Appendix 7-M
Spring and Seep Inventory
Federal Lease Area

1Spring and Seep Inventory
Co-Op Bear Canyon Mine Federal Leases

General

A total of ~~five~~ seven Federal Leases are held by Co-Op Mining Company (U-024316, U-024318, U-46484, U-38727, and U-020668, U-91048, U-61049; see Plate 2 ~~1~~-1). ~~Four~~ Six of the leases are within, or partially within the boundaries of the Manti-Lasal National Forest (U-024316, U-46484, U-38727, U-020668, U-61048, and U-91049). Federal Lease U-024318 exists to the South and West of the existing permit area. Federal leases U-024316 and U-46484 are located in and around the McCadden Hollow area (T.16S., R.7E.). U-38727 and U-020668 include the area surrounding Wild Horse Ridge (T.16S., R.7E. & R.8E.). Federal Leases U-61048 and U-61049 are located in and around the Mohrland area (T.16S, R7E & R8E). A survey was conducted on Lease area U-024316 and U-024318 in 1990, and on all of the lease areas in 1991 and 1992, for springs, seeps and other occurrences of water. A survey was conducted on leases U-61048 and U-61049 in 1994, 1995, and 1997. The purpose of the inventories was to establish locations of seeps and springs within the actual lease area as well as a one-quarter mile periphery area, which could feasibly be impacted through future subsidence. The inventory was designed to not only locate, but to establish baseline data relative to both quantitative and qualitative parameters of each site where springs were observed which had greater than 2 gpm. The survey area is defined in Figure 7M-1 (1990 survey) and 7M-2 (1991 survey).

Methodology

On June 18, 1990, and July 28, 1991, an aerial survey reconnaissance of the permit area was conducted by 3 staff members from Environmental Industrial Systems (E.I.S.). The purpose of the reconnaissance was to locate evidence of the surface water through actual observation as well as suspect areas of moisture, which would be indicated by a lushness of vegetation and/or indicator species such as willow or cottonwood trees. An aerial survey was beneficial also in establishing a plan for the ground search of the area due to the extreme roughness of the terrain and limited access by any means other than foot.

With the information secured from the aerial survey, the U.S.F.S. was contacted and a search of their files was conducted to locate all existing water rights within the survey area. All water rights in the area are shown in Table 7.2-1. Locations are shown on Plate 7-4. The location of all existing water rights were correlated against the observations from the aerial survey. The water rights, which fell within the area of potential influence, were then confirmed with actual ground sightings. The results of the ground observations are recorded in Table 7M-1 (1990) and 7M-2 (1991).

The final phase was to conduct a ground survey of the entire area of potential influence. The method involved a 100-pct survey of all areas, which could theoretically be impacted through mining activities; then to walk all areas within the area of influence at approx 200 ft intervals (where accessible) with particular emphasis on all draws end drainage areas. This was accomplished by utilizing a four to six man team. Access to the ridge was gained by the road up Cedar Creek from Mohrland, then across Gentry Mt. to the Lease areas, then along jeep trails down the main ridges. Three to five men would be let out along the ridge, then contour search the side hills and canyon bottoms to the lower road where they would be picked up. Due to extreme roughness of the terrain and the time involved in transport, a normal working day was limited to approximately 6 hrs. Each man carried with him 2 sets of sample bottles, a thermometer, Ph and Conductivity meters, and the means to determine flow through time-volume measurements. When a spring or seep was observed, its location was plotted on a map. If there was flow, it was measured as to volume, temperature, Ph and conductivity.

In October 1992, a search was conducted using the information from the previous surveys to verify and sample the previous sites as well as to locate any new springs and/or seeps. No new springs were located in 1992.

Conclusions and Results

1990

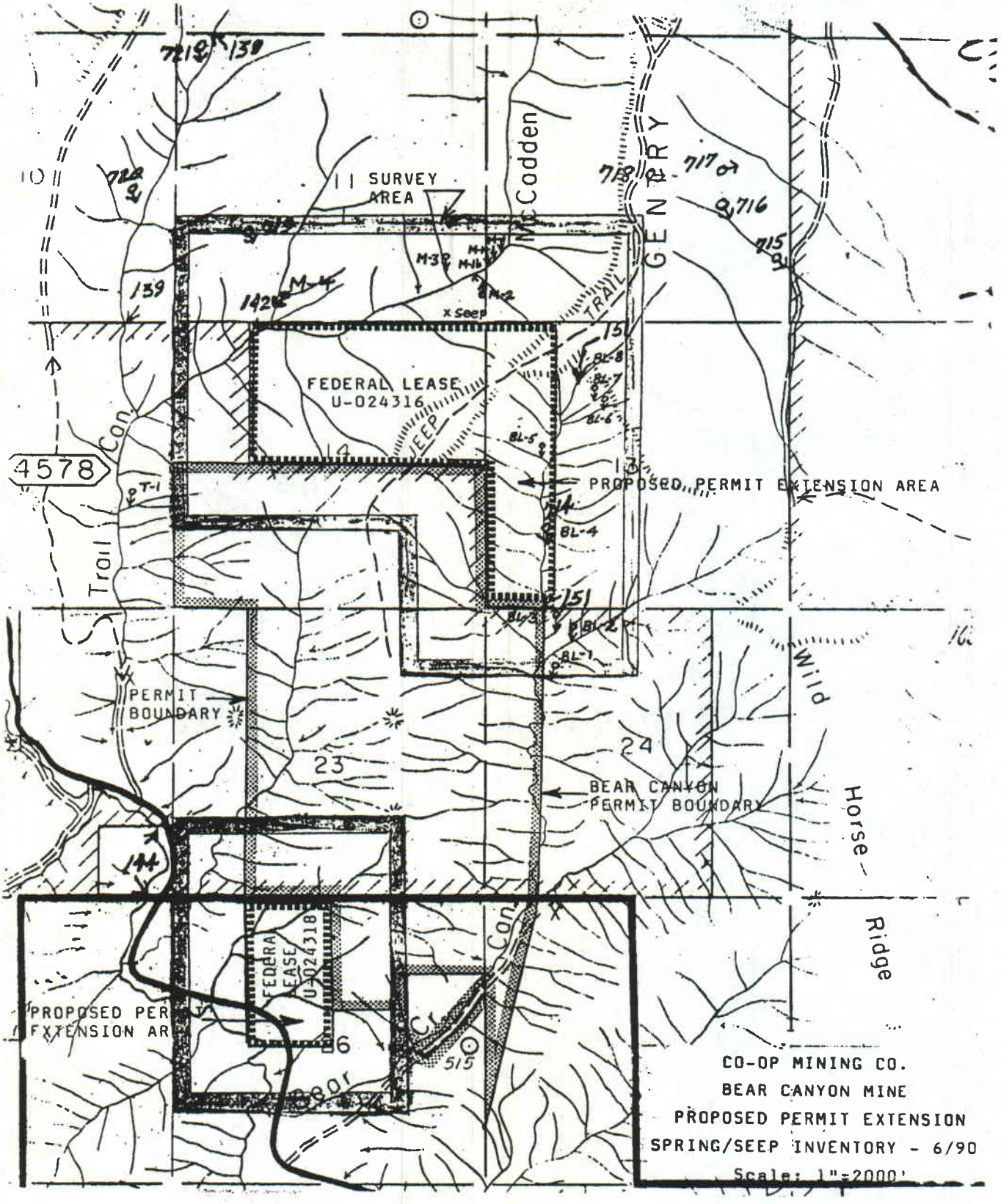
In 1990, springs and/or seeps were located in and around the Lease areas within the mining area of influence. There were a total of 14 seeps and/or springs that were located; none of these had sufficient flow to collect qualitative samples. The flow from 9 of the sampled springs was less than 0.5 gpm. Only 1 site had in excess of 2 gpm. These are labeled in Figure 7M-1 as BL-8 (FBC-12 on Plate 7-4). BL-8 (SBC-12) is the source for the water associated with Water Right #93-151, belonging to the U.S. Forest Service, with a flow of 2 gpm. This spring is located at the outer edge of the area of potential influence and is the only source, which has a well-defined outfall and established riparian zone. It is believed to be a permanent year-round source of water. M-4 (FBC-2) had a flow of 0.25 gpm at the source but then diminished to 0 gpm within approx 200 ft of channel. The absence of a well-defined riparian zone leads to the assumption that this spring is of an intermittent nature and is most likely dry during the fall of the year. Subsequent years have revealed no flow at this location.

All of the remaining springs and seeps had a very small area of influence with virtually no surface flow beyond 10 ft to 15 ft and no defined riparian zones other than a minor lushness of vegetation in the immediate area of influence. There was no riparian based vegetation but simply a lushness of vegetation which was indigenous to the surrounding area. Table 7M-1 lists each spring and seep with flow.

Table 7M-1. 1990 Survey

BL-1	Spring	0.3 gpm	
BL-2	Spring	0.5 gpm	
BL-3	Seep	No Flow	
BL-3a	Associated Seep	No Flow	
BL-4	Spring	0.5 gpm	
BL-5	Spring	0.5 gpm	
BL-6 (FBC-12)	Spring	0.5 gpm	
BL-7	Spring	0.5 gpm	
BL-8 (16-7-13-1)	Spring	2+ gpm	Main Source
M-1a			
M-1b	Intermittant in main drainage		
M-1c			
M-2	Spring	0.5 gpm	
M-3 (FBC-4)	Spring	0.25 gpm	
M-4 (SMH-1)	Spring	0.25 gpm	
T-1 (FBC-10)	Seep	0.1 gpm	Puddled

Figure 7M-1. 1990 Survey



11991

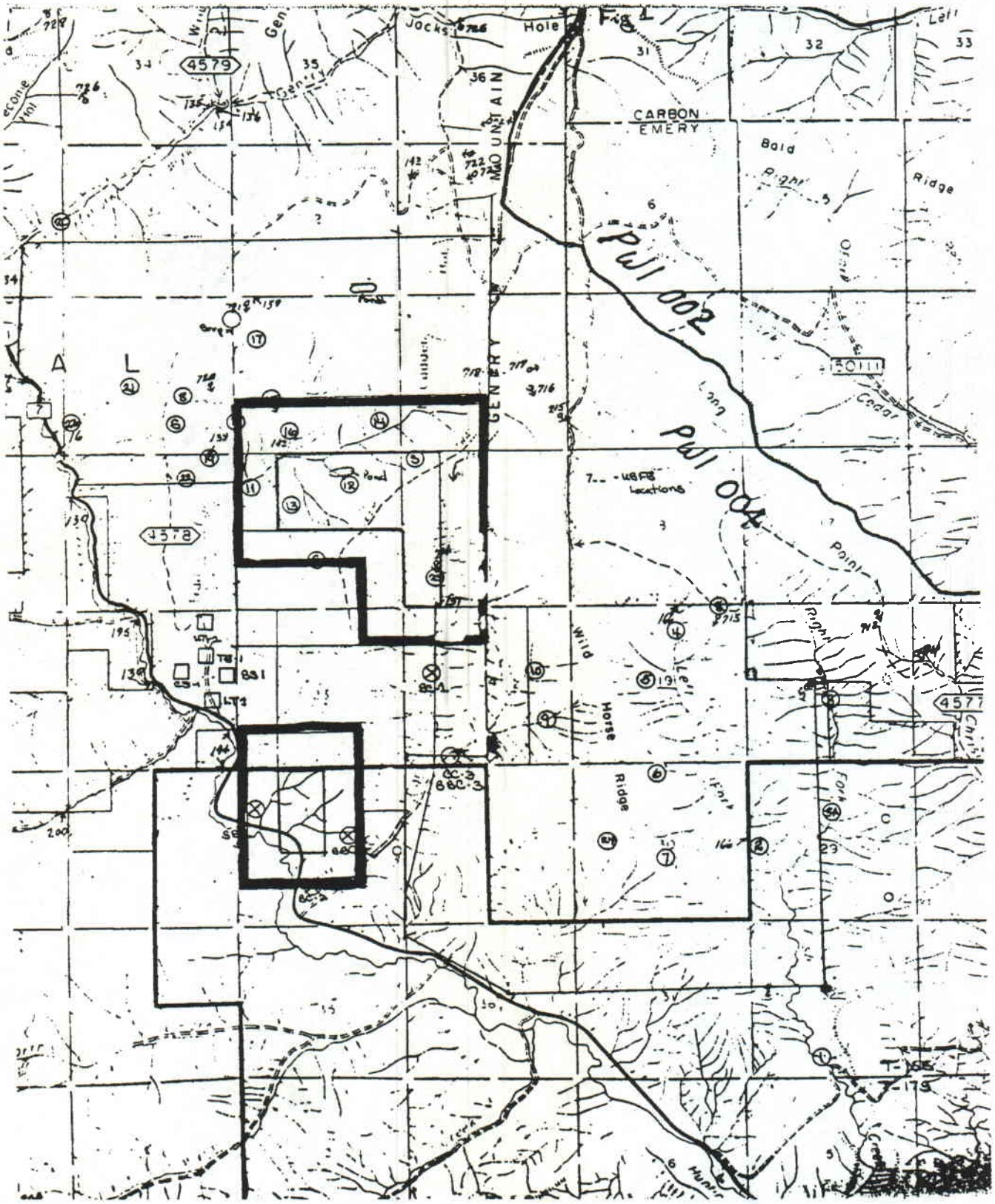
In July 1991, springs and/or seeps were also located in and around the Lease areas within the mining area of influence. There were a total of 25 seeps and/or springs that were located; 24 of these had sufficient flow to collect qualitative samples. ~~Although Co-Op has preserved the qualitative data electronically, the lab sheets for the samples cannot be found and are not available. The electronic data has been included in Attachment A for informational purposes.~~ The data has been included in Attachment B. The flow from 1 of the sampled springs was less than .5 gpm. The balance of the sites had in excess of 1 gpm. A brief description of each site and field data is shown in Table 7M-2.

1

1Table 7M-2. 1991 Survey

1ID#	Description	Flow	pH	Cond.		Date
#1 (WHR-1)	Fish Creek	120	7.9	800		7/30/91
#2 (FC-1)	L.F. Fish Creek	2.5	7.6	500		7/31/91
#3 (RF-1)	Rt. F. Fish Creek	80	7.6	500		7/31/91
#4 (WHR-3)	Head of L.F. Fish Creek	20	8.3	1050		7/30/91
#5 (SBC-16)	West Side Fish Creek L.F.		31	8.2	600	7/30/91
#6 (WHR-7)	West Side Fish Creek L.F.		40	8.2	450	7/30/91
#7 (WHR-8)	East Side Wild Horse Ridge	5	8.1	500		7/31/91
#8 (WHR-2)	East Side Fish Creek L.F.	10	8	500		7/31/91
#9 (SBC-14)	R.F., R.F. Bear Canyon	4.7	8.1	510		8/08/91
#10 (SBC-15)	L.F., R.F. Bear Canyon	<.2	8	1450		7/31/91
#11 (MH-1)	McCadden Hallow Creek	1.5	7.9	800		7/31/91
#12 (FBC-2)	McCadden Hallow Below Fence	12	8.05	550		8/01/91
#13 (FBC-3)	South Side McCadden Hallow	1.5	8	450		8/01/91
#14 (SMH-4)	McCadden Hallow Above Fence	8.7	7.5	500		8/01/91
#15 (SMH-2)	L.F. McCadden Hallow Through	8.5	8	550		8/02/91
#16 (SMH-1)	L.F. McCadden Hallow	9.8	8.4	500		8/02/91
#17 (FBC-7)	Trail Canyon Through	2.1	8.2	700		7/30/91
#18 (FBC-8)	West Side Trail Canyon	5	7.6	450		8/07/91
#19 (FBC-9)	East Side Trail Canyon	22.4	7.6	480		8/07/91
#20	Tie Fork Creek	120	8	500		8/08/91
#21 (FBC-11)	East Side Huntington Canyon	15	8.4	300		8/08/91
#22 (FBC-10)	Trail Canyon	9	7.8	450		8/07/91
#23	Huntington Creek Seepage	2.4	7.8	2000		8/08/91
#24 (WHR-9)	Wild Horse Trough	4	8.1	450		8/08/91
#25 (SBC-12)	Head Bear Creek	7.8	8.2	2000		8/08/91

Figure 7M-2. 1991 Survey



1992

In September of 1992, a meeting with Dennis Kelley of the U.S. Forest Service was held and the 1991 survey was reviewed. A monitoring matrix was discussed and prematurely agreed upon which Co-Op could propose for the Lease areas. This matrix is discussed in the following sections. Baseline samples were taken in October 1992. Flow data from 1990, 1991 and 1992 for Lease U-024316 is shown in Table 7M-3.

Table 7M-3. Flow Data, U-024316

Spring	June, 1990	August, 1991	October, 1992
FBC-1	Dry	1.5 gpm	Dry
FBC-2	0.25 gpm	12 gpm	Dry
FBC-3	Dry	1.5 gpm	Dry
SMH-4 (FBC-4)	0.25 gpm	8.7 gpm	0.5 gpm
SMH-2 (FBC-5)	Dry	8.5 gpm	0.6 gpm
FBC-6A	Dry	*See Comment 1	1.1 gpm
SMH-1 (FBC-6)	Dry	9.8 gpm	1.5 gpm

NOTE:

1. FBC-6A flows into SMH-1. A total of 7 small springs were found in the area of SMH-1. It was recommended in 1992 by USFS that the largest spring be sampled separately (FBC-6A) to compare initial baseline data between FBC-6A and SMH-1. Subsequent to 1993, only SMH-1 has flowed.
2. Data obtained from Seep and Spring Inventories conducted in 1990 and 1991 by Mel Coonrod (EIS) and baseline samples taken in 1992 by Charles Reynolds (MEC).
3. Co-Op was unable to locate FBC-3, WHR-7, WHR-8 and WHR-9, likely due to insignificant flows.

Beginning with the October 1992, samples, two years of baseline data were collected through 1993 and 1994. An additional set was collected in 1997 during the permitting process of Lease U-024316. A final pre-mining set of data will be collected in 2000 for the Wild Horse Ridge Leases.

The follow sections describe the proposed matrices for each Federal Lease separately.

U-024316

The description of U-024316 includes ~~E½, NW¼~~ E1/2 NW1/4, NE1/4 sect. 14, W¼ sect. 13, T.16S., R.7E. The total area is 400 acres.

A total of four measurable seeps and springs were located in and around the lease area. These are MH-1, FBC-2, FBC-3, and FBC-12. FBC-2, FBC-3 and FBC-12 flow out of the North Horn formation. MH-1 was found in McCadden Hollow. FBC-2 and FBC-3 were dry or not found in subsequent years. MH-1, the McCadden Hollow Creek, is a stream which is fed from the springs above it. Since the springs are to be sampled, it is proposed to measure flow only for this site. Due to the small flow of FBC-3, sampling is not proposed at this site. FBC-12 is one of the source springs for Bear Creek, located within the slide area at the head of Bear Canyon. An additional source spring, labeled 16-7-13-1, was monitored by Intermountain Power Agency, and flows out of the Bear Canyon fault in the same area. This site is proposed to be monitored as SBC-12.

Table 7.1-8 summarizes the monitoring, which is proposed for U-024316.

Attachment 7M-A shows the baseline data from 1992 through 1997.

1**U-024318**

This lease includes the E¼ of the NW¼, Section 26, T.16 S., R.7 E. The total area of the lease is 80 acres. This lease area is outside of the Manti-Lasal National Forest boundaries.

The only spring near this lease is Birch Springs (SBC-5). Baseline monitoring of SBC-5 is shown in Table ~~7.1-9~~ 7-15. Possible impacts to Birch Springs are discussed in Appendix 7-J.

U-46484

This lease includes Section 10, except the SW¼SW¼, all of Section 11, and the W¼ of Section 12, T.16 S., R.7 E. The total area of the lease is 1,400 acres.

A total of nine measurable sites were located and sampled in and around U-46484. These are designated on Plate 7-4 as SMH-1, SMH-2, SMH-3, SMH-4, FBC-7, FBC-8, FBC-9, FBC-10 and FBC-11. The springs are primarily located within the North Horn and Price River formations.

SMH-2 and FBC-7 are troughs located in the McCadden Hollow and upper Trail Canyon areas, respectively. SMH-4 is a spring located above the fenceline in McCadden Hollow. SMH-3 is located on the ridge between McCadden Hollow and Trail Canyon. The source of SMH-1 initially came from a total of seven springs on the side slope of the left fork of McCadden Hollow. In a discussion with Dennis Kelley of the U.S. Forest Service, Co-Op was asked to monitor both the spring with the largest flow (FBC-6A) and the point where all seven flows come together (SMH-1) to compare baseline parameters. However, in 1993 and subsequent years, only SMH-1 has shown any flow and is currently monitored. FBC-8 and FBC-9 are springs located in the upper Trail Canyon area. FBC-10 is Trail Creek. FBC-11 is located in Huntington Canyon below Tie Fork Canyon. These four sites are isolated from the permit area by faults and will not be monitored until ~~this lease is added to the permit area.~~ three years prior to mining in this area

Baseline sampling began in October 1992. Attachment 7M-A contains the baseline data and will be updated as new baseline samples are taken.

This lease includes:

T.16 S., R.7 E.:	
Section 24	~~SE¼NE¼, E½SE¼~~ E1/4
Section 25	W½NE¼, NE¼NE¼, W½SE¼, SE¼SE¼, SW¼NW¼, NW¼SW¼
T.16 S., R.8 E.:	
Section 19	S½NW¼, SW¼, SW¼SE¼

The total area of this lease is ~~720~~ 740 acres.

A total of five seeps, springs or streams were located in and around this lease area. They are WHR-2, WHR-3, SBC-14, SBC-15 and SBC-16. WHR-3 is the head of Fish Creek Left Fork. WHR-2 and SBC-16 are springs near the head of Fish Creek Left Fork. SBC-15 is found in the left fork of Bear Canyon Right Fork. SBC-14 is found in the right fork of Bear Canyon Right Fork. WHR-2, WHR-3 and SBC-16 all originate from the North Horn formation. SBC-16 originates in a watering pond on Wild Horse Ridge.

Attachment 7M-A contains the baseline data and will be updated as new baseline samples are taken.

U-020668

This lease includes:

T.16 S., R.7 E.:	
Section 25	SE¼NE¼, NE¼SE¼
T.16 S., R.8 E.:	
Section 30	W½, W½NE¼, NW¼SE¼
Section 31	NE¼NW¼, NW¼NE¼

The total area of this lease is 600 acres.

A total of four seeps, springs or streams were initially mapped in and around this Lease area. They are designated on Plate 7-4 as WHR-1, WHR-7, WHR-8 and WHR-9. WHR-1 is the left fork of Fish Creek. Intermountain Power Agency also collected baseline information on two additional samples, FC-1 and RF-1. Although WHR-7, WHR-8 and WHR-9 were identified in 1991, these sites could not be found in subsequent years, likely due to the lack of flow. SBC-16 is a watering pond on Wild Horse Ridge which receives minimal use (verbal communication with U.S. Forest Service). Since the left fork of Fish Creek is monitored at LF-1, WHR-1 will not be. RF-1, the right fork of Fish Creek, is isolated from the permit area and will also not be monitored.

Attachment 7M-A contains the baseline data and will be updated as new baseline samples are taken.

U-61048

This lease includes

T165,,R.7E,:

Section 1	E1/2, SE1/4, SE1/4 NE1/4, S1/2 NE1/4, NE1/4
Section 12	E1/2 NE1/4

T.165, R.8E

Section 6	S1/2 NW1/4, S1/2 SE1/4, NW1/4 SE1/4, SW1/4
Section 7	NW1/4, S1/2 NE1/4, NW1/4, NE1/4, SE1/4
Section 8	SW1/4, SW1/4

Area=1100 Arches

A total of 4 seeps or spring are located in and around the lease area. They are SCC-2, SCC-5, SCC-6, and SCC-7. All sites originate in the North Horn formation. SCC-2 and SCC-5 are in Chris Otteson Hollow. SCC-6 and SCC-7 are at the head of Cedar Creek.

U-61049

This lease includes

T165, R7E,:

Section 1	W1/2 SE1/4, SW1/4 NE1/4, S1/2 NW1/4, NE1/4
Section 12	W1/2 NE1/4, E1/2 W1/2, SE1/4
Section 13	E1/2, E1/2, W1/2

T165, R8E,:

Section 7	SW1/2
Section 18	All
Section 19	S1/2 NE1/4, N1/2 SE1/4
Section 20	S1/2 NW1/4, N1/2 SW1/4

Area= 2200 Achres

A total of 3Wells and 14 seeps and springs are located in and around this lease area. They are MW-14, MW-16, MW-17, SCC-1, SCC-2, SBC-15, SBC-16, SBC-17, SBC-18, SBC-19, 16-8-18-1, 16-8-18-2, 16-8-18-4, 16-8-18-10, SBC-12, 16-7-13-1, 16-8-7-3. All sites are located in the North Horn except 16-7-13-1 which is located in the Price River Formation, and SBC-17 which is located in the Black Hawk Formation. MW-114 is on Wild Horse Ridge. MW-116 is between Wild Horse Ridge and Long Point. MW-117 is in McCadden Hollow. SCC-1 and SCC-2 are at Long point. SBC-18 and SBC-19 are above Fish Creek. SBC-15, SBC-16, and SBC-17 are on Wild Horse Ridge. 16-8-18-1, 16-8-18-2, 16-8-18-4, and 16-8-18-10 are above Wild Horse Ridge. SBC-12 and 16-7-13-1 are at the head of Bear Canyon. 16-8-7-3 is above Cedar Creek.

Attachment 7M-A

Surface and Groundwater Water Quality Baseline Information

WATER MONITORING REPORT

Property: Co-op
Station: FBC-1 (MH-1)
Location: McCadden Hollow Drainage
Type: Stream

Field Measurements	Date Sampled 07/31/91	10/04/92	03/22/93	06/21/93	08/29/93	10/15/93	03/30/94	06/16/94	08/30/94	10/31/94	06/29/97	09/11/97	10/15/97
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op
Flow (gpm)	1.5	Dry	Inaccess	120	48	37	Inaccess	0.7	Dry	Dry		75	40
pH	7.9	N/A	N/A	7.94	7.75	7.45	N/A	8.52	N/A	N/A	8.53	8.58	8.29
Sp. Cond. (ohms)	800	N/A	N/A	364	435	695	N/A	484	N/A	N/A	565	393	552
Temp (C)	N/R	N/A	N/A	14.3	12.4	3.6	N/A	14.2	N/A	N/A	17.8	13.3	7.5
Dissolved Oxygen	N/R	N/A	N/A	6	5.4	4.9	N/A	5.5	N/A	N/A	7.5		9.6
Lab Measurements													
Analyzed by:	IML	N/A	N/A	CT&E	CT&E	CT&E	N/A	CT&E	N/A	N/A	CT&E	CT&E	CT&E
TDS (mg/L)	468			259	246	286		276			240	260	320
Hardness (CaCO3)	445			203	241	293		235			188	205	286
Aluminum (Al)	0.2			N/D	1	N/D		N/D			N/D	N/D	N/D
Arsenic (As)	N/D			N/D	N/D	N/D		N/D			N/D	N/D	N/D
Boron (B)	N/D			0.05	N/D	0.1		0.1			0.1	0.1	0.2
Carbonate (CO3)	N/D			N/D	N/D	N/D		N/D			N/D	N/D	N/D
Bicarbonate (HCO3)	464			209	253	313		294			233	269	371
Cadmium (Cd)	N/D			N/D	N/D	N/D		N/D			N/D	N/D	N/D
Calcium (Ca)	85.9			46.9	52	68		48			39	46	60
Chloride (Cl)	15.3			4.3	3.2	10		4			4	5	9
Copper (Cu)	N/D			0.06	N/D	N/D		N/D			N/D	N/D	N/D
Iron (Fe) Total	0.44			0.57	0.79	0.27		1.6			1	1.6	N/D
Iron (Fe) Dissolved	N/D			N/D	N/D	N/D		N/D			N/D	N/D	N/D
Lead (Pb)	N/D			N/D	N/D	N/D		N/D			N/D	N/D	N/D
Magnesium (Mg)	56.1			20.9	27	30		28			22	22	33
Manganese (Mn) Tot.	0.15			N/D	0.03	N/D		N/D			N/D	N/D	N/D
Manganese (Mn) Dis.	N/D			N/D	N/D	N/D		N/D			N/D	N/D	N/D
Molybdenum (Mo)	N/D			N/D	N/D	0.2		N/D			N/D	N/D	N/D
Nitrogen (NH3)	0.07			N/D	N/D	N/D		N/D			N/D	N/D	N/D
Nitrite (NO2)	N/D			0.04	0.01	N/D		0.01			N/D	N/D	N/D
Nitrate (NO3)	N/D			0.01	0.1	0.27		0.1			N/D	N/D	N/D
Potassium (K)	1.53			2.3	1.2	N/D		N/D			N/D	N/D	1
Phosphate (PO4)	N/D			0.04	0.051	0.007		0.02			0.05	0.01	N/D
Selenium (Se)	N/D			0.004	N/D	N/D		N/D			N/D	N/D	N/D
Sodium (Na)	13.8			3	4	N/D		7			4	4	6
Sp. Conductivity											385	573	575.00
Sulfate (SO4)	72.8			10	10	15		31			11	15	23
Zinc (Z)	N/D			N/D	0.01	N/D		N/D			N/D	N/D	N/D
Anions	9.56			3.68	4.35	5.6		5.6			4.2	4.9	6.8
Cations	9.54			4.25	5.02	5.9		5			3.9	4.3	6
Anion/Cation Balance	0.12%			7.24%	7.15%	2.20%		-5.40%			-2.80%	6.40%	-6.40%

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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

July 20, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 21, 1993

Date received June 22, 1993

FBC-1 (mH-1)
Rec'd 0900 hr.
Sampled 1601 hr.

NOTE: Fluoride not distilled.

Analysis report no. 59-13207

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	209	2	mg/l HCO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Carbonate	0	1	mg/l CO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Total	172	2	mg/l $CaCO_3$	EPA 310.1	06-29-1993 15:00 LS
Aluminum	<1.00	1	mg/l	EPA 202.1	07-16-1993 13:35 ED
Anions	3.68	----	meq/l	---------	---------- ----- --
Arsenic	<0.003	.003	mg/l	EPA 206.2	07-07-1993 09:50 ED
Barium	<0.20	.2	mg/l	EPA 208.1	07-16-1993 16:10 ED
Boron	0.05	.04	mg/l	EPA 212.3	06-28-1993 14:00 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	07-08-1993 14:35 ED
Calcium	46.9	.03	mg/l	EPA 215.1	07-14-1993 11:05 ED
Cations	4.25	----	meq/l	---------	---------- ----- --
Chloride	4.3	.5	mg/l	EPA 325.3	06-29-1993 08:30 LM
Chromium	0.0034	.0003	mg/l	EPA 218.2	07-02-1993 10:50 ED
Copper	0.060	.03	mg/l	EPA 220.1	07-15-1993 16:25 ED
Fluoride	0.12	.02	mg/l	EPA 340.2	07-06-1993 13:00 LS
Hardness, Total	203	.03	mg/l $CaCO_3$	---------	07-14-1993 11:05 ED
Iron	0.57	.05	mg/l	EPA 236.1	06-29-1993 12:00 ED
Iron, Dissolved	0.09	.05	mg/l	EPA 236.1	07-01-1993 11:00 ED
Lead	<0.003	.003	mg/l	EPA 239.2	07-07-1993 13:45 ED
Magnesium	20.90	.007	mg/l	EPA 242.1	07-14-1993 16:20 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-29-1993 13:15 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	07-09-1993 14:50 ED
Molybdenum	<0.20	.2	mg/l	EPA 246.1	07-16-1993 14:35 ED
Nickel	<0.08	.08	mg/l	EPA 249.1	07-16-1993 10:50 ED

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

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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

July 20, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 21, 1993

Date received June 22, 1993

FBC-1 (MH-1)
Rec'd 0900 hr.
Sampled 1601 hr.

NOTE: Fluoride not distilled.

Analysis report no. 59-13207

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	07-06-1993 08:00 LS
Nitrogen, Nitrate	0.01	.01	mg/l	EPA 353.3	06-22-1993 10:00 LM
Nitrogen, Nitrite	0.04	.02	mg/l	EPA 354.1	06-22-1993 11:00 LM
Oil & Grease	0.4	1	mg/l	EPA 413.1	07-01-1993 08:00 LM
Phosphorus, Total	0.04	.008	mg/l	EPA 365.2	07-06-1993 14:00 ED
Potassium	2.30	.1	mg/l	EPA 258.1	07-13-1993 18:15 ED
Selenium	0.004	.004	mg/l	EPA 270.2	07-06-1993 12:30 ED
Sodium	3.00	.2	mg/l	EPA 273.1	07-13-1993 16:25 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	06-22-1993 11:30 LM
Solids, Total Dissolved	259.0	14	mg/l	EPA 160.1	06-24-1993 10:00 LM
Solids, Total Suspended	13.0	7	mg/l	EPA 160.2	06-25-1993 14:30 LM
Sulfate	10.0	1	mg/l	EPA 375.4	07-06-1993 10:00 LS
Sulfide	<0.10	.9	mg/l	EPA 376.1	06-28-1993 15:25 ED
Zinc	<0.03	.03	mg/l	EPA 289.1	07-15-1993 16:00 ED
Cation/Anion Balance	7.24	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:FBC-1 (MH-1)

Kind of sample reported to us: Water

Rec'd 1100 hr.
Sampled 1352 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 29, 1993

NOTE: FLUORIDE NOT DISTILLED.

Date received: August 30, 1993

Analysis report no. 59-13470

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	253	2	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220 LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220 LS
Alkalinity, Total	208	2	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220 ED
Aluminum	1	.05	mg/l		EPA 200.7	09-15-1993 1616 SE
Anions	4.35	----	meq/l		---------	----------
Arsenic	<0.002	.002	mg/l		EPA 206.2	09-21-1993 1015 SM
Barium	0.1	.005	mg/l		EPA 200.7	09-15-1993 1616 SE
Boron	<0.01	.01	mg/l		EPA 200.7	09-16-1993 0130 SE
Cadmium	<0.0050	.005	mg/l		EPA 200.7	09-15-1993 1616 SE
Calcium	52.0	.1	mg/l		EPA 200.7	09-15-1993 1616 SE
Cations	5.02	----	meq/l		---------	----------
Chloride	3.2	.5	mg/l		EPA 325.3	09-07-1993 1300 LM
Chromium	<0.0	.005	mg/l		EPA 200.7	09-15-1993 1616 SE
Copper	<0.01	.005	mg/l		EPA 200.7	09-15-1993 1616 SE
Fluoride	0.28	.02	mg/l		EPA 340.2	09-13-1993 1400 LS
Hardness, Total	241.0	.03	mg/l	$CaCO_3$	---------	09-15-1993 1616 SE
Iron	0.79	.01	mg/l		EPA 200.7	09-15-1993 1616 SE
Lead	<0.050	.05	mg/l		EPA 200.7	09-15-1993 1616 SE
Magnesium	27.00	.1	mg/l		EPA 200.7	09-15-1993 1616 SE
Manganese	0.03	.01	mg/l		EPA 200.7	09-15-1993 1616 SE
Mercury	<0.0040	.0002	mg/l		EPA 245.1	09-21-1993 1000 SM
Molybdenum	<0.1	.1	mg/l		EPA 200.7	09-15-1993 1616 SE
Nickel	0.07	.01	mg/l		EPA 200.7	09-15-1993 1616 SE
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	09-07-1993 0800 LS

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

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:FBC-1 (MH-1)

Kind of sample reported to us: Water

Rec'd 1100 hr.
Sampled 1352 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 29, 1993

NOTE: FLUORIDE NOT DISTILLED.

Date received: August 30, 1993

Analysis report no. 59-13470

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Nitrogen, Nitrate	0.10	.01	mg/l	EPA 353.3	08 30-1993 1145	LM
Nitrogen, Nitrite	0.01	.02	mg/l	EPA 354.1	08-31-1993 1000	LM
Oil & Grease	<1	1	mg/l	EPA 413.1	09-08-1993 1310	LM
Phosphorus, Total	0.051	.008	mg/l	EPA 365.2	09-15-1993 0720	LM
Potassium	1.2	.1	mg/l	EPA 200.7	09-15-1993 1616	SE
Selenium	<0.002	.002	mg/l	EPA 270.2	09-20-1993 1900	SM
Sodium	4.0	.1	mg/l	EPA 200.7	09-15-1993 1616	SE
Solids, Total Dissolved	246	14	mg/l	EPA 160.1	08-31-1993 1100	LM
Sulfate	10	1	mg/l	EPA 375.4	09-24-1993 0800	LS
Sulfide	<0.9	.1	mg/l	EPA 376.1	09-03-1993 1515	ED
Zinc	0.01	.005	mg/l	EPA 200.7	09-16-1993 1616	SE
Cation/Anion Balance	7.15	----	%	---------	----------	-----

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

December 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-1 (MW-1)

Kind of sample reported to us Water

Rec'd 1430 hr.
Sampled 1017 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Holding time expired when Chloride was run.

Date sampled October 15, 1993

Date received October 15, 1993

Analysis report no. 59-13634

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	313	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950 LS
Alkalinity, Total	257	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950 LS
Aluminum	<1	1	mg/l		EPA 202.1	10-28-1993 1630 ED
Anions	5.60	----	meq/l		---------	---------- ----- --
Arsenic	<0.010	.003	mg/l		EPA 206.2	11-23-1993 1115 DW
Boron	0.10	.04	mg/l		EPA 212.3	12-02-1993 1400 LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125 ED
Calcium	68.0	.03	mg/l		EPA 215.1	11-08-1993 1450 ED
Cations	5.90	----	meq/l		---------	---------- ----- --
Chloride	10.0	.5	mg/l		EPA 325.3	11-15-1993 1430 LM
Conductivity	499.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945 ED
Copper	<0.05	.03	mg/l		EPA 220.1	10-27-1993 1550 ED
Hardness, Total	293.0	.03	mg/l	$CaCO_3$	---------	11-08-1993 1450 ED
Iron	0.27	.05	mg/l		EPA 236.1	11-08-1993 1315 ED
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	11-24-1993 1200 DW
Lead	<0.400	.003	mg/l		EPA 239.2	11-05-1993 1000 ED
Magnesium	30.00	.007	mg/l		EPA 242.1	11-08-1993 1630 ED
Manganese	<0.03	.03	mg/l		EPA 243.1	11-08-1993 1100 ED
Manganese, Dissolved	0.1	.03	mg/l		EPA 243.1	11-29-1993 1500 DW
Molybdenum	0.2	.2	mg/l		EPA 246.1	10-29-1993 1105 ED
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000 LS
Nitrogen, Nitrate	0.27	.01	mg/l		EPA 353.3	10-18-1993 0745 LM
Nitrogen, Nitrite	0.00	.02	mg/l		EPA 354.1	10-15-1993 1500 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

December 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-1 (MH-1)

Kind of sample reported to us: Water

Rec'd 1430 hr.
Sampled 1017 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 15, 1993

Date received October 15, 1993

NOTE: Holding time expired when Chloride was run.

Analysis report no. 59-13634

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorus, Ortho	0.007	.003	mg/l	EPA 365.2	10-16-1993 0950	LM
Potassium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315	ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400	DW
Sodium	<10.0	.2	mg/l	EPA 273.1	11-09-1993 1135	ED
Solids, Total Dissolved	286	14	mg/l	EPA 160.1	10-19-1993 0815	LM
Sulfate	15	1	mg/l	EPA 375.4	11-11-1993 1020	LS
Zinc	<0.03	.03	mg/l	EPA 289.1	10-27-1993 1300	ED
Cation/Anion Balance	2.20	----	%	---------	---------- -----	--

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 11, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-1 (MH-1)

Rec'd 1620 hr.
Sampled 1315 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 16, 1994

Date received June 16, 1994

Analysis report no. 59-14162

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	294	1	mg/l as HCO_3	SM2320-B	06-22-1994 1415 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-22-1994 1415 LS
Alkalinity, Total	241	1	mg/l as $CaCO_3$	EPA 310.1	06-22-1994 1415 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-27-1994 1430 DW
Anions	5.60	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-08-1994 0930 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	07-06-1994 1045 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-27-1994 1400 DW
Calcium, Dissolved	48	1	mg/l	EPA 215.1	06-27-1994 1130 DW
Cations	5.00	----	meq/l	---------	---------- ----- --
Chloride	4	1	mg/l	SM4500-Cl-B	06-10-1994 1610 LS
Conductivity	471	1	umhos/cm	SM2510-B	06-17-1994 1255 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-27-1994 1300 DW
Hardness, Total	235	1	mg/l as $CaCO_3$	SM2340-B	06-27-1994 1130 DW
Iron, Total	1.6	0.2	mg/l	EPA 236.1	07-01-1994 0930 ED
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-27-1994 0730 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-28-1994 0730 DW
Magnesium, Dissolved	28	1	mg/l	EPA 242.1	06-27-1994 1200 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1994 0800 DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-27-1994 0830 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-27-1994 1600 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-17-1994 1000 ED
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l	EPA 353.3	06-29-1994 1300 LM
Nitrogen, Nitrite	0.01	0.01	mg/l	EPA 354.1	06-17-1994 1100 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hart

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 11, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-1 (MH-1)

Kind of sample reported to us Water

Rec'd 1620 hr.
Sampled 1315 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 16, 1994

Date received June 16, 1994

Analysis report no. 59-14162

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Oil & Grease	<5	5	mg/l	EPA 413.1	06-21-1994 1300 LM
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	06-17-1994 0910 LM
Potassium, Dissolved	<2	2	mg/l	EPA 258.1	06-27-1994 0900 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-08-1994 1300 DW
Sodium, Dissolved	7	1	mg/l	EPA 273.1	06-27-1994 0930 DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	06-17-1994 0750 LS
Solids, Total Dissolved	276	10	mg/l	EPA 160.1	06-22-1994 1035 LM
Solids, Total Suspended	92	4	mg/l	EPA 160.2	06-21-1994 1400 LM
Sulfate	31	1	mg/l	EPA 375.4	06-20-1994 1045 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-28-1994 0800 DW
Cation/Anion Balance	-5.40	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hart CD

Original Watermarked For Your Protection

TERMS AND CONDITIONS ON REVERSE

COMMERCIAL TESTING & ENGINEERING CO.

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

August 12, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-1 (MH-1)

Rec'd 1230 hr.
Sampled 1618 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 29, 1997

Date received: June 30, 1997

NOTE: DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17443

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	233	5	mg/l as HCO_3	SM2320-B	07-09-1997 0700 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	07-09-1997 0700 SC
Alkalinity, Total	191	5	mg/l as $CaCO_3$	EPA 310.1	07-09-1997 0700 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	08-05-1997 1315 MK
Anions	4.2	----	meq/l	---------	08-07-1997 1100 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	08-08-1997 1015 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	07-30-1997 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	08-05-1997 0845 MK
Calcium, Dissolved	39	1	mg/l	EPA 215.1	08-05-1997 1200 MK
Cations	3.9	----	meq/l	---------	08-07-1997 1100 RJ
Chloride	4	1	mg/l	SM4500-Cl-B	07-23-1997 0830 SC
Conductivity	385	1	umhos/cm	SM2510-B	07-22-1997 1230 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 220.1	08-05-1997 0800 MK
Hardness, Total	188	----	mg/l as $CaCO_3$	SM2340-B	08-07-1997 1100 RJ
Iron, Total	1.0	0.1	mg/l	EPA 236.1	08-05-1997 1000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	08-05-1997 1000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	08-05-1997 0915 MK
Magnesium, Dissolved	22	1	mg/l	EPA 242.1	08-05-1997 1230 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	08-05-1997 1030 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	08-05-1997 1030 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	08-05-1997 1430 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-22-1997 0720 RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	07-22-1997 0430 AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	07-01-1997 0800 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory RD

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • TEL: 708-953-9300 FAX: 708-953-9306

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PLEASE ADDRESS ALL CORRESPONDENCE TO
P.O BOX 1020, HUNTINGTON UT 84526
TEL (801) 653-2311
FAX: (801) 653-2436

August 12, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-1 (MH-1)

Rec'd 1230 hr.
Sampled 1618 hr.

Kind of sample Water
Reported to us

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 29, 1997

Date received June 30, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17443

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Grease	<2	2	mg/l	SM5520-B	07-19-1997 [illegible] JC
Phosphorus, Ortho-PO_4	0.05	0.01	mg/l as P	SM4500-P-E	07-01-1997 0800 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	08-05-1997 1045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	08-09-1997 0600 MK
Sodium, Dissolved	4	1	mg/l	EPA 273.1	08-05-1997 1130 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	07-01-1997 0830 RJ
Solids, Total Dissolved	240	10	mg/l	EPA 160.1	07-03-1997 0700 JC
Solids, Total Suspended	141	5	mg/l	EPA 160.2	07-02-1997 1200 JC
Solids, Volatile	11	5	mg/l	EPA 375.4	07-21-1997 0830 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	08-05-1997 0815 MK
Cation/Anion Balance	-2.8	----	%		08-07-1997 1100 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory RO

COMMERCIAL TESTING & ENGINEERING CO.

[illegible] SUITE 210-B LOMBARD, ILLINOIS [illegible]

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

October 13, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-1 (MH-1)

Rec'd 1715 hr.
Sampled 1353 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 11, 1997

Date received: September 11, 1997

NOTE: DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17764

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	269	5	mg/l as HCO_3	SM2320-B	09-24-1997 0730 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	09-24-1997 0730 SC
Alkalinity, Total	220	5	mg/l as $CaCO_3$	EPA 310.1	09-24-1997 0730 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	09-27-1997 0245 MK
Anions	4.9	----	meq/l	---------	10-08-1997 0900 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-27-1997 1900 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-29-1997 1500 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	09-26-1997 2300 MK
Calcium, Dissolved	46	1	mg/l	EPA 215.1	09-27-1997 0145 MK
Cations	4.3	----	meq/l	---------	10-08-1997 0900 RJ
Chloride	5	1	mg/l	SM4500-Cl-B	10-02-1997 1215 SC
Conductivity	573	1	umhos/cm	SM2510-B	09-22-1997 1230 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	09-26-1997 2200 MK
Hardness, Total	205	----	mg/l as $CaCO_3$	SM2340-B	10-08-1997 0900 RJ
Iron, Total	1.6	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	09-26-1997 2315 MK
Magnesium, Dissolved	22	1	mg/l	EPA 242.1	09-27-1997 0200 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	09-27-1997 0330 MK
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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

October 13, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-1 (MH-1)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 11, 1997

Date received: September 11, 1997

Rec'd 1715 hr.
Sampled 1353 hr.

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17764

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Oil & Grease	<2	2	mg/l	SM5520-B	09-19-1997 0700 JC
Phosphorous, Ortho-PO_4	0.01	0.01	mg/l as P	SM4500-P-E	09-11-1997 1730 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	09-27-1997 0045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-28-1997 1430 MK
Silver, Dissolved	4	1	mg/l	EPA 273.1	09-27-1997 0115 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-11-1997 1800 RJ
Solids, Total Dissolved	260	10	mg/l	EPA 160.1	09-17-1997 0700 JC
Solids, Total Suspended	83	5	mg/l	EPA 160.2	09-15-1997 0700 JC
Sulfate	15	5	mg/l	EPA 375.4	10-07-1997 0800 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	09-26-1997 2215 MK
Cation/Anion Balance	6.4	----	%		10-08-1997 0900 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

WATER MONITORING REPORT

Property: Co-op
Station: FBC-2
Location: McCadden Hollow Spring
Type: Spring

Field Measurements	Date Sampled 08/01/91	10/04/92	06/21/93	06/16/94
Sampled by:	EIS	MEC	MEC	MEC
Flow (gpm)	12	Not Found	Not Found	Not Found
pH	8.05			
Sp. Cond. (ohms)	550			
Temp (C)	N/R			
Lab Measurements				
Analyzed by	IML			
TDS (mg/L)	352			
Hardness (CaCO3)	305			
Aluminum (Al)	10.4			
Arsenic (As)	N/D			
Barium (Ba)	0.69			
Boron (B)	N/D			
Carbonate (CO3)	N/D			
Bicarbonate (HCO3)	379			
Cadmium (Cd)	N/D			
Calcium (Ca)	77.8			
Chloride (Cl)	2.33			
Chromium (Cr)	N/D			
Copper (Cu)	0.02			
Flouride (F)	0.33			
Iron (Fe) Total	7.6			
Iron (Fe) Dissolved	N/D			
Lead (Pb)	N/D			
Magnesium (Mg)	26.90			
Manganese (Mn) Tot.	0.26			
Manganese (Mn) Dis.	N/D			
Mercury (Hg)	N/D			
Molybdenum (Mo)	N/D			
Nickel (Ni)	0.01			
Nitrogen (NH3)	0.07			
Nitrite (NO2)	N/D			
Nitrate (NO3)	N/D			
Potassium (K)	0.89			
Phosphate (PO4)	N/D			
Selenium (Se)	N/D			
Sodium (Na)	4.9			
Sp. Conductivity				
Sulfate (SO4)	5.76			
Sulfide (S)	N/D			
Zinc (Z)	0.03			
Anions	6.4			
Cations	6.33			
Anion/Cation Balance	0.58%			

WATER MONITORING REPORT

Property: Co-op
Station: FBC-3
Location: McCadden Hollow Spring
Type: Spring

Field Measurements	Date Sampled 08/01/91	10/04/92	06/21/93	10/15/93	06/16/94
Sampled by:	EIS	MEC	MEC	MEC	MEC
Flow (gpm)	1.5	Not Found	Not Found	Not Found	Not Found
pH	8.00	N/A	N/A	N/A	N/A
Sp. Cond. (ohms)	450	N/A	N/A	N/A	N/A
Temp (C)	N/R	N/A	N/A	N/A	N/A

Lab Measurements	
Analyzed by	IML
TDS (mg/L)	274
Hardness (CaCO3)	258
Aluminum (Al)	0.20
Arsenic (As)	N/D
Barium (Ba)	0.2
Boron (B)	N/D
Carbonate (CO3)	N/D
Bicarbonate (HCO3)	307
Cadmium (Cd)	N/D
Calcium (Ca)	72.4
Chloride (Cl)	2.43
Chromium (Cr)	N/D
Copper (Cu)	0.03
Fluoride (F)	0.2
Iron (Fe) Total	0.22
Iron (Fe) Dissolved	N/D
Lead (Pb)	N/D
Magnesium (Mg)	18.8
Manganese (Mn) Tot.	N/D
Manganese (Mn) Dis.	N/D
Mercury (Hg)	N/D
Molybdenum (Mo)	N/D
Nickel (Ni)	0.01
Nitrogen (NH3)	0.05
Nitrite (NO2)	N/D
Nitrate (NO3)	0.38
Potassium (K)	0.84
Phosphate (PO4)	N/D
Selenium (Se)	N/D
Sodium (Na)	3.5
Sulfate (SO4)	12.3
[illegible]	N/D
[illegible]	0.01
Anions	5.40
Cations	5.34
Anion/Cation Balance	0.53%

COMMERCIAL TESTING & ENGINEERING CO.

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P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE (801) 653-2311
FAX (801) 653-2474

November 12, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

#14 (SMH-4)
Rec'd 1100 hr.
Sampled 1440 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 13, 1992

Date received: October 14, 1992

Analysis report no. 59-12589

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	10-26-1992 08:00 LS
Alkalinity, Bicarbonate	314	1	mg/l $CaCO_3$	EPA 310.1	10-19-1992 08:30 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	10-19-1992 08:30 LS
Alkalinity, Total	258	1	mg/l $CaCO_3$	EPA 310.1	10-19-1992 08:30 LS
Aluminum	0.00	.5	mg/l	EPA 202.1	10-27-1992 10:20 JS
Anions	7.20	----	meq/l	---	--- --
Arsenic	0.000	.002	mg/l	EPA 206.2	11-10-1992 10:50 JS
Barium	0.06	.03	mg/l	EPA 208.1	10-27-1992 10:20 JS
Boron	0.02	.01	mg/l	EPA 212.3	10-20-1992 15:35 LM
Cadmium	0.230	.00	mg/l	EPA 213.2	11-10-1992 12:10 JS
Calcium	66.1	.1	mg/l	EPA 215.1	10-26-1992 12:50 JS
Cations	7.12	----	meq/l	---	--- --
Chloride	10.0	.1	mg/l	EPA 325.3	10-21-1992 15:30 LM
Chromium	0.07	.001	mg/l	EPA 218.2	11-10-1992 12:10 JS
Copper	0.011	.01	mg/l	EPA 220.1	10-27-1992 09:20 JS
Fluoride	0.03	.01	mg/l	EPA 340.2	10-23-1992 11:15 LS
Hardness, Total	342	1	mg/l $CaCO_3$	---	10-26-1992 12:50 JS
Iron	0.00	.02	mg/l	EPA 236.1	10-23-1992 13:00 JS
Lead	0.120	.001	mg/l	EPA 239.2	11-10-1992 12:10 JS
Magnesium	42.90	.01	mg/l	EPA 242.1	10-26-1992 12:50 JS
Manganese	0.00	.01	mg/l	EPA 243.1	10-23-1992 13:00 JS
Mercury	0.000	.002	mg/l	EPA 245.1	10-22-1992 16:00 JS
Molybdenum	0.00	.1	mg/l	EPA 246.1	10-27-1992 10:20 JS
Nickel	0.08	.02	mg/l	EPA 249.1	10-27-1992 09:20 JS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

June Kosman

Manager, Huntington Laboratory

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

November 12, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

#14 (SMH-4)
Rec'd 1100 hr.
Sampled 1440 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 13, 1992

Date received: October 14, 1992

Analysis report no. 59-12589

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	0.02	.01	mg/l	EPA 350.3	10-23-1992 14:00 LS
Nitrogen, Nitrate	0.43	.01	mg/l	EPA 353.3	10-14-1992 11:00 LM
Nitrogen, Nitrite	0.00	.01	mg/l	EPA 354.1	10-14-1992 11:00 LM
Oil & Grease	0.0	1	mg/l	EPA 413.1	10-15-1992 14:00 LM
Phosphorus, Total	0.00	.01	mg/l	EPA 365.2	10-16-1992 08:00 LM
Potassium	0.27	.01	mg/l	EPA 258.1	10-26-1992 12:50 JS
Selenium	0.000	.002	mg/l	EPA 270.2	11-10-1992 10:50 JS
Sodium	6.83	.01	mg/l	EPA 273.1	10-26-1992 12:50 JS
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	10-14-1992 11:30 LM
Solids, Total Dissolved	318.0	.5	mg/l	EPA 160.1	10-15-1992 12:30 LM
Solids, Total Suspended	0.0	.5	mg/l	EPA 160.2	10-15-1992 12:30 LM
Sulfate	90.0	.1	mg/l	EPA 375.4	10-26-1992 14:00 LS
Sulfide	0.80	.1	mg/l	EPA 376.1	10-16-1992 14:15 LM
Zinc	0.00	.01	mg/l	EPA 289.1	10-27-1992 09:20 JS
Cation/Anion Balance	-0.49	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

June Komas

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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PLEASE ADDRESS ALL CORRESPONDENCE TO:
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TEL: (801) 653-2311
FAX: (801) 653-2436

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 24, 1993

Date received: June 25, 1993

FBC-4 (SMH-4)
Rec'd 0800 hr.
Sampled 1057 hr.

NOTE: Fluoride not distilled.

Analysis report no. 59-13225

ameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
..kalinity, Bicarbonate	317	.4	mg/l HCO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Total	260	.4	mg/l $CaCO_3$	EPA 310.1	06-29-1993 15:00 LS
Aluminum	<1.00	1	mg/l	EPA 202.1	07-16-1993 13:35 ED
Anions	6.04	----	meq/l	---------	---------- ----- --
Arsenic	0.008	.003	mg/l	EPA 206.2	07-07-1993 09:50 ED
Barium	<0.20	.2	mg/l	EPA 208.1	07-16-1993 16:10 ED
Boron	0.14	.04	mg/l	EPA 212.3	07-19-1993 13:30 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	07-08-1993 14:35 ED
Calcium	71.6	.03	mg/l	EPA 215.1	07-13-1993 14:00 ED
Cations	7.09	----	meq/l	---------	---------- ----- --
Chloride	8.3	.5	mg/l	EPA 325.3	06-29-1993 08:30 LM
Chromium	0.0007	.0003	mg/l	EPA 218.2	07-21-1993 10:30 ED
Copper	0.050	.03	mg/l	EPA 220.1	07-15-1993 16:25 ED
Fluoride	0.30	.02	mg/l	EPA 340.2	07-06-1993 13:00 LS
Hardness, Total	337	.03	mg/l $CaCO_3$	---------	07-13-1993 14:00 ED
Iron	<0.05	.05	mg/l	EPA 236.1	07-12-1993 14:40 ED
Iron, Dissolved	<0.05	.05	mg/l	EPA 236.1	07-16-1993 12:30 ED
Lead	<0.003	.003	mg/l	EPA 239.2	07-01-1993 13:45 ED
Magnesium	38.40	.007	mg/l	EPA 242.1	07-14-1993 16:20 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	07-12-1993 10:00 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	07-09-1993 14:50 ED
Molybdenum	0.20	.2	mg/l	EPA 246.1	07-16-1993 14:35 ED
Nickel	<0.08	.08	mg/l	EPA 249.1	07-16-1993 10:50 ED

SP98(1)

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

FBC-4 (SMH-4)
Rec'd 0800 hr.
Sampled 1057 hr.

Sample taken at: Co-op

Sample taken by: Co-op

NOTE: Fluoride not distilled.

Date sampled June 24, 1993

Date received June 25, 1993

Analysis report no. 59-13225

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
[illegible]	<[illegible]	.08	mg/l	EPA [illegible]	[illegible]
Nitrogen, Nitrate-Nitrite	0.48	.01	mg/l	EPA 353.3	06-30-1993 11:00 LM
Nitrogen, Nitrite	0.00	.004	mg/l	EPA 354.1	06-25-1993 14:00 LM
Oil & Grease	1.4	1	mg/l	EPA 413.1	07-15-1993 10:00 LM
Phosphorus, Total	0.30	.008	mg/l	EPA 365.2	07-06-1993 14:00 LM
Potassium	<0.10	.1	mg/l	EPA 258.1	07-13-1993 18:15 ED
Selenium	0.006	.004	mg/l	EPA 270.2	07-06-1993 12:30 ED
Sodium	8.40	.2	mg/l	EPA 273.1	07-13-1993 16:25 ED
Solids, Total Dissolved	325.0	14	mg/l	EPA 160.1	06-28-1993 09:00 LM
Sulfate	35.0	1	mg/l	EPA 375.4	07-08-1993 13:15 LS
Sulfide	<0.90	.9	mg/l	EPA 376.1	06-30-1993 13:10 ED
Zinc	<0.03	.03	mg/l	EPA 289.1	07-15-1993 16:00 ED
Cation/Anion Balance	8.00	----	%	---------	----------

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
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TEL: (801) 653-2311
FAX: (801) 653-2436

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:FBC-4 (SMW-4)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 29, 1993

Date received: August 30, 1993

Rec'd 1100 hr.
Sampled 1755 hr.

NOTE:DUE TO SPILLAGE IN LAB, METALS WERE RUN ON PLAIN BOTTLE. FLUORIDE NOT DISTILLED.

Analysis report no. 59-13474

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	297	2	mg/l	$CaCO_3$	EPA 310.1	09 08 1993 1220 [illegible]
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	09 08 1993 1220 [illegible]
Alkalinity, Total	244	2	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220 ED
Aluminum	2	.05	mg/l		EPA 200.7	09-15-1993 1616 SE
Anions	6.15	----	meq/l		---------	---------- ----- --
Arsenic	<0.002	.002	mg/l		EPA 206.2	09-21-1993 1015 SM
Barium	0.1	.005	mg/l		EPA 200.7	09-15-1993 1616 SE
Boron	0.07	.01	mg/l		EPA 200.7	09-16-1993 0130 ST
Cadmium	<0.0050	.005	mg/l		EPA 200.7	09-15-1993 1616 SE
Calcium	70.0	.1	mg/l		EPA 200.7	09-15-1993 1616 SE
Cations	7.25	----	meq/l		---------	---------- ----- --
Chloride	12.6	.5	mg/l		EPA 325.3	09-07-1993 1300 LM
Chromium	0.0	.005	mg/l		EPA 200.7	09-15-1993 1616 SE
Copper	<0.03	.005	mg/l		EPA 200.7	09-15-1993 1616 SE
Fluoride	0.55	.02	mg/l		EPA 340.2	09 13 1993 0800 LL
Hardness, Total	327.2	.03	mg/l	$CaCO_3$	---------	09-15-1993 1616 SE
Iron	0.43	.01	mg/l		EPA 200.7	09-15-1993 1616 SE
Lead	<0.050	.05	mg/l		EPA 200.7	09-15-1993 1616 SE
Magnesium	37.00	.1	mg/l		EPA 200.7	09 15 1993 1616 SE
Manganese	0.14	.01	mg/l		EPA 200.7	09-15-1993 1616 SE
Mercury	<0.0040	.0002	mg/l		EPA 245.1	09-21-1993 1000 SM
Molybdenum	<0.1	.1	mg/l		EPA 200.7	09-15-1993 1616 SE
Nickel	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616 SE
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	09-22-1993 0800 [illegible]

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

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

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:FBC-4 (SMH-4)

Kind of sample reported to us: Water

Rec'd 1100 hr.
Sampled 1755 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 29, 1993

Date received: August 30, 1993

NOTE:DUE TO SPILLAGE IN LAB, METALS WERE RUN ON PLAIN BOTTLE. FLUORIDE NOT DISTILLED.

Analysis report no. 59-13474

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Nitrate	0.29	.01	mg/l	EPA 353.3	08-30-1993 1145 LM
Nitrogen, Nitrite	<0.02	.02	mg/l	EPA 354.1	08-31-1993 0910 LM
Oil & Grease	1	1	mg/l	EPA 413.1	09-08-1993 1310 LM
Phosphorus, Total	<0.008	.008	mg/l	EPA 365.2	09-15-1993 0745 LM
Potassium	1.1	.1	mg/l	EPA 200.7	09-15-1993 1616 SF
Selenium	0.002	.002	mg/l	EPA 270.2	09-20-1993 1900 SM
Sodium	16.0	.1	mg/l	EPA 200.7	09-15-1993 1616 SF
Solids, Total Dissolved	354	14	mg/l	EPA 160.1	08-31-1993 1100 LM
Sulfate	50	1	mg/l	EPA 375.4	09-24-1993 0800 LM
Sulfide	<0.9	.1	mg/l	EPA 376.1	09-15-1993 1515 LM
Zinc	0.14	.005	mg/l	EPA 200.7	09-15-1993 1616 SF
Cation/Anion Balance	8.17	----	%	---------	---------- ------ --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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PLEASE ADDRESS ALL CORRESPONDENCE TO
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TEL (801) 653-2311
FAX: (801) 653-2436

December 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-4 (SMH-4)

Kind of sample reported to us: Water

Rec'd 1430 hr.
Sampled 0942 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 15, 1993

Date received October 15, 1993

NOTE: Holding time expired when Chloride was run.
Possible matrix interference with Magnesium.

Analysis report no. 59-13637

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	302	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Total	248	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0850	LS
Aluminum	1	1	mg/l		EPA 202.1	10-28-1993 1630	ED
Anions	6.10	----	meq/l		---------	---------- -----	--
Arsenic	<0.010	.003	mg/l		EPA 206.2	11-23-1993 1115	DW
Boron	0.10	.04	mg/l		EPA 212.3	12-02-1993 1400	LM
Cadmium	0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125	ED
Calcium	53.0	.03	mg/l		EPA 215.1	11-08-1993 1450	ED
Cations	7.20	----	meq/l		---------	---------- -----	--
Chloride	16.0	.5	mg/l		EPA 325.3	11-15-1993 1430	LM
Conductivity	570.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Copper	<0.05	.03	mg/l		EPA 220.1	10-27-1993 1550	ED
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	11-24-1993 1200	DW
Lead	<0.400	.003	mg/l		EPA 239.2	11-05-1993 1000	ED
Magnesium	50.00	.007	mg/l		EPA 242.1	11-08-1993 1630	ED
Manganese	<0.03	.03	mg/l		EPA 243.1	11-08-1993 1100	ED
Manganese, Dissolved	0.1	.03	mg/l		EPA 243.1	11-29-1993 1500	DW
Molybdenum	<0.2	.2	mg/l		EPA 246.1	10-29-1993 1105	ED
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000	LS
Nitrogen, Nitrate	0.50	.01	mg/l		EPA 353.3	10-18-1993 0745	LM
Nitrogen, Nitrite	0.00	.02	mg/l		EPA 354.1	10-15-1993 1500	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
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TEL: (801) 653-2311
FAX: (801) 653-2436

December 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-4 (SMH-4)

Rec'd 1430 hr.
Sampled 0942 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1993

Date received: October 15, 1993

NOTE: Holding time expired when Chloride was run.
Possible matrix interference with Magnesium.

Analysis report no. 59-13637

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorus, Ortho	0.000	.003	mg/l	EPA 365.2	10-16-1993 0950 LM
Potassium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315 ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400 DW
Sodium	11.0	.2	mg/l	EPA 273.1	11-09-1993 1135 ED
Solids, Total Dissolved	333	14	mg/l	EPA 160.1	10-19-1993 0815 LM
Sulfate	41	1	mg/l	EPA 375.4	11-11-1993 1020 LS
Zinc	<0.03	.03	mg/l	EPA 289.1	10-27-1993 1300 ED
Cation/Anion Balance	8.10	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 14, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-4 (SMH-4)

Rec'd 1015 hr.
Sampled 0948 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 15, 1994

Date received June 16, 1994

Analysis report no. 59-14144

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	321	1	mg/l as HCO_3	SM2320-B	06-16-1994 1310	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-16-1994 1310	LS
Alkalinity, Total	263	1	mg/l as $CaCO_3$	EPA 310.1	06-16-1994 1310	LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-27-1994 1430	DW
Anions	6.30	----	meq/l	---------	---------- -----	--
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-13-1994 1300	DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	07-06-1994 1045	LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-27-1994 1400	DW
Calcium, Dissolved	47	1	mg/l	EPA 215.1	06-23-1994 1130	DW
Cations	6.20	----	meq/l	---------	---------- -----	--
Chloride	8	1	mg/l	SM4500-Cl-B	06-20-1994 1610	LS
Conductivity	582	1	umhos/cm	SM2510-B	06-17-1994 1255	ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-27-1994 1300	DW
Hardness, Total	290	1	mg/l as $CaCO_3$	SM2340-B	06-23-1994 1130	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-23-1994 0900	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-22-1994 1400	DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-28-1994 0730	DW
[illegible] Dissolved	42	1	mg/l	EPA 243.1	[illegible]	
[illegible] Total	<0.1	0.1	mg/l	EPA 243.1	[illegible]	
[illegible], Dissolved	<0.1	0.1	mg/l	EPA 243.1	[illegible]	
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-27-1994 1600	DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-17-1994 1000	ED
Nitrogen, Nitrate-Nitrite	0.5	0.1	mg/l	EPA 353.3	06-23-1994 1030	LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-17-1994 1100	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 14, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-4 (SMH-4)

Rec'd 1015 hr.
Sampled 0948 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 15, 1994

Date received June 16, 1994

Analysis report no. 59-14144

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	06-16-1994 1615 LM
Potassium, Dissolved	<2	2	mg/l	EPA 258.1	06-23-1994 0945 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-13-1994 1600 DW
Sodium, Dissolved	10	1	mg/l	EPA 273.1	06-23-1994 1100 DW
Solids, Total Dissolved	320	10	mg/l	EPA 160.1	06-17-1994 1600 LM
Sulfate	40	1	mg/l	EPA 375.4	06-16-1994 1340 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-28-1994 0800 DW
Cation/Anion Balance	-0.60	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jerry Stout SD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
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TEL (801) 653-2311
FAX (801) 653-2436

September 16, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-4 (SMH-4)

Kind of sample reported to us Water

Rec'd 1230 hr.
Sampled 1500 hr.

