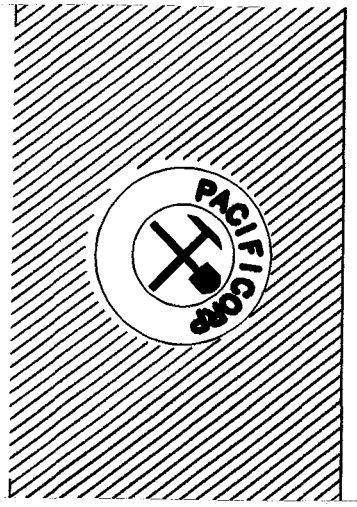
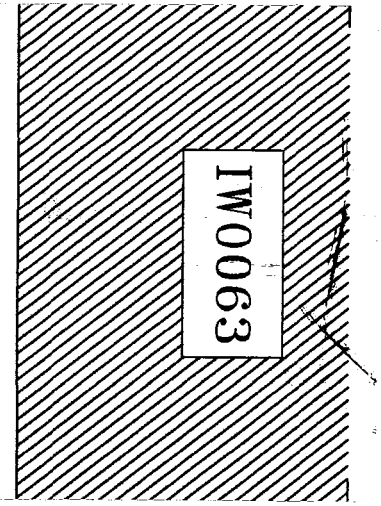


ANNUAL HYDROLOGIC MONITORING REPORT
EAST/TRAIL MOUNTAIN PROPERTIES
1993



IW0063

PACIFICORP
TECHNICAL SERVICES REPORT
CHUCK SEMBORSKI

CENTRAL ENGINEERING

ANNUAL HYDROLOGIC MONITORING REPORT
EAST/TRAIL MOUNTAIN PROPERTIES
1993

MAY 31, 1994

RECEIVED
JUN 20 1994
DIV. OF OIL, GAS & MINING

PACIFICORP - FUEL RESOURCES
HYDROLOGIC MONITORING PROGRAM
ANNUAL REPORT FOR 1993

MAY 1994

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

Prepared and submitted for PacifiCorp by:

Hydrologic Section of the Power Operations Department

and

Energy West

TABLE OF CONTENTS

List of Figures iv

List of Tables v

List of Appendices vii

List of Maps vi

I. Introduction 1

II. Climatic Observations 4

A. Regional Climatology 4

B. Local Climatology 5

1. Precipitation 5
2. Temperatures 13

III. Drainage Systems 15

A. Huntington Creek Drainage System 15
1. Huntington Creek 15
2. Deer Creek 21
a. Flow and Sampling Schedule 21
(1) Locations 21
(2) Flow 21
(3) Water and Quality Sampling 21
b. Flow Information 21
c. Quality Information 22
3. Meetinghouse Canyon Creek 22
a. Flow and Sampling Schedule 22
(1) Locations 22
(2) Flow 22
(3) Water Quality Sampling 25
b. Flow Information 25
c. Quality Information 25
4. Rilda Canyon Creek 25
a. Flow and Sampling Schedule 25
(1) Locations 25
(2) Flow 27
(3) Water Quality Sampling 27
b. Flow Information 27
c. Quality Information 28

B. Cottonwood Creek Drainage System 29
1. Cottonwood Canyon Creek 32
a. Flow and Sampling Schedule 32
(1) Locations 32
(2) Flow 32
(3) Water Quality Sampling 32
b. Flow Information 33
c. Quality Information 33
2. Grimes Wash 37
a. Flow and Sampling Schedule 37
(1) Locations 37
(2) Flow 37
(3) Water Quality Sampling 37
b. Flow Information 37
c. Quality Information 38

IV. Springs 42

A. East Mountain 42

1. Flow and Sampling Schedule 43
a. Flow 43
b. Quality Samples 43
2. Spring Flow 44
3. Quality 52

B. Rilda Canyon-North Emery Water Users Association 55

1. Spring Flow 55
2. Quality 56

C. Trail Mountain 60

1. Flow and Sampling Schedule 60
a. Flow 60
b. Quality Samples 60
2. Spring Flow 60
3. Quality 62

V. Mine Hydrology 64

A. Groundwater and
Surface Water Sources in Relation to Mine Workings 64

B. Groundwater Quality and Collection Procedures 64

C. Mine Water 65

1. Deer Creek Mine 65
   a. In-Mine Water Production 65
   b. In-Mine Quality 65
   c. Discharge Quantity 67
   d. Discharge Quality 72
2. Des-Bee-Dove Mine 74
3. Wilberg/Cottonwood Mine 74
   a. In-Mine Water Production 74
   b. In-Mine Quality 76
   c. Discharge Quantity 79
   d. Discharge Quality 79
4. Trail Mountain Mine 82
   a. In-Mine Water Production 82
   b. In-Mine Quality 82
   c. Discharge Quantity 84
   d. Discharge Quality 84

VI. Piezometric Gradient Information 85

A. Surface 85
   1. Cottonwood Canyon Creek 85
   2. Rilda Canyon 85
B. In-Mine 86
   1. Deer Creek Mine 86
   2. Cottonwood Mine 86

VII. Waste Rock Wells 88

A. Deer Creek Mine - Waste Rock Storage Facility 88

B. Cottonwood/Wilberg Mine - Waste Rock Storage Facility 89

VIII. Effects of Mining and Subsidence on Hydrology 91

IX. Summary 92

LIST OF FIGURES

Figure

1A East Mountain Location Map 2

1B Trail Mountain Location Map 3

2 East Mountain Precipitation 12

3 Spring Discharge vs. Precipitation and Temperature 50

4 NEWUA-Rilda Canyon Spring Flow 58

5 Long-Term Water Sources 66

6 Deer Creek Coal Mine Water Sump Areas 69

7 Deer Creek Mine 1993 Mine Water Discharge 71

8 Deer Creek Mine Discharge, 1/80 Through 12/93 73

9 Wilberg/Cottonwood Mine Water Sump Areas 75

10 Wilberg/Cottonwood Mine Discharge 4/79 Through 12/93 77

11 Wilberg/Cottonwood 1993 Mine Water Discharge 81

12 Deer Creek Mine Piezometric Study
In-Mine Water Well Elevations 87

LIST OF TABLES

1	Precipitation in Emery County, Utah (1993 Water Year)	6
2	Comparison of 1992 and 1993 Precipitation (Inches)	5
3	Hunter Plant Precipitation	8
4	Huntington Plant Precipitation	9
5	Electric Lake Precipitation	10
6	East Mountain Precipitation	11
7	Temperatures in Emery County, Utah (1993 Water Year)	14
8	Comparison of 1992 and 1993 Temperatures	13
9	Huntington Creek Water Flows (1993 Water Year)	16
10	Comparison of 1992 and 1993 Runoff Values	17
11	Huntington Creek Water Quality - HCC01	18
12	Huntington Creek Water Quality - HCC02	19
13	Huntington Creek Water Quality - HCC04	20
14	Deer Creek Surface Water Quality Above the Mine	23
15	Deer Creek Surface Water Quality Below the Mine	24
16	Meetinghouse Canyon Water Quality	26
17	Rilda Canyon Surface Water Quality - RCF1	29
18	Rilda Canyon Surface Water Quality - RCF3	30
19	Rilda Canyon Surface Water Quality - RCW4	31
20	Cottonwood Canyon Creek Water Quality - SW-1	34
21	Cottonwood Canyon Creek Water Quality - SW2	35
23	Cottonwood Canyon Creek Water Quality - SW-3	36
23	Grimes Wash Surface Quality Right Fork	39
24	Grimes Wash Surface Quality Left Fork	40
25	Grimes Wash Surface Quality Below Mine	41
26A	East Mountain Springs Discharge	45
26B	East Mountain Springs Discharge	46
27	Yearly Spring Discharge Variations (GPM)	47

28	Modes of Occurrence - East Mountain Springs	48
29	Temperature Comparison	49
30	East Mountain Regression Study (Flow/Temperature)	52
31	East Mountain Springs Water Quality (Historical to 1993)	54
32	NEWUA-Rilda Canyon Spring Flow (GPM)	56
33	NEWUA-Rilda Canyon Water Quality	59
34	Trail Mountain Springs Discharge	61
35	Trail Mountain Yearly Spring Discharge Variations (GPM)	61
36	Trail Mountain Springs Water Quality Historical vs. 1993)	63
37	Deer Creek In-Mine Water Quality - 1993	68
38	Deer Creek Mine - Discharge Water Quality	74
39	Wilberg/Cottonwood In-Mine Water Quality - 1993	78
40	Wilberg/Cottonwood Discharge Water Quality	80
41	Trail Mountain In-Mine Water Quality	83
42	Waste Rock Storage Facilities - Water Quality - 1993	90

LIST OF APPENDICES

Appendix	
A	Huntington Creek Stream Flows/Water Quality
B	Deer Creek Surface Water Flow and Quality
C	Meetinghouse Canyon Creek Water Flow and Quality
D	Rilda Canyon Creek Water Flow and Quality
E	Cottonwood Canyon Creek (Includes T-19)
F	Grimes Wash Water Flow and Quality
G	East Mountain Springs Cation-Anion Diagrams/Flow and Quality
H	Trail Mountain Springs Cation-Anion Diagrams/Flow and Quality
I	Deer Creek In-Mine Water Quality
J	Deer Creek Mine Discharge Water Quality
K	Wilberg Mine In-Mine Water Quality
L	Wilberg Mine Discharge-Grimes Wash and Miller Canyon Water Quality
M	Trail Mountain Mine In-Mine Water Quality
N	Trail Mountain Mine Discharge (Includes T-18)
O	Well Information
P	Field Data
Q	Water Monitoring Plan

LIST OF MAPS

(Located in Map Pockets)

Map No.	
1	East Mountain Water Monitoring Stations
2	Deer Creek Mine - In-Mine Sampling Locations
3	Wilberg Mine - In-Mine Sampling Locations
4	East Mountain Spring Map
5	Spring Map with 5-Year Mine Plan Overlay and Subsidence Zones
6	Trail Mountain - In-Mine Sampling Locations
7	Trail Mountain Spring Map with Surface Monitoring Sites

I. INTRODUCTION

The 1993 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 sixteenth 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.

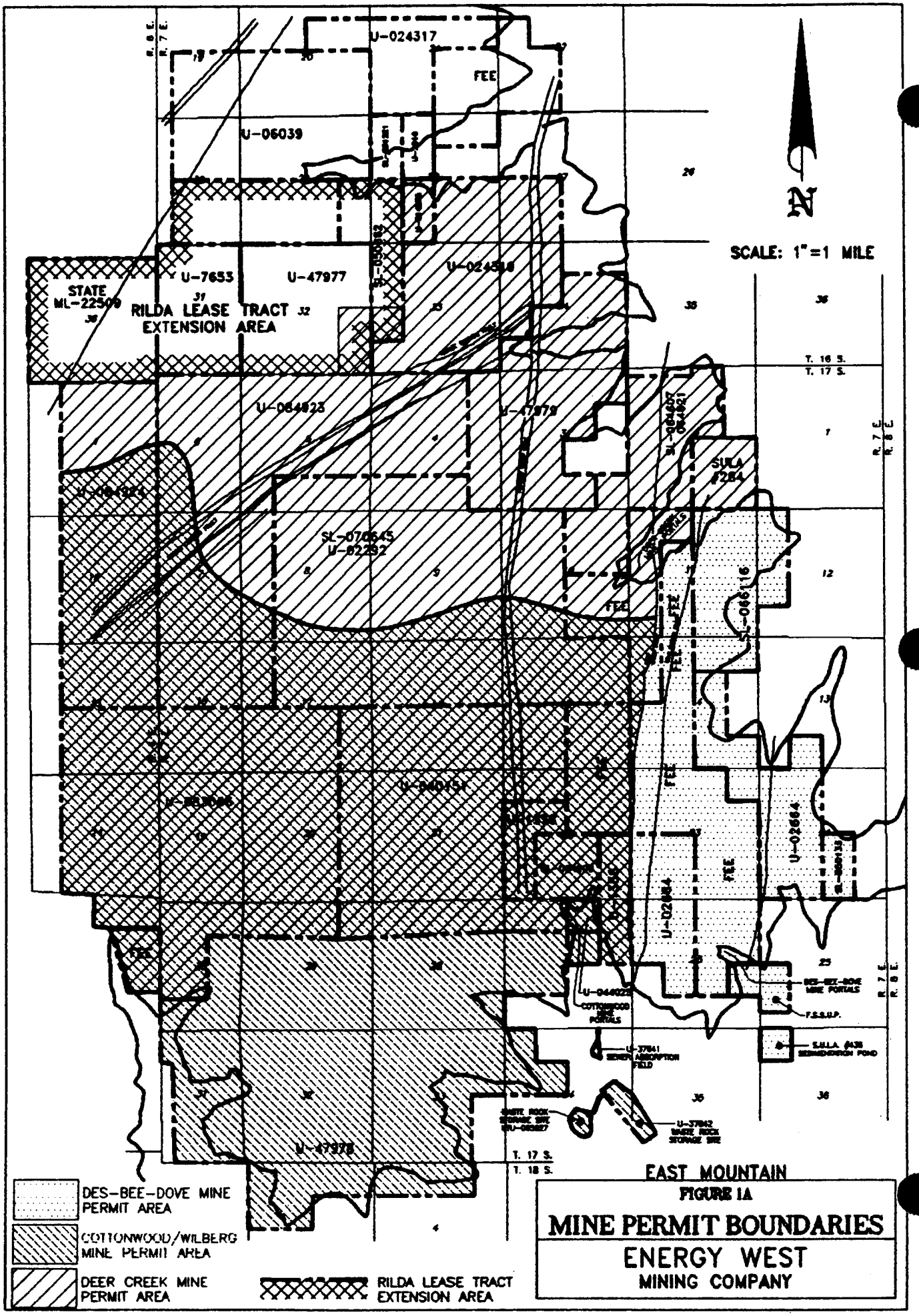
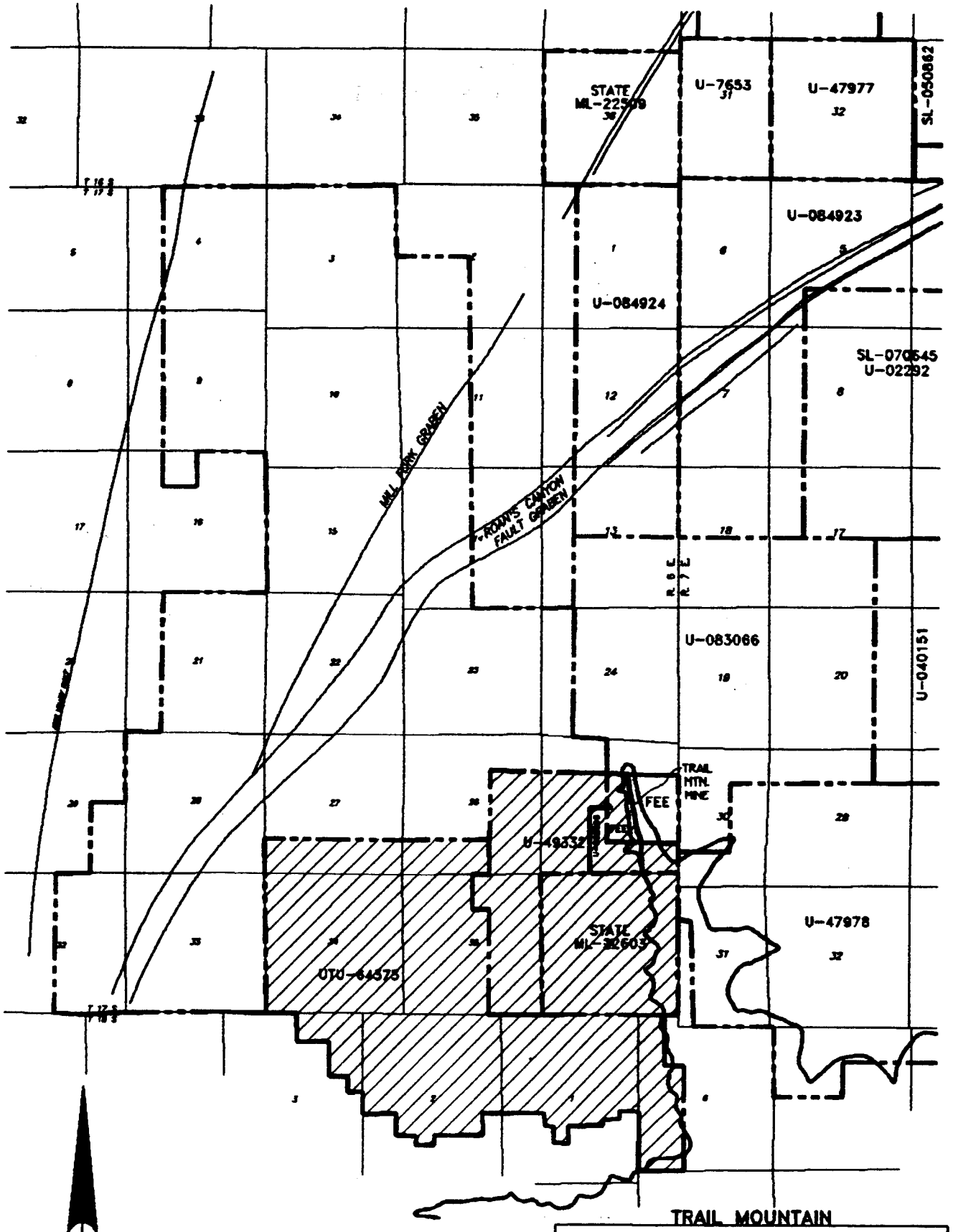


FIGURE 1A

MINE PERMIT BOUNDARIES

ENERGY WEST
MINING COMPANY



TRAIL MOUNTAIN

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.

B. Local Climatology

1. Precipitation

Valley precipitation in Emery County during 1993 was generally above average. The mountains in the San Rafael Basin received above normal snowfall during the 1991-92 winter and precipitation at Hunter and Huntington plants was above normal as well.

Precipitation amounts recorded at Hunter Plant, Huntington Plant, Electric Lake, and East Mountain for the 1993 water year (October 1992 to September 1993) 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 1992 and 1993 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 1992-1993 precipitation levels recorded at the four locations.

TABLE 2: COMPARISON OF 1992 AND 1993 PRECIPITATION (Inches)

Station	1992 Amount	1992 % of Normal	1993 Amount	1993 % of Normal	1993 As % of 1992
Hunter Plant	9.90	142	8.55	123	86
Huntington Plant	15.78	211	14.16	189	90
Electric Lake	15.63	80	27.32	139	175
East Mountain	11.74	85	12.69	91	108
Average %		129		114	115

Table 2 indicates that 1993 precipitation was higher than 1992 at Electric Lake and East Mountain and lower at and Hunter plants. The overall

TABLE 1: PRECIPITATION IN EMERY COUNTY, UTAH (1993 Water Year)

Month	Hunter Plant (Elev. 5800') Precip (in.)	Hunter Plant (Elev. 5800') % Of Normal	Huntington Plant (Elev. 6500') Precip (in.)	Huntington Plant (Elev. 6500') % Of Normal	Electric Lake (Elev. 8350') Precip. (in.)	Electric Lake (Elev. 8350') % Of Normal	East Mountain (Elev. 8985') Precip. (in.)	East Mountain (Elev. 8985') % of Normal
1992								
October	0.81	104	1.93	154	1.51	71	1.57	124
November	0.07	14	1.02	173	1.33	72	0.57	51
December	0.78	144	1.67	355	3.60	124	1.53	156
1993								
January	1.44	334	2.32	437	5.01	248	4.10	345
February	1.67	407	1.71	502	4.76	274	2.34	211
March	1.18	281	1.87	302	2.25	118	2.01	114
April	0.50	116	0.46	84	2.49	148	0.33	41
May	0.92	156	0.65	114	2.40	161	0.72	74
June	0.15	33	0.31	76	1.57	194	0.19	37
July	0.05	9	0.08	8	0.48	41	0.04	3
August	0.93	92	1.68	247	1.32	155	0.82	54
September	0.05	7	0.46	87	0.60	57	0.14	10
TOTALS	8.55	123	14.16	189	27.32	139	14.37	104
Mean Monthly	0.71	---	1.18	---	2.28	---	1.20	---

precipitation at the four stations averaged fifteen percent (15%) higher in 1993 than in 1992.

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 1993 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

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

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

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

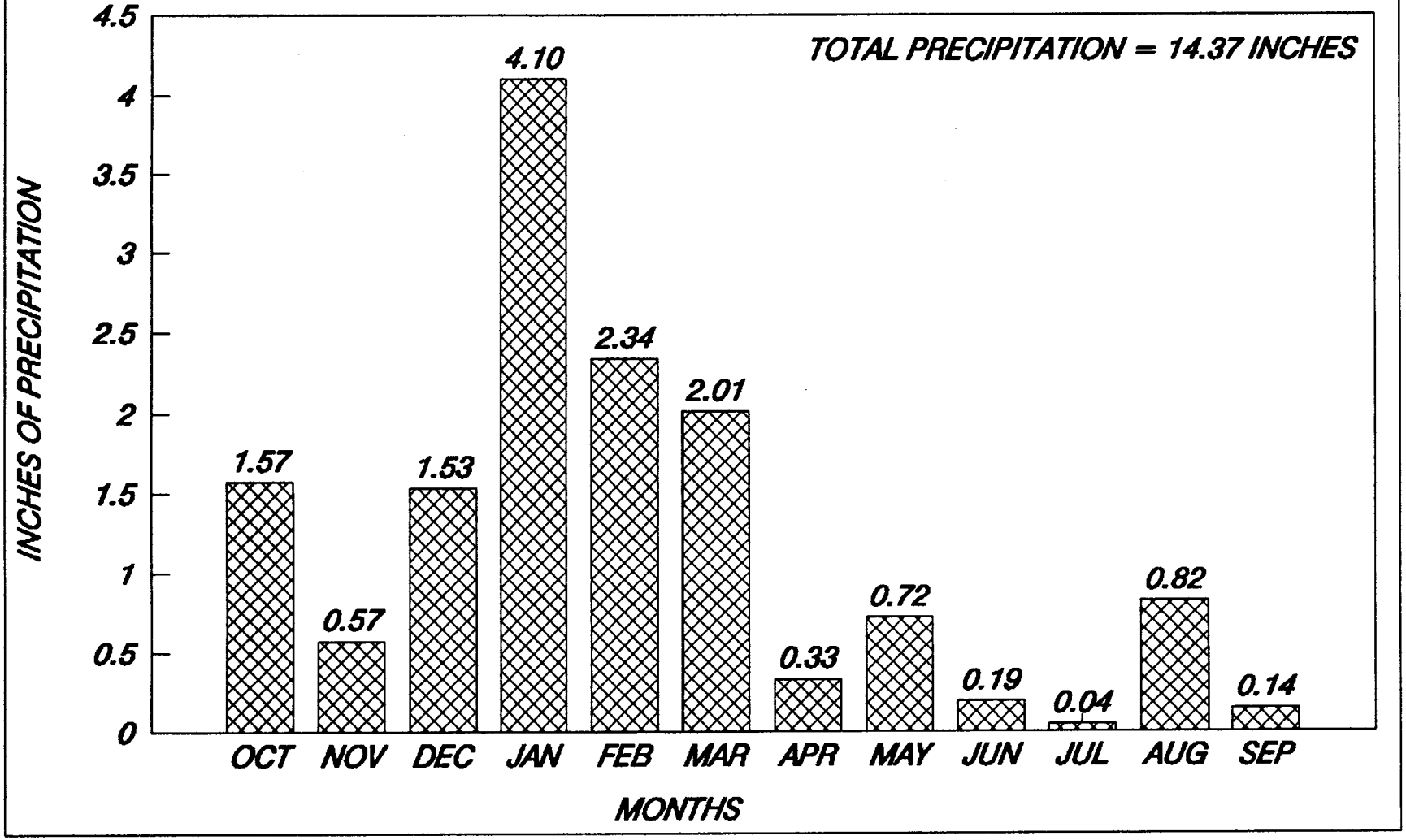
Elevation - 8,985 Feet

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

FIGURE 2

EAST MOUNTAIN PRECIPITATION

1993 WATER YEAR



2. Temperatures

During the 1993 water year temperatures were above normal at Hunter and below normal for the other stations. Temperatures at the Hunter Plant station were above normal for all months except November and December. At the East Mountain station temperatures were above normal during October, March, May, and September, while the rest of the year was below normal. Temperatures at the Electric Lake station fluctuated from above normal during the winter to below normal during the summer. (See Table 7.)

A comparison of 1992 and 1993 temperatures for the four stations is addressed since temperatures also influence water supplies from year to year. Table 8 depicts the variation and compares 1992 to 1993.

TABLE 8: COMPARISON OF 1992 AND 1993 TEMPERATURES*

	1992		1993		1993
Station	Average Temp.	Departure From Normal	Average Temp.	Departure From Normal	Departure From 1992
Hunter Plant	51.4	+5.5	49.6	+3.7	-1.8
Huntington Plant	48.2	+0.6	45.6	-2.0	-2.6
Electric Lake	37.0	+4.3	33.2	-0.7	-5.0
East Mountain	40.1	+1.0	38.5	-1.2	-1.6
Average Departure From Normal		+2.9		-0.1	-2.8

* Temperatures reported in degrees Fahrenheit.

TABLE 7: TEMPERATURES IN EMERY COUNTY, UTAH (1993 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
1992								
October	55.9	+7.5	52.9	+3.5	N/A	N/A	45.0	+6.1
November	34.1	-1.1	30.7	-5.3	N/A	N/A	22.6	-5.3
December	21.6	-5.1	20.9	-6.5	2.5	-13.3	14.2	-6.3
1993								
January	25.0	+0.9	22.8	-0.8	17.3	+2.7	17.6	-3.8
February	28.9	+0.5	25.9	-4.3	16.4	-2.9	20.4	-3.5
March	43.0	+7.2	37.2	-0.5	24.4	+3.6	32.0	+4.2
April	49.0	+4.4	43.1	-2.0	28.8	+0.1	33.9	-2.2
May	61.0	+8.9	56.5	+1.6	41.8	+2.8	47.3	+4.1
June	67.2	+5.8	61.7	-4.1	46.4	-2.2	50.7	-3.9
July	74.1	+5.7	68.0	-3.7	52.9	-2.8	59.5	-1.7
August	71.9	+5.5	67.0	-2.4	53.8	0.0	56.4	-4.2
September	63.5	+4.8	60.4	0.0	47.0	-0.5	53.3	+1.7
TOTALS	49.6	+3.7	45.6	-2.0	33.2	-0.7	37.7	-1.2

* 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 1993 water year (October 1992 - September 1993) at the two stations plus the calculated natural flow and Electric Lake storage are found in Appendix A.

TABLE 9: HUNTINGTON CREEK WATER FLOWS (1993 Water Year)

	Huntington Creek Below Electric Lake	Huntington Creek At Plant	Calc. Natural Flow at Plant
Total Yearly Flow (Acre Feet)	12,640	52,130	70,566
% of Normal	58	76	101
Mean Discharge in Cubic Feet Per Second (CFS)	17.5	72	
Maximum Discharge (CFS)	191	629	
Date of Maximum Discharge	9/21/93	5/21/93	
Minimum Discharge (CFS)	1.7	3.0	
Date of Minimum Discharge	6/30/93	2/3/93	

*Influenced by upstream storage in Electric Lake.

During the 1993 spring runoff period (April through July) 12,996 acre feet of water were impounded behind Electric Lake Dam. During spring runoff the impoundment reached its highest level on July 3. Total storage on that date amounted to 22,623 acre feet, which is 8,641 acre feet below full. Reservoir releases for fishery, irrigation, and Huntington Plant needs during the water year totaled 12,640 acre feet. The total flow of 52,130 acre feet recorded for Huntington Creek at the Huntington Plant is equal to 76% of normal.

A comparison of runoff values from 1992 and 1993 is presented in Table 10.

TABLE 10: COMPARISON OF 1993 AND 1992 RUNOFF VALUES

	1993		1992		
	Amount	% Of Normal	Amount	% Of Normal	1993 as a % of 1992
Spring Runoff Stored in Electric Lake (Acre Feet)	12,916	128	1,430	14	903
Calculated Natural Flow at Plant (Acre Feet)	70,566	101	39,954	57	177

During 1993 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

1993 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
1-15	0.0	235	76.4	6.0	20.0	423	6.7	275	0.15	0.20	20.52	0.00	0.0	7.95	0.00	7.20	60.0	6.0	252	0.00
2-26	0.0	250	58.4	0.0	1.0	448	8.2	245	0.17	0.58	24.00	0.06	0.0	8.72	0.00	13.50	30.0	30.0	266	0.00
3-17	0.0	233	56.2	0.0	17.8	449	8.4	246	0.07	0.17	25.60	0.00	<5.0	8.00	0.40	19.60	36.0	19.0	330	0.00
4-22	3.0	240	56.4	0.0	13.1	439	5.7	236	0.08	1.01	23.10	0.08	0.0	7.80	0.01	10.40	35.0	40.0	264	0.00
5-13	2.0	197	56.1	<1.0	7.7	329	7.2	210	0.12	1.95	16.90	0.10	1.5	7.84	0.00	4.10	22.0	95.0	190	0.70
6-11	0.0	202	49.8	0.0	6.1	355	6.7	181	0.12	0.17	13.70	<0.03	0.2	8.63	<0.10	3.20	17.0	17.0	194	<0.50
7-16	0.0	181	50.6	0.0	6.7	309	7.4	168	<0.05	0.17	10.20	<0.03	0.4	8.71	1.40	2.40	12.0	12.0	181	<0.50
8-23	0.0	159	38.4	5.0	6.8	323	9.3	141	0.25	0.10	11.00	0.05	<1.0	8.75	1.00	1.00	3.0	25.0	200	<0.50
9-20	2.0	168	32.7	0.0	10.5	640	3.9	119	0.08	0.41	9.00	0.04	0.0	8.77	1.00	15.70	13.0	22.0	164	<0.50
10-22	0.0	253	42.0	<1.0	10.0	412	10.5	200	<0.20	<0.20	23.00	0.20	1.0	8.31	<2.00	3.00	34.0	10.0	246	<0.50
11-22	0.0	195	51.0	<1.0	8.0	387	4.3	206	<0.20	0.30	19.00	<0.18	<5.0	9.17	2.00	4.00	24.0	9.0	228	<0.50
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
No. of Analyses	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
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 1990-1992																				
MIN	1.0	183	40.3	0.1	5.0	210	5.8	177	0.01	0.01	11.30	0.01	0.1	7.10	0.01	1.20	5.0	1.0	134	0.01
MAX	25.0	400	102.6	6.0	45.0	510	10.5	392	0.20	0.33	44.70	0.07	3.9	8.90	4.52	55.00	130.0	85.0	369	1.00
MEAN	2.8	242	66.5	1.3	19.0	383	8.3	252	0.04	0.10	20.97	0.02	1.2	8.30	0.81	8.98	40.6	10.7	235	0.36
No. of Analyses	30	32	32	32	31	42	42	32	31	31	32	31	30	42	30	32	32	41	42	39

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

TABLE 12: HUNTINGTON CREEK WATER QUALITY *

HCC02 - @ POWER PLANT (BELOW DEER CREEK CONFLUENCE)

1993 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
1-15	0.0	237	78.1	6.0	35.0	484	7.2	288	0.11	0.11	22.70	0.00	0.0	8.31	0.00	16.7	39.0	8.0	346	0.0
2-26	0.0	245	47.8	0.0	1.3	532	7.8	214	0.15	0.55	23.00	0.05	0.0	8.71	0.00	20.5	40.0	21.0	342	0.0
3-17	0.0	250	55.3	0.0	34.4	535	7.0	240	0.09	0.16	24.80	0.00	0.3	8.89	1.00	20.5	50.0	14.0	361	0.0
4-22	0.0	237	58.7	0.0	17.6	466	4.8	237	0.10	1.16	21.90	0.06	0.7	8.45	0.70	12.3	50.0	42.0	282	0.0
5-13	0.0	167	57.1	<1.0	8.0	343	6.7	209	0.12	2.00	16.10	0.10	2.5	8.24	0.00	6.0	25.0	98.0	212	0.6
6-11	0.0	220	57.4	0.0	7.5	366	6.5	203	0.14	0.19	14.40	<0.03	0.8	8.55	1.30	5.0	17.0	16.0	198	<0.5
7-16	0.0	172	58.8	0.0	7.4	318	7.0	190	<0.05	0.32	10.60	<0.03	0.7	8.77	1.10	3.4	15.0	19.0	188	<0.5
8-23	0.0	151	32.0	5.0	8.4	320	3.3	129	0.05	0.28	12.00	0.05	<0.5	8.65	0.78	4.4	4.0	28.0	190	<0.5
9-20	<1.0	164	45.4	<1.0	8.5	280	3.1	146	<0.05	0.35	8.00	<0.03	<1.0	8.92	1.00	3.7	14.0	16.0	161	<0.5
10-22	0.0	242	52.0	<1.0	12.0	424	8.2	245	<0.20	<0.20	28.00	0.20	<1.0	8.94	<2.00	23.0	33.0	11.0	262	<0.5
11-22	0.0	188	50.0	<1.0	11.0	413	2.9	203	<0.20	0.30	19.00	<0.10	<5.0	8.96	4.00	7.0	26.0	11.0	252	<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
No. of Analyses	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
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
No. of Analyses	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
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
No. of Analyses	11	12	12	12	12	14	14	12	12	12	12	12	12	14	12	12	12	14	14	14
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
No. of Analyses	7	7	7	7	7	15	15	7	7	7	7	7	7	15	7	7	7	15	15	15
HISTORICAL 1990-1992																				
MIN	1.0	183	40.1	0.1	5.0	210	4.9	179	0.01	0.01	8.40	0.01	0.1	7.50	0.01	1.52	14.0	1.0	174	0.01
MAX	33.0	310	91.7	7.0	45.0	700	10.3	365	0.21	0.41	39.90	0.07	5.1	8.97	4.90	22.94	150.0	77.0	425	1.00
MEAN	3.9	246	69.6	1.3	20.8	444	8.1	272	0.05	0.12	23.96	0.02	1.2	8.33	1.16	10.78	59.0	12.6	279	0.36
No. of Analyses	28	31	31	31	31	41	41	31	30	30	31	29	29	41	27	31	31	41	41	38

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

TABLE 13: HUNTINGTON CREEK WATER QUALITY *

HCC04 - @ RESEARCH FARM

1993 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
1-15	0.0	250	82.3	6.0	30.0	542	7.1	306	0.14	0.14	24.30	0.00	0.0	7.82	0.00	22.20	100.0	11.0	335	0.00
2-26	6.0	269	69.9	0.0	61.2	729	6.8	310	0.37	0.90	33.00	0.06	0.0	8.80	0.00	41.80	110.0	32.0	436	0.00
3-17	0.0	251	59.1	0.0	38.2	622	6.8	268	0.10	0.22	29.20	0.00	0.0	8.58	1.10	58.60	100.0	15.0	429	0.00
4-22	2.0	237	62.9	0.0	20.7	507	4.9	258	0.11	1.59	24.40	0.07	0.0	8.90	0.03	14.40	70.0	80.0	318	0.00
5-13	2.0	198	62.4	<1.0	8.9	358	6.3	234	0.17	2.46	19.10	0.10	2.0	8.47	0.00	6.30	31.0	58.0	209	0.70
6-11	0.0	213	50.2	0.0	8.7	379	6.5	177	0.11	0.16	12.50	<0.03	0.4	8.13	<0.10	4.60	26.0	9.0	196	<0.50
7-16	0.0	193	45.9	0.0	8.8	332	7.6	155	<0.05	0.23	9.90	<0.03	1.0	8.88	1.10	4.60	17.0	23.0	185	<0.50
8-23	0.0	169	35.3	6.0	9.4	340	2.2	203	0.09	0.43	28.00	0.05	0.0	8.78	1.00	6.20	23.0	30.0	208	<0.50
9-20	0.0	130	40.2	5.0	8.5	297	2.8	149	<0.05	0.49	12.00	0.04	0.0	8.97	1.00	5.30	17.0	15.0	170	<0.50
10-22	0.0	259	56.0	<1.0	18.0	474	6.0	272	<0.20	<0.20	32.00	0.20	0.0	8.96	<2.00	7.00	50.0	0.0	305	<0.50
11-22	0.0	195	63.0	<1.0	22.0	502	3.1	260	<0.20	0.40	25.00	<0.10	<5.0	8.97	5.00	12.00	70.0	15.0	344	<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
NO. OF ANALYSES	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
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
NO. OF ANALYSES	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
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
NO. OF ANALYSES	7	7	7	7	7	15	15	7	7	7	7	7	7	15	7	7	7	15	15	15
HISTORICAL 1990-1992																				
MIN	0.1	181	40.4	0.1	10.0	220	4.3	163	0.01	0.01	12.80	0.01	0.1	7.35	0.01	3.79	17.0	1.0	182	0.01
MAX	25.0	326	108.1	10.0	45.0	762	10.0	397	0.19	1.12	42.00	0.08	2.8	8.89	10.70	33.35	170.0	82.0	469	1.00
MEAN	2.4	251	71.3	1.3	21.1	465	8.0	283	0.05	0.16	25.61	0.02	0.8	8.34	1.43	14.12	76.1	14.1	311	0.37
NO. OF ANALYSES	28	31	31	31	31	41	41	31	30	30	31	29	27	41	28	31	31	41	41	38

* 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 1994; 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 1993 and 1988-1992 has been generated for each location. (See Appendix B.) Deer Creek stream above the mine was observed to flow from May to October. Deer Creek drainage did receive flow below Deer Creek Mine until the month of November as a result of the temporary mine discharge Bypass Agreement granted by the State Department of Health. The quantity and quality of water discharge and impacts to the receiving streams (Deer Creek and Huntington

Creek) will be discussed in the Deer Creek Discharge section of this report. Both locations and schedules for hydrologic monitoring were updated in 1991 to reflect the Bypass Agreement (see Appendix Q).

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. For location Deer Creek Above Mine (DCR01) flow only occurred from May through October. Samples were collected and analyzed at two locations below the mine (DCR04 and DCR06) in accordance with the Bypass Agreement. 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.

TABLE 14: DEER CREEK SURFACE WATER QUALITY *

DCR01 ABOVE THE MINE

1993 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
5-13	0.0	373	94.2	<1.0	5.6	484	8.9	343	0.14	8.10	26.20	0.14	1.3	8.26	1.70	30.20	36.0	317	27.0	1.3
6-11	0.0	263	75.5	0.0	6.2	497	8.6	301	0.18	0.11	27.20	<0.03	0.1	8.62	2.20	25.00	100.0	284	31.0	<0.5
7-16	0.0	291	54.9	0.0	8.4	516	7.2	217	<0.05	0.39	19.30	<0.03	0.0	8.71	1.70	31.30	36.0	312	2.0	<0.5
8-23	0.0	241	36.0	9.0	8.4	537	9.9	193	0.13	0.24	25.00	0.03	<0.5	8.65	0.94	29.50	45.0	346	16.0	<0.5
9-20	2.0	336	45.3	0.0	9.0	557	11.0	257	0.35	0.07	35.00	<0.03	0.0	8.73	1.00	45.70	50.0	364	1.0	<0.5
10-22	0.0	342	48.0	<1.0	8.0	580	22.0	272	<0.20	<0.20	37.00	0.20	0.0	8.69	<2.00	20.00	60.0	377	1.0	<0.5
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 1978-1992																				
MIN	0.1	262	2.2	0.1	3.5	360	5.3	225	0.01	0.01	24.8	<0.01	<0.5	7.0	0.01	13.4	10.0	231	<0.5	0.01
MAX	137.0	397	107.2	8.0	176.0	1580	10.2	599	0.09	40.10	83.9	0.24	2.6	8.5	4.33	111.6	255.0	897	3592.0	1.0
MEAN	14.6	311	59.6	1.5	28.4	601	8.0	318	0.05	0.81	39.8	0.04	0.9	7.9	1.20	30.3	72.8	351	111.7	0.25
NO. OF ANALYSES	20	20	20	20	21	60	21	20	13	61	20	59	21	61	19	20	22	61	61	19

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

TABLE 15: DEER CREEK SURFACE WATER QUALITY *

DCR06 BELOW THE MINE

1993 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
1-15	0.0	314	89.2	9.0	115.0	1090	6.4	483	0.06	0.06	63.20	0.00	0.0	8.59	2.70	115.00	190.0	766	6.0	0.00
2-26	0.0	340	72.2	8.0	205.0	1360	8.6	407	0.04	0.19	55.00	0.02	0.0	8.14	10.30	138.00	180.0	862	5.0	0.00
3-17	0.0	309	75.1	0.0	135.3	1010	7.9	450	0.30	0.43	63.70	0.00	<1.0	8.81	8.20	111.50	190.0	730	42.0	0.00
4-22	0.0	347	79.3	0.0	89.2	1020	6.9	388	0.13	0.21	46.10	0.06	1.3	8.65	6.80	68.30	180.0	712	9.0	0.00
5-13	0.0	431	95.3	<1.0	49.2	803	5.8	410	0.13	2.70	41.80	0.07	1.7	8.79	2.90	48.20	150.0	485	200.0	1.00
6-11	0.0	274	51.2	0.0	39.5	724	6.1	278	0.14	0.15	36.50	<0.03	0.3	8.52	2.20	38.90	90.0	413	8.0	<0.50
7-16	0.0	283	53.0	0.0	35.4	732	7.5	323	<0.05	0.16	46.40	<0.03	0.0	8.80	4.20	40.10	140.0	494	4.0	<0.50
8-23	0.0	274	38.2	7.0	64.0	830	4.6	260	0.21	0.31	40.00	<0.03	<0.5	8.64	4.00	50.00	140.0	536	36.0	<0.50
9-20	<1.0	311	58.7	<1.0	55.0	851	5.0	287	<0.05	0.11	34.00	<0.03	<1.0	8.82	5.00	34.00	190.0	543	1.0	<0.50
10-22	0.0	308	62.0	<1.0	68.0	841	10.2	377	<0.20	<0.20	54.00	0.10	<1.0	8.52	3.00	34.00	160.0	557	7.0	<0.50
11-22	0.0	279	78.0	<1.0	89.0	993	6.6	462	<0.20	0.50	65.00	<0.10	<5.0	8.95	5.00	80.00	170.0	724	20.0	<0.50
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 1978-1992																				
MIN	0.1	162	2.4	0.1	5.0	420	5.4	278	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	9.23	272.80	610.0	1544	20540.0	2.30
MEAN	7.6	318	88.6	1.4	77.2	995	7.8	465	0.12	2.29	56.94	0.04	1.3	8.14	4.84	70.74	209.6	624	268.2	0.43
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.

(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 1994, 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.

b. Flow Information

A hydrograph comparing 1993 and 1988-1992 can be found in Appendix C. Peak flow occurred during the month of June at a rate of 1639 GPM. Base flow of 0.0 GPM existed during the months of January through April and November through December.

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 1989-1993 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*

TABLE 16: MEETINGHOUSE CANYON WATER QUALITY *

LEFT FORK

1993 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
6-11	0.0	254	65.8	0.0	4.6	394	4.4	242	0.07	0.27	18.9	<0.03	0.1	8.3	<0.10	4.8	14.0	219	32.0	<0.5
9-28	0.0	256	39.0	<1.0	5.0	395	7.5	217	<0.05	0.10	29.0	<0.03	0.0	8.8	<0.10	14.0	26.0	271	9.0	<0.5
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 1986-92																				
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	5.8	245	46.3	1.8	10.3	399	7.6	244	0.09	0.18	28.06	0.02	1.4	7.9	1.00	8.43	38.7	244	32.5	0.20
NO. OF ANALYSES	15	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	18	16

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

(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 1994 on a quarterly basis, i.e., March, June, September, December. Field measurements, including pH, specific conductivity, 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 during the months of June through October, with a peak flow of 1975 GPM in May and a base of 0.0 GPM during the months of January through May and November through December. Location RCLF1 remained dry throughout 1993 except for the month of June with an estimated flow of 150 GPM. For location RCF2 flow occurred during the months of June and July, with peak flow of 1838 GPM in June and a base flow of 0.0 GPM during the months of January through May and August through December. Below the spring area the stream is perennial and increases

in flow from RCF3 to RCW4. During 1993 the peak flow for RCF3 was 1874 GPM (June), for RCW4, 1960 GPM (June). Baseline flow for 1993 at RCF3 and RCW4 was approximately 27 and 60 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.

TABLE 17: RILDA CANYON SURFACE WATER QUALITY *

RCF1 - RILDA CANYON FLUME - RIGHT FORK

1993 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
6-11	0.0	290	63.6	0.0	2.5	915	9.9	238	0.12	0.23	19.20	<0.03	0.0	8.99	<0.10	4.90	17.0	225	41	<0.5
9-28	0.0	254	54.0	<1.0	5.0	399	12.5	250	<0.05	0.07	28.00	<0.03	0.0	8.69	<10.00	12.00	23.0	266	0	<0.5
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 1989-1992																				
MIN	1.0	227	49.8	0.1	10.0	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	371	9.4	384	0.09	1.13	27.40	0.14	1.9	8.80	2.10	7.48	80.0	277	160.0	0.50
MEAN	0.7	261	71.3	1.0	13.0	336	7.6	270	0.04	0.27	22.40	0.05	0.7	8.39	0.92	5.49	30.0	238	36.8	0.22
NO. OF ANALYSES	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

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

TABLE 18: RILDA CANYON SURFACE WATER QUALITY *

RCF3 - RILDA CANYON FLUME - ABOVE NEWUA SPRINGS

1993 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
6-11	0.0	242	67.7	0.0	4.0	437	7.7	265	0.08	0.31	23.30	<0.03	1.2	8.83	0.20	11.20	40.0	254	39.0	<0.50
9-28	0.0	412	75.0	<1.0	5.0	674	6.7	381	<0.05	0.20	47.00	<0.10	<1.0	8.34	<2.00	16.00	70.0	469	6.0	<0.50
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 1989-1992																				
MIN	1.0	278	58.1	0.1	5.0	380	4.5	268	0.01	0.02	25.00	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	8.40	4.57	17.55	150.0	513	185.0	2.50
MEAN	3.0	397	91.3	0.5	17.5	627	7.4	410	0.11	0.38	44.24	0.04	1.6	8.02	1.71	12.85	86.0	408	22.7	0.44
NO. OF ANALYSES	11	14	14	14	14	15	15	14	14	13	14	13	14	15	14	14	14	13	14	14

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

TABLE 19: RILDA CANYON SURFACE WATER QUALITY *

RCW4 - RILDA CANYON WEIR - NEAR HIGHWAY 31

1993 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
6-11	0.0	317	69.0	0.0	4.8	486	5.5	290	0.06	0.71	28.50	<0.03	0.7	8.73	0.20	7.9	37.0	262	96.0	0.50
9-28	0.0	403	79.0	<1.0	14.0	707	7.5	453	<0.05	0.20	62.00	0.10	1.0	8.62	<10.00	20.0	110.0	642	6.0	<0.50
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 1989-1992																				
MIN	0.1	298	63.0	0.1	10.0	400	5.2	336	0.01	0.01	35.3	0.01	0.1	7.70	0.01	7.6	40.0	286	1.0	0.01
MAX	10.0	461	132.7	5.0	45.0	800	10.9	545	0.28	2.06	67.2	0.15	2.8	8.86	7.69	52.0	250.0	538	505.0	1.0
MEAN	2.5	383	90.7	1.0	19.1	652	7.7	443	0.05	0.30	52.6	0.03	1.6	8.15	2.28	21.3	129.0	443	73.9	0.46
NO. OF ANALYSES	11	13	13	13	13	14	14	13	12	11	13	12	13	14	13	13	13	13	13	12

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

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

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 1994, 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 1993 has been generated for each sampling location. (See Appendix E.) The hydrographs show the intermittent nature of Cottonwood Canyon Creek. Flow at SW-1 and SW-3 locations continued throughout the year due to the influence of the alluvial/colluvial deposits. Baseline flow averaged approximately <3 GPM and 25 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 1993 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

1993 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	ISS	SETTLEABLE
2-22	0.0	231	39.6		0.7	406	8.4	210	0.12	0.02	27.00	0.03	0.0	8.82	0.00	16.3	20	254	0.0	0.00
3-23	2.0	401	64.9	0	25.2	843	9.5	413	0.19	0.25	61.00	0.00	0.0	8.07	3.20	35.4	180	610	4.0	0.00
5-19	2.0	355	152.3	0	5.6	423	9.5	466	0.19	0.91	20.90	0.19	0.0	8.34	3.10	6.0	40	253	412.0	1.50
9-10	0.0	288	61.7	9	19.8	713	11.2	348	<0.05	0.13	47.00	<0.03	0.0	8.45	2.00	29.5	90	489	8.0	<0.50
MIN	0.0	231	39.6	0	0.7	406	8.4	210	0.05	0.02	20.90	0.00	0.0	8.07	0.00	6.0	20	253	0.0	0.00
MAX	2.0	401	152.3	9	25.2	843	11.2	466	0.19	0.91	61.00	0.19	0.0	8.82	3.20	35.4	180	610	412.0	1.50
MEAN	1.0	319	79.6	3	12.8	596	9.7	359	0.14	0.33	38.97	0.06	0.0	8.42	2.07	21.8	82	401	106.0	0.50
HISTORICAL 1977-1992																				
MIN	1.0	275	15.1	1.0	1.5	559	0.0	260	0.05	0.05	2.40	0.01	0.5	7.10	1.00	11.0	20.1	226	0.5	0.10
MAX	22.0	416	108.0	1.0	22.0	757	0.0	390	0.43	15.90	61.61	1.31	358.0	8.36	21.00	60.0	238.7	508	1298.0	0.30
MEAN	4.0	334	65.5	1.0	12.3	648	0.0	313	0.12	1.07	37.17	0.08	12.1	7.81	3.45	21.0	70.8	362	78.1	0.13
NO. OF ANALYSES	35	53	52	11	53	14	0	20	8	51	53	47	35	48	52	52	53	53	52	8

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

TABLE 21: COTTONWOOD CANYON CREEK WATER QUALITY *

SW-2

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
3-23	0.0	320	94.8	0.0	33.8	786	8.6	488	1.25	2.44	61.00	0.12	0.3	8.41	1.70	38.0	200	563	253.0	0.0
5-19	2.0	408	136.9	0.0	7.1	456	9.0	461	0.25	3.11	28.90	0.22	0.1	8.90	0.00	8.0	80	300	682.0	1.5
9-10	0.0	452	66.8	0.9	24.6	838	9.1	443	0.06	0.30	67.00	<0.03	1.0	8.80	4.00	39.7	150	584	18.0	<0.5
MIN	0.0	320	66.8	0.0	7.1	456	8.6	443	0.06	0.30	28.90	0.03	0.1	8.41	0.00	8.0	80	300	18.0	0.0
MAX	2.0	452	136.9	0.9	33.8	838	9.1	488	1.25	3.11	67.00	0.22	1.0	8.90	4.00	39.7	200	584	682.0	1.5
MEAN	0.6	393	99.5	0.3	21.8	693	8.9	464	0.52	1.95	52.30	0.12	0.5	8.70	1.90	28.6	143	482	317.6	0.7
HISTORICAL 1977-1992																				
MIN	0.1	261	11.1	1.0	1.5	570	0.0	250	0.05	0.05	2.40	0.01	0.5	7.00	1.00	11.85	19.5	267	1.0	0.1
MAX	22.0	458	123.2	1.0	32.0	915	0.0	469	0.34	16.20	69.25	1.37	9.0	8.39	25.60	53.10	246.9	700	1004.0	0.1
MEAN	3.9	324	64.7	1.0	13.4	715	0.0	315	0.09	1.23	37.78	0.10	2.0	7.86	4.77	24.01	84.8	376	68.8	0.1
NO. OF ANALYSES	34	51	51	11	51	12	0	18	8	50	51	47	39	46	51	50	51	51	50	8

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

TABLE 22: COTTONWOOD CANYON CREEK WATER QUALITY *

SW-3

1993 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
3-23	0.0	390	80.6	0.0	57.6	1320	7.9	485	0.20	0.27	69.00	0.00	0.7	8.06	2.50	84.7	340.0	957	17.0	0.0
5-19	2.0	451	159.0	<1.0	12.8	536	7.4	572	0.27	1.11	42.60	0.25	0.2	8.59	3.70	20.5	130.0	372	626.0	1.5
9-10	0.0	297	82.0	14.0	48.2	1210	6.4	435	<0.05	0.47	56.00	0.03	<1.0	8.68	3.00	88.8	290.0	909	12.0	<0.5
12-13	<1.0	349	91.0	<1.0	50.0	1160	10.1	548	<0.20	<0.20	78.00	<0.10	<5.0	8.31	5.00	78.0	270.0	914	8.0	<0.5
MIN	0.0	297	80.6	0.0	12.8	536	6.4	435	0.05	0.20	42.60	0.00	0.2	8.06	2.50	20.5	130.0	372	8.0	0.0
MAX	10.0	451	159.0	14.0	57.6	1320	10.1	572	0.27	1.11	78.00	0.25	5.0	8.68	5.00	88.8	340.0	957	626.0	1.5
MEAN	3.0	372	103.2	4.0	42.2	1057	7.9	510	0.18	0.51	61.40	0.09	1.7	8.41	3.55	68.0	257.5	788	165.8	0.6
HISTORICAL 1977-1992																				
MIN	0.1	253	14.3	0.1	1.7	600	5.7	245	0.05	19.00	2.40	0.01	0.2	7.20	1.62	3.00	22.0	40	1.0	0.1
MAX	18.0	430	120.8	14.0	59.2	1330	5.7	614	0.43	0.04	96.37	2.48	114	8.50	30.00	87.80	386	976	5024.0	0.1
MEAN	3.3	332	72.4	7.5	21.0	1050	5.7	418	0.10	1.46	43.42	0.15	4.6	7.92	4.66	33.44	128.0	449	176.4	0.1
NO. OF ANALYSES	34	53	52	12	52	14	1	20	8	50	53	43	46	48	51	52	53	53	50	7

* 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 1994 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 1993 to the data collected from 1988 through 1992 has been generated for each flume location. (See Appendix F.) The hydrographs show that the Right fork remained dry throughout 1993. Flow occurred at the Left Fork from May through October, with a peak flow of 961 GPM in May and base flow of 0.0 GPM from January through April and November through December. 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 1000 GPM, and baseline flow averaged approximately 55 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 1993 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 *

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 1989-93																				
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 1979-1992																				
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 *

LEFT FORK

1993 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
5-19	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
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 1979-1992																				
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	71.1	15.0	156.0	790	9.6	460	0.12	0.81	68.5	0.15	3.5	8.7	3.0	34.0	115.0	570	1428.0	<0.50
MEAN	3.4	309	44.6	2.0	19.7	627	7.7	289	0.06	0.15	41.3	0.03	1.1	8.0	1.6	28.5	73.8	363	52.1	0.13
NO. OF ANALYSES	14	14	14	14	14	49	14	14	6	51	14	50	14	51	14	14	15	51	52	13

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

TABLE 25: GRIMES WASH WATER QUALITY *

BELOW MINE

1993 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
3-23	0.0	344	141.3	0.0	17.4	3280	8.4	736	0.22	0.23	93.00	0.10	0.0	7.76	6.50	39.2	250	2109	4.0	
5-19	0.0	325	95.8	0.0	32.7	590	9.1	364	0.18	2.04	30.40	0.09	0.3	8.61	2.10	27.1	120	444	280.0	0.7
9-13	0.0	362	163.0	0.0	103.7	1549	5.2	687	<0.05	0.23	68.00	0.06	<1.0	8.26	7.00	60.0	370	994	2.0	<0.5
12-13	<10.0	249	108.0	<1.0	31.0	1140	10.3	525	<0.20	5.10	62.00	<0.10	<5.0	8.47	10.00	44.0	250	768	28.0	<0.5
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 1979-1992																				
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	12.5	341	137.4	0.8	332.5	1508	7.5	655	0.19	0.86	74.28	0.06	2.4	7.9	6.56	243.3	339.3	929	219.2	0.45
NO. OF ANALYSES	40	38	38	38	40	78	40	38	80	39	38	77	40	82	38	38	41	33	80	80

* 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 1994 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 increased from 1992 to 1993, whereas temperature, a critical factor on spring discharge rates, was 0.4 degrees higher in 1993 than the historical average. Table 26, A and B, is a tabulation of the flow data collected during the 1993 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 sixty-one percent (61%) [eighty-two percent (82%) by volume] decrease from the July to the October measurements.

