1341	480	1900	1186
Iron, Total	<0.2	<0.2	<0.2	0.01	1.38	0.26
Oil & Grease	<5.0	<5.0	<5.0	0.1	5.8	7.2
Sulfate	300	680	418.0	200	650	415.5
TDS	850	990	945	413	1182	913
TSS	<4.0	15	6.1	0.1	32	4.6

* Quality parameters reported as mg/l unless otherwise noted.

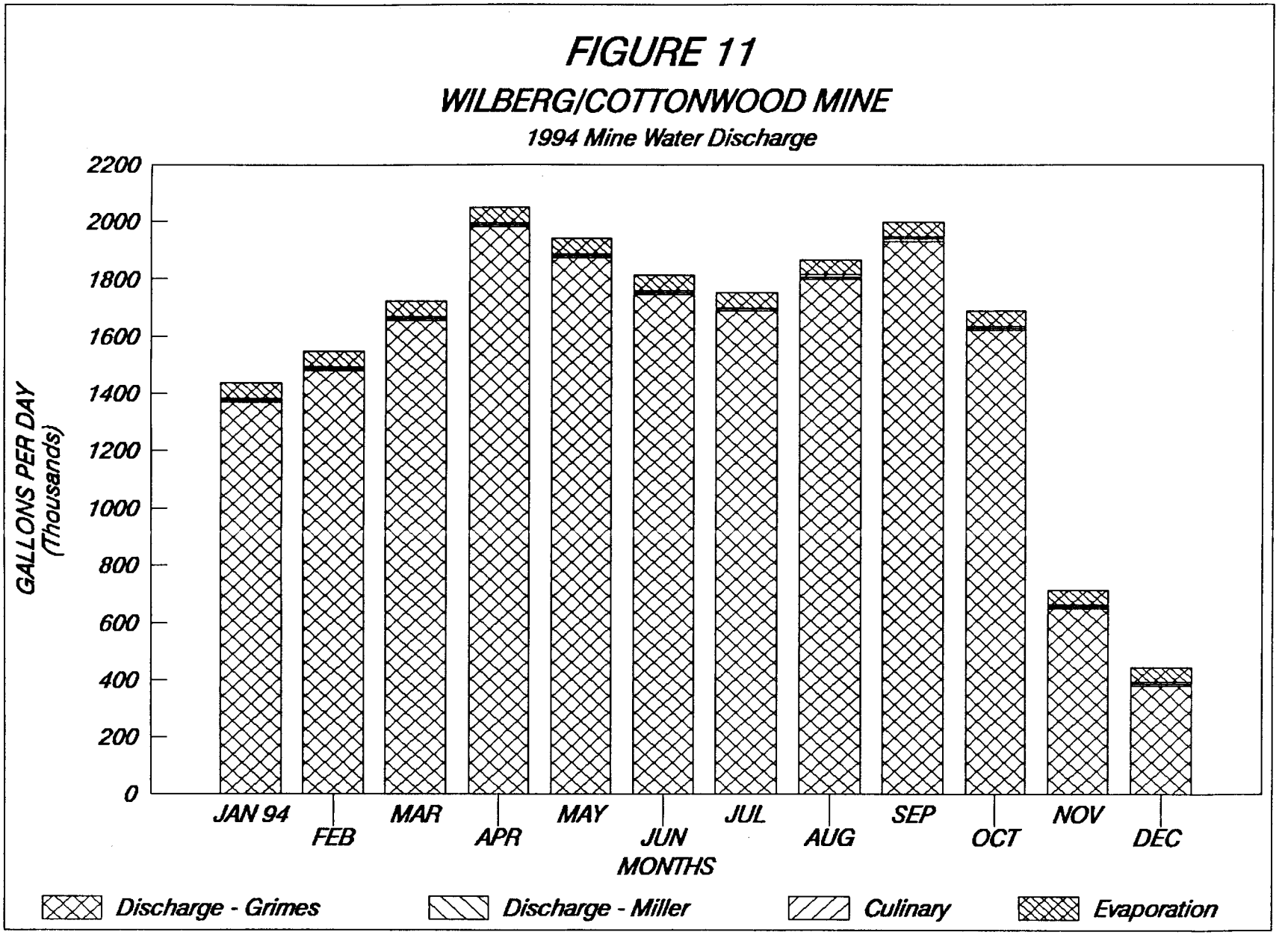


FIGURE 11
WILBERG/COTTONWOOD MINE
1994 Mine Water Discharge
GALLONS PER DAY
(Thousands)
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
JAN 94
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
Discharge - Grimes
Discharge - Miller
Culinary
Evaporation

4. Trail Mountain Mine

a. In-Mine Water Production

The best estimate of in-mine water production was arrived at by combining the following values:

Trail Mountain Discharge	0.0 Million Gallons
Estimated Evaporation	7.8 Million Gallons
Domestic Usage	0.9 Million Gallons
Total Discharge	8.7 Million Gallons

b. In-Mine Quality

Eight samples were collected in the Trail Mountain Mine in 1994. (See Map 6 in pocket for locations.) Parameters analyzed in 1994 are those listed in the DOGM Guidelines for Groundwater Baseline or Operational Quality. (See Appendix Q.) Table lists the characteristics of the samples collected and compares the mean, minimum, and maximum results of 1994 to the historical values for each location. It is apparent from Table 41 that the average quality of the in-mine water has remained relatively constant. (Refer to Cation/Anion diagrams in Appendix M.)

TABLE 41: TRAIL MOUNTAIN IN-MINE WATER QUALITY* - 1994

LOCATION	SAMPLE DATES	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON DISSOLVED	MAGNESIUM	MANGANESE	pH (units)	POTASSIUM	SODIUM	SULFATE	TDS
UG-2	3-28	378	8.0	4.0	16.0	593	41	<0.20	5.0	<0.10	8.23	4.0	124.0	<1.0	340
	6-21	346	11.0	5.0	6.0	599	52	<0.20	6.0	<0.10	8.19	3.0	119.0	<1.0	350
	9-26	387	7.0	<1.0	10.0	605	17	<0.20	5.0	<0.20	8.21	<5.0	129.0	3.0	360
	12-20	345	8.0	<5.0	8.0	598	57	<0.10	9.0	<0.10	8.20	3.0	128.0	<1.0	350
	MIN	345	7.0	1.0	6.0	593	41	0.10	5.0	0.10	8.19	3.0	119.0	1.0	340
	MAX	387	11.0	5.0	16.0	605	57	0.20	9.0	0.20	8.23	5.0	129.0	3.0	360
	MEAN	364	8.5	3.7	10.0	598	42	0.18	6.3	0.13	8.21	3.8	125.0	1.5	350
HISTORICAL (1985-93)	MIN	118	7.1	0.1	2.5	438	24	0.01	2.9	0.01	7.55	1.4	12.0	0.7	212
	MAX	395	683.2	9.6	355.0	3490	2419	0.20	201.0	0.10	8.33	18.9	148.0	1860.0	3170
	MEAN	320	150.2	5.1	78.7	1303	578	0.09	49.7	0.04	7.96	6.2	114.7	440.8	970
	NO. OF ANALYSES	18	18	5	18	15	18	7	18	7	16	17	18	17	18
UG-3	3-28	301	26.0	4.0	7.0	555	151	<0.20	21.0	<0.10	8.33	5.0	61.0	20.0	270
	6-21	281	36.0	6.0	5.0	561	185	<0.20	23.0	<0.10	8.20	4.0	54.0	60.0	320
	9-26	315	1.0	<1.0	2.0	533	180	<0.20	24.0	<0.20	8.06	<5.0	52.0	25.0	310
	12-20	288	30.0	<5.0	9.0	531	178	<0.10	25.0	<0.10	8.17	4.0	48.0	18.0	310
	MIN	281	26.0	1.0	2.0	531	151	0.10	21.0	0.10	8.06	4.0	48.0	18.0	270
	MAX	315	36.0	6.0	9.0	561	185	0.20	25.0	0.20	8.33	5.0	61.0	60.0	320
	MEAN	296	30.7	4.0	5.7	545	173	0.18	23.3	0.13	8.19	4.5	53.8	30.7	302
HISTORICAL (1985-93)	MIN	274	26.4	0.1	5.8	380	153	0.03	19.6	0.03	7.41	2.1	48.1	16.5	252
	MAX	344	49.3	8.4	15.0	696	222	0.20	29.0	0.10	8.48	4.3	58.0	130.0	424
	MEAN	302	37.2	2.6	8.7	538	187	0.09	22.9	0.05	8.03	3.5	52.2	49.8	319
	NO. OF ANALYSES	12	12	4	12	12	12	5	12	3	12	12	12	12	12

* Quality parameters are reported as mg/l unless otherwise noted.

c. Discharge Quantity

Water produced in the Trail Mountain Mine either is pumped or gravity flows to a sump located in 4th Left. A portion of the water is redistribruted to various areas of the mine to be utilized in the mining operations. Excess water not used in the mining operations is stored in sealed areas of the mine or discharged to Cottonwood Canyon Creek. No water was discharged from Trail Mountain Mine in 1994. Discharge from Trail Mountain is monitored in accordance with stipulations of the Trail Mountain Mine Discharge Permit UTG040003-002.

d. Discharge Quality

Samples are collected each month from Trail Mountain Mine whenever discharge occurs. No water discharged during 1994 from the Trail Mountain Mine. Appendix N includes monitoring completed at the sealed Oliphant Mine portals.

VI. PIEZOMETRIC GRADIENT INFORMATION

A. Surface

1. Cottonwood Canyon Creek

Eight (8) wells located along the extent of Cottonwood Canyon Creek are monitored monthly except TM-3, which is monitored quarterly. The following table lists the zone isolated with each well.

Well I.D.	Monitoring Zone
CCCW-1A	Alluvial Deposits
CCCW-1S	Starpoint Sandstone
CCCW-2A	Alluvial Deposits
CCCW-3A	Alluvial Deposits
CCCW-3S U	Blackhawk - Fluvial Sandstone
CCCW-3S L	Starpoint Sandstone
EM-31	Lower Blackhawk/Starpoint Sandstone
TM-1B	Starpoint Sandstone
TM-3 (Straight Canyon)	Starpoint Sandstone

Hydrographs of the surface wells can be found in Appendix O.

2. Rilda Canyon

Six (6) wells located in Rilda Canyon are monitored monthly when accessible. The following table lists the zone isolated with each well.

Well I.D.	Monitoring Zone
P-1	Alluvial Deposits
P-4	Alluvial Deposits
P-5	Alluvial Deposits
P-6	Alluvial Deposits
P-7	Alluvial Deposits
EM-47	Lower Blackhawk/Starpoint Sandstone

Information collected during 1994 correlated well with historical information. Hydrographs for the individual wells can be found in Appendix O.

B. In-Mine

1. Deer Creek

Four (4) long-term monitoring wells were completed during 1989. (See Map 2 for well locations.) Due to changes in the mine layout only one well remained active during 1994. Water levels remained relatively constant during 1994. (See Appendix I.)

2. Cottonwood Mine

During 1989 four holes were drilled in the Cottonwood Mine. Monitoring of the long-term wells, WCP 1-3, was discontinued in 1992 due to the sealing of the 3rd South area.

VII. WASTE ROCK WELLS

A. Deer Creek Mine - Waste Rock Storage Facility

The Deer Creek Waste Rock Storage Facility is located on the northeast side of State Highway 31 approximately six (6) miles west of Huntington, Utah.

The geology of the Deer Creek Waste Rock Storage Facility is fairly simple and straightforward. The site is located on the southern flanks of Gentry Mountain in the area just south of Wild Horse Ridge. Rocks exposed in the area are marine-derived mudstones in the lower portion of the Masuk member of the Mancos Shale. The Masuk Shale on the bench which adjoins the proposed site on the east and west is covered by a five- to twenty-foot thick layer of terrace gravel of Quaternary age. North-south trending normal faults have disrupted the strata in the region; however, no faults are known to exist within the area of the proposed Deer Creek Waste Rock Storage Facility.

The test wells completed prior to construction identified the existence of a limited quantity of groundwater locally in the Masuk Shale. The water is most likely flowing along fractures in the strata. The rate of water migration has been shown to be extremely slow (< 100 feet per year); therefore, the proposed operations to be conducted at the waste rock site should not impact the hydrology of the area. The weathered Masuk Shale present on and near the ground surface will act as an effective barrier to prevent the surface waters from migrating to depths and intersecting groundwater.

The groundwater present in the terrace gravels should not be impacted by the waste rock site because it is located at a higher elevation than the proposed site.

In order to identify the groundwater quality characteristics of the waste rock storage facility one of the test wells completed prior to the construction of the site was developed into a long-term water monitoring well. (See Map 1 for location.)

Four samples were collected in 1994. The analysis, along with water depth, is listed in Table 42. Values are in milligrams per liter unless otherwise noted. Complete raw data can be found in Appendix O. It is a well known fact that the Mancos Shale typically contains large quantities of soluble minerals such as gypsum; therefore, any water passing through it will be naturally high in dissolved solids. Samples at the waste rock well verify this condition.

B. Cottonwood/Wilberg Mines - Waste Rock Storage Facility

The Cottonwood/Wilberg Waste Rock Storage Facility is located on the west side of the Wilberg Mine road approximately 1.5 miles south of the Wilberg Mine.

The geology of the proposed waste rock site is fairly simple and straightforward. The site is located on the southern flank of East Mountain to the south of Newberry Canyon. Rocks exposed in the area are marine-derived mudstones in the lower portion of the Masuk member of the Mancos Shale. The Masuk Shale on the bench which adjoins the proposed site on the north and east is covered by a five- to twenty-foot thick layer of terrace gravel of Quaternary age. North-south trending normal faults have disrupted the strata in the region; however, no faults are known to exist within the area of the proposed waste rock site.

In order to identify the groundwater quality characteristics of the waste rock storage facility one of the test wells completed prior to the construction of the site was developed into a long-term water monitoring well. (See Map 1 for location.)

TABLE 42: WELLS - ...ER QUALITY* - 1994

SAMPLE DATES	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY	HARDNESS	IRON DISSOLVED	MAGNESIUM	MANGANESE	pH	POTASSIUM	SODIUM	SULFATE	TDS
					(umhos/cm)						(units)			
						DEER CREEK - DCWR-1								
3-23	820	185.0	2.0	206	24,200	1471	<0.20	245.0	<0.10	7.7	13.0	7000	13,000	21,970
6-22	719	180.0	<1.0	822	24,000	1380	<0.20	226.0	<0.10	7.9	13.0	6180	13,000	22,880
9-16	781	180.0	<1.0	777	24,100	1528	<0.20	262.0	<0.20	7.6	16.0	6490	11,000	22,280
12-19	705	157.0	<5.0	940	24,100	1520	<0.10	275.0	<0.10	7.6	17.0	6890	12,200	21,880
MIN	705	157.0	1.0	206	24,000	1380	0.10	226.0	0.10	7.6	13.0	6180	11,000	21,880
MAX	820	185.0	5.0	940	24,200	1528	0.20	275.0	0.20	7.9	17.0	7000	13,000	22,880
MEAN	756	175.5	2.2	686	24,100	1474	0.18	252.0	0.13	7.7	14.8	6640	12,300	22,252
HISTORICAL 1989-1993:														
MIN	626	142.2	0.0	645	17,300	951	0.05	57.0	0.01	7.3	14.0	5165	6,000	11,466
MAX	935	880.1	1.0	1140	45,000	3351	1.74	351.0	0.20	8.2	43.8	9978	18,000	24,189
MEAN	758	286.2	0.6	889	26,430	1673	0.41	232.9	0.06	7.7	26.1	7021	13,522	21,056
NO. OF ANALYSES	19	20	20	20	20	20	16	20	20	20	20	20	20	20
						WILBERG/COTTONWOOD - WCWR-1								
3-28	364	213.0	1.0	3040	22,900	3876	<0.20	812.0	0.10	7.8	27.0	5200	11,000	19,890
6-16	382	270.0	<1.0	2100	24,000	4479	<0.20	924.0	0.20	8.0	33.0	5470	14,500	21,556
9-21	405	331.0	<1.0	4020	25,200	5250	<0.20	1075.0	<0.20	7.8	41.0	5815	10,000	23,271
12-19	326	248.0	<5.0	3000	25,000	1730	<0.10	270.0	<0.10	7.7	33.0	5600	11,600	22,820
MIN	326	213.0	1.0	2100	22,900	1730	0.10	270.0	0.10	7.7	27.0	5200	10,000	19,890
MAX	405	331.0	5.0	4020	25,200	5250	0.20	1075.0	0.20	8.0	41.0	5815	14,500	23,271
MEAN	369	265.5	2.0	3040	24,275	3833	0.18	770.3	0.15	7.8	33.5	5521	11,755	21,884
HISTORICAL 1989-1993:														
MIN	305	132.0	0.0	280	10,666	1629	0.05	138=7.7	0.02	6.9	8.0	851	750	8,714
MAX	863	1135.0	1.0	3700	120,000	8327	9.00	1717.0	2.48	8.3	119.1	8812	24,000	30,440
MEAN	530	486.6	0.5	1135	34,092	4407	1.08	750.2	0.45	7.6	51.4	5163	12,539	19,876
NO. OF ANALYSES	19	19	19	19	19	19	15	19	19	19	19	19	19	19
						TRAIL MOUNTAIN TM-1B								
6-22	862	5.0	28.0	124	1,981	21	<0.20	2.0	<0.10	8.8	3.0	545	35	1120
9-16	960	<5.0	<1.0	142	1,944	0	<0.20	<5.0	<0.20	8.6	<5.0	474	4	1110
MIN	862	5.0	1.0	124	1944	21	0.20	2.0	0.10	8.6	3.0	474	4	1110
MAX	960	5.0	28.0	142	1981	21	0.20	5.0	0.20	8.8	5.0	545	35	1120
MEAN	911	5.0	14.5	133	1962	21	0.20	3.5	0.15	8.7	4.0	510	20	1115
HISTORICAL 1985-1993:														
MIN	304	2.4	152.0	69	1050	18	0.05	2.9	0.01	9.5	11.7	231	20	632
MAX	346	3.6	164.0	69	1050	53	0.05	10.7	0.01	9.6	15.7	239	27	652
MEAN	325	3.0	158.0	69	1050	35	0.05	6.8	0.01	9.5	13.7	235	24	642
NO. OF ANALYSES	29	29	29	29	23	27	25	29	29	23	29	29	29	28

* Quality parameters reported as mg/l unless otherwise noted.

Four samples were collected in 1994. The analysis, along with water depth, is listed in Table 42. Values are in milligrams per liter unless otherwise noted. Complete raw data can be found in Appendix O. It is a well known fact that the Mancos Shale typically contains large quantities of soluble minerals such as gypsum; therefore, any water passing through it will be naturally high in dissolved solids. Samples at the waste rock well verify this condition.

VIII. EFFECTS OF MINING AND SUBSIDENCE ON HYDROLOGY

Since the development of the PacifiCorp mining complex on East and Trail mountains, 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 annual Subsidence Monitoring reports.)

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 and Trail mountains or the surrounding area.

IX. SUMMARY

PacifiCorp 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. The program has been in existence since 1977, and this is the sixteenth annual report submitted concerning the hydrology.

From 1982 to 1984 the Western United States, especially Utah, experienced an unprecedented wet cycle of precipitation. The 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. The 1987 weather pattern changed dramatically with near normal valley precipitation and mountain snowfall much below normal. The resulting 1987 runoff was substantially below normal. The drought continued from 1988 through 1992. Runoff improved substantially in 1993 with above average flow conditions occurring in most drainages. The drought returned in 1994, with precipitation and runoff much below normal.

The data collected in 1994 continued to show the relationship between the variation in surface water quantity and precipitation, but the hydrologic monitoring completed on East and Trail mountains to date has failed to identify any change in the quantity or quality of ground or surface water which can be attributed to mining present on the East and Trail Mountain properties.

APPENDIX A

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	62.00	42.00	28.00	20.00	8.90	19.00	20.00	45.00	84.00	82.00	78.00	58.00	1
2	63.00	40.00	27.00	22.00	10.00	20.00	20.00	43.00	82.00	80.00	78.00	57.00	2
3	63.00	22.00	21.00	26.00	12.00	21.00	22.00	52.00	75.00	80.00	70.00	59.00	3
4	63.00	20.00	24.00	25.00	14.00	22.00	22.00	57.00	83.00	79.00	70.00	54.00	4
5	65.00	22.00	24.00	23.00	14.00	22.00	22.00	75.00	76.00	89.00	66.00	53.00	5
6	81.00	19.00	25.00	23.00	13.00	22.00	22.00	67.00	80.00	98.00	65.00	55.00	6
7	73.00	21.00	25.00	19.00	19.00	22.00	22.00	72.00	79.00	98.00	65.00	51.00	7
8	73.00	23.00	29.00	18.00	23.00	21.00	21.00	59.00	74.00	102.00	71.00	52.00	8
9	69.00	21.00	29.00	19.00	22.00	19.00	23.00	61.00	77.00	99.00	73.00	49.00	9
10	67.00	22.00	28.00	20.00	23.00	19.00	22.00	100.00	74.00	99.00	72.00	46.00	10
11	71.00	23.00	27.00	17.00	22.00	19.00	21.00	109.00	80.00	97.00	70.00	46.00	11
12	69.00	25.00	27.00	21.00	19.00	19.00	23.00	123.00	78.00	99.00	64.00	49.00	12
13	34.00	24.00	20.00	22.00	22.00	20.00	24.00	140.00	74.00	96.00	63.00	51.00	13
14	34.00	23.00	24.00	21.00	21.00	21.00	26.00	127.00	75.00	98.00	64.00	39.00	14
15	35.00	20.00	21.00	18.00	21.00	21.00	28.00	113.00	80.00	97.00	65.00	38.00	15
16	39.00	18.00	21.00	15.00	15.00	21.00	29.00	117.00	80.00	97.00	64.00	38.00	16
17	41.00	29.00	18.00	13.00	12.00	20.00	34.00	99.00	81.00	97.00	64.00	38.00	17
18	40.00	33.00	16.00	14.00	14.00	19.00	35.00	121.00	80.00	97.00	65.00	38.00	18
19	39.00	26.00	17.00	11.00	13.00	19.00	35.00	142.00	78.00	95.00	66.00	38.00	19
20	27.00	24.00	12.00	13.00	13.00	19.00	41.00	136.00	79.00	88.00	64.00	43.00	20
21	23.00	28.00	14.00	12.00	20.00	18.00	51.00	134.00	81.00	82.00	65.00	38.00	21
22	28.00	32.00	15.00	12.00	18.00	19.00	60.00	138.00	92.00	87.00	64.00	38.00	22
23	23.00	33.00	16.00	13.00	16.00	17.00	64.00	141.00	86.00	85.00	63.00	36.00	23
24	23.00	24.00	16.00	14.00	18.00	15.00	52.00	144.00	84.00	83.00	61.00	37.00	24
25	23.00	18.00	18.00	13.00	19.00	16.00	40.00	106.00	84.00	82.00	64.00	37.00	25
26	31.00	16.00	18.00	13.00	19.00	16.00	37.00	96.00	83.00	80.00	66.00	37.00	26
27	44.00	23.00	19.00	12.00	19.00	16.00	40.00	97.00	83.00	75.00	69.00	39.00	27
28	44.00	27.00	19.00	12.00	19.00	16.00	38.00	98.00	85.00	75.00	69.00	50.00	28
29	43.00	29.00	17.00	16.00	0.00	19.00	36.00	97.00	88.00	73.00	68.00	54.00	29
30	42.00	28.00	16.00	12.00	0.00	18.00	41.00	95.00	89.00	71.00	70.00	59.00	30
31	42.00	0.00	21.00	11.00	0.00	19.00	0.00	95.00	0.00	72.00	60.00	0.00	31
MONTHLY													
TOT	1474.00	755.00	651.00	516.00	478.90	594.00	971.00	3098.00	2424.00	2732.00	2076.00	1377.00	
MEA	47.50	25.20	21.00	16.60	17.10	19.20	32.40	99.90	80.80	88.10	67.00	45.90	
MAX	81.00	42.00	29.00	26.00	23.00	22.00	64.00	144.00	92.00	102.00	78.00	59.00	
MIN	23.00	16.00	12.00	11.00	8.90	15.00	20.00	43.00	74.00	71.00	60.00	36.00	
ACR FT	2920.00	1500.00	1290.00	1020.00	950.00	1180.00	1930.00	6140.00	4810.00	5420.00	4120.00	2730.00	

OCT93-SEPT94 TOTAL 17146.90 MEAN 47.00 MAX 144.00 MIN 8.90 TOT ACR FT 34010.00

TOTAL MEAN MAX MIN TOT ACR FT

MAX UNIT DISCHARGE 218.00 CFS (3.25 FT) DATE AUG 1 MIN UNIT DISCHARGE 3.90 CFS DATE JAN 31

REMARKS:

UTAH POWER & LIGHT COMPANY

STREAM DISCHARGE RECORDS

DAILY DISCHARGE (CFS)

AY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	11.00	19.00	12.00	12.00	14.00	13.00	12.00	11.00	12.00	13.00	44.00	45.00	1
2	11.00	20.00	12.00	12.00	15.00	13.00	13.00	12.00	12.00	11.00	47.00	45.00	2
3	12.00	14.00	12.00	12.00	15.00	13.00	13.00	14.00	12.00	11.00	47.00	45.00	3
4	12.00	9.00	12.00	12.00	14.00	13.00	13.00	14.00	12.00	12.00	47.00	44.00	4
5	12.00	11.00	12.00	12.00	14.00	13.00	13.00	14.00	12.00	12.00	47.00	45.00	5
6	13.00	12.00	12.00	12.00	14.00	13.00	13.00	14.00	12.00	12.00	47.00	45.00	6
7	14.00	12.00	12.00	12.00	14.00	13.00	14.00	15.00	12.00	14.00	46.00	44.00	7
8	14.00	12.00	12.00	12.00	14.00	12.00	14.00	15.00	12.00	16.00	46.00	44.00	8
9	14.00	12.00	12.00	12.00	14.00	11.00	14.00	15.00	13.00	16.00	46.00	44.00	9
0	14.00	12.00	12.00	12.00	14.00	11.00	15.00	15.00	13.00	17.00	47.00	44.00	10
1	14.00	12.00	12.00	12.00	14.00	11.00	15.00	15.00	13.00	17.00	47.00	44.00	11
2	14.00	12.00	12.00	12.00	14.00	11.00	15.00	15.00	13.00	17.00	47.00	43.00	12
3	14.00	12.00	12.00	12.00	13.00	11.00	16.00	15.00	13.00	16.00	47.00	46.00	13
4	14.00	12.00	12.00	12.00	13.00	12.00	16.00	15.00	13.00	18.00	47.00	46.00	14
5	15.00	12.00	12.00	12.00	12.00	12.00	17.00	22.00	13.00	18.00	47.00	45.00	15
6	15.00	12.00	12.00	12.00	13.00	12.00	17.00	22.00	15.00	18.00	47.00	45.00	16
7	16.00	12.00	10.00	12.00	13.00	12.00	18.00	15.00	14.00	18.00	47.00	45.00	17
8	17.00	12.00	9.80	12.00	13.00	12.00	19.00	15.00	14.00	17.00	47.00	44.00	18
9	17.00	12.00	9.80	12.00	13.00	12.00	20.00	15.00	14.00	29.00	47.00	44.00	19
0	11.00	12.00	11.00	12.00	12.00	12.00	20.00	15.00	14.00	40.00	47.00	44.00	20
1	12.00	12.00	11.00	13.00	12.00	12.00	21.00	15.00	14.00	38.00	47.00	44.00	21
2	16.00	11.00	11.00	13.00	12.00	12.00	22.00	15.00	14.00	38.00	47.00	44.00	22
3	7.90	11.00	11.00	13.00	13.00	12.00	23.00	14.00	13.00	39.00	47.00	43.00	23
4	8.90	11.00	11.00	13.00	14.00	12.00	22.00	13.00	13.00	39.00	45.00	43.00	24
5	9.70	11.00	11.00	13.00	14.00	12.00	23.00	13.00	13.00	39.00	46.00	43.00	25
6	11.00	11.00	12.00	13.00	14.00	12.00	23.00	13.00	13.00	40.00	42.00	43.00	26
7	14.00	11.00	12.00	13.00	14.00	12.00	23.00	13.00	13.00	40.00	45.00	43.00	27
8	15.00	12.00	12.00	13.00	13.00	12.00	23.00	13.00	15.00	40.00	44.00	25.00	28
9	16.00	12.00	12.00	13.00	0.00	12.00	24.00	13.00	15.00	41.00	44.00	14.00	29
0	17.00	12.00	12.00	13.00	0.00	12.00	17.00	13.00	15.00	41.00	44.00	13.00	30
1	17.00	0.00	12.00	13.00	0.00	12.00	0.00	13.00	0.00	42.00	44.00	0.00	31
ONTHLY													
OT	418.50	367.00	359.60	383.00	378.00	374.00	528.00	451.00	394.00	779.00	1429.00	1246.00	
EA	13.50	12.20	11.60	12.40	13.50	12.10	17.60	14.50	13.10	25.10	46.10	41.50	
AX	17.00	20.00	12.00	13.00	15.00	13.00	24.00	22.00	15.00	42.00	47.00	46.00	
IN	7.90	9.00	9.80	12.00	12.00	11.00	12.00	11.00	12.00	11.00	42.00	13.00	
CR FT	830.00	728.00	713.00	760.00	750.00	742.00	1050.00	895.00	781.00	1550.00	2830.00	2470.00	

CT93-SEPT94	TOTAL	7107.10	MEAN	19.50	MAX	47.00	MIN	7.90	TOT ACR FT	14100.00		
	TOTAL		MEAN		MAX		MIN		TOT ACR FT			

MAX UNIT DISCHARGE 49.00 CFS (1.67 FT) DATE AUG 26 MIN UNIT DISCHARGE 1.40 CFS DATE JUL 13

EMARKS:

UTAH POWER & LIGHT COMPANY

DAILY GAGE HEIGHT (FEET)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	240.99	240.40	238.89	237.18	235.35	234.11	233.22	236.17	245.35	244.60	239.32	231.26	1
2	240.95	240.39	238.84	237.11	235.29	234.06	233.22	236.24	245.44	244.53	239.06	230.95	2
3	240.90	240.39	238.79	237.06	235.22	234.00	233.22	236.27	245.52	244.45	238.79	230.70	3
4	240.85	240.39	238.73	236.97	235.14	233.95	233.25	236.37	245.59	244.36	238.51	230.43	4
5	240.80	240.38	238.67	236.92	235.10	233.91	233.24	236.60	245.63	244.27	238.22	230.16	5
6	240.79	240.26	238.61	236.89	235.05	233.87	233.21	236.79	245.67	244.17	237.94	229.90	6
7	240.77	240.19	238.55	236.83	235.03	233.83	233.25	236.89	245.70	244.07	237.68	229.68	7
8	240.77	240.13	238.49	236.78	235.05	233.79	233.23	237.00	245.71	243.95	237.41	229.35	8
9	240.75	240.06	238.43	236.72	234.98	233.75	233.23	237.36	245.72	243.85	237.14	229.10	9
10	240.70	239.99	238.37	236.66	234.95	233.71	233.22	237.72	245.72	243.72	236.90	228.81	10
11	240.70	239.93	238.32	236.60	234.97	233.69	233.20	238.08	245.72	243.60	236.64	228.56	11
12	240.70	239.88	238.31	236.55	234.91	233.65	233.19	238.44	245.70	243.48	236.38	228.31	12
13	240.67	239.84	238.24	236.48	234.85	233.62	233.20	238.80	245.69	243.36	236.12	228.06	13
14	240.64	239.78	238.18	236.42	234.79	233.60	233.23	239.16	245.65	243.25	235.85	227.76	14
15	240.61	239.71	238.13	236.36	234.73	233.58	233.28	239.52	245.62	243.12	235.62	227.47	15
16	240.59	239.64	238.08	236.30	234.67	233.55	233.35	239.88	245.58	243.00	235.26	227.17	16
17	240.57	239.58	238.04	236.24	234.64	233.53	233.50	240.24	245.54	242.89	235.02	226.90	17
18	240.55	239.54	237.99	236.17	234.65	233.51	233.65	240.60	245.50	242.78	234.78	226.55	18
19	240.52	239.47	237.94	236.12	234.62	233.50	233.85	240.96	245.46	242.59	234.54	226.35	19
20	240.49	239.40	237.88	236.05	234.58	233.48	234.10	241.32	245.42	242.31	234.44	226.15	20
21	240.47	239.34	237.83	235.98	234.55	233.44	234.35	241.68	245.38	242.05	234.18	225.82	21
22	240.44	239.36	237.77	235.91	234.51	233.47	234.70	242.04	245.33	241.80	233.87	225.60	22
23	240.44	239.36	237.70	235.85	234.45	233.45	235.15	242.40	245.23	241.57	233.64	225.37	23
24	240.44	239.30	237.65	235.80	234.38	233.42	235.40	242.76	245.21	241.31	233.38	225.10	24
25	240.44	239.24	237.59	235.74	234.31	233.41	235.58	243.12	245.15	241.06	233.13	224.82	25
26	240.43	239.17	237.53	235.68	234.25	233.37	235.70	243.48	245.06	240.86	232.93	224.54	26
27	240.42	239.11	237.48	235.65	234.22	233.34	235.85	243.84	244.99	240.57	232.67	224.26	27
28	240.42	239.06	237.42	235.60	234.16	233.31	235.96	244.20	244.90	240.30	232.47	224.10	28
29	240.41	239.00	237.35	235.54	0.00	233.28	236.05	244.56	244.81	240.05	232.15	224.07	29
30	240.40	238.95	237.29	235.48	0.00	233.25	236.10	244.92	244.72	239.89	231.87	224.07	30
31	240.39	0.00	237.23	235.41	0.00	233.23	0.00	245.04	0.00	239.66	231.61	0.00	31

MAXIMUM GAGE HEIGHT 245.72 JUN 9 MINIMUM GAGE HEIGHT 224.07 SEP 29

NOTE: ADD 8300 FEET TO GAGE HEIGHT TO OBTAIN ELEVATION

UTAH POWER & LIGHT COMPANY

RESERVOIR RECORDS

DAILY CONTENTS (ACRE FEET)

AY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	18310.00	18133.00	17685.00	17188.00	16669.00	16324.00	16080.00	16900.00	19666.00	19427.00	17812.00	15551.00	1
2	18298.00	18130.00	17670.00	17168.00	16652.00	16310.00	16080.00	16920.00	19695.00	19405.00	17735.00	15468.00	2
3	18283.00	18130.00	17656.00	17154.00	16633.00	16294.00	16080.00	16929.00	19720.00	19379.00	17656.00	15402.00	3
4	18268.00	18130.00	17638.00	17128.00	16610.00	16280.00	16088.00	16957.00	19743.00	19351.00	17574.00	15331.00	4
5	18253.00	18127.00	17620.00	17114.00	16599.00	16269.00	16085.00	17023.00	19756.00	19322.00	17489.00	15260.00	5
6	18250.00	18091.00	17603.00	17105.00	16585.00	16258.00	16077.00	17077.00	19769.00	19291.00	17408.00	15192.00	6
7	18244.00	18070.00	17585.00	17088.00	16580.00	16247.00	16088.00	17105.00	19778.00	19259.00	17333.00	15134.00	7
8	18244.00	18052.00	17568.00	17074.00	16585.00	16236.00	16082.00	17137.00	19781.00	19222.00	17255.00	15048.00	8
9	18238.00	18031.00	17550.00	17057.00	16566.00	16225.00	16082.00	17240.00	19785.00	19190.00	17177.00	14983.00	9
0	18223.00	18010.00	17533.00	17040.00	16557.00	16214.00	16080.00	17344.00	19785.00	19149.00	17108.00	14908.00	10
1	18223.00	17992.00	17518.00	17023.00	16563.00	16208.00	16074.00	17448.00	19785.00	19112.00	17034.00	14844.00	11
2	18223.00	17978.00	17515.00	17008.00	16546.00	16197.00	16071.00	17553.00	19778.00	19074.00	16960.00	14779.00	12
3	18214.00	17966.00	17495.00	16988.00	16529.00	16189.00	16074.00	17659.00	19775.00	19037.00	16886.00	14715.00	13
4	18205.00	17948.00	17477.00	16971.00	16513.00	16184.00	16082.00	17764.00	19762.00	19003.00	16810.00	14639.00	14
5	18196.00	17927.00	17463.00	16954.00	16496.00	16178.00	16096.00	17871.00	19753.00	18962.00	16745.00	14565.00	15
6	18190.00	17906.00	17448.00	16937.00	16479.00	16170.00	16115.00	17978.00	19740.00	18925.00	16644.00	14489.00	16
7	18184.00	17886.00	17437.00	16920.00	16471.00	16164.00	16156.00	18085.00	19727.00	18891.00	16577.00	14421.00	17
8	18178.00	17877.00	17422.00	16900.00	16474.00	16159.00	16197.00	18193.00	19714.00	18857.00	16510.00	14333.00	18
9	18169.00	17856.00	17408.00	16886.00	16465.00	16156.00	16252.00	18301.00	19701.00	18798.00	16443.00	14282.00	19
0	18160.00	17835.00	17390.00	16866.00	16454.00	16151.00	16321.00	18410.00	19688.00	18712.00	16415.00	14232.00	20
1	18154.00	17817.00	17376.00	16847.00	16446.00	16140.00	16390.00	18519.00	19675.00	18632.00	16343.00	14150.00	21
2	18145.00	17823.00	17359.00	16827.00	16435.00	16148.00	16488.00	18629.00	19659.00	18556.00	16258.00	14096.00	22
3	18145.00	17823.00	17338.00	16810.00	16418.00	16142.00	16613.00	18740.00	19627.00	18486.00	16195.00	14039.00	23
4	18145.00	17806.00	17324.00	16796.00	16399.00	16134.00	16683.00	18851.00	19621.00	18407.00	16123.00	13972.00	24
5	18145.00	17788.00	17307.00	16779.00	16379.00	16132.00	16734.00	18962.00	19602.00	18331.00	16055.00	13903.00	25
6	18142.00	17767.00	17289.00	16762.00	16363.00	16121.00	16768.00	19074.00	19573.00	18271.00	16001.00	13834.00	26
7	18139.00	17750.00	17275.00	16753.00	16354.00	16112.00	16810.00	19187.00	19551.00	18184.00	15930.00	13766.00	27
8	18139.00	17735.00	17258.00	16739.00	16338.00	16104.00	16841.00	19300.00	19522.00	18103.00	15876.00	13727.00	28
9	18136.00	17717.00	17237.00	16722.00	0.00	16096.00	16866.00	19414.00	19493.00	18028.00	15789.00	13720.00	29
0	18133.00	17703.00	17220.00	16706.00	0.00	16088.00	16881.00	19528.00	19465.00	17980.00	15714.00	13720.00	30
1	18130.00	0.00	17203.00	16686.00	0.00	16082.00	0.00	19567.00	0.00	17912.00	15644.00	0.00	31
ONTHLY HANGE	-192.	-427.	-500.	-517.	-348.	-256.	799.	2686.	-102.	-1553.	-2268.	-1924.	

CT93-SEPT94 TOTAL CHANGE -4602. MAX CONTENTS 19785. AC FT JUN 9 MIN CONTENTS 13720. AC FT SEP 29

TOTAL CHANGE MAX CONTENTS MIN CONTENTS

EMARKS:

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • TEL: 708-953-9300 FAX: 708-953-9306
SINCE 1908
Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

January 26, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
1/26/94

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCCO1

Kind of sample reported to us: Water

FIELD OFFICE

Sample taken at: Huntington Canyon Creek

Sample taken by: Energy West/KH

Date sampled: January 20, 1994

Date received: January 20, 1994

Temperature 32.8°F
Flow NA
Rec'd 1130 hr.
Sampled 1020 hr.

FIELD MEASUREMENTS	
pH	8.69
Conductivity	390
DO	10.9
Turbidity	3.9

Analysis report no. 59-13851

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l	$CaCO_3$	2310 B	01-26-1994 1130 ED
Alkalinity, Bicarbonate	244	1	mg/l	HCO_3	4500 CO_2D	01-24-1994 1040 LS
Alkalinity, Carbonate	3	1	mg/l	CO_3	4500 CO_2D	01-24-1994 1040 LS
Alkalinity, Total	204	1	mg/l	$CaCO_3$	EPA 310.1	01-24-1994 1040 LS
Anions	5.00	----	meq/l		---------	---------- ----- --
Calcium	52.0	1	mg/l		EPA 215.1	01-24-1994 1600 DW
Cations	4.40	----	meq/l		---------	---------- ----- --
Chloride	7.0	1	mg/l		EPA 325.3	01-25-1994 1025 LS
Conductivity	392.00	0.2	umhos/cm		EPA 120.1	01-20-1994 1315 ED
Hardness, Total	208.0	1	mg/l	$CaCO_3$	2340 B	01-24-1994 1600 DW
Iron	0.40	0.2	mg/l		EPA 236.1	01-24-1994 1400 DW
Iron, Dissolved	<0.20	0.2	mg/l		EPA 236.1	01-24-1994 1430 DW
Magnesium	19.00	1	mg/l		EPA 242.1	01-24-1994 1600 DW
Manganese	<0.10	0.1	mg/l		EPA 243.1	01-24-1994 1300 DW
Oil & Grease	<5	5	mg/l		EPA 413.1	01-25-1994 1400 LM
Oxygen, Dissolved	8.67	.01	mg/l		EPA 360.1	01-20-1994 1240 LS
pH	8.35	----	Units		EPA 150.1	01-20-1994 1300 LS
Potassium	<2.0	2	mg/l		EPA 258.1	01-24-1994 1130 DW
Sodium	6.0	1	mg/l		EPA 273.1	01-24-1994 1500 DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	01-20-1994 1330 LS
Solids, Total Dissolved	278	10	mg/l		EPA 160.1	01-21-1994 0900 LM
Solids, Total Suspended	12	4	mg/l		EPA 160.2	01-21-1994 1600 LM
Sulfate	32	1	mg/l		EPA 375.4	01-24-1994 1300 LS
Turbidity	2.1	.1	NTU		EPA 180.1	01-20-1994 1320 LS
Cation/Anion Balance	-5.8		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • TEL: 708-953-9300 FAX: 708-953-9306
SINCE 1908
Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

February 24, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
2/24/94

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC01

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled February 18, 1994

Date received February 18, 1994

Temperature 35.5°F
Flow NA
Rec'd 1325 hr.
Sampled 1140 hr.

FIELD MEASUREMENTS

pH	8.36
Conductivity	357
DO	11.8
Turbidity	Run at Lab

Analysis report no. 59-13906

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l	$CaCO_3$	2310-B	02-24-1994 1130	F
Alkalinity, Bicarbonate	243	1	mg/l	HCO_3	4500-CO_2-D	02-21-1994 1330	[illegible]
Alkalinity, Carbonate	3	1	mg/l	CO_3	4500-CO_2-D	02-21-1994 1330	LS
Alkalinity, Total	204	1	mg/l	$CaCO_3$	EPA 310.1	02-21-1994 1330	LS
Anions	4.90	----	meq/l		---------	---------- -----	--
Calcium	55.0	1	mg/l		EPA 215.1	02-22-1994 1000	DW
Cations	4.70	----	meq/l		---------	---------- -----	--
Chloride	9.0	1	mg/l		4500-Cl-B	02-21-1994 1430	LS
Conductivity	443.00	1	umhos/cm		EPA 120.1	02-24-1994 0940	ED
Hardness, Total	220.0	1	mg/l	$CaCO_3$	2340-B	02-22-1994 1000	DW
Iron	<0.20	0.2	mg/l		EPA 236.1	02-21-1994 1145	DW
Iron, Dissolved	<0.20	0.2	mg/l		EPA 236.1	02-21-1994 1630	DW
Magnesium	20.00	1	mg/l		EPA 242.1	02-22-1994 1130	DW
Manganese	<0.10	0.1	mg/l		EPA 243.1	02-22-1994 0730	DW
Oil & Grease	7	5	mg/l		EPA 413.1	02-18-1994 1410	LM
Oxygen, Dissolved	7.82	----	mg/l		EPA 360.1	02-18-1994 1325	LM
pH	8.40	----	Units		EPA 150.1	02-18-1994 1515	LM
Potassium	<2.0	2	mg/l		EPA 258.1	02-21-1994 1100	DW
Sodium	8.0	1	mg/l		EPA 273.1	02-22-1994 0800	DW
Solids, Settleable	<0.5	0.5	mg/l		EPA 160.5	02-18-1994 1530	LM
Solids, Total Dissolved	250	10	mg/l		EPA 160.1	02-18-1994 1600	LM
Solids, Total Suspended	27	4	mg/l		EPA 160.2	02-21-1994 0830	LM
Sulfate	26	1	mg/l		EPA 375.4	02-21-1994 1045	LS
Turbidity	1.1	0.1	NTU		EPA 180.1	02-18-1994 1430	ED
Cation/Anion Balance	-1.6		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout ED

Manager, Huntington Laboratory

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

F-465/059/94
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TERMS AND CONDITIONS ON REVERSE

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • TEL: 708-953-9300 FAX: 708-953-9306
SINCE 1908
Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

March 30, 1994

RECEIVED
3/30/94

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCCO1

Kind of sample reported to us Water

Sample taken at Huntington Canyon Creek

Sample taken by Energy West/KH

Date sampled March 23, 1994

Date received March 23, 1994

Temperature 7.0°C
Flow NA
Rec'd 1545 hr.
Sampled 1430 hr.
FIELD MEASURMENTS
Turbidity 6

NOTE: Possible matrix interference with Alkalinity.