Sample taken at Co-op

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

Sample taken by Co-op

Date sampled August 30, 1994

Date received August 31, 1994

Analysis report no. 59-14378

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	311	1	mg/l as HCO_3	SM2320-B	09-01-1994 0830 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-01-1994 0830 LS
Alkalinity, Total	255	1	mg/l as $CaCO_3$	EPA 310.1	09-01-1994 0830 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	09-08-1994 1530 DW
Anions	6.00	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-02-1994 1100 ED
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-14-1994 1300 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	09-08-1994 1200 DW
Calcium, Dissolved	48	5	mg/l	EPA 215.1	09-09-1994 0930 DW
Cations	6.40	----	meq/l	---------	---------- ----- --
Chloride	10	1	mg/l	SM4500-Cl-B	09-06-1994 1200 LS
Conductivity	581	1	umhos/cm	SM2510-B	09-07-1994 1015 ET
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	09-08-1994 1200 DW
Hardness, Total	297	10	mg/l as $CaCO_3$	SM2340-B	09-09-1994 0930 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	09-13-1994 1030 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-09-1994 1430 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	09-08-1994 1100 DW
Magnesium, Dissolved	43	2	mg/l	EPA 242.1	09-09-1994 1030 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-13-1994 1000 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	09-09-1994 1330 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	09-09-1994 1800 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	09-08-1994 0930 ED
Nitrogen, Nitrate-Nitrite	0.4	0.1	mg/l	EPA 353.3	09-15-1994 1100 [illegible]
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	09-01-1994 [illegible]

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Mont CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 16, 1994

[illegible] MINE
[illegible] BOX 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-4 (SMH-4)

Rec'd 1230 hr.
Sampled 1500 hr.

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

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 30, 1994

Date received: August 31, 1994

Analysis report no. 59-14378

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	09-01-1994 [illegible]	[illegible]
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	09-09-1994 1300	DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-06-1994 1030	ED
Sodium, Dissolved	11	5	mg/l	EPA 273.1	09-09-1994 1230	DW
Solids, Total Dissolved	330	10	mg/l	EPA 160.1	09-02-1994 1500	LM
Sulfate	32	1	mg/l	EPA 375.4	09-08-1994 1030	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	09-08-1994 1330	DW
Cation/Anion Balance	2.90	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jerry Hunt CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-4 (SMH-4)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 31, 1994

Date received: October 31, 1994

Rec'd 1700 hr.
Sampled No Time Given

NOTE: Sample temperature above 6.0C when received. Dissolved metals filtered at Lab.

Analysis report no. 59-14537

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	310	1	mg/l as HCO_3	SM2320-B	11-01-1994 1545 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-01-1994 1545 LS
Alkalinity, Total	253	1	mg/l as $CaCO_3$	EPA 310.1	11-01-1994 1545 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	11-02-1994 1600 DW
Anions	6.20	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-07-1994 1000 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	11-03-1994 1330 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	11-02-1994 1730 DW
Calcium, Dissolved	43	5	mg/l	EPA 215.1	11-01-1994 1500 DW
Cations	6.30	----	meq/l	---------	---------- ----- --
Chloride	11	1	mg/l	SM4500-Cl-B	11-10-1994 0835 ED
Conductivity	584	1	umhos/cm	SM2510-B	11-01-1994 0930 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	11-03-1994 1230 DW
Hardness, Total	280	10	mg/l as $CaCO_3$	SM2340-B	11-01-1994 1500 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	11-02-1994 1700 DW
Magnesium, Dissolved	43	2	mg/l	EPA 242.1	11-02-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	11-03-1994 1630 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	11-04-1994 0915 ED
Nitrogen, Nitrate-Nitrite	0.5	0.1	mg/l	EPA 353.3	11-09-1994 1000 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	11-01-1994 0830 LM

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. [illegible]

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
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TEL. (801) 653-2311
FAX: (801) 653-2436

November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-4 (SMH-4)

Rec'd 1700 hr.
Sampled No Time Given

NOTE: Sample temperature above 6.0C when received. Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 31, 1994

Date received October 31, 1994

Analysis report no. 59-14537

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	11-01-1994 1120	LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	11-02-1994 0900	DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-07-1994 1500	DW
Sodium, Dissolved	15	5	mg/l	EPA 273.1	11-02-1994 0830	DW
Solids, Total Dissolved	330	10	mg/l	EPA 160.1	11-01-1994 0830	LS
Sulfate	38	1	mg/l	EPA 375.4	11-09-1994 1000	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	11-03-1994 1300	DW
Cation/Anion Balance	1.40	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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PLEASE ADDRESS ALL CORRESPONDENCE TO
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TEL: (801) 653-2311
FAX: (801) 653-2436

August 5, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

CO-OP
FBC-4 (SMH-4)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 25, 1997

Date received: June 26, 1997

Rec'd 1000 hr.
Sampled 1500 hr.

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17397

	Result	MRL	Units	Method	Analyzed Date Time	Analyst
Alkalinity, Bicarbonate	331	5	mg/l as HCO_3	SM2320-B	06-28-1997 1930	RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	06-28-1997 1930	RJ
Alkalinity, Total	271	5	mg/l as $CaCO_3$	EPA 310.1	06-28-1997 1930	RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	08-02-1997 1300	MK
Anions	6.0	----	meq/l	---------	10-04-1997 1000	RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-24-1997 0730	MK
Boron, Dissolved	<0.1	0.1	mg/l	EPA 212.3	07-16-1997 0700	MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	08-03-1997 1215	MK
Calcium, Dissolved	47	1	mg/l	EPA 215.1	08-03-1997 0715	MK
Cations	5.8	----	meq/l	---------	10-04-1997 1000	RJ
Chloride	8	1	mg/l	SM4500-Cl-B	07-22-1997 0715	SC
Conductivity	574	1	umhos/cm	SM2510-B	06-30-1997 0545	RJ
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	08-03-1997 1115	MK
Hardness, Total	270	----	mg/l as $CaCO_3$	SM2340-B	10-04-1997 1000	RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	08-03-1997 0815	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	08-03-1997 0815	MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	08-03-1997 1230	MK
[illegible]	37	5	mg/l	EPA 242.1	[illegible]	
[illegible]	<0.1	0.1	mg/l	EPA 243.1	[illegible]	
[illegible]	<0.1	0.1	mg/l	EPA 248.1	[illegible]	
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	08-02-1997 1345	MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-22-1997 0320	RJ
Nitrogen, Nitrate-Nitrite	0.5	0.1	mg/l as N	EPA 353.3	07-18-1997 0400	AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	06-27-1997 0700	JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

August 5, 1997

CO-OP MINE
P.O Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

CO-OP
FBC-4 (SMH-4)

Rec'd 1000 hr.
Sampled 1500 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 25, 1997

Date received June 26, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17397

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
[illegible] Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	06-27-1997 [illegible] RC
[illegible] Dissolved	1	1	mg/l	EPA 258.1	08-03-1997 0930 MK
[illegible]lenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-24-1997 1115 MK
[illegible]dium, Dissolved	8	1	mg/l	EPA 273.1	08-03-1997 1000 MK
[illegible]olids, Total Dissolved	330	10	mg/l	EPA 160.1	07-02-1997 0700 JC
[illegible]lfate	16	5	mg/l	EPA 375.4	07-16-1997 0730 SC
[illegible] Dissolved	0.01	0.01	mg/l	EPA 289.1	08-03-1997 1130 MK
[illegible]um Anion Balance	-1.9	----	%		10-04-1997 1000 RC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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FAX (801) 653-2436

October 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by CO-OP MINE

FBC-4 (SMH-4)

Rec'd 1715 hr.
Sampled 1240 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 11, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17767

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	327	5	mg/l as HCO_3	SM2320-B	09-24-1997 0730 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	09-24-1997 0730 SC
Alkalinity, Total	268	5	mg/l as $CaCO_3$	EPA 310.1	09-24-1997 0730 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	09-27-1997 0245 MK
Anions	6.2	----	meq/l	---------	10-08-1997 0900 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-27-1997 1900 MK
Boron, Dissolved	<0.1	0.1	mg/l	EPA 212.3	09-29-1997 1500 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	09-26-1997 2300 MK
Calcium, Dissolved	43	1	mg/l	EPA 215.1	09-27-1997 0145 MK
Cations	5.6	----	meq/l	---------	10-08-1997 0900 RJ
Chloride	8	1	mg/l	SM4500-Cl-B	10-02-1997 1215 SC
Conductivity	547	1	umhos/cm	SM2510-B	09-22-1997 1230 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	09-26-1997 2200 MK
Hardness, Total	264	----	mg/l as $CaCO_3$	SM2340-B	10-08-1997 0900 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	09-26-1997 2315 MK
Magnesium, Dissolved	38	1	mg/l	EPA 242.1	09-27-1997 0200 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	09-27-1997 0330 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-07-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	0.7	0.1	mg/l as N	EPA 353.3	09-22-1997 0730 RJ
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-12-1997 0700 SC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Huntington Laboratory

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FAX (801) 653-2...

October 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-4 (SMH-4)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 11, 1997

Date received: September 11, 1997

Rec'd 1715 hr.
Sampled 1240 hr.

NOTE: DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17767

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.01	0.01	mg/l as P	SM4500-P-E	09-11-1997 1730 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	09-27-1997 0045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-28-1997 1430 MK
Sodium, Dissolved	8	1	mg/l	EPA 273.1	09-27-1997 0115 MK
Solids, Total Dissolved	350	10	mg/l	EPA 160.1	09-17-1997 0700 JC
Sulfate	30	5	mg/l	EPA 375.4	10-07-1997 0800 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	09-26-1997 2215 MK
Cation/Anion Balance	5.0	----	%		10-08-1997 0900 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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SGS [illegible] SGS Group [illegible]

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

November 26, 1997

CO-OP MINE

[illegible] 1845
[illegible] UT 84526

Sample identification by
CO-OP MINE

ID: FBC-4 (SMH-4)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1997

[illegible]ate received: October 16, 1997

Rec'd 1105 hr.
Sampled 1715 hr.

FIELD MEASUREMENTS

pH	7.61
Flow	3
Conductivity	391
Temperature	48.5°

Dissolved metals filtered at lab

Analysis report no. 59-17953

Parameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst	
[illegible], Bicarbonate	335	5	mg/l	as HCO_3	SM2320-B	10-23-1997 2020	RJ
[illegible], Carbonate	<5	5	mg/l	as CO_3	SM2320-B	10-23-1997 2020	RJ
[illegible]alinity, Total	275	5	mg/l	as $CaCO_3$	EPA 310.1	10-23-1997 2020	RJ
[illegible]luminum, Dissolved	<1	1	mg/l		EPA 202.1	11-12-1997 0315	MK
[illegible]senic, Dissolved	<0.01	0.01	mg/l		EPA 206.2	11-24-1997 1645	MK
[illegible]ron, Dissolved	0.1	0.1	mg/l		EPA 212.3	10-30-1997 1300	MK
[illegible]dmium, Dissolved	<0.01	0.01	mg/l		EPA 213.1	11-12-1997 2245	MK
[illegible]um, Dissolved	44	1	mg/l		EPA 215.1	11-13-1997 0200	MK
[illegible]oride	8	1	mg/l		SM4500-Cl-B	10-30-1997 1400	SC
[illegible]nductivity	550	1	umhos/cm		SM2510-B	10-21-1997 1500	SC
[illegible]opper, Dissolved	<0.1	0.1	mg/l		EPA 220.1	11-12-1997 2145	MK
[illegible]rdness, Total	289	----	mg/l	as $CaCO_3$	SM2340-B	11-20-1997 0945	RJ
[illegible]n, Total	<0.1	0.1	mg/l		EPA 236.1	11-12-1997 2330	MK
[illegible]n, Dissolved	<0.1	0.1	mg/l		EPA 236.1	11-12-1997 2330	MK
[illegible]ad, Dissolved	<0.1	0.1	mg/l		EPA 239.1	11-12-1997 2300	MK
[illegible]agnesium, Dissolved	43	1	mg/l		EPA 242.1	11-13-1997 1430	MK
[illegible]anganese, Total	<0.1	0.1	mg/l		EPA 243.1	11-13-1997 0000	MK
[illegible]anganese, Dissolved	<0.1	0.1	mg/l		EPA 243.1	11-13-1997 0000	MK
[illegible]lybdenum, Dissolved	<0.1	0.1	mg/l		EPA 246.1	11-13-1997 0400	MK
[illegible]gen Ammonia	<0.5	0.5	mg/l	as N	EPA 350.3	10-27-1997 0800	RJ
[illegible]gen, Nitrate-Nitrite	0.6	0.1	mg/l	as N	EPA 353.3	11-14-1997 1500	[illegible]
[illegible]gen, Nitrite	<0.01	0.01	mg/l	as N	EPA 354.1	10-17-1997 [illegible]	[illegible]
[illegible]sphorous, Total	<0.05	0.05	mg/l	as P	SM4500-P-B,E	11-05-1997 1745	MK
[illegible]otassium, Dissolved	<1	1	mg/l		EPA 258.1	11-13-1997 0045	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

[illegible]-465
Original Watermarked For Your Protection

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FAX: (801) 653-2436

November 26, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: FBC-4 (SMH-4)

Kind of sample Water
Reported to us

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 15, 1997

Date received October 16, 1997

Rec'd 1105 hr.
Sampled 1715 hr.

FIELD MEASUREMENTS

pH	7.61
Flow	3
Conductivity	391
Temperature	48.5°

Dissolved metals filtered at lab

Analysis report no. 59-17953

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-24-1997 2030 MK
Sodium, Dissolved	8	1	mg/l	EPA 273.1	11-13-1997 0130 MK
Sulfate, Total Dissolved	280	10	mg/l	EPA 160.1	10-21-1997 0700 JC
Sulfide	37	10	mg/l	EPA 375.4	10-28-1997 1400 SC
Thallium, Dissolved	<0.01	0.01	mg/l	EPA 289.1	11-12-1997 2200 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

WATER MONITORING REPORT

Property: Co-op
Station: FBC-5 (SMH-2)
Location: McCadden Hollow Left Fork Trough
Type: Spring

Field Measurements	Date Sampled 08/02/91	10/13/92	03/22/93	06/21/93	08/29/93	10/15/93	03/30/94	06/15/94	08/30/94	10/31/94	06/29/97	09/11/97	10/15/97
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op	Co-Op
Flow (gpm)	8.5	0.6	Inaccess	1.5	3	0.8	Inaccess	12	6	10	15	20	20
pH	8	7.68	N/A	7.39	6.9	7.34	N/A	7.7	7.85	8.14	8.05	7.98	7.9
Sp. Cond. (ohms)	550	549	N/A	495	550	572	N/A	527	505	499	546	447	400
Temp (C)	N/R	9.72	N/A	10.9	7.9	5.9	N/A	7.4	11.8	8.8	9.4	11.6	11.7

Lab Measurements													
Analyzed by:	IML	CT&E	N/A	CT&E	CT&E	CT&E	N/A	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E
TDS (mg/L)	328	149		321	294	278		260	270	270	290	300	250
Hardness (CaCO3)	302	319		295	221.3	260		249	255	246	248	241	243
Aluminum (Al)	1.3	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Arsenic (As)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Boron (B)	N/D	0.08		0.05	N/D	0.1		0.1	0.1	0.1	0.1	0.1	0.2
Carbonate (CO3)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Bicarbonate (HCO3)	367	328		306	294	231		329	293	311	320	320	327
Cadmium (Cd)	N/D	0.04		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Calcium (Ca)	81.7	103.8		75.9	54	66		65	64	64	63	62	61
Chloride (Cl)	7.2	25		4.2	4.6	13		3	6	5	4	5	5
Copper (Cu)	N/D	0.012		0.06	0.01	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Iron (Fe) total	1.24	0.1		0.68	N/D	0.15		N/D	N/D	N/D	N/D	N/D	N/D
Iron (Fe) dissolved								N/D	N/D	N/D	N/D	N/D	N/D
Lead (Pb)	N/D	0.22		0.003	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Magnesium (Mg)	23.9	14.6		25.6	21	23		21	23	21	22	21	22
Manganese (Mn) tot.	0.06	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Manganese (Mn) dis.								N/D	N/D	N/D	N/D	N/D	N/D
Molybdenum (Mo)	N/D	N/D		N/D	N/D	0.2		N/D	N/D	N/D	N/D	N/D	N/D
Nitrogen (NH3)	0.12	0.02		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Nitrite (NO2)	N/D	N/D		0.04	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Nitrate (NO3)	N/D	0.1		0.28	0.18	0.33		0.2	0.2	0.2	1.10	0.2	0.4
Potassium (K)	2.91	N/D		2.1	0.4	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Phosphate (PO4)	N/D	N/D		N/D	0.004	N/D		0.02	N/D	0.02	0.03	0.01	N/D
Selenium (Se)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Sodium (Na)	5.8	1.81		4.5	3.9	N/D		4	6	7	4	4	6
Sp. Conductivity						497		489	483	491	483	480	492
Sulfate (SO4)	13	9		10	7	8		10	7	8	9	9	9
Zinc (Z)	0.01	0.03		N/D	N/D	N/D		N/D	N/D	0.04	0.03	N/D	0.03
Anions	6.48	6.13		5.22	5	4.2		5.7	5.1	5.4	5.50	5.6	
Cations	6.37	6.47		6.14	4.6	5.2		5.1	5.3	5.2	5.1	5	
Anion/Cation Balance	0.92%	2.60%		8.09%	-4.16%	10.20%		-5.00%	2.20%	-1.70%	-3.90%	5.50%	

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FAX (801) 653-2479

November 12, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

#15 (SMH-2)
Rec'd 1100 hr.
Sampled 1220 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 13, 1992

Date received: October 14, 1992

Analysis report no. 59-12592

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
dity	0	1	mg/l $CaCO_3$	EPA 305.1	10-26-1992 08:00 LS
kalinity, Bicarbonate	328	1	mg/l $CaCO_3$	EPA 310.1	10-19-1992 08:30 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	10-19-1992 08:30 LS
Alkalinity, Total	269	1	mg/l $CaCO_3$	EPA 310.1	10-19-1992 08:30 LS
Aluminum	0.00	.5	mg/l	EPA 202.1	10-27-1992 10:20 JS
Anions	6.13	----	meq/l	---------	---------- ----- --
Arsenic	0.000	.002	mg/l	EPA 206.2	11-10-1992 10:50 JS
Barium	0.00	.03	mg/l	EPA 208.1	10-27-1992 10:20 JS
Boron	0.08	.01	mg/l	EPA 212.3	10-20-1992 15:35 LM
Cadmium	0.040	.00	mg/l	EPA 213.2	11-10-1992 12:10 JS
Calcium	103.8	.1	mg/l	EPA 215.1	10-26-1992 12:50 JS
Cations	6.47	----	meq/l	---------	---------- ----- --
Chloride	25.0	.1	mg/l	EPA 325.3	10-21-1992 15:30 LM
Chromium	0.00	.001	mg/l	EPA 218.2	11-10-1992 12:10 JS
Copper	0.012	.01	mg/l	EPA 220.1	10-27-1992 09:20 LS
Fluoride	0.02	.01	mg/l	EPA 340.2	10-23-1992 11:15 LS
Hardness, Total	319	1	mg/l $CaCO_3$	---------	10-26-1992 12:50 JS
Iron	0.10	.02	mg/l	EPA 236.1	10-23-1992 13:00 JS
Lead	0.220	.001	mg/l	EPA 239.2	11-10-1992 12:10 JS
Magnesium	14.60	.01	mg/l	EPA 242.1	10-26-1992 12:50 JS
Manganese	0.00	.01	mg/l	EPA 243.1	10-23-1992 13:00 JS
Mercury	0.000	.002	mg/l	EPA 245.1	10-22-1992 16:00 JS
Molybdenum	0.00	.1	mg/l	EPA 246.1	10-27-1992 10:20 JS
Nickel	0.15	.02	mg/l	EPA 249.1	10-27-1992 09:20 JS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

November 12, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

#15 (SMH-2)
Rec'd 1100 hr.
Sampled 1220 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 13, 1992

Date received: October 14, 1992

Analysis report no. 59-12592

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	0.02	.01	mg/l	EPA 350.3	10-23-1992 14:00 JS
Nitrogen, Nitrate	0.10	.01	mg/l	EPA 353.3	10-14-1992 11:00 LM
Nitrogen, Nitrite	0.00	.01	mg/l	EPA 354.1	10-14-1992 11:00 LM
Oil & Grease	0.2	1	mg/l	EPA 413.1	10-23-1992 11:00 LM
Phosphorus, Total	0.00	.01	mg/l	EPA 365.2	10-16-1992 08:00 LM
Potassium	0.00	.01	mg/l	EPA 258.1	10-26-1992 12:50 JS
Selenium	0.000	.002	mg/l	EPA 270.2	11-10-1992 10:50 JS
Sodium	1.81	.01	mg/l	EPA 273.1	10-26-1992 12:50 JS
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	10-14-1992 11:30 LM
Solids, Total Dissolved	149.0	.5	mg/l	EPA 160.1	10-15-1992 12:30 LM
Solids, Total Suspended	29.0	.5	mg/l	EPA 160.2	10-15-1992 12:30 LM
Sulfate	9.0	.1	mg/l	EPA 375.4	10-26-1992 14:00 LS
Sulfide	1.40	.1	mg/l	EPA 376.1	10-16-1992 14:15 LM
Zinc	0.03	.01	mg/l	EPA 289.1	10-27-1992 09:20 JS
Cation/Anion Balance	2.60	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jane Komar

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 20, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

FBC-5 (SMH-2)
Rec'd 0900 hr.
Sampled 1810 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Fluoride not distilled.

Date sampled June 21, 1993

Date received June 22, 1993

Analysis report no. 59-13209

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	306	2	mg/l HCO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Carbonate	0	1	mg/l CO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Total	251	2	mg/l $CaCO_3$	EPA 310.1	06-29-1993 15:00 LS
Aluminum	<1.00	1	mg/l	EPA 202.1	07-16-1993 13:35 ED
Anions	5.22	----	meq/l	---------	--------- ----- --
Arsenic	<0.003	.003	mg/l	EPA 206.2	07-07-1993 09:50 ED
Barium	<0.20	.2	mg/l	EPA 208.1	07-16-1993 16:10 ED
Boron	0.05	.04	mg/l	EPA 212.3	06-28-1993 14:00 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	07-08-1993 14:35 ED
Calcium	75.9	.03	mg/l	EPA 215.1	07-14-1993 11:05 ED
Cations	6.14	----	meq/l	---------	--------- ----- --
Chloride	4.2	.5	mg/l	EPA 325.3	06-29-1993 08:30 LM
Chromium	0.0006	.0003	mg/l	EPA 218.2	07-02-1993 10:50 ED
Copper	0.060	.03	mg/l	EPA 220.1	07-15-1993 16:25 ED
Fluoride	0.19	.02	mg/l	EPA 340.2	07-06-1993 13:00 LS
Hardness, Total	295	.03	mg/l $CaCO_3$	---------	07-14-1993 11:05 ED
Iron	0.68	.05	mg/l	EPA 236.1	06-29-1993 12:00 ED
Iron, Dissolved	0.07	.05	mg/l	EPA 236.1	07-01-1993 11:00 ED
Lead	0.003	.003	mg/l	EPA 239.2	07-07-1993 13:45 ED
Magnesium	25.60	.007	mg/l	EPA 242.1	07-14-1993 16:20 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-29-1993 13:15 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	07-09-1993 14:50 ED
Molybdenum	<0.20	.2	mg/l	EPA 246.1	07-16-1993 14:35 ED
Nickel	<0.08	.08	mg/l	EPA 249.1	07-16-1993 10:50 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 20, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 21, 1993

Date received June 22, 1993

FBC-5 (SMH-2)
Rec'd 0900 hr.
Sampled 1810 hr.

NOTE: Fluoride not distilled.

Analysis report no. 59-13209

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	07-06-1993 08:00 LS
Nitrogen, Nitrate	0.28	.01	mg/l	EPA 353.3	06-22-1993 10:00 LM
Nitrogen, Nitrite	0.04	.02	mg/l	EPA 354.1	06-22-1993 11:00 LM
Oil & Grease	0.1	1	mg/l	EPA 413.1	07-01-1993 08:00 LM
Phosphorus, Total	0.00	.008	mg/l	EPA 365.2	07-06-1993 14:00 LM
Potassium	2.10	.1	mg/l	EPA 258.1	07-13-1993 18:15 ED
Selenium	<0.004	.004	mg/l	EPA 270.2	07-06-1993 12:30 ED
Sodium	4.50	.2	mg/l	EPA 273.1	07-13-1993 16:25 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	06-22-1993 11:30 LM
Solids, Total Dissolved	321.0	14	mg/l	EPA 160.1	06-24-1993 10:00 LM
Solids, Total Suspended	25.0	7	mg/l	EPA 160.2	06-25-1993 14:30 LM
Sulfate	10.0	1	mg/l	EPA 375.4	07-06-1993 10:00 LS
Sulfide	0.10	.9	mg/l	EPA 376.1	06-28-1993 15:25 ED
Zinc	<0.03	.03	mg/l	EPA 289.1	07-15-1993 16:00 ED
Cation/Anion Balance	8.09	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:FBC-5 (SMH-2)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 29, 1993

Date received: August 30, 1993

Rec'd 1100 hr.
Sampled 1705 hr.

NOTE: DUE TO SPILLAGE IN LAB, METALS WERE RUN ON PLAIN BOTTLE. FLUORIDE NOT DISSTILED.

Analysis report no. 59-13469

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	294	2	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220 LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220 LS
Alkalinity, Total	241	2	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220 LS
Aluminum	0	.05	mg/l		EPA 200.7	09-15-1993 1616 SF
Anions	5.00	----	meq/l		---------	-------- -- ----- --
Arsenic	<0.002	.002	mg/l		EPA 206.2	09-21-1993 1015 SM
Barium	0.1	.005	mg/l		EPA 200.7	09-15-1993 1616 SF
Boron	<0.05	.01	mg/l		EPA 200.7	09-16-1993 0130 SF
Cadmium	<0.0050	.005	mg/l		EPA 200.7	09-15-1993 1616 SF
Calcium	54.0	.1	mg/l		EPA 200.7	09-15-1993 1616 SF
Cations	4.60	----	meq/l		---------	-------- -- ----- --
Chloride	5.3	.5	mg/l		EPA 325.3	09-07-1993 1300 LM
Chromium	<0.0	.005	mg/l		EPA 200.7	09-15-1993 1616 SF
Copper	0.01	.005	mg/l		EPA 200.7	09-15-1993 1616 SF
Fluoride	0.36	.02	mg/l		EPA 340.2	09-13-1993 1400 LS
Hardness, Total	221.3	.03	mg/l	$CaCO_3$	---------	09-15-1993 1616 SF
Iron	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616 SF
Lead	<0.050	.05	mg/l		EPA 200.7	09-15-1993 1616 SF
Magnesium	21.00	.1	mg/l		EPA 200.7	09-15-1993 1616 SF
Manganese	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616 SF
Mercury	<0.0004	.0002	mg/l		EPA 245.1	09-21-1993 1000 SM
Molybdenum	<0.1	.1	mg/l		EPA 200.7	09-15-1993 1616 SF
Nickel	<0.10	.01	mg/l		EPA 200.7	09-15-1993 1616 SF
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	09-07-1993 0800 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:FBC-5 (SMH-2)

Kind of sample reported to us: Water

Rec'd 1100 hr.
Sampled 1705 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 29, 1993

Date received: August 30, 1993

NOTE: DUE TO SPILLAGE IN LAB, METALS WERE RUN ON PLAIN BOTTLE. FLUORIDE NOT DISSTILED.

Analysis report no. 59-13469

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Nitrate	0.18	.01	mg/l	EPA 353.3	08-30-1993 1145 LM
Nitrogen, Nitrite	0.01	.02	mg/l	EPA 354.1	08-31-1993 0910 LM
Oil & Grease	1	1	mg/l	EPA 413.1	09-08-1993 1310 LM
Phosphorus, Total	0.004	.008	mg/l	EPA 365.2	09-15-1993 0720 LM
Potassium	0.4	.1	mg/l	EPA 200.7	09-15-1993 1616 SF
Selenium	<0.002	.002	mg/l	EPA 270.2	09-15-1993 1616 SF
Sodium	3.9	.1	mg/l	EPA 200.7	09-15-1993 1616 SF
Solids, Total Dissolved	294	14	mg/l	EPA 160.1	08-31-1993 1106 LM
Sulfate	7	1	mg/l	EPA 375.4	09-24-1993 0800 LS
Sulfide	<0.9	.1	mg/l	EPA 376.1	09-03-1993 1515 LD
Zinc	<0.01	.005	mg/l	EPA 200.7	09-15-1993 1616 SF
Cation/Anion Balance	-4.16	----	%	---------	---------- --- -

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX (801) 653-2436

December 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-5 (SMH-2)

Rec'd 1430 hr.
Sampled 1139 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 15, 1993

Date received October 15, 1993

Analysis report no. 59-13630

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	231	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Total	190	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Aluminum	<1	1	mg/l		EPA 202.1	10-28-1993 1630	ED
Anions	4.20	----	meq/l		---------	---------- -----	--
Arsenic	<0.010	.003	mg/l		EPA 206.2	11-23-1993 1115	DW
Boron	0.10	.04	mg/l		EPA 212.3	11-30-1993 1500	LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125	ED
Calcium	66.0	.03	mg/l		EPA 215.1	11-08-1993 1450	ED
Cations	5.20	----	meq/l		---------	---------- -----	--
Chloride	13.0	.5	mg/l		EPA 325.3	11-01-1993 0900	LM
Conductivity	497.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Copper	<0.05	.03	mg/l		EPA 220.1	10-27-1993 1550	ED
Hardness, Total	260.0	.03	mg/l	$CaCO_3$	---------	11-08-1993 1450	ED
Iron	0.15	.05	mg/l		EPA 236.1	11-08-1993 1315	ED
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	11-24-1993 1200	DW
Lead	<0.400	.003	mg/l		EPA 239.2	11-05-1993 1000	ED
Magnesium	23.00	.007	mg/l		EPA 242.1	11-08-1993 1630	ED
Manganese	<0.03	.03	mg/l		EPA 243.1	11-08-1993 1100	ED
Manganese, Dissolved	0.1	.03	mg/l		EPA 243.1	11-29-1993 1500	DW
Molybdenum	0.2	.2	mg/l		EPA 246.1	10-29-1993 1105	ED
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000	LS
Nitrogen, Nitrate	0.33	.01	mg/l		EPA 353.3	10-18-1993 0745	LM
Nitrogen, Nitrite	0.00	.02	mg/l		EPA 354.1	10-15-1993 1500	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

December 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-5 (SMH-2)

Rec'd 1430 hr.
Sampled 1139 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 15, 1993

Date received October 15, 1993

Analysis report no. 59-13630

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorus, Ortho	0.000	.003	mg/l	EPA 365.2	10-16-1993 0950	LM
Potassium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315	ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400	DW
Sodium	<10.0	.2	mg/l	EPA 273.1	11-09-1993 1135	ED
Solids, Total Dissolved	278	14	mg/l	EPA 160.1	10-19-1993 0815	LM
Sulfate	8	1	mg/l	EPA 375.4	11-11-1993 1020	LS
Zinc	<0.03	.03	mg/l	EPA 289.1	10-27-1993 1300	ED
Cation/Anion Balance	10.2	----	%	---------	---------- -----	--

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 11, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-5 (SMH-2)

Rec'd 1015 hr.
Sampled 1135 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 15, 1994

Date received June 16, 1994

Analysis report no. 59-14147

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	329	1	mg/l as HCO_3	SM2320-B	06-16-1994 1310 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-16-1994 1310 LS
Alkalinity, Total	270	1	mg/l as $CaCO_3$	EPA 310.1	06-16-1994 1310 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-27-1994 1430 DW
Anions	5.70	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-08-1994 0930 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	07-06-1994 1045 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-27-1994 1400 DW
Calcium, Dissolved	65	1	mg/l	EPA 215.1	06-23-1994 1130 DW
Cations	5.10	----	meq/l	---------	---------- ----- --
Chloride	3	1	mg/l	SM4500-Cl-B	06-20-1994 1610 LS
Conductivity	489	1	umhos/cm	SM2510-B	06-17-1994 1255 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-27-1994 1300 DW
Hardness, Total	249	1	mg/l as $CaCO_3$	SM2340-B	06-23-1994 1130 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-23-1994 0900 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-22-1994 1400 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-28-1994 0730 DW
Magnesium, Dissolved	21	1	mg/l	EPA 242.1	06-23-1994 1200 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-23-1994 0830 DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-22-1994 1600 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-27-1994 1600 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-17-1994 1000 ED
Nitrogen, Nitrate-Nitrite	0.2	0.1	mg/l	EPA 353.3	06-23-1994 1030 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-17-1994 1100 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 11, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-5 (SM4-2)

Rec'd 1015 hr.
Sampled 1135 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 15, 1994

Date received June 16, 1994

Analysis report no. 59-14147

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	06-16-1994 1615	LM
Potassium, Dissolved	<2	2	mg/l	EPA 258.1	06-23-1994 0945	DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-08-1994 1300	DW
Sodium, Dissolved	4	1	mg/l	EPA 273.1	06-23-1994 1100	DW
Solids, Total Dissolved	260	10	mg/l	EPA 160.1	06-17-1994 1600	LM
Sulfate	10	1	mg/l	EPA 375.4	06-16-1994 1340	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-28-1994 0800	DW
Cation/Anion Balance	-5.00	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hunt CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 16, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-5 (SMH-2)

Rec'd 1230 hr.
Sampled 1843 hr.

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled August 30, 1994

Date received August 31, 1994

Analysis report no. 59-14382

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	293	1	mg/l as HCO_3	SM2320-B	09-06-1994 0945 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-06-1994 0945 LS
Alkalinity, Total	240	1	mg/l as $CaCO_3$	EPA 310.1	09-06-1994 0945 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	09-08-1994 1530 DW
Anions	5.10	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-02-1994 1100 ED
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-16-1994 1100 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	09-08-1994 1200 DW
Calcium, Dissolved	64	5	mg/l	EPA 215.1	09-09-1994 0930 DW
Cations	5.30	----	meq/l	---------	---------- ----- --
Chloride	6	1	mg/l	SM4500-Cl-B	09-06-1994 1500 LS
Conductivity	483	1	umhos/cm	SM2510-B	09-07-1994 1015 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	09-08-1994 1200 DW
Hardness, Total	255	10	mg/l as $CaCO_3$	SM2340-B	09-09-1994 0930 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	09-13-1994 1030 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-09-1994 1430 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	09-08-1994 1100 DW
Magnesium, Dissolved	23	2	mg/l	EPA 242.1	09-09-1994 1030 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-13-1994 1000 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	09-09-1994 1330 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	09-09-1994 1800 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	09-09-1994 1000 ED
Nitrogen, Nitrate-Nitrite	0.2	0.1	mg/l	EPA 353.3	09-15-1994 1100 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	09-01-1994 1100 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Barry Hart CS

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

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 16, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-5 (SMH-2)

Rec'd 1230 hr.
Sampled 1843 hr.

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled August 30, 1994

Date received August 31, 1994

Analysis report no. 59-14382

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	09-01-1994 1030 LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	09-09-1994 1300 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-02-1994 1450 ED
Sodium, Dissolved	6	5	mg/l	EPA 273.1	09-09-1994 1230 DW
Solids, Total Dissolved	270	10	mg/l	EPA 160.1	09-02-1994 1500 LM
Sulfate	7	1	mg/l	EPA 375.4	09-15-1994 1310 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	09-08-1994 1330 DW
Cation/Anion Balance	2.20	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jerry Hout TD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

November 22, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-5 (SMH-2)

Rec'd 1700 hr.
Sampled No Time Given

NOTE: Sample temperature above 6.0C when received. Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 31, 1994

Date received October 31, 1994

Analysis report no. 59-14541

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	311	1	mg/l as HCO_3	SM2320-B	11-02-1994 0845 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-02-1994 0845 LS
Alkalinity, Total	255	1	mg/l as $CaCO_3$	EPA 310.1	11-02-1994 0845 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	11-21-1994 1330 DW
Anions	5.40	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-07-1994 1000 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	11-11-1994 1330 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	11-21-1994 1000 DW
Calcium, Dissolved	64	5	mg/l	EPA 215.1	11-17-1994 0830 DW
Cations	5.20	----	meq/l	---------	---------- ----- --
Chloride	5	1	mg/l	SM4500-Cl-B	11-10-1994 0835 LS
Conductivity	491	1	umhos/cm	SM2510-B	11-01-1994 0930 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	11-21-1994 1030 DW
Hardness, Total	246	10	mg/l as $CaCO_3$	SM2340-B	11-17-1994 0830 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	11-15-1994 1100 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-17-1994 1445 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	11-21-1994 0930 DW
Magnesium, Dissolved	21	2	mg/l	EPA 242.1	11-17-1994 0930 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-15-1994 1115 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	11-17-1994 1400 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	11-03-1994 1630 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	11-16-1994 0930 ED
Nitrogen, Nitrate-Nitrite	0.2	0.1	mg/l	EPA 353.3	11-09-1994 1000 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	11-01-1994 0830 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

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

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

November 22, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-5 (SM4-2)

Rec'd 1700 hr.
Sampled No Time Given

NOTE: Sample temperature above 6.0°C when received. Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 31, 1994

Date received October 31, 1994

Analysis report no. 59-14541

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	11-01-1994 1120	LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	11-17-1994 1300	DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-07-1994 1500	DW
Sodium, Dissolved	7	5	mg/l	EPA 273.1	11-17-1994 1030	DW
Solids, Total Dissolved	270	10	mg/l	EPA 160.1	11-01-1994 0830	LS
Sulfate	8	1	mg/l	EPA 375.4	11-09-1994 1000	LS
Zinc, Dissolved	0.04	0.03	mg/l	EPA 289.1	11-21-1994 1130	DW
Cation/Anion Balance	-1.70	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

August 13, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-5 (SMH-2)

Kind of sample reported to us: Water

Rec'd 1230 hr.
Sampled 1515 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 29, 1997

Date received: June 30, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17440

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	320	5	mg/l as HCO_3	SM2320-B	07-09-1997 0700	SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	07-09-1997 0700	SC
Alkalinity, Total	262	5	mg/l as $CaCO_3$	EPA 310.1	07-09-1997 0700	SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	08-05-1997 1315	MK
Anions	5.5	----	meq/l	---------	08-07-1997 1100	RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	08-08-1997 1015	MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	07-30-1997 0700	MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	08-05-1997 0845	MK
Calcium, Dissolved	63	1	mg/l	EPA 215.1	08-05-1997 1200	MK
Cations	5.1	----	meq/l	---------	08-07-1997 1100	RJ
Chloride	4	1	mg/l	SM4500-Cl-B	07-23-1997 0830	SC
Conductivity	483	1	umhos/cm	SM2510-B	07-22-1997 1230	MK
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	08-05-1997 0800	MK
Hardness, Total	248	----	mg/l as $CaCO_3$	SM2340-B	08-07-1997 1100	RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	08-05-1997 1000	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	08-05-1997 1000	MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	08-05-1997 0915	MK
Magnesium, Dissolved	22	1	mg/l	EPA 242.1	08-05-1997 1230	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	08-05-1997 1030	MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	08-05-1997 1030	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	08-05-1997 1430	MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-22-1997 0720	RJ
Nitrogen, Nitrate-Nitrite	1.1	0.1	mg/l as N	EPA 353.3	07-22-1997 0430	AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	07-01-1997 0800	JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

August 13, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-5 (SMH-2)

Rec'd 1230 hr.
Sampled 1515 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 29, 1997

Date received: June 30, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17440

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	07-01-1997 0800 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	08-05-1997 1045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	08-09-1997 0600 MK
Sodium, Dissolved	4	1	mg/l	EPA 273.1	08-05-1997 1130 MK
Solids, Total Dissolved	290	10	mg/l	EPA 160.1	07-03-1997 0700 JC
Sulfate	9	5	mg/l	EPA 375.4	07-21-1997 0830 SC
Zinc, Dissolved	0.03	0.01	mg/l	EPA 289.1	08-05-1997 0815 MK
%Cation/Anion Balance	-3.9	----	%		08-07-1997 1100 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Larry Stout

Huntington Laboratory RJ

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • TEL: 630-953-9300 FAX: 630-953-9306

SGS 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 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-5 (SMH-2)

Kind of sample reported to us: Water

Rec'd 1715 hr.
Sampled 1455 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 11, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17762

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	320	5	mg/l as HCO_3	SM2320-B	09-24-1997 0730 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	09-24-1997 0730 SC
Alkalinity, Total	262	5	mg/l as $CaCO_3$	EPA 310.1	09-24-1997 0730 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	09-27-1997 0245 MK
Anions	5.6	----	meq/l	---------	10-08-1997 0900 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-27-1997 1900 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-29-1997 1500 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	09-26-1997 2300 MK
Calcium, Dissolved	62	1	mg/l	EPA 215.1	09-27-1997 0145 MK
Cations	5.0	----	meq/l	---------	10-08-1997 0900 RJ
Chloride	5	1	mg/l	SM4500-Cl-B	10-02-1997 1215 SC
Conductivity	480	1	umhos/cm	SM2510-B	09-22-1997 1230 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	09-26-1997 2200 MK
Hardness, Total	241	----	mg/l as $CaCO_3$	SM2340-B	10-08-1997 0900 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	09-26-1997 2315 MK
Magnesium, Dissolved	21	1	mg/l	EPA 242.1	09-27-1997 0200 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	09-27-1997 0330 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-07-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	0.2	0.1	mg/l as N	EPA 353.3	09-22-1997 0730 RJ
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-12-1997 0700 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

WATER MONITORING REPORT

Property: Co-op
Station: FBC-6 (SMH-1)
Location: McCadden Hollow Left Fork Springs
Type: Spring

Field Measurements	Date Sampled 08/21/91	03/22/93	06/21/93	08/29/93	10/15/93	03/30/94	06/16/94	08/30/94	10/31/94	06/29/97	09/11/97	10/15/97
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op	Co-Op
Flow (gpm)	9.8	Inaccess	10	30	8	Inaccess	15	13	32	20	40	20
pH	8.4	N/A	6.39	7.3	7.4	N/A	7.69	7.9	8.02	7.45	7.54	7.44
Sp. Cond. (ohms)	500	N/A	713	648	673	N/A	632	627	594	676	504	628
Temp (C)	N/R	N/A	7.11	8.4	6.3	N/A	8.1	7.8	9.3	7.8	8.9	13.3
Lab Measurements												
Analyzed by:	IML	N/A	CT&E	CT&E	CT&E	N/A	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E
TDS (mg/L)	272		378	324	324		306	370	340	380	330	310
Hardness (CaCO3)	261		355	263.6	357		290	311	300	286	283	264
Aluminum (Al)	N/D		N/D	N/D	1		N/D	N/D	N/D	N/D	N/D	N/D
Arsenic (As)	N/D		0.003	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Boron (B)	N/D		0.06	N/D	0.1		0.1	0.1	0.1	0.1	0.1	0.2
Carbonate (CO3)	3.3		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Bicarbonate (HCO3)	303		366	301	328		348	370	370	358	362	383
Cadmium (Cd)	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Calcium (Ca)	69.2		81.3	71	50		70	69	69	70	69	58
Chloride (Cl)	5.27		13.1	6.3	9		6	8	8	7	9	6.0
Copper (Cu)	0.01		0.07	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Iron (Fe) Total	0.1		0.59	0.04	0.15		N/D	N/D	N/D	N/D	0.4	N/D
Iron (Fe) Dissolved	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Lead (Pb)	N/D		0.003	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Magnesium (Mg)	21.5		37	38	32		28	30	30	27	27	29.0
Manganese (Mn) Tot.	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Manganese (Mn) Dis.	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Molybdenum (Mo)	N/D		N/D	N/D	0.2		N/D	N/D	N/D	N/D	N/D	N/D
Nitrogen (NH3)	0.09		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Nitrite (NO2)	N/D		0.04	N/D	0.01		N/D	N/D	N/D	N/D	N/D	N/D
Nitrate (NO3)	0.29		0.24	0.27	0.32		0.1	0.1	0.1	0.2	0.2	0.1
Potassium (K)	0.61		2.5	1.6	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Phosphate (PO4)	N/D		0.03	N/D	0.003		0.02	0.02	0.02	0.03	N/D	N/D
Selenium (Se)	N/D		0.006	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Sodium (Na)	5.1		7.9	7.4	N/D		7	12	12	6	6	5
Sp. Conductivity					523		582	582	582	576	442	578
Sulfate (SO4)	15		27	22	25		19	20	20	25	22	22
Zinc (Z)	0.01		0.06	0.01	N/D		N/D	N/D	N/D	0.01	N/D	N/D
Anions	5.56		6.78	5.45	6		6.3	6.6	6.6	6.6	6.6	
Cations	5.46		7.5	5.62	5.1		6.1	6.4	6.4	6	5.9	
Anion/Cation Balance	0.89%		5.46%	1.50%	-8.10%		-1.30%	-1.60%	-1.60%	-4.90%	5.70%	

WATER MONITORING REPORT

Property: Co-op
Station: FBC-6 (SMH-1)
Location: McCadden Hollow Left Fork Springs
Type: Spring (7 Locations)

Field Measurements	Date Sampled											
	08/21/91	03/22/93	06/21/93	08/29/93	10/15/93	03/30/94	06/16/94	08/30/94	10/31/94	06/29/97	09/11/97	10/15/97
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op	Co-Op
Flow (gpm)	9.8	Inaccess	10	30	8	Inaccess	15	13	32	20	40	20
pH	8.4	N/A	6.39	7.3	7.4	N/A	7.69	7.9	8.02	7.45	7.54	7.44
Sp. Cond. (ohms)	500	N/A	713	648	673	N/A	632	627	594	676	504	628
Temp (C)	N/R	N/A	7.11	8.4	6.3	N/A	8.1	7.8	9.3	7.8	8.9	13.3
Lab Measurements												
Analyzed by:	IML	N/A	CT&E	CT&E	CT&E	N/A	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E
TDS (mg/L)	272		378	324	324		306	370	340	380	330	310
Hardness (CaCO3)	261		355	263.6	357		290	311	300	286	283	264
Aluminum (Al)	N/D		N/D	N/D	1		N/D	N/D	N/D	N/D	N/D	N/D
Arsenic (As)	N/D		0.003	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Boron (B)	N/D		0.06	N/D	0.1		0.1	0.1	0.1	0.1	0.1	0.2
Carbonate (CO3)	3.3		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Bicarbonate (HCO3)	303		366	301	328		348	370	370	358	362	383
Cadmium (Cd)	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Calcium (Ca)	69.2		81.3	71	50		70	69	69	70	69	58
Chloride (Cl)	5.27		13.1	6.3	9		6	8	8	7	9	6.0
Copper (Cu)	0.01		0.07	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Iron (Fe) Total	0.1		0.59	0.04	0.15		N/D	N/D	N/D	N/D	0.4	N/D
Iron (Fe) Dissolved	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Lead (Pb)	N/D		0.003	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Magnesium (Mg)	21.5		37	38	32		28	30	30	27	27	29.0
Manganese (Mn) Tot.	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Manganese (Mn) Dis.	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Molybdenum (Mo)	N/D		N/D	N/D	0.2		N/D	N/D	N/D	N/D	N/D	N/D
Nitrogen (NH3)	0.09		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Nitrite (NO2)	N/D		0.04	N/D	0.01		N/D	N/D	N/D	N/D	N/D	N/D
Nitrate (NO3)	0.29		0.24	0.27	0.32		0.1	0.1	0.1	0.2	0.2	0.1
Potassium (K)	0.61		2.5	1.6	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Phosphate (PO4)	N/D		0.03	N/D	0.003		0.02	0.02	0.02	0.03	N/D	N/D
Selenium (Se)	N/D		0.006	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Sodium (Na)	5.1		7.9	7.4	N/D		7	12	12	6	6	5
Sp. Conductivity					523		582	582	582	576	442	578
Sulfate (SO4)	15		27	22	25		19	20	20	25	22	22
Zinc (Z)	0.01		0.06	0.01	N/D		N/D	N/D	N/D	0.01	N/D	N/D
Anions	5.56		6.78	5.45	6		6.3	6.6	6.6	6.6	6.6	
Cations	5.46		7.5	5.62	5.1		6.1	6.4	6.4	6	5.9	
Anion/Cation Balance	0.89%		5.46%	1.50%	-8.10%		-1.30%	-1.60%	-1.60%	-4.90%	5.70%	

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FAX. (801) 653-2436

July 21, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 21, 1993

Date received: June 22, 1993

FBC-6 (SMH-1)
Rec'd 0900 hr.
Sampled 1634 hr.

NOTE: Fluoride was not distilled.

Analysis report no. 59-13206

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	366	.4	mg/l HCO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Total	300	.4	mg/l $CaCO_3$	EPA 310.1	06-29-1993 15:00 LS
Aluminum	<1.00	1	mg/l	EPA 202.1	07-16-1993 13:35 ED
Anions	6.78	----	meq/l	---------	---------- ----- --
Arsenic	0.003	.003	mg/l	EPA 206.2	07-07-1993 09:50 ED
Barium	<0.20	.2	mg/l	EPA 208.1	07-16-1993 16:10 ED
Boron	0.06	.04	mg/l	EPA 212.3	07-19-1993 13:30 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	07-08-1993 14:35 ED
Calcium	81.3	.03	mg/l	EPA 215.1	07-14-1993 11:05 ED
Cations	7.50	----	meq/l	---------	---------- ----- --
Chloride	13.1	.5	mg/l	EPA 325.3	06-29-1993 08:30 LM
Chromium	0.0021	.0003	mg/l	EPA 218.2	07-02-1993 10:50 ED
Copper	0.070	.03	mg/l	EPA 220.1	07-15-1993 16:25 ED
Fluoride	0.19	.02	mg/l	EPA 340.2	07-06-1993 13:00 LS
Hardness, Total	355	.03	mg/l $CaCO_3$	---------	07-14-1993 11:05 ED
Iron	0.59	.05	mg/l	EPA 236.1	06-29-1993 12:00 ED
Iron, Dissolved	0.07	.05	mg/l	EPA 236.1	07-01-1993 11:00 ED
Lead	0.003	.003	mg/l	EPA 239.2	07-07-1993 13:45 ED
Magnesium	37.00	.007	mg/l	EPA 242.1	07-14-1993 16:20 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-29-1993 13:15 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	07-09-1993 14:50 ED
Molybdenum	<0.20	.2	mg/l	EPA 246.1	07-16-1993 14:35 ED
Nickel	<0.08	.08	mg/l	EPA 249.1	07-16-1993 10:50 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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July 21, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

FBC-6 (SMA-1)
Rec'd 0900 hr.
Sampled 1634 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 21, 1993

Date received: June 22, 1993

Analysis report no. 59-13206

meter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
...trogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	07-06-1993 08:00 LS
Nitrogen, Nitrate-Nitrite	0.24	.01	mg/l	EPA 353.3	06-22-1993 10:00 LM
Nitrogen, Nitrite	0.04	.004	mg/l	EPA 354.1	06-22-1993 11:00 LM
Oil & Grease	0.2	1	mg/l	EPA 413.1	07-01-1993 08:00 LM
Phosphorus, Total	0.03	.008	mg/l	EPA 365.2	07-06-1993 14:00 LM
Potassium	2.50	.1	mg/l	EPA 258.1	07-13-1993 18:15 ED
Selenium	0.006	.004	mg/l	EPA 270.2	07-06-1993 12:30 ED
Sodium	7.90	.2	mg/l	EPA 273.1	07-13-1993 16:25 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	06-22-1993 11:30 LM
Solids, Total Dissolved	378.0	14	mg/l	EPA 160.1	06-24-1993 10:00 LM
Solids, Total Suspended	10.0	7	mg/l	EPA 160.2	06-25-1993 14:30 LM
Sulfate	27.0	1	mg/l	EPA 375.4	07-06-1993 10:00 LS
Sulfide	0.10	.9	mg/l	EPA 376.1	06-28-1993 15:25 ED
Zinc	0.06	.03	mg/l	EPA 289.1	07-15-1993 16:00 ED
Cation/Anion Balance	5.46	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Manager, Huntington Laboratory

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FAX (801) 653-2436

October 18, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-6 (SMH-1)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 29, 1993

Date received: August 30, 1993

Rec'd 1100 hr.
Sampled 1430 hr.

NOTE: DUE TO SPILLAGE IN LAB, METALS WERE RUN ON PLAIN BOTTLE. FLUORIDE NOT DISTILLED. CALCIUM DETERMINED ON UNDIGESTED SAMPLE.

Analysis report no. 59-13475

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Nitrate	0.27	.01	mg/l	EPA 353.3	08-30-1993 [illegible]
Nitrogen, Nitrite	0.00	.02	mg/l	EPA 354.1	08-31-1993 [illegible]
Oil & Grease	<1	1	mg/l	EPA 413.1	09 08 [illegible]
Phosphorus, Total	0.000	.008	mg/l	EPA 365.2	09-15 [illegible]
Potassium	1.6	.1	mg/l	EPA 200.7	09 [illegible]
Selenium	<0.002	.002	mg/l	EPA 270.2	09 20 [illegible]
Sodium	7.4	.1	mg/l	EPA 200.7	09-15 [illegible]
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	08-31-1993 [illegible]
Solids, Total Dissolved	324	14	mg/l	EPA 160.1	08 31 [illegible]
Solids, Total Suspended	1	7	mg/l	EPA 160.2	09 01 [illegible]
Sulfate	22	1	mg/l	EPA 375.4	09 [illegible]
Sulfide	<0.9	.1	mg/l	EPA 376.1	09-03-1993 [illegible]
Zinc	0.01	.005	mg/l	EPA 200.7	09 15 [illegible]
Cation/Anion Balance	1.50	----	%	----------	

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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December 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-6 (SMU-1)

Kind of sample reported to us: Water

Rec'd 1430 hr.
Sampled 1043 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1993

Date received: October 15, 1993

NOTE: Holding time expired when Chloride was run.

Analysis report no. 59-13636

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	328	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Total	269	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Aluminum	1	1	mg/l		EPA 202.1	10-28-1993 1630	ED
Anions	6.00	----	meq/l		---------	---------- -----	--
Arsenic	<0.010	.003	mg/l		EPA 206.2	11-23-1993 1115	DW
Boron	0.10	.04	mg/l		EPA 212.3	12-02-1993 1400	LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125	ED
Calcium	50.0	.03	mg/l		EPA 215.1	11-08-1993 1450	ED
Cations	5.10	----	meq/l		---------	---------- -----	--
Chloride	9.0	.5	mg/l		EPA 325.3	11-15-1993 1430	LM
Conductivity	523.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Copper	<0.05	.03	mg/l		EPA 220.1	10-27-1993 1550	ED
Hardness, Total	357.0	.03	mg/l	$CaCO_3$	---------	11-08-1993 1450	ED
Iron	0.15	.05	mg/l		EPA 236.1	11-08-1993 1315	ED
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	11-24-1993 1200	DW
Lead	<0.400	.003	mg/l		EPA 239.2	11-05-1993 1000	ED
Magnesium	32.00	.007	mg/l		EPA 242.1	11-08-1993 1630	ED
Manganese	<0.03	.03	mg/l		EPA 243.1	11-08-1993 1100	ED
Manganese, Dissolved	0.1	.03	mg/l		EPA 243.1	11-29-1993 1500	DW
Molybdenum	0.2	.2	mg/l		EPA 246.1	10-29-1993 1105	ED
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000	LS
Nitrogen, Nitrate	0.32	.01	mg/l		EPA 353.3	10-18-1993 0745	LM
Nitrogen, Nitrite	0.01	.02	mg/l		EPA 354.1	10-15-1993 1500	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Larry L. Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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December 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-6 (SM14-1)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1993

Date received: October 15, 1993

Rec'd 1430 hr.
Sampled 1043 hr.

NOTE: Holding time expired when Chloride was run.

Analysis report no. 59-13636

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorus, Ortho	0.003	.003	mg/l	EPA 365.2	10-16-1993 0950 LM
Potassium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315 ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400 DW
Sodium	<10.0	.2	mg/l	EPA 273.1	11-09-1993 1135 ED
Solids, Total Dissolved	324	14	mg/l	EPA 160.1	10-19-1993 0815 LM
Sulfate	25	1	mg/l	EPA 375.4	11-11-1993 1020 LS
Zinc	<0.03	.03	mg/l	EPA 289.1	10-27-1993 1300 ED
Cation/Anion Balance	-8.10	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Larry Stout

Manager, Huntington Laboratory

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July 11, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-6 (SMH-1)

Rec'd 1620 hr.
Sampled 1255 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 16, 1994

Date received: June 16, 1994

Analysis report no. 59-14160

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	348	1	mg/l as HCO_3	SM2320-B	06-22-1994 1415 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-22-1994 1415 LS
Alkalinity, Total	285	1	mg/l as $CaCO_3$	EPA 310.1	06-22-1994 1415 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-27-1994 1430 DW
Anions	6.30	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-08-1994 0930 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	07-06-1994 1045 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-27-1994 1400 DW
Calcium, Dissolved	70	1	mg/l	EPA 215.1	06-27-1994 1130 DW
Cations	6.10	----	meq/l	---------	---------- ----- --
Chloride	6	1	mg/l	SM4500-Cl-B	06-20-1994 1610 LS
Conductivity	582	1	umhos/cm	SM2510-B	06-17-1994 1255 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-27-1994 1300 DW
Hardness, Total	290	1	mg/l as $CaCO_3$	SM2340-B	06-27-1994 1130 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	07-01-1994 0930 ED
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-27-1994 0730 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-28-1994 0730 DW
Magnesium, Dissolved	28	1	mg/l	EPA 242.1	06-27-1994 1200 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1994 0800 DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-27-1994 0830 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-27-1994 1600 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-17-1994 1000 ED
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l	EPA 353.3	06-23-1994 1030 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-17-1994 1100 LM

Respectfully submitted,
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Manager, Huntington Laboratory

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November 18, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: FBC-1 (MW-1)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1997

Date received: October 16, 1997

Rec'd 1105 hr.
Sampled 1300 hr.

FIELD MEASUREMENTS

pH	8.29
DO	9.6
Flow	40
Conductivity	552
Temperature	45.5°

NOTE: Dissolved metals filtered at lab

Analysis report no. 59-17947

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	371	5	mg/l as HCO_3	SM2320-B	10-23-1997 2020 RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	10-23-1997 2020 RJ
Alkalinity, Total	304	5	mg/l as $CaCO_3$	EPA 310.1	10-23-1997 2020 RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	11-12-1997 0315 MK
Anions	6.8	----	meq/l	---------	11-17-1997 1100 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-02-1997 2115 MK
Boron, Dissolved	0.2	0.1	mg/l	EPA 212.3	10-30-1997 1300 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	11-12-1997 2245 MK
Calcium, Dissolved	60	1	mg/l	EPA 215.1	11-13-1997 0200 MK
Cations	6.0	----	meq/l	---------	11-17-1997 1100 RJ
Chloride	9	1	mg/l	SM4500-Cl-B	10-30-1997 1215 SC
Conductivity	575	1	umhos/cm	SM2510-B	10-21-1997 1400 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	11-12-1997 2145 MK
Hardness, Total	286	----	mg/l as $CaCO_3$	SM2340-B	11-17-1997 1100 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	11-12-1997 2330 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	11-12-1997 2330 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	11-12-1997 2300 MK
Magnesium, Dissolved	33	1	mg/l	EPA 242.1	11-13-1997 1430 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	11-13-1997 0000 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	11-13-1997 0000 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	11-13-1997 0400 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-27-1997 0800 RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	11-14-1997 1500 RJ
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	10-17-1997 0900 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: FBC-1 (MH-1)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1997

Date received: October 16, 1997

Rec'd 1105 hr.
Sampled 1300 hr.

FIELD MEASUREMENTS

pH	8.29
DO	9.6
Flow	40
Conductivity	552
Temperature	45.5°

NOTE: Dissolved metals filtered at lab

Analysis report no. 59-17947

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Oil & Grease	<2	2	mg/l	SM5520-B	11-11-1997 0800 JC
Phosphorous, Total	<0.05	0.05	mg/l as P	SM4500-P-B,E	11-05-1997 1745 MK
Potassium, Dissolved	1	1	mg/l	EPA 258.1	11-13-1997 0045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-03-1997 0100 MK
Sodium, Dissolved	6	1	mg/l	EPA 273.1	11-13-1997 0130 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	10-16-1997 1200 SC
Solids, Total Dissolved	320	10	mg/l	EPA 160.1	10-21-1997 0700 JC
Solids, Total Suspended	<5	5	mg/l	EPA 160.2	10-20-1997 0700 JC
Sulfate	23	5	mg/l	EPA 375.4	10-28-1997 1300 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	11-12-1997 0200 MK
Cation Anion Balance	-6.4	----	%		11-17-1997 1130 RC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

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

July 11, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-6 (SMH-1)

Kind of sample reported to us: Water

Rec'd 1620 hr.
Sampled 1255 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 16, 1994

Date received: June 16, 1994

Analysis report no. 59-14160

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	06-17-1994 0910 LM
Potassium, Dissolved	<2	2	mg/l	EPA 258.1	06-27-1994 0900 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-08-1994 1300 DW
Sodium, Dissolved	7	1	mg/l	EPA 273.1	06-27-1994 0930 DW
Solids, Total Dissolved	306	10	mg/l	EPA 160.1	06-22-1994 1035 LM
Sulfate	19	1	mg/l	EPA 375.4	06-20-1994 1045 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-28-1994 0800 DW
Cation/Anion Balance	-1.30	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Manager, Huntington Laboratory

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FAX: (801) 653-2436

September 21, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-6 (SMH-1)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 30, 1994

Date received: August 31, 1994

Rec'd 1230 hr.
Sampled 1745 hr.

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

Analysis report no. 59-14383

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	334	1	mg/l as HCO_3	SM2320-B	09-06-1994 0945 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-06-1994 0945 LS
Alkalinity, Total	274	1	mg/l as $CaCO_3$	EPA 310.1	09-06-1994 0945 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	09-08-1994 1530 DW
Anions	5.90	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-02-1994 1100 ED
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-16-1994 1100 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	09-08-1994 1200 DW
Calcium, Dissolved	75	5	mg/l	EPA 215.1	09-09-1994 0930 DW
Cations	6.50	----	meq/l	---------	---------- ----- --
Chloride	1	1	mg/l	SM4500-Cl-B	09-06-1994 1500 LS
Conductivity	571	1	umhos/cm	SM2510-B	09-07-1994 1015 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	09-08-1994 1200 DW
Hardness, Total	311	10	mg/l as $CaCO_3$	SM2340-B	09-09-1994 0930 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	09-13-1994 1030 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-09-1994 1430 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	09-08-1994 1100 DW
Magnesium, Dissolved	30	2	mg/l	EPA 242.1	09-09-1994 1030 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-13-1994 1000 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	09-09-1994 1330 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	09-09-1994 1800 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	09-09-1994 1000 ED
Nitrogen, Nitrate-Nitrite	1.2	0.1	mg/l	EPA 353.3	09-20-1994 0920 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	09-01-1994 1100 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jerry Hart CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 21, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-6 (SMH-1)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 30, 1994

Date received: August 31, 1994

Rec'd 1230 hr.
Sampled 1745 hr.

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

Analysis report no. 59-14383

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	09-01-1994 1030	LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	09-09-1994 1300	DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-02-1994 1450	ED
Sodium, Dissolved	7	5	mg/l	EPA 273.1	09-09-1994 1230	DW
Solids, Total Dissolved	370	10	mg/l	EPA 160.1	09-02-1994 1500	LM
Sulfate	21	1	mg/l	EPA 375.4	09-15-1994 1310	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	09-08-1994 1330	DW
Cation/Anion Balance	4.60	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

November 21, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-6 (SMH-1)

Rec'd 1700 hr.
Sampled No Time Given

NOTE: Sample temperature above 6.0C when received. Dissolved metals filtered at Lab. Possible matrix interference with Calcium.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 31, 1994

Date received: October 31, 1994

Analysis report no. 59-14539

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	370	1	mg/l as HCO_3	SM2320-B	11-02-1994 0845 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-02-1994 0845 LS
Alkalinity, Total	300	1	mg/l as $CaCO_3$	EPA 310.1	11-02-1994 0845 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	11-02-1994 1600 DW
Anions	6.60	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-07-1994 1000 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	11-03-1994 1330 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	11-02-1994 1730 DW
Calcium, Dissolved	69	5	mg/l	EPA 215.1	11-01-1994 1500 DW
Cations	6.40	----	meq/l	---------	---------- ----- --
Chloride	8	1	mg/l	SM4500-Cl-B	11-10-1994 0835 LS
Conductivity	582	1	umhos/cm	SM2510-B	11-01-1994 0930 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	11-03-1994 1230 DW
Hardness, Total	300	10	mg/l as $CaCO_3$	SM2340-B	11-01-1994 1500 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	11-17-1994 1445 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	11-02-1994 1700 DW
Magnesium, Dissolved	30	2	mg/l	EPA 242.1	11-02-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-17-1994 1400 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	11-03-1994 1630 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	11-04-1994 0915 ED
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l	EPA 353.3	11-09-1994 1000 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	11-01-1994 0830 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CO

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

November 21, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-6 (SMH-1)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 31, 1994

Date received: October 31, 1994

Rec'd 1700 hr.
Sampled No Time Given

NOTE: Sample temperature above 6.0°C when received. Dissolved metals filtered at Lab. Possible matrix interference with Calcium.