A nine-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
1993

Spring	Date Sampled	Flow (GPM)	Temp. ° F	Date Sampled	Flow (GPM)	Temp. ° F	Seasonal Net Change %
Sheba	07-15-93	11.0	44.3	11-01-93	1.3	41.3	-88.18
Elk Spring	07-15-93	369.9	44.6	10-29-93	56.2	38.4	-84.81
Burnt Tree	07-14-93	8.6	44.9	11-01-93	10.0	42.7	16.28
Jerk Water							
Pine Springs							
Pine Sp. Trough							
Ted's Tub	07-14-93	51.0	51.2	11-04-93	6.7	38.0	-86.86
79-1							
79-2	07-14-93	7.5	43.8	11-01-93	2.2	41.4	-70.67
79-3							
79-4							
79-5							
79-6							
79-7							
79-8							
79-9							
79-10	07-15-93	30.0	44.5	10-29-93	6.7	42.2	-77.67
79-11							
79-12	07-14-93	<2.0 - sheet flow		11-04-93	damp		
79-13							
79-14							
79-15	07-15-93	20.7	46.1	11-04-93	3.8	44.9	-81.64
79-16							
79-17							
79-18							
79-19							
79-20							
79-21							
79-22							
79-23	07-14-93	damp		11-01-93	dry		
79-24	07-14-93	damp		11-01-93	dry		
79-25							
79-26	07-12-93	10.0	59.5	11-01-93	0.9	49.1	
79-27							
79-28	07-12-93	2.2	44.2	11-01-93	no flow	- standing water	
79-29	07-12-93	2.9	42.9	11-01-93	2.1	43.2	-27.59
79-30							
79-31							
79-32	07-12-93	1.3	53.5	11-01-93	damp		
79-33							
79-34	07-15-93	13.0	46.3	11-04-93	damp		
79-35	07-15-93	8.9	42.9	10-29-93	1.2	43.2	-86.52
79-36							
79-37							
79-38	07-14-93	6.4	54.3	11-04-93	1.8	43.2	-71.88
79-39							
79-40	07-12-93	4.0	58.0	11-01-93	damp		
80-41	07-12-93	4.0	60.7	11-01-93	damp		

TABLE 26B: EAST MOUNTAIN SPRINGS DISCHARGE
1993

Spring	Date Sampled	Flow (GPM)	Temp. ° F	Date Sampled	Flow (GPM)	Temp. ° F	Seasonal Net Change %
80-42							
80-43	07-14-93	2.7	47.8	11-01-93	damp		
80-44	07-12-93	1.4	75.4	11-01-93	dry		
80-45							
80-46	07-14-93	7.5	43.5	11-01-93	damp		
80-47	07-14-93	13.3	48.2	11-01-93	7.5	39.1	-43.61
80-48	07-15-93	6.7	52.8	10-29-93	2.4	46.2	-64.18
80-49							
80-50							
82-51	07-14-93	3.2	52.9	11-01-93	damp		
82-52	07-14-93	16.7	44.1	11-04-93	4.0	44.3	-76.05
84-53	07-12-93	13.3	52.2	11-04-92	damp		
84-54							
84-55							
84-56	07-12-93	1.0	43.4	11-01-93	1.1	42.3	10.00
85-57							
86-58							
86-59							
89-60	07-14-93	2.1	54.5	11-04-93		sheet flow	
89-61	07-15-93	129.3	45.6	10-29-93	24.0	38.7	-81.44
89-62							
89-63							
89-64							
89-65	07-15-93	1.6	45.5	10-29-93	<0.1 flow		
89-66	07-15-93	2.6	45.0	10-29-93	damp		
89-67	07-15-93	9.2	40.4	10-29-93	2.7	40.5	-70.65
89-68	07-15-93	2.7	47.7	10-29-93	<0.1 flow		
89-69							
89-70							
89-71							
91-72	07-22-93	8.7	56.5	10-27-93	3.2	43.6	-63.22
91-73	07-22-93	1.0	62.4	10-27-93	0.5	41.2	-50.00
TOTAL FLOW FOR JULY 1993 (Without 91-72 & 73)		764.7			134.6		
				Net Change - Average			-61.59
				Net Change - By Volume			-82.40
TOTAL FOR JULY 1992 =		221.1					
JULY 1993 246% HIGHER THAN JULY 1992							

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

JULY FLOW DATA

Spring	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Burnt Tree	30.5	26.6	26.1	17.5	10.2	12.0	6.4	4.1	2.0	4.0	8.6
Elk Spring	642.3	427.9	390.5	309.7	217.0	217.4	78.5	130.8	176.0	116.8	369.9
Sheba	22.9	19.7	14.4	8.6	11.4	10.4	1.1	8.1	10.1	6.3	11.0
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
79-2	9.1	9.7	5.5	2.9	4.0	2.1	2.7	3.9	2.4	2.3	7.5
79-10	37.1	20.0	33.3	26.1	26.1	25.0	7.0	10.2	12.5	10.5	30.0
79-15	42.9	26.1	18.2	18.2	14.6	12.7	2.9	3.0	5.0	4.1	20.7
79-23	20.0	3.6	6.8	0.6	Damp	Damp	Dry	Dry	Damp	Dry	Damp
79-24	9.3*	6.1*	5.0	4.3	Damp	0.8	Dry	Dry	Dry	Dry	Damp
79-26	20.7	20.0	10.9	8.7	1.5	3.3	0.3	Dry	Damp	Damp	10.0
79-29	10.0	6.2	6.0	4.7	2.5	2.6	1.1	1.3	1.7	0.8	2.9
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
79-34	356.7	42.9	18.5	16.7	10.5	13.3	Dry	Dry	0.3	Damp	13.0
79-35	15.0	10.5	10.5	7.8	6.3	2.7	Dry	1.9	4.3	4.4	8.9
79-38	10.9	9.2	4.7	3.6	8.3	10.0	1.1	7.8	6.5	2.3	6.4
79-40	15.0	8.3	5.6	4.7	2.0	5.4	Dry	Dry	Dry	Dry	4.0
80-41	10.9	15.0	5.8	4.1	2.5	3.9	Dry	Dry	Dry	Dry	4.0
80-43	24.0	20.0	6.6	3.1	0.4	1.8	Dry	Dry	Dry	Dry	2.7
80-44	24.0	13.1	5.5	2.2	Dry	0.5	Dry	Dry	Dry	Dry	1.4
80-46	60.0	28.3	18.2	12.0	4.0	6.7	Dry	Dry	Dry	Dry	7.5
80-47	20.0	15.0	12.5	12.2	7.4	9.9	4.6	2.0	1.3	3.3	13.3
80-51	10.0	5.9	3.8	2.6	Damp	Damp	Dry	Dry	<0.1	Damp	3.2
82-52	80.0	48.0	32.1	23.3	20.1	21.5	2.6	1.3	1.0	1.0	16.7
84-56	9.6*	6.3	4.7	3.7	2.5	2.9	1.6	1.0	0.5	0.6	1.0
TOTALS	1,293.2	839.5	687.0	530.2	421.3	425.5	115.4	188.4	244.7	170.0	595.0

* 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		80-49 (Price River) 91-72 (Blackhawk)	Flagstaff Limestone 79-4, 79-5, Pine Springs Trough
	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)		

TABLE 29: TEMPERATURE COMPARISON

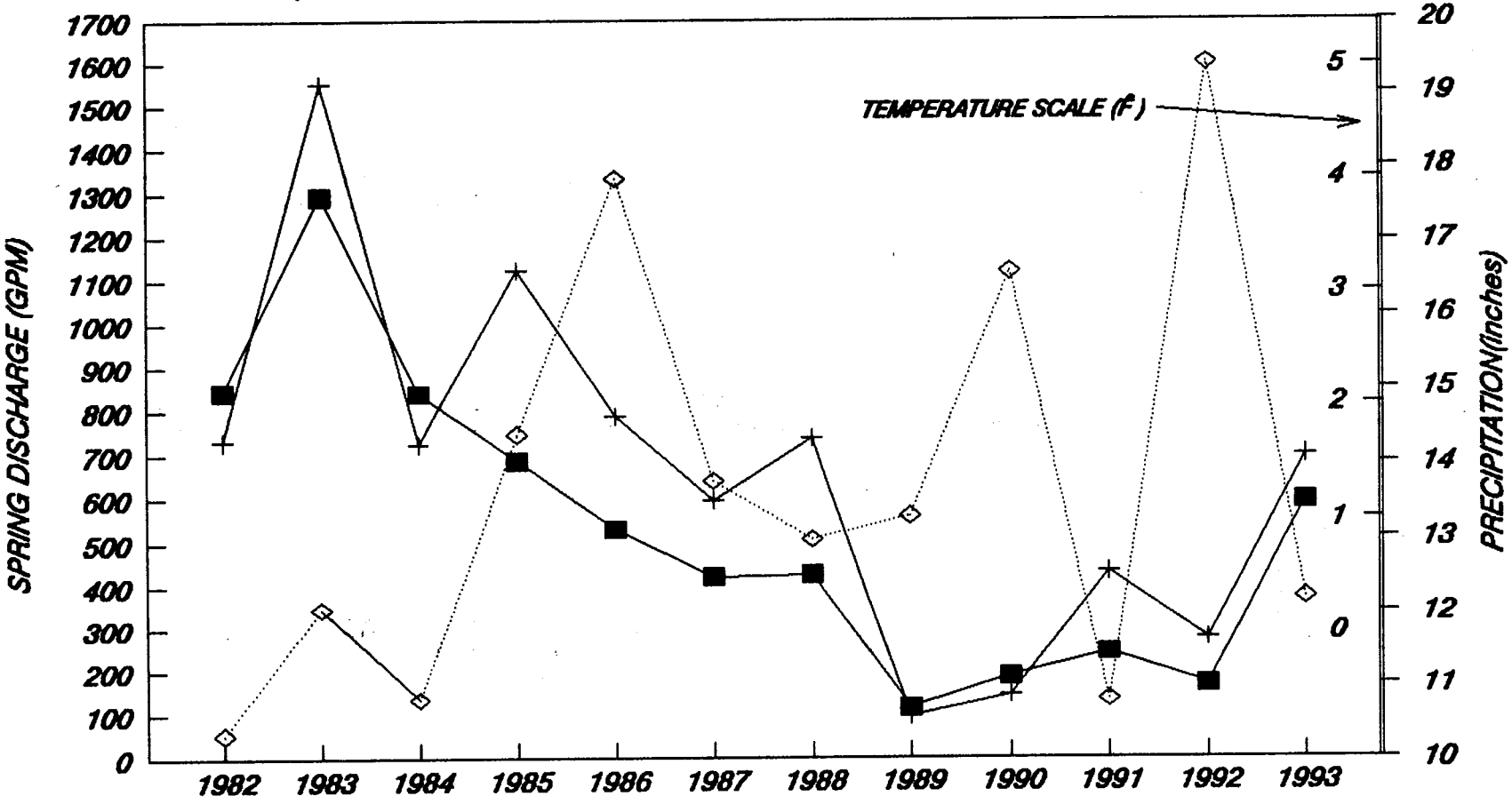
MONTH	EAST MOUNTAIN DEPARTURE FROM NORMAL	ELECTRIC LAKE DEPARTURE FROM NORMAL	HUNTER PLANT DEPARTURE FROM NORMAL	HUNTINGTON PLANT DEPARTURE FROM NORMAL
1985				
JAN	-1.4	-5.7	-2.8	+2.1
FEB	-2.5	-8.6	-4.5	-5.5
MAR	+1.0	-1.4	+2.2	-0.4
APR	+7.8	+6.6	+8.0	+6.1
MAY	+6.1	+7.6	+8.4	+2.5
JUN	+7.3	+3.0	+6.8	+0.3
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

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

FIGURE 3

EAST MOUNATIN

SPRING DISCHARGE vs. PRECIPITATION & TEMPERATURE



1985-93 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 1992 (except for 1991) positive departure from normal has been significant. In 1993 the temperatures were slightly 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 1993 is shown in Table 30; corresponding spring recession curves comparing 1993 to 1988-1992 are located in Appendix G.

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

1993

Spring	July	August	September	October
Burnt Tree	8.6/45	7.3/47	10.5/49	10.0/43
Elk Spring	369.9/45	152.8/43	72.7/44	56.2/38
Sheba	11.0/44	5.3/45	1.3/47	1.3/41
79-10	30.0/45	14.0/47	8.3/46	6.7/42
79-23	Damp	Dry	Dry	Dry
79-26	10.0/60	2.6/59	1.1/58	0.9/49
79-29	2.9/43	2.7/44	2.1/48	2.1/43
79-35	8.9/43	6.1/44	2.7/45	1.2/43
80-44	1.4/75	Damp	Dry	Dry
80-46	7.5/44	4.5/45	<0.5/na	Damp
82-52	16.7/44	9.4/44	5.5/42	4.0/44
84-56	1.0/43	0.9/46	0.8/47	1.1/42

* All flow given in gallons per minute
** Temperatures reported in degrees Fahrenheit
*** 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 1993 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 1993 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. 1993) **

	Burnt Tree		Elk Spring		Sheba Spring		79–10		79–23		79–26	
PARAMETER	Historical	1993	Historical	1993	Historical	1993	Historical	1993	Historical	1993	Historical	1993
Elevation	9260		9350		9740		9350		9035		9310	
Geologic Formation	TKn		TKn		Tf		Kpr		TKn		TKn	
Bicarbonate	332	328	291	297	290	282	323	294	413	no	335	326
Calcium	65.2	48.1	68.1	47.8	89.2	65.1	76.3	59.9	79.6	flow	70.9	46.9
Carbonate	<1	<1	<1	<1	<1	<1	<1	<1	<1	during	<1	<1
Chloride	7.3	6.4	6.4	5.1	6.7	5.2	8.4	5.4	11.3	1993	8.2	6.40
Cond.(umhos/cm)	494	494	428	427	430	386	458	446	691		520	510
Hardness	273	245	256	221	253	215	280	241			286	255
Iron	0.18	0.13	0.11	0.13	0.12	0.13	0.10	0.13	0.09		0.20	0.13
Magnesium	26.89	30.40	22.59	22.58	9.92	10.08	21.72	21.18	38.30		26.28	30.13
Manganese	0.01	0.05	0.02	0.05	0.01	0.05	0.01	0.05	0.01		0.02	0.05
pH(units)	7.54	7.54	7.77	7.70	7.54	7.69	7.63	7.50	7.72		7.94	8.30
Potassium	1.15	2.00	2.21	2.00	1.53	1.45	2.71	1.70	1.54		2.15	1.65
Sodium	14.12	14.45	8.80	5.60	4.83	3.30	4.89	4.45	14.90		16.63	12.30
Sulfate	27.4	9.0	28.7	4.3	28.2	3.5	20.4	6.5	27.2		41.9	10.5
TDS	289	290	254	272	261	243	274	288	364		319	302

	79–29		79–35		80–44		80–46		82–52		84–56	
PARAMETER	Historical	1993	Historical	1993	Historical	1993	Historical	1993	Historical	1993	Historical	1993
Elevation	9410		9585		8980		9350		8995		9335	
Geologic Formation	TKn		Tf		Kpr		TKn		Kpr		TKn	
Bicarbonate	328	315	304	285	451	392	365	336	417	422	346	342
Calcium	48.7	35.1	90.1	65.8	101.6	88.4	64.0	47.1	78.6	56.2	66.1	49.2
Carbonate	<1	<1	<1	<1	<1	0.00	<1	0.00	1.40	<1	<1	<1
Chloride	20.80	15.30	8.00	4.40	11.10	11.50	4.80	6.60	12.10	10.00	12.00	8.20
Cond.(umhos/cm)	531	549	426	419	876	809.0	561	490	635	624	527	553
Hardness	251	240	278	238	377	396	304	243	324	299	302	262
Iron	0.10	0.13	0.12	0.13	0.12	0.05	0.27	0.05	0.08	0.13	0.03	0.13
Magnesium	33.54	35.13	15.08	17.13	41.48	42.60	28.57	30.45	33.49	36.83	32.46	32.63
Manganese	0.02	0.05	0.02	0.05	0.01	0.03	0.01	0.03	0.01	0.05	0.01	0.05
pH(units)	7.73	7.72	7.71	7.71	7.79	8.20	7.43	7.41	7.66	7.60	7.48	7.50
Potassium	2.79	2.40	0.97	1.30	2.76	13.00	0.83	0.00	1.37	1.70	0.90	1.05
Sodium	32.52	31.25	6.29	2.95	35.17	41.70	9.90	8.10	23.80	25.75	16.97	14.90
Sulfate	49.0	23.5	37.2	2.1	138.7	140.0	19.0	1.4	38.8	30.5	30.0	21.0
TDS	335	318	271	253	524	603	310	261	372	362	324	326

** 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

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

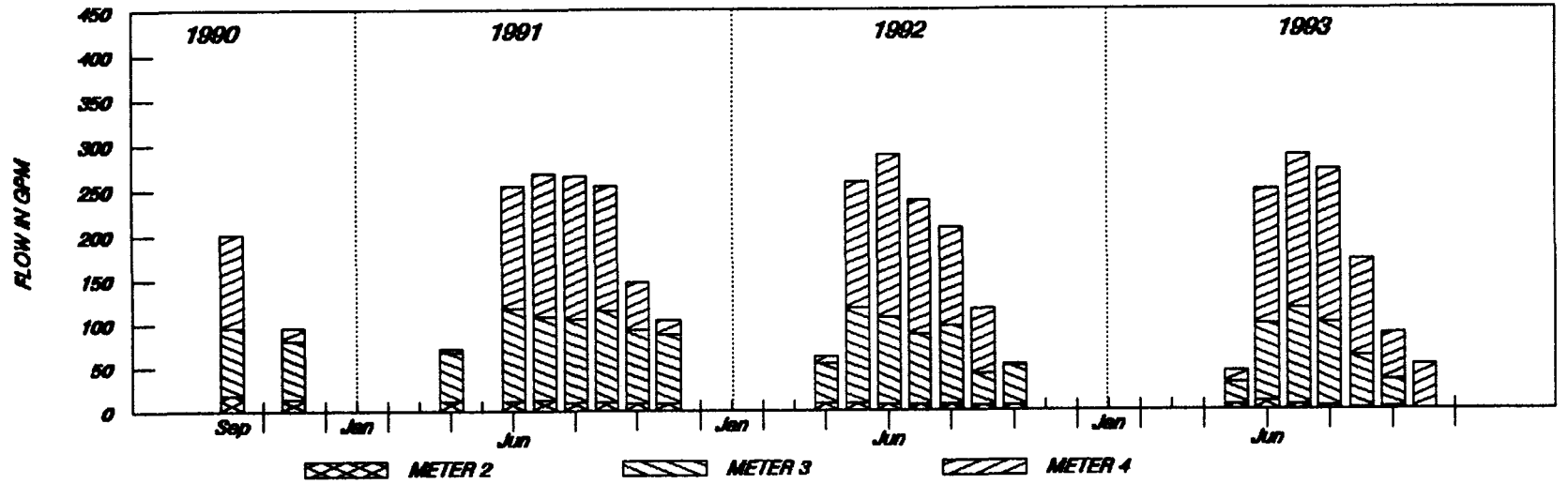
The seasonal variation of the monthly average flow from NEWUA's Rilda Canyon Springs is shown in Figure 4. With the installation of flow meters, individual spring contribution to the total flow can be plotted over time.

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 1992. The minimum, maximum, and mean results of the 1993 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
RILDA CANYON SPRING FLOW



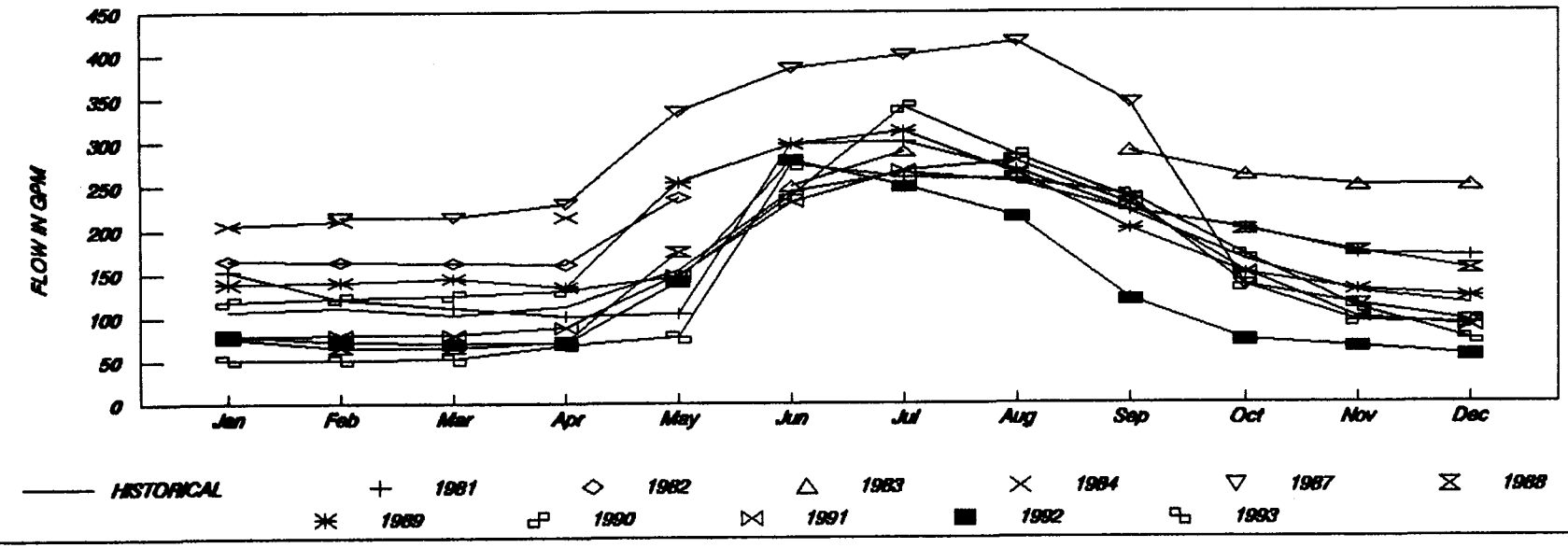


TABLE 33
NEWUA – RILDA CANYON SPRINGS
AVERAGE WATER QUALITY*

PARAMETER	METER 2		METER 3		METER 4	
	1993	Historical	1993	Historical	1993	Historical
Bicarbonate	413	446	396	403	344	357
Calcium	93.0	97.2	74.4	84.7	56.7	73.2
Carbonate	1.0	0.6	1.0	0.6	1.0	0.6
Chloride	8.2	16.3	8.4	15.5	7.7	15.5
Cond.(umhos/cm)	719	719	639	588	596	510
Hardness	453	454	372	399	333	346
Iron	0.11	0.08	0.07	0.09	0.05	0.04
Magnesium	53.80	51.31	45.15	45.62	46.50	39.73
Mangenese	0.03	0.03	0.03	0.06	0.03	0.07
pH(units)	6.86	7.24	7.10	7.38	7.10	7.45
Potassium	8.30	1.67	5.35	0.80	5.30	0.90
Sodium	15.60	14.68	14.10	13.32	12.75	12.40
Sulfate	75.0	100.8	60.0	78.3	50.5	58.8
TDS	495	472	410	411	372	363

* 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-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)

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 increased from 1992 to 1993. Table 34 is a tabulation of the flow data collected during the 1993 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 sixty-nine percent (69%) [eighty-two percent (82%) 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.**)

1993

Spring	July	August	September	October	Seasonal Net Change %
T-6 (18-2-1)	6.0/61	5.0/55	2.5/55	2.7/52	-55
T-8 (17-21-1)	1.7/46	1.0/47	0.6/46	0.4/42	-77
T-9 (17-22-1)	40.0/47	15.8/50	8.0/47	5.5/46	-86
T-10 (17-26-4)	0.4/65	0.3/55	0.3/56	Damp/na	
T-14 (17-25-1)	1.6/64	<1.0/na	Damp/na	Damp/na	
T-14A (17-26-5)	Dry	Dry	Dry	Dry	
T-15 (17-35-1)	1.6/53	1.0/52	0.7/52	0.7/49	-56
T-16 (17-35-2)	Dry	Dry	Dry	Dry	
TM-23	Dry	Dry	Dry	Dry	
			Net Change by Average		-69
			Net Change by Volume		-82

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

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

* 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 1993 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 1993 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. 1993) *

PARAMETER	18-2-1 Historical	1993	17-21-1 Historical	1993	17-22-1 Historical	1993	17-26-4 Historical	1993	17-25-1 Historical	1993	17-26-5 Historical	1993
Elevation	8395		9320		9210		8880		8155		9080	
Geologic Formation	TKn		TKn		TKn		TKn		Kcg		TKn	
Bicarbonate	406	400	400	407	382	277	397	370	486	365	398	No
Calcium	63.2	56.5	53.3	43.9	55.9	37.5	50.5	70.5	71.1	85.4	77.5	Flow
Carbonate	0.00	<1	0.00	<1	6.20	<1	4.00	0.00	0.00	2.00	0.00	During
Chloride	47.8	47.2	34.1	29.1	11.6	11.0	27.4	28.9	47.3	16.60	20.0	1993
Cond.(umhos/cm)	951	929	713	705	612	490	712	687	1496	840	848	
Hardness	391	389	255	222	299	238	320	382	500	440	429	
Iron	0.05	0.10	0.04	0.13	0.06	0.14	0.14	0.11	0.13	0.16	0.45	
Magnesium	56.52	60.25	30.63	27.50	38.19	35.25	47.77	50.00	67.91	55.00	58.68	
Mangenese	0.02	0.05	0.03	0.05	0.02	0.09	0.13	0.09	0.03	0.03	0.02	
pH(units)	7.80	8.07	7.75	7.20	7.80	7.56	8.04	7.98	7.88	7.70	7.79	
Potassium	1.27	1.20	1.90	1.85	1.14	1.78	1.66	2.57	3.20	2.90	1.84	
Sodium	69.42	57.15	61.00	61.93	28.47	17.50	34.48	28.90	121.30	26.00	31.70	
Sulfate	133.8	157.5	18.7	20.7	27.2	17.0	31.2	50.0	305.3	190.0	141.6	
TDS	577	549	396	376	340	261	388	398	884	583	511	

PARAMETER	17-35-1 Historical	1993	17-35-2 Historical	1993	17-14-4 Historical	1993
Elevation	8880		9000		7880	
Geologic Formation	TKn		TKn		Alluvium	
Bicarbonate	390	329	No	No	362	No
Calcium	41.7	36.2	Flow	Flow	65.8	Flow
Carbonate	8.10	<1		During	0.00	During
Chloride	43.70	39.40		1993	13.90	1993
Cond.(umhos/cm)	753	785			641	
Hardness	271	213			346	
Iron	1.23	0.10			0.19	
Magnesium	40.87	29.75			43.95	
Mangenese	0.06	0.05			0.02	
pH(units)	8.14	7.82			7.77	
Potassium	1.33	1.20			1.95	
Sodium	71.48	75.85			15.83	
Sulfate	41.0	63.7			61.8	
TDS	433	436			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 1993. 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	427.4 Million Gallons
Estimated Evaporation*	18.9 Million Gallons
Domestic Usage	6.0 Million Gallons
Total Discharge	452.3 Million Gallons

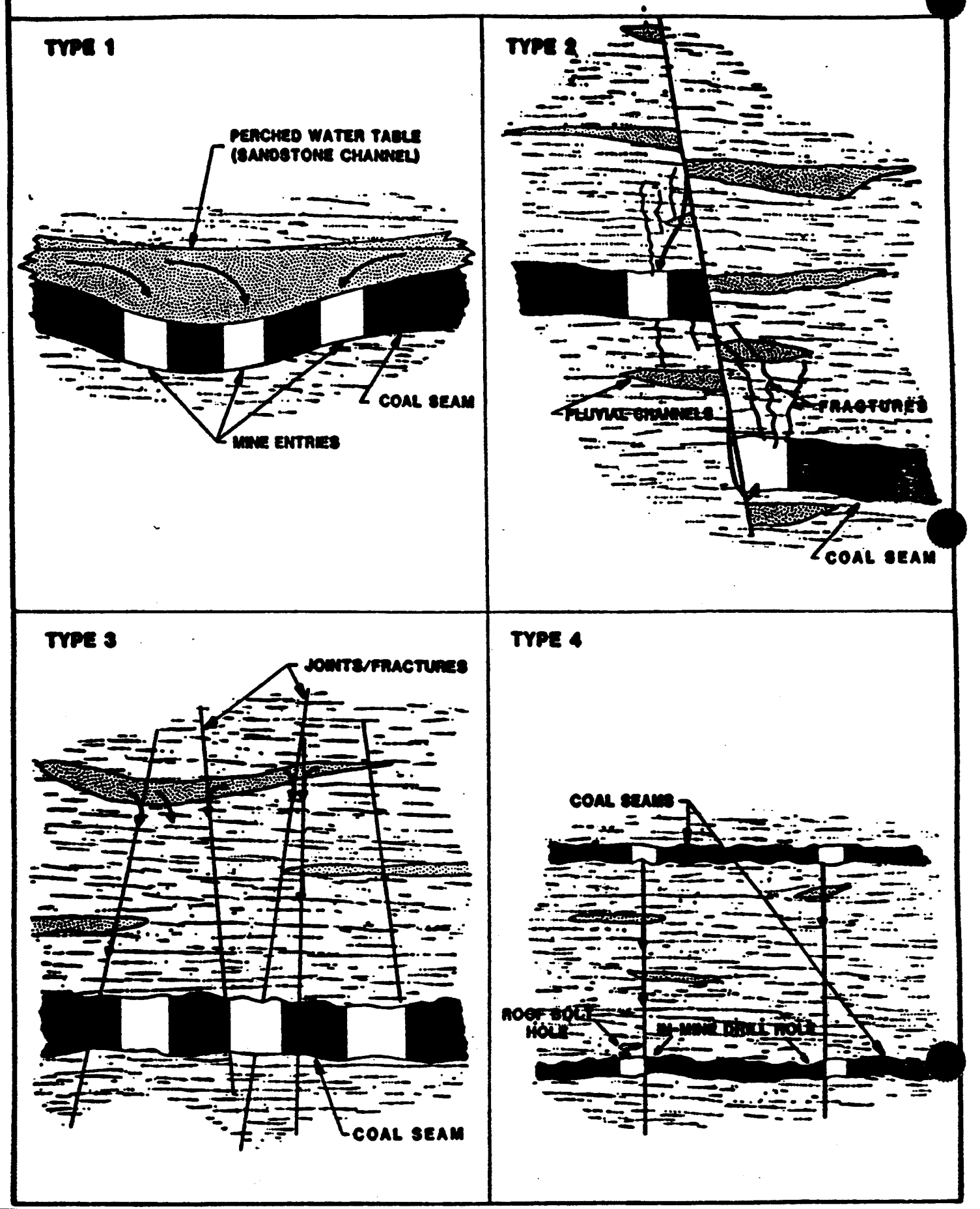
* See 1981 Hydrologic Monitoring Report

b. In-Mine Quality

Eleven samples were collected in the Deer Creek Mine in 1993. (See Map No. 2 in pocket for locations.) Parameters analyzed in 1993 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 1993 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 1993 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. Prior to December 1990 all of the water discharged from Deer Creek was piped directly to PacifiCorp's Huntington Power Plant. As of November 16, 1990, the State of Utah-Department of Health granted PacifiCorp a temporary discharge permit under a bypass agreement. (Refer to 1991 Annual Report for details concerning the Temporary Agreement.)

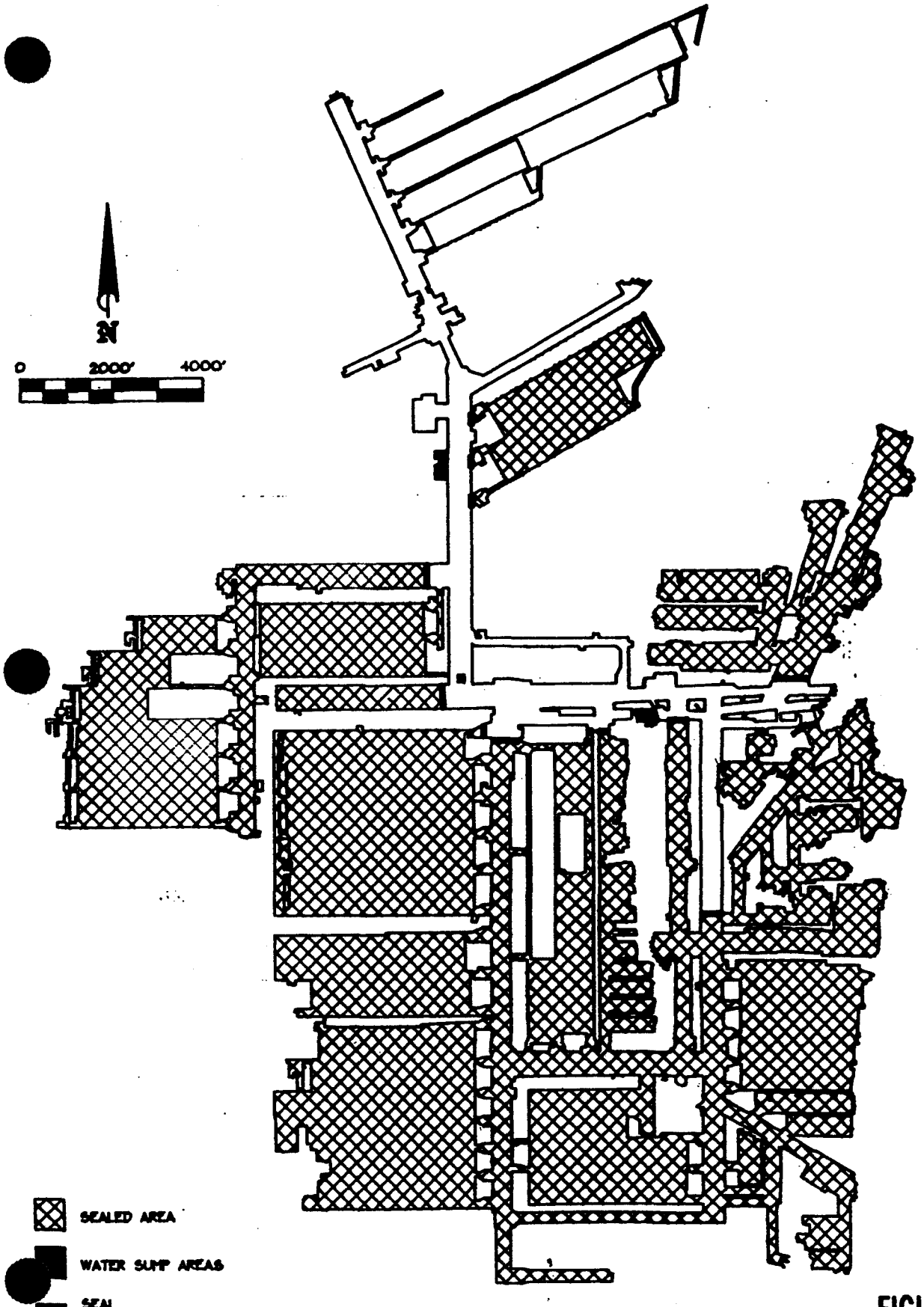
As part of the agreement a comprehensive hydrologic monitoring program was established to monitor the potential impacts to the receiving streams of Deer Creek and Huntington Creek. The program includes monitoring stream transects, water quality, and macroinvertebrates.

TABLE 37: DEER CREEK IN-MINE WATER QUALITY* - 1993

LOCATION	1993 SAMPLE DATES	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON DISSOLVED	MAGNESIUM	MANGANESE	pH (units)	POTASSIUM	SODIUM	SULFATE	TDS
4S SEALS	3-17	412	80.2	0.0	8.1	810	388	1.53	45.6	0.04	6.90	7.00	51.30	200.0	513
	6-29	437	92.2	0.0	8.0	720	403	0.14	42.0	0.04	8.40	4.00	21.00	140.0	517
	MIN	412	80.2	0.0	8.0	720	388	0.14	42.0	0.04	6.90	4.00	21.00	140.0	513
	MAX	437	92.2	0.0	8.1	810	403	1.53	45.6	0.04	8.40	7.00	51.30	200.0	517
	MEAN	424	86.2	0.0	8.1	765	395	0.83	43.8	0.04	7.65	5.50	36.15	170.0	515
HISTORICAL (1992)	MIN	424	98.8	0.0	10.0	710	471	0.00	49.3	0.02	7.38	1.98	16.93	78.0	535
	MAX	436	118.0	0.0	35.0	900	498	2.53	54.4	0.06	7.42	7.60	29.40	220.0	606
	MEAN	430	108.4	0.0	22.5	805	484	1.26	51.8	0.04	7.40	4.79	23.16	149.0	570
TW-10	3-17	279	61.3	0.0	0.4	610	279	0.0	30.6	0.00	7.20	0.00	13.70	35.0	391
	6-29	375	81.7	0.0	4.9	530	281	<0.05	18.7	<0.03	8.40	0.30	14.80	40.0	364
	9-15	376	89.0	0.0	8.2	652	382	<0.05	39.0	<0.03		2.00	15.90	40.0	375
	MIN	279	61.3	0.0	0.4	530	279	0.00	18.7	0.00	7.20	0.00	13.70	35.0	364
	MAX	376	89.0	0.0	8.2	652	382	0.05	39.0	0.03	8.40	2.00	15.90	40.0	391
	MEAN	343	77.3	0.0	4.5	597	314	0.03	29.4	0.02	7.80	0.76	14.80	38.3	376
HISTORICAL (1988-92)	MIN	292	62.9	0.1	5.0	450	292	0.01	28.1	0.01	6.60	0.01	9.81	27.0	313
	MAX	714	211.0	1.0	30.0	950	732	1.17	77.1	1.21	7.85	5.00	55.03	350.0	439
	MEAN	399	94.8	0.7	14.0	580	390	0.19	37.3	0.09	7.36	1.52	17.73	70.6	377
	NO. OF ANALYSES	19	19	19	18	19	19	18	19	19	18	18	19	19	19
MM-ME**	3-17	413	72.6	0.0	7.3	720	343	0.00	39.2	0.00	7.10	1.90	17.00	80.0	453
	6-28	406	91.9	0.0	11.1	620	399	0.05	41.1	<0.03	7.02	0.80	21.60	80.0	426
	9-15	424	89.4	0.0	6.8	757	420	<0.05	48.0	<0.03	--	3.00	20.20	80.0	439
	12-15	326	76.0	<1.0	7.0	750	367	<0.20	43.0	<0.10	7.03	14.00	18.00	80.0	453
	MIN	326	72.6	0.0	6.8	620	343	0.00	39.2	0.00	7.02	0.80	17.00	80.0	426
	MAX	424	91.9	1.0	11.1	757	420	0.20	48.0	0.10	7.10	14.00	21.60	80.0	453
	MEAN	392	82.4	0.2	8.0	711	382	0.07	42.8	0.04	7.05	4.92	19.20	80.0	442
HISTORICAL (1991-92)	MIN	355	86.8	0.1	10.0	500	397	0.01	38.6	0.01	6.90	0.74	17.45	40.0	366
	MAX	427	100.0	1.0	25.0	690	432	2.81	49.6	0.07	7.59	7.95	37.16	110.0	439
	MEAN	388	94.6	0.2	17.5	615	409	0.50	42.0	0.02	7.30	3.69	23.30	80.5	411
	NO. OF ANALYSES	6	6	6	6	6	6	6	6	6	5	6	6	6	6

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

** Sample site intiated during 1991.



WORKINGS UPDATED TO MAY 1, 1994

FIGURE 6

DEER CREEK MINE
WATER SUMP AREAS

Initial data collected during the time frame December 1990 through December 1993 indicate the major constituents of water discharged from the mine have had only a minor impact on the receiving stream of Huntington Creek (see Appendices A and B for water quality analysis). Monitoring sites were established along the extent of Deer Creek in addition to sites above and below the confluence of Deer Creek on Huntington Creek. Listed below are the parameters analyzed to determine the potential impact.

Alkalinity (total)	pH
Calcium	Potassium
Chloride	Sodium
Flow	Solids: Settleable/Suspended
Iron (Total)	Sulfate
Magnesium	Temperature
Manganese	Turbidity
Oil & Grease	TDS
Oxygen - Dissolved	

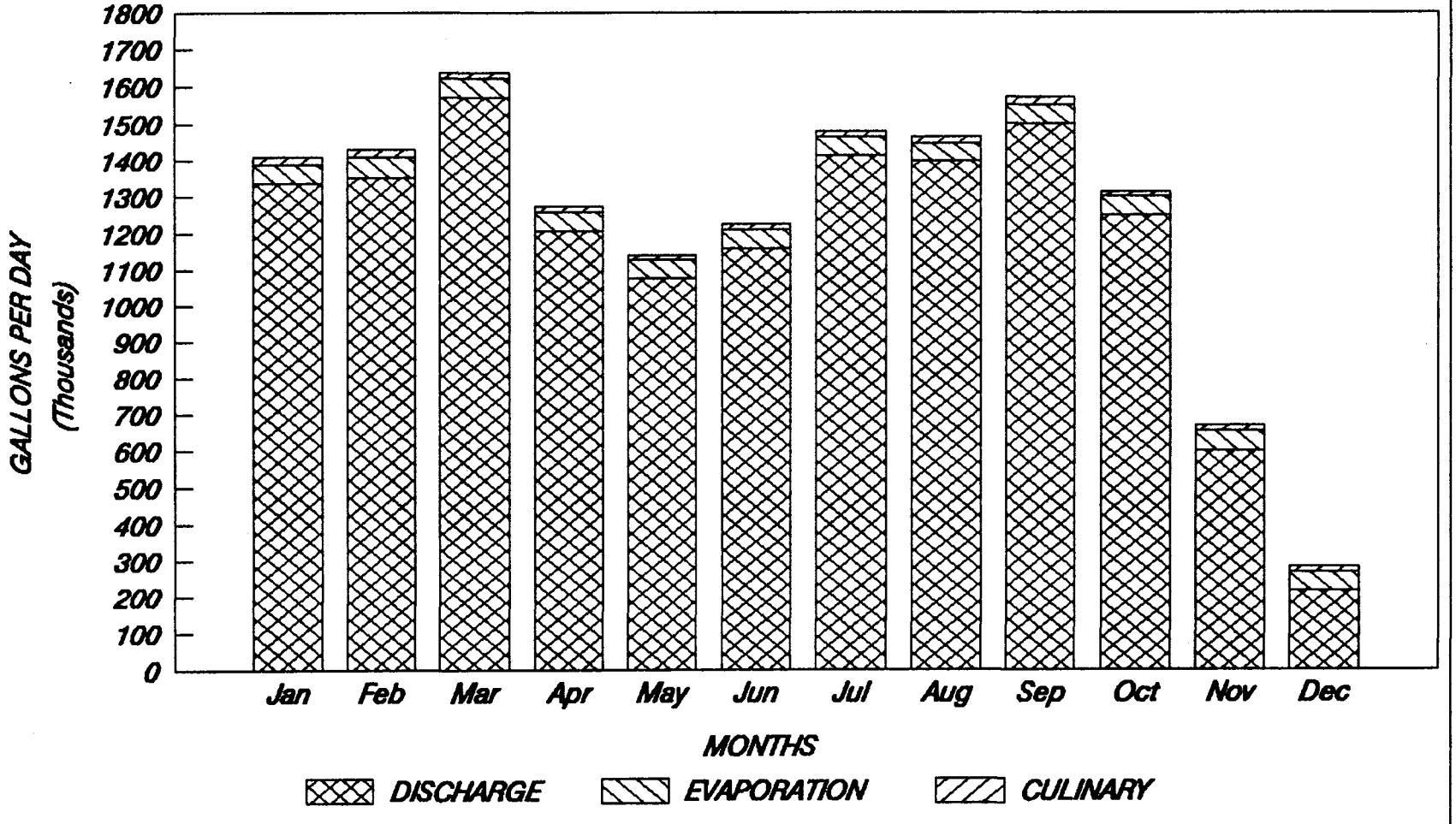
Considering the low flow conditions of Huntington Creek, downstream of the confluence of Deer Creek only the parameters TDS, sodium, and sulfate increased slightly from background.

The total water discharged from the Deer Creek Mine during 1993 was estimated at 1289 acre feet, or 427.4 million gallons. The recorded flow of 1289 acre feet during 1993 is a forty-nine percent (49%) decrease from the 1992 discharge of 2547 acre feet. The average monthly discharges are shown in Figure 7.

FIGURE 7

DEER CREEK MINE

1993 Mine Water Discharge



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 1993. Table 38 compares the minimum, maximum, and mean values from an historical standpoint to 1993. An examination of Table 38 reveals excellent correlation with historical results. Individual analysis can be found in Appendix J.

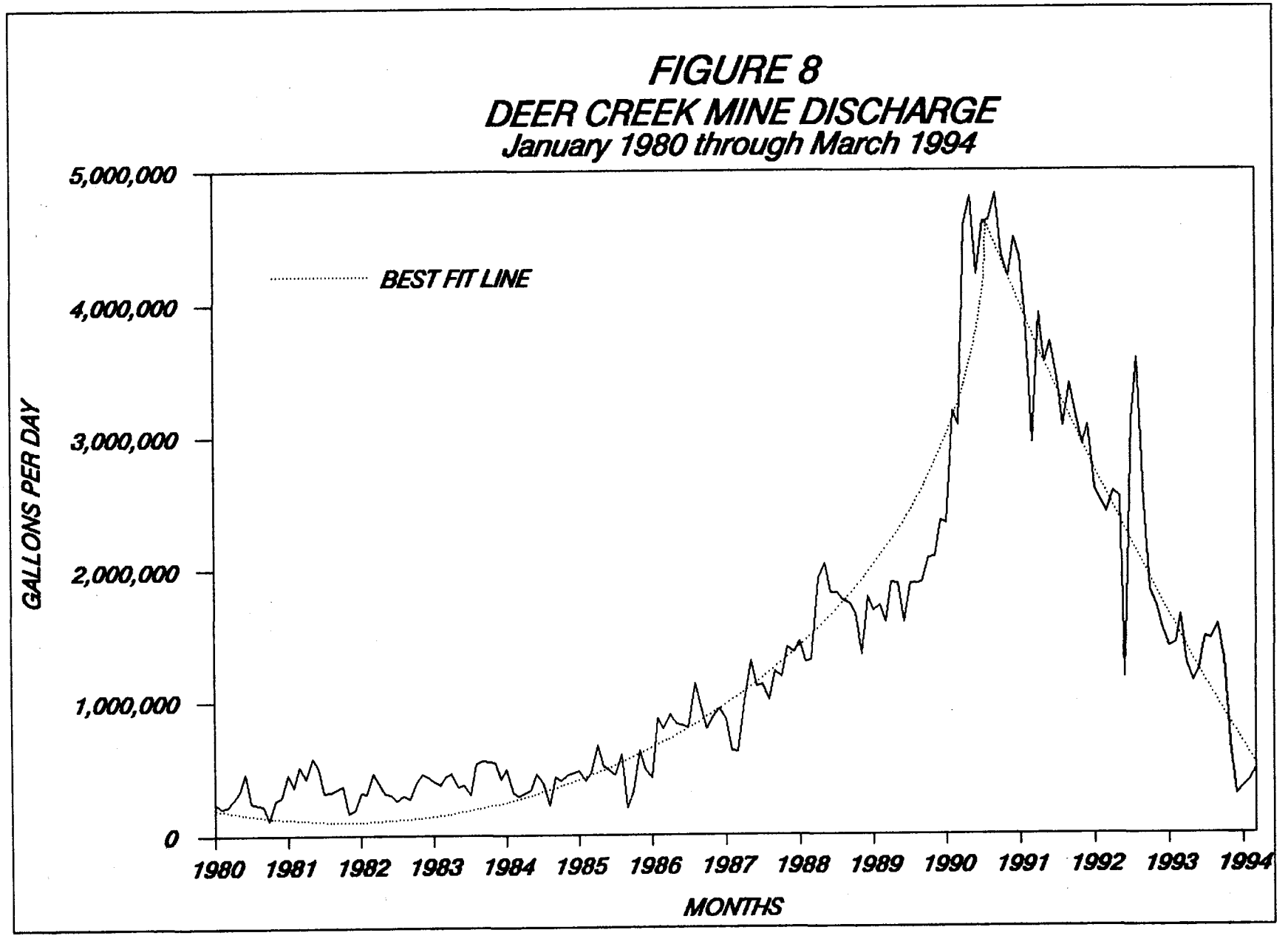


FIGURE 8
DEER CREEK MINE DISCHARGE
January 1980 through March 1994
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
GALLONS PER DAY
BEST FIT LINE
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
MONTHS

TABLE 38: DEER CREEK MINE - DISCHARGE WATER QUALITY*

Parameters	1993 Minimum	1993 Maximum	1993 Mean	Historical - (1976-1992) Minimum	Historical - (1976-1992) Maximum	Historical - (1976-1992) Mean
pH (units)	6.76	8.25	7.35	6.8	8.3	7.6
Acidity	0.1	24.0	5.9	0.1	97.0	11.7
Alkalinity	215	361	319	207	459	301.8
Chloride	0.7	49.0	12.8	2.4	60.0	17.2
Conductivity (umhos/cm)	762	1424	866	480	1900	886
Iron (Total)	<0.05	0.90	0.76	0.01	7.53	0.50
Oil & Grease	0.2	5.0	2.1	0.1	48.8	2.9
Sulfate	100	400	177	13.0	460	207.4
TDS	502	1027	598	289	1088	589
TSS	3.0	57	14.7	0.10	2784	68.5

* 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 1993.

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

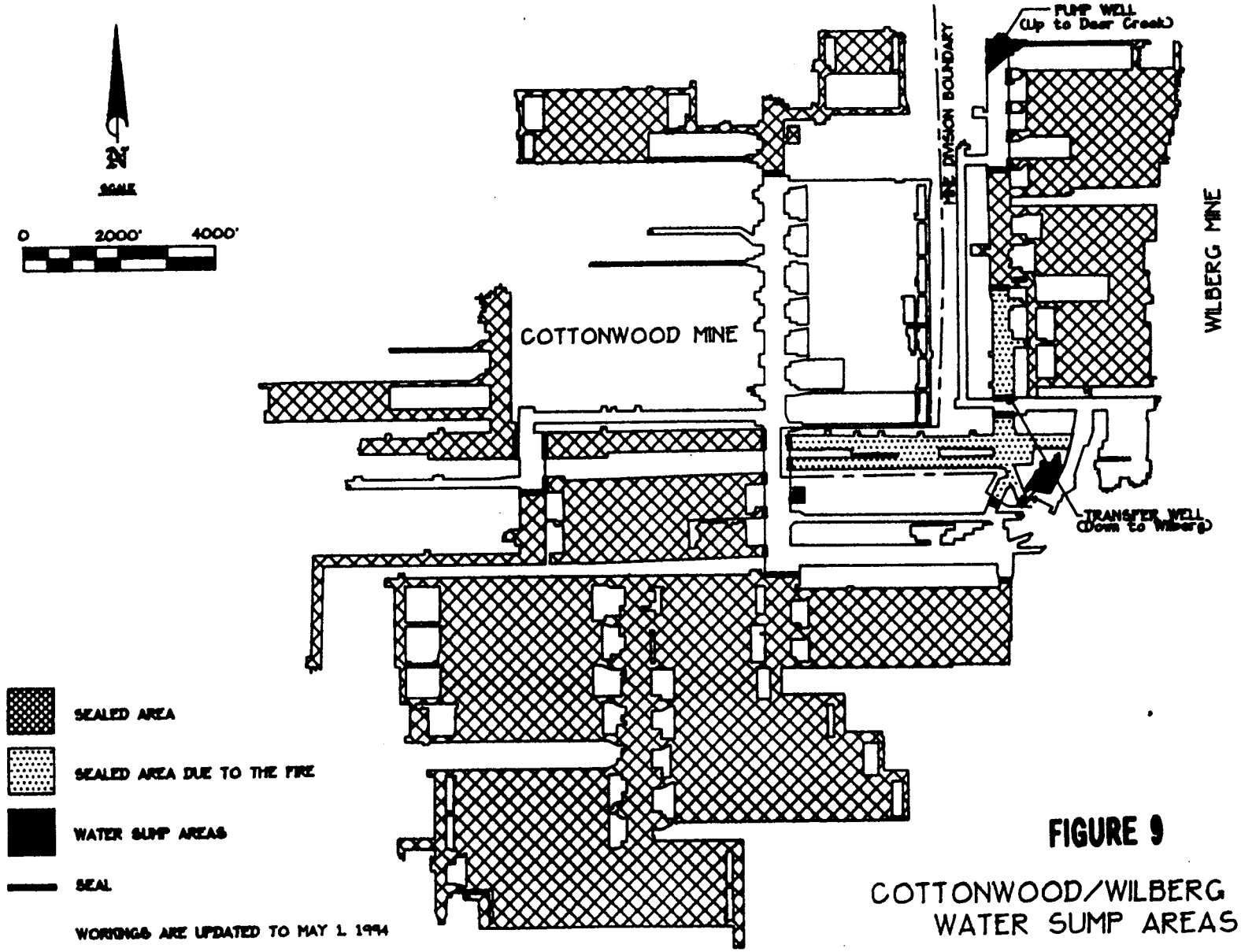


FIGURE 9

COTTONWOOD/WILBERG MINE
WATER SUMP AREAS

75

in the 1984 Annual Report, water discharged from the Wilberg Mine complex (includes the area designated as the Cottonwood Mine) decreased substantially from previous years. (See Figure 10.) The main reason for the large decrease was mining in areas dominated by mudstone roof. Consistent with previous years, the following table lists the factors involved in estimating in-mine water production.