Analysis report no. 59-13948

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst		
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	03-29-1994	1130	ED
Alkalinity, Bicarbonate	249	1	mg/l as HCO_3	SM4500-CO_2-D	03-24-1994	1350	LS
Alkalinity, Carbonate	4	1	mg/l as CO_3	SM4500-CO_2-D	03-24-1994	1350	LS
Alkalinity, Total	209	1	mg/l as $CaCO_3$	EPA 310.1	03-24-1994	1350	LS
Anions	5.90	----	meq/l	---------	----------	-----	--
Calcium, Total	56	1	mg/l	EPA 215.1	03-28-1994	1600	DW
Cations	5.20	----	meq/l	---------	----------	-----	--
Chloride	30	1	mg/l	SM4500-Cl-B	03-30-1994	0830	LS
Conductivity	484	1	umhos/cm	SM2510-B	03-29-1994	0930	ED
Hardness, Total	235	1	mg/l as $CaCO_3$	SM2340-B	03-28-1994	1600	DW
Iron, Total	0.2	0.2	mg/l	EPA 236.1	03-24-1994	1700	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	03-24-1994	1700	DW
Magnesium, Total	23	1	mg/l	EPA 242.1	03-28-1994	1400	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	03-24-1994	1530	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-25-1994	1520	LM
Oxygen, Dissolved	9.9	----	mg/l	EPA 360.1	03-23-1994	1620	LS
pH	8.41	----	pH units	EPA 150.1	03-23-1994	1730	LS
Potassium, Total	<2	2	mg/l	EPA 258.1	03-28-1994	0830	DW
Sodium, Total	11	1	mg/l	EPA 273.1	03-28-1994	1015	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	03-24-1994	0815	LS
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	03-24-1994	1000	LM
Solids, Total Suspended	15	4	mg/l	EPA 160.2	03-25-1994	1730	LM
Sulfate	40	1	mg/l	EPA 375.4	03-29-1994	1010	LS
Turbidity	4.9	0.1	NTU	EPA 180.1	03-24-1994	1115	LS
Cation/Anion Balance	-6.4		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Terry Stout CD

Manager, Huntington Laboratory

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May 2, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
5/2/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC01
Temperature 5.4°C
Rec'd 1150 hr.
Sampled 1037 hr.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled April 25, 1994

Date received April 25, 1994

FIELD MEASUREMENTS

pH	8.53
Conductivity	382
DO	9
Turbidity	11

NOTE: Possible matrix interference with Chloride.

Analysis report no. 59-14029

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	04-26-1994 1120
Alkalinity, Bicarbonate	208	1	mg/l as HCO_3	SM4500-CO_2-D	04-25-1994 1430
Alkalinity, Carbonate	2	1	mg/l as CO_3	SM4500-CO_2-D	04-25-1994 1430 LS
Alkalinity, Total	173	1	mg/l as $CaCO_3$	EPA 310.1	04-25-1994 1430 LS
Anions	3.90	----	meq/l	---------	---------- ----- --
Calcium, Total	51	1	mg/l	EPA 215.1	05-02-1994 0800 DW
Cations	4.00	----	meq/l	---------	---------- ----- --
Chloride	13	1	mg/l	SM4500-Cl-B	04-25-1994 1530 LS
Conductivity	388	1	umhos/cm	SM2510-B	04-26-1994 1330 ED
Hardness, Total	189	1	mg/l as $CaCO_3$	SM2340-B	05-02-1994 0800 DW
Iron, Total	0.3	0.2	mg/l	EPA 236.1	04-27-1994 1300 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	04-27-1994 1330 DW
Magnesium, Total	15	1	mg/l	EPA 242.1	05-02-1994 0830 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-27-1994 1430 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	04-28-1994 1600 LM
Oxygen, Dissolved	9.7	----	mg/l	EPA 360.1	04-25-1994 1240 LS
pH	8.22	----	pH units	EPA 150.1	04-25-1994 1315 LS
Potassium, Total	<2	2	mg/l	EPA 258.1	04-27-1994 1600 DW
Sodium, Total	5	1	mg/l	EPA 273.1	04-27-1994 1630 DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	04-25-1994 1340 LS
Solids, Total Dissolved	190	10	mg/l	EPA 160.1	04-26-1994 1200 LM
Solids, Total Suspended	14	4	mg/l	EPA 160.2	04-25-1994 1600 LM
Sulfate	2	1	mg/l	EPA 375.4	04-26-1994 0900 LS
Turbidity	5.3	0.1	NTU	EPA 180.1	04-25-1994 1325 LS
Cation/Anion Balance	1.5		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout ED

Manager, Huntington Laboratory

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June 1, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
6/1/94

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCCO1

Kind of sample reported to us Water

Temperature 9.2°C
Rec'd 1435 hr.
Sampled 1120 hr.

FIELD MEASUREMENTS

pH	8.56
Conductivity	292
DO	8.0
Turbidity	28

Sample taken at Huntington Canyon

Sample taken by Energy West/CS

Date sampled May 24, 1994

Date received May 24, 1994

Analysis report no. 59-14067

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	05-26-1994 1230 ED
Alkalinity, Bicarbonate	178	1	mg/l as HCO_3	SM2320-B	05-25-1994 1015 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	05-25-1994 1015 LS
Alkalinity, Total	147	1	mg/l as $CaCO_3$	EPA 310.1	05-25-1994 1015 LS
Anions	3.20	----	meq/l	---------	---------- ----- --
Calcium, Total	48	1	mg/l	EPA 215.1	05-26-1994 0930 DW
Cations	3.40	----	meq/l	---------	---------- ----- --
Chloride	3	1	mg/l	SM4500-Cl-B	06-01-1994 0900 LS
Conductivity	310	1	umhos/cm	SM2510-B	05-26-1994 1130 ED
Hardness, Total	165	1	mg/l as $CaCO_3$	SM2340-B	05-26-1994 0930 DW
Iron, Total	0.6	0.2	mg/l	EPA 236.1	05-26-1994 1600 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	05-26-1994 1600 DW
Magnesium, Total	11	1	mg/l	EPA 242.1	05-26-1994 1300 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	05-25-1994 1700 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	05-27-1994 1520 LM
Oxygen, Dissolved	8.5	----	mg/l	EPA 360.1	05-24-1994 1515 LS
pH	7.84	----	pH units	EPA 150.1	05-24-1994 1600 LS
Potassium, Total	<2	2	mg/l	EPA 258.1	05-26-1994 0730 DW
Sodium, Total	3	1	mg/l	EPA 273.1	05-26-1994 0900 DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	05-25-1994 0800 LS
Solids, Total Dissolved	190	10	mg/l	EPA 160.1	05-26-1994 1115 LM
Solids, Total Suspended	40	4	mg/l	EPA 160.2	05-25-1994 1500 LM
Sulfate	9	1	mg/l	EPA 375.4	05-31-1994 0815 LS
Turbidity	14.0	0.1	NTU	EPA 180.1	05-24-1994 1630 LS
Cation/Anion Balance	3.3		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout ED

Manager, Huntington Laboratory

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July 6, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
7/6/94

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC01

Kind of sample reported to us: Water

Sample taken at: Huntington Canyon

Sample taken by: Energy West/CS

Date sampled: June 21, 1994

Date received: June 21, 1994

Temperature 12.6°C
Rec'd 1220 hr.
Sampled 1114 hr.

FIELD MEASUREMENTS

pH	8.48
Conductivity	300
DO	6.5
Turbidity	10.0

Analysis report no. 59-14170

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	06-22-1994 1500	
Alkalinity, Bicarbonate	207	1	mg/l as HCO_3	SM2320-B	06-22-1994 1415	
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-22-1994 1415	LS
Alkalinity, Total	170	1	mg/l as $CaCO_3$	EPA 310.1	06-22-1994 1415	LS
Anions	3.70	----	meq/l	---------	----------	----- --
Calcium, Total	49	1	mg/l	EPA 215.1	07-05-1994 1130	DW
Cations	3.80	----	meq/l	---------	----------	----- --
Chloride	2	1	mg/l	SM4500-Cl-B	06-22-1994 1940	LS
Conductivity	339	1	umhos/cm	SM2510-B	06-22-1994 1230	ED
Hardness, Total	180	1	mg/l as $CaCO_3$	SM2340-B	07-05-1994 1130	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-01-1994 0930	ED
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-30-1994 0800	DW
Magnesium, Total	14	1	mg/l	EPA 242.1	07-05-1994 1400	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1994 0800	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	07-05-1994 1000	LM
Oxygen, Dissolved	7.9	----	mg/l	EPA 360.1	06-21-1994 1315	LS
pH	8.57	----	pH units	EPA 150.1	06-21-1994 1340	LS
Potassium, Total	<2	2	mg/l	EPA 258.1	07-05-1994 0900	DW
Sodium, Total	4	1	mg/l	EPA 273.1	07-05-1994 1000	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	06-21-1994 1500	LS
Solids, Total Dissolved	190	10	mg/l	EPA 160.1	06-22-1994 1035	LM
Solids, Total Suspended	13	4	mg/l	EPA 160.2	06-24-1994 1420	LM
Sulfate	10	1	mg/l	EPA 375.4	06-22-1994 1315	LS
Turbidity	4.0	0.1	NTU	EPA 180.1	06-21-1994 1530	LS
Cation/Anion Balance	1.4		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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July 25, 1994

RECEIVED
7/26/94

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCC01

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled July 14, 1994

Date received July 14, 1994

Temperature 13.0°C
Rec'd 1200 hr.
Sampled 1025 hr.

FIELD MEASUREMENTS

pH	8.88
Conductivity	260
DO	6.5
Turbidity	18

Analysis report no. 59-14250

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-22-1994 1310 ED
Alkalinity, Bicarbonate	184	1	mg/l as HCO_3	SM2320-B	07-18-1994 1100 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-18-1994 1100 LS
Alkalinity, Total	151	1	mg/l as $CaCO_3$	EPA 310.1	07-18-1994 1100 LS
Anions	3.30	----	meq/l	---------	---------- ----- --
Calcium, Total	49	5	mg/l	EPA 215.1	07-21-1994 1700 DW
Cations	3.40	----	meq/l	---------	---------- ----- --
Chloride	4	1	mg/l	SM4500-Cl-B	07-18-1994 1230 LS
Conductivity	316	1	umhos/cm	SM2510-B	07-19-1994 1515 ED
Hardness, Total	168	10	mg/l as $CaCO_3$	SM2340-B	07-21-1994 1700 DW
Iron, Total	0.3	0.2	mg/l	EPA 236.1	07-21-1994 1600 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	07-19-1994 0930 DW
Magnesium, Total	11	2	mg/l	EPA 242.1	07-21-1994 1800 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-21-1994 1400 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	07-14-1994 1615 LM
Oxygen, Dissolved	7.2	----	mg/l	EPA 360.1	07-14-1994 1450 LS
pH	8.56	----	pH units	EPA 150.1	07-14-1994 1600 LS
Potassium, Total	<5	5	mg/l	EPA 258.1	07-21-1994 1230 DW
Sodium, Total	<5	5	mg/l	EPA 273.1	07-21-1994 1015 DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	07-14-1994 1640 LS
Solids, Total Dissolved	170	10	mg/l	EPA 160.1	07-15-1994 1230 LM
Solids, Total Suspended	22	4	mg/l	EPA 160.2	07-15-1994 1515 LM
Sulfate	9	1	mg/l	EPA 375.4	07-19-1994 0830 LS
Turbidity	4.9	0.1	NTU	EPA 180.1	07-14-1994 1530 LS
Cation/Anion Balance	0.5		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hunt

Manager, Huntington Laboratory

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August 30, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC01

Kind of sample reported to us: Water

Sample taken at: Huntington Canyon

Sample taken by: Energy West/KH

Date sampled: August 22, 1994

Date received: August 22, 1994

Temperature 13.6°C
Rec'd 1430 hr.
Sampled 1245 hr.

FIELD MEASUREMENTS

pH	8.84
Conductivity	276
DO	6.3
Turbidity	8

Analysis report no. 59-14338

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	08-24-1994 1130 [illegible]
Alkalinity, Bicarbonate	173	1	mg/l as HCO_3	SM2320-B	08-23-1994 1450 [illegible]
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	08-23-1994 1450 LS
Alkalinity, Total	142	1	mg/l as $CaCO_3$	EPA 310.1	08-23-1994 1450 LS
Anions	3.30	----	meq/l	---------	---------- ----- --
Calcium, Total	48	5	mg/l	EPA 215.1	08-26-1994 1100 DW
Cations	3.40	----	meq/l	---------	---------- ----- --
Chloride	2	1	mg/l	SM4500-Cl-B	08-29-1994 0830 LS
Conductivity	321	1	umhos/cm	SM2510-B	08-26-1994 1130 ED
Hardness, Total	169	10	mg/l as $CaCO_3$	SM2340-B	08-26-1994 1100 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	08-26-1994 1330 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-24-1994 1400 DW
Magnesium, Total	12	2	mg/l	EPA 242.1	08-26-1994 1430 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	08-26-1994 1245 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	08-24-1994 1030 LM
Oxygen, Dissolved	6.9	----	mg/l	EPA 360.1	08-22-1994 1645 LS
pH	8.55	----	pH units	EPA 150.1	08-22-1994 1645 LS
Potassium, Total	<5	5	mg/l	EPA 258.1	08-26-1994 1230 DW
Sodium, Total	<5	5	mg/l	EPA 273.1	08-26-1994 1200 DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	08-23-1994 0730 LS
Solids, Total Dissolved	170	10	mg/l	EPA 160.1	08-23-1994 1530 LM
Solids, Total Suspended	9	4	mg/l	EPA 160.2	08-23-1994 1030 LM
Sulfate	18	1	mg/l	EPA 375.4	08-25-1994 0900 LS
Turbidity	3.0	0.1	NTU	EPA 180.1	08-23-1994 1000 LS
Cation/Anion Balance	1.7		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jerry Stout CD

Manager, Huntington Laboratory

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September 22, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
9/22/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC01
Temperature 12.9°C
Rec'd 0815 hr.
Sampled 1328 hr.

FIELD MEASUREMENTS

pH	8.80
Conductivity	296
DO	5.0

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled September 13, 1994

Date received September 14, 1994

Analysis report no. 59-14418

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	09-15-1994 1030 ED
Alkalinity, Bicarbonate	173	1	mg/l as HCO_3	SM2320-B	09-14-1994 1730 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-14-1994 1730 LS
Alkalinity, Total	142	1	mg/l as $CaCO_3$	EPA 310.1	09-14-1994 1730 LS
Anions	3.40	----	meq/l	---------	---------- ----- --
Calcium, Total	40	5	mg/l	EPA 215.1	09-21-1994 1500 DW
Cations	3.00	----	meq/l	---------	---------- ----- --
Chloride	9	1	mg/l	SM4500-Cl-B	09-16-1994 1100 LS
Conductivity	314	1	umhos/cm	SM2510-B	09-14-1994 1100 ED
Hardness, Total	149	10	mg/l as $CaCO_3$	SM2340-B	09-21-1994 1500 DW
Iron, Total	0.3	0.2	mg/l	EPA 236.1	09-21-1994 0900 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-21-1994 0900 DW
Magnesium, Total	12	2	mg/l	EPA 242.1	09-21-1994 1615 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-21-1994 1200 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	09-21-1994 1300 LM
Oxygen, Dissolved	7.5	----	mg/l	EPA 360.1	09-14-1994 0930 LS
pH	7.84	----	pH units	EPA 150.1	09-14-1994 1000 LS
Potassium, Total	<5	5	mg/l	EPA 258.1	09-21-1994 1330 DW
Sodium, Total	<5	5	mg/l	EPA 273.1	09-21-1994 1300 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-14-1994 1535 LS
Solids, Total Dissolved	180	10	mg/l	EPA 160.1	09-16-1994 0830 LS
Solids, Total Suspended	13	4	mg/l	EPA 160.2	09-16-1994 1300 LM
Sulfate	15	1	mg/l	EPA 375.4	09-20-1994 1310 LS
Turbidity	5.5	0.1	NTU	EPA 180.1	09-14-1994 1500 LS
Cation/Anion Balance	-6.6		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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November 16, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
11/16/94
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Creek

Sample taken by Energy West/KH

Date sampled October 31, 1994

Date received November 1, 1994

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC01
Temperature 3.9°C
Flow N/A
Rec'd 1305 hr.
Sampled 1125 hr.

FIELD MEASUREMENTS

pH	8.74
Conductivity	386
DO	5.4
Turbidity	9.1

NOTE: Dissolved matals filtered at Lab.

Analysis report no. 59-14543

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	11-03-1994 1215
Alkalinity, Bicarbonate	230	1	mg/l as HCO_3	SM2320-B	11-02-1994 0845
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-02-1994 0845 LS
Alkalinity, Total	187	1	mg/l as $CaCO_3$	EPA 310.1	11-02-1994 0845 LS
Anions	4.40	----	meq/l	---------	---------- ----- --
Calcium, Total	47	5	mg/l	EPA 215.1	11-14-1994 1600 DW
Cations	4.10	----	meq/l	---------	---------- ----- --
Chloride	8	1	mg/l	SM4500-Cl-B	11-10-1994 0835 LS
Conductivity	413	1	umhos/cm	SM2510-B	11-02-1994 1345 ED
Hardness, Total	190	10	mg/l as $CaCO_3$	SM2340-B	11-14-1994 1600 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	11-15-1994 1100 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-16-1994 0730 DW
Magnesium, Total	18	2	mg/l	EPA 242.1	11-15-1994 1000 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-15-1994 1115 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	11-01-1994 1300 LM
Oxygen, Dissolved	6.5	----	mg/l	EPA 360.1	11-01-1994 1410 LS
pH	7.93	----	pH units	EPA 150.1	11-01-1994 1500 LS
Potassium, Total	<5	5	mg/l	EPA 258.1	11-15-1994 1330 DW
Sodium, Total	6	5	mg/l	EPA 273.1	11-15-1994 1300 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	11-01-1994 1525 LS
Solids, Total Dissolved	240	10	mg/l	EPA 160.1	11-04-1994 0745 LS
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	11-03-1994 0730 LM
Sulfate	23	1	mg/l	EPA 375.4	11-09-1994 1000 LS
Turbidity	3.1	0.1	NTU	EPA 180.1	11-01-1994 1525 LS
Cation/Anion Balance	-4.2		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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FAX: (801) 653-2438

December 5, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
12/5/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC01
Temperature 0.8°F
Flow NA
Rec'd 1200 hr.
Sampled 1035 hr.

FIELD MEASUREMENTS

pH	8.56
Conductivity	359
DO	5.5
Turbidity	6

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled November 28, 1994

Date received November 28, 1994

Analysis report no. 59-14601

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	12-01-1994 1030 ED
Alkalinity, Bicarbonate	220	1	mg/l as HCO_3	SM2320-B	11-29-1994 0840 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-29-1994 0840 LS
Alkalinity, Total	180	1	mg/l as $CaCO_3$	EPA 310.1	11-29-1994 0840 LS
Anions	4.50	----	meq/l	---------	---------- ----- --
Calcium, Total	57	5	mg/l	EPA 215.1	12-01-1994 0800 DW
Cations	5.00	----	meq/l	---------	---------- ----- --
Chloride	11	1	mg/l	SM4500-Cl-B	11-29-1994 1300 LS
Conductivity	460	1	umhos/cm	SM2510-B	12-01-1994 0930 ED
Hardness, Total	230	10	mg/l as $CaCO_3$	SM2340-B	12-01-1994 0800 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	12-01-1994 1700 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	12-01-1994 1700 DW
Magnesium, Total	22	2	mg/l	EPA 242.1	12-01-1994 1000 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	12-01-1994 1600 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	11-29-1994 1300 LM
Oxygen, Dissolved	7.4	----	mg/l	EPA 360.1	11-28-1994 1300 LS
pH	8.17	----	pH units	EPA 150.1	11-28-1994 1450 LS
Potassium, Total	<5	5	mg/l	EPA 258.1	12-01-1994 1430 DW
Sodium, Total	8	5	mg/l	EPA 273.1	12-01-1994 1300 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	11-28-1994 1530 LS
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	11-29-1994 0940 LS
Solids, Total Suspended	8	4	mg/l	EPA 160.2	11-29-1994 0745 LM
Sulfate	26	1	mg/l	EPA 375.4	12-05-1994 1200 LS
Turbidity	2.6	0.1	NTU	EPA 180.1	11-28-1994 1500 LS
Cation/Anion Balance	5.8		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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January 6, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
1/6/95
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled December 19, 1994

Date received December 19, 1994

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC01
Temperature 2.0°C.
Flow NA
Rec'd 1550 hr.
Sampled 1420 hr.

FIELD MEASUREMENTS
pH 8.75 TURB 6.5
Conductivity 429
DO 2.6

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14664

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	12-28-1994 1020 ED
Alkalinity, Bicarbonate	226	5	mg/l as HCO_3	SM2320-B	12-27-1994 1030 LM
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	12-27-1994 1030 LM
Alkalinity, Total	185	5	mg/l as $CaCO_3$	EPA 310.1	12-27-1994 1030 LM
Anions	5.10	----	meq/l	---------	---------- ----- --
Calcium, Total	56	1	mg/l	EPA 215.1	12-21-1994 1130 DW
Cations	4.80	----	meq/l	---------	---------- ----- --
Chloride	30	1	mg/l	SM4500-Cl-B	12-29-1994 1100 ED
Conductivity	470	1	umhos/cm	SM2510-B	01-03-1995 1500 ED
Hardness, Total	220	10	mg/l as $CaCO_3$	SM2340-B	12-21-1994 1130 DW
Iron, Total	0.2	0.1	mg/l	EPA 236.1	12-21-1994 1530 DW
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-21-1994 1530 DW
Magnesium, Total	20	1	mg/l	EPA 242.1	12-21-1994 1400 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-22-1994 0830 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	12-28-1994 0800 LM
Oxygen, Dissolved	6.2	----	mg/l	EPA 360.1	12-19-1994 1350 LM
pH	8.28	----	pH units	EPA 150.1	12-19-1994 1520 LM
Potassium, Total	1	1	mg/l	EPA 258.1	12-22-1994 0930 DW
Sodium, Total	8	1	mg/l	EPA 273.1	12-22-1994 1000 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	12-20-1994 0845 LM
Solids, Total Dissolved	270	10	mg/l	EPA 160.1	12-20-1994 1540 LM
Solids, Total Suspended	14	4	mg/l	EPA 160.2	12-20-1994 1230 LM
Sulfate	27	1	mg/l	EPA 375.4	12-30-1994 1000 ED
Turbidity	2.2	0.1	NTU	EPA 180.1	12-19-1994 1645 ED
Cation/Anion Balance	-3.2		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jerry Stout

Manager, Huntington Laboratory

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January 26, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
1/26/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCCO2

Kind of sample reported to us Water

Sample taken at Huntington Canyon Creek

Sample taken by Energy West/KH

Date sampled January 20, 1994

Date received January 20, 1994

Temperature 33.1°F
Flow NA
Rec'd 1130 hr.
Sampled 1035 hr.

FIELD MEASUREMENTS

pH	~~6.70~~ 8.67
Conductivity	397
DO	10.9
Turbidity	4.2

Analysis report no. 59-13850

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst		
Acidity	<10	10	mg/l	$CaCO_3$	2310 B	01-26-1994	1130	ED
Alkalinity, Bicarbonate	250	1	mg/l	HCO_3	4500 CO_2D	01-24-1994	1040	LS
Alkalinity, Carbonate	3	1	mg/l	CO_3	4500 CO_2D	01-24-1994	1040	LS
Alkalinity, Total	209	1	mg/l	$CaCO_3$	EPA 310.1	01-24-1994	1040	LS
Anions	5.30	----	meq/l		---------	----------	-----	--
Calcium	54.0	1	mg/l		EPA 215.1	01-24-1994	1600	DW
Cations	4.60	----	meq/l		---------	----------	-----	--
Chloride	9.0	1	mg/l		EPA 325.3	01-25-1994	1040	LS
Conductivity	385.00	0.2	umhos/cm		EPA 120.1	01-20-1994	1315	ED
Hardness, Total	217.0	1	mg/l	$CaCO_3$	2340 B	01-24-1994	1600	DW
Iron	0.20	0.2	mg/l		EPA 236.1	01-24-1994	1400	DW
Iron, Dissolved	<0.20	0.2	mg/l		EPA 236.1	01-24-1994	1430	DW
Magnesium	20.00	1	mg/l		EPA 242.1	01-24-1994	1600	DW
Manganese	<0.10	0.1	mg/l		EPA 243.1	01-24-1994	1300	DW
Oil & Grease	<5	5	mg/l		EPA 413.1	01-25-1994	1400	LM
Oxygen, Dissolved	8.59	.01	mg/l		EPA 360.1	01-20-1994	1240	LS
pH	8.33	----	Units		EPA 150.1	01-20-1994	1300	LS
Potassium	2.0	2	mg/l		EPA 258.1	01-24-1994	1130	DW
Sodium	6.0	1	mg/l		EPA 273.1	01-24-1994	1500	DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	01-20-1994	1330	LS
Solids, Total Dissolved	261	10	mg/l		EPA 160.1	01-21-1994	0900	LM
Solids, Total Suspended	9	4	mg/l		EPA 160.2	01-21-1994	1600	LM
Sulfate	40	1	mg/l		EPA 375.4	01-24-1994	1300	LS
Turbidity	2.5	.1	NTU		EPA 180.1	01-20-1994	1320	LS

Cation/Anion Balance -6.9 %

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC.

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February 24, 1994

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PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
2/24/94

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCCO2

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled February 18, 1994

Date received February 18, 1994

Temperature 35.7°F
Flow NA
Rec'd 1325 hr.
Sampled 1145 hr.

FIELD MEASUREMENTS	
pH	8.38
Conductivity	374
DO	8.9
Turbidity	Run at Lab

Analysis report no. 59-13907

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l	$CaCO_3$	2310-B	02-24-1994 1130	ED
Alkalinity, Bicarbonate	232	1	mg/l	HCO_3	4500-CO_2-D	02-22-1994 0845	LS
Alkalinity, Carbonate	3	1	mg/l	CO_3	4500-CO_2-D	02-22-1994 0845	[illegible]
Alkalinity, Total	194	1	mg/l	$CaCO_3$	EPA 310.1	02-22-1994 0845	
Anions	4.70	----	meq/l		---------	---------- -----	--
Calcium	53.0	1	mg/l		EPA 215.1	02-22-1994 1000	DW
Cations	4.70	----	meq/l		---------	---------- -----	--
Chloride	9.0	1	mg/l		4500-Cl-B	02-21-1994 1430	LS
Conductivity	445.00	1	umhos/cm		EPA 120.1	02-24-1994 0940	ED
Hardness, Total	215.0	1	mg/l	$CaCO_3$	2340-B	02-22-1994 1000	DW
Iron	<0.20	0.2	mg/l		EPA 236.1	02-21-1994 1145	DW
Iron, Dissolved	<0.20	0.2	mg/l		EPA 236.1	02-21-1994 1630	DW
Magnesium	20.00	1	mg/l		EPA 242.1	02-22-1994 1130	DW
Manganese	<0.10	0.1	mg/l		EPA 243.1	02-22-1994 0730	DW
Oil & Grease	<5	5	mg/l		EPA 413.1	02-18-1994 1410	LM
Oxygen, Dissolved	7.51	----	mg/l		EPA 360.1	02-18-1994 1325	LM
pH	8.36	----	Units		EPA 150.1	02-18-1994 1515	LM
Potassium	<2.0	2	mg/l		EPA 258.1	02-21-1994 1100	DW
Sodium	9.0	1	mg/l		EPA 273.1	02-22-1994 0800	DW
Solids, Settleable	<0.5	0.5	mg/l		EPA 160.5	02-18-1994 1530	LM
Solids, Total Dissolved	240	10	mg/l		EPA 160.1	02-18-1994 1600	LM
Solids, Total Suspended	5	4	mg/l		EPA 160.2	02-21-1994 0830	LM
Sulfate	27	1	mg/l		EPA 375.4	02-21-1994 1045	LS
Turbidity	0.9	0.1	NTU		EPA 180.1	02-18-1994 1430	ED
Cation/Anion Balance	-0.3		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout ED

Manager, Huntington Laboratory

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March 30, 1994

RECEIVED
3/30/94

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCCO2

Kind of sample reported to us Water

Temperature 8.0°C
Flow NA
Rec'd 1545 hr.
Sampled 1445 hr.

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

FIELD MEASUREMENTS
Turbidity 7

Date sampled March 23, 1994

Date received March 23, 1994

Analysis report no. 59-13945

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	03-29-1994 1130	ED
Alkalinity, Bicarbonate	242	1	mg/l as HCO_3	SM4500-CO_2-D	03-24-1994 1350	LS
Alkalinity, Carbonate	4	1	mg/l as CO_3	SM4500-CO_2-D	03-24-1994 1350	LS
Alkalinity, Total	203	1	mg/l as $CaCO_3$	EPA 310.1	03-24-1994 1350	LS
Anions	5.50	----	meq/l	---------	---------- -----	--
Calcium, Total	58	1	mg/l	EPA 215.1	03-28-1994 1600	DW
Cations	5.30	----	meq/l	---------	---------- -----	--
Chloride	12	1	mg/l	SM4500-Cl-B	03-30-1994 0830	LS
Conductivity	490	1	umhos/cm	SM2510-B	03-29-1994 0930	ED
Hardness, Total	240	1	mg/l as $CaCO_3$	SM2340-B	03-28-1994 1600	DW
Iron, Total	0.2	0.2	mg/l	EPA 236.1	03-24-1994 1700	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	03-24-1994 1700	DW
Magnesium, Total	23	1	mg/l	EPA 242.1	03-28-1994 1400	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	03-24-1994 1530	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-25-1994 1520	LM
Oxygen, Dissolved	9.9	----	mg/l	EPA 360.1	03-23-1994 1620	LS
pH	8.41	----	pH units	EPA 150.1	03-23-1994 1730	LS
Potassium, Total	<2	2	mg/l	EPA 258.1	03-28-1994 0830	DW
Sodium, Total	12	1	mg/l	EPA 273.1	03-28-1994 1015	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	03-24-1994 0815	LS
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	03-24-1994 1000	LM
Solids, Total Suspended	8	4	mg/l	EPA 160.2	03-25-1994 1730	LM
Sulfate	50	1	mg/l	EPA 375.4	03-29-1994 1000	LS
Turbidity	3.9	0.1	NTU	EPA 180.1	03-24-1994 1115	LS
Cation/Anion Balance	-1.4		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jerry Stout ED

Manager, Huntington Laboratory

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May 2, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
5/2/94

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCCO2

Kind of sample reported to us Water

Temperature 4.8°C
Rec'd 1150 hr.
Sampled 1055 hr.

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled April 25, 1994

Date received April 25, 1994

FIELD MEASUREMENTS

pH	8.61
Conductivity	350
DO	9.2
Turbidity	12

Analysis report no. 59-14031

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	04-26-1994 1120	
Alkalinity, Bicarbonate	216	1	mg/l as HCO_3	SM4500-CO_2-D	04-25-1994 1430	
Alkalinity, Carbonate	2	1	mg/l as CO_3	SM4500-CO_2-D	04-25-1994 1430	LS
Alkalinity, Total	180	1	mg/l as $CaCO_3$	EPA 310.1	04-25-1994 1430	LS
Anions	4.20	----	meq/l	---------	----------	----- --
Calcium, Total	52	1	mg/l	EPA 215.1	05-02-1994 0800	DW
Cations	4.20	----	meq/l	---------	----------	----- --
Chloride	6	1	mg/l	SM4500-Cl-B	04-25-1994 1530	LS
Conductivity	351	1	umhos/cm	SM2510-B	04-26-1994 1330	ED
Hardness, Total	196	1	mg/l as $CaCO_3$	SM2340-B	05-02-1994 0800	DW
Iron, Total	0.3	0.2	mg/l	EPA 236.1	04-27-1994 1300	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	04-27-1994 1330	DW
Magnesium, Total	16	1	mg/l	EPA 242.1	05-02-1994 0830	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-27-1994 1430	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	04-28-1994 1600	LM
Oxygen, Dissolved	9.5	----	mg/l	EPA 360.1	04-25-1994 1240	LS
pH	8.22	----	pH units	EPA 150.1	04-25-1994 1315	LS
Potassium, Total	<2	2	mg/l	EPA 258.1	04-27-1994 1600	DW
Sodium, Total	6	1	mg/l	EPA 273.1	04-27-1994 1630	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	04-25-1994 1340	LS
Solids, Total Dissolved	170	10	mg/l	EPA 160.1	04-26-1994 1200	LM
Solids, Total Suspended	12	4	mg/l	EPA 160.2	04-25-1994 1600	LM
Sulfate	18	1	mg/l	EPA 375.4	04-26-1994 0900	LS
Turbidity	4.9	0.1	NTU	EPA 180.1	04-25-1994 1325	LS
Cation/Anion Balance	0.2		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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June 1, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
6/1/94

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCCO2

FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CS

Date sampled May 24, 1994

Date received May 24, 1994

Temperature 9.3°C
Rec'd 1435 hr.
Sampled 1135 hr.

FIELD MEASUREMENTS	
pH	8.51
Conductivity	299
DO	5.8
Turbidity	24

Analysis report no. 59-14068

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst		
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	05-26-1994	1230	ED
Alkalinity, Bicarbonate	184	1	mg/l as HCO_3	SM2320-B	05-25-1994	1015	LS
Alkalinity, Carbonate	3	1	mg/l as CO_3	SM2320-B	05-25-1994	1015	LS
Alkalinity, Total	155	1	mg/l as $CaCO_3$	EPA 310.1	05-25-1994	1015	LS
Anions	3.40	----	meq/l	---------	----------	-----	--
Calcium, Total	46	1	mg/l	EPA 215.1	05-26-1994	0930	DW
Cations	3.20	----	meq/l	---------	----------	-----	--
Chloride	1	1	mg/l	SM4500-Cl-B	06-01-1994	0900	LS
Conductivity	313	1	umhos/cm	SM2510-B	05-26-1994	1130	ED
Hardness, Total	156	1	mg/l as $CaCO_3$	SM2340-B	05-26-1994	0930	DW
Iron, Total	0.5	0.2	mg/l	EPA 236.1	05-26-1994	1600	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	05-26-1994	1600	DW
Magnesium, Total	10	1	mg/l	EPA 242.1	05-26-1994	1300	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	05-25-1994	1700	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	05-27-1994	1520	LM
Oxygen, Dissolved	8.6	----	mg/l	EPA 360.1	05-24-1994	1515	LS
pH	8.45	----	pH units	EPA 150.1	05-24-1994	1600	LS
Potassium, Total	<2	2	mg/l	EPA 258.1	05-26-1994	0730	DW
Sodium, Total	3	1	mg/l	EPA 273.1	05-26-1994	0900	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	05-25-1994	0800	LS
Solids, Total Dissolved	200	10	mg/l	EPA 160.1	05-26-1994	1115	LM
Solids, Total Suspended	30	4	mg/l	EPA 160.2	05-25-1994	1500	LM
Sulfate	10	1	mg/l	EPA 375.4	05-31-1994	0815	LS
Turbidity	13.0	0.1	NTU	EPA 180.1	05-24-1994	1630	LS
Cation/Anion Balance	-1.5		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Terry Mont

Manager, Huntington Laboratory

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July 6, 1994

RECEIVED
7/6/94

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCC02

Kind of sample reported to us: Water

Temperature 12.7°C
Rec'd 1220 hr.
Sampled 1142 hr.

Sample taken at: Huntington Canyon

Sample taken by: Energy West/CS

Date sampled: June 21, 1994

Date received: June 21, 1994

FIELD MEASUREMENTS

pH	8.68
Conductivity	310
DO	8.9

Analysis report no. 59-14171

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	06-22-1994 1500
Alkalinity, Bicarbonate	207	1	mg/l as HCO_3	SM2320-B	06-22-1994 1415
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-22-1994 1415 LS
Alkalinity, Total	170	1	mg/l as $CaCO_3$	EPA 310.1	06-22-1994 1415 LS
Anions	3.70	----	meq/l	---------	---------- ----- --
Calcium, Total	50	1	mg/l	EPA 215.1	07-05-1994 1130 DW
Cations	3.80	----	meq/l	---------	---------- ----- --
Chloride	2	1	mg/l	SM4500-Cl-B	06-22-1994 1940 LS
Conductivity	344	1	umhos/cm	SM2510-B	06-22-1994 1230 ED
Hardness, Total	183	1	mg/l as $CaCO_3$	SM2340-B	07-05-1994 1130 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-01-1994 0930 ED
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-30-1994 0800 DW
Magnesium, Total	14	1	mg/l	EPA 242.1	07-05-1994 1400 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1994 0800 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	07-05-1994 1000 LM
Oxygen, Dissolved	7.4	----	mg/l	EPA 360.1	06-21-1994 1315 LS
pH	8.50	----	pH units	EPA 150.1	06-21-1994 1340 LS
Potassium, Total	3	2	mg/l	EPA 258.1	07-05-1994 0900 DW
Sodium, Total	3	1	mg/l	EPA 273.1	07-05-1994 1000 DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	06-21-1994 1500 LS
Solids, Total Dissolved	167	10	mg/l	EPA 160.1	06-22-1994 1035 LM
Solids, Total Suspended	9	4	mg/l	EPA 160.2	06-24-1994 1420 LM
Sulfate	12	1	mg/l	EPA 375.4	06-22-1994 1315 LS
Turbidity	3.4	0.1	NTU	EPA 180.1	06-21-1994 1530 LS
Cation/Anion Balance	1.0		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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July 26, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
7/26/94

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCC02

Kind of sample reported to us	Water
Sample taken at	Huntington Canyon
Sample taken by	Energy West/KH
Date sampled	July 14, 1994
Date received	July 14, 1994

Temperature 13.1°C
Rec'd 1200 hr.
Sampled 1034 hr.

FIELD MEASUREMENTS

pH	8.68
Conductivity	256
DO	6.7
Turbidity	12

Analysis report no. 59-14249

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-22-1994 1310 ED
Alkalinity, Bicarbonate	182	1	mg/l as HCO_3	SM2320-B	07-18-1994 1100 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-18-1994 1100 LS
Alkalinity, Total	149	1	mg/l as $CaCO_3$	EPA 310.1	07-18-1994 1100 LS
Anions	3.30	----	meq/l	---------	---------- ----- --
Calcium, Total	49	5	mg/l	EPA 215.1	07-21-1994 1700 DW
Cations	3.30	----	meq/l	---------	---------- ----- --
Chloride	5	1	mg/l	SM4500-Cl-B	07-18-1994 1230 LS
Conductivity	317	1	umhos/cm	SM2510-B	07-19-1994 1515 ED
Hardness, Total	164	10	mg/l as $CaCO_3$	SM2340-B	07-21-1994 1700 DW
Iron, Total	0.3	0.2	mg/l	EPA 236.1	07-21-1994 1600 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	07-19-1994 1930 DW
Magnesium, Total	10	2	mg/l	EPA 242.1	07-21-1994 1800 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-21-1994 1400 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	07-14-1994 1615 LM
Oxygen, Dissolved	6.5	----	mg/l	EPA 360.1	07-14-1994 1450 LS
pH	8.55	----	pH units	EPA 150.1	07-14-1994 1600 LS
Potassium, Total	<5	5	mg/l	EPA 258.1	07-21-1994 1230 DW
Sodium, Total	<5	5	mg/l	EPA 273.1	07-21-1994 1015 DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	07-14-1994 1640 LS
Solids, Total Dissolved	180	10	mg/l	EPA 160.1	07-15-1994 1230 LM
Solids, Total Suspended	24	4	mg/l	EPA 160.2	07-15-1994 1515 LM
Sulfate	11	1	mg/l	EPA 375.4	07-19-1994 0830 LS
Turbidity	5.1	0.1	NTU	EPA 180.1	07-14-1994 1530 LS
Cation/Anion Balance	-1.2		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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FAX: (801) 653-2436

August 30, 1994

RECEIVED
8/30/94

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCC02

Kind of sample reported to us: Water

Sample taken at: Huntington Canyon

Sample taken by: Energy West/KH

Date sampled: August 22, 1994

Date received: August 22, 1994

Temperature 13.8°C
Rec'd 1430 hr.
Sampled 1255 hr.

FIELD MEASUREMENTS

pH	8.81
Conductivity	294
DO	5.8
Turbidity	6

Analysis report no. 59-14339

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	08-24-1994 1130 ED
Alkalinity, Bicarbonate	181	1	mg/l as HCO_3	SM2320-B	08-23-1994 1450 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	08-23-1994 1450 LS
Alkalinity, Total	148	1	mg/l as $CaCO_3$	EPA 310.1	08-23-1994 1450 LS
Anions	3.30	----	meq/l	---------	---------- ----- --
Calcium, Total	50	5	mg/l	EPA 215.1	08-26-1994 1100 DW
Cations	3.50	----	meq/l	---------	---------- ----- --
Chloride	2	1	mg/l	SM4500-Cl-B	08-29-1994 0830 LS
Conductivity	323	1	umhos/cm	SM2510-B	08-26-1994 1130 ED
Hardness, Total	174	10	mg/l as $CaCO_3$	SM2340-B	08-26-1994 1100 DW
Iron, Total	0.2	0.2	mg/l	EPA 236.1	08-26-1994 1330 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-24-1994 1400 DW
Magnesium, Total	12	2	mg/l	EPA 242.1	08-26-1994 1430 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	08-26-1994 1245 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	08-24-1994 1030 LM
Oxygen, Dissolved	6.0	----	mg/l	EPA 360.1	08-22-1994 1645 LS
pH	8.42	----	pH units	EPA 150.1	08-22-1994 1645 LS
Potassium, Total	<5	5	mg/l	EPA 258.1	08-26-1994 1230 DW
Sodium, Total	<5	5	mg/l	EPA 273.1	08-26-1994 1200 DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	08-23-1994 0730 LS
Solids, Total Dissolved	180	10	mg/l	EPA 160.1	08-23-1994 1530 LM
Solids, Total Suspended	6	4	mg/l	EPA 160.2	08-23-1994 1030 LM
Sulfate	12	1	mg/l	EPA 375.4	08-25-1994 0900 LS
Turbidity	2.8	0.1	NTU	EPA 180.1	08-23-1994 1000 LS
Cation/Anion Balance	3.2		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hoot

Manager, Huntington Laboratory

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FAX: (801) 653-2436

September 26, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
9/26/94

FIELD OFFICE

Kind of sample reported to us: Water

Sample taken at: Huntington Creek

Sample taken by: Energy West/KH

Date sampled: September 13, 1994

Date received: September 14, 1994

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC02
Temperature 13.9°C
Rec'd 0815 hr.
Sampled 1340 hr.

FIELD MEASUREMENTS

pH	8.80
Conductivity	302
DO	5.0
Turbidity	12

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14413

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	09-15-1994 1030 ED
Alkalinity, Bicarbonate	176	1	mg/l as HCO_3	SM2320-B	09-14-1994 1730 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-14-1994 1730 LS
Alkalinity, Total	144	1	mg/l as $CaCO_3$	EPA 310.1	09-14-1994 1730 LS
Anions	3.40	----	meq/l	---------	---------- ----- --
Calcium, Total	57	5	mg/l	EPA 215.1	09-21-1994 1500 DW
Cations	4.10	----	meq/l	---------	---------- ----- --
Chloride	5	1	mg/l	SM4500-Cl-B	09-16-1994 1100 LS
Conductivity	323	1	umhos/cm	SM2510-B	09-14-1994 1100 ED
Hardness, Total	197	10	mg/l as $CaCO_3$	SM2340-B	09-21-1994 1500 DW
Iron, Total	0.3	0.2	mg/l	EPA 236.1	09-21-1994 0900 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-21-1994 0900 DW
Magnesium, Total	13	2	mg/l	EPA 242.1	09-21-1994 1615 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-21-1994 1200 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	09-21-1994 1300 LM
Oxygen, Dissolved	6.6	----	mg/l	EPA 360.1	09-14-1994 0930 LS
pH	8.59	----	pH units	EPA 150.1	09-14-1994 1000 LS
Potassium, Total	<5	5	mg/l	EPA 258.1	09-21-1994 1330 DW
Sodium, Total	5	5	mg/l	EPA 273.1	09-21-1994 1300 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-14-1994 1535 LS
Solids, Total Dissolved	180	10	mg/l	EPA 160.1	09-16-1994 0830 LS
Solids, Total Suspended	18	4	mg/l	EPA 160.2	09-16-1994 1300 LM
Sulfate	13	1	mg/l	EPA 375.4	09-20-1994 1310 LS
Turbidity	5.4	0.1	NTU	EPA 180.1	09-14-1994 1500 LS
Cation/Anion Balance	10.0		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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November 16, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
11/16/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC02
Temperature 3.6°C
Flow N/A
Rec'd 1305 hr.
Sampled 1132 hr.