Analysis report no. 59-14539

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	11-01-1994 1120 LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	11-02-1994 0900 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-07-1994 1500 DW
Sodium, Dissolved	12	5	mg/l	EPA 273.1	11-02-1994 0830 DW
Solids, Total Dissolved	340	10	mg/l	EPA 160.1	11-01-1994 0830 LS
Sulfate	20	1	mg/l	EPA 375.4	11-09-1994 1000 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	11-03-1994 1300 DW
Cation/Anion Balance	-1.60	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout SD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

August 13, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-6 (SMH-1)

Kind of sample reported to us: Water

Rec'd 1230 hr.
Sampled 1600 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 29, 1997

Date received: June 30, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17442

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	358	5	mg/l as HCO_3	SM2320-B	07-09-1997 0700 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	07-09-1997 0700 SC
Alkalinity, Total	293	5	mg/l as $CaCO_3$	EPA 310.1	07-09-1997 0700 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	08-05-1997 1315 MK
Anions	6.6	----	meq/l	---------	08-07-1997 1100 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	08-08-1997 1015 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	07-30-1997 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	08-05-1997 0845 MK
Calcium, Dissolved	70	1	mg/l	EPA 215.1	08-05-1997 1200 MK
Cations	6.0	----	meq/l	---------	08-07-1997 1100 RJ
Chloride	7	1	mg/l	SM4500-Cl-B	07-23-1997 0830 SC
Conductivity	576	1	umhos/cm	SM2510-B	07-22-1997 1230 MK
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	08-05-1997 0800 MK
Hardness, Total	286	----	mg/l as $CaCO_3$	SM2340-B	08-07-1997 1100 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	08-05-1997 1000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	08-05-1997 1000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	08-05-1997 0915 MK
Magnesium, Dissolved	27	1	mg/l	EPA 242.1	08-05-1997 1230 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	08-05-1997 1030 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	08-05-1997 1030 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	08-05-1997 1430 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-22-1997 0720 RJ
Nitrogen, Nitrate-Nitrite	0.2	0.1	mg/l as N	EPA 353.3	07-22-1997 0430 AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	07-01-1997 0800 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory BJ

COMMERCIAL TESTING & ENGINEERING CO.

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

August 13, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-6 (SMH-1)

Kind of sample Water
reported to us

Rec'd 1230 hr.
Sampled 1600 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 29, 1997

Date received June 30, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17442

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	07-01-1997 0800	RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	08-05-1997 1045	MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	08-09-1997 0600	MK
Sodium, Dissolved	6	1	mg/l	EPA 273.1	08-05-1997 1130	MK
Solids, Total Dissolved	380	10	mg/l	EPA 160.1	07-03-1997 0700	JC
Sulfate	25	5	mg/l	EPA 375.4	07-21-1997 0830	SC
Zinc, Dissolved	0.01	0.01	mg/l	EPA 289.1	08-05-1997 0815	MK
Cation/Anion Balance	-4.9	----	%		08-07-1997 1100	RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory RO

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

October 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-6 (SMH-1)

Rec'd 1715 hr.
Sampled 1412 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 11, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17765

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	362	5	mg/l as HCO_3	SM2320-B	09-24-1997 0730 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	09-24-1997 0730 SC
Alkalinity, Total	297	5	mg/l as $CaCO_3$	EPA 310.1	09-24-1997 0730 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	09-27-1997 0245 MK
Anions	6.6	----	meq/l	---------	10-08-1997 0900 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-27-1997 1900 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-29-1997 1500 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	09-26-1997 2300 MK
Calcium, Dissolved	69	1	mg/l	EPA 215.1	09-27-1997 0145 MK
Cations	5.9	----	meq/l	---------	10-08-1997 0900 RJ
Chloride	9	1	mg/l	SM4500-Cl-B	10-02-1997 1215 SC
Conductivity	442	1	umhos/cm	SM2510-B	09-22-1997 1230 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	09-26-1997 2200 MK
Hardness, Total	283	----	mg/l as $CaCO_3$	SM2340-B	10-08-1997 0900 RJ
Iron, Total	0.4	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	09-26-1997 2315 MK
Magnesium, Dissolved	27	1	mg/l	EPA 242.1	09-27-1997 0200 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	09-27-1997 0330 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-07-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	0.2	0.1	mg/l as N	EPA 353.3	09-22-1997 0730 RJ
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-12-1997 0700 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

COMMERCIAL TESTING & ENGINEERING CO.

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HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

October 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-6 (SMH-1)

Rec'd 1715 hr.
Sampled 1412 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 11, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17765

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.01	0.01	mg/l as P	SM4500-P-E	09-11-1997 1730 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	09-27-1997 0045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-28-1997 1430 MK
Sodium, Dissolved	6	1	mg/l	EPA 273.1	09-27-1997 0115 MK
Solids, Total Dissolved	330	10	mg/l	EPA 160.1	09-17-1997 0700 JC
Sulfate	22	5	mg/l	EPA 375.4	10-07-1997 0800 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	09-26-1997 2215 MK
Cation/Anion Balance	5.7	----	%		10-08-1997 0900 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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

November 20, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: FBC-6 (SMH-1)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1997

Date received: October 16, 1997

Rec'd 1105 hr.
Sampled 1405 hr.

FIELD MEASUREMENTS

pH	7.44
Flow	20
Conductivity	628
Temperature	56°

NOTE: Dissolved metals filtered at lab

Analysis report no. 59-17949

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	383	5	mg/l as HCO_3	SM2320-B	10-23-1997 2020 RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	10-23-1997 2020 RJ
Alkalinity, Total	314	5	mg/l as $CaCO_3$	EPA 310.1	10-23-1997 2020 RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	11-12-1997 0315 MK
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-02-1997 2115 MK
Boron, Dissolved	0.2	0.1	mg/l	EPA 212.3	10-30-1997 1300 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	11-12-1997 2245 MK
Calcium, Dissolved	58	1	mg/l	EPA 215.1	11-13-1997 0200 MK
Chloride	6	1	mg/l	SM4500-Cl-B	10-30-1997 1215 SC
Conductivity	578	1	umhos/cm	SM2510-B	10-21-1997 1400 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	11-12-1997 2145 MK
Hardness, Total	264	----	mg/l as $CaCO_3$	SM2340-B	11-17-1997 1100 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	11-12-1997 2330 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	11-12-1997 2330 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	11-12-1997 2300 MK
Magnesium, Dissolved	29	1	mg/l	EPA 242.1	11-13-1997 1430 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	11-13-1997 0000 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	11-13-1997 0000 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	11-13-1997 0400 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-27-1997 0800 RJ
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l as N	EPA 353.3	11-14-1997 1500 JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	10-17-1997 0900 RJ
Phosphorous, Total	<0.05	0.05	mg/l as P	SM4500-P-B,E	11-05-1997 1745 MK
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	11-13-1997 0045 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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FAX: (801) 653-2436

November 20, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: FBC-6 (SMH-1)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1997

Date received: October 16, 1997

Rec'd 1105 hr.
Sampled 1405 hr.

FIELD MEASUREMENTS

pH	7.44
Flow	20
Conductivity	628
Temperature	56°

NOTE: Dissolved metals filtered at lab

Analysis report no. 59-17949

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-03-1997 0100 MK
Sodium, Dissolved	5	1	mg/l	EPA 273.1	11-13-1997 0130 MK
Solids, Total Dissolved	310	10	mg/l	EPA 160.1	10-21-1997 0700 JC
Sulfate	22	10	mg/l	EPA 375.4	10-28-1997 1400 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	11-12-1997 2200 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

WATER MONITORING REPORT

Property: Co-op
Station: FBC-7
Location: Trail Canyon Trough
Type: Spring

Field Measurements	Date Sampled 07/30/91	10/12/92	03/22/93	06/21/93	08/29/93	10/15/93	03/30/94	06/15/94	08/30/94	10/31/94	06/24/97	09/11/97	10/15/97
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op	Co-Op
Flow (gpm)	2.1	0.7	Inaccess	27	25	13	Inaccess	15	8	3	35	20	15
pH	8.2	7.28	N/A	6.63	7.83	7.4	N/A	7.38	7.8	7.81	7.89	7.43	7.22
Sp. Cond. (ohms)	700	563	N/A	630	590	588	N/A	580	542	590	604	446	456
Temp (C)	N/R	7.78	N/A	5.2	9.8	5	N/A	5	6.7	7.6	6.7	8.2	13.3
Lab Measurements													
Analyzed by:	IML	CT&E	N/A	CT&E	CT&E	CT&E	N/A	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E
TDS (mg/L)	440	301		340	301	284		250	260	260	280	280	260
Hardness (CaCO3)	368	286		301	264.7	256		256	244	290	247	254	246
Aluminum (Al)	7	0.03		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Arsenic (As)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Boron (B)	N/D	N/D		0.05	N/D	0.1		0.1	0.1	0.1	N/D	N/D	0.1
Carbonate (CO3)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Bicarbonate (HCO3)	333	295		311	298	297		305	283	280	269	321	314
Cadmium (Cd)	N/D	0.03		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Calcium (Ca)	53.4	83.6		70.6	62	63		63	58	57	61	62	59
Chloride (Cl)	5.07	45		7.6	5.3	9		5	7	8	6	6	6
Copper (Cu)	0.03	0.011		0.06	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Iron (Fe) Total	7.1	N/D		0.32	0.16	0.16		N/D	N/D	N/D	N/D	N/D	N/D
Iron (Fe) Dissolved						N/D		N/D	N/D	N/D	N/D	N/D	N/D
Lead (Pb)	N/D	N/D		0.003	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Magnesium (Mg)	57.1	18.7		30.2	43	24		24	24	24	23	24	24
Manganese (Mn) Total	0.16	N/D		N/D	0.05	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Manganese (Mn) Dis.						0.1		N/D	N/D	N/D	N/D	N/D	N/D
Molybdenum (Mo)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Nitrogen (NH3)	0.05	0.02		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Nitrite (NO2)	N/D	N/D		0.03	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Nitrate (NO3)	0.21	N/D		0.29	0.27	0.4		0.3	0.4	0.4	0.30	N/D	0.6
Potassium (K)	5.04	N/D		2	20	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Phosphate (PO4)	0.5	N/D		N/D	N/D	N/D		0.02	N/D	0.02	0.03	0.02	N/D
Selenium (Se)	N/D	N/D		0.005	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Sodium (Na)	10.1	2.21		6.4	15	N/D		5	8	9	5	6	4
Sp. Conductivity						499		502	475	488	510	488	499
Sulfate (SO4)	96.3	17		16	14	15		15	10	16	14	13	13
Zinc (Z)	0 03	N/D		N/D	0.1	N/D		N/D	N/D	N/D	0.02	N/D	0.01
Anions	7.63	6 34		5.52	5.21	5 3		5 4	5	5.2		5.7	
Cations	7 93	5 81		6.33	6.02	5 1		5 3	5 2	5.2		5.3	
Anion/Cation Balance	1 94%	4 33%		6.82%	7.19%	1 90%		0 35%	1.70%	0 50%		3.40%	

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P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

November 12, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 12, 1992

Date received: October 13, 1992

#17 (FBC-7)
Rec'd 1000 hr.
Sampled 1708 hr.

Analysis report no. 59-12580

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
[illegible]city	2	1	mg/l $CaCO_3$	EPA 305.1	10-26-1992 08:00 LS
[illegible]linity, Bicarbonate	295	1	mg/l $CaCO_3$	EPA 310.1	10-29-1992 10:30 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	10-29-1992 10:30 LS
Alkalinity, Total	242	1	mg/l $CaCO_3$	EPA 310.1	10-29-1992 10:30 LS
Aluminum	0.03	.5	mg/l	EPA 202.1	10-27-1992 10:20 JS
Anions	6.34	----	meq/l	---------	---------- ----- --
Arsenic	0.000	.002	mg/l	EPA 206.2	11-10-1992 10:50 JS
Barium	0.02	.03	mg/l	EPA 208.1	10-27-1992 10:20 JS
Boron	0.00	.01	mg/l	EPA 212.3	10-20-1992 15:35 LM
Cadmium	0.030	.00	mg/l	EPA 213.2	11-10-1992 12:10 JS
Calcium	83.6	.1	mg/l	EPA 215.1	10-26-1992 12:50 JS
Cations	5.81	----	meq/l	---------	---------- ----- --
Chloride	45.0	.1	mg/l	EPA 325.3	10-21-1992 15:30 LM
Chromium	0.04	.001	mg/l	EPA 218.2	11-10-1992 12:10 JS
Copper	0.011	.01	mg/l	EPA 220.1	10-27-1992 09:30 JS
Fluoride	0.02	.01	mg/l	EPA 340.2	10-23-1992 11:15 LS
Hardness, Total	286	1	mg/l $CaCO_3$	---------	10-26-1992 12:50 JS
Iron	0.00	.02	mg/l	EPA 236.1	10-27-1992 14:20 JS
Lead	0.000	.001	mg/l	EPA 239.2	11-10-1992 12:10 JS
Magnesium	18.70	.01	mg/l	EPA 242.1	10-26-1992 12:50 JS
Manganese	0.00	.01	mg/l	EPA 243.1	10-27-1992 14:20 JS
Mercury	0.000	.002	mg/l	EPA 245.1	10-15-1992 11:35 JS
Molybdenum	0.00	.1	mg/l	EPA 246.1	10-27-1992 10:30 JS
Nickel	0.09	.02	mg/l	EPA 249.1	10-27-1992 09:20 JS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

November 12, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 12, 1992

Date received: October 13, 1992

#17 (FBC-7)
Rec'd 1000 hr.
Sampled 1708 hr.

Analysis report no. 59-12580

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
›gen, Ammonia	0.02	.01	mg/l	EPA 350.3	10-23-1992 14:00 LS
›rogen, Nitrate	0.00	.01	mg/l	EPA 353.3	10-13-1992 13:00 LM
Nitrogen, Nitrite	0.00	.01	mg/l	EPA 354.1	10-13-1992 13:00 LM
Oil & Grease	0.0	1	mg/l	EPA 413.1	10-15-1992 14:00 LM
Phosphorus, Total	0.00	.01	mg/l	EPA 365.2	10-13-1992 15:30 LM
Potassium	0.00	.01	mg/l	EPA 258.1	10-26-1992 12:50 JS
Selenium	0.000	.002	mg/l	EPA 270.2	11-10-1992 10:50 JS
Sodium	2.21	.01	mg/l	EPA 273.1	10-26-1992 12:50 JS
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	10-13-1992 11:30 LM
Solids, Total Dissolved	301.0	.5	mg/l	EPA 160.1	10-13-1992 11:30 LM
Solids, Total Suspended	3.0	.5	mg/l	EPA 160.2	10-13-1992 11:30 LM
Sulfate	17.0	.1	mg/l	EPA 375.4	10-26-1992 13:40 LS
Sulfide	1.00	.1	mg/l	EPA 376.1	10-16-1992 14:15 LM
Zinc	0.00	.01	mg/l	EPA 289.1	10-27-1992 09:20 JS
Cation/Anion Balance	-4.33	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jim Komar

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 20, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 21, 1993

Date received June 22, 1993

FBC-7 (FBC-7)
Rec'd 0900 hr.
Sampled 1440 hr.

NOTE: Fluoride not distilled.

Analysis report no. 59-13208

meter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	311	2	mg/l HCO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Carbonate	0	1	mg/l CO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Total	255	2	mg/l $CaCO_3$	EPA 310.1	06-29-1993 15:00 LS
Aluminum	<1.00	1	mg/l	EPA 202.1	07-16-1993 13:35 ED
Anions	5.52	----	meq/l	---	--- ----- --
Arsenic	<0.003	.003	mg/l	EPA 206.2	07-07-1993 09:50 ED
Barium	<0.20	.2	mg/l	EPA 208.1	07-16-1993 16:10 ED
Boron	0.05	.04	mg/l	EPA 212.3	06-28-1993 14:00 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	07-08-1993 14:35 ED
Calcium	70.6	.03	mg/l	EPA 215.1	07-14-1993 11:05 ED
Cations	6.33	----	meq/l	---	--- ----- --
Chloride	7.6	.5	mg/l	EPA 325.3	06-29-1993 08:30 LM
Chromium	0.0010	.0003	mg/l	EPA 218.2	07-02-1993 10:50 ED
Copper	0.060	.03	mg/l	EPA 220.1	07-15-1993 16:25 ED
Fluoride	0.22	.02	mg/l	EPA 340.2	07-06-1993 13:00 LS
Hardness, Total	301	.03	mg/l $CaCO_3$	---	07-14-1993 11:05 ED
Iron	0.32	.05	mg/l	EPA 236.1	06-29-1993 12:00 ED
Iron, Dissolved	0.12	.05	mg/l	EPA 236.1	07-01-1993 11:00 ED
Lead	0.003	.003	mg/l	EPA 239.2	07-07-1993 13:45 ED
Magnesium	30.20	.007	mg/l	EPA 242.1	07-14-1993 16:20 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-29-1993 13:15 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	07-09-1993 14:50 ED
Molybdenum	<0.20	.2	mg/l	EPA 246.1	07-16-1993 14:35 ED
Nickel	<0.08	.08	mg/l	EPA 249.1	07-16-1993 10:50 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

July 20, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample Water
reported to us

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 21, 1993

Date received June 22, 1993

FBC-7
Rec'd 0900 hr.
Sampled 1440 hr.

NOTE: Fluoride not distilled.

Analysis report no. 59-13208

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	07-06-1993 08:00 LS
Nitrogen, Nitrate	0.29	.01	mg/l	EPA 353.3	06-22-1993 10:00 LM
Nitrogen, Nitrite	0.03	.02	mg/l	EPA 354.1	06-22-1993 11:00 LM
Oil & Grease	0.4	1	mg/l	EPA 413.1	07-01-1993 08:00 LM
Phosphorus, Total	0.00	.008	mg/l	EPA 365.2	07-06-1993 14:00 LM
Potassium	2.00	.1	mg/l	EPA 258.1	07-13-1993 18:15 ED
Selenium	0.005	.004	mg/l	EPA 270.2	07-06-1993 12:30 ED
Sodium	6.40	.2	mg/l	EPA 273.1	07-13-1993 16:25 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	06-22-1993 11:30 LM
Solids, Total Dissolved	340.0	14	mg/l	EPA 160.1	06-24-1993 10:00 LM
Solids, Total Suspended	3.0	7	mg/l	EPA 160.2	06-25-1993 14:30 LM
Sulfate	16.0	1	mg/l	EPA 375.4	07-06-1993 10:00 LS
Sulfide	0.20	.9	mg/l	EPA 376.1	06-28-1993 15:35 ED
Zinc	<0.03	.03	mg/l	EPA 289.1	07-15-1993 16:00 ED
Cation/Anion Balance	6.82	----	%	---------	---------- ----- --

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

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 18, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-7

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 29, 1993

Date received: August 30, 1993

Rec'd 1100 hr.
Sampled 1222 hr.

Note: DUE TO SPILLAGE IN LAB, METALS WERE RUN ON PLAIN BOTTLE.
FLUORIDE NOT DISTILLED.
SODIUM DETERMINED ON UNDIGESTED SAMPLE.

Analysis report no. 59-13473

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	298	2	mg/l	$CaCO_3$	EPA 310.1	09 08 1993 1220
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220
Alkalinity, Total	245	2	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220
Aluminum	0	.05	mg/l		EPA 200.7	09-15-1993 1616
Anions	5.21	----	meq/l		---------	-- -- - -
Arsenic	<0.002	.002	mg/l		EPA 206.2	09-12-1993 1015
Barium	0.1	.005	mg/l		EPA 200.7	09-15-1993 1616
Boron	<0.05	.01	mg/l		EPA 200.7	09 16 1993 1330
Cadmium	<0.0050	.005	mg/l		EPA 200.7	09-15-1993 1616
Calcium	62.0	.1	mg/l		EPA 200.7	09-15-1993 1616
Cations	6.02	----	meq/l		---------	---- --
Chloride	5.3	.5	mg/l		EPA 325.3	09 07-1993 1300
Chromium	<0.0	.005	mg/l		EPA 200.7	09 15 1993 1616
Copper	<0.01	.005	mg/l		EPA 200.7	09 15 1993 1616
Fluoride	0.40	.02	mg/l		EPA 340.2	09-13-1993 1300
Hardness, Total	264.7	.03	mg/l	$CaCO_3$	---------	09-15-1993 1616
Iron	0.16	.01	mg/l		EPA 200.7	09-15-1993 1616
Lead	<0.050	.05	mg/l		EPA 200.7	09-15-1993 1616
Magnesium	43.00	.1	mg/l		EPA 200.7	09-15-1993 1616
Manganese	0.05	.01	mg/l		EPA 200.7	09-15 1993 1616
Mercury	<0.0004	.0002	mg/l		EPA 245.1	09 12 1993 1015
Molybdenum	<0.1	.1	mg/l		EPA 200.7	09-15-1993 1616
Nickel	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	09-22-1993 0862

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

October 18, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-7

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 29, 1993

Date received: August 30, 1993

Rec'd 1100 hr.
Sampled 1222 hr.

Note: DUE TO SPILLAGE IN LAB, METALS WERE RUN ON PLAIN BOTTLE.
FLUORIDE NOT DISTILLED.
SODIUM DETERMINED ON UNDIGESTED SAMPLE.

Analysis report no. 59-13473

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Nitrate	0.27	.01	mg/l	EPA 353.3	08 30 1993 1145 [illegible]
Nitrogen, Nitrite	0.00	.02	mg/l	EPA 354.1	08-31-1993 0930 [illegible]
Oil & Grease	1	1	mg/l	EPA 413.1	09 08 1993 1310 [illegible]
Phosphorus, Total	0.000	.008	mg/l	EPA 365.2	09-15-1993 0730 [illegible]
Potassium	20.0	.1	mg/l	EPA 200.7	09-15-1993 1615 [illegible]
Selenium	<0.002	.002	mg/l	EPA 270.2	09-20-1993 1900 [illegible]
Sodium	15.0	.1	mg/l	EPA 200.7	09-15-1993 1615 [illegible]
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	08-31-1993 0730 [illegible]
Solids, Total Dissolved	301	14	mg/l	EPA 160.1	08-31-1993 1100 [illegible]
Solids, Total Suspended	8	7	mg/l	EPA 160.2	09-01-1993 0830 [illegible]
Sulfate	14	1	mg/l	EPA 375.4	09-24 1993 0800 [illegible]
Sulfide	<0.9	.1	mg/l	EPA 376.1	09-03-1993 1515 [illegible]
Zinc	0.10	.005	mg/l	EPA 200.7	09 15-1993 1615 [illegible]
Cation/Anion Balance	7.19	----	%	---------	----------

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

December 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-7

Rec'd 1430 hr.
Sampled 1225 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1993

Date received: October 15, 1993

Analysis report no. 59-13632

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	297	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950 LS
Alkalinity, Total	244	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950 LS
Aluminum	<1	1	mg/l		EPA 202.1	10-28-1993 1630 ED
Anions	5.30	----	meq/l		---------	---------- ----- --
Arsenic	<0.010	.003	mg/l		EPA 206.2	11-23-1993 1115 DW
Boron	0.10	.04	mg/l		EPA 212.3	11-30-1993 1500 LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125 ED
Calcium	63.0	.03	mg/l		EPA 215.1	11-08-1993 1450 ED
Cations	5.10	----	meq/l		---------	---------- ----- --
Chloride	9.0	.5	mg/l		EPA 325.3	11-01-1993 0900 LM
Conductivity	499.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945 ED
Copper	<0.05	.03	mg/l		EPA 220.1	10-27-1993 1550 ED
Hardness, Total	256.0	.03	mg/l	$CaCO_3$	---------	11-08-1993 1450 ED
Iron	0.16	.05	mg/l		EPA 236.1	11-08-1993 1315 ED
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	11-24-1993 1200 DW
Lead	<0.400	.003	mg/l		EPA 239.2	11-05-1993 1000 ED
Magnesium	24.00	.007	mg/l		EPA 242.1	11-08-1993 1630 ED
Manganese	<0.03	.03	mg/l		EPA 243.1	11-08-1993 1100 ED
Manganese, Dissolved	0.1	.03	mg/l		EPA 243.1	11-29-1993 1500 DW
Molybdenum	<0.2	.2	mg/l		EPA 246.1	10-29-1993 1105 ED
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000 LS
Nitrogen, Nitrate	0.40	.01	mg/l		EPA 353.3	10-18-1993 0745 LM
Nitrogen, Nitrite	0.00	.02	mg/l		EPA 354.1	10-15-1993 1500 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

December 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-7

Rec'd 1430 hr.
Sampled 1225 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1993

Date received: October 15, 1993

Analysis report no. 59-13632

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
sphorus, Ortho	0.000	.003	mg/l	EPA 365.2	10-16-1993 0950 LM
assium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315 ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400 DW
Sodium	<10.0	.2	mg/l	EPA 273.1	11-09-1993 1135 ED
Solids, Total Dissolved	284	14	mg/l	EPA 160.1	10-19-1993 0815 LM
Sulfate	15	1	mg/l	EPA 375.4	11-11-1993 1020 LS
Zinc	<0.03	.03	mg/l	EPA 289.1	10-27-1993 1300 ED
Cation/Anion Balance	-1.90	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 14, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-7

Rec'd 1015 hr.
Sampled 1238 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 15, 1994

Date received June 16, 1994

Analysis report no. 59-14146

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	305	1	mg/l as HCO_3	SM2320-B	06-16-1994 1310 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-16-1994 1310 LS
Alkalinity, Total	250	1	mg/l as $CaCO_3$	EPA 310.1	06-16-1994 1310 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-27-1994 1430 DW
Anions	5.40	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-13-1994 1300 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	07-06-1994 1045 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-27-1994 1400 DW
Calcium, Dissolved	63	1	mg/l	EPA 215.1	06-23-1994 1130 DW
Cations	5.30	----	meq/l	---------	---------- ----- --
Chloride	5	1	mg/l	SM4500-Cl-B	06-20-1994 1610 LS
Conductivity	502	1	umhos/cm	SM2510-B	06-17-1994 1255 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-27-1994 1300 DW
Hardness, Total	256	1	mg/l as $CaCO_3$	SM2340-B	06-23-1994 1130 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-23-1994 0900 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-22-1994 1400 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-28-1994 0730 DW
Magnesium, Dissolved	24	1	mg/l	EPA 242.1	06-23-1994 1200 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-23-1994 0830 DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-22-1994 1600 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-27-1994 1600 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-17-1994 1000 ED
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l	EPA 353.3	06-23-1994 1030 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-17-1994 1100 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hunt SD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 14, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-7

Rec'd 1015 hr.
Sampled 1238 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 15, 1994

Date received June 16, 1994

Analysis report no. 59-14146

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
sphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	06-16-1994 1615 LM
assium, Dissolved	<2	2	mg/l	EPA 258.1	06-23-1994 0945 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-13-1994 1600 DW
Sodium, Dissolved	5	1	mg/l	EPA 273.1	06-23-1994 1100 DW
Solids, Total Dissolved	250	10	mg/l	EPA 160.1	06-17-1994 1600 LM
Sulfate	12	1	mg/l	EPA 375.4	06-16-1994 1340 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-28-1994 0800 DW
Cation/Anion Balance	-0.50	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Terry Stout CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-7

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 30, 1994

Date received: August 31, 1994

Rec'd 1230 hr.
Sampled 1550 hr.

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14377

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	283	1	mg/l as HCO_3	SM2320-B	09-01-1994 0830 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-01-1994 0830 LS
Alkalinity, Total	232	1	mg/l as $CaCO_3$	EPA 310.1	09-01-1994 0830 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	09-08-1994 1530 DW
Anions	5.00	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-02-1994 1100 ED
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-14-1994 1300 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	09-08-1994 1200 DW
Calcium, Dissolved	58	5	mg/l	EPA 215.1	09-09-1994 0930 DW
Cations	5.20	----	meq/l	---------	---------- ----- --
Chloride	7	1	mg/l	SM4500-Cl-B	09-06-1994 1015 ED
Conductivity	475	1	umhos/cm	SM2510-B	09-07-1994 1015 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	09-08-1994 1200 DW
Hardness, Total	244	10	mg/l as $CaCO_3$	SM2340-B	09-09-1994 0930 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	09-13-1994 1030 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-09-1994 1430 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	09-09-1994 1100 DW
Magnesium, Dissolved	24	2	mg/l	EPA 242.1	09-09-1994 1030 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-13-1994 1000 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	09-09-1994 1330 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	09-09-1994 1800 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	09-08-1994 0930 ED
Nitrogen, Nitrate-Nitrite	0.4	0.1	mg/l	EPA 353.3	09-09-1994 0800 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	09-01-1994 1100 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-F

Kind of sample reported to us: Water

Rec'd 1230 hr.
Sampled 1550 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE:Dissolved metals filtered at Lab.

Date sampled August 30, 1994

Date received August 31, 1994

Analysis report no. 59-14377

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	09-01-1994 1030 LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	09-09-1994 1300 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-06-1994 1030 ED
Sodium, Dissolved	8	5	mg/l	EPA 273.1	09-09-1994 1230 DW
Solids, Total Dissolved	260	10	mg/l	EPA 160.1	09-02-1994 1500 LM
Sulfate	10	1	mg/l	EPA 375.4	09-08-1994 1030 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	09-08-1994 1330 DW
Cation/Anion Balance	1.70	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-7

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 31, 1994

Date received: October 31, 1994

Rec'd 1700 hr.
Sampled 1135 hr.

NOTE: Sample temperature above 6.0°C when received. Dissolved metals filtered at Lab.

Analysis report no. 59-14536

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	280	1	mg/l	as HCO_3	SM2320-B	11-01-1994 1545	LS
Alkalinity, Carbonate	<1	1	mg/l	as CO_3	SM2320-B	11-01-1994 1545	LS
Alkalinity, Total	230	1	mg/l	as $CaCO_3$	EPA 310.1	11-01-1994 1545	LS
Aluminum, Dissolved	<2	2	mg/l		EPA 202.1	11-02-1994 1600	DW
Anions	5.20	----	meq/l		---------	---------- -----	--
Arsenic, Dissolved	<0.01	0.01	mg/l		EPA 206.2	11-07-1994 1000	DW
Boron, Dissolved	0.1	0.1	mg/l		EPA 212.3	11-03-1994 1330	LM
Cadmium, Dissolved	<0.02	0.02	mg/l		EPA 213.1	11-02-1994 1730	DW
Calcium, Dissolved	57	5	mg/l		EPA 215.1	11-01-1994 1500	DW
Cations	5.20	----	meq/l		---------	---------- -----	--
Chloride	8	1	mg/l		SM4500-Cl-B	11-10-1994 0835	LS
Conductivity	488	1	umhos/cm		SM2510-B	11-01-1994 0930	ED
Copper, Dissolved	<0.2	0.2	mg/l		EPA 220.1	11-03-1994 1230	DW
Hardness, Total	290	10	mg/l	as $CaCO_3$	SM2340-B	11-01-1994 1500	DW
Iron, Total	<0.2	0.2	mg/l		EPA 236.1	11-02-1994 1200	DW
Iron, Dissolved	<0.2	0.2	mg/l		EPA 236.1	11-02-1994 1200	DW
Lead, Dissolved	<0.2	0.2	mg/l		EPA 239.1	11-02-1994 1700	DW
Magnesium, Dissolved	24	2	mg/l		EPA 242.1	11-02-1994 0730	DW
Manganese, Total	<0.2	0.2	mg/l		EPA 243.1	11-02-1994 1100	DW
Manganese, Dissolved	<0.2	0.2	mg/l		EPA 243.1	11-02-1994 1100	DW
Molybdenum, Dissolved	<0.2	0.2	mg/l		EPA 246.1	11-03-1994 1630	DW
Nitrogen, Ammonia	<0.4	0.4	mg/l		EPA 350.3	11-04-1994 0915	ED
Nitrogen, Nitrate-Nitrite	0.4	0.1	mg/l		EPA 353.3	11-09-1994 1000	LM
Nitrogen, Nitrite	<0.01	0.01	mg/l		EPA 354.1	11-01-1994 0830	LM

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

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
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TEL: (801) 653-2311
FAX: (801) 653-2436

November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-7

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 31, 1994

Date received: October 31, 1994

Rec'd 1700 hr.
Sampled 1135 hr.

NOTE: Sample temperature above 6.0C when received. Dissolved metals filtered at Lab.

Analysis report no. 59-14536

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	11-01-1994 1120	LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	11-02-1994 0900	DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-07-1994 1500	DW
Sodium, Dissolved	9	5	mg/l	EPA 273.1	11-02-1994 0830	DW
Solids, Total Dissolved	260	10	mg/l	EPA 160.1	11-01-1994 0830	LS
Sulfate	16	1	mg/l	EPA 375.4	11-09-1994 1000	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	11-03-1994 1300	DW
Cation/Anion Balance	0.50	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Manager, Huntington Laboratory

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

July 30, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-7

Kind of sample reported to us: Water

Rec'd 0718 hr.
Sampled 1325 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 24, 1997

Date received: June 25, 1997

NOTE:Dissolved metals filtered at lab!

Analysis report no. 59-17371

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	269	5	mg/l as HCO_3	SM2320-B	06-28-1997 1530 RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	06-28-1997 1530 RJ
Alkalinity, Total	267	5	mg/l as $CaCO_3$	EPA 310.1	06-28-1997 1530 RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	07-29-1997 1315 MK
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-18-1997 0800 MK
Boron, Dissolved	<0.1	0.1	mg/l	EPA 212.3	07-16-1997 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	07-29-1997 0900 MK
Calcium, Dissolved	61	1	mg/l	EPA 215.1	07-29-1997 1215 MK
Chloride	6	1	mg/l	SM4500-Cl-B	07-02-1997 1400 RJ
Conductivity	510	1	umhos/cm	SM2510-B	06-30-1997 0455 RJ
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	07-29-1997 0800 MK
Hardness, Total	247	----	mg/l as $CaCO_3$	SM2340-B	07-29-1997 1600 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	07-29-1997 1000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-29-1997 1000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	07-29-1997 0910 MK
Magnesium, Dissolved	23	1	mg/l	EPA 242.1	07-29-1997 1230 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-29-1997 1015 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	07-29-1997 1015 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	07-29-1997 1500 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-21-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l as N	EPA 353.3	07-17-1997 0500 AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	06-25-1997 1330 JC
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	06-25-1997 1030 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	07-29-1997 1115 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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

July 30, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-7

Kind of sample reported to us: Water

Rec'd 0718 hr.
Sampled 1325 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 24, 1997

Date received: June 25, 1997

NOTE:Dissolved metals filtered at lab!

Analysis report no. 59-17371

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-18-1997 1130 MK
Sodium, Dissolved	5	1	mg/l	EPA 273.1	07-29-1997 1130 MK
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	06-26-1997 0700 JC
Sulfate	14	5	mg/l	EPA 375.4	07-15-1997 0800 SC
Zinc, Dissolved	0.02	0.01	mg/l	EPA 289.1	07-29-1997 0815 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Huntington Laboratory

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HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

October 14, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-7

Kind of sample reported to us: Water

Rec'd 1030 hr.
Sampled 1800 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 11, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17742

Parameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	321	5	mg/l	as HCO_3	SM2320-B	09-19-1997 1430	SC
Alkalinity, Carbonate	<5	5	mg/l	as CO_3	SM2320-B	09-19-1997 1430	SC
Alkalinity, Total	263	5	mg/l	as $CaCO_3$	EPA 310.1	09-19-1997 1430	SC
Aluminum, Dissolved	<1	1	mg/l		EPA 202.1	09-25-1997 2145	MK
Anions	5.7	----	meq/l		---------	10-08-1997 0900	RJ
Arsenic, Dissolved	<0.01	0.01	mg/l		EPA 206.2	09-24-1997 1745	MK
Boron, Dissolved	<0.1	0.1	mg/l		EPA 212.3	09-29-1997 1500	MK
Cadmium, Dissolved	<0.01	0.01	mg/l		EPA 213.1	09-25-1997 1745	MK
Calcium, Dissolved	62	1	mg/l		EPA 215.1	09-25-1997 2030	MK
Cations	5.3	----	meq/l		---------	10-08-1997 0900	RJ
Chloride	6	1	mg/l		SM4500-Cl-B	10-02-1997 0930	SC
Conductivity	488	1	umhos/cm		SM2510-B	09-22-1997 1140	SC
Copper, Dissolved	<0.1	0.1	mg/l		EPA 220.1	09-25-1997 1645	MK
Hardness, Total	254	----	mg/l	as $CaCO_3$	SM2340-B	10-08-1997 0900	RJ
Iron, Total	<0.1	0.1	mg/l		EPA 236.1	09-25-1997 1830	MK
Iron, Dissolved	<0.1	0.1	mg/l		EPA 236.1	09-25-1997 1830	MK
Lead, Dissolved	<0.1	0.1	mg/l		EPA 239.1	09-25-1997 1800	MK
Magnesium, Dissolved	24	1	mg/l		EPA 242.1	09-25-1997 2100	MK
Manganese, Total	<0.1	0.1	mg/l		EPA 243.1	09-25-1997 1845	MK
Manganese, Dissolved	<0.1	0.1	mg/l		EPA 243.1	09-25-1997 1845	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l		EPA 246.1	09-25-1997 2230	MK
Nitrogen, Ammonia	<0.5	0.5	mg/l	as N	EPA 350.3	09-26-1997 0900	SC
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l	as N	EPA 353.3	09-20-1997 0600	RJ
Nitrogen, Nitrite	<0.01	0.01	mg/l	as N	EPA 354.1	09-12-1997 0700	JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

October 14, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-7

Kind of sample reported to us: Water

Rec'd 1030 hr.
Sampled 1800 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 11, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17742

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	09-11-1997 1315 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	09-25-1997 1915 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-24-1997 2145 MK
Sodium, Dissolved	6	1	mg/l	EPA 273.1	09-25-1997 1945 MK
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	09-15-1997 0700 JC
Sulfate	13	5	mg/l	EPA 375.4	10-06-1997 1215 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	09-25-1997 1715 MK
Cation/Anion Balance	3.4	----	%		10-08-1997 0900 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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

November 20, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: FBC-7

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1997

Date received: October 16, 1997

Rec'd 1105 hr.
Sampled 1530 hr.

FIELD MEASUREMENTS

pH	7.22
Flow	15
Conductivity	456
Temperature	56°

NOTE: Dissolved metals filtered at lab

Analysis report no. 59-17951

Parameter	Result	MRL	Units			Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	314	5	mg/l	as	HCO_3	SM2320-B	10-23-1997 2020	RJ
Alkalinity, Carbonate	<5	5	mg/l	as	CO_3	SM2320-B	10-23-1997 2020	RJ
Alkalinity, Total	258	5	mg/l	as	$CaCO_3$	EPA 310.1	10-23-1997 2020	RJ
Aluminum, Dissolved	<1	1	mg/l			EPA 202.1	11-12-1997 0315	MK
Arsenic, Dissolved	<0.01	0.01	mg/l			EPA 206.2	11-02-1997 2115	MK
Boron, Dissolved	0.1	0.1	mg/l			EPA 212.3	10-30-1997 1300	MK
Cadmium, Dissolved	<0.01	0.01	mg/l			EPA 213.1	11-12-1997 2245	MK
Calcium, Dissolved	59	1	mg/l			EPA 215.1	11-13-1997 0200	MK
Chloride	6	1	mg/l			SM4500-Cl-B	10-30-1997 1400	SC
Conductivity	499	1	umhos/cm			SM2510-B	10-21-1997 1400	SC
Copper, Dissolved	<0.1	0.1	mg/l			EPA 220.1	11-12-1997 2145	MK
Hardness, Total	246	----	mg/l	as	$CaCO_3$	SM2340-B	11-17-1997 1100	RJ
Iron, Total	<0.1	0.1	mg/l			EPA 236.1	11-12-1997 2330	MK
Iron, Dissolved	<0.1	0.1	mg/l			EPA 236.1	11-12-1997 2330	MK
Lead, Dissolved	<0.1	0.1	mg/l			EPA 239.1	11-12-1997 2300	MK
Magnesium, Dissolved	24	1	mg/l			EPA 242.1	11-13-1997 1430	MK
Manganese, Total	<0.1	0.1	mg/l			EPA 243.1	11-13-1997 0000	MK
Manganese, Dissolved	<0.1	0.1	mg/l			EPA 243.1	11-13-1997 0000	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l			EPA 246.1	11-13-1997 0400	MK
Nitrogen, Ammonia	<0.5	0.5	mg/l	as	N	EPA 350.3	10-27-1997 0800	RJ
Nitrogen, Nitrate-Nitrite	0.6	0.1	mg/l	as	N	EPA 353.3	11-14-1997 1500	JC
Nitrogen, Nitrite	<0.01	0.01	mg/l	as	N	EPA 354.1	10-17-1997 0900	RJ
Phosphorous, Total	<0.05	0.05	mg/l	as	P	SM4500-P-B,E	11-05-1997 1745	MK
Potassium, Dissolved	<1	1	mg/l			EPA 258.1	11-13-1997 0045	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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

November 20, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: FBC-7

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1997

Date received: October 16, 1997

Rec'd 1105 hr.
Sampled 1530 hr.

FIELD MEASUREMENTS

pH	7.22
Flow	15
Conductivity	456
Temperature	56°

NOTE: Dissolved metals filtered at lab

Analysis report no. 59-17951

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-03-1997 0100 MK
Sodium, Dissolved	4	1	mg/l	EPA 273.1	11-13-1997 0130 MK
Solids, Total Dissolved	260	10	mg/l	EPA 160.1	10-21-1997 0700 JC
Sulfate	13	5	mg/l	EPA 375.4	10-28-1997 1400 SC
Zinc, Dissolved	0.01	0.01	mg/l	EPA 289.1	11-12-1997 2200 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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WATER MONITORING REPORT

Property: Co-op
Station: FBC-8
Location: Upper Trail Canyon Spring
Type: Spring

Field Measurements	Date Sampled 08/07/91	10/12/92	03/22/93	06/21/93	06/16/94	08/30/94
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC
Flow (gpm)	5	Not Found	Not Found	Not Found	Not Found	Not Found
pH	7.6	N/A	N/A	N/A	N/A	N/A
Sp. Cond. (ohms)	450	N/A	N/A	N/A	N/A	N/A
Temp (C)	N/R	N/A	N/A	N/A	N/A	N/A
Lab Measurements						
Analyzed by:	IML	N/A	N/A	N/A	N/A	N/A
TDS (mg/L)	250					
Hardness (CaCO3)	231					
Aluminum (Al)	3.60					
Arsenic (As)	0.005					
Boron (B)	0.04					
Carbonate (CO3)	N/D					
Bicarbonate (HCO3)	289					
Cadmium (Cd)	N/D					
Calcium (Ca)	61.7					
Chloride (Cl)	6.18					
Copper (Cu)	0.02					
Iron (Fe) Total	4.15					
Iron (Fe) Dissolved	N/D					
Lead (Pb)	N/D					
Magnesium (Mg)	18.8					
Manganese (Mn) tot.	0.11					
Manganese (Mn) dis.	N/D					
Molybdenum (Mo)	N/D					
Nitrogen (NH3)	0.27					
Nitrite (NO2)	N/D					
Nitrate (NO3)	N/D					
Potassium (K)	4.40					
Phosphate (PO4)	N/D					
Selenium (Se)	N/D					
Sodium (Na)	5.60					
Sulfate (SO4)	11.9					
Zinc (Z)	0.05					
Anions	5.16					
Cations	4.98					
Anion/Cation Balance	1.72%					

WATER MONITORING REPORT

Property: Co-op
Station: FBC-9
Location: Upper Trail Canyon Spring
Type: Spring

Field Measurements	Date Sampled 08/07/91	10/12/92	03/22/93	06/21/93	08/29/93	03/30/94	06/16/94	08/30/94	10/31/94
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC
Flow (gpm)	22.4	Dry	Inaccess	1.0	Dry	Inaccess	Dry	Dry	Dry
pH	7.6	N/A	N/A	7.46	N/A	N/A	N/A	N/A	N/A
Sp. Cond. (ohms)	480	N/A	N/A	760	N/A	N/A	N/A	N/A	N/A
Temp (C)	N/R	N/A	N/A	9.4	N/A	N/A	N/A	N/A	N/A
Lab Measurements									
Analyzed by:	IML	N/A	N/A	CT&E	N/A	N/A	N/A	N/A	N/A
TDS (mg/L)	252			441					
Hardness (CaCO3)	257			342					
Aluminum (Al)	0.40			N/D					
Arsenic (As)	N/D			N/D					
Barium (Ba)	0.21			N/D					
Boron (B)	N/D			0.08					
Carbonate (CO3)	N/D			N/D					
Bicarbonate (HCO3)	307			376					
Cadmium (Cd)	N/D			N/D					
Calcium (Ca)	68.1			84.1					
Chloride (Cl)	5.17			7.2					
Chromium (Cr)	N/D			0.005					
Copper (Cu)	0.05			0.07					
Fluoride (F)	0.26			0.23					
Iron (Fe)	0.76			0.35					
Lead (Pb)	N/D			0.003					
Magnesium (Mg)	21.2			32					
Manganese (Mn)	N/D			N/D					
Mercury (Hg)	N/D			N/D					
Molybdenum (Mo)	N/D			N/D					
Nickel (Ni)	0.11			N/D					
Nitrogen (NH3)	0.08			N/D					
Nitrite (NO2)	N/D			0.04					
Nitrate (NO3)	0.23			0.04					
Potassium (K)	0.45			3.1					
Phosphate (PO4)	N/D			0.02					
Selenium (Se)	N/D			N/D					
Sodium (Na)	5.00			15.5					
Sulfate (SO4)	14.0			34					
Sulfide (S)	N/D			N/D					
Zinc (Z)	0.03			N/D					
Anions	5.49			6.94					
Cations	5.37			7.58					
Anion/Cation Balance	1.07%			4.44%					

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FAX: (801) 653-2436

July 20, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 21, 1993

Date received June 22, 1993

FBC-9
Rec'd 0900 hr.
Sampled 1339 hr.

NOTE: Fluoride not distilled.

Analysis report no. 59-13211

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	376	2	mg/l HCO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Carbonate	0	1	mg/l CO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Total	309	2	mg/l $CaCO_3$	EPA 310.1	06-29-1993 15:00 LS
Aluminum	<1.00	1	mg/l	EPA 202.1	07-16-1993 13:35 ED
Anions	6.94	----	meq/l	---	--- ----- --
Arsenic	<0.003	.003	mg/l	EPA 206.2	07-07-1993 09:50 ED
Barium	<0.20	.2	mg/l	EPA 208.1	07-16-1993 16:10 ED
Boron	0.08	.04	mg/l	EPA 212.3	06-28-1993 14:00 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	07-08-1993 14:35 ED
Calcium	84.1	.03	mg/l	EPA 215.1	07-14-1993 11:05 ED
Cations	7.58	----	meq/l	---	--- ----- --
Chloride	7.2	.5	mg/l	EPA 325.3	06-29-1993 08:30 LM
Chromium	0.0005	.0003	mg/l	EPA 218.2	07-02-1993 10:50 ED
Copper	0.070	.03	mg/l	EPA 220.1	07-15-1993 16:25 ED
Fluoride	0.23	.02	mg/l	EPA 340.2	07-06-1993 13:00 LS
Hardness, Total	342	.03	mg/l $CaCO_3$	---	07-14-1993 11:05 ED
Iron	0.35	.05	mg/l	EPA 236.1	06-29-1993 12:00 ED
Iron, Dissolved	0.08	.05	mg/l	EPA 236.1	07-01-1993 11:00 ED
Lead	0.003	.003	mg/l	EPA 239.2	07-07-1993 13:45 ED
Magnesium	32.00	.007	mg/l	EPA 242.1	07-14-1993 16:20 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	06-29-1993 13:15 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	07-09-1993 14:50 ED
Molybdenum	<0.20	.2	mg/l	EPA 246.1	07-16-1993 14:35 ED
Nickel	<0.08	.08	mg/l	EPA 249.1	07-16-1993 10:50 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

Original Watermarked For Your Protection

TERMS AND CONDITIONS ON REVERSE

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

July 20, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

FBC-9
Rec'd 0900 hr.
Sampled 1339 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Fluoride not distilled.

Date sampled June 21, 1993

Date received June 22, 1993

Analysis report no. 59-13211

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	07-06-1993 08:00 LS
Nitrogen, Nitrate	0.04	.01	mg/l	EPA 353.3	06-22-1993 10:00 LM
Nitrogen, Nitrite	0.04	.02	mg/l	EPA 354.1	06-22-1993 11:00 LM
Oil & Grease	0.0	1	mg/l	EPA 413.1	07-01-1993 08:00 LM
Phosphorus, Total	0.02	.008	mg/l	EPA 365.2	07-06-1993 14:00 LM
Potassium	3.10	.1	mg/l	EPA 258.1	07-13-1993 18:15 ED
Selenium	<0.004	.004	mg/l	EPA 270.2	07-06-1993 12:30 ED
Sodium	15.50	.2	mg/l	EPA 273.1	07-13-1993 16:25 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	06-22-1993 11:30 LM
Solids, Total Dissolved	441.0	14	mg/l	EPA 160.1	06-24-1993 10:00 LM
Solids, Total Suspended	4.0	7	mg/l	EPA 160.2	06-25-1993 14:30 LM
Sulfate	34.0	1	mg/l	EPA 375.4	07-06-1993 10:00 LS
Sulfide	<0.10	.9	mg/l	EPA 376.1	06-28-1993 15:25 ED
Zinc	<0.03	.03	mg/l	EPA 289.1	07-15-1993 16:00 ED
Cation/Anion Balance	4.44	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

WATER MONITORING REPORT

Property: Co-op
Station: FBC-10
Location: Trail Creek Above Ledges
Type: Stream

Field Measurements	Date Sampled											
	07/30/91	10/12/92	03/22/93	06/21/93	08/29/93	03/30/94	06/16/94	08/30/94	10/31/94	6/24/97	09/10/97	10/15/97
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op	Co-Op
Flow (gpm)	9	Dry	Inaccess	Dry	Dry	Inaccess	Dry	Dry	Dry	46	35	15
pH	7.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10	8.67	8.4
Sp. Cond. (ohms)	450	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	435	393	697
Temp (C)	N/R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.4	14.7	7.7
Dissolved Oxygen	N/R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.5	N/R	8.9
Lab Measurements												
Analyzed by:	IML	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CT&E	CT&E	CT&E
TDS (mg/L)	244									230	220	280
Hardness (CaCO3)	244									204	194	251
Aluminum (Al)	1.7									N/D	N/D	N/D
Arsenic (As)	N/D									N/D	N/D	N/D
Boron (B)	0.02									N/D	0.1	0.1
Carbonate (CO3)	N/D									N/D	13	N/D
Bicarbonate (HCO3)	294									228	232	323
Cadmium (Cd)	N/D									N/D	N/D	N/D
Calcium (Ca)	60									42	43	56
Chloride (Cl)	8.01									6	7	8
Copper (Cu)	0.01									N/D	N/D	N/D
Iron (Fe) Total	1.27									4.7	1.7	0.8
Iron (Fe) Dissolved										N/D	N/D	N/D
Lead (Pb)	N/D									N/D	N/D	N/D
Magnesium (Mg)	22.9									24	21	27
Manganese (Mn) Tot.	N/D									0.2	N/D	N/D
Manganese (Mn) Dis.										N/D	N/D	N/D
Molybdenum (Mo)	N/D									N/D	N/D	N/D
Nitrogen (NH3)	0.07									N/D	N/D	N/D
Nitrite (NO2)	N/D									N/D	N/D	N/D
Nitrate (NO3)	0.39									N/D	N/D	N/D
Potassium (K)	0.4									N/D	N/D	2
Phosphate (PO4)	N/D									0.03	0.03	0.06
Selenium (Se)	N/D									N/D	N/D	N/D
Sodium (Na)	5.4									5	5	5
Sp. Conductivity										424	399	498
Sulfate (SO4)	9.05									12	13	14
Zinc (Z)	0.01									0.01	0.01	0.01
Anions	5.26									4.2	4.7	5.8
Cations	5.13									4.3	4.1	5.3
Anion/Cation Balance	1.30%									-1.60%	7.00%	-4.70%

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

August 5, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

CO-OP
FBC-10

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 24, 1997

Date received: June 25, 1997

Rec'd 0718 hr.
Sampled 1210 hr.

NOTE:DISSOLVED METALS FILTERED AT LAB!
NOTE:ALKALINITY BICARBONATE &CARBONATE EXPIRED WHEN REANALYZED FOR CHARGE BALANCE PURPOSES!

Analysis report no. 59-17370

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	228	5	mg/l as HCO_3	SM2320-B	07-30-1997 0730 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	07-30-1997 0730 SC
Alkalinity, Total	227	5	mg/l as $CaCO_3$	EPA310.1	07-30-1997 0730 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	07-29-1997 1315 MK
Anions	4.2	----	meq/l	---------	08-04-1997 1100 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-18-1997 0800 MK
Boron, Dissolved	<0.1	0.1	mg/l	EPA 212.3	07-16-1997 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	07-29-1997 0900 MK
Calcium, Dissolved	42	1	mg/l	EPA 215.1	07-29-1997 1215 MK
Cations	4.3	----	meq/l	---------	08-04-1997 1100 RJ
Chloride	6	1	mg/l	SM4500-Cl-B	07-02-1997 1240 RJ
Conductivity	424	1	umhos/cm	SM2510-B	06-30-1997 0455 RJ
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	07-29-1997 0800 MK
Hardness, Total	204	----	mg/l as $CaCO_3$	SM2340-B	08-04-1997 1100 RJ
Iron, Total	4.7	0.1	mg/l	EPA 236.1	07-29-1997 1000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-29-1997 1000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	07-29-1997 0910 MK
Magnesium, Dissolved	24	1	mg/l	EPA 242.1	07-29-1997 1230 MK
Manganese, Total	0.2	0.1	mg/l	EPA 243.1	07-29-1997 1015 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	07-29-1997 1015 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	07-29-1997 1500 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-21-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	07-17-1997 0500 AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	06-25-1997 1330 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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

August 5, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

CO-OP
FBC-10

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 24, 1997

Date received: June 25, 1997

Rec'd 0718 hr.
Sampled 1210 hr.

NOTE:DISSOLVED METALS FILTERED AT LAB!
NOTE:ALKALINITY BICARBONATE &CARBONATE EXPIRED WHEN REANALYZED FOR CHARGE BALANCE PURPOSES!

Analysis report no. 59-17370

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Oil & Grease	<2	2	mg/l	SM5520-B	07-15-1997 0800 JC
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	06-25-1997 1030 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	07-29-1997 1115 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-18-1997 1130 MK
Sodium, Dissolved	5	1	mg/l	EPA 273.1	07-29-1997 1130 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-25-1997 1715 RJ
Solids, Total Dissolved	230	10	mg/l	EPA 160.1	06-26-1997 0700 JC
Solids, Total Suspended	275	5	mg/l	EPA 160.2	06-26-1997 0700 JC
Sulfate	12	5	mg/l	EPA 375.4	07-15-1997 0800 SC
Zinc, Dissolved	0.01	0.01	mg/l	EPA 289.1	07-29-1997 0815 MK
Cation/Anion Balance	-1.6	----	%		08-04-1997 1100 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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FAX: (801) 653-2436

October 13, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-10

Kind of sample reported to us: Water

Rec'd 1030 hr.
Sampled 1832 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 10, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17753

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	232	5	mg/l as HCO_3	SM2320-B	09-19-1997 1430 SC
Alkalinity, Carbonate	13	5	mg/l as CO_3	SM2320-B	09-19-1997 1430 SC
Alkalinity, Total	212	5	mg/l as $CaCO_3$	EPA 310.1	09-19-1997 1430 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	09-27-1997 0245 MK
Anions	4.7	----	meq/l	---------	10-08-1997 0900 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-27-1997 1900 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-29-1997 1500 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	09-26-1997 2300 MK
Calcium, Dissolved	43	1	mg/l	EPA 215.1	09-27-1997 0145 MK
Cations	4.1	----	meq/l	---------	10-08-1997 0900 RJ
Chloride	7	1	mg/l	SM4500-Cl-B	10-02-1997 1215 SC
Conductivity	399	1	umhos/cm	SM2510-B	09-22-1997 1140 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	09-26-1997 2200 MK
Hardness, Total	194	----	mg/l as $CaCO_3$	SM2340-B	10-08-1997 0900 RJ
Iron, Total	1.7	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	09-26-1997 2315 MK
Magnesium, Dissolved	21	1	mg/l	EPA 242.1	09-27-1997 0200 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	09-27-1997 0330 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-07-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	09-22-1997 0730 RJ
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-12-1997 0700 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

October 13, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-10

Rec'd 1030 hr.
Sampled 1832 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 10, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17753

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Oil & Grease	<2	2	mg/l	SM5520-B	09-19-1997 0700 JC
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	09-11-1997 1315 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	09-27-1997 0045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-28-1997 1430 MK
Sodium, Dissolved	5	1	mg/l	EPA 273.1	09-27-1997 0115 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-11-1997 1145 RJ
Solids, Total Dissolved	220	10	mg/l	EPA 160.1	09-15-1997 0700 JC
Solids, Total Suspended	143	5	mg/l	EPA 160.2	09-15-1997 0700 JC
Sulfate	13	5	mg/l	EPA 375.4	10-06-1997 1400 SC
Zinc, Dissolved	0.01	0.01	mg/l	EPA 289.1	09-26-1997 2215 MK
Cation/Anion Balance	7.0	----	%		10-08-1997 0900 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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FAX: (801) 653-2436

November 18, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: FBC-10

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1997

Date received: October 16, 1997

Rec'd 1105 hr.
Sampled 1230 hr.

FIELD MEASUREMENTS

pH	8.4
DO	8.9
Flow	15
Conductivity	697
Temperature	45.8°

NOTE: Dissolved metals filtered at lab

Analysis report no. 59-17946

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	323	5	mg/l as HCO_3	SM2320-B	10-23-1997 2020 RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	10-23-1997 2020 RJ
Alkalinity, Total	264	5	mg/l as $CaCO_3$	EPA 310.1	10-23-1997 2020 RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	11-12-1997 0315 MK
Anions	5.8	----	meq/l	---------	11-17-1997 1100 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-02-1997 2115 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	10-30-1997 1300 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	11-12-1997 2245 MK
Calcium, Dissolved	56	1	mg/l	EPA 215.1	11-13-1997 0200 MK
Cations	5.3	----	meq/l	---------	11-17-1997 1100 RJ
Chloride	8	1	mg/l	SM4500-Cl-B	10-30-1997 1215 SC
Conductivity	498	1	umhos/cm	SM2510-B	10-21-1997 1400 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	11-12-1997 2145 MK
Hardness, Total	251	----	mg/l as $CaCO_3$	SM2340-B	11-17-1997 1100 RJ
Iron, Total	0.8	0.1	mg/l	EPA 236.1	11-12-1997 2330 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	11-12-1997 2330 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	11-12-1997 2300 MK
Magnesium, Dissolved	27	1	mg/l	EPA 242.1	11-13-1997 1430 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	11-13-1997 0000 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	11-13-1997 0000 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	11-13-1997 0400 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-27-1997 0800 RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	11-14-1997 1500 JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	10-17-1997 0900 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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November 18, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: FBC-10

Rec'd 1105 hr.
Sampled 1230 hr.

FIELD MEASUREMENTS

pH	8.4
DO	8.9
Flow	15
Conductivity	697
Temperature	45.8°

NOTE: Dissolved metals filtered at lab

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 15, 1997

Date received October 16, 1997

Analysis report no. 59-17946

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Oil & Grease	<2	2	mg/l	SM5520-B	11-11-1997 0800	JC
Phosphorous, Total	0.06	0.05	mg/l as P	SM4500-P-B,E	11-05-1997 1745	MK
Potassium, Dissolved	2	1	mg/l	EPA 258.1	11-13-1997 0045	MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-03-1997 0100	MK
Sodium, Dissolved	5	1	mg/l	EPA 273.1	11-13-1997 0130	MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	10-16-1997 1200	SC
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	10-21-1997 0700	JC
Solids, Total Suspended	35	5	mg/l	EPA 160.2	10-20-1997 0700	JC
Sulfate	14	5	mg/l	EPA 375.4	10-28-1997 1300	SC
Zinc, Dissolved	0.01	0.01	mg/l	EPA 289.1	11-12-1997 2200	MK
Cation/Anion Balance	-4.7	----	%		11-17-1997 1100	RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

WATER MONITORING REPORT

Property: Co-op
Station: FBC-11
Location: Huntington Canyon Spring
Type: Spring

Field Measurements	Date Sampled						
	08/08/91	10/12/92	03/22/93	06/21/93	06/16/94	08/30/94	10/31/94
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC	M.E.C.
Flow (gpm)	15	Not Found	Not Found	Not Found	Not Found	Not Found	Not Found
pH	8.4	N/A	N/A	N/A	N/A	N/A	N/A
Sp. Cond. (ohms)	300	N/A	N/A	N/A	N/A	N/A	N/A
Temp (C)	N/R	N/A	N/A	N/A	N/A	N/A	N/A
Lab Measurements							
Analyzed by:	IML	N/A	N/A	N/A	N/A	N/A	N/A
TDS (mg/L)	182						
Hardness (CaCO3)	169						
Aluminum (Al)	0.60						
Arsenic (As)	N/D						
Barium (Ba)	0.13						
Boron (B)	N/D						
Carbonate (CO3)	5.10						
Bicarbonate (HCO3)	194						
Cadmium (Cd)	N/D						
Calcium (Ca)	52.3						
Chloride (Cl)	3.35						
Chromium (Cr)	N/D						
Copper (Cu)	0.01						
Fluoride (F)	0.12						
Iron (Fe)	1.30						
Lead (Pb)	N/D						
Magnesium (Mg)	9.39						
Manganese (Mn)	0.05						
Mercury (Hg)	N/D						
Molybdenum (Mo)	N/D						
Nickel (Ni)	0.16						
Nitrogen (NH3)	0.14						
Nitrite (NO2)	N/D						
Nitrate (NO3)	0.03						
Potassium (K)	0.82						
Phosphate (PO4)	N/D						
Selenium (Se)	N/D						
Sodium (Na)	3.20						
Sulfate (SO4)	9.88						
Sulfide (S)	N/D						
Zinc (Z)	0.02						
Anions	3.65						
Cations	3.54						
Anion/Cation Balance	1.45%						

Property: Co-op
Station: FBC-1
Location: Head of Bear Creek
Type: Spring

Field Measurements	Date Sampled										
	03/22/93	06/29/93*	08/29/93	10/15/93	03/30/94	06/15/94	08/29/94	10/30/94	06/25/97	09/10/97	10/15/97
Sampled by:	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op	Co-Op
Flow (gpm)	Inaccess	100	58	21	Inaccess	26	32	43	3	12	1
pH	N/A	8.14	7.82	7.72	N/A	7.65	7.78	7.87	8.51	8.29	8.19
Sp. Cond. (ohms)	N/A	420	472	546	N/A	564	393	484	510	457	469
Temp (C)	N/A	13.6	10	4.7	N/A	4.4	11.1	6.3	10.1	12.2	9.7
Lab Measurements											
Analyzed by:	N/A	CT&E	CT&E	CT&E	N/A	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E
TDS (mg/L)		220	245	261		270	220	260	270	260	2940
Hardness (CaCO3)		345	564	311		243	178	240	230	223	230
Aluminum (Al)		8	3	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Arsenic (As)		0.005	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Boron (B)		0.17	N/D	0.1		0.1	0.1	0.1	N/D	0.1	0.1
Carbonate (CO3)		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Bicarbonate (HCO3)		286	461	292		301	255	311	276	266	270
Cadmium (Cd)		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Calcium (Ca)		75.7	140	65		51	45	49	36	35	36
Chloride (Cl)		4.3	3.7	451		1	2	8	4	3	5
Copper (Cu)		0.07	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Iron (Fe) Total		3.28	3.4	0.21		N/D	2.7	1.1	N/D	0.1	0.3
Iron (Fe) Dissolved		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Lead (Pb)		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Magnesium (Mg)		37.9	52	36		28	16	28	34	33	34
Manganese (Mn) Tot.		0.08	0.2	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Manganese (Mn) Dis.		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Molybdenum (Mo)		0.3	N/D	0.2		N/D	N/D	N/D	N/D	N/D	N/D
Nitrogen (NH3)		N/D	0.09	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Nitrite (NO2)		0.03	0.01	N/D		N/D	N/D	0.01	N/D	N/D	N/D
Nitrate (NO3)		0.18	0.21	0.38		0.3	0.3	0.3	0.4	0.5	0.4
Potassium (K)		3.8	1.9	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Phosphate (PO4)		0.29	0.073	0.003		0.06	0.02	0.12	0.02	0.03	0.26
Selenium (Se)		N/D	0.002	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Sodium (Na)		5.6	3	N/D		3	N/D	5	4	4	4
Sp. Conductivity				451		470	394	470	457	452	462
Sulfate (SO4)		70	40	14		15	2	7	30	15	24
Zinc (Z)		0.03	0.01	N/D		N/D	N/D	N/D	0.02	N/D	0.02
Anions		6.17	8.3	5.1		5.3	4.3	5.5	5.3	4.8	
Cations		7.23	11.4	6.2		5	3.6	5	1.8	4.6	
Anion/Cation Balance		7.95%	15.80%	9.40%		-2.90%	-9.10%	-4.80%	-4.90%	-1.30%	

*6/29/93 sample taken in Bear Creek where sources converge.

COMMERCIAL TESTING & ENGINEERING CO.

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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

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 29, 1993

Date received: June 30, 1993

FBC-12
Rec'd 0800 hr.
Sampled 1557 hr.

NOTE: Fluoride not distilled.

Analysis report no. 59-13232

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	286	.4	mg/l HCO_3	EPA 310.1	07-06-1993 15:00 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	EPA 310.1	07-06-1993 15:00 LS
Alkalinity, Total	235	.4	mg/l $CaCO_3$	EPA 310.1	07-06-1993 15:00 LS
Aluminum	8.00	1	mg/l	EPA 202.1	07-16-1993 13:35 ED
Anions	6.17	----	meq/l	---------	---------- ----- --
Arsenic	0.005	.003	mg/l	EPA 206.2	07-07-1993 09:50 ED
Barium	<0.20	.2	mg/l	EPA 208.1	07-16-1993 16:10 ED
Boron	0.17	.04	mg/l	EPA 212.3	07-19-1993 13:30 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	07-08-1993 14:35 ED
Calcium	75.7	.03	mg/l	EPA 215.1	07-13-1993 14:00 ED
Cations	7.23	----	meq/l	---------	---------- ----- --
Chloride	4.3	.5	mg/l	EPA 325.3	07-08-1993 11:00 LM
Chromium	0.0079	.0003	mg/l	EPA 218.2	07-21-1993 10:30 ED
Copper	0.070	.03	mg/l	EPA 220.1	07-15-1993 16:25 ED
Fluoride	0.28	.02	mg/l	EPA 340.2	07-06-1993 13:00 LS
Hardness, Total	345	.03	mg/l $CaCO_3$	---------	07-13-1993 14:00 ED
Iron	3.28	.05	mg/l	EPA 236.1	07-12-1993 14:40 ED
Iron, Dissolved	0.26	.05	mg/l	EPA 236.1	07-16-1993 12:30 ED
Lead	<0.003	.003	mg/l	EPA 239.2	07-07-1993 13:45 ED
Magnesium	37.90	.007	mg/l	EPA 242.1	07-14-1993 16:20 ED
Manganese	0.08	.03	mg/l	EPA 243.1	07-12-1993 10:00 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	07-09-1993 14:50 ED
Molybdenum	0.30	.2	mg/l	EPA 246.1	07-16-1993 14:35 ED
Nickel	0.10	.08	mg/l	EPA 249.1	07-16-1993 10:50 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

FBC-12
Rec'd 0800 hr.
Sampled 1557 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Fluoride not distilled.