Wilberg/Cottonwood Discharge

Grimes Wash	239.8 Million Gallons
Miller Canyon*	5.6 Million Gallons
Estimated Evaporation**	19.0 Million Gallons
Domestic Usage	2.7 Million Gallons
Total Discharge	267.1 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 1993. (See Map 5 in pocket for locations.) Parameters analyzed in 1993 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 1993 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 MARCH 1994

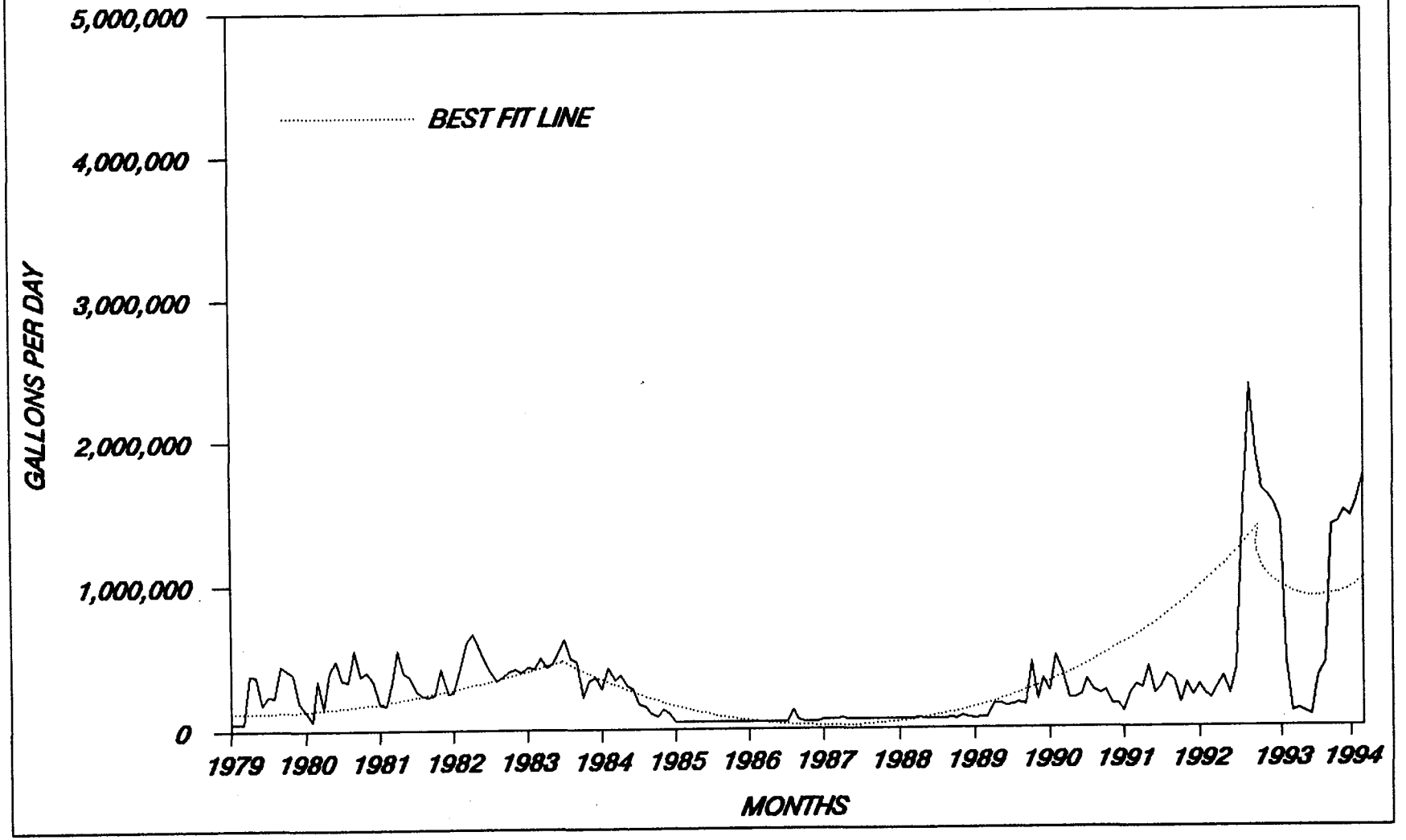


TABLE 39: WILBERG/COTTONWOOD IN-MINE WATER QUALITY* - 1993

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	3-23	568	172.0	0.0	14.3	1450	887	0.20	111.0	0.10	7.00	0.00	5.80	380	1066
	7-01	569	175.2	0.0	16.0	1260	833	<0.05	96.0	<0.03	7.09	2.40	22.50	500	1094
	9-23	597	150.0	<1.0	16.7	1536	745	<0.05	90.0	0.03	6.77	4.00	18.00	250	991
	12-13	491	162.0	<1.0	16.0	1523	841	<0.20	106.0	<0.10	6.72	6.00	22.00	500	1059
	MIN	491	150	0.0	14.3	1260	745	0.05	90.0	0.03	6.72	0.00	5.80	250	991
	MAX	597	175	1.0	16.7	1536	887	0.20	111.0	0.10	7.09	6.00	22.50	500	1094
	MEAN	556	164	0.5	15.7	1442	826	0.12	100.7	0.06	6.89	3.10	17.07	407	1052
HISTORICAL (1983-92)	MIN	403	116.0	0.1	9.6	1000	725	0.01	5.4	0.01	6.5	0.3	6.4	250	664
	MAX	676	330.0	1.0	160.0	2600	1022	0.30	134.4	0.08	8.0	7.4	36.9	690	1328
	MEAN	524	173.1	0.9	26.7	1465	873	0.09	104.6	0.02	7.3	4.1	23.0	420	997
	NO. OF ANALYSES	27	30	25	29	30	27	26	30	27	30	30	30	30	30
5R XC-9½	3-23	400	112.0	0.0	11.6	1000	537	0.27	62.0	0.00	7.00	0.20	22.30	220	685
3R XC-6	7-01	396	86.9	0.0	12.1	760	414	<0.05	47.9	<0.03	7.30	5.60	23.20	180	580
MWE XC-20H2E	9-23	433	109.5	<1.0	15.2	1193	533	0.35	63.0	<0.03	6.84	6.00	27.00	290	793
2R XC-13	12-13	410	115.0	<1.0	10.0	1011	510	<0.20	54.0	<0.10	6.82	4.00	19.00	150	651

* 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 239.8 million gallons was discharged to Grimes Wash during 1993; 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 8 to 12 GPM. Discharge from Miller Canyon is monitored in accordance with stipulations of the Wilberg Mine Discharge Permit UT-0022896-04. Approximately 5.6 million gallons were discharged during 1993.

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 1993. Table 40 compares the minimum, maximum, and mean values from 1993 to the historical values.

TABLE 40: WILBERG/COTTONWOOD - DISCHARGE WATER QUALITY*

GRIMES WASH

Parameters	1993 Minimum	1993 Maximum	1993 Mean	Historical - (1976-1992) Minimum	Historical - (1976-1992) Maximum	Historical - (1976-1992) Mean
pH (units)	7.2	8.1	7.71	6.9	8.5	7.66
Acidity	2.0	20.0	6.7	0.1	62.0	7.3
Alkalinity	240	346	291.1	163	442	278.5
Chloride	0.6	19.4	12.9	2.7	80.0	17.5
Conductivity (umhos/cm)	901	1224	1025	490	1590	952
Iron, Total	0.07	0.60	0.25	0.01	3.0	0.26
Oil & Grease	0.1	5.0	1.2	0.1	23.8	1.8
Sulfate	160	313	261.4	29.2	600	236.0
TDS	651	866	744	407	1287	593
TSS	2.0	17.0	6.4	0.1	222	7.7

MILLER CANYON

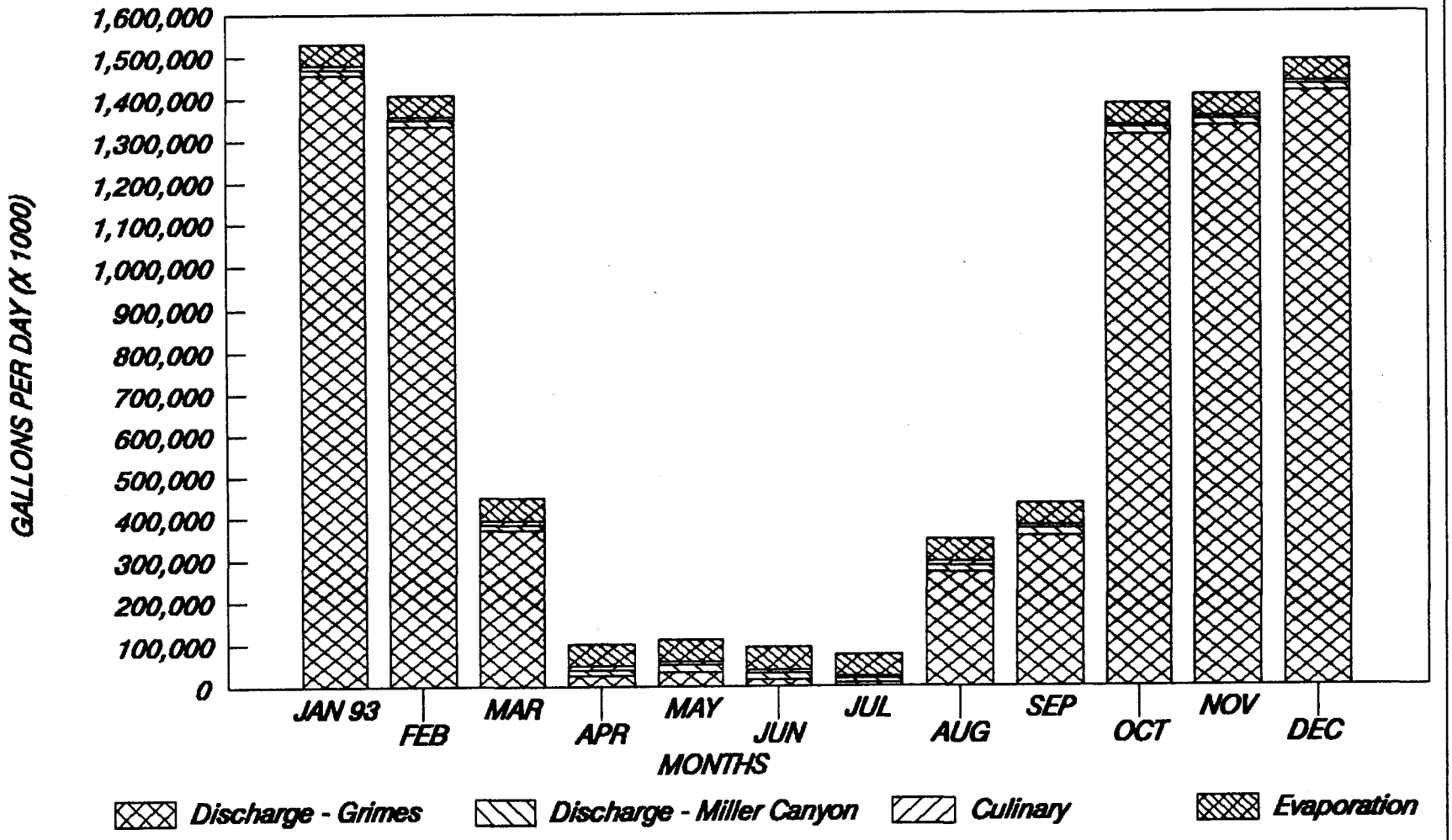
Parameters	1993 Minimum	1993 Maximum	1993 Mean	Historical - (1986-1992) Minimum	Historical - (1986-1992) Maximum	Historical - (1986-1992) Mean
pH (units)	6.86	8.51	7.70	6.4	8.4	7.16
Acidity	5.0	8.0	6.0	0.1	98	22.5
Alkalinity	219	353	262.8	225	445	346.3
Chloride	14	17	15.9	10	155	25.2
Conductivity (umhos/cm)	1090	1255	1199	480	1900	1185
Iron, Total	0.05	0.70	0.23	0.01	1.38	0.27
Oil & Grease	0.2	7.2	2.5	0.1	5.8	1.3
Sulfate	200	500	386.2	250	650	420.1
TDS	861	1030	941	413	1182	908
TSS	1.0	17	5.1	0.1	32	4.5

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

FIGURE 11

WILBERG/COTTONWOOD MINE

1993 Mine Water Discharge



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*	5.5 Million Gallons
Estimated Evaporation	7.8 Million Gallons
Domestic Usage	0.9 Million Gallons
Total Discharge	14.2 Million Gallons

* Intermittent Discharge

b. In-Mine Quality

Eight samples were collected in the Trail Mountain Mine in 1993. (See Map 6 in pocket for locations.) Parameters analyzed in 1993 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 1993 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* - 1993

LOCATION	SAMPLE DATES	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON DISSOLVED	MAGNESIUM	MANGANESE	pH (units)	POTASSIUM	SODIUM	SULFATE	TDS
UG-2	4-02	379	8.0	0.0	6.4	529	43	0.07	5.5	0.00	8.0	2.3	124.7	0.7	356
	7-02	359	14.7	0.0	2.5	500	65	0.06	6.8	<0.03	7.6	1.4	125.7	0.0	348
	9-23	379	7.1	<1.0	11.2	600	24	0.09	5.8	<0.03	7.8	3.0	123.0	<1.0	337
	12-16	376	8.0	4.0	5.0	N/A	41	<0.20	5.0	<0.10	8.3	3.0	117.0	<1.0	364
	MIN	359	7.1	1.0	2.5	495	24	0.06	5.0	0.00	7.6	1.4	117.0	0.0	337
	MAX	383	14.7	4.0	11.2	600	65	0.20	6.8	0.10	8.3	3.0	125.7	1.0	364
	MEAN	375	9.4	1.3	6.2	531	43	0.10	5.7	0.04	7.9	2.4	122.6	2.3	351
HISTORICAL (1985-92)	MIN	118	8.0	0.1	6.0	438	36	0.01	2.9	0.01	7.5	2.8	12.0	1.0	212
	MAX	395	683.2	9.6	355.0	3490	2419	0.10	201.0	0.05	8.3	18.9	148.0	1860.0	3170
	MEAN	304	190.4	6.3	99.4	1497	731	0.06	62.2	0.03	7.9	7.3	112.4	535.1	1147
	NO. OF ANALYSES	14	14	3	14	12	14	3	14	4	12	13	14	14	14
UG-3	4-02	305	26.4	0.0	7.8	436	153	0.03	21.2	0.00	7.7	2.1	50.7	20.0	297
	8-23	274	34.7	0.0	10.0	696	206	0.13	29.0	<0.03	8.1	3.0	49.0	130.0	424
	9-23	302	38.3	<1.0	9.7	640	194	<0.05	24.0	<0.03	7.4	4.0	55.0	90.0	366
	12-16	305	32.0	<1.0	8.0	536	175	<0.20	23.0	<0.10	7.6	3.0	49.0	25.0	323
	MIN	274	26.4	0.0	7.8	436	153	0.03	21.2	0.00	7.4	2.1	49.0	20.0	297
	MAX	305	38.3	1.0	10.0	696	206	0.20	29.0	0.10	8.1	4.0	55.0	130.0	424
	MEAN	296	32.8	0.5	8.8	577	182	0.10	24.3	0.04	7.7	3.0	50.9	66.0	352
HISTORICAL (1985-92)	MIN	291	30.3	0.1	5.8	380	161	0.06	19.6	0.00	7.9	3.0	48.1	16.0	252
	MAX	344	49.3	8.4	15.0	631	222	0.66	25.0	0.00	8.4	4.3	58.0	80.0	350
	MEAN	305	39.5	4.2	8.6	519	189	0.06	22.1	0.00	8.1	3.6	52.7	41.0	302
	NO. OF ANALYSES	8	8	2	8	8	8	1	8	0	8	8	8	8	8

* 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.

A total of 5.5 million gallons was discharged to Cottonwood Canyon Creek during 1993. Intermittent discharges occurred during the months of January through April and September with a flow rate ranging from 30 to 84 GPM. 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. A total of five (5) samples was collected during 1993. (Refer to Appendix N for the individual lab analysis sheets.) Appendix N also includes monitoring completed at the 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-1	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 1993 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 1993. As Figure 12 reveals, the water levels remained relatively constant during 1993.

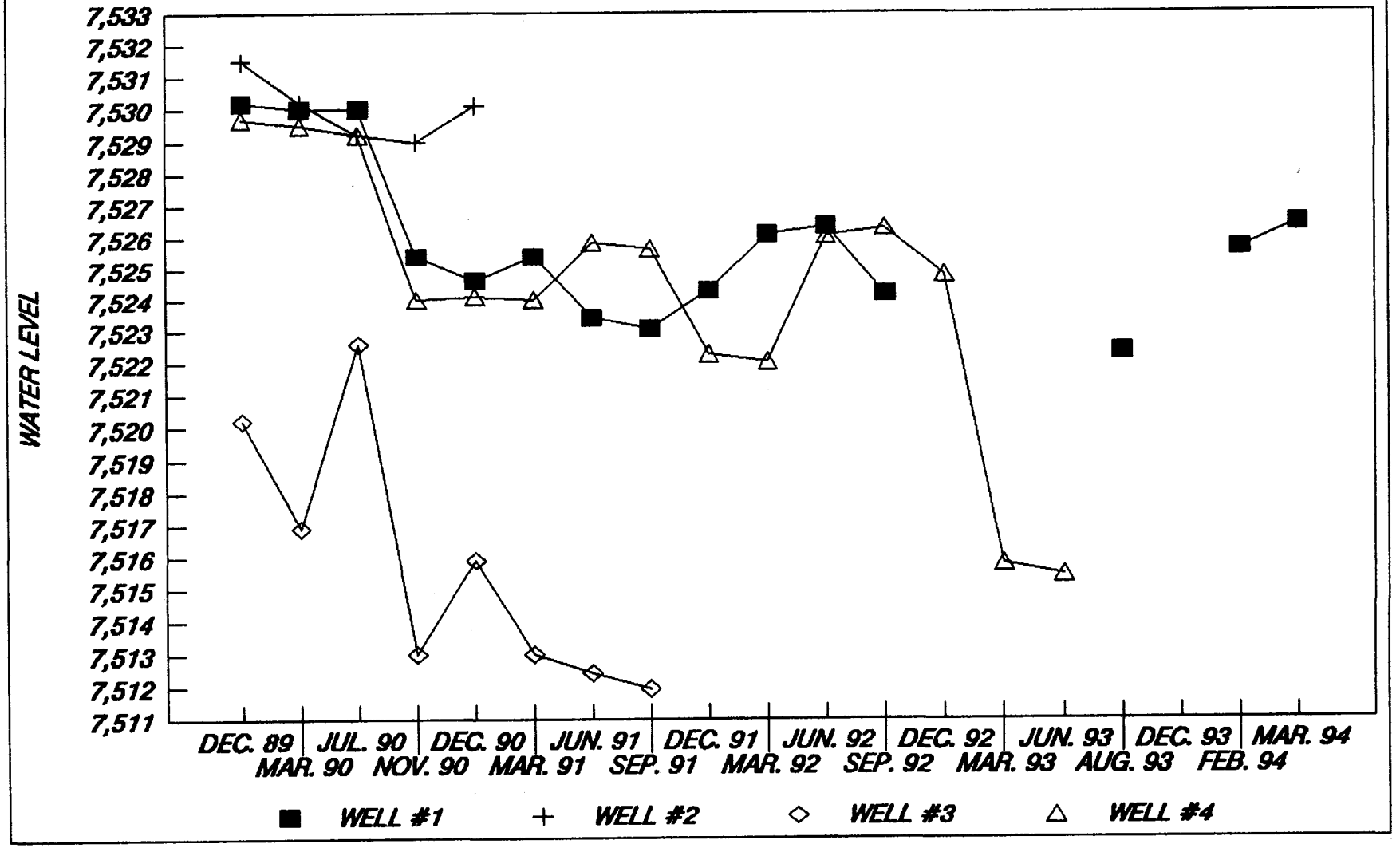
2. Cottonwood Mine

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.

FIGURE 12

DEER CREEK MINE PIEZOMETRIC STUDY

IN-MINE WATER WELL ELEVATIONS



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 1993. 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: WASTE ROCK STORAGE FACILITIES - WATER QUALITY* - 1993

SAMPLE DATES	BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	DISSOLVED IRON	MAGNESIUM	MANGANESE	pH (units)	POTASSIUM	SODIUM	SULFATE	TDS
DEER CREEK - DCWR-1														
3-17	767	156.9	0.0	992	24,500	1300	0.07	220.5	0.05	7.5	22.0	6560	16,000	23,169
7-01	777	146.2	0.0	954	34,800	1220	0.16	207.7	0.03	7.5	31.1	5550	13,000	22,789
9-28	807	205.0	0.0	872	24,400	1706	0.05	290.0	0.20	7.7	14.0	7100	12,000	22,324
12-17	626	185.0	0.0	850	23,800	1533	0.20	260.0	0.10	7.8	15.0	6750	13,000	21,751
MIN	626	146.2	0.0	850	23,800	1220	0.05	207.7	0.03	7.5	14.0	5550	12,000	21,751
MAX	807	205.0	0.0	992	34,800	1706	0.20	290.0	0.20	7.8	31.1	6750	16,000	23,169
MEAN	744	173.3	0.0	917	26,875	1440	0.12	244.6	0.10	7.6	20.5	6490	13,500	22,508
HISTORICAL 1989-1992:														
MIN	673	142.2	0.0	645.0	18,900	951	0.06	57.0	0.01	7.3	19.2	5165	6,000	11,466
MAX	935	880.1	1.0	1140.0	45,000	3351	1.74	351.0	0.09	8.2	43.8	9978	18,000	24,189
MEAN	761	314.4	0.6	882.1	27,131	1732	0.50	230.0	0.05	7.7	27.5	7154	13,528	20,693
NO. OF ANALYSES	15	16	16	16	16	16	12	16	16	16	16	16	16	16
WILBERG/COTTONWOOD - WCWR-1														
4-05	337	337.9	0.0	2341	44,900	6748	0.29	1424	0.02	8.2	62.0	5530	18,000	27,422
7-01	392	337.0	0.0	2530	34,000	5960	0.34	1243	0.03	7.7	73.0	7030	14,000	27,177
9-13	333	132.0	0.0	2933	25,800	4818	0.05	1090	0.03	7.9	8.0	6620	14,000	24,794
12-20	305	265.0	0.0	3700	24,900	4986	0.40	1050	0.10	6.9	43.0	5550	1,000	21,494
MIN	305	132.0	0.0	2341	24,900	4818	0.05	1050	0.02	6.9	8.0	5530	1,000	21,494
MAX	392	337.9	0.0	3700	44,900	6748	0.40	1424	0.10	8.2	73.0	7030	18,000	27,422
MEAN	342	268.0	0.0	2876	32,400	5628	0.27	1202	0.05	7.7	46.5	6182	11,750	25,222
HISTORICAL 1989-1992:														
MIN	386	266.4	0.0	280	10,666	1629	0.05	138	0.02	6.9	18.0	851	750	8,714
MAX	863	1135.0	1.0	1135	120,000	8327	9.00	1717	2.48	7.8	119.1	8812	24,000	30,440
MEAN	580	543.8	0.6	670	35,084	4082	1.38	630	0.55	7.5	52.6	4891	12,750	18,450
NO. OF ANALYSES	15	15	15	15	15	15	11	15	15	15	15	15	15	15
TRAIL MOUNTAIN TM-1														
4-02	695	8.7	0.0	108	1,300	51	0.89	7	0.00	8.6	2.1	397	30	848
6-10	611	11.3	0.0	112	1,350	54	0.08	6	0.03	8.4	1.8	343	20	825
9-10	614	10.5	18.0	102	1,340	46	0.18	5	0.03	8.7	2.0	304	18	883
HISTORICAL 1985-1992:														
MIN	254	4.0	0.0	42	600	25	0.05	1	0.01	7.1	0.0	12	7	402
MAX	816	196.1	24.0	680	3,350	916	6.40	168	10.10	8.8	10.7	420	283	1,630
MEAN	537	54.5	3.1	230	1,649	308	1.20	37	0.40	8	5.0	271	120	964
NO. OF ANALYSES	27	27	27	27	21	25	23	27	27	21	27	27	27	26

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

Four samples were collected in 1993 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 data collected in 1993 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.

CONTENTS

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

X

Y

Z

ENG0006A HUNTINGTON CREEK AT PLANT OCT92-SEPT93

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	10.00	28.00	15.00	17.00	14.00	17.00	23.00	63.00	262.00	205.00	94.00	73.00	1
2	11.00	32.00	16.00	16.00	11.00	16.00	25.00	71.00	243.00	200.00	94.00	71.00	2
3	10.00	25.00	13.00	13.00	7.00	13.00	23.00	85.00	234.00	190.00	94.00	70.00	3
4	8.80	21.00	11.00	11.00	8.10	13.00	24.00	101.00	186.00	184.00	101.00	70.00	4
5	8.00	22.00	11.00	16.00	10.00	16.00	27.00	77.00	170.00	180.00	101.00	71.00	5
6	8.30	18.00	12.00	18.00	16.00	15.00	24.00	69.00	160.00	191.00	96.00	71.00	6
7	10.00	18.00	13.00	17.00	16.00	14.00	22.00	71.00	144.00	99.00	98.00	71.00	7
8	13.00	17.00	14.00	17.00	14.00	15.00	24.00	63.00	141.00	93.00	101.00	85.00	8
9	13.00	17.00	15.00	17.00	13.00	16.00	27.00	54.00	128.00	91.00	108.00	86.00	9
10	15.00	11.00	16.00	16.00	15.00	16.00	29.00	57.00	124.00	91.00	123.00	80.00	10
11	15.00	9.90	15.00	13.00	16.00	17.00	29.00	78.00	128.00	90.00	103.00	82.00	11
12	16.00	12.00	15.00	9.20	16.00	14.00	30.00	107.00	134.00	90.00	93.00	85.00	12
13	17.00	14.00	11.00	17.00	9.30	15.00	28.00	146.00	152.00	115.00	83.00	85.00	13
14	18.00	11.00	9.70	19.00	9.20	16.00	27.00	188.00	162.00	115.00	79.00	88.00	14
15	21.00	9.60	19.00	18.00	12.00	17.00	27.00	225.00	201.00	114.00	89.00	102.00	15
16	22.00	8.70	9.80	16.00	15.00	17.00	28.00	270.00	210.00	112.00	89.00	99.00	16
17	15.00	8.70	12.00	16.00	18.00	18.00	29.00	279.00	269.00	111.00	80.00	102.00	17
18	16.00	8.90	16.00	16.00	14.00	22.00	31.00	408.00	230.00	110.00	78.00	104.00	18
19	17.00	12.00	11.00	15.00	18.00	19.00	30.00	399.00	210.00	109.00	78.00	102.00	19
20	17.00	19.00	13.00	13.00	17.00	19.00	29.00	438.00	244.00	107.00	83.00	101.00	20
21	18.00	17.00	16.00	16.00	14.00	19.00	31.00	495.00	288.00	106.00	83.00	123.00	21
22	20.00	14.00	14.00	14.00	15.00	20.00	38.00	498.00	269.00	105.00	81.00	79.00	22
23	20.00	15.00	13.00	7.00	15.00	21.00	44.00	444.00	243.00	104.00	81.00	85.00	23
24	21.00	9.90	12.00	12.00	15.00	22.00	46.00	411.00	213.00	102.00	80.00	93.00	24
25	25.00	4.50	14.00	15.00	14.00	23.00	40.00	389.00	186.00	101.00	74.00	88.00	25
26	26.00	6.30	14.00	17.00	17.00	23.00	43.00	386.00	181.00	100.00	77.00	87.00	26
27	27.00	10.00	15.00	12.00	17.00	29.00	51.00	365.00	178.00	99.00	72.00	87.00	27
28	26.00	19.00	17.00	13.00	16.00	26.00	65.00	357.00	173.00	98.00	63.00	88.00	28
29	26.00	17.00	16.00	16.00	0.00	28.00	73.00	313.00	177.00	97.00	63.00	88.00	29
30	28.00	11.00	17.00	17.00	0.00	24.00	70.00	290.00	211.00	96.00	68.00	75.00	30
31	30.00	0.00	15.00	16.00	0.00	22.00	0.00	271.00	0.00	95.00	62.00	0.00	31

MONTHLY

TOT	548.10	446.50	430.50	466.20	391.60	582.00	1037.00	7568.00	5851.00	3700.00	2669.00	2591.00
MEA	17.70	14.90	13.90	15.00	14.00	18.80	34.60	244.00	195.00	119.00	86.10	86.40
MAX	30.00	32.00	19.00	19.00	18.00	29.00	73.00	498.00	288.00	205.00	123.00	123.00
MIN	8.00	4.50	9.70	7.00	7.00	13.00	22.00	54.00	124.00	90.00	62.00	70.00
ACR FT	1090.00	886.00	854.00	925.00	777.00	1150.00	2060.00	15010.00	11610.00	7340.00	5290.00	5140.00

OCT92-SEPT93 TOTAL 26280.90 MEAN 72.00 MAX 498.00 MIN 4.50 TOT ACR FT 52130.00

TOTAL MEAN MAX MIN TOT ACR FT

MAX UNIT DISCHARGE 629.00 CFS (4.32 FT) DATE MAY 21 MIN UNIT DISCHARGE 3.00 CFS DATE FEB 3

REMARKS:

Note: Ice period begins 11/2/92. Ice period ends 3/14/93. Clock stopped; flows will be estimated from 7/13 to 8/1/93.

NG0006A ELECTRIC LAKE OCT92-SEPT93 PAGE 0

UTAH POWER & LIGHT COMPANY

DAILY GAGE HEIGHT (FEET)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	213.73	212.34	210.95	209.65	208.43	207.17	205.85	208.50	245.75	254.01	253.12	250.33	1
2	213.65	212.34	210.93	209.63	208.37	207.12	205.85	208.91	247.62	254.02	252.95	250.00	2
3	213.58	212.31	210.90	209.61	208.28	207.05	205.85	209.33	247.96	254.03	252.89	249.66	3
4	213.52	212.27	210.85	209.54	208.24	206.96	205.85	209.75	248.29	254.00	252.80	249.36	4
5	213.46	212.21	210.83	209.54	208.17	206.89	205.85	210.17	248.63	254.00	252.71	249.05	5
6	213.40	212.17	210.80	209.45	208.12	206.83	205.85	210.58	248.96	253.99	252.62	248.72	6
7	213.35	212.15	210.75	209.45	208.09	206.77	205.85	211.00	249.30	253.97	252.53	248.38	7
8	213.28	212.10	210.69	209.44	208.05	206.70	205.85	211.42	249.63	253.95	252.45	247.99	8
9	213.24	212.06	210.67	209.44	208.04	206.66	205.77	211.83	249.97	253.93	252.36	247.61	9
10	213.18	211.98	210.60	209.41	207.99	206.59	205.72	212.25	250.30	253.90	252.27	247.22	10
11	213.13	211.92	210.54	209.40	207.94	206.51	205.70	212.78	250.64	253.87	252.18	246.82	11
12	213.09	211.86	210.51	209.37	207.92	206.46	205.70	213.48	250.97	253.85	252.09	246.44	12
13	213.04	211.81	210.44	209.34	207.85	206.39	205.66	214.60	251.31	253.83	252.00	246.11	13
14	212.98	211.76	210.37	209.29	207.80	206.37	205.63	215.93	251.64	253.80	251.91	245.66	14
15	212.93	211.70	210.32	209.27	207.74	206.35	205.61	217.56	251.98	253.79	251.82	245.17	15
16	212.87	211.65	210.26	209.22	207.70	206.30	205.61	219.40	252.31	253.77	251.73	244.70	16
17	212.82	211.60	210.22	209.19	207.65	206.25	205.59	221.41	252.65	253.75	251.64	244.23	17
18	212.76	211.52	210.22	209.14	207.61	206.24	205.58	223.03	252.79	253.73	251.56	243.74	18
19	212.72	211.49	210.19	209.10	207.60	206.19	205.58	224.66	253.00	253.69	251.47	243.26	19
20	212.67	211.46	210.10	209.06	207.58	206.11	205.58	226.28	253.17	253.65	251.38	242.76	20
21	212.63	211.41	210.05	209.01	207.55	206.09	205.58	227.90	253.35	253.62	251.29	242.24	21
22	212.59	211.39	210.01	208.95	207.50	206.03	205.58	229.52	253.50	253.60	251.20	242.09	22
23	212.54	211.37	209.95	208.85	207.47	205.99	205.58	231.15	253.63	253.57	251.11	241.96	23
24	212.48	211.31	209.90	208.80	207.47	205.98	205.58	232.77	253.72	253.53	251.02	241.80	24
25	212.47	211.25	209.85	208.75	207.45	205.97	206.00	234.39	253.80	253.49	250.93	241.68	25
26	212.44	211.18	209.82	208.71	207.37	205.97	206.41	236.01	253.86	253.48	250.84	241.57	26
27	212.39	211.12	209.76	208.66	207.30	205.97	206.83	237.64	253.91	253.47	250.76	241.29	27
28	212.37	211.08	209.75	208.60	207.23	205.97	207.25	239.26	253.95	253.39	250.67	241.14	28
29	212.37	211.05	209.73	208.55	0.00	205.97	207.66	240.88	253.98	253.35	250.58	241.06	29
30	212.36	210.99	209.72	208.49	0.00	205.97	208.08	242.50	254.01	253.27	250.49	241.03	30
31	212.35	0.00	209.69	208.48	0.00	205.95	0.00	244.13	0.00	253.20	250.40	0.00	31

MAXIMUM GAGE HEIGHT 254.03 JUL 3 MINIMUM GAGE HEIGHT 205.58 APR 18

NOTE: ADD 8300 FEET TO GAGE HEIGHT TO OBTAIN ELEVATION

IG0006A ELECTRIC LAKE OCT92-SEPT93 PAGE 0

UTAH POWER & LIGHT COMPANY
RESERVOIR RECORDS

DAILY CONTENTS (ACRE FEET)

AY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
	11325.00	11023.00	10726.00	10453.00	10201.00	9944.00	9680.00	10215.00	19794.00	22616.00	22298.00	21321.00	1
	11307.00	11023.00	10722.00	10449.00	10189.00	9934.00	9680.00	10300.00	20405.00	22620.00	22237.00	21207.00	2
	11292.00	11017.00	10716.00	10445.00	10170.00	9920.00	9680.00	10387.00	20518.00	22623.00	22216.00	21091.00	3
	11279.00	11008.00	10705.00	10430.00	10162.00	9902.00	9680.00	10474.00	20628.00	22613.00	22184.00	20984.00	4
	11266.00	10995.00	10701.00	10430.00	10148.00	9888.00	9680.00	10562.00	20742.00	22613.00	22152.00	20884.00	5
	11253.00	10987.00	10695.00	10412.00	10137.00	9876.00	9680.00	10648.00	20853.00	22609.00	22120.00	20772.00	6
	11242.00	10982.00	10684.00	10412.00	10131.00	9864.00	9680.00	10737.00	20968.00	22602.00	22088.00	20658.00	7
	11227.00	10972.00	10671.00	10410.00	10123.00	9850.00	9680.00	10826.00	21081.00	22595.00	22060.00	20511.00	8
	11218.00	10963.00	10667.00	10410.00	10121.00	9842.00	9664.00	10914.00	21197.00	22588.00	22028.00	20402.00	9
	11205.00	10946.00	10652.00	10403.00	10111.00	9828.00	9654.00	11004.00	21310.00	22577.00	21997.00	20273.00	10
	11194.00	10933.00	10640.00	10401.00	10101.00	9812.00	9650.00	11118.00	21428.00	22566.00	21965.00	20142.00	11
	11185.00	10920.00	10633.00	10395.00	10097.00	9802.00	9650.00	11270.00	21542.00	22559.00	21933.00	20018.00	12
	11175.00	10909.00	10619.00	10389.00	10082.00	9788.00	9642.00	11516.00	21660.00	22552.00	21902.00	19911.00	13
	11161.00	10899.00	10604.00	10378.00	10072.00	9784.00	9637.00	11813.00	21775.00	22541.00	21870.00	19765.00	14
	11151.00	10886.00	10593.00	10374.00	10060.00	9780.00	9633.00	12182.00	21895.00	22537.00	21838.00	19608.00	15
	11138.00	10875.00	10581.00	10364.00	10052.00	9770.00	9633.00	12606.00	22011.00	22530.00	21807.00	19458.00	16
	11127.00	10865.00	10572.00	10358.00	10042.00	9760.00	9629.00	13079.00	22131.00	22523.00	21775.00	19310.00	17
	11114.00	10847.00	10572.00	10347.00	10034.00	9758.00	9627.00	13467.00	22180.00	22516.00	21747.00	19156.00	18
	11105.00	10841.00	10566.00	10339.00	10031.00	9748.00	9627.00	13864.00	22255.00	22501.00	21716.00	19006.00	19
	11094.00	10835.00	10547.00	10331.00	10027.00	9732.00	9627.00	14265.00	22316.00	22487.00	21685.00	18851.00	20
	11086.00	10824.00	10537.00	10320.00	10021.00	9722.00	9627.00	14674.00	22380.00	22476.00	21653.00	18691.00	21
	11077.00	10820.00	10528.00	10308.00	10011.00	9716.00	9627.00	15092.00	22433.00	22469.00	21622.00	18645.00	22
	11066.00	10816.00	10516.00	10287.00	10005.00	9708.00	9627.00	15522.00	22480.00	22458.00	21591.00	18605.00	23
	11053.00	10803.00	10505.00	10277.00	10005.00	9706.00	9627.00	15957.00	22512.00	22444.00	21559.00	18556.00	24
	11051.00	10790.00	10495.00	10267.00	10001.00	9704.00	9710.00	16401.00	22541.00	22430.00	21528.00	18519.00	25
	11045.00	10775.00	10489.00	10258.00	9985.00	9704.00	9792.00	16855.00	22562.00	22426.00	21497.00	18486.00	26
	11034.00	10762.00	10476.00	10248.00	9971.00	9704.00	9876.00	17321.00	22580.00	22423.00	21469.00	18401.00	27
	11030.00	10754.00	10474.00	10236.00	9957.00	9704.00	9961.00	17794.00	22595.00	22394.00	21438.00	18355.00	28
	11030.00	10748.00	10470.00	10226.00	0.00	9704.00	10044.00	18277.00	22605.00	22380.00	21407.00	18331.00	29
	11027.00	10735.00	10468.00	10213.00	0.00	9704.00	10129.00	18770.00	22616.00	22351.00	21376.00	18322.00	30
	11025.00	0.00	10462.00	10211.00	0.00	9700.00	0.00	19278.00	0.00	22326.00	21345.00	0.00	31
NTHLY ANGE	-348.	-290.	-273.	-251.	-254.	-257.	429.	9149.	3338.	-290.	-981.	-3023.	

CT92-SEPT93 TOTAL CHANGE 6949. MAX CONTENTS 22623. AC FT JUL 3 MIN CONTENTS 9627. AC FT APR 18

TOTAL CHANGE MAX CONTENTS MIN CONTENTS

MARKS:

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	13.00	9.90	12.00	11.00	11.00	12.00	11.00	15.00	19.00	19.00	14.00	49.00	1
2	12.00	9.90	11.00	11.00	11.00	13.00	11.00	15.00	18.00	19.00	14.00	68.00	2
3	12.00	9.90	10.00	11.00	11.00	12.00	11.00	16.00	17.00	19.00	15.00	67.00	3
4	11.00	10.00	10.00	11.00	11.00	12.00	11.00	16.00	16.00	19.00	15.00	67.00	4
5	10.00	10.00	10.00	11.00	11.00	12.00	11.00	16.00	16.00	20.00	15.00	66.00	5
6	10.00	10.00	9.70	11.00	11.00	12.00	12.00	17.00	16.00	20.00	15.00	66.00	6
7	10.00	10.00	9.40	11.00	11.00	12.00	12.00	17.00	15.00	20.00	15.00	72.00	7
8	10.00	10.00	11.00	11.00	11.00	12.00	12.00	17.00	16.00	20.00	14.00	78.00	8
9	10.00	10.00	12.00	11.00	11.00	12.00	12.00	18.00	16.00	20.00	14.00	77.00	9
10	10.00	11.00	12.00	11.00	11.00	12.00	12.00	18.00	16.00	19.00	14.00	76.00	10
11	10.00	11.00	12.00	11.00	11.00	12.00	12.00	18.00	17.00	20.00	15.00	76.00	11
12	10.00	11.00	12.00	11.00	11.00	12.00	12.00	17.00	17.00	16.00	16.00	76.00	12
13	10.00	11.00	12.00	11.00	11.00	12.00	12.00	17.00	16.00	14.00	16.00	75.00	13
14	10.00	11.00	12.00	11.00	11.00	12.00	13.00	17.00	15.00	15.00	16.00	86.00	14
15	10.00	11.00	12.00	12.00	11.00	12.00	13.00	17.00	16.00	15.00	16.00	97.00	15
16	10.00	11.00	12.00	12.00	12.00	12.00	13.00	17.00	16.00	14.00	16.00	95.00	16
17	10.00	11.00	12.00	12.00	12.00	12.00	13.00	17.00	16.00	14.00	15.00	93.00	17
18	10.00	11.00	12.00	12.00	12.00	12.00	13.00	17.00	16.00	13.00	15.00	93.00	18
19	10.00	11.00	11.00	12.00	12.00	12.00	13.00	17.00	16.00	13.00	15.00	93.00	19
20	10.00	11.00	13.00	12.00	12.00	12.00	13.00	17.00	17.00	13.00	16.00	94.00	20
21	10.00	11.00	12.00	11.00	12.00	12.00	14.00	17.00	17.00	13.00	15.00	101.00	21
22	10.00	11.00	10.00	11.00	12.00	12.00	14.00	18.00	17.00	14.00	15.00	31.00	22
23	10.00	11.00	10.00	11.00	12.00	11.00	14.00	18.00	17.00	14.00	14.00	31.00	23
24	10.00	11.00	10.00	11.00	12.00	11.00	14.00	18.00	17.00	14.00	14.00	32.00	24
25	10.00	11.00	10.00	11.00	12.00	11.00	14.00	18.00	18.00	14.00	15.00	33.00	25
26	10.00	11.00	10.00	11.00	12.00	11.00	14.00	18.00	18.00	13.00	15.00	33.00	26
27	10.00	11.00	10.00	11.00	12.00	11.00	14.00	19.00	18.00	15.00	18.00	34.00	27
28	10.00	11.00	10.00	11.00	12.00	11.00	15.00	18.00	18.00	16.00	19.00	34.00	28
29	10.00	11.00	11.00	11.00	0.00	11.00	15.00	18.00	18.00	15.00	19.00	34.00	29
30	10.00	12.00	11.00	11.00	0.00	11.00	15.00	18.00	17.00	14.00	19.00	18.00	30
31	9.90	0.00	11.00	11.00	0.00	10.00	0.00	18.00	0.00	14.00	31.00	0.00	31
MONTHLY													
TOT	317.90	321.70	342.10	347.00	321.00	363.00	385.00	534.00	502.00	498.00	495.00	1945.00	
MEA	10.30	10.70	11.00	11.20	11.50	11.70	12.80	17.20	16.70	16.10	16.00	64.80	
MAX	13.00	12.00	13.00	12.00	12.00	13.00	15.00	19.00	19.00	20.00	31.00	101.00	
MIN	9.90	9.90	9.40	11.00	11.00	10.00	11.00	15.00	15.00	13.00	14.00	18.00	
ACR FT	631.00	638.00	679.00	688.00	637.00	720.00	764.00	1060.00	996.00	988.00	982.00	3860.00	

OCT92-SEPT93 TOTAL 6371.70 MEAN 17.50 MAX 101.00 MIN 9.40 TOT ACR FT 12640.00
TOTAL MEAN MAX MIN TOT ACR FT

MAX UNIT DISCHARGE 191.00 CFS (2.76 FT) DATE SEP 21 MIN UNIT DISCHARGE 1.70 CFS DATE JUN 30

REMARKS:
Note: From 3/1 to 3/31/93 the recorder ran one day slow. On 5/3/93, the clock stopped for 39 days; a new clock was installed on 5/10/93.

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (708) 953-9300

SINCE 1908

Member of the SGS Group (Societe Generale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

January 22, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by ENERGY WEST (KH)

Date sampled January 15, 1993

Date received January 15, 1993

HUNTINGTON CANYON CREEK
HCC-01 EW
Temperature 33.7°F
Flow N/A
Rec'd 1200 hr.
Sampled 1120 hr.

FIELD MEASUREMENTS

pH	7.95
Conductivity	423
DO	6.7
Turbidity	7.3

Analysis report no. 59-12820

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	01-18-1993 08:00 LS
Alkalinity, Bicarbonate	235	1	mg/l $CaCO_3$	EPA 310.1	01-18-1993 08:00 LS
Alkalinity, Carbonate	6	1	mg/l $CaCO_3$	EPA 310.1	01-21-1993 10:40 LDS
Alkalinity, Total	193	1	mg/l $CaCO_3$	EPA 310.1	01-18-1993 08:00 LS
Anions	5.58	----	meq/l	---	--- ----- --
Calcium	76.4	.1	mg/l	EPA 215.1	01-20-1993 13:00 LM
Cations	5.81	----	meq/l	---	--- ----- --
Chloride	20.0	.1	mg/l	EPA 325.3	01-18-1993 09:00 LS
Conductivity	440	2	umhos/cm	EPA 120.1	01-18-1993 10:00 LS
Hardness, Total	275	1	mg/l $CaCO_3$	---	01-20-1993 13:00 LS
Iron	0.20	.02	mg/l	EPA 236.1	01-20-1993 13:45 LS
Iron, Dissolved	0.15	.02	mg/l	EPA 236.1	01-20-1993 13:45 LS
Magnesium	20.52	.01	mg/l	EPA 242.1	01-20-1993 13:00 LS
Manganese	0.00	.01	mg/l	EPA 243.1	01-20-1993 13:45 LS
Oil & Grease	0.0	1	mg/l	EPA 413.1	01-19-1993 10:30 LM
Oxygen, Dissolved	9.0	.01	mg/l	EPA 360.1	01-15-1993 13:00 LM
pH	8.40	----	Units	EPA 150.1	01-15-1993 13:00 LM
Potassium	0.00	.01	mg/l	EPA 258.1	01-20-1993 13:00 LS
Sodium	7.20	.01	mg/l	EPA 273.1	01-20-1993 13:00 LS
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	01-15-1993 08:30 LM
Solids, Total Dissolved	252.0	.5	mg/l	EPA 160.1	01-19-1993 11:30 LM
Solids, Total Suspended	6.0	.5	mg/l	EPA 160.2	01-19-1993 11:30 LM
Sulfate	60.0	.1	mg/l	EPA 375.4	01-14-1993 11:00 LS
Turbidity	3.1	.1	NTU	EPA 180.1	01-15-1993 15:00 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

1/22/93

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

March 12, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Creek

Sample taken by Energy West/CS

Date sampled February 26, 1993

Date received February 26, 1993

Huntington Creek HCC01
Temperature 34.2°F
Rec'd 1230 hr.
Sampled 1144 hr.

FIELD MEASUREMENTS

pH	8.72
Conductivity	448
Turbidity	12
DO	8.2

Analysis report no. 59-12904

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	03-04-1993 10:20 LS
Alkalinity, Bicarbonate	250	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Alkalinity, Total	205	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Anions	4.66	----	meq/l	---------	---------- ----- --
Calcium	58.4	.1	mg/l	EPA 215.1	03-04-1993 13:30 ED
Cations	5.47	----	meq/l	---------	---------- ----- --
Chloride	1.0	.1	mg/l	EPA 325.3	03-08-1993 08:00 LM
Conductivity	470	2	umhos/cm	EPA 120.1	03-04-1993 15:30 LS
Hardness, Total	245	1	mg/l $CaCO_3$	---------	03-04-1993 13:30 ED
Iron	0.58	.02	mg/l	EPA 236.1	03-04-1993 13:30 ED
Iron, Dissolved	0.17	.02	mg/l	EPA 236.1	03-04-1993 13:30 ED
Magnesium	24.00	.01	mg/l	EPA 242.1	03-04-1993 13:30 ED
Manganese	0.06	.01	mg/l	EPA 243.1	03-04-1993 13:30 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	03-03-1993 08:00 LM
Oxygen, Dissolved	9.8	.01	mg/l	EPA 360.1	02-26-1993 13:20 LS
pH	8.20	----	Units	EPA 150.1	02-26-1993 13:20 LS
Potassium	0.00	.01	mg/l	EPA 258.1	03-04-1993 13:30 ED
Sodium	13.50	.01	mg/l	EPA 273.1	03-04-1993 13:30 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	02-26-1993 13:00 LS
Solids, Total Dissolved	266.0	.5	mg/l	EPA 160.1	03-04-1993 09:30 LM
Solids, Total Suspended	30.0	.5	mg/l	EPA 160.2	03-04-1993 09:30 LM
Sulfate	30.0	.1	mg/l	EPA 375.4	03-10-1993 09:00 LS
Turbidity	3.4	.1	NTU	EPA 180.1	02-26-1993 14:15 LS
Cation/Anion Balance	1.67		%		

RECEIVED
3/12/93

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 (Societe Generale de Surveillance)

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

March 24, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Creek

Sample taken by Energy West/CS

Date sampled March 17, 1993

Date received March 17, 1993

Huntington Canyon Creek HCC01
Temperature 45.8°F
Rec'd 1530 hr.
Sampled 1508 hr.

FIELD MEASUREMENTS

pH	8.43
Conductivity	449
Turbidity	9.2
DO	8.4

Analysis report no. 59-12947

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	03-19-1993 12:15 LS
Alkalinity, Bicarbonate	233	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 12:15 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 12:15 LS
Alkalinity, Total	191	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 12:15 LS
Anions	4.98	----	meq/l	---------	---------- ----- --
Calcium	56.2	.1	mg/l	EPA 215.1	03-22-1993 13:20 ED
Cations	5.76	----	meq/l	---------	---------- ----- --
Chloride	17.8	.1	mg/l	EPA 325.3	03-22-1993 14:30 LM
Conductivity	480	2	umhos/cm	EPA 120.1	03-24-1993 11:00 LS
Hardness, Total	246	1	mg/l $CaCO_3$	---------	03-22-1993 13:20 ED
Iron	0.17	.02	mg/l	EPA 236.1	03-23-1993 08:35 ED
Iron, Dissolved	0.07	.02	mg/l	EPA 236.1	03-23-1993 08:35 ED
Magnesium	25.60	.01	mg/l	EPA 242.1	03-22-1993 13:20 ED
Manganese	0.00	.01	mg/l	EPA 243.1	03-22-1993 08:35 ED
Oxygen, Dissolved	7.3	.01	mg/l	EPA 360.1	03-17-1993 16:00 LS
pH	8.00	----	Units	EPA 150.1	03-17-1993 16:00 LS
Potassium	0.40	.01	mg/l	EPA 258.1	03-22-1993 13:20 ED
Sodium	19.60	.01	mg/l	EPA 273.1	03-22-1993 13:20 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	03-18-1993 08:00 LS
Solids, Total Dissolved	330.0	.5	mg/l	EPA 160.1	03-19-1993 10:45 LM
Solids, Total Suspended	19.0	.5	mg/l	EPA 160.2	03-19-1993 10:45 LM
Sulfate	36.0	.1	mg/l	EPA 375.4	03-23-1993 12:00 LS
Turbidity	2.5	.1	NTU	EPA 180.1	03-18-1993 07:30 LS
Cation/Anion Balance	7.26	----	%	---------	---------- ----- --

RECEIVED
3/24/93

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

April 30, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled April 22, 1993

Date received April 22, 1993

Huntington Canyon Creek HCC01
Temperature 43.4°F
Rec'd 1100 hr.
Sampled 0945 hr.

Field Measurements

pH	8.85
Conductivity	439
DO	5.7
Turbidity	22.0

Analysis report no. 59-13032

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	3	1	mg/l $CaCO_3$	EPA 305.1	04-23-1993 12:45 LS
Alkalinity, Bicarbonate	240	1	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Alkalinity, Total	197	1	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Anions	4.94	----	meq/l	---------	---------- ----- --
Calcium	56.4	.1	mg/l	EPA 215.1	04-28-1993 13:40 ED
Cations	5.16	----	meq/l	---------	---------- ----- --
Chloride	13.1	.1	mg/l	EPA 325.3	04-22-1993 13:00 LM
Conductivity	395	2	umhos/cm	EPA 120.1	04-27-1993 14:00 LS
Hardness, Total	236	1	mg/l $CaCO_3$	---------	04-28-1993 13:40 ED
Iron	1.01	.02	mg/l	EPA 236.1	04-29-1993 10:35 ED
Iron, Dissolved	0.08	.02	mg/l	EPA 236.1	04-30-1993 08:55 ED
Magnesium	23.10	.01	mg/l	EPA 242.1	04-28-1993 14:15 ED
Manganese	0.08	.01	mg/l	EPA 243.1	04-28-1993 15:20 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	04-26-1993 08:00 LM
Oxygen, Dissolved	9.7	.01	mg/l	EPA 360.1	04-22-1993 16:00 LS
pH	7.80	----	Units	EPA 150.1	04-22-1993 16:00 LS
Potassium	0.01	.01	mg/l	EPA 258.1	04-29-1993 13:30 ED
Sodium	10.40	.01	mg/l	EPA 273.1	04-29-1993 11:50 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	04-23-1993 07:30 LM
Solids, Total Dissolved	264.0	.5	mg/l	EPA 160.1	04-23-1993 08:00 LM
Solids, Total Suspended	40.0	.5	mg/l	EPA 160.2	04-23-1993 08:00 LM
Sulfate	35.0	.1	mg/l	EPA 375.4	04-26-1993 08:30 LS
Turbidity	11.0	.1	NTU	EPA 180.1	04-23-1993 07:30 LS
Cation/Anion Balance	2.20		%		

RECEIVED
4/30/93

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

May 25, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington

Sample taken by Energy West/CS

Date sampled May 13, 1993

Date received May 13, 1993

Huntington Creek HCC01
Temperature 48.2°F
Rec'd 1500 hr.
Sampled 1422 hr.

FIELD MEASUREMENTS

pH	8.38
Conductivity	329
Turbidity	53
DO	7.2

Analysis report no. 59-13078

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	2	1	mg/l $CaCO_3$	EPA 305.1	05-23-1993 15:00 LS
Alkalinity, Bicarbonate	197	2	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Alkalinity, Carbonate	<1	1	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Alkalinity, Total	162	2	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Anions	3.84	----	meq/l	---------	---------- ----- --
Calcium	56.1	.03	mg/l	EPA 215.1	05-21-1993 14:30 ED
Cations	4.37	----	meq/l	---------	---------- ----- --
Chloride	7.7	.5	mg/l	EPA 325.3	05-24-1993 07:45 LM
Conductivity	290	0.2	umhos/cm	EPA 120.1	05-24-1993 09:00 LS
Hardness, Total	210	.03	mg/l $CaCO_3$	---------	05-21-1993 14:30 ED
Iron	1.95	.05	mg/l	EPA 236.1	05-21-1993 12:55 ED
Iron, Dissolved	0.12	.05	mg/l	EPA 236.1	05-21-1993 12:55 ED
Magnesium	16.90	.01	mg/l	EPA 242.1	05-21-1993 15:00 ED
Manganese	0.10	.03	mg/l	EPA 243.1	05-21-1993 14:05 ED
Oil & Grease	1.5	1	mg/l	EPA 413.1	05-18-1993 09:30 LM
Oxygen, Dissolved	8.8	.01	mg/l	EPA 360.1	05-13-1993 15:15 LM
pH	7.84	----	Units	EPA 150.1	05-13-1993 15:15 LM
Potassium	0.00	.1	mg/l	EPA 258.1	05-24-1993 07:50 ED
Sodium	4.10	.2	mg/l	EPA 273.1	05-21-1993 15:30 ED
Solids, Settleable	0.7	.5	mg/l	EPA 160.5	05-14-1993 07:30 LS
Solids, Total Dissolved	190.0	14	mg/l	EPA 160.1	05-17-1993 10:30 LM
Solids, Total Suspended	95.0	7	mg/l	EPA 160.2	05-17-1993 10:30 LM
Sulfate	22.0	1	mg/l	EPA 375.4	05-24-1993 08:15 LS
Turbidity	15.0	.1	NTU	EPA 180.1	05-14-1993 09:00 LS
Cation/Anion Balance	6.55		%		

RECEIVED
5/25/93

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 (Societe Generale de Surveillance)

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

June 25, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Creek

Sample taken by Energy West/CS

Date sampled June 11, 1993

Date received June 11, 1993

Huntington Creek HCC01
Temperature 53.5°F
Rec'd 1600 hr.
Sampled 1453 hr.