FIELD MEASUREMENTS

pH	8.98
Conductivity	400
DO	4.2
Turbidity	7.5

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Creek

Sample taken by Energy West/KH

Date sampled October 31, 1994

Date received November 1, 1994

Analysis report no. 59-14545

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst		
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	11-03-1994	1215	[illegible]
Alkalinity, Bicarbonate	230	1	mg/l as HCO_3	SM2320-B	11-02-1994	0845	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-02-1994	0845	LS
Alkalinity, Total	186	1	mg/l as $CaCO_3$	EPA 310.1	11-02-1994	0845	LS
Anions	4.60	----	meq/l	---------	----------	-----	--
Calcium, Total	48	5	mg/l	EPA 215.1	11-14-1994	1600	DW
Cations	4.30	----	meq/l	---------	----------	-----	--
Chloride	9	1	mg/l	SM4500-Cl-B	11-10-1994	1200	LS
Conductivity	422	1	umhos/cm	SM2510-B	11-02-1994	1345	ED
Hardness, Total	200	10	mg/l as $CaCO_3$	SM2340-B	11-14-1994	1600	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	11-15-1994	1100	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-16-1994	0730	DW
Magnesium, Total	19	2	mg/l	EPA 242.1	11-15-1994	1000	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-15-1994	1115	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	11-01-1994	1300	LM
Oxygen, Dissolved	5.0	----	mg/l	EPA 360.1	11-01-1994	1410	LS
pH	8.27	----	pH units	EPA 150.1	11-01-1994	1500	LS
Potassium, Total	<5	5	mg/l	EPA 258.1	11-15-1994	1330	DW
Sodium, Total	7	5	mg/l	EPA 273.1	11-15-1994	1300	DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	11-01-1994	1525	LS
Solids, Total Dissolved	240	10	mg/l	EPA 160.1	11-04-1994	0745	LS
Solids, Total Suspended	8	4	mg/l	EPA 160.2	11-03-1994	0730	LM
Sulfate	31	1	mg/l	EPA 375.4	11-15-1994	1000	LS
Turbidity	3.8	0.1	NTU	EPA 180.1	11-01-1994	1525	LS
Cation/Anion Balance	-4.0		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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December, 5, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

12/5/94

FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled November 28, 1994

Date received November 28, 1994

Sample identification by PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC02
Temperature 0.5°F
Flow NA
Rec'd 1200 hr.
Sampled 1040 hr.

FIELD MEASUREMENTS

pH	8.64
Conductivity	388
DO	3.3
Turbidity	4

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14602

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	12-01-1994 1030	ED
Alkalinity, Bicarbonate	220	1	mg/l as HCO_3	SM2320-B	11-29-1994 0840	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-29-1994 0840	LS
Alkalinity, Total	180	1	mg/l as $CaCO_3$	EPA 310.1	11-29-1994 0840	LS
Anions	4.50	----	meq/l	---------	---------- -----	--
Calcium, Total	57	5	mg/l	EPA 215.1	12-01-1994 0800	DW
Cations	5.00	----	meq/l	---------	---------- -----	--
Chloride	11	1	mg/l	SM4500-Cl-B	11-29-1994 1300	LS
Conductivity	468	1	umhos/cm	SM2510-B	12-01-1994 0930	ED
Hardness, Total	230	10	mg/l as $CaCO_3$	SM2340-B	12-01-1994 0800	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	12-01-1994 1700	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	12-01-1994 1700	DW
Magnesium, Total	22	2	mg/l	EPA 242.1	12-01-1994 1000	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	12-01-1994 1600	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	11-29-1994 1300	LM
Oxygen, Dissolved	8.6	----	mg/l	EPA 360.1	11-28-1994 1300	LS
pH	8.23	----	pH units	EPA 150.1	11-28-1994 1450	LS
Potassium, Total	<5	5	mg/l	EPA 258.1	12-01-1994 1430	DW
Sodium, Total	8	5	mg/l	EPA 273.1	12-01-1994 1300	DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	11-28-1994 1500	LS
Solids, Total Dissolved	290	10	mg/l	EPA 160.1	11-29-1994 0940	LS
Solids, Total Suspended	4	4	mg/l	EPA 160.2	11-29-1994 0745	LM
Sulfate	27	1	mg/l	EPA 375.4	12-05-1994 1200	LS
Turbidity	1.9	0.1	NTU	EPA 180.1	11-28-1994 1500	LS
Cation/Anion Balance	5.6		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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January 6, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
1/6/95
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC02
Temperature 2.0°C
Flow NA
Rec'd 1550 hr.
Sampled 1430 hr.

FIELD MEASUREMENTS
pH 8.85 TURB. 8.3
Conductivity 428
DO 3.5

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled December 19, 1994

Date received December 19, 1994

Analysis report no. 59-14665

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	12-28-1994 1020	
Alkalinity, Bicarbonate	228	5	mg/l as HCO_3	SM2320-B	12-27-1994 1030	
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	12-27-1994 1030	LM
Alkalinity, Total	187	5	mg/l as $CaCO_3$	EPA 310.1	12-27-1994 1030	LM
Anions	4.60	----	meq/l	---------	----------	----- --
Calcium, Total	57	1	mg/l	EPA 215.1	12-21-1994 1130	DW
Cations	4.90	----	meq/l	---------	----------	----- --
Chloride	10	1	mg/l	SM4500-Cl-B	12-29-1994 1100	ED
Conductivity	460	1	umhos/cm	SM2510-B	01-03-1995 1500	ED
Hardness, Total	230	10	mg/l as $CaCO_3$	SM2340-B	12-21-1994 1130	DW
Iron, Total	0.2	0.1	mg/l	EPA 236.1	12-21-1994 1530	DW
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-21-1994 1530	DW
Magnesium, Total	20	1	mg/l	EPA 242.1	12-21-1994 1400	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-22-1994 0830	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	12-28-1994 0800	LM
Oxygen, Dissolved	6.4	----	mg/l	EPA 360.1	12-19-1994 1350	LM
pH	8.41	----	pH units	EPA 150.1	12-19-1994 1520	LM
Potassium, Total	1	1	mg/l	EPA 258.1	12-22-1994 0930	DW
Sodium, Total	9	1	mg/l	EPA 273.1	12-22-1994 1000	DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	12-20-1994 0845	LM
Solids, Total Dissolved	270	10	mg/l	EPA 160.1	12-20-1994 1540	LM
Solids, Total Suspended	30	4	mg/l	EPA 160.2	12-20-1994 1230	LM
Sulfate	29	1	mg/l	EPA 375.4	12-30-1994 1000	ED
Turbidity	2.4	0.1	NTU	EPA 180.1	12-19-1994 1645	ED
Cation/Anion Balance	2.7		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Terry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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January 26, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
1/26/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon Creek

Sample taken by Energy West/KH

Date sampled January 20, 1994

Date received January 20, 1994

Huntington Canyon Creek HCCO4
Temperature 34.7°F
Flow NA
Rec'd 1130 hr.
Sampled 1045 hr.

FIELD MEASUREMENTS

pH	8.63
Conductivity	449
DO	11.0
Turbidity	10

NOTE: Possible matrix interference with Alkalinity.

Analysis report no. 59-13849

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l	$CaCO_3$	2310 B	01-26-1994 1130	ED
Alkalinity, Bicarbonate	244	1	mg/l	HCO_3	4500 CO_2D	01-24-1994 1040	LS
Alkalinity, Carbonate	3	1	mg/l	CO_3	4500 CO_2D	01-24-1994 1040	LS
Alkalinity, Total	204	1	mg/l	$CaCO_3$	EPA 310.1	01-24-1994 1040	LS
Anions	5.60	----	meq/l		---------	----------	----- --
Calcium	54.0	1	mg/l		EPA 215.1	01-24-1994 1600	DW
Cations	5.10	----	meq/l		---------	----------	----- --
Chloride	15.0	1	mg/l		EPA 325.3	01-25-1994 1025	LS
Conductivity	441.00	0.2	umhos/cm		EPA 120.1	01-20-1994 1315	ED
Hardness, Total	230.0	1	mg/l	$CaCO_3$	2340 B	01-24-1994 1600	DW
Iron	0.20	0.2	mg/l		EPA 236.1	01-24-1994 1400	DW
Iron, Dissolved	<0.20	0.2	mg/l		EPA 236.1	01-24-1994 1430	DW
Magnesium	23.00	1	mg/l		EPA 242.1	01-24-1994 1600	DW
Manganese	<0.10	0.1	mg/l		EPA 243.1	01-24-1994 1300	DW
Oil & Grease	<5	5	mg/l		EPA 413.1	01-25-1994 1400	LM
Oxygen, Dissolved	9.01	.01	mg/l		EPA 360.1	01-20-1994 1240	LS
pH	8.27	----	Units		EPA 150.1	01-20-1994 1300	LS
Potassium	<2.0	2	mg/l		EPA 258.1	01-24-1994 1130	DW
Sodium	11.0	1	mg/l		EPA 273.1	01-24-1994 1500	DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	01-20-1994 1330	LS
Solids, Total Dissolved	317	10	mg/l		EPA 160.1	01-21-1994 0900	LM
Solids, Total Suspended	21	4	mg/l		EPA 160.2	01-21-1994 1600	LM
Sulfate	50	1	mg/l		EPA 375.4	01-24-1994 1300	LS
Turbidity	4.8	.1	NTU		EPA 180.1	01-20-1994 1320	LS
Cation/Anion Balance	-4.6		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC.

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

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TEL: (801) 653-2311
FAX: (801) 653-2436

February 24, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
2/24/94

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

FIELD OFFICE

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled February 18, 1994

Date received February 18, 1994

Huntington Canyon Creek HCCO4
Temperature 40.5°F
Flow NA
Rec'd 1325 hr.
Sampled 1155 hr.

FIELD MEASUREMENTS

pH	8.29
Conductivity	455
DO	10.5
Turbidity	Run at Lab

NOTE: Possible matrix interference with Alkalinity.

Analysis report no. 59-13908

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l	$CaCO_3$	2310-B	02-24-1994 1130	
Alkalinity, Bicarbonate	236	1	mg/l	HCO_3	4500-CO_2-D	02-21-1994 1330	
Alkalinity, Carbonate	4	1	mg/l	CO_3	4500-CO_2-D	02-21-1994 1330	LS
Alkalinity, Total	199	1	mg/l	$CaCO_3$	EPA 310.1	02-21-1994 1330	LS
Anions	5.50	----	meq/l		---------	---------- -----	--
Calcium	58.0	1	mg/l		EPA 215.1	02-22-1994 1000	DW
Cations	5.60	----	meq/l		---------	---------- -----	--
Chloride	17.0	1	mg/l		4500-Cl-B	02-21-1994 1430	LS
Conductivity	520.00	1	umhos/cm		EPA 120.1	02-24-1994 0940	ED
Hardness, Total	248.0	1	mg/l	$CaCO_3$	2340-B	02-22-1994 1000	DW
Iron	<0.20	0.2	mg/l		EPA 236.1	02-21-1994 1145	DW
Iron, Dissolved	<0.20	0.2	mg/l		EPA 236.1	02-21-1994 1630	DW
Magnesium	25.00	1	mg/l		EPA 242.1	02-22-1994 1130	DW
Manganese	<0.10	0.1	mg/l		EPA 243.1	02-22-1994 0730	DW
Oil & Grease	<5	5	mg/l		EPA 413.1	02-18-1994 1410	LM
Oxygen, Dissolved	7.30	----	mg/l		EPA 360.1	02-18-1994 1325	LM
pH	8.47	----	Units		EPA 150.1	02-18-1994 1515	LM
Potassium	<2.0	2	mg/l		EPA 258.1	02-21-1994 1100	DW
Sodium	15.0	1	mg/l		EPA 273.1	02-22-1994 0800	DW
Solids, Settleable	<0.5	0.5	mg/l		EPA 160.5	02-18-1994 1530	LM
Solids, Total Dissolved	310	10	mg/l		EPA 160.1	02-18-1994 1600	LM
Solids, Total Suspended	7	4	mg/l		EPA 160.2	02-21-1994 0830	LM
Sulfate	50	1	mg/l		EPA 375.4	02-21-1994 1045	LS
Turbidity	1.0	0.1	NTU		EPA 180.1	02-18-1994 1430	ED
Cation/Anion Balance	0.80		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

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FAX: (801) 653-2436

March 30, 1994

RECEIVED
3/30/94

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCCO4

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled March 23, 1994

Date received March 23, 1994

Temperature 11.0°C
Flow NA
Rec'd 1545 hr.
Sampled 1459 hr.

FIELD MEASUREMENTS
Turbidity 6

Analysis report no. 59-13944

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	03-29-1994 1130 ED
Alkalinity, Bicarbonate	250	1	mg/l as HCO_3	SM4500-CO_2-D	03-24-1994 1350 LS
Alkalinity, Carbonate	4	1	mg/l as CO_3	SM4500-CO_2-D	03-24-1994 1350 LS
Alkalinity, Total	211	1	mg/l as $CaCO_3$	EPA 310.1	03-24-1994 1350 LS
Anions	6.80	----	meq/l	---------	---------- ----- --
Calcium, Total	64	1	mg/l	EPA 215.1	03-28-1994 1600 DW
Cations	6.40	----	meq/l	---------	---------- ----- --
Chloride	30	1	mg/l	SM4500-Cl-B	03-30-1994 0830 LS
Conductivity	610	1	umhos/cm	SM2510-B	03-29-1994 0930 ED
Hardness, Total	275	1	mg/l as $CaCO_3$	SM2340-B	03-28-1994 1600 DW
Iron, Total	0.2	0.2	mg/l	EPA 236.1	03-24-1994 1700 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	03-24-1994 1700 DW
Magnesium, Total	28	1	mg/l	EPA 242.1	03-28-1994 1400 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	03-24-1994 1530 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-25-1994 1520 LM
Oxygen, Dissolved	9.6	----	mg/l	EPA 360.1	03-23-1994 1620 LS
pH	8.46	----	pH units	EPA 150.1	03-23-1994 1730 LS
Potassium, Total	<2	2	mg/l	EPA 258.1	03-28-1994 0830 DW
Sodium, Total	21	1	mg/l	EPA 273.1	03-28-1994 1015 DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	03-24-1994 0815 LS
Solids, Total Dissolved	360	10	mg/l	EPA 160.1	03-24-1994 1000 LM
Solids, Total Suspended	8	4	mg/l	EPA 160.2	03-25-1994 1730 LM
Sulfate	80	1	mg/l	EPA 375.4	03-29-1994 1010 LS
Turbidity	4.0	0.1	NTU	EPA 180.1	03-24-1994 1115 LS
Cation/Anion Balance	-2.6		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hart ED

Manager, Huntington Laboratory

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May 2, 1994

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PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

5/2/94

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCCO4

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled April 25, 1994

Date received April 25, 1994

Temperature 4.9°C
Rec'd 1150 hr.
Sampled 1110 hr.

FIELD MEASUREMENTS

pH	8.62
Conductivity	383
DO	9.1
Turbidity	12

Analysis report no. 59-14030

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	04-26-1994 1120	FT
Alkalinity, Bicarbonate	217	1	mg/l as HCO_3	SM4500-CO_2-D	04-25-1994 1430	
Alkalinity, Carbonate	3	1	mg/l as CO_3	SM4500-CO_2-D	04-25-1994 1430	LS
Alkalinity, Total	182	1	mg/l as $CaCO_3$	EPA 310.1	04-25-1994 1430	LS
Anions	4.40	----	meq/l	---------	----------	----- --
Calcium, Total	52	1	mg/l	EPA 215.1	05-02-1994 0800	DW
Cations	4.30	----	meq/l	---------	----------	----- --
Chloride	8	1	mg/l	SM4500-Cl-B	04-25-1994 1530	LS
Conductivity	376	1	umhos/cm	SM2510-B	04-26-1994 1330	ED
Hardness, Total	200	1	mg/l as $CaCO_3$	SM2340-B	05-02-1994 0800	DW
Iron, Total	0.2	0.2	mg/l	EPA 236.1	04-27-1994 1300	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	04-27-1994 1330	DW
Magnesium, Total	17	1	mg/l	EPA 242.1	05-02-1994 0830	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-27-1994 1430	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	04-28-1994 1600	LM
Oxygen, Dissolved	9.3	----	mg/l	EPA 360.1	04-25-1994 1240	LS
pH	8.42	----	pH units	EPA 150.1	04-25-1994 1315	LS
Potassium, Total	<2	2	mg/l	EPA 258.1	04-27-1994 1600	DW
Sodium, Total	8	1	mg/l	EPA 273.1	04-27-1994 1630	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	04-25-1994 1340	LS
Solids, Total Dissolved	200	10	mg/l	EPA 160.1	04-26-1994 1200	LM
Solids, Total Suspended	17	4	mg/l	EPA 160.2	04-25-1994 1600	LM
Sulfate	25	1	mg/l	EPA 375.4	04-26-1994 0900	LS
Turbidity	5.0	0.1	NTU	EPA 180.1	04-25-1994 1325	LS
Cation/Anion Balance	-0.7		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Terry Stout

Manager, Huntington Laboratory

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June 1, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
6/1/94

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCCO4

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CS

Date sampled May 24, 1994

Date received May 24, 1994

Temperature 9.9°C
Rec'd 1435 hr.
Sampled 1145 hr.

FIELD MEASUREMENTS	
pH	8.34
Conductivity	309
DO	7.6
Turbidity	26

Analysis report no. 59-14069

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	05-26-1994 1230	ED
Alkalinity, Bicarbonate	194	1	mg/l as HCO_3	SM2320-B	05-25-1994 1015	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	05-25-1994 1015	LS
Alkalinity, Total	160	1	mg/l as $CaCO_3$	EPA 310.1	05-25-1994 1015	LS
Anions	3.50	----	meq/l	---------	----------	----- --
Calcium, Total	52	1	mg/l	EPA 215.1	05-26-1994 0930	DW
Cations	3.80	----	meq/l	---------	----------	----- --
Chloride	2	1	mg/l	SM4500-Cl-B	06-01-1994 0900	LS
Conductivity	324	1	umhos/cm	SM2510-B	05-26-1994 1130	ED
Hardness, Total	179	1	mg/l as $CaCO_3$	SM2340-B	05-26-1994 0930	DW
Iron, Total	0.8	0.2	mg/l	EPA 236.1	05-26-1994 1600	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	05-26-1994 1600	DW
Magnesium, Total	12	1	mg/l	EPA 242.1	05-26-1994 1300	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	05-25-1994 1700	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	05-27-1994 1520	LM
Oxygen, Dissolved	9.3	----	mg/l	EPA 360.1	05-24-1994 1515	LS
pH	7.63	----	pH units	EPA 150.1	05-24-1994 1600	LS
Potassium, Total	<2	2	mg/l	EPA 258.1	05-26-1994 0730	DW
Sodium, Total	4	1	mg/l	EPA 273.1	05-26-1994 0900	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	05-25-1994 0800	LS
Solids, Total Dissolved	180	10	mg/l	EPA 160.1	05-26-1994 1115	LM
Solids, Total Suspended	30	4	mg/l	EPA 160.2	05-25-1994 1500	LM
Sulfate	14	1	mg/l	EPA 375.4	05-31-1994 0815	LS
Turbidity	15.0	0.1	NTU	EPA 180.1	05-24-1994 1630	LS
Cation/Anion Balance	2.8		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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July 6, 1994

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PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek ~~HCC01~~ HCC04

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CS

Date sampled June 21, 1994

Date received June 21, 1994

Temperature 13.0°C
Rec'd 1220 hr.
Sampled 1150 hr.

FIELD MEASUREMENTS

pH	8.11
Conductivity	332
DO	8.9
Turbidity	11.0

Analysis report no. 59-14167

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	06-22-1994 1500	
Alkalinity, Bicarbonate	203	1	mg/l as HCO_3	SM2320-B	06-22-1994 1415	
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-22-1994 1415	LS
Alkalinity, Total	166	1	mg/l as $CaCO_3$	EPA 310.1	06-22-1994 1415	LS
Anions	3.80	----	meq/l	---------	---------- -----	--
Calcium, Total	50	1	mg/l	EPA 215.1	07-05-1994 1130	DW
Cations	3.90	----	meq/l	---------	---------- -----	--
Chloride	3	1	mg/l	SM4500-Cl-B	06-22-1994 1940	LS
Conductivity	364	1	umhos/cm	SM2510-B	06-22-1994 1230	ED
Hardness, Total	183	1	mg/l as $CaCO_3$	SM2340-B	07-05-1994 1130	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-01-1994 0930	ED
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-30-1994 0800	DW
Magnesium, Total	14	1	mg/l	EPA 242.1	07-05-1994 1400	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1994 0800	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	07-05-1994 1000	LM
Oxygen, Dissolved	7.2	----	mg/l	EPA 360.1	06-21-1994 1315	LS
pH	8.57	----	pH units	EPA 150.1	06-21-1994 1340	LS
Potassium, Total	<2	2	mg/l	EPA 258.1	07-05-1994 0900	DW
Sodium, Total	5	1	mg/l	EPA 273.1	07-05-1994 1000	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	06-21-1994 1500	LS
Solids, Total Dissolved	211	10	mg/l	EPA 160.1	06-22-1994 1035	LM
Solids, Total Suspended	12	4	mg/l	EPA 160.2	06-24-1994 1420	LM
Sulfate	17	1	mg/l	EPA 375.4	06-22-1994 1315	LS
Turbidity	4.2	0.1	NTU	EPA 180.1	06-21-1994 1530	LS
Cation/Anion Balance	1.4		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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July 25, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
7/26/94

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCC04

Kind of sample reported to us: Water

Sample taken at: Huntington Canyon

Sample taken by: Energy West/KH

Date sampled: July 14, 1994

Date received: July 14, 1994

Temperature 13.5°C
Rec'd 1200 hr.
Sampled 1045 hr.

FIELD MEASUREMENTS

pH	8.94
Conductivity	294
DO	7.4
Turbidity	17

Analysis report no. 59-14248

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst		
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-22-1994	1310	ED
Alkalinity, Bicarbonate	176	1	mg/l as HCO_3	SM2320-B	07-18-1994	1100	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-18-1994	1100	LS
Alkalinity, Total	144	1	mg/l as $CaCO_3$	EPA 310.1	07-18-1994	1100	LS
Anions	3.30	----	meq/l	---------	----------	-----	--
Calcium, Total	53	5	mg/l	EPA 215.1	07-21-1994	1700	DW
Cations	3.50	----	meq/l	---------	----------	-----	--
Chloride	5	1	mg/l	SM4500-Cl-B	07-18-1994	1230	LS
Conductivity	327	1	umhos/cm	SM2510-B	07-19-1994	1515	ED
Hardness, Total	178	10	mg/l as $CaCO_3$	SM2340-B	07-21-1994	1700	DW
Iron, Total	0.4	0.2	mg/l	EPA 236.1	07-21-1994	1600	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	07-19-1994	0930	DW
Magnesium, Total	11	2	mg/l	EPA 242.1	07-21-1994	1800	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-21-1994	1400	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	07-14-1994	1615	LM
Oxygen, Dissolved	6.2	----	mg/l	EPA 360.1	07-14-1994	1450	LS
pH	8.25	----	pH units	EPA 150.1	07-14-1994	1600	LS
Potassium, Total	<5	5	mg/l	EPA 258.1	07-21-1994	1230	DW
Sodium, Total	<5	5	mg/l	EPA 273.1	07-21-1994	1015	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	07-14-1994	1640	LS
Solids, Total Dissolved	180	10	mg/l	EPA 160.1	07-15-1994	1230	LM
Solids, Total Suspended	33	4	mg/l	EPA 160.2	07-15-1994	1515	LM
Sulfate	13	1	mg/l	EPA 375.4	07-19-1994	0830	LS
Turbidity	4.4	0.1	NTU	EPA 180.1	07-14-1994	1530	LS
Cation/Anion Balance	3.8		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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September 7, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
9/8/94

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC04

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled August 22, 1994

Date received August 22, 1994

Temperature 15.1°C
Flow NA
Rec'd 1430 hr.
Sampled 1310 hr.

FIELD MEASUREMENTS

pH	8.70
Conductivity	319
DO	5.6
Turbidity	10

Analysis report no. 59-14342

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	08-24-1994 1130	
Alkalinity, Bicarbonate	182	1	mg/l as HCO_3	SM2320-B	08-23-1994 1450	
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	08-23-1994 1450	LS
Alkalinity, Total	149	1	mg/l as $CaCO_3$	EPA 310.1	08-23-1994 1450	LS
Anions	3.50	----	meq/l	---------	----------	----- --
Calcium, Total	58	5	mg/l	EPA 215.1	09-01-1994 1215	DW
Cations	4.10	----	meq/l	---------	----------	----- --
Chloride	8	1	mg/l	SM4500-Cl-B	08-29-1994 0830	LS
Conductivity	342	1	umhos/cm	SM2510-B	08-26-1994 1130	ED
Hardness, Total	210	10	mg/l as $CaCO_3$	SM2340-B	09-01-1994 1215	DW
Iron, Total	0.5	0.2	mg/l	EPA 236.1	09-01-1994 1430	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-24-1994 1400	DW
Magnesium, Total	15	2	mg/l	EPA 242.1	09-01-1994 1459	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-01-1994 1400	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	08-24-1994 1030	LM
Oxygen, Dissolved	5.2	----	mg/l	EPA 360.1	08-22-1994 1645	LS
pH	8.40	----	pH units	EPA 150.1	08-22-1994 1645	LS
Potassium, Total	<5	5	mg/l	EPA 258.1	09-01-1994 1330	DW
Sodium, Total	<5	5	mg/l	EPA 273.1	09-01-1994 1300	DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	08-23-1994 0730	LS
Solids, Total Dissolved	190	10	mg/l	EPA 160.1	08-23-1994 1530	LM
Solids, Total Suspended	12	4	mg/l	EPA 160.2	08-23-1994 1030	LM
Sulfate	16	1	mg/l	EPA 375.4	08-25-1994 0900	LS
Turbidity	3.9	0.1	NTU	EPA 180.1	08-23-1994 1000	LS
Cation/Anion Balance	7.7		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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September 23, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

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9/23/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC04
Temperature 13.4°C
Rec'd 0815 hr.
Sampled 1350 hr.

FIELD MEASUREMENTS

pH	8.89
Conductivity	329
DO	5.7
Turbidity	16

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled September 13, 1994

Date received September 14, 1994

Analysis report no. 59-14421

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	09-15-1994 1030 ED
Alkalinity, Bicarbonate	182	1	mg/l as HCO_3	SM2320-B	09-22-1994 1400 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-22-1994 1400 LS
Alkalinity, Total	149	1	mg/l as $CaCO_3$	EPA 310.1	09-22-1994 1400 LS
Anions	3.60	----	meq/l	---------	---------- ----- --
Calcium, Total	40	5	mg/l	EPA 215.1	09-21-1994 1500 DW
Cations	3.40	----	meq/l	---------	---------- ----- --
Chloride	8	1	mg/l	SM4500-Cl-B	09-16-1994 1100 LS
Conductivity	347	1	umhos/cm	SM2510-B	09-14-1994 1100 ED
Hardness, Total	150	10	mg/l as $CaCO_3$	SM2340-B	09-21-1994 1500 DW
Iron, Total	0.3	0.2	mg/l	EPA 236.1	09-21-1994 0900 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-21-1994 0900 DW
Magnesium, Total	13	2	mg/l	EPA 242.1	09-21-1994 1615 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-21-1994 1200 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	09-21-1994 1300 LM
Oxygen, Dissolved	6.9	----	mg/l	EPA 360.1	09-14-1994 0930 LS
pH	8.53	----	pH units	EPA 150.1	09-14-1994 1000 LS
Potassium, Total	<5	5	mg/l	EPA 258.1	09-21-1994 1330 DW
Sodium, Total	7	5	mg/l	EPA 273.1	09-21-1994 1300 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-14-1994 1535 LS
Solids, Total Dissolved	190	10	mg/l	EPA 160.1	09-16-1994 0830 LS
Solids, Total Suspended	17	4	mg/l	EPA 160.2	09-16-1994 1300 LM
Sulfate	20	1	mg/l	EPA 375.4	09-21-1994 0800 LS
Turbidity	3.6	0.1	NTU	EPA 180.1	09-14-1994 1500 LS
Cation/Anion Balance	-3.6		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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November 16, 1994

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11/16/94

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Creek

Sample taken by Energy West/KH

Date sampled October 31, 1994

Date received November 1, 1994

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC04
Temperature 3.9°C
Flow N/A
Rec'd 1305 hr.
Sampled 1145 hr.

FIELD MEASUREMENTS

pH	8.86
Conductivity	457
DO	4.2
Turbidity	7.3

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14546

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	11-03-1994 1215
Alkalinity, Bicarbonate	240	1	mg/l as HCO_3	SM2320-B	11-02-1994 0845 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-02-1994 0845 LS
Alkalinity, Total	200	1	mg/l as $CaCO_3$	EPA 310.1	11-02-1994 0845 LS
Anions	5.20	----	meq/l	---------	---------- ----- --
Calcium, Total	50	5	mg/l	EPA 215.1	11-14-1994 1600 DW
Cations	4.70	----	meq/l	---------	---------- ----- --
Chloride	13	1	mg/l	SM4500-Cl-B	11-10-1994 1200 LS
Conductivity	474	1	umhos/cm	SM2510-B	11-02-1994 1345 ED
Hardness, Total	210	10	mg/l as $CaCO_3$	SM2340-B	11-14-1994 1600 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	11-15-1994 1100 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-16-1994 0730 DW
Magnesium, Total	21	2	mg/l	EPA 242.1	11-15-1994 1000 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-15-1994 1115 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	11-01-1994 1300 LM
Oxygen, Dissolved	5.2	----	mg/l	EPA 360.1	11-01-1994 1410 LS
pH	8.22	----	pH units	EPA 150.1	11-01-1994 1500 LS
Potassium, Total	<5	5	mg/l	EPA 258.1	11-15-1994 1330 DW
Sodium, Total	12	5	mg/l	EPA 273.1	11-15-1994 1300 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	11-01-1994 1525 LS
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	11-04-1994 0745 LS
Solids, Total Suspended	10	4	mg/l	EPA 160.2	11-03-1994 0730 LM
Sulfate	40	1	mg/l	EPA 375.4	11-15-1994 1000 LS
Turbidity	4.0	0.1	NTU	EPA 180.1	11-01-1994 1525 LS
Cation/Anion Balance	-4.6		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Short

Manager, Huntington Laboratory

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December 5, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

12/5/94

FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled November 28, 1994

Date received November 28, 1994

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC04
Temperature 0.8°F
Flow NA
Rec'd 1200 hr.
Sampled 1050 hr.

FIELD MEASUREMENTS

pH	8.59
Conductivity	461
DO	~~NA~~ 5.6
Turbidity	6

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14603

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	12-01-1994 1030	ED
Alkalinity, Bicarbonate	220	1	mg/l as HCO_3	SM2320-B	11-29-1994 0840	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-29-1994 0840	LS
Alkalinity, Total	180	1	mg/l as $CaCO_3$	EPA 310.1	11-29-1994 0840	LS
Anions	5.10	----	meq/l	---------	---------- -----	--
Calcium, Total	60	5	mg/l	EPA 215.1	12-01-1994 0800	DW
Cations	5.70	----	meq/l	---------	---------- -----	--
Chloride	18	1	mg/l	SM4500-Cl-B	11-29-1994 1300	LS
Conductivity	550	1	umhos/cm	SM2510-B	12-01-1994 0930	ED
Hardness, Total	260	10	mg/l as $CaCO_3$	SM2340-B	12-01-1994 0800	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	12-01-1994 1700	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	12-01-1994 1700	DW
Magnesium, Total	26	2	mg/l	EPA 242.1	12-01-1994 1000	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	12-01-1994 1600	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	11-29-1994 1300	LM
Oxygen, Dissolved	9.4	----	mg/l	EPA 360.1	11-28-1994 1300	LS
pH	8.24	----	pH units	EPA 150.1	11-28-1994 1450	LS
Potassium, Total	<5	5	mg/l	EPA 258.1	12-01-1994 1430	DW
Sodium, Total	14	5	mg/l	EPA 273.1	12-01-1994 1300	DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	11-28-1994 1530	LS
Solids, Total Dissolved	350	10	mg/l	EPA 160.1	11-29-1994 0940	LS
Solids, Total Suspended	9	4	mg/l	EPA 160.2	11-29-1994 0745	LM
Sulfate	50	1	mg/l	EPA 375.4	12-05-1994 1200	LS
Turbidity	3.3	0.1	NTU	EPA 180.1	11-28-1994 1500	LS
Cation/Anion Balance	5.5		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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January 6, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
1/6/95
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC04
Temperature 2.7°C
Flow NA
Rec'd 1550 hr.
Sampled 1445 hr.

FIELD MEASUREMENTS

pH	8.90	TURB. 7.8
Conductivity	475	
DO	2.4	

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled December 19, 1994

Date received December 19, 1994

Analysis report no. 59-14666

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	12-28-1994 1020 ED
Alkalinity, Bicarbonate	221	5	mg/l as HCO_3	SM2320-B	12-27-1994 1030 LM
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	12-27-1994 1030 LM
Alkalinity, Total	181	5	mg/l as $CaCO_3$	EPA 310.1	12-27-1994 1030 LM
Anions	4.80	----	meq/l	---------	---------- ----- --
Calcium, Total	58	1	mg/l	EPA 215.1	12-28-1994 1300 DW
Cations	5.30	----	meq/l	---------	---------- ----- --
Chloride	14	1	mg/l	SM4500-Cl-B	12-29-1994 1100 ED
Conductivity	517	1	umhos/cm	SM2510-B	01-03-1995 1500 ED
Hardness, Total	240	10	mg/l as $CaCO_3$	SM2340-B	12-28-1994 1300 DW
Iron, Total	0.1	0.1	mg/l	EPA 236.1	12-21-1994 1530 DW
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-21-1994 1530 DW
Magnesium, Total	23	1	mg/l	EPA 242.1	12-28-1994 1300 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-22-1994 0830 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	12-28-1994 0800 LM
Oxygen, Dissolved	6.8	----	mg/l	EPA 360.1	12-19-1994 1350 LM
pH	8.69	----	pH units	EPA 150.1	12-19-1994 1520 LM
Potassium, Total	2	1	mg/l	EPA 258.1	12-22-1994 0930 DW
Sodium, Total	12	1	mg/l	EPA 273.1	12-28-1994 1100 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	12-20-1994 0845 LM
Solids, Total Dissolved	300	10	mg/l	EPA 160.1	12-20-1994 1540 LM
Solids, Total Suspended	17	4	mg/l	EPA 160.2	12-20-1994 1230 LM
Sulfate	40	1	mg/l	EPA 375.4	12-30-1994 1000 ED
Turbidity	2.0	0.1	NTU	EPA 180.1	12-19-1994 1645 ED
Cation/Anion Balance	4.5		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

F-465/050/95
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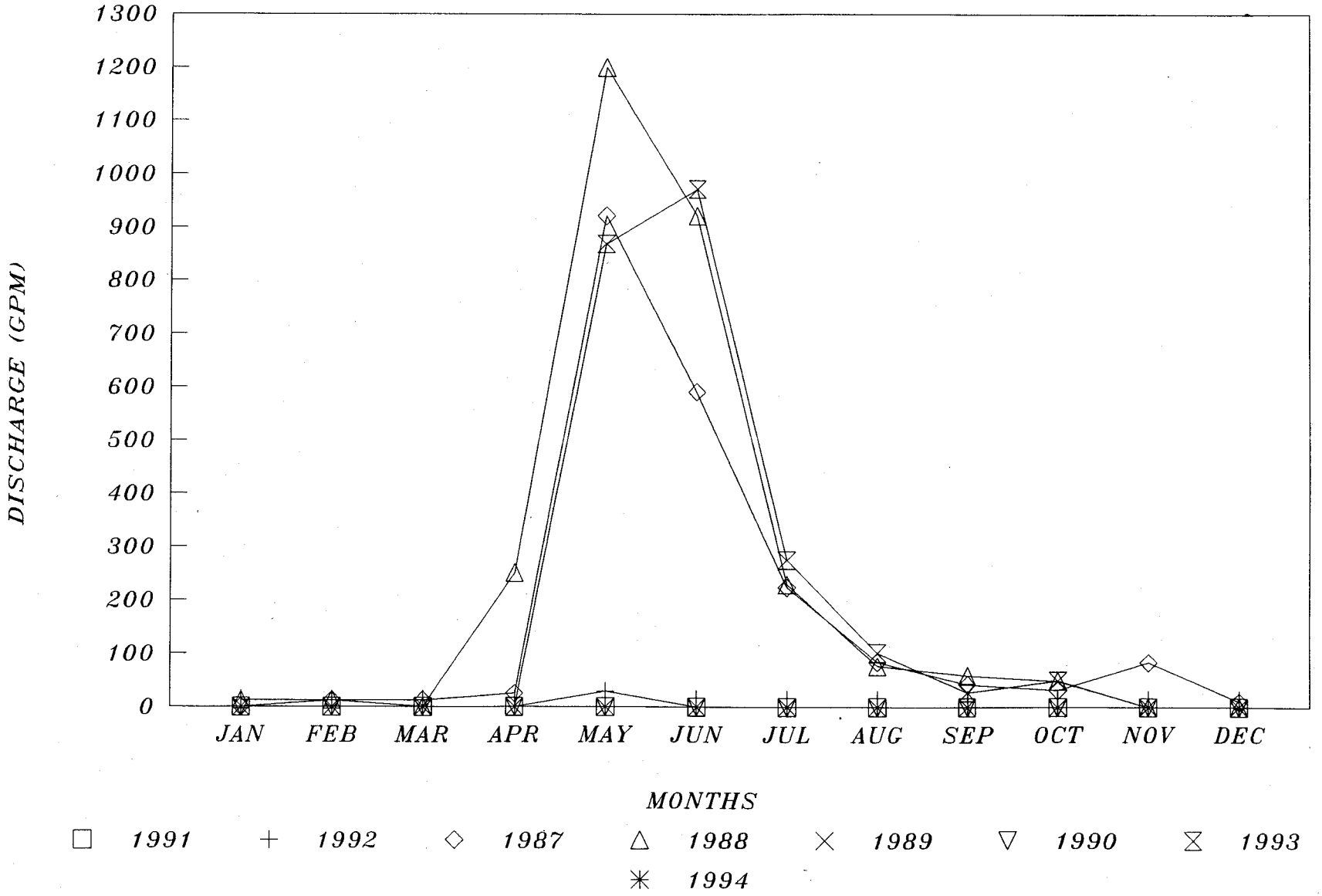
TERMS AND CONDITIONS ON REVERSE

APPENDIX B

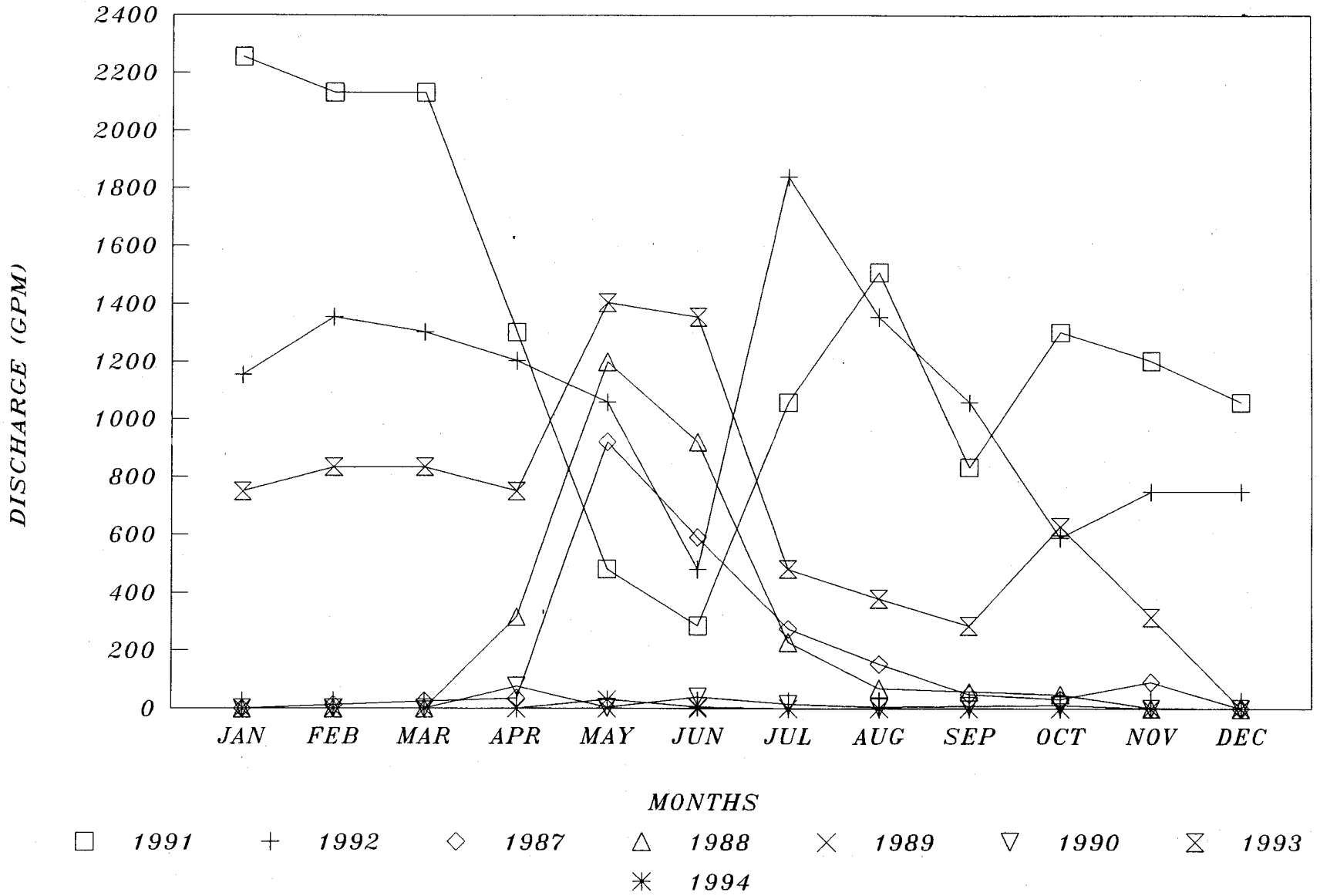
DEER CREEK – ABOVE MINE

Drainage Recession Curve Study



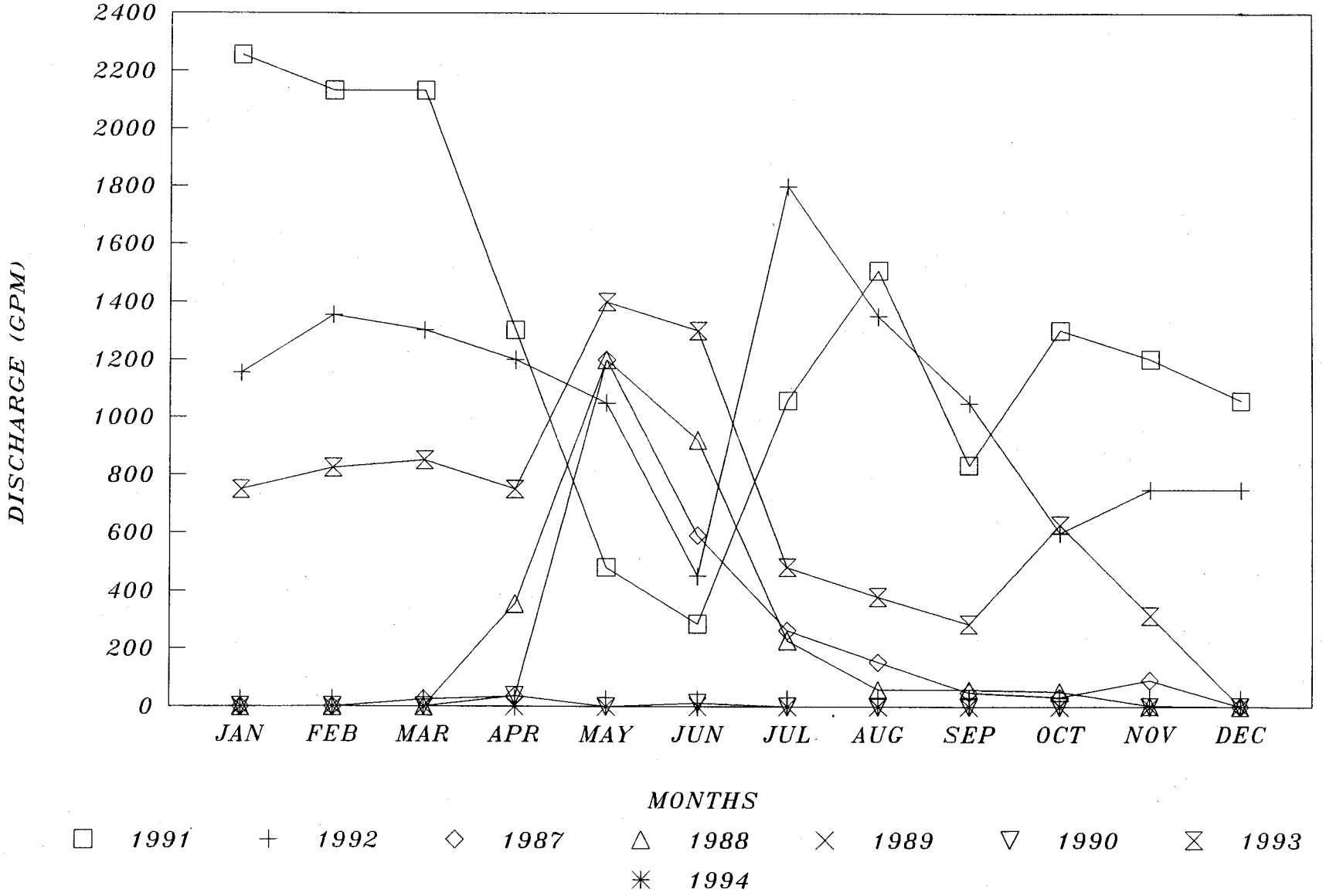
DEER CREEK – @ PERMIT BOUNDARY

Drainage Recession Curve Study



DEER CREEK – BELOW MINE

Drainage Recession Curve Study



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TEL: (801) 653-2311
FAX: (801) 653-2436

June 7, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
6/7/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/CS

Date sampled May 24, 1994

Date received May 24, 1994

Deer Creek Run-Off
DCR-04
Temperature 11.2°C
Rec'd 1435 hr.
Sampled 1055 hr.