Date sampled June 29, 1993

Date received June 30, 1993

Analysis report no. 59-13232

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	07-06-1993 08:00 LS
Nitrogen, Nitrate-Nitrite	0.18	.01	mg/l	EPA 353.3	06-30-1993 11:00 LM
Nitrogen, Nitrite	0.03	.004	mg/l	EPA 354.1	06-30-1993 14:00 LM
Oil & Grease	2.1	1	mg/l	EPA 413.1	07-15-1993 10:00 LM
Phosphorus, Total	0.29	.008	mg/l	EPA 365.2	07-06-1993 14:00 LM
Potassium	3.80	.1	mg/l	EPA 258.1	07-13-1993 18:15 ED
Selenium	<0.004	.004	mg/l	EPA 270.2	07-06-1993 12:30 ED
Sodium	5.60	.2	mg/l	EPA 273.1	07-13-1993 16:25 ED
Solids, Total Dissolved	220.0	14	mg/l	EPA 160.1	07-02-1993 09:00 LM
Sulfate	70.0	1	mg/l	EPA 375.4	07-08-1993 13:15 LS
Sulfide	<0.90	.9	mg/l	EPA 376.1	06-30-1993 13:10 ED
Zinc	0.03	.03	mg/l	EPA 289.1	07-15-1993 16:00 ED
Cation/Anion Balance	7.95	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

October 19, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Kind of sample reported to us: Water

Rec'd 1100 hr.
Sampled 1930 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 29, 1993

Date received: August 30, 1993

NOTE: Due to high TSS interference, cation/anion balance is high. Sulfate run after holding time expired. Fluoride not distilled.

Analysis report no. 59-13471

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	461	2	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220	LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220	LS
Alkalinity, Total	378	2	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220	ED
Aluminum	3	.05	mg/l		EPA 200.7	09-15-1993 1616	SE
Anions	8.30	----	meq/l		---------	---------- -----	--
Arsenic	<0.002	.002	mg/l		EPA 206.2	09-21-1993 1015	SM
Barium	0.1	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Boron	<0.05	.01	mg/l		EPA 200.7	09-16-1993 1330	SE
Cadmium	<0.0050	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Calcium	140.0	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Cations	11.40	----	meq/l		---------	---------- -----	--
Chloride	3.7	.5	mg/l		EPA 325.3	09-07-1993 1300	LM
Chromium	<0.0	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Copper	<0.01	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Fluoride	0.39	.02	mg/l		EPA 340.2	09-13-1993 1400	LS
Hardness, Total	564.0	.03	mg/l	$CaCO_3$	---------	09-15-1993 1616	SE
Iron	3.40	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Lead	<0.050	.05	mg/l		EPA 200.7	09-15-1993 1616	SE
Magnesium	52.00	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Manganese	0.20	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Mercury	<0.0004	.0002	mg/l		EPA 245.1	09-21-1993 1015	SM
Molybdenum	<0.1	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Nickel	0.02	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Nitrogen, Ammonia	0.09	.08	mg/l		EPA 350.3	09-07-1993 0800	dc

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

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

October 19, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Rec'd 1100 hr.
Sampled 1930 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled August 29, 1993

Date received August 30, 1993

NOTE: Due to high TSS interference, cation/anion balance is high.
Sulfate run after holding time expired.
Fluoride not distilled.

Analysis report no. 59-13471

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Nitrate	0.21	.01	mg/l	EPA 353.3	08-30 1993 1145 LM
Nitrogen, Nitrite	0.01	.02	mg/l	EPA 354.1	08-31-1993 0910 LM
Oil & Grease	1	1	mg/l	EPA 413.1	09-08 1993 1310 LM
Phosphorus, Total	0.073	.008	mg/l	EPA 365.2	09-15 1993 0720 LM
Potassium	1.9	.1	mg/l	EPA 200.7	09 15 1993 1616 SF
Selenium	0.002	.002	mg/l	EPA 270.2	09-15-1993 1616 SF
Sodium	3.0	.1	mg/l	EPA 200.7	09-15 1993 1616 SF
Solids, Settleable	2.0	.5	mg/l	EPA 160.5	08-31-1993 0730 LM
Solids, Total Dissolved	245	14	mg/l	EPA 160.1	08-31-1993 1100 LM
Solids, Total Suspended	1100	7	mg/l	EPA 160.2	09-01-1993 0830 LM
Sulfate	40	1	mg/l	EPA 375.4	10-05-1993 1100 LS
Sulfide	<0.9	.1	mg/l	EPA 376.1	09-03-1993 1515 ED
Zinc	0.01	.005	mg/l	EPA 200.7	09-15-1993 1616 SF
Cation/Anion Balance	15.8	----	%	---------	---------- ----- --

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S298(1)

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

December 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Rec'd 1430 hr.
Sampled 1312 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 15, 1993

Date received October 15, 1993

Analysis report no. 59-13633

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
lkalinity, Bicarbonate	292	2	mg/l	$CaCO_3$ EPA 310.1	10-19-1993 0950 LS
kalinity, Carbonate	<1	1	mg/l	$CaCO_3$ EPA 310.1	10-19-1993 0950 LS
alinity, Total	240	2	mg/l	$CaCO_3$ EPA 310.1	10-19-1993 0950 LS
Aluminum	<1	1	mg/l	EPA 202.1	10-28-1993 1630 ED
Anions	5.10	----	meq/l	---------	---------- ----- --
Arsenic	<0.010	.003	mg/l	EPA 206.2	11-28-1993 1115 DW
Boron	0.10	.04	mg/l	EPA 212.3	11-30-1993 1500 LM
Cadmium	<0.0200	.0002	mg/l	EPA 213.2	11-05-1993 1125 ED
Calcium	65.0	.03	mg/l	EPA 215.1	11-08-1993 1450 ED
Cations	6.20	----	meq/l	---------	---------- ----- --
Chloride	6.0	.5	mg/l	EPA 325.3	11-01-1993 0900 LM
Conductivity	451.00	0.2	umhos/cm	EPA 120.1	10-28-1993 0945 ED
Copper	<0.05	.03	mg/l	EPA 220.1	10-27-1993 1550 ED
Hardness, Total	311.0	.03	mg/l	$CaCO_3$ ---------	11-08-1993 1450 ED
Iron	0.21	.05	mg/l	EPA 236.1	11-08-1993 1315 ED
Iron, Dissolved	<0.20	.05	mg/l	EPA 236.1	11-24-1993 1200 DW
Lead	<0.400	.003	mg/l	EPA 239.2	11-05-1993 1000 ED
Magnesium	36.00	.007	mg/l	EPA 242.1	11-08-1993 1630 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	11-08-1993 1100 ED
Manganese, Dissolved	0.1	.03	mg/l	EPA 243.1	11-29-1993 1500 DW
Molybdenum	0.2	.2	mg/l	EPA 246.1	10-29-1993 1105 ED
Nitrogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	11-08-1993 1000 LS
Nitrogen, Nitrate	0.38	.01	mg/l	EPA 353.3	10-18-1993 0745 LM
Nitrogen, Nitrite	0.01	.02	mg/l	EPA 354.1	10-15-1993 1500 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

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COMMERCIAL TESTING & ENGINEERING CO.

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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 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Kind of sample reported to us Water

Rec'd 1430 hr.
Sampled 1312 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 15, 1993

Date received October 15, 1993

Analysis report no. 59-13633

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorus, Ortho	0.003	.003	mg/l	EPA 365.2	10-16-1993 0950 LM
Potassium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315 ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400 DW
Sodium	<10.0	.2	mg/l	EPA 273.1	11-09-1993 1135 ED
Solids, Total Dissolved	261	14	mg/l	EPA 160.1	10-19-1993 0815 LM
Sulfate	14	1	mg/l	EPA 375.4	11-11-1993 1020 LS
Zinc	<0.03	.03	mg/l	EPA 289.1	10-27-1993 1300 ED
Cation/Anion Balance	9.40	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry D. Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 11, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Rec'd 1015 hr.
Sampled 0842 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 15, 1994

Date received: June 16, 1994

Analysis report no. 59-14148

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	301	1	mg/l as HCO_3	SM2320-B	06-16-1994 1310 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-16-1994 1310 LS
Alkalinity, Total	247	1	mg/l as $CaCO_3$	EPA 310.1	06-16-1994 1310 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-27-1994 1430 DW
Anions	5.30	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-08-1994 0930 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	07-06-1994 1045 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-27-1994 1400 DW
Calcium, Dissolved	51	1	mg/l	EPA 215.1	06-23-1994 1130 DW
Cations	5.00	----	meq/l	---------	---------- ----- --
Chloride	1	1	mg/l	SM4500-Cl-B	06-20-1994 1610 LS
Conductivity	470	1	umhos/cm	SM2510-B	06-17-1994 1255 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-27-1994 1300 DW
Hardness, Total	243	1	mg/l as $CaCO_3$	SM2340-B	06-23-1994 1130 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-23-1994 0900 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-22-1994 1400 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-28-1994 0730 DW
Magnesium, Dissolved	28	1	mg/l	EPA 242.1	06-23-1994 1200 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-23-1994 0830 DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-22-1994 1600 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-27-1994 1600 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-17-1994 1000 ED
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l	EPA 353.3	06-23-1994 1030 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-17-1994 1100 LM

INCORPORATED
EFFECTIVE:
JUL 03 2001
UTAH DIVISION OIL, GAS AND MINING

SPG8(1)

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 11, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Kind of sample reported to us: Water

Rec'd 1015 hr.
Sampled 0842 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 15, 1994

Date received: June 16, 1994

Analysis report no. 59-14148

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.06	0.02	mg/l	SM4500-P-E	06-16-1994 1615 LM
Potassium, Dissolved	<2	2	mg/l	EPA 258.1	06-23-1994 0945 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-08-1994 1300 DW
Sodium, Dissolved	3	1	mg/l	EPA 273.1	06-23-1994 1100 DW
Solids, Total Dissolved	270	10	mg/l	EPA 160.1	06-17-1994 1600 LM
Sulfate	15	1	mg/l	EPA 375.4	06-16-1994 1340 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-28-1994 0800 DW
Cation/Anion Balance	-2.90	----	%		

INCORPORATED
EFFECTIVE:
JUL 03 2001
DIVISION OIL, GAS AND MINING

SR048(1)

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

465
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PLEASE ADDRESS ALL CORRESPONDENCE TO:
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TEL: (801) 653-2311
FAX: (801) 653-2436

September 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Kind of sample reported to us Water

Rec'd 1130 hr.
Sampled 1645 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Dissolved metals filtered at Lab.

Date sampled August 29, 1994

Date received August 30, 1994

Analysis report no. 59-14363

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	255	1	mg/l as HCO_3	SM2320-B	08-31-1994 0845 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	08-31-1994 0845 LS
Alkalinity, Total	209	1	mg/l as $CaCO_3$	EPA 310.1	08-31-1994 0845 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	09-08-1994 1530 DW
Anions	4.30	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-02-1994 1100 ED
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-14-1994 1300 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	09-08-1994 1200 DW
Calcium, Dissolved	45	5	mg/l	EPA 215.1	09-09-1994 0930 DW
Cations	3.60	----	meq/l	---------	---------- ----- --
Chloride	2	1	mg/l	SM4500-Cl-B	09-06-1994 0930 LS
Conductivity	394	1	umhos/cm	SM2510-B	08-31-1994 0945 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	09-08-1994 1200 DW
Hardness, Total	178	10	mg/l as $CaCO_3$	SM2340-B	09-09-1994 0930 DW
Iron, Total	2.7	0.2	mg/l	EPA 236.1	09-13-1994 1030 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-09-1994 1430 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	09-08-1994 1100 DW
Magnesium, Dissolved	16	2	mg/l	EPA 242.1	09-09-1994 1030 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-13-1994 1000 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	09-09-1994 1330 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	09-09-1994 1100 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	09-08-1994 0930 ED
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l	EPA 353.3	09-07-1994 1000 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	08-30-1994 1610 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jerry Hunt CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Kind of sample reported to us: Water

Rec'd 1130 hr.
Sampled 1645 hr.

Sample taken at: Co-op

Sample taken by: Co-op

NOTE: Dissolved metals filtered at Lab.

Date sampled: August 29, 1994

Date received: August 30, 1994

Analysis report no. 59-14363

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	08-30-1994 1530 LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	09-09-1994 1300 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-06-1994 1030 ED
Sodium, Dissolved	<5	5	mg/l	EPA 273.1	09-09-1994 1230 DW
Solids, Total Dissolved	220	10	mg/l	EPA 160.1	08-30-1994 1415 LM
Sulfate	2	1	mg/l	EPA 375.4	09-07-1994 1000 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	09-08-1994 1330 DW
Cation/Anion Balance	-9.10	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jerry Hunt SD

Manager, Huntington Laboratory

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TERMS AND CONDITIONS ON REVERSE

COMMERCIAL TESTING & ENGINEERING CO.

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

November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Rec'd 1100 hr.
Sampled 1631 hr.

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

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 30, 1994

Date received October 31, 1994

Analysis report no. 59-14526

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	311	1	mg/l as HCO_3	SM2320-B	11-01-1994 0730 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-01-1994 0730 LS
Alkalinity, Total	255	1	mg/l as $CaCO_3$	EPA 310.1	11-01-1994 0730 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	11-02-1994 1600 DW
Anions	5.50	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-07-1994 1000 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	11-03-1994 1330 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	11-02-1994 1730 DW
Calcium, Dissolved	49	5	mg/l	EPA 215.1	11-01-1994 1500 DW
Cations	5.00	----	meq/l	---------	---------- ----- --
Chloride	8	1	mg/l	SM4500-Cl-B	10-31-1994 1500 LS
Conductivity	470	1	umhos/cm	SM2510-B	11-01-1994 0930 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	11-03-1994 1230 DW
Hardness, Total	240	10	mg/l as $CaCO_3$	SM2340-B	11-01-1994 1500 DW
Iron, Total	1.1	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	11-02-1994 1700 DW
Magnesium, Dissolved	28	2	mg/l	EPA 242.1	11-02-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	11-03-1994 1630 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	11-04-1994 0915 ED
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l	EPA 353.3	11-02-1994 0930 LM
Nitrogen, Nitrite	0.01	0.01	mg/l	EPA 354.1	11-01-1994 0830 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 30, 1994

Date received October 31, 1994

Rec'd 1100 hr.
Sampled 1631 hr.

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

Analysis report no. 59-14526

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.12	0.02	mg/l	SM4500-P-E	11-01-1994 1120 LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	11-02-1994 0900 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-07-1994 1500 DW
Sodium, Dissolved	5	5	mg/l	EPA 273.1	11-02-1994 0830 DW
Solids, Total Dissolved	260	10	mg/l	EPA 160.1	11-01-1994 0830 LS
Sulfate	7	1	mg/l	EPA 375.4	11-07-1994 1050 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	11-03-1994 1300 DW
Cation/Anion Balance	-4.80	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Manager, Huntington Laboratory

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

August 5, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

CO-OP
FBC-12

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 25, 1997

Date received: June 26, 1997

Rec'd 1000 hr.
Sampled 1320 hr.

NOTE: DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17398

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	276	5	mg/l as HCO_3	SM2320-B	06-28-1997 1930 RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	06-28-1997 1930 RJ
Alkalinity, Total	226	5	mg/l as $CaCO_3$	EPA 310.1	06-28-1997 1930 RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	08-02-1997 1300 MK
Anions	5.3	----	meq/l	---------	10-04-1997 1000 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-24-1997 0730 MK
Boron, Dissolved	<0.1	0.1	mg/l	EPA 212.3	07-16-1997 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	08-03-1997 1215 MK
Calcium, Dissolved	36	1	mg/l	EPA 215.1	08-03-1997 0715 MK
Cations	4.8	----	meq/l	---------	10-04-1997 1000 RJ
Chloride	4	1	mg/l	SM4500-Cl-B	07-22-1997 0715 SC
Conductivity	457	1	umhos/cm	SM2510-B	06-30-1997 0545 RJ
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	08-03-1997 1115 MK
Hardness, Total	230	----	mg/l as $CaCO_3$	SM2340-B	10-04-1997 1000 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	08-03-1997 0815 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	08-03-1997 0815 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	08-03-1997 1230 MK
Magnesium, Dissolved	34	5	mg/l	EPA 242.1	08-03-1997 0745 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	08-03-1997 0845 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	08-03-1997 0845 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	08-02-1997 1345 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-22-1997 0320 RJ
Nitrogen, Nitrate-Nitrite	0.4	0.1	mg/l as N	EPA 353.3	07-18-1997 0400 AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	06-27-1997 0700 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

August 5, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

CO-OP
FBC-12

Kind of sample reported to us: Water

Rec'd 1000 hr.
Sampled 1320 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 25, 1997

Date received: June 26, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17398

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	06-27-1997 0730	RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	08-03-1997 0930	MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-24-1997 1115	MK
Sodium, Dissolved	4	1	mg/l	EPA 273.1	08-03-1997 1000	MK
Solids, Total Dissolved	270	10	mg/l	EPA 160.1	07-02-1997 0700	JC
Sulfate	30	5	mg/l	EPA 375.4	07-16-1997 0730	SC
Zinc, Dissolved	0.02	0.01	mg/l	EPA 289.1	08-03-1997 1130	MK
Cation/Anion Balance	-4.9	----	%		10-04-1997 1000	RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

October 14, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Kind of sample Water
reported to us

Rec'd 1030 hr.
Sampled 1650 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled September 10, 1997

Date received September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17748

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	266	5	mg/l as HCO_3	SM2320-B	09-19-1997 1430 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	09-19-1997 1430 SC
Alkalinity, Total	218	5	mg/l as $CaCO_3$	EPA 310.1	09-19-1997 1430 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	09-25-1997 2145 MK
Anions	4.8	----	meq/l	---------	10-08-1997 0900 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-24-1997 1745 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-29-1997 1500 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	09-25-1997 1745 MK
Calcium, Dissolved	35	1	mg/l	EPA 215.1	09-25-1997 2030 MK
Cations	4.6	----	meq/l	---------	10-08-1997 0900 RJ
Chloride	3	1	mg/l	SM4500-Cl-B	10-02-1997 0930 SC
Conductivity	452	1	umhos/cm	SM2510-B	09-22-1997 1140 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	09-25-1997 1645 MK
Hardness, Total	223	----	mg/l as $CaCO_3$	SM2340-B	10-08-1997 0900 RJ
Iron, Total	0.1	0.1	mg/l	EPA 236.1	09-25-1997 1830 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-25-1997 1830 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	09-25-1997 1800 MK
Magnesium, Dissolved	33	1	mg/l	EPA 242.1	09-25-1997 2100 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-25-1997 1845 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	09-25-1997 1845 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	09-25-1997 2230 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-07-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	0.5	0.1	mg/l as N	EPA 353.3	09-22-1997 0730 RJ
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-12-1997 0700 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • TEL: 630-953-9300 FAX: 630-953-9306

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SGS 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, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Kind of sample reported to us: Water

Rec'd 1030 hr.
Sampled 1650 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 10, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17748

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	09-11-1997 1315	RJ
Thallium, Dissolved	<1	1	mg/l	EPA 258.1	09-25-1997 1915	MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-24-1997 2145	MK
Silicon, Dissolved	4	1	mg/l	EPA 273.1	09-25-1997 1945	MK
Solids, Total Dissolved	260	10	mg/l	EPA 160.1	09-15-1997 0700	JC
Sulfate	15	5	mg/l	EPA 375.4	10-06-1997 1215	SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	09-25-1997 1715	MK
Cation/Anion Balance	- 1.3	----	%		10-08-1997 0900	RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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

December 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: FBC-12

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1997

Date received: October 16, 1997

Rec'd 1105 hr.
Sampled 1830 hr.

FIELD MEASUREMENTS

pH	8.19
Flow	1
Conductivity	469
Temperature	49.4°

NOTE: DISSOLVED METALS FILTERED AT LAB

Analysis report no. 59-17954

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	270	5	mg/l as HCO_3	SM2320-B	10-23-1997 2020 RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	10-23-1997 2020 RJ
Alkalinity, Total	221	5	mg/l as $CaCO_3$	EPA 310.1	10-23-1997 2020 RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	12-02-1997 0145 MK
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-24-1997 1645 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	10-30-1997 1300 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	12-01-1997 2145 MK
Calcium, Dissolved	36	1	mg/l	EPA 215.1	12-02-1997 0100 MK
Chloride	5	1	mg/l	SM4500-Cl-B	10-30-1997 1400 SC
Conductivity	462	1	umhos/cm	SM2510-B	10-21-1997 1500 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	12-01-1997 2100 MK
Hardness, Total	230	----	mg/l as $CaCO_3$	SM2340-B	11-03-1997 1000 RJ
Iron, Total	0.3	0.1	mg/l	EPA 236.1	12-01-1997 2245 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-01-1997 2245 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	12-01-1997 2200 MK
Magnesium, Dissolved	34	1	mg/l	EPA 242.1	12-02-1997 0115 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-01-1997 2300 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	12-01-1997 2300 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	12-02-1997 0245 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-27-1997 0800 RJ
Nitrogen, Nitrate-Nitrite	0.4	0.1	mg/l as N	EPA 353.3	11-14-1997 1500 JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	10-17-1997 0900 RJ
Phosphorous, Total	0.26	0.05	mg/l as P	SM4500-P-B,E	11-05-1997 1745 MK
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	12-01-1997 2345 MK

Respectfully submitted,
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December 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: FBC-12

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 15, 1997

Date received: October 16, 1997

Rec'd 1105 hr.
Sampled 1830 hr.

FIELD MEASUREMENTS

pH	8.19
Flow	1
Conductivity	469
Temperature	49.4°

NOTE: DISSOLVED METALS FILTERED AT LAB

Analysis report no. 59-17954

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-24-1997 2030	MK
[illegible]um, Dissolved	4	1	mg/l	EPA 273.1	12-02-1997 2030	MK
[illegible]ids, Total Dissolved	2940	10	mg/l	EPA 160.1	10-21-1997 0700	JC
Sulfate	24	10	mg/l	EPA 375.4	10-28-1997 1400	SC
Zinc, Dissolved	0.02	0.01	mg/l	EPA 289.1	12-01-1997 2115	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

WATER MONITORING REPORT

Property: Co-op
Station: FBC-13 (SMH-3)
Location: Spring On McCadden/Trail Ridge
Type: Spring

Field Measurements	Date Sampled 08/29/93	10/15/93	03/30/94	06/15/94	08/30/94	10/31/94	03/29/95	06/28/95	06/29/97	09/11/97
Sampled by:	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op
Flow (gpm)	35	21	Inaccess	46	22	45	Inaccess	60	35	75
pH	6.99	7.85	N/A	7.4	7.72	7.6	N/A	7.55	7.32	7.29
Sp. Cond. (ohms)	607	597	N/A	617	462	502	N/A	542	590	468
Temp (C)	7.2	6.4	N/A	5.6	13	8.6	N/A	7.8	7	7.29
Lab Measurements										
Analyzed by:	CT&E	CT&E	N/A	CT&E	CT&E	CT&E	N/A	CT&E	CT&E	CT&E
TDS (mg/L)	332	287		290	370	300		320	310	330
Hardness (CaCO3)	313.2	308		275	240	273		280	266	259
Aluminum (Al)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D
Arsenic (As)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D
Boron (B)	N/D	0.1		0.1	0.1	0.1		0.1	0.1	0.1
Carbonate (CO3)	N/D	N/D		N/D	N/D	N/D		5	N/D	N/D
Bicarbonate (HCO3)	313	311		325	267	325		315	334	327
Cadmium (Cd)	N/D	N/D		N/D	N/D	N/D		0.01	N/D	N/D
Calcium (Ca)	71	69		64	50	63		62	62	61
Chloride (Cl)	4.2	9		4	7	7		10	6	7
Copper (Cu)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D
Iron (Fe) Total	0.06	0.16		N/D	0.3	N/D		0.3	N/D	N/D
Iron (Fe) Dissolved	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D
Lead (Pb)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D
Magnesium (Mg)	33	33		28	28	28		30	27	26
Manganese (Mn) tot.	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D
Manganese (Mn) dis.	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D
Molybdenum (Mo)	N/D	0.2		N/D	N/D	N/D		N/D	N/D	N/D
Nitrogen (NH3)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D
Nitrite (NO2)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D
Nitrate (NO3)	0.23	0.35		0.3	0.3	0.3		0.3	0.3	0.4
Potassium (K)	1.1	N/D		N/D	N/D	N/D		N/D	N/D	N/D
Phosphate (PO4)	0.008	0.003		0.02	0.02	0.02		N/D	0.03	0.01
Selenium (Se)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D
Sodium (Na)	6	N/D		5	N/D	7		6	6	5
Sp. Conductivity		479		535	463	549		550	536	538
Sulfate (SO4)	23	20		21	27	26		17	24	21
Zinc (Z)	N/D	N/D		N/D	N/D	N/D		0.04	0.02	N/D
Anions	7.48	5.6		5.9	3.1	6.1		6	6.1	6
Cations	6.54	6.2		5.7	4.8	58		5.8	5.6	5.4
Anion/Cation Balance	-6.68%	4.30%		-1.30%	-3.40%	-2.60%		-1.20%	-4.80%	5.20%

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FAX: (801) 653-2436

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:FBC-13 (SMH-3)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 29, 1993

Date received: August 30, 1993

Rec'd 1100 hr.
Sampled 1521 hr.

NOTE: FLUORIDE NOT DISTILLED.

Analysis report no. 59-13472

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	313	2	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220	LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220	LS
Alkalinity, Total	257	2	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220	LS
Aluminum	<0	.05	mg/l		EPA 200.7	09-08-1993 1616	SF
Anions	7.48	----	meq/l		---------	--------- -----	
Arsenic	<0.002	.002	mg/l		EPA 206.2	09-21-1993 1015	SM
Barium	0.1	.005	mg/l		EPA 200.7	09-15-1993 1616	SF
Boron	<0.01	.01	mg/l		EPA 200.7	09-16-1993 0130	SF
Cadmium	<0.0050	.005	mg/l		EPA 200.7	09-15-1993 1616	SF
Calcium	71.0	.1	mg/l		EPA 200.7	09-15-1993 1616	SF
Cations	6.54	----	meq/l		---------	---- ----- -----	
Chloride	4.2	.5	mg/l		EPA 325.3	09-07-1993 1300	LM
Chromium	<0.0	.005	mg/l		EPA 200.7	09-15-1993 1616	SF
Copper	<0.01	.005	mg/l		EPA 200.7	09-15-1993 1616	SF
Fluoride	0.37	.02	mg/l		EPA 340.2	09-13-1993 1400	LS
Hardness, Total	313.2	.03	mg/l	$CaCO_3$	---------	09-15-1993 1616	SF
Iron	0.06	.01	mg/l		EPA 200.7	09-15-1993 1616	SF
Lead	<0.050	.05	mg/l		EPA 200.7	09-15-1993 1616	SF
Magnesium	33.00	.1	mg/l		EPA 200.7	09-15-1993 1616	SF
Manganese	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616	SF
Mercury	<0.0004	.0002	mg/l		EPA 245.1	09-21-1993 1000	SM
Molybdenum	<0.1	.1	mg/l		EPA 200.7	09-15-1993 1616	SF
Nickel	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616	SF
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	09-07-1993 0800	LS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:FBC-13 (SMH-3)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 29, 1993

Date received: August 30, 1993

Rec'd 1100 hr.
Sampled 1521 hr.

NOTE: FLUORIDE NOT DISTILLED.

Analysis report no. 59-13472

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Nitrate	0.23	.01	mg/l	EPA 353.3	08-30-1993 1145 LM
Nitrogen, Nitrite	0.00	.02	mg/l	EPA 354.1	08-31-1993 0910 LM
Oil & Grease	<1	1	mg/l	EPA 413.1	09-08-1993 1310 LM
Phosphorus, Total	0.008	.008	mg/l	EPA 365.2	09-15-1993 0720 LM
Potassium	1.1	.1	mg/l	EPA 200.7	09-15-1993 1616 SF
Selenium	<0.002	.002	mg/l	EPA 270.2	09-20-1993 1900 SM
Sodium	6.0	.1	mg/l	EPA 200.7	09-15-1993 1616 SF
Solids, Total Dissolved	332	14	mg/l	EPA 160.1	08-31-1993 1100 LM
Sulfate	23	1	mg/l	EPA 375.4	09-24-1993 0800 LS
Sulfide	<0.9	.1	mg/l	EPA 376.1	09-03-1993 1515 ED
Zinc	<0.01	.005	mg/l	EPA 200.7	09-15-1993 1616 SF
Cation/Anion Balance	-6.68	----	%	---------	-------

Respectfully submitted,
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Manager, Huntington Laboratory

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December 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-13 (SMH-3)

Rec'd 1430 hr.
Sampled 1119 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 15, 1993

Date received October 15, 1993

Analysis report no. 59-13631

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	311	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Total	255	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Aluminum	<1	1	mg/l		EPA 202.1	10-28-1993 1630	ED
Anions	5.60	----	meq/l		---------	---------- -----	--
Arsenic	<0.010	.003	mg/l		EPA 206.2	11-23-1993 1115	DW
Boron	0.10	.04	mg/l		EPA 212.3	11-30-1993 1500	LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125	ED
Calcium	69.0	.03	mg/l		EPA 215.1	11-08-1993 1450	ED
Cations	6.20	----	meq/l		---------	---------- -----	--
Chloride	9.0	.5	mg/l		EPA 325.3	11-01-1993 0900	LM
Conductivity	479.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Copper	<0.05	.03	mg/l		EPA 220.1	10-27-1993 1550	ED
Hardness, Total	308.0	.03	mg/l	$CaCO_3$	---------	11-08-1993 1450	ED
Iron	0.16	.05	mg/l		EPA 236.1	11-08-1993 1315	ED
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	11-24-1993 1200	DW
Lead	<0.400	.003	mg/l		EPA 239.2	11-05-1993 1000	ED
Magnesium	33.00	.007	mg/l		EPA 242.1	11-08-1993 1630	ED
Manganese	<0.03	.03	mg/l		EPA 243.1	11-08-1993 1100	ED
Manganese, Dissolved	0.1	.03	mg/l		EPA 243.1	11-29-1993 1500	DW
Molybdenum	0.2	.2	mg/l		EPA 246.1	10-29-1993 1105	ED
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000	LS
Nitrogen, Nitrate	0.35	.01	mg/l		EPA 353.3	10-18-1993 0745	LM
Nitrogen, Nitrite	0.01	.02	mg/l		EPA 354.1	10-15-1993 1500	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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December 3, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-13 (SMH-3)

Rec'd 1430 hr.
Sampled 1119 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 15, 1993

Date received October 15, 1993

Analysis report no. 59-13631

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorus, Ortho	0.003	.003	mg/l	EPA 365.2	10-16-1993 0950	LM
Potassium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315	ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400	DW
Sodium	<10.0	.2	mg/l	EPA 273.1	11-09-1993 1135	ED
Solids, Total Dissolved	287	14	mg/l	EPA 160.1	10-19-1993 0815	LM
Sulfate	20	1	mg/l	EPA 375.4	11-11-1993 1020	LS
Zinc	<0.03	.03	mg/l	EPA 289.1	10-27-1993 1300	ED
Cation/Anion Balance	4.30	----	%	---------	---------- -----	--

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

July 11, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Kind of sample reported to us Water

Rec'd 1015 hr.
Sampled 0842 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 15, 1994

Date received June 16, 1994

Analysis report no. 59-14148

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	301	1	mg/l as HCO_3	SM2320-B	06-16-1994 1310	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-16-1994 1310	LS
Alkalinity, Total	247	1	mg/l as $CaCO_3$	EPA 310.1	06-16-1994 1310	LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-27-1994 1430	DW
Anions	5.30	----	meq/l	---------	---------- -----	--
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-08-1994 0930	DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	07-06-1994 1045	LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-27-1994 1400	DW
Calcium, Dissolved	51	1	mg/l	EPA 215.1	06-23-1994 1130	DW
Cations	5.00	----	meq/l	---------	---------- -----	--
Chloride	1	1	mg/l	SM4500-Cl-B	06-20-1994 1610	LS
Conductivity	470	1	umhos/cm	SM2510-B	06-17-1994 1255	ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-27-1994 1300	DW
Hardness, Total	243	1	mg/l as $CaCO_3$	SM2340-B	06-23-1994 1130	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-23-1994 0900	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-22-1994 1400	DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-28-1994 0730	DW
Magnesium, Dissolved	28	1	mg/l	EPA 242.1	06-23-1994 1200	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-23-1994 0830	DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-22-1994 1600	DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-27-1994 1600	DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-17-1994 1000	ED
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l	EPA 353.3	06-23-1994 1030	LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-17-1994 1100	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

Original Watermarked For Your Protection

COMMERCIAL TESTING & ENGINEERING CO.

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

July 11, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-12

Rec'd 1015 hr.
Sampled 0842 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 15, 1994

Date received June 16, 1994

Analysis report no. 59-14148

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.06	0.02	mg/l	SM4500-P-E	06-16-1994 1615 LM
Potassium, Dissolved	<2	2	mg/l	EPA 258.1	06-23-1994 0945 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-08-1994 1300 DW
Sodium, Dissolved	3	1	mg/l	EPA 273.1	06-23-1994 1100 DW
Solids, Total Dissolved	270	10	mg/l	EPA 160.1	06-17-1994 1600 LM
Sulfate	15	1	mg/l	EPA 375.4	06-16-1994 1340 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-28-1994 0800 DW
Cation/Anion Balance	-2.90	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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FAX: (801) 653-2436

July 14, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-13 (SMH-3)

Rec'd 1015 hr.
Sampled 1100 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 15, 1994

Date received June 16, 1994

Analysis report no. 59-14145

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	325	1	mg/l as HCO_3	SM2320-B	06-16-1994 1310 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-16-1994 1310 LS
Alkalinity, Total	266	1	mg/l as $CaCO_3$	EPA 310.1	06-16-1994 1310 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-27-1994 1430 DW
Anions	5.90	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-13-1994 1300 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	07-06-1994 1045 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-27-1994 1400 DW
Calcium, Dissolved	64	1	mg/l	EPA 215.1	06-23-1994 1130 DW
Cations	5.70	----	meq/l	---------	---------- ----- --
Chloride	4	1	mg/l	SM4500-Cl-B	06-20-1994 1610 LS
Conductivity	535	1	umhos/cm	SM2510-B	06-17-1994 1255 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-27-1994 1300 DW
Hardness, Total	275	1	mg/l as $CaCO_3$	SM2340-B	06-23-1994 1130 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-23-1994 0900 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-22-1994 1400 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-28-1994 0730 DW
Magnesium, Dissolved	28	1	mg/l	EPA 242.1	06-23-1994 1200 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-23-1994 0830 DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-22-1994 1600 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-27-1994 1600 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-17-1994 1000 ED
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l	EPA 353.3	06-23-1994 1030 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-17-1994 1100 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hoot SD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 14, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-13 (SMH-3)

Rec'd 1015 hr.
Sampled 1100 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 15, 1994

Date received June 16, 1994

Analysis report no. 59-14145

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	06-16-1994 1615 LM
Potassium, Dissolved	<2	2	mg/l	EPA 258.1	06-23-1994 0945 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-13-1994 1600 DW
Sodium, Dissolved	5	1	mg/l	EPA 273.1	06-23-1994 1100 DW
Solids, Total Dissolved	290	10	mg/l	EPA 160.1	06-17-1994 1600 LM
Sulfate	21	1	mg/l	EPA 375.4	06-16-1994 1340 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-28-1994 0800 DW
Cation/Anion Balance	-1.30	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Barry Hunt SD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 16, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-13 (SM4-3)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 30, 1994

Date received: August 31, 1994

Rec'd 1230 hr.
Sampled 1705 hr.

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14381

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	267	1	mg/l as HCO_3	SM2320-B	09-06-1994 0945 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-06-1994 0945 LS
Alkalinity, Total	219	1	mg/l as $CaCO_3$	EPA 310.1	09-06-1994 0945 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	09-08-1994 1530 DW
Anions	3.10	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-02-1994 1100 ED
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-16-1994 1100 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	09-08-1994 1200 DW
Calcium, Dissolved	50	5	mg/l	EPA 215.1	09-09-1994 0930 DW
Cations	4.80	----	meq/l	---------	---------- ----- --
Chloride	7	1	mg/l	SM4500-Cl-B	09-06-1994 1500 LS
Conductivity	463	1	umhos/cm	SM2510-B	09-07-1994 1015 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	09-08-1994 1200 DW
Hardness, Total	240	10	mg/l as $CaCO_3$	SM2340-B	09-09-1994 0930 DW
Iron, Total	0.3	0.2	mg/l	EPA 236.1	09-13-1994 1030 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-09-1994 1430 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	09-08-1994 1100 DW
Magnesium, Dissolved	28	2	mg/l	EPA 242.1	09-09-1994 1030 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-13-1994 1000 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	09-09-1994 1330 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	09-09-1994 1800 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	09-09-1994 1000 ED
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l	EPA 353.3	09-15-1994 1100 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	09-01-1994 1100 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Mont D

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 16, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-13 (SM4-3)

Kind of sample reported to us Water

Rec'd 1230 hr.
Sampled 1705 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Dissolved metals filtered at Lab.

Date sampled August 30, 1994

Date received August 31, 1994

Analysis report no. 59-14381

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	09-01-1994 1030	LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	09-09-1994 1300	DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-02-1994 1450	ED
Sodium, Dissolved	<5	5	mg/l	EPA 273.1	09-09-1994 1230	DW
Solids, Total Dissolved	370	10	mg/l	EPA 160.1	09-02-1994 1500	LM
Sulfate	27	1	mg/l	EPA 375.4	09-15-1994 1310	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	09-08-1994 1330	DW
Cation/Anion Balance	-3.40	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jerry Mont CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

November 22, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-13 (SMH-3)

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 31, 1994

Date received October 31, 1994

Rec'd 1700 hr.
Sampled No Time Given

NOTE: Sample temperature above 6.0°C when received. Dissolved metals filtered at Lab.

Analysis report no. 59-14542

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	325	1	mg/l as HCO_3	SM2320-B	11-02-1994 0845 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-02-1994 0845 LS
Alkalinity, Total	266	1	mg/l as $CaCO_3$	EPA 310.1	11-02-1994 0845 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	11-21-1994 1330 DW
Anions	6.10	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-07-1994 1000 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	11-11-1994 1330 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	11-21-1994 1000 DW
Calcium, Dissolved	63	5	mg/l	EPA 215.1	11-17-1994 0830 DW
Cations	5.80	----	meq/l	---------	---------- ----- --
Chloride	7	1	mg/l	SM4500-Cl-B	11-10-1994 0835 LS
Conductivity	549	1	umhos/cm	SM2510-B	11-01-1994 0930 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	11-21-1994 1030 DW
Hardness, Total	273	10	mg/l as $CaCO_3$	SM2340-B	11-17-1994 0830 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	11-15-1994 1100 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-17-1994 1445 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	11-21-1994 0930 DW
Magnesium, Dissolved	28	2	mg/l	EPA 242.1	11-17-1994 0930 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-15-1994 1115 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	11-17-1994 1400 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	11-03-1994 1630 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	11-16-1994 0930 ED
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l	EPA 353.3	11-09-1994 1100 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	11-01-1994 0830 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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November 22, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-13 (SMH-3)

Rec'd 1700 hr.
Sampled No Time Given

NOTE: Sample temperature above 6.0C when received. Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 31, 1994

Date received October 31, 1994

Analysis report no. 59-14542

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	11-01-1994 1120	LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	11-15-1994 1300	DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-07-1994 1500	DW
Sodium, Dissolved	7	5	mg/l	EPA 273.1	11-17-1994 1030	DW
Solids, Total Dissolved	300	10	mg/l	EPA 160.1	11-01-1994 0830	LS
Sulfate	26	1	mg/l	EPA 375.4	11-09-1994 1000	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	11-21-1994 1130	DW
Cation/Anion Balance	-2.60	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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July 14, 1995

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-13 (SMH-3)

Rec'd 1315 hr.
Sampled 1110 hr.

NOTE: Possible matrix interference with Selenium.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 28, 1995

Date received June 28, 1995

Analysis report no. 59-15116

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	315	5	mg/l as HCO_3	SM2320-B	07-05-1995 1300 SW
Alkalinity, Carbonate	5	5	mg/l as CO_3	SM2320-B	07-05-1995 1300 SW
Alkalinity, Total	270	5	mg/l as $CaCO_3$	EPA 310.1	07-05-1995 1300 SW
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	07-06-1995 1550 MK
Anions	6.00	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-11-1995 1325 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	06-30-1995 0940 MK
Cadmium, Dissolved	0.01	0.01	mg/l	EPA 213.1	07-10-1995 1415 MK
Calcium, Dissolved	62	1	mg/l	EPA 215.1	07-06-1995 1400 MK
Cations	5.80	----	meq/l	---------	---------- ----- --
Chloride	10	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	550	1	umhos/cm	SM2510-B	06-29-1995 1510 MK
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	07-10-1995 1200 MK
Hardness, Total	280	10	mg/l as $CaCO_3$	SM2340-B	07-06-1995 1400 MK
Iron, Total	0.3	0.1	mg/l	EPA 236.1	07-03-1995 1325 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-06-1995 1220 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	07-10-1995 1445 MK
Magnesium, Dissolved	30	1	mg/l	EPA 242.1	07-06-1995 1435 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-03-1995 1415 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	07-06-1995 1310 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	07-10-1995 0950 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-12-1995 0730 SW
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l as N	EPA 353.3	07-12-1995 1045 MK
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	06-29-1995 1630 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 14, 1995

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-1 (SMH-3)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 28, 1995

Date received: June 28, 1995

Rec'd 1315 hr.
Sampled 1110 hr.

NOTE: Possible matrix interference with Selenium.

Analysis report no. 59-15116

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
& Grease	<5	5	mg/l	EPA 413.1	07-10-1995 1220 JK
sphorous, Ortho-PO_4	<0.01	0.01	mg/l as P	SM4500-P-E	06-29-1995 0810 JC
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	07-06-1995 1325 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-12-1995 1015 MK
Sodium, Dissolved	6	1	mg/l	EPA 273.1	07-06-1995 1335 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-28-1995 1600 SW
Solids, Total Dissolved	320	10	mg/l	EPA 160.1	06-28-1995 1000 JC
Solids, Total Suspended	<5	5	mg/l	EPA 160.2	06-28-1995 1145 JC
Sulfate	17	1	mg/l	EPA 375.4	07-03-1995 0700 SW
Zinc, Dissolved	0.04	0.01	mg/l	EPA 289.1	07-10-1995 1345 MK
Cation/Anion Balance	-1.20	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

August 13, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-13 (SMH-3)

Kind of sample reported to us: Water

Rec'd 1230 hr.
Sampled 1540 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 29, 1997

Date received: June 30, 1997

NOTE: DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17441

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	334	5	mg/l as HCO_3	SM2320-B	07-09-1997 0700 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	07-09-1997 0700 SC
Alkalinity, Total	274	5	mg/l as $CaCO_3$	EPA 310.1	07-09-1997 0700 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	08-05-1997 1315 MK
Anions	6.1	----	meq/l	---------	08-07-1997 1100 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	08-08-1997 1015 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	07-30-1997 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	08-05-1997 0845 MK
Calcium, Dissolved	62	1	mg/l	EPA 215.1	08-05-1997 1200 MK
Cations	5.6	----	meq/l	---------	08-07-1997 1100 RJ
Chloride	6	1	mg/l	SM4500-Cl-B	07-23-1997 0830 SC
Conductivity	536	1	umhos/cm	SM2510-B	07-22-1997 1230 MK
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	08-05-1997 0800 MK
Hardness, Total	266	----	mg/l as $CaCO_3$	SM2340-B	08-07-1997 1100 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	08-05-1997 1000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	08-05-1997 1000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	08-05-1997 0915 MK
Magnesium, Dissolved	27	1	mg/l	EPA 242.1	08-05-1997 1230 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	08-05-1997 1030 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	08-05-1997 1030 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	08-05-1997 1430 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-22-1997 0720 RJ
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l as N	EPA 353.3	07-22-1997 0430 AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	07-01-1997 0800 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

August 13, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-13 (SMH-3)

Kind of sample reported to us: Water

Rec'd 1230 hr.
Sampled 1540 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 29, 1997

Date received: June 30, 1997

NOTE: DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17441

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	07-01-1997 0800 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	08-05-1997 1045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	08-09-1997 0600 MK
Sodium, Dissolved	6	1	mg/l	EPA 273.1	08-05-1997 1130 MK
Solids, Total Dissolved	310	10	mg/l	EPA 160.1	07-03-1997 0700 JC
Sulfate	24	5	mg/l	EPA 375.4	07-21-1997 0830 SC
Zinc, Dissolved	0.02	0.01	mg/l	EPA 289.1	08-05-1997 0815 MK
Cation/Anion Balance	-4.8	----	%		08-07-1997 1100 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory RJ

COMMERCIAL TESTING & ENGINEERING CO.

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HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

October 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-13 (SMH-3)

Kind of sample reported to us: Water

Rec'd 1715 hr.
Sampled 1435 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 11, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17763

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	327	5	mg/l as HCO_3	SM2320-B	09-24-1997 0730	SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	09-24-1997 0730	SC
Alkalinity, Total	268	5	mg/l as $CaCO_3$	EPA 310.1	09-24-1997 0730	SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	09-27-1997 0245	MK
Anions	6.0	----	meq/l	---------	10-08-1997 0900	RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-27-1997 1900	MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-29-1997 1500	MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	09-26-1997 2300	MK
Calcium, Dissolved	61	1	mg/l	EPA 215.1	09-27-1997 0145	MK
Cations	5.4	----	meq/l	---------	10-08-1997 0900	RJ
Chloride	7	1	mg/l	SM4500-Cl-B	10-02-1997 1215	SC
Conductivity	538	1	umhos/cm	SM2510-B	09-22-1997 1230	SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	09-26-1997 2200	MK
Hardness, Total	259	----	mg/l as $CaCO_3$	SM2340-B	10-08-1997 0900	RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	09-27-1997 0000	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-27-1997 0000	MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	09-26-1997 2315	MK
Magnesium, Dissolved	26	1	mg/l	EPA 242.1	09-27-1997 0200	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030	MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	09-27-1997 0330	MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-07-1997 1000	RJ
Nitrogen, Nitrate-Nitrite	0.4	0.1	mg/l as N	EPA 353.3	09-22-1997 0730	RJ
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-12-1997 0700	JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

COMMERCIAL TESTING & ENGINEERING CO.

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HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

October 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC-13 (SMH-3)

Kind of sample reported to us: Water

Rec'd 1715 hr.
Sampled 1435 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 11, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17763

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.01	0.01	mg/l as P	SM4500-P-E	09-11-1997 1730	RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	09-27-1997 0045	MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-28-1997 1430	MK
Sodium, Dissolved	5	1	mg/l	EPA 273.1	09-27-1997 0115	MK
Solids, Total Dissolved	330	10	mg/l	EPA 160.1	09-17-1997 0700	JC
Sulfate	21	5	mg/l	EPA 375.4	10-06-1997 1400	SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	09-26-1997 2215	MK
Cation/Anion Balance	5.2	----	%		10-08-1997 0900	RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

WATER MONITORING REPORT

Property: Co-op
Station: WHR-1
Location: Fish Creek
Type: Stream

Field Measurements	Date Sampled 07/31/91	10/28/92	03/22/93	06/24/93	08/15/93	10/26/93	03/23/94	06/01/94	08/29/94	10/30/94	06/29/97	09/17/97	10/28/97
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op	Co-Op
Flow (gpm)	2.5	46	Inaccess	300	65	122	210	120	Dry	105	650	250	N/R
pH	7.9	8.6	N/A	8.35	8.15	8.04	8.6	8.6	N/A	8.5	8.49	8.5	8.6
Sp. Cond. (ohms)	800	946	N/A	663	890	1415	1671	1268	N/A	1637	648	810	1054
Temp (C)	N/R	7.61	N/A	7.6	23.1	7.5	8.1	11	N/A	8.6	10.9	20.9	6.9
Dissolved Oxygen	N/R	N/R	N/A	N/R	N/R	N/R	N/R	N/R	N/A	N/R	7.2	N/R	7.1
Lab Measurements													
Analyzed by:	IML	CT&E	N/A	CT&E	CT&E	CT&E	CT&E	CT&E	N/A	CT&E	CT&E	CT&E	CT&E
Settleable Solids		N/D		N/D			N/D	N/D		N/D	N/D	N/D	N/D
TSS (mg/L)		668		7	17		10	9		N/D	40	N/D	14
TDS (mg/L)	272	614		433	648	648	1000	820		1240	390	600	710
Hardness (CaCO3)	283	547		354	549.7	642	712	578		760	275	415	489
Aluminum (Al)	0.1	3.85		N/D	1	N/D	N/D	N/D		N/D	N/D	N/D	N/D
Arsenic (As)	N/D	N/D		0.007	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D
Boron (B)	N/D	0.33		0.2	N/D	0.1	0.2	0.5		0.2	0.10	0.2	0.3
Carbonate (CO3)	N/D	N/D		N/D	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D
Bicarbonate (HCO3)	333	281		274	311	302	349	374		390	284	321	374
Cadmium (Cd)	N/D	N/D		0.0002	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D
Calcium (Ca)	72.6	108.1		55.7	75	74	89	70		87	41	46	59
Chloride (Cl)	2.13	20		7.9	10	15	65	15		24	6	10	12
Copper (Cu)	N/D	N/D		0.05	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D
Iron (Fe) Total	0.05	5.67		0.07	0.31	0.29	N/D	N/D		N/D	0.40	N/D	0.4
Iron (Fe) Dissolved				N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D
Lead (Pb)	N/D	N/D		N/D	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D
Magnesium (Mg)	24.8	67.2		52.1	88	111	119	98		132	42	73	83
Manganese (Mn) Tot.	N/D	0.17		0.03	0.03	0.04	N/D	N/D		N/D	N/D	N/D	N/D
Manganese (Mn) Dis.						N/D	N/D	N/D		N/D	N/D	N/D	N/D
Molybdenum (Mo)	N/D	N/D		N/D	N/D	0.2	N/D	N/D		N/D	N/D	N/D	N/D
Nitrogen (NH3)	0.07	N/D		N/D	N/D	N/D	0.1	N/D		N/D	N/D	N/D	N/D
Nitrite (NO2)	N/D	N/D		0.01	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D
Nitrate (NO3)	0.17	0.54		0.07	0.04	0.1	0.1	N/D		N/D	N/D	N/D	N/D
Potassium (K)	0.33	3.21		0.3	3.1	N/D	4	3		N/D	N/D	3	2
Phosphate (PO4)	N/D	0.22		0.02	0.04	N/D	N/D	0.02		0.02	0.03	0.02	0.01
Selenium (Se)	N/D	N/D		N/D	N/D	N/D	0.01	N/D		N/D	N/D	N/D	N/D
Sodium (Na)	2.8	18.4		19.6	38	53	69	47		81	12	29	34
Sp. Conductivity						1241	1537	1182		1629	584	870	1013
Sulfate (SO4)	9.05	250		150	29	330	6000	330		500	98	228	143
Zinc (Z)	N/D	0.1		0.04	0.47	N/D	N/D	N/D		N/D	N/D	N/D	N/D
Oil & Grease		2.1		0.1	N/D		N/D	N/D		N/D	N/D		N/D
Anions	5.72	10.31		7.76	10.95	13.3	20	13.4		17.5	6.9	10.3	9.4
Cations	5.79	11.79		7.91	12.68	15.1	17.2	13.6		18.7	6.0	9.6	11.3
Anion/Cation Balance	0.62%	6.72%		0.97%	7.32%	6.30%	-7.50%	0.60%		3.40%	-6.50%	-3.30%	9.00%

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

November 25, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

#2 (WHR-1)
Rec'd 1000 hr.
Sampled 1615 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 28, 1992

Date received: October 29, 1992

Analysis report no. 59-12647

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	11-11-1992 11:30 LS
Alkalinity, Bicarbonate	281	1	mg/l $CaCO_3$	EPA 310.1	11-04-1992 13:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	11-04-1992 11:30 LS
Alkalinity, Total	231	1	mg/l $CaCO_3$	EPA 310.1	11-04-1992 11:30 LS
Aluminum	3.85	.5	mg/l	EPA 202.1	11-11-1992 13:30 JS
Anions	10.31	----	meq/l	---------	---------- ----- --
Arsenic	0.000	.002	mg/l	EPA 206.2	11-10-1992 10:50 JS
Barium	0.00	.03	mg/l	EPA 208.1	11-11-1992 13:30 JS
Boron	0.33	.01	mg/l	EPA 212.3	11-05-1992 14:00 LM
Cadmium	0.000	.00	mg/l	EPA 213.2	11-10-1992 12:10 JS
Calcium	108.1	.1	mg/l	EPA 215.1	11-17-1992 16:15 JS
Cations	11.79	----	meq/l	---------	---------- ----- --
Chloride	20.0	.1	mg/l	EPA 325.3	11-16-1992 15:45 LS
Chromium	0.00	.001	mg/l	EPA 218.2	11-10-1992 12:10 JS
Copper	0.000	.01	mg/l	EPA 220.1	11-11-1992 12:20 JS
Fluoride	0.03	.01	mg/l	EPA 340.2	11-05-1992 08:30 LS
Hardness, Total	547	1	mg/l $CaCO_3$	---------	11-17-1992 16:15 JS
Iron	5.67	.02	mg/l	EPA 236.1	11-02-1992 14:00 JS
Lead	0.000	.001	mg/l	EPA 239.2	11-10-1992 12:10 JS
Magnesium	67.20	.01	mg/l	EPA 242.1	11-17-1992 16:15 JS
Manganese	0.17	.01	mg/l	EPA 243.1	11-02-1992 14:00 JS
Mercury	0.000	.002	mg/l	EPA 245.1	11-12-1992 14:00 JS
Molybdenum	0.00	.1	mg/l	EPA 246.1	11-11-1992 13:30 JS
Nickel	0.00	.02	mg/l	EPA 249.1	11-11-1992 12:00 JS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

June Komar

Manager, Huntington Laboratory

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TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

November 25, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 28, 1992

Date received: October 29, 1992

#2 (WHR-1)
Rec'd 1000 hr.
Sampled 1615 hr.

Analysis report no. 59-12647

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	0.00	.01	mg/l	EPA 350.3	11-13-1992 08:30 JS
Nitrogen, Nitrate	0.54	.01	mg/l	EPA 353.3	10-29-1992 15:00 JM
Nitrogen, Nitrite	0.00	.01	mg/l	EPA 354.1	10-29-1992 15:00 JM
Oil & Grease	2.1	1	mg/l	EPA 413.1	11-05-1992 15:00 JM
Phosphorus, Total	0.22	.01	mg/l	EPA 365.2	11-04-1992 13:30 JM
Potassium	3.21	.01	mg/l	EPA 258.1	11-17-1992 16:15 JS
Selenium	0.000	.002	mg/l	EPA 270.2	11-10-1992 10:50 JS
Sodium	18.40	.01	mg/l	EPA 273.1	11-17-1992 16:15 JS
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	10-29-1992 13:30 JM
Solids, Total Dissolved	614.0	.5	mg/l	EPA 160.1	10-30-1992 09:30 JM
Solids, Total Suspended	668.0	.5	mg/l	EPA 160.2	10-30-1992 09:30 JM
Sulfate	250.0	.1	mg/l	EPA 375.4	11-13-1992 10:30 JS
Sulfide	15.00	.1	mg/l	EPA 376.1	10-30-1992 15:30 JM
Zinc	0.10	.01	mg/l	EPA 289.1	11-11-1992 12:00 JS
Cation/Anion Balance	6.72	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

June Koman

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

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

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

WHR-1
Rec'd 0800 hr.
Sampled 1847 hr.

Sample taken at Co-op

NOTE: Fluoride not distilled.

Sample taken by Co-op

Date sampled June 24, 1993

Date received June 25, 1993

Analysis report no. 59-13220

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	274	.4	mg/l HCO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Total	225	.4	mg/l $CaCO_3$	EPA 310.1	06-29-1993 15:00 LS
Aluminum	<1.00	1	mg/l	EPA 202.1	07-16-1993 13:35 ED
Anions	7.76	----	meq/l	---	--- ----- --
Arsenic	0.007	.003	mg/l	EPA 206.2	07-07-1993 09:50 ED
Barium	<0.20	.2	mg/l	EPA 208.1	07-16-1993 16:10 ED
Boron	0.20	.04	mg/l	EPA 212.3	07-19-1993 13:30 LM
Cadmium	0.0002	.0002	mg/l	EPA 213.2	07-08-1993 14:35 ED
Calcium	55.7	.03	mg/l	EPA 215.1	07-13-1993 14:00 ED
Cations	7.91	----	meq/l	---	--- ----- --
Chloride	7.9	.5	mg/l	EPA 325.3	06-29-1993 08:30 LM
Chromium	0.0023	.0003	mg/l	EPA 218.2	07-21-1993 10:30 ED
Copper	0.050	.03	mg/l	EPA 220.1	07-15-1993 16:25 ED
Fluoride	0.19	.02	mg/l	EPA 340.2	07-06-1993 13:00 LS
Hardness, Total	354	.03	mg/l $CaCO_3$	---	07-13-1993 14:00 ED
Iron	0.07	.05	mg/l	EPA 236.1	07-12-1993 14:40 ED
Iron, Dissolved	<0.05	.05	mg/l	EPA 236.1	07-16-1993 12:30 ED
Lead	<0.003	.003	mg/l	EPA 239.2	07-07-1993 13:45 ED
Magnesium	52.10	.007	mg/l	EPA 242.1	07-14-1993 16:20 ED
Manganese	0.03	.03	mg/l	EPA 243.1	07-12-1993 10:00 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	07-09-1993 14:50 ED
Molybdenum	<0.20	.2	mg/l	EPA 246.1	07-16-1993 14:35 ED
Nickel	<0.08	.08	mg/l	EPA 249.1	07-16-1993 10:50 ED

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

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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

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

WHR-1
Rec'd 0800 hr.
Sampled 1847 hr.

Sample taken at Co-op

NOTE: Fluoride not distilled.

Sample taken by Co-op

Date sampled June 24, 1993

Date received June 25, 1993

Analysis report no. 59-13220

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	07-06-1993 08:00 LS
Nitrogen, Nitrate-Nitrite	0.07	.01	mg/l	EPA 353.3	06-30-1993 11:00 LM
Nitrogen, Nitrite	0.01	.004	mg/l	EPA 354.1	06-25-1993 14:00 LM
Oil & Grease	0.1	1	mg/l	EPA 413.1	07-01-1993 08:00 LM
Phosphorus, Total	0.02	.008	mg/l	EPA 365.2	07-06-1993 14:00 LM
Potassium	0.30	.1	mg/l	EPA 258.1	07-08-1993 13:15 ED
Selenium	<0.004	.004	mg/l	EPA 270.2	07-06-1993 12:30 ED
Sodium	19.60	.2	mg/l	EPA 273.1	07-13-1993 16:25 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	06-25-1993 14:00 LM
Solids, Total Dissolved	433.0	14	mg/l	EPA 160.1	06-28-1993 09:00 LM
Solids, Total Suspended	7.0	7	mg/l	EPA 160.2	06-28-1993 07:30 LM
Sulfate	150.0	1	mg/l	EPA 375.4	07-06-1993 10:00 LS
Sulfide	<0.90	.9	mg/l	EPA 376.1	06-30-1993 13:10 ED
Zinc	0.04	.03	mg/l	EPA 289.1	07-15-1993 16:00 ED
Cation/Anion Balance	0.97	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Kind of sample reported to us Water

Rec'd 1100 hr.
Sampled 1550 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: FLUORIDE NOT DISTILLED.

Date sampled August 16, 1993

Date received August 16, 1993

Analysis report no. 59-13418

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	311	2	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 0930	LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 0930	LS
Alkalinity, Total	255	2	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 1330	LS
Aluminum	1	.05	mg/l		EPA 200.7	09-15-1993 1616	SF
Anions	10.95	----	meq/l		---------	---------	--
Arsenic	<0.002	.002	mg/l		EPA 206.2	09-12-1993 1015	SM
Barium	0.1	.005	mg/l		EPA 200.7	09-15-1993 1616	SF
Boron	<0.05	.01	mg/l		EPA 200.7	09-16-1993 1330	SF
Cadmium	<0.0050	.005	mg/l		EPA 200.7	09-15-1993 1616	SF
Calcium	75.0	.1	mg/l		EPA 200.7	09-15-1993 1616	SF
Cations	12.68	----	meq/l		---------	---------	--
Chloride	10.0	.5	mg/l		EPA 325.3	09-07 1993 1300	LM
Chromium	<0.0	.005	mg/l		EPA 200.7	09-15-1993 1616	SF
Copper	<0.01	.005	mg/l		EPA 200.7	09-15-1993 1616	SF
Fluoride	0.28	.02	mg/l		EPA 340.2	08-18-1993 0930	LS
Hardness, Total	549.7	.03	mg/l	$CaCO_3$	---------	09-15-1993 1616	SF
Iron	0.31	.01	mg/l		EPA 200.7	09-15-1993 1616	SF
Lead	<0.050	.05	mg/l		EPA 200.7	09-15-1993 1616	SF
Magnesium	88.00	.1	mg/l		EPA 200.7	09-15-1993 1616	SF
Manganese	0.03	.01	mg/l		EPA 200.7	09-15-1993 1616	SF
Mercury	<0.0040	.0002	mg/l		EPA 245.1	09-21-1993 1015	SM
Molybdenum	<0.1	.1	mg/l		EPA 200.7	09-18-1993 1616	SF
Nickel	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616	SF
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	09-07-1993 0800	S

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Kind of sample reported to us: Water

Rec'd 1100 hr.
Sampled 1550 hr.

Sample taken at: Co-op

Sample taken by: Co-op

NOTE: FLUORIDE NOT DISTILLED.

Date sampled: August 16, 1993

Date received: August 16, 1993

Analysis report no. 59-13418

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Nitrate	0.04	.01	mg/l	EPA 353.3	08-16-1993 0930 LM
Nitrogen, Nitrite	0.00	.02	mg/l	EPA 354.1	08-16-1993 1400 LM
Oil & Grease	0	1	mg/l	EPA 413.1	08-25-1993 1400 LM
Phosphorus, Total	0.040	.008	mg/l	EPA 365.2	08-27-1993 0800 LM
Potassium	3.1	.1	mg/l	EPA 200.7	09-15-1993 1616 SE
Selenium	<0.000	.002	mg/l	EPA 270.2	09-20-1993 1900 SM
Sodium	38.0	.1	mg/l	EPA 200.7	09-15-1993 1616 SE
Solids, Total Dissolved	648	14	mg/l	EPA 160.1	08-18-1993 1030 LM
Solids, Total Suspended	17	7	mg/l	EPA 160.2	08-19-1993 0800 LM
Sulfate	29	1	mg/l	EPA 375.4	09-17-1993 1000 LS
Sulfide	<0.9	.1	mg/l	EPA 376.1	08-20-1993 1515 ED
Zinc	0.47	.005	mg/l	EPA 200.7	09-15-1993 1616 SE
Cation/Anion Balance	7.32	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

December 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Rec'd 1700 hr.
Sampled 1140 hr.

NOTE: Holding time expired when Sulfate was run.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 26, 1993

Date received October 26, 1993

Analysis report no. 59-13674

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	302	2	mg/l	$CaCO_3$	EPA 310.1	11-03-1993 1400	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	11-03-1993 1400	LS
Alkalinity, Total	302	2	mg/l	$CaCO_3$	EPA 310.1	11-03-1993 1400	LS
Aluminum	<2	1	mg/l		EPA 202.1	12-06-1993 1330	DW
Anions	13.30	----	meq/l		---------	---------- -----	--
Arsenic	<0.010	.003	mg/l		EPA 206.2	11-23-1993 1115	DW
Boron	0.10	.04	mg/l		EPA 212.3	12-09-1993 1530	LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125	ED
Calcium	74.0	.03	mg/l		EPA 215.1	12-13-1993 1500	DW
Cations	15.10	----	meq/l		---------	---------- -----	--
Chloride	15.0	.5	mg/l		EPA 325.3	11-22-1993 0930	LM
Conductivity	1241.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Copper	<0.20	.03	mg/l		EPA 220.1	11-09-1993 1520	ED
Hardness, Total	642.0	.03	mg/l	$CaCO_3$	---------	12-13-1993 1500	DW
Iron	0.29	.05	mg/l		EPA 236.1	11-08-1993 1315	ED
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-08-1993 0920	ED
Lead	<0.400	.003	mg/l		EPA 239.2	11-05-1993 1000	ED
Magnesium	111.00	.007	mg/l		EPA 242.1	12-14-1993 1100	ED
Manganese	0.04	.03	mg/l		EPA 243.1	11-08-1993 1100	ED
Manganese, Dissolved	<0.1	.03	mg/l		EPA 243.1	12-08-1993 1010	ED
Molybdenum	0.2	.2	mg/l		EPA 246.1	12-06-1993 1620	DW
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000	LS
Nitrogen, Nitrate	0.10	.01	mg/l		EPA 353.3	11-03-1993 1000	LM
Nitrogen, Nitrite	0.00	.02	mg/l		EPA 354.1	10-27-1993 1100	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

December 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Kind of sample reported to us Water

Rec'd 1700 hr.
Sampled 1140 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Holding time expired when Sulfate was run.