FIELD MEASUREMENTS

pH	8.63
Conductivity	355
DO	6.7
TURBIDITY	12

Analysis report no. 59-13187

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	06-11-1993 16:00 LS
Alkalinity, Bicarbonate	202	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Total	166	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Anions	3.76	----	meq/l	---------	---------- ----- --
Calcium	49.8	.03	mg/l	EPA 215.1	06-21-1993 13:05 ED
Cations	3.75	----	meq/l	---------	---------- ----- --
Chloride	6.1	.5	mg/l	EPA 325.3	06-23-1993 09:10 LM
Conductivity	320	0.2	umhos/cm	EPA 120.1	06-24-1993 09:00 LS
Hardness, Total	181	.03	mg/l $CaCO_3$	---------	06-21-1993 13:05 ED
Iron	0.17	.05	mg/l	EPA 236.1	06-17-1993 09:40 ED
Iron, Dissolved	0.12	.05	mg/l	EPA 236.1	06-22-1993 09:15 ED
Magnesium	13.70	.007	mg/l	EPA 242.1	06-21-1993 15:10 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-22-1993 10:05 ED
Oil & Grease	0.2	1	mg/l	EPA 413.1	06-23-1993 08:00 LM
Oxygen, Dissolved	6.2	.01	mg/l	EPA 360.1	06-11-1993 16:00 LM
pH	8.30	----	Units	EPA 150.1	06-11-1993 16:00 LM
Potassium	<0.10	.1	mg/l	EPA 258.1	06-22-1993 12:20 ED
Sodium	3.20	.2	mg/l	EPA 273.1	06-22-1993 11:15 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	06-12-1993 10:00 LS
Solids, Total Dissolved	194.0	14	mg/l	EPA 160.1	06-14-1993 13:00 LM
Solids, Total Suspended	17.0	7	mg/l	EPA 160.2	06-15-1993 08:00 LM
Sulfate	17.0	1	mg/l	EPA 375.4	06-21-1993 13:50 LS
Turbidity	20.0	.1	NTU	EPA 180.1	06-12-1993 08:00 LS
Cation/Anion Balance	-0.11		%		

RECEIVED
6/25/93

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

August 24, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample Water
reported to us

Sample taken at Huntington Canyon Creek

Sample taken by Energy West/CS-KH

Date sampled July 16, 1993

Date received July 16, 1993

Huntington Canyon Creek HCCO1
Temperature 52.0°F
Rec'd 1300 hr.
Sampled 1052 hr.

FIELD MEASUREMENTS

pH	8.71
Conductivity	309
DO	7.4
Turbidity	9.2

Analysis report no. 59-13317

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	181	.4	mg/l HCO_3	4500 CO_2 D	07-22-1993 10:30 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	4500 CO_2 D	07-22-1993 10:30 LS
Alkalinity, Total	149	.4	mg/l $CaCO_3$	EPA 310.1	07-22-1993 10:30 LS
Anions	3.35	----	meq/l	---	--- ----- --
Calcium	50.6	.03	mg/l	EPA 215.1	08-23-1993 15:00 ED
Cations	3.51	----	meq/l	---	--- ----- --
Chloride	6.7	.5	mg/l	EPA 325.3	07-28-1993 08:00 LM
Conductivity	323	0.2	umhos/cm	EPA 120.1	08-11-1993 15:25 LS
Hardness, Total	168	.03	mg/l $CaCO_3$	---	08-23-1993 15:00 ED
Iron	0.17	.05	mg/l	EPA 236.1	07-29-1993 12:30 LS
Iron, Dissolved	<0.05	.05	mg/l	EPA 236.1	07-28-1993 16:10 JK
Magnesium	10.20	.007	mg/l	EPA 242.1	08-10-1993 13:15 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	07-29-1993 13:05 LS
Oil & Grease	0.4	1	mg/l	EPA 413.1	07-26-1993 08:00 LM
Oxygen, Dissolved	16.6	.01	mg/l	EPA 360.1	07-16-1993 16:00 LM
pH	7.75	----	Units	EPA 150.1	07-16-1993 16:00 LM
Potassium	1.40	.1	mg/l	EPA 258.1	08-10-1993 15:50 ED
Sodium	2.40	.2	mg/l	EPA 273.1	08-10-1993 14:05 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	07-16-1993 16:30 LM
Solids, Total Dissolved	181.0	14	mg/l	EPA 160.1	07-21-1993 10:00 LM
Solids, Total Suspended	12.0	7	mg/l	EPA 160.2	07-21-1993 08:30 LM
Sulfate	12.0	1	mg/l	EPA 375.4	08-04-1993 13:00 LS
Cation/Anion Balance	2.49	----	%	---	--- ----- --

RECEIVED
8/24/93

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

September 21, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled August 23, 1993

Date received August 23, 1993

Huntington Canyon Creek HCC01
Temperature 61.5°F
Rec'd 1430 hr.
Sampled 1310 hr.

FIELD MEASUREMENTS

pH	8.75
Conductivity	308
DO	6.9
Turbidity	18

Analysis report no. 59-13437

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	08-23-1993 16:00 LS
Alkalinity, Bicarbonate	159	.4	mg/l HCO_3	4500 CO_2 D	09-01-1993 15:30 LS
Alkalinity, Carbonate	5	.4	mg/l CO_3	4500 CO_2 D	09-01-1993 15:30 LS
Alkalinity, Total	164	.4	mg/l $CaCO_3$	EPA 310.1	09-01-1993 15:30 LS
Anions	3.45	----	meq/l	---------	---------- ----- --
Calcium	38.4	.03	mg/l	EPA 215.1	09-14-1993 14:10 ED
Cations	2.89	----	meq/l	---------	---------- ----- --
Chloride	6.8	.5	mg/l	EPA 325.3	09-07-1993 13:00 LM
Conductivity	323	0.2	umhos/cm	EPA 120.1	08-25-1993 09:15 LS
Hardness, Total	141	.03	mg/l $CaCO_3$	---------	09-14-1993 14:10 ED
Iron	0.10	.05	mg/l	EPA 236.1	09-14-1993 17:50 ED
Iron, Dissolved	0.25	.05	mg/l	EPA 236.1	09-16-1993 12:15 ED
Magnesium	11.00	.007	mg/l	EPA 242.1	09-14-1993 15:10 ED
Manganese	0.05	.03	mg/l	EPA 243.1	09-14-1993 18:15 ED
Oil & Grease	<1.0	1	mg/l	EPA 413.1	09-01-1993 11:45 LM
Oxygen, Dissolved	9.3	.01	mg/l	EPA 360.1	08-23-1993 16:00 LS
pH	8.50	----	Units	EPA 150.1	08-23-1993 16:00 LS
Potassium	1.00	.1	mg/l	EPA 258.1	09-14-1993 18:40 ED
Sodium	1.00	.2	mg/l	EPA 273.1	09-14-1993 16:45 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	08-24-1993 08:00 LS
Solids, Total Dissolved	200.0	14	mg/l	EPA 160.1	08-25-1993 10:45 LM
Solids, Total Suspended	25.0	7	mg/l	EPA 160.2	08-24-1993 07:30 LM
Sulfate	3.0	1	mg/l	EPA 375.4	09-13-1993 09:30 LS
Turbidity	3.5	.1	NTU	EPA 180.1	08-24-1993 16:00 LS
Calculated Ion Balance	-8.87				

RECEIVED
9/23/93

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

October 20, 1993

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

RECEIVED
10/20/93
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled September 20, 1993

Date received September 22, 1993

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC01
Temperature 51.6°F
Rec'd 0845 hr.
Sampled 1635 hr.

FIELD MEASUREMENTS

pH	8.77
Conductivity	275
DO	3.9
Turbidity	9

NOTE: pH, DO & Settleable Solids holding times were expired when received at Lab.

Analysis report no. 59-13559

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	2	1	mg/l	$CaCO_3$	EPA 305.1	10-03-1993 1400	LS
Alkalinity, Bicarbonate	168	2	mg/l	$CaCO_3$	EPA 310.1	10-03-1993 1400	LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	10-03-1993 1400	LS
Alkalinity, Total	138	2	mg/l	$CaCO_3$	EPA 310.1	10-03-1993 1400	LS
Anions	3.26	----	meq/l		---------	---------- -----	--
Calcium	32.7	.03	mg/l		EPA 215.1	10-19-1993 0925	ED
Cations	3.07	----	meq/l		---------	---------- -----	--
Chloride	10.5	.5	mg/l		EPA 325.3	10-13-1993 0830	LM
Conductivity	640.00	0.2	umhos/cm		EPA 120.1	09-27-1993 1400	KP
Hardness, Total	118.7	.03	mg/l	$CaCO_3$	---------	10-19-1993 0925	ED
Iron	0.41	.05	mg/l		EPA 236.1	10-19-1993 1150	ED
Iron, Dissolved	0.08	.05	mg/l		EPA 236.1	10-19-1993 1220	ED
Magnesium	9.00	.007	mg/l		EPA 242.1	10-18-1993 1405	ED
Manganese	0.04	.03	mg/l		EPA 243.1	10-19-1993 1410	ED
Oil & Grease	0	1	mg/l		EPA 413.1	10-02-1993 0930	LM
Oxygen, Dissolved	7.28	.01	mg/l		EPA 360.1	09-22-1993 1500	LM
pH	7.63	----	Units		EPA 150.1	09-22-1993 1500	LM
Potassium	1.0	.1	mg/l		EPA 258.1	10-19-1993 1515	ED
Sodium	15.7	.2	mg/l		EPA 273.1	10-18-1993 1650	ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-22-1993 1500	LS
Solids, Total Dissolved	164	14	mg/l		EPA 160.1	09-23-1993 1300	LM
Solids, Total Suspended	22	7	mg/l		EPA 160.2	09-23-1993 1230	LM
Sulfate	13	1	mg/l		EPA 375.4	10-19-1993 1400	LS
Turbidity	2.1	.1	NTU		EPA 180.1	09-22-1993 1430	LS
Cation/Anion Balance	-2.86		%				

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 (Societe Generale de Surveillance)

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

December 2, 1993

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

RECEIVED
12/2/93
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 October 22, 1993

Date received October 22, 1993

Temperature 43.3°F
Flow NA
Rec'd 1130 hr.
Sampled 1030 hr.

FIELD MEASUREMENTS

pH	8.31
Conductivity	412
DO	10.5
Turbidity	6

Analysis report no. 59-13659

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	10-28-1993 1850
Alkalinity, Bicarbonate	253	2	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1850 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1850 LS
Alkalinity, Total	208	2	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1850 ED
Anions	5.00	----	meq/l		---------	---------- ----- --
Calcium	42.0	.03	mg/l		EPA 215.1	11-29-1993 1630 DW
Cations	4.10	----	meq/l		---------	---------- ----- --
Chloride	10.0	.5	mg/l		EPA 325.3	11-19-1993 1000 LM
Conductivity	454.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945 ED
Hardness, Total	200.0	.03	mg/l	$CaCO_3$	---------	11-29-1993 1630 DW
Iron	<0.20	.05	mg/l		EPA 236.1	11-24-1993 1200 DW
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-01-1993 1500 DW
Magnesium	23.00	.007	mg/l		EPA 242.1	11-30-1993 1100 DW
Manganese	0.20	.03	mg/l		EPA 243.1	11-29-1993 1500 DW
Oil & Grease	1	1	mg/l		EPA 413.1	11-08-1993 1000 LM
Oxygen, Dissolved	9.40	.01	mg/l		EPA 360.1	10-22-1993 1530 LS
pH	8.20	----	Units		EPA 150.1	10-22-1993 1610 LS
Potassium	<2.0	.1	mg/l		EPA 258.1	11-30-1993 1500 DW
Sodium	3.0	.2	mg/l		EPA 273.1	11-30-1993 1300 DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	10-23-1993 0930 LM
Solids, Total Dissolved	246	14	mg/l		EPA 160.1	10-29-1993 0730 LM
Solids, Total Suspended	10	7	mg/l		EPA 160.2	10-27-1993 0800 LM
Sulfate	34	1	mg/l		EPA 375.4	11-19-1993 1400 LS
Turbidity	2.4	.1	NTU		EPA 180.1	10-22-1993 1630 LS
Cation/Anion Balance	-10.1		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

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 (Societe Generale de Surveillance)

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

December 17, 1993

RECEIVED
12/17/93
FIELD OFFICE

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

Temperature 33.2°F
Rec'd 1310 hr.
Sampled 0950 hr.

FIELD MEASUREMENTS

pH	9.17
Conductivity	387
DO	4.3
Turbidity	5.3

Sample taken at Huntington Canyon Creek

Sample taken by Energy West/KH

Date sampled November 22, 1993

Date received November 22, 1993

Analysis report no. 59-13746

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	12-02-1993 1500	ED
Alkalinity, Bicarbonate	195	2	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1500	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1500	LS
Alkalinity, Total	195	2	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1500	LS
Anions	4.60	----	meq/l		---------	---------- -----	--
Calcium	51.0	.03	mg/l		EPA 215.1	12-16-1993 1045	DW
Cations	4.30	----	meq/l		---------	---------- -----	--
Chloride	8.0	.5	mg/l		EPA 325.3	11-30-1993 1000	LM
Conductivity	412.00	0.2	umhos/cm		EPA 120.1	12-16-1993 1035	ED
Hardness, Total	206.0	.03	mg/l	$CaCO_3$	---------	12-16-1993 1045	DW
Iron	0.30	.05	mg/l		EPA 236.1	12-17-1993 1030	DW
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-15-1993 0830	DW
Magnesium	19.00	.007	mg/l		EPA 242.1	12-16-1993 1230	DW
Manganese	<0.10	.03	mg/l		EPA 243.1	12-16-1993 1600	DW
Oil & Grease	<5	1	mg/l		EPA 413.1	12-14-1993 1000	LM
Oxygen, Dissolved	9.41	.01	mg/l		EPA 360.1	11-22-1993 1400	LS
pH	8.06	----	Units		EPA 150.1	11-22-1993 1330	LS
Potassium	2.0	.1	mg/l		EPA 258.1	12-16-1993 0830	DW
Sodium	4.0	.2	mg/l		EPA 273.1	12-16-1993 1430	DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	11-22-1993 1515	LS
Solids, Total Dissolved	228	14	mg/l		EPA 160.1	11-23-1993 0845	LM
Solids, Total Suspended	9	7	mg/l		EPA 160.2	11-24-1993 1530	LM
Sulfate	24	1	mg/l		EPA 375.4	12-14-1993 1130	LS
Turbidity	2.3	.1	NTU		EPA 180.1	11-22-1993 1450	LS
Cation/Anion Balance	-3.80		%				

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 • (708) 953-9300
SINCE 1908
Member of the SGS Group (Societe Generale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

January 22, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by ENERGY WEST (KH)

Date sampled January 15, 1993

Date received January 15, 1993

HUNTINGTON CANYON CREEK
HCC-02 EW
Temperature 34.5°F
Flow N/A
Rec'd 1200 hr.
Sampled 1140 hr.

FIELD MEASUREMENTS

pH	8.3
Conductivity	484
DO	7.2
Turbidity	8.0

Analysis report no. 59-12818

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	01-18-1993 08:00 LS
Alkalinity, Bicarbonate	237	1	mg/l $CaCO_3$	EPA 310.1	01-18-1993 08:00 LS
Alkalinity, Carbonate	6	1	mg/l $CaCO_3$	EPA 310.1	01-20-1993 10:40 LDS
Alkalinity, Total	195	1	mg/l $CaCO_3$	EPA 310.1	01-18-1993 08:00 LS
Anions	5.60	----	meq/l	---------	---------- ----- --
Calcium	78.1	.1	mg/l	EPA 215.1	01-20-1993 13:00 LS
Cations	6.48	----	meq/l	---------	---------- ----- --
Chloride	35.0	.1	mg/l	EPA 325.3	01-18-1993 09:00 LS
Conductivity	510	2	umhos/cm	EPA 120.1	01-18-1993 10:00 LS
Hardness, Total	288	1	mg/l $CaCO_3$	---------	01-20-1993 13:00 LS
Iron	0.11	.02	mg/l	EPA 236.1	01-20-1993 13:45 LS
Iron, Dissolved	0.11	.02	mg/l	EPA 236.1	01-20-1993 13:45 LS
Magnesium	22.70	.01	mg/l	EPA 242.1	01-20-1993 13:00 LS
Manganese	0.00	.01	mg/l	EPA 243.1	01-20-1993 13:45 LS
Oil & Grease	0.0	1	mg/l	EPA 413.1	01-19-1993 10:30 LM
Oxygen, Dissolved	9.6	.01	mg/l	EPA 360.1	01-15-1993 13:00 LM
pH	8.40	----	Units	EPA 150.1	01-15-1993 13:00 LM
Potassium	0.00	.01	mg/l	EPA 258.1	01-20-1993 13:00 LS
Sodium	16.70	.01	mg/l	EPA 273.1	01-20-1993 13:00 LS
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	01-15-1993 08:30 LM
Solids, Total Dissolved	346.0	.5	mg/l	EPA 160.1	01-19-1993 11:30 LM
Solids, Total Suspended	8.0	.5	mg/l	EPA 160.2	01-19-1993 11:30 LM
Sulfate	39.0	.1	mg/l	EPA 375.4	01-14-1993 11:00 LS
Turbidity	3.3	.1	NTU	EPA 180.1	01-15-1993 15:00

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

1/22/93

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

March 12, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Creek

Sample taken by Energy West/CS

Date sampled February 26, 1993

Date received February 26, 1993

Huntington Creek HCCO2
Temperature 34.1°F
Rec'd 1230 hr.
Sampled 1136 hr.

FIELD MEASUREMENTS

pH	~~Not Given~~ 8.71
Conductivity	532
Turbidity	19.0
DO	7.8

Analysis report no. 59-12901

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	03-04-1993 10:20 LS
Alkalinity, Bicarbonate	245	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Alkalinity, Total	201	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Anions	4.80	----	meq/l	---------	---------- ----- --
Calcium	47.8	.1	mg/l	EPA 215.1	03-04-1993 13:30 ED
Cations	5.16	----	meq/l	---------	---------- ----- --
Chloride	1.3	.1	mg/l	EPA 325.3	03-08-1993 08:00 LM
Conductivity	550	2	umhos/cm	EPA 120.1	03-04-1993 15:30 LS
Hardness, Total	214	1	mg/l $CaCO_3$	---------	03-04-1993 13:30 LS
Iron	0.55	.02	mg/l	EPA 236.1	03-04-1993 13:30 ED
Iron, Dissolved	0.15	.02	mg/l	EPA 236.1	03-04-1993 13:30 ED
Magnesium	23.00	.01	mg/l	EPA 242.1	03-04-1993 13:30 ED
Manganese	0.05	.01	mg/l	EPA 243.1	03-04-1993 13:30 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	03-03-1993 08:00 LM
Oxygen, Dissolved	9.4	.01	mg/l	EPA 360.1	02-26-1993 13:20 LS
pH	8.10	----	Units	EPA 150.1	02-26-1993 13:20 LS
Potassium	0.00	.01	mg/l	EPA 258.1	03-04-1993 13:30 ED
Sodium	20.50	.01	mg/l	EPA 273.1	03-04-1993 13:30 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	02-26-1993 12:00 LS
Solids, Total Dissolved	342.0	.5	mg/l	EPA 160.1	03-04-1993 09:30 LM
Solids, Total Suspended	21.0	.5	mg/l	EPA 160.2	03-04-1993 09:30 LM
Sulfate	40.0	.1	mg/l	EPA 375.4	03-10-1993 09:00 LS
Turbidity	8.0	.1	NTU	EPA 180.1	02-26-1993 14:15 LS
Cation/Anion Balance	3.62		%		

RECEIVED
3/12/93

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

MEMBER OF THE AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC.

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 (Societe Generale de Surveillance)

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

March 24, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Creek

Sample taken by Energy West/CS

Date sampled March 17, 1993

Date received March 17, 1993

Huntington Canyon Creek HCCO2
Temperature 47.0°F
Rec'd 1530 hr.
Sampled 1521 hr.

FIELD MEASUREMENTS

pH	8.89
Conductivity	535
Turbidity	12.0
DO	7.0

Analysis report no. 59-12946

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	03-19-1993 12:15 LS
Alkalinity, Bicarbonate	250	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 12:15 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 12:15 LS
Alkalinity, Total	205	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 12:15 LS
Anions	6.01	----	meq/l	---------	---------- ----- --
Calcium	55.3	.1	mg/l	EPA 215.1	03-22-1993 13:20 ED
Cations	5.71	----	meq/l	---------	---------- ----- --
Chloride	34.4	.1	mg/l	EPA 325.3	03-22-1993 14:30 LM
Conductivity	550	2	umhos/cm	EPA 120.1	03-24-1993 11:00 LS
Hardness, Total	240	1	mg/l $CaCO_3$	---------	03-22-1993 13:20 ED
Iron	0.16	.02	mg/l	EPA 236.1	03-23-1993 08:35 ED
Iron, Dissolved	0.09	.02	mg/l	EPA 236.1	03-23-1993 08:35 ED
Magnesium	24.80	.01	mg/l	EPA 242.1	03-22-1993 13:20 ED
Manganese	0.00	.01	mg/l	EPA 243.1	03-23-1993 08:35 ED
Oxygen, Dissolved	6.8	.01	mg/l	EPA 360.1	03-17-1993 16:00 LS
pH	8.10	----	Units	EPA 150.1	03-17-1993 16:00 LS
Potassium	1.00	.01	mg/l	EPA 258.1	03-22-1993 13:20 ED
Sodium	20.50	.01	mg/l	EPA 273.1	03-22-1993 13:20 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	03-18-1993 08:00 LS
Solids, Total Dissolved	361.0	.5	mg/l	EPA 160.1	03-19-1993 10:45 LM
Solids, Total Suspended	14.0	.5	mg/l	EPA 160.2	03-19-1993 10:45 LM
Sulfate	50.0	.1	mg/l	EPA 375.4	03-23-1993 12:00 LS
Turbidity	3.5	.1	NTU	EPA 180.1	03-18-1993 07:30 LS
Cation/Anion Balance	-2.61	----	%	---------	---------- ----- --

RECEIVED
3/24/93

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 (Societe Generale de Surveillance)

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

May 4, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled April 22, 1993

Date received April 22, 1993

Huntington Canyon Creek HCCO2
Temperature 45.0°F
Rec'd 1100 hr.
Sampled 1005 hr.

Field Measurements	
pH	8.45
Conductivity	466
Turbidity	32.0
DO	4.8

Analysis report no. 59-13035

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	04-23-1993 12:45 LS
Alkalinity, Bicarbonate	237	2	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Alkalinity, Total	195	2	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Anions	5.35	----	meq/l	---------	---------- ----- --
Calcium	58.7	.03	mg/l	EPA 215.1	05-03-1993 10:15 ED
Cations	5.28	----	meq/l	---------	---------- ----- --
Chloride	17.6	.5	mg/l	EPA 325.3	04-27-1993 09:00 LM
Conductivity	420	2	umhos/cm	EPA 120.1	04-27-1993 14:00 LS
Hardness, Total	237	.03	mg/l $CaCO_3$	---------	05-03-1993 10:15 ED
Iron	1.16	.05	mg/l	EPA 236.1	04-29-1993 10:35 ED
Iron, Dissolved	0.10	.05	mg/l	EPA 236.1	04-30-1993 08:55 ED
Magnesium	21.90	.01	mg/l	EPA 242.1	04-28-1993 14:15 ED
Manganese	0.06	.03	mg/l	EPA 243.1	04-28-1993 15:20 ED
Oil & Grease	0.7	1	mg/l	EPA 413.1	04-26-1993 08:00 LM
Oxygen, Dissolved	8.5	.01	mg/l	EPA 360.1	04-22-1993 15:00 LS
pH	8.00	----	Units	EPA 150.1	04-22-1993 15:00 LS
Potassium	0.70	.1	mg/l	EPA 258.1	04-29-1993 13:30 ED
Sodium	12.30	.2	mg/l	EPA 273.1	05-03-1993 12:45 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	04-23-1993 07:30 LM
Solids, Total Dissolved	282.0	14	mg/l	EPA 160.1	04-23-1993 08:00 LM
Solids, Total Suspended	42.0	7	mg/l	EPA 160.2	04-23-1993 08:00 LM
Sulfate	50.0	1	mg/l	EPA 375.4	04-26-1993 08:30 LS
Turbidity	9.0	.1	NTU	EPA 180.1	04-23-1993 07:30 LS
Cation/Anion Balance	6.54		%		

RECEIVED
5/4/93

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

May 25, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington

Sample taken by Energy West/CS

Date sampled May 13, 1993

Date received May 13, 1993

Huntington Creek HCCO2
Temperature 49.0°F
Rec'd 1500 hr.
Sampled 1432 hr.

FIELD MEASUREMENTS

pH	8.24
Conductivity	343
Turbidity	62
DO	6.7

Analysis report no. 59-13073

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	167	2	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Alkalinity, Carbonate	<1	1	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Alkalinity, Total	203	2	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Anions	4.71	----	meq/l	---------	---------- ----- --
Calcium	57.1	.03	mg/l	EPA 215.1	05-21-1993 14:30 ED
Cations	4.43	----	meq/l	---------	---------- ----- --
Chloride	8.0	.5	mg/l	EPA 325.3	05-24-1993 07:45 LM
Conductivity	300	0.2	umhos/cm	EPA 120.1	05-24-1993 09:00 LS
Hardness, Total	209	.03	mg/l $CaCO_3$	---------	05-21-1993 14:30 ED
Iron	2.00	.05	mg/l	EPA 236.1	05-21-1993 12:55 ED
Iron, Dissolved	0.12	.05	mg/l	EPA 236.1	05-21-1993 12:55 ED
Magnesium	16.10	.01	mg/l	EPA 242.1	05-21-1993 15:00 ED
Manganese	0.10	.03	mg/l	EPA 243.1	05-21-1993 14:05 ED
Oil & Grease	2.5	1	mg/l	EPA 413.1	05-18-1993 09:30 LM
Oxygen, Dissolved	8.8	.01	mg/l	EPA 360.1	05-13-1993 15:15 LM
pH	7.83	----	Units	EPA 150.1	05-13-1993 15:15 LM
Potassium	0.00	.1	mg/l	EPA 258.1	05-24-1993 07:50 ED
Sodium	6.00	.2	mg/l	EPA 273.1	05-21-1993 15:30 ED
Solids, Settleable	0.6	.5	mg/l	EPA 160.5	05-14-1993 07:30 LS
Solids, Total Dissolved	212.0	14	mg/l	EPA 160.1	05-17-1993 10:30 LM
Solids, Total Suspended	98.0	7	mg/l	EPA 160.2	05-17-1993 10:30 LM
Sulfate	25.0	1	mg/l	EPA 375.4	05-17-1993 08:00 LS
Turbidity	14.0	.1	NTU	EPA 180.1	05-14-1993 09:00 LS
Cation/Anion Balance	5.20	----	%	---------	---------- ----- --

RECEIVED
5/25/93

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

FIELD OFFICE

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

June 25, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CS

Date sampled June 11, 1993

Date received June 11, 1993

Huntington Canyon HCCO2
Temperature 54.2°F
Rec'd 1600 hr.
Sampled 1509 hr.

FIELD MEASUREMENTS

pH	8.55
Conductivity	366
DO	6.5
Turbidity	9.0

Analysis report no. 59-13190

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	06-11-1993 16:00 LS
Alkalinity, Bicarbonate	220	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Total	181	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Anions	4.10	----	meq/l	---------	---------- ----- --
Calcium	57.4	.03	mg/l	EPA 215.1	06-21-1993 13:05 ED
Cations	4.30	----	meq/l	---------	---------- ----- --
Chloride	7.5	.5	mg/l	EPA 325.3	06-23-1993 09:10 LM
Conductivity	330	0.2	umhos/cm	EPA 120.1	06-24-1993 09:00 LS
Hardness, Total	203	.03	mg/l $CaCO_3$	---------	06-21-1993 13:05 ED
Iron	0.19	.05	mg/l	EPA 236.1	06-17-1993 09:40 ED
Iron, Dissolved	0.14	.05	mg/l	EPA 236.1	06-22-1993 09:15 ED
Magnesium	14.40	.007	mg/l	EPA 242.1	06-21-1993 15:10 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-22-1993 10:05 ED
Oil & Grease	0.8	1	mg/l	EPA 413.1	06-23-1993 08:00 LM
Oxygen, Dissolved	6.4	.01	mg/l	EPA 360.1	06-11-1993 16:00 LM
pH	8.20	----	Units	EPA 150.1	06-11-1993 16:00 LM
Potassium	1.30	.1	mg/l	EPA 258.1	06-22-1993 12:20 ED
Sodium	5.00	.2	mg/l	EPA 273.1	06-22-1993 11:15 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	06-12-1993 10:00 LS
Solids, Total Dissolved	198.0	14	mg/l	EPA 160.1	06-14-1993 13:00 LM
Solids, Total Suspended	16.0	7	mg/l	EPA 160.2	06-15-1993 08:00 LM
Sulfate	17.0	1	mg/l	EPA 375.4	06-21-1993 13:40 LS
Turbidity	3.6	.1	NTU	EPA 180.1	06-12-1993 08:00 LS
Cation/Anion	1.00		%		

RECEIVED
6/24/93

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

August 24, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon Creek

Sample taken by Energy West/CS-KH

Date sampled July 16, 1993

Date received July 16, 1993

Huntington Canyon Creek HCCO2
Temperature 51.4° F
Rec'd 1300 hr.
Sampled 1105 hr.

FIELD MEASUREMENTS

pH	8.77
Conductivity	318
DO	7.0
Turbidity	10

Analysis report no. 59-13316

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	07-22-1993 10:30 LS
Alkalinity, Bicarbonate	172	.4	mg/l HCO_3	4500 CO_2 D	07-22-1993 10:30 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	4500 CO_2 D	07-22-1993 10:30 LS
Alkalinity, Total	141	.4	mg/l $CaCO_3$	EPA 310.1	07-22-1993 10:30 LS
Anions	3.27	----	meq/l	---	--- ----- --
Calcium	58.8	.03	mg/l	EPA 215.1	08-23-1993 15:00 ED
Cations	3.98	----	meq/l	---	--- ----- --
Chloride	7.4	.5	mg/l	EPA 325.3	07-28-1993 08:00 LM
Conductivity	353	0.2	umhos/cm	EPA 120.1	08-09-1993 15:25 LS
Hardness, Total	190	.03	mg/l $CaCO_3$	---	08-23-1993 15:00 ED
Iron	0.32	.05	mg/l	EPA 236.1	07-29-1993 12:30 LS
Iron, Dissolved	<0.05	.05	mg/l	EPA 236.1	07-28-1993 16:10 JK
Magnesium	10.60	.007	mg/l	EPA 242.1	08-10-1993 13:15 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	07-29-1993 13:05 LS
Oil & Grease	0.7	1	mg/l	EPA 413.1	07-26-1993 08:00 LM
Oxygen, Dissolved	11.7	.01	mg/l	EPA 360.1	07-16-1993 16:00 LM
pH	7.64	----	Units	EPA 150.1	07-16-1993 16:00 LM
Potassium	1.10	.1	mg/l	EPA 258.1	08-10-1993 15:50 ED
Sodium	3.40	.2	mg/l	EPA 273.1	08-10-1993 14:05 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	07-16-1993 16:30 LM
Solids, Total Dissolved	188.0	14	mg/l	EPA 160.1	07-21-1993 10:00 LM
Solids, Total Suspended	19.0	7	mg/l	EPA 160.2	07-21-1993 08:30 LM
Sulfate	15.0	1	mg/l	EPA 375.4	08-04-1993 13:00 LS
Cation/Anion Balance	9.78	----	%	---	--- ----- --

RECEIVED
8/24/93

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

FIELD OFFICE

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

September 23, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled August 23, 1993

Date received August 23, 1993

Huntington Canyon Creek HCCO2
Temperature 60.7°F
Rec'd 1430 hr.
Sampled 1320 hr.

FIELD MEASUREMENTS

pH	8.65
Conductivity	320
DO	3.3
Turbidity	20

Analysis report no. 59-13439

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	08-23-1993 16:00 LS
Alkalinity, Bicarbonate	151	.4	mg/l HCO_3	4500 CO_2 D	09-01-1993 15:30 LS
Alkalinity, Carbonate	5	.4	mg/l CO_3	4500 CO_2 D	09-01-1993 15:30 LS
Alkalinity, Total	156	.4	mg/l $CaCO_3$	EPA 310.1	09-01-1993 15:30 LS
Anions	3.36	----	meq/l	---------	---------- ----- --
Calcium	32.0	.03	mg/l	EPA 215.1	09-21-1993 14:45 JK
Cations	2.79	----	meq/l	---------	---------- ----- --
Chloride	8.4	.5	mg/l	EPA 325.3	09-07-1993 13:00 LM
Conductivity	338	0.2	umhos/cm	EPA 120.1	08-25-1993 09:15 LS
Hardness, Total	129	.03	mg/l $CaCO_3$	---------	09-21-1993 14:45 JK
Iron	0.28	.05	mg/l	EPA 236.1	09-17-1993 14:45 ED
Iron, Dissolved	0.05	.05	mg/l	EPA 236.1	09-16-1993 12:15 ED
Magnesium	12.00	.007	mg/l	EPA 242.1	09-21-1993 15:25 JK
Manganese	0.05	.03	mg/l	EPA 243.1	09-17-1993 14:05 ED
Oil & Grease	<0.5	1	mg/l	EPA 413.1	09-03-1993 10:00 LM
Oxygen, Dissolved	8.4	.01	mg/l	EPA 360.1	08-23-1993 16:00 LS
pH	8.50	----	Units	EPA 150.1	08-23-1993 16:00 LS
Potassium	0.78	.1	mg/l	EPA 258.1	09-22-1993 11:47 JK
Sodium	4.40	.2	mg/l	EPA 273.1	09-22-1993 08:40 JK
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	08-24-1993 10:00 LS
Solids, Total Dissolved	190.0	14	mg/l	EPA 160.1	08-25-1993 10:45 LM
Solids, Total Suspended	28.0	7	mg/l	EPA 160.2	08-24-1993 07:30 LM
Sulfate	4.0	1	mg/l	EPA 375.4	09-13-1993 09:30 LS
Turbidity	5.8	.1	NTU	EPA 180.1	08-24-1993 16:00 [illegible]
Cation/Anion Balance	-9.19		%		

RECEIVED
9/23/93

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

October 27, 1993

RECEIVED
10/27/93

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

FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled September 20, 1993

Date received September 22, 1993

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCCO2
Temperature 52.1°F
Rec'd 0845 hr.
Sampled 1642 hr.

FIELD MEASUREMENTS

pH	8.92
Conductivity	280
DO	3.1
Turbidity	10

NOTE: pH, DO & Settleable Solids holding times were expired when received at Lab. Calcium determined on undigested sample.

Analysis report no. 59-13556

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analy	
Acidity	<1	1	mg/l	$CaCO_3$	EPA 305.1	10-03-1993 1400	LS
Alkalinity, Bicarbonate	164	2	mg/l	$CaCO_3$	EPA 310.1	10-03-1993 1400	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-03-1993 1400	LS
Alkalinity, Total	135	2	mg/l	$CaCO_3$	EPA 310.1	10-03-1993 1400	LS
Anions	3.20	----	meq/l		---------	---------- -----	--
Calcium	45.4	.03	mg/l		EPA 215.1	10-26-1993 1245	ED
Cations	3.10	----	meq/l		---------	---------- -----	--
Chloride	8.5	.5	mg/l		EPA 325.3	10-13-1993 0830	LM
Conductivity	304.00	0.2	umhos/cm		EPA 120.1	09-27-1993 1400	KP
Hardness, Total	146.0	.03	mg/l	$CaCO_3$	---------	10-26-1993 1245	ED
Iron	0.35	.05	mg/l		EPA 236.1	10-19-1993 1150	ED
Iron, Dissolved	<0.05	.05	mg/l		EPA 236.1	10-19-1993 1220	ED
Magnesium	8.00	.007	mg/l		EPA 242.1	10-18-1993 1405	ED
Manganese	<0.03	.03	mg/l		EPA 243.1	10-19-1993 1410	ED
Oil & Grease	<1	1	mg/l		EPA 413.1	10-02-1993 0930	LM
Oxygen, Dissolved	8.00	.01	mg/l		EPA 360.1	09-22-1993 1500	LM
pH	7.14	----	Units		EPA 150.1	09-22-1993 1500	LM
Potassium	1.0	.1	mg/l		EPA 258.1	10-19-1993 1515	ED
Sodium	3.7	.2	mg/l		EPA 273.1	10-18-1993 1650	ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-22-1993 1600	LS
Solids, Total Dissolved	161	14	mg/l		EPA 160.1	09-23-1993 1300	LM
Solids, Total Suspended	16	7	mg/l		EPA 160.2	09-23-1993 1230	LM
Sulfate	14	1	mg/l		EPA 375.4	10-19-1993 1400	LS
Turbidity	2.0	.1	NTU		EPA 180.1	09-22-1993 1430	LS
Cation/Anion Balance	-0.70		%				

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

December 9, 1993

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

RECEIVED
12/9/93

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled October 22, 1993

Date received October 22, 1993

Huntington Canyon Creek HCCO2

Temperature 45.6°F
Flow NA
Rec'd 1130 hr.
Sampled 1045 hr.

FIELD MEASUREMENTS

pH	8.94
Conductivity	424
DO	8.2
Turbidity	6

Analysis report no. 59-13654

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	10-28-1993 1455 LS
Alkalinity, Bicarbonate	242	2	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1455 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1455 LS
Alkalinity, Total	199	2	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1455 ED
Anions	5.00	----	meq/l		---------	---------- ----- --
Calcium	52.0	.03	mg/l		EPA 215.1	12-08-1993 1330 DW
Cations	5.90	----	meq/l		---------	---------- ----- --
Chloride	12.0	.5	mg/l		EPA 325.3	11-18-1993 1515 LM
Conductivity	471.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945 ED
Hardness, Total	245.0	.03	mg/l	$CaCO_3$	---------	12-08-1993 1330 DW
Iron	<0.20	.05	mg/l		EPA 236.1	11-24-1993 1200 DW
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-01-1993 1500 DW
Magnesium	28.00	.007	mg/l		EPA 242.1	11-30-1993 1100 DW
Manganese	0.20	.03	mg/l		EPA 243.1	11-29-1993 1500 DW
Oil & Grease	<1	1	mg/l		EPA 413.1	11-08-1993 1000 LM
Oxygen, Dissolved	9.38	.01	mg/l		EPA 360.1	10-22-1993 1530 LS
pH	8.18	----	Units		EPA 150.1	10-22-1993 1610 LS
Potassium	<2.0	.1	mg/l		EPA 258.1	11-30-1993 1500 DW
Sodium	23.0	.2	mg/l		EPA 273.1	11-30-1993 1300 DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	10-23-1993 0930 LM
Solids, Total Dissolved	262	14	mg/l		EPA 160.1	10-25-1993 0800 LM
Solids, Total Suspended	11	7	mg/l		EPA 160.2	10-27-1993 0800 LM
Sulfate	33	1	mg/l		EPA 375.4	11-19-1993 1400 LS
Turbidity	2.1	.1	NTU		EPA 180.1	10-22-1993 1630 LS
Cation/Anion Balance	8.20		%			

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

December 17, 1993

RECEIVED
12/17/93

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 Creek

Sample taken by Energy West/KH

Date sampled November 22, 1993

Date received November 22, 1993

Temperature 33.8°F
Rec'd 1310 hr.
Sampled 1000 hr.

FIELD MEASUREMENTS

pH	8.96
Conductivity	413
DO	2.9
Turbidity	11

Analysis report no. 59-13743

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	12-02-1993 1512	
Alkalinity, Bicarbonate	188	2	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1512	
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1512	LS
Alkalinity, Total	188	2	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1512	LS
Anions	4.60	----	meq/l		---------	---------- -----	--
Calcium	50.0	.03	mg/l		EPA 215.1	12-16-1993 1045	DW
Cations	4.40	----	meq/l		---------	---------- -----	--
Chloride	11.0	.5	mg/l		EPA 325.3	11-30-1993 1000	LM
Conductivity	441.00	0.2	umhos/cm		EPA 120.1	12-16-1993 1035	ED
Hardness, Total	203.0	.03	mg/l	$CaCO_3$	---------	12-16-1993 1045	DW
Iron	0.30	.05	mg/l		EPA 236.1	12-17-1993 1030	DW
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-15-1993 0830	DW
Magnesium	19.00	.007	mg/l		EPA 242.1	12-16-1993 1230	DW
Manganese	<0.10	.03	mg/l		EPA 243.1	12-16-1993 1600	DW
Oil & Grease	<5	1	mg/l		EPA 413.1	12-14-1993 1000	LM
Oxygen, Dissolved	9.24	.01	mg/l		EPA 360.1	11-22-1993 1400	LS
pH	8.08	----	Units		EPA 150.1	11-22-1993 1330	LS
Potassium	4.0	.1	mg/l		EPA 258.1	12-16-1993 0830	DW
Sodium	7.0	.2	mg/l		EPA 273.1	12-16-1993 1430	DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	11-22-1993 1515	LS
Solids, Total Dissolved	252	14	mg/l		EPA 160.1	11-23-1993 0845	LM
Solids, Total Suspended	11	7	mg/l		EPA 160.2	11-24-1993 1530	LM
Sulfate	26	1	mg/l		EPA 375.4	12-14-1993 1130	LS
Turbidity	2.6	.1	NTU		EPA 180.1	11-22-1993 1450	LS
Cation/Anion Balance	-2.80		%				

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 • (708) 953-9300
SINCE 1908
Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

January 22, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by ENERGY WEST (KH)

Date sampled January 15, 1993

Date received January 15, 1993

HUNTINGTON CANYON CREEK
HCC-04 EW
Temperature 34.0°F
Flow N/A
Rec'd 1200 hr.
Sampled 1155 hr.

FIELD MEASUREMENTS

pH	7.82
Conductivity	542
DO	7.1
Turbidity	8.8

Analysis report no. 59-12819

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	01-18-1993 08:00 LS
Alkalinity, Bicarbonate	250	1	mg/l $CaCO_3$	EPA 310.1	01-18-1993 08:00 LS
Alkalinity, Carbonate	6	1	mg/l $CaCO_3$	EPA 310.1	01-21-1993 10:40 LDS
Alkalinity, Total	205	1	mg/l $CaCO_3$	EPA 310.1	01-18-1993 08:00 LS
Anions	6.94	----	meq/l	---------	---------- ----- --
Calcium	82.3	.1	mg/l	EPA 215.1	01-20-1993 13:00 LS
Cations	7.06	----	meq/l	---------	---------- ----- --
Chloride	30.0	.1	mg/l	EPA 325.3	01-18-1993 09:00 LS
Conductivity	570	2	umhos/cm	EPA 120.1	01-18-1993 10:00 LS
Hardness, Total	306	1	mg/l $CaCO_3$	---------	01-20-1993 13:00 LS
Iron	0.14	.02	mg/l	EPA 236.1	01-20-1993 13:45 LS
Iron, Dissolved	0.14	.02	mg/l	EPA 236.1	01-20-1993 13:45 LS
Magnesium	24.30	.01	mg/l	EPA 242.1	01-20-1993 13:00 LS
Manganese	0.00	.01	mg/l	EPA 243.1	01-20-1993 13:45 LS
Oil & Grease	0.0	1	mg/l	EPA 413.1	01-19-1993 10:30 LM
Oxygen, Dissolved	8.6	.01	mg/l	EPA 360.1	01-15-1993 13:00 LM
pH	8.40	----	Units	EPA 150.1	01-15-1993 13:00 LM
Potassium	0.00	.01	mg/l	EPA 258.1	01-20-1993 13:00 LS
Sodium	22.20	.01	mg/l	EPA 273.1	01-20-1993 13:00 LS
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	01-15-1993 08:30 LM
Solids, Total Dissolved	335.0	.5	mg/l	EPA 160.1	01-19-1993 11:30 LM
Solids, Total Suspended	11.0	.5	mg/l	EPA 160.2	01-19-1993 11:30 LM
Sulfate	100.0	.1	mg/l	EPA 375.4	01-14-1993 11:00 LS
Turbidity	2.5	.1	NTU	EPA 180.1	01-15-1993 15:00 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

1/22/93

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 12, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Creek

Sample taken by Energy West/CS

Date sampled February 26, 1993

Date received February 26, 1993

Huntington Creek HCCO4
Temperature 33.5°F
Rec'd 1230 hr.
Sampled 1207 hr.

FIELD MEASUREMENTS

pH	8.80
Conductivity	729
Turbidity	3.9
DO	6.8

Analysis report no. 59-12900

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	6	1	mg/l $CaCO_3$	EPA 305.1	03-04-1993 10:20 LS
Alkalinity, Bicarbonate	269	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Alkalinity, Total	221	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Anions	8.33	----	meq/l	---------	---------- ----- --
Calcium	69.9	.1	mg/l	EPA 215.1	03-04-1993 13:30 ED
Cations	8.00	----	meq/l	---------	---------- ----- --
Chloride	61.2	.1	mg/l	EPA 325.3	03-11-1993 13:00 LM
Conductivity	760	2	umhos/cm	EPA 120.1	03-04-1993 15:30 LS
Hardness, Total	310	1	mg/l $CaCO_3$	---------	03-04-1993 13:30 ED
Iron	0.90	.02	mg/l	EPA 236.1	03-04-1993 13:30 ED
Iron, Dissolved	0.37	.02	mg/l	EPA 236.1	03-04-1993 13:30 ED
Magnesium	33.00	.01	mg/l	EPA 242.1	03-04-1993 13:30 ED
Manganese	0.06	.01	mg/l	EPA 243.1	03-04-1993 13:30 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	03-03-1993 08:00 LM
Oxygen, Dissolved	9.5	.01	mg/l	EPA 360.1	02-26-1993 13:20 LS
pH	7.60	----	Units	EPA 150.1	02-26-1993 13:20 LS
Potassium	0.00	.01	mg/l	EPA 258.1	03-04-1993 13:30 ED
Sodium	41.80	.01	mg/l	EPA 273.1	03-04-1993 13:30 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	02-26-1993 13:00 LS
Solids, Total Dissolved	436.0	.5	mg/l	EPA 160.1	03-04-1993 09:30 LM
Solids, Total Suspended	32.0	.5	mg/l	EPA 160.2	03-04-1993 09:30 LM
Sulfate	110.0	.1	mg/l	EPA 375.4	03-10-1993 09:00 LS
Turbidity	14.0	.1	NTU	EPA 180.1	02-26-1993 14:15 LS
Cation/Anion Balance	0.56		%		

RECEIVED
3/12/93

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

Original Watermarked For Your Protection

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 (Societe Generale de Surveillance)

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

March 30, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Creek

Sample taken by Energy West/CS

Date sampled March 17, 1993

Date received March 17, 1993

Huntington Canyon Creek HCCO4
Temperature 51.6°F
Rec'd 1530 hr.
Sampled 1537 hr.

FIELD MEASUREMENTS

pH	8.58
Conductivity	622
Turbidity	11.0
DO	6.8

Analysis report no. 59-12953

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	03-19-1993 14:15 LS
Alkalinity, Bicarbonate	251	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 14:15 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 14:15 LS
Alkalinity, Total	206	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 14:15 LS
Anions	7.19	----	meq/l	---	--- ----- --
Calcium	59.1	.1	mg/l	EPA 215.1	03-22-1993 13:20 ED
Cations	7.90	----	meq/l	---	--- ----- --
Chloride	38.2	.1	mg/l	EPA 325.3	03-22-1993 14:30 LM
Conductivity	660	2	umhos/cm	EPA 120.1	03-24-1993 11:00 LS
Hardness, Total	268	1	mg/l $CaCO_3$	---	03-22-1993 13:20 ED
Magnesium	29.20	.01	mg/l	EPA 242.1	03-22-1993 13:20 ED
Manganese	0.00	.01	mg/l	EPA 243.1	03-23-1993 08:40 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	03-23-1993 13:00 LM
Oxygen, Dissolved	7.1	.01	mg/l	EPA 360.1	03-17-1993 16:00 LS
pH	8.20	----	Units	EPA 150.1	03-17-1993 16:00 LS
Potassium	1.10	.01	mg/l	EPA 258.1	03-22-1993 13:20 ED
Sodium	58.60	.01	mg/l	EPA 273.1	03-22-1993 13:20 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	03-18-1993 08:00 LS
Solids, Total Dissolved	429.0	.5	mg/l	EPA 160.1	03-19-1993 10:45 LM
Solids, Total Suspended	15.0	.5	mg/l	EPA 160.2	03-19-1993 10:45 LM
Sulfate	100.0	.1	mg/l	EPA 375.4	03-23-1993 12:00 LS
Turbidity	3.0	.1	NTU	EPA 180.1	03-18-1993 07:30 LS
Cation/Anion Balance	4.72	----	%	---	--- ----- --

RECEIVED
3/30/93

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

April 30, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled April 22, 1993

Date received April 22, 1993

Huntington Canyon Creek HCCO4
Temperature 45.4°F
Rec'd 1100 hr.
Sampled 1015 hr.

Field Measurements

pH	8.90
Conductivity	507
DO	4.9
Turbidity	49.0

Analysis report no. 59-13033

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	2	1	mg/l $CaCO_3$	EPA 305.1	04-23-1993 12:45 LS
Alkalinity, Bicarbonate	237	1	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Alkalinity, Total	195	1	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Anions	5.85	----	meq/l	---------	---------- ----- --
Calcium	62.9	.1	mg/l	EPA 215.1	04-28-1993 13:40 ED
Cations	5.77	----	meq/l	---------	---------- ----- --
Chloride	20.7	.1	mg/l	EPA 325.3	04-22-1993 13:00 LM
Conductivity	450	2	umhos/cm	EPA 120.1	04-27-1993 14:00 LS
Hardness, Total	258	1	mg/l $CaCO_3$	---------	04-28-1993 13:40 ED
Iron	1.59	.02	mg/l	EPA 236.1	04-29-1993 10:35 ED
Iron, Dissolved	0.11	.02	mg/l	EPA 236.1	04-30-1993 08:55 ED
Magnesium	24.40	.01	mg/l	EPA 242.1	04-28-1993 14:15 ED
Manganese	0.07	.01	mg/l	EPA 243.1	04-28-1993 15:20 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	04-26-1993 08:00 LM
Oxygen, Dissolved	8.6	.01	mg/l	EPA 360.1	04-22-1993 16:00 LS
pH	7.90	----	Units	EPA 150.1	04-22-1993 16:00 LS
Potassium	0.03	.01	mg/l	EPA 258.1	04-29-1993 13:30 ED
Sodium	14.40	.01	mg/l	EPA 273.1	04-29-1993 11:50 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	04-23-1993 07:30 LM
Solids, Total Dissolved	318.0	.5	mg/l	EPA 160.1	04-23-1993 08:00 LM
Solids, Total Suspended	80.0	.5	mg/l	EPA 160.2	04-23-1993 08:00 LM
Sulfate	70.0	.1	mg/l	EPA 375.4	04-26-1993 08:30 LS
Turbidity	4.0	.1	NTU	EPA 180.1	04-23-1993 13:00 LS
Canion/Anion Balance	-0.60		%		

RECEIVED
4/30/93

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

May 25, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington

Sample taken by Energy West/CS

Date sampled May 13, 1993

Date received May 13, 1993

Huntington Creek HCCO4
Temperature 50.5°F
Rec'd 1500 hr.
Sampled 1440 hr.

FIELD MEASUREMENTS

pH	8.47
Conductivity	358
Turbidity	78
DO	6.3

Analysis report no. 59-13074

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	2	1	mg/l $CaCO_3$	EPA 305.1	05-23-1993 15:00 LS
Alkalinity, Bicarbonate	198	2	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Alkalinity, Carbonate	<1	1	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Alkalinity, Total	163	2	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Anions	4.08	----	meq/l	---------	---------- ----- --
Calcium	62.4	.03	mg/l	EPA 215.1	05-21-1993 14:30 ED
Cations	4.96	----	meq/l	---------	---------- ----- --
Chloride	8.9	.5	mg/l	EPA 325.3	05-24-1993 07:45 LM
Conductivity	320	0.2	umhos/cm	EPA 120.1	05-24-1993 09:00 LS
Hardness, Total	234	.03	mg/l $CaCO_3$	---------	05-21-1993 14:30 ED
Iron	2.46	.05	mg/l	EPA 236.1	05-21-1993 12:55 ED
Iron, Dissolved	0.17	.05	mg/l	EPA 236.1	05-21-1993 12:55 ED
Magnesium	19.10	.01	mg/l	EPA 242.1	05-21-1993 08:55 ED
Manganese	0.10	.03	mg/l	EPA 243.1	05-21-1993 14:05 ED
Oil & Grease	2.0	1	mg/l	EPA 413.1	05-18-1993 09:30 LM
Oxygen, Dissolved	8.7	.01	mg/l	EPA 360.1	05-13-1993 15:15 LM
pH	7.81	----	Units	EPA 150.1	05-13-1993 15:15 LM
Potassium	0.00	.1	mg/l	EPA 258.1	05-24-1993 07:50 ED
Sodium	6.30	.2	mg/l	EPA 273.1	05-21-1993 15:30 ED
Solids, Settleable	0.7	.5	mg/l	EPA 160.5	05-14-1993 07:30 LS
Solids, Total Dissolved	209.0	14	mg/l	EPA 160.1	05-17-1993 10:30 LM
Solids, Total Suspended	58.0	7	mg/l	EPA 160.2	05-17-1993 10:30 LM
Sulfate	31.0	1	mg/l	EPA 375.4	05-17-1993 08:00 LS
urbidity	20.0	.1	NTU	EPA 180.1	05-14-1993 09:00 LS
ation/Anion Balance	9.85		%		

RECEIVED
5/25/93

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

June 25, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CS

Date sampled June 11, 1993

Date received June 11, 1993

Huntington Canyon HCC04
Temperature 53.3°F
Rec'd 1600 hr.
Sampled 1520 hr.

FIELD MEASUREMENTS

pH	8.13
Conductivity	379
DO	6.5
TURBIDITY	9

Analysis report no. 59-13189

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	06-11-1993 16:00 LS
Alkalinity, Bicarbonate	213	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Total	175	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Anions	4.20	----	meq/l	---------	---------- ----- --
Calcium	50.2	.03	mg/l	EPA 215.1	06-21-1993 13:05 ED
Cations	3.74	----	meq/l	---------	---------- ----- --
Chloride	8.7	.5	mg/l	EPA 325.3	06-23-1993 09:10 LM
Conductivity	340	0.2	umhos/cm	EPA 120.1	06-24-1993 09:00 LS
Hardness, Total	177	.03	mg/l $CaCO_3$	---------	06-21-1993 13:05 ED
Iron	0.16	.05	mg/l	EPA 236.1	06-17-1993 09:40 ED
Iron, Dissolved	0.11	.05	mg/l	EPA 236.1	06-22-1993 09:15 ED
Magnesium	12.50	.007	mg/l	EPA 242.1	06-21-1993 15:10 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-22-1993 10:05 ED
Oil & Grease	0.4	1	mg/l	EPA 413.1	06-23-1993 08:00 LM
Oxygen, Dissolved	5.2	.01	mg/l	EPA 360.1	06-11-1993 16:00 LM
pH	8.30	----	Units	EPA 150.1	06-11-1993 16:00 LM
Potassium	<0.10	.1	mg/l	EPA 258.1	06-22-1993 12:20 ED
Sodium	4.60	.2	mg/l	EPA 273.1	06-22-1993 11:15 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	06-12-1993 10:00 LS
Solids, Total Dissolved	196.0	14	mg/l	EPA 160.1	06-14-1993 13:00 LM
Solids, Total Suspended	9.0	7	mg/l	EPA 160.2	06-15-1993 08:00 LM
Sulfate	26.0	1	mg/l	EPA 375.4	06-21-1993 13:40 LS
Turbidity	4.2	.1	NTU	EPA 180.1	06-12-1993 08:00 LS
Cation/Anion Balance	-5.85		%		

RECEIVED
6/24/93

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 (Societe Generale de Surveillance)

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

August 24, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon Creek

Sample taken by Energy West/CS-KH

Date sampled July 16, 1993

Date received July 16, 1993

Huntington Canyon Creek HCCO4
Temperature 52.3°F
Rec'd 1300 hr.
Sampled 1118 hr.