FIELD MEASUREMENTS

pH	8.23
Conductivity	2080
DO	7.4
Turbidity	11

FLOW 30 GPM

Analysis report no. 59-14072

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
cidity	<10	10	mg/l as $CaCO_3$	SM2310-B	05-26-1994 1230 ED
Alkalinity, Bicarbonate	322	1	mg/l as HCO_3	SM2320-B	05-25-1994 1015 LS
Alkalinity, Carbonate	5	1	mg/l as CO_3	SM2320-B	05-25-1994 1015 LS
Alkalinity, Total	271	1	mg/l as $CaCO_3$	EPA 310.1	05-25-1994 1015 LS
Anions	21.30	----	meq/l	---------	---------- ----- --
Calcium, Total	91	1	mg/l	EPA 215.1	05-26-1994 0930 DW
Cations	21.60	----	meq/l	---------	---------- ----- --
Chloride	422	1	mg/l	SM4500-Cl-B	06-01-1994 0900 LS
Conductivity	2240	1	umhos/cm	SM2510-B	05-26-1994 1130 ED
Hardness, Total	454	1	mg/l as $CaCO_3$	SM2340-B	05-26-1994 0930 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	05-26-1994 1600 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	05-26-1994 1600 DW
Magnesium, Total	55	1	mg/l	EPA 242.1	05-26-1994 1300 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	05-25-1994 1700 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	06-03-1994 1300 LM
Oxygen, Dissolved	7.8	----	mg/l	EPA 360.1	05-24-1994 1515 LS
pH	8.43	----	pH units	EPA 150.1	05-24-1994 1600 LS
Potassium, Total	3	2	mg/l	EPA 258.1	05-26-1994 0730 DW
Sodium, Total	288	1	mg/l	EPA 273.1	05-26-1994 0900 DW
Solids, Total Dissolved	1270	10	mg/l	EPA 160.1	05-26-1994 1115 LM
Solids, Total Suspended	4	4	mg/l	EPA 160.2	05-25-1994 1500 LM
Sulfate	190	1	mg/l	EPA 375.4	05-31-1994 0815 LS
Turbidity	1.4	0.1	NTU	EPA 180.1	05-24-1994 1630 LS
Cation/Anion Balance	0.70	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout SD

Manager, Huntington Laboratory

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC.

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

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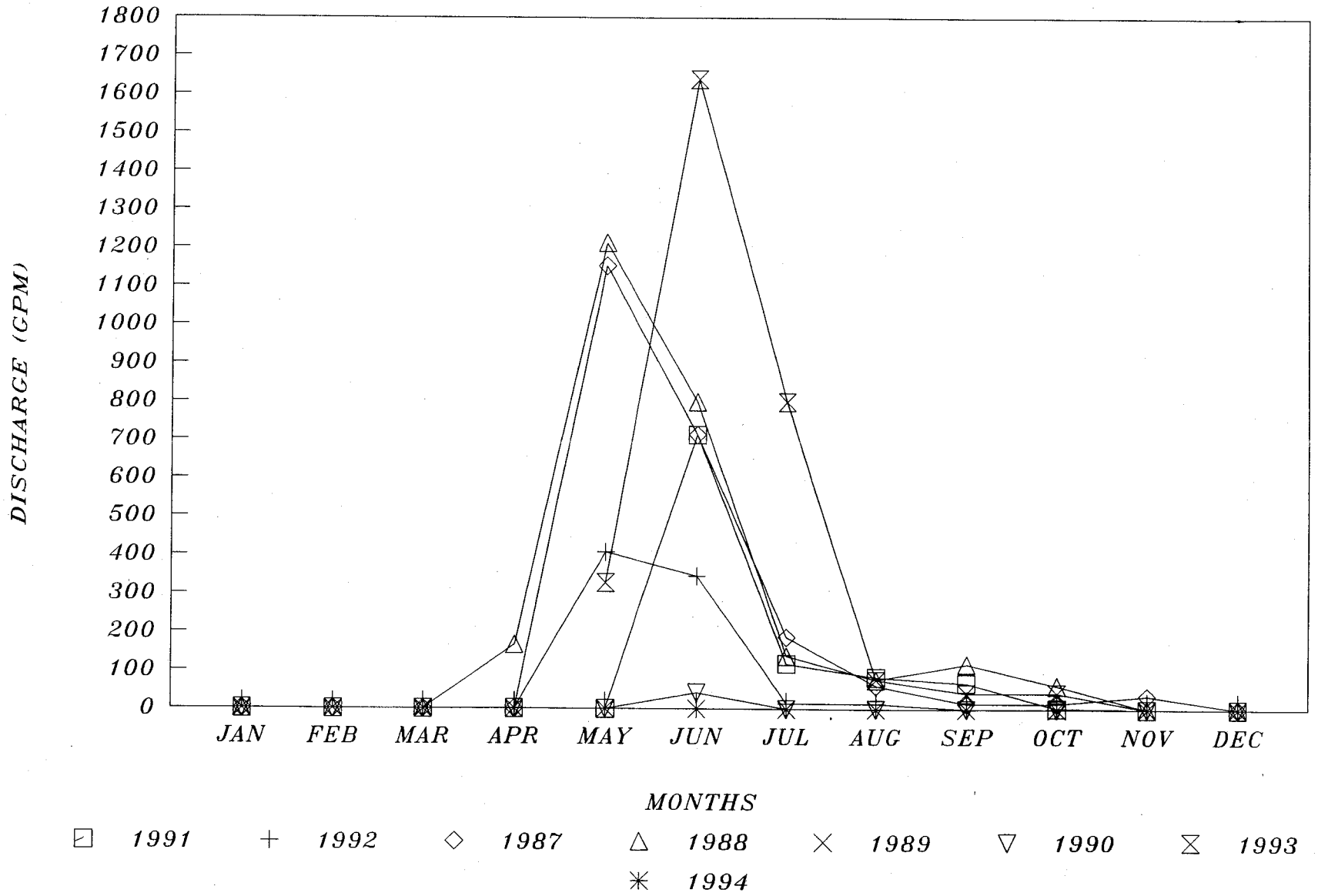
TERMS AND CONDITIONS ON REVERSE

APPENDIX C

MEETINGHOUSE CANYON – LEFT FORK

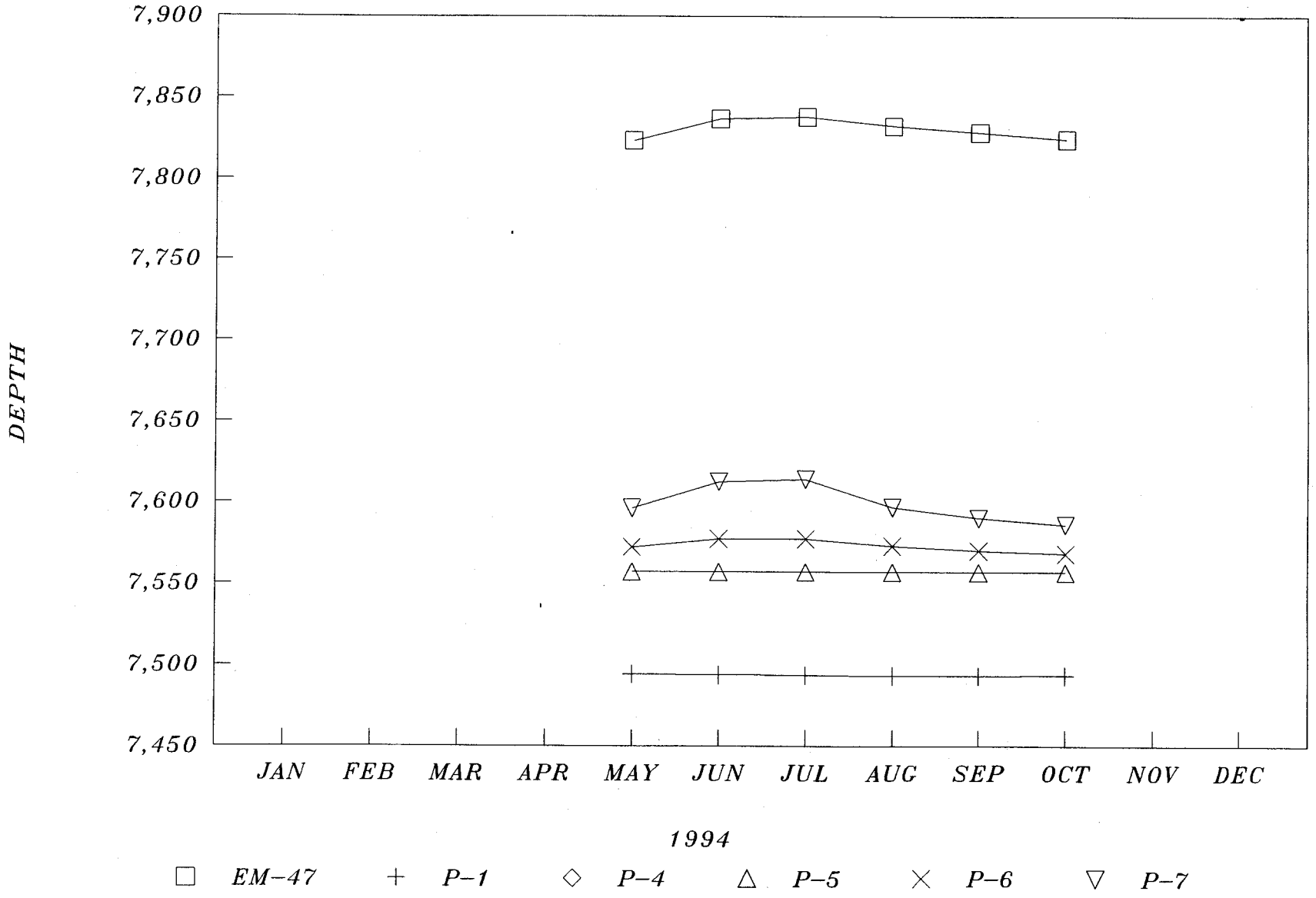
Drainage Recession Curve Study



APPENDIX D

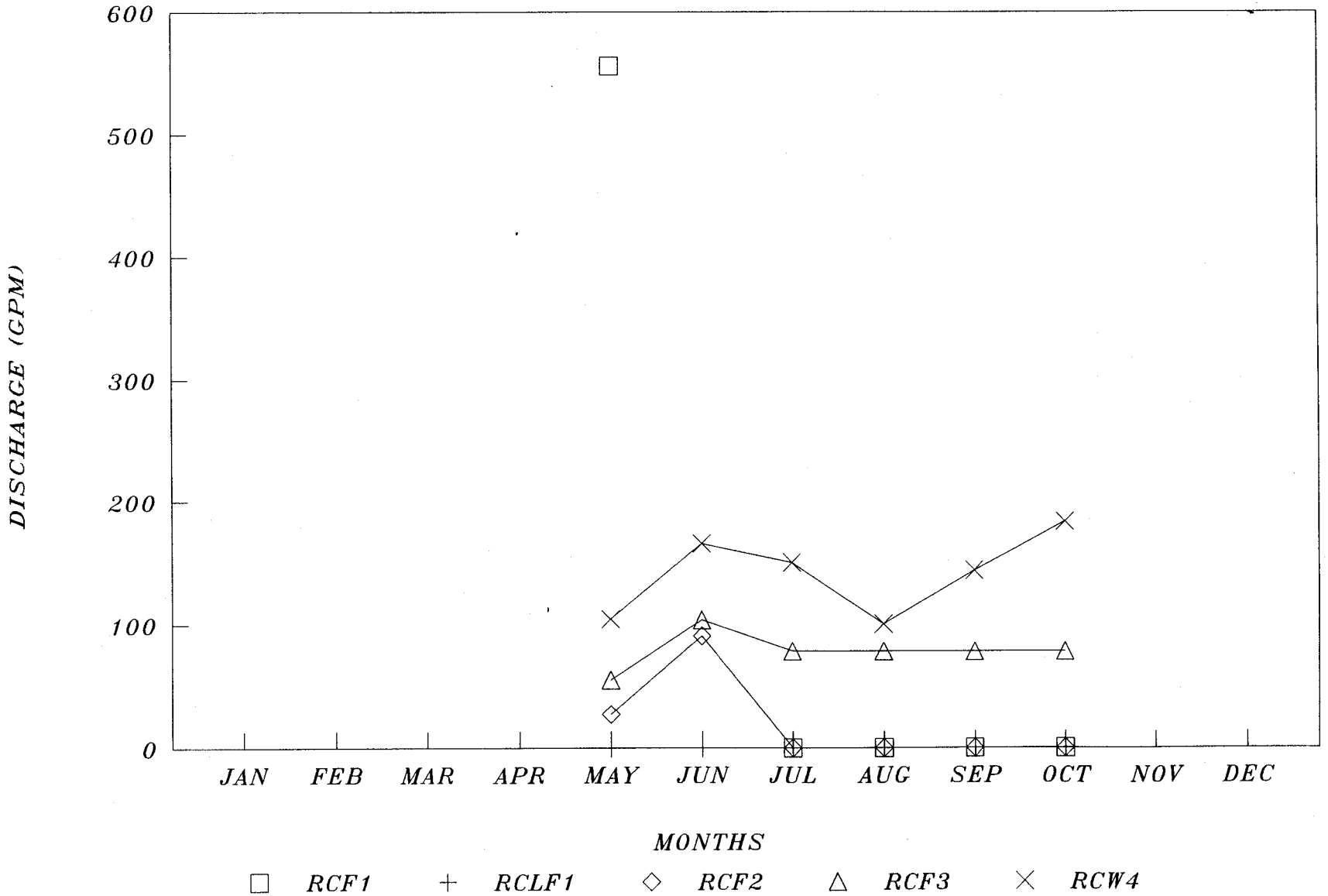
RILDA CANYON MONITORING WELLS

Piezometric Study



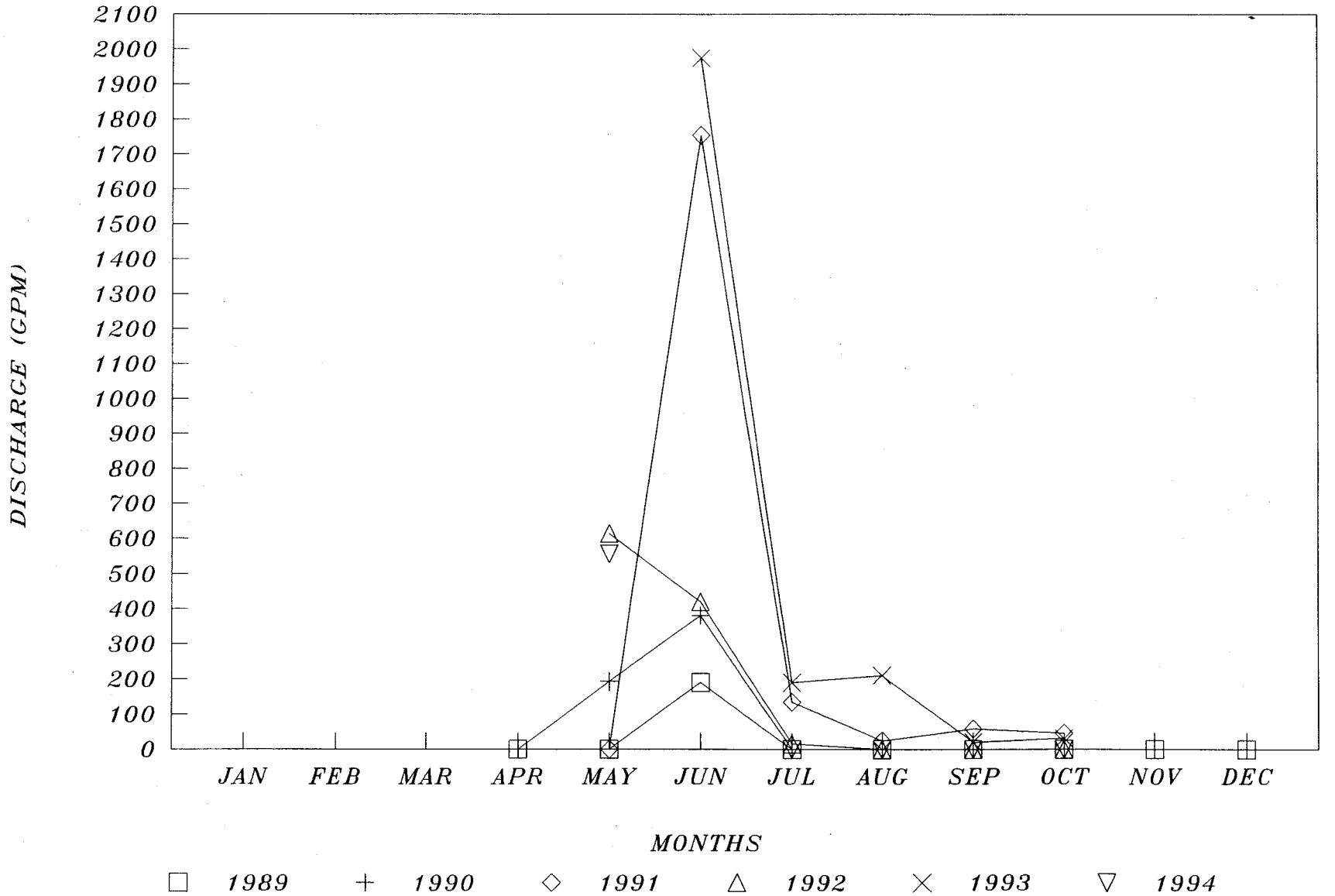
RILDA CANYON – 1994

Drainage Recession Curve Study



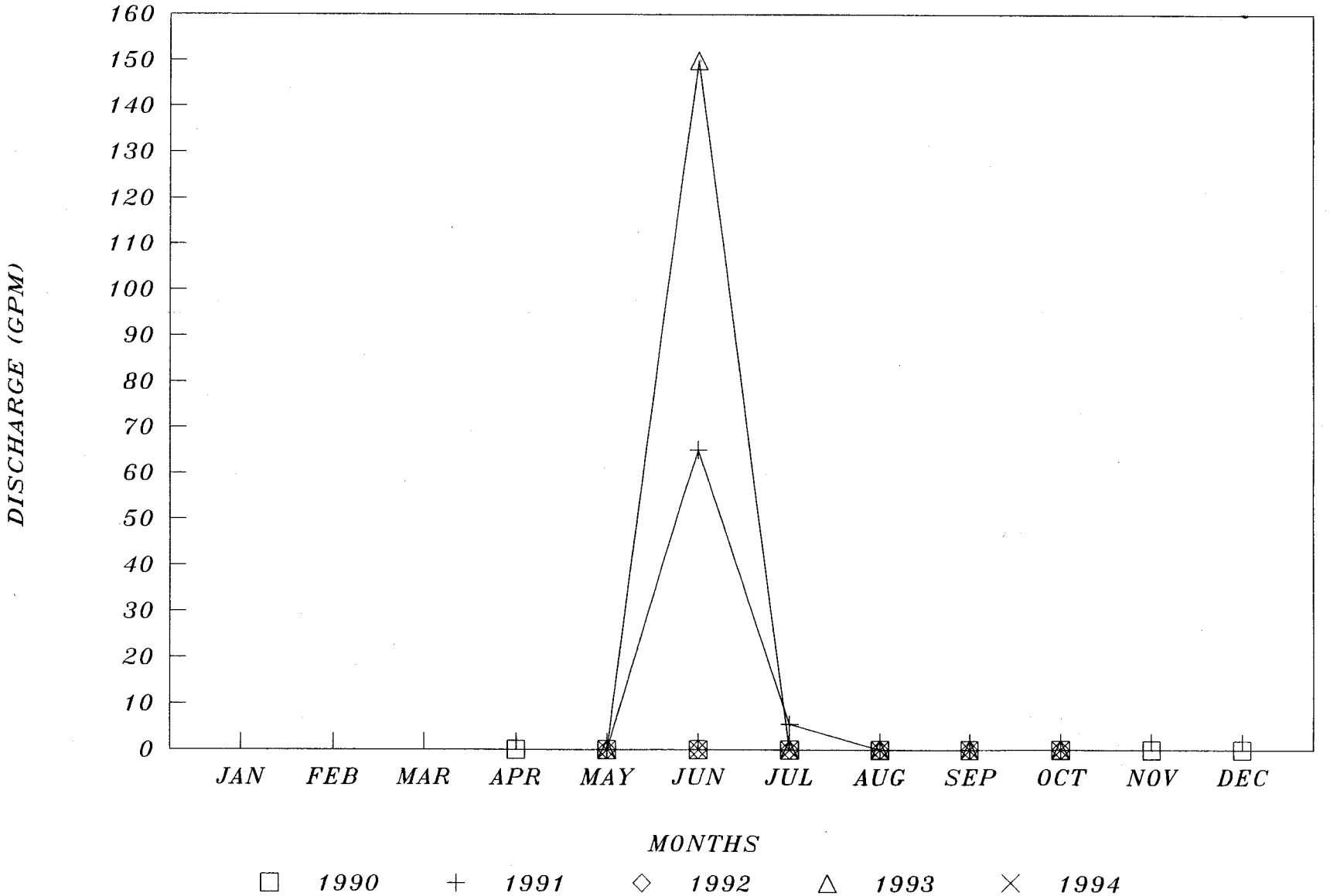
RILDA CANYON – RIGHT FORK(RCF1)

Drainage Recession Curve Study



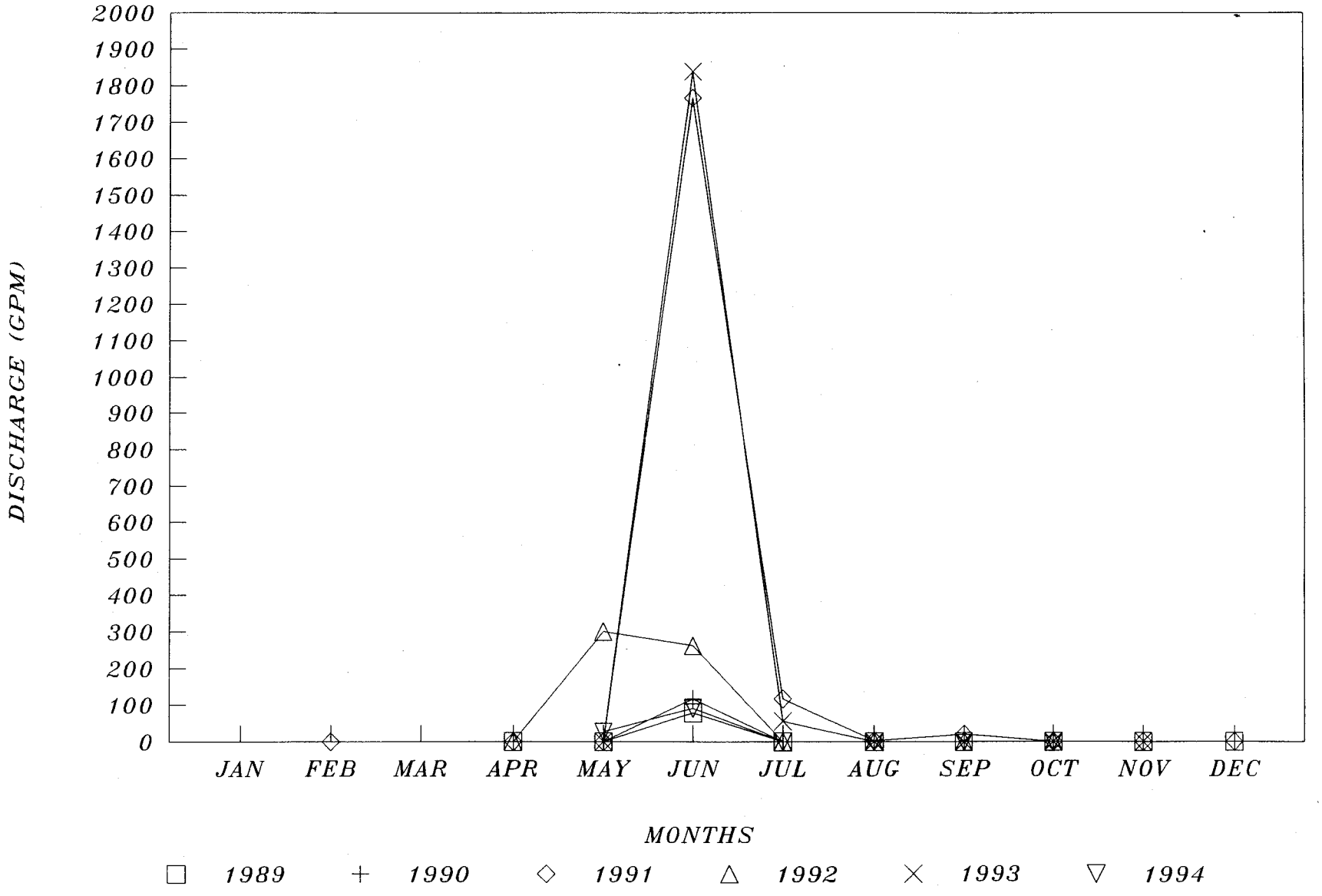
RILDA CANYON – LEFT FORK(RCLF1)

Drainage Recession Curve Study



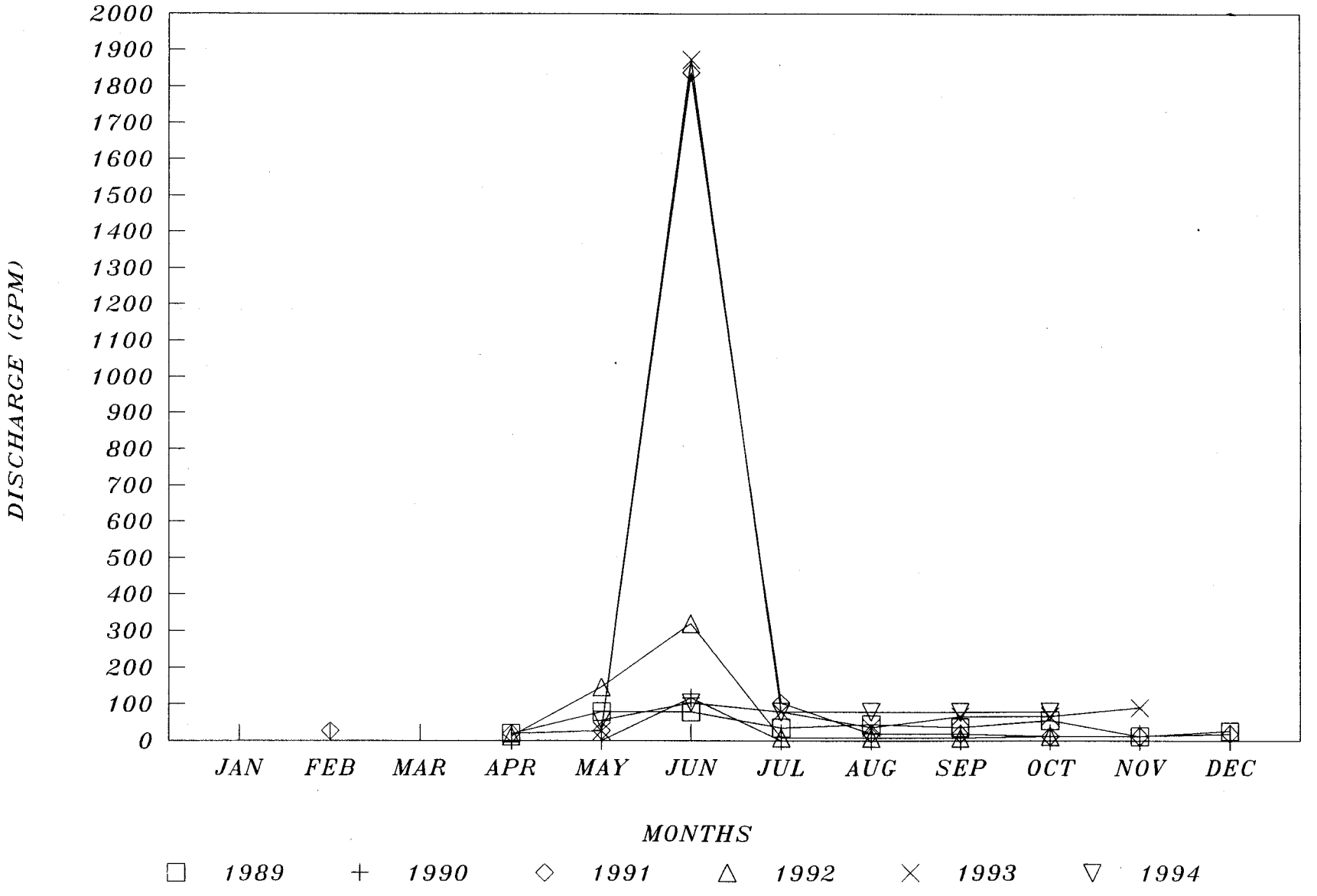
RILDA CANYON – ABOVE NEWUA(RCF2)

Drainage Recession Curve Study



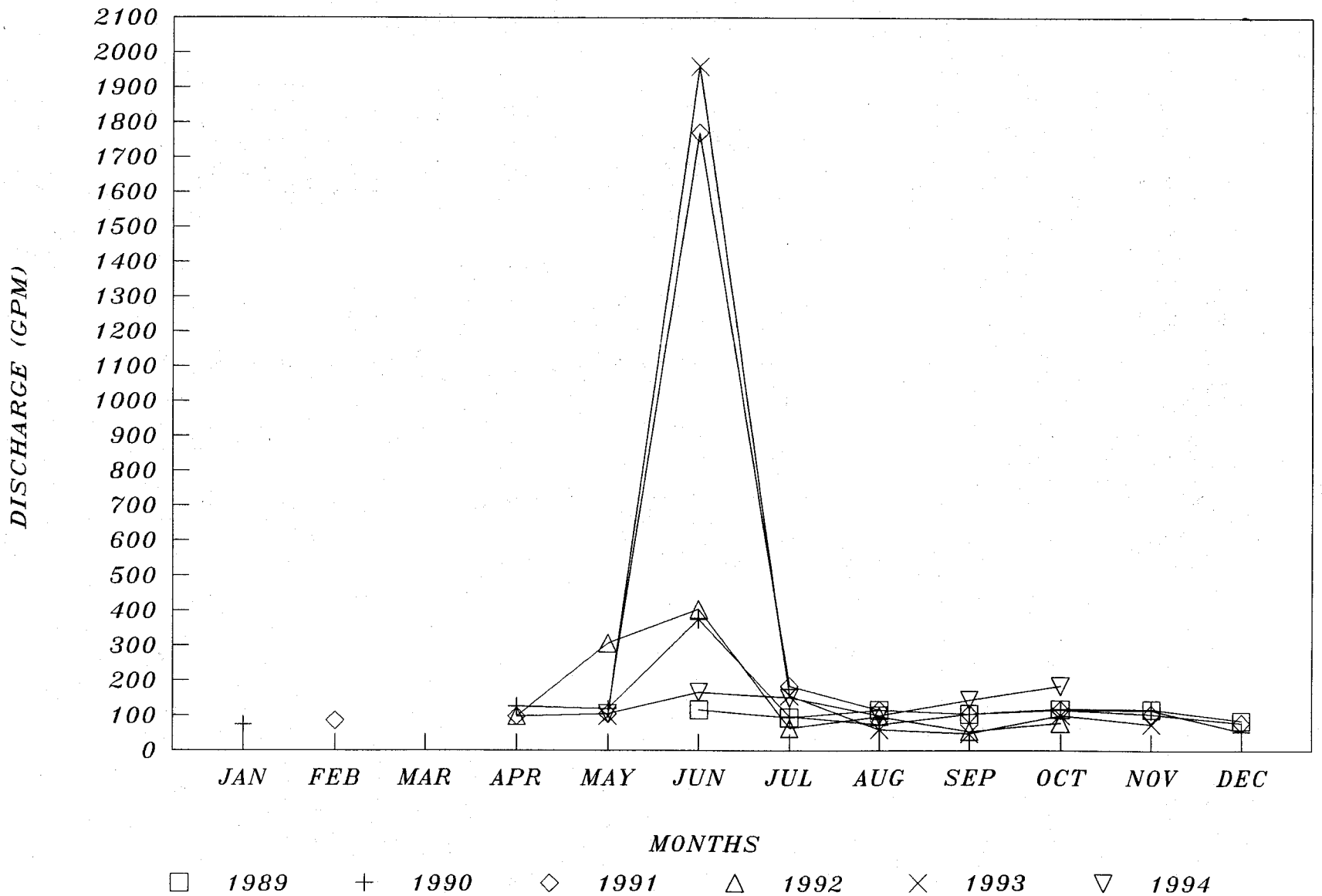
RILDA CANYON – BELOW NEWUA(RCF3)

Drainage Recession Curve Study



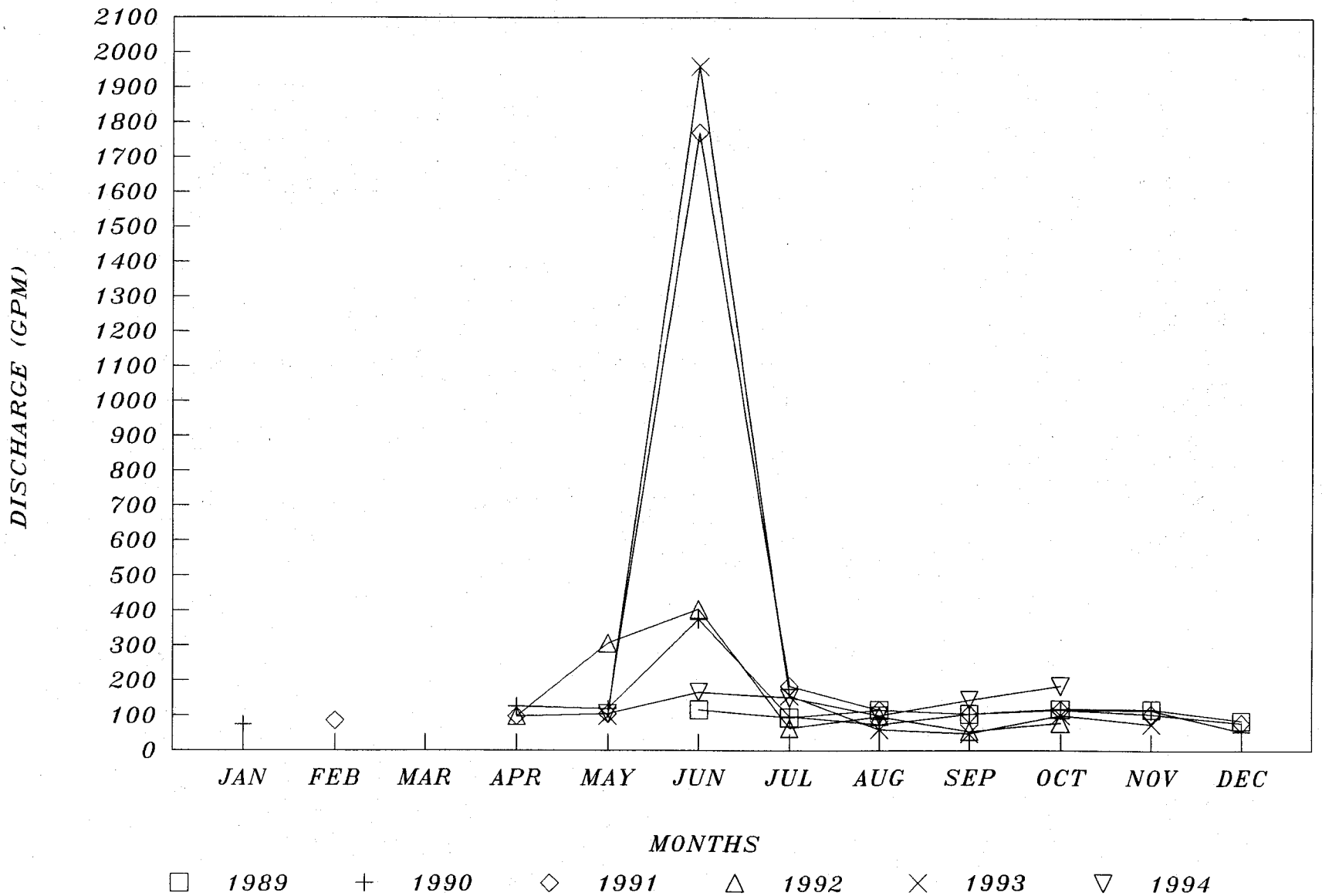
RILDA CANYON – NEAR HWY 31(RCW4)

Drainage Recession Curve Study



RILDA CANYON – NEAR HWY 31(RCW4)

Drainage Recession Curve Study



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TEL: (801) 653-2311
FAX: (801) 653-2436

June 24, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
6/24/94

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Rilda Canyon RCF-3

Temperature 11.0°C
Flow 0.1/103.3 GPM
Rec'd 1450 hr.
Sampled 1120 hr.

FIELD MEASUREMENTS

pH	7.86
Conductivity	563
DO	9.2

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/CS

Date sampled June 16, 1994

Date received June 16, 1994

Analysis report no. 59-14152

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	06-22-1994 1500	ED
Alkalinity, Bicarbonate	375	1	mg/l as HCO_3	SM2320-B	06-17-1994 1105	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-17-1994 1105	LS
Alkalinity, Total	307	1	mg/l as $CaCO_3$	EPA 310.1	06-17-1994 1105	LS
Anions	7.50	----	meq/l	---------	----------	----- --
Calcium, Total	73	1	mg/l	EPA 215.1	06-23-1994 1130	DW
Cations	7.20	----	meq/l	---------	----------	----- --
Chloride	4	1	mg/l	SM4500-Cl-B	06-20-1994 1610	LS
Conductivity	631	1	umhos/cm	SM2510-B	06-17-1994 1255	ED
Hardness, Total	335	1	mg/l as $CaCO_3$	SM2340-B	06-23-1994 1130	DW
Iron, Total	0.4	0.2	mg/l	EPA 236.1	06-23-1994 0900	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-22-1994 1400	DW
Magnesium, Total	37	1	mg/l	EPA 242.1	06-23-1994 1200	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-23-1994 0830	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	06-21-1994 1300	LM
Oxygen, Dissolved	6.5	----	mg/l	EPA 360.1	06-16-1994 1550	LS
pH	8.09	----	pH units	EPA 150.1	06-16-1994 1620	LS
Potassium, Total	<2	2	mg/l	EPA 258.1	06-23-1994 0945	DW
Sodium, Total	11	1	mg/l	EPA 273.1	06-23-1994 1100	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	06-17-1994 0750	LS
Solids, Total Dissolved	380	10	mg/l	EPA 160.1	06-17-1994 1600	LM
Solids, Total Suspended	6	4	mg/l	EPA 160.2	06-21-1994 1400	LM
Sulfate	60	1	mg/l	EPA 375.4	06-16-1994 1340	LS
Turbidity	2.5	0.1	NTU	EPA 180.1	06-16-1994 1720	LS
Cation/Anion Balance	-2.3		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

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P.O. BOX 1020, HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

June 24, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
6/24/94

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Rilda Canyon RCF-3

Temperature 11.0°C
Flow 0.1/103.3 GPM
Rec'd 1450 hr.
Sampled 1120 hr.

FIELD MEASUREMENTS

pH	7.86
Conductivity	563
DO	9.2

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/CS

Date sampled June 16, 1994

Date received June 16, 1994

Analysis report no. 59-14152

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst		
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	06-22-1994	1500	ED
Alkalinity, Bicarbonate	375	1	mg/l as HCO_3	SM2320-B	06-17-1994	1105	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-17-1994	1105	LS
Alkalinity, Total	307	1	mg/l as $CaCO_3$	EPA 310.1	06-17-1994	1105	LS
Anions	7.50	----	meq/l	---------	----------	-----	--
Calcium, Total	73	1	mg/l	EPA 215.1	06-23-1994	1130	DW
Cations	7.20	----	meq/l	---------	----------	-----	--
Chloride	4	1	mg/l	SM4500-Cl-B	06-20-1994	1610	LS
Conductivity	631	1	umhos/cm	SM2510-B	06-17-1994	1255	ED
Hardness, Total	335	1	mg/l as $CaCO_3$	SM2340-B	06-23-1994	1130	DW
Iron, Total	0.4	0.2	mg/l	EPA 236.1	06-23-1994	0900	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-22-1994	1400	DW
Magnesium, Total	37	1	mg/l	EPA 242.1	06-23-1994	1200	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-23-1994	0830	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	06-21-1994	1300	LM
Oxygen, Dissolved	6.5	----	mg/l	EPA 360.1	06-16-1994	1550	LS
pH	8.09	----	pH units	EPA 150.1	06-16-1994	1620	LS
Potassium, Total	<2	2	mg/l	EPA 258.1	06-23-1994	0945	DW
Sodium, Total	11	1	mg/l	EPA 273.1	06-23-1994	1100	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	06-17-1994	0750	LS
Solids, Total Dissolved	380	10	mg/l	EPA 160.1	06-17-1994	1600	LM
Solids, Total Suspended	6	4	mg/l	EPA 160.2	06-21-1994	1400	LM
Sulfate	60	1	mg/l	EPA 375.4	06-16-1994	1340	LS
Turbidity	2.5	0.1	NTU	EPA 180.1	06-16-1994	1720	LS
Cation/Anion Balance	-2.3		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

September 22, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
9/22/94
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled September 13, 1994

Date received September 14, 1994

Sample identification by
PACIFICORP FIELD OFFICE

Rilda Canyon Flume RCF3
Temperature 11.2°C
Flow .1 OR 103.3 GPM
Rec'd 0815 hr.
Sampled 1415 hr.

FIELD MEASUREMENTS

pH	8.37
Conductivity	684
DO	4.0

NOTE: Dissolved metals filtered at Lab. Possible matrix interference with Alkalinity.

Analysis report no. 59-14420

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	09-15-1994 1030	
Alkalinity, Bicarbonate	401	1	mg/l as HCO_3	SM2320-B	09-14-1994 1730	
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-14-1994 1730	LS
Alkalinity, Total	329	1	mg/l as $CaCO_3$	EPA 310.1	09-14-1994 1730	LS
Anions	7.80	----	meq/l	---------	---------- -----	--
Calcium, Total	72	5	mg/l	EPA 215.1	09-21-1994 1500	DW
Cations	8.00	----	meq/l	---------	---------- -----	--
Chloride	6	1	mg/l	SM4500-Cl-B	09-16-1994 1100	LS
Conductivity	719	1	umhos/cm	SM2510-B	09-14-1994 1100	ED
Hardness, Total	370	10	mg/l as $CaCO_3$	SM2340-B	09-21-1994 1500	DW
Iron, Total	0.2	0.2	mg/l	EPA 236.1	09-21-1994 0900	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-21-1994 0900	DW
Magnesium, Total	47	2	mg/l	EPA 242.1	09-21-1994 1615	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-21-1994 1200	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	09-21-1994 1300	LM
Oxygen, Dissolved	7.9	----	mg/l	EPA 360.1	09-14-1994 0930	LS
pH	8.06	----	pH units	EPA 150.1	09-14-1994 1000	LS
Potassium, Total	<5	5	mg/l	EPA 258.1	09-21-1994 1330	DW
Sodium, Total	13	5	mg/l	EPA 273.1	09-21-1994 1300	DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-14-1994 1535	LS
Solids, Total Dissolved	436	10	mg/l	EPA 160.1	09-20-1994 1045	LS
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	09-16-1994 1300	LM
Sulfate	50	1	mg/l	EPA 375.4	09-21-1994 0800	LS
Turbidity	1.7	0.1	NTU	EPA 180.1	09-14-1994 1500	LS
Cation/Anion Balance	1.5		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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FAX: (801) 653-2436

June 27, ,1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
6/24/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Rilda Canyon ~~RCF-4~~ RCW-4

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/CS

Date sampled June 16, 1994

Date received June 16, 1994

Temperature 10.7°C
Flow 0.47/165.7 GPM
Rec'd 1450 hr.
Sampled 1203 hr.

FIELD MEASUREMENTS

pH	8.51
Conductivity	756
DO	8.9

Analysis report no. 59-14153

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst		
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	06-22-1994	1500	ED
Alkalinity, Bicarbonate	432	1	mg/l as HCO_3	SM2320-B	06-17-1994	1105	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-17-1994	1105	LS
Alkalinity, Total	354	1	mg/l as $CaCO_3$	EPA 310.1	06-17-1994	1105	LS
Anions	10.10	----	meq/l	---------	----------	-----	--
Calcium, Total	75	1	mg/l	EPA 215.1	06-23-1994	1130	DW
Cations	9.30	----	meq/l	---------	----------	-----	--
Chloride	10	1	mg/l	SM4500-Cl-B	06-20-1994	1610	LS
Conductivity	840	1	umhos/cm	SM2510-B	06-17-1994	1255	ED
Hardness, Total	422	1	mg/l as $CaCO_3$	SM2340-B	06-23-1994	1130	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-23-1994	0900	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-22-1994	1400	DW
Magnesium, Total	57	1	mg/l	EPA 242.1	06-23-1994	1200	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-23-1994	0830	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	06-21-1994	1300	LM
Oxygen, Dissolved	7.5	----	mg/l	EPA 360.1	06-16-1994	1550	LS
pH	8.70	----	pH units	EPA 150.1	06-16-1994	1620	LS
Potassium, Total	2	2	mg/l	EPA 258.1	06-23-1994	0745	DW
Sodium, Total	19	1	mg/l	EPA 273.1	06-23-1994	1100	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	06-17-1994	0750	LS
Solids, Total Dissolved	510	10	mg/l	EPA 160.1	06-17-1994	1600	LM
Solids, Total Suspended	4	4	mg/l	EPA 160.2	06-21-1994	1400	LM
Sulfate	130	1	mg/l	EPA 375.4	06-16-1994	1340	LS
Turbidity	1.3	0.1	NTU	EPA 180.1	06-16-1994	1720	LS
Cation/Anion Balance	-4.2		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout SD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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FAX: (801) 653-2436

September 22, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
9/22/94
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled September 13, 1994

Date received September 14, 1994

Sample identification by
PACIFICORP FIELD OFFICE

RCW-4
Temperature 10.3°C
Flow .44/44GPM
Rec'd 0815 hr.
Sampled 1507 hr.