Date sampled October 26, 1993

Date received October 26, 1993

Analysis report no. 59-13674

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorus, Ortho	0.000	.003	mg/l	EPA 365.2	10-27-1993 1130 LM
Potassium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315 ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400 DW
Sodium	53.0	.2	mg/l	EPA 273.1	11-09-1993 1135 ED
Solids, Total Dissolved	865	14	mg/l	EPA 160.1	10-29-1993 0730 LM
Sulfate	330	1	mg/l	EPA 375.4	12-01-1993 0830 LS
Zinc	<0.02	.03	mg/l	EPA 289.1	12-06-1993 1500 DW
Cation/Anion Balance	6.30	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

April 8, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Rec'd 1300 hr.
Sampled 1505 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled March 23, 1994

Date received March 24, 1994

Analysis report no. 59-13949

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	349	1	mg/l as HCO_3	SM4500-CO_2-D	03-28-1994 0900 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM4500-CO_2-D	03-28-1994 0900 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	04-04-1994 1600 DW
Anions	20.00	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	04-07-1994 1300 DW
Boron, Dissolved	0.2	0.1	mg/l	EPA 212.3	04-05-1994 1250 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	04-06-1994 1045 DW
Calcium, Dissolved	89	1	mg/l	EPA 215.1	04-05-1994 1330 DW
Cations	17.20	----	meq/l	---------	---------- ----- --
Chloride	65	1	mg/l	SM4500-Cl-B	03-30-1994 0830 LS
Conductivity	1537	1	umhos/cm	SM2510-B	03-29-1994 0930 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	04-06-1994 1130 DW
Hardness, Total	712	1	mg/l as $CaCO_3$	SM2340-B	04-05-1994 1130 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	03-31-1994 1230 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	04-04-1994 0930 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	04-06-1994 0900 DW
Magnesium, Dissolved	119	1	mg/l	EPA 242.1	04-05-1994 0900 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-04-1994 1000 DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	04-04-1994 1015 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	04-06-1994 0730 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	04-07-1994 1000 ED
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l	EPA 353.3	03-24-1994 1400 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	03-24-1994 1545 LM
Oil & Grease	<5	5	mg/l	EPA 413.1	03-25-1994 1520 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hart

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

April 8, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Kind of sample reported to us Water

Rec'd 1300 hr.
Sampled 1505 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled March 23, 1994

Date received March 24, 1994

Analysis report no. 59-13949

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	03-25-1994 1115	LM
Potassium, Dissolved	4	2	mg/l	EPA 258.1	04-04-1994 1200	DW
Selenium, Dissolved	0.01	0.01	mg/l	EPA 270.2	04-07-1994 1030	DW
Sodium, Dissolved	69	1	mg/l	EPA 273.1	04-04-1994 1400	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	03-25-1994 0715	LM
Solids, Total Dissolved	1000	10	mg/l	EPA 160.1	03-25-1994 1320	LM
Solids, Total Suspended	10	4	mg/l	EPA 160.2	03-25-1994 1730	LM
Sulfate	6000	1	mg/l	EPA 375.4	03-29-1994 1010	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	04-06-1994 1300	DW
Cation/Anion Balance	-7.50	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Mont ED

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

April 8, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Rec'd 1300 hr.
Sampled 1505 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled March 23, 1994

Date received March 24, 1994

Analysis report no. 59-13949

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	349	1	mg/l as HCO_3	SM4500-CO_2-D	03-28-1994 0900	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM4500-CO_2-D	03-28-1994 0900	LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	04-04-1994 1600	DW
Anions	20.00	----	meq/l	---------	---------- -----	--
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	04-07-1994 1300	DW
Boron, Dissolved	0.2	0.1	mg/l	EPA 212.3	04-05-1994 1250	LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	04-06-1994 1045	DW
Calcium, Dissolved	89	1	mg/l	EPA 215.1	04-05-1994 1330	DW
Cations	17.20	----	meq/l	---------	---------- -----	--
Chloride	65	1	mg/l	SM4500-Cl-B	03-30-1994 0830	LS
Conductivity	1537	1	umhos/cm	SM2510-B	03-29-1994 0930	ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	04-06-1994 1130	DW
Hardness, Total	712	1	mg/l as $CaCO_3$	SM2340-B	04-05-1994 1130	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	03-31-1994 1230	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	04-04-1994 0930	DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	04-06-1994 0900	DW
Magnesium, Dissolved	119	1	mg/l	EPA 242.1	04-05-1994 0900	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-04-1994 1000	DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	04-04-1994 1015	DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	04-06-1994 0730	DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	04-07-1994 1000	ED
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l	EPA 353.3	03-24-1994 1400	LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	03-24-1994 1545	LM
Oil & Grease	<5	5	mg/l	EPA 413.1	03-25-1994 1520	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

June 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Kind of sample reported to us Water

Rec'd 1250 hr.
Sampled 0850 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 1, 1994

Date received June 1, 1994

Analysis report no. 59-14106

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	374	1	mg/l as HCO_3	SM2320-B	06-06-1994 1055 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-06-1994 1055 LS
Alkalinity, Total	307	1	mg/l as $CaCO_3$	EPA 310.1	06-06-1994 1055 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-15-1994 1030 DW
Anions	13.40	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	06-08-1994 1130 DW
Boron, Dissolved	0.5	0.1	mg/l	EPA 212.3	06-09-1994 1130 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-15-1994 0830 DW
Calcium, Dissolved	70	1	mg/l	EPA 215.1	06-13-1994 1430 DW
Cations	13.60	----	meq/l	---------	---------- ----- --
Chloride	15	1	mg/l	SM4500-Cl-B	06-01-1994 1220 LS
Conductivity	1182	1	umhos/cm	SM2510-B	06-02-1994 1500 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-14-1994 1600 DW
Hardness, Total	578	1	mg/l as $CaCO_3$	SM2340-B	06-13-1994 1430 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-06-1994 1400 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-14-1994 1500 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-15-1994 0800 DW
Magnesium, Dissolved	98	1	mg/l	EPA 242.1	06-13-1994 1500 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-09-1994 1100 DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-14-1994 1530 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-15-1994 0930 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-01-1994 1330 ED
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l	EPA 353.3	06-02-1994 0800 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-02-1994 1005 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

June 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Kind of sample reported to us: Water

Rec'd 1250 hr.
Sampled 0850 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 1, 1994

Date received: June 1, 1994

Analysis report no. 59-14106

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Oil & Grease	<5	5	mg/l	EPA 413.1	06-08-1994 0745	LM
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	06-01-1994 1345	LM
Potassium, Dissolved	3	2	mg/l	EPA 258.1	06-13-1994 1630	DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	06-08-1994 0800	DW
Sodium, Dissolved	47	1	mg/l	EPA 273.1	06-13-1994 1600	DW
Solids, Settleable	<0.5	0.5	mg/l	EPA 160.5	06-02-1994 0640	LM
Solids, Total Dissolved	820	10	mg/l	EPA 160.1	06-03-1994 0800	LM
Solids, Total Suspended	9	4	mg/l	EPA 160.2	06-02-1994 1600	LM
Sulfate	330	1	mg/l	EPA 375.4	06-08-1994 1330	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-15-1994 0900	DW
Cation/Anion Balance	0.60	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 30, 1994

Date received October 31, 1994

Rec'd 1100 hr.
Sampled 1141 hr.

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14527

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	390	1	mg/l as HCO_3	SM2320-B	11-01-1994 1545 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-01-1994 1545 LS
Alkalinity, Total	321	1	mg/l as $CaCO_3$	EPA 310.1	11-01-1994 1545 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	11-02-1994 1600 DW
Anions	17.50	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-07-1994 1000 DW
Boron, Dissolved	0.2	0.1	mg/l	EPA 212.3	11-03-1994 1330 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	11-02-1994 1730 DW
Calcium, Dissolved	87	5	mg/l	EPA 215.1	11-01-1994 1500 DW
Cations	18.70	----	meq/l	---------	---------- ----- --
Chloride	24	1	mg/l	SM4500-Cl-B	10-31-1994 1500 LS
Conductivity	1629	1	umhos/cm	SM2510-B	11-01-1994 0930 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	11-03-1994 1230 DW
Hardness, Total	760	10	mg/l as $CaCO_3$	SM2340-B	11-01-1994 1500 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	11-03-1994 1700 DW
Magnesium, Dissolved	132	2	mg/l	EPA 242.1	11-02-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	11-03-1994 1630 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	11-04-1994 0915 ED
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l	EPA 353.3	11-02-1994 0930 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	11-01-1994 0830 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 30, 1994

Date received: October 31, 1994

Rec'd 1100 hr.
Sampled 1141 hr.

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14527

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Oil & Grease	<5	5	mg/l	EPA 413.1	10-31-1994 1200 LM
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	11-01-1994 1120 LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	11-02-1994 0900 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-07-1994 1500 DW
Sodium, Dissolved	81	5	mg/l	EPA 273.1	11-02-1994 0830 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	10-31-1994 1230 LS
Solids, Total Dissolved	1240	10	mg/l	EPA 160.1	11-01-1994 0830 LS
Solids, Total Suspended	<4	4	mg/l	EPA 160.2	11-03-1994 0730 LM
Sulfate	500	1	mg/l	EPA 375.4	11-07-1994 1050 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	11-03-1994 1300 DW
Cation/Anion Balance	3.40	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

August 12, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 29, 1997

Date received: June 30, 1997

Rec'd 1230 hr.
Sampled 0830 hr.

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17437

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	284	5	mg/l as HCO_3	SM2320-B	07-09-1997 0700	SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	07-09-1997 0700	SC
Alkalinity, Total	233	5	mg/l as $CaCO_3$	EPA 310.1	07-09-1997 0700	SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	08-05-1997 1315	MK
Anions	6.9	----	meq/l	---------	08-07-1997 1100	RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	08-08-1997 1015	MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	07-30-1997 0700	MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	08-05-1997 0845	MK
Calcium, Dissolved	41	1	mg/l	EPA 215.1	08-05-1997 1200	MK
Cations	6.0	----	meq/l	---------	08-07-1997 1100	RJ
Chloride	6	1	mg/l	SM4500-Cl-B	07-23-1997 0830	SC
Conductivity	584	1	umhos/cm	SM2510-B	07-22-1997 1230	MK
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	08-05-1997 0800	MK
Hardness, Total	275	----	mg/l as $CaCO_3$	SM2340-B	08-07-1997 1100	RJ
Iron, Total	0.4	0.1	mg/l	EPA 236.1	08-05-1997 1000	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	08-05-1997 1000	MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	08-05-1997 0915	MK
Magnesium, Dissolved	42	1	mg/l	EPA 242.1	08-05-1997 1230	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	08-05-1997 1030	MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	08-05-1997 1030	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	08-05-1997 1430	MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-22-1997 0720	RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	07-22-1997 0430	AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	07-01-1997 0800	JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

August 12, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Kind of sample reported to us: Water

Rec'd 1230 hr.
Sampled 0830 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 29, 1997

Date received: June 30, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17437

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Oil & Grease	<2	2	mg/l	SM5520-B	07-19-1997 0630 JC
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	07-01-1997 0800 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	08-05-1997 1045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	08-09-1997 0600 MK
Sodium, Dissolved	12	1	mg/l	EPA 273.1	08-05-1997 1130 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	07-01-1997 0830 RJ
Solids, Total Dissolved	390	10	mg/l	EPA 160.1	07-03-1997 0700 JC
Solids, Total Suspended	40	5	mg/l	EPA 160.2	07-02-1997 1200 JC
Sulfate	98	83	mg/l	EPA 375.4	07-17-1997 0800 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	08-05-1997 0815 MK
Cation/Anion Balance	-6.5	----	%		08-07-1997 1100 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory RJ

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

October 21, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Rec'd 1100 hr.
Sampled 1435 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled September 17, 1997

Date received September 18, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17796

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	321	5	mg/l as HCO_3	SM2320-B	09-24-1997 0730 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	09-24-1997 0730 SC
Alkalinity, Total	263	5	mg/l as $CaCO_3$	EPA 310.1	09-24-1997 0730 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	10-01-1997 2345 MK
Anions	10.3	----	meq/l	---------	10-20-1997 1500 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	10-02-1997 0230 MK
Boron, Dissolved	0.2	0.1	mg/l	EPA 212.3	09-29-1997 1500 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	10-01-1997 1900 MK
Calcium, Dissolved	46	1	mg/l	EPA 215.1	10-01-1997 2245 MK
Cations	9.6	----	meq/l	---------	10-20-1997 1500 RJ
Chloride	10	1	mg/l	SM4500-Cl-B	10-02-1997 1305 SC
Conductivity	870	1	umhos/cm	SM2510-B	09-22-1997 1400 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	10-01-1997 1800 MK
Hardness, Total	415	----	mg/l as $CaCO_3$	SM2340-B	10-20-1997 1500 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	10-01-1997 1945 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	10-01-1997 1945 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	10-01-1997 1915 MK
Magnesium, Dissolved	73	1	mg/l	EPA 242.1	10-01-1997 2300 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	10-01-1997 2015 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	10-01-1997 2015 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	10-01-1997 1700 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-07-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	10-09-1997 0700 JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-18-1997 1300 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

October 21, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Kind of sample reported to us: Water

Rec'd 1100 hr.
Sampled 1435 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 17, 1997

Date received: September 18, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17796

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	09-19-1997 0815 RJ
Potassium, Dissolved	3	1	mg/l	EPA 258.1	10-01-1997 2045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	10-03-1997 0145 MK
Sodium, Dissolved	29	1	mg/l	EPA 273.1	10-01-1997 2115 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-18-1997 1600 MK
Solids, Total Dissolved	600	10	mg/l	EPA 160.1	09-22-1997 0700 JC
Solids, Total Suspended	<5	5	mg/l	EPA 160.2	09-22-1997 0700 JC
Sulfate	228	125	mg/l	EPA 375.4	10-15-1997 1330 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	10-01-1997 1815 MK
Cation/Anion Balance	-3.3	----	%		10-20-1997 1500 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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

December 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Kind of sample reported to us: Water

Rec'd 1200 hr.
Sampled 1812

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 28, 1997

Date received: October 29, 1997

NOTE: Dissolved metals filtered at lab

Analysis report no. 59-18025

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	374	5	mg/l as HCO_3	SM2320-B	11-03-1997 1330 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	11-03-1997 1330 SC
Alkalinity, Total	317	5	mg/l as $CaCO_3$	EPA 310.1	11-03-1997 1330 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	12-04-1997 0230 MK
Anions	9.4	----	meq/l	---------	12-05-1997 1400 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-25-1997 1500 MK
Boron, Dissolved	0.3	0.1	mg/l	EPA 212.3	11-11-1997 1700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	12-03-1997 2230 MK
Calcium, Dissolved	59	1	mg/l	EPA 215.1	12-04-1997 0115 MK
Cations	11.3	----	meq/l	---------	12-05-1997 1400 RJ
Chloride	12	1	mg/l	SM4500-Cl-B	11-04-1997 1400 SC
Conductivity	1013	1	umhos/cm	SM2510-B	10-30-1997 2115 MK
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	12-03-1997 2145 MK
Hardness, Total	489	----	mg/l as $CaCO_3$	SM2340-B	12-05-1997 1400 RJ
Iron, Total	0.4	0.1	mg/l	EPA 236.1	12-03-1997 2330 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-03-1997 2330 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	12-03-1997 2245 MK
Magnesium, Dissolved	83	5	mg/l	EPA 242.1	12-04-1997 0145 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-03-1997 2345 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	12-03-1997 2345 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	12-04-1997 0315 MK
Oil & Grease	<2	2	mg/l	SM5520-B	11-18-1997 0700 JC
Phosphorous, Ortho-PO_4	0.01	0.01	mg/l as P	SM4500-P-E	10-30-1997 0700 JC
Potassium, Dissolved	2	1	mg/l	EPA 258.1	12-04-1997 0016 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

COMMERCIAL TESTING & ENGINEERING CO.

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

December 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-1

Kind of sample reported to us: Water

Rec'd 1200 hr.
Sampled 1812

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 28, 1997

Date received: October 29, 1997

NOTE: Dissolved metals filtered at lab

Analysis report no. 59-18025

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-25-1997 1900 MK
Sodium, Dissolved	34	1	mg/l	EPA 273.1	12-04-1997 0030 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	10-29-1997 2315 MK
Solids, Total Dissolved	710	10	mg/l	EPA 160.1	11-04-1997 0900 RJ
Solids, Total Suspended	14	5	mg/l	EPA 160.2	11-04-1997 0900 RJ
Sulfate	143	50	mg/l	EPA 375.4	11-12-1997 1300 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	12-03-1997 2200 MK
Cation/Anion Balance	9.0	----	%		12-05-1997 1400 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

WATER MONITORING REPORT

Property: Co-op
Station: WHR-2
Location: Fish Creek Left Fork Spring - East side
Type: Spring

Field Measurements	Date Sampled												
	07/31/91	10/28/92	03/22/93	06/24/93	08/15/93	10/13/93	03/30/94	05/30/94	08/30/94	10/31/94	06/25/97	09/10/97	10/20/97
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op	Co-Op
Flow (gpm)	10	0.4	Inaccess	20	10	12	Inaccess	3	0.2	Dry	18	2	6
pH	8	7.98	N/A	7.34	6.56	7.44	N/A	8.14	7.56	N/A	8.18	7.77	8.39
Sp. Cond. (ohms)	500	510	N/A	480	472	515	N/A	480	421	N/A	489	388	374
Temp (C)	N/R	7.78	N/A	10	14.7	7.8	N/A	8.5	15.4	N/A	7.2	12.8	14.3
Lab Measurements													
Analyzed by:	IML	CT&E	N/A	CT&E	CT&E	CT&E	N/A	CT&E	CT&E	N/A	CT&E	CT&E	CT&E
TDS (mg/L)	262	221		257	253	267		240	300		260	280	250
Hardness (CaCO3)	272	251		271	349.6	269		271	225		242	239	234
Aluminum (Al)	1.3	N/D		N/D	1	N/D		N/D	N/D		N/D	N/D	N/D
Arsenic (As)	N/D	N/D		0.005	N/D	N/D		N/D	N/D		N/D	N/D	N/D
Boron (B)	N/D	0.15		0.09	N/D	N/D		0.2	0.1		N/D	N/D	0.1
Carbonate (CO3)	N/D	N/D		N/D	N/D	N/D		N/D	N/D		N/D	N/D	N/D
Bicarbonate (HCO3)	328	245		279	353	275		271	237		290	291	270
Calcium (Ca)	76.3	51.4		58.1	79	50		42	39		44	43	41
Chloride (Cl)	2.23	15		N/D	N/D	7		2	5		4	4	4
Cadmium (Cd)	N/D	N/D		N/D	N/D	N/D		N/D	N/D		N/D	N/D	N/D
Copper (Cu)	N/D	N/D		0.06	N/D	N/D		N/D	N/D		N/D	N/D	N/D
Iron (Fe) Total	0.9	0.05		N/D	1.06	0.2		N/D	0.5		N/D	0.2	N/D
Iron (Fe) Dissolved	N/D	N/D		N/D	N/D	N/D		N/D	N/D		N/D	N/D	N/D
Lead (Pb)	N/D	0.44		N/D	N/D	N/D		N/D	N/D		N/D	N/D	N/D
Magnesium (Mg)	19.8	29.9		30.7	37	35		30	31		32	32	32
Manganese (Mn) tot.	0.02	0.03		N/D	0.07	N/D		N/D	N/D		N/D	N/D	N/D
Manganese (Mn) dis.	N/D	N/D		N/D	N/D	N/D		N/D	N/D		N/D	N/D	N/D
Molybdenum (Mo)	N/D	N/D		N/D	N/D	0.2		N/D	N/D		N/D	N/D	N/D
Nitrogen (NH3)	0.08	N/D		N/D	N/D	N/D		N/D	N/D		N/D	N/D	N/D
Nitrite (NO2)	N/D	N/D		N/D	N/D	N/D		N/D	N/D		N/D	N/D	N/D
Nitrate (NO3)	0.28	0.34		0.16	0.07	0.2		0.1	0.2		0.10	0.2	N/D
Potassium (K)	0.4	0.56		N/D	0.4	N/D		N/D	N/D		N/D	N/D	N/D
Phosphate (PO4)	N/D	N/D		N/D	0.31	N/D		N/D	N/D		0.02	0.02	N/D
Selenium (Se)	N/D	N/D		N/D	N/D	N/D		N/D	N/D		N/D	N/D	N/D
Sodium (Na)	3.2	4.79		3.6	4.4	N/D		5	7		4	5	4
Sp. Conductivity											460	454	430
Sulfate (SO4)	8.23	25		15	31	21		28	18		19	25	21
Zinc (Z)	0.01	0.08		N/D	0.01	0.08		N/D	N/D		0.02	N/D	N/D
Anions	5.62	4.86		4.88	6.06	5.2		5.1	4.4		5.3	5.4	
Cations	5.58	5.24		5.58	7.18	5.7		4.8	4.8		5	5	
Anion/Cation Balance	0.36%	3.73%		6.72%	8.52%	4.90%		3.00%	4.40%		-2.50%	-3.90%	

COMMERCIAL TESTING & ENGINEERING CO.
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PLEASE ADDRESS ALL CORRESPONDENCE TO:
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TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

November 13, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 28, 1992

Date received: October 29, 1992

#8 (WHR-2)
Rec'd 1000 hr.
Sampled 1110 hr.

Analysis report no. 59-12648

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	11-11-1992 11:30 LS
Alkalinity, Bicarbonate	245	1	mg/l $CaCO_3$	EPA 310.1	11-04-1992 13:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	11-04-1992 13:00 LS
Alkalinity, Total	201	1	mg/l $CaCO_3$	EPA 310.1	11-04-1992 13:00 LS
Aluminum	0.00	.5	mg/l	EPA 202.1	11-11-1992 13:30 JS
Anions	4.86	----	meq/l	---------	---------- ----- --
Arsenic	0.000	.002	mg/l	EPA 206.2	11-10-1992 10:50 JS
Barium	0.00	.03	mg/l	EPA 208.1	11-11-1992 13:30 JS
Boron	0.15	.01	mg/l	EPA 212.3	11-05-1992 14:00 LM
Cadmium	0.000	.00	mg/l	EPA 213.2	11-10-1992 12:10 JS
Calcium	51.4	.1	mg/l	EPA 215.1	11-02-1992 12:30 JS
Cations	5.24	----	meq/l	---------	---------- ----- --
Chloride	15.0	.1	mg/l	EPA 325.3	11-09-1992 08:30 LS
Chromium	0.11	.001	mg/l	EPA 218.2	11-10-1992 12:10 JS
Copper	0.000	.01	mg/l	EPA 220.1	11-11-1992 12:00 JS
Fluoride	0.03	.01	mg/l	EPA 340.2	11-05-1992 08:30 LS
Hardness, Total	251	1	mg/l $CaCO_3$	---------	11-02-1992 12:30 JS
Iron	0.05	.02	mg/l	EPA 236.1	11-02-1992 14:00 JS
Lead	0.440	.001	mg/l	EPA 239.2	11-10-1992 12:10 LM
Magnesium	29.90	.01	mg/l	EPA 242.1	11-02-1992 12:30 JS
Manganese	0.03	.01	mg/l	EPA 243.1	11-02-1992 14:00 JS
Mercury	0.000	.002	mg/l	EPA 245.1	11-12-1992 14:00 JS
Molybdenum	0.00	.1	mg/l	EPA 246.1	11-11-1992 13:30 JS
Nickel	0.00	.02	mg/l	EPA 249.1	11-11-1992 12:00 JS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

November 13, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 28, 1992

Date received October 29, 1992

#8 (WHR-2)
Rec'd 1000 hr.
Sampled 1110 hr.

Analysis report no. 59-12648

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	0.00	.01	mg/l	EPA 350.3	11-03-1992 08:30 LS
Nitrogen, Nitrate	0.34	.01	mg/l	EPA 353.3	10-29-1992 15:00 LM
Nitrogen, Nitrite	0.00	.01	mg/l	EPA 354.1	10-29-1992 15:00 LM
Oil & Grease	0.0	1	mg/l	EPA 413.1	11-05-1992 15:00 LM
Phosphorus, Total	0.00	.01	mg/l	EPA 365.2	11-04-1992 13:30 LM
Potassium	0.56	.01	mg/l	EPA 258.1	11-02-1992 12:30 JS
Selenium	0.000	.002	mg/l	EPA 270.2	11-10-1992 10:50 JS
Sodium	4.79	.01	mg/l	EPA 273.1	11-02-1992 12:30 JS
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	10-29-1992 13:30 LM
Solids, Total Dissolved	221.0	.5	mg/l	EPA 160.1	10-30-1992 09:30 LM
Solids, Total Suspended	0.0	.5	mg/l	EPA 160.2	10-30-1992 09:30 LM
Sulfate	25.0	.1	mg/l	EPA 375.4	11-02-1992 13:00 LS
Sulfide	4.60	.1	mg/l	EPA 376.1	10-30-1992 15:20 LM
Zinc	0.08	.01	mg/l	EPA 289.1	11-11-1992 12:00 JS
Cation/Anion Balance	3.73	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

WHR-2
Rec'd 0800 hr.
Sampled 1637 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Fluoride not distilled.

Date sampled June 24, 1993

Date received June 25, 1993

Analysis report no. 59-13221

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	279	.4	mg/l HCO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Total	229	.4	mg/l $CaCO_3$	EPA 310.1	06-29-1993 15:00 LS
Aluminum	<1.00	1	mg/l	EPA 202.1	07-16-1993 13:35 ED
Anions	4.88	----	meq/l	---------	---------- ----- --
Arsenic	0.005	.003	mg/l	EPA 206.2	07-07-1993 09:50 ED
Barium	0.20	.2	mg/l	EPA 208.1	07-16-1993 16:10 ED
Boron	0.09	.04	mg/l	EPA 212.3	07-19-1993 13:30 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	07-08-1993 14:35 ED
Calcium	58.1	.03	mg/l	EPA 215.1	07-13-1993 14:00 ED
Cations	5.58	----	meq/l	---------	---------- ----- --
Chloride	3.4	.5	mg/l	EPA 325.3	06-29-1993 08:30 LM
Chromium	0.0004	.0003	mg/l	EPA 218.2	07-21-1993 10:30 ED
Copper	0.060	.03	mg/l	EPA 220.1	07-15-1993 16:25 ED
Fluoride	0.18	.02	mg/l	EPA 340.2	07-06-1993 13:00 LS
Hardness, Total	271	.03	mg/l $CaCO_3$	---------	07-13-1993 14:00 ED
Iron	<0.05	.05	mg/l	EPA 236.1	07-12-1993 14:45 ED
Iron, Dissolved	<0.05	.05	mg/l	EPA 236.1	07-16-1993 12:30 ED
Lead	<0.003	.003	mg/l	EPA 239.2	07-07-1993 13:45 ED
Magnesium	30.70	.007	mg/l	EPA 242.1	07-14-1993 16:20 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	07-12-1993 10:00 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	07-09-1993 14:50 ED
Molybdenum	<0.20	.2	mg/l	EPA 246.1	07-16-1993 14:35 ED
Nickel	0.11	.08	mg/l	EPA 249.1	07-16-1993 10:50 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
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TEL: (801) 653-2311
FAX: (801) 653-2436

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 24, 1993

Date received June 25, 1993

WHR-2
Rec'd 0800 hr.
Sampled 1637 hr.

NOTE: Fluoride not distilled.

Analysis report no. 59-13221

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	07-06-1993 08:00 LS
Nitrogen, Nitrate-Nitrite	0.16	.01	mg/l	EPA 353.3	06-30-1993 11:00 LM
Nitrogen, Nitrite	0.00	.004	mg/l	EPA 354.1	06-25-1993 14:00 LM
Oil & Grease	0.2	1	mg/l	EPA 413.1	07-01-1993 08:00 LM
Phosphorus, Total	0.00	.008	mg/l	EPA 365.2	07-06-1993 14:00 LM
Potassium	<0.10	.1	mg/l	EPA 258.1	07-13-1993 18:15 ED
Selenium	<0.004	.004	mg/l	EPA 270.2	07-06-1993 12:30 ED
Sodium	3.60	.2	mg/l	EPA 273.1	07-13-1993 16:25 ED
Solids, Total Dissolved	257.0	14	mg/l	EPA 160.1	06-28-1993 09:00 LM
Sulfate	15.0	1	mg/l	EPA 375.4	07-08-1993 13:15 LS
Sulfide	<0.90	.9	mg/l	EPA 376.1	06-30-1993 13:10 ED
Zinc	<0.03	.03	mg/l	EPA 289.1	07-15-1993 16:00 ED
Cation/Anion Balance	6.72	----	%	----------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-2

Kind of sample reported to us Water

Rec'd 1100 hr.
Sampled 1707 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: FLUORIDE NOT DISTILLED.

Date sampled August 15, 1993

Date received August 16, 1993

Analysis report no. 59-13419

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	353	2	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 1300	LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 1300	LS
Alkalinity, Total	300	2	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 1330	LS
Aluminum	1	.05	mg/l		EPA 200.7	09-15-1993 1616	SE
Anions	6.06	----	meq/l		---------	---------- -----	--
Arsenic	<0.002	.002	mg/l		EPA 206.2	09-21-1993 1015	SM
Barium	0.1	.005	mg/l		EPA 200.7	09-16-1993 1616	SE
Boron	<0.05	.01	mg/l		EPA 200.7	09-16-1993 1330	SE
Cadmium	<0.0050	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Calcium	79.0	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Cations	7.18	----	meq/l		---------	---------- -----	--
Chloride	2.6	.5	mg/l		EPA 325.3	09-07-1993 1300	LM
Chromium	<0.0	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Copper	<0.01	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Fluoride	0.28	.02	mg/l		EPA 340.2	08-18-1993 0930	LS
Hardness, Total	349.6	.03	mg/l	$CaCO_3$	---------	09-15-1993 1616	SE
Iron	1.06	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Lead	<0.050	.05	mg/l		EPA 200.7	09-15-1993 1616	SE
Magnesium	37.00	.1	mg/l		EPA 200.7	09-16-1993 1616	SE
Manganese	0.07	.01	mg/l		EPA 200.7	09-16-1993 1616	SE
Mercury	<0.0040	.0002	mg/l		EPA 245.1	09-21-1993 1015	SM
Molybdenum	<0.1	.1	mg/l		EPA 200.7	09-16-1993 1616	SE
Nickel	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	09-07-1993 0800	AS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-2

Kind of sample reported to us: Water

Rec'd 1100 hr.
Sampled 1707 hr.

Sample taken at: Co-op

Sample taken by: Co-op

NOTE: FLUORIDE NOT DISTILLED.

Date sampled: August 15, 1993

Date received: August 16, 1993

Analysis report no. 59-13419

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Nitrate	0.07	.01	mg/l	EPA 353.3	08-16-1993 0930 LM
Nitrogen, Nitrite	0.00	.02	mg/l	EPA 354.1	08-16-1993 1400 LM
Oil & Grease	0	1	mg/l	EPA 413.1	08-25-1993 1400 LM
Phosphorus, Total	0.310	.008	mg/l	EPA 365.2	08-27-1993 0800 LM
Potassium	0.4	.1	mg/l	EPA 200.7	09-15-1993 1616 SE
Selenium	<0.002	.002	mg/l	EPA 270.2	09-15-1993 1616 SE
Sodium	4.4	.1	mg/l	EPA 200.7	09-15-1993 1616 SE
Solids, Total Dissolved	253	14	mg/l	EPA 160.1	08-18-1993 1030 LM
Sulfate	31	1	mg/l	EPA 375.4	09-17-1993 1000 LS
Sulfide	<0.9	.1	mg/l	EPA 376.1	08-20-1993 1515 ED
Zinc	0.01	.005	mg/l	EPA 200.7	09-15-1993 1616 SE
Cation/Anion Balance	8.52	----	%	---------	---------- ---- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

December 9, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-2

Kind of sample reported to us Water

Rec'd 1000 hr.
Sampled 1318 hr.

Sample taken at Co-op

NOTE: Holding time expired when Phosphorous Ortho was run.

Sample taken by Co-op

Date sampled October 13, 1993

Date received October 14, 1993

Analysis report no. 59-13626

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	275	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Total	226	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Aluminum	<1	1	mg/l		EPA 202.1	10-28-1993 1630	ED
Anions	5.20	----	meq/l		---------	---------- -----	--
Arsenic	<0.010	.003	mg/l		EPA 206.2	11-23-1993 1115	DW
Boron	<0.10	.04	mg/l		EPA 212.3	11-19-1993 1430	LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125	ED
Calcium	50.0	.03	mg/l		EPA 215.1	12-08-1993 1330	DW
Cations	5.70	----	meq/l		---------	---------- -----	--
Chloride	7.0	.5	mg/l		EPA 325.3	11-01-1993 0900	LM
Conductivity	453.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Copper	<0.05	.03	mg/l		EPA 220.1	10-27-1993 1550	ED
Hardness, Total	269.0	.03	mg/l	$CaCO_3$	---------	12-08-1993 1330	DW
Iron	0.20	.05	mg/l		EPA 236.1	11-08-1993 1315	ED
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-08-1993 0920	ED
Lead	<0.400	.003	mg/l		EPA 239.2	11-05-1993 1000	ED
Magnesium	35.00	.007	mg/l		EPA 242.1	11-08-1993 1630	ED
Manganese	<0.03	.03	mg/l		EPA 243.1	11-08-1993 1100	ED
Manganese, Dissolved	<0.1	.03	mg/l		EPA 243.1	12-08-1993 1010	ED
Molybdenum	0.2	.2	mg/l		EPA 246.1	10-29-1993 1105	ED
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000	LS
Nitrogen, Nitrate	0.20	.01	mg/l		EPA 353.3	10-18-1993 0745	LM
Nitrogen, Nitrite	0.00	.02	mg/l		EPA 354.1	10-14-1993 1600	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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TEL: (801) 653-2311
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December 9, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-2

Kind of sample reported to us: Water

Rec'd 1000 hr.
Sampled 1318 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 13, 1993

Date received October 14, 1993

NOTE: Holding time expired when Phosphorous Ortho was run.

Analysis report no. 59-13626

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorus, Ortho	0.000	.003	mg/l	EPA 365.2	10-16-1993 0950 LM
Potassium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315 ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400 DW
Sodium	<10.0	.2	mg/l	EPA 273.1	11-09-1993 1135 ED
Solids, Total Dissolved	267	14	mg/l	EPA 160.1	10-19-1993 0815 LM
Sulfate	21	1	mg/l	EPA 375.4	11-11-1993 1020 LS
Zinc	0.08	.03	mg/l	EPA 289.1	10-27-1993 1300 ED
Cation/Anion Balance	4.90	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
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FAX: (801) 653-2436

June 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-2

Kind of sample reported to us: Water

Rec'd 0945 hr.
Sampled 1140 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: May 30, 1994

Date received: May 31, 1994

Analysis report no. 59-14095

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	271	1	mg/l as HCO_3	SM2320-B	06-02-1994 1520	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-02-1994 1520	LS
Alkalinity, Total	222	1	mg/l as $CaCO_3$	EPA 310.1	06-02-1994 1520	LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-07-1994 1000	DW
Anions	5.10	----	meq/l	---------	---------- -----	--
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	06-08-1994 1130	DW
Boron, Dissolved	0.2	0.1	mg/l	EPA 212.3	06-09-1994 1130	LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-07-1994 0900	DW
Calcium, Dissolved	42	1	mg/l	EPA 215.1	06-06-1994 1400	DW
Cations	4.80	----	meq/l	---------	---------- -----	--
Chloride	2	1	mg/l	SM4500-Cl-B	06-01-1994 1220	LS
Conductivity	454	1	umhos/cm	SM2510-B	05-31-1994 1500	ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-07-1994 0730	DW
Hardness, Total	271	1	mg/l as $CaCO_3$	SM2340-B	06-06-1994 1400	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-09-1994 1015	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-06-1994 0830	DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-06-1994 1700	DW
Magnesium, Dissolved	30	1	mg/l	EPA 242.1	06-06-1994 1500	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-09-1994 1100	DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-06-1994 0715	DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-07-1994 1100	DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-01-1994 1330	ED
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l	EPA 353.3	06-06-1994 1600	LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-01-1994 0715	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout SD

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

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

June 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-2

Kind of sample reported to us Water

Rec'd 0945 hr.
Sampled 1140 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled May 30, 1994

Date received May 31, 1994

Analysis report no. 59-14095

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	06-01-1994 0840 LM
Potassium, Dissolved	<2	2	mg/l	EPA 258.1	06-06-1994 1115 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	06-08-1994 0800 DW
Sodium, Dissolved	5	1	mg/l	EPA 273.1	06-06-1994 1230 DW
Solids, Total Dissolved	240	10	mg/l	EPA 160.1	06-03-1994 0800 LM
Sulfate	28	1	mg/l	EPA 375.4	06-07-1994 1230 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-07-1994 0830 DW
Cation/Anion Balance	3.00	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout SD

Manager, Huntington Laboratory

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

September 16, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-2

Kind of sample reported to us Water

Rec'd 1230 hr.
Sampled 1312 hr.

Sample taken at Co-op

NOTE: Dissolved metals filtered at Lab.

Sample taken by Co-op

Date sampled August 30, 1994

Date received August 31, 1994

Analysis report no. 59-14379

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	237	1	mg/l as HCO_3	SM2320-B	09-06-1994 0945 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-06-1994 0945 LS
Alkalinity, Total	194	1	mg/l as $CaCO_3$	EPA 310.1	09-06-1994 0945 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	09-08-1994 1530 DW
Anions	4.40	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-02-1994 1100 ED
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-14-1994 1300 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	09-08-1994 1200 DW
Calcium, Dissolved	39	5	mg/l	EPA 215.1	09-09-1994 0930 DW
Cations	4.80	----	meq/l	---------	---------- ----- --
Chloride	5	1	mg/l	SM4500-Cl-B	09-06-1994 1200 LS
Conductivity	418	1	umhos/cm	SM2510-B	09-07-1994 1015 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	09-08-1994 1200 DW
Hardness, Total	225	10	mg/l as $CaCO_3$	SM2340-B	09-09-1994 0930 DW
Iron, Total	0.5	0.2	mg/l	EPA 236.1	09-13-1994 1030 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-09-1994 1430 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	09-08-1994 1100 DW
Magnesium, Dissolved	31	2	mg/l	EPA 242.1	09-09-1994 1030 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-13-1994 1000 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	09-09-1994 1330 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	09-09-1994 1800 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	09-08-1994 0930 ED
Nitrogen, Nitrate-Nitrite	0.2	0.1	mg/l	EPA 353.3	09-15-1994 1100 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	09-01-1994 1100 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 16, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-2

Kind of sample reported to us Water

Rec'd 1230 hr.
Sampled 1312 hr.

Sample taken at Co-op

NOTE: Dissolved metals filtered at Lab.

Sample taken by Co-op

Date sampled August 30, 1994

Date received August 31, 1994

Analysis report no. 59-14379

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	09-01-1994 1030 LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	09-09-1994 1300 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-06-1994 1030 ED
Sodium, Dissolved	7	5	mg/l	EPA 273.1	09-09-1994 1230 DW
Solids, Total Dissolved	300	10	mg/l	EPA 160.1	09-02-1994 1500 LM
Sulfate	18	1	mg/l	EPA 375.4	09-08-1994 1030 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	09-08-1994 1330 DW
Cation/Anion Balance	4.40	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hurst CD

Manager, Huntington Laboratory

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

August 5, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

CO-OP
WHR-2

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 25, 1997

Date received: June 26, 1997

Rec'd 1000 hr.
Sampled 1150 hr.

NOTE: DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17395

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	290	5	mg/l as HCO_3	SM2320-B	06-28-1997 1930 RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	06-28-1997 1930 RJ
Alkalinity, Total	237	5	mg/l as $CaCO_3$	EPA 310.1	06-28-1997 1930 RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	08-02-1997 1300 MK
Anions	5.3	----	meq/l	---------	10-04-1997 1000 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-24-1997 0730 MK
Boron, Dissolved	<0.1	0.1	mg/l	EPA 212.3	07-16-1997 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	08-03-1997 1215 MK
Calcium, Dissolved	44	1	mg/l	EPA 215.1	08-03-1997 0715 MK
Cations	5.0	----	meq/l	---------	10-04-1997 1000 RJ
Chloride	4	1	mg/l	SM4500-Cl-B	07-22-1997 0715 SC
Conductivity	460	1	umhos/cm	SM2510-B	06-30-1997 0545 RJ
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	08-03-1997 1115 MK
Hardness, Total	242	----	mg/l as $CaCO_3$	SM2340-B	10-04-1997 1000 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	08-03-1997 0815 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	08-03-1997 0815 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	08-03-1997 1230 MK
Magnesium, Dissolved	32	5	mg/l	EPA 242.1	08-03-1997 0745 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	08-03-1997 0845 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	08-03-1997 0845 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	08-02-1997 1345 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-22-1997 0320 RJ
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l as N	EPA 353.3	07-18-1997 0400 AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	06-27-1997 0700 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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

August 5, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

CO-OP
WHR-2

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 25, 1997

Date received: June 26, 1997

Rec'd 1000 hr.
Sampled 1150 hr.

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17395

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	06-27-1997 0730	RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	08-03-1997 0930	MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-24-1997 1115	MK
Sodium, Dissolved	4	1	mg/l	EPA 273.1	08-03-1997 1000	MK
Solids, Total Dissolved	260	10	mg/l	EPA 160.1	06-30-1997 0730	JC
Sulfate	19	10	mg/l	EPA 375.4	07-16-1997 0730	SC
Zinc, Dissolved	0.02	0.01	mg/l	EPA 289.1	08-03-1997 1130	MK
Cation/Anion Balance	-2.5	----	%		10-04-1997 1000	RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

October 14, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-2

Kind of sample reported to us: Water

Rec'd 1030 hr.
Sampled 1345 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 10, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17744

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	291	5	mg/l as HCO_3	SM2320-B	09-19-1997 1430 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	09-19-1997 1430 SC
Alkalinity, Total	238	5	mg/l as $CaCO_3$	EPA 310.1	09-19-1997 1430 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	09-25-1997 2145 MK
Anions	5.4	----	meq/l	---------	10-08-1997 0900 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-24-1997 1745 MK
Boron, Dissolved	<0.1	0.1	mg/l	EPA 212.3	09-29-1997 1500 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	09-25-1997 1745 MK
Calcium, Dissolved	43	1	mg/l	EPA 215.1	09-25-1997 2030 MK
Cations	5.0	----	meq/l	---------	10-08-1997 0900 RJ
Chloride	4	1	mg/l	SM4500-Cl-B	10-02-1997 0930 SC
Conductivity	454	1	umhos/cm	SM2510-B	09-22-1997 1140 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	09-25-1997 1645 MK
Hardness, Total	239	----	mg/l as $CaCO_3$	SM2340-B	10-08-1997 0900 RJ
Iron, Total	0.2	0.1	mg/l	EPA 236.1	09-25-1997 1830 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-25-1997 1830 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	09-25-1997 1800 MK
Magnesium, Dissolved	32	1	mg/l	EPA 242.1	09-25-1997 2100 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-25-1997 1845 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	09-25-1997 1845 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	09-25-1997 2230 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-07-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	0.2	0.1	mg/l as N	EPA 353.3	09-20-1997 0600 RJ
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-12-1997 0700 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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FAX: (801) 653-2436

October 14, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-2

Kind of sample reported to us: Water

Rec'd 1030 hr.
Sampled 1345 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 10, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17744

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	09-11-1997 1315 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	09-25-1997 1915 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-24-1997 2145 MK
Sodium, Dissolved	5	1	mg/l	EPA 273.1	09-25-1997 1945 MK
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	09-15-1997 0700 JC
Sulfate	25	5	mg/l	EPA 375.4	10-06-1997 1215 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	09-25-1997 1715 MK
Cation/Anion Balance	-3.9	----	%		10-08-1997 0900 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

December 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by .
CO-OP MINE

ID: WHR-2

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 20, 1997

Date received: October 21, 1997

Rec'd 1100 hr.
Sampled 1440 hr.

FIELD MEASUREMENTS

pH	8.39
Flow	6
Conductivity	374
Temperature	57.7°

NOTE: DISSOLVED METALS FILTERED AT LAB

Analysis report no. 59-17979

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	270	5	mg/l as HCO_3	SM2320-B	10-23-1997 2240 RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	10-23-1997 2240 RJ
Alkalinity, Total	221	5	mg/l as $CaCO_3$	EPA 310.1	10-23-1997 2240 RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	12-02-1997 0145 MK
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-24-1997 1645 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	10-30-1997 1300 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	12-01-1997 2145 MK
Calcium, Dissolved	41	1	mg/l	EPA 215.1	12-02-1997 0100 MK
Chloride	4	1	mg/l	SM4500-Cl-B	11-04-1997 1000 SC
Conductivity	430	1	umhos/cm	SM2510-B	10-21-1997 1500 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	12-01-1997 2100 MK
Hardness, Total	234	----	mg/l as $CaCO_3$	SM2340-B	11-03-1997 1000 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	12-01-1997 2245 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-01-1997 2245 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	12-01-1997 2200 MK
Magnesium, Dissolved	32	1	mg/l	EPA 242.1	12-02-1997 0115 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-01-1997 2300 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	12-01-1997 2300 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	12-02-1997 0245 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-27-1997 1110 RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	11-14-1997 1500 JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	10-22-1997 0700 JC
Phosphorous, Total	<0.05	0.05	mg/l as P	SM4500-P-B,E	11-05-1997 1745 MK
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	12-01-1997 2345 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

December 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: WHR-2

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 20, 1997

Date received: October 21, 1997

Rec'd 1100 hr.
Sampled 1440 hr.

FIELD MEASUREMENTS

pH	8.39
Flow	6
Conductivity	374
Temperature	57.7°

NOTE: DISSOLVED METALS FILTERED AT LAB

Analysis report no. 59-17979

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-24-1997 2030	MK
Sodium, Dissolved	4	1	mg/l	EPA 273.1	12-02-1997 2030	MK
Solids, Total Dissolved	250	10	mg/l	EPA 160.1	10-27-1997 0700	JC
Sulfate	21	5	mg/l	EPA 375.4	10-29-1997 0900	SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	12-01-1997 2115	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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TERMS AND CONDITIONS ON REVERSE

WATER MONITORING REPORT

Property: Co-op
Station: WHR-3
Location: Head Fish Creek
Type: Spring

Field Measurements	Date Sampled												
	07/30/91	10/27/92	03/22/93	06/24/93	08/15/93	10/13/93	03/30/94	05/30/94	08/30/94	10/31/94	06/25/97	09/10/97	10/20/97
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op	Co-Op
Flow (gpm)	20	4	Inaccess	70	22	16	Inaccess	27	0.5	1	15	15	2
pH	8.3	7.64	N/A	6.44	6.88	7.27	N/A	736	7.89	8.14	7.85	7.72	7.9
Sp. Cond. (ohms)	1050	434	N/A	626	658	522	N/A	572	390	538	539	458	462
Temp (C)	N/R	5.39	N/A	21.1	5.7	7.7	N/A	6.3	13.4	5.6	6.2	9.6	10
Lab Measurements													
Analyzed by:	IML	CT&E	N/A	CT&E	CT&E	CT&E	N/A	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E
TDS (mg/L)	822	258		292	319	254		20	360	280	320	300	280
Hardness (CaCO3)	585	236		343	291.1	257		277	204	260	256	299	275
Aluminum (Al)	0.4	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Arsenic (As)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Boron (B)	N/D	0.12		0.29	N/D	N/D		0.3	0.1	0.1	N/D	0.1	0.2
Carbonate (CO3)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Bicarbonate (HCO3)	260	262		344	347	278		378	234	320	345	373	356
Calcium (Ca)	68	55.9		101.9	77	60		78	47	68	73.0	82	74
Chloride (Cl)	13.5	10		3.5	4.7	32		2	4	5	2	4	3
Cadmium (Cd)	N/D	0.01		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Copper (Cu)	N/D	N/D		0.06	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Iron (Fe) Total	0.55	N/D		N/D	0.03	0.1		N/D	N/D	N/D	N/D	N/D	N/D
Iron (Fe) Dissolved	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Lead (Pb)	N/D	0.17		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Magnesium (Mg)	101	23.3		21.4	24	26		20	21	22	18	23	22
Manganese (Mn) tot.	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Manganese (Mn) dis.	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Molybdenum (Mo)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Nitrogen (NH3)	0.04	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Nitrite (NO2)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Nitrate (NO3)	N/D	0.03		0.18	0.06	0.08		0.3	0.1	0.1	0.2	N/D	0.30
Potassium (K)	6.52	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Phosphate (PO4)	N/D	N/D		0.02	N/D	N/D		N/D	N/D	0.02	0.02	0.02	N/D
Selenium (Se)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Sodium (Na)	24.8	2.49		2.9	2.5	N/D		2	N/D	8	2	2	2
Sp. Conductivity						402		522	363	513	523	543	520
Sulfate (SO4)	413	9		9	8	7		6	6	7	11	7	7
Zinc (Z)	0.01	0.02		N/D	0.01	N/D		N/D	N/D	N/D	N/D	0.01	N/D
Anions	13.2	4.66		5.79	5.85	5.5		6.4	4.1	5.6	5.9	6.4	
Cations	12.9	4.81		6.98	5.93	5.1		5.6	4.1	5.6	5.2	6.1	
Anion/Cation Balance	1.17%	1.58%		9.26%	0.62%	-3.40%		-6.30%	0.00%	-0.30%	-6.50%	-2.40%	

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TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

November 12, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

#4 (WHR-3)
Rec'd 1715 hr.
Sampled 1543 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 27, 1992

Date received October 27, 1992

Analysis report no. 59-12641

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	11-05-1992 09:00 LS
Alkalinity, Bicarbonate	262	1	mg/l $CaCO_3$	EPA 310.1	10-29-1992 10:30 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	10-29-1992 10:30 LS
Alkalinity, Total	215	1	mg/l $CaCO_3$	EPA 310.1	10-29-1992 10:30 LS
Aluminum	0.00	.5	mg/l	EPA 202.1	11-11-1992 13:30 JS
Anions	4.66	----	meq/l	---------	---------- ----- --
Arsenic	0.000	.002	mg/l	EPA 206.2	11-10-1992 10:50 JS
Barium	0.00	.03	mg/l	EPA 208.1	11-11-1992 13:30 JS
Boron	0.12	.01	mg/l	EPA 212.3	11-05-1992 14:00 LM
Cadmium	0.010	.00	mg/l	EPA 213.2	11-10-1992 12:10 JS
Calcium	55.9	.1	mg/l	EPA 215.1	11-02-1992 12:30 JS
Cations	4.81	----	meq/l	---------	---------- ----- --
Chloride	10.0	.1	mg/l	EPA 325.3	11-09-1992 08:30 LS
Chromium	0.00	.001	mg/l	EPA 218.2	11-10-1992 12:10 JS
Copper	0.000	.01	mg/l	EPA 220.1	11-11-1992 12:00 JS
Fluoride	0.04	.01	mg/l	EPA 340.2	11-05-1992 08:30 LS
Hardness, Total	236	1	mg/l $CaCO_3$	---------	11-02-1992 12:30 JS
Iron	0.00	.02	mg/l	EPA 236.1	11-02-1992 14:00 JS
Lead	0.170	.001	mg/l	EPA 239.2	11-10-1992 12:10 JS
Magnesium	23.30	.01	mg/l	EPA 242.1	11-02-1992 12:30 JS
Manganese	0.00	.01	mg/l	EPA 243.1	11-02-1992 14:00 JS
Mercury	0.000	.002	mg/l	EPA 245.1	11-02-1992 16:00 JS
Molybdenum	0.00	.1	mg/l	EPA 246.1	11-11-1992 13:30 JS
Nickel	0.00	.02	mg/l	EPA 249.1	11-11-1992 12:00 JS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

June Kosnar

Manager, Huntington Laboratory

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TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

November 12, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

#4 (WHR-3)
Rec'd 1715 hr.
Sampled 1543 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 27, 1992

Date received October 27, 1992

Analysis report no. 59-12641

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	0.00	.01	mg/l	EPA 350.3	11-03-1992 08:30 LS
Nitrogen, Nitrate	0.03	.01	mg/l	EPA 353.3	10-28-1992 10:00 LM
Nitrogen, Nitrite	0.00	.01	mg/l	EPA 354.1	10-28-1992 10:00 LM
Oil & Grease	0.9	1	mg/l	EPA 413.1	11-03-1992 11:30 LM
Phosphorus, Total	0.00	.01	mg/l	EPA 365.2	10-29-1992 12:30 LM
Potassium	0.00	.01	mg/l	EPA 258.1	11-02-1992 12:30 JS
Selenium	0.000	.002	mg/l	EPA 270.2	11-10-1992 10:50 JS
Sodium	2.49	.01	mg/l	EPA 273.1	11-02-1992 12:30 JS
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	10-28-1992 08:00 LM
Solids, Total Dissolved	258.0	.5	mg/l	EPA 160.1	10-28-1992 13:00 LM
Solids, Total Suspended	6.0	.5	mg/l	EPA 160.2	10-28-1992 13:00 LM
Sulfate	9.0	.1	mg/l	EPA 375.4	11-02-1992 13:00 LS
Sulfide	1.40	.1	mg/l	EPA 376.1	10-30-1992 15:20 LM
Zinc	0.02	.01	mg/l	EPA 289.1	11-11-1992 12:00 JS
Cation/Anion Balance	1.58	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 24, 1993

Date received: June 25, 1993

WHR-3
Rec'd 0800 hr.
Sampled 1735 hr.

NOTE: Fluoride not distilled.

Analysis report no. 59-13226

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	344	.4	mg/l HCO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Total	282	.4	mg/l $CaCO_3$	EPA 310.1	06-29-1993 15:00 LS
Aluminum	<1.00	1	mg/l	EPA 202.1	07-16-1993 13:35 ED
Anions	5.79	----	meq/l	---------	---------- ----- --
Arsenic	<0.003	.003	mg/l	EPA 206.2	07-07-1993 09:50 ED
Barium	<0.20	.2	mg/l	EPA 208.1	07-16-1993 16:10 ED
Boron	0.29	.04	mg/l	EPA 212.3	07-19-1993 13:30 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	07-08-1993 14:35 ED
Calcium	101.9	.03	mg/l	EPA 215.1	07-13-1993 14:00 ED
Cations	6.98	----	meq/l	---------	---------- ----- --
Chloride	3.5	.5	mg/l	EPA 325.3	06-29-1993 08:30 LM
Chromium	0.0012	.0003	mg/l	EPA 218.2	07-21-1993 10:30 ED
Copper	0.060	.03	mg/l	EPA 220.1	07-15-1993 16:25 ED
Fluoride	0.14	.02	mg/l	EPA 340.2	07-06-1993 13:00 LS
Hardness, Total	343	.03	mg/l $CaCO_3$	---------	07-13-1993 14:00 ED
Iron	<0.05	.05	mg/l	EPA 236.1	07-12-1993 14:40 ED
Iron, Dissolved	0.06	.05	mg/l	EPA 236.1	07-16-1993 12:30 ED
Lead	<0.003	.003	mg/l	EPA 239.2	07-07-1993 13:45 ED
Magnesium	21.40	.007	mg/l	EPA 242.1	07-14-1993 16:20 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	07-12-1993 10:00 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	07-09-1993 14:50 ED
Molybdenum	<0.20	.2	mg/l	EPA 246.1	07-16-1993 14:35 ED
Nickel	<0.08	.08	mg/l	EPA 249.1	07-16-1993 10:50 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
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TEL: (801) 653-2311
FAX: (801) 653-2436

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

WHR-3
Rec'd 0800 hr.
Sampled 1735 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Fluoride not distilled.

Date sampled June 24, 1993

Date received June 25, 1993

Analysis report no. 59-13226

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	07-06-1993 08:00 LS
Nitrogen, Nitrate-Nitrite	0.18	.01	mg/l	EPA 353.3	06-30-1993 11:00 LM
Nitrogen, Nitrite	0.00	.004	mg/l	EPA 354.1	06-25-1993 14:00 LM
Oil & Grease	1.6	1	mg/l	EPA 413.1	07-15-1993 10:00 LM
Phosphorus, Total	0.02	.008	mg/l	EPA 365.2	07-06-1993 14:00 LM
Potassium	<0.10	.1	mg/l	EPA 258.1	07-13-1993 18:15 ED
Selenium	<0.004	.004	mg/l	EPA 270.2	07-06-1993 12:30 ED
Sodium	2.90	.2	mg/l	EPA 273.1	07-13-1993 16:25 ED
Solids, Total Dissolved	292.0	14	mg/l	EPA 160.1	06-28-1993 13:10 LM
Sulfate	9.0	1	mg/l	EPA 375.4	07-08-1993 13:15 LS
Sulfide	<0.90	.9	mg/l	EPA 376.1	06-30-1993 13:10 ED
Zinc	<0.03	.03	mg/l	EPA 289.1	07-15-1993 16:00 ED
Cation/Anion Balance	9.26	----	%	---------	---------- ----- --

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

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:WHR-3

Rec'd 1100 hr.
Sampled 1732 hr.

NOTE: FLUORIDE NOT DISTILLED.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled August 15, 1993

Date received August 16, 1993

Analysis report no. 59-13417

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	347	2	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 1330	LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 1330	LS
Alkalinity, Total	285	2	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 1330	LS
Aluminum	0	.05	mg/l		EPA 200.7	09-15-1993 1616	SE
Anions	5.85	----	meq/l		---------	---------- -----	--
Arsenic	<0.002	.002	mg/l		EPA 206.2	09-21-1993 1015	SM
Barium	0.2	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Boron	<0.05	.01	mg/l		EPA 200.7	09-16-1993 0130	SE
Cadmium	<0.0050	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Calcium	77.0	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Cations	5.93	----	meq/l		---------	---------- -----	--
Chloride	4.7	.5	mg/l		EPA 325.3	09-07-1993 1300	LM
Chromium	<0.0	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Copper	<0.01	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Fluoride	0.21	.02	mg/l		EPA 340.2	08-18-1993 0930	LS
Hardness, Total	291.1	.03	mg/l	$CaCO_3$	---------	09-15-1993 1616	SE
Iron	0.03	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Lead	<0.050	.05	mg/l		EPA 200.7	09-15-1993 1616	SE
Magnesium	24.00	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Manganese	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Mercury	<0.0004	.0002	mg/l		EPA 245.1	09-21-1993 1000	SM
Molybdenum	<0.1	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Nickel	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	09-07-1993 0800	LS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:WHR-3

Kind of sample reported to us: Water

Rec'd 1100 hr.
Sampled 1732 hr.

Sample taken at: Co-op

Sample taken by: Co-op

NOTE: FLUORIDE NOT DISTILLED.

Date sampled: August 15, 1993

Date received: August 16, 1993

Analysis report no. 59-13417

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Nitrate	0.06	.01	mg/l	EPA 353.3	08-16-1993 0930 LM
Nitrogen, Nitrite	<0.02	.02	mg/l	EPA 354.1	08-16-1993 1400 LM
Oil & Grease	<1	1	mg/l	EPA 413.1	08-25-1993 0800 LM
Phosphorus, Total	<0.010	.008	mg/l	EPA 365.2	08-27-1993 0800 LM
Potassium	<0.1	.1	mg/l	EPA 200.7	09-15-1993 1616 SE
Selenium	<0.002	.002	mg/l	EPA 270.2	09-20-1993 1900 SM
Sodium	2.5	.1	mg/l	EPA 200.7	09-15-1993 1616 SE
Solids, Total Dissolved	319	14	mg/l	EPA 160.1	08-18-1993 1030 LM
Sulfate	8	1	mg/l	EPA 375.4	09-17-1993 1000 LS
Sulfide	<0.9	.1	mg/l	EPA 376.1	08-20-1993 1515 ED
Zinc	0.01	.005	mg/l	EPA 200.7	09-15-1993 1616 SE
Cation/Anion Balance	0.62	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

This Information has Been Lost

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FAX: (801) 653-2436

December 9, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-3

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 13, 1993

Date received: October 14, 1993

Rec'd 1000 hr.
Sampled 1350 hr.

NOTE:Holding time expired when Phosphorous Ortho was run.

Analysis report no. 59-13625

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorus, Ortho	0.000	.003	mg/l	EPA 365.2	10-16-1993 0950	LM
Potassium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315	ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400	DW
Sodium	<10.0	.2	mg/l	EPA 273.1	11-09-1993 1135	ED
Solids, Total Dissolved	254	14	mg/l	EPA 160.1	10-19-1993 0815	LM
Sulfate	7	1	mg/l	EPA 375.4	11-11-1993 1020	LS
Zinc	<0.03	.03	mg/l	EPA 289.1	10-27-1993 1300	ED
Cation/Anion Balance	-3.40	----	%	---------	---------- -----	--

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

June 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-3

Rec'd 0945 hr.
Sampled 1200 hr.

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: May 30, 1994

Date received: May 31, 1994

Analysis report no. 59-14102

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	378	1	mg/l as HCO_3	SM2320-B	06-06-1994 1055	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-06-1994 1055	LS
Alkalinity, Total	310	1	mg/l as $CaCO_3$	EPA 310.1	06-06-1994 1055	LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-07-1994 1000	DW
Anions	6.40	----	meq/l	---------	---------- -----	--
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	06-08-1994 1130	DW
Boron, Dissolved	0.3	0.1	mg/l	EPA 212.3	06-09-1994 1130	LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-07-1994 0900	DW
Calcium, Dissolved	78	1	mg/l	EPA 215.1	06-06-1994 1400	DW
Cations	5.60	----	meq/l	---------	---------- -----	--
Chloride	2	1	mg/l	SM4500-Cl-B	06-01-1994 1220	LS
Conductivity	522	1	umhos/cm	SM2510-B	05-31-1994 1500	ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-07-1994 0730	DW
Hardness, Total	277	1	mg/l as $CaCO_3$	SM2340-B	06-06-1994 1400	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-09-1994 1015	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-06-1994 0830	DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-06-1994 1700	DW
Magnesium, Dissolved	20	1	mg/l	EPA 242.1	06-06-1994 1500	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-09-1994 1100	DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-06-1994 0715	DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-07-1994 1100	DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-01-1994 1330	ED
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l	EPA 353.3	06-07-1994 1600	LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-01-1994 0715	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

June 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-3

Rec'd 0945 hr.
Sampled 1200 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled May 30, 1994

Date received May 31, 1994

Analysis report no. 59-14102

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	06-01-1994 0840	LM
Potassium, Dissolved	<2	2	mg/l	EPA 258.1	06-06-1994 1115	DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	06-08-1994 0800	DW
Sodium, Dissolved	2	1	mg/l	EPA 273.1	06-06-1994 1230	DW
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	06-03-1994 0800	LM
Sulfate	6	1	mg/l	EPA 375.4	06-08-1994 1330	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-07-1994 0830	DW
Cation/Anion Balance	-6.30	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

September 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-3

Rec'd 1230 hr.
Sampled 1345 hr.

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled August 30, 1994

Date received August 31, 1994

Analysis report no. 59-14376

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	234	1	mg/l as HCO_3	SM2320-B	09-01-1994 0830 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-01-1994 0830 LS
Alkalinity, Total	192	1	mg/l as $CaCO_3$	EPA 310.1	09-01-1994 0830 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	09-08-1994 1530 DW
Anions	4.10	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-02-1994 1100 ED
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-14-1994 1300 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	09-08-1994 1200 DW
Calcium, Dissolved	47	5	mg/l	EPA 215.1	09-09-1994 0930 DW
Cations	4.10	----	meq/l	---------	---------- ----- --
Chloride	4	1	mg/l	SM4500-Cl-B	09-06-1994 1200 LS
Conductivity	363	1	umhos/cm	SM2510-B	09-07-1994 1015 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	09-08-1994 1200 DW
Hardness, Total	204	10	mg/l as $CaCO_3$	SM2340-B	09-09-1994 0930 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	09-13-1994 1030 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-09-1994 1430 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	09-08-1994 1100 DW
Magnesium, Dissolved	21	2	mg/l	EPA 242.1	09-09-1994 1030 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-13-1994 1000 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	09-09-1994 1330 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	09-09-1994 1800 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	09-08-1994 0930 ED
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l	EPA 353.3	09-08-1994 1030 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	09-01-1994 1100 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-3

Kind of sample reported to us: Water

Rec'd 1230 hr.
Sampled 1345 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Dissolved metals filtered at Lab.

Date sampled August 30, 1994

Date received August 31, 1994

Analysis report no. 59-14376

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	09-01-1994 1030 LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	09-09-1994 1300 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-06-1994 1030 ED
Sodium, Dissolved	<5	5	mg/l	EPA 273.1	09-09-1994 1230 DW
Solids, Total Dissolved	360	10	mg/l	EPA 160.1	09-02-1994 1500 LM
Sulfate	6	1	mg/l	EPA 375.4	09-08-1994 1030 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	09-08-1994 1330 DW
Cation/Anion Balance	0.00	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

November 21, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-3

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 31, 1994

Date received: October 31, 1994

Rec'd 1700 hr.
Sampled No Time Given

NOTE: Sample temperature above 6.0C when received. Dissolved metals filtered at Lab.

Analysis report no. 59-14538

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	320	1	mg/l as HCO_3	SM2320-B	11-01-1994 1545 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-01-1994 1545 LS
Alkalinity, Total	265	1	mg/l as $CaCO_3$	EPA 310.1	11-01-1994 1545 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	11-02-1994 1600 DW
Anions	5.60	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-07-1994 1000 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	11-03-1994 1330 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	11-02-1994 1730 DW
Calcium, Dissolved	68	5	mg/l	EPA 215.1	11-01-1994 1500 DW
Cations	5.60	----	meq/l	---------	---------- ----- --
Chloride	5	1	mg/l	SM4500-Cl-B	11-10-1994 0835 LS
Conductivity	513	1	umhos/cm	SM2510-B	11-01-1994 0930 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	11-03-1994 1230 DW
Hardness, Total	260	10	mg/l as $CaCO_3$	SM2340-B	11-01-1994 1500 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	11-17-1994 1445 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	11-03-1994 1700 DW
Magnesium, Dissolved	22	2	mg/l	EPA 242.1	11-02-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-17-1994 1400 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	11-03-1994 1630 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	11-04-1994 0915 ED
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l	EPA 353.3	11-09-1994 1000 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	11-01-1994 0830 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

November 21, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-3

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 31, 1994

Date received: October 31, 1994

Rec'd 1700 hr.
Sampled No Time Given

NOTE: Sample temperature above 6.0C when received. Dissolved metals filtered at Lab.

Analysis report no. 59-14538

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	11-01-1994 1120 LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	11-02-1994 0900 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-07-1994 1500 DW
Sodium, Dissolved	8	5	mg/l	EPA 273.1	11-02-1994 0830 DW
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	11-01-1994 0830 LS
Sulfate	7	1	mg/l	EPA 375.4	11-09-1994 1000 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	11-03-1994 1300 DW
Cation/Anion Balance	-0.30	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

August 5, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

CO-OP
WHR-3

Kind of sample reported to us: Water

Rec'd 1000 hr.
Sampled 1220 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 25, 1997

Date received: June 26, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17396

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	345	5	mg/l as HCO_3	SM2320-B	06-28-1997 1930 RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	06-28-1997 1930 RJ
Alkalinity, Total	283	5	mg/l as $CaCO_3$	EPA 310.1	06-28-1997 1930 RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	08-02-1997 1300 MK
Anions	5.9	----	meq/l	---------	10-04-1997 1000 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-24-1997 0730 MK
Boron, Dissolved	<0.1	0.1	mg/l	EPA 212.3	07-16-1997 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	08-03-1997 1215 MK
Calcium, Dissolved	73	1	mg/l	EPA 215.1	08-03-1997 0715 MK
Cations	5.2	----	meq/l	---------	10-04-1997 1000 RJ
Chloride	2	1	mg/l	SM4500-Cl-B	07-22-1997 0715 SC
Conductivity	523	1	umhos/cm	SM2510-B	06-30-1997 0545 RJ
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	08-03-1997 1115 MK
Hardness, Total	256	----	mg/l as $CaCO_3$	SM2340-B	10-04-1997 1000 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	08-03-1997 0815 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	08-03-1997 0815 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	08-03-1997 1230 MK
Magnesium, Dissolved	18	5	mg/l	EPA 242.1	08-03-1997 0745 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	08-03-1997 0845 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	08-03-1997 0845 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	08-02-1997 1345 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-22-1997 0320 RJ
Nitrogen, Nitrate-Nitrite	0.2	0.1	mg/l as N	EPA 353.3	07-18-1997 0400 AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	06-27-1997 0700 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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

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SGS 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 5, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

CO-OP
WHR-3

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 25, 1997

Date received: June 26, 1997

Rec'd 1000 hr.
Sampled 1220 hr.