FIELD MEASUREMENTS

pH	8.88
Conductivity	332
DO	7.6
Turbidity	10

Analysis report no. 59-13318

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	193	.4	mg/l HCO_3	4500 CO_2 D	07-22-1993 10:30 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	4500 CO_2 D	07-22-1993 10:30 LS
Alkalinity, Total	159	.4	mg/l $CaCO_3$	EPA 310.1	07-22-1993 10:30 LS
Anions	3.70	----	meq/l	---	--- ----- --
Calcium	45.9	.03	mg/l	EPA 215.1	08-23-1993 15:00 ED
Cations	3.33	----	meq/l	---	--- ----- --
Chloride	8.8	.5	mg/l	EPA 325.3	07-28-1993 08:00 LM
Conductivity	344	0.2	umhos/cm	EPA 120.1	08-11-1993 15:25 LS
Hardness, Total	155	.03	mg/l $CaCO_3$	---	08-23-1993 15:00 ED
Iron	0.23	.05	mg/l	EPA 236.1	07-29-1993 12:30 LS
Iron, Dissolved	<0.05	.05	mg/l	EPA 236.1	07-28-1993 16:10 JK
Magnesium	9.90	.007	mg/l	EPA 242.1	08-10-1993 13:15 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	07-29-1993 13:05 LS
Oil & Grease	1.0	1	mg/l	EPA 413.1	07-26-1993 08:00 LM
Oxygen, Dissolved	16.6	.01	mg/l	EPA 360.1	07-16-1993 16:00 LM
pH	7.82	----	Units	EPA 150.1	07-16-1993 16:00 LM
Potassium	1.10	.1	mg/l	EPA 258.1	08-10-1993 15:50 ED
Sodium	4.60	.2	mg/l	EPA 273.1	08-10-1993 14:05 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	07-16-1993 16:30 LM
Solids, Total Dissolved	185.0	14	mg/l	EPA 160.1	07-21-1993 10:00 LM
Solids, Total Suspended	23.0	7	mg/l	EPA 160.2	07-21-1993 08:30 LM
Sulfate	17.0	1	mg/l	EPA 375.4	08-04-1993 13:00 LS
Cation/Anion Balance	-5.10	----	%	---	--- ----- --

RECEIVED
8/24/93

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 (Societe Generale de Surveillance)

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

September 23, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled August 23, 1993

Date received August 23, 1993

Huntington Canyon Creek HCCO4
Temperature 61.1°F
Rec'd 1430 hr.
Sampled 1345 hr.

FIELD MEASUREMENTS

pH	8.76
Conductivity	340
DO	2.2
Turbidity	2.0

Analysis report no. 59-13438

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	08-23-1993 16:00 LS
Alkalinity, Bicarbonate	169	.4	mg/l HCO_3	4500 CO_2 D	09-01-1993 15:30 LS
Alkalinity, Carbonate	6	.4	mg/l CO_3	4500 CO_2 D	09-01-1993 15:30 LS
Alkalinity, Total	175	.4	mg/l $CaCO_3$	EPA 310.1	09-01-1993 15:30 LS
Anions	4.16	----	meq/l	---------	---------- ----- --
Calcium	35.3	.03	mg/l	EPA 215.1	09-21-1993 14:45 JK
Cations	4.35	----	meq/l	---------	---------- ----- --
Chloride	9.4	.5	mg/l	EPA 325.3	09-07-1993 13:00 LM
Conductivity	357	0.2	umhos/cm	EPA 120.1	08-25-1993 09:15 LS
Hardness, Total	203	.03	mg/l $CaCO_3$	---------	09-21-1993 14:45 JK
Iron	0.43	.05	mg/l	EPA 236.1	09-17-1993 14:45 ED
Iron, Dissolved	0.09	.05	mg/l	EPA 236.1	09-16-1993 12:15 ED
Magnesium	28.00	.007	mg/l	EPA 242.1	08-20-1993 11:15 JK
Manganese	0.05	.03	mg/l	EPA 243.1	09-17-1993 14:05 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	09-01-1993 11:45 LM
Oxygen, Dissolved	8.7	.01	mg/l	EPA 360.1	08-23-1993 16:00 LS
pH	8.60	----	Units	EPA 150.1	08-23-1993 16:00 LS
Potassium	1.00	.1	mg/l	EPA 258.1	09-22-1993 11:47 JK
Sodium	6.20	.2	mg/l	EPA 273.1	09-22-1993 08:40 JK
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	08-24-1993 10:00 LS
Solids, Total Dissolved	208.0	14	mg/l	EPA 160.1	08-25-1993 10:45 LM
Solids, Total Suspended	30.0	7	mg/l	EPA 160.2	08-24-1993 07:30 LM
Sulfate	23.0	1	mg/l	EPA 375.4	09-13-1993 09:30 LS
Turbidity	5.4	.1	NTU	EPA 180.1	08-24-1993 16:00
Cation/Anion Balance	2.33		%		

RECEIVED
9/23/93

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

October 20, 1993

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

RECEIVED
10/20/93
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled September 20, 1993

Date received September 22, 1993

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC04
Temperature 52.7°F
Rec'd 0845 hr.
Sampled 1651 hr.

FIELD MEASUREMENTS

pH	8.97
Conductivity	297
DO	2.8
Turbidity	11

NOTE: pH, DO & Settleable Solids holding times were expired when received at Lab.

Analysis report no. 59-13553

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	09-23-1993 1230	LM
Alkalinity, Bicarbonate	130	2	mg/l	$CaCO_3$	EPA 310.1	10-01-1993 1550	LS
Alkalinity, Carbonate	5	1	mg/l	$CaCO_3$	EPA 310.1	10-01-1993 1550	LS
Alkalinity, Total	135	2	mg/l	$CaCO_3$	EPA 310.1	10-01-1993 1550	LS
Anions	3.22	----	meq/l		---------	---------- -----	--
Calcium	40.2	.03	mg/l		EPA 215.1	10-19-1993 0925	ED
Cations	3.25	----	meq/l		---------	---------- -----	--
Chloride	8.5	.5	mg/l		EPA 325.3	10-13-1993 0830	LM
Conductivity	317.00	0.2	umhos/cm		EPA 120.1	09-27-1993 1400	KP
Hardness, Total	149.8	.03	mg/l	$CaCO_3$	---------	10-19-1993 0925	ED
Iron	0.49	.05	mg/l		EPA 236.1	10-19-1993 1150	ED
Iron, Dissolved	<0.05	.05	mg/l		EPA 236.1	10-19-1993 1220	ED
Magnesium	12.00	.007	mg/l		EPA 242.1	10-18-1993 1405	ED
Manganese	0.04	.03	mg/l		EPA 243.1	10-19-1993 1410	ED
Oil & Grease	0	1	mg/l		EPA 413.1	09-21-1993 1100	LM
Oxygen, Dissolved	8.22	.01	mg/l		EPA 360.1	09-22-1993 1500	LS
pH	8.61	----	Units		EPA 150.1	09-22-1993 1500	LM
Potassium	1.0	.1	mg/l		EPA 258.1	10-19-1993 1515	ED
Sodium	5.3	.2	mg/l		EPA 273.1	10-18-1993 1650	ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-22-1993 1600	LS
Solids, Total Dissolved	170	14	mg/l		EPA 160.1	09-23-1993 1300	LM
Solids, Total Suspended	15	7	mg/l		EPA 160.2	09-23-1993 1230	LM
Sulfate	17	1	mg/l		EPA 375.4	10-19-1993 1400	LS
Turbidity	2.1	.1	NTU		EPA 180.1	09-22-1993 1430	
Cation/Anion Balance	0.45		%				

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 (Societe Generale de Surveillance)

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

December 2, 1993

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

RECEIVED
12/2/93
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled October 22, 1993

Date received October 22, 1993

Huntington Canyon Creek HCCO4

Temperature 44.8°F
Flow NA
Rec'd 1130 hr.
Sampled 1100 hr.

FIELD MEASUREMENTS

pH	8.96
Conductivity	474
DO	6.0
Turbidity	5

Analysis report no. 59-13656

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	10-28-1993 1455	[illegible]
Alkalinity, Bicarbonate	259	2	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1455	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1455	LS
Alkalinity, Total	213	2	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1455	ED
Anions	5.70	----	meq/l		---------	---------- -----	--
Calcium	56.0	.03	mg/l		EPA 215.1	11-29-1993 1630	DW
Cations	5.70	----	meq/l		---------	---------- -----	--
Chloride	18.0	.5	mg/l		EPA 325.3	11-18-1993 1515	LM
Conductivity	516.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Hardness, Total	272.0	.03	mg/l	$CaCO_3$	---------	11-29-1993 1630	DW
Iron	<0.20	.05	mg/l		EPA 236.1	11-24-1993 1200	DW
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-01-1993 1500	DW
Magnesium	32.00	.007	mg/l		EPA 242.1	11-30-1993 1100	DW
Manganese	0.20	.03	mg/l		EPA 243.1	11-29-1993 1500	DW
Oil & Grease	0	1	mg/l		EPA 413.1	11-08-1993 1000	LM
Oxygen, Dissolved	9.71	.01	mg/l		EPA 360.1	10-22-1993 1530	LS
pH	8.11	----	Units		EPA 150.1	10-22-1993 1610	LS
Potassium	<2.0	.1	mg/l		EPA 258.1	11-30-1993 1500	DW
Sodium	7.0	.2	mg/l		EPA 273.1	11-30-1993 1300	DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	10-23-1993 0930	LM
Solids, Total Dissolved	305	14	mg/l		EPA 160.1	10-25-1993 0800	LM
Solids, Total Suspended	0	7	mg/l		EPA 160.2	10-27-1993 0800	LM
Sulfate	50	1	mg/l		EPA 375.4	11-19-1993 1400	LS
Turbidity	2.3	.1	NTU		EPA 180.1	10-22-1993 1630	LS
Cation/Anion Balance	0.20		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

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 (Societe Generale de Surveillance)

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

December 17, 1993

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

RECEIVED
12/17/93
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 November 22, 1993

Date received November 22, 1993

Huntington Canyon Creek HCCO4

Temperature 35.0°F
Rec'd 1310 hr.
Sampled 1010 hr.

FIELD MEASUREMENTS

pH	8.97
Conductivity	502
DO	3.1
Turbidity	24

Analysis report no. 59-13744

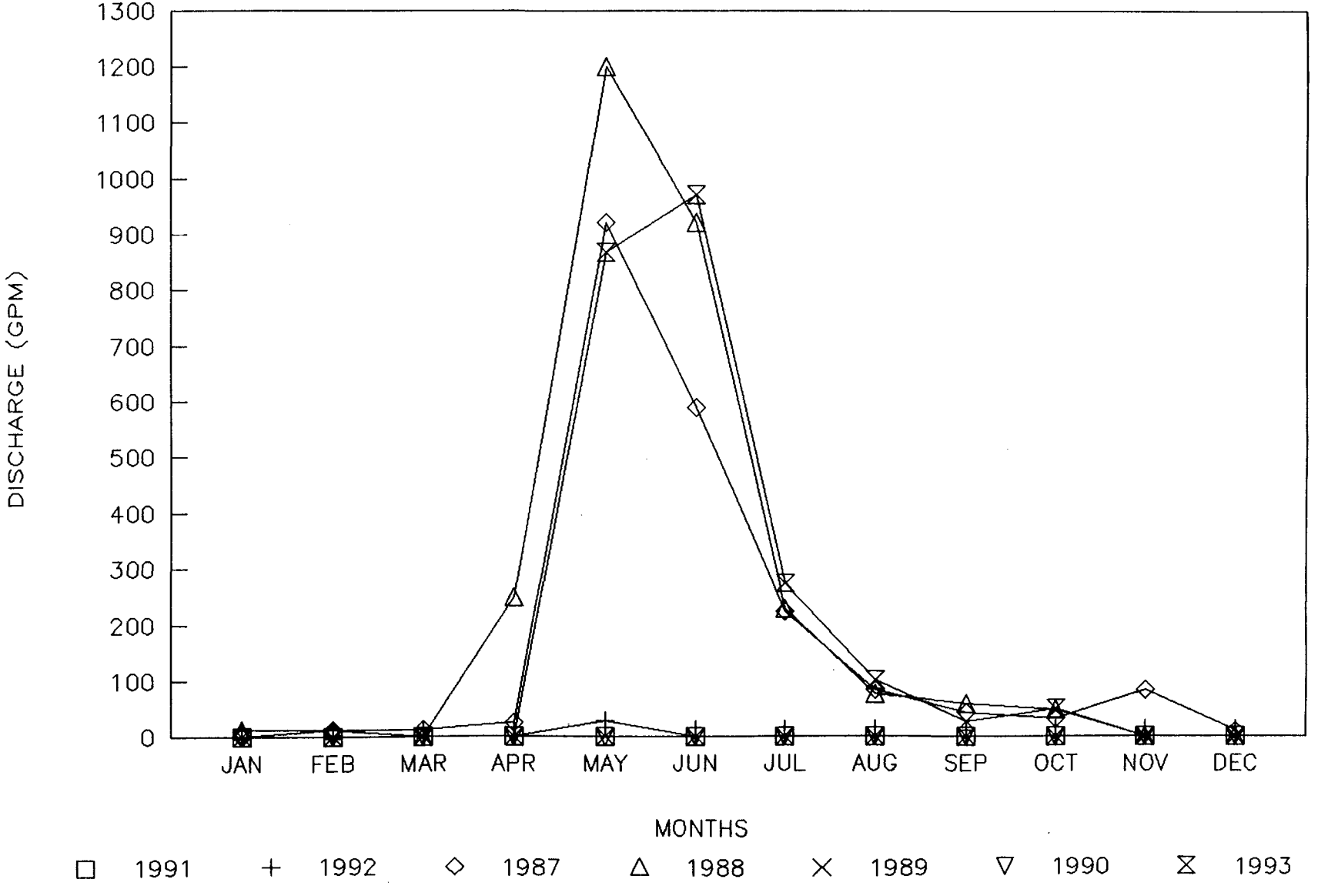
Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	12-02-1993 1500 ED
Alkalinity, Bicarbonate	195	2	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1500 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1500 LS
Alkalinity, Total	195	2	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1500 LS
Anions	6.00	----	meq/l		---------	---------- ----- --
Calcium	63.0	.03	mg/l		EPA 215.1	12-16-1993 1045 DW
Cations	5.70	----	meq/l		---------	---------- ----- --
Chloride	22.0	.5	mg/l		EPA 325.3	11-30-1993 1000 LM
Conductivity	555.00	0.2	umhos/cm		EPA 120.1	12-16-1993 1035 ED
Hardness, Total	260.0	.03	mg/l	$CaCO_3$	---------	12-16-1993 1045 DW
Iron	0.40	.05	mg/l		EPA 236.1	12-17-1993 1030 DW
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-15-1993 0830 DW
Magnesium	25.00	.007	mg/l		EPA 242.1	12-15-1993 1230 DW
Manganese	<0.10	.03	mg/l		EPA 243.1	12-16-1993 1600 DW
Oil & Grease	<5	1	mg/l		EPA 413.1	12-14-1993 1000 LM
Oxygen, Dissolved	9.46	.01	mg/l		EPA 360.1	11-22-1993 1400 LS
pH	8.04	----	Units		EPA 150.1	11-22-1993 1330 LS
Potassium	5.0	.1	mg/l		EPA 258.1	12-16-1993 0830 DW
Sodium	12.0	.2	mg/l		EPA 273.1	12-16-1993 1430 DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	11-22-1993 1515 LS
Solids, Total Dissolved	344	14	mg/l		EPA 160.1	11-23-1993 0845 LM
Solids, Total Suspended	15	7	mg/l		EPA 160.2	11-24-1993 1530 LM
Sulfate	70	1	mg/l		EPA 375.4	12-14-1993 1130 LS
Turbidity	3.8	.1	NTU		EPA 180.1	11-22-1993 1450 LS
Cation/Anion Balance	-2.20		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

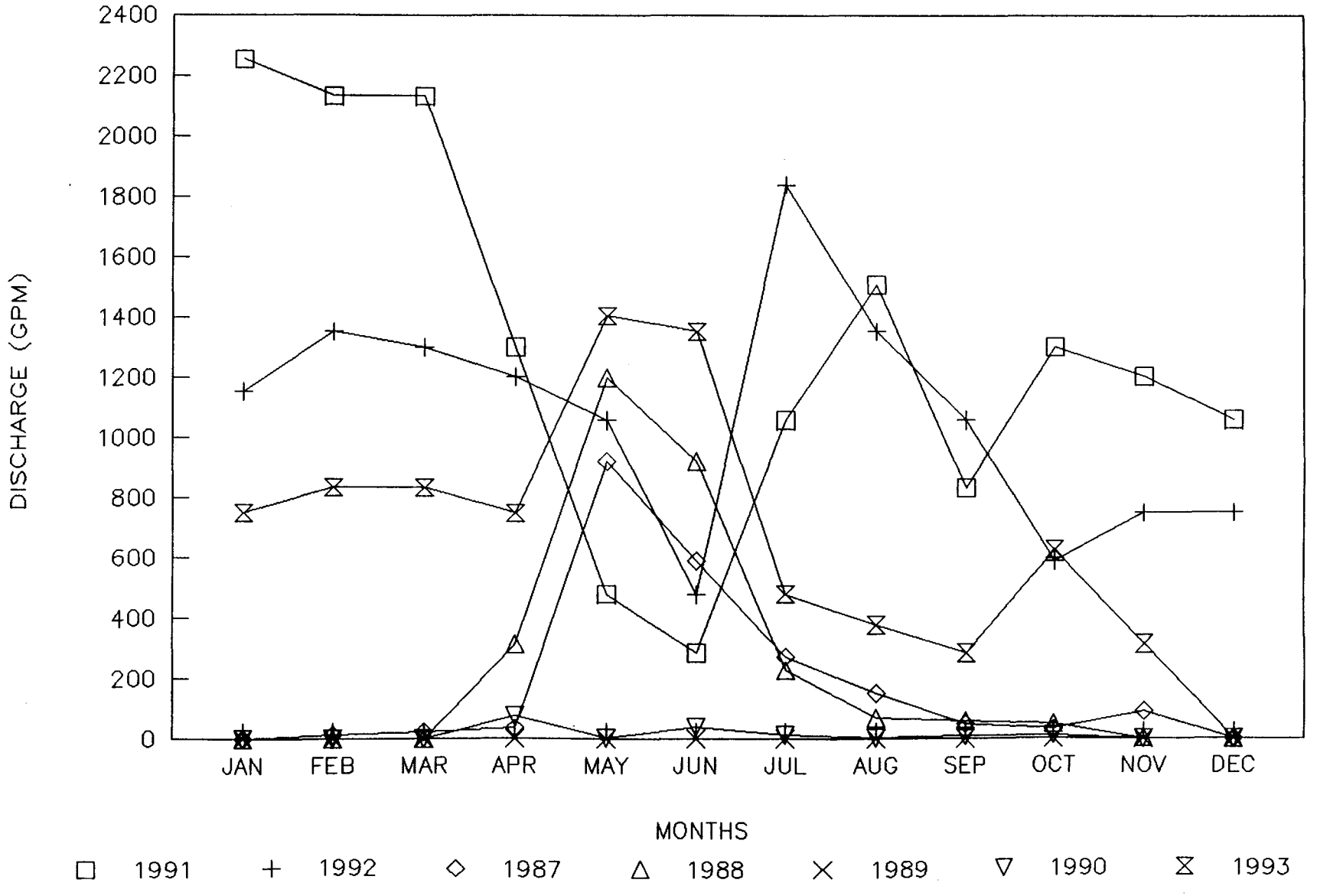
DEER CREEK – ABOVE MINE

Drainage Recession Curve Study



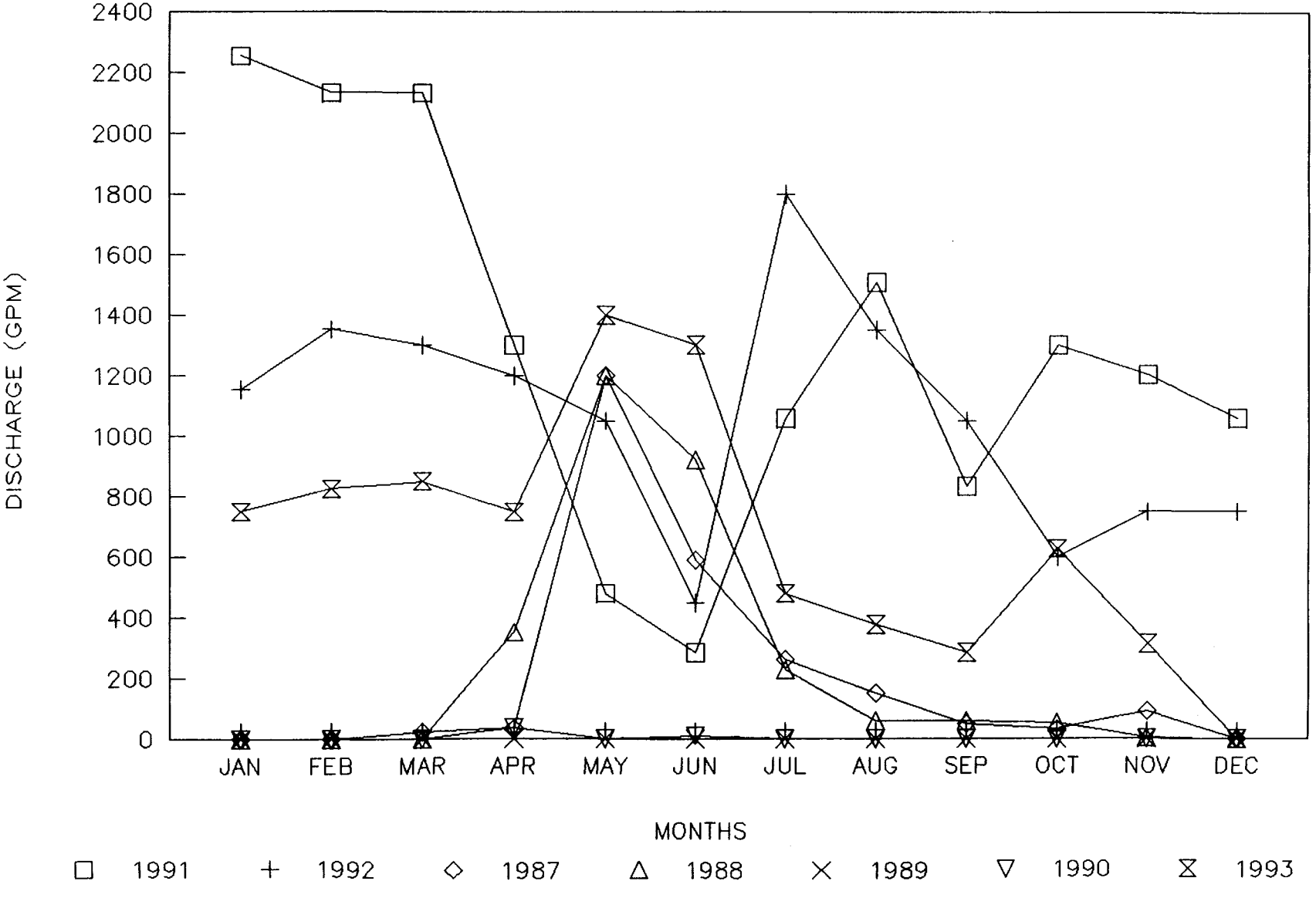
DEER CREEK – @ PERMIT BOUNDARY

Drainage Recession Curve Study



DEER CREEK – BELOW MINE

Drainage Recession Curve Study



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

May 25, 1993

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

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 13, 1993

Date received May 13, 1993

Deer Creek Run-Off DCRO1
Temperature 43.4°F
Flow 0.4/ 868 GPM
Rec'd 1500 hr.
Sampled 1325 hr.

FIELD MEASUREMENTS	
pH	8.26
Conductivity	484
Turbidity	200+
DO	8.9

Analysis report no. 59-13076

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	05-23-1993 15:00 LS
Alkalinity, Bicarbonate	373	2	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Alkalinity, Carbonate	<1	1	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Alkalinity, Total	306	2	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Anions	6.88	----	meq/l	---------	---------- ----- --
Calcium	94.2	.03	mg/l	EPA 215.1	05-21-1993 14:30 ED
Cations	8.20	----	meq/l	---------	---------- ----- --
Chloride	5.6	.5	mg/l	EPA 325.3	05-21-1993 07:45 LM
Conductivity	460	0.2	umhos/cm	EPA 120.1	05-24-1993 09:00 LS
Hardness, Total	343	.03	mg/l $CaCO_3$	---------	05-21-1993 14:30 ED
Iron	8.10	.05	mg/l	EPA 236.1	05-21-1993 12:55 ED
Iron, Dissolved	0.14	.05	mg/l	EPA 236.1	05-21-1993 12:55 ED
Magnesium	26.20	.01	mg/l	EPA 242.1	05-21-1993 15:00 ED
Manganese	0.14	.03	mg/l	EPA 243.1	05-21-1993 14:05 ED
Oil & Grease	1.3	1	mg/l	EPA 413.1	05-18-1993 09:30 LM
Oxygen, Dissolved	9.2	.01	mg/l	EPA 360.1	05-13-1993 15:15 LM
pH	7.95	----	Units	EPA 150.1	05-13-1993 15:15 LM
Potassium	1.70	.1	mg/l	EPA 258.1	05-24-1993 07:50 ED
Sodium	30.20	.2	mg/l	EPA 273.1	05-21-1993 15:30 ED
Solids, Settleable	1.3	.5	mg/l	EPA 160.5	05-14-1993 07:30 LS
Solids, Total Dissolved	317.0	14	mg/l	EPA 160.1	05-17-1993 10:30 LM
Solids, Total Suspended	27.0	7	mg/l	EPA 160.2	05-17-1993 10:30 LM
Sulfate	36.0	1	mg/l	EPA 375.4	05-24-1993 08:15 LS
Turbidity	75.0	.1	NTU	EPA 180.1	05-14-1993 09:00 LS
ation/Anion Balance	8.75		%		

RECEIVED
5/25/93

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

June 28, 1993

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

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 June 11, 1993

Date received June 11, 1993

Deer Creek DCRO1
Temperature 50.8°F
Flow 0.43/971 GPM
Rec'd 1600 hr.
Sampled 1400 hr.

FIELD MEASUREMENTS

pH	8.62
Conductivity	497
DO	8.6
TURBIDITY	16.0

Analysis report no. 59-13182

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	06-11-1993 16:00 LS
Alkalinity, Bicarbonate	263	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Total	216	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Anions	6.49	----	meq/l	---------	---------- ----- --
Calcium	75.5	.03	mg/l	EPA 215.1	06-21-1993 13:05 ED
Cations	7.14	----	meq/l	---------	---------- ----- --
Chloride	6.2	.5	mg/l	EPA 325.3	06-23-1993 09:10 LM
Conductivity	430	0.2	umhos/cm	EPA 120.1	06-24-1993 09:00 LS
Hardness, Total	301	.03	mg/l $CaCO_3$	---------	06-21-1993 13:05 ED
Iron	0.11	.05	mg/l	EPA 236.1	06-17-1993 09:40 ED
Iron, Dissolved	0.18	.05	mg/l	EPA 236.1	06-22-1993 09:15 ED
Magnesium	27.20	.007	mg/l	EPA 242.1	06-21-1993 15:10 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-22-1993 10:05 ED
Oil & Grease	0.1	1	mg/l	EPA 413.1	06-23-1993 08:00 LM
Oxygen, Dissolved	8.9	.01	mg/l	EPA 360.1	06-11-1993 16:00 LM
pH	8.30	----	Units	EPA 150.1	06-11-1993 16:00 LM
Potassium	2.20	.1	mg/l	EPA 258.1	06-22-1993 12:20 ED
Sodium	25.00	.2	mg/l	EPA 273.1	06-22-1993 11:15 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	06-12-1993 10:00 LS
Solids, Total Dissolved	284.0	14	mg/l	EPA 160.1	06-14-1993 13:00 LM
Solids, Total Suspended	31.0	7	mg/l	EPA 160.2	06-15-1993 08:00 LM
Sulfate	100.0	1	mg/l	EPA 375.4	06-28-1993 13:00 LS
Turbidity	3.3	.1	NTU	EPA 180.1	06-12-1993 08:00 LS
Cation/Anion Balance	4.82		%		

RECEIVED
6/28/93

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

August 27, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/CS-KH

Date sampled July 16, 1993

Date received July 16, 1993

Deer Creek Run-off DCRO1
Temperature 55.6°F
Flow .19/274 GPM
Rec'd 1300 hr.
Sampled 0939 hr.

FIELD MEASUREMENTS

pH	8.71
Conductivity	516
DO	7.2

Analysis report no. 59-13319

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	07-23-1993 13:15 LS
Alkalinity, Bicarbonate	291	.4	mg/l HCO_3	EPA 310.1	07-23-1993 13:15 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	EPA 310.1	07-23-1993 13:15 LS
Alkalinity, Total	239	.4	mg/l $CaCO_3$	EPA 310.1	07-23-1993 13:15 LS
Anions	5.65	----	meq/l	---------	---------- ----- --
Calcium	54.9	.03	mg/l	EPA 215.1	08-10-1993 12:25 ED
Cations	5.72	----	meq/l	---------	---------- ----- --
Chloride	8.4	.5	mg/l	EPA 325.3	07-28-1993 08:00 LM
Conductivity	505	0.2	umhos/cm	EPA 120.1	08-09-1993 15:25 LS
Hardness, Total	217	.03	mg/l $CaCO_3$	---------	08-10-1993 12:25 ED
Iron	0.39	.05	mg/l	EPA 236.1	07-29-1993 12:30 LS
Iron, Dissolved	<0.05	.05	mg/l	EPA 236.1	07-28-1993 16:10 JK
Magnesium	19.30	.007	mg/l	EPA 242.1	08-10-1993 13:15 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	07-29-1993 13:05 LS
Oil & Grease	0.0	1	mg/l	EPA 413.1	07-26-1993 08:00 LM
Oxygen, Dissolved	8.8	.01	mg/l	EPA 360.1	07-16-1993 16:00 LM
pH	7.97	----	Units	EPA 150.1	07-16-1993 16:00 LM
Potassium	1.70	.1	mg/l	EPA 258.1	08-10-1993 15:50 ED
Sodium	31.30	.2	mg/l	EPA 273.1	08-10-1993 14:05 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	07-16-1993 16:30 LM
Solids, Total Dissolved	312.0	14	mg/l	EPA 160.1	07-21-1993 10:00 LM
Solids, Total Suspended	2.0	7	mg/l	EPA 160.2	07-21-1993 08:30 LM
Sulfate	36.0	1	mg/l	EPA 375.4	08-04-1993 13:00 LS
Cation/Anion Balance	0.62	----	%	---------	---------- ----- --

RECEIVED
8/27/93

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

F-465 FIELD OFFICE

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

September 23, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled August 23, 1993

Date received August 23, 1993

Deer Creek Run-Off DCRO1
Temperature 51.2°F
Flow .1/101 GPM
Rec'd 1430 hr.
Sampled 1205 hr.

FIELD MEASUREMENTS

pH	8.65
Conductivity	537
DO	9.9
Turbidity	20

Analysis report no. 59-13443

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	08-23-1993 16:00 LS
Alkalinity, Bicarbonate	241	.4	mg/l HCO_3	4500 CO_2 D	09-01-1993 15:30 LS
Alkalinity, Carbonate	9	.4	mg/l CO_3	4500 CO_2 D	09-01-1993 15:30 LS
Alkalinity, Total	251	.4	mg/l $CaCO_3$	EPA 310.1	09-01-1993 15:30 LS
Anions	6.07	----	meq/l	---------	---------- ----- --
Calcium	36.0	.03	mg/l	EPA 215.1	09-21-1993 14:45 JK
Cations	5.14	----	meq/l	---------	---------- ----- --
Chloride	8.4	.5	mg/l	EPA 325.3	09-07-1993 13:00 LM
Conductivity	570	0.2	umhos/cm	EPA 120.1	08-25-1993 09:15 LS
Hardness, Total	193	.03	mg/l $CaCO_3$	---------	09-21-1993 14:45 JK
Iron	0.24	.05	mg/l	EPA 236.1	09-17-1993 14:45 ED
Iron, Dissolved	0.13	.05	mg/l	EPA 236.1	09-16-1993 12:15 ED
Magnesium	25.00	.007	mg/l	EPA 242.1	09-21-1993 15:26 JK
Manganese	0.03	.03	mg/l	EPA 243.1	09-17-1993 14:05 ED
Oil & Grease	<0.5	1	mg/l	EPA 413.1	09-03-1993 10:00 LM
Oxygen, Dissolved	9.4	.01	mg/l	EPA 360.1	08-23-1993 16:00 LS
pH	8.60	----	Units	EPA 150.1	08-23-1993 16:00 LS
Potassium	0.94	.1	mg/l	EPA 258.1	09-22-1993 11:47 JK
Sodium	29.50	.2	mg/l	EPA 273.1	09-22-1993 08:40 JK
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	08-24-1993 10:00 LS
Solids, Total Dissolved	346.0	14	mg/l	EPA 160.1	08-25-1993 10:45 LM
Solids, Total Suspended	16.0	7	mg/l	EPA 160.2	08-24-1993 07:30 LM
Sulfate	45.0	1	mg/l	EPA 375.4	09-13-1993 09:30 LS
Turbidity	5.9	.1	NTU	EPA 180.1	08-24-1993 16:00 LS
Carbon Dioxide, Calculated	8.32		%		

RECEIVED
9/23/93

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

October 20, 1993

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

RECEIVED
10/20/93

Kind of sample reported to us Water

Sample taken at Deer Creek FIELD OFFICE

Sample taken by Energy West/KH

Date sampled September 20, 1993

Date received September 22, 1993

Sample identification by
PACIFICORP FIELD OFFICE

Deer Creek Run-Off DCRO1
Temperature 44.9°F
Flow .04/27 GPM
Rec'd 0845 hr.
Sampled 1457 hr.

FIELD MEASUREMENTS

pH	8.73
Conductivity	557
DO	11
Turbidity	2

NOTE: pH, DO & Settleable Solids holding times were expired when received at Lab.

Analysis report no. 59-13555

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	2	1	mg/l	$CaCO_3$	EPA 305.1	10-03-1993 1400	LS
Alkalinity, Bicarbonate	336	2	mg/l	$CaCO_3$	EPA 310.1	10-03-1993 1400	LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	10-03-1993 1400	LS
Alkalinity, Total	276	2	mg/l	$CaCO_3$	EPA 310.1	10-03-1993 1400	LS
Anions	6.68	----	meq/l		---------	---------- -----	--
Calcium	45.3	.03	mg/l		EPA 215.1	10-19-1993 0925	ED
Cations	7.13	----	meq/l		---------	---------- -----	--
Chloride	9.0	.5	mg/l		EPA 325.3	10-13-1993 0830	LM
Conductivity	627.00	0.2	umhos/cm		EPA 120.1	09-27-1993 1400	KP
Hardness, Total	257.2	.03	mg/l	$CaCO_3$	---------	10-19-1993 0925	ED
Iron	0.07	.05	mg/l		EPA 236.1	10-19-1993 1150	ED
Iron, Dissolved	0.35	.05	mg/l		EPA 236.1	10-19-1993 1220	ED
Magnesium	35.00	.007	mg/l		EPA 242.1	10-18-1993 1405	ED
Manganese	<0.03	.03	mg/l		EPA 243.1	10-19-1993 1410	ED
Oil & Grease	0	1	mg/l		EPA 413.1	10-02-1993 0930	LM
Oxygen, Dissolved	8.37	.01	mg/l		EPA 360.1	09-22-1993 1500	LM
pH	7.44	----	Units		EPA 150.1	09-22-1993 1500	LM
Potassium	1.0	.1	mg/l		EPA 258.1	10-19-1993 1515	ED
Sodium	45.7	.2	mg/l		EPA 273.1	10-18-1993 1650	ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-22-1993 1600	LS
Solids, Total Dissolved	364	14	mg/l		EPA 160.1	09-23-1993 1300	LM
Solids, Total Suspended	1	7	mg/l		EPA 160.2	09-23-1993 1230	LM
Sulfate	50	1	mg/l		EPA 375.4	10-19-1993 1400	LS
Turbidity	1.0	.1	NTU		EPA 180.1	09-22-1993 1430	
Cation/Anion Balance	3.25		%				

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 (Societe' Generale de Surveillance)

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

December 2, 1993

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

RECEIVED
12/2/93
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Deer Creek Run-off DCRO1

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled October 22, 1993

Date received October 22, 1993

Temperature 35.0°F
Flow 50 GPM
Rec'd 1130 hr.
Sampled 0910 hr.

FIELD MEASUREMENTS

pH	8.69
Conductivity	580
DO	22.0
Turbidity	.09

Analysis report no. 59-13655

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	10-28-1993 1455	LS
Alkalinity, Bicarbonate	342	2	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1455	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1455	LS
Alkalinity, Total	281	2	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1455	ED
Anions	7.00	----	meq/l		---------	---------- -----	--
Calcium	48.0	.03	mg/l		EPA 215.1	11-29-1993 1630	DW
Cations	6.30	----	meq/l		---------	---------- -----	--
Chloride	8.0	.5	mg/l		EPA 325.3	11-18-1993 1515	LM
Conductivity	660.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Hardness, Total	272.0	.03	mg/l	$CaCO_3$	---------	11-29-1993 1630	DW
Iron	<0.20	.05	mg/l		EPA 236.1	11-24-1993 1200	DW
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-01-1993 1500	DW
Magnesium	37.00	.007	mg/l		EPA 242.1	11-30-1993 1100	DW
Manganese	0.20	.03	mg/l		EPA 243.1	11-29-1993 1500	DW
Oil & Grease	0	1	mg/l		EPA 413.1	11-08-1993 1000	LM
Oxygen, Dissolved	9.87	.01	mg/l		EPA 360.1	10-22-1993 1530	LS
pH	8.24	----	Units		EPA 150.1	10-22-1993 1610	LS
Potassium	<2.0	.1	mg/l		EPA 258.1	11-30-1993 1500	DW
Sodium	20.0	.2	mg/l		EPA 273.1	11-30-1993 1300	DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	10-23-1993 0930	LM
Solids, Total Dissolved	377	14	mg/l		EPA 160.1	10-25-1993 0800	LM
Solids, Total Suspended	1	7	mg/l		EPA 160.2	10-27-1993 0800	LM
Sulfate	60	1	mg/l		EPA 375.4	11-19-1993 1400	LS
Turbidity	0.1	.1	NTU		EPA 180.1	10-22-1993 1630	LS
Cation/Anion Balance	-5.00		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout
Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (708) 953-9300

SINCE 1908

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

January 22, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by ENERGY WEST (KH)

Date sampled January 15, 1993

Date received January 15, 1993

DEER CREEK RUN-OFF
DCR-04 EW
Temperature 46.5°F
Flow 749 GPM
Rec'd 1200 hr.
Sampled 1020 hr.

FIELD MEASUREMENTS

pH	8.48
Conductivity	1070
DO	N/A
Turbidity	1.9

Analysis report no. 59-12816

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	01-18-1993 08:00 LS
Alkalinity, Bicarbonate	369	1	mg/l $CaCO_3$	EPA 310.1	01-18-1993 08:00 LS
Alkalinity, Carbonate	9	1	mg/l $CaCO_3$	EPA 310.1	01-21-1993 10:40 LDS
Alkalinity, Total	303	1	mg/l $CaCO_3$	EPA 310.1	01-18-1993 08:00 LS
Anions	12.77	----	meq/l	---------	---------- ----- --
Calcium	124.0	.1	mg/l	EPA 215.1	01-20-1993 13:00 LS
Cations	14.88	----	meq/l	---------	---------- ----- --
Chloride	110.0	.1	mg/l	EPA 325.3	01-18-1993 09:00 LS
Conductivity	1130	2	umhos/cm	EPA 120.1	01-18-1993 10:00 LS
Hardness, Total	536	1	mg/l $CaCO_3$	---------	01-20-1993 13:00 LS
Iron	0.04	.02	mg/l	EPA 236.1	01-20-1993 13:45 LS
Iron, Dissolved	0.04	.02	mg/l	EPA 236.1	01-20-1993 13:45 LS
Magnesium	55.00	.01	mg/l	EPA 242.1	01-20-1993 13:00 LS
Manganese	0.00	.01	mg/l	EPA 243.1	01-20-1993 13:45 LS
Oil & Grease	0.0	1	mg/l	EPA 413.1	01-19-1993 10:30 LM
Oxygen, Dissolved	7.7	.01	mg/l	EPA 360.1	01-15-1993 13:00 LM
pH	8.40	----	Units	EPA 150.1	01-15-1993 13:00 LM
Potassium	5.10	.01	mg/l	EPA 258.1	01-20-1993 13:00 LS
Sodium	94.00	.01	mg/l	EPA 273.1	01-20-1993 13:00 LS
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	01-15-1993 08:30 LM
Solids, Total Dissolved	739.0	.5	mg/l	EPA 160.1	01-19-1993 11:30 LM
Solids, Total Suspended	7.0	.5	mg/l	EPA 160.2	01-19-1993 11:30 LM
Sulfate	180.0	.1	mg/l	EPA 375.4	01-14-1993 11:00 LS
Turbidity	1.0	.1	NTU	EPA 180.1	01-15-1993 15:00 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

11/22/93

Manager, Huntington Laboratory

FIELD OFFICE

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 (Societe Generale de Surveillance)

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

March 12, 1993

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

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 February 26, 1993

Date received February 26, 1993

Deer Creek Runoff DCR04
Temperature 49.0°F
Flow 0.3/834 GPM
Rec'd 1230 hr.
Sampled 1115 hr.

FIELD MEASUREMENTS

pH	8.16
Conductivity	1360
Turbidity	1.6
DO	7.2

Analysis report no. 59-12902

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	03-04-1993 10:20 LS
Alkalinity, Bicarbonate	363	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Alkalinity, Total	298	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Anions	12.43	----	meq/l	---------	---------- ----- --
Calcium	82.1	.1	mg/l	EPA 215.1	03-04-1993 13:30 ED
Cations	14.08	----	meq/l	---------	---------- ----- --
Chloride	199.0	.1	mg/l	EPA 325.3	03-11-1993 13:00 LM
Conductivity	1423	2	umhos/cm	EPA 120.1	03-04-1993 15:30 LS
Hardness, Total	411	1	mg/l $CaCO_3$	---------	03-04-1993 13:30 ED
Iron	0.11	.02	mg/l	EPA 236.1	03-04-1993 13:30 ED
Iron, Dissolved	0.00	.02	mg/l	EPA 236.1	03-04-1993 13:30 ED
Magnesium	50.00	.01	mg/l	EPA 242.1	03-04-1993 13:30 ED
Manganese	0.03	.01	mg/l	EPA 243.1	03-04-1993 13:30 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	03-03-1993 08:00 LM
Oxygen, Dissolved	8.3	.01	mg/l	EPA 360.1	02-26-1993 13:20 LS
pH	8.30	----	Units	EPA 150.1	02-26-1993 13:20 LS
Potassium	9.20	.01	mg/l	EPA 258.1	03-04-1993 13:30 ED
Sodium	131.00	.01	mg/l	EPA 273.1	03-04-1993 13:30 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	02-26-1993 13:00 LS
Solids, Total Dissolved	895.0	.5	mg/l	EPA 160.1	03-04-1993 09:30 LM
Solids, Total Suspended	5.0	.5	mg/l	EPA 160.2	03-04-1993 09:30 LM
Sulfate	50.0	.1	mg/l	EPA 375.4	03-10-1993 09:00 LS
Turbidity	6.0	.1	NTU	EPA 180.1	02-26-1993 14:15 LS
Ca[illegible]	6.94		%		

RECEIVED
3/12/93

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

April 5, 1993

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

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 March 17, 1993

Date received March 17, 1993

Deer Creek Run-Off DCRO4
Temperature 56.3°F
Flow 834 GPM
Rec'd 1530 hr.
Sampled 1436 hr.

FIELD MEASUREMENTS

pH	8.70
Conductivity	1090
Turbidity	16
DO	8.7

Analysis report no. 59-12949

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	03-19-1993 12:15 LS
Alkalinity, Bicarbonate	348	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 12:15 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 12:15 LS
Alkalinity, Total	286	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 12:15 LS
Anions	13.18	----	meq/l	---------	---------- ----- --
Calcium	89.7	.1	mg/l	EPA 215.1	04-02-1993 09:00 ED
Cations	11.52	----	meq/l	---------	---------- ----- --
Chloride	121.7	.1	mg/l	EPA 325.3	03-22-1993 14:30 LM
Conductivity	1170	2	umhos/cm	EPA 120.1	03-24-1993 11:00 LS
Hardness, Total	343	1	mg/l $CaCO_3$	---------	04-02-1993 09:00 ED
Iron	0.17	.02	mg/l	EPA 236.1	03-23-1993 08:35 ED
Iron, Dissolved	0.16	.02	mg/l	EPA 236.1	03-23-1993 08:35 ED
Magnesium	29.00	.01	mg/l	EPA 242.1	04-02-1993 09:00 ED
Manganese	0.00	.01	mg/l	EPA 243.1	03-23-1993 08:35 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	03-23-1993 13:00 LM
Oxygen, Dissolved	6.7	.01	mg/l	EPA 360.1	03-17-1993 15:00 LS
pH	8.10	----	Units	EPA 150.1	03-17-1993 15:00 LS
Potassium	9.60	.01	mg/l	EPA 258.1	03-22-1993 13:20 ED
Sodium	102.40	.01	mg/l	EPA 273.1	03-22-1993 13:20 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	03-18-1993 07:30 LM
Solids, Total Dissolved	741.0	.5	mg/l	EPA 160.1	03-19-1993 10:45 LM
Solids, Total Suspended	13.0	.5	mg/l	EPA 160.2	03-19-1993 10:45 LM
Sulfate	200.0	.1	mg/l	EPA 375.4	03-23-1993 12:00 LS
Turbidity	5.6	.1	NTU	EPA 180.1	03-18-1993 09:00 LS
Cation/Anion Balance	-6.27		%		

RECEIVED
4/6/93

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

Original Watermarked For Your Protection

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 (Societe Generale de Surveillance)

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

April 30, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled April 22, 1993

Date received April 22, 1993

Deer Creek Run-Off DCRO4
Rec'd 1100 hr.
Sampled 0910 hr.
TEMP. 52.1°F
FLOW 749 GPM
FIELD MEASUREMENTS
PH 8.75
COND. 943
DO 6.9
TURB. 4.1

Analysis report no. 59-13037

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	2	1	mg/l $CaCO_3$	EPA 305.1	04-23-1993 12:45 LS
Alkalinity, Bicarbonate	356	1	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Alkalinity, Total	292	1	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Anions	11.08	----	meq/l	---------	---------- ----- --
Calcium	85.3	.1	mg/l	EPA 215.1	04-28-1993 13:40 ED
Cations	11.34	----	meq/l	---------	---------- ----- --
Chloride	57.2	.1	mg/l	EPA 325.3	04-22-1993 13:00 LM
Conductivity	835	2	umhos/cm	EPA 120.1	04-27-1993 14:00 LS
Hardness, Total	452	1	mg/l $CaCO_3$	---------	04-28-1993 13:40 ED
Iron	0.12	.02	mg/l	EPA 236.1	04-29-1993 10:35 ED
Iron, Dissolved	0.12	.02	mg/l	EPA 236.1	04-30-1993 08:55 ED
Magnesium	58.10	.01	mg/l	EPA 242.1	04-28-1993 14:15 ED
Manganese	0.06	.01	mg/l	EPA 243.1	04-28-1993 15:20 ED
Oil & Grease	0.7	1	mg/l	EPA 413.1	04-26-1993 08:00 LM
Oxygen, Dissolved	7.9	.01	mg/l	EPA 360.1	04-22-1993 16:00 LS
pH	8.00	----	Units	EPA 150.1	04-22-1993 16:00 LS
Potassium	7.00	.01	mg/l	EPA 258.1	04-29-1993 13:30 ED
Sodium	49.60	.01	mg/l	EPA 273.1	04-29-1993 11:50 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	04-23-1993 07:30 ED
Solids, Total Dissolved	651.0	.5	mg/l	EPA 160.1	04-23-1993 08:00 ED
Solids, Total Suspended	2.0	.5	mg/l	EPA 160.2	04-23-1993 08:00 ED
Sulfate	180.0	.1	mg/l	EPA 375.4	04-26-1993 08:30 LS
Turbidity	10.0	.1	NTU	EPA 180.1	04-23-1993 13:00 LS

RECEIVED
4/30/93

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

June 3, 1993

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

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 13, 1993

Date received May 13, 1993

Deer Creek Run-Off DCRO4
Temperature 49.5°F
Flow .42/1404 GPM
Rec'd 1500 hr.
Sampled 1358 hr.

FIELD MEASUREMENTS

pH	8.35
Conductivity	734
Turbidity	200+
DO	7.8

Analysis report no. 59-13075

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	05-23-1993 15:00 LS
Alkalinity, Bicarbonate	369	2	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Alkalinity, Carbonate	<1	1	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Alkalinity, Total	303	2	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Anions	9.32	----	meq/l	---------	---------- ----- --
Calcium	104.6	.03	mg/l	EPA 215.1	05-21-1993 14:30 ED
Cations	10.47	----	meq/l	---------	---------- ----- --
Chloride	31.9	.5	mg/l	EPA 325.3	05-24-1993 07:45 LM
Conductivity	630	0.2	umhos/cm	EPA 120.1	05-24-1993 09:00 LS
Hardness, Total	430	.03	mg/l $CaCO_3$	---------	05-21-1993 14:30 ED
Iron	3.92	.05	mg/l	EPA 236.1	05-21-1993 12:55 ED
Iron, Dissolved	0.14	.05	mg/l	EPA 236.1	05-21-1993 12:55 ED
Magnesium	40.90	.01	mg/l	EPA 242.1	05-21-1993 15:00 ED
Manganese	0.09	.03	mg/l	EPA 243.1	05-21-1993 14:05 ED
Oil & Grease	1.7	1	mg/l	EPA 413.1	05-18-1993 09:30 LM
Oxygen, Dissolved	8.8	.01	mg/l	EPA 360.1	05-13-1993 15:15 LM
pH	7.90	----	Units	EPA 150.1	05-13-1993 15:15 LM
Potassium	3.60	.1	mg/l	EPA 258.1	05-24-1993 07:50 ED
Sodium	41.60	.2	mg/l	EPA 273.1	05-21-1993 15:30 ED
Solids, Settleable	0.8	.5	mg/l	EPA 160.5	05-14-1993 07:30 LS
Solids, Total Dissolved	463.0	14	mg/l	EPA 160.1	05-17-1993 10:30 LM
Solids, Total Suspended	190.0	7	mg/l	EPA 160.2	05-17-1993 10:30 LM
Sulfate	120.0	1	mg/l	EPA 375.4	05-17-1993 08:00 LS
Turbidity	40.0	.1	NTU	EPA 180.1	05-14-1993 09:00 LS
[illegible]	6.03		%		

RECEIVED
6/3/93

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

June 25, 1993

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

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 June 11, 1993

Date received June 11, 1993

Deer Creek DCRO4
Temperature 54.9°F
Flow 0.41/1353
Rec'd 1600 hr.
Sampled 1447 hr.

FIELD MEASUREMENTS

pH	8.83
Conductivity	671
DO	7.5
TURBIDITY	12

Analysis report no. 59-13183

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	06-11-1993 16:00 LS
Alkalinity, Bicarbonate	270	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Total	222	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Anions	6.86	----	meq/l	---------	---------- ----- --
Calcium	68.7	.03	mg/l	EPA 215.1	06-21-1993 13:05 ED
Cations	7.36	----	meq/l	---------	---------- ----- --
Chloride	23.0	.5	mg/l	EPA 325.3	06-23-1993 09:10 LM
Conductivity	580	0.2	umhos/cm	EPA 120.1	06-24-1993 09:00 LS
Hardness, Total	305	.03	mg/l $CaCO_3$	---------	06-21-1993 13:05 ED
Iron	0.12	.05	mg/l	EPA 236.1	06-17-1993 09:40 ED
Iron, Dissolved	0.30	.05	mg/l	EPA 236.1	06-22-1993 09:15 ED
Magnesium	32.40	.007	mg/l	EPA 242.1	06-21-1993 15:10 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-22-1993 10:05 ED
Oil & Grease	0.1	1	mg/l	EPA 413.1	06-23-1993 08:00 LM
Oxygen, Dissolved	7.5	.01	mg/l	EPA 360.1	06-11-1993 16:00 LM
pH	8.10	----	Units	EPA 150.1	06-11-1993 16:00 LM
Potassium	2.20	.1	mg/l	EPA 258.1	06-22-1993 12:20 ED
Sodium	28.20	.2	mg/l	EPA 273.1	06-15-1993 11:15 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	06-12-1993 10:00 LS
Solids, Total Dissolved	397.0	14	mg/l	EPA 160.1	06-14-1993 13:00 LM
Solids, Total Suspended	23.0	7	mg/l	EPA 160.2	06-15-1993 08:00 LM
Sulfate	90.0	1	mg/l	EPA 375.4	06-21-1993 13:50 LS
Turbidity	5.5	.1	NTU	EPA 180.1	06-12-1993 08:00 LS
Carbonate/Bicarbonate	3.57		%		

RECEIVED
6/25/93

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 (Societe Generale de Surveillance)

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

August 23, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/CS-KH

Date sampled July 16, 1993

Date received July 16, 1993

Deer Creek Run-off DCRO4
Temperature 53.3°F
Flow 21/480 GPM
Rec'd 1300 hr.
Sampled 1018 hr.