FIELD MEASUREMENTS

pH	8.57
Conductivity	796
DO	5.8

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14416

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	09-15-1994 1030 ED
Alkalinity, Bicarbonate	416	1	mg/l as HCO_3	SM2320-B	09-14-1994 1730 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-14-1994 1730 LS
Alkalinity, Total	341	1	mg/l as $CaCO_3$	EPA 310.1	09-14-1994 1730 LS
Anions	10.00	----	meq/l	---------	---------- ----- --
Calcium, Total	76	5	mg/l	EPA 215.1	09-21-1994 1500 DW
Cations	9.80	----	meq/l	---------	---------- ----- --
Chloride	10	1	mg/l	SM4500-Cl-B	09-16-1994 1100 LS
Conductivity	831	1	umhos/cm	SM2510-B	09-14-1994 1100 ED
Hardness, Total	440	10	mg/l as $CaCO_3$	SM2340-B	09-21-1994 1500 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	09-21-1994 0900 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-21-1994 0900 DW
Magnesium, Total	61	2	mg/l	EPA 242.1	09-21-1994 1615 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-21-1994 1200 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	09-21-1994 1300 LM
Oxygen, Dissolved	6.8	----	mg/l	EPA 360.1	09-14-1994 0930 LS
pH	8.49	----	pH units	EPA 150.1	09-14-1994 1000 LS
Potassium, Total	<5	5	mg/l	EPA 258.1	09-21-1994 1330 DW
Sodium, Total	22	5	mg/l	EPA 273.1	09-21-1994 1300 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-14-1994 1535 LS
Solids, Total Dissolved	500	10	mg/l	EPA 160.1	09-16-1994 0830 LS
Solids, Total Suspended	9	4	mg/l	EPA 160.2	09-16-1994 1300 LM
Sulfate	140	1	mg/l	EPA 375.4	09-20-1994 1310 LS
Turbidity	2.1	0.1	NTU	EPA 180.1	09-14-1994 1500 LS
Cation/Anion Balance	-1.2		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

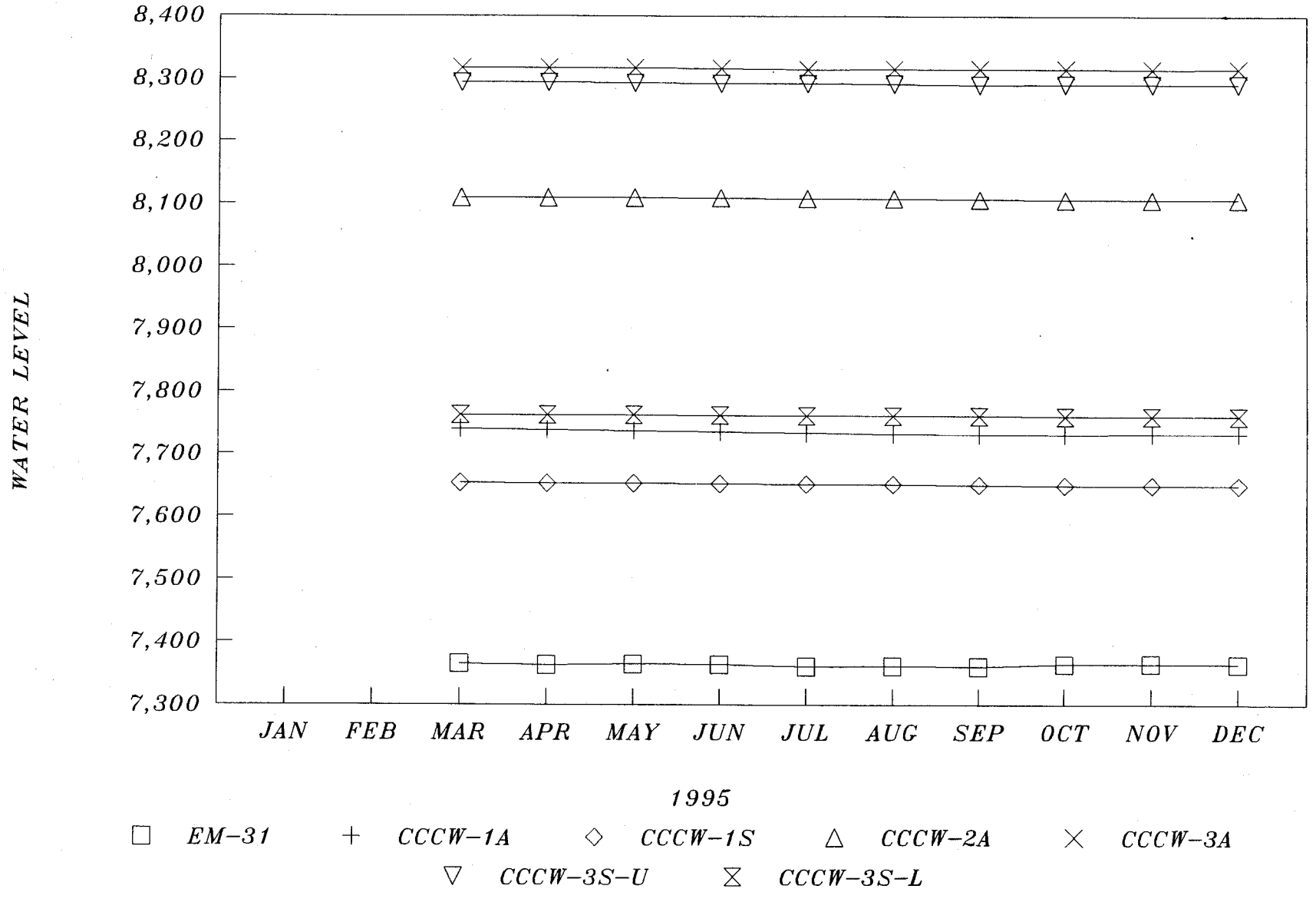
Larry Stout

Manager, Huntington Laboratory

APPENDIX E

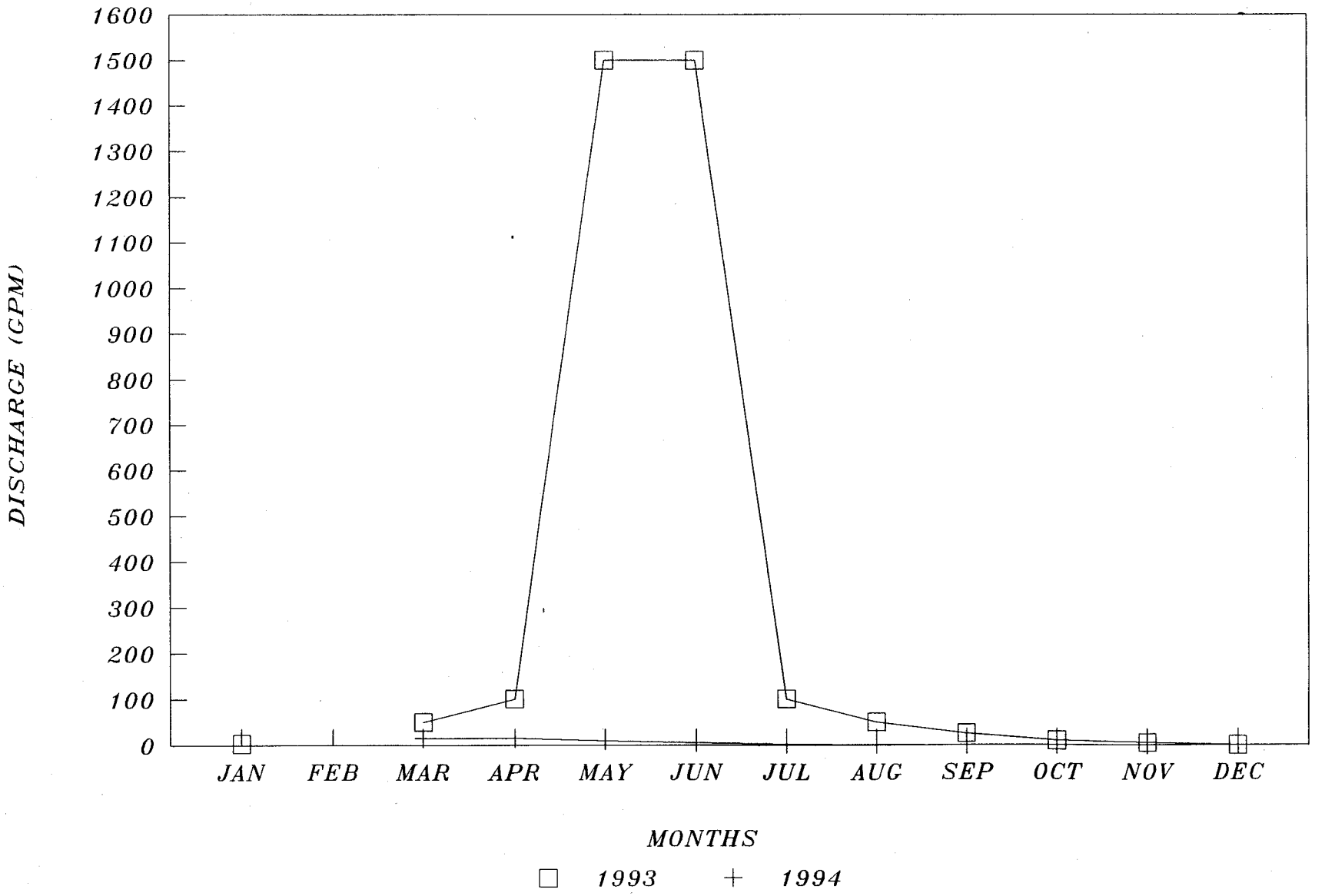
COTTONWOOD CANYON CREEK

Piezometric Study



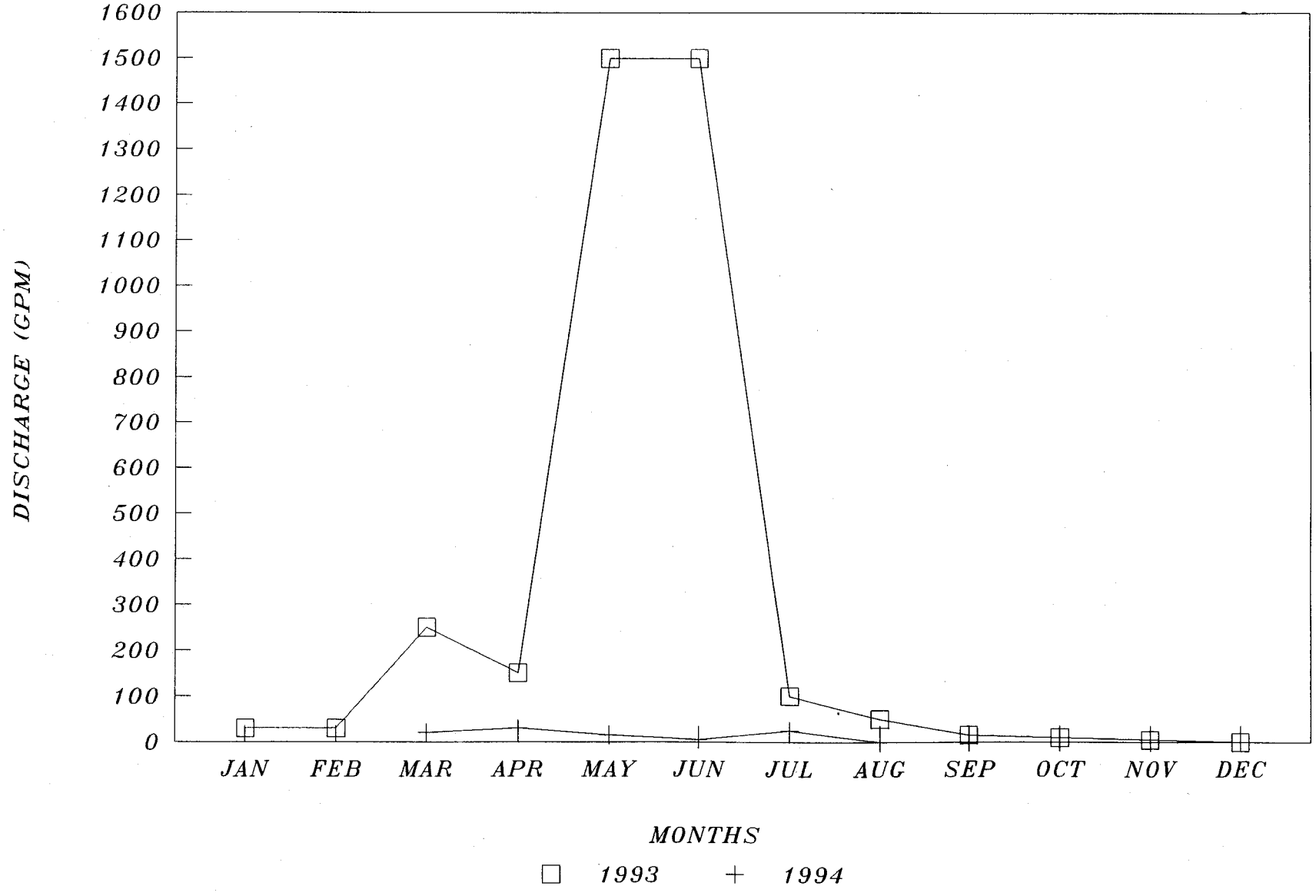
COTTONWOOD CANYON CREEK: SW-1

Drainage Recession Curve Study



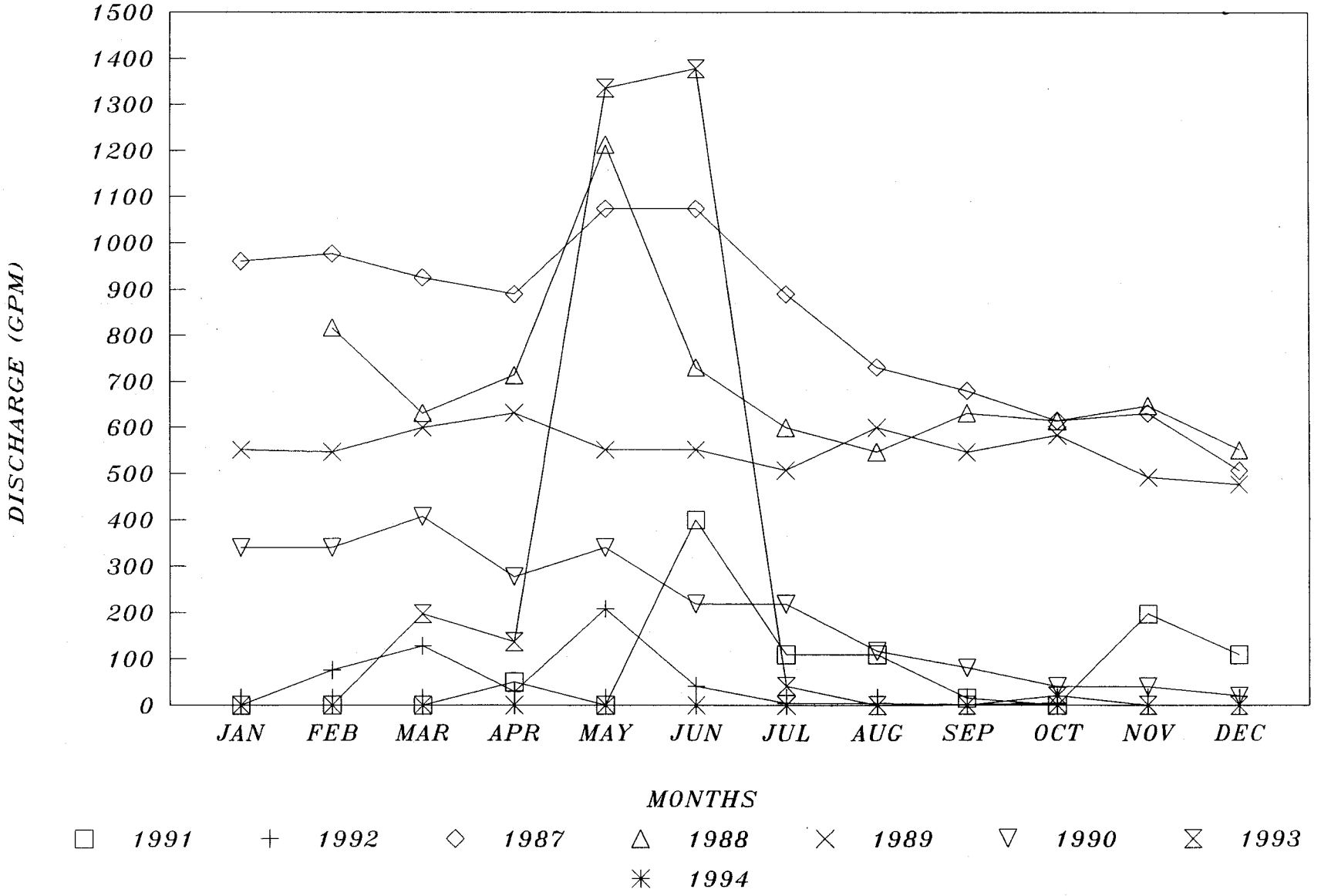
COTTONWOOD CANYON CREEK: SW-2

Drainage Recession Curve Study



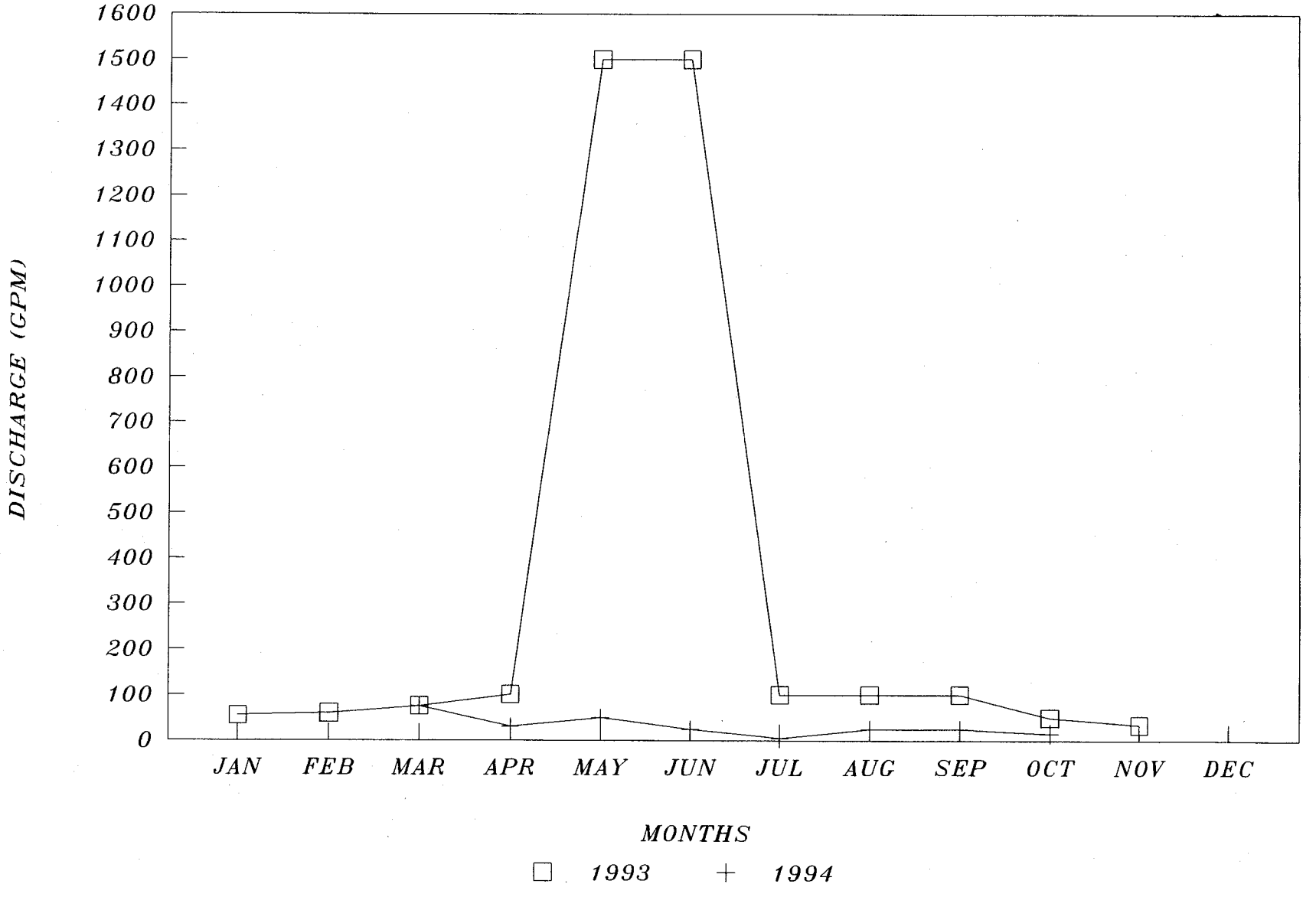
COTTONWOOD CANYON CREEK @ USGS FLUME

Drainage Recession Curve Study



COTTONWOOD CANYON CREEK: SW-3

Drainage Recession Curve Study



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FAX: (801) 653-2436

April 7, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
4/7/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Trail Mountain SW-1

Temperature 2.0°C
Rec'd 1630 hr.
Sampled 1420 hr.
FLOW 15 GPM

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled March 24, 1994

Date received March 24, 1994

Analysis report no. 59-13963

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	03-29-1994 1130	
Alkalinity, Bicarbonate	433	1	mg/l as HCO_3	SM4500-CO_2-D	03-28-1994 1310	
Alkalinity, Carbonate	2	1	mg/l as CO_3	SM4500-CO_2-D	03-28-1994 1310	LS
Alkalinity, Total	358	1	mg/l as $CaCO_3$	EPA 310.1	03-28-1994 1310	LS
Anions	10.60	----	meq/l	---------	---------- -----	--
Calcium, Total	77	1	mg/l	EPA 215.1	04-05-1994 1300	DW
Cations	9.80	----	meq/l	---------	---------- -----	--
Chloride	17	1	mg/l	SM4500-Cl-B	04-06-1994 1315	LS
Conductivity	881	1	umhos/cm	SM2510-B	03-29-1994 0930	ED
Hardness, Total	431	1	mg/l as $CaCO_3$	SM2340-B	04-05-1994 1300	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	03-31-1994 1230	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	03-31-1994 1130	DW
Magnesium, Total	58	1	mg/l	EPA 242.1	04-05-1994 0830	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-04-1994 1000	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-25-1994 1520	LM
Oxygen, Dissolved	9.9	----	mg/l	EPA 360.1	03-24-1994 1640	LS
pH	8.08	----	pH units	EPA 150.1	03-24-1994 1700	LS
Potassium, Total	2	2	mg/l	EPA 258.1	04-04-1994 1130	DW
Sodium, Total	27	1	mg/l	EPA 273.1	04-04-1994 1400	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	03-25-1994 0715	LM
Solids, Total Dissolved	530	10	mg/l	EPA 160.1	03-28-1994 1340	LM
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	03-28-1994 1500	LM
Sulfate	140	1	mg/l	EPA 375.4	04-05-1994 0830	LS
Turbidity	0.7	0.1	NTU	EPA 180.1	03-24-1994 1800	LS
Cation/Anion Balance	-3.80		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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FAX: (801) 653-2436

July 7, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
7/7/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-1

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled June 22, 1994

Date received June 22, 1994

Temperature 20.0°C
Flow 5 GPM
Rec'd 1630 hr.
Sampled 1540 hr.

FIELD MEASUREMENTS

pH	8.2
Conductivity	829
DO	12.8

Analysis report no. 59-14184

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	06-30-1994 1000 ED
Alkalinity, Bicarbonate	385	1	mg/l as HCO_3	SM2320-B	06-27-1994 1100 ED
Alkalinity, Carbonate	8	1	mg/l as CO_3	SM2320-B	06-27-1994 1100 ED
Alkalinity, Total	329	1	mg/l as $CaCO_3$	EPA 310.1	06-27-1994 1100 ED
Anions	10.20	----	meq/l	---------	---------- ----- --
Calcium, Total	80	1	mg/l	EPA 215.1	07-06-1994 1600 DW
Cations	10.60	----	meq/l	---------	---------- ----- --
Chloride	17	1	mg/l	SM4500-Cl-B	06-22-1994 1940 LS
Conductivity	883	1	umhos/cm	SM2510-B	06-27-1994 1630 ED
Hardness, Total	447	1	mg/l as $CaCO_3$	SM2340-B	07-06-1994 1600 DW
Iron, Total	0.2	0.2	mg/l	EPA 236.1	07-06-1994 1130 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-30-1994 0800 DW
Magnesium, Total	60	1	mg/l	EPA 242.1	07-06-1994 1600 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-06-1994 1315 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	07-05-1994 1000 LM
Oxygen, Dissolved	5.0	----	mg/l	EPA 360.1	06-22-1994 1715 LS
pH	8.04	----	pH units	EPA 150.1	06-22-1994 1730 LS
Potassium, Total	3	2	mg/l	EPA 258.1	07-06-1994 1400 DW
Sodium, Total	38	1	mg/l	EPA 273.1	07-06-1994 1500 DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	06-23-1994 1400 ED
Solids, Total Dissolved	530	10	mg/l	EPA 160.1	06-28-1994 0900 LM
Solids, Total Suspended	5	4	mg/l	EPA 160.2	06-24-1994 1420 LM
Sulfate	150	1	mg/l	EPA 375.4	06-22-1994 1315 LS
Turbidity	2.7	0.1	NTU	EPA 180.1	06-23-1994 1415 ED
Cation/Anion Balance	1.9		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout ED

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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April 7, 1994

RECEIVED
4/7/94
FIELD OFFICE

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

Trail Mountain SW-2

Temperature 3.0°C
Flow 20 GPM
Rec'd 1630 hr.
Sampled 1252 hr.

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled March 24, 1994

Date received March 24, 1994

Analysis report no. 59-13966

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	03-29-1994 1130	
Alkalinity, Bicarbonate	409	1	mg/l as HCO_3	SM4500-CO_2-D	03-29-1994 0945	
Alkalinity, Carbonate	6	1	mg/l as CO_3	SM4500-CO_2-D	03-29-1994 0945	LS
Alkalinity, Total	343	1	mg/l as $CaCO_3$	EPA 310.1	03-29-1994 0945	LS
Anions	10.70	----	meq/l	---------	----------	----- --
Calcium, Total	71	1	mg/l	EPA 215.1	04-05-1994 1300	DW
Cations	10.80	----	meq/l	---------	----------	----- --
Chloride	24	1	mg/l	SM4500-Cl-B	04-06-1994 1315	LS
Conductivity	949	1	umhos/cm	SM2510-B	03-29-1994 0930	ED
Hardness, Total	461	1	mg/l as $CaCO_3$	SM2340-B	04-05-1994 1300	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	03-31-1994 1230	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	03-31-1994 1130	DW
Magnesium, Total	69	1	mg/l	EPA 242.1	04-05-1994 0830	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-04-1994 1000	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-29-1994 1430	LM
Oxygen, Dissolved	10.9	----	mg/l	EPA 360.1	03-24-1994 1640	LS
pH	8.42	----	pH units	EPA 150.1	03-24-1994 1700	LS
Potassium, Total	3	2	mg/l	EPA 258.1	04-04-1994 1130	DW
Sodium, Total	36	1	mg/l	EPA 273.1	04-04-1994 1400	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	03-25-1994 0715	LM
Solids, Total Dissolved	590	10	mg/l	EPA 160.1	03-28-1994 1340	LM
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	03-29-1994 1605	LM
Sulfate	150	1	mg/l	EPA 375.4	04-05-1994 0830	LS
Turbidity	1.4	0.1	NTU	EPA 180.1	03-24-1994 1800	LS
Cation/Anion Balance	0.40		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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FAX: (801) 653-2436

July 8, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
7/8/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-2

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled June 22, 1994

Date received June 22, 1994

Temperature 17.7°C
Flow 5 GPM
Rec'd 1630 hr.
Sampled 1430 hr.

FIELD MEASUREMENTS

pH	8.62
Conductivity	825
DO	12.3

Analysis report no. 59-14188

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst		
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	06-30-1994	1000	ED
Alkalinity, Bicarbonate	320	1	mg/l as HCO_3	SM2320-B	06-27-1994	1100	ED
Alkalinity, Carbonate	20	1	mg/l as CO_3	SM2320-B	06-27-1994	1100	ED
Alkalinity, Total	295	1	mg/l as $CaCO_3$	EPA 310.1	06-27-1994	1100	ED
Anions	10.20	----	meq/l	---------	----------	-----	--
Calcium, Total	57	1	mg/l	EPA 215.1	07-06-1994	1600	DW
Cations	10.30	----	meq/l	---------	----------	-----	--
Chloride	27	1	mg/l	SM4500-Cl-B	06-29-1994	1030	ED
Conductivity	910	1	umhos/cm	SM2510-B	06-27-1994	1630	ED
Hardness, Total	426	1	mg/l as $CaCO_3$	SM2340-B	07-06-1994	1600	DW
Iron, Total	0.2	0.2	mg/l	EPA 236.1	07-06-1994	1130	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-30-1994	0800	DW
Magnesium, Total	69	1	mg/l	EPA 242.1	07-06-1994	1600	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-06-1994	1315	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	07-07-1994	0900	LM
Oxygen, Dissolved	5.3	----	mg/l	EPA 360.1	06-22-1994	1715	LS
pH	8.69	----	pH units	EPA 150.1	06-22-1994	1730	LS
Potassium, Total	4	2	mg/l	EPA 258.1	07-06-1994	1400	DW
Sodium, Total	41	1	mg/l	EPA 273.1	07-06-1994	1500	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	06-23-1994	1400	ED
Solids, Total Dissolved	560	10	mg/l	EPA 160.1	06-28-1994	0900	LM
Solids, Total Suspended	10	4	mg/l	EPA 160.2	06-24-1994	1420	LM
Sulfate	170	1	mg/l	EPA 375.4	06-22-1994	1315	LS
Turbidity	4.1	0.1	NTU	EPA 180.1	06-23-1994	1415	ED
Cation/Anion Balance	0.5		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Terry Stout CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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FAX: (801) 653-2436

April 7, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
4/7/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Trail Mountain SW-3

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled March 24, 1994

Date received March 24, 1994

Temperature 3.0°C
Flow 75 GPM
Rec'd 1630 hr.
Sampled 1245 hr.

NOTE: Possible matrix interference with Acidity.

Analysis report no. 59-13967

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	03-29-1994 1130	
Alkalinity, Bicarbonate	442	1	mg/l as HCO_3	SM4500-CO_2-D	03-29-1994 0945	
Alkalinity, Carbonate	5	1	mg/l as CO_3	SM4500-CO_2-D	03-29-1994 0945	LS
Alkalinity, Total	369	1	mg/l as $CaCO_3$	EPA 310.1	03-29-1994 0945	LS
Anions	15.50	----	meq/l	---------	----------	----- --
Calcium, Total	93	1	mg/l	EPA 215.1	04-05-1994 1300	DW
Cations	15.10	----	meq/l	---------	----------	----- --
Chloride	50	1	mg/l	SM4500-Cl-B	04-06-1994 1500	LS
Conductivity	1381	1	umhos/cm	SM2510-B	03-29-1994 0930	ED
Hardness, Total	574	1	mg/l as $CaCO_3$	SM2340-B	04-05-1994 1300	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	03-31-1994 1230	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	03-31-1994 1130	DW
Magnesium, Total	83	1	mg/l	EPA 242.1	04-05-1994 0830	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-04-1994 1000	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-29-1994 1430	LM
Oxygen, Dissolved	9.9	----	mg/l	EPA 360.1	03-24-1994 1640	LS
pH	8.30	----	pH units	EPA 150.1	03-24-1994 1700	LS
Potassium, Total	4	2	mg/l	EPA 258.1	04-04-1994 1130	DW
Sodium, Total	84	1	mg/l	EPA 273.1	04-04-1994 1400	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	03-25-1994 0715	LM
Solids, Total Dissolved	880	10	mg/l	EPA 160.1	03-28-1994 1340	LM
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	03-29-1994 1605	LM
Sulfate	320	1	mg/l	EPA 375.4	04-05-1994 0830	LS
Turbidity	0.6	0.1	NTU	EPA 180.1	03-24-1994 1800	LS
Cation/Anion Balance	-1.20		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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July 7, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
7/7/94

Sample identification by
PACIFICORP FIELD OFFICE

SW-3

FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled June 22, 1994

Date received June 22, 1994

Temperature 22.6°C
Flow 25 GPM
Rec'd 1630 hr.
Sampled 1416 hr.

FIELD MEASUREMENTS

pH	8.36
Conductivity	1280
DO	10.8

Analysis report no. 59-14186

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst		
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	06-30-1994	1000	ED
Alkalinity, Bicarbonate	381	1	mg/l as HCO_3	SM2320-B	06-27-1994	1100	ED
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-27-1994	1100	ED
Alkalinity, Total	312	1	mg/l as $CaCO_3$	EPA 310.1	06-27-1994	1100	ED
Anions	13.60	----	meq/l	---------	----------	-----	--
Calcium, Total	91	1	mg/l	EPA 215.1	07-06-1994	1600	DW
Cations	14.90	----	meq/l	---------	----------	-----	--
Chloride	47	1	mg/l	SM4500-Cl-B	06-29-1994	1030	ED
Conductivity	1330	1	umhos/cm	SM2510-B	06-27-1994	1630	ED
Hardness, Total	561	1	mg/l as $CaCO_3$	SM2340-B	07-06-1994	1600	DW
Iron, Total	0.3	0.2	mg/l	EPA 236.1	07-06-1994	1130	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-30-1994	0800	DW
Magnesium, Total	81	1	mg/l	EPA 242.1	07-06-1994	1600	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-06-1994	1315	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	07-05-1994	1000	LM
Oxygen, Dissolved	5.2	----	mg/l	EPA 360.1	06-22-1994	1715	LS
pH	8.43	----	pH units	EPA 150.1	06-22-1994	1730	LS
Potassium, Total	4	2	mg/l	EPA 258.1	07-06-1994	1400	DW
Sodium, Total	86	1	mg/l	EPA 273.1	07-06-1994	1500	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	06-23-1994	1400	ED
Solids, Total Dissolved	880	10	mg/l	EPA 160.1	06-28-1994	0900	LM
Solids, Total Suspended	26	4	mg/l	EPA 160.2	06-24-1994	1420	LM
Sulfate	290	1	mg/l	EPA 375.4	06-22-1994	1315	LS
Turbidity	8.3	0.1	NTU	EPA 180.1	06-23-1994	1415	ED
Cation/Anion Balance	4.7		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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September 26, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
9/26/94

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-3
Temperature 12.5°C
Flow 25 GPM
Rec'd 1400 hr.
Sampled 1035 hr.

FIELD MEASUREMENTS

pH	7.92
Conductivity	1250
DO	7.5

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/KH

Date sampled September 16, 1994

Date received September 16, 1994

Analysis report no. 59-14426

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	09-23-1994 1000	
Alkalinity, Bicarbonate	414	1	mg/l as HCO_3	SM2320-B	09-19-1994 0930	
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-19-1994 0930	LS
Alkalinity, Total	339	1	mg/l as $CaCO_3$	EPA 310.1	09-19-1994 0930	LS
Anions	15.10	----	meq/l	---------	---------- -----	--
Calcium, Total	103	5	mg/l	EPA 215.1	09-21-1994 1500	DW
Cations	15.80	----	meq/l	---------	---------- -----	--
Chloride	53	1	mg/l	SM4500-Cl-B	09-26-1994 1000	LS
Conductivity	1355	1	umhos/cm	SM2510-B	09-22-1994 1115	ED
Hardness, Total	600	10	mg/l as $CaCO_3$	SM2340-B	09-21-1994 1500	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	09-21-1994 0900	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-21-1994 0900	DW
Magnesium, Total	84	2	mg/l	EPA 242.1	09-21-1994 1615	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-21-1994 1200	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	09-21-1994 1300	LM
Oxygen, Dissolved	9.4	----	mg/l	EPA 360.1	09-16-1994 1440	LS
pH	8.29	----	pH units	EPA 150.1	09-16-1994 1500	LS
Potassium, Total	<5	5	mg/l	EPA 258.1	09-21-1994 1330	DW
Sodium, Total	87	5	mg/l	EPA 273.1	09-21-1994 1200	DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-16-1994 1510	LM
Solids, Total Dissolved	909	10	mg/l	EPA 160.1	09-19-1994 1045	LS
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	09-22-1994 1130	LM
Sulfate	330	1	mg/l	EPA 375.4	09-21-1994 0800	LS
Turbidity	1.0	0.1	NTU	EPA 180.1	09-16-1994 1515	LS
Cation/Anion Balance	2.2		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES
F-485/059/94
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April 7, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
4/7/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Trail Mountain T-19

Temperature 2.0°C
Rec'd 1630 hr.
Sampled 1215 hr.
FLOW 150 GPM

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled March 24, 1994

Date received March 24, 1994

Analysis report no. 59-13964

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst		
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	03-29-1994	1130	
Alkalinity, Bicarbonate	435	1	mg/l as HCO_3	SM4500-CO_2-D	03-28-1994	1310	LS
Alkalinity, Carbonate	6	1	mg/l as CO_3	SM4500-CO_2-D	03-28-1994	1310	LS
Alkalinity, Total	365	1	mg/l as $CaCO_3$	EPA 310.1	03-28-1994	1310	LS
Anions	11.40	----	meq/l	---------	----------	-----	--
Calcium, Total	92	1	mg/l	EPA 215.1	04-05-1994	1300	DW
Cations	11.80	----	meq/l	---------	----------	-----	--
Chloride	33	1	mg/l	SM4500-Cl-B	04-06-1994	1315	LS
Conductivity	818	1	umhos/cm	SM2510-B	03-29-1994	0930	ED
Hardness, Total	460	1	mg/l as $CaCO_3$	SM2340-B	04-05-1994	1300	DW
Iron, Total	5.1	0.2	mg/l	EPA 236.1	03-31-1994	1230	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	03-31-1994	1130	DW
Magnesium, Total	56	1	mg/l	EPA 242.1	04-05-1994	0830	DW
Manganese, Total	0.1	0.1	mg/l	EPA 243.1	04-04-1994	1000	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-25-1994	1520	LM
Oxygen, Dissolved	11.1	----	mg/l	EPA 360.1	03-24-1994	1640	LS
pH	8.46	----	pH units	EPA 150.1	03-24-1994	1700	LS
Potassium, Total	3	2	mg/l	EPA 258.1	04-04-1994	1130	DW
Sodium, Total	59	1	mg/l	EPA 273.1	04-04-1994	1400	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	03-25-1994	0715	LM
Solids, Total Dissolved	490	10	mg/l	EPA 160.1	03-28-1994	1340	LM
Solids, Total Suspended	420	4	mg/l	EPA 160.2	03-28-1994	1500	LM
Sulfate	150	1	mg/l	EPA 375.4	04-05-1994	0830	LS
Turbidity	21.0	0.1	NTU	EPA 180.1	03-24-1994	1800	LS
Cation/Anion Balance	1.60		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout ED

Manager, Huntington Laboratory

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

TRAIL MOUNTAIN WATER QUALITY *

T-19

1994 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	---- IRON ---- DISSOLVED	TOTAL	MAGNESIUM	MANGANESE	OIL & GREASE	pH (units)	POTASSIUM	SODIUM	SULFATE	------ SOLIDS ------ TDS	TSS	SETTLEABLE
3-24	<10.0	435	92.0	6.0	33.0	818	11.1	460	<0.20	5.10	56.0	0.10	<5.0	8.46	3.00	59.0	150.0	490	420	<0.50
6-22	<10.0	295	37.0	18.0	34.0	821	5.4	302	<0.20	0.40	51.0	<0.20	<5.0	8.82	3.00	63.0	170.0	430	21	<0.50
9-16	<10.0	411	49.0	<1.0	39.0	1012	9.9	410	<0.20	0.20	69.0	<0.20	<5.0	8.48	<5.00	77.0	170.0	631	18	<0.50
MIN	10.0	295	37.0	1.0	33.0	818	5.4	302	0.20	0.20	51.0	0.10	5.0	8.46	3.00	59.0	150.0	430	18	0.50
MAX	10.0	435	92.0	18.0	39.0	1012	11.1	460	0.20	5.10	69.0	0.20	5.0	8.82	5.00	77.0	170.0	631	420	0.50
MEAN	10.0	380	59.3	8.3	35.3	883	8.8	390	0.20	1.90	58.67	0.13	5.0	8.59	3.67	66.3	163.3	517	153	0.50
HISTORICAL 1979-1993																				
MIN	1.0	258	14.3	5.1	20.1	600	0.0	178	0.03	0.05	24.0	0.01	1.0	7.44	0.70	12.0	50.0	418	1.0	0.0
MAX	1.0	401	61.1	26.1	67.9	1380	0.0	476	0.38	1.11	85.0	0.03	1.9	8.74	30.20	125.2	336.0	910	325.0	0.0
MEAN	1.0	354	41.2	13.9	42.4	986	0.0	352	0.18	0.27	60.7	0.02	1.4	3.50	4.59	80.9	178.0	594	48.5	0.0
NO. OF ANALYSES	5	19	19	10	19	15	0	19	6	14	19	10	2	18	18	19	19	19	14	0

* Quality parameters are reported as mg/l unless otherwise noted.

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July 7, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
7/7/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

T-19

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled June 22, 1994

Date received June 22, 1994

Temperature 21.6°C
Flow 35 GPM
Rec'd 1630 hr.
Sampled 1346 hr.

FIELD MEASUREMENTS

pH	8.71
Conductivity	750
DO	5.4

Analysis report no. 59-14185

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst		
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	06-30-1994	1000	ED
Alkalinity, Bicarbonate	295	1	mg/l as HCO_3	SM2320-B	06-27-1994	1100	ED
Alkalinity, Carbonate	18	1	mg/l as CO_3	SM2320-B	06-27-1994	1100	ED
Alkalinity, Total	272	1	mg/l as $CaCO_3$	EPA 310.1	06-27-1994	1100	ED
Anions	9.90	----	meq/l	---------	----------	-----	--
Calcium, Total	37	1	mg/l	EPA 215.1	07-06-1994	1600	DW
Cations	8.80	----	meq/l	---------	----------	-----	--
Chloride	34	1	mg/l	SM4500-Cl-B	06-22-1994	1940	LS
Conductivity	821	1	umhos/cm	SM2510-B	06-27-1994	1630	ED
Hardness, Total	302	1	mg/l as $CaCO_3$	SM2340-B	07-06-1994	1600	DW
Iron, Total	0.4	0.2	mg/l	EPA 236.1	07-06-1994	1130	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-30-1994	0800	DW
Magnesium, Total	51	1	mg/l	EPA 242.1	07-06-1994	1600	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-06-1994	1315	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	07-05-1994	1000	LM
Oxygen, Dissolved	5.4	----	mg/l	EPA 360.1	06-22-1994	1715	LS
pH	8.82	----	pH units	EPA 150.1	06-22-1994	1730	LS
Potassium, Total	3	2	mg/l	EPA 258.1	07-06-1994	1400	DW
Sodium, Total	63	1	mg/l	EPA 273.1	07-06-1994	1500	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	06-23-1994	1400	ED
Solids, Total Dissolved	430	10	mg/l	EPA 160.1	06-28-1994	0900	LM
Solids, Total Suspended	21	4	mg/l	EPA 160.2	06-24-1994	1420	LM
Sulfate	170	1	mg/l	EPA 375.4	06-22-1994	1315	LS
Turbidity	8.8	0.1	NTU	EPA 180.1	06-23-1994	1415	ED
Cation/Anion Balance	-6.2		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

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September 26, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
9/26/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

T-19
Temperature 9.7°C
Flow 10 GPM
Rec'd 1400 hr.
Sampled 1007 hr.