NOTE: DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17396

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	06-27-1997 0730 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	08-03-1997 0930 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-24-1997 1115 MK
Sodium, Dissolved	2	1	mg/l	EPA 273.1	08-03-1997 1000 MK
Solids, Total Dissolved	320	10	mg/l	EPA 160.1	06-30-1997 0730 JC
Sulfate	11	10	mg/l	EPA 375.4	07-16-1997 0730 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	08-03-1997 1130 MK
Cation/Anion Balance	-6.5	----	%		10-04-1997 1000 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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

October 14, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-3

Kind of sample reported to us: Water

Rec'd 1030 hr.
Sampled 1405 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 10, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17752

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	373	5	mg/l as HCO_3	SM2320-B	09-19-1997 1430 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	09-19-1997 1430 SC
Alkalinity, Total	306	5	mg/l as $CaCO_3$	EPA 310.1	09-19-1997 1430 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	09-27-1997 0245 MK
Anions	6.4	----	meq/l	---------	10-08-1997 0900 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-27-1997 1900 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-29-1997 1500 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	09-26-1997 2300 MK
Calcium, Dissolved	82	1	mg/l	EPA 215.1	09-27-1997 0145 MK
Cations	6.1	----	meq/l	---------	10-08-1997 0900 RJ
Chloride	4	1	mg/l	SM4500-Cl-B	10-02-1997 1215 SC
Conductivity	543	1	umhos/cm	SM2510-B	09-22-1997 1140 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	09-26-1997 2200 MK
Hardness, Total	299	----	mg/l as $CaCO_3$	SM2340-B	10-08-1997 0900 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	09-26-1997 2315 MK
Magnesium, Dissolved	23	1	mg/l	EPA 242.1	09-27-1997 0200 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	09-27-1997 0330 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-07-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	09-22-1997 0730 RJ
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-12-1997 0700 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

October 14, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-3

Kind of sample reported to us: Water

Rec'd 1030 hr.
Sampled 1405 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 10, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17752

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	09-11-1997 1315 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	09-27-1997 0045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-28-1997 1430 MK
Sodium, Dissolved	2	1	mg/l	EPA 273.1	09-27-1997 0115 MK
Solids, Total Dissolved	300	10	mg/l	EPA 160.1	09-15-1997 0700 JC
Sulfate	7	5	mg/l	EPA 375.4	10-06-1997 1400 SC
Zinc, Dissolved	0.01	0.01	mg/l	EPA 289.1	09-26-1997 2215 MK
Cation/Anion Balance	- 2.4	----	%		10-08-1997 0900 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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

December 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: WHR-3

Rec'd 1100 hr.
Sampled 1400 hr.

FIELD MEASUREMENTS

pH	7.90
Flow	2
Conductivity	462
Temperature	50°

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 20, 1997

Date received: October 21, 1997

NOTE: DISSOLVED METALS FILTERED AT LAB

Analysis report no. 59-17980

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	356	5	mg/l as HCO_3	SM2320-B	10-23-1997 2240 RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	10-23-1997 2240 RJ
Alkalinity, Total	292	5	mg/l as $CaCO_3$	EPA 310.1	10-23-1997 2240 RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	12-02-1997 0145 MK
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-24-1997 1645 MK
Boron, Dissolved	0.2	0.1	mg/l	EPA 212.3	10-30-1997 1300 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	12-01-1997 2145 MK
Calcium, Dissolved	74	1	mg/l	EPA 215.1	12-02-1997 0100 MK
Chloride	3	1	mg/l	SM4500-Cl-B	11-04-1997 1000 SC
Conductivity	520	1	umhos/cm	SM2510-B	10-21-1997 1500 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	12-01-1997 2100 MK
Hardness, Total	275	----	mg/l as $CaCO_3$	SM2340-B	11-03-1997 1000 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	12-01-1997 2245 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-01-1997 2245 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	12-01-1997 2200 MK
Magnesium, Dissolved	22	1	mg/l	EPA 242.1	12-02-1997 0115 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-01-1997 2300 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	12-01-1997 2300 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	12-02-1997 0245 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-27-1997 1110 RJ
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l as N	EPA 353.3	11-14-1997 1500 JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	10-22-1997 0700 JC
Phosphorous, Total	<0.05	0.05	mg/l as P	SM4500-P-B,E	11-05-1997 1745 MK
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	12-01-1997 2345 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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

December 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: WHR-3

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 20, 1997

Date received: October 21, 1997

Rec'd 1100 hr.
Sampled 1400 hr.

FIELD MEASUREMENTS

pH	7.90
Flow	2
Conductivity	462
Temperature	50°

NOTE: DISSOLVED METALS FILTERED AT LAB

Analysis report no. 59-17980

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-24-1997 2030 MK
Sodium, Dissolved	2	1	mg/l	EPA 273.1	12-02-1997 2030 MK
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	10-27-1997 0700 JC
Sulfate	7	5	mg/l	EPA 375.4	10-29-1997 0900 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	12-01-1997 2115 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

Original Watermarked For Your Protection

WATER MONITORING REPORT

Property: Co-op
Station: WHR-4 (SBC-16)
Location: Fish Creek Left Fork Spring - West side
Type: Spring

Field Measurements	Date Sampled											
	07/30/91	10/28/92	03/22/93	06/24/93	08/15/93	10/13/93	03/30/94	05/30/94	08/29/94	10/31/94	06/24/97	09/10/97
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op
Flow (gpm)	31	4	Inaccess	65	6	0.4	Inaccess	45	<0.1	15	59	4
pH	8.2	8.41	N/A	7.24	7.31	7.6	N/A	0.45	7.39	8	7.8	8.27
Sp. Cond. (ohms)	600	626	N/A	663	579	628	N/A	575	545	613	538	481
Temp (C)	N/R	5.39	N/A	9.5	10.6	7.9	N/A	7.7	13.4	2.8	11.2	16.4
Lab Measurements												
Analyzed by:	IML	CT&E	N/A	CT&E	CT&E	CT&E	N/A	CT&E	CT&E	CT&E	CT&E	CT&E
TDS (mg/L)	342	280		335	314	332		280	320	330	280	330
Hardness (CaCO3)	326	337		358	313.3	345		268	267	280	240	262
Aluminum (Al)	0.7	N/D		1	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Arsenic (As)	N/D	N/D		0.004	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Boron (B)	N/D	0.18		0.06	N/D	N/D		0.3	0.1	0.1	N/D	0.1
Carbonate (CO3)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Bicarbonate (HCO3)	312	284		367	346	348		352	338	330	345	334
Cadmium (Cd)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Calcium (Ca)	43.3	81.9		79.9	76	59		66	51	64	60	54
Chloride (Cl)	4.97	15		5.9	4.7	9		2	4	7	3	6
Copper (Cu)	N/D	N/D		0.06	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Iron (Fe) Total	0.66	N/D		0.15	0.05	0.2		N/D	1.4	N/D	N/D	0.1
Iron (Fe) Dissolved	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Lead (Pb)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Magnesium (Mg)	53.1	32.1		38.6	30	48		25	34	30	22	31
Manganese (Mn) tot.	0.02	N/D		0.03	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Manganese (Mn) dis.	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Molybdenum (Mo)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Nitrogen (NH3)	0.29	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Nitrite (NO2)	N/D	N/D		N/D	N/D	N/D		N/D	0.02	N/D	N/D	N/D
Nitrate (NO3)	N/D	0.01		0.02	N/D	0.1		N/D	0.01	N/D	N/D	N/D
Potassium (K)	1.93	N/D		N/D	0.3	N/D		N/D	N/D	N/D	N/D	N/D
Phosphate (PO4)	N/D	N/D		0.02	0.02	N/D		N/D	0.06	0.02	0.03	0.02
Selenium (Se)	N/D	N/D		0.004	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Sodium (Na)	10.8	6.05		9.9	3.8	N/D		3	10	11	3	7
Sp. Conductivity						542		512	530	583	489	540
Sulfate (SO4)	98.8	36		26	10	17		10	20	25	9	34
Zinc (Z)	N/D	0.12		N/D	N/D	0.03		N/D	N/D	N/D	N/D	0.01
Anions	7.31	5.72		6.58	5.88	6.2		6	6.1	6.1		5.8
Cations	7.07	6.99		7.59	6.43	6.9		5.5	5.8	6.1		5.6
Anion/Cation Balance	1.90%	9.96%		7.07%	4.50%	5.40%		-4.90%	-2.50%	0.70%		-2.10%

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

November 17, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

#5 (SBC-16)
Rec'd 1000 hr.
Sampled 1240 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 28, 1992

Date received October 29, 1992

Analysis report no. 59-12649

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	11-11-1992 11:30 LS
Alkalinity, Bicarbonate	284	1	mg/l $CaCO_3$	EPA 310.1	11-04-1992 13:00 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	11-04-1992 13:00 LS
Alkalinity, Total	233	1	mg/l $CaCO_3$	EPA 310.1	11-04-1992 13:00 LS
Aluminum	0.00	.5	mg/l	EPA 202.1	11-11-1992 13:30 JS
Anions	5.72	----	meq/l	---------	---------- ----- --
Arsenic	0.000	.002	mg/l	EPA 206.2	11-10-1992 10:50 JS
Barium	0.00	.03	mg/l	EPA 208.1	11-11-1992 13:30 JS
Boron	0.18	.01	mg/l	EPA 212.3	11-05-1992 14:00 LM
Cadmium	0.000	.00	mg/l	EPA 213.2	11-10-1992 12:10 JS
Calcium	81.9	.1	mg/l	EPA 215.1	11-11-1992 16:30 JS
Cations	6.99	----	meq/l	---------	---------- ----- --
Chloride	15.0	.1	mg/l	EPA 325.3	11-16-1992 15:45 LS
Chromium	0.00	.001	mg/l	EPA 218.2	11-10-1992 12:10 JS
Copper	0.000	.01	mg/l	EPA 220.1	11-11-1992 12:00 JS
Fluoride	0.03	.01	mg/l	EPA 340.2	11-05-1992 08:30 LS
Hardness, Total	337	1	mg/l $CaCO_3$	---------	11-11-1992 16:30 JS
Iron	0.00	.02	mg/l	EPA 236.1	11-02-1992 14:00 JS
Lead	0.000	.001	mg/l	EPA 239.2	11-10-1992 12:10 JS
Magnesium	32.10	.01	mg/l	EPA 242.1	11-02-1992 12:30 JS
Manganese	0.00	.01	mg/l	EPA 243.1	11-02-1992 14:00 JS
Mercury	0.000	.002	mg/l	EPA 245.1	11-12-1992 14:00 JS
Molybdenum	0.00	.1	mg/l	EPA 246.1	11-11-1992 13:30 JS
Nickel	0.00	.02	mg/l	EPA 249.1	11-11-1992 12:00 JS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

June Koman

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

November 17, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 28, 1992

Date received: October 29, 1992

#5 (SBC-16)
Rec'd 1000 hr.
Sampled 1240 hr.

Analysis report no. 59-12649

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	0.00	.01	mg/l	EPA 350.3	11-03-1992 08:30 LS
Nitrogen, Nitrate	0.01	.01	mg/l	EPA 353.3	10-29-1992 15:00 LM
Nitrogen, Nitrite	0.00	.01	mg/l	EPA 354.1	10-29-1992 15:00 LM
Oil & Grease	0.0	1	mg/l	EPA 413.1	11-05-1992 15:00 LM
Phosphorus, Total	0.00	.01	mg/l	EPA 365.2	11-04-1992 13:30 LM
Potassium	0.00	.01	mg/l	EPA 258.1	11-11-1992 16:30 JS
Selenium	0.000	.002	mg/l	EPA 270.2	11-10-1992 10:50 JS
Sodium	6.05	.01	mg/l	EPA 273.1	11-11-1992 16:30 JS
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	10-29-1992 13:30 LM
Solids, Total Dissolved	280.0	.5	mg/l	EPA 160.1	10-30-1992 09:30 LM
Solids, Total Suspended	14.0	.5	mg/l	EPA 160.2	10-30-1992 09:30 LM
Sulfate	36.0	.1	mg/l	EPA 375.4	11-13-1992 10:30 LS
Sulfide	0.80	.1	mg/l	EPA 376.1	10-30-1992 15:20 LM
Zinc	0.12	.01	mg/l	EPA 289.1	11-11-1992 12:00 JS
Cation/Anion Balance	9.96	----	%	---------	---------- ----- --

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

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 24, 1993

Date received: June 25, 1993

WHR-4 (SEC-16)
Rec'd 0800 hr.
Sampled 1451 hr.

NOTE: Fluoride not distilled.

Analysis report no. 59-13222

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	367	.4	mg/l HCO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Total	301	.4	mg/l $CaCO_3$	EPA 310.1	06-29-1993 15:00 LS
Aluminum	1.00	1	mg/l	EPA 202.1	07-16-1993 13:35 ED
Anions	6.58	----	meq/l	---	--- ----- --
Arsenic	0.004	.003	mg/l	EPA 206.2	07-07-1993 09:50 ED
Barium	<0.20	.2	mg/l	EPA 208.1	07-16-1993 16:10 ED
Boron	0.06	.04	mg/l	EPA 212.3	07-19-1993 13:30 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	07-08-1993 14:35 ED
Calcium	79.9	.03	mg/l	EPA 215.1	07-13-1993 14:00 ED
Cations	7.59	----	meq/l	---	--- ----- --
Chloride	5.9	.5	mg/l	EPA 325.3	06-29-1993 08:30 LM
Chromium	0.0023	.0003	mg/l	EPA 218.2	07-21-1993 10:30 ED
Copper	0.060	.03	mg/l	EPA 220.1	07-15-1993 16:25 ED
Fluoride	0.17	.02	mg/l	EPA 340.2	07-06-1993 13:00 LS
Hardness, Total	358	.03	mg/l $CaCO_3$	---	07-13-1993 14:00 ED
Iron	0.15	.05	mg/l	EPA 236.1	07-12-1993 14:45 ED
Iron, Dissolved	0.05	.05	mg/l	EPA 236.1	07-16-1993 12:30 ED
Lead	<0.003	.003	mg/l	EPA 239.2	07-07-1993 13:45 ED
Magnesium	38.60	.007	mg/l	EPA 242.1	07-14-1993 16:20 ED
Manganese	0.03	.03	mg/l	EPA 243.1	07-12-1993 10:00 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	07-19-1993 14:50 ED
Molybdenum	<0.20	.2	mg/l	EPA 246.1	07-16-1993 14:35 ED
Nickel	<0.08	.08	mg/l	EPA 249.1	07-16-1993 10:50 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample Water
reported to us

WHR-4 (SBC-16)
Rec'd 0800 hr.
Sampled 1451 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Fluoride not distilled.

Date sampled June 24, 1993

Date received June 25, 1993

Analysis report no. 59-13222

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	07-06-1993 08:00 LS
Nitrogen, Nitrate-Nitrite	0.02	.01	mg/l	EPA 353.3	06-30-1993 11:00 LM
Nitrogen, Nitrite	0.00	.004	mg/l	EPA 354.1	06-25-1993 14:00 LM
Oil & Grease	0.9	1	mg/l	EPA 413.1	07-15-1993 10:00 LM
Phosphorus, Total	0.02	.008	mg/l	EPA 365.2	07-06-1993 14:00 LM
Potassium	<0.10	.1	mg/l	EPA 258.1	07-13-1993 18:15 ED
Selenium	0.004	.004	mg/l	EPA 270.2	07-06-1993 12:30 ED
Sodium	9.90	.2	mg/l	EPA 273.1	07-13-1993 16:25 ED
Solids, Total Dissolved	335.0	14	mg/l	EPA 160.1	06-28-1993 09:00 LM
Sulfate	26.0	1	mg/l	EPA 375.4	07-08-1993 13:15 LS
Sulfide	<0.90	.9	mg/l	EPA 376.1	06-30-1993 13:10 ED
Zinc	<0.03	.03	mg/l	EPA 289.1	07-15-1993 16:00 ED
Cation/Anion Balance	7.07	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:WHR-4 (SBC-16)

Kind of sample Water
reported to us

Rec'd 1100 hr.
Sampled 1817 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled August 15, 1993

NOTE: FLUORIDE NOT DISTILLED.

Date received August 16, 1993

Analysis report no. 59-13415

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Acidity	XXXX	1	mg/l	$CaCO_3$	EPA 305.1		
Alkalinity, Bicarbonate	346	2	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 1330	LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 1330	LS
Alkalinity, Total	284	2	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 1330	LS
Aluminum	0	.05	mg/l		EPA 200.7	09-15-1993 1616	SE
Anions	5.88	----	meq/l		---------	---------- -----	--
Arsenic	<0.002	.002	mg/l		EPA 206.2	09-21-1993 1015	SM
Barium	0.3	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Boron	<0.05	.01	mg/l		EPA 200.7	09-16-1993 0130	SE
Cadmium	<0.0050	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Calcium	76.0	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Cations	6.43	----	meq/l		---------	---------- -----	--
Chloride	4.7	.5	mg/l		EPA 325.3	09-07-1993 1300	LM
Chromium	<0.0	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Copper	<0.01	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Fluoride	0.24	.02	mg/l		EPA 340.2	08-18-1993 0930	LS
Hardness, Total	313.3	.03	mg/l	$CaCO_3$	---------	09-15-1993 1616	SE
Iron	0.05	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Lead	<0.050	.05	mg/l		EPA 200.7	09-15-1993 1616	SE
Magnesium	30.00	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Manganese	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Mercury	<0.0040	.0002	mg/l		EPA 245.1	09-21-1993 1000	LS
Molybdenum	<0.1	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Nickel	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616	SE

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: WHR-4 (SBC-16)

Kind of sample reported to us: Water

Rec'd 1100 hr.
Sampled 1817 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 15, 1993

Date received: August 16, 1993

NOTE: FLUORIDE NOT DISTILLED.

Analysis report no. 59-13415

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	09-07-1993 0800 LS
Nitrogen, Nitrate	<0.01	.01	mg/l	EPA 353.3	08-16-1993 0930 LM
Nitrogen, Nitrite	<0.02	.02	mg/l	EPA 354.1	08-16-1993 1400 LM
Oil & Grease	<1	1	mg/l	EPA 413.1	08-25-1993 1400 LM
Phosphorus, Total	0.020	.008	mg/l	EPA 365.2	08-27-1993 0800 LM
Potassium	0.3	.1	mg/l	EPA 200.7	09-15-1993 1616 SE
Selenium	<0.002	.002	mg/l	EPA 270.2	09-20-1993 1900 SM
Sodium	3.8	.1	mg/l	EPA 200.7	09-15-1993 1616 SE
Solids, Total Dissolved	314	14	mg/l	EPA 160.1	08-18-1993 1030 LM
Sulfate	10	1	mg/l	EPA 375.4	09-17-1993 1000 LS
Sulfide	<0.9	.1	mg/l	EPA 376.1	08-20-1993 1515 ED
Zinc	<0.01	.005	mg/l	EPA 200.7	09-15-1993 1616 SE
Cation/Anion Balance	4.50	----	%	---------	---------- ----- -

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

December 9, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-4 (SBC-16)

Kind of sample reported to us Water

Rec'd 1000 hr.
Sampled 1440 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Holding time expired when Phosphorous Ortho was run.

Date sampled October 13, 1993

Date received October 14, 1993

Analysis report no. 59-13627

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	348	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Total	286	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Aluminum	<1	1	mg/l		EPA 202.1	10-28-1993 1630	ED
Anions	6.20	----	meq/l		---------	---------- -----	--
Arsenic	<0.010	.003	mg/l		EPA 206.2	11-23-1993 1115	DW
Boron	<0.10	.04	mg/l		EPA 212.3	11-19-1993 1430	LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125	ED
Calcium	59.0	.03	mg/l		EPA 215.1	11-08-1993 1450	ED
Cations	6.90	----	meq/l		---------	---------- -----	--
Chloride	9.0	.5	mg/l		EPA 325.3	11-01-1993 0900	LM
Conductivity	542.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Copper	<0.05	.03	mg/l		EPA 220.1	10-27-1993 1550	ED
Hardness, Total	345.0	.03	mg/l	$CaCO_3$	---------	11-08-1993 1450	ED
Iron	0.20	.05	mg/l		EPA 236.1	11-08-1993 1315	ED
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-08-1993 0920	ED
Lead	<0.400	.003	mg/l		EPA 239.2	11-05-1993 1000	ED
Magnesium	48.00	.007	mg/l		EPA 242.1	11-08-1993 1630	ED
Manganese	<0.03	.03	mg/l		EPA 243.1	11-08-1993 1100	ED
Manganese, Dissolved	<0.1	.03	mg/l		EPA 243.1	12-08-1993 1010	ED
Molybdenum	<0.2	.2	mg/l		EPA 246.1	10-29-1993 1105	ED
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000	LS
Nitrogen, Nitrate	0.10	.01	mg/l		EPA 353.3	10-18-1993 0745	LM
Nitrogen, Nitrite	0.00	.02	mg/l		EPA 354.1	10-14-1993 1600	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

December 9, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-4 (SBC-16)

Kind of sample reported to us: Water

Rec'd 1000 hr.
Sampled 1440 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Holding time expired when Phosphorous Ortho was run.

Date sampled October 13, 1993

Date received October 14, 1993

Analysis report no. 59-13627

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorus, Ortho	0.000	.003	mg/l	EPA 365.2	10-16-1993 0950	LM
Potassium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315	ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400	DW
Sodium	<10.0	.2	mg/l	EPA 273.1	11-09-1993 1135	ED
Solids, Total Dissolved	332	14	mg/l	EPA 160.1	10-19-1993 0815	LM
Sulfate	17	1	mg/l	EPA 375.4	11-11-1993 1020	LS
Zinc	0.03	.03	mg/l	EPA 289.1	10-27-1993 1300	ED
Cation/Anion Balance	5.40	----	%	---------	---------- -----	--

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

June 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-4 (SBC-16)

Rec'd 0945 hr.
Sampled 1238 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled *May 30, 1994*

Date received May 31, 1994

Analysis report no. 59-14101

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	352	1	mg/l as HCO_3	SM2320-B	06-06-1994 1055 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-06-1994 1055 LS
Alkalinity, Total	289	1	mg/l as $CaCO_3$	EPA 310.1	06-06-1994 1055 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-15-1994 1030 DW
Anions	6.00	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	06-08-1994 1130 DW
Boron, Dissolved	0.3	0.1	mg/l	EPA 212.3	06-09-1994 1130 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-15-1994 0830 DW
Calcium, Dissolved	66	1	mg/l	EPA 215.1	06-13-1994 1430 DW
Cations	5.50	----	meq/l	---------	---------- ----- --
Chloride	2	1	mg/l	SM4500-Cl-B	06-01-1994 1220 LS
Conductivity	512	1	umhos/cm	SM2510-B	05-31-1994 1500 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-14-1994 1600 DW
Hardness, Total	268	1	mg/l as $CaCO_3$	SM2340-B	06-13-1994 1430 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-09-1994 1015 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-14-1994 1500 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-15-1994 0800 DW
Magnesium, Dissolved	25	1	mg/l	EPA 242.1	06-13-1994 1500 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-09-1994 1100 DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-14-1994 1530 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-15-1994 0930 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-01-1994 1330 ED
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l	EPA 353.3	06-07-1994 1600 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-01-1994 0715 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

June 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-4 (SBC-16)

Rec'd 0945 hr.
Sampled 1238 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled May 30, 1994

Date received May 31, 1994

Analysis report no. 59-14101

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	06-01-1994 0840	LM
Potassium, Dissolved	<2	2	mg/l	EPA 258.1	06-13-1994 1630	DW
Selenium, Dissolved	<0.00	0.01	mg/l	EPA 270.2	06-08-1994 0800	DW
Sodium, Dissolved	3	1	mg/l	EPA 273.1	06-13-1994 1600	DW
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	06-03-1994 0800	LM
Sulfate	10	1	mg/l	EPA 375.4	06-08-1994 1330	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-15-1994 0900	DW
Cation/Anion Balance	-4.90	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-4 (SBC-16)

Kind of sample reported to us Water

Rec'd 1130 hr.
Sampled 1752 hr.

Sample taken at Co-op

NOTE: Dissolved metals filtered at Lab.

Sample taken by Co-op

Date sampled August 29, 1994

Date received August 30, 1994

Analysis report no. 59-14365

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	338	1	mg/l as HCO_3	SM2320-B	08-31-1994 0845 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	08-31-1994 0845 LS
Alkalinity, Total	277	1	mg/l as $CaCO_3$	EPA 310.1	08-31-1994 0845 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	09-08-1994 1530 DW
Anions	6.10	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-02-1994 1100 ED
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-14-1994 1300 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	09-08-1994 1200 DW
Calcium, Dissolved	51	5	mg/l	EPA 215.1	09-09-1994 0930 DW
Cations	5.80	----	meq/l	---------	---------- ----- --
Chloride	4	1	mg/l	SM4500-Cl-B	09-06-1994 0930 LS
Conductivity	530	1	umhos/cm	SM2510-B	08-31-1994 0945 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	09-08-1994 1200 DW
Hardness, Total	267	10	mg/l as $CaCO_3$	SM2340-B	09-09-1994 0930 DW
Iron, Total	1.4	0.2	mg/l	EPA 236.1	09-13-1994 1030 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-09-1994 1430 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	09-08-1994 1100 DW
Magnesium, Dissolved	34	2	mg/l	EPA 242.1	09-09-1994 1030 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-13-1994 1000 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	09-09-1994 1330 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	09-09-1994 1800 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	09-08-1994 0930 ED
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l	EPA 353.3	09-07-1994 1000 LM
Nitrogen, Nitrite	0.02	0.01	mg/l	EPA 354.1	08-30-1994 1610 LM

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

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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 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-4 (SBC-16)

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled August 29, 1994

Date received August 30, 1994

Rec'd 1130 hr.
Sampled 1752 hr.

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14365

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.06	0.02	mg/l	SM4500-P-E	08-30-1994 1530 LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	09-09-1994 1300 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-06-1994 1030 ED
Sodium, Dissolved	10	5	mg/l	EPA 273.1	09-09-1994 1230 DW
Solids, Total Dissolved	320	10	mg/l	EPA 160.1	08-30-1994 1415 LM
Sulfate	20	1	mg/l	EPA 375.4	09-07-1994 1000 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	09-08-1994 1330 DW
Cation/Anion Balance	-2.50	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hunt SD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

November 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-4 (SBC-16)

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 31, 1994

Date received October 31, 1994

Rec'd 1700 hr.
Sampled 1043 hr.

NOTE: Sample temperature above 6.0°C when received. Dissolved metals filtered at Lab.

Analysis report no. 59-14535

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	330	1	mg/l as HCO_3	SM2320-B	11-01-1994 1545 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-01-1994 1545 LS
Alkalinity, Total	267	1	mg/l as $CaCO_3$	EPA 310.1	11-01-1994 1545 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	11-02-1994 1600 DW
Anions	6.10	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-07-1994 1000 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	11-03-1994 1330 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	11-02-1994 1730 DW
Calcium, Dissolved	64	5	mg/l	EPA 215.1	11-01-1994 1500 DW
Cations	6.10	----	meq/l	---------	---------- ----- --
Chloride	7	1	mg/l	SM4500-Cl-B	11-10-1994 0835 LS
Conductivity	583	1	umhos/cm	SM2510-B	11-01-1994 0930 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	11-03-1994 1230 DW
Hardness, Total	280	10	mg/l as $CaCO_3$	SM2340-B	11-01-1994 1500 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	11-02-1994 1700 DW
Magnesium, Dissolved	30	2	mg/l	EPA 242.1	11-02-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	11-14-1994 1530 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	11-14-1994 0915 ED
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l	EPA 353.3	11-09-1994 1000 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	11-01-1994 0830 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

November 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-4 (SBC-16)

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 31, 1994

Date received October 31, 1994

Rec'd 1700 hr.
Sampled 1043 hr.

NOTE: Sample temperature above 6.0°C when received. Dissolved metals filtered at Lab.

Analysis report no. 59-14535

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	11-01-1994 1120	LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	11-02-1994 0900	DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-07-1994 1500	DW
Sodium, Dissolved	11	5	mg/l	EPA 273.1	11-02-1994 0830	DW
Solids, Total Dissolved	330	10	mg/l	EPA 160.1	11-01-1994 0830	LS
Sulfate	25	1	mg/l	EPA 375.4	11-09-1994 1000	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	11-03-1994 1300	DW
Cation/Anion Balance	0.70	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

COMMERCIAL T...
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November 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 31, 1994

Sample identification by
CO-OP MINE

WHR-4 (SBC-16)

Rec'd 1700 hr.
Sampled 1043 hr.

NOTE:Sample temperature above 6.0°C when received. Dissolved metals filtered at Lab.

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FAX: (801) 653-2436

July 30, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-4 (SBC-16)

Kind of sample reported to us Water

Rec'd 0718 hr.
Sampled 1425 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 24, 1997

Date received June 25, 1997

Dissolved metals filtered at lab!

Analysis report no. 59-17369

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	345	5	mg/l as HCO_3	SM2320-B	06-28-1997 1530 RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	06-28-1997 1530 RJ
Alkalinity, Total	269	5	mg/l as $CaCO_3$	EPA 310.1	06-28-1997 1530 RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	07-29-1997 1315 MK
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-18-1997 0800 MK
Boron, Dissolved	<0.1	0.1	mg/l	EPA 212.3	07-16-1997 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	07-29-1997 0900 MK
Calcium, Dissolved	60	1	mg/l	EPA 215.1	07-29-1997 1215 MK
Chloride	3	1	mg/l	SM4500-Cl-B	07-02-1997 1240 RJ
Conductivity	489	1	umhos/cm	SM2510-B	06-30-1997 0455 RJ
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	07-29-1997 0800 MK
Hardness, Total	240	----	mg/l as $CaCO_3$	SM2340-B	07-29-1997 1600 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	07-29-1997 1000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-29-1997 1000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	07-29-1997 0910 MK
Magnesium, Dissolved	22	1	mg/l	EPA 242.1	07-29-1997 1230 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-29-1997 1015 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	07-29-1997 1015 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	07-29-1997 1500 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-21-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	07-17-1997 0500 AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	06-25-1997 1330 JC
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	06-25-1997 1030 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	07-29-1997 1115 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

July 30, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-4 (SBC-16)

Kind of sample reported to us **Water**

Rec'd 0718 hr.
Sampled 1425 hr.

Sample taken at **Co-op**

Sample taken by **Co-op**

Date sampled **June 24, 1997**

Date received **June 25, 1997**

Dissolved metals filtered at lab!

Analysis report no. 59-17369

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-18-1997 1130 MK
Sodium, Dissolved	3	1	mg/l	EPA 273.1	07-29-1997 1130 MK
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	06-26-1997 0700 JC
Sulfate	9	5	mg/l	EPA 375.4	07-15-1997 0800 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	07-29-1997 0815 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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FAX: (801) 653-2436

October 14, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-4 (SBC-16)

Kind of sample reported to us: Water

Rec'd 1030 hr.
Sampled 1518 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 10, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17747

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	334	5	mg/l as HCO_3	SM2320-B	09-19-1997 1430 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	09-19-1997 1430 SC
Alkalinity, Total	274	5	mg/l as $CaCO_3$	EPA 310.1	09-19-1997 1430 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	09-25-1997 2145 MK
Anions	5.8	----	meq/l	---------	10-08-1997 0900 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-24-1997 1745 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-29-1997 1500 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	09-25-1997 1745 MK
Calcium, Dissolved	54	1	mg/l	EPA 215.1	09-25-1997 2030 MK
Cations	5.6	----	meq/l	---------	10-08-1997 0900 RJ
Chloride	6	1	mg/l	SM4500-Cl-B	10-02-1997 0930 SC
Conductivity	540	1	umhos/cm	SM2510-B	09-22-1997 1140 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	09-25-1997 1645 MK
Hardness, Total	262	----	mg/l as $CaCO_3$	SM2340-B	10-08-1997 0900 RJ
Iron, Total	0.1	0.1	mg/l	EPA 236.1	09-25-1997 1830 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-25-1997 1830 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	09-25-1997 1800 MK
Magnesium, Dissolved	31	1	mg/l	EPA 242.1	09-25-1997 2100 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-25-1997 1845 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	09-25-1997 1845 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	09-25-1997 2230 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-07-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	09-20-1997 0600 RJ
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-12-1997 0700 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

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

October 14, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-4 (SBC-16)

Kind of sample reported to us Water

Rec'd 1030 hr.
Sampled 1518 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled September 10, 1997

Date received September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17747

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	09-11-1997 1315	RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	09-25-1997 1915	MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-24-1997 2145	MK
Sodium, Dissolved	7	1	mg/l	EPA 273.1	09-25-1997 1945	MK
Solids, Total Dissolved	330	10	mg/l	EPA 160.1	09-15-1997 0700	JC
Sulfate	34	10	mg/l	EPA 375.4	10-06-1997 1215	SC
Zinc, Dissolved	0.01	0.01	mg/l	EPA 289.1	09-25-1997 1715	MK
Cation/Anion Balance	-2.1	----	%		10-08-1997 0900	RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

WATER MONITORING REPORT

Property: Co-op
Station: WHR-5 (SBC-15)
Location: Bear Canyon, Right Fork, Left Fork
Type: Spring

Field Measurements	Date Sampled												
	07/31/91	10/27/92	03/22/93	06/24/93	08/15/93	10/13/93	03/30/94	05/30/94	08/29/94	10/30/94	06/24/97	09/10/97	10/20/97
Sampled by:	EIS	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op	Co-Op
Flow (gpm)	<0.2	2.8	Inacces	10	13	17	Inacces	6	3	2	31	25	1
pH	8	7.72	N/A	7.6	7.29	7.73	N/A	7.96	8.42	8.45	7.67	8.11	8.21
Sp. Cond. (ohms)	1450	563	N/A	589	600	602	N/A	620	534	525	601	487	553
Temp (C)	N/R	5.61	N/A	8.1	9.4	5.5	N/A	8.1	12.4	2.6	7.3	11.2	12.2
Lab Measurements													
Analyzed by:	IML	CT&E	N/A	CT&E	CT&E	CT&E	N/A	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E
TDS (mg/L)	1140	328		295	332	267		300	300	270	290	280	300
Hardness (CaCO3)	891	295		310	452	316		289	289	240	255	290	265
Aluminum (Al)	0.1	N/D		N/D	1	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Arsenic (As)	N/D	N/D		0.08	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Boron (B)	N/D	0.15		0.15	N/D	0.1		0.4	0.1	0.1	N/D	0.1	0.20
Carbonate (CO3)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Bicarbonate (HCO3)	503	303		330	337	308		380	346	290	317	359	364
Cadmium (Cd)	N/D	0.13		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Calcium (Ca)	114	67.2		71	120	64		63	63	44	56	65	55
Chloride (Cl)	18.8	5		5.3	4.7	9		3	2	5	3	4	5
Copper (Cu)	N/D	N/D		0.05	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Iron (Fe) Total	0.1	0.05		0.06	0.36	0.12		N/D	N/D	N/D	N/D	N/D	0.30
Iron (Fe) Dissolved	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Lead (Pb)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Magnesium (Mg)	148	31		32.2	37	38		32	32	32	28	31	31
Manganese (Mn) tot.	N/D	N/D		N/D	0.02	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Manganese (Mn) dis.	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Molybdenum (Mo)	N/D	N/D		0.2	N/D	0.2		N/D	N/D	N/D	N/D	N/D	N/D
Nitrogen (NH3)	0.07	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Nitrite (NO2)	N/D	N/D		N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Nitrate (NO3)	N/D	0.02		0.06	0.05	0.18		0.1	N/D	0.1	N/D	N/D	N/D
Potassium (K)	5.86	0.01		N/D	0.5	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Phosphate (PO4)	N/D	N/D		N/D	N/D	0.003		N/D	0.03	N/D	0.03	0.02	N/D
Selenium (Se)	N/D	N/D		0.01	0.002	N/D		N/D	N/D	N/D	N/D	N/D	N/D
Sodium (Na)	37.8	4.86		4.6	4.7	N/D		5	N/D	9	4	4	4
Sp. Conductivity						470		556	530	472	517	542	536
Sulfate (SO4)	541	50		12	140	12		15	20	19	15	13	13
Zinc (Z)	N/D	0.12		N/D	0.01	N/D		N/D	N/D	N/D	0.01	N/D	N/D
Anions	20	6.03		5.7	8.46	5.4		6.6	6.2	5.3		6.3	
Cations	19.6	6.11		6.39	9.25	6.3		6	5.8	5.2		6	
Anion/Cation Balance	1.04%	0.59%		5.88%	4.43%	7.50%		-5.10%	-3.10%	-0.50%		-2.40%	

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

November 12, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

#10 (SBC-15)
Rec'd 1715 hr.
Sampled 1225 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 27, 1992

Date received October 27, 1992

Analysis report no. 59-12640

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	0	1	mg/l $CaCO_3$	EPA 305.1	11-04-1992 09:00 LS
Alkalinity, Bicarbonate	303	1	mg/l $CaCO_3$	EPA 310.1	10-29-1992 10:30 LS
Alkalinity, Carbonate	0	1	mg/l $CaCO_3$	EPA 310.1	10-29-1992 10:30 LS
Alkalinity, Total	248	1	mg/l $CaCO_3$	EPA 310.1	10-29-1992 10:30 LS
Aluminum	0.00	.5	mg/l	EPA 202.1	11-11-1992 13:30 JS
Anions	6.03	----	meq/l	---------	---------- ----- --
Arsenic	0.000	.002	mg/l	EPA 206.2	11-10-1992 10:50 JS
Barium	0.00	.03	mg/l	EPA 208.1	11-11-1992 13:30 JS
Boron	0.15	.01	mg/l	EPA 212.3	11-05-1992 14:00 LM
Cadmium	0.130	.00	mg/l	EPA 213.2	10-10-1992 12:10 JS
Calcium	67.2	.1	mg/l	EPA 215.1	11-02-1992 12:30 JS
Cations	6.11	----	meq/l	---------	---------- ----- --
Chloride	5.0	.1	mg/l	EPA 325.3	11-09-1992 08:30 LS
Chromium	0.00	.001	mg/l	EPA 218.2	11-10-1992 12:10 JS
Copper	0.000	.01	mg/l	EPA 220.1	11-10-1992 12:00 JS
Fluoride	0.03	.01	mg/l	EPA 340.2	11-05-1992 08:30 LS
Hardness, Total	295	1	mg/l $CaCO_3$	---------	11-02-1992 12:30 JS
Iron	0.05	.02	mg/l	EPA 236.1	11-02-1992 14:00 JS
Lead	0.000	.001	mg/l	EPA 239.2	10-10-1992 12:10 JS
Magnesium	31.00	.01	mg/l	EPA 242.1	11-02-1992 12:30 JS
Manganese	0.00	.01	mg/l	EPA 243.1	11-02-1992 14:00 JS
Mercury	0.000	.002	mg/l	EPA 245.1	11-02-1992 16:00 JS
Molybdenum	0.00	.1	mg/l	EPA 246.1	11-11-1992 13:30 JS
Nickel	0.00	.02	mg/l	EPA 249.1	11-11-1992 12:00 JS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

June Kosman

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

November 12, 1992

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 27, 1992

Date received October 27, 1992

#10 (SBL-15)
Rec'd 1715 hr.
Sampled 1225 hr.

Analysis report no. 59-12640

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	0.00	.01	mg/l	EPA 350.3	11-03-1992 08:30 LS
Nitrogen, Nitrate	0.02	.01	mg/l	EPA 353.3	10-28-1992 10:00 LM
Nitrogen, Nitrite	0.00	.01	mg/l	EPA 354.1	10-28-1992 10:00 LM
Oil & Grease	1.0	1	mg/l	EPA 413.1	11-03-1992 11:30 LM
Phosphorus, Total	0.00	.01	mg/l	EPA 365.2	10-29-1992 12:30 LM
Potassium	0.01	.01	mg/l	EPA 258.1	11-02-1992 12:30 JS
Selenium	0.000	.002	mg/l	EPA 270.2	11-10-1992 10:50 JS
Sodium	4.86	.01	mg/l	EPA 273.1	11-02-1992 12:30 JS
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	10-28-1992 08:00 LM
Solids, Total Dissolved	328.0	.5	mg/l	EPA 160.1	10-28-1992 13:00 LM
Solids, Total Suspended	6.0	.5	mg/l	EPA 160.2	10-28-1992 13:00 LM
Sulfate	50.0	.1	mg/l	EPA 375.4	11-02-1992 13:00 LS
Sulfide	0.00	.1	mg/l	EPA 376.1	10-30-1992 15:20 LM
Zinc	0.12	.01	mg/l	EPA 289.1	11-11-1992 12:00 JS
Cation/Anion Balance	0.59	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 24, 1993

Date received: June 25, 1993

WHR-5 (SBC-15)
Rec'd 0800 hr.
Sampled 1543 hr.

NOTE: Fluoride not distilled.

Analysis report no. 59-13224

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	330	.4	mg/l HCO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Carbonate	0	.4	mg/l CO_3	EPA 310.1	06-29-1993 15:00 LS
Alkalinity, Total	271	.4	mg/l $CaCO_3$	EPA 310.1	06-29-1993 15:00 LS
Aluminum	<1.00	1	mg/l	EPA 202.1	07-16-1993 13:35 ED
Anions	5.68	----	meq/l	---------	---------- ----- --
Arsenic	0.008	.003	mg/l	EPA 206.2	07-07-1993 09:50 ED
Barium	<0.20	.2	mg/l	EPA 208.1	07-16-1993 16:10 ED
Boron	0.15	.04	mg/l	EPA 212.3	07-19-1993 13:30 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	07-08-1993 14:35 ED
Calcium	71.0	.03	mg/l	EPA 215.1	07-13-1993 14:00 ED
Cations	6.39	----	meq/l	---------	---------- ----- --
Chloride	5.3	.5	mg/l	EPA 325.3	06-29-1993 08:30 LM
Chromium	<0.0003	.0003	mg/l	EPA 218.2	07-21-1993 10:30 ED
Copper	0.050	.03	mg/l	EPA 220.1	07-15-1993 16:25 ED
Fluoride	0.22	.02	mg/l	EPA 340.2	07-06-1993 13:00 LS
Hardness, Total	310	.03	mg/l $CaCO_3$	---------	07-13-1993 14:00 ED
Iron	0.06	.05	mg/l	EPA 236.1	07-12-1993 14:40 ED
Iron, Dissolved	<0.05	.05	mg/l	EPA 236.1	07-16-1993 12:30 ED
Lead	<0.003	.003	mg/l	EPA 239.2	07-07-1993 13:45 ED
Magnesium	32.20	.007	mg/l	EPA 242.1	07-14-1993 16:20 ED
Manganese	<0.03	.03	mg/l	EPA 243.1	07-12-1993 10:00 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	07-09-1993 14:50 ED
Molybdenum	0.20	.2	mg/l	EPA 246.1	07-16-1993 14:35 ED
Nickel	0.09	.08	mg/l	EPA 249.1	07-16-1993 10:50 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

July 22, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 24, 1993

Date received: June 25, 1993

WHR-5 (SBC-15)
Rec'd 0800 hr.
Sampled 1543 hr.

NOTE: Fluoride not distilled.

Analysis report no. 59-13224

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	07-06-1993 08:00 LS
Nitrogen, Nitrate-Nitrite	0.06	.01	mg/l	EPA 353.3	06-30-1993 11:00 LM
Nitrogen, Nitrite	0.00	.004	mg/l	EPA 354.1	06-25-1993 14:00 LM
Oil & Grease	2.5	1	mg/l	EPA 413.1	07-15-1993 10:00 LM
Phosphorus, Total	0.00	.008	mg/l	EPA 365.2	07-06-1993 14:00 LM
Potassium	<0.10	.1	mg/l	EPA 258.1	07-13-1993 18:15 ED
Selenium	0.009	.004	mg/l	EPA 270.2	07-06-1993 12:30 ED
Sodium	4.60	.2	mg/l	EPA 273.1	07-13-1993 16:25 ED
Solids, Total Dissolved	295.0	14	mg/l	EPA 160.1	06-28-1993 09:00 LM
Sulfate	12.0	1	mg/l	EPA 375.4	07-08-1993 13:15 ED
Sulfide	<0.90	.9	mg/l	EPA 376.1	06-30-1993 13:10 ED
Zinc	<0.03	.03	mg/l	EPA 289.1	07-15-1993 16:00 ED
Cation/Anion Balance	5.88	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:WHR-5 (SBC-15)

Kind of sample reported to us: Water

Rec'd 1100 hr.
Sampled 1834 hr.

Sample taken at: Co-op

Sample taken by: Co-op

NOTE: FLUORIDE NOT DISTILLED.

Date sampled: August 15, 1993

Date received: August 16, 1993

Analysis report no. 59-13416

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	337	2	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 1330	LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 1330	LS
Alkalinity, Total	277	2	mg/l	$CaCO_3$	EPA 310.1	08-27-1993 1330	LS
Aluminum	1	.05	mg/l		EPA 200.7	09-15-1993 1616	SE
Anions	8.46	----	meq/l		---------	---------- -----	--
Arsenic	<0.002	.002	mg/l		EPA 206.2	09-21-1993 1015	SM
Barium	0.4	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Boron	<0.05	.01	mg/l		EPA 200.7	09-16-1993 0130	SE
Cadmium	<0.0050	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Calcium	120.0	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Cations	9.25	----	meq/l		---------	---------- -----	--
Chloride	4.7	.5	mg/l		EPA 325.3	09-07-1993 1300	LM
Chromium	<0.0	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Copper	<0.01	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Fluoride	0.33	.02	mg/l		EPA 340.2	08-18-1993 0930	LS
Hardness, Total	452.0	.03	mg/l	$CaCO_3$	---------	09-15-1993 1616	SE
Iron	0.36	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Lead	<0.050	.05	mg/l		EPA 200.7	09-15-1993 1616	SE
Magnesium	37.00	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Manganese	0.02	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Mercury	<0.0040	.0002	mg/l		EPA 245.1	09-21-1993 1000	SM
Molybdenum	<0.1	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Nickel	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	09-07-1993 0805	LS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:WHR-5 (SBC-15)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 15, 1993

Date received: August 16, 1993

Rec'd 1100 hr.
Sampled 1834 hr.

NOTE: FLUORIDE NOT DISTILLED.

Analysis report no. 59-13416

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Nitrogen, Nitrate	0.05	.01	mg/l	EPA 353.3	08-16-1993 0930	LM
Nitrogen, Nitrite	<0.02	.02	mg/l	EPA 354.1	08-16-1993 1400	LM
Oil & Grease	<1	1	mg/l	EPA 413.1	08-16-1993 1400	LM
Phosphorus, Total	<0.010	.008	mg/l	EPA 365.2	08-27-1993 0800	LM
Potassium	0.5	.1	mg/l	EPA 200.7	09-15-1993 1616	SE
Selenium	0.002	.002	mg/l	EPA 270.2	09-20-1993 1900	SM
Sodium	4.7	.1	mg/l	EPA 200.7	09-15-1993 1616	SE
Solids, Total Dissolved	332	14	mg/l	EPA 160.1	08-16-1993 1030	LM
Sulfate	140	1	mg/l	EPA 375.4	09-17-1993 1000	LS
Sulfide	<0.9	.1	mg/l	EPA 376.1	08-20-1993 1515	ED
Zinc	0.01	.005	mg/l	EPA 200.7	09-15-1993 1616	SE
Cation/Anion Balance	4.43	----	%	---------	----------	--

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

December 9, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-5 (SBC-15)

Kind of sample reported to us Water

Rec'd 1000 hr.
Sampled 1521 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Holding time expired when Phosphorous Ortho was run.

Date sampled October 13, 1993

Date received October 14, 1993

Analysis report no. 59-13628

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	308	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Alkalinity, Total	253	2	mg/l	$CaCO_3$	EPA 310.1	10-19-1993 0950	LS
Aluminum	<1	1	mg/l		EPA 202.1	10-28-1993 1630	ED
Anions	5.40	----	meq/l		---------	---------- -----	--
Arsenic	<0.010	.003	mg/l		EPA 206.2	11-22-1993 1115	DW
Boron	0.10	.04	mg/l		EPA 212.3	11-19-1993 1430	LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125	ED
Calcium	64.0	.03	mg/l		EPA 215.1	11-08-1993 1450	ED
Cations	6.30	----	meq/l		---------	---------- -----	--
Chloride	9.0	.5	mg/l		EPA 325.3	11-01-1993 0900	LM
Conductivity	470.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Copper	<0.05	.03	mg/l		EPA 220.1	10-27-1993 1550	ED
Hardness, Total	316.0	.03	mg/l	$CaCO_3$	---------	11-08-1993 1450	ED
Iron	0.12	.05	mg/l		EPA 236.1	11-08-1993 1315	ED
Iron, Dissolved	<0.02	.05	mg/l		EPA 236.1	12-08-1993 0920	ED
Lead	<0.040	.003	mg/l		EPA 239.2	11-05-1993 1000	ED
Magnesium	38.00	.007	mg/l		EPA 242.1	11-08-1993 1630	ED
Manganese	<0.03	.03	mg/l		EPA 243.1	11-08-1993 1100	ED
Manganese, Dissolved	<0.1	.03	mg/l		EPA 243.1	12-08-1993 1010	ED
Molybdenum	0.2	.2	mg/l		EPA 246.1	10-29-1993 1105	ED
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000	LS
Nitrogen, Nitrate	0.18	.01	mg/l		EPA 353.3	10-18-1993 0745	LM
Nitrogen, Nitrite	0.00	.02	mg/l		EPA 354.1	10-14-1993 1600	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

December 9, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-5 (SBC-15)

Kind of sample reported to us Water

Rec'd 1000 hr.
Sampled 1521 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Holding time expired when Phosphorous Ortho was run.

Date sampled October 13, 1993

Date received October 14, 1993

Analysis report no. 59-13628

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorus, Ortho	0.003	.003	mg/l	EPA 365.2	10-16-1993 0950 LM
Potassium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315 ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400 DW
Sodium	<10.0	.2	mg/l	EPA 273.1	11-09-1993 1135 ED
Solids, Total Dissolved	267	14	mg/l	EPA 160.1	10-19-1993 0815 LM
Sulfate	12	1	mg/l	EPA 375.4	11-11-1993 1020 LS
Zinc	<0.03	.03	mg/l	EPA 289.1	10-27-1993 1300 ED
Cation/Anion Balance	7.50	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX (801) 653-2436

June 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-5 (SBC-15)

Rec'd 0945 hr.
Sampled 1258 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled May 30, 1994

Date received May 31, 1994

Analysis report no. 59-14094

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	380	1	mg/l as HCO_3	SM2320-B	06-02-1994 1520	LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-02-1994 1520	LS
Alkalinity, Total	312	1	mg/l as $CaCO_3$	EPA 310.1	06-02-1994 1520	LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-07-1994 1000	DW
Anions	6.60	----	meq/l	---------	---------- -----	--
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	06-08-1994 1130	DW
Boron, Dissolved	0.4	0.1	mg/l	EPA 212.3	06-09-1994 1130	LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-07-1994 0900	DW
Calcium, Dissolved	63	1	mg/l	EPA 215.1	06-06-1994 1400	DW
Cations	6.00	----	meq/l	---------	---------- -----	--
Chloride	3	1	mg/l	SM4500-Cl-B	06-01-1994 1220	LS
Conductivity	556	1	umhos/cm	SM2510-B	05-31-1994 1500	ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-07-1994 0730	DW
Hardness, Total	289	1	mg/l as $CaCO_3$	SM2340-B	06-06-1994 1400	DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-09-1994 1015	DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-06-1994 0830	DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-06-1994 1700	DW
Magnesium, Dissolved	32	1	mg/l	EPA 242.1	06-06-1994 1500	DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-09-1994 1100	DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-06-1994 0715	DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-07-1994 1100	DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-01-1994 1330	ED
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l	EPA 353.3	06-06-1994 1600	LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-01-1994 0715	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Larry Stout CD

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

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 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-5 (SBC-15)

Kind of sample reported to us Water

Rec'd 0945 hr.
Sampled 1258 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled May 30, 1994

Date received May 31, 1994

Analysis report no. 59-14094

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	06-01-1994 0840 LM
Potassium, Dissolved	<2	2	mg/l	EPA 258.1	06-06-1994 1115 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	06-08-1994 0800 DW
Sodium, Dissolved	5	1	mg/l	EPA 273.1	06-06-1994 1230 DW
Solids, Total Dissolved	300	10	mg/l	EPA 160.1	06-03-1994 0800 LM
Sulfate	15	1	mg/l	EPA 375.4	06-07-1994 1230 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-07-1994 0830 DW
Cation/Anion Balance	-5.10	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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September 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-5 (SBC-15)

Kind of sample reported to us Water

Rec'd 1130 hr.
Sampled 1735 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Dissolved metals filtered at Lab.

Date sampled August 29, 1994

Date received August 30, 1994

Analysis report no. 59-14364

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	346	1	mg/l as HCO_3	SM2320-B	08-31-1994 0845 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	08-31-1994 0845 LS
Alkalinity, Total	284	1	mg/l as $CaCO_3$	EPA 310.1	08-31-1994 0845 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	09-08-1994 1530 DW
Anions	6.20	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-02-1994 1100 ED
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-14-1994 1300 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	09-08-1994 1200 DW
Calcium, Dissolved	63	5	mg/l	EPA 215.1	09-09-1994 0930 DW
Cations	5.80	----	meq/l	---------	---------- ----- --
Chloride	2	1	mg/l	SM4500-Cl-B	09-06-1994 0930 LS
Conductivity	530	1	umhos/cm	SM2510-B	08-31-1994 0945 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	09-08-1994 1200 DW
Hardness, Total	289	10	mg/l as $CaCO_3$	SM2340-B	09-09-1994 0930 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	09-13-1994 1030 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-09-1994 1430 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	09-08-1994 1100 DW
Magnesium, Dissolved	32	2	mg/l	EPA 242.1	09-09-1994 1030 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-13-1994 1000 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	09-09-1994 1330 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	09-09-1994 1800 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	09-08-1994 0930 ED
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l	EPA 353.3	09-07-1994 1000 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	08-30-1994 1610 LM

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

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FAX: (801) 653-2436

September 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-5 (SBC-75)

Kind of sample reported to us Water

Rec'd 1130 hr.
Sampled 1735 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Dissolved metals filtered at Lab.

Date sampled August 29, 1994

Date received August 30, 1994

Analysis report no. 59-14364

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.03	0.02	mg/l	SM4500-P-E	08-30-1994 1530	LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	09-09-1994 1300	DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-06-1994 1030	ED
Sodium, Dissolved	<5	5	mg/l	EPA 273.1	09-09-1994 1230	DW
Solids, Total Dissolved	300	10	mg/l	EPA 160.1	08-30-1994 1415	LM
Sulfate	20	1	mg/l	EPA 375.4	09-07-1994 1000	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	09-08-1994 1330	DW
Cation/Anion Balance	-3.10	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hart SD

Manager, Huntington Laboratory

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FAX: (801) 653-2436

November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-5 (SBC-15)

Rec'd 1100 hr.
Sampled 1711 hr.

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 30, 1994

Date received October 31, 1994

Analysis report no. 59-14529

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	290	1	mg/l as HCO_3	SM2320-B	11-01-1994 1545 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	11-01-1994 1545 LS
Alkalinity, Total	237	1	mg/l as $CaCO_3$	EPA 310.1	11-01-1994 1545 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	11-02-1994 1600 DW
Anions	5.30	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-07-1994 1000 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	11-03-1994 1330 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	11-02-1994 1730 DW
Calcium, Dissolved	44	5	mg/l	EPA 215.1	11-01-1994 1500 DW
Cations	5.20	----	meq/l	---------	---------- ----- --
Chloride	5	1	mg/l	SM4500-Cl-B	10-31-1994 1500 LS
Conductivity	472	1	umhos/cm	SM2510-B	11-01-1994 0930 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	11-03-1994 1230 DW
Hardness, Total	240	10	mg/l as $CaCO_3$	SM2340-B	11-01-1994 1500 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	11-02-1994 1700 DW
Magnesium, Dissolved	32	2	mg/l	EPA 242.1	11-02-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 0730 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	11-03-1994 1630 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	11-04-1994 0915 ED
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l	EPA 353.3	11-02-1994 0930 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	11-01-1994 0830 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-5 (SBC-15)

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 30, 1994

Date received October 31, 1994

Rec'd 1100 hr.
Sampled 1711 hr.

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14529

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	11-01-1994 1120 LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	11-02-1994 0900 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-07-1994 1500 DW
Sodium, Dissolved	9	5	mg/l	EPA 273.1	11-02-1994 0830 DW
Solids, Total Dissolved	270	10	mg/l	EPA 160.1	11-01-1994 0830 LS
Sulfate	19	1	mg/l	EPA 375.4	11-07-1994 1050 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	11-03-1994 1300 DW
Cation/Anion Balance	-0.50	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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July 30, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-5 (SBC-15)

Kind of sample reported to us Water

Rec'd 0718 hr.
Sampled 1446 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 24, 1997

Date received June 25, 1997

NOTE:Dissolved metals filtered at lab!

Analysis report no. 59-17368

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	317	5	mg/l as HCO_3	SM2320-B	06-28-1997 1530 RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	06-28-1997 1530 RJ
Alkalinity, Total	283	5	mg/l as $CaCO_3$	EPA 310.1	06-28-1997 1530 RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	07-29-1997 1315 MK
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-18-1997 0800 MK
Boron, Dissolved	<0.1	0.1	mg/l	EPA 212.3	07-16-1997 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	07-29-1997 0900 MK
Calcium, Dissolved	56	1	mg/l	EPA 215.1	07-29-1997 1215 MK
Chloride	3	1	mg/l	SM4500-Cl-B	07-02-1997 1240 RJ
Conductivity	517	1	umhos/cm	SM2510-B	06-30-1997 0455 RJ
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	07-29-1997 0800 MK
Hardness, Total	255	----	mg/l as $CaCO_3$	SM2340-B	07-29-1997 1600 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	07-29-1997 1000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-29-1997 1000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	07-29-1997 0910 MK
Magnesium, Dissolved	28	1	mg/l	EPA 242.1	07-29-1997 1230 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-29-1997 1015 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	07-29-1997 1015 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	07-29-1997 1500 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-21-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	07-17-1997 0500 AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	06-25-1997 1330 JC
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	06-25-1997 1030 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	07-29-1997 1115 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

July 30, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-5 (SBC-15)

Kind of sample reported to us: Water

Rec'd 0718 hr.
Sampled 1446 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 24, 1997

Date received: June 25, 1997

NOTE:Dissolved metals filtered at lab!

Analysis report no. 59-17368

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
[illegible]. Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-18-1997 1130 MK
[illegible] Dissolved	4	1	mg/l	EPA 273.1	07-29-1997 1130 MK
[illegible]. Total Dissolved	290	10	mg/l	EPA 160.1	06-26-1997 0700 JC
Sulfate	15	5	mg/l	EPA 375.4	07-11-1997 1000 SC
[illegible]. Dissolved	0.01	0.01	mg/l	EPA 289.1	07-29-1997 0815 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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October 14, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-5 (SBC-15)

Kind of sample reported to us Water

Rec'd 1030 hr.
Sampled 1537 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled September 10, 1997

Date received September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17754

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	359	5	mg/l as HCO_3	SM2320-B	09-19-1997 1430 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	09-19-1997 1430 SC
Alkalinity, Total	294	5	mg/l as $CaCO_3$	EPA 310.1	09-19-1997 1430 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	09-27-1997 0245 MK
Anions	6.3	----	meq/l	---------	10-08-1997 0900 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-27-1997 1900 MK
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-29-1997 1500 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	09-26-1997 2300 MK
Calcium, Dissolved	65	1	mg/l	EPA 215.1	09-27-1997 0145 MK
Cations	6.0	----	meq/l	---------	10-08-1997 0900 RJ
Chloride	4	1	mg/l	SM4500-Cl-B	10-02-1997 1215 SC
Conductivity	542	1	umhos/cm	SM2510-B	09-22-1997 1140 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	09-26-1997 2200 MK
Hardness, Total	290	----	mg/l as $CaCO_3$	SM2340-B	10-08-1997 0900 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-27-1997 0000 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	09-26-1997 2315 MK
Magnesium, Dissolved	31	1	mg/l	EPA 242.1	09-27-1997 0200 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	09-27-1997 0030 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	09-27-1997 0330 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-07-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	09-22-1997 0730 RJ
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-12-1997 0700 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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October 14, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-5 (SBC-15)

Kind of sample reported to us: Water

Rec'd 1030 hr.
Sampled 1537 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 10, 1997

Date received: September 11, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17754

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	09-11-1997 1315 RJ
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	09-27-1997 0045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-28-1997 1430 MK
Sodium, Dissolved	4	1	mg/l	EPA 273.1	09-27-1997 0115 MK
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	09-15-1997 0700 JC
Sulfate	13	5	mg/l	EPA 375.4	10-06-1997 1400 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	09-26-1997 2215 MK
Cation/Anion Balance	-2.4	----	%		10-08-1997 0900 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

COMMERCIAL TESTING & ENGINEERING CO.

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

December 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: WHR-5 (SBC-15)

Rec'd 1100 hr.
Sampled 1200 hr.

FIELD MEASUREMENTS

pH	8.21
Flow	1
Conductivity	553
Temperature	54°

NOTE: DISSOLVED METALS FILTERED AT LAB

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 20, 1997

Date received October 21, 1997

Analysis report no. 59-17981

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	364	5	mg/l as HCO_3	SM2320-B	10-23-1997 2240	RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	10-23-1997 2240	RJ
Alkalinity, Total	298	5	mg/l as $CaCO_3$	EPA 310.1	10-23-1997 2240	RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	12-02-1997 0145	MK
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-24-1997 1645	MK
Boron, Dissolved	0.2	0.1	mg/l	EPA 212.3	10-30-1997 1300	MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	12-01-1997 2145	MK
Calcium, Dissolved	55	1	mg/l	EPA 215.1	12-02-1997 0100	MK
Chloride	5	1	mg/l	SM4500-Cl-B	11-04-1997 1000	SC
Conductivity	536	1	umhos/cm	SM2510-B	10-21-1997 1500	SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	12-01-1997 2100	MK
Hardness, Total	265	----	mg/l as $CaCO_3$	SM2340-B	11-03-1997 1000	RJ
Iron, Total	0.3	0.1	mg/l	EPA 236.1	12-01-1997 2245	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-01-1997 2245	MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	12-01-1997 2200	MK
Magnesium, Dissolved	31	1	mg/l	EPA 242.1	12-02-1997 0115	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-01-1997 2300	MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	12-01-1997 2300	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	12-02-1997 0245	MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-27-1997 1110	RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	11-14-1997 1500	JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	10-22-1997 0700	JC
Phosphorous, Total	<0.05	0.05	mg/l as P	SM4500-P-B,E	11-05-1997 1745	MK
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	12-01-1997 2345	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

December 9, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID: WHR-5 (SBC-15)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: October 20, 1997

Date received: October 21, 1997

Rec'd 1100 hr.
Sampled 1200 hr.

FIELD MEASUREMENTS

pH	8.21
Flow	1
Conductivity	553
Temperature	54°

NOTE: DISSOLVED METALS FILTERED AT LAB

Analysis report no. 59-17981

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-24-1997 2030 MK
Sodium, Dissolved	4	1	mg/l	EPA 273.1	12-02-1997 2030 MK
Solids, Total Dissolved	300	10	mg/l	EPA 160.1	10-27-1997 0700 JC
Sulfate	13	5	mg/l	EPA 375.4	10-29-1997 0900 SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	12-01-1997 2115 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Huntington Laboratory

MEMBER ACIL

WATER MONITORING RE

Property: Co-op
Station: WHR-6 (SBC-14)
Location: Bear Canyon, Right Fork, Right Fork
Type: Spring

Field Measurements	Date Sampled										
	10/26/93	03/23/94	06/01/94	08/28/94	10/26/94	03/23/95	05/24/95	08/22/95	06/24/97	09/18/97	10/28/97
Sampled by:	MEC	MEC	MEC	MEC	MEC	MEC	MEC	MEC	Co-Op	Co-Op	Co-Op
Flow (gpm)	2	3.5	1.5	0.5	15	Inaccess	6	4	2	5	3
pH	7.46	7.34	7.58	7.89	7.22	N/A	7.71	7.58	8.07	7.52	7.53
Sp. Cond. (ohms)	2690	2370	2480	2670	2320	N/A	2280	2570	2110	2190	2040
Temp (C)	7.5	4.7	6.3	10.8	9.8	N/A	7.8	11	16.1	10.6	8.9
Lab Measurements											
Analyzed by:	CT&E	CT&E	CT&E	CT&E	CT&E	N/A	CT&E	CT&E	CT&E	CT&E	CT&E
TDS (mg/L)	1908	1500	1530	2050	1840		1720	1840	1880	1870	1690
Hardness (CaCO3)	1367	1061	1210	1397	1280		1280	1321	1245	1170	1164
Aluminum (Al)	N/D	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Arsenic (As)	N/D	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Boron (B)	0.4	0.3	0.9	0.5	0.3		0.4	0.5	0.4	0.6	0.6
Carbonate (CO3)	N/D	N/D	N/D	N/D	N/D		10	5	N/D	N/D	N/D
Bicarbonate (HCO3)	496	506	561	533	630		520	573	558	616	598
Cadmium (Cd)	N/D	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Calcium (Ca)	160	120	135	172	146		132	138	149	142	138
Chloride (Cl)	42	66	31	37	37		40	40	27.5	53	35
Copper (Cu)	N/D	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Iron (Fe) Total	0.23	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Iron (Fe) Dissolved	N/D	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Lead (Pb)	N/D	0.2	N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Magnesium (Mg)	235	185	212	235	223		230	237	212	198	199
Manganese (Mn) tot.	0.04	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Manganese (Mn) dis.	N/D	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Molybdenum (Mo)	0.2	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Nitrogen (NH3)	N/D	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Nitrite (NO2)	N/D	N/D	N/D	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Nitrate (NO3)	0.9	0.7	0.7	1.9	0.9		0.1	0.8	1.1	0.9	0.8
Potassium (K)	22	13	14	21	18		14	14	15	15	14
Phosphate (PO4)	0.004	N/D	N/D	0.02	N/D		N/D	0.01	0.03	0.02	0.01
Selenium (Se)	N/D	N/D	0.01	N/D	N/D		N/D	N/D	N/D	N/D	N/D
Sodium (Na)	68	44	50	61	56		47	56	52	51	50
Sp. Conductivity	2430	1982	2080	2480	2320		2130	2330	2180	2200	2110
Sulfate (SO4)	750	850	800	990	1000		850	1046	873	930	263
Zinc (Z)	N/D	N/D	N/D	N/D	N/D		N/D	N/D	0.03	0.02	N/D
Anions	26.7	27.9	26.7	30.8	32.3		27.7	32.5	28.4	31	16.3
Cations	30.3	23.1	26.4	30.6	28.1		27.6	28.8	27.5	26	25.8
Anion/Cation Balance	6.30%	-9.30%	0.70%	-0.40%	-6.90%		-0.20%	-5.90%	-1.60%	-8.70%	22.70%

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

December 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6A (CSBC-14)

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 26, 1993

Date received October 26, 1993

Rec'd 1700 hr.
Sampled 1056 hr.