FIELD MEASUREMENTS

pH	8.65
Conductivity	688
DO	7.8
Turbidity	5

Analysis report no. 59-13320

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	07-23-1993 13:15 LS
Alkalinity, Bicarbonate	251	.4	mg/l HCO_3	EPA 310.1	07-23-1993 13:15 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	EPA 310.1	07-23-1993 13:15 LS
Alkalinity, Total	206	.4	mg/l $CaCO_3$	EPA 310.1	07-23-1993 13:15 LS
Anions	6.83	----	meq/l	---------	---------- ----- --
Calcium	50.5	.03	mg/l	EPA 215.1	08-10-1993 12:25 ED
Cations	7.11	----	meq/l	---------	---------- ----- --
Chloride	17.9	.5	mg/l	EPA 325.3	07-28-1993 08:00 LM
Conductivity	647	0.2	umhos/cm	EPA 120.1	08-09-1993 15:25 ED
Hardness, Total	284	.03	mg/l $CaCO_3$	---------	08-10-1993 12:25 ED
Iron	0.24	.05	mg/l	EPA 236.1	07-29-1993 12:30 LS
Iron, Dissolved	<0.05	.05	mg/l	EPA 236.1	07-28-1993 16:10 JK
Magnesium	38.40	.007	mg/l	EPA 242.1	08-10-1993 13:15 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	07-29-1993 13:05 LS
Oil & Grease	0.3	1	mg/l	EPA 413.1	07-06-1993 08:00 LM
Oxygen, Dissolved	16.7	.01	mg/l	EPA 360.1	07-16-1993 16:00 LM
pH	7.96	----	Units	EPA 150.1	07-16-1993 16:00 LM
Potassium	4.30	.1	mg/l	EPA 258.1	08-10-1993 15:50 ED
Sodium	30.90	.2	mg/l	EPA 273.1	08-10-1993 14:05 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	07-16-1993 16:30 LM
Solids, Total Dissolved	436.0	14	mg/l	EPA 160.1	07-21-1993 10:00 LM
Solids, Total Suspended	15.0	7	mg/l	EPA 160.2	07-21-1993 08:30 LM
Sulfate	110.0	1	mg/l	EPA 375.4	08-04-1993 13:00LS eh
Cation/Anion Balance	6.88	----	%	---------	---------- ----- --

RECEIVED
8/23/93

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

September 23, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled August 23, 1993

Date received August 23, 1993

Deer Creek Run-Off DCRO4
Temperature 60.4°F
Flow .18/378 GPM
Rec'd 1430 hr.
Sampled 1245 hr.

FIELD MEASUREMENTS	
pH	8.60
Conductivity	1050
DO	7.9
Turbidity	10

Analysis report no. 59-13440

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	08-23-1993 16:99 LS
Alkalinity, Bicarbonate	267	.4	mg/l HCO_3	4500 CO_2 D	09-01-1993 15:39 LS
Alkalinity, Carbonate	6	.4	mg/l CO_3	4500 CO_2 D	09-01-1993 15:39 LS
Alkalinity, Total	273	.4	mg/l $CaCO_3$	EPA 310.1	09-01-1993 15:39 LS
Anions	11.52	----	meq/l	---------	---------- ----- --
Calcium	50.4	.03	mg/l	EPA 215.1	09-21-1993 14:45 LS
Cations	10.16	----	meq/l	---------	---------- ----- --
Chloride	123.8	.5	mg/l	EPA 325.3	09-07-1993 13:00 LM
Conductivity	1152	0.2	umhos/cm	EPA 120.1	08-25-1993 09:15 LS
Hardness, Total	303	.03	mg/l $CaCO_3$	---------	09-21-1993 14:45 LS
Iron	0.18	.05	mg/l	EPA 236.1	09-17-1993 14:45 ED
Iron, Dissolved	0.11	.05	mg/l	EPA 236.1	09-16-1993 12:15 ED
Magnesium	43.00	.007	mg/l	EPA 242.1	09-21-1993 15:26 JK
Manganese	<0.03	.03	mg/l	EPA 243.1	09-17-1993 14:05 ED
Oil & Grease	0.5	1	mg/l	EPA 413.1	09-03-1993 10:09 LM
Oxygen, Dissolved	8.2	.01	mg/l	EPA 360.1	08-23-1993 16:00 LM
pH	8.40	----	Units	EPA 150.1	08-23-1993 16:00 LM
Potassium	4.42	.1	mg/l	EPA 258.1	09-22-1993 11:47 JK
Sodium	93.00	.2	mg/l	EPA 273.1	09-22-1993 08:40 JK
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	08-24-1993 10:00 LS
Solids, Total Dissolved	681.0	14	mg/l	EPA 160.1	08-25-1993 10:45 LM
Solids, Total Suspended	17.0	7	mg/l	EPA 160.2	08-24-1993 07:30 LM
Sulfate	130.0	1	mg/l	EPA 375.4	09-13-1993 09:30 LS
Turbidity	5.4	.1	NTU	EPA 180.1	08-24-1993 16:00
Cation/Anion Balance	-6.29		%		

RECEIVED
9/23/93

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

F-465
Original Watermarked For Your Protection

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

October 20, 1993

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

RECEIVED
10/20/93

Kind of sample reported to us Water

Sample taken at Deer Creek FIELD OFFICE

Sample taken by Energy West/KH

Date sampled September 20, 1993

Date received September 22, 1993

Sample identification by PACIFICORP FIELD OFFICE

Deer Creek Run-Off DCRO4
Temperature 53.6°F
Flow .15/285 GPM
Rec'd 0845 hr.
Sampled 1603 hr.

FIELD MEASUREMENTS

pH	8.82 Cond 838
DO	7.8
Turbidity	4

NOTE: pH, DO & Settleable Solids holding times were expired when received at Lab.

Analysis report no. 59-13554

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	10-01-1993 1550 LS
Alkalinity, Bicarbonate	352	2	mg/l	$CaCO_3$	EPA 310.1	10-01-1993 1550 LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	10-01-1993 1550 LS
Alkalinity, Total	289	2	mg/l	$CaCO_3$	EPA 310.1	10-01-1993 1550 LS
Anions	9.96	----	meq/l		---------	---------- ----- --
Calcium	69.6	.03	mg/l		EPA 215.1	10-19-1993 0925 ED
Cations	10.48	----	meq/l		---------	---------- ----- --
Chloride	42.0	.5	mg/l		EPA 325.3	10-13-1993 0830 LM
Conductivity	896.00	0.2	umhos/cm		EPA 120.1	09-27-1993 1400 KP
Hardness, Total	400.3	.03	mg/l	$CaCO_3$	---------	10-19-1993 0925 ED
Iron	0.15	.05	mg/l		EPA 236.1	10-19-1993 1150 ED
Iron, Dissolved	0.07	.05	3g/l		EPA 236.1	10-19-1993 1220 ED
Magnesium	55.00	.007	mg/l		EPA 242.1	10-18-1993 1405 ED
Manganese	<0.03	.03	mg/l		EPA 243.1	10-19-1993 1410 ED
Oil & Grease	0	1	mg/l		EPA 413.1	10-02-1993 0930 LM
Oxygen, Dissolved	8.35	.01	mg/l		EPA 360.1	09-22-1993 1500 LS
pH	7.58	----	Units		EPA 150.1	09-22-1993 1500 LM
Potassium	6.0	.1	mg/l		EPA 258.1	10-19-1993 1515 ED
Sodium	54.3	.2	mg/l		EPA 273.1	10-18-1993 1650 ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-22-1993 1600 LS
Solids, Total Dissolved	540	14	mg/l		EPA 160.1	09-23-1993 1300 LM
Solids, Total Suspended	7	7	mg/l		EPA 160.2	09-23-1993 1230 LM
Sulfate	150	1	mg/l		EPA 375.4	10-19-1993 1400 LS
Turbidity	1.1	.1	NTU		EPA 180.1	09-22-1993 1430 [illegible]
Cation/Anion Balance	2.56		%			

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

December 2, 1993

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

RECEIVED
12/2/93
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled October 22, 1993

Date received October 22, 1993

Sample identification by
PACIFICORP FIELD OFFICE

Deer Creek Run-Off DCRO4
Temperature 49.8°F
Flow 628 GPM
Rec'd 1130 hr.
Sampled 0950 hr.

FIELD MEASUREMENTS	
pH	8.50
Conductivity	976
DO	13.8
Turbidity	42

NOTE: Possible matrix interference with Alkalinity.

Analysis report no. 59-13657

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	10-28-1993 1850 LS
Alkalinity, Bicarbonate	333	2	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1850 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1850 LS
Alkalinity, Total	273	2	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1850 ED
Anions	11.80	----	meq/l		---------	---------- ----- --
Calcium	92.0	.03	mg/l		EPA 215.1	11-29-1993 1630 DW
Cations	10.50	----	meq/l		---------	---------- ----- --
Chloride	105.0	.5	mg/l		EPA 325.3	11-18-1993 1515 LM
Conductivity	1135.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945 ED
Hardness, Total	469.0	.03	mg/l	$CaCO_3$	---------	11-29-1993 1630 DW
Iron	0.50	.05	mg/l		EPA 236.1	11-24-1993 1200 DW
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-01-1993 1500 DW
Magnesium	58.00	.007	mg/l		EPA 242.1	11-30-1993 1100 DW
Manganese	0.20	.03	mg/l		EPA 243.1	11-29-1993 1500 DW
Oil & Grease	2	1	mg/l		EPA 413.1	11-08-1993 1000 LM
Oxygen, Dissolved	8.17	.01	mg/l		EPA 360.1	10-22-1993 1530 LS
pH	8.05	----	Units		EPA 150.1	10-22-1993 1610 LS
Potassium	4.0	.1	mg/l		EPA 258.1	11-30-1993 1500 DW
Sodium	24.0	.2	mg/l		EPA 273.1	11-30-1993 1300 DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	10-23-1993 0930 LM
Solids, Total Dissolved	679	14	mg/l		EPA 160.1	10-29-1993 0730 LM
Solids, Total Suspended	52	7	mg/l		EPA 160.2	10-27-1993 0800 LM
Sulfate	170	1	mg/l		EPA 375.4	11-19-1993 1400 LS
Turbidity	14.0	.1	NTU		EPA 180.1	10-22-1993 1630 LS
Cation/Anion Balance	-6.00		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout
Manager, Huntington Laboratory

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)

RECEIVED

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

December 17, 1993

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

12/17/93

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Deer Creek Run-Off DCRO4

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled November 22, 1993

Date received November 22, 1993

Temperature 43.7°F
Flow .10/315
Rec'd 1310 hr.
Sampled 0910 hr.

FIELD MEASUREMENTS

pH	8.77
Conductivity	980
DO	8.8
Turbidity	25

Analysis report no. 59-13745

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	12-02-1993 1500 ED
Alkalinity, Bicarbonate	287	2	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1500 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1500 LS
Alkalinity, Total	287	2	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1500 LS
Anions	11.60	----	meq/l		---------	---------- ----- --
Calcium	75.0	.03	mg/l		EPA 215.1	12-16-1993 1045 DW
Cations	10.80	----	meq/l		---------	---------- ----- --
Chloride	97.0	.5	mg/l		EPA 325.3	11-30-1993 1000 LM
Conductivity	1045.00	0.2	umhos/cm		EPA 120.1	12-16-1993 1035 ED
Hardness, Total	410.0	.03	mg/l	$CaCO_3$	---------	12-16-1993 1045 DW
Iron	0.50	.05	mg/l		EPA 236.1	12-17-1993 1030 DW
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-15-1993 0830 DW
Magnesium	54.00	.007	mg/l		EPA 242.1	12-16-1993 1230 DW
Manganese	<0.10	.03	mg/l		EPA 243.1	12-16-1993 1600 DW
Oil & Grease	<5	1	mg/l		EPA 413.1	12-14-1993 1000 LM
Oxygen, Dissolved	8.34	.01	mg/l		EPA 360.1	11-22-1993 1400 LS
pH	8.03	----	Units		EPA 150.1	11-22-1993 1330 LS
Potassium	7.0	.1	mg/l		EPA 258.1	12-16-1993 0830 DW
Sodium	59.0	.2	mg/l		EPA 273.1	12-16-1993 1430 DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	11-22-1993 1515 LS
Solids, Total Dissolved	648	14	mg/l		EPA 160.1	11-23-1993 0845 LM
Solids, Total Suspended	3	7	mg/l		EPA 160.2	11-24-1993 1530 LM
Sulfate	150	1	mg/l		EPA 375.4	12-14-1993 1130 LS
Turbidity	5.9	.1	NTU		EPA 180.1	11-22-1993 1450 LS
Cation/Anion Balance	-3.80		%			

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 • (708) 953-9300

SINCE 1908

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

January 22, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by ENERGY WEST (KH)

Date sampled January 15, 1993

Date received January 15, 1993

DEER CREEK RUN-OFF
DCR-06 EW
Temperature 37.2°F
Flow 749 GPM Est.
Rec'd 1200 hr.
Sampled 1045 hr.

FIELD MEASUREMENTS

pH	8.59
Conductivity	1090
DO	6.4
Turbidity	6.0

Analysis report no. 59-12815

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	01-18-1993 08:00 LS
Alkalinity, Bicarbonate	314	1	mg/l $CaCO_3$	EPA 310.1	01-18-1993 08:00 LS
Alkalinity, Carbonate	9	1	mg/l $CaCO_3$	EPA 310.1	01-21-1993 10:40 LDS
Alkalinity, Total	258	1	mg/l $CaCO_3$	EPA 310.1	01-18-1993 08:00 LS
Anions	12.24	----	meq/l	---------	---------- ----- --
Calcium	89.2	.1	mg/l	EPA 215.1	01-20-1993 13:00 LS
Cations	14.66	----	meq/l	---------	---------- ----- --
Chloride	115.0	.1	mg/l	EPA 325.3	01-18-1993 09:00 LS
Conductivity	1170	2	umhos/cm	EPA 120.1	01-18-1993 10:00 LS
Hardness, Total	483	1	mg/l $CaCO_3$	---------	01-20-1993 13:00 LS
Iron	0.06	.02	mg/l	EPA 236.1	01-20-1993 13:45 LS
Iron, Dissolved	0.06	.02	mg/l	EPA 236.1	01-20-1993 13:45 LS
Magnesium	63.20	.01	mg/l	EPA 242.1	01-20-1993 13:00 LS
Manganese	0.00	.01	mg/l	EPA 243.1	01-20-1993 13:45 LS
Oil & Grease	0.0	1	mg/l	EPA 413.1	01-19-1993 10:30 LM
Oxygen, Dissolved	8.9	.01	mg/l	EPA 360.1	01-15-1993 13:00 LM
pH	8.50	----	Units	EPA 150.1	01-15-1993 13:00 LM
Potassium	2.70	.01	mg/l	EPA 258.1	01-20-1993 13:00 LS
Sodium	115.00	.01	mg/l	EPA 273.1	01-20-1993 13:00 LS
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	01-15-1993 08:30 LM
Solids, Total Dissolved	766.0	.5	mg/l	EPA 160.1	01-19-1993 11:30 LM
Solids, Total Suspended	6.0	.5	mg/l	EPA 160.2	01-19-1993 11:30 LM
Sulfate	190.0	.1	mg/l	EPA 375.4	01-14-1993 11:00 LS
Turbidity	6.1	.1	NTU	EPA 180.1	01-15-1993 15:00 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

1/22/93

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 (Societe Generale de Surveillance)

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

March 12, 1993

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

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 February 26, 1993

Date received February 26, 1993

Deer Creek Runoff DCR06
Temperature 42.3°F
Flow 825 GPM Est.
Rec'd 1230 hr.
Sampled 1136 hr.

FIELD MEASUREMENTS

pH	8.14
Conductivity	1360
Turbidity	1.8
DO	8.6

Analysis report no. 59-12903

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	03-04-1993 10:20 LS
Alkalinity, Bicarbonate	340	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Alkalinity, Carbonate	8	1	mg/l $CaCO_3$	EPA 310.1	03-12-1993 10:20 LS
Alkalinity, Total	279	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Anions	14.96	----	meq/l	---------	---------- ----- --
Calcium	72.2	.1	mg/l	EPA 215.1	03-04-1993 13:30 ED
Cations	14.32	----	meq/l	---------	---------- ----- --
Chloride	205.0	.1	mg/l	EPA 325.3	03-11-1993 13:00 LM
Conductivity	1430	2	umhos/cm	EPA 120.1	03-04-1993 15:30 LS
Hardness, Total	407	1	mg/l $CaCO_3$	---------	03-04-1993 13:30 ED
Iron	0.19	.02	mg/l	EPA 236.1	03-04-1993 13:30 ED
Iron, Dissolved	0.04	.02	mg/l	EPA 236.1	03-04-1993 13:30 ED
Magnesium	55.00	.01	mg/l	EPA 242.1	03-04-1993 13:30 ED
Manganese	0.02	.01	mg/l	EPA 243.1	03-04-1993 13:30 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	03-03-1993 08:00 LM
Oxygen, Dissolved	9.1	.01	mg/l	EPA 360.1	02-26-1993 13:20 LS
pH	8.40	----	Units	EPA 150.1	02-26-1993 13:20 LS
Potassium	10.30	.01	mg/l	EPA 258.1	03-04-1993 13:30 ED
Sodium	138.00	.01	mg/l	EPA 273.1	03-04-1993 13:30 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	02-26-1993 13:00 LS
Solids, Total Dissolved	862.0	.5	mg/l	EPA 160.1	03-04-1993 09:30 LM
Solids, Total Suspended	5.0	.5	mg/l	EPA 160.2	03-04-1993 09:30 LM
Sulfate	180.0	.1	mg/l	EPA 375.4	03-10-1993 09:00 LS
Turbidity	12.0	.1	NTU	EPA 180.1	02-26-1993 14:15 LS
Cation/Anion Balance	-0.84		%		

RECEIVED
3/12/93

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

March 24, 1993

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

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 March 17, 1993

Date received March 17, 1993

Deer Creek Run-Off DCRO6
Flow 850 GPM est.
Temperature 57.3°F
Rec'd 1530 hr.
Sampled 1502 hr.

FIELD MEASUREMENTS

pH	8.81
Conductivity	1010
Turbidity	32.0
DO	7.9

Analysis report no. 59-12952

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	03-19-1993 12:15 LS
Alkalinity, Bicarbonate	309	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 12:15 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 12:15 LS
Alkalinity, Total	254	1	mg/l $CaCO_3$	EPA 310.1	03-19-1993 12:15 LS
Anions	12.73	----	meq/l	---------	---------- ----- --
Calcium	75.1	.1	mg/l	EPA 215.1	03-22-1993 13:20 ED
Cations	13.99	----	meq/l	---------	---------- ----- --
Chloride	135.3	.1	mg/l	EPA 325.3	03-22-1993 14:30 LM
Conductivity	1160	2	umhos/cm	EPA 120.1	03-24-1993 11:00 LS
Hardness, Total	450	1	mg/l $CaCO_3$	---------	03-22-1993 13:20 ED
Iron	0.43	.02	mg/l	EPA 236.1	03-23-1993 08:35 ED
Iron, Dissolved	0.30	.02	mg/l	EPA 236.1	03-23-1993 08:35 ED
Magnesium	63.70	.01	mg/l	EPA 242.1	03-22-1993 13:20 ED
Manganese	0.00	.01	mg/l	EPA 243.1	03-23-1993 08:35 ED
Oxygen, Dissolved	6.9	.01	mg/l	EPA 360.1	03-17-1993 16:00 LS
pH	8.20	----	Units	EPA 150.1	03-17-1993 16:00 LS
Potassium	8.20	.01	mg/l	EPA 258.1	03-22-1993 13:20 ED
Sodium	111.50	.01	mg/l	EPA 273.1	03-22-1993 13:20 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	03-18-1993 08:00 LS
Solids, Total Dissolved	730.0	.5	mg/l	EPA 160.1	03-19-1993 10:45 LM
Solids, Total Suspended	42.0	.5	mg/l	EPA 160.2	03-19-1993 10:45 LM
Sulfate	190.0	.1	mg/l	EPA 375.4	03-23-1993 12:00 LS
Turbidity	15.0	.1	NTU	EPA 180.1	03-18-1993 07:30 LS
Cation/Anion Balance	4.76	----	%	---------	---------- ----- --

RECEIVED
3/24/93

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 (Societe Generale de Surveillance)

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

April 30, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled April 22, 1993

Date received April 22, 1993

Deer Creek Run-Off DCRO6
Temperature 50.1°F
Flow 749 GPM Est.
Rec'd 1100 hr.
Sampled 0930 hr.

Field Measurements

pH	8.65
Conductivity	1020
DO	6.9
Turbidity	15.0

Analysis report no. 59-13034

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	04-23-1993 12:45 LS
Alkalinity, Bicarbonate	347	1	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Alkalinity, Total	285	1	mg/l $CaCO_3$	EPA 310.1	04-23-1993 12:45 LS
Anions	11.84	----	meq/l	---------	---------- ----- --
Calcium	79.3	.1	mg/l	EPA 215.1	04-28-1993 13:40 ED
Cations	10.86	----	meq/l	---------	---------- ----- --
Chloride	89.2	.1	mg/l	EPA 325.3	04-22-1993 13:00 LM
Conductivity	920	2	umhos/cm	EPA 120.1	04-27-1993 14:00 LS
Hardness, Total	388	1	mg/l $CaCO_3$	---------	04-28-1993 13:40 ED
Iron	0.21	.02	mg/l	EPA 236.1	04-29-1993 10:35 ED
Iron, Dissolved	0.13	.02	mg/l	EPA 236.1	04-30-1993 08:55 ED
Magnesium	46.10	.01	mg/l	EPA 242.1	04-28-1993 14:15 ED
Manganese	0.06	.01	mg/l	EPA 243.1	04-28-1993 15:20 ED
Oil & Grease	1.3	1	mg/l	EPA 413.1	04-26-1993 08:00 LM
Oxygen, Dissolved	8.7	.01	mg/l	EPA 360.1	04-22-1993 16:00 LS
pH	8.00	----	Units	EPA 150.1	04-22-1993 16:00 LS
Potassium	6.80	.01	mg/l	EPA 258.1	04-29-1993 13:30 ED
Sodium	68.30	.01	mg/l	EPA 273.1	04-29-1993 13:30 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	04-23-1993 07:30 LM
Solids, Total Dissolved	712.0	.5	mg/l	EPA 160.1	04-23-1993 08:00 LM
Solids, Total Suspended	9.0	.5	mg/l	EPA 160.2	04-23-1993 08:00 LM
Sulfate	180.0	.1	mg/l	EPA 375.4	04-26-1993 08:30 LS
Turbidity	4.0	.1	NTU	EPA 180.1	04-23-1993 13:00 LS
Ionic Balance	4.27		%		

RECEIVED
4/30/93

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

June 3, 1993

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

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 13, 1993

Date received May 13, 1993

Deer Creek Run-Off DCRO6
Temperature 57.0°F
Rec'd 1500 hr.
Sampled 1413 hr.

FIELD MEASUREMENTS

pH	8.79
Conductivity	803
Turbidity	200+
DO	5.8

Analysis report no. 59-13077

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	05-23-1993 15:00 LS
Alkalinity, Bicarbonate	431	2	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Alkalinity, Carbonate	<1	1	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Alkalinity, Total	354	2	mg/l $CaCO_3$	EPA 310.1	05-23-1993 15:00 LS
Anions	11.43	----	meq/l	---------	---------- ----- --
Calcium	95.3	.03	mg/l	EPA 215.1	05-21-1993 14:30 ED
Cations	10.34	----	meq/l	---------	---------- ----- --
Chloride	49.2	.5	mg/l	EPA 325.3	05-24-1993 07:45 LM
Conductivity	710	0.2	umhos/cm	EPA 120.1	05-24-1993 09:00 LS
Hardness, Total	410	.03	mg/l $CaCO_3$	---------	05-21-1993 14:30 ED
Iron	2.70	.05	mg/l	EPA 236.1	05-21-1993 12:55 ED
Iron, Dissolved	0.13	.05	mg/l	EPA 236.1	05-21-1993 12:55 ED
Magnesium	41.80	.01	mg/l	EPA 242.1	05-21-1993 15:00 ED
Manganese	0.07	.03	mg/l	EPA 243.1	05-21-1993 14:05 ED
Oil & Grease	1.7	1	mg/l	EPA 413.1	05-18-1993 09:30 LM
Oxygen, Dissolved	7.1	.01	mg/l	EPA 360.1	05-13-1993 15:15 LM
pH	7.90	----	Units	EPA 150.1	05-13-1993 15:15 LM
Potassium	2.90	.1	mg/l	EPA 258.1	05-24-1993 07:50 ED
Sodium	48.20	.2	mg/l	EPA 273.1	05-21-1993 15:30 ED
Solids, Settleable	1.0	.5	mg/l	EPA 160.5	05-14-1993 07:30 LS
Solids, Total Dissolved	485.0	14	mg/l	EPA 160.1	05-17-1993 10:30 LM
Solids, Total Suspended	200.0	7	mg/l	EPA 160.2	05-19-1993 10:30 LM
Sulfate	150.0	1	mg/l	EPA 375.4	06-02-1993 08:15 LS
Turbidity	35.0	.1	NTU	EPA 180.1	05-14-1993 09:00 LS
Cation/Anion Balance	-4.97		%		

RECEIVED
6/3/93

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 (Societe Generale de Surveillance)

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

June 25, 1993

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

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 June 11, 1993

Date received June 11, 1993

Deer Creek DCRO6
Temperature 58.6°F
Flow 1300 GPM
Rec'd 1600 hr.
Sampled 1457 hr.

FIELD MEASUREMENTS

pH	8.52
Conductivity	724
DO	6.1
TURBIDITY	9.0

Analysis report no. 59-13184

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	06-11-1993 16:00 LS
Alkalinity, Bicarbonate	274	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Total	225	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Anions	7.38	----	meq/l	---------	---------- ----- --
Calcium	51.2	.03	mg/l	EPA 215.1	06-21-1993 13:05 ED
Cations	7.28	----	meq/l	---------	---------- ----- --
Chloride	39.5	.5	mg/l	EPA 325.3	06-23-1993 09:10 LM
Conductivity	620	0.2	umhos/cm	EPA 120.1	06-24-1993 09:00 LS
Hardness, Total	278	.03	mg/l $CaCO_3$	---------	06-21-1993 13:05 ED
Iron	0.15	.05	mg/l	EPA 236.1	06-17-1993 09:40 ED
Iron, Dissolved	0.14	.05	mg/l	EPA 236.1	06-22-1993 09:15 ED
Magnesium	36.50	.007	mg/l	EPA 242.1	06-21-1993 15:10 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-22-1993 10:05 ED
Oil & Grease	0.3	1	mg/l	EPA 413.1	06-23-1993 08:00 LM
Oxygen, Dissolved	6.5	.01	mg/l	EPA 360.1	06-11-1993 16:00 LM
pH	8.40	----	Units	EPA 150.1	06-11-1993 16:00 LM
Potassium	2.20	.1	mg/l	EPA 258.1	06-22-1993 12:20 ED
Sodium	38.90	.2	mg/l	EPA 273.1	06-22-1993 11:15 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	06-12-1993 10:00 LS
Solids, Total Dissolved	413.0	14	mg/l	EPA 160.1	06-14-1993 13:00 LM
Solids, Total Suspended	8.0	7	mg/l	EPA 160.2	06-15-1993 08:00 LM
Sulfate	90.0	1	mg/l	EPA 375.4	06-21-1993 13:50 LS
Turbidity	1.0	.1	NTU	EPA 180.1	06-12-1993 08:00 LS
Cation-Anion Balance	-0.66		%		

RECEIVED
6/25/93

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 (Societe Generale de Surveillance)

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

August 23, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/CS-KH

Date sampled July 16, 1993

Date received July 16, 1993

Deer Creek Run-off DCRO6
Temperature 56.6°F
Flow 480 GPM
Rec'd 1300 hr.
Sampled 1045 hr.

FIELD MEASUREMENTS

pH	8.80
Conductivity	732
DO	7.5
Turbidity	4

Analysis report no. 59-13322

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	07-23-1993 13:15 LS
Alkalinity, Bicarbonate	283	.4	mg/l HCO_3	EPA 310.1	07-23-1993 13:15 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	EPA 310.1	07-23-1993 13:15 LS
Alkalinity, Total	232	.4	mg/l $CaCO_3$	EPA 310.1	07-23-1993 13:15 LS
Anions	8.46	----	meq/l	---------	---------- ----- --
Calcium	53.0	.03	mg/l	EPA 215.1	08-10-1993 12:25 ED
Cations	8.29	----	meq/l	---------	---------- ----- --
Chloride	35.4	.5	mg/l	EPA 325.3	07-28-1993 08:00 LM
Conductivity	738	0.2	umhos/cm	EPA 120.1	08-09-1993 15:25 LS
Hardness, Total	323	.03	mg/l $CaCO_3$	---------	08-10-1993 12:25 ED
Iron	0.16	.05	mg/l	EPA 236.1	07-22-1993 12:30 LS
Iron, Dissolved	<0.05	.05	mg/l	EPA 236.1	07-28-1993 16:10 JK
Magnesium	46.40	.007	mg/l	EPA 242.1	08-10-1993 13:15 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	07-29-1993 13:05 LS
Oil & Grease	0.0	1	mg/l	EPA 413.1	07-26-1993 08:00 LM
Oxygen, Dissolved	5.9	.01	mg/l	EPA 360.1	07-16-1993 16:00 LM
pH	8.07	----	Units	EPA 150.1	07-16-1993 16:00 LM
Potassium	4.20	.1	mg/l	EPA 258.1	08-10-1993 15:50 ED
Sodium	40.10	.2	mg/l	EPA 273.1	08-10-1993 14:05 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	07-16-1993 16:30 LM
Solids, Total Dissolved	494.0	14	mg/l	EPA 160.1	07-23-1993 08:25 LM
Solids, Total Suspended	4.0	7	mg/l	EPA 160.2	07-21-1993 08:30 LM
Sulfate	140.0	1	mg/l	EPA 375.4	08-04-1993 13:00 LS
Cation/Anion Balance	-1.02	----	%	---------	---------- ----- --

RECEIVED
8/23/93
FIELD OFFICE

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

September 28, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled August 23, 1993

Date received August 23, 1993

Deer Creek Run-Off DCRO6
Temperature 66.0°F
Flow 378 GPM
Rec'd 1430 hr.
Sampled 1300 hr.

FIELD MEASUREMENTS

pH	8.64
Conductivity	830
DO	4.6
Turbidity	22

Analysis report no. 59-13441

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	08-23-1993 16:00 LS
Alkalinity, Bicarbonate	274	.4	mg/l HCO_3	4500 CO_2 D	09-01-1993 15:30 LS
Alkalinity, Carbonate	7	.4	mg/l CO_3	4500 CO_2 D	09-01-1993 15:30 LS
Alkalinity, Total	218	.4	mg/l $CaCO_3$	EPA 310.1	09-01-1993 15:30 LS
Anions	8.98	----	meq/l	---------	---------- ----- --
Calcium	38.2	.03	mg/l	EPA 215.1	09-21-1993 14:45 JK
Cations	7.44	----	meq/l	---------	---------- ----- --
Chloride	64.0	.5	mg/l	EPA 325.3	09-07-1993 13:00 LM
Conductivity	885	0.2	umhos/cm	EPA 120.1	08-26-1993 09:15 LS
Hardness, Total	260	.03	mg/l $CaCO_3$	---------	09-21-1993 14:45 JK
Iron	0.31	.05	mg/l	EPA 236.1	09-17-1993 14:45 ED
Iron, Dissolved	0.21	.05	mg/l	EPA 236.1	09-16-1993 12:15 ED
Magnesium	40.00	.007	mg/l	EPA 242.1	09-21-1993 15:26 JK
Manganese	<0.03	.03	mg/l	EPA 243.1	09-17-1993 14:05 ED
Oil & Grease	<0.5	1	mg/l	EPA 413.1	09-03-1993 10:00 LM
Oxygen, Dissolved	8.0	.01	mg/l	EPA 360.1	08-23-1993 16:00 LS
pH	8.50	----	Units	EPA 150.1	08-23-1993 16:00 LS
Potassium	4.00	.1	mg/l	EPA 258.1	09-22-1993 08:40 JK
Sodium	50.00	.2	mg/l	EPA 273.1	09-22-1993 08:40 JK
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	08-24-1993 10:00 LS
Solids, Total Dissolved	536.0	14	mg/l	EPA 160.1	08-25-1993 10:45 LM
Solids, Total Suspended	36.0	7	mg/l	EPA 160.2	08-24-1993 07:30 LM
Sulfate	140.0	1	mg/l	EPA 375.4	09-13-1993 09:30 LS
Turbidity	6.9	.1	NTU	EPA 180.1	08-24-1993 16:00 [illegible]
[illegible] Balance	-8.94		%		

RECEIVED
9/29/93

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 (Societe Generale de Surveillance)

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

October 27, 1993

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

RECEIVED
10/27/93
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled September 20, 1993

Date received September 22, 1993

Sample identification by
PACIFICORP FIELD OFFICE

Deer Creek Run-Off ~~DCR04~~ DCR06
Temperature 61.1°F
Flow Est. 285 GPM
Rec'd 0845 hr.-Sampled 1607 hr.

FIELD MEASUREMENTS

pH	8.82
Conductivity	851
DO	5.0
Turbidity	2.4

NOTE: pH, DO & Settleable Solids holding times were expired when received at Lab. Calcium determined on undigested sample.

Analysis report no. 59-13558

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analy	
Acidity	<1	1	mg/l	$CaCO_3$	EPA 305.1	10-03-1993 1400	LS
Alkalinity, Bicarbonate	311	2	mg/l	$CaCO_3$	EPA 310.1	10-03-1993 1400	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-03-1993 1400	LS
Alkalinity, Total	255	2	mg/l	$CaCO_3$	EPA 310.1	10-03-1993 1400	LS
Anions	8.80	----	meq/l		---------	---------- -----	--
Calcium	58.7	.03	mg/l		EPA 215.1	10-26-1993 1245	ED
Cations	7.30	----	meq/l		---------	---------- -----	--
Chloride	55.0	.5	mg/l		EPA 325.3	10-13-1993 0830	LM
Conductivity	940.00	0.2	umhos/cm		EPA 120.1	09-27-1993 1400	KP
Hardness, Total	287.0	.03	mg/l	$CaCO_3$	---------	10-26-1993 1245	ED
Iron	0.11	.05	mg/l		EPA 236.1	10-19-1993 1150	ED
Iron, Dissolved	<0.05	.05	mg/l		EPA 236.1	10-19-1993 1220	ED
Magnesium	34.00	.007	mg/l		EPA 242.1	10-18-1993 1405	ED
Manganese	<0.03	.03	mg/l		EPA 243.1	10-19-1993 1410	ED
Oil & Grease	<1	1	mg/l		EPA 413.1	10-02-1993 0930	LM
Oxygen, Dissolved	7.90	.01	mg/l		EPA 360.1	09-22-1993 1500	LM
pH	7.75	----	Units		EPA 150.1	09-22-1993 1500	LM
Potassium	5.0	.1	mg/l		EPA 258.1	10-19-1993 1515	ED
Sodium	34.0	.2	mg/l		EPA 273.1	10-18-1993 1650	ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-22-1993 1600	LS
Solids, Total Dissolved	543	14	mg/l		EPA 160.1	09-23-1993 1300	LM
Solids, Total Suspended	1	7	mg/l		EPA 160.2	09-23-1993 1230	LM
Sulfate	190	1	mg/l		EPA 375.4	10-19-1993 1400	LS
Turbidity	1.2	.1	NTU		EPA 180.1	09-22-1993 1430	
Cation/Anion Balance	-9.50		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

Original Watermarked For Your Protection

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

December 2, 1993

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

RECEIVED
12/2/93
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Deer Creek Run-Off DCRO6

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled October 22, 1993

Date received October 22, 1993

Temperature 45.5°F
Flow 628 GPM
Rec'd 1130 hr.
Sampled 1015 hr.

FIELD MEASUREMENTS	
pH	8.52
Conductivity	841
DO	10.2
Turbidity	8

Analysis report no. 59-13653

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	10-28-1993 1455 LS
Alkalinity, Bicarbonate	308	2	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1455 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1455 LS
Alkalinity, Total	256	2	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1455 ED
Anions	10.20	----	meq/l		---------	---------- ----- --
Calcium	62.0	.03	mg/l		EPA 215.1	11-29-1993 1630 DW
Cations	9.10	----	meq/l		---------	---------- ----- --
Chloride	68.0	.5	mg/l		EPA 325.3	11-18-1993 1515 LM
Conductivity	952.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945 ED
Hardness, Total	377.0	.03	mg/l	$CaCO_3$	---------	11-29-1993 1630 DW
Iron	<0.20	.05	mg/l		EPA 236.1	11-24-1993 1200 DW
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-01-1993 1500 DW
Magnesium	54.00	.007	mg/l		EPA 242.1	11-30-1993 1100 DW
Manganese	0.10	.03	mg/l		EPA 243.1	11-29-1993 1500 DW
Oil & Grease	<1	1	mg/l		EPA 413.1	11-08-1993 1000 LM
Oxygen, Dissolved	8.95	.01	mg/l		EPA 360.1	10-22-1993 1530 LS
pH	8.14	----	Units		EPA 150.1	10-22-1993 1610 LS
Potassium	3.0	.1	mg/l		EPA 258.1	11-30-1993 1500 DW
Sodium	34.0	.2	mg/l		EPA 273.1	11-30-1993 1300 DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	10-23-1993 0930 LM
Solids, Total Dissolved	557	14	mg/l		EPA 160.1	10-25-1993 0800 LM
Solids, Total Suspended	7	7	mg/l		EPA 160.2	10-27-1993 0800 LM
Sulfate	160	1	mg/l		EPA 375.4	11-19-1993 1400 LS
Turbidity	3.1	.1	NTU		EPA 180.1	10-22-1993 1630 LS
Cation/Anion Balance	-5.80		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

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 (Societe Generale de Surveillance)

December 17, 1993

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

RECEIVED
12/17/93
FIELD OFFICE

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled November 22, 1993

Date received November 22, 1993

Deer Creek Run-Off DCRO6

Temperature 33.5°F
Flow 315 GPM
Rec'd 1310 hr.
Sampled 0935 hr.

FIELD MEASUREMENTS	
pH	8.95
Conductivity	993
DO	6.6
Turbidity	42

Analysis report no. 59-13742

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	12-02-1993 1512 ED
Alkalinity, Bicarbonate	279	2	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1512 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1512 LS
Alkalinity, Total	279	2	mg/l	$CaCO_3$	EPA 310.1	12-02-1993 1512
Anions	11.60	----	meq/l		---------	---------- -----
Calcium	78.0	.03	mg/l		EPA 215.1	12-16-1993 1045 DW
Cations	12.70	----	meq/l		---------	---------- ----- --
Chloride	89.0	.5	mg/l		EPA 325.3	11-30-1993 1000 LM
Conductivity	1055.00	0.2	umhos/cm		EPA 120.1	12-16-1993 1035 ED
Hardness, Total	462.0	.03	mg/l	$CaCO_3$	---------	12-16-1993 1045 DW
Iron	0.50	.05	mg/l		EPA 236.1	12-17-1993 1030 DW
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-15-1993 0830 DW
Magnesium	65.00	.007	mg/l		EPA 242.1	12-16-1993 1230 DW
Manganese	<0.10	.03	mg/l		EPA 243.1	12-16-1993 1600 DW
Oil & Grease	<5	1	mg/l		EPA 413.1	12-10-1993 1030 LM
Oxygen, Dissolved	10.05	.01	mg/l		EPA 360.1	11-22-1993 1400 LS
pH	8.02	----	Units		EPA 150.1	11-22-1993 1330 LS
Potassium	5.0	.1	mg/l		EPA 258.1	12-16-1993 0830 DW
Sodium	80.0	.2	mg/l		EPA 273.1	12-16-1993 1430 DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	11-22-1993 1515 LS
Solids, Total Dissolved	724	14	mg/l		EPA 160.1	11-23-1993 0845 LM
Solids, Total Suspended	20	7	mg/l		EPA 160.2	11-24-1993 1530 LM
Sulfate	170	1	mg/l		EPA 375.4	12-14-1993 1130 LS
Turbidity	18.0	.1	NTU		EPA 180.1	11-22-1993 1450 LS
Cation/Anion Balance	4.50		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

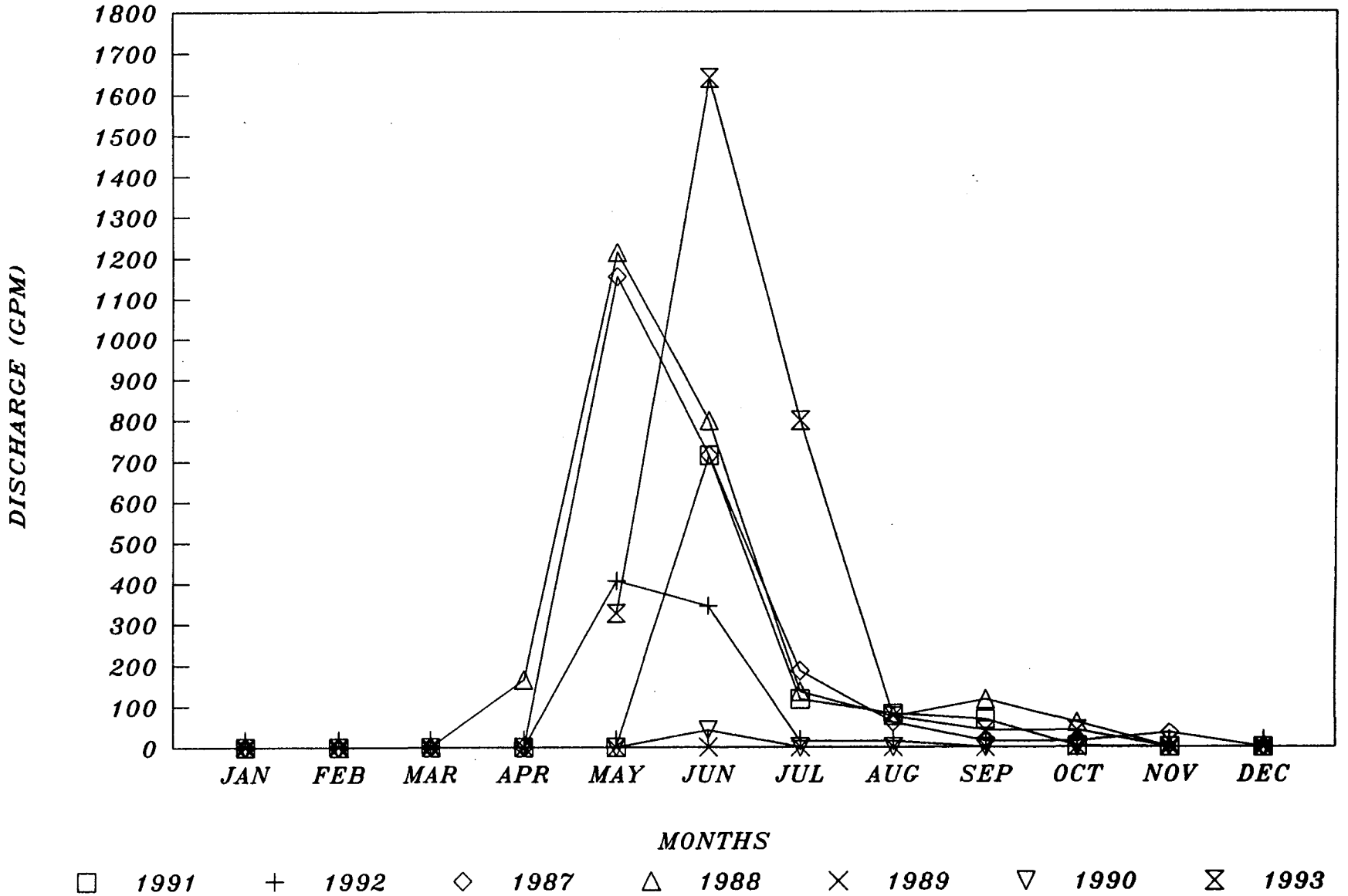
Manager, Huntington Laboratory

Original Watermarked For Your Protection

TERMS AND CONDITIONS ON REVERSE

MEETINGHOUSE CANYON – LEFT FORK

Drainage Recession Curve Study



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

November 16, 1993

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

RECEIVED
11/16/93
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Meeting House Canyon

Sample taken by Energy West/KH

Date sampled September 28, 1993

Date received September 28, 1993

Meeting House Canyon
Temperature 53.7°F
Flume 1
Rec'd 1535 hr.
Sampled 1420 hr.

FIELD MEASUREMENTS

pH	8.80
Conductivity	395
DO	7.5

NOTE: DO Probe was inoperational. Holding times expired when Conductivity and Chloride were run.

Analysis report no. 59-13594

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	10-12-1993 0815 LS
Alkalinity, Bicarbonate	256	2	mg/l	$CaCO_3$	EPA 310.1	10-12-1993 0815 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-12-1993 0815 LS
Alkalinity, Total	210	2	mg/l	$CaCO_3$	EPA 310.1	10-12-1993 0815 LS
Anions	4.80	----	meq/l		---------	---------- ----- --
Calcium	39.0	.03	mg/l		EPA 215.1	11-08-1993 1450 ED
Cations	4.90	----	meq/l		---------	---------- ----- --
Chloride	5.0	.5	mg/l		EPA 325.3	11-01-1993 0900 LM
Conductivity	440.00	0.2	umhos/cm		EPA 120.1	10-27-1993 0945 ED
Hardness, Total	217.0	.03	mg/l	$CaCO_3$	---------	11-08-1993 1450 ED
Iron	0.10	.05	mg/l		EPA 236.1	11-16-1993 1100 ED
Iron, Dissolved	<0.05	.05	mg/l		EPA 236.1	11-16-1993 1020 ED
Magnesium	29.00	.007	mg/l		EPA 242.1	11-08-1993 1630 ED
Manganese	<0.03	.03	mg/l		EPA 243.1	11-16-1993 1215 ED
Oil & Grease	0	1	mg/l		EPA 413.1	10-02-1993 0930 LM
pH	8.14	----	Units		EPA 150.1	09-28-1993 1545 LS
Potassium	<10.0	.1	mg/l		EPA 258.1	11-09-1993 1315 ED
Sodium	14.0	.2	mg/l		EPA 273.1	11-09-1993 1135 ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-29-1993 0930 LS
Solids, Total Dissolved	271	14	mg/l		EPA 160.1	09-30-1993 0745 LM
Solids, Total Suspended	9	7	mg/l		EPA 160.2	10-04-1993 1300 LM
Sulfate	26	1	mg/l		EPA 375.4	11-02-1993 1230 LS
Turbidity	2.3	.1	NTU		EPA 180.1	09-29-1993 0830 LS
Cation/Anion Balance	1.50	----	%		---------	---------- ----- --

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

June 25, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Meeting House

Sample taken by Energy West/CS

Date sampled June 11, 1993

Date received June 11, 1993

Meeting House Canyon 1 MCHO1
Temperature 51.9°F
Flow 1.12/1639 GPM
Rec'd 1600 hr.
Sampled 1339 hr.

FIELD MEASUREMENTS

pH	8.80
Conductivity	394
Do	4.4

Analysis report no. 59-13188

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	06-11-1993 16:00 LS
Alkalinity, Bicarbonate	254	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Total	227	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Anions	4.85	----	meq/l	---------	---------- ----- --
Calcium	65.8	.03	mg/l	EPA 215.1	06-21-1993 13:05 ED
Cations	5.05	----	meq/l	---------	---------- ----- --
Chloride	4.6	.5	mg/l	EPA 325.3	06-23-1993 09:10 LM
Conductivity	340	0.2	umhos/cm	EPA 120.1	06-24-1993 09:00 LS
Hardness, Total	242	.03	mg/l $CaCO_3$	---------	06-21-1993 13:05 ED
Iron	0.27	.05	mg/l	EPA 236.1	06-17-1993 09:40 ED
Iron, Dissolved	0.07	.05	mg/l	EPA 236.1	06-22-1993 09:15 ED
Magnesium	18.90	.007	mg/l	EPA 242.1	06-21-1993 15:10 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-22-1993 10:05 ED
Oil & Grease	0.1	1	mg/l	EPA 413.1	06-23-1993 08:00 LM
Oxygen, Dissolved	4.4	.01	mg/l	EPA 360.1	06-11-1993 16:00 LM
pH	8.30	----	Units	EPA 150.1	06-11-1993 16:00 LM
Potassium	<0.10	.1	mg/l	EPA 258.1	06-22-1993 12:20 ED
Sodium	4.80	.2	mg/l	EPA 273.1	06-22-1993 11:15 ED
Solids, Settleable	< 0.5	.5	mg/l	EPA 160.5	06-12-1993 10:00 LS
Solids, Total Dissolved	219.0	14	mg/l	EPA 160.1	06-14-1993 13:00 LM
Solids, Total Suspended	32.0	7	mg/l	EPA 160.2	06-15-1993 08:00 LM
Sulfate	14.0	1	mg/l	EPA 375.4	06-21-1993 13:50 LS
Turbidity	8.0	.1	NTU	EPA 180.1	06-12-1993 08:00 LS
Cation/Anion Balance	5.88		%		

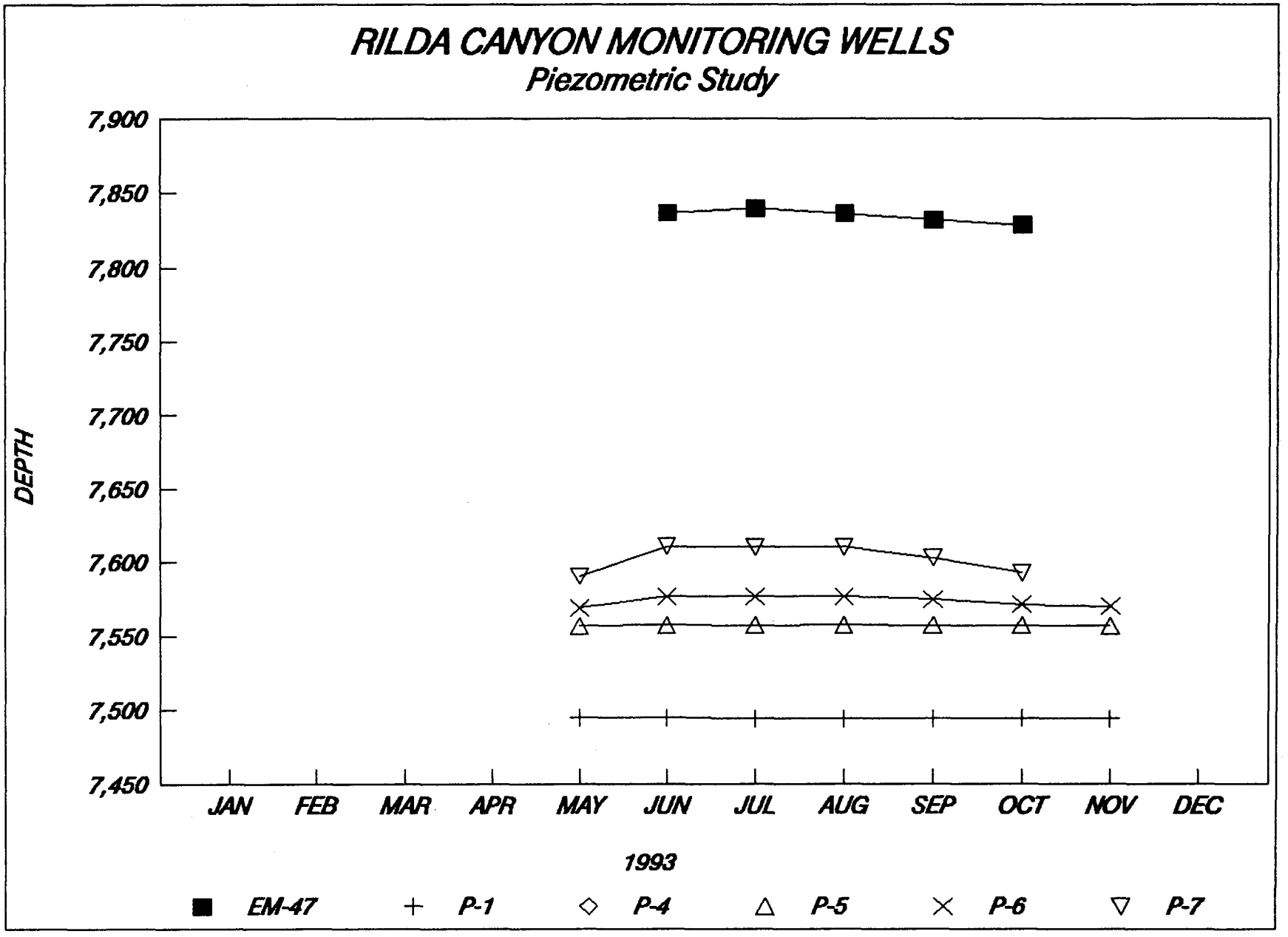
RECEIVED
6/25/93

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

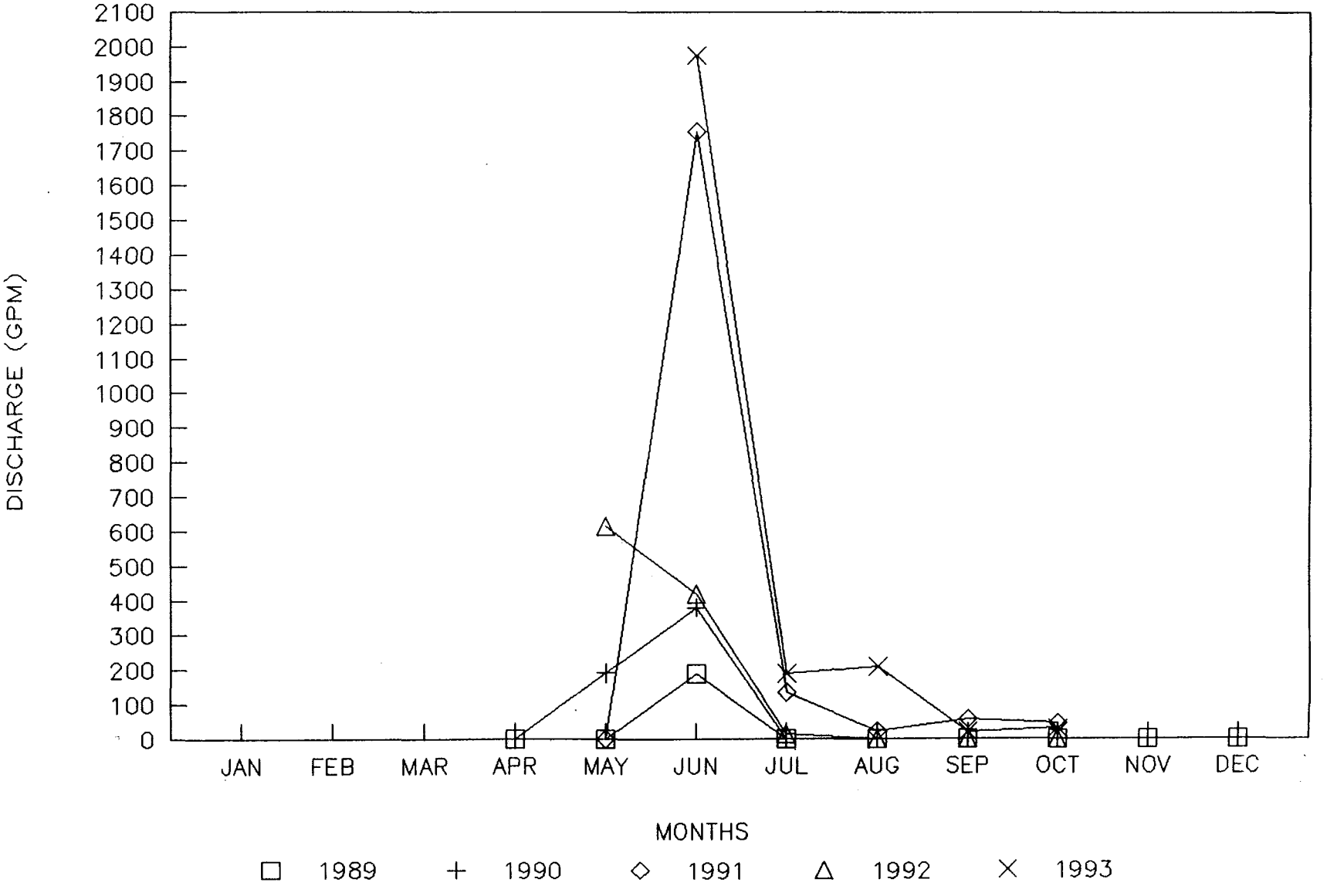
F-465
Original Watermarked For Your Protection