FIELD MEASUREMENTS

pH	8.68
Conductivity	939
DO	8.4

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/KH

Date sampled September 16, 1994

Date received September 16, 1994

Analysis report no. 59-14425

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	09-23-1994 1000 ED
Alkalinity, Bicarbonate	411	1	mg/l as HCO_3	SM2320-B	09-19-1994 0930 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-19-1994 0930 LS
Alkalinity, Total	337	1	mg/l as $CaCO_3$	EPA 310.1	09-19-1994 0930 LS
Anions	11.40	----	meq/l	---------	---------- ----- --
Calcium, Total	49	5	mg/l	EPA 215.1	09-21-1994 1500 DW
Cations	11.50	----	meq/l	---------	---------- ----- --
Chloride	39	1	mg/l	SM4500-Cl-B	09-26-1994 1000 LS
Conductivity	1012	1	umhos/cm	SM2510-B	09-22-1994 1115 ED
Hardness, Total	410	10	mg/l as $CaCO_3$	SM2340-B	09-21-1994 1500 DW
Iron, Total	0.2	0.2	mg/l	EPA 236.1	09-21-1994 0900 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-21-1994 0900 DW
Magnesium, Total	69	2	mg/l	EPA 242.1	09-21-1994 1615 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-21-1994 1200 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	09-21-1994 1300 LM
Oxygen, Dissolved	9.9	----	mg/l	EPA 360.1	09-16-1994 1440 LS
pH	8.48	----	pH units	EPA 150.1	09-16-1994 1500 LS
Potassium, Total	<5	5	mg/l	EPA 258.1	09-21-1994 1330 DW
Sodium, Total	77	5	mg/l	EPA 273.1	09-21-1994 1200 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-16-1994 1510 LM
Solids, Total Dissolved	631	10	mg/l	EPA 160.1	09-19-1994 1045 LS
Solids, Total Suspended	18	4	mg/l	EPA 160.2	09-22-1994 1130 LM
Sulfate	170	1	mg/l	EPA 375.4	09-21-1994 0800 LS
Turbidity	14.0	0.1	NTU	EPA 180.1	09-16-1994 1515 LS
Cation/Anion Balance	0.4		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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F-465/059/94
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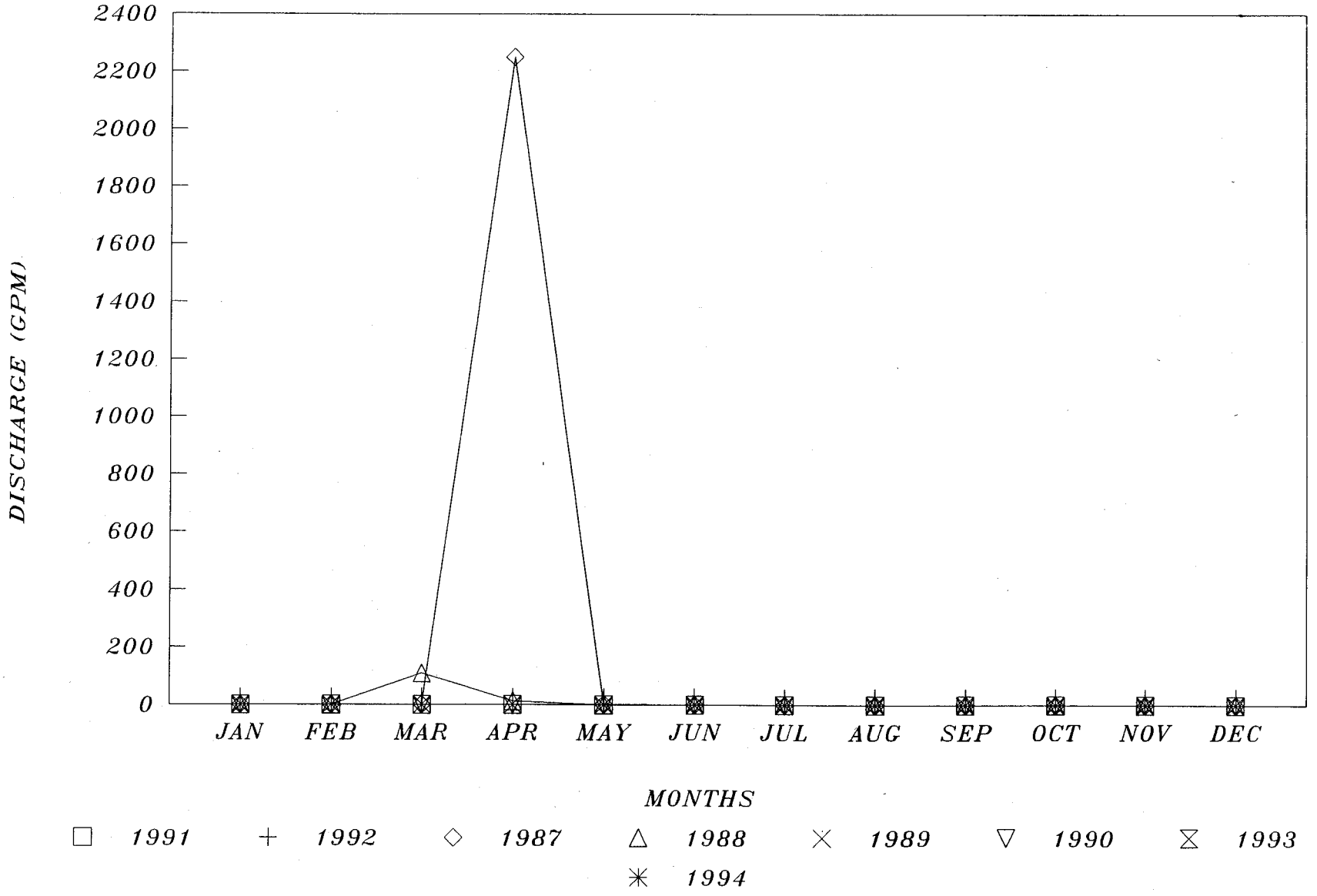
APPENDIX F

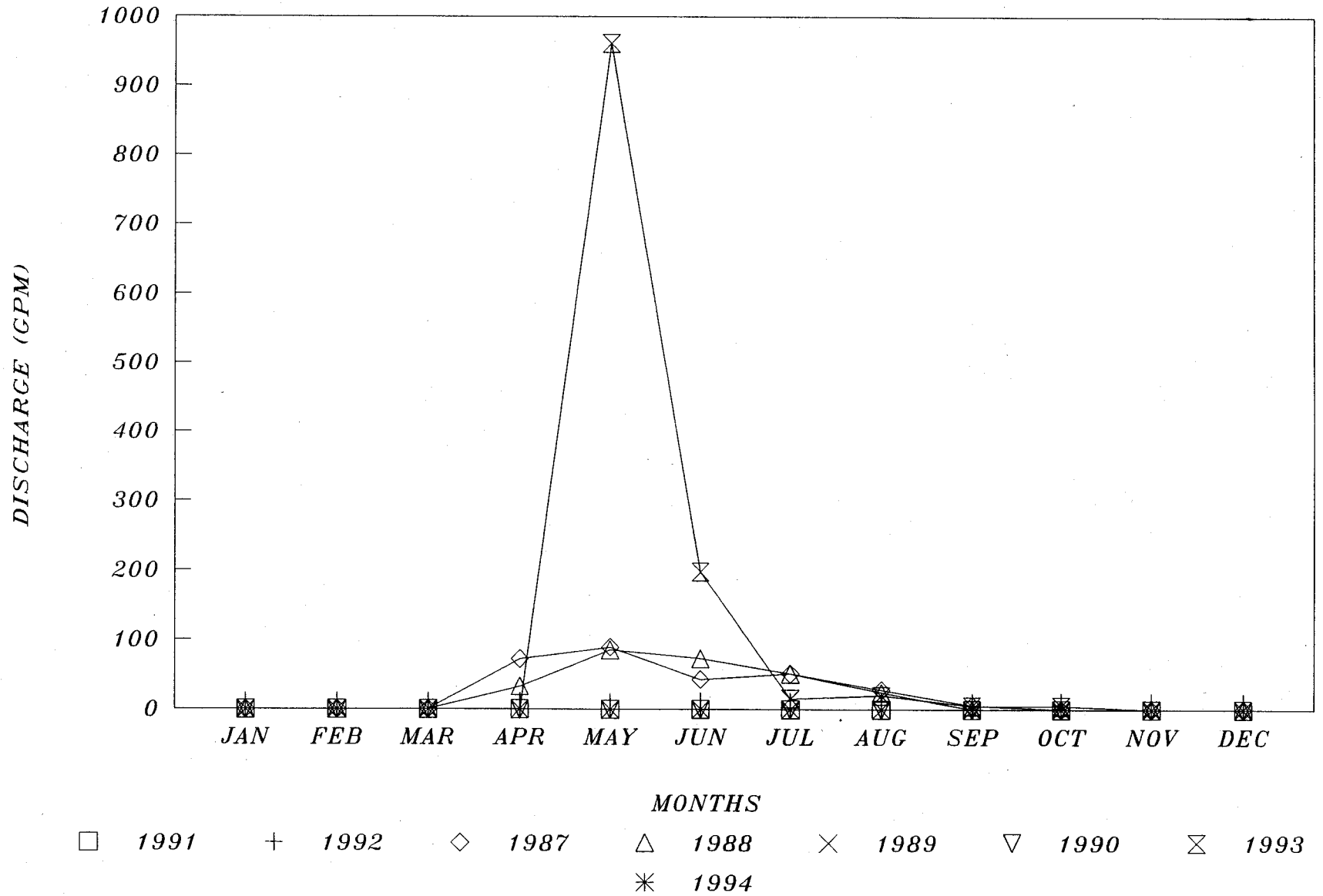
GRIMES WASH – RIGHT FORK ABOVE MINE

Drainage Recession Curve Study



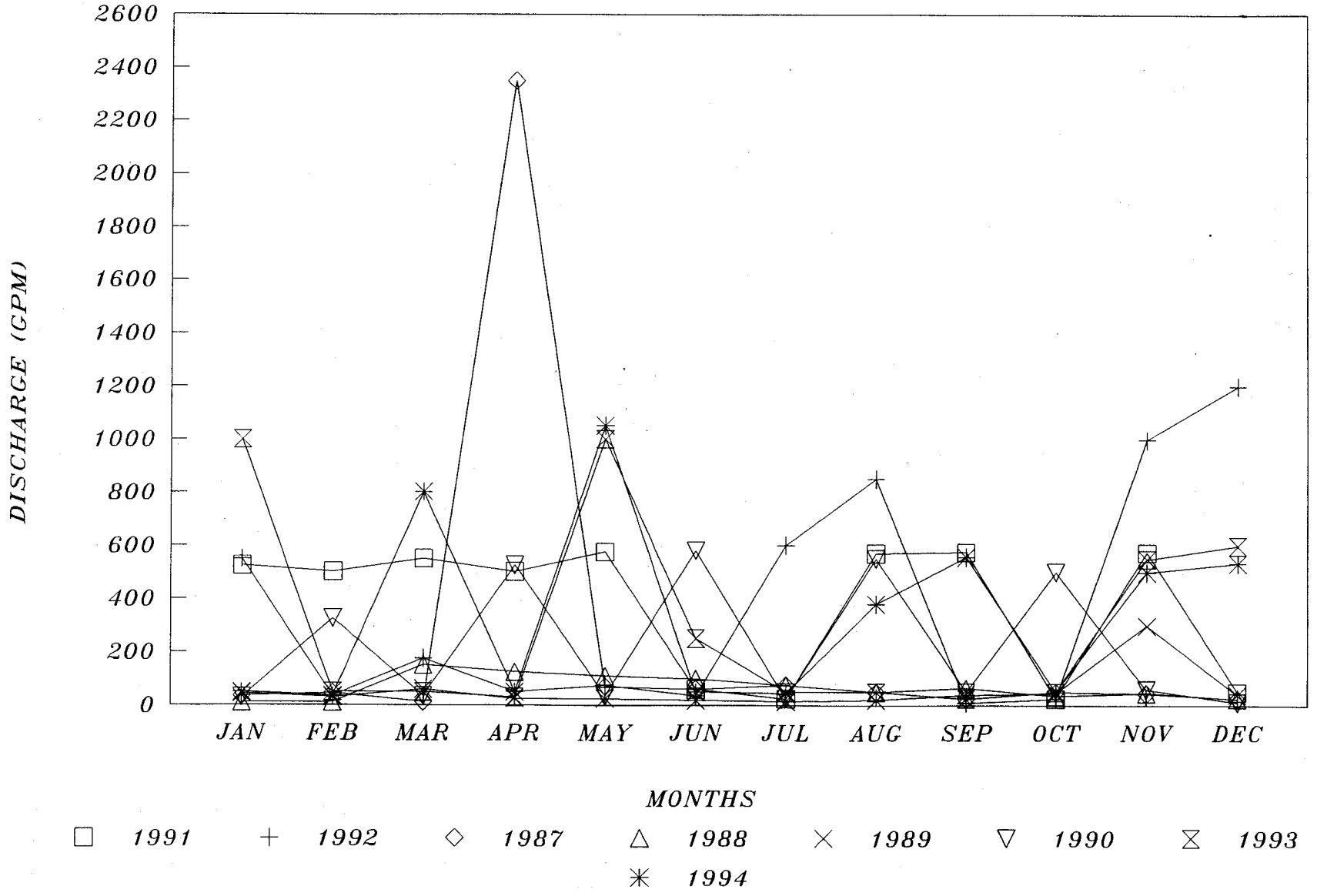
GRIMES WASH – LEFT FORK ABOVE MINE

Drainage Recession Curve Study



GRIMES WASH – BELOW MINE

Drainage Recession Curve Study



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FAX: (801) 653-2436

April 7, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
4/7/94
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Grimes Wash Run-Off GWRO3

Temperature 11.5°C
Flow 800GPM
Rec'd 1630 hr.
Sampled 1450 hr.

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/CS

Date sampled March 24, 1994

Date received March 24, 1994

Analysis report no. 59-13961

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	03-29-1994 1130	
Alkalinity, Bicarbonate	398	1	mg/l as HCO_3	SM4500-CO_2-D	03-28-1994 1310	
Alkalinity, Carbonate	4	1	mg/l as CO_3	SM4500-CO_2-D	03-28-1994 1310	LS
Alkalinity, Total	331	1	mg/l as $CaCO_3$	EPA 310.1	03-28-1994 1310	LS
Anions	12.20	----	meq/l	---------	---------- -----	--
Calcium, Total	101	1	mg/l	EPA 215.1	04-05-1994 1300	DW
Cations	11.80	----	meq/l	---------	---------- -----	--
Chloride	27	1	mg/l	SM4500-Cl-B	04-06-1994 1315	LS
Conductivity	1047	1	umhos/cm	SM2510-B	03-29-1994 0930	ED
Hardness, Total	499	1	mg/l as $CaCO_3$	SM2340-B	04-05-1994 1300	DW
Iron, Total	1.9	0.2	mg/l	EPA 236.1	03-31-1994 1230	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	03-31-1994 1130	DW
Magnesium, Total	60	1	mg/l	EPA 242.1	04-05-1994 0830	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-04-1994 1000	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-25-1994 1520	LM
Oxygen, Dissolved	8.2	----	mg/l	EPA 360.1	03-24-1994 1640	LS
pH	8.20	----	pH units	EPA 150.1	03-24-1994 1700	LS
Potassium, Total	8	2	mg/l	EPA 258.1	04-04-1994 1130	DW
Sodium, Total	41	1	mg/l	EPA 273.1	04-04-1994 1400	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	03-25-1994 0715	LM
Solids, Total Dissolved	650	10	mg/l	EPA 160.1	03-28-1994 1340	LM
Solids, Total Suspended	40	4	mg/l	EPA 160.2	03-28-1994 1500	LM
Sulfate	230	1	mg/l	EPA 375.4	04-05-1994 0830	LS
Turbidity	8.9	0.1	NTU	EPA 180.1	03-24-1994 1800	LS
Cation/Anion Balance	-1.80		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

F-465
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TERMS AND CONDITIONS ON REVERSE

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TEL: (801) 653-2311
FAX: (801) 653-2436

July 6, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Grimes Wash Run-Off GWRO3

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/CS

Date sampled June 16, 1994

Date received June 16, 1994

Temperature 15.0°C
Flow 50 GPM
Rec'd 1450 hr.
Sampled 11¼5 hr.

FIELD MEASUREMENTS

pH	8.62
Conductivity	1420
DO	8.3

Analysis report no. 59-14157

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	06-22-1994 1500 ED
Alkalinity, Bicarbonate	367	1	mg/l as HCO_3	SM2320-B	06-17-1994 1105 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-17-1994 1105 LS
Alkalinity, Total	301	1	mg/l as $CaCO_3$	EPA 310.1	06-17-1994 1105 LS
Anions	14.20	----	meq/l	---------	---------- ----- --
Calcium, Total	108	1	mg/l	EPA 215.1	07-05-1994 1130 DW
Cations	16.50	----	meq/l	---------	---------- ----- --
Chloride	60	1	mg/l	SM4500-Cl-B	06-20-1994 1610 LS
Conductivity	1560	1	umhos/cm	SM2510-B	06-17-1994 1255 ED
Hardness, Total	607	1	mg/l as $CaCO_3$	SM2340-B	07-05-1994 1130 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-01-1994 0930 ED
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-27-1994 0730 DW
Magnesium, Total	82	1	mg/l	EPA 242.1	07-05-1994 1400 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1994 0800 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	06-21-1994 1300 LM
Oxygen, Dissolved	6.5	----	mg/l	EPA 360.1	06-16-1994 1550 LS
pH	8.28	----	pH units	EPA 150.1	06-16-1994 1620 LS
Potassium, Total	9	2	mg/l	EPA 258.1	07-05-1994 0900 DW
Sodium, Total	100	1	mg/l	EPA 273.1	07-05-1994 1000 DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	06-17-1994 0750 LS
Solids, Total Dissolved	980	10	mg/l	EPA 160.1	06-22-1994 1035 LM
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	06-21-1994 1400 LM
Sulfate	310	1	mg/l	EPA 375.4	06-20-1994 1045 LS
Turbidity	1.4	0.1	NTU	EPA 180.1	06-16-1994 1720 LS
Cation/Anion Balance	7.6		%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Terry Stout CD

Manager, Huntington Laboratory

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

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September 19, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
9/19/94

FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/CS

Date sampled September 12, 1994

Date received September 12, 1994

Sample identification by
PACIFICORP FIELD OFFICE

GWR03 Grimes Wash Run-Off
Temperature 14.5°C
Flow 600 GPM
Rec'd 1405 hr.
Sampled 1305 hr.

FIELD MEASUREMENTS

pH	8.81
Conductivity	905
DO	6.2

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14394

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	09-15-1994 1030	
Alkalinity, Bicarbonate	342	1	mg/l as HCO_3	SM2320-B	09-14-1994 1600	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-14-1994 1600	LS
Alkalinity, Total	280	1	mg/l as $CaCO_3$	EPA 310.1	09-14-1994 1600	LS
Anions	10.10	----	meq/l	---------	---------- -----	--
Calcium, Total	90	5	mg/l	EPA 215.1	09-14-1994 1130	DW
Cations	10.80	----	meq/l	---------	---------- -----	--
Chloride	19	1	mg/l	SM4500-Cl-B	09-16-1994 1600	LS
Conductivity	941	1	umhos/cm	SM2510-B	09-14-1994 1100	ED
Hardness, Total	459	10	mg/l as $CaCO_3$	SM2340-B	09-14-1994 1130	DW
Iron, Total	0.6	0.2	mg/l	EPA 236.1	09-13-1994 1430	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-15-1994 1500	DW
Magnesium, Total	57	2	mg/l	EPA 242.1	09-14-1994 1200	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-13-1994 1400	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	09-13-1994 0715	LM
Oxygen, Dissolved	6.1	----	mg/l	EPA 360.1	09-12-1994 1610	ED
pH	8.36	----	pH units	EPA 150.1	09-12-1994 1600	ED
Potassium, Total	8	5	mg/l	EPA 258.1	09-14-1994 1000	DW
Sodium, Total	37	5	mg/l	EPA 273.1	09-13-1994 1700	DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-13-1994 0730	LM
Solids, Total Dissolved	579	10	mg/l	EPA 160.1	09-13-1994 1515	LS
Solids, Total Suspended	5	4	mg/l	EPA 160.2	09-13-1994 0620	LM
Sulfate	190	1	mg/l	EPA 375.4	09-15-1994 1310	LS
Turbidity	5.1	0.1	NTU	EPA 180.1	09-13-1994 0815	LS
Cation/Anion Balance	3.4		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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TEL: (801) 653-2311
FAX: (801) 653-2436

January 6, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
1/6/95

FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/KH

Date sampled December 19, 1994

Date received December 19, 1994

Sample identification by
PACIFICORP FIELD OFFICE

Grimes Wash Runoff GWR03
Temperature 10.4°C
Flow 533 gpm
Rec'd 1320 hr.
Sampled 1005 hr.

FIELD MEASUREMENTS

pH	8.06
Conductivity	1160
DO	5.4

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14658

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst		
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	12-28-1994	1020	ED
Alkalinity, Bicarbonate	325	5	mg/l as HCO_3	SM2320-B	12-27-1994	1030	LM
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	12-27-1994	1030	LM
Alkalinity, Total	266	5	mg/l as $CaCO_3$	EPA 310.1	12-27-1994	1030	LM
Anions	13.00	----	meq/l	---------	----------	-----	--
Calcium, Total	86	1	mg/l	EPA 215.1	12-21-1994	1130	DW
Cations	13.60	----	meq/l	---------	----------	-----	--
Chloride	140	1	mg/l	SM4500-Cl-B	12-29-1994	1100	ED
Conductivity	1250	1	umhos/cm	SM2510-B	01-03-1995	1500	ED
Hardness, Total	430	10	mg/l as $CaCO_3$	SM2340-B	12-21-1994	1130	DW
Iron, Total	0.9	0.1	mg/l	EPA 236.1	12-21-1994	1530	DW
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-21-1994	1530	DW
Magnesium, Total	53	1	mg/l	EPA 242.1	12-21-1994	1400	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-22-1994	0830	DW
Oil & Grease	<5	5	mg/l	EPA 413.1	12-19-1994	1445	LM
Oxygen, Dissolved	5.7	----	mg/l	EPA 360.1	12-19-1994	1350	LM
pH	8.18	----	pH units	EPA 150.1	12-19-1994	1520	LM
Potassium, Total	8	1	mg/l	EPA 258.1	12-22-1994	0930	DW
Sodium, Total	114	1	mg/l	EPA 273.1	12-22-1994	1000	DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	12-20-1994	0845	LM
Solids, Total Dissolved	810	10	mg/l	EPA 160.1	12-19-1994	1515	LM
Solids, Total Suspended	15	4	mg/l	EPA 160.2	12-20-1994	1230	LM
Sulfate	180	1	mg/l	EPA 375.4	12-30-1994	1000	ED
Turbidity	14.0	0.1	NTU	EPA 180.1	12-19-1994	1645	ED
Cation/Anion Balance	2.2		%				

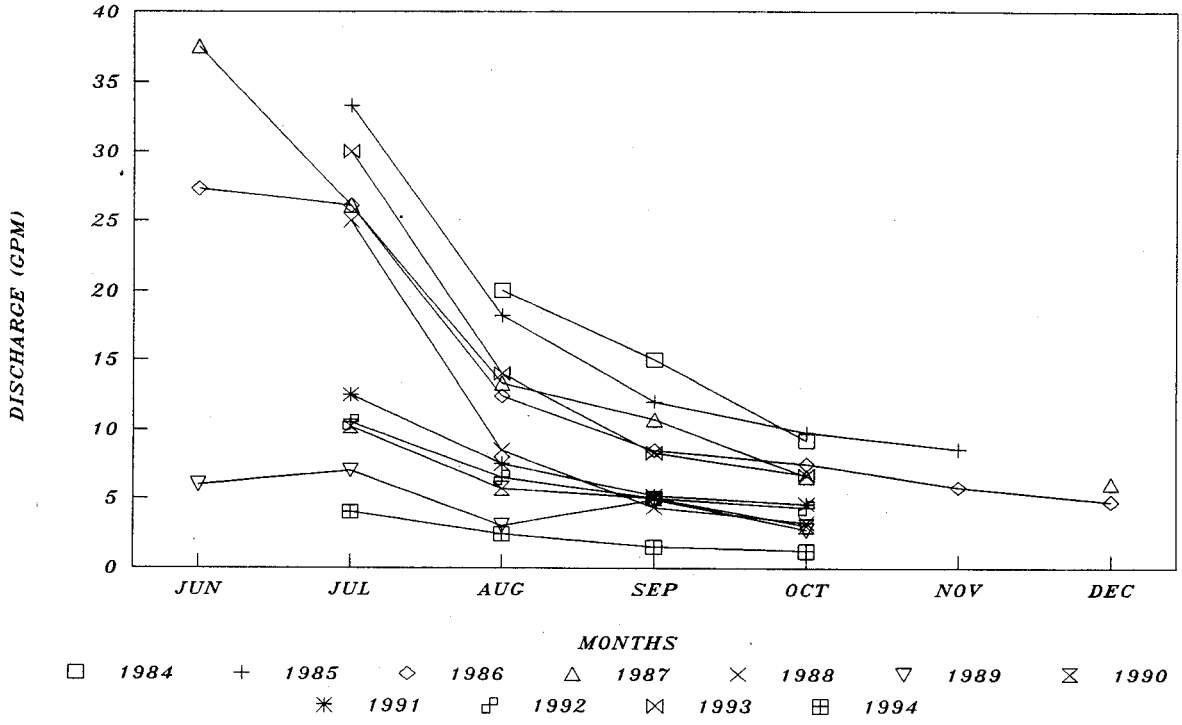
Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

APPENDIX G

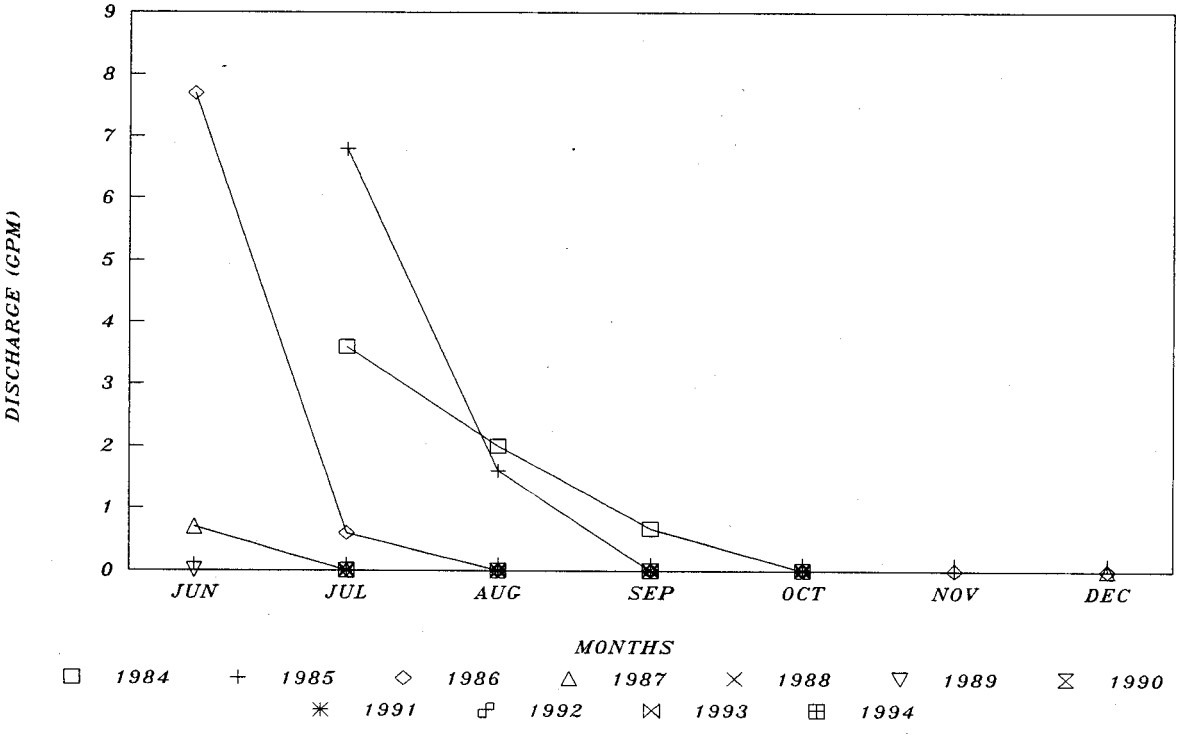
79-10

Discharge Recession Study



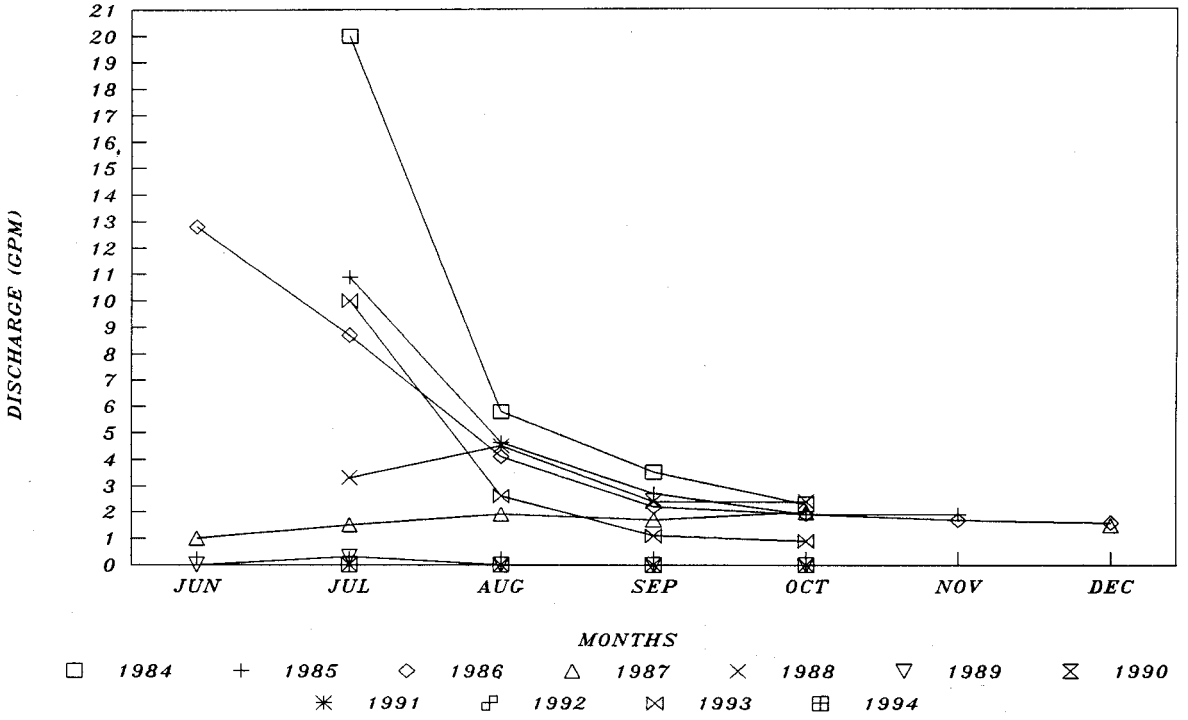
79-23

Discharge Recession Study



79-26

Discharge Recession Study



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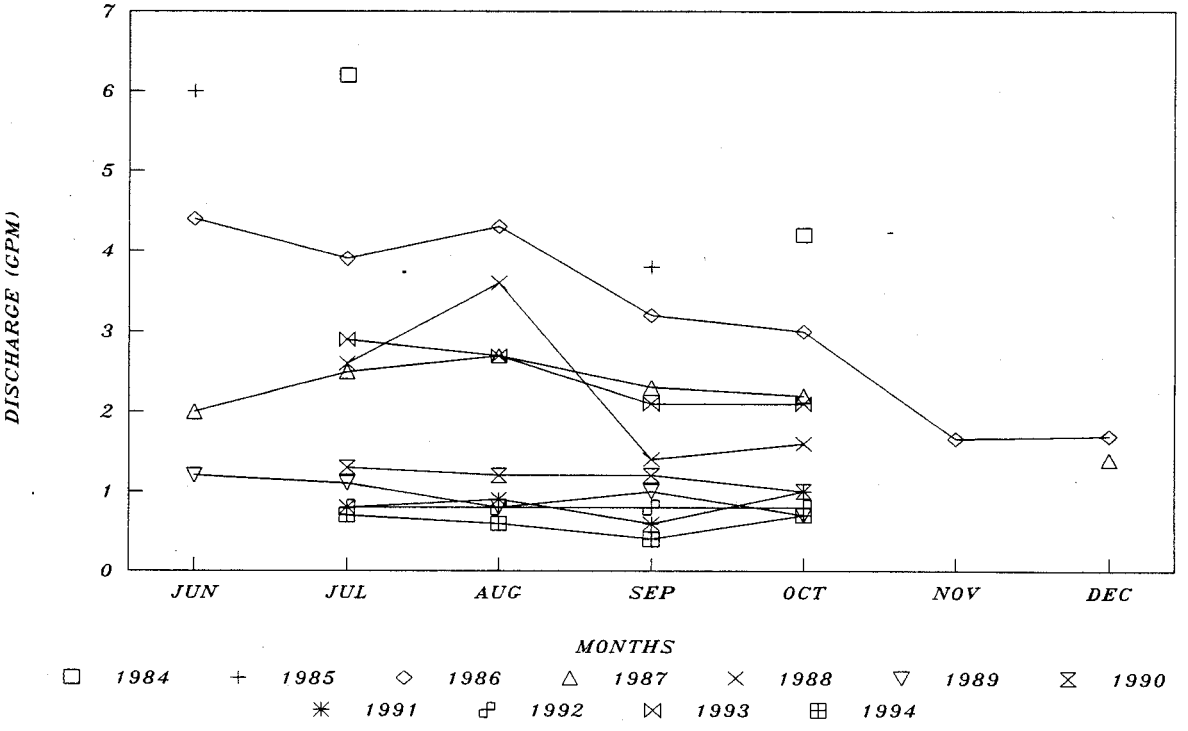
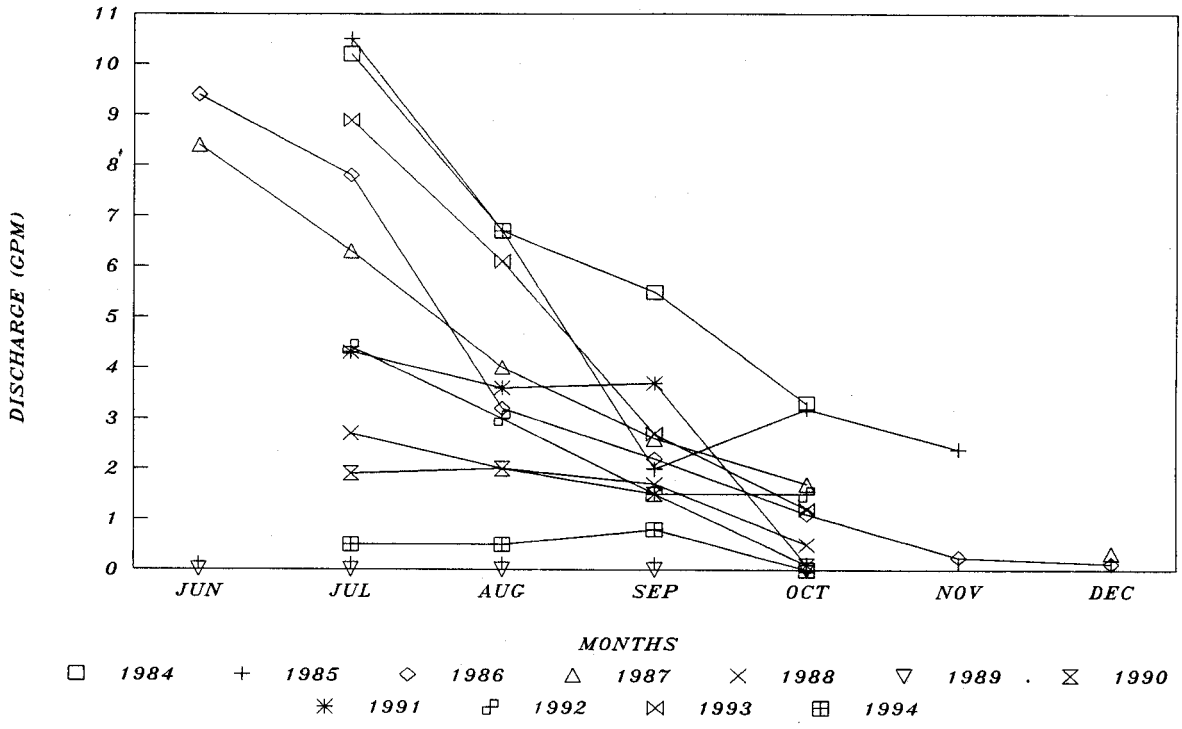
Discharge Recession Study