NOTE: Holding time expired when Sulfate was run.

Analysis report no. 59-13673

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	496	2	mg/l	$CaCO_3$	EPA 310.1	11-01-1993 1212 LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	11-01-1993 1212 LS
Alkalinity, Total	496	2	mg/l	$CaCO_3$	EPA 310.1	11-01-1993 1212 LS
Aluminum	<2	1	mg/l		EPA 202.1	12-06-1993 1500 DW
Anions	26.70	----	meq/l		---------	---------- ----- --
Arsenic	<0.010	.003	mg/l		EPA 206.2	11-23-1993 1115 DW
Boron	0.40	.04	mg/l		EPA 212.3	12-09-1993 1530 LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125 ED
Calcium	160.0	.03	mg/l		EPA 215.1	12-13-1993 1500 DW
Cations	30.30	----	meq/l		---------	---------- ----- --
Chloride	42.0	.5	mg/l		EPA 325.3	11-22-1993 0930 LM
Conductivity	2430.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945 ED
Copper	<0.20	.03	mg/l		EPA 220.1	11-09-1993 1520 ED
Hardness, Total	1367.0	.03	mg/l	$CaCO_3$	---------	12-13-1993 1500 DW
Iron	0.23	.05	mg/l		EPA 236.1	11-08-1993 1315 ED
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-08-1993 0920 ED
Lead	<0.400	.003	mg/l		EPA 239.2	11-05-1993 1000 ED
Magnesium	235.00	.007	mg/l		EPA 242.1	12-14-1993 1100 ED
Manganese	0.04	.03	mg/l		EPA 243.1	11-08-1993 1100 ED
Manganese, Dissolved	<0.1	.03	mg/l		EPA 243.1	12-08-1993 1010 ED
Molybdenum	0.2	.2	mg/l		EPA 246.1	12-06-1993 1620 DW
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000 LS
Nitrogen, Nitrate	0.90	.01	mg/l		EPA 353.3	11-03-1993 1000 LM
Nitrogen, Nitrite	0.00	.02	mg/l		EPA 354.1	10-27-1993 1100 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

December 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6A (SBC-14)

Kind of sample reported to us Water

Rec'd 1700 hr.
Sampled 1056 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Holding time expired when Sulfate was run.

Date sampled October 26, 1993

Date received October 26, 1993

Analysis report no. 59-13673

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorus, Ortho	0.004	.003	mg/l	EPA 365.2	10-27-1993 1130	LM
Potassium	22.0	.1	mg/l	EPA 258.1	11-09-1993 1315	ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400	DW
Sodium	68.0	.2	mg/l	EPA 273.1	11-09-1993 1135	ED
Solids, Total Dissolved	1908	14	mg/l	EPA 160.1	10-29-1993 0730	LM
Sulfate	750	1	mg/l	EPA 375.4	12-01-1993 0830	LS
Zinc	<0.02	.03	mg/l	EPA 289.1	12-06-1993 1500	DW
Cation/Anion Balance	6.30	----	%	---------	---------- -----	--

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

April 8, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (SBC-14)

Kind of sample reported to us Water

Rec'd 1300 hr.
Sampled 1650 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled March 23, 1994

Date received March 24, 1994

Analysis report no. 59-13950

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	506	1	mg/l as HCO_3	SM4500-CO_2-D	03-28-1994 0900 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM4500-CO_2-D	03-28-1994 0900 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	04-04-1994 1600 DW
Anions	27.90	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	04-07-1994 1300 DW
Boron, Dissolved	0.3	0.1	mg/l	EPA 212.3	04-08-1994 1045 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	04-06-1994 1045 DW
Calcium, Dissolved	120	1	mg/l	EPA 215.1	04-05-1994 1330 DW
Cations	23.10	----	meq/l	---------	---------- ----- --
Chloride	66	1	mg/l	SM4500-Cl-B	03-30-1994 0830 LS
Conductivity	1982	1	umhos/cm	SM2510-B	03-29-1994 0930 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	04-06-1994 1130 DW
Hardness, Total	1061	1	mg/l as $CaCO_3$	SM2340-B	04-05-1994 1330 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	03-31-1994 1230 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	04-04-1994 0930 DW
Lead, Dissolved	0.2	0.2	mg/l	EPA 239.1	04-06-1994 0900 DW
Magnesium, Dissolved	185	1	mg/l	EPA 242.1	04-05-1994 0900 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-04-1994 1000 DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	04-04-1994 1015 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	04-06-1994 0730 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	04-07-1994 1000 ED
Nitrogen, Nitrate-Nitrite	0.7	0.1	mg/l	EPA 353.3	03-24-1994 1400 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	03-24-1994 1545 LM
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	03-25-1994 1115 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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April 8, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (SBC-14)

Rec'd 1300 hr.
Sampled 1650 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled March 23, 1994

Date received March 24, 1994

Analysis report no. 59-13950

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Potassium, Dissolved	13	2	mg/l	EPA 258.1	04-04-1994 1200 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	04-07-1994 1030 DW
Sodium, Dissolved	44	1	mg/l	EPA 273.1	04-04-1994 1400 DW
Solids, Total Dissolved	1500	10	mg/l	EPA 160.1	03-25-1994 1320 LM
Sulfate	850	1	mg/l	EPA 375.4	04-07-1994 1030 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	04-06-1994 1300 DW
Cation/Anion Balance	-9.30	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

June 14, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (SBC-14)

Kind of sample reported to us Water

Rec'd 1250 hr.
Sampled 0933 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 1, 1994

Date received June 1, 1994

NOTE: Possible matrix intererence with Chloride.

Analysis report no. 59-14108

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	561	1	mg/l as HCO_3	SM2320-B	06-07-1994 1500 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-07-1994 1500 LS
Alkalinity, Total	460	1	mg/l as $CaCO_3$	EPA 310.1	06-07-1994 1500 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-07-1994 1000 DW
Anions	26.70	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	06-08-1994 1130 DW
Boron, Dissolved	0.9	0.1	mg/l	EPA 212.3	06-09-1994 1130 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-07-1994 0900 DW
Calcium, Dissolved	135	1	mg/l	EPA 215.1	06-06-1994 1400 DW
Cations	26.40	----	meq/l	---------	---------- ----- --
Chloride	31	1	mg/l	SM4500-Cl-B	06-01-1994 1220 LS
Conductivity	2080	1	umhos/cm	SM2510-B	06-02-1994 1500 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-07-1994 0730 DW
Hardness, Total	1210	1	mg/l as $CaCO_3$	SM2340-B	06-06-1994 1400 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-09-1994 1015 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-06-1994 0830 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-06-1994 1700 DW
Magnesium, Dissolved	212	1	mg/l	EPA 242.1	06-06-1994 1500 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-09-1994 1100 DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-06-1994 0715 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-07-1994 1100 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-01-1994 1330 ED
Nitrogen, Nitrate-Nitrite	0.7	0.1	mg/l	EPA 353.3	06-02-1994 0800 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-02-1994 1005 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout SD

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

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

June 14, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (SBC-14)

Rec'd 1250 hr.
Sampled 0933 hr.

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled June 1, 1994

Date received June 1, 1994

NOTE: Possible matrix intererence with Chloride.

Analysis report no. 59-14108

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	06-01-1994 1345	LM
Potassium, Dissolved	14	2	mg/l	EPA 258.1	06-06-1994 1115	DW
Selenium, Dissolved	0.01	0.01	mg/l	EPA 270.2	06-08-1994 0800	DW
Sodium, Dissolved	50	1	mg/l	EPA 273.1	06-06-1994 1230	DW
Solids, Total Dissolved	1530	10	mg/l	EPA 160.1	06-07-1994 0815	LM
Sulfate	800	1	mg/l	EPA 375.4	06-08-1994 1330	LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	06-07-1994 0830	DW
Cation/Anion Balance	0.70	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hart CD

Manager, Huntington Laboratory

Original Watermarked For Your Protection

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FAX (801) 653-2436

September 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6A (SBC-14)

Kind of sample reported to us Water

Rec'd 1450 hr.
Sampled 1948 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Dissolved metals filtered at Lab.

Date sampled August 28, 1994

Date received August 29, 1994

Analysis report no. 59-14359

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	533	1	mg/l as HCO_3	SM2320-B	08-31-1994 0845 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	08-31-1994 0845 LS
Alkalinity, Total	459	1	mg/l as $CaCO_3$	EPA 310.1	08-31-1994 0845 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	09-08-1994 1530 DW
Anions	30.80	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-02-1994 1100 ED
Boron, Dissolved	0.5	0.1	mg/l	EPA 212.3	09-14-1994 1300 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	09-08-1994 1200 DW
Calcium, Dissolved	172	5	mg/l	EPA 215.1	09-09-1994 0930 DW
Cations	30.60	----	meq/l	---------	---------- ----- --
Chloride	37	1	mg/l	SM4500-Cl-B	09-06-1994 0930 LS
Conductivity	2480	1	umhos/cm	SM2510-B	08-31-1994 0945 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	09-08-1994 1200 DW
Hardness, Total	1397	10	mg/l as $CaCO_3$	SM2340-B	09-09-1994 0930 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	09-01-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-09-1994 1430 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	09-08-1994 1100 DW
Magnesium, Dissolved	235	2	mg/l	EPA 242.1	09-09-1994 1030 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-01-1994 1400 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	09-09-1994 1330 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	09-09-1994 1800 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	09-08-1994 0930 ED
Nitrogen, Nitrate-Nitrite	1.9	0.1	mg/l	EPA 353.3	09-07-1994 1000 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	08-30-1994 1610 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hunt CO

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6A (SBC-14)

Kind of sample reported to us Water

Rec'd 1450 hr.
Sampled 1948 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Dissolved metals filtered at Lab.

Date sampled August 28, 1994

Date received August 29, 1994

Analysis report no. 59-14359

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.02	0.02	mg/l	SM4500-P-E	08-30-1994 1530 LM
Potassium, Dissolved	21	5	mg/l	EPA 258.1	09-09-1994 1300 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-06-1994 1030 ED
Sodium, Dissolved	61	5	mg/l	EPA 273.1	09-09-1994 1230 DW
Solids, Total Dissolved	2050	10	mg/l	EPA 160.1	08-30-1994 1415 LM
Sulfate	990	1	mg/l	EPA 375.4	09-13-1994 0900 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	09-08-1994 1330 DW
Cation/Anion Balance	-0.40	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jerry Stout CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX (801) 653-2436

November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (SBC-14)

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 26, 1994

Date received October 27, 1994

Rec'd 1630 hr.
Sampled 1745 hr.

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

Analysis report no. 59-14520

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	630	1	mg/l as HCO_3	SM2320-B	10-31-1994 0810 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	10-31-1994 0810 LS
Alkalinity, Total	520	1	mg/l as $CaCO_3$	EPA 310.1	10-31-1994 0810 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	11-02-1994 1600 DW
Anions	32.30	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	10-31-1994 1530 DW
Boron, Dissolved	0.3	0.1	mg/l	EPA 212.3	11-03-1994 1330 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	11-02-1994 1730 DW
Calcium, Dissolved	146	5	mg/l	EPA 215.1	11-01-1994 1500 DW
Cations	28.10	----	meq/l	---------	---------- ----- --
Chloride	37	1	mg/l	SM4500-Cl-B	10-31-1994 0800 LS
Conductivity	2320	1	umhos/cm	SM2510-B	11-01-1994 0930 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	11-03-1994 1230 DW
Hardness, Total	1280	10	mg/l as $CaCO_3$	SM2340-B	11-01-1994 1500 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	11-02-1994 1700 DW
Magnesium, Dissolved	223	2	mg/l	EPA 242.1	11-02-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	10-31-1994 1730 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	11-04-1994 0915 ED
Nitrogen, Nitrate-Nitrite	0.9	0.1	mg/l	EPA 353.3	11-02-1994 0930 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	10-28-1994 0730 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (SBC-14)

Kind of sample reported to us Water

Rec'd 1630 hr.
Sampled 1745 hr.

Sample taken at Co-op

Sample taken by Co-op

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

Date sampled October 26, 1994

Date received October 27, 1994

Analysis report no. 59-14520

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	10-28-1994 0930 LM
Potassium, Dissolved	18	5	mg/l	EPA 258.1	11-02-1994 0900 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	10-31-1994 1400 DW
Sodium, Dissolved	56	5	mg/l	EPA 273.1	11-02-1994 0830 DW
Solids, Total Dissolved	1840	10	mg/l	EPA 160.1	11-01-1994 0830 LS
Sulfate	1000	1	mg/l	EPA 375.4	11-02-1994 1000 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	11-03-1994 1300 DW
Cation/Anion Balance	-6.90	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

June 26, 1995

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (SBC-14)

Rec'd 1400 hr.
Sampled 0820 hr.

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

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled May 23, 1995

Date received May 24, 1995

Analysis report no. 59-14982

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	520	5	mg/l as HCO_3	SM2320-B	05-30-1995 0800 SW
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	05-30-1995 0800 SW
Alkalinity, Total	440	5	mg/l as $CaCO_3$	EPA 310.1	05-30-1995 0800 SW
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	06-06-1995 1620 ED
Anions	27.70	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	05-31-1995 1325 LM
Boron, Dissolved	0.4	0.1	mg/l	EPA 212.3	06-13-1995 1330 LM
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	06-06-1995 1515 ED
Calcium, Dissolved	132	1	mg/l	EPA 215.1	06-05-1995 0930 ED
Cations	27.60	----	meq/l	---------	---------- ----- --
Chloride	40	1	mg/l	SM4500-Cl-B	06-05-1995 0730 SW
Conductivity	2130	1	umhos/cm	SM2510-B	06-01-1995 0800 SW
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	06-05-1995 1413 LM
Hardness, Total	1280	10	mg/l as $CaCO_3$	SM2340-B	06-05-1995 0930 ED
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	05-29-1995 1612 LM
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	06-02-1995 1430 ED
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	06-05-1995 1056 LM
Magnesium, Dissolved	230	1	mg/l	EPA 242.1	06-02-1995 1615 ED
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	05-30-1995 1341 LM
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-02-1995 1515 ED
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	05-30-1995 1630 ED
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	06-06-1995 1030 ED
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l as N	EPA 353.3	05-26-1995 1530 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	05-25-1995 0800 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

June 26, 1995

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (SBC-14)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: May 23, 1995

Date received: May 24, 1995

Rec'd 1400 hr.
Sampled 0820 hr.

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

Analysis report no. 59-14982

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	<0.01	0.01	mg/l as P	SM4500-P-E	05-25-1995 1530	LM
Potassium, Dissolved	14	1	mg/l	EPA 258.1	06-02-1995 1545	ED
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	06-01-1995 1140	LM
Sodium, Dissolved	47	1	mg/l	EPA 273.1	06-05-1995 1000	ED
Solids, Total Dissolved	1720	10	mg/l	EPA 160.1	05-31-1995 1215	JC
Sulfate	850	1	mg/l	EPA 375.4	06-02-1995 0930	SW
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	06-06-1995 1430	ED
Cation/Anion Balance	-0.20	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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FAX: (801) 653-2436

September 7, 1995

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (SBC-14)

Kind of sample reported to us Water

Rec'd 1100 hr.
Sampled 1506 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled August 22, 1995

Date received August 23, 1995

NOTE: Sample temperature above 6.0°C when received. Dissolved metals filtered at Lab.

Analysis report no. 59-15276

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	573	5	mg/l as HCO_3	SM2320-B	08-24-1995 1100 SW
Alkalinity, Carbonate	5	5	mg/l as CO_3	SM2320-B	08-24-1995 1100 SW
Alkalinity, Total	478	5	mg/l as $CaCO_3$	EPA 310.1	08-24-1995 1100 SW
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	08-29-1995 1215 MK
Anions	32.5	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	08-26-1995 1045 MK
Boron, Dissolved	0.5	0.1	mg/l	EPA 212.3	09-01-1995 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	08-30-1995 0830 MK
Calcium, Dissolved	138	1	mg/l	EPA 215.1	08-25-1995 1400 MK
Cations	28.8	----	meq/l	---------	---------- ----- --
Chloride	40	1	mg/l	SM4500-Cl-B	08-25-1995 0900 SW
Conductivity	2330	1	umhos/cm	SM2510-B	08-25-1995 1545 SW
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	08-30-1995 0745 MK
Hardness, Total	1321	10	mg/l as $CaCO_3$	SM2340-B	08-25-1995 1400 MK
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	08-25-1995 0815 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	08-25-1995 0815 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	08-30-1995 0900 MK
Magnesium, Dissolved	237	1	mg/l	EPA 242.1	08-25-1995 1515 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	08-25-1995 1015 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	08-25-1995 1015 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	08-29-1995 1330 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	09-05-1995 1030 SW
Nitrogen, Nitrate-Nitrite	0.8	0.1	mg/l as N	EPA 353.3	08-31-1995 1700 MK
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	08-24-1995 0715 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stow

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 7, 1995

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (SBC-14)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 22, 1995

Date received: August 23, 1995

Rec'd 1100 hr.
Sampled 1506 hr.

NOTE: Sample temperature above 6.0°C when received. Dissolved metals filtered at Lab.

Analysis report no. 59-15276

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.01	0.01	mg/l as P	SM4500-P-E	08-24-1995 0900 JC
Potassium, Dissolved	14	1	mg/l	EPA 258.1	08-25-1995 1130 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	08-26-1995 0815 MK
Sodium, Dissolved	56	1	mg/l	EPA 273.1	08-25-1995 1245 MK
Solids, Total Dissolved	1840	10	mg/l	EPA 160.1	08-24-1995 1200 JC
Sulfate	1046	1	mg/l	EPA 375.4	08-28-1995 0830 SW
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	08-30-1995 0800 MK
Cation/Anion Balance	-5.9	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

August 5, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

CO-OP
WHR-6 (SBC-14)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 23, 1997

Date received: June 24, 1997

Rec'd 1350 hr.
Sampled 1540 hr.

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17359

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	558	5	mg/l as HCO_3	SM2320-B	06-28-1997 1330	RJ
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	06-28-1997 1330	RJ
Alkalinity, Total	458	5	mg/l as $CaCO_3$	EPA 310.1	06-28-1997 1330	RJ
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	07-29-1997 1315	MK
Anions	28.4	----	meq/l	---------	08-04-1997 1000	RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	07-18-1997 0800	MK
Boron, Dissolved	0.4	0.1	mg/l	EPA 212.3	07-16-1997 0700	MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	07-29-1997 0900	MK
Calcium, Dissolved	149	1	mg/l	EPA 215.1	07-29-1997 1215	MK
Cations	27.5	----	meq/l	---------	08-04-1997 1000	RJ
Chloride	40	1	mg/l	SM4500-Cl-B	07-02-1997 1240	RJ
Conductivity	2180	1	umhos/cm	SM2510-B	06-30-1997 0455	RJ
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	07-29-1997 0800	MK
Hardness, Total	1245	----	mg/l as $CaCO_3$	SM2340-B	08-04-1997 1000	RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	07-29-1997 1000	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-29-1997 1000	MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	07-29-1997 0910	MK
Magnesium, Dissolved	212	5	mg/l	EPA 242.1	07-29-1997 1230	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-29-1997 1015	MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	07-29-1997 1015	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	07-29-1997 1500	MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-16-1997 1000	RJ
Nitrogen, Nitrate-Nitrite	1.1	0.1	mg/l as N	EPA 353.3	07-16-1997 0500	AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	06-25-1997 1330	JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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

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

August 5, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

CO-OP
WHR-6 (SBC-14)

Kind of sample reported to us: Water

Rec'd 1350 hr.
Sampled 1540 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: June 23, 1997

Date received: June 24, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17359

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	06-25-1997 1030 RJ
Potassium, Dissolved	15	1	mg/l	EPA 258.1	07-29-1997 1115 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-18-1997 1130 MK
Sodium, Dissolved	52	1	mg/l	EPA 273.1	07-29-1997 1130 MK
Solids, Total Dissolved	1880	10	mg/l	EPA 160.1	06-26-1997 0700 JC
Sulfate	873	500	mg/l	EPA 375.4	07-11-1997 1000 SC
Zinc, Dissolved	0.03	0.01	mg/l	EPA 289.1	07-29-1997 0815 MK
Cation/Anion Balance	-1.6	----	%		08-04-1997 1000 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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

October 14, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (SBC-14)

Kind of sample reported to us: Water

Rec'd 1100 hr.
Sampled 0915 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 18, 1997

Date received: September 18, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17800

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	616	5	mg/l as HCO_3	SM2320-B	09-30-1997 1000 SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	09-30-1997 1000 SC
Alkalinity, Total	505	5	mg/l as $CaCO_3$	EPA 310.1	09-30-1997 1000 SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	10-01-1997 2345 MK
Anions	31.0	----	meq/l	---------	10-13-1997 1430 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	10-02-1997 0230 MK
Boron, Dissolved	0.6	0.1	mg/l	EPA 212.3	09-29-1997 1500 MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	10-01-1997 1900 MK
Calcium, Dissolved	142	1	mg/l	EPA 215.1	10-01-1997 2245 MK
Cations	26.0	----	meq/l	---------	10-13-1997 1430 RJ
Chloride	53	1	mg/l	SM4500-Cl-B	10-13-1997 1330 SC
Conductivity	2200	1	umhos/cm	SM2510-B	09-22-1997 1400 SC
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	10-01-1997 1800 MK
Hardness, Total	1170	----	mg/l as $CaCO_3$	SM2340-B	10-13-1997 1430 RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	10-01-1997 1945 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	10-01-1997 1945 MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	10-01-1997 1915 MK
Magnesium, Dissolved	198	5	mg/l	EPA 242.1	10-01-1997 2300 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	10-01-1997 2015 MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	10-01-1997 2015 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	10-01-1997 1700 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-07-1997 1000 RJ
Nitrogen, Nitrate-Nitrite	0.9	0.1	mg/l as N	EPA 353.3	10-09-1997 0700 JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-18-1997 1300 JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

COMMERCIAL TESTING & ENGINEERING CO.

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

October 14, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (SBC-14)

Kind of sample reported to us: Water

Rec'd 1100 hr.
Sampled 0915 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: September 18, 1997

Date received: September 18, 1997

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17800

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	09-19-1997 0815 RJ
Potassium, Dissolved	15	1	mg/l	EPA 258.1	10-01-1997 2045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	10-03-1997 0145 MK
Sodium, Dissolved	51	1	mg/l	EPA 273.1	10-01-1997 2115 MK
Solids, Total Dissolved	1870	10	mg/l	EPA 160.1	09-22-1997 0700 JC
Sulfate	930	250	mg/l	EPA 375.4	10-07-1997 1035 SC
Zinc, Dissolved	0.02	0.01	mg/l	EPA 289.1	10-01-1997 1815 MK
Cation/Anion Balance	−8.7	----	%		10-13-1997 1430 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
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HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

December 17, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (SBC-14)

Kind of sample reported to us **Water**

Rec'd 1200 hr.
Sampled 1545

Sample taken at Co-op

Sample taken by Co-op

Date sampled October 28, 1997

Date received October 29, 1997

NOTE: Dissolved metals filtered at lab
NOTE: Charge balance >10

Analysis report no. 59-18024

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	598	5	mg/l as HCO_3	SM2320-B	11-03-1997 1330	SC
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	11-03-1997 1330	SC
Alkalinity, Total	490	5	mg/l as $CaCO_3$	EPA 310.1	11-03-1997 1330	SC
Aluminum, Dissolved	<1	1	mg/l	EPA 202.1	12-04-1997 0230	MK
Anions	16.3	----	meq/l	---------	12-15-1997 1200	RJ
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	11-25-1997 1500	MK
Boron, Dissolved	0.6	0.1	mg/l	EPA 212.3	11-11-1997 1700	MK
Cadmium, Dissolved	<0.01	0.01	mg/l	EPA 213.1	12-03-1997 2230	MK
Calcium, Dissolved	138	1	mg/l	EPA 215.1	12-04-1997 0115	MK
Cations	25.8	----	meq/l	---------	12-15-1997 1200	RJ
Chloride	35	1	mg/l	SM4500-Cl-B	11-04-1997 1400	SC
Conductivity	2110	1	umhos/cm	SM2510-B	10-30-1997 2115	MK
Copper, Dissolved	<0.1	0.1	mg/l	EPA 220.1	12-03-1997 2145	MK
Hardness, Total	1164	----	mg/l as $CaCO_3$	SM2340-B	12-15-1997 1200	RJ
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	12-03-1997 2330	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-03-1997 2330	MK
Lead, Dissolved	<0.1	0.1	mg/l	EPA 239.1	12-03-1997 2245	MK
Magnesium, Dissolved	199	5	mg/l	EPA 242.1	12-04-1997 0145	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-03-1997 2345	MK
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	12-03-1997 2345	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l	EPA 246.1	12-04-1997 0315	MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	11-14-1997 1000	SC
Nitrogen, Nitrate-Nitrite	0.8	0.1	mg/l as N	EPA 353.3	11-17-1997 0700	JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	10-30-1997 0700	JC

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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

December 17, 1997

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

WHR-6 (BC-14)

Kind of sample **Water**
Reported to us

Sample taken at **Co-op**

Sample taken by **Co-op**

Date sampled **October 28, 1997**

Date received October 29, 1997

Rec'd 1200 hr.
Sampled 1545

NOTE: Dissolved metals filtered at lab
NOTE: Charge balance >10

Analysis report no. 59-18024

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	0.01	0.01	mg/l as P	SM4500-P-E	10-30-1997 0700	JC
Potassium, Dissolved	14	1	mg/l	EPA 258.1	12-04-1997 0016	MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	11-25-1997 1900	MK
Sodium, Dissolved	50	1	mg/l	EPA 273.1	12-04-1997 0030	MK
Solids, Total Dissolved	1690	10	mg/l	EPA 160.1	11-04-1997 0900	RJ
Sulfate	263	1	mg/l	EPA 375.4	11-12-1997 1300	SC
Zinc, Dissolved	<0.01	0.01	mg/l	EPA 289.1	12-03-1997 2200	MK
Cation/Anion Balance	22.7	----	%		12-15-1997 1200	RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

LOS ANGELES DEPARTMENT OF WATER AND POWER
MOHRLAND PROPERTY
SEEP AND SPRING DATA
JUNE 1994

SEEP/SPRING Number	PH (units)	CONDUCTIVITY (umhos/cm @ 25 deg C)	FLOW RATE (gpm)	TEMPERATURE (deg C)
16-7-1-6	7.44	325	2	4.5
16-7-12-6	7.76	320	1	5
16-7-13-1 (SBC-12)	8.08	250	3	7
16-8-5-1	7.61	350	2	5
16-8-6-1	7.79	300	5	6
16-8-7-3	7.58	310	2	3
16-8-8-5	7.68	425	8	7
16-8-8-10	7.17	1050	745	13
16-8-18-4	7.45	350	0.5	7
16-8-18-5	7.69	325	12	5
16-8-20-1	7.95	550	4	8

SURFACE WATER Number				
CK-1	7.65	755	708	18
CK-2	7.55	850	4	10
LF-1 (FC-1)	7.46	1250	45	12
RF-1	7.4	1200	50	12

LOS ANGELES DEPARTMENT OF WATER AND POWER
MOHRLAND PROPERTY
SEEP AND SPRING DATA
OCTOBER 1994

SEEP/SPRING Number	PH (units)	CONDUCTIVITY (umhos/cm @ 25 deg C)	FLOW RATE (gpm)	TEMPERATU (deg C)
16-7-1-6	7.69	456	3	6
16-7-12-6	8.17	364	2	6
16-7-13-1 (SBC-12)	8.00	385	10	5
16-8-5-1			DRY	
16-8-6-1	7.90	391	3	6
16-8-7-3			SEEP	
16-8-8-5	7.75	538	8.5	5
16-8-8-10	6.97	1220	708	12
16-8-18-4			DRY	
16-8-18-5			SEEP	
16-8-20-1			SEEP	

SURFACE WATER Number				
CK-1	7.74	1040	745	8.5
CK-2	8.11	716	40	2
LF-1 (FC-1)	8.06	1180	30	9.5
RF-1	8.36	1110	25	9.0

LOS ANGELES DEPARTMENT OF WATER AND POWER
MOHRLAND PROPERTY
SEEP AND SPRING DATA
JULY 1995

SEEP/SPRING Number	PH (units)	CONDUCTIVITY (umhos/cm @ 25 deg C)	FLOW RATE (gpm)	TEMPERAT (deg C)
16-7-1-6	7.81	614	26	4
16-7-12-6	7.96	630	2	5
16-7-13-1 (SBC-12)	8.03	605	12	6
16-8-5-1	7.99	552	7	8
16-8-6-1	7.63	635	15	6
16-8-7-3	7.81	669	2	6
16-8-8-5	7.78	823	17	7
16-8-8-10	7.21	1174	755	13
16-8-18-4	7.69	720	2	8
16-8-18-5	7.77	548	50	5
16-8-20-1	7.88	718	2	7.5

SURFACE WATER Number				
CK-1	8.26	1133	1104	18
CK-2	8.65	692	950	17
LF-1 (FC-1)	8.81	629	80	20
RF-1	8.82	780	100	19

LOS ANGELES DEPARTMENT OF WATER AND POWER
MOHRLAND PROPERTY
SEEP AND SPRING DATA
OCTOBER 1995

SEEP/SPRING Number	PH (units)	CONDUCTIVITY (umhos/cm @ 25 deg C)	FLOW RATE (gpm)	TEMPERAT (deg C)
16-7-1-6	7.26	450	20	6
16-7-12-6	7.54	380	12	6
16-7-13-1 (SBC-12)	7.99	360	6	6
16-8-5-1	7.82	370	6	8
16-8-6-1	7.46	400	8	6
16-8-7-3			DRY	
16-8-8-5	7.88	540	10	6
16-8-8-10	7.27	1150	672	11
16-8-18-4	7.06	520	0.5	8
16-8-18-5	7.01	450	8	6
16-8-20-1			DRY	

SURFACE WATER Number				
CK-1	8.06	1000	985	11
CK-2	8.27	650	376	4
LF-1 (FC-1)	8.34	910	15	10
RF-1	8.52	450	15	12

LOS ANGELES DEPARTMENT OF WATER AND POWER
MOHRLAND PROPERTY
SEEP AND SPRING DATA
JULY 1996

SEEP/SPRING Number	PH (units)	CONDUCTIVITY (umhos/cm @ 25 deg C)	FLOW RATE (gpm)	TEMPERAT (deg C)
16-7-1-6	7.2	480	17	6
16-7-12-6	6.95	403	4	6
16-7-13-1 (SBC-12)	7.7	353	4	14
16-8-5-1	6.9	534	8	7
16-8-6-1	7.6	432	9	8
16-8-7-3	6.7	546	8	9
16-8-8-5	6.9	564	5	9
16-8-8-10	7.21	1174	755	12
16-8-18-4	6.9	475	2	13
16-8-18-5	6.5	474	10	6
16-8-20-1	7.65	520	1	11

SURFACE WATER Number				
CK-1	7.8	849	352	19
CK-2	8.15	548	25	13
LF-1 (FC-1)	8.3	550	226	18
RF-1	8	594	191	21

LOS ANGELES DEPARTMENT OF WATER AND POWER
MOHRLAND PROPERTY
SEEP AND SPRING DATA
OCTOBER 1996

SEEP/SPRING Number	PH (units)	CONDUCTIVITY (umhos/cm @ 25 deg C)	FLOW RATE (gpm)	TEMPERAT (deg C)
16-7-1-6	8.18	468	3.4	4
16-7-12-6	7.21	439	3	5
16-7-13-1 (5BC-12)	8.21	406	4	5
16-8-5-1	7.54	521	7	5
16-8-6-1	8.05	450	6	6
16-8-7-3			DRY	
16-8-8-5	8.03	563	3.3	4
16-8-8-10	7.16	1028	67	11
16-8-18-4			DRY	
16-8-18-5	8.02	450	2.5	5
16-8-20-1			DRY	

SURFACE WATER Number				
CK-1	8.29	849	103	3
CK-2	8.26	548	50	0.5
LF-1 (FC-1)	8.24	550	15	6
RF-1	8.49	594	18	6

CHEMTECH

ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 6-30-94

TO: Earthfax Engineering
7324 S. 1300 E. STE 100
Midvale, Utah 84047

DATE SUBMITTED: 6-13-94

PROJECT: Mohrland

DATE SAMPLED: 6-08-94

CERTIFICATE OF ANALYSIS

SAMPLE ID:	(SBC-12) 16-7-13-1		
LAB #:	U009008		
PARAMETER		**DATE ANALYZED**	**METHOD**
TDS, mg/l	190	6-14-94	EPA 160.1
Hardness as $CaCO_3$, mg/l	213	6-23-94	EPA 130.2
Carbonate as CO_3, mg/l	2.0	6-22-94	SM 2320B
Bicarbonate as HCO_3, mg/l	255	6-22-94	SM 2320B
Chloride as Cl, mg/l	<2	6-16-94	EPA 325.3
Fluoride as F, mg/l	0.14	6-17-94	EPA 340.2
Ammonia as NH_3-N, mg/l	<.4	6-19-94	SM 4500
Nitrate as NO_3-N, mg/l	0.332	6-27-94	EPA 353.1
*Nitrite as NO_2-N, mg/l	<.01	6-14-94	EPA 354.1
Phosphorus as P, mg/l	<.02	6-17-94	SM 4500
Sulfate as SO_4, mg/l	7.5	6-22-94	SM 4500
Sulfide as S, mg/l	<.1	6-15-94	EPA 376.1
Aluminum as Al, mg/l	0.021	6-20-94	EPA 200.7
Arsenic as As, mg/l	<.01	6-20-94	EPA 200.7
Barium as Ba, mg/l	0.104	6-20-94	EPA 200.7
Boron as B, mg/l	0.016	6-20-94	EPA 200.7
Cadmium as Cd, mg/l	<.01	6-20-94	EPA 200.7
Calcium as Ca, mg/l	51.7	6-20-94	EPA 200.7
Chromium as Cr, mg/l	<.01	6-20-94	EPA 200.7

NOTE: Sample temp. when submitted was 10.1°C on ice.
*Sample submitted past holding time for this parameter.

Approved By: _____

CHEMTECH

ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 6-30-94

TO: Earthfax Engineering
7324 S. 1300 E. STE 100
Midvale, Utah 84047

DATE SUBMITTED: 6-13-94

PROJECT: Mohrland

DATE SAMPLED: 6-08-94

CERTIFICATE OF ANALYSIS

SAMPLE ID: (SBC-12)	16-7-13-1	DATE	
LAB #:	U009008	ANALYZED/METHOD	
PARAMETER			
Copper as Cu, mg/l	<.01	6-20-94	EPA 200.7
Iron as Fe, mg/l	0.026	6-20-94	EPA 200.7
Lead as Pb, mg/l	<.01	6-20-94	EPA 200.7
Magnesium as Mg, mg/l	17.7	6-20-94	EPA 200.7
Manganese as Mn, mg/l	<.01	6-20-94	EPA 200.7
Mercury as Hg, mg/l	<.0002	6-17-94	EPA 245.1
Molybdenum as Mo, mg/l	<.01	6-20-94	EPA 200.7
Nickel as Ni, mg/l	<.01	6-20-94	EPA 200.7
Potassium as K, mg/l	0.42	6-20-94	EPA 200.7
Selenium as Se, mg/l	<.01	6-20-94	EPA 200.7
Sodium as Na, mg/l	1.91	6-20-94	EPA 200.7
Zinc as Zn, mg/l	<.01	6-20-94	EPA 200.7

NOTE: Sample temp. when submitted was 10.1°C on ice.

Approved By:

CHEMTECH

ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 6-30-94

TO: Earthfax Engineering
7324 S. 1300 E. STE 100
Midvale, Utah 84047

DATE SUBMITTED: 6-13-94

PROJECT: Mohrland

DATE SAMPLED: 6-08-94

CERTIFICATE OF ANALYSIS

SAMPLE ID:	16-8-18-4	DATE	
LAB #:	U009000	ANALYZED/METHOD	
PARAMETER			
TDS, mg/l	253	6-14-94	EPA 160.1
Hardness as $CaCO_3$, mg/l	281	6-23-94	EPA 130.2
Carbonate as CO_3, mg/l	1.0	6-20-94	SM 2320B
Bicarbonate as HCO_3, mg/l	357	6-20-94	SM 2320B
Chloride as Cl, mg/l	3.0	6-16-94	EPA 325.3
Fluoride as F, mg/l	0.15	6-17-94	EPA 340.2
Ammonia as NH_3-N, mg/l	<.4	6-19-94	SM 4500
Nitrate as NO_3-N, mg/l	0.246	6-27-94	EPA 353.1
*Nitrite as NO_2-N, mg/l	<.01	6-14-94	EPA 354.1
Phosphorus as P, mg/l	0.045	6-17-94	SM 4500
Sulfate as SO_4, mg/l	6.9	6-22/24	SM 4500/ 375.4
Sulfide as S, mg/l	<.1	6-15-94	EPA 376.1
Aluminum as Al, mg/l	0.484	6-20-94	EPA 200.7
Arsenic as As, mg/l	<.01	6-20-94	EPA 200.7
Barium as Ba, mg/l	0.232	6-20-94	EPA 200.7
Boron as B, mg/l	0.021	6-20-94	EPA 200.7
Cadmium as Cd, mg/l	<.01	6-20-94	EPA 200.7
Calcium as Ca, mg/l	80.3	6-20-94	EPA 200.7
Chromium as Cr, mg/l	<.01	6-20-94	EPA 200.7

NOTE: Sample temp. when submitted was 10.1°C on ice.
*Sample submitted past holding time for this parameter.

Approved By: _____

CHEMTECH

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DATE: 6-30-94

TO: Earthfax Engineering
7324 S. 1300 E. STE 100
Midvale, Utah 84047

DATE SUBMITTED: 6-13-94

PROJECT: Mohrland

DATE SAMPLED: 6-08-94

CERTIFICATE OF ANALYSIS

SAMPLE ID:	16-8-18-4	DATE	
LAB #:	U009000	ANALYZED/METHOD	
PARAMETER			
Copper as Cu, mg/l	0.011	6-20-94	EPA 200.7
Iron as Fe, mg/l	0.363	6-20-94	EPA 200.7
Lead as Pb, mg/l	<.01	6-20-94	EPA 200.7
Magnesium as Mg, mg/l	21.4	6-20-94	EPA 200.7
Manganese as Mn, mg/l	0.020	6-20-94	EPA 200.7
Mercury as Hg, mg/l	<.0002	6-29-94	EPA 245.1
Molybdenum as Mo, mg/l	<.01	6-20-94	EPA 200.7
Nickel as Ni, mg/l	<.01	6-20-94	EPA 200.7
Potassium as K, mg/l	0.37	6-20-94	EPA 200.7
Selenium as Se, mg/l	<.01	6-20-94	EPA 200.7
Sodium as Na, mg/l	2.30	6-20-94	EPA 200.7
Zinc as Zn, mg/l	<.01	6-20-94	EPA 200.7

NOTE: Sample temp. when submitted was 10.1°C on ice.

Approved By:

CHEMTECH

ANALYTICAL LABORATORY

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DATE: 6-30-94

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Midvale, Utah 84047

DATE SUBMITTED: 6-13-94

PROJECT: Mohrland

DATE SAMPLED: 6-08-94

CERTIFICATE OF ANALYSIS

SAMPLE ID:	16-8-20-1	DATE	
LAB #:	U008996	ANALYZED/METHOD	
PARAMETER			
TDS, mg/l	540	6-14-94	EPA 160.1
Hardness as $CaCO_3$, mg/l	291	6-23-94	EPA 130.2
Carbonate as CO_3, mg/l	<1	6-20-94	SM 2320B
Bicarbonate as HCO_3, mg/l	93	6-20-94	SM 2320B
Chloride as Cl, mg/l	7.0	6-16-94	EPA 325.3
Fluoride as F, mg/l	0.25	6-17-94	EPA 340.2
Ammonia as NH_3-N, mg/l	<.4	6-19-94	SM 4500
Nitrate as NO_3-N, mg/l	0.048	6-27-94	EPA 353.1
*Nitrite as NO_2-N, mg/l	<.01	6-14-94	EPA 354.1
Phosphorus as P, mg/l	<.02	6-17-94	SM 4500
Sulfate as SO_4, mg/l	372	6-22/24	SM 4500/ 375.4
Sulfide as S, mg/l	<.1	6-15-94	EPA 376.1
Aluminum as Al, mg/l	0.016	6-20-94	EPA 200.7
Arsenic as As, mg/l	<.01	6-20-94	EPA 200.7
Barium as Ba, mg/l	0.035	6-20-94	EPA 200.7
Boron as B, mg/l	0.043	6-20-94	EPA 200.7
Cadmium as Cd, mg/l	<.01	6-20-94	EPA 200.7
Calcium as Ca, mg/l	59.7	6-20-94	EPA 200.7
Chromium as Cr, mg/l	<.01	6-20-94	EPA 200.7

NOTE: Sample temp. when submitted was 10.1°C on ice.
*Sample submitted past holding time for this parameter.

Approved By:

CHEMTECH

ANALYTICAL LABORATORY

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DATE: 6-30-94

TO: Earthfax Engineering
7324 S. 1300 E. STE 100
Midvale, Utah 84047

DATE SUBMITTED: 6-13-94

PROJECT: Mohrland

DATE SAMPLED: 6-08-94

CERTIFICATE OF ANALYSIS

SAMPLE ID:	16-8-20-1	DATE	
LAB #:	U008996	ANALYZED	METHOD
PARAMETER			
Copper as Cu, mg/l	<.01	6-20-94	EPA 200.7
Iron as Fe, mg/l	0.028	6-20-94	EPA 200.7
Lead as Pb, mg/l	<.01	6-20-94	EPA 200.7
Magnesium as Mg, mg/l	29.0	6-20-94	EPA 200.7
Manganese as Mn, mg/l	<.01	6-20-94	EPA 200.7
Mercury as Hg, mg/l	<.0002	6-29-94	EPA 245.1
Molybdenum as Mo, mg/l	<.01	6-20-94	EPA 200.7
Nickel as Ni, mg/l	<.01	6-20-94	EPA 200.7
Potassium as K, mg/l	1.36	6-20-94	EPA 200.7
Selenium as Se, mg/l	<.01	6-20-94	EPA 200.7
Sodium as Na, mg/l	60.6	6-20-94	EPA 200.7
Zinc as Zn, mg/l	<.01	6-20-94	EPA 200.7

NOTE: Sample temp. when submitted was 10.1°C on ice.

Approved By:

CHEMTECH

ANALYTICAL LABORATORY

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DATE: 6-30-94

TO: Earthfax Engineering
7324 S. 1300 E. STE 100
Midvale, Utah 84047

DATE SUBMITTED: 6-13-94

PROJECT: Mohrland

DATE SAMPLED: 6-09-94

CERTIFICATE OF ANALYSIS

SAMPLE ID:	LF-1 (FC-1)	DATE	
LAB #:	U009003	ANALYZED/METHOD	
PARAMETER			
TDS, mg/l	570	6-14-94	EPA 160.1
Hardness as $CaCO_3$, mg/l	454	6-23-94	EPA 130.2
Carbonate as CO_3, mg/l	9.0	6-22-94	SM 2320B
Bicarbonate as HCO_3, mg/l	325	6-22-94	SM 2320B
Chloride as Cl, mg/l	10.5	6-16-94	EPA 325.3
Fluoride as F, mg/l	0.22	6-17-94	EPA 340.2
Ammonia as NH_3-N, mg/l	<.4	6-19-94	SM 4500
Nitrate as NO_3-N, mg/l	<.02	6-27-94	EPA 353.1
*Nitrite as NO_2-N, mg/l	<.01	6-14-94	EPA 354.1
Phosphorus as P, mg/l	<.02	6-17-94	SM 4500
Sulfate as SO_4, mg/l	236	6-22-94	SM 4500
Sulfide as S, mg/l	<.1	6-15-94	EPA 376.1
Aluminum as Al, mg/l	0.033	6-20-94	EPA 200.7
Arsenic as As, mg/l	<.01	6-20-94	EPA 200.7
Barium as Ba, mg/l	0.048	6-20-94	EPA 200.7
Boron as B, mg/l	0.095	6-20-94	EPA 200.7
Cadmium as Cd, mg/l	<.01	6-20-94	EPA 200.7
Calcium as Ca, mg/l	52.5	6-20-94	EPA 200.7
Chromium as Cr, mg/l	<.01	6-20-94	EPA 200.7

NOTE: Sample temp. when submitted was 10.1°C on ice.
*Sample submitted past holding time for this parameter.

Approved By: _____

CHEMTECH

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DATE: 6-30-94

TO: Earthfax Engineering
7324 S. 1300 E. STE 100
Midvale, Utah 84047

DATE SUBMITTED: 6-13-94

PROJECT: Mohrland

DATE SAMPLED: 6-09-94

CERTIFICATE OF ANALYSIS

SAMPLE ID:	LF-1 (FC-1)	DATE	
LAB #:	U009003	ANALYZED/METHOD	
PARAMETER			
Copper as Cu, mg/l	0.013	6-20-94	EPA 200.7
Iron as Fe, mg/l	0.053	6-20-94	EPA 200.7
Lead as Pb, mg/l	<.01	6-20-94	EPA 200.7
Magnesium as Mg, mg/l	70.1	6-20-94	EPA 200.7
Manganese as Mn, mg/l	<.01	6-20-94	EPA 200.7
Mercury as Hg, mg/l	<.0002	6-17-94	EPA 245.1
Molybdenum as Mo, mg/l	<.01	6-20-94	EPA 200.7
Nickel as Ni, mg/l	<.01	6-20-94	EPA 200.7
Potassium as K, mg/l	3.08	6-20-94	EPA 200.7
Selenium as Se, mg/l	<.01	6-20-94	EPA 200.7
Sodium as Na, mg/l	29.9	6-20-94	EPA 200.7
Zinc as Zn, mg/l	<.01	6-20-94	EPA 200.7
Oil & Grease, mg/l	<5	6-15-94	EPA 413.1

NOTE: Sample temp. when submitted was 10.1°C on ice.

Approved By: [signature]

CHEMTECH

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DATE: 6-30-94

TO: Earthfax Engineering
7324 S. 1300 E. STE 100
Midvale, Utah 84047

DATE SUBMITTED: 6-13-94

PROJECT: Mohrland

DATE SAMPLED: 6-09-94

CERTIFICATE OF ANALYSIS

SAMPLE ID: / LAB #: / PARAMETER	RF-1 U009004	DATE ANALYZED/METHOD	
TDS, mg/l	790	6-14-94	EPA 160.1
Hardness as $CaCO_3$, mg/l	637	6-23-94	EPA 130.2
Carbonate as CO_3, mg/l	7.0	6-22-94	SM 2320B
Bicarbonate as HCO_3, mg/l	326	6-22-94	SM 2320B
Chloride as Cl, mg/l	16.0	6-16-94	EPA 325.3
Fluoride as F, mg/l	0.19	6-17-94	EPA 340.2
Ammonia as NH_3-N, mg/l	<.4	6-19-94	SM 4500
Nitrate as NO_3-N, mg/l	<.02	6-27-94	EPA 353.1
*Nitrite as NO_2-N, mg/l	<.01	6-14-94	EPA 354.1
Phosphorus as P, mg/l	<.02	6-17-94	SM 4500
Sulfate as SO_4, mg/l	415	6-22-94	SM 4500
Sulfide as S, mg/l	<.1	6-15-94	EPA 376.1
Aluminum as Al, mg/l	0.017	6-20-94	EPA 200.7
Arsenic as As, mg/l	<.01	6-20-94	EPA 200.7
Barium as Ba, mg/l	0.053	6-20-94	EPA 200.7
Boron as B, mg/l	0.059	6-20-94	EPA 200.7
Cadmium as Cd, mg/l	<.01	6-20-94	EPA 200.7
Calcium as Ca, mg/l	85.3	6-20-94	EPA 200.7
Chromium as Cr, mg/l	<.01	6-20-94	EPA 200.7

NOTE: Sample temp. when submitted was 10.1°C on ice.
*Sample submitted past holding time for this parameter.

Approved By:

CHEMTECH

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Midvale, Utah 84047

DATE SUBMITTED: 6-13-94

PROJECT: Mohrland

DATE SAMPLED: 6-09-94

CERTIFICATE OF ANALYSIS

SAMPLE ID: / LAB #: / PARAMETER	RF-1 U009004	DATE ANALYZED/METHOD	
Copper as Cu, mg/l	<.01	6-20-94	EPA 200.7
Iron as Fe, mg/l	0.056	6-20-94	EPA 200.7
Lead as Pb, mg/l	<.01	6-20-94	EPA 200.7
Magnesium as Mg, mg/l	88.9	6-20-94	EPA 200.7
Manganese as Mn, mg/l	<.01	6-20-94	EPA 200.7
Mercury as Hg, mg/l	<.0002	6-17-94	EPA 245.1
Molybdenum as Mo, mg/l	<.01	6-20-94	EPA 200.7
Nickel as Ni, mg/l	<.01	6-20-94	EPA 200.7
Potassium as K, mg/l	2.89	6-20-94	EPA 200.7
Selenium as Se, mg/l	<.01	6-20-94	EPA 200.7
Sodium as Na, mg/l	32.6	6-20-94	EPA 200.7
Zinc as Zn, mg/l	<.01	6-20-94	EPA 200.7
Oil & Grease, mg/l	<5	6-15-94	EPA 413.1

NOTE: Sample temp. when submitted was 10.1°C on ice.

Approved By:

CHEMTECH

ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 11-16-94

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U017438
PROJECT: IPA Seep & Spring Fall 94': 16-7-13-1 (SBC-12)
DATE SAMPLED: 10-28-94
DATE SUBMITTED: 10-28-94

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
TDS, mg/l	195	11-01-94 EPA 160.2
Hardness as $CaCO_3$, mg/l	240	11-11-94 EPA 130.2
Carbonate as CO3, mg/l	<1	11-07-94 SM2320B
Bicarbonate as HCO_3, mg/l	268	11-07-94 SM2320B
Chloride as Cl, mg/l	<1	11-09-94 EPA 325.3
Fluoride as F, mg/l	0.14	11-04-94 EPA 340.2
Ammonia as NH_3-N, mg/l	<.4	11-08-94 SM4500
Nitrate as NO_3-N, mg/l	0.256	10-31-94 EPA 353.1
Nitrite as NO_2-N, mg/l	<.005	10-28-94 EPA 354.1
Phosphate as PO_4-P, mg/l	0.072	11-14-94 SM4500
Sulfate as SO_4, mg/l	6.4	11-05/07 EPA 375.4/SM4500
Sulfide as S, mg/l	<.1	10-31-94 EPA 376.1
Aluminum as Al, mg/l	0.328	11-02-94 EPA 200.7
Arsenic as As, mg/l	<.04	11-02-94 EPA 200.7
Barium as Ba, mg/l	0.122	11-02-94 EPA 200.7
Boron as B, mg/l	<.05	11-02-94 EPA 200.7
Cadmium as Cd, mg/l	<.005	11-02-94 EPA 200.7
Calcium as Ca, mg/l	62.5	11-02-94 EPA 200.7
Chromium as Cr, mg/l	<.005	11-02-94 EPA 200.7
Copper as Cu, mg/l	<.005	11-02-94 EPA 200.7
Iron as Fe, mg/l	0.459	11-02-94 EPA 200.7

Approved By: Joel Workman

CHEMTECH

ANALYTICAL LABORATORY

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PHONE: (801) 262-7299
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DATE: 11-16-94

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U017438
PROJECT: IPA Seep & Spring Fall 94': 16-7-13-1 (SBC-12)
DATE SAMPLED: 10-28-94
DATE SUBMITTED: 10-28-94

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
Lead as Pb, mg/l	<.005	11-02-94 EPA 200.7
Magnesium as Mg, mg/l	20.6	11-02-94 EPA 200.7
Manganese as Mn, mg/l	0.018	11-02-94 EPA 200.7
Mercury as Hg, mg/l	<.0002	11-02-94 EPA 245.1
Molybdenum as Mo, mg/l	<.01	11-02-94 EPA 200.7
Nickel as Ni, mg/l	<.005	11-02-94 EPA 200.7
Potassium as K, mg/l	0.55	11-02-94 EPA 200.7
Selenium as Se, mg/l	<.04	11-02-94 EPA 200.7
Sodium as Na, mg/l	2.5	11-02-94 EPA 200.7
Zinc as Zn, mg/l	0.011	11-02-94 EPA 200.7

NOTE: Sample temp. when submitted was 10.1°C on ice.

Approved By: Joel Workman

CHEMTECH

ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
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DATE: 11-16-94

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U017431
PROJECT: IPA Seep & Spring Fall 94' ~~BF-2~~ This is LF-1 (FC-1)
DATE SAMPLED: 10-27-94
DATE SUBMITTED: 10-28-94

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
TDS, mg/l	1,030	11-01-94 EPA 160.2
Hardness as $CaCO_3$, mg/l	736	11-11-94 EPA 130.2
Carbonate as CO3, mg/l	<1	11-07-94 SM2320B
Bicarbonate as HCO_3, mg/l	485	11-07-94 SM2320B
Chloride as Cl, mg/l	18	11-09-94 EPA 325.3
Fluoride as F, mg/l	0.22	11-04-94 EPA 340.2
Ammonia as NH_3-N, mg/l	<.4	11-08-94 SM4500
Nitrate as NO_3-N, mg/l	<.08	10-31-94 EPA 353.1
Nitrite as NO_2-N, mg/l	<.005	10-28-94 EPA 354.1
Phosphate as PO_4-P, mg/l	0.022	11-14-94 SM4500
Sulfate as SO_4, mg/l	484	11-05/07 EPA 375.4/SM4500
Sulfide as S, mg/l	<.1	10-31-94 EPA 376.1
Aluminum as Al, mg/l	0.289	11-02-94 EPA 200.7
Arsenic as As, mg/l	<.04	11-02-94 EPA 200.7
Barium as Ba, mg/l	0.044	11-02-94 EPA 200.7
Boron as B, mg/l	0.174	11-02-94 EPA 200.7
Cadmium as Cd, mg/l	<.005	11-02-94 EPA 200.7
Calcium as Ca, mg/l	82.2	11-02-94 EPA 200.7
Chromium as Cr, mg/l	<.005	11-02-94 EPA 200.7
Copper as Cu, mg/l	<.005	11-02-94 EPA 200.7
Iron as Fe, mg/l	0.064	11-02-94 EPA 200.7

Approved By: Joel Wolfram

CHEMTECH

ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 11-16-94

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U017431
PROJECT: IPA Seep & Spring Fall 94' ~~RF-2~~ LF-1 (FC-1)
DATE SAMPLED: 10-27-94
DATE SUBMITTED: 10-28-94

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
Lead as Pb, mg/l	<.005	11-02-94 EPA 200.7
Magnesium as Mg, mg/l	124	11-02-94 EPA 200.7
Manganese as Mn, mg/l	<.01	11-02-94 EPA 200.7
Mercury as Hg, mg/l	<.0002	11-02-94 EPA 245.1
Molybdenum as Mo, mg/l	<.01	11-02-94 EPA 200.7
Nickel as Ni, mg/l	0.0052	11-02-94 EPA 200.7
Potassium as K, mg/l	4.71	11-02-94 EPA 200.7
Selenium as Se, mg/l	<.04	11-02-94 EPA 200.7
Sodium as Na, mg/l	67.9	11-02-94 EPA 200.7
Zinc as Zn, mg/l	<.01	11-02-94 EPA 200.7
Oil & Grease, mg/l	<5	11-07-94 EPA 413.1

NOTE: Sample temp. when submitted was 10.1°C on ice.

Approved By: Joe Workman

INCORPORATED
EFFECTIVE:
JUL 03 2001
UTAH DIVISION OIL, GAS AND MINING

SRG8(1)

CHEMTECH

ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 11-16-94

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U017430
PROJECT: IPA Seep & Spring Fall 94': RF-1
DATE SAMPLED: 10-27-94
DATE SUBMITTED: 10-28-94

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
TDS, mg/l	1,020	11-01-94 EPA 160.2
Hardness as $CaCO_3$, mg/l	751	11-11-94 EPA 130.2
Carbonate as CO3, mg/l	<1	11-07-94 SM2320B
Bicarbonate as HCO_3, mg/l	390	11-07-94 SM2320B
Chloride as Cl, mg/l	22	11-09-94 EPA 325.3
Fluoride as F, mg/l	0.17	11-04-94 EPA 340.2
Ammonia as NH_3-N, mg/l	<.4	11-08-94 SM4500
Nitrate as NO_3-N, mg/l	<.4	10-31-94 EPA 353.1
Nitrite as NO_2-N, mg/l	<.005	10-28-94 EPA 354.1
Phosphate as PO_4-P, mg/l	0.050	11-14-94 SM4500
Sulfate as SO_4, mg/l	509	11-05/07 EPA 375.4/SM4500
Sulfide as S, mg/l	<.1	10-31-94 EPA 376.1
Aluminum as Al, mg/l	0.063	11-02-94 EPA 200.7
Arsenic as As, mg/l	<.04	11-02-94 EPA 200.7
Barium as Ba, mg/l	0.060	11-02-94 EPA 200.7
Boron as B, mg/l	0.073	11-02-94 EPA 200.7
Cadmium as Cd, mg/l	<.005	11-02-94 EPA 200.7
Calcium as Ca, mg/l	101	11-02-94 EPA 200.7
Chromium as Cr, mg/l	<.005	11-02-94 EPA 200.7
Copper as Cu, mg/l	<.005	11-02-94 EPA 200.7
Iron as Fe, mg/l	0.063	11-02-94 EPA 200.7

Approved By: Joel Workman

CHEMTECH

ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 11-16-94

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U017430
PROJECT: IPA Seep & Spring Fall 94': RF-1
DATE SAMPLED: 10-27-94
DATE SUBMITTED: 10-28-94

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
Lead as Pb, mg/l	0.0057	11-02-94 EPA 200.7
Magnesium as Mg, mg/l	119	11-02-94 EPA 200.7
Manganese as Mn, mg/l	<.01	11-02-94 EPA 200.7
Mercury as Hg, mg/l	<.0002	11-02-94 EPA 245.1
Molybdenum as Mo, mg/l	<.01	11-02-94 EPA 200.7
Nickel as Ni, mg/l	<.005	11-02-94 EPA 200.7
Potassium as K, mg/l	3.18	11-02-94 EPA 200.7
Selenium as Se, mg/l	<.04	11-02-94 EPA 200.7
Sodium as Na, mg/l	45.6	11-02-94 EPA 200.7
Zinc as Zn, mg/l	0.015	11-02-94 EPA 200.7
Oil & Grease, mg/l	5	11-07-94 EPA 413.1

NOTE: Sample temp. when submitted was 10.1°C on ice.