TERMS AND CONDITIONS ON REVERSE


RILDA CANYON MONITORING WELLS
Piezometric Study
DEPTH
7,900
7,850
7,800
7,750
7,700
7,650
7,600
7,550
7,500
7,450
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
1993
EM-47
P-1
P-4
P-5
P-6
P-7

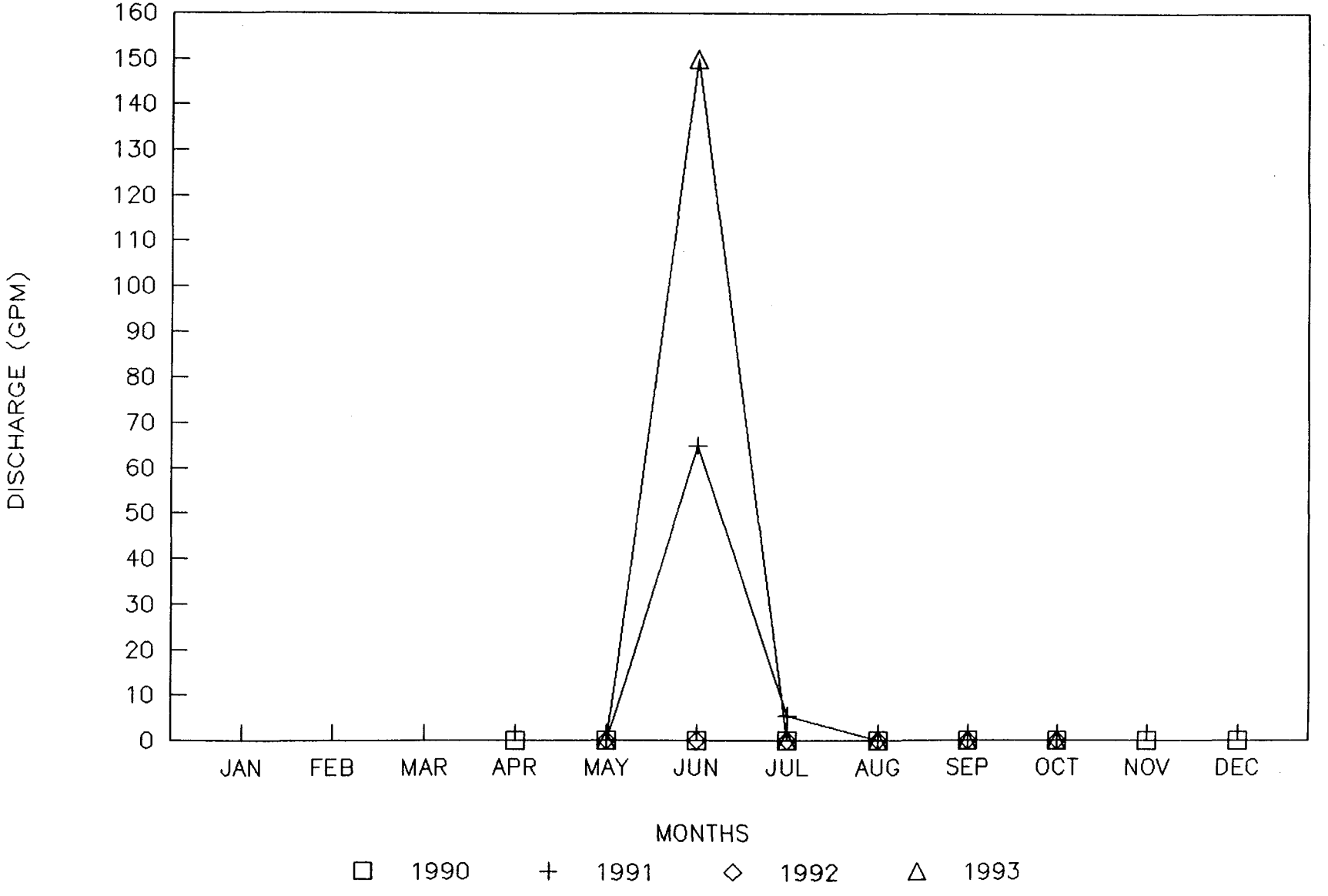
RILDA CANYON – RIGHT FORK(RCF1)

Drainage Recession Curve Study



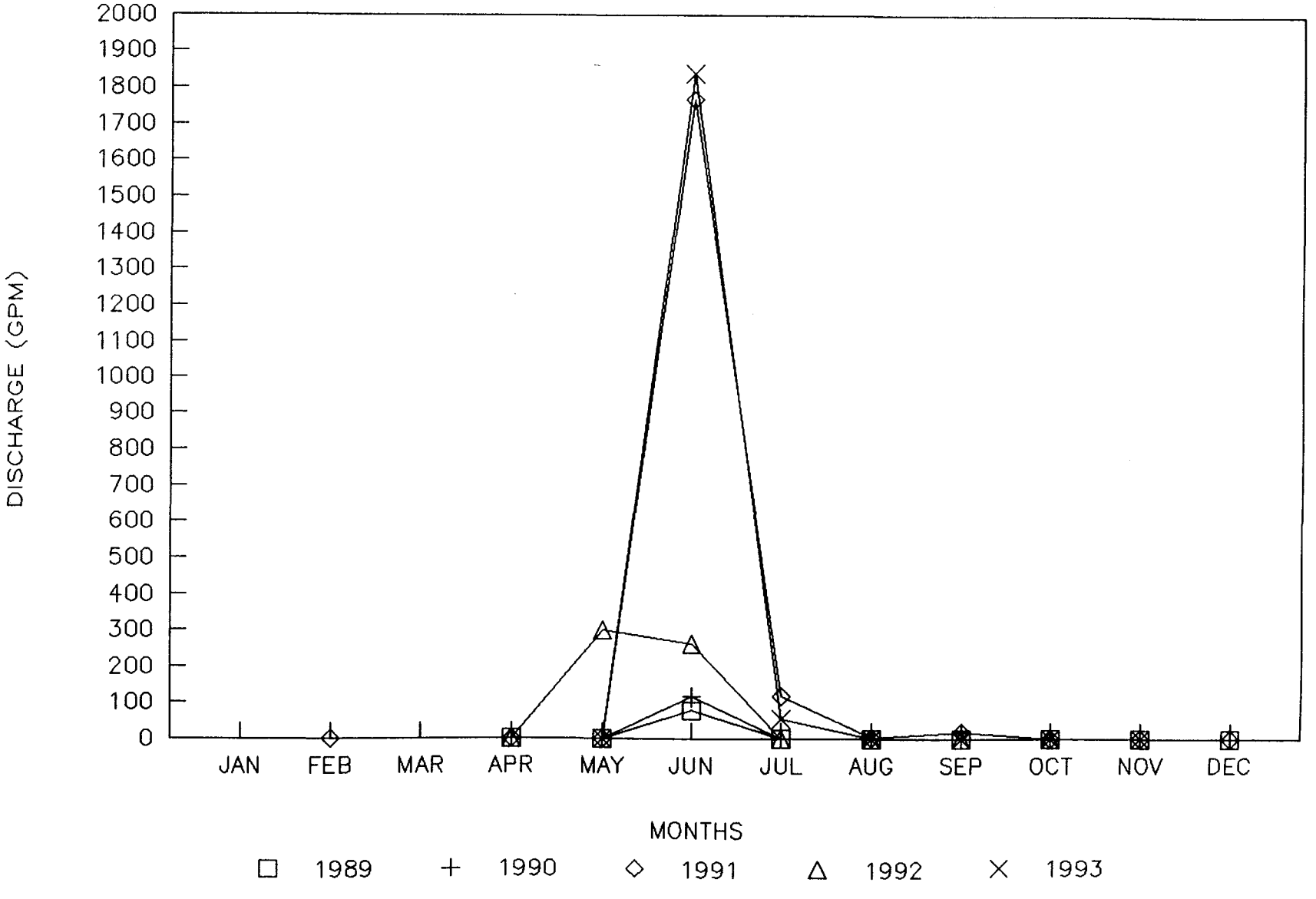
RILDA CANYON – LEFT FORK(RCLF1)

Drainage Recession Curve Study



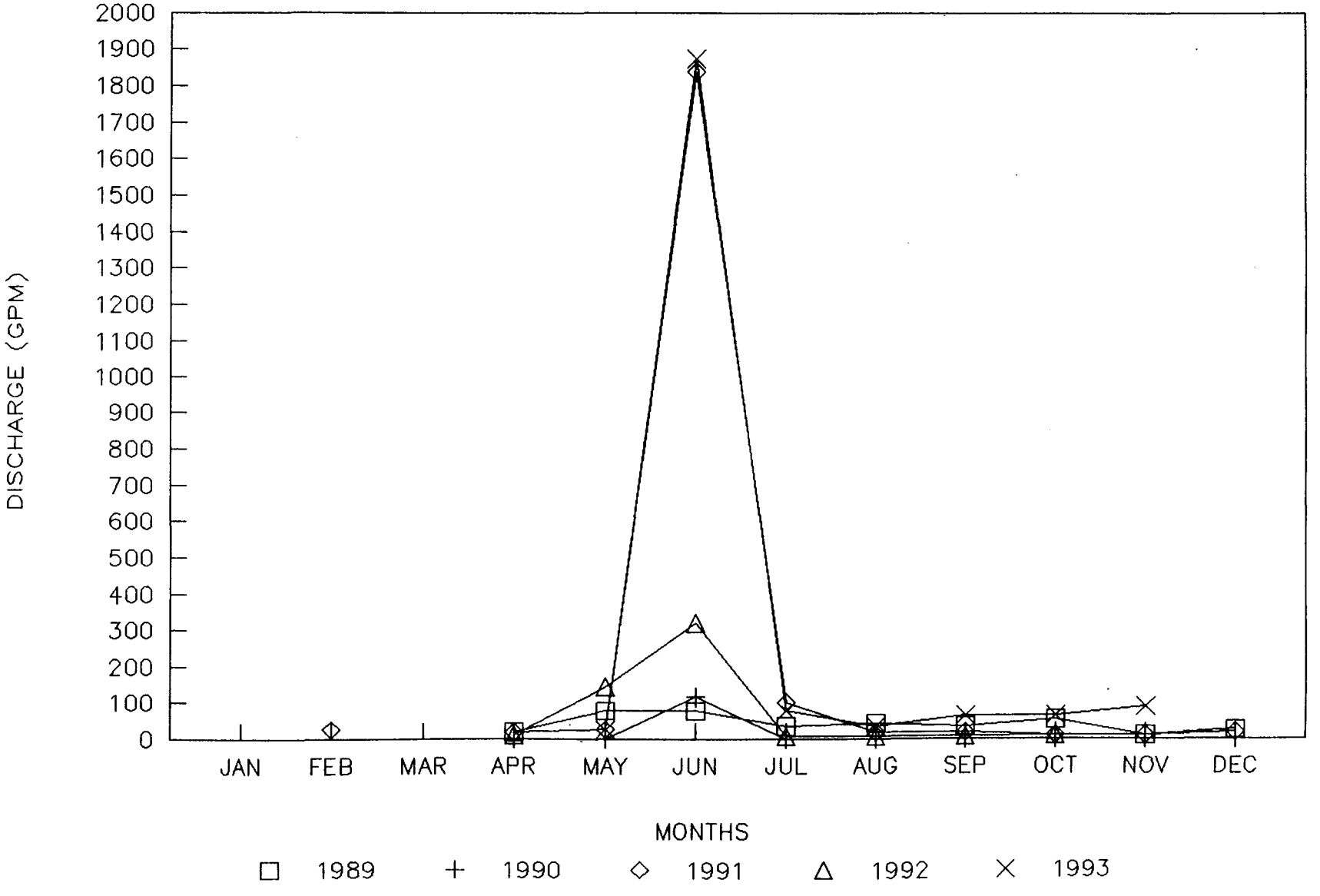
RILDA CANYON – ABOVE NEWUA(RCF2)

Drainage Recession Curve Study



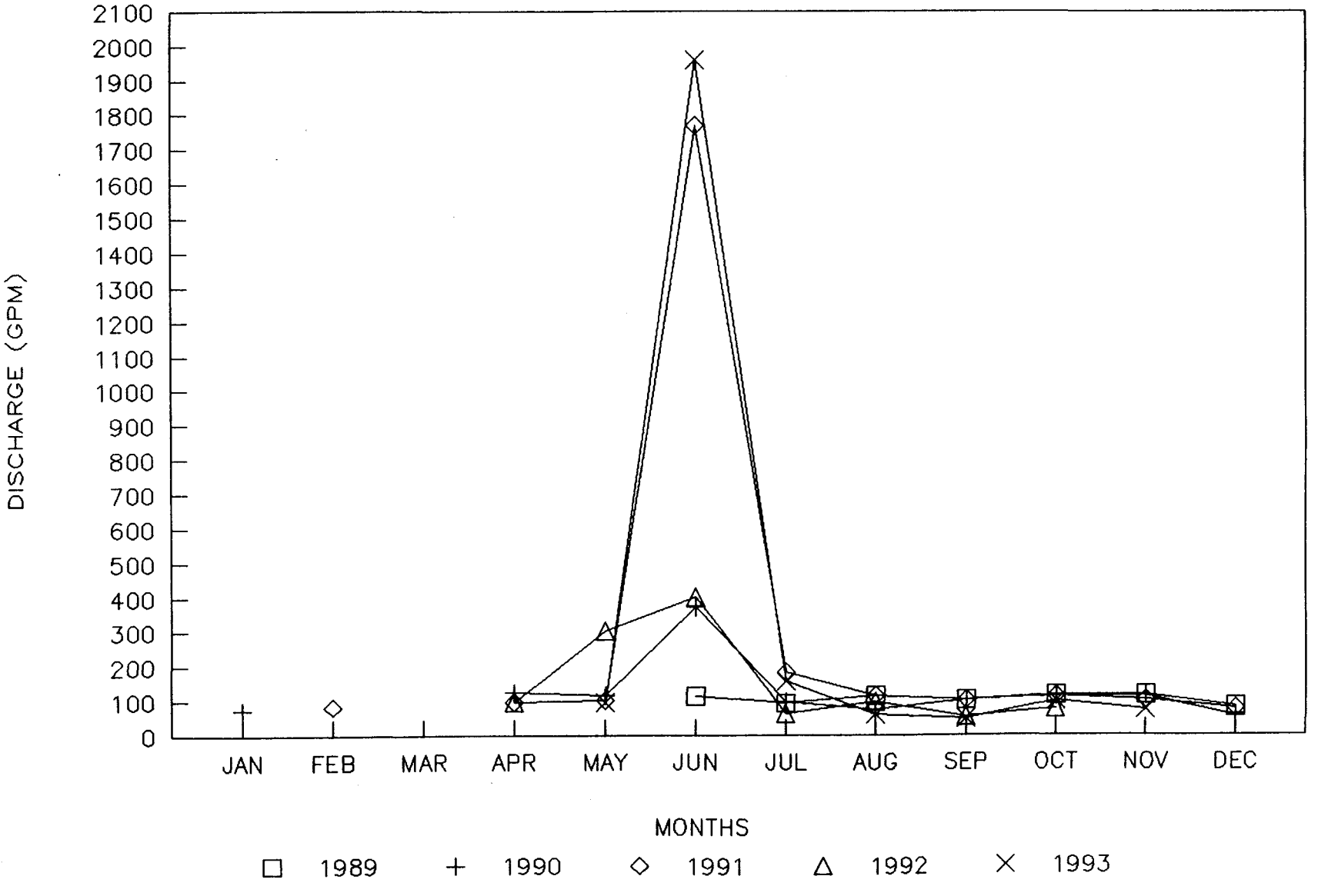
RILDA CANYON – BELOW NEWUA(RCF3)

Drainage Recession Curve Study



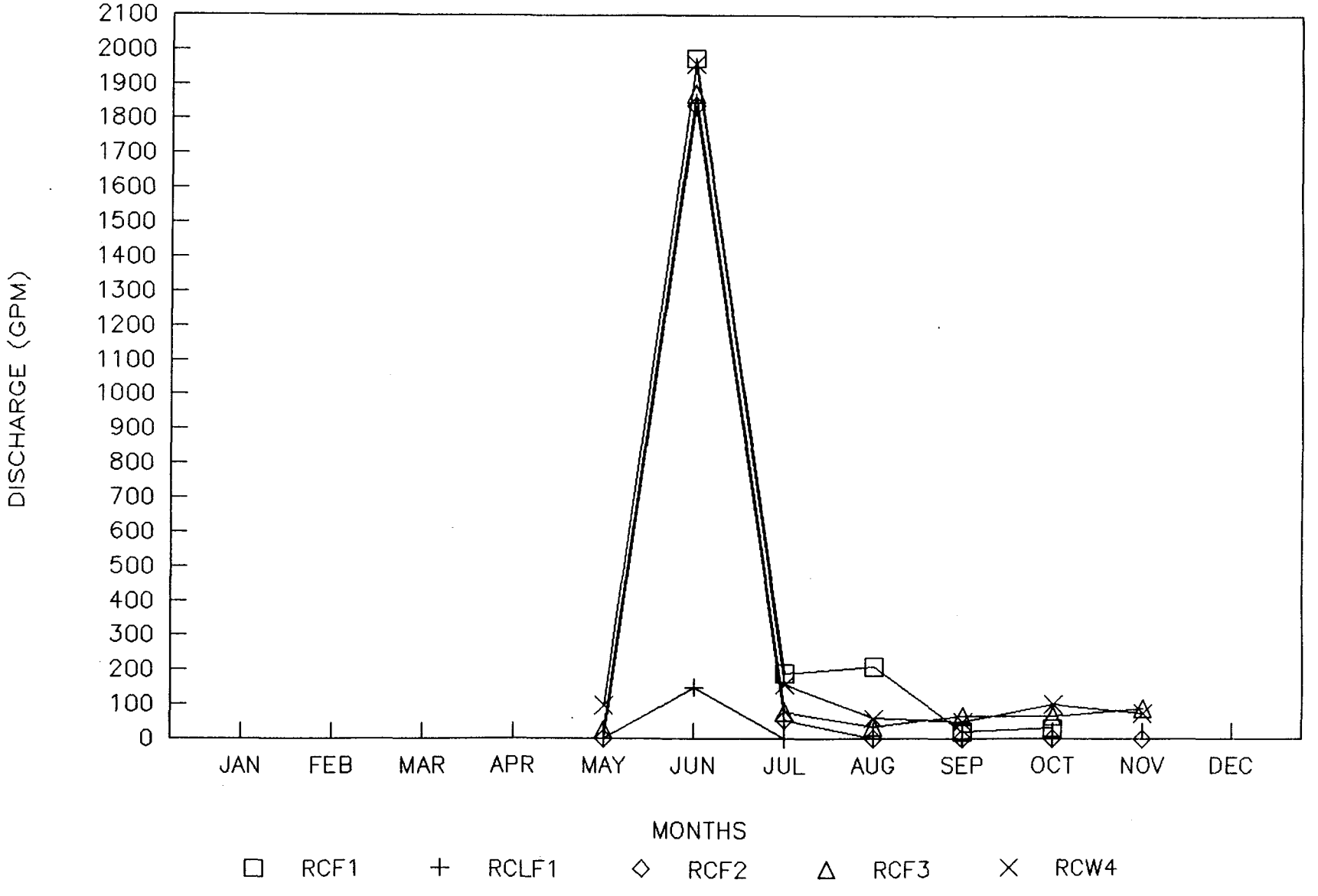
RILDA CANYON – NEAR HWY 31(RCW4)

Drainage Recession Curve Study



RILDA CANYON – 1993

Drainage Recession Curve Study



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

June 25, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/CS

Date sampled June 11, 1993

Date received June 11, 1993

Rilda Canyon RCF-1
Temperature 45.1°F
Flow 0.68/1975 GPM
Rec'd 1600 hr.
Sampled 1132 hr.

FIELD MEASUREMENTS

pH	8.99
Conductivity	915
DO	9.9

Analysis report no. 59-13179

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	06-11-1993 16:00 LS
Alkalinity, Bicarbonate	290	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Total	156	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Anions	3.47	----	meq/l	---------	---------- ----- --
Calcium	63.6	.03	mg/l	EPA 215.1	06-21-1993 13:05 ED
Cations	4.97	----	meq/l	---------	---------- ----- --
Chloride	2.5	.5	mg/l	EPA 325.3	06-23-1993 09:10 LM
Conductivity	420	0.2	umhos/cm	EPA 120.1	06-24-1993 09:00 LS
Hardness, Total	238	.03	mg/l $CaCO_3$	---------	06-21-1993 13:05 ED
Iron	0.23	.05	mg/l	EPA 236.1	06-17-1993 09:40 ED
Iron, Dissolved	0.12	.05	mg/l	EPA 236.1	06-22-1993 09:15 ED
Magnesium	19.20	.007	mg/l	EPA 242.1	06-21-1993 15:10 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-22-1993 10:05 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	06-23-1993 08:00 LM
Oxygen, Dissolved	7.2	.01	mg/l	EPA 360.1	06-11-1993 16:00 LM
pH	8.20	----	Units	EPA 150.1	06-11-1993 16:00 LM
Potassium	<0.10	.1	mg/l	EPA 258.1	06-22-1993 12:20 ED
Sodium	4.90	.2	mg/l	EPA 273.1	06-22-1993 11:15 ED
Solids, Settleable	< 0.5	.5	mg/l	EPA 160.5	06-12-1993 10:00 LS
Solids, Total Dissolved	225.0	14	mg/l	EPA 160.1	06-14-1993 13:00 LM
Solids, Total Suspended	41.0	7	mg/l	EPA 160.2	06-15-1993 08:00 LM
Sulfate	17.0	1	mg/l	EPA 375.4	06-21-1993 13:50 LS
Turbidity	3.0	.1	NTU	EPA 180.1	06-12-1993 08:00 LS
Cation/Anion Balance	-1.02		%		

RECEIVED
6/21/93

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 (Societe Generale de Surveillance)

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

November 16, 1993

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

RECEIVED
11/16/93
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled September 28, 1993

Date received September 28, 1993

Sample identification by
PACIFICORP FIELD OFFICE

Rilda Canyon Flume 1
Temperature 42.8°F
Flow 20 GPM
Rec'd 1535 hr.
Sampled 1150 hr.

FIELD MEASUREMENTS

pH	8.69
Conductivity	399
DO	12.5

NOTE: DO Probe was inoperational. Holding times expired when Conductivity and Chloride were run.

Analysis report no. 59-13598

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	10-12-1993 0815	
Alkalinity, Bicarbonate	254	2	mg/l	$CaCO_3$	EPA 310.1	10-12-1993 0815	
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-12-1993 0815	LS
Alkalinity, Total	210	2	mg/l	$CaCO_3$	EPA 310.1	10-12-1993 0815	LS
Anions	4.70	----	meq/l		---------	---------- -----	--
Calcium	54.0	.03	mg/l		EPA 215.1	11-08-1993 1450	ED
Cations	5.50	----	meq/l		---------	---------- -----	--
Chloride	5.0	.5	mg/l		EPA 325.3	11-01-1993 0900	LM
Conductivity	439.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Hardness, Total	250.0	.03	mg/l	$CaCO_3$	---------	11-08-1993 1450	ED
Iron	0.07	.05	mg/l		EPA 236.1	11-16-1993 1100	ED
Iron, Dissolved	<0.05	.05	mg/l		EPA 236.1	11-16-1993 1020	ED
Magnesium	28.00	.007	mg/l		EPA 242.1	11-08-1993 1630	ED
Manganese	<0.03	.03	mg/l		EPA 243.1	11-16-1993 1215	ED
Oil & Grease	0	1	mg/l		EPA 413.1	10-02-1993 0930	LM
pH	8.22	----	Units		EPA 150.1	09-28-1993 1545	LS
Potassium	<10.0	.1	mg/l		EPA 258.1	11-09-1993 1315	ED
Sodium	12.0	.2	mg/l		EPA 273.1	11-09-1993 1135	ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-29-1993 0930	LS
Solids, Total Dissolved	266	14	mg/l		EPA 160.1	09-30-1993 0745	LM
Solids, Total Suspended	0	7	mg/l		EPA 160.2	10-04-1993 1300	LM
Sulfate	23	1	mg/l		EPA 375.4	11-04-1993 1110	LSD
Turbidity	1.0	.1	NTU		EPA 180.1	09-29-1993 0830	LS
Cation/Anion Balance	8.10	----	%		---------	---------- -----	--

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 (Societe Generale de Surveillance)

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

June 28, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/CS

Date sampled June 11, 1993

Date received June 11, 1993

Rilda Canyon RCF-3
Temperature 46.4° F
Flow 0.79/1874 GPM
Rec'd 1600 hr.
Sampled 1242 hr.

FIELD MEASUREMENTS

pH	8.83
Conductivity	437
DO	7.7

Analysis report no. 59-13185

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	06-11-1993 16:00 LS
Alkalinity, Bicarbonate	242	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Total	199	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Anions	4.83	----	meq/l	---------	---------- ----- --
Calcium	67.7	.03	mg/l	EPA 215.1	06-21-1993 13:05 ED
Cations	5.78	----	meq/l	---------	---------- ----- --
Chloride	4.0	.5	mg/l	EPA 325.3	06-23-1993 09:10 LM
Conductivity	400	0.2	umhos/cm	EPA 120.1	06-24-1993 09:00 LS
Hardness, Total	265	.03	mg/l $CaCO_3$	---------	06-21-1993 13:05 ED
Iron	0.31	.05	mg/l	EPA 236.1	06-17-1993 09:40 ED
Iron, Dissolved	0.08	.05	mg/l	EPA 236.1	06-22-1993 09:15 ED
Magnesium	23.30	.007	mg/l	EPA 242.1	06-21-1993 15:10 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-22-1993 10:05 ED
Oil & Grease	1.2	1	mg/l	EPA 413.1	06-23-1993 08:00 LM
Oxygen, Dissolved	8.0	.01	mg/l	EPA 360.1	06-11-1993 16:00 LM
pH	8.40	----	Units	EPA 150.1	06-11-1993 16:00 LM
Potassium	0.20	.1	mg/l	EPA 258.1	06-22-1993 12:20 ED
Sodium	11.20	.2	mg/l	EPA 273.1	06-22-1993 11:15 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	06-12-1993 10:00 LS
Solids, Total Dissolved	254.0	14	mg/l	EPA 160.1	06-14-1993 13:00 LM
Solids, Total Suspended	39.0	7	mg/l	EPA 160.2	06-15-1993 08:00 LM
Sulfate	40.0	1	mg/l	EPA 375.4	06-28-1993 13:00 LS
Turbidity	2.0	.1	NTU	EPA 180.1	06-12-1993 08:00 LS
Cation/Anion balance	9.05		%		

RECEIVED
6/28/93

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

December 14, 1993

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

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled September 28, 1993

Date received September 28, 1993

Sample identification by
PACIFICORP FIELD OFFICE

Rilda Canyon Flume 3
Temperature 50.9°F
Flume .09/66 GPM
Rec'd 1535 hr.
Sampled 1400 hr.

FIELD MEASUREMENTS

pH	8.36
Conductivity	674
DO	6.7

NOTE: DO Probe was inoperational. Holding times expired when Chloride and Conductivity were run.

Analysis report no. 59-13596

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	11-18-1993 0820 LS
Alkalinity, Bicarbonate	412	2	mg/l	$CaCO_3$	EPA 310.1	11-18-1993 0820 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	11-18-1993 0820 LS
Alkalinity, Total	339	2	mg/l	$CaCO_3$	EPA 310.1	11-18-1993 0820 LS
Anions	8.40	----	meq/l		---------	---------- ----- --
Calcium	75.0	.03	mg/l		EPA 215.1	12-08-1993 1330 DW
Cations	8.30	----	meq/l		---------	---------- ----- --
Chloride	5.0	.5	mg/l		EPA 325.3	11-01-1993 0900 LM
Conductivity	698.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945 ED
Hardness, Total	381.0	.03	mg/l	$CaCO_3$	---------	12-08-1993 1330 DW
Iron	0.20	.05	mg/l		EPA 236.1	12-10-1993 1240 DW
Iron, Dissolved	<0.05	.05	mg/l		EPA 236.1	11-16-1993 1020 ED
Magnesium	47.00	.007	mg/l		EPA 242.1	12-08-1993 1430 DW
Manganese	<0.10	.03	mg/l		EPA 243.1	12-13-1993 1400 DW
Oil & Grease	<1	1	mg/l		EPA 413.1	10-02-1993 0930 LM
pH	7.95	----	Units		EPA 150.1	09-28-1993 1545 LS
Potassium	<2.0	.1	mg/l		EPA 258.1	12-13-1993 1220 DW
Sodium	16.0	.2	mg/l		EPA 273.1	12-09-1993 1000 ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-29-1993 0930 LS
Solids, Total Dissolved	469	14	mg/l		EPA 160.1	09-30-1993 0745 LM
Solids, Total Suspended	6	7	mg/l		EPA 160.2	10-04-1993 1300 LM
Sulfate	70	1	mg/l		EPA 375.4	11-04-1993 1110 LS
Turbidity	1.6	.1	NTU		EPA 180.1	09-29-1993 0830 LS
Cation/Anion Balance	-0.40	----	%		---------	---------- ----- --

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

June 25, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/CS

Date sampled June 11, 1993

Date received June 11, 1993

Rilda Canyon RCW-4
Temperature 45.4°F
Flow 1.25/1960 GPM
Rec'd 1600 hr.
Sampled 1308 hr.

FIELD MEASUREMENTS

pH	8.73
Conductivity	486
DO	5.5

Analysis report no. 59-13178

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	06-11-1993 16:00 LS
Alkalinity, Bicarbonate	317	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Alkalinity, Total	260	2	mg/l $CaCO_3$	EPA 310.1	06-23-1993 10:00 LS
Anions	5.98	----	meq/l	---------	---------- ----- --
Calcium	69.0	.03	mg/l	EPA 215.1	06-21-1993 13:05 ED
Cations	6.13	----	meq/l	---------	---------- ----- --
Chloride	4.8	.5	mg/l	EPA 325.3	06-23-1993 09:10 LM
Conductivity	420	0.2	umhos/cm	EPA 120.1	06-24-1993 09:00 LS
Hardness, Total	290	.03	mg/l $CaCO_3$	---------	06-21-1993 13:05 ED
Iron	0.71	.05	mg/l	EPA 236.1	06-17-1993 09:40 ED
Iron, Dissolved	0.06	.05	mg/l	EPA 236.1	06-22-1993 09:15 ED
Magnesium	28.50	.007	mg/l	EPA 242.1	06-21-1993 15:10 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-22-1993 10:05 ED
Oil & Grease	0.7	1	mg/l	EPA 413.1	06-23-1993 08:00 LM
Oxygen, Dissolved	7.6	.01	mg/l	EPA 360.1	06-11-1993 16:00 LM
pH	8.00	----	Units	EPA 150.1	06-11-1993 16:00 LM
Potassium	0.20	.1	mg/l	EPA 258.1	06-22-1993 12:20 ED
Sodium	7.90	.2	mg/l	EPA 273.1	06-22-1993 11:15 ED
Solids, Settleable	0.5	.5	mg/l	EPA 160.5	06-12-1993 10:00 LS
Solids, Total Dissolved	262.0	14	mg/l	EPA 160.1	06-14-1993 13:00 LM
Solids, Total Suspended	96.0	7	mg/l	EPA 160.2	06-15-1993 08:00 LM
Sulfate	37.0	1	mg/l	EPA 375.4	06-21-1993 13:50 LS
Turbidity	16.0	.1	NTU	EPA 180.1	06-12-1993 08:00 LS
Cation/Anion Balance	1.23		%		

RECEIVED
6/25/93

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

December 1, 1993

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

RECEIVED
12/1/93

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled September 28, 1993

Date received September 28, 1993

Rilda Canyon Wier 4 RCW4
Temperature 49.1°F
Flow 48 GPM
Rec'd 1535 hr.
Sampled 1340 hr.

FIELD MEASUREMENTS

pH	8.62
Conductivity	707
DO	7.5

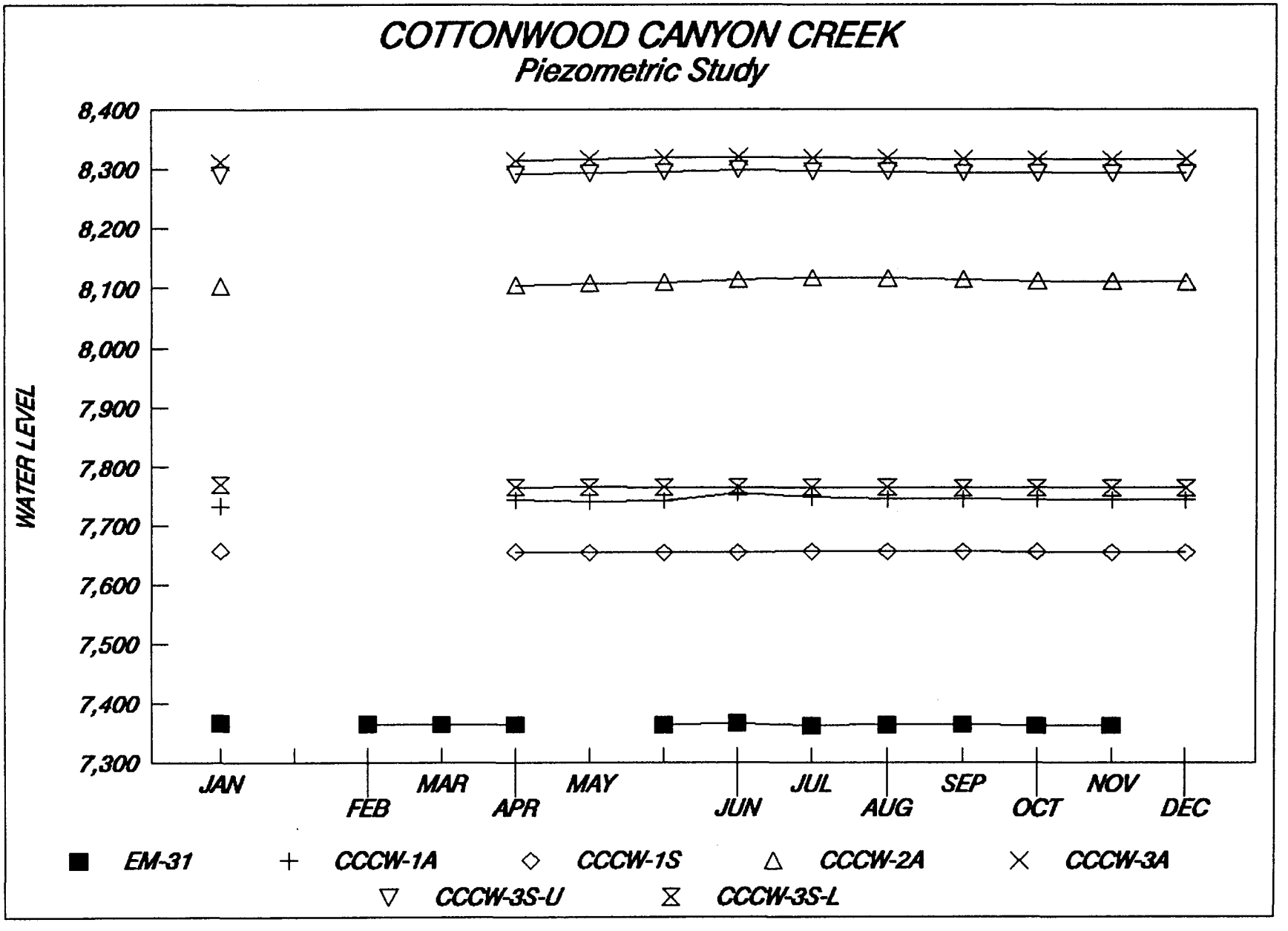
NOTE: DO Probe was inoperational. Holding times expired when Chloride and Conductivity were run.

Analysis report no. 59-13600

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	10-12-1993 0815	
Alkalinity, Bicarbonate	403	2	mg/l	$CaCO_3$	EPA 310.1	10-12-1993 0815	
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-12-1993 0815	LS
Alkalinity, Total	332	2	mg/l	$CaCO_3$	EPA 310.1	10-12-1993 0815	LS
Anions	9.20	----	meq/l		---------	---------- -----	--
Calcium	79.0	.03	mg/l		EPA 215.1	11-08-1993 1450	ED
Cations	9.90	----	meq/l		---------	---------- -----	--
Chloride	14.0	.5	mg/l		EPA 325.3	11-01-1993 0900	LM
Conductivity	737.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Hardness, Total	453.0	.03	mg/l	$CaCO_3$	---------	11-08-1993 1450	ED
Iron	<0.20	.05	mg/l		EPA 236.1	11-24-1993 1200	DW
Iron, Dissolved	<0.05	.05	mg/l		EPA 236.1	11-16-1993 1020	ED
Magnesium	62.00	.007	mg/l		EPA 242.1	11-08-1993 1630	ED
Manganese	0.10	.03	mg/l		EPA 243.1	11-29-1993 1500	DW
Oil & Grease	1	1	mg/l		EPA 413.1	10-02-1993 0930	LM
pH	8.09	----	Units		EPA 150.1	09-28-1993 1545	LS
Potassium	<10.0	.1	mg/l		EPA 258.1	11-09-1993 1315	ED
Sodium	20.0	.2	mg/l		EPA 273.1	11-09-1993 1135	ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-29-1993 0930	LS
Solids, Total Dissolved	642	14	mg/l		EPA 160.1	09-30-1993 0745	LS
Solids, Total Suspended	6	7	mg/l		EPA 160.2	10-04-1993 1300	LM
Sulfate	110	1	mg/l		EPA 375.4	10-19-1993 1400	LS
Turbidity	1.4	.1	NTU		EPA 180.1	09-29-1993 0830	LS
Cation/Anion Balance	3.90	----	%		---------	---------- -----	--

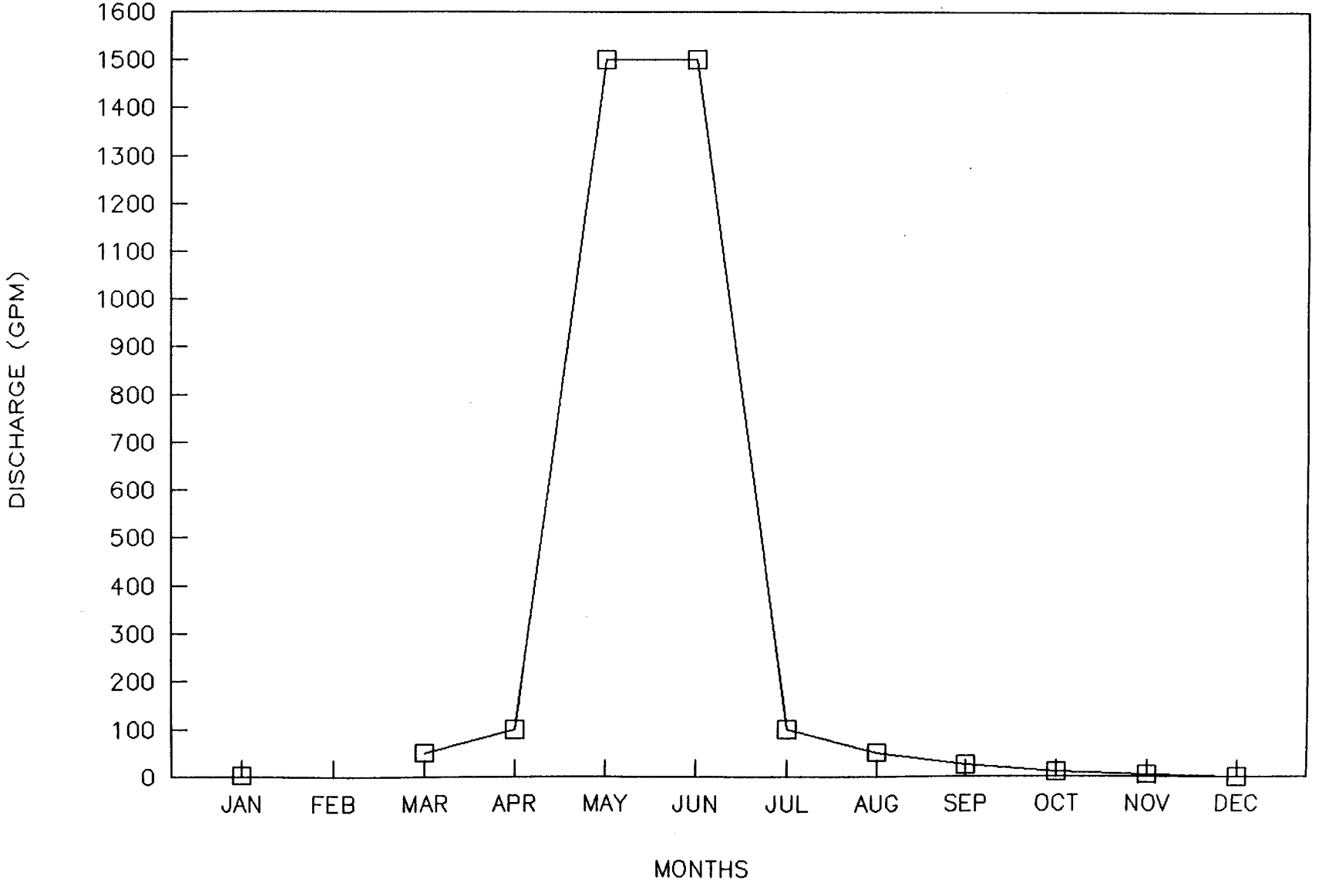
Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory


COTTONWOOD CANYON CREEK
Piezometric Study
WATER LEVEL
8,400
8,300
8,200
8,100
8,000
7,900
7,800
7,700
7,600
7,500
7,400
7,300
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
EM-31
CCCW-1A
CCCW-1S
CCCW-2A
CCCW-3A
CCCW-3S-U
CCCW-3S-L

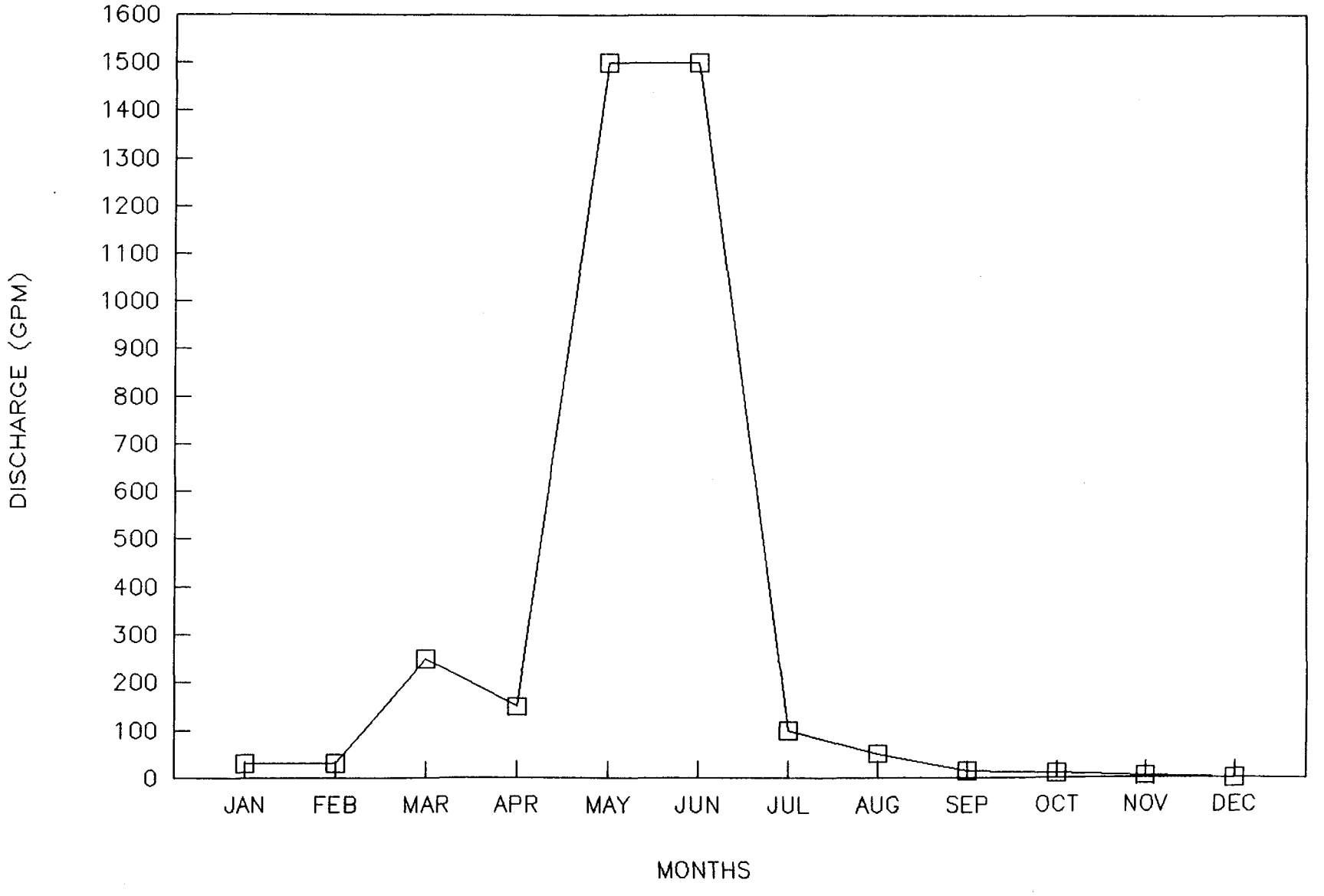
COTTONWOOD CANYON CREEK: SW-1

Drainage Recession Curve Study



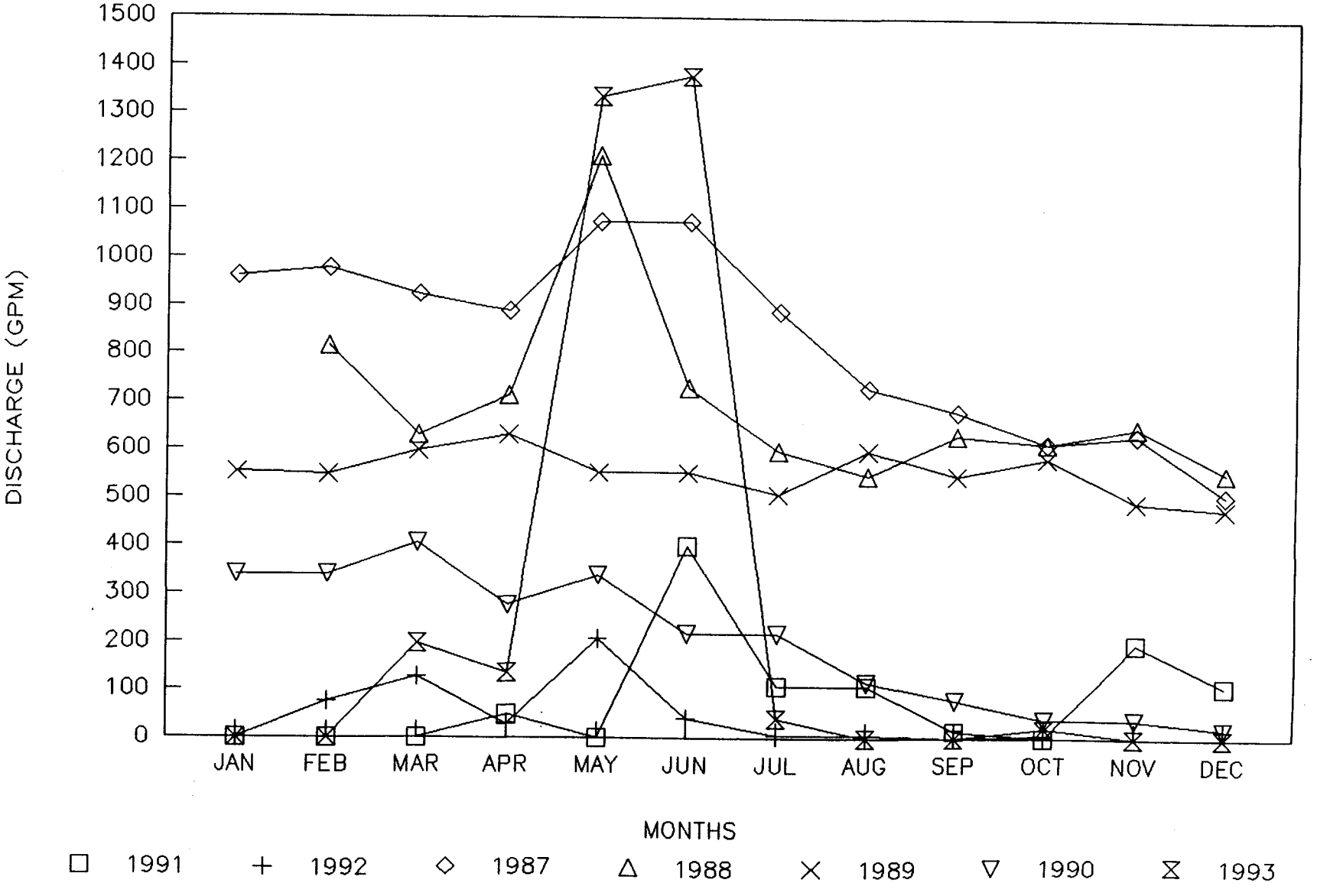
COTTONWOOD CANYON CREEK: SW-2

Drainage Recession Curve Study



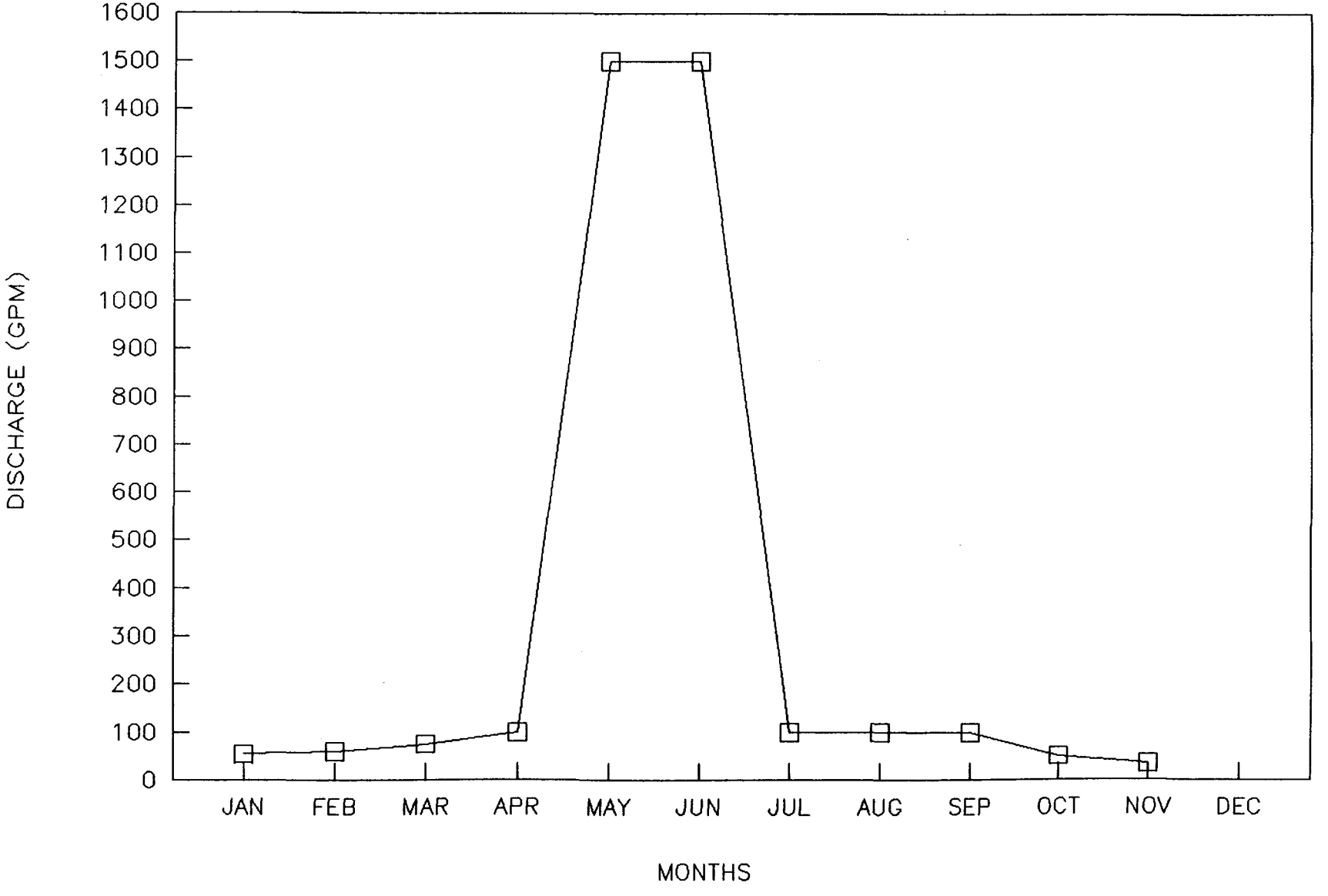
COTTONWOOD CANYON CREEK @ USGS FLUME

Drainage Recession Curve Study



COTTONWOOD CANYON CREEK: SW-3

Drainage Recession Curve Study



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 (Societe Generale de Surveillance)

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

April 5, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled March 23, 1993

Date received March 24, 1993

Trail Mountain SW-1
Temperature 49.1°F
Flow 50 GPM EST.
Rec'd 1000 hr.
Sampled 1520 hr.

FIELD MEASUREMENTS

pH	8.07
Conductivity	843
DO	9.5

Analysis report no. 59-12970

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	2	1	mg/l $CaCO_3$	EPA 305.1	03-31-1993 10:10 LS
Alkalinity, Bicarbonate	401	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Alkalinity, Total	329	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Anions	10.90	----	meq/l	---------	---------- ----- --
Calcium	64.9	.1	mg/l	EPA 215.1	03-31-1993 08:50 ED
Cations	9.85	----	meq/l	---------	---------- ----- --
Chloride	25.2	.1	mg/l	EPA 325.3	03-30-1993 14:00 LM
Conductivity	930	2	umhos/cm	EPA 120.1	04-01-1993 10:00 LS
Hardness, Total	413	1	mg/l $CaCO_3$	---------	03-31-1993 08:50 ED
Iron	0.25	.02	mg/l	EPA 236.1	03-31-1993 13:40 ED
Iron, Dissolved	0.19	.02	mg/l	EPA 236.1	03-31-1993 13:40 ED
Magnesium	61.00	.01	mg/l	EPA 242.1	03-31-1993 08:50 ED
Manganese	0.00	.01	mg/l	EPA 243.1	03-31-1993 13:40 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	03-30-1993 08:00 LM
Oxygen, Dissolved	8.3	.01	mg/l	EPA 360.1	03-24-1993 11:00 LS
pH	7.90	----	Units	EPA 150.1	03-24-1993 11:00 LS
Potassium	3.20	.01	mg/l	EPA 258.1	03-31-1993 08:50 ED
Sodium	35.40	.01	mg/l	EPA 273.1	03-31-1993 08:50 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	03-25-1993 07:30 LM
Solids, Total Dissolved	610.0	.5	mg/l	EPA 160.1	03-29-1993 10:00 LM
Solids, Total Suspended	4.0	.5	mg/l	EPA 160.2	03-29-1993 10:00 LM
Sulfate	180.0	.1	mg/l	EPA 375.4	03-30-1993 08:30 LS
Turbidity	3.0	.1	NTU	EPA 180.1	03-24-1993 11:30 LS
Cation/Anion Balance	1.00		%		

RECEIVED
4/6/93

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

Original Watermarked For Your Protection
SEE REVERSE SIDE FOR 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 (Societe Generale de Surveillance)

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

June 11, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Cottonwood

Sample taken by Energy West/KH

Date sampled May 19, 1993

Date received May 19, 1993

Cottonwood Creek SW-1
Temperature 47.7°F
Flow 3 C S Est.
Rec'd 1330 hr.
Sampled 1220 hr.