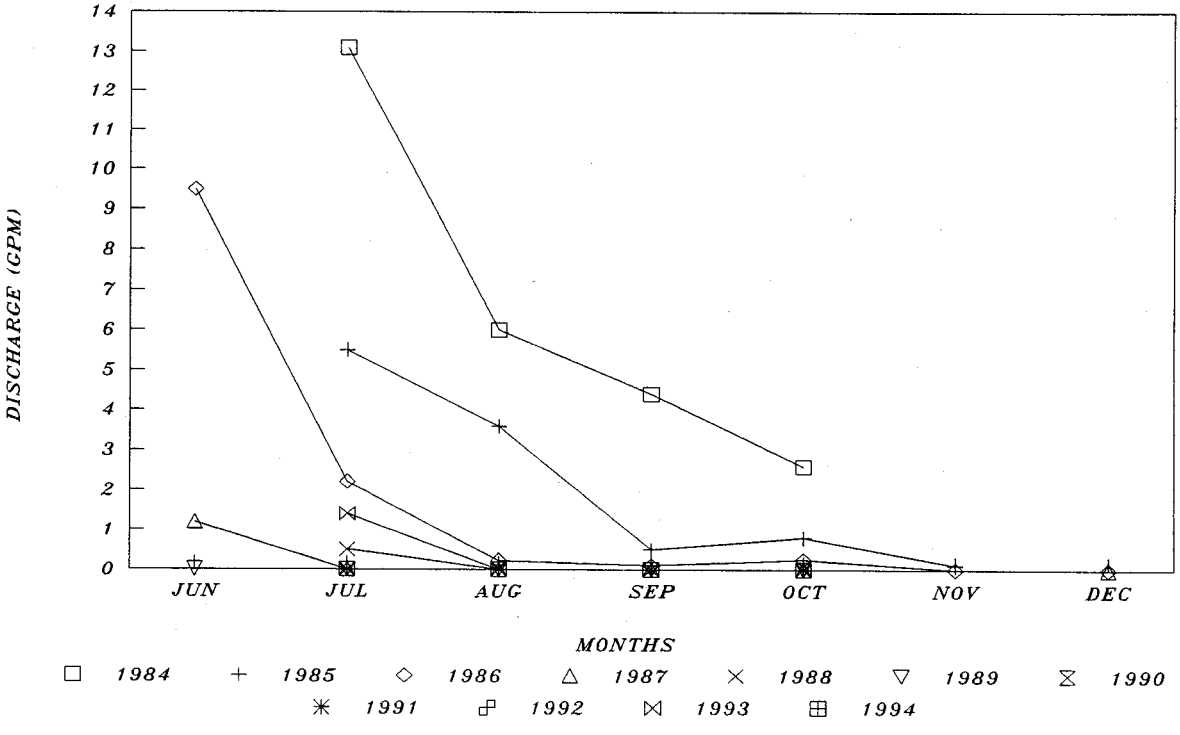
79-35

Discharge Recession Study



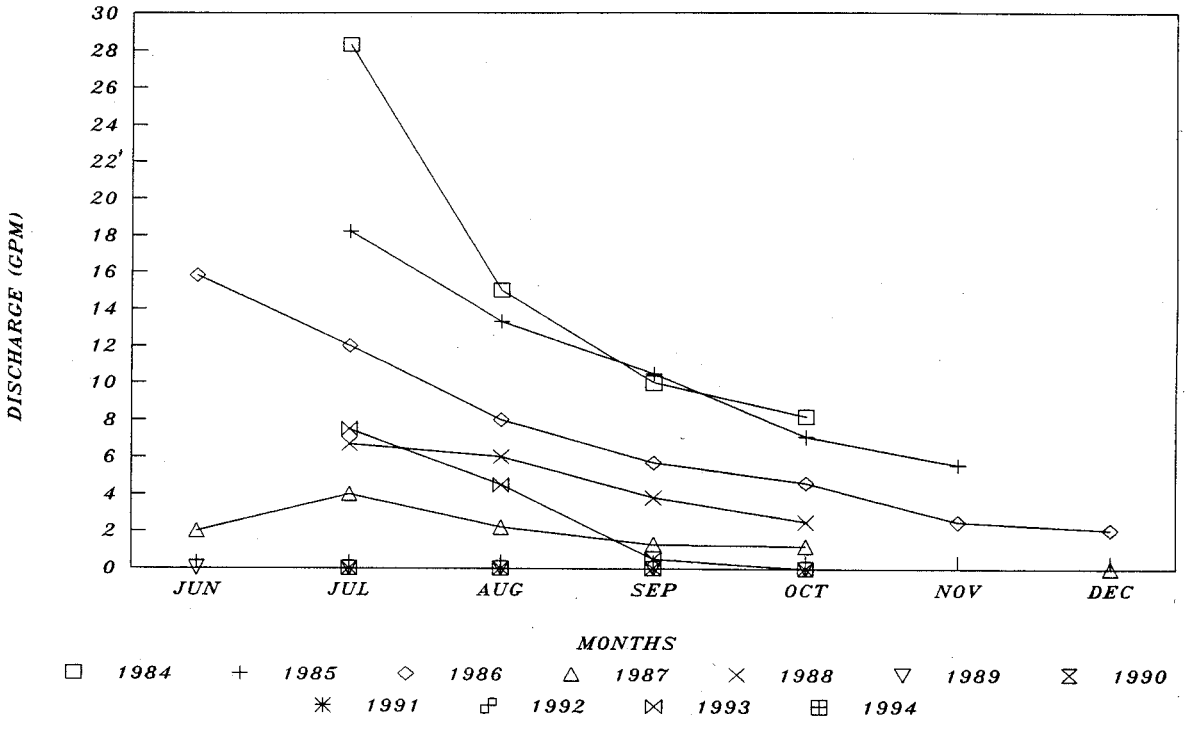
80-44

Discharge Recession Study



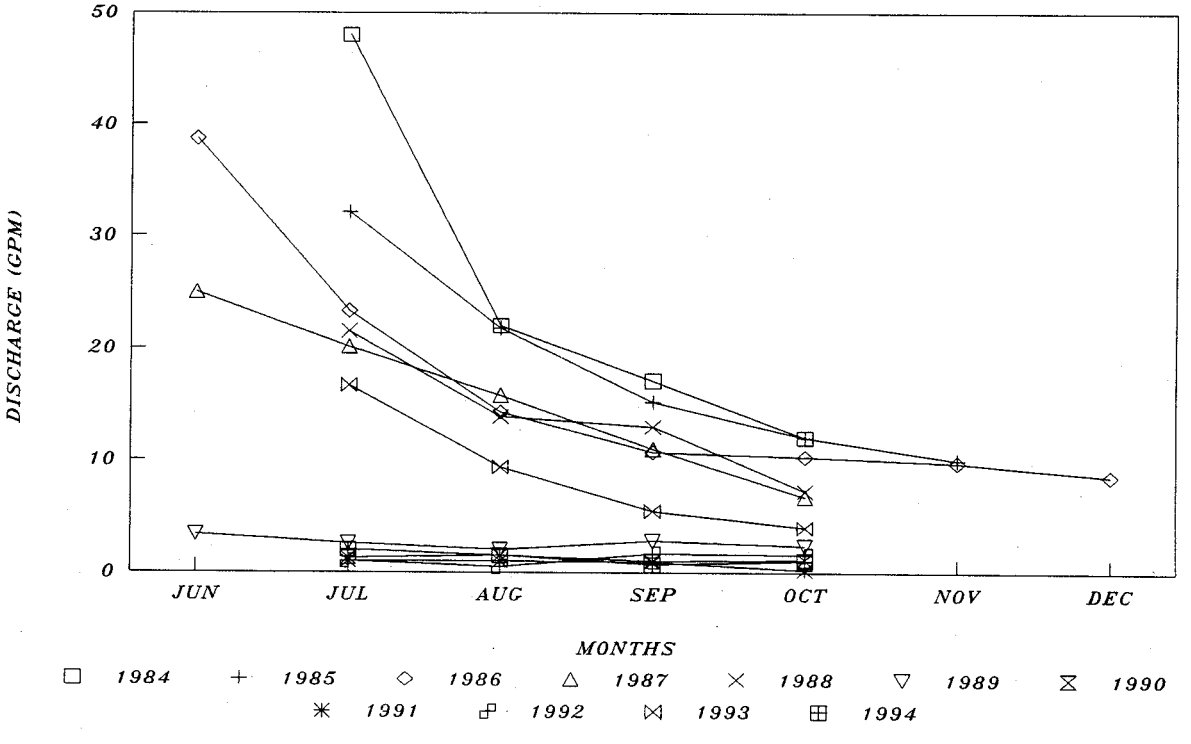
80–46

Discharge Recession Study



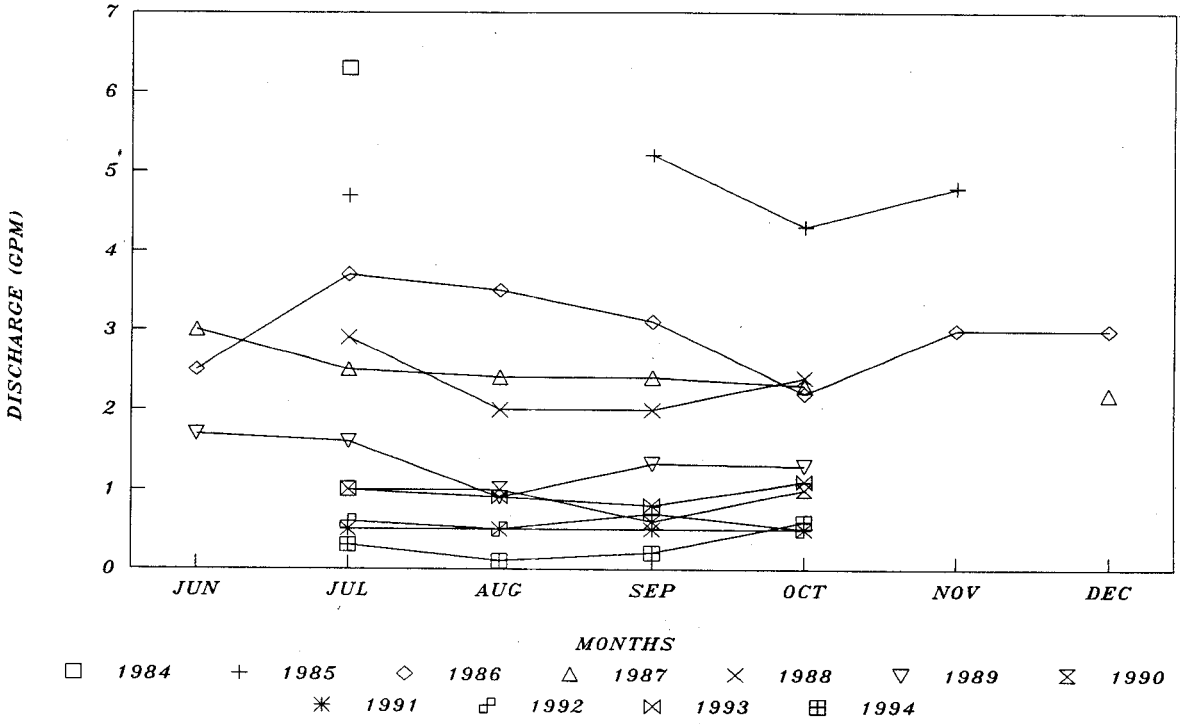
82–52

Discharge Recession Study



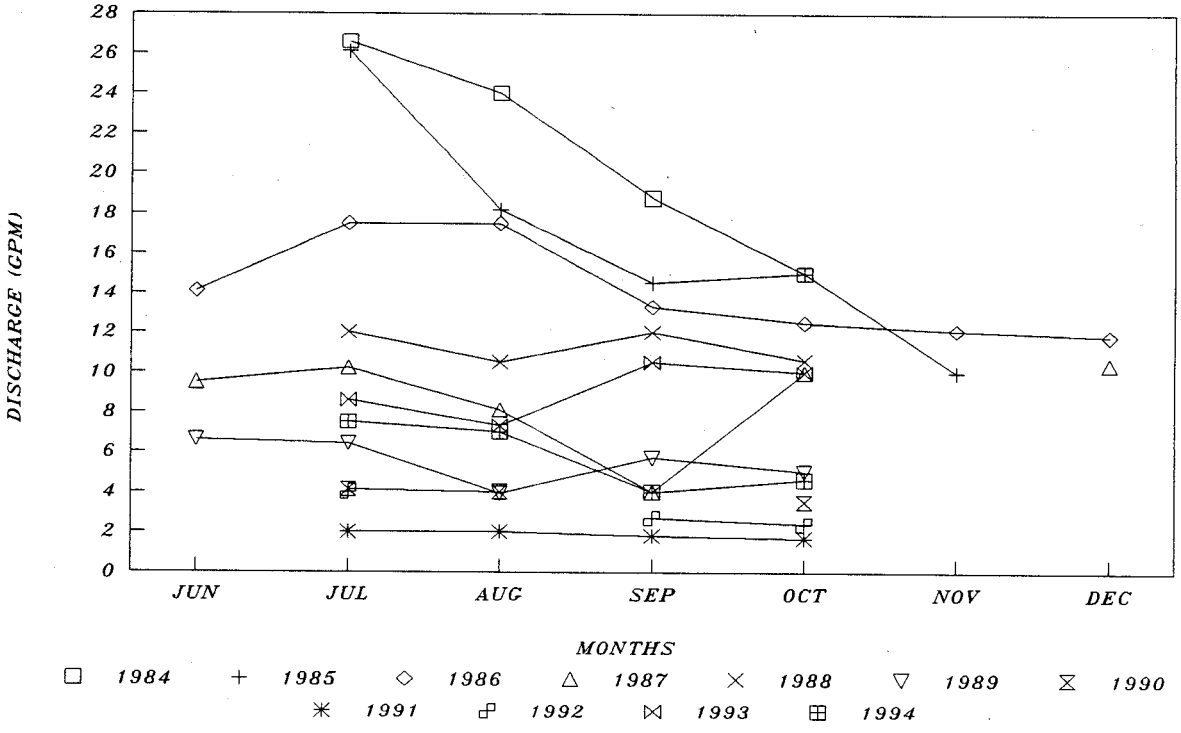
84-56

Discharge Recession Study



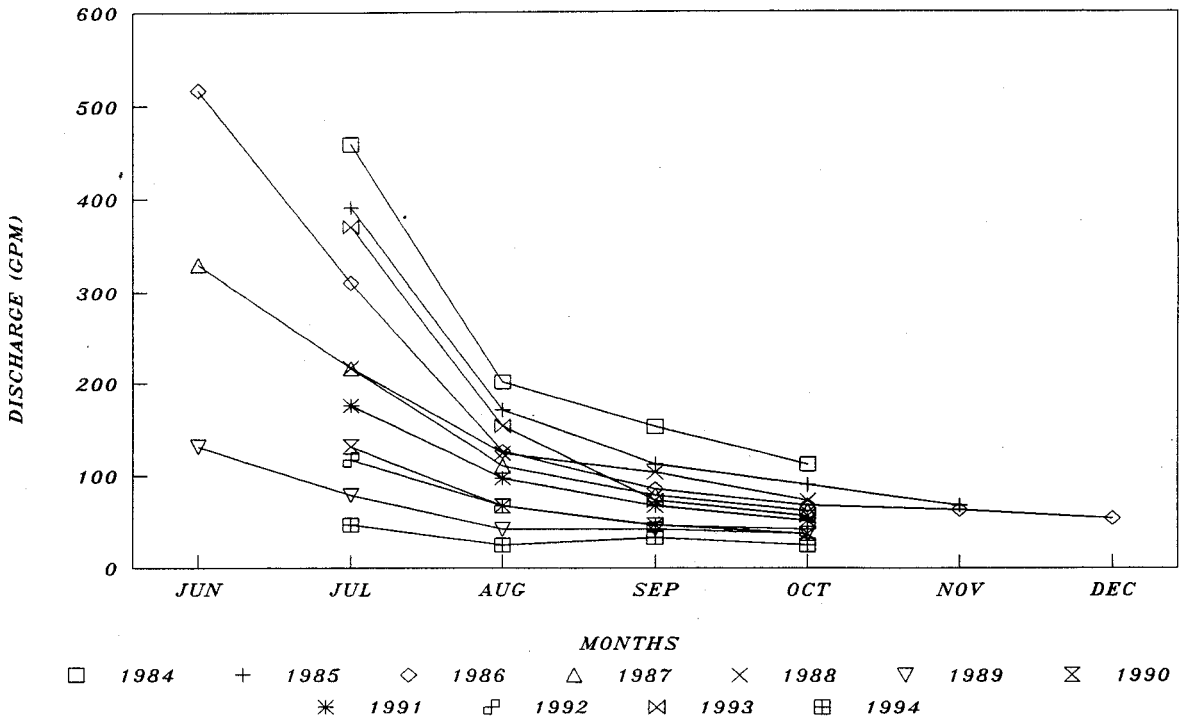
BURNT TREE

Discharge Recession Study



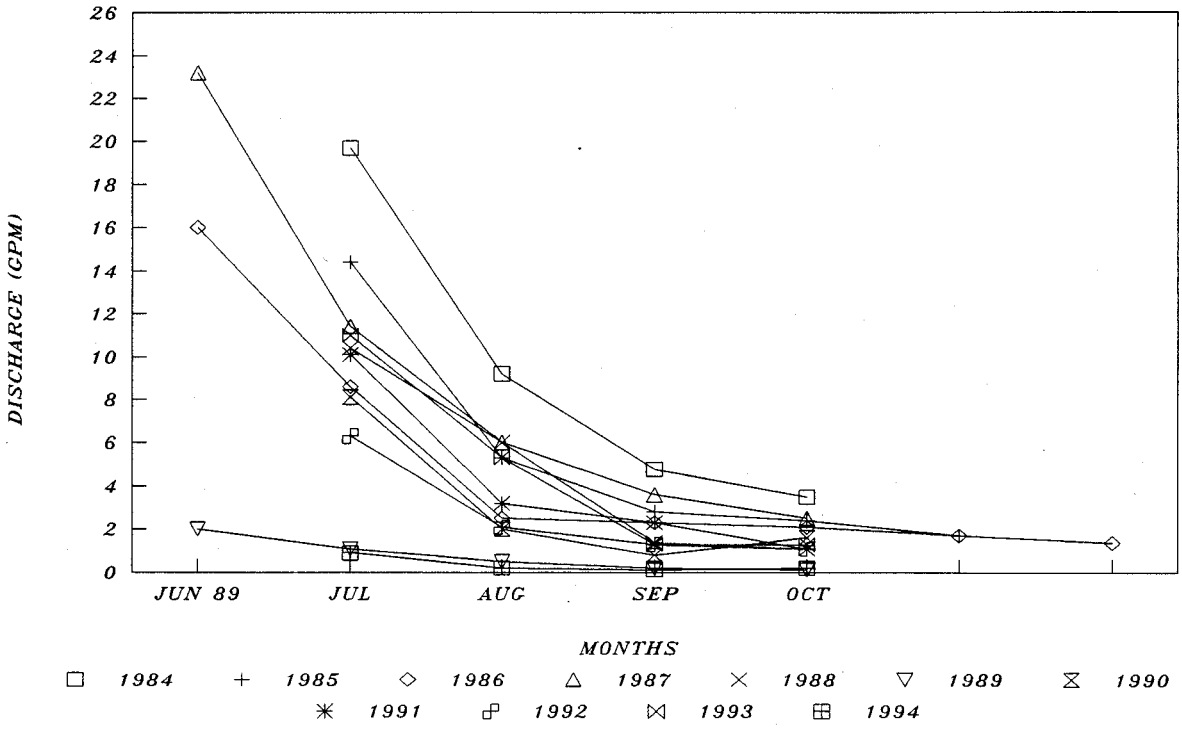
ELK SPRING

Discharge Recession Study

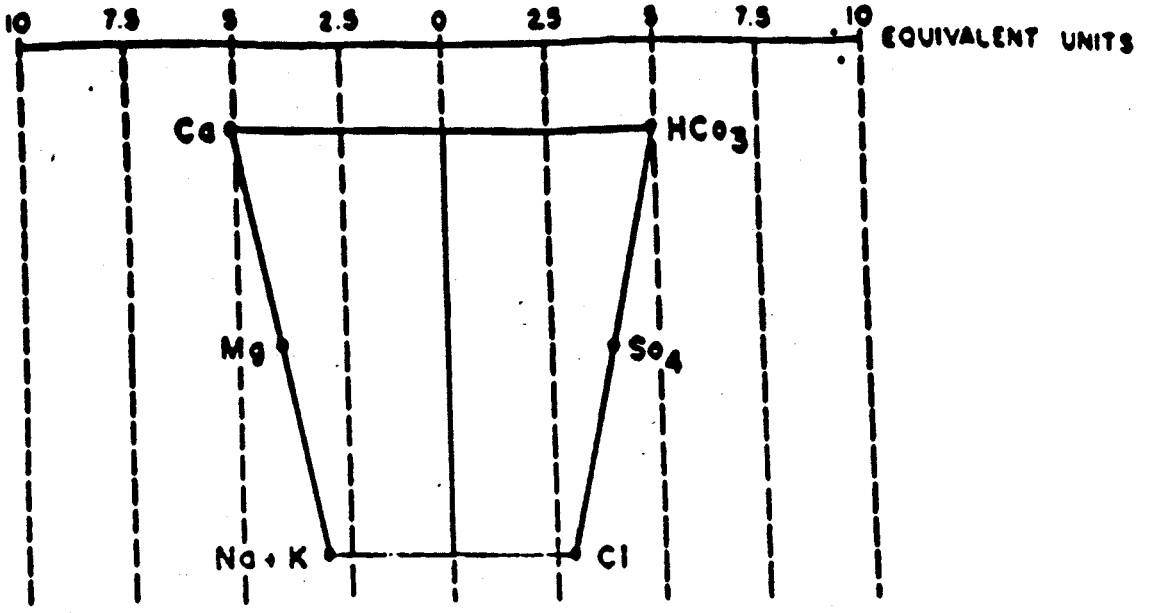


SHEBA SPRINGS

Discharge Recession Study



CATION – ANION DIAGRAMS



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

1" = 5 Equivalent Units

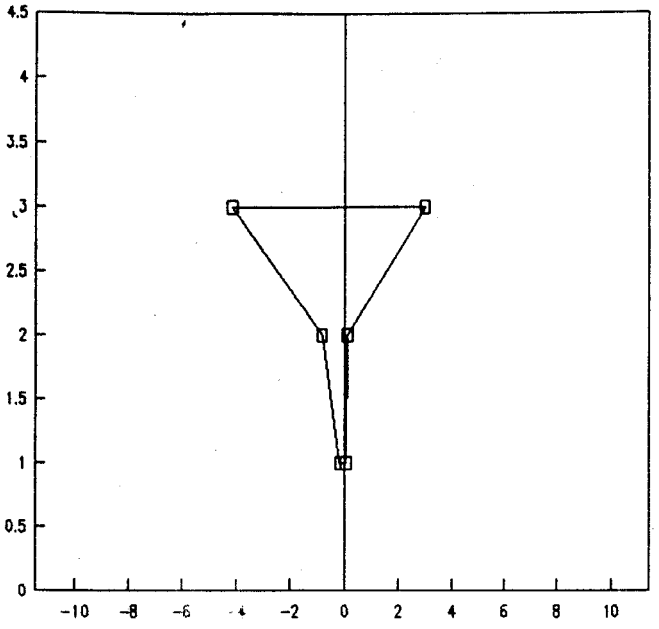
Equivalent Weights

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

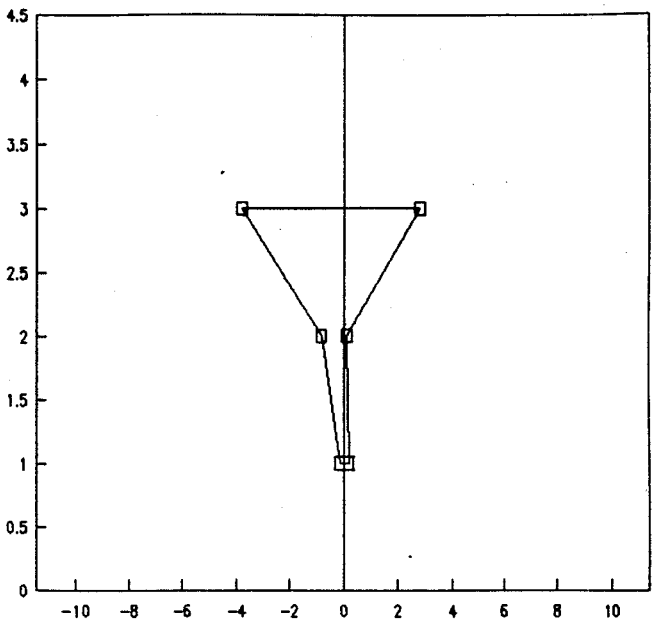
SHEBA SPRINGS

07-22-94



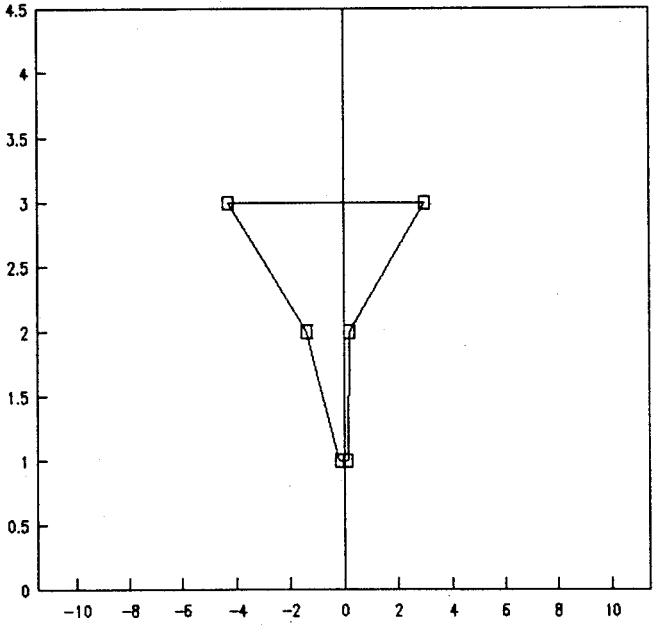
SHEBA SPRINGS

11-07-94



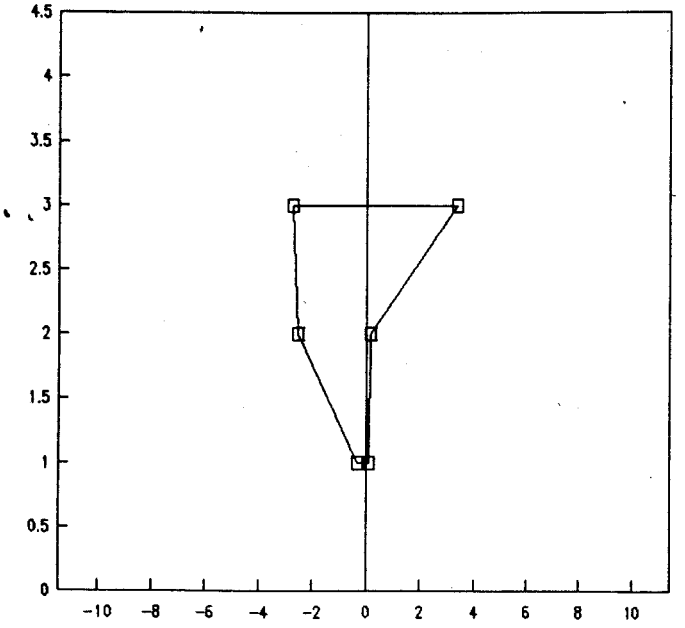
79-35

07-22-94

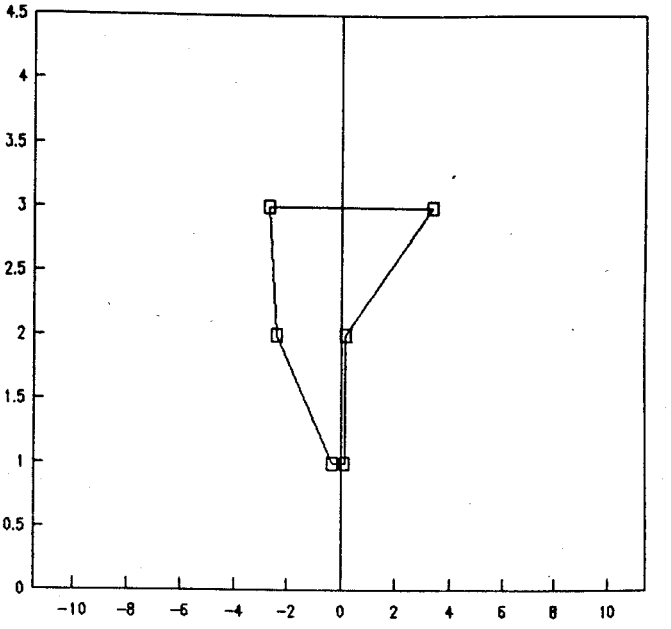


NORTH HORN FORMATION

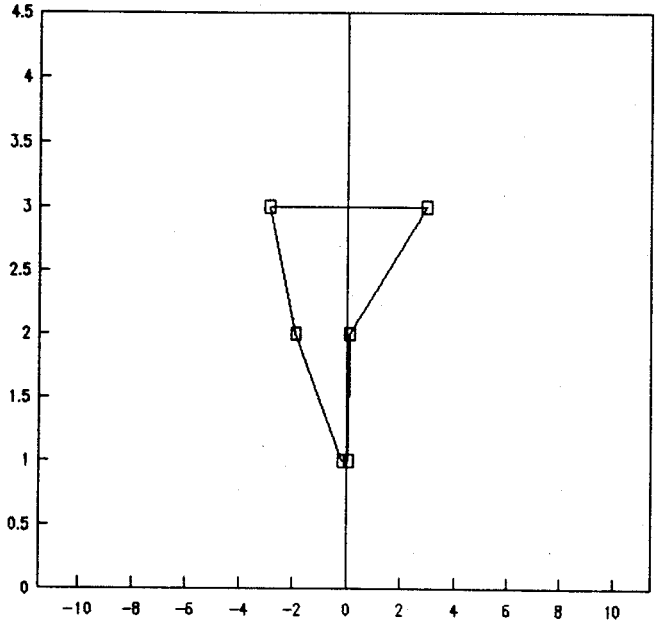
BURNT TREE
07-22-94



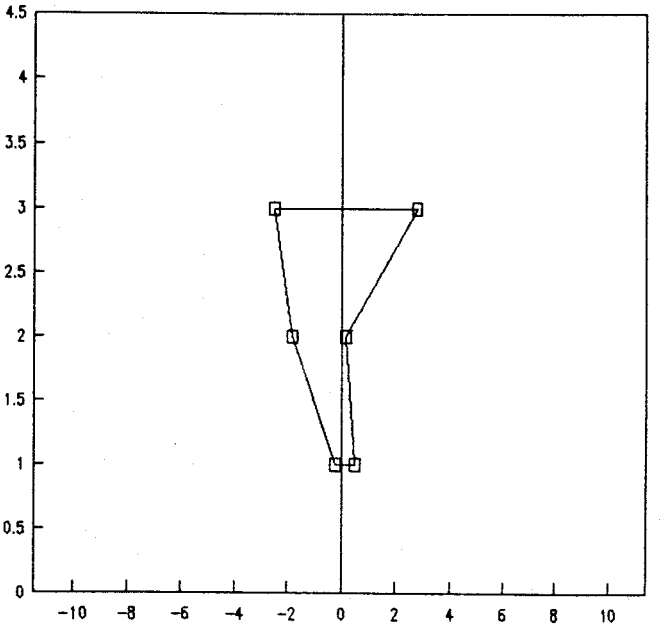
BURNT TREE
11-07-94



ELK SPRINGS
07-22-94

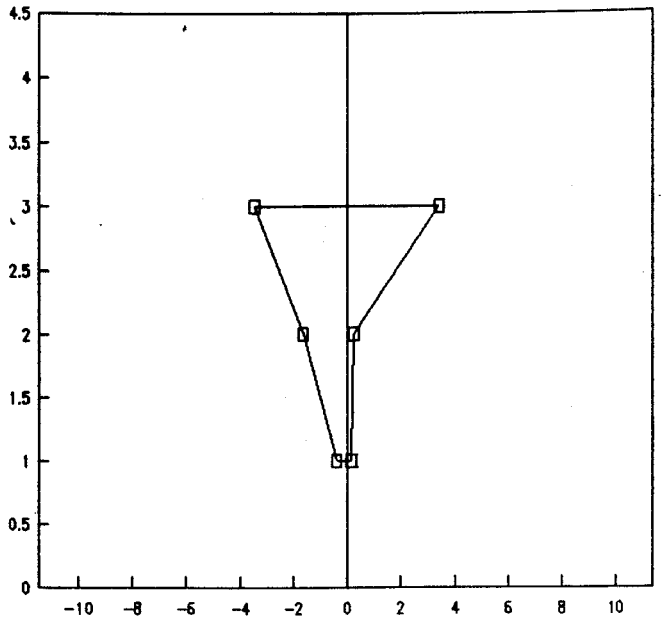


ELK SPRINGS
11-07-94

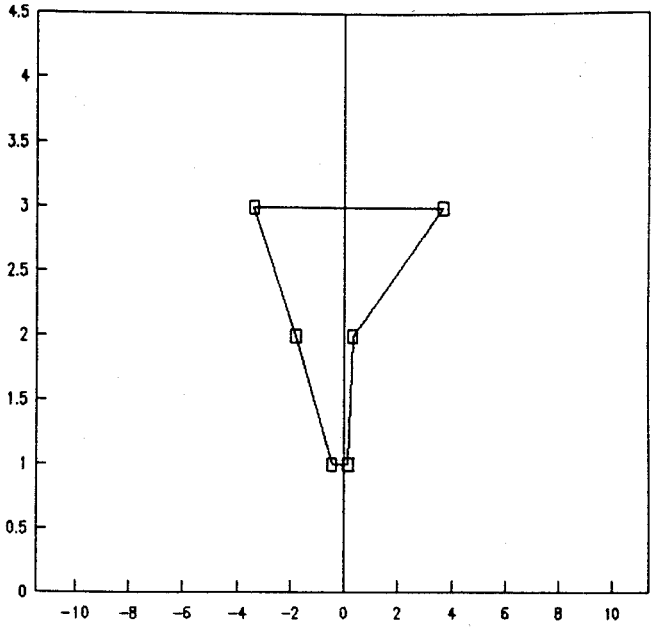


NORTH HORN FORMATION

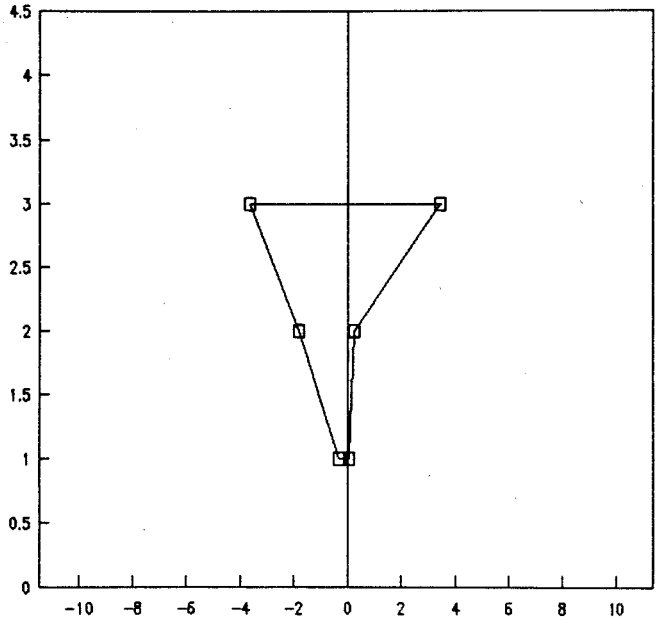
TEDS TUB
07-22-94



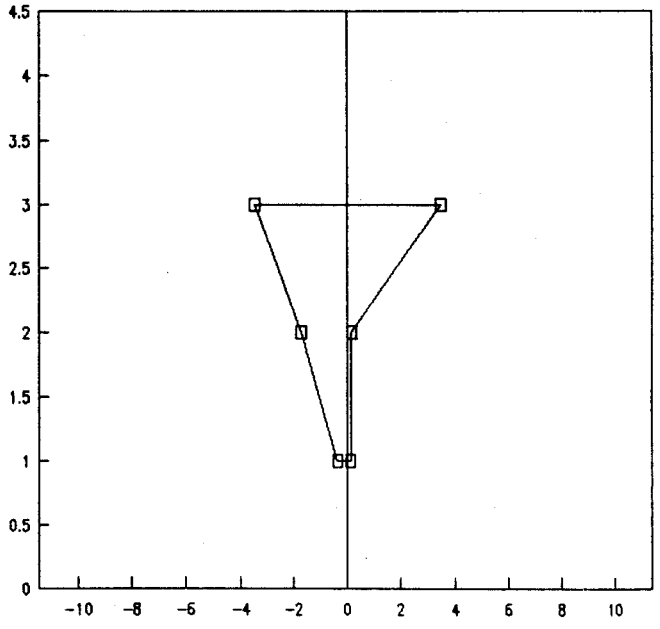
TEDS TUB
11-07-94



79-2
07-22-94

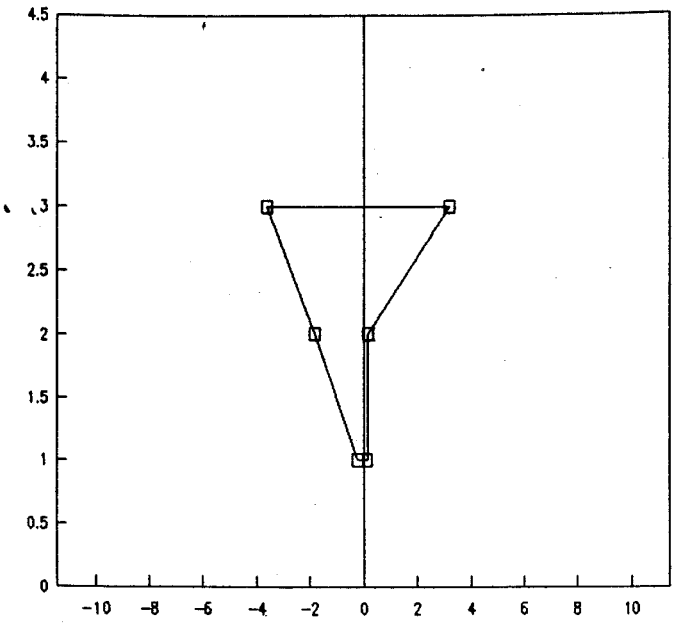


79-2
11-07-94

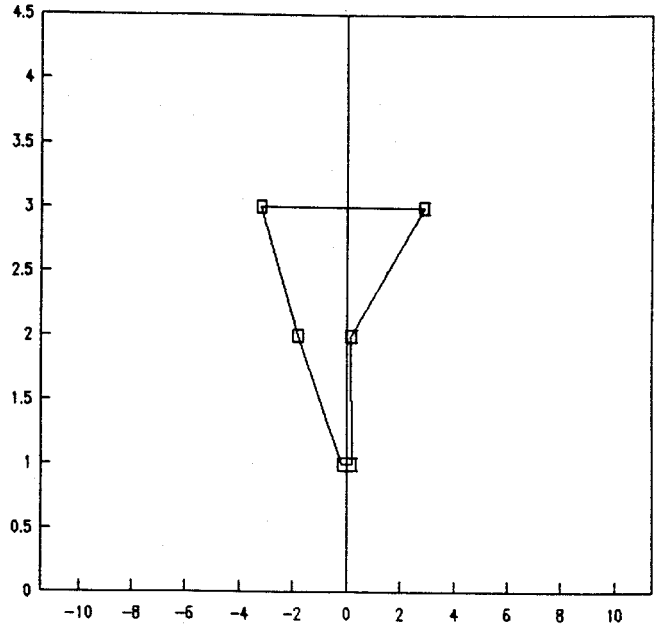


NORTH HORN FORMATION

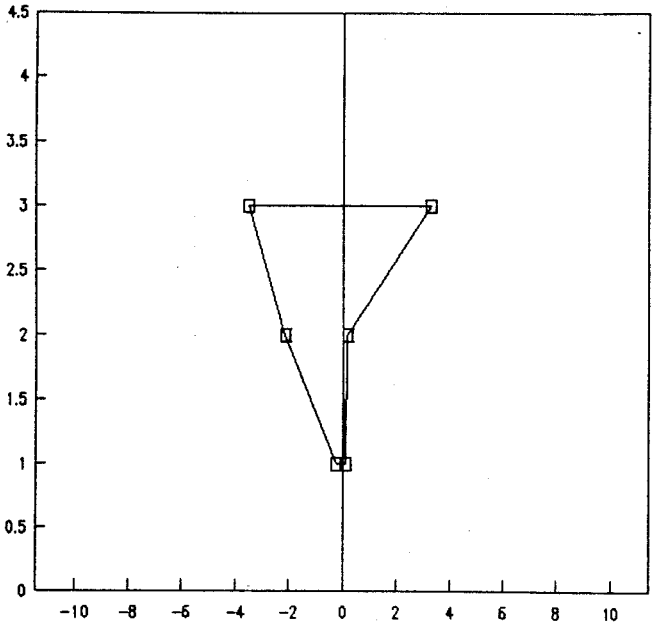
79-10
07-22-94



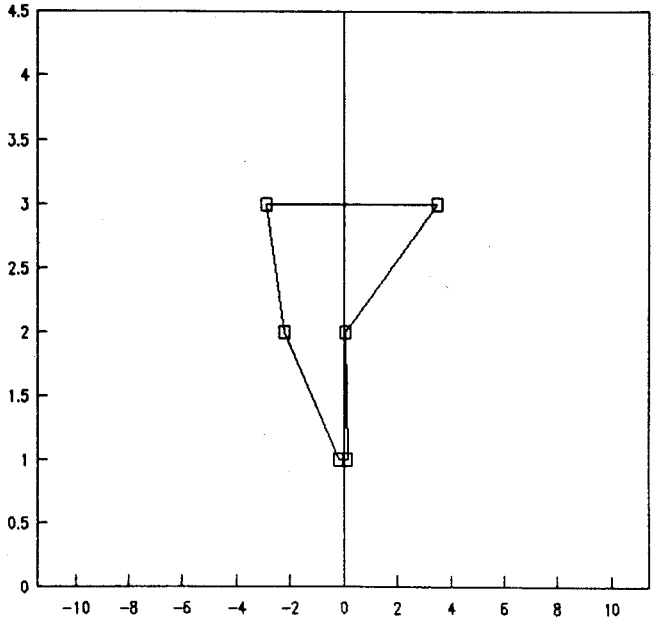
79-10
11-07-94



79-15
07-22-94



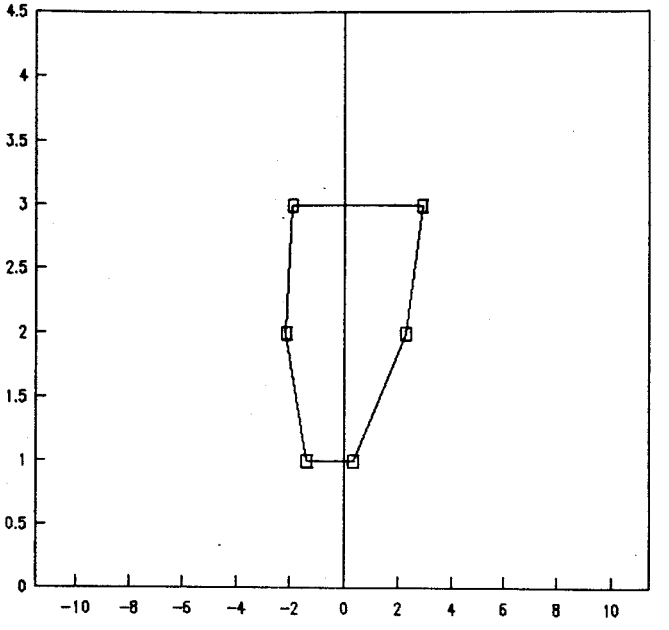
79-15
11-07-94



NORTH HORN FORMATION

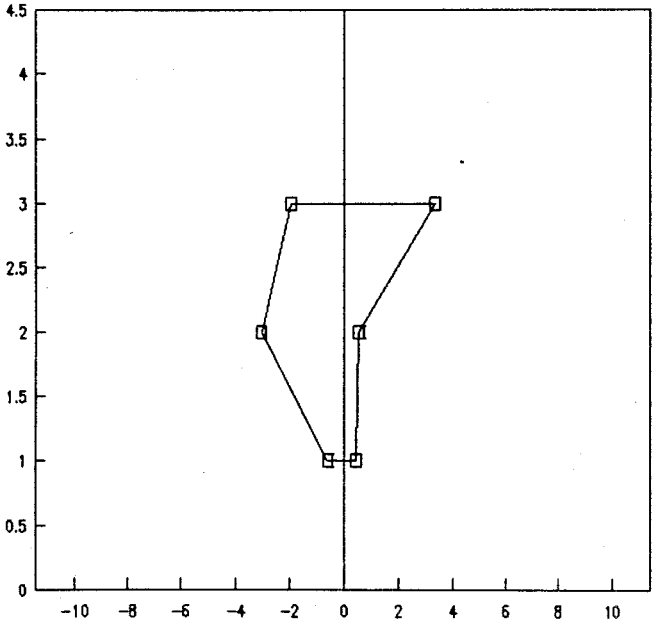
79-28

07-22-94



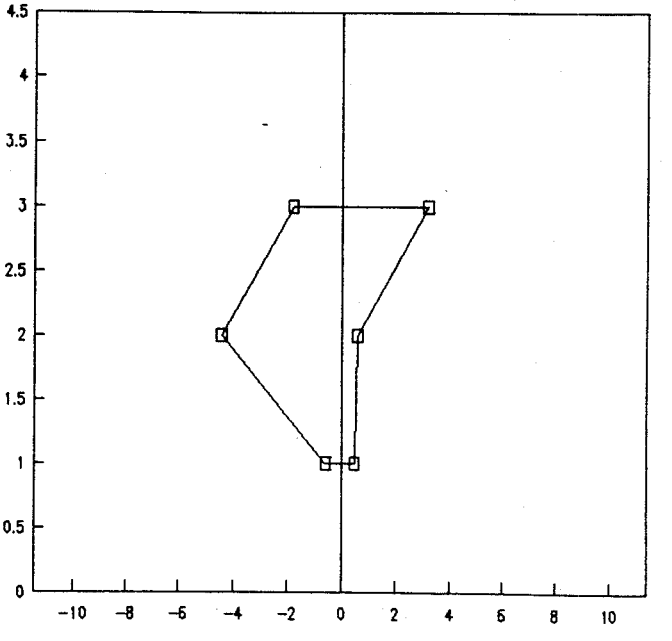
79-29

07-22-94



79-29

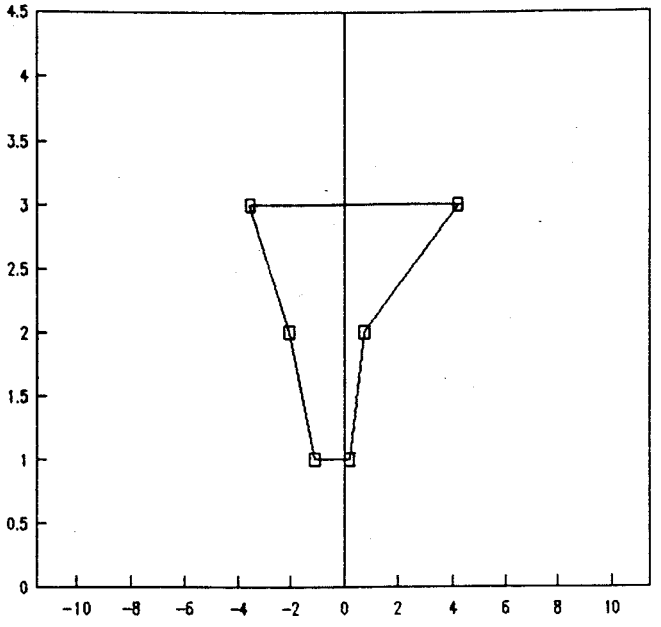
11-07-94



NORTH HORN FORMATION

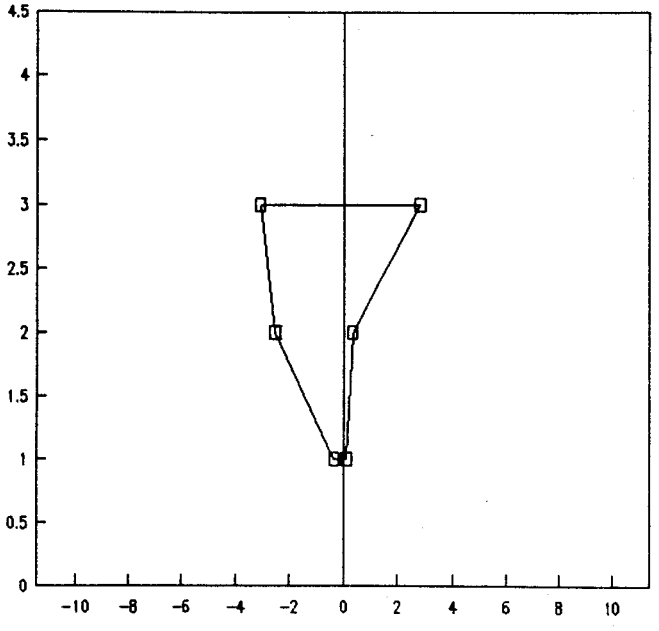
79-38

07-22-94



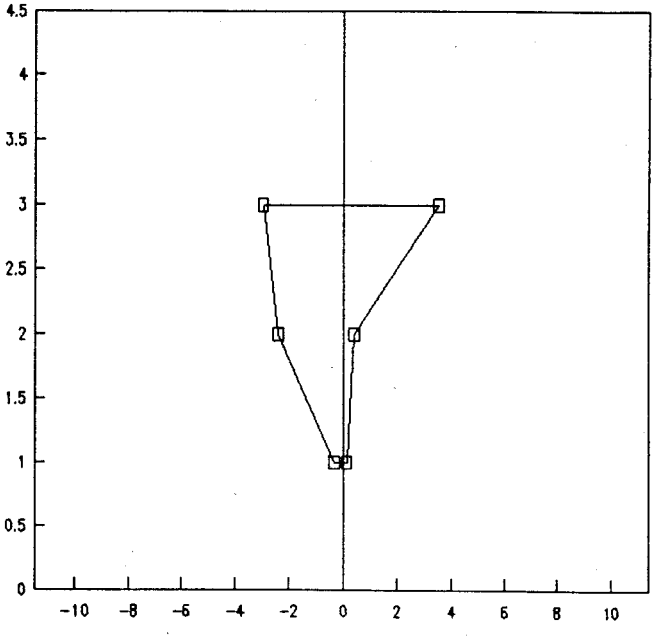
80-47

07-22-94



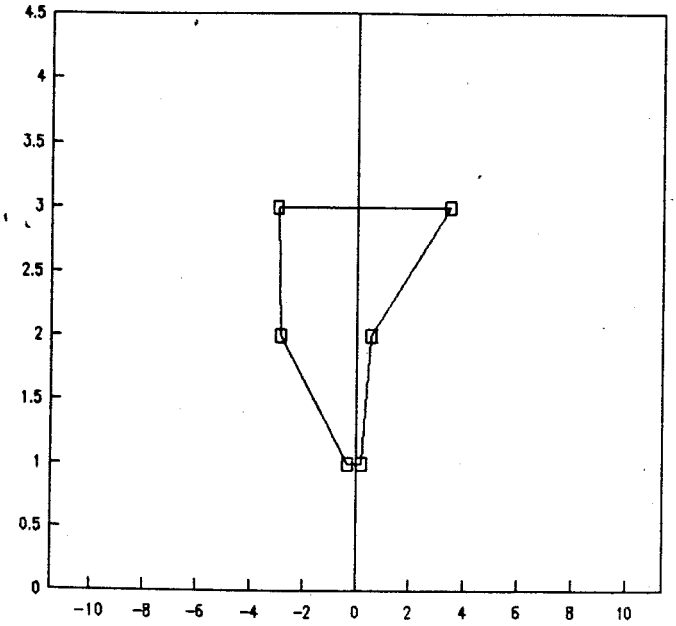
80-47

11-07-94

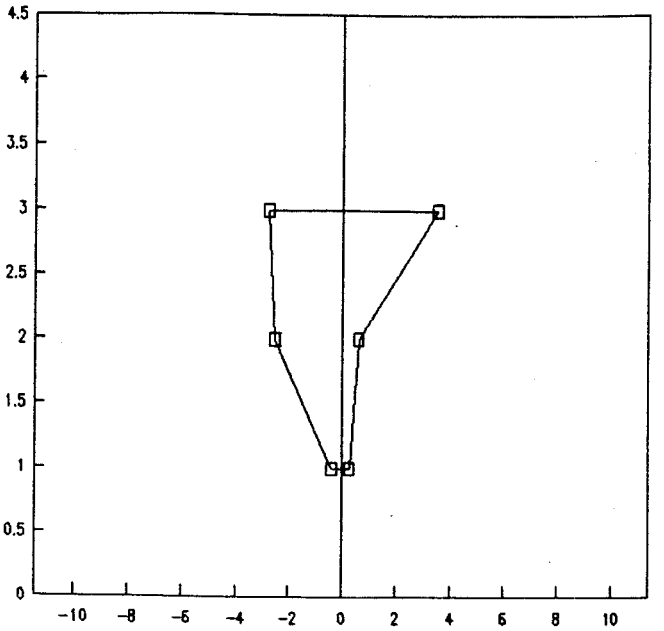


NORTH HORN FORMATION

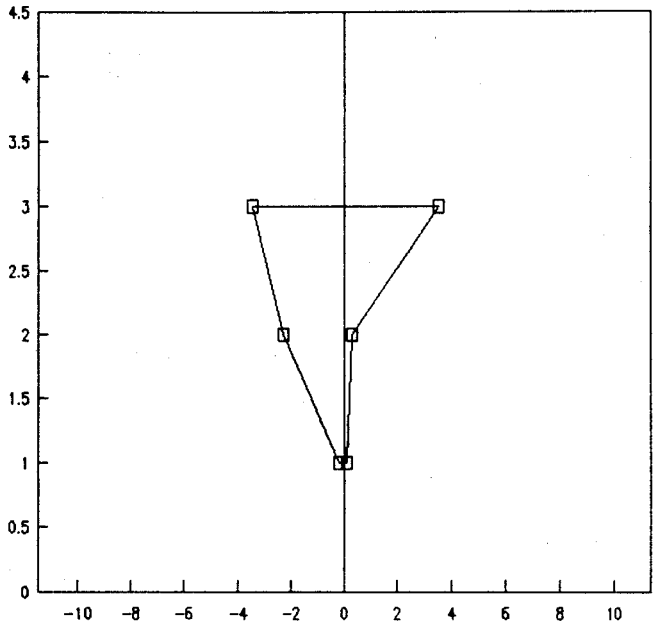
84-56
07-22-94



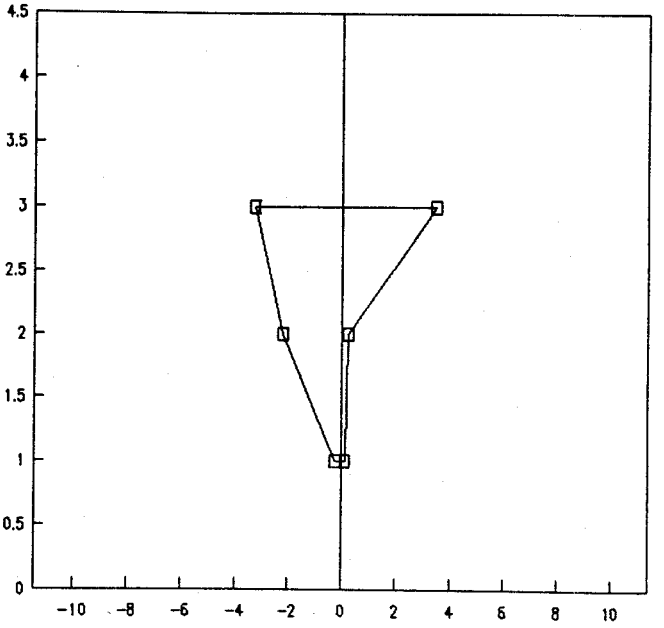
84-56
11-07-94



89-61
07-22-94



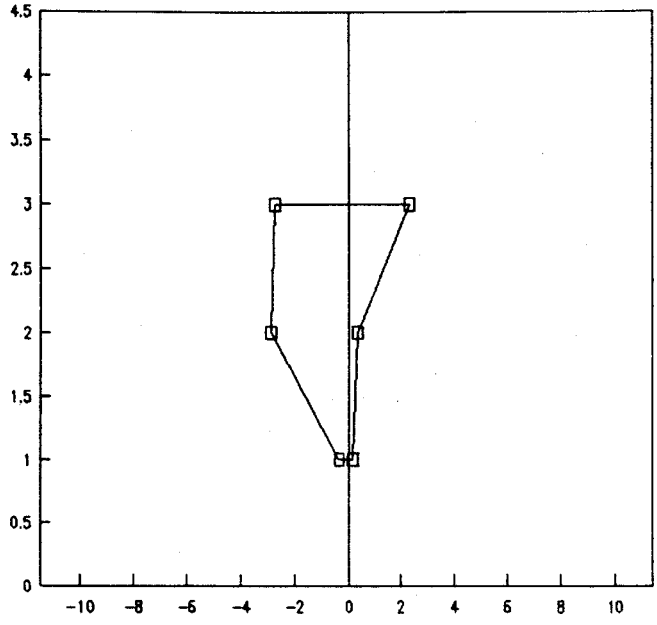
89-61
11-07-94



NORTH HORN FORMATION

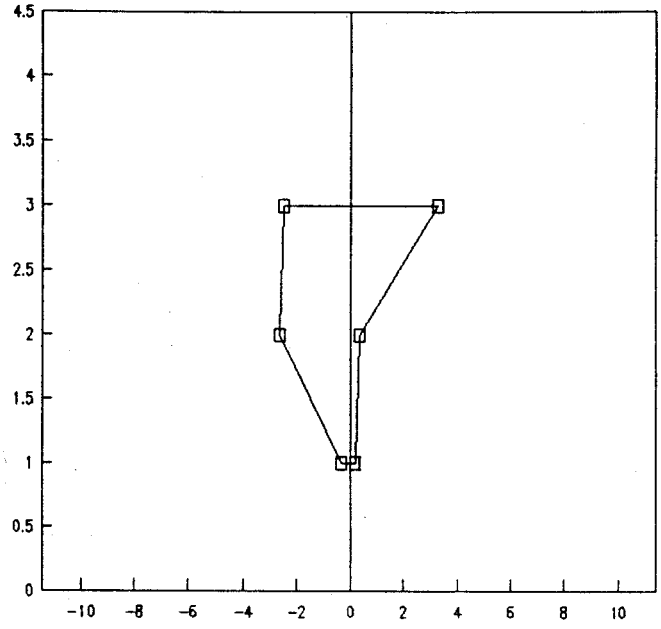
89-67

07-22-94



89-67

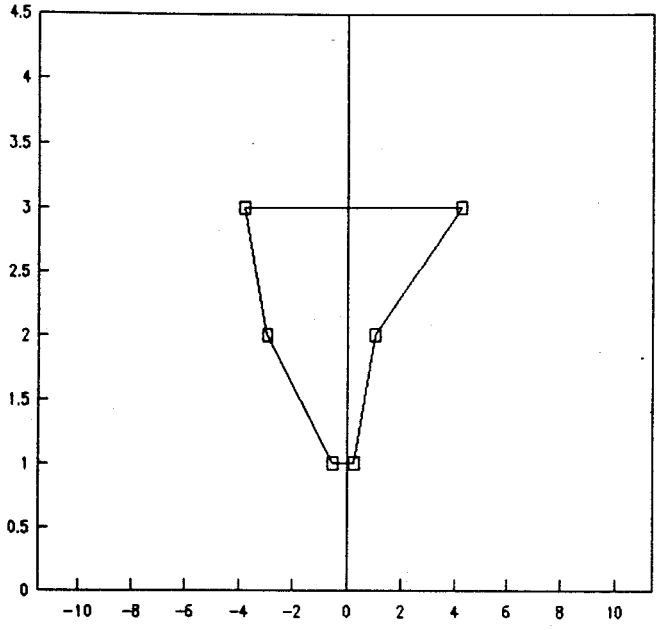
11-07-94



PRICE RIVER FORMATION

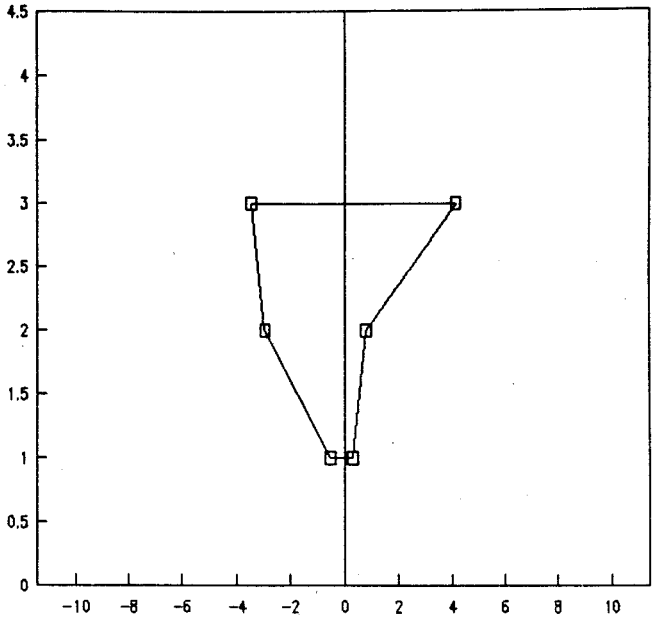
82-52

07-22-94



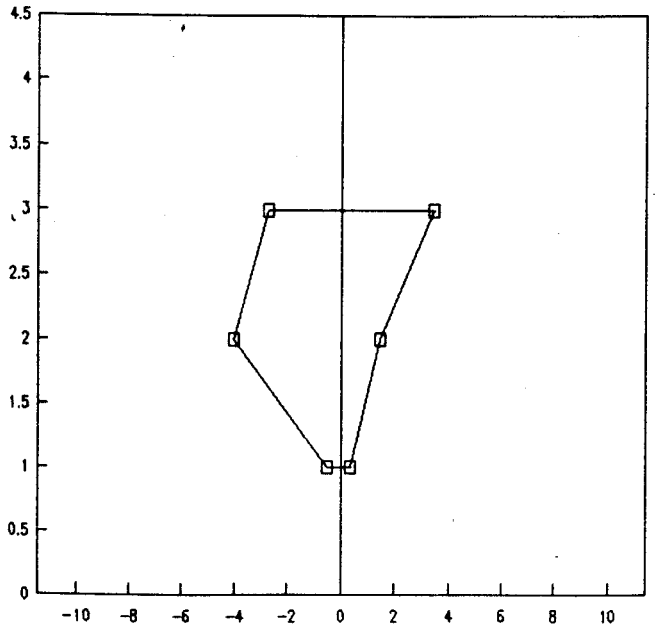
82-52

11-07-94

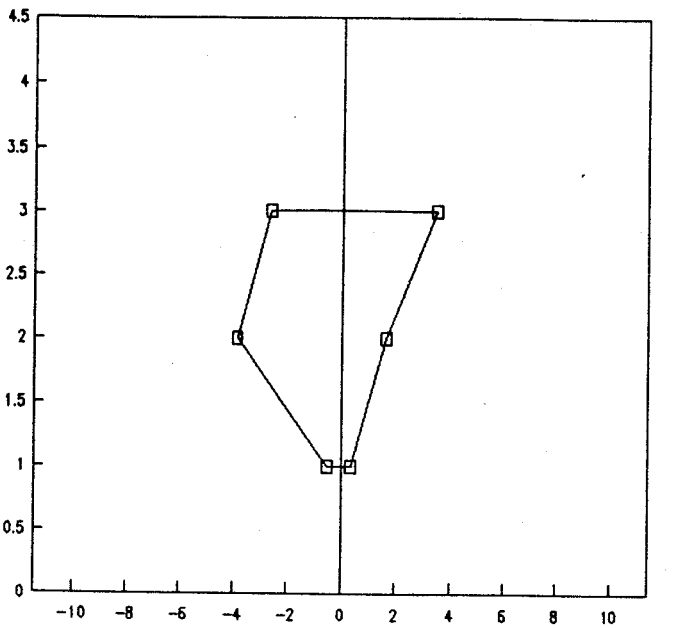


BLACKHAWK FORMATION

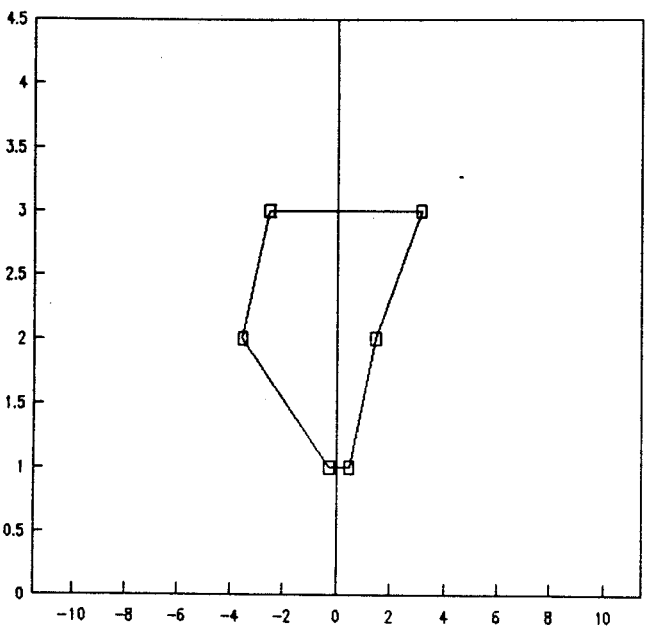
91-72
07-22-94



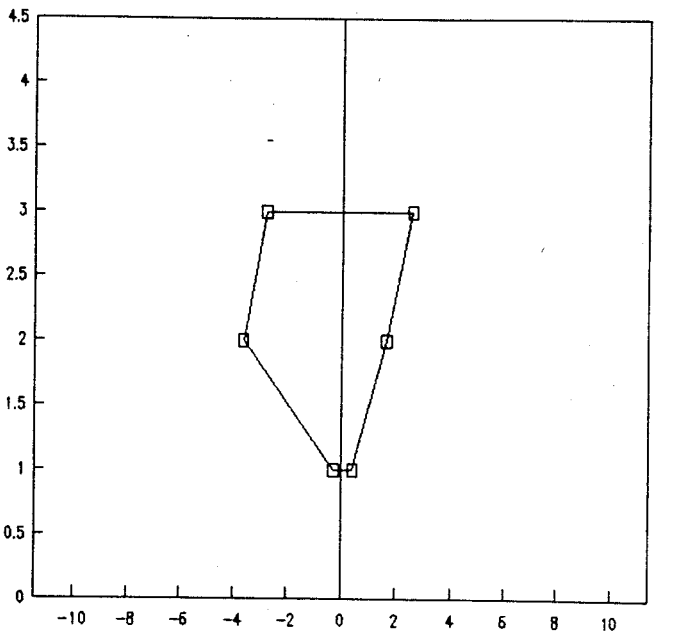
91-72
11-07-94



91-73
07-22-94



91-73
11-07-94



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FAX: (801) 653-2436

August 15, 1994

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8/15/94

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

East Springs Burnt Tree

Kind of sample reported to us: Water

Sample taken at: East Springs

Sample taken by: Energy West/KH

Date sampled: July 22, 1994

Date received: July 22, 1994

Temperature 6.0°C Flow 7.5 GPM
Rec'd 1700 hr.
Sampled 1455 hr.

FIELD MEASUREMENTS
pH 7.68
Conductivity 506

Analysis report no. 59-14288

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	339	1	mg/l as HCO_3	SM2320-B	07-25-1994 0810 [illegible]
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-25-1994 0810 [illegible]
Alkalinity, Total	278	1	mg/l as $CaCO_3$	EPA 310.1	07-25-1994 0810 LS
Anions	5.80	----	meq/l	---------	---------- ----- --
Calcium, Total	55	5	mg/l	EPA 215.1	08-11-1994 1400 DW
Cations	5.90	----	meq/l	---------	---------- ----- --
Chloride	4	1	mg/l	SM4500-Cl-B	07-27-1994 0800 LS
Conductivity	526	1	umhos/cm	SM2510-B	07-27-1994 1630 ED
Hardness, Total	265	10	mg/l as $CaCO_3$	SM2340-B	08-11-1994 1400 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	08-10-1994 1600 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130 DW
Magnesium, Total	31	2	mg/l	EPA 242.1	08-11-1994 1430 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	08-11-1994 1130 DW
Oxygen, Dissolved	6.5	----	mg/l	EPA 360.1	07-22-1994 1730 ED
pH	7.92	----	pH units	EPA 150.1	07-22-1994 1730 ED
Potassium, Total	<5	5	mg/l	EPA 258.1	08-08-1994 1715 DW
Sodium, Total	15	5	mg/l	EPA 273.1	08-08-1994 1630 DW
Solids, Total Dissolved	300	10	mg/l	EPA 160.1	07-27-1994 1515 LM
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	07-29-1994 0720 LM
Sulfate	7	1	mg/l	EPA 375.4	07-27-1994 1245 LS
Cation/Anion Balance	1.10	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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August 8, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

East Springs Elk Springs

Kind of sample reported to us Water

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

Temperature 6.2°C
Flow 46.2 GPM
Rec'd 1700 hr.
Sampled 1056 hr.

FIELD MEASUREMENTS

pH	7.75
Conductivity	428
DO	5.59

Analysis report no. 59-14279

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	296	1	mg/l as HCO_3	SM2320-B	07-24-1994 1300 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-24-1994 1300 LS
Alkalinity, Total	243	1	mg/l as $CaCO_3$	EPA 310.1	07-24-1994 1300 LS
Anions	5.00	----	meq/l	---------	---------- ----- --
Calcium, Total	58	5	mg/l	EPA 215.1	07-25-1994 1730 DW
Cations	4.80	----	meq/l	---------	---------- ----- --
Chloride	3	1	mg/l	SM4500-Cl-B	07-27-1994 0800 LS
Conductivity	458	1	umhos/cm	SM2510-B	07-27-1994 1630 ED
Hardness, Total	240	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-26-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130 DW
Magnesium, Total	23	2	mg/l	EPA 242.1	07-26-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400 DW
Oxygen, Dissolved	6.2	----	mg/l	EPA 360.1	07-22-1994 1730 ED
pH	8.15	----	pH units	EPA 150.1	07-22-1994 1730 ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300 DW
Sodium, Total	<5	5	mg/l	EPA 273.1	07-26-1994 1100 DW
Solids, Total Dissolved	250	10	mg/l	EPA 160.1	07-25-1994 0800 LM
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	07-29-1994 0720 LM
Sulfate	5	1	mg/l	EPA 375.4	07-27-1994 1245 LS
Cation/Anion Balance	-2.70	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Terry Stout

Manager, Huntington Laboratory

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August 8, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

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FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

East Springs Sheba Springs

Kind of sample reported to us Water

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

Temperature 8.8°C
Flow .9 GPM
Rec'd 1700 hr.
Sampled 0958 hr.

FIELD MEASUREMENTS	
pH	7.38
Conductivity	427
DO	10.5

Analysis report no. 59-14277

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	300	1	mg/l as HCO_3	SM2320-B	07-24-1994 1300	
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-24-1994 1300	
Alkalinity, Total	246	1	mg/l as $CaCO_3$	EPA 310.1	07-24-1994 1300	LS
Anions	5.10	----	meq/l	---------	---------- -----	--
Calcium, Total	83	5	mg/l	EPA 215.1	07-25-1994 1730	DW
Cations	5.00	----	meq/l	---------	---------- -----	--
Chloride	2	1	mg/l	SM4500-Cl-B	07-27-1994 0800	LS
Conductivity	467	1	umhos/cm	SM2510-B	07-27-1994 1630	ED
Hardness, Total	248	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-26-1994 1430	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130	DW
Magnesium, Total	10	2	mg/l	EPA 242.1	07-26-1994 0730	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400	DW
Oxygen, Dissolved	5.6	----	mg/l	EPA 360.1	07-22-1994 1730	ED
pH	7.51	----	pH units	EPA 150.1	07-22-1994 1730	ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300	DW
Sodium, Total	<5	5	mg/l	EPA 273.1	07-26-1994 1100	DW
Solids, Total Dissolved	250	10	mg/l	EPA 160.1	07-25-1994 0800	LM
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	07-29-1994 0720	LM
Sulfate	5	1	mg/l	EPA 375.4	07-24-1994 1030	LS
Cation/Anion Balance	-1.10	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout SD

Manager, Huntington Laboratory

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August 8, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

East Springs Teds Tub

Kind of sample reported to us Water

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

Temperature 12.6°C
Flow 6 GPM
Rec'd 1700 hr.
Sampled 1311 hr.

FIELD MEASUREMENTS

pH	8.52
Conductivity	498
DO	4.8

Analysis report no. 59-14274

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	342	1	mg/l as HCO_3	SM2320-B	07-24-1994 0930 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-24-1994 0930 LS
Alkalinity, Total	280	1	mg/l as $CaCO_3$	EPA 310.1	07-24-1994 0930 LS
Anions	6.00	----	meq/l	---------	---------- ----- --
Calcium, Total	69	5	mg/l	EPA 215.1	07-25-1994 1730 DW
Cations	5.90	----	meq/l	---------	---------- ----- --
Chloride	6	1	mg/l	SM4500-Cl-B	07-25-1994 0900 LS
Conductivity	532	1	umhos/cm	SM2510-B	07-27-1994 1630 ED
Hardness, Total	255	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-26-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130 DW
Magnesium, Total	20	2	mg/l	EPA 242.1	07-26-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400 DW
Oxygen, Dissolved	4.7	----	mg/l	EPA 360.1	07-22-1994 1730 ED
pH	7.87	----	pH units	EPA 150.1	07-22-1994 1730 ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300 DW
Sodium, Total	19	5	mg/l	EPA 273.1	07-26-1994 1100 DW
Solids, Total Dissolved	340	10	mg/l	EPA 160.1	07-25-1994 0800 LM
Solids, Total Suspended	12	4	mg/l	EPA 160.2	07-25-1994 1410 LM
Sulfate	12	1	mg/l	EPA 375.4	07-24-1994 1030 LS
Cation/Anion Balance	-0.90	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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August 8, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

East Springs 79-2

Kind of sample reported to us Water

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

Temperature 6.0°C
Flow 1.7 GPM
Rec'd 1700 hr.
Sampled 1430 hr.

FIELD MEASUREMENTS
pH 7.56
Conductivity 532

Analysis report no. 59-14284

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	346	1	mg/l as HCO_3	SM2320-B	07-25-1994 0810 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-25-1994 0810
Alkalinity, Total	284	1	mg/l as $CaCO_3$	EPA 310.1	07-25-1994 0810 LS
Anions	6.00	----	meq/l	---------	---------- ----- --
Calcium, Total	73	5	mg/l	EPA 215.1	07-25-1994 1730 DW
Cations	6.10	----	meq/l	---------	---------- ----- --
Chloride	3	1	mg/l	SM4500-Cl-B	07-27-1994 0800 LS
Conductivity	556	1	umhos/cm	SM2510-B	07-27-1994 1630 ED
Hardness, Total	273	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-26-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130 DW
Magnesium, Total	22	2	mg/l	EPA 242.1	07-26-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400 DW
Oxygen, Dissolved	6.0	----	mg/l	EPA 360.1	07-22-1994 1730 ED
pH	7.50	----	pH units	EPA 150.1	07-22-1994 1730 ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300 DW
Sodium, Total	15	5	mg/l	EPA 273.1	07-26-1994 1100 DW
Solids, Total Dissolved	320	10	mg/l	EPA 160.1	07-25-1994 0800 LM
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	07-29-1994 0720 LM
Sulfate	12	1	mg/l	EPA 375.4	07-27-1994 1245 LS
Cation/Anion Balance	0.80	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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August 8, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

East Springs 79-10

Kind of sample reported to us Water

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

Temperature 7.2°C
Flow 4 GPM
Rec'd 1700 hr.
Sampled 1024 hr.

FIELD MEASUREMENTS

pH	7.72
Conductivity	454
DO	7.9

Analysis report no. 59-14276

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	321	1	mg/l as HCO_3	SM2320-B	07-24-1994 0930 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-24-1994 0930 LS
Alkalinity, Total	263	1	mg/l as $CaCO_3$	EPA 310.1	07-24-1994 0930 LS
Anions	5.50	----	meq/l	---------	---------- ----- --
Calcium, Total	72	5	mg/l	EPA 215.1	07-25-1994 1730 DW
Cations	5.80	----	meq/l	---------	---------- ----- --
Chloride	5	1	mg/l	SM4500-Cl-B	07-25-1994 0900 LS
Conductivity	493	1	umhos/cm	SM2510-B	07-27-1994 1630 ED
Hardness, Total	270	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-26-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130 DW
Magnesium, Total	22	2	mg/l	EPA 242.1	07-26-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400 DW
Oxygen, Dissolved	5.5	----	mg/l	EPA 360.1	07-22-1994 1730 ED
pH	7.81	----	pH units	EPA 150.1	07-22-1994 1730 ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300 DW
Sodium, Total	8	5	mg/l	EPA 273.1	07-26-1994 1100 DW
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	07-25-1994 0800 LM
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	07-29-1994 0720 LM
Sulfate	7	1	mg/l	EPA 375.4	07-24-1994 1030 LS
Cation/Anion Balance	1.80	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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August 15, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

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FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

East Springs 79-15

Kind of sample reported to us: Water

Sample taken at: East Springs

Sample taken by: Energy West/KH

Date sampled: July 22, 1994

Date received: July 22, 1994

Temperature 9.0°C
Flow 2.0 GPM
Rec'd 1700 hr.
Sampled 1157 hr.

FIELD MEASUREMENTS
pH 7.65
Conductivity 492

Analysis report no. 59-14289

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	331	1	mg/l as HCO_3	SM2320-B	07-25-1994 0810	
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-25-1994 0810	
Alkalinity, Total	271	1	mg/l as $CaCO_3$	EPA 310.1	07-25-1994 0810	LS
Anions	5.70	----	meq/l	---------	---------- -----	--
Calcium, Total	70	5	mg/l	EPA 215.1	08-11-1994 1400	DW
Cations	6.00	----	meq/l	---------	---------- -----	--
Chloride	4	1	mg/l	SM4500-Cl-B	07-27-1994 0800	LS
Conductivity	512	1	umhos/cm	SM2510-B	07-27-1994 1630	ED
Hardness, Total	282	10	mg/l as $CaCO_3$	SM2340-B	08-11-1994 1400	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	08-10-1994 1600	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130	DW
Magnesium, Total	26	2	mg/l	EPA 242.1	08-11-1994 1430	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	08-11-1994 1130	DW
Oxygen, Dissolved	6.4	----	mg/l	EPA 360.1	07-22-1994 1730	ED
pH	7.81	----	pH units	EPA 150.1	07-22-1994 1730	ED
Potassium, Total	<5	5	mg/l	EPA 258.1	08-08-1994 1715	DW
Sodium, Total	8	5	mg/l	EPA 273.1	08-08-1994 1630	DW
Solids, Total Dissolved	290	10	mg/l	EPA 160.1	07-27-1994 1515	LM
Solids, Total Suspended	4	4	mg/l	EPA 160.2	07-29-1994 0720	LM
Sulfate	9	1	mg/l	EPA 375.4	07-27-1994 1245	LS
Cation/Anion Balance	2.20	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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August 8, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

East Springs 79-28

Kind of sample reported to us Water

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

Temperature 6.0°C
Flow 1.3 GPM
Rec'd 1700 hr.
Sampled 1326 hr.

FIELD MEASUREMENTS
pH 7.91
Conductivity 683

Analysis report no. 59-14286

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	290	1	mg/l as HCO_3	SM2320-B	07-25-1994 0810 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-25-1994 0810 LS
Alkalinity, Total	238	1	mg/l as $CaCO_3$	EPA 310.1	07-25-1994 0810 LS
Anions	7.40	----	meq/l	---------	---------- ----- --
Calcium, Total	38	5	mg/l	EPA 215.1	07-25-1994 1730 DW
Cations	7.50	----	meq/l	---------	---------- ----- --
Chloride	13	1	mg/l	SM4500-Cl-B	07-27-1994 0800 LS
Conductivity	718	1	umhos/cm	SM2510-B	07-27-1994 1630 ED
Hardness, Total	202	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-26-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130 DW
Magnesium, Total	26	2	mg/l	EPA 242.1	07-26-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400 DW
Oxygen, Dissolved	6.7	----	mg/l	EPA 360.1	07-22-1994 1730 ED
pH	7.65	----	pH units	EPA 150.1	07-22-1994 1730 ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300 DW
Sodium, Total	80	5	mg/l	EPA 273.1	07-26-1994 1100 DW
Solids, Total Dissolved	440	10	mg/l	EPA 160.1	07-27-1994 1515 LM
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	07-29-1994 0720 LM
Sulfate	110	1	mg/l	EPA 375.4	07-27-1994 1245 LS
Cation/Anion Balance	0.70	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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August 8, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

East Springs 79-29

Kind of sample reported to us Water

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

Temperature 6.0°C
Flow .71 GPM
Rec'd 1700 hr.
Sampled 1304 hr.

FIELD MEASUREMENTS

pH	7.67
Conductivity	557
DO	6.8

Analysis report no. 59-14285

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	336	1	mg/l as HCO_3	SM2320-B	07-25-1994 0810
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-25-1994 0810
Alkalinity, Total	275	1	mg/l as $CaCO_3$	EPA 310.1	07-25-1994 0810 LS
Anions	6.50	----	meq/l	---------	---------- ----- --
Calcium, Total	39	5	mg/l	EPA 215.1	07-25-1994 1730 DW
Cations	6.40	----	meq/l	---------	---------- ----- --
Chloride	16	1	mg/l	SM4500-Cl-B	07-27-1994 0800 LS
Conductivity	589	1	umhos/cm	SM2510-B	07-27-1994 1630 ED
Hardness, Total	250	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-26-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130 DW
Magnesium, Total	37	2	mg/l	EPA 242.1	07-26-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400 DW
Oxygen, Dissolved	5.8	----	mg/l	EPA 360.1	07-22-1994 1730 ED
pH	7.74	----	pH units	EPA 150.1	07-22-1994 1730 ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300 DW
Sodium, Total	32	5	mg/l	EPA 273.1	07-26-1994 1100 DW
Solids, Total Dissolved	350	10	mg/l	EPA 160.1	07-25-1994 0800 LM
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	07-29-1994 0720 LM
Sulfate	26	1	mg/l	EPA 375.4	07-27-1994 1245 LS
Cation/Anion Balance	-0.80	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Terry Mont CD

Manager, Huntington Laboratory

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PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

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FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

East Springs 79-35

Kind of sample reported to us: Water

Sample taken at: East Springs

Sample taken by: Energy West/KH

Date sampled: July 22, 1994

Date received: July 22, 1994

Temperature 7.6°C
Flow .5 GPM
Rec'd 1700 hr.
Sampled 1205 hr.

FIELD MEASUREMENTS

pH	7.89
Conductivity	424
DO	5.1

Analysis report no. 59-14273

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	301	1	mg/l as HCO_3	SM2320-B	07-24-1994 0930	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-24-1994 0930	LS
Alkalinity, Total	247	1	mg/l as $CaCO_3$	EPA 310.1	07-24-1994 0930	LS
Anions	5.30	----	meq/l	---------	----------	----- --
Calcium, Total	86	5	mg/l	EPA 215.1	07-25-1994 1730	DW
Cations	5.70	----	meq/l	---------	----------	----- --
Chloride	5	1	mg/l	SM4500-Cl-B	07-25-1994 0900	LS
Conductivity	453	1	umhos/cm	SM2510-B	07-27-1994 1630	ED
Hardness, Total	285	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730	DW
Iron, Total	1.1	0.2	mg/l	EPA 236.1	07-26-1994 1430	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130	DW
Magnesium, Total	17	2	mg/l	EPA 242.1	07-26-1994 0730	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400	DW
Oxygen, Dissolved	4.7	----	mg/l	EPA 360.1	07-30-1994 1730	ED
pH	7.74	----	pH units	EPA 150.1	07-30-1994 1730	ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300	DW
Sodium, Total	<5	5	mg/l	EPA 273.1	07-26-1994 1100	DW
Solids, Total Dissolved	260	10	mg/l	EPA 160.1	07-25-1994 0800	LM
Solids, Total Suspended	101	4	mg/l	EPA 160.2	07-25-1994 1410	LM
Sulfate	10	1	mg/l	EPA 375.4	07-24-1994 1030	LS
Cation/Anion Balance	3.70	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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August 15, 1994

PACIFICORP FIELD OFFICE
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Huntington UT 84528

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FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

East Springs Mfk& Spring 79-38

Kind of sample reported to us Water

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

Temperature 13.3°C
Flow .52 GPM
Rec'd 1700 hr.
Sampled 1402 hr.

FIELD MEASUREMENTS

pH	8.22
Conductivity	655
DO	5.1

Analysis report no. 59-14278

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	420	1	mg/l as HCO_3	SM2320-B	07-24-1994 1300	
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-24-1994 1300	LS
Alkalinity, Total	344	1	mg/l as $CaCO_3$	EPA 310.1	07-24-1994 1300	LS
Anions	7.80	----	meq/l	---------	---------- -----	--
Calcium, Total	71	5	mg/l	EPA 215.1	08-11-1994 1400	DW
Cations	8.30	----	meq/l	---------	---------- -----	--
Chloride	7	1	mg/l	SM4500-Cl-B	07-27-1994 0800	LS
Conductivity	704	1	umhos/cm	SM2510-B	07-27-1994 1130	ED
Hardness, Total	240	10	mg/l as $CaCO_3$	SM2340-B	08-11-1994 1400	DW
Iron, Total	1.0	0.2	mg/l	EPA 236.1	08-10-1994 1600	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130	DW
Magnesium, Total	25	2	mg/l	EPA 242.1	08-11-1994 1430	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	08-11-1994 1130	DW
Oxygen, Dissolved	5.5	----	mg/l	EPA 360.1	07-22-1994 1730	ED
pH	7.88	----	pH units	EPA 150.1	07-22-1994 1730	ED
Potassium, Total	<5	5	mg/l	EPA 258.1	08-08-1994 1715	DW
Sodium, Total	63	5	mg/l	EPA 273.1	08-08-1994 1630	DW
Solids, Total Dissolved	400	10	mg/l	EPA 160.1	07-25-1994 0800	LM
Solids, Total Suspended	75	4	mg/l	EPA 160.2	07-29-1994 0720	LM
Sulfate	36	1	mg/l	EPA 375.4	07-27-1994 1245	LS
Cation/Anion Balance	3.20	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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August 8, 1994

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PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

East Springs 80-47

Kind of sample reported to us Water

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

Temperature 12.0°C
Flow 2.2 GPM
Rec'd 1700 hr.
Sampled 1412 hr.

FIELD MEASUREMENTS
pH 8.08
Conductivity 536

Analysis report no. 59-14287

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	282	1	mg/l as HCO_3	SM2320-B	07-25-1994 0810 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-25-1994 0810 LS
Alkalinity, Total	302	1	mg/l as $CaCO_3$	EPA 310.1	07-25-1994 0810 LS
Anions	6.50	----	meq/l	---------	---------- ----- --
Calcium, Total	62	5	mg/l	EPA 215.1	07-25-1994 1730 DW
Cations	6.40	----	meq/l	---------	---------- ----- --
Chloride	4	1	mg/l	SM4500-Cl-B	07-27-1994 0800 LS
Conductivity	560	1	umhos/cm	SM2510-B	07-27-1994 1630 ED
Hardness, Total	282	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730 DW
Iron, Total	0.4	0.2	mg/l	EPA 236.1	07-26-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130 DW
Magnesium, Total	31	2	mg/l	EPA 242.1	07-26-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400 DW
Oxygen, Dissolved	6.4	----	mg/l	EPA 360.1	07-22-1994 1730 ED
pH	8.21	----	pH units	EPA 150.1	07-22-1994 1730 ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300 DW
Sodium, Total	17	5	mg/l	EPA 273.1	07-26-1994 1100 DW
Solids, Total Dissolved	320	10	mg/l	EPA 160.1	07-27-1994 1515 LM
Solids, Total Suspended	33	4	mg/l	EPA 160.2	07-29-1994 0720 LM
Sulfate	16	1	mg/l	EPA 375.4	07-27-1994 1245 LS
Cation/Anion Balance	-0.80	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

East Springs 82-52

Kind of sample reported to us Water

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

Temperature 6.3°C
Flow 2 GPM
Rec'd 1700 hr.
Sampled 1456 hr.

FIELD MEASUREMENTS

pH	7.38
Conductivity	677
DO	3.4

Analysis report no. 59-14275

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	426	1	mg/l as HCO_3	SM2320-B	07-24-1994 0930
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-24-1994 0930 [illegible]
Alkalinity, Total	349	1	mg/l as $CaCO_3$	EPA 310.1	07-24-1994 0930 LS
Anions	8.30	----	meq/l	---------	---------- ----- --
Calcium, Total	76	5	mg/l	EPA 215.1	07-25-1994 1730 DW
Cations	7.90	----	meq/l	---------	---------- ----- --
Chloride	9	1	mg/l	SM4500-Cl-B	07-25-1994 0900 LS
Conductivity	723	1	umhos/cm	SM2510-B	07-27-1994 1630 ED
Hardness, Total	338	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-26-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130 DW
Magnesium, Total	36	2	mg/l	EPA 242.1	07-26-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1300 DW
Oxygen, Dissolved	5.0	----	mg/l	EPA 360.1	07-30-1994 1730 ED
pH	8.66	----	pH units	EPA 150.1	07-30-1994 1730 ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300 DW
Sodium, Total	26	5	mg/l	EPA 273.1	07-26-1994 1100 DW
Solids, Total Dissolved	390	10	mg/l	EPA 160.1	07-25-1994 0800 LM
Solids, Total Suspended	7	4	mg/l	EPA 160.2	07-25-1994 1410 LM
Sulfate	50	1	mg/l	EPA 375.4	07-24-1994 1030 LS
Cation/Anion Balance	-2.40	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

East Springs 84-56

Kind of sample reported to us Water

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

Temperature 6.0°C
Flow .3 GPM
Rec'd 1700 hr.
Sampled 1349 hr.

FIELD MEASUREMENTS
pH 7.54
Conductivity 564

Analysis report no. 59-14283

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	348	1	mg/l as HCO_3	SM2320-B	07-24-1994 1300 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-24-1994 1300 LS
Alkalinity, Total	285	1	mg/l as $CaCO_3$	EPA 310.1	07-24-1994 1300 LS
Anions	6.50	----	meq/l	---------	---------- ----- --
Calcium, Total	60	5	mg/l	EPA 215.1	07-25-1994 1730 DW
Cations	6.50	----	meq/l	---------	---------- ----- --
Chloride	8	1	mg/l	SM4500-Cl-B	07-27-1994 0800 LS
Conductivity	597	1	umhos/cm	SM2510-B	07-27-1994 1630 ED
Hardness, Total	294	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-26-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130 DW
Magnesium, Total	35	2	mg/l	EPA 242.1	07-26-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400 DW
Oxygen, Dissolved	5.8	----	mg/l	EPA 360.1	07-22-1994 1730 ED
pH	7.45	----	pH units	EPA 150.1	07-22-1994 1730 ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300 DW
Sodium, Total	15	5	mg/l	EPA 273.1	07-26-1994 1100 DW
Solids, Total Dissolved	370	10	mg/l	EPA 160.1	07-25-1994 0800 LM
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	07-29-1994 0720 LM
Sulfate	27	1	mg/l	EPA 375.4	07-27-1994 1245 LS
Cation/Anion Balance	0.30	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Terry Hart ED

Manager, Huntington Laboratory

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August 8, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

East Springs 89-61

Kind of sample reported to us Water

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

Temperature 4.0°C
Flow 20.1 GPM
Rec'd 1700 hr.
Sampled 1045 hr.

FIELD MEASUREMENTS	
pH	7.50
Conductivity	506
DO	4.8

Analysis report no. 59-14280

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	354	1	mg/l as HCO_3	SM2320-B	07-24-1994 1300	
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-24-1994 1300	
Alkalinity, Total	290	1	mg/l as $CaCO_3$	EPA 310.1	07-24-1994 1300	LS
Anions	6.20	----	meq/l	---------	---------- -----	--
Calcium, Total	69	5	mg/l	EPA 215.1	07-25-1994	
Cations	6.10	----	meq/l	---------	---------- -----	--
Chloride	4	1	mg/l	SM4500-Cl-B	07-27-1994 0800	LS\
Conductivity	541	1	umhos/cm	SM2510-B	07-27-1994 1630	ED
Hardness, Total	288	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-26-1994 1430	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130	DW
Magnesium, Total	28	2	mg/l	EPA 242.1	07-26-1994 0730	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400	DW
Oxygen, Dissolved	6.0	----	mg/l	EPA 360.1	07-22-1994 1730	ED
pH	7.58	----	pH units	EPA 150.1	07-22-1994 1730	ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300	DW
Sodium, Total	7	5	mg/l	EPA 273.1	07-26-1994 1100	DW
Solids, Total Dissolved	300	10	mg/l	EPA 160.1	07-25-1994 0800	LM
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	07-29-1994 0720	LM
Sulfate	14	1	mg/l	EPA 375.4	07-27-1994 1245	LS
Cation/Anion Balance	-1.20	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout ED

Manager, Huntington Laboratory

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PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

East Springs 89-67

Kind of sample reported to us Water

Temperature 4.0°C
Flow 1.9 GPM
Rec'd 1700 hr.
Sampled 1017 hr.

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

FIELD MEASUREMENTS

pH	7.47
Conductivity	517
DO	6.3

Analysis report no. 59-14281

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	232	1	mg/l as HCO_3	SM2320-B	07-24-1994 1300 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-24-1994 1300 LS
Alkalinity, Total	272	1	mg/l as $CaCO_3$	EPA 310.1	07-24-1994 1300 LS
Anions	6.00	----	meq/l	---------	---------- ----- --
Calcium, Total	55	5	mg/l	EPA 215.1	07-25-1994 1730 DW
Cations	6.40	----	meq/l	---------	---------- ----- --
Chloride	6	1	mg/l	SM4500-Cl-B	07-27-1994 0800 LS
Conductivity	553	1	umhos/cm	SM2510-B	07-27-1994 1630 ED
Hardness, Total	281	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-26-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130 DW
Magnesium, Total	35	2	mg/l	EPA 242.1	07-26-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400 DW
Oxygen, Dissolved	5.9	----	mg/l	EPA 360.1	07-22-1994 1730 ED
pH	7.65	----	pH units	EPA 150.1	07-22-1994 1730 ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300 DW
Sodium, Total	17	5	mg/l	EPA 273.1	07-26-1994 1100 DW
Solids, Total Dissolved	290	10	mg/l	EPA 160.1	07-25-1994 0800 LM
Solids, Total Suspended	4	4	mg/l	EPA 160.2	07-29-1994 0730 LM
Sulfate	17	1	mg/l	EPA 375.4	07-27-1994 1245 LS
Cation/Anion Balance	3.30	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

East Springs 91-72

Kind of sample reported to us: Water

Sample taken at: East Springs

Sample taken by: Energy West/KH

Date sampled: July 22, 1994

Date received: July 22, 1994

Temperature 13.0°C
Flow 6.3 GPM
Rec'd 1700 hr.
Sampled 1550 hr.

FIELD MEASUREMENTS

pH	8.84
Conductivity	680
DO	~~3.0~~

Analysis report no. 59-14282

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	346	1	mg/l as HCO_3	SM2320-B	07-24-1994 1300 [illegible]
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-24-1994 1300 LS
Alkalinity, Total	284	1	mg/l as $CaCO_3$	EPA 310.1	07-24-1994 1300 LS
Anions	7.50	----	meq/l	---------	---------- ----- --
Calcium, Total	55	5	mg/l	EPA 215.1	07-25-1994 1730 DW
Cations	8.00	----	meq/l	---------	---------- ----- --
Chloride	12	1	mg/l	SM4500-Cl-B	07-27-1994 0800 LS
Conductivity	711	1	umhos/cm	SM2510-B	07-27-1994 1630 ED
Hardness, Total	339	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-26-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130 DW
Magnesium, Total	49	2	mg/l	EPA 242.1	07-26-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400 DW
Oxygen, Dissolved	7.0	----	mg/l	EPA 360.1	07-22-1994 1730 ED
pH	8.45	----	pH units	EPA 150.1	07-22-1994 1730 ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300 DW
Sodium, Total	27	5	mg/l	EPA 273.1	07-26-1994 1100 DW
Solids, Total Dissolved	450	10	mg/l	EPA 160.1	07-25-1994 0800 LM
Solids, Total Suspended	11	4	mg/l	EPA 160.2	07-29-1994 0720 LM
Sulfate	70	1	mg/l	EPA 375.4	07-27-1994 1245 LS
Cation/Anion Balance	3.10	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout SD

Manager, Huntington Laboratory

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August 8, 1994

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FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

East Springs 91-73

Kind of sample reported to us Water

Sample taken at East Springs

Sample taken by Energy West/KH

Date sampled July 22, 1994

Date received July 22, 1994

Temperature 14.1°C
Flow ~~1113~~ GPM 1.13
Rec'd 1700 hr.
Sampled 1553 hr.

FIELD MEASUREMENTS

pH	8.90
Conductivity	598
DO	3.6

Analysis report no. 59-14272

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	314	1	mg/l as HCO_3	SM2320-B	07-24-1994 0930	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	07-24-1994 0930	LS
Alkalinity, Total	257	1	mg/l as $CaCO_3$	EPA 310.1	07-24-1994 0930	LS
Anions	7.10	----	meq/l	---------	---------- -----	--
Calcium, Total	51	5	mg/l	EPA 215.1	07-25-1994 1730	DW
Cations	6.60	----	meq/l	---------	---------- -----	--
Chloride	17	1	mg/l	SM4500-Cl-B	07-25-1994 0900	LS
Conductivity	605	1	umhos/cm	SM2510-B	07-27-1994 1630	ED
Hardness, Total	304	10	mg/l as $CaCO_3$	SM2340-B	07-25-1994 1730	DW
Iron, Total	0.5	0.2	mg/l	EPA 236.1	07-26-1994 1430	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	08-05-1994 1130	DW
Magnesium, Total	43	2	mg/l	EPA 242.1	07-26-1994 0730	DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	07-26-1994 1400	DW
Oxygen, Dissolved	4.7	----	mg/l	EPA 360.1	07-22-1994 1730	ED
pH	8.50	----	pH units	EPA 150.1	07-22-1994 1730	ED
Potassium, Total	<5	5	mg/l	EPA 258.1	07-26-1994 1300	DW
Sodium, Total	13	5	mg/l	EPA 273.1	07-26-1994 1100	DW
Solids, Total Dissolved	350	10	mg/l	EPA 160.1	07-25-1994 0800	LM
Solids, Total Suspended	28	4	mg/l	EPA 160.2	07-25-1994 1410	LM
Sulfate	70	1	mg/l	EPA 375.4	07-24-1994 1030	LS
Cation/Anion Balance	-3.10	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Terry Stout

Manager, Huntington Laboratory

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September 8, 1994

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

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FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

East Mountain Springs Burnt Tree

Kind of sample reported to us Water

Sample taken at East Mountain

Sample taken by Energy West/KH

Date sampled August 25, 1994

Date received August 25, 1994

Temperature 16.0°C
Flow ~~3~~ GPM 7.0
Rec'd 1530 hr.
Sampled 1237 hr.

FIELD MEASUREMENTS

pH	7.99
Conductivity	476
DO	6.6

Analysis report no. 59-14354

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	318	1	mg/l as HCO_3	SM2320-B	08-29-1994 0845
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	08-29-1994 0845 LS
Alkalinity, Total	261	1	mg/l as $CaCO_3$	EPA 310.1	08-29-1994 0845 LS
Anions	5.60	----	meq/l	---------	---------- ----- --
Calcium, Total	55	5	mg/l	EPA 215.1	09-01-1994 1215 DW
Cations	5.90	----	meq/l	---------	---------- ----- --
Chloride	6	1	mg/l	SM4500-Cl-B	08-29-1994 1300 LS
Conductivity	504	1	umhos/cm	SM2510-B	08-26-1994 1130 ED
Hardness, Total	265	10	mg/l as $CaCO_3$	SM2340-B	09-01-1994 1215 DW
Iron, Total	0.2	0.2	mg/l	EPA 236.1	09-01-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-07-1994 0900 DW
Magnesium, Total	31	2	mg/l	EPA 242.1	09-01-1994 1459 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-01-1994 1400 DW
Oxygen, Dissolved	9.0	----	mg/l	EPA 360.1	08-25-1994 1540 LS
pH	7.66	----	pH units	EPA 150.1	08-25-1994 1620 LS
Potassium, Total	<5	5	mg/l	EPA 258.1	09-01-1994 1330 DW
Sodium, Total	15	5	mg/l	EPA 273.1	09-01-1994 1300 DW
Solids, Total Dissolved	300	10	mg/l	EPA 160.1	08-26-1994 1400 LM
Solids, Total Suspended	7	4	mg/l	EPA 160.2	08-30-1994 1100 LM
Sulfate	8	1	mg/l	EPA 375.4	09-01-1994 1030 LS
Cation/Anion Balance	3.40	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hunt

Manager, Huntington Laboratory