Approved By: Joe Workman

CHEMTECH ANALYTICAL LABORATORIES

DATE: 7-28-95

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U029673
PROJECT: Mohrland Seep & Spring: ~~16-7-3-1~~ 16-7-13-1 (SBC-12)
DATE SAMPLED: 7-10-95
DATE SUBMITTED: 7-11-95

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
Bicarbonate as HCO_3, mg/l	284	7-20-95 SM 2320B
Carbonate as CO_3, mg/l	<1	7-20-95 SM 2320B
Chloride as Cl, mg/l	3.0	7-11-95 EPA 325.3
Fluoride as F, mg/l	<.2	7-12-95 EPA 340.2
Ammonia as NH_3-N, mg/l	<.8	7-18-95 SM 4500
Nitrate as NO_3-N, mg/l	0.360	7-19-95 EPA 353.1
Nitrite as NO_2-N, mg/l	<.005	7-11-95 EPA 354.1
Phosphorus as P, mg/l	<.02	7-17-95 SM 4500
Sulfate as SO_4, mg/l	9.1	7-15-95 SM4500C/D
TDS, mg/l	255	7-12-95 EPA 160.1
Sulfide, mg/l	1.64	7-06-95 EPA 376.1
Hardness as $CaCO_3$, mg/l	241	7-19-95 EPA 130.2
Mercury as Hg, mg/l	<.0005	7-22-95 EPA 245.1
Aluminum as Al, mg/l	0.023	7-14-95 EPA 200.7
Arsenic as As, mg/l	<.04	7-14-95 EPA 200.7
Barium as Ba, mg/l	0.13	7-14-95 EPA 200.7
Boron as B, mg/l	<.5	7-14-95 EPA 200.7
Cadmium as Cd, mg/l	<.01	7-14-95 EPA 200.7
Calcium as Ca, mg/l	57	7-14-95 EPA 200.7

Approved By: Joseph L. Philpott

801 262 7299 PHONE
801 262 7378 FAX

6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

DATE: 7-28-95

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U029673
PROJECT: Mohrland Seep & Spring: ~~16-7-3-1~~ 16-7-13-1 (SBC-12)
DATE SAMPLED: 7-10-95
DATE SUBMITTED: 7-11-95

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
Chromium as Cr, mg/l	<.01	7-14-95 EPA 200.7
Copper as Cu, mg/l	<.01	7-14-95 EPA 200.7
Iron as Fe, mg/l	<.01	7-14-95 EPA 200.7
Lead as Pb, mg/l	<.02	7-14-95 EPA 200.7
Magnesium as Mg, mg/l	24	7-14-95 EPA 200.7
Manganese as Mn, mg/l	<.01	7-14-95 EPA 200.7
Molybdenum as Mo, mg/l	<.04	7-14-95 EPA 200.7
Nickel as Ni, mg/l	<.01	7-14-95 EPA 200.7
Potassium as K, mg/l	0.42	7-14-95 EPA 200.7
Selenium as Se, mg/l	<.04	7-14-95 EPA 200.7
Sodium as Na, mg/l	2.7	7-14-95 EPA 200.7
Zinc as Zn, mg/l	<.01	7-14-95 EPA 200.7

Approved By: Joseph L. Oliphant

801 262 7299 PHONE
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6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

DATE: 7-28-95

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U029671
PROJECT: Mohrland Seep & Spring: 16-8-18-4
DATE SAMPLED: 7-09-95
DATE SUBMITTED: 7-11-95

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
Bicarbonate as HCO_3, mg/l	341	7-20-95 SM 2320B
Carbonate as CO_3, mg/l	<1	7-20-95 SM 2320B
Chloride as Cl, mg/l	3.6	7-11-95 EPA 325.3
Fluoride as F, mg/l	<.2	7-12-95 EPA 340.2
Ammonia as NH_3-N, mg/l	<.8	7-18-95 SM 4500
Nitrate as NO_3-N, mg/l	0.114	7-19-95 EPA 353.1
Nitrite as NO_2-N, mg/l	<.005	7-11-95 EPA 354.1
Phosphorus as P, mg/l	<.02	7-17-95 SM 4500
Sulfate as SO_4, mg/l	10.1	7-15-95 SM4500C/D
TDS, mg/l	309	7-12-95 EPA 160.1
Sulfide, mg/l	0.72	7-06-95 EPA 376.1
Hardness as $CaCO_3$, mg/l	301	7-19-95 EPA 130.2
Mercury as Hg, mg/l	<.0005	7-22-95 EPA 245.1
Aluminum as Al, mg/l	0.039	7-14-95 EPA 200.7
Arsenic as As, mg/l	<.04	7-14-95 EPA 200.7
Barium as Ba, mg/l	0.22	7-14-95 EPA 200.7
Boron as B, mg/l	<.5	7-14-95 EPA 200.7
Cadmium as Cd, mg/l	<.01	7-14-95 EPA 200.7
Calcium as Ca, mg/l	82	7-14-95 EPA 200.7

Approved By: Joseph L. Oliphant

801 262 7299 PHONE
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6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

DATE: 7-28-95

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U029671
PROJECT: Mohrland Seep & Spring: 16-8-18-4
DATE SAMPLED: 7-09-95
DATE SUBMITTED: 7-11-95

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
Chromium as Cr, mg/l	<.01	7-14-95 EPA 200.7
Copper as Cu, mg/l	<.01	7-14-95 EPA 200.7
Iron as Fe, mg/l	<.01	7-14-95 EPA 200.7
Lead as Pb, mg/l	<.02	7-14-95 EPA 200.7
Magnesium as Mg, mg/l	19	7-14-95 EPA 200.7
Manganese as Mn, mg/l	<.01	7-14-95 EPA 200.7
Molybdenum as Mo, mg/l	<.04	7-14-95 EPA 200.7
Nickel as Ni, mg/l	<.01	7-14-95 EPA 200.7
Potassium as K, mg/l	0.39	7-14-95 EPA 200.7
Selenium as Se, mg/l	<.04	7-14-95 EPA 200.7
Sodium as Na, mg/l	2.8	7-14-95 EPA 200.7
Zinc as Zn, mg/l	<.01	7-14-95 EPA 200.7

Approved By: Joseph L. Alphenaar

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6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

DATE: 7-28-95

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U029672
PROJECT: Mohrland Seep & Spring: 16-8-20-1
DATE SAMPLED: 7-10-95
DATE SUBMITTED: 7-11-95

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
Bicarbonate as HCO_3, mg/l	360	7-20-95 SM 2320B
Carbonate as CO_3, mg/l	<1	7-20-95 SM 2320B
Chloride as Cl, mg/l	4.0	7-11-95 EPA 325.3
Fluoride as F, mg/l	<.2	7-12-95 EPA 340.2
Ammonia as NH_3-N, mg/l	<.8	7-18-95 SM 4500
Nitrate as NO_3-N, mg/l	0.078	7-19-95 EPA 353.1
Nitrite as NO_2-N, mg/l	<.005	7-11-95 EPA 354.1
Phosphorus as P, mg/l	0.022	7-17-95 SM 4500
Sulfate as SO_4, mg/l	12.8	7-15-95 SM4500C/D
TDS, mg/l	331	7-12-95 EPA 160.1
Sulfide, mg/l	0.30	7-06-95 EPA 376.1
Hardness as $CaCO_3$, mg/l	303	7-19-95 EPA 130.2
Mercury as Hg, mg/l	<.0005	7-22-95 EPA 245.1
Aluminum as Al, mg/l	0.12	7-14-95 EPA 200.7
Arsenic as As, mg/l	<.04	7-14-95 EPA 200.7
Barium as Ba, mg/l	0.24	7-14-95 EPA 200.7
Boron as B, mg/l	<.5	7-14-95 EPA 200.7
Cadmium as Cd, mg/l	<.01	7-14-95 EPA 200.7
Calcium as Ca, mg/l	87	7-14-95 EPA 200.7

Approved By: Joseph L. Oliphant

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6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

DATE: 7-28-95

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U029672
PROJECT: Mohrland Seep & Spring: 16-8-20-1
DATE SAMPLED: 7-10-95
DATE SUBMITTED: 7-11-95

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
Chromium as Cr, mg/l	<.01	7-14-95 EPA 200.7
Copper as Cu, mg/l	<.01	7-14-95 EPA 200.7
Iron as Fe, mg/l	0.053	7-14-95 EPA 200.7
Lead as Pb, mg/l	<.02	7-14-95 EPA 200.7
Magnesium as Mg, mg/l	20	7-14-95 EPA 200.7
Manganese as Mn, mg/l	0.040	7-14-95 EPA 200.7
Molybdenum as Mo, mg/l	<.04	7-14-95 EPA 200.7
Nickel as Ni, mg/l	<.01	7-14-95 EPA 200.7
Potassium as K, mg/l	0.35	7-14-95 EPA 200.7
Selenium as Se, mg/l	<.04	7-14-95 EPA 200.7
Sodium as Na, mg/l	2.8	7-14-95 EPA 200.7
Zinc as Zn, mg/l	0.011	7-14-95 EPA 200.7

Approved By: Joseph L. Oliphant

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6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

DATE: 7-28-95

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U029675
PROJECT: Mohrland Seep & Spring: LF-1 (FL-1)
DATE SAMPLED: 7-10-95
DATE SUBMITTED: 7-11-95

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
Bicarbonate as HCO_3, mg/l	333	7-20-95 SM 2320B
Carbonate as CO_3, mg/l	<1	7-20-95 SM 2320B
Chloride as Cl, mg/l	6.2	7-11-95 EPA 325.3
Fluoride as F, mg/l	0.21	7-12-95 EPA 340.2
Ammonia as NH_3-N, mg/l	<.8	7-18-95 SM 4500
Nitrate as NO_3-N, mg/l	0.138	7-19-95 EPA 353.1
Nitrite as NO_2-N, mg/l	0.0070	7-11-95 EPA 354.1
Phosphorus as P, mg/l	0.117	7-17-95 SM 4500
Sulfate as SO_4, mg/l	98.8	7-15-95 SM4500C/D
TDS, mg/l	386	7-12-95 EPA 160.1
Sulfide, mg/l	<.1	7-06-95 EPA 376.1
Hardness as $CaCO_3$, mg/l	398	7-19-95 EPA 130.2
Mercury as Hg, mg/l	<.0005	7-26-95 EPA 245.1
Aluminum as Al, mg/l	0.86	7-14-95 EPA 200.7
Arsenic as As, mg/l	<.04	7-14-95 EPA 200.7
Barium as Ba, mg/l	0.11	7-14-95 EPA 200.7
Boron as B, mg/l	<.5	7-14-95 EPA 200.7
Cadmium as Cd, mg/l	<.01	7-14-95 EPA 200.7
Calcium as Ca, mg/l	64	7-14-95 EPA 200.7

Approved By: Joseph L. Oliphant

801 262 7299 PHONE
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6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

DATE: 7-28-95

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U029675
PROJECT: Mohrland Seep & Spring: LF-1 (FC-1)
DATE SAMPLED: 7-10-95
DATE SUBMITTED: 7-11-95

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
Chromium as Cr, mg/l	<.01	7-14-95 EPA 200.7
Copper as Cu, mg/l	<.01	7-14-95 EPA 200.7
Iron as Fe, mg/l	0.93	7-14-95 EPA 200.7
Lead as Pb, mg/l	<.02	7-14-95 EPA 200.7
Magnesium as Mg, mg/l	50	7-14-95 EPA 200.7
Manganese as Mn, mg/l	0.038	7-14-95 EPA 200.7
Molybdenum as Mo, mg/l	<.04	7-14-95 EPA 200.7
Nickel as Ni, mg/l	<.01	7-14-95 EPA 200.7
Potassium as K, mg/l	1.6	7-14-95 EPA 200.7
Selenium as Se, mg/l	<.04	7-14-95 EPA 200.7
Sodium as Na, mg/l	13	7-14-95 EPA 200.7
Zinc as Zn, mg/l	<.01	7-14-95 EPA 200.7
Oil & Grease, mg/l	<5	7-26-95 EPA 413.1

Approved By: Joseph T. Oliphant

801 262 7299 PHONE
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6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

DATE: 7-28-95

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U029676
PROJECT: Mohrland Seep & Spring: RF-1
DATE SAMPLED: 7-10-95
DATE SUBMITTED: 7-11-95

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
Bicarbonate as HCO_3, mg/l	260	7-20-95 SM 2320B
Carbonate as CO_3, mg/l	<1	7-20-95 SM 2320B
Chloride as Cl, mg/l	6.0	7-11-95 EPA 325.3
Fluoride as F, mg/l	<.2	7-12-95 EPA 340.2
Ammonia as NH_3-N, mg/l	<.8	7-18-95 SM 4500
Nitrate as NO_3-N, mg/l	0.103	7-19-95 EPA 353.1
Nitrite as NO_2-N, mg/l	<.005	7-11-95 EPA 354.1
Phosphorus as P, mg/l	<.02	7-17-95 SM 4500
Sulfate as SO_4, mg/l	92.7	7-15-95 SM4500C/D
TDS, mg/l	360	7-12-95 EPA 160.1
Sulfide, mg/l	0.18	7-06-95 EPA 376.1
Hardness as $CaCO_3$, mg/l	286	7-19-95 EPA 130.2
Mercury as Hg, mg/l	<.0005	7-26-95 EPA 245.1
Aluminum as Al, mg/l	0.023	7-14-95 EPA 200.7
Arsenic as As, mg/l	<.04	7-14-95 EPA 200.7
Barium as Ba, mg/l	0.092	7-14-95 EPA 200.7
Boron as B, mg/l	<.5	7-14-95 EPA 200.7
Cadmium as Cd, mg/l	<.01	7-14-95 EPA 200.7
Calcium as Ca, mg/l	47	7-14-95 EPA 200.7

Approved By: Joseph L. Oliphant

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6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

DATE: 7-28-95

TO: EarthFax Engineering
7324 So. 1300 E. STE 100
Midvale, Utah 84047

SAMPLE ID: Lab #U029676

PROJECT: Mohrland Seep & Spring: RF-1

DATE SAMPLED: 7-10-95

DATE SUBMITTED: 7-11-95

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED	DATE ANALYZED/METHOD
Chromium as Cr, mg/l	<.01	7-14-95 EPA 200.7
Copper as Cu, mg/l	<.01	7-14-95 EPA 200.7
Iron as Fe, mg/l	<.01	7-14-95 EPA 200.7
Lead as Pb, mg/l	<.02	7-14-95 EPA 200.7
Magnesium as Mg, mg/l	40	7-14-95 EPA 200.7
Manganese as Mn, mg/l	<.01	7-14-95 EPA 200.7
Molybdenum as Mo, mg/l	<.04	7-14-95 EPA 200.7
Nickel as Ni, mg/l	<.01	7-14-95 EPA 200.7
Potassium as K, mg/l	1.3	7-14-95 EPA 200.7
Selenium as Se, mg/l	<.04	7-14-95 EPA 200.7
Sodium as Na, mg/l	12	7-14-95 EPA 200.7
Zinc as Zn, mg/l	<.01	7-14-95 EPA 200.7
Oil & Grease, mg/l	<5	7-26-95 EPA 413.1

Approved By: Joseph L. Oliphant

801 262 7299 PHONE
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6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

Date: 11/29/95

To: EARTH FAX ENGINEERING
7324 So. 1300 E. STE 100
Midvale, UT 84047

Group #: 4815
Lab #: 95-U035474
Project: MORHLAND
Sample Desc: 16-7-13-1 (SBC-12)

Date Sampled: 10/18/95 Time Sampled: 9:30
Date Submitted: 10/19/95 Time Received: 9:40

CERTIFICATE OF ANALYSIS

PARAMETER	RESULT	MDL	DATE ANALYZED	METHOD	ANALYST
INORGANIC PARAMETERS					
Bicarbonate as HCO3, mg/L	271	1	10/23/95 10:00	SM 2320B	TM
Carbonate as CO3, mg/L	< 1	1	10/23/95 10:00	SM 2320B	TM
Ammonia-Nitrogen, mg/L	< 0.4	0.4	10/29/95 10:00	SM 4500G/F	DI
Chloride, mg/L	3	1	11/ 4/95 10:00	EPA 325.3	TM
Fluoride, mg/L	< 0.2	0.2	10/31/95 11:40	EPA 340.2	DI
Hardness, EDTA Titration, mg/L	217	10	10/25/95 9:30	EPA 130.2	TM
Mercury, as Hg, mg/L	0.0002	0.0002	11/ 6/95 11:45	EPA 245.1	TH
Nitrate, Nitrogen, mg/L	0.28	0.02	11/ 2/95 11:00	EPA 353.1	TH
Nitrite, Nitrogen, mg/L	0.012	0.005	10/20/95 9:30	EPA 354.1	KA
Phosphorus, Total, mg/L	0.01	0.01	10/25/95 15:00	SM 4500-P	KA
Sulfate, mg/L	8	5	11/ 6/95 9:00	EPA 375.4	TM
Sulfide, mg/L	0.83	0.1	10/23/95 17:00	EPA 376.1	KA
Total Dissolved Solids, mg/L	228	10	10/25/95 12:00	EPA 160.1	MA
Aluminum (T), as Al, mg/L	< 0.02	0.02	11/ 1/95 18:28	EPA 200.7	LH
Arsenic (T), as As, mg/L	0.030	0.02	11/ 1/95 18:28	EPA 200.7	LH
Barium (T), as Ba, mg/L	0.10	0.02	11/ 1/95 18:28	EPA 200.7	LH
Boron (T), as B, mg/L	< 0.1	0.1	11/ 1/95 18:28	EPA 200.7	LH
Cadmium (T), as Cd, mg/L	< 0.005	0.005	11/ 1/95 18:28	EPA 200.7	LH
Calcium (T), as Ca, mg/L	49.6	0.2	11/ 1/95 18:28	EPA 200.7	LH
Chromium(T), as Cr, mg/L	< 0.005	0.005	11/ 1/95 18:28	EPA 200.7	LH
Copper (T), as Cu, mg/L	< 0.01	0.01	11/ 1/95 18:28	EPA 200.7	LH
Iron (T), as Fe, mg/L	< 0.04	0.04	11/ 1/95 18:28	EPA 200.7	LH

Approved By: R Dune

(generic.rpt)

801 262 7299 PHONE
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6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

Date: 11/29/95

To: EARTH FAX ENGINEERING
7324 So. 1300 E. STE 100
Midvale, UT 84047

Group #: 4815
Lab #: 95-U035474
Project: MORHLAND
Sample Desc: 16-7-13-1 (SBC-12)

Date Sampled: 10/18/95
Date Submitted: 10/19/95

Time Sampled: 9:30
Time Received: 9:40

CERTIFICATE OF ANALYSIS

PARAMETER	RESULT	MDL	DATE ANALYZED	METHOD	ANALYST
INORGANIC PARAMETERS					
Lead (T), as Pb, mg/L	< 0.01	0.01	11/ 1/95 18:28	EPA 200.7	LH
Magnesium (T), as Mg, mg/L	18.0	0.1	11/ 1/95 18:28	EPA 200.7	LH
Manganese (T), as Mn, mg/L	< 0.01	0.01	11/ 1/95 18:28	EPA 200.7	LH
Molybdnum (T), as Mo, mg/L	< 0.01	0.01	11/ 1/95 18:28	EPA 200.7	LH
Nickel (T), as Ni, mg/L	< 0.01	0.01	11/ 1/95 18:28	EPA 200.7	LH
Potassium (T), as K, mg/L	0.2	0.1	11/ 1/95 18:28	EPA 200.7	LH
Selenium (T), as Se, mg/L	< 0.04	0.04	11/ 1/95 18:28	EPA 200.7	LH
Sodium (T), as Na, mg/L	1.8	0.2	11/ 1/95 18:28	EPA 200.7	LH
Zinc (T), as Zn, mg/l	< 0.02	0.02	11/ 1/95 18:28	EPA 200.7	LH

NOTE: Nitrite was run past holding time due to late arrival and size of project.

Approved By: R Druce

{generic.rpt}

801 262 7299 PHONE
801 262 7378 FAX
6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

Date: 11/ 8/95

To: EARTH FAX ENGINEERING
7324 So. 1300 E. STE 100
Midvale, UT 84047

Group #: 4815
Lab #: 95-U035473
Project: HORSE CANYON
Sample Desc: 16-8-18-4
Date Sampled: 10/18/95
Date Submitted: 10/19/95

CERTIFICATE OF ANALYSIS

PARAMETER	RESULT	MDL	DATE ANALYZED	METHOD	ANALYST
INORGANIC PARAMETERS					
Bicarbonate as HCO3, mg/L	356	1	10/23/95 10:00	SM 2320B	TM
Carbonate as CO3, mg/L	< 1	1	10/23/95 10:00	SM 2320B	TM
Ammonia-Nitrogen, mg/L	< 0.4	0.4	10/29/95 10:00	SM 4500G/F	DI
Chloride, mg/L	3	1	11/ 4/95 10:00	EPA 325.3	TM
Fluoride, mg/L	< 0.2	0.2	10/31/95 11:40	EPA 340.2	DI
Hardness, EDTA Titration, mg/L	275	10	10/25/95 9:30	EPA 130.2	TM
Mercury, as Hg, mg/L	0.0003	0.0002	11/ 6/95 11:45	EPA 245.1	TH
Nitrate, Nitrogen, mg/L	0.20	0.02	11/ 2/95 11:00	EPA 353.1	TH
Nitrite, Nitrogen, mg/L	0.010	0.005	10/20/95 9:30	EPA 354.1	KA
Phosphorus, Total, mg/L	0.05	0.01	10/25/95 15:00	SM 4500-P	KA
Sulfate, mg/L	8	5	11/ 6/95 9:00	EPA 375.4	TM
Sulfide, mg/L	< 0.1	0.1	10/23/95 17:00	EPA 376.1	KA
Total Dissolved Solids, mg/L	239	10	10/25/95 12:00	EPA 160.1	MA
Aluminum (T), as Al, mg/L	0.03	0.02	11/ 1/95 18:26	EPA 200.7	LH
Arsenic (T), as As, mg/L	< 0.02	0.02	11/ 1/95 18:26	EPA 200.7	LH
Barium (T), as Ba, mg/L	0.21	0.02	11/ 1/95 18:26	EPA 200.7	LH
Boron (T), as B, mg/L	< 0.1	0.1	11/ 1/95 18:26	EPA 200.7	LH
Cadmium (T), as Cd, mg/L	< 0.005	0.005	11/ 1/95 18:26	EPA 200.7	LH
Calcium (T), as Ca, mg/L	67.2	0.2	11/ 1/95 18:26	EPA 200.7	LH
Chromium(T), as Cr, mg/L	< 0.005	0.005	11/ 1/95 18:26	EPA 200.7	LH
Copper (T), as Cu, mg/L	< 0.01	0.01	11/ 1/95 18:26	EPA 200.7	LH
Iron (T), as Fe, mg/L	< 0.04	0.04	11/ 1/95 18:26	EPA 200.7	LH
Lead (T), as Pb, mg/L	0.020	0.01	11/ 1/95 18:26	EPA 200.7	LH

Approved By: _____

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SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

Date: 11/ 8/95

To: EARTH FAX ENGINEERING
7324 So. 1300 E. STE 100
Midvale, UT 84047

Group #: 4815
Lab #: 95-U035473
Project: HORSE CANYON
Sample Desc: 16-8-18-4
Date Sampled: 10/18/95
Date Submitted: 10/19/95

CERTIFICATE OF ANALYSIS

PARAMETER	RESULT	MDL	DATE ANALYZED	METHOD	ANALYST
INORGANIC PARAMETERS					
Magnesium (T), as Mg, mg/L	22.1	0.1	11/ 1/95 18:26	EPA 200.7	LH
Manganese (T), as Mn, mg/L	< 0.01	0.01	11/ 1/95 18:26	EPA 200.7	LH
Molybdnum (T), as Mo, mg/L	0.01	0.01	11/ 1/95 18:26	EPA 200.7	LH
Nickel (T), as Ni, mg/L	< 0.01	0.01	11/ 1/95 18:26	EPA 200.7	LH
Potassium (T), as K, mg/L	0.1	0.1	11/ 1/95 18:26	EPA 200.7	LH
Selenium (T), as Se, mg/L	< 0.04	0.04	11/ 1/95 18:26	EPA 200.7	LH
Sodium (T), as Na, mg/L	1.9	0.2	11/ 1/95 18:26	EPA 200.7	LH
Zinc (T), as Zn, mg/L	< 0.02	0.02	11/ 1/95 18:26	EPA 200.7	LH

NOTE: Nitrite was run past holding time due to late arrival and size of project.

Approved By: R Dru

{generic.rpt}

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SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

Date: 11/ 8/95

To: EARTH FAX ENGINEERING
7324 So. 1300 E. STE 100
Midvale, UT 84047

Group #: 4815
Lab #: 95-U035466
Project: HORSE CANYON
Sample Desc: LF-1 (FC-1)
Date Sampled: 10/18/95
Date Submitted: 10/19/95

CERTIFICATE OF ANALYSIS

PARAMETER	RESULT	MDL	DATE ANALYZED	METHOD	ANALYST
INORGANIC PARAMETERS					
Bicarbonate as HCO3, mg/L	419	1	10/23/95 10:00	SM 2320B	TM
Carbonate as CO3, mg/L	9	1	10/23/95 10:00	SM 2320B	TM
Ammonia-Nitrogen, mg/L	< 0.4	0.4	10/27/95 12:40	SM 4500G/F	DI
Chloride, mg/L	13	1	11/ 4/95 10:00	EPA 325.3	TM
Fluoride, mg/L	0.2	0.2	10/31/95 11:40	EPA 340.2	DI
Hardness, EDTA Titration, mg/L	584	10	10/25/95 9:30	EPA 130.2	TM
Mercury, as Hg, mg/L	0.0003	0.0002	11/ 6/95 11:45	EPA 245.1	TH
Nitrate, Nitrogen, mg/L	< 0.16	0.16	10/28/95 14:45	EPA 353.1	TH
Nitrite, Nitrogen, mg/L	0.009	0.005	10/20/95 9:30	EPA 354.1	KA
Phosphorus, Total, mg/L	0.02	0.01	10/25/95 15:00	SM 4500-P	KA
Sulfate, mg/L	318	20	11/ 2/95 11:30	EPA 375.4	TM
Sulfide, mg/L	< 0.1	0.1	10/23/95 17:00	EPA 376.1	KA
Total Dissolved Solids, mg/L	778	10	10/25/95 12:00	EPA 160.1	MA
Aluminum (T), as Al, mg/L	< 0.02	0.02	10/30/95 15:33	EPA 200.7	LH
Arsenic (T), as As, mg/L	< 0.02	0.02	10/30/95 15:33	EPA 200.7	LH
Barium (T), as Ba, mg/L	0.05	0.02	10/30/95 15:33	EPA 200.7	LH
Boron (T), as B, mg/L	0.1	0.1	10/30/95 15:33	EPA 200.7	LH
Cadmium (T), as Cd, mg/L	< 0.005	0.005	10/30/95 15:33	EPA 200.7	LH
Calcium (T), as Ca, mg/L	64.5	0.2	10/30/95 15:33	EPA 200.7	LH
Chromium(T), as Cr, mg/L	< 0.005	0.005	10/30/95 15:33	EPA 200.7	LH
Copper (T), as Cu, mg/L	< 0.01	0.01	10/30/95 15:33	EPA 200.7	LH
Iron (T), as Fe, mg/L	< 0.04	0.04	10/30/95 15:33	EPA 200.7	LH
Lead (T), as Pb, mg/L	< 0.01	0.01	10/30/95 15:33	EPA 200.7	LH

Approved By: R Dulle

{generic.rpt}

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SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

Date: 11/ 8/95

To: EARTH FAX ENGINEERING
7324 So. 1300 E. STE 100
Midvale, UT 84047

Group #: 4815
Lab #: 95-U035466
Project: HORSE CANYON
Sample Desc: LF-1 (FC-1)
Date Sampled: 10/18/95
Date Submitted: 10/19/95

CERTIFICATE OF ANALYSIS

PARAMETER	RESULT	MDL	DATE ANALYZED	METHOD	ANALYST
INORGANIC PARAMETERS					
Magnesium (T), as Mg, mg/L	100	0.1	10/30/95 15:33	EPA 200.7	LH
Manganese (T), as Mn, mg/L	< 0.01	0.01	10/30/95 15:33	EPA 200.7	LH
Molybdnum (T), as Mo, mg/L	< 0.01	0.01	10/30/95 15:33	EPA 200.7	LH
Nickel (T), as Ni, mg/L	< 0.01	0.01	10/30/95 15:33	EPA 200.7	LH
Potassium (T), as K, mg/L	4.6	0.1	10/30/95 15:33	EPA 200.7	LH
Selenium (T), as Se, mg/L	< 0.04	0.04	10/30/95 15:33	EPA 200.7	LH
Sodium (T), as Na, mg/L	47.3	0.2	10/30/95 15:33	EPA 200.7	LH
Zinc (T), as Zn, mg/L	< 0.02	0.02	10/30/95 15:33	EPA 200.7	LH
Oil & Grease, mg/L	< 5	5	10/27/95 14:10	EPA 413.1	RH

NOTE: Nitrite was run past holding time due to late arrival and size of project.
Nitrate has a matrix interference consequently the detection limit was raised.

Approved By: R Drum

{generic.rpt}

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SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

Date: 11/ 8/95

To: EARTH FAX ENGINEERING
7324 So. 1300 E. STE 100
Midvale, UT 84047

Group #: 4815
Lab #: 95-U035465
Project: HORSE CANYON
Sample Desc: RF-1
Date Sampled: 10/18/95
Date Submitted: 10/19/95

CERTIFICATE OF ANALYSIS

PARAMETER	RESULT	MDL	DATE ANALYZED	METHOD	ANALYST
INORGANIC PARAMETERS					
Bicarbonate as HCO3, mg/L	326	1	10/23/95 10:00	SM 2320B	TM
Carbonate as CO3, mg/L	11	1	10/23/95 10:00	SM 2320B	TM
Ammonia-Nitrogen, mg/L	< 0.4	0.4	10/27/95 12:40	SM 4500G/F	DI
Chloride, mg/L	10	1	11/ 4/95 10:00	EPA 325.3	TM
Fluoride, mg/L	< 0.2	0.2	10/31/95 11:40	EPA 340.2	DI
Hardness, EDTA Titration, mg/L	476	10	10/25/95 9:30	EPA 130.2	TM
Mercury, as Hg, mg/L	0.0002	0.0002	11/ 6/95 11:45	EPA 245.1	TH
Nitrate, Nitrogen, mg/L	< 0.02	0.02	10/28/95 14:45	EPA 353.1	TH
Nitrite, Nitrogen, mg/L	0.013	0.005	10/20/95 9:30	EPA 354.1	KA
Phosphorus, Total, mg/L	< 0.01	0.01	10/25/95 15:00	SM 4500-P	KA
Sulfate, mg/L	238	20	11/ 2/95 11:30	EPA 375.4	TM
Sulfide, mg/L	< 0.1	0.1	10/23/95 17:00	EPA 376.1	KA
Total Dissolved Solids, mg/L	620	10	10/25/95 12:00	EPA 160.1	MA
Aluminum (T), as Al, mg/L	< 0.02	0.02	10/30/95 15:31	EPA 200.7	LH
Arsenic (T), as As, mg/L	0.020	0.02	10/30/95 15:31	EPA 200.7	LH
Barium (T), as Ba, mg/L	0.06	0.02	10/30/95 15:31	EPA 200.7	LH
Boron (T), as B, mg/L	< 0.1	0.1	10/30/95 15:31	EPA 200.7	LH
Cadmium (T), as Cd, mg/L	< 0.005	0.005	10/30/95 15:31	EPA 200.7	LH
Calcium (T), as Ca, mg/L	74.8	0.2	10/30/95 15:31	EPA 200.7	LH
Chromium(T), as Cr, mg/L	< 0.005	0.005	10/30/95 15:31	EPA 200.7	LH
Copper (T), as Cu, mg/L	< 0.01	0.01	10/30/95 15:31	EPA 200.7	LH
Iron (T), as Fe, mg/L	< 0.04	0.04	10/30/95 15:31	EPA 200.7	LH
Lead (T), as Pb, mg/L	< 0.01	0.01	10/30/95 15:31	EPA 200.7	LH

Approved By: R Dulle

{generic.rpt}

801 262 7299 PHONE
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6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

CHEMTECH ANALYTICAL LABORATORIES

Date: 11/ 8/95

To: EARTH FAX ENGINEERING
7324 So. 1300 E. STE 100
Midvale, UT 84047

Group #: 4815
Lab #: 95-U035465
Project: HORSE CANYON
Sample Desc: RF-1
Date Sampled: 10/18/95
Date Submitted: 10/19/95

CERTIFICATE OF ANALYSIS

PARAMETER	RESULT	MDL	DATE ANALYZED	METHOD	ANALYST
INORGANIC PARAMETERS					
Magnesium (T), as Mg, mg/L	80.9	0.1	10/30/95 15:31	EPA 200.7	LH
Manganese (T), as Mn, mg/L	< 0.01	0.01	10/30/95 15:31	EPA 200.7	LH
Molybdnum (T), as Mo, mg/L	< 0.01	0.01	10/30/95 15:31	EPA 200.7	LH
Nickel (T), as Ni, mg/L	< 0.01	0.01	10/30/95 15:31	EPA 200.7	LH
Potassium (T), as K, mg/L	2.7	0.1	10/30/95 15:31	EPA 200.7	LH
Selenium (T), as Se, mg/L	< 0.04	0.04	10/30/95 15:31	EPA 200.7	LH
Sodium (T), as Na, mg/L	23.5	0.2	10/30/95 15:31	EPA 200.7	LH
Zinc (T), as Zn, mg/L	< 0.02	0.02	10/30/95 15:31	EPA 200.7	LH
Oil & Grease, mg/L	< 5	5	10/27/95 14:10	EPA 413.1	RH

NOTE: Nitrite was run past holding time due to late arrival and size of project.

Approved By: R Dulle

{generic.rpt}

801 262 7299 PHONE
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6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • TEL: 708-953-9300 FAX: 708-953-9306

NCE 1908

SGS 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 4, 1996

AMERICAN FUELS CORP.
P.O. BOX 279
PRICE, UTAH 84501
GARY GRAY

Sample identification by
AMERICAN FUELS CORP.

IPA SP 16-7-13-1 (SBC-12)

Kind of sample reported to us Water

Sample taken at

Sample taken by Gary Gray

Date sampled July 18, 1996

Date received July 18, 1996

Temperature 58.0°F
Flow 4 GPM
Rec'd 1540 hr.
Sampled 1310 hr.

FIELD MEASUREMENTS

pH	7.70
Conductivity	353
DO	5.6

NOTE: TDS expired when analyzed!

Analysis report no. 59-16309

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	230	5	mg/l as HCO_3	SM2320-B	07-26-1996 0830 SW
Alkalinity, Carbonate	6	5	mg/l as CO_3	SM2320-B	07-26-1996 0830 SW
Aluminum, Total	<1	1	mg/l	EPA 202.1	08-13-1996 1315 MK
Anions	4.3	----	meq/l	---------	08-14-1996 1700 JJ
Arsenic, Total	<0.01	0.01	mg/l	EPA 206.2	08-22-1996 1115 MK
Barium, Total	<1	1	mg/l	EPA 208.1	08-13-1996 1400 MK
Boron, Total	0.1	0.1	mg/l	EPA 212.3	07-22-1996 0700 MK
Cadmium, Total	<0.01	0.01	mg/l	EPA 213.1	08-13-1996 0830 MK
Calcium, Total	53	1	mg/l	EPA 215.1	08-13-1996 1200 MK
Cations	4.7	----	meq/l	---------	08-14-1996 1700 JJ
Chloride	5	1	mg/l	SM4500-Cl-B	07-29-1996 1100 SW
Chromium, Total	<0.1	0.1	mg/l	EPA 218.1	08-13-1996 1330 MK
Copper, Total	<0.1	0.1	mg/l	EPA 220.1	08-13-1996 0715 MK
Fluoride	0.08	0.01	mg/l	SM4500-F-C	08-05-1996 0730 SW
Hardness, Total	215	----	mg/l as $CaCO_3$	SM2340-B	08-14-1996 1700 JJ
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	08-13-1996 1000 MK
Lead, Total	<0.1	0.1	mg/l	EPA 239.1	08-13-1996 0900 MK
Magnesium, Total	20	1	mg/l	EPA 242.1	08-13-1996 1230 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	08-13-1996 1015 MK
Mercury, Total	<0.2	0.2	ug/l	EPA 245.1	08-05-1996 0700 MK
Molybdenum, Total	<0.1	0.1	mg/l	EPA 246.1	08-13-1996 1430 MK
Nickel, Total	<0.1	0.1	mg/l	EPA 249.1	08-13-1996 0800 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	08-08-1996 0800 SW
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l as N	EPA 353.3	08-02-1996 0700 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.
Larry Stout
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

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

September 4, 1996

AMERICAN FUELS CORP.
P.O. BOX 279
PRICE, UTAH 84501
GARY GRAY

Sample identification by
AMERICAN FUELS CORP.

IPA SP 16-7-13-1 (SBC-12)

Kind of sample reported to us Water

Sample taken at

Sample taken by Gary Gray

Date sampled July 18, 1996

Date received July 18, 1996

Temperature 58.0°F
Flow 4 GPM
Rec'd 1540 hr.
Sampled 1310 hr.

FIELD MEASUREMENTS

pH	7.70
Conductivity	353
DO	5.6

NOTE: TDS expired when analyzed!

Analysis report no. 59-16309

Parameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst	
Nitrogen, Nitrite	<0.01	0.01	mg/l as	N	EPA 354.1	07-19-1996 0930	JC
Oil & Grease	<2	4	mg/l		SM5520-B	08-01-1996 0700	JC
Phosphorous, Ortho-PO_4	<0.01	0.01	mg/l as	P	SM4500-P-E	07-19-1996 0900	JC
Phosphorous, Total	<0.05	0.05	mg/l as	P	SM4500-P-B,E	08-08-1996 0645	MK
Potassium, Total	<1	1	mg/l		EPA 258.1	08-13-1996 1045	MK
Selenium, Total	<0.01	0.01	mg/l		EPA 270.2	09-03-1996 0800	MK
Sodium, Total	2	1	mg/l		EPA 273.1	08-13-1996 1115	MK
Solids, Total Dissolved	220	10	mg/l		EPA 160.1	07-29-1996 0700	JC
Solids, Total Suspended	<5	5	mg/l		EPA 160.2	07-25-1996 0830	AR
Sulfate	7	1	mg/l		EPA 375.4	08-01-1996 0900	SW
Sulfide	<1.0	0.1	mg/l		EPA 376.1	07-31-1996 1100	JJ
Zinc, Total	<0.01	0.01	mg/l		EPA 289.1	08-13-1996 0730	MK
Cation/Anion Balance	5.3	----	%			08-14-1996 1700	JJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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

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

September 3, 1996

AMERICAN FUELS CORP.
P.O. BOX 279
PRICE, UTAH 84501
GARY GRAY

Sample identification by
AMERICAN FUELS CORP.

IPA SP 16-8-18-4

Kind of sample reported to us Water

Sample taken at

Sample taken by Gary Gray

Date sampled July 18, 1996

Date received July 18, 1996

Temperature 56.0°F
Flow 2 GPM
Rec'd 1540 hr.
Sampled 1145 hr.

FIELD MEASUREMENTS

pH	6.90
Conductivity	475
DO	7.9

NOTE: TDS expired when analyzed!
Dissolved metals filtered at lab!

Analysis report no. 59-16308

Parameter	Result	MRL	Units			Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	336	5	mg/l	as	HCO_3	SM2320-B	07-26-1996 0830	SW
Alkalinity, Carbonate	5	5	mg/l	as	CO_3	SM2320-B	07-26-1996 0830	SW
Aluminum, Total	<1	1	mg/l			EPA 202.1	08-13-1996 1315	MK
Anions	6.0	----	meq/l			---------	08-14-1996 1700	JJ
Arsenic, Total	<0.01	0.01	mg/l			EPA 206.2	08-22-1996 1115	MK
Barium, Total	<1	1	mg/l			EPA 208.1	08-13-1996 1400	MK
Boron, Total	0.1	0.1	mg/l			EPA 212.3	07-22-1996 0700	MK
Cadmium, Total	<0.01	0.01	mg/l			EPA 213.1	08-13-1996 0830	MK
Calcium, Total	82	1	mg/l			EPA 215.1	08-13-1996 1200	MK
Cations	6.1	----	meq/l			---------	08-14-1996 1700	JJ
Chloride	6	1	mg/l			SM4500-Cl-B	07-29-1996 1100	SW
Chromium, Total	<0.1	0.1	mg/l			EPA 218.1	08-13-1996 1330	MK
Copper, Total	<0.1	0.1	mg/l			EPA 220.1	08-13-1996 0715	MK
Fluoride	0.10	0.01	mg/l			SM4500-F-C	08-05-1996 0730	SW
Hardness, Total	299	----	mg/l	as	$CaCO_3$	SM2340-B	08-14-1996 1700	JJ
Iron, Dissolved	<0.1	0.1	mg/l			EPA 236.1	08-13-1996 1000	MK
Lead, Total	<0.1	0.1	mg/l			EPA 239.1	08-13-1996 0900	MK
Magnesium, Total	23	1	mg/l			EPA 242.1	08-13-1996 1230	MK
Manganese, Total	<0.1	0.1	mg/l			EPA 243.1	08-13-1996 1015	MK
Mercury, Total	<0.2	0.2	ug/l			EPA 245.1	08-05-1996 0700	MK
Molybdenum, Total	<0.1	0.1	mg/l			EPA 246.1	08-13-1996 1430	MK
Nickel, Total	<0.1	0.1	mg/l			EPA 249.1	08-13-1996 0800	MK
Nitrogen, Ammonia	<0.5	0.5	ag/l	as	N	EPA 350.3	08-08-1996 0800	SW
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l	as	N	EPA 353.3	08-02-1996 0700	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 3, 1996

AMERICAN FUELS CORP.
P.O. BOX 279
PRICE, UTAH 84501
GARY GRAY

Sample identification by
AMERICAN FUELS CORP.

IPA SP 16-8-18-4

Kind of sample Water
reported to us

Sample taken at

Sample taken by Gary Gray

Date sampled July 18, 1996

Date received July 18, 1996

Temperature 56.0°F
Flow 2 GPM
Rec'd 1540 hr.
Sampled 1145 hr.

FIELD MEASUREMENTS

pH	6.90
Conductivity	475
DO	7.9

NOTE: TDS expired when analyzed!
Dissolved metals filtered at lab!

Analysis report no. 59-16308

Parameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst	
Nitrogen, Nitrite	<0.01	0.01	mg/l as	N	EPA 354.1	07-19-1996 0930	JC
Oil & Grease	<2	4	mg/l		SM5520-B	08-01-1996 0700	JC
Phosphorous, Ortho-PO_4	<0.01	0.01	mg/l as	P	SM4500-P-E	07-19-1996 0900	JC
Phosphorous, Total	<0.05	0.05	mg/l as	P	SM4500-P-B,E	08-08-1996 0645	MK
Potassium, Total	<1	1	mg/l		EPA 258.1	08-13-1996 1045	MK
Selenium, Total	<0.01	0.01	mg/l		EPA 270.2	09-03-1996 0800	MK
Sodium, Total	2	1	mg/l		EPA 273.1	08-13-1996 1115	MK
Solids, Total Dissolved	322	10	mg/l		EPA 160.1	07-29-1996 0700	JC
Solids, Total Suspended	<5	5	mg/l		EPA 160.2	07-25-1996 0830	AR
Sulfate	7	1	mg/l		EPA 375.4	08-01-1996 0900	SW
Sulfide	<1.0	0.1	mg/l		EPA 376.1	07-31-1996 1100	JJ
Zinc, Total	0.10	0.01	mg/l		EPA 289.1	08-13-1996 0730	MK
Cation/Anion Balance	0.9	----	%			08-14-1996 1700	JJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

September 3, 1996

AMERICAN FUELS CORP.
P.O. BOX 279
PRICE, UTAH 84501
GARY GRAY

Sample identification by
AMERICAN FUELS CORP.

IPA SP 16-8-20-1

Kind of sample reported to us Water

Sample taken at

Sample taken by Gary Gray

Date sampled July 19, 1996

Date received July 19, 1996

Temperature 53.0°F
Flow 1 GPM
Rec'd 1550 hr.
Sampled 0945 hr.

FIELD MEASUREMENTS

pH	7.65
Conductivity	520
DO	5.7

NOTE:TDS expired when analyzed!
Dissolved metals filtered at lab!

Analysis report no. 59-16315

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	364	5	mg/l as HCO_3	SM2320-B	07-26-1996 0830 SW
Alkalinity, Carbonate	7	5	mg/l as CO_3	SM2320-B	07-26-1996 0830 SW
Aluminum, Total	<1	1	mg/l	EPA 202.1	08-15-1996 1345 MK
Anions	6.8	----	meq/l	---------	08-16-1996 1330 JJ
Arsenic, Total	<0.01	0.01	mg/l	EPA 206.2	08-22-1996 1115 MK
Barium, Total	<1	1	mg/l	EPA 208.1	08-15-1996 1430 MK
Boron, Total	0.2	0.1	mg/l	EPA 212.3	07-22-1996 0700 MK
Cadmium, Total	<0.01	0.01	mg/l	EPA 213.1	08-15-1996 0845 MK
Calcium, Total	83	1	mg/l	EPA 215.1	08-15-1996 1230 MK
Cations	6.8	----	meq/l	---------	08-16-1996 1330 JJ
Chloride	7	1	mg/l	SM4500-Cl-B	07-29-1996 1100 SW
Chromium, Total	<0.1	0.1	mg/l	EPA 218.1	08-15-1996 1400 MK
Copper, Total	<0.1	0.1	mg/l	EPA 220.1	08-15-1996 0730 MK
Fluoride	0.16	0.01	mg/l	SM4500-F-C	08-05-1996 1200 SW
Hardness, Total	323	----	mg/l as $CaCO_3$	SM2340-B	08-16-1996 1330 JJ
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	08-15-1996 1000 MK
Lead, Total	<0.1	0.1	mg/l	EPA 239.1	08-15-1996 0900 MK
Magnesium, Total	28	1	mg/l	EPA 242.1	08-15-1996 1245 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	08-15-1996 1030 MK
Mercury, Total	<0.2	0.2	ug/l	EPA 245.1	08-06-1996 0800 MK
Molybdenum, Total	<0.1	0.1	mg/l	EPA 246.1	08-15-1996 1445 MK
Nickel, Total	<0.1	0.1	mg/l	EPA 249.1	08-15-1996 0830 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	08-08-1996 1210 SW
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	08-02-1996 0700 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.
Larry Stout
Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

September 3, 1996

AMERICAN FUELS CORP.
P.O. BOX 279
PRICE, UTAH 84501
GARY GRAY

Sample identification by
AMERICAN FUELS CORP.

IPA SP 16-8-20-1

Kind of sample reported to us Water

Sample taken at

Sample taken by Gary Gray

Date sampled July 19, 1996

Date received July 19, 1996

Temperature 53.0°F
Flow 1 GPM
Rec'd 1550 hr.
Sampled 0945 hr.

FIELD MEASUREMENTS

pH	7.65
Conductivity	520
DO	5.7

NOTE: TDS expired when analyzed!
Dissolved metals filtered at lab!

Analysis report no. 59-16315

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	07-19-1996 0930 JC
Oil & Grease	<2	4	mg/l	SM5520-B	08-01-1996 0700 JC
Phosphorous, Ortho-PO_4	<0.01	0.01	mg/l as P	SM4500-P-E	07-19-1996 0900 JC
Phosphorous, Total	0.06	0.05	mg/l as P	SM4500-P-B,E	08-09-1996 0630 MK
Potassium, Total	2	1	mg/l	EPA 258.1	08-15-1996 1100 MK
Selenium, Total	<0.01	0.01	mg/l	EPA 270.2	09-03-1996 0800 MK
Sodium, Total	8	1	mg/l	EPA 273.1	08-15-1996 1130 MK
Solids, Total Dissolved	348	10	mg/l	EPA 160.1	07-29-1996 0700 JC
Solids, Total Suspended	6	5	mg/l	EPA 160.2	07-25-1996 0830 AR
Sulfate	18	1	mg/l	EPA 375.4	08-01-1996 1230 SW
Sulfide	<1.0	0.1	mg/l	EPA 376.1	07-31-1996 1600 JJ
Zinc, Total	<0.01	0.01	mg/l	EPA 289.1	08-15-1996 0800 MK
Cation/Anion Balance	0.5	----	%		08-16-1996 1330 JJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.
Larry Stout
Huntington Laboratory

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FAX: (801) 653-2436

August 19, 1996

AMERICAN FUELS CORP.
P.O. BOX 279
PRICE, UTAH 84501
GARY GRAY

Kind of sample reported to us: Water

Sample taken at:

Sample taken by: Gary Gray

Date sampled: July 16, 1996

Date received: July 16, 1996

Sample identification by
AMERICAN FUELS CORP.

IPA LF-1 (FC-1)
Temperature 66.0°F
Flow 226 GPM
Rec'd 1550 hr.
Sampled 1245 hr.

FIELD MEASUREMENTS

pH	8.30
Conductivity	550
DO	7.2

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-16288

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	286	5	mg/l as HCO_3	SM2320-B	07-24-1996 1000 SW
Alkalinity, Carbonate	6	5	mg/l as CO_3	SM2320-B	07-24-1996 1000 SW
Alkalinity, Total	245	5	mg/l as $CaCO_3$	EPA 310.1	07-24-1996 1000 SW
Aluminum, Total	<1	1	mg/l	EPA 202.1	08-13-1996 1315 MK
Anions	7.1	----	meq/l	---------	08-14-1996 1700 JJ
Arsenic, Total	<0.01	0.01	mg/l	EPA 206.2	07-25-1996 0500 MK
Barium, Total	<1	1	mg/l	EPA 208.1	08-13-1996 1400 MK
Boron, Total	0.2	0.1	mg/l	EPA 212.3	07-22-1996 0700 MK
Cadmium, Total	<0.01	0.01	mg/l	EPA 213.1	08-13-1996 0830 MK
Calcium, Total	48	1	mg/l	EPA 215.1	08-13-1996 1200 MK
Cations	7.2	----	meq/l	---------	08-14-1996 1700 JJ
Chloride	8	1	mg/l	SM4500-Cl-B	08-29-1996 0800 SW
Chromium, Total	<0.1	0.1	mg/l	EPA 218.1	08-13-1996 1330 MK
Copper, Total	<0.1	0.1	mg/l	EPA 220.1	08-13-1996 0715 MK
Fluoride	0.19	0.01	mg/l	SM4500-F-C	08-05-1996 0730 SW
Hardness, Total	327	----	mg/l as $CaCO_3$	SM2340-B	08-14-1996 1700 JJ
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	08-13-1996 1000 MK
Lead, Total	<0.1	0.1	mg/l	EPA 239.1	08-13-1996 0900 MK
Magnesium, Total	52	1	mg/l	EPA 242.1	08-13-1996 1230 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	08-13-1996 1015 MK
Mercury, Total	<0.2	0.2	ug/l	EPA 245.1	08-05-1996 0700 MK
Molybdenum, Total	<0.1	0.1	mg/l	EPA 246.1	08-13-1996 1430 MK
Nickel, Total	<0.1	0.1	mg/l	EPA 249.1	08-13-1996 0800 MK
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	08-07-1996 0730 SW

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.
Larry Stout JJ.
Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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FAX: (801) 653-2436

August 19, 1996

AMERICAN FUELS CORP.
P.O. BOX 279
PRICE, UTAH 84501
GARY GRAY

Kind of sample reported to us: Water

Sample taken at:

Sample taken by: Gary Gray

Date sampled: July 16, 1996

Date received: July 16, 1996

Sample identification by
AMERICAN FUELS CORP.

IPA LF-1 (FC-1)
Temperature 66.0°F
Flow 226 GPM
Rec'd 1550 hr.
Sampled 1245 hr.

FIELD MEASUREMENTS

pH	8.30
Conductivity	550
DO	7.2

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-16288

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	08-01-1996 0700 JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	07-17-1996 1030 JC
Oil & Grease	<2	4	mg/l	SM5520-B	07-31-1996 0700 JC
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	07-17-1996 0800 JC
Phosphorous, Total	0.05	0.05	mg/l as P	SM4500-P-B,E	08-08-1996 0645 MK
Potassium, Total	2	1	mg/l	EPA 258.1	08-13-1996 1045 MK
Selenium, Total	<0.01	0.01	mg/l	EPA 270.2	07-25-1996 1200 MK
Sodium, Total	15	1	mg/l	EPA 273.1	08-13-1996 1115 MK
Solids, Total Dissolved	350	10	mg/l	EPA 160.1	07-19-1996 0700 JC
Solids, Total Suspended	49	5	mg/l	EPA 160.2	07-23-1996 1430 AR
Sulfate	97	100	mg/l	EPA 375.4	07-30-1996 1100 SW
Sulfide	3.0	0.1	mg/l	EPA 376.1	07-31-1996 1100 JJ
Zinc, Total	<0.01	0.01	mg/l	EPA 289.1	08-13-1996 0730 MK
Cation/Anion Balance	0.7	----	%		08-14-1996 1700 JJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.
Larry Stout
Huntington Laboratory

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August 19, 1996

AMERICAN FUELS CORP.
P.O. BOX 279
PRICE, UTAH 84501
GARY GRAY

Sample identification by
AMERICAN FUELS CORP.

IPA RF-1
Temperature 70.0°F
Flow 191 GPM
Rec'd 1550 hr.
Sampled 1240 hr.

FIELD MEASUREMENTS

pH	8.00
Conductivity	594
DO	6.3

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at

Sample taken by Gary Gray

Date sampled July 16, 1996

Date received July 16, 1996

Analysis report no. 59-16289

Parameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	219	5	mg/l	as HCO_3	SM2320-B	07-24-1996 1000	SW
Alkalinity, Carbonate	47	5	mg/l	as CO_3	SM2320-B	07-24-1996 1000	SW
Alkalinity, Total	257	5	mg/l	as $CaCO_3$	EPA 310.1	07-24-1996 1000	SW
Aluminum, Total	<1	1	mg/l		EPA 202.1	08-13-1996 1315	MK
Anions	7.9	----	meq/l		---------	08-14-1996 1700	JJ
Arsenic, Total	<0.01	0.01	mg/l		EPA 206.2	07-25-1996 0500	MK
Barium, Total	<1	1	mg/l		EPA 208.1	08-13-1996 1400	MK
Boron, Total	0.2	0.1	mg/l		EPA 212.3	07-22-1996 0700	MK
Cadmium, Total	<0.01	0.01	mg/l		EPA 213.1	08-13-1996 0830	MK
Calcium, Total	52	1	mg/l		EPA 215.1	08-13-1996 1200	MK
Cations	7.5	----	meq/l		---------	08-14-1996 1700	JJ
Chloride	9	1	mg/l		SM4500-Cl-B	07-29-1996 0800	SW
Chromium, Total	<0.1	0.1	mg/l		EPA 218.1	08-13-1996 1330	MK
Copper, Total	<0.1	0.1	mg/l		EPA 220.1	08-13-1996 0715	MK
Fluoride	0.14	0.01	mg/l		SM4500-F-C	08-05-1996 0730	SW
Hardness, Total	344	----	mg/l	as $CaCO_3$	SM2340-B	08-14-1996 1700	JJ
Iron, Dissolved	<0.1	0.1	mg/l		EPA 236.1	08-13-1996 1000	MK
Lead, Total	<0.1	0.1	mg/l		EPA 239.1	08-13-1996 0900	MK
Magnesium, Total	52	1	mg/l		EPA 242.1	08-13-1996 1230	MK
Manganese, Total	<0.1	0.1	mg/l		EPA 243.1	08-13-1996 1015	MK
Mercury, Total	<0.2	0.2	ug/l		EPA 245.1	08-05-1996 0700	MK
Molybdenum, Total	<0.1	0.1	mg/l		EPA 246.1	08-13-1996 1430	MK
Nickel, Total	<0.1	0.1	mg/l		EPA 249.1	08-13-1996 0800	MK
Nitrogen, Ammonia	<0.5	0.5	mg/l	as N	EPA 350.3	08-07-1996 0730	SW

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.
Gary Stout
JJ.
Huntington Laboratory

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August 19, 1996

AMERICAN FUELS CORP.
P.O. BOX 279
PRICE, UTAH 84501
GARY GRAY

Sample identification by
AMERICAN FUELS CORP.

IPA RF-1
Temperature 70.0°F
Flow 191 GPM
Rec'd 1550 hr.
Sampled 1240 hr.

FIELD MEASUREMENTS

pH	8.00
Conductivity	594
DO	6.3

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at

Sample taken by Gary Gray

Date sampled July 16, 1996

Date received July 16, 1996

Analysis report no. 59-16289

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	08-01-1996 0700 AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	07-17-1996 1030 JC
Oil & Grease	<2	4	mg/l	SM5520-B	07-31-1996 0700 JC
Phosphorous, Ortho-PO_4	<0.01	0.01	mg/l as P	SM4500-P-E	07-17-1996 0800 JC
Phosphorous, Total	<0.05	0.05	mg/l as P	SM4500-P-B,E	08-08-1996 0645 MK
Potassium, Total	1	1	mg/l	EPA 258.1	08-13-1996 1045 MK
Selenium, Total	<0.01	0.01	mg/l	EPA 270.2	07-25-1996 1200 MK
Sodium, Total	13	1	mg/l	EPA 273.1	08-13-1996 1115 MK
Solids, Total Dissolved	403	10	mg/l	EPA 160.1	07-19-1996 0700 JC
Solids, Total Suspended	<5	5	mg/l	EPA 160.2	07-23-1996 1430 AR
Sulfate	118	10	mg/l	EPA 375.4	07-30-1996 1100 SW
Sulfide	<1.0	0.1	mg/l	EPA 376.1	07-31-1996 1100 JJ
Zinc, Total	<0.01	0.01	mg/l	EPA 289.1	08-13-1996 0730 MK
Cation/Anion Balance	- 2.9	----	%		08-14-1996 1700 JJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.
Larry Stout
JJ.
Huntington Laboratory

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P.O. BOX 1020, HUNTINGTON, UT 84526
TEL (801) 653-2311
FAX (801) 653-2436

October 18, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

FBC 6 (SMH-1)

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 29, 1993

Date received: August 30, 1993

Rec'd 1100 hr.
Sampled 1430 hr.

NOTE: DUE TO SPILLAGE IN LAB, METALS WERE RUN ON PLAIN BOTTLE. FLUORIDE NOT DISTILLED. CALCIUM DETERMINED ON UNDIGESTED SAMPLE.

Analysis report no. 59-13475

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	301	2	mg/l	$CaCO_3$	EPA 310.1	09 08 [illegible]
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	09 08 [illegible]
Alkalinity, Total	247	2	mg/l	$CaCO_3$	EPA 310.1	09 08 [illegible]
Aluminum	0	.05	mg/l		EPA 200.7	09 15 [illegible]
Anions	5.45	----	meq/l		--- -	
Arsenic	<0.002	.002	mg/l		EPA 206.2	09-21 1993 1015
Barium	0.1	.005	mg/l		EPA 200.7	09 15 [illegible]
Boron	<0.05	.01	mg/l		EPA 200.7	09 16 [illegible]
Cadmium	<0.0050	.005	mg/l		EPA 200.7	09 15 [illegible]
Calcium	71.0	.1	mg/l		EPA 200.7	09 15 1993 [illegible]
Cations	5.62	----	meq/l		---------	
Chloride	6.3	.5	mg/l		EPA 325.3	09 07 [illegible]
Chromium	<0.0	.005	mg/l		EPA 200.7	09 15 1993 [illegible]
Copper	<0.01	.005	mg/l		EPA 200.7	09-15 1993 [illegible]
Fluoride	0.39	.02	mg/l		EPA 340.2	09 [illegible]
Hardness, Total	263.6	.03	mg/l	$CaCO_3$	---------	09-15 1993 [illegible]
Iron	0.04	.01	mg/l		EPA 200.7	09-15 [illegible]
Lead	<0.050	.05	mg/l		EPA 200.7	09-15 1993 [illegible]
Magnesium	38.00	.1	mg/l		EPA 200.7	09 15 [illegible]
Manganese	<0.01	.01	mg/l		EPA 200.7	09 [illegible]
Mercury	<0.0040	.0002	mg/l		EPA 245.1	09 [illegible]
Molybdenum	<0.1	.1	mg/l		EPA 200.7	09 15 [illegible]
Nickel	<0.01	.01	mg/l		EPA 200.7	09 15 [illegible]
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	09 [illegible]

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO

Manager, Huntington Laboratory

Attachment 7M-B

1991 Spring and Seep Inventory

SPRING AND SEEP INVENTORY

CO-OP BEAR CANYON MINE FEDERAL LEASE

SCOPE

An inventory was conducted on the Co-Op Mine Lease areas during June, 1990. The purpose of the inventory was to establish locations of seeps and springs within the actual permit area as well as a one-half mile periphery area which could feasibly be impacted through future subsidence. The inventory was designed to not only locate, but to establish baseline data relative to both quantitative and qualitative parameters of each site where springs were observed which had greater than 2 gpm. The area in question is defined on Figure 1.

METHODOLOGY

June 18, 1990, an aerial survey reconnaissance of the permit area was conducted by 3 staff members from E.I.S.. The purpose of the reconnaissance was to locate evidence of surface water through actual observation as well as suspect areas of moisture which would be indicated by a lushness of vegetation and/or indicator species such as willow, or cottonwood trees. An aerial survey was beneficial also in establishing a plan to contour ground search the area due to the extreme roughness of the terrain and limited access by any means other than foot.

With the information secured from the aerial survey, the U.S.F.S. was contacted and a search of their files was conducted to locate all existing water rights within the survey area. A copy of the rights are attached as Table 2. The location of all existing water rights were plotted on Figure 1 and correlated against the observation from the aerial survey. These water rights which fell within the area of potential influence were then confirmed with actual ground sightings. The results of the ground observations are recorded on Table 1 with photographs in Appendix #1.

The final phase was to conduct a ground survey of the entire area of potential influence. The method involved a 100% survey of all areas which could theoretically be impacted through mining activities; then to walk all areas within the area of influence at approximately a 200' interval (where accessible) with particular emphasis on all draws and drainage areas. This was accomplished by utilizing a four man team. Access to the ridge was gained by the road up Mohrland. then across Gentry Mt. to McCadden Hollow, then, a jeep trail down the main ridge separating Bear and Trail Canyons. Three men would be let out along the ridge, then contour search the side hills and canyon bottoms to the lower road where they would be picked up. Due to extreme roughness of the terrain and the time involved in transport, an normal working day was limited to approximately 6 hours. Each man carried with him, 2 sets of sample bottles, a thermometer, Ph and Conductivity meters, and the means to determine flow through time-volume materials. When a spring or seep was observed, its location was plotted on a map. If there was flow, it was measured as to volume, temperature, and Ph and Conductivity. There were no springs within the survey area (that were accessible) with flows in excess of 2 gpm's. The upper region of Bear Canyon was inaccessible and the main flow of Bear Creek originates approximately 300' below the ridge. This area is not accessible by conventional means, however, Bear Creek has been historically sampled by Co-Op Mine over the last 9 years.

CONCLUSIONS AND RESULTS

The area of potential influence in association with underground mining of the lease areas had springs and or seeps. There were a total of 14 seeps and/or springs that were located; none of these had sufficient flow to collect qualitative samples. The flow from 9 of the sampled springs was less then .5 gpm. Only 1 site had in excess of 2 gpm. These are labeled on Figure 1 as BL-8. BL-8 is associated with Water Right # 714 with a flow of 2 gpm. This spring is located at the outer edge of the area of potential influence and is the only source which has a well

defined outfall and established riparian zone. It is believed to be a permanent year-round source of water. M-4, (USFS # 142) has a flow of .25 gpm at the source but then diminishes to 0 gpm within approximately 200 ft. of channel. The absence of a well defined riparian zone leads to the assumption that this spring is of an intermittent nature and is most likely dry during the fall of the year.

All of the remaining springs and seeps had a very small area of influence with virtually no surface flow beyond 10' to 15' and no defined riparian zones other than that a minor lushness of vegetation in the immediate area of influence. There was no riparian based vegetation but simply a lushness of vegetation which was indigenous to the surrounding area. Table 1 lists each spring and seep with flow.

RECOMMENDATIONS

Only 1 spring has sufficient flow to warrant baseline monitoring. This constitutes the head water of Bear Creek BL-8. Due to the nature and location of this, it would necessitate an experienced rock climber to collect at the source, considering that the creek is sampled with 1300 to 1600 feet of the source, it would seem redundant to re-initiate baseline data in this inaccessible area.

CONCLUSIONS

It is apparent after the survey, that surface water is conspicuously absent over the majority of the proposed lease area. In this light, all effort should be made to maintain the integrity of the existing springs. However, due to the amount of overburden and depth of the coal seam, no adverse impacts appear likely; in fact, the general consequence of the existing mining operation with its associated sediment control structures and ponds has resulted in a positive benefit to Bear Creek in eliminating considerable sediment as the creek transverses the existing permit area.

Table 1

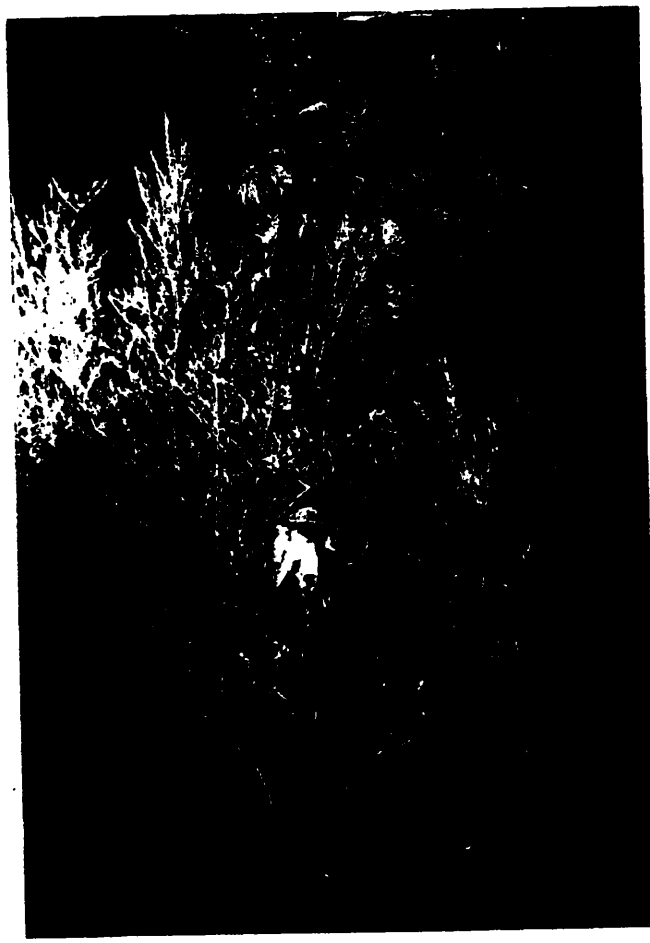
BL-1	Spring	.3 gpm	
BL-2	Spring	.5 gpm	
BL-3	Seep	No Flow	
BL-3a	Associated seep	No Flow	
BL-4	Spring	.5 gpm	
BL-5	Spring	.5 gpm	
BL-6	Spring	.5 gpm	
BL-7	Spring	.5 gpm	
BL-8	Spring	2+ gpm	Main source
M-1a			
M-1b	Intermittant in main drainage		
M-1c			
M-2	Spring	.5 gpm	
M-3	Spring	.25 gpm	
M-4	Spring	.25 gpm	
T-1	Seep	.1 gpm	puddled

Table 2

USFS 712	Channel Area 151
USFS 714	Channel Area 142
USFS 713	Off Area of Influence

M-2

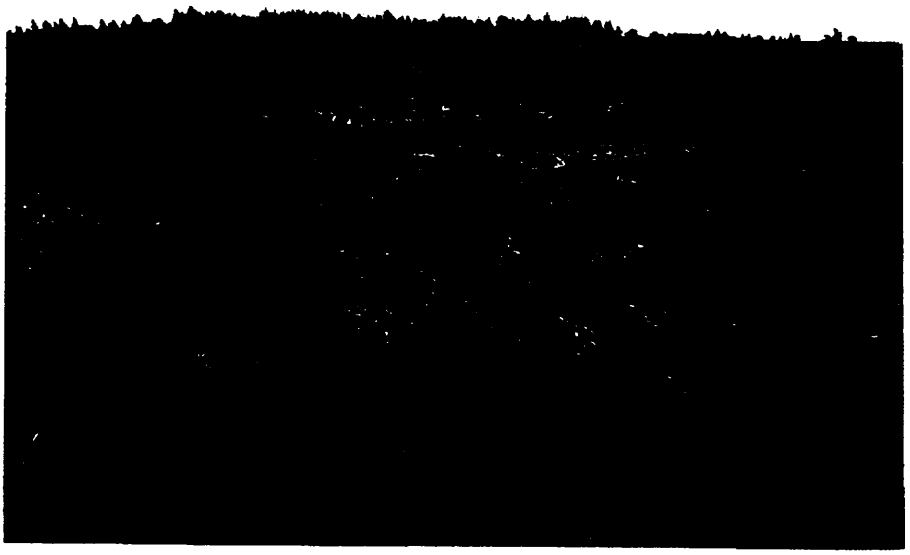
M-3



BL-3

BL-4

BL-5



BL-6 BL-7

SPRING AND SEEP INVENTORY

CO-OP MINING CO. FEDERAL LEASES

AUGUST, 1991

Prepared by:

Environmental Industrial Services

P.O. Box 358

Elmo, Utah

SPRING AND SEEP INVENTORY

CO-OP MINING FEDERAL LEASES

SCOPE

An inventory was conducted on the Bear Canyon Mine Lease area during July and August, 1991. The purpose of the inventory was to establish locations of seeps and springs within the actual permit area as well as a one-quarter mile periphery area which could feasibly be impacted through future subsidence. The inventory was designed to not only locate, but to establish baseline data relative to both quantitative and qualitative parameters of each site where springs were observed which had flowsgreater than .2 gpm. The area in question is defined on Figure 1.

METHODOLOGY

July 28, 1991, an aerial survey reconnaissance of the permit area was conducted by 3 staff members from E.I.S.. The purpose of the reconnaissance was to locate evidence of surface water through actual observation as well as suspect areas of moisture which would be indicated by a lushness of vegetation and/or indicator species such as willow, or cottonwood trees. An aerial survey was beneficial also in establishing a plan to contour ground search the area due to the extreme roughness of the terrain and limited access by any means other than foot.

With the information secured from the aerial survey, the U.S.F.S. was contacted and a search of their files was conducted to locate all existing water rights within the survey area. A copy of the rights are attached as Table 2. The location of all existing water rights were plotted on Figure 1 and correlated against the observation from the aerial survey. These water rights which fell within the area of potential influence were then confirmed with actual ground sightings. The results of the ground observations are recorded on Table 1 with lab analysis in Appendix #1.

The final phase was to conduct a ground survey of the entire area of potential influence. The method involved a 100% survey of all areas which could theoretically be impacted through mining activities; then to walk all areas within the area of influence at approximately a 200' interval (where accessible) with particular emphasis on all draws and drainage areas. This was accomplished by utilizing a four to six man team. Access to the ridge was gained by the road up Cedar Creek from Mohrland, then across Gentry Mt. to the Lease area, then along jeep trails down the main ridges. Three to five men would be let out along the ridge, then contour search the side hills and canyon bottoms to the lower road where they would be picked up. Due to extreme roughness of the terrain and the time involved in transport, an normal working day was limited to approximately 6 hours. Each man carried with him, 2 sets of sample bottles, a thermometer, Ph and Conductivity meters, and the means to determine flow through

time-volume materials. When a spring or seep was observed, its location was plotted on a map. If there was flow, it was measured as to volume, temperature, and Ph and Conductivity.

CONCLUSIONS AND RESULTS

The area of potential influence in association with underground mining of the lease areas had springs and or seeps. There were a total of 25 seeps and/or springs that were located; 24 of these had sufficient flow to collect qualitative samples. The flow from 1 of the sampled springs was less than .5 gpms. The balance of the sites had in excess of 1 gpm. A brief description of each site and field data is as follows:

Table 1

Identification #		Flow	PH	Cond.	Date
# 1	Fish Creek	120	7.9	800	7/30/91
# 2	L.F. Fish Creek	2.5	7.6	500	7/31/91
# 3	Rt. F. Fish Creek	80	7.6	500	7/31/91
# 4	Head of L.F. Fish Creek	20	8.3	1050	7/30/91
# 5	Head of L.F. Fish Creek	31	8.2	600	7/30/91
# 6	Head of L.F. Fish Creek	40	8.2	450	7/30/91
# 7	Wild Horse Ridge Pt.	5	8.1	500	7/31/91
# 8	Wild Horse Ridge Trough	10	8	500	7/31/91
# 9	RF, RF Bear	4.7	8.1	510	8/08/91
#10	LF, RF Bear	>.2	8	1450	7/31/91
#11	McCadden Hollow	1.5	7.9	800	7/31/91
#12	McCadden Hollow	12	8.05	550	8/01/91
#13	McCadden Hollow	1.5	8	450	8/01/91
#14	McCadden Hollow Trough	8.7	7.5	500	8/01/91
#15	McCadden Hollow Trough	8.5	8	550	8/02/91
#16	(7 locations)	9.8	8.4	500	8/02/91
#17	Spring (Fish Creek)	2.1	8.2	700	7/30/91
#18	Tie Fork Above Fence	5	7.6	450	8/07/91
#19	Tie Fork Below Fence	22.4	7.6	480	8/07/91
#20	Main Creek Tie Fork	120	8	500	8/08/91

Table 1 (Continued)

Identification #		Flow	PH	Cond.	Date
#21	Side Canyon Hunt. Creek	15	8.4	300	8/08/91
#22	Head of Trail Creek	9	7.8	450	8/07/91
#23	Huntington Canyon (Hwy)	2.4 seep area	7.8	2000	8/08/91
#24	Wild Horse Ridge (Top side canyon)	4	8.1	450	8/08/91
#25	Head of Bear Creek	7.8	8.2	2000	8/08/91

RECOMMENDATIONS:

A number of the sources located are presently being monitored or have been historically monitored. A determination by Co-Op Mining Company, the U.S. Forest Service, Division of Oil, Gas & Mining and other concerned agencies