FIELD MEASUREMENTS

pH	8.34
Conductivity	423
DO	9.5

Analysis report no. 59-13094

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	2	1	mg/l $CaCO_3$	EPA 305.1	05-26-1993 13:00 LS
Alkalinity, Bicarbonate	355	2	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Alkalinity, Total	291	2	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Anions	6.67	----	meq/l	---------	---------- ----- --
Calcium	152.3	.03	mg/l	EPA 215.1	06-01-1993 14:45 ED
Cations	9.67	----	meq/l	---------	---------- ----- --
Chloride	5.6	.5	mg/l	EPA 325.3	05-24-1993 07:45 LM
Conductivity	380	0.2	umhos/cm	EPA 120.1	06-02-1993 14:00 LS
Hardness, Total	466	.03	mg/l $CaCO_3$	---------	06-01-1993 14:45 ED
Iron	0.91	.05	mg/l	EPA 236.1	06-01-1993 16:55 ED
Iron, Dissolved	0.19	.05	mg/l	EPA 236.1	06-01-1993 16:55 ED
Magnesium	20.90	.007	mg/l	EPA 242.1	06-01-1993 15:30 ED
Manganese	0.19	.03	mg/l	EPA 243.1	06-01-1993 15:55 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	06-10-1993 14:00 LM
Oxygen, Dissolved	7.5	.01	mg/l	EPA 360.1	05-19-1993 13:00 LS
pH	7.80	----	Units	EPA 150.1	05-19-1993 13:00 LS
Potassium	3.10	.1	mg/l	EPA 258.1	06-02-1993 09:50 ED
Sodium	6.00	.2	mg/l	EPA 273.1	06-02-1993 09:20 ED
Solids, Settleable	1.5	.5	mg/l	EPA 160.5	05-20-1993 07:30 LM
Solids, Total Dissolved	253.0	14	mg/l	EPA 160.1	05-26-1993 07:45 LM
Solids, Total Suspended	412.0	7	mg/l	EPA 160.2	05-28-1993 14:30 LM
Sulfate	40.0	1	mg/l	EPA 375.4	06-02-1993 09:45 LS
Turbidity	73.0	.1	NTU	EPA 180.1	05-20-1993 08:00 LS
Cation/Anion Balance	4.83		%		

RECEIVED
6/11/93

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

October 21, 1993

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

RECEIVED
10/24/93
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled September 10, 1993

Date received September 10, 1993

Sample identification by
PACIFICORP FIELD OFFICE

SW-1
Temperature 64.8°F
Flow 25 GPM
Rec'd 1535 hr.
Sampled 1257 hr.

FIELD MEASUREMENTS

pH	8.45
Conductivity	713
DO	11.2

NOTE: HOLDING TIME EXPIRED WHEN ALKALINITY WAS RUN.
AMENDED ALKALINITY DATE

Analysis report no. 59-13504

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	09-23-1993 1000 LS
Alkalinity, Bicarbonate	288	2	mg/l	$CaCO_3$	EPA 310.1	09-27-1993 1000 LS
Alkalinity, Carbonate	9	1	mg/l	$CaCO_3$	EPA 310.1	09-27-1993 1000 LS
Alkalinity, Total	297	2	mg/l	$CaCO_3$	EPA 310.1	09-27-1993 1000 LS
Anions	8.24	----	meq/l		---------	---------- ----- --
Calcium	61.7	.03	mg/l		EPA 215.1	10-01-1993 1220 ED
Cations	8.26	----	meq/l		---------	---------- ----- --
Chloride	19.8	.5	mg/l		EPA 325.3	10-01-1993 0700 LM
Conductivity	780.00	0.2	umhos/cm		EPA 120.1	09-14-1993 1215 LS
Hardness, Total	347.6	.03	mg/l	$CaCO_3$	---------	10-01-1993 1220 ED
Iron	0.13	.05	mg/l		EPA 236.1	09-29-1993 1030 ED
Iron, Dissolved	<0.05	.05	mg/l		EPA 236.1	10-04-1993 0920 ED
Magnesium	47.00	.007	mg/l		EPA 242.1	10-01-1993 1410 ED
Manganese	<0.03	.03	mg/l		EPA 243.1	09-30-1993 1545 ED
Oil & Grease	0	1	mg/l		EPA 413.1	09-17-1993 1000 LM
Oxygen, Dissolved	7.21	.01	mg/l		EPA 360.1	09-10-1993 1635 ED
pH	8.72	----	Units		EPA 150.1	09-10-1993 1605 ED
Potassium	2.0	.1	mg/l		EPA 258.1	10-01-1993 1700 ED
Sodium	29.5	.2	mg/l		EPA 273.1	10-01-1993 1550 ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-10-1993 1600 LM
Solids, Total Dissolved	489	14	mg/l		EPA 160.1	09-13-1993 0800 LM
Solids, Total Suspended	8	7	mg/l		EPA 160.2	09-13-1993 1410 LM
Sulfate	90	1	mg/l		EPA 375.4	10-03-1993 1030 LS
Turbidity	3.6	.1	NTU		EPA 180.1	09-12-1993 0800 LS
Cation/Anion Balance	0.15		%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout
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

April 5, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled March 23, 1993

Date received March 24, 1993

Trail Mountain SW-2
Temperature 45.4°F
Flow 250 GPM EST.
Rec'd 1000 hr.
Sampled 1545 hr.

FIELD MESUREMENTS

pH	8.41
Conductivity	786
DO	8.6

Analysis report no. 59-12966

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	03-31-1993 10:10 LS
Alkalinity, Bicarbonate	320	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Alkalinity, Total	293	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Anions	10.86	----	meq/l	---------	---------- ----- --
Calcium	94.8	.1	mg/l	EPA 215.1	03-31-1993 08:50 ED
Cations	11.42	----	meq/l	---------	---------- ----- --
Chloride	33.8	.1	mg/l	EPA 325.3	03-29-1993 13:05 LM
Conductivity	830	2	umhos/cm	EPA 120.1	04-01-1993 10:00 LS
Hardness, Total	488	1	mg/l $CaCO_3$	---------	03-31-1993 08:50 ED
Iron	2.44	.02	mg/l	EPA 236.1	03-31-1993 13:40 ED
Iron, Dissolved	1.25	.02	mg/l	EPA 236.1	03-31-1993 13:40 ED
Magnesium	61.00	.01	mg/l	EPA 242.1	03-31-1993 08:50 ED
Manganese	0.12	.01	mg/l	EPA 243.1	03-31-1993 13:40 ED
Oil & Grease	0.3	1	mg/l	EPA 413.1	03-30-1993 08:00 LM
Oxygen, Dissolved	8.6	.01	mg/l	EPA 360.1	03-24-1993 11:00 LS
pH	8.20	----	Units	EPA 150.1	03-24-1993 11:00 LS
Potassium	1.70	.01	mg/l	EPA 258.1	03-31-1993 08:50 ED
Sodium	38.00	.01	mg/l	EPA 273.1	03-31-1993 08:50 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	03-25-1993 07:30 LM
Solids, Total Dissolved	563.0	.5	mg/l	EPA 160.1	03-29-1993 10:00 LM
Solids, Total Suspended	253.0	.5	mg/l	EPA 160.2	03-29-1993 10:00 LM
Sulfate	200.0	.1	mg/l	EPA 375.4	03-30-1993 08:30 LS
Turbidity	100.0	.1	NTU	EPA 180.1	03-24-1993 11:30 LS
Cation/Anion Balance	6.69		%		

RECEIVED
4/6/93

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

Original Watermarked For Your Protection

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

June 11, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Cottonwood

Sample taken by Energy West/KH

Date sampled May 19, 1993

Date received May 19, 1993

Cottonwood Creek SW-2
Temperature 47.6°F FLOW 3 CFS EST.
Rec'd 1330 hr.
Sampled 1205 hr.

FIELD MEASUREMENTS

pH	8.90
Conductivity	456
DO	9.0

Analysis report no. 59-13093

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	2	1	mg/l $CaCO_3$	EPA 305.1	05-26-1993 13:00 LS
Alkalinity, Bicarbonate	408	2	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Alkalinity, Total	335	2	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Anions	8.41	----	meq/l	---------	---------- ----- --
Calcium	136.9	.03	mg/l	EPA 215.1	06-01-1993 14:45 ED
Cations	9.56	----	meq/l	---------	---------- ----- --
Chloride	7.1	.5	mg/l	EPA 325.3	05-24-1993 07:45 LM
Conductivity	410	0.2	umhos/cm	EPA 120.1	06-02-1993 14:00 LS
Hardness, Total	461	.03	mg/l $CaCO_3$	---------	06-01-1993 14:45 ED
Iron	3.11	.05	mg/l	EPA 236.1	06-01-1993 16:55 ED
Iron, Dissolved	0.25	.05	mg/l	EPA 236.1	06-01-1993 16:55 ED
Magnesium	28.90	.007	mg/l	EPA 242.1	06-01-1993 15:30 ED
Manganese	0.22	.03	mg/l	EPA 243.1	06-01-1993 15:55 ED
Oil & Grease	0.1	1	mg/l	EPA 413.1	06-10-1993 14:00 LM
Oxygen, Dissolved	8.5	.01	mg/l	EPA 360.1	05-19-1993 13:00 LS
pH	7.80	----	Units	EPA 150.1	05-19-1993 13:00 LS
Potassium	0.00	.1	mg/l	EPA 258.1	06-02-1993 09:50 ED
Sodium	8.00	.2	mg/l	EPA 273.1	06-02-1993 09:20 ED
Solids, Settleable	1.5	.5	mg/l	EPA 160.5	05-20-1993 07:30 LM
Solids, Total Dissolved	300.0	14	mg/l	EPA 160.1	05-26-1993 07:45 LM
Solids, Total Suspended	682.0	7	mg/l	EPA 160.2	05-28-1993 14:30 LM
Sulfate	80.0	1	mg/l	EPA 375.4	06-02-1993 09:45 LS
Turbidity	79.0	.1	NTU	EPA 180.1	05-20-1993 08:00 LS
Cation/Anion Balance	6.42		%		

RECEIVED
6/11/93

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 (Societe Generale de Surveillance)

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

October 19, 1993

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

RECEIVED
10/19/93
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled September 10, 1993

Date received September 10, 1993

Sample identification by PACIFICORP FIELD OFFICE

SW-2

Temperature 60.3°F
Flow 15 GPM
Rec'd 1535 hr.
Sampled 1408 hr.

FIELD MEASUREMENTS

pH	8.80
Conductivity	838
DO	9.1

NOTE: Alkalinity run after holding time expired.

Analysis report no. 59-13507

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Ana	
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	09-28-1993 1030	LS
Alkalinity, Bicarbonate	452	2	mg/l	$CaCO_3$	EPA 310.1	09-28-1993 1030	LS
Alkalinity, Carbonate	9	1	mg/l	$CaCO_3$	EPA 310.1	09-28-1993 1030	LS
Alkalinity, Total	461	2	mg/l	$CaCO_3$	EPA 310.1	09-28-1993 0103	LS
Anions	12.81	----	meq/l		---------	---------- -----	--
Calcium	66.8	.03	mg/l		EPA 215.1	10-12-1993 1330	ED
Cations	10.65	----	meq/l		---------	---------- -----	--
Chloride	24.6	.5	mg/l		EPA 325.3	10-01-1993 0700	LM
Conductivity	933.00	0.2	umhos/cm		EPA 120.1	09-14-1993 1215	LS
Hardness, Total	442.7	.03	mg/l	$CaCO_3$	---------	10-12-1993 1330	ED
Iron	0.30	.05	mg/l		EPA 236.1	10-12-1993 1700	ED
Iron, Dissolved	0.06	.05	mg/l		EPA 236.1	10-04-1993 0920	ED
Magnesium	67.00	.007	mg/l		EPA 242.1	10-18-1993 1405	ED
Manganese	<0.03	.03	mg/l		EPA 243.1	10-12-1993 1730	ED
Oil & Grease	1	1	mg/l		EPA 413.1	09-21-1993 1100	LM
Oxygen, Dissolved	7.67	.01	mg/l		EPA 360.1	09-10-1993 1635	ED
pH	8.91	----	Units		EPA 150.1	09-10-1993 1605	ED
Potassium	4.0	.1	mg/l		EPA 258.1	10-13-1993 1250	ED
Sodium	39.7	.2	mg/l		EPA 273.1	10-18-1993 1650	ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-10-1993 1600	LM
Solids, Total Dissolved	584	14	mg/l		EPA 160.1	09-13-1993 0800	LM
Solids, Total Suspended	18	7	mg/l		EPA 160.2	09-13-1993 1410	LM
Sulfate	150	1	mg/l		EPA 375.4	10-03-1993 1030	LS
Turbidity	7.4	.1	NTU		EPA 180.1	09-12-1993 0800	
Cation/Anion Balance	-9.52		%				

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 (Societe Generale de Surveillance)

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

April 5, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled March 23, 1993

Date received March 24, 1993

Trail Mountain SW-3
Temperature 55.5°F
Flow 75 GPM EST.
Rec'd 1000 hr.
Sampled 1601 hr.

FIELD MESUREMENTS

pH	8.06
Conductivity	1320
DO	7.9

Analysis report no. 59-12965

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	03-31-1993 10:10 LS
Alkalinity, Bicarbonate	390	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Alkalinity, Total	320	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Anions	14.99	----	meq/l	---------	---------- ----- --
Calcium	80.6	.1	mg/l	EPA 215.1	03-31-1993 08:50 ED
Cations	13.40	----	meq/l	---------	---------- ----- --
Chloride	57.6	.1	mg/l	EPA 325.3	03-29-1993 13:05 LM
Conductivity	1350	2	umhos/cm	EPA 120.1	04-01-1993 10:00 LS
Hardness, Total	485	1	mg/l $CaCO_3$	---------	03-31-1993 08:50 ED
Iron	0.27	.02	mg/l	EPA 236.1	03-31-1993 13:40 ED
Iron, Dissolved	0.20	.02	mg/l	EPA 236.1	03-31-1993 13:40 ED
Magnesium	69.00	.01	mg/l	EPA 242.1	03-31-1993 08:50 ED
Manganese	0.00	.01	mg/l	EPA 243.1	03-31-1993 13:40 ED
Oil & Grease	0.7	1	mg/l	EPA 413.1	03-30-1993 08:00 LM
Oxygen, Dissolved	7.3	.01	mg/l	EPA 360.1	03-24-1993 11:00 LS
pH	8.10	----	Units	EPA 150.1	03-24-1993 11:00 LS
Potassium	2.50	.01	mg/l	EPA 258.1	03-31-1993 08:50 ED
Sodium	84.70	.01	mg/l	EPA 273.1	03-31-1993 08:50 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	03-25-1993 07:30 LM
Solids, Total Dissolved	957.0	.5	mg/l	EPA 160.1	03-29-1993 10:00 LM
Solids, Total Suspended	17.0	.5	mg/l	EPA 160.2	03-29-1993 10:00 LM
Sulfate	340.0	.1	mg/l	EPA 375.4	03-30-1993 08:30 LS
Turbidity	8.5	.1	NTU	EPA 180.1	03-24-1993 11:30 LS
Cation/Anion Balance	-5.62		%		

RECEIVED
4/6/93

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

June 3, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Cottonwood

Sample taken by Energy West/KH

Date sampled May 19, 1993

Date received May 19, 1993

Cottonwood Canyon Creek SW-3
Temperature 56.8°F FLOW 2.5-3.0 CFS EST
Rec'd 1330 hr.
Sampled 1115 hr.

FIELD MEASUREMENTS

pH	8.59
Conductivity	536
DO	7.4

Analysis report no. 59-13088

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	2	1	mg/l $CaCO_3$	EPA 305.1	05-26-1993 13:00 LS
Alkalinity, Bicarbonate	451	2	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Alkalinity, Carbonate	<1	1	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Alkalinity, Total	370	2	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Anions	10.30	----	meq/l	---------	---------- ----- --
Calcium	159.0	.03	mg/l	EPA 215.1	06-01-1993 14:45 ED
Cations	12.42	----	meq/l	---------	---------- ----- --
Chloride	12.8	.5	mg/l	EPA 325.3	05-24-1993 07:45 LM
Conductivity	510	0.2	umhos/cm	EPA 120.1	06-02-1993 14:00 LS
Hardness, Total	572	.03	mg/l $CaCO_3$	---------	06-01-1993 14:45 ED
Iron	1.11	.05	mg/l	EPA 236.1	06-01-1993 16:55 ED
Iron, Dissolved	0.27	.05	mg/l	EPA 236.1	06-01-1993 16:55 ED
Magnesium	42.60	.01	mg/l	EPA 242.1	06-01-1993 15:30 ED
Manganese	0.25	.03	mg/l	EPA 243.1	06-01-1993 15:55 ED
Oil & Grease	0.2	1	mg/l	EPA 413.1	06-01-1993 08:00 LM
Oxygen, Dissolved	7.7	.01	mg/l	EPA 360.1	05-19-1993 13:00 LS
pH	7.70	----	Units	EPA 150.1	05-19-1993 13:00 LS
Potassium	3.70	.1	mg/l	EPA 258.1	06-02-1993 09:50 ED
Sodium	20.50	.2	mg/l	EPA 273.1	06-02-1993 09:20 ED
Solids, Settleable	1.5	.5	mg/l	EPA 160.5	05-20-1993 07:30 LM
Solids, Total Dissolved	372.0	14	mg/l	EPA 160.1	05-26-1993 07:45 LM
Solids, Total Suspended	626.0	7	mg/l	EPA 160.2	05-28-1993 14:30 LM
Sulfate	130.0	1	mg/l	EPA 375.4	06-02-1993 09:45 LS
Turbidity	83.0	.1	NTU	EPA 180.1	05-20-1993 08:00 LS
Cation-Anion Balance	9.31		%		

RECEIVED
6/3/93

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 (Societe Generale de Surveillance)

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

October 21, 1993

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

RECEIVED
10/21/93
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled September 10, 1993

Date received September 10, 1993

Sample identification by
PACIFICORP FIELD OFFICE

SW-3
Temperature 65.2°F
Flow 100 GPM
Rec'd 1535 hr.
Sampled 1417 hr.

FIELD MEASUREMENTS

pH	8.68
Conductivity	1210
DO	6.4

NOTE: HOLDING TIME EXPIRED WHEN ALKALINITY WAS RUN.
AMENDED ALKALINITY DATE

Analysis report no. 59-13506

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	09-24-1993 1030	LS
Alkalinity, Bicarbonate	297	2	mg/l	$CaCO_3$	EPA 310.1	09-28-1993 1030	LS
Alkalinity, Carbonate	14	1	mg/l	$CaCO_3$	EPA 310.1	09-28-1993 1030	LS
Alkalinity, Total	311	2	mg/l	$CaCO_3$	EPA 310.1	09-28-1993 1030	LS
Anions	13.50	----	meq/l		---------	---------- -----	--
Calcium	82.0	.03	mg/l		EPA 215.1	10-01-1993 1220	ED
Cations	12.59	----	meq/l		---------	---------- -----	--
Chloride	48.2	.5	mg/l		EPA 325.3	10-01-1993 0700	LM
Conductivity	1298.00	0.2	umhos/cm		EPA 120.1	09-14-1993 1215	LS
Hardness, Total	435.4	.03	mg/l	$CaCO_3$	---------	10-01-1993 1220	ED
Iron	0.47	.05	mg/l		EPA 236.1	09-29-1993 1030	ED
Iron, Dissolved	<0.05	.05	mg/l		EPA 236.1	10-04-1993 0920	ED
Magnesium	56.00	.007	mg/l		EPA 242.1	10-01-1993 1410	ED
Manganese	0.03	.03	mg/l		EPA 243.1	09-30-1993 1545	ED
Oil & Grease	<1	1	mg/l		EPA 413.1	09-17-1993 1000	LM
Oxygen, Dissolved	7.08	.01	mg/l		EPA 360.1	09-10-1993 1635	ED
pH	8.69	----	Units		EPA 150.1	09-10-1993 1605	ED
Potassium	3.0	.1	mg/l		EPA 258.1	10-01-1993 1700	ED
Sodium	88.8	.2	mg/l		EPA 273.1	10-01-1993 1550	ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-10-1993 1600	LM
Solids, Total Dissolved	909	14	mg/l		EPA 160.1	09-13-1993 0800	LM
Solids, Total Suspended	12	7	mg/l		EPA 160.2	09-13-1993 1410	LM
Sulfate	290	1	mg/l		EPA 375.4	10-03-1993 1030	LS
Turbidity	3.3	.1	NTU		EPA 180.1	09-12-1993 0800	LS
Cation/Anion Balance	-3.51		%				

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

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

December 28, 1993

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

RECEIVED
14/28/93

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water FIELD OFFICE

Trail Mountain SW-3

Sample taken at Trail Mountain

Temperature 44.1°F
Flow 25 GPM
Rec'd 1545 hr.
Sampled 1310 hr.

Sample taken by Energy West/KH

FIELD MEASUREMENTS
pH 8.31
Conductivity 1160
DO 10.1

Date sampled December 13, 1993

Date received December 13, 1993

Note: Amended Alkalinity, Carbonate

Analysis report no. 59-13780

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	<10	1	mg/l	$CaCO_3$	2310 B	12-15-1993 0955 LM
Alkalinity, Bicarbonate	349	1	mg/l	$CaCO_3$	4500 CO_2D	12-17-1993 1143 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	4500 CO_2D	12-17-1993 1143 LS
Alkalinity, Total	349	1	mg/l	$CaCO_3$	EPA 310.1	12-17-1993 1143 LS
Anions	12.60	----	meq/l		---------	---------- ----- --
Calcium	91.0	1	mg/l		EPA 215.1	12-20-1993 1600 DW
Cations	14.40	----	meq/l		---------	---------- ----- --
Chloride	50.0	1	mg/l		EPA 325.3	12-22-1993 1255 ED
Conductivity	1342.00	0.2	umhos/cm		EPA 120.1	12-16-1993 1035 ED
Hardness, Total	548.0	1	mg/l	$CaCO_3$	2340 B	- -
Iron	<0.20	0.2	mg/l		EPA 236.1	12-21-1993 1430 DW
Iron, Dissolved	<0.20	0.2	mg/l		EPA 236.1	12-21-1993 1200 DW
Magnesium	78.00	1	mg/l		EPA 242.1	12-22-1993 0830 DW
Manganese	<0.10	0.1	mg/l		EPA 243.1	12-21-1993 1030 DW
Oil & Grease	<5	5	mg/l		EPA 413.1	12-22-1993 0900 LM
Oxygen, Dissolved	9.52	.01	mg/l		EPA 360.1	12-13-1993 1550 LS
pH	8.00	----	Units		EPA 150.1	12-13-1993 1600 LS
Potassium	5.0	2	mg/l		EPA 258.1	12-20-1993 1030 DW
Sodium	78.0	1	mg/l		EPA 273.1	12-21-1993 1530 DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	12-14-1993 0745 LM
Solids, Total Dissolved	914	10	mg/l		EPA 160.1	12-15-1993 1500 LM
Solids, Total Suspended	8	4	mg/l		EPA 160.2	12-16-1993 1430 LM
Sulfate	270	1	mg/l		EPA 375.4	12-16-1993 1345 LS
Turbidity	2.3	.1	NTU		EPA 180.1	12-15-1993 0800 LS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry D Stout
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 (Societe' Generale de Surveillance)

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

June 29, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/KH

Date sampled June 10, 1993

Date received June 10, 1993

Trail Mountain T-19
Temperature 55.6°F
Flow 300 GPM Est.
Rec'd 1600 hr.
Sampled 1245 hr.

FIELD MEASUREMENTS

pH	8.61
Conductivity	665
DO	8.5

Analysis report no. 59-13171

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	06-10-1993 13:30 LS
Alkalinity, Bicarbonate	337	2	mg/l $CaCO_3$	EPA 310.1	06-15-1993 13:30 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	06-15-1993 13:30 LS
Alkalinity, Total	277	2	mg/l $CaCO_3$	EPA 310.1	06-15-1993 13:30 LS
Anions	7.64	----	meq/l	---------	---------- ----- --
Calcium	36.1	.03	mg/l	EPA 215.1	06-29-1993 09:45 ED
Cations	7.73	----	meq/l	---------	---------- ----- --
Chloride	20.1	.5	mg/l	EPA 325.3	06-23-1993 09:10 LM
Conductivity	600	0.2	umhos/cm	EPA 120.1	06-24-1993 09:00 LS
Hardness, Total	286	.03	mg/l $CaCO_3$	---------	06-29-1993 09:45 ED
Iron	0.53	.05	mg/l	EPA 236.1	06-17-1993 09:40 ED
Iron, Dissolved	0.21	.05	mg/l	EPA 236.1	06-22-1993 09:15 ED
Magnesium	47.60	.007	mg/l	EPA 242.1	06-21-1993 15:10 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-22-1993 10:05 ED
Oil & Grease	1.9	1	mg/l	EPA 413.1	06-23-1993 08:00 LM
Oxygen, Dissolved	7.3	.01	mg/l	EPA 360.1	06-10-1993 17:30 LS
pH	8.10	----	Units	EPA 150.1	06-10-1993 17:30 LS
Potassium	0.70	.1	mg/l	EPA 258.1	06-22-1993 12:20 ED
Sodium	46.50	.2	mg/l	EPA 273.1	06-22-1993 11:15 ED
Solids, Settleable	< 0.5	.5	mg/l	EPA 160.5	06-11-1993 10:00 LS
Solids, Total Dissolved	418.0	14	mg/l	EPA 160.1	06-14-1993 13:00 LM
Solids, Total Suspended	123.0	7	mg/l	EPA 160.2	06-15-1993 08:00 LM
Sulfate	80.0	1	mg/l	EPA 375.4	06-21-1993 13:50 LS
Turbidity	16.0	.1	NTU	EPA 180.1	06-11-1993 08:00 LS
[illegible]tion/Anion Balance	0.60		%		

RECEIVED
6/29/93

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 1909

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

October 14, 1993

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

RECEIVED
10/14/93

FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled September 10, 1993

Date received September 10, 1993

Sample identification by
PACIFICORP FIELD OFFICE

T-19
Temperature 64.1°F
Flow 150 GPM
Rec'd 1535 hr.
Sampled 1437 hr.

FIELD MEASUREMENTS

pH	8.74
Conductivity	650
DO	5.9

NOTE: HOLDING TIME EXPIRERD WHEN ALKALINITY WAS RUN.
AMENDED ALKALINITY DATE

Analysis report no. 59-13505

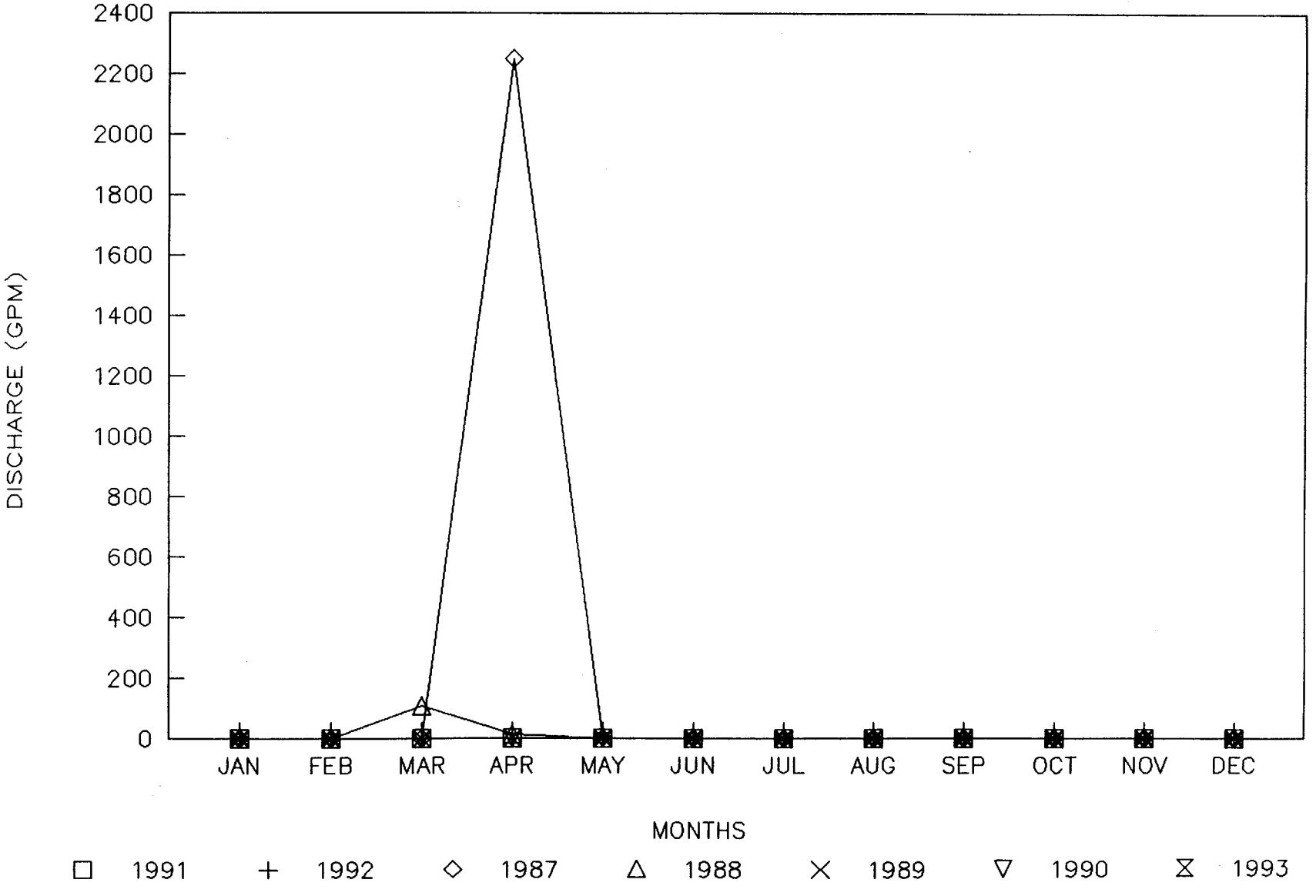
Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Ana	
Alkalinity, Bicarbonate	258	2	mg/l	$CaCO_3$	EPA 310.1	09-28-1993 1030	LS
Alkalinity, Carbonate	8	1	mg/l	$CaCO_3$	EPA 310.1	09-28-1993 1030	LS
Alkalinity, Total	266	2	mg/l	$CaCO_3$	EPA 310.1	09-28-1993 1030	LS
Anions	6.89	----	meq/l		---------	---------- -----	--
Calcium	31.9	.03	mg/l		EPA 215.1	10-01-1993 1220	ED
Cations	5.93	----	meq/l		---------	---------- -----	--
Chloride	24.1	.5	mg/l		EPA 325.3	10-01-1993 0700	LM
Conductivity	709.00	0.2	umhos/cm		EPA 120.1	09-14-1993 1215	LS
Hardness, Total	178.5	.03	mg/l	$CaCO_3$	---------	10-01-1993 1220	ED
Iron	0.18	.05	mg/l		EPA 236.1	09-29-1993 1030	ED
Iron, Dissolved	<0.05	.05	mg/l		EPA 236.1	10-04-1993 0920	ED
Magnesium	24.00	.007	mg/l		EPA 242.1	10-01-1993 1410	ED
Manganese	<0.03	.03	mg/l		EPA 243.1	09-30-1993 1545	ED
Oil & Grease	<1	1	mg/l		EPA 413.1	09-17-1993 1000	LM
Oxygen, Dissolved	7.21	.01	mg/l		EPA 360.1	09-10-1993 1635	ED
pH	9.24	----	Units		EPA 150.1	09-10-1993 1605	ED
Potassium	2.0	.1	mg/l		EPA 258.1	10-01-1993 1700	ED
Sodium	53.9	.2	mg/l		EPA 273.1	10-01-1993 1550	ED
Solids, Total Dissolved	424	14	mg/l		EPA 160.1	09-13-1993 0800	LM
Solids, Total Suspended	11	7	mg/l		EPA 160.2	09-13-1993 1410	LM
Sulfate	50	1	mg/l		EPA 375.4	10-03-1993 1030	LS
Cation/Anion Balance	-7.49	----	%		---------	---------- -----	--

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

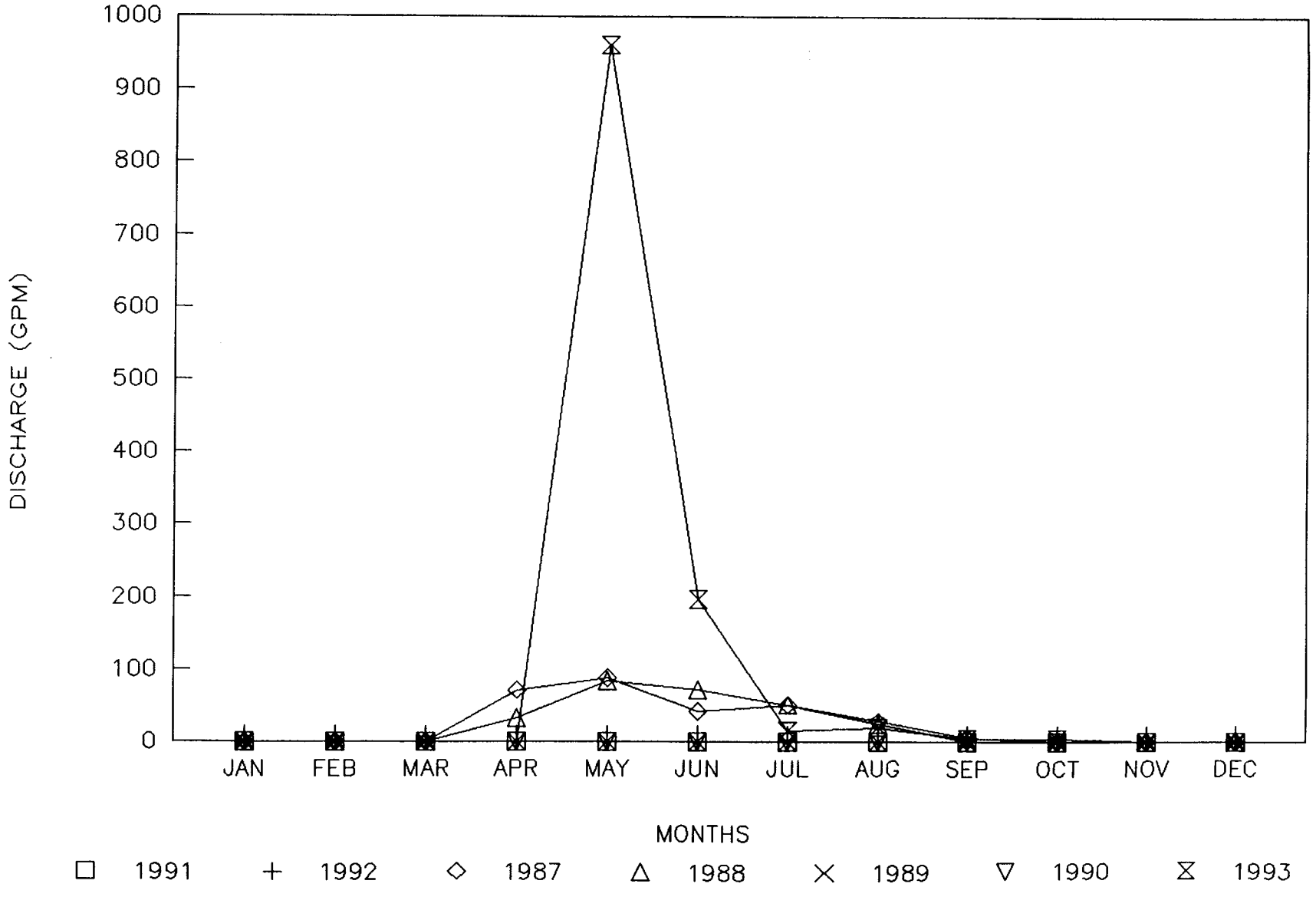
GRIMES WASH – RIGHT FORK ABOVE MINE

Drainage Recession Curve Study



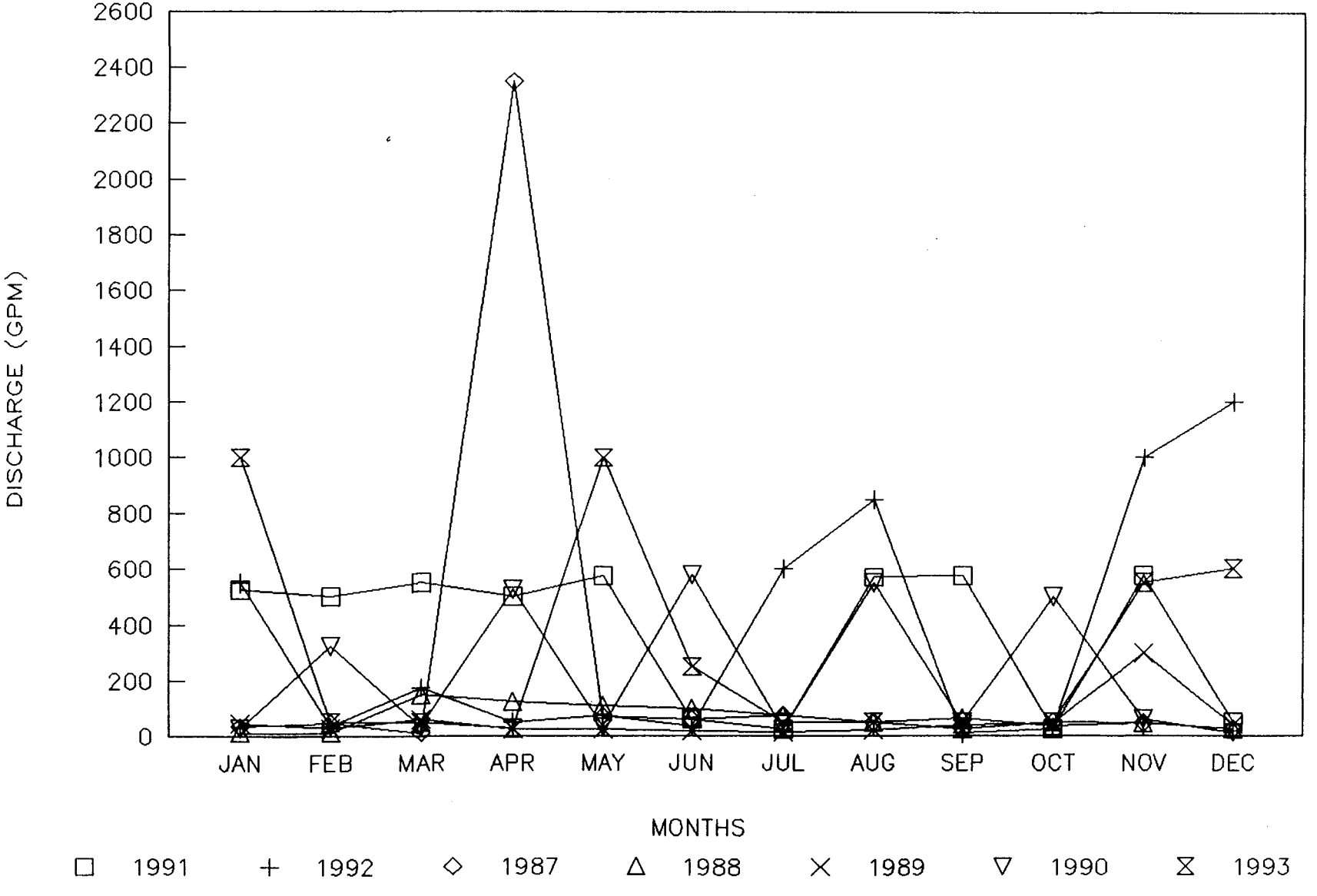
GRIMES WASH – LEFT FORK ABOVE MINE

Drainage Recession Curve Study



GRIMES WASH – BELOW MINE

Drainage Recession Curve Study



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

June 11, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/KH

Date sampled May 19, 1993

Date received May 19, 1993

Grimes Wash Run-Off Left Fork GWRO2
Temperature 48.3°F
Flow 0.79/ 960.7 GPM
Rec'd 1330 hr.
Sampled 1025 hr.

FIELD MEASUREMENTS

pH	8.72
Conductivity	482
DO	11.7

Analysis report no. 59-13092

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	3	1	mg/l $CaCO_3$	EPA 305.1	05-26-1993 13:00 LS
Alkalinity, Bicarbonate	276	2	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Alkalinity, Total	227	2	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Anions	6.36	----	meq/l	---------	---------- ----- --
Calcium	88.9	.03	mg/l	EPA 215.1	06-01-1993 14:45 ED
Cations	7.14	----	meq/l	---------	---------- ----- --
Chloride	8.9	.5	mg/l	EPA 325.3	05-24-1993 07:45 LM
Conductivity	470	0.2	umhos/cm	EPA 120.1	06-02-1993 14:00 LS
Hardness, Total	327	.03	mg/l $CaCO_3$	---------	06-01-1993 14:45 ED
Iron	2.52	.05	mg/l	EPA 236.1	06-01-1993 16:55 ED
Iron, Dissolved	0.22	.05	mg/l	EPA 236.1	06-01-1993 16:55 ED
Magnesium	25.40	.007	mg/l	EPA 242.1	06-01-1993 15:30 ED
Manganese	0.10	.03	mg/l	EPA 243.1	06-01-1993 15:55 ED
Oil & Grease	0.6	1	mg/l	EPA 413.1	06-10-1993 14:00 LM
Oxygen, Dissolved	8.3	.01	mg/l	EPA 360.1	05-19-1993 15:00 LS
pH	7.40	----	Units	EPA 150.1	05-19-1993 15:00 LS
Potassium	1.90	.1	mg/l	EPA 258.1	06-02-1993 09:50 ED
Sodium	13.20	.2	mg/l	EPA 273.1	06-02-1993 09:20 ED
Solids, Settleable	0.6	.5	mg/l	EPA 160.5	05-20-1993 07:30 LM
Solids, Total Dissolved	366.0	14	mg/l	EPA 160.1	05-26-1993 07:45 LM
Solids, Total Suspended	294.0	7	mg/l	EPA 160.2	05-28-1993 07:45 LM
Sulfate	80.0	1	mg/l	EPA 375.4	06-04-1993 09:45 LS
Turbidity	57.0	.1	NTU	EPA 180.1	05-20-1993 08:00 LS
Cation/Anion Balance	5.94		%		

RECEIVED
6/11/93

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

April 5, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/CS

Date sampled March 23, 1993

Date received March 24, 1993

Grimes Wash Run-Off Below Mine GWRO3
Temperature 68.2°F
Flow 50 GPM EST.
Rec'd 1000 hr.
Sampled 1355 hr.

FIELD MESUREMENTS

pH	7.76
Conductivity	2530
DO	8.4

Analysis report no. 59-12968

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	03-31-1993 10:10 LS
Alkalinity, Bicarbonate	344	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Alkalinity, Total	282	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Anions	11.24	----	meq/l	---------	---------- ----- --
Calcium	141.3	.1	mg/l	EPA 215.1	03-31-1993 08:50 ED
Cations	16.55	----	meq/l	---------	---------- ----- --
Chloride	17.4	.1	mg/l	EPA 325.3	03-29-1993 13:05 LM
Conductivity	3280	2	umhos/cm	EPA 120.1	04-01-1993 10:00 LS
Hardness, Total	736	1	mg/l $CaCO_3$	---------	03-31-1993 08:50 ED
Iron	0.23	.02	mg/l	EPA 236.1	03-31-1993 13:40 ED
Iron, Dissolved	0.22	.02	mg/l	EPA 236.1	03-31-1993 13:40 ED
Magnesium	93.00	.01	mg/l	EPA 242.1	03-31-1993 08:50 ED
Manganese	0.10	.01	mg/l	EPA 243.1	03-31-1993 13:40 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	03-30-1993 08:00 LM
Oxygen, Dissolved	8.8	.01	mg/l	EPA 360.1	03-24-1993 11:00 LS
pH	8.10	----	Units	EPA 150.1	03-24-1993 11:00 LS
Potassium	6.50	.01	mg/l	EPA 258.1	03-31-1993 08:50 ED
Sodium	39.20	.01	mg/l	EPA 273.1	03-31-1993 08:50 ED
Solids, Total Dissolved	2109.0	.5	mg/l	EPA 160.1	03-29-1993 10:00 LM
Solids, Total Suspended	4.0	.5	mg/l	EPA 160.2	03-29-1993 10:00 LM
Sulfate	250.0	.1	mg/l	EPA 375.4	03-30-1993 08:30 LS
Turbidity	1.1	.1	NTU	EPA 180.1	03-24-1993 11:30 LS
Cation/Anion Balance	-2.31	----	%	---------	---------- ----- --

RECEIVED
4/6/93

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

Original Watermarked For Your Protection

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

April 5, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/CS

Date sampled March 23, 1993

Date received March 24, 1993

Grimes Wash Run-Off Below Mine GWRO3
Temperature 68.2°F
Flow 50 GPM EST.
Rec'd 1000 hr.
Sampled 1355 hr.

FIELD MESUREMENTS

pH	7.76
Conductivity	2530
DO	8.4

Analysis report no. 59-12968

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	03-31-1993 10:10 LS
Alkalinity, Bicarbonate	344	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Alkalinity, Total	282	1	mg/l $CaCO_3$	EPA 310.1	03-31-1993 10:10 LS
Anions	11.24	----	meq/l	---------	---------- ----- --
Calcium	141.3	.1	mg/l	EPA 215.1	03-31-1993 08:50 ED
Cations	16.55	----	meq/l	---------	---------- ----- --
Chloride	17.4	.1	mg/l	EPA 325.3	03-29-1993 13:05 LM
Conductivity	3280	2	umhos/cm	EPA 120.1	04-01-1993 10:00 LS
Hardness, Total	736	1	mg/l $CaCO_3$	---------	03-31-1993 08:50 ED
Iron	0.23	.02	mg/l	EPA 236.1	03-31-1993 13:40 ED
Iron, Dissolved	0.22	.02	mg/l	EPA 236.1	03-31-1993 13:40 ED
Magnesium	93.00	.01	mg/l	EPA 242.1	03-31-1993 08:50 ED
Manganese	0.10	.01	mg/l	EPA 243.1	03-31-1993 13:40 ED
Oil & Grease	0.0	1	mg/l	EPA 413.1	03-30-1993 08:00 LM
Oxygen, Dissolved	8.8	.01	mg/l	EPA 360.1	03-24-1993 11:00 LS
pH	8.10	----	Units	EPA 150.1	03-24-1993 11:00 LS
Potassium	6.50	.01	mg/l	EPA 258.1	03-31-1993 08:50 ED
Sodium	39.20	.01	mg/l	EPA 273.1	03-31-1993 08:50 ED
Solids, Total Dissolved	2109.0	.5	mg/l	EPA 160.1	03-29-1993 10:00 LM
Solids, Total Suspended	4.0	.5	mg/l	EPA 160.2	03-29-1993 10:00 LM
Sulfate	250.0	.1	mg/l	EPA 375.4	03-30-1993 08:30 LS
Turbidity	1.1	.1	NTU	EPA 180.1	03-24-1993 11:30 LS
Cation/Anion Balance	-2.31	----	%	---------	---------- ----- --

RECEIVED
4/6/93

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

June 11, 1993

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

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/KH

Date sampled May 19, 1993

Date received May 19, 1993

Grimes Wash Run-Off Below Mine GW03
Temperature 47.9°F FLOW 1000 GPM EST.
Rec'd 1330 hr.
Sampled 1040 hr.

FIELD MEASUREMENTS

pH	8.61
Conductivity	643
DO	9.1

Analysis report no. 59-13090

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	05-26-1993 13:00 LS
Alkalinity, Bicarbonate	325	2	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Alkalinity, Total	267	2	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Anions	8.64	----	meq/l	---------	---------- ----- --
Calcium	95.8	.03	mg/l	EPA 215.1	06-01-1993 14:45 ED
Cations	8.50	----	meq/l	---------	---------- ----- --
Chloride	32.7	.5	mg/l	EPA 325.3	05-24-1993 07:45 LM
Conductivity	590	0.2	umhos/cm	EPA 120.1	06-02-1993 14:00 LS
Hardness, Total	364	.03	mg/l $CaCO_3$	---------	06-01-1993 14:45 ED
Iron	2.04	.05	mg/l	EPA 236.1	06-01-1993 16:55 ED
Iron, Dissolved	0.18	.05	mg/l	EPA 236.1	06-01-1993 16:55 ED
Magnesium	30.40	.007	mg/l	EPA 242.1	06-01-1993 15:30 ED
Manganese	0.09	.03	mg/l	EPA 243.1	06-01-1993 15:55 ED
Oil & Grease	0.3	1	mg/l	EPA 413.1	06-10-1993 14:00 LM
Oxygen, Dissolved	8.1	.01	mg/l	EPA 360.1	05-19-1993 13:00 LS
pH	7.90	----	Units	EPA 150.1	05-19-1993 13:00 LS
Potassium	2.10	.1	mg/l	EPA 258.1	06-02-1993 09:50 ED
Sodium	27.10	.2	mg/l	EPA 273.1	06-02-1993 09:20 ED
Solids, Settleable	0.7	.5	mg/l	EPA 160.5	05-20-1993 07:30 LM
Solids, Total Dissolved	444.0	14	mg/l	EPA 160.1	05-26-1993 07:45 LM
Solids, Total Suspended	280.0	7	mg/l	EPA 160.2	05-28-1993 07:45 LM
Sulfate	120.0	1	mg/l	EPA 375.4	06-02-1993 09:45 LS
Turbidity	65.0	.1	NTU	EPA 180.1	05-20-1993 08:00 LS
Cation/Anion Balance	-0.77		%		

RECEIVED
6/11/93

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 (Societe Generale de Surveillance)

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

October 21, 1993

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

RECEIVED
10/21/93
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Grimes Washon

Sample taken by Energy West/CS

Date sampled September 13, 1993

Date received September 13, 1993

Sample identification by PACIFICORP FIELD OFFICE

Grimes Wash Run-Off GWRO3
Temperature 55.8°F
Flow 25 GPM
Rec'd 1500 hr.
Sampled 1300 hr.

FIELD MEASUREMENTS

pH	8.26
Conductivity	1400
DO	5.2

NOTE Holding time expired when sulfate was run.

Analysis report no. 59-13521

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	0	1	mg/l	$CaCO_3$	EPA 305.1	09-13-1993 1730	LS
Alkalinity, Bicarbonate	362	2	mg/l	$CaCO_3$	EPA 310.1	10-16-1993 0915	LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	09-13-1993 1730	LS
Alkalinity, Total	297	2	mg/l	$CaCO_3$	EPA 310.1	10-16-1993 0915	LS
Anions	20.09	----	meq/l		---------	---------- -----	--
Calcium	163.0	.03	mg/l		EPA 215.1	10-12-1993 1330	ED
Cations	16.49	----	meq/l		---------	---------- -----	--
Chloride	103.7	.5	mg/l		EPA 325.3	10-01-1993 0700	LM
Conductivity	1549.00	0.2	umhos/cm		EPA 120.1	09-14-1993 1215	LS
Hardness, Total	687.0	.03	mg/l	$CaCO_3$	---------	10-12-1993 1330	ED
Iron	0.23	.05	mg/l		EPA 236.1	10-12-1993 1700	ED
Iron, Dissolved	<0.05	.05	mg/l		EPA 236.1	10-19-1993 1220	ED
Magnesium	68.00	.007	mg/l		EPA 242.1	10-18-1993 1405	ED
Manganese	0.06	.03	mg/l		EPA 243.1	10-12-1993 1730	ED
Oil & Grease	<1	1	mg/l		EPA 413.1	09-21-1993 1100	LM
Oxygen, Dissolved	8.61	.01	mg/l		EPA 360.1	09-13-1993 1745	ED
pH	8.39	----	Units		EPA 150.1	09-13-1993 1730	ED
Potassium	7.0	.1	mg/l		EPA 258.1	10-13-1993 1250	ED
Sodium	60.0	.2	mg/l		EPA 273.1	10-18-1993 1650	ED
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	09-14-1993 1100	LM
Solids, Total Dissolved	994	14	mg/l		EPA 160.1	09-20-1993 0900	LM
Solids, Total Suspended	2	7	mg/l		EPA 160.2	09-20-1993 0745	LM
Sulfate	370	1	mg/l		EPA 375.4	10-21-1993 1030	LS
Turbidity	1.4	.1	NTU		EPA 180.1	09-14-1993 1300	LS
Cation/Anion Balance	-9.84		%				

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

December 28, 1993

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

RECEIVED
12/29/93
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/KH

Date sampled December 13, 1993

Date received December 13, 1993

Grimes Wash Run-Off GWRO3

Temperature 53.8°F
Flow 600 GPM
Rec'd 1545 hr.
Sampled 1235 hr.

FIELD MEASUREMENTS

pH	8.47
Conductivity	1040
DO	10.3

Note: Amended Alkalinity, Carbonate

Analysis report no. 59-13779

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Acidity	<10	1	mg/l	$CaCO_3$	2310 B	12-15-1993 0955
Alkalinity, Bicarbonate	249	1	mg/l	$CaCO_3$	4500 CO_2D	12-17-1993 1143 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	4500 CO_2D	12-17-1993 1143 LS
Alkalinity, Total	249	1	mg/l	$CaCO_3$	EPA 310.1	12-17-1993 1143 LS
Anions	11.10	----	meq/l		---------	---------- ----- --
Calcium	108.0	1	mg/l		EPA 215.1	12-20-1993 1600 DW
Cations	12.40	----	meq/l		---------	---------- ----- --
Chloride	31.0	1	mg/l		EPA 325.3	12-22-1993 1255 ED
Conductivity	1140.00	0.2	umhos/cm		EPA 120.1	12-16-1993 1035 ED
Hardness, Total	525.0	1	mg/l	$CaCO_3$	2340 B	- -
Iron	5.10	0.2	mg/l		EPA 236.1	12-21-1993 1430 DW
Iron, Dissolved	<0.20	0.2	mg/l		EPA 236.1	12-21-1993 1200 DW
Magnesium	62.00	1	mg/l		EPA 242.1	12-22-1993 0830 DW
Manganese	<0.10	0.1	mg/l		EPA 243.1	12-21-1993 1030 DW
Oil & Grease	<5	5	mg/l		EPA 413.1	12-22-1993 0900 LM
Oxygen, Dissolved	8.23	.01	mg/l		EPA 360.1	12-13-1993 1550 LS
pH	7.97	----	Units		EPA 150.1	12-13-1993 1600 LS
Potassium	10.0	2	mg/l		EPA 258.1	12-20-1993 1030 DW
Sodium	44.0	1	mg/l		EPA 273.1	12-21-1993 1530 DW
Solids, Settleable	<0.5	.5	mg/l		EPA 160.5	12-14-1993 0745 LM
Solids, Total Dissolved	768	10	mg/l		EPA 160.1	12-15-1993 1500 LM
Solids, Total Suspended	28	4	mg/l		EPA 160.2	12-16-1993 1430 LM
Sulfate	250	1	mg/l		EPA 375.4	12-16-1993 1345 LS
Cation/Anion Balance	5.7	----	%		---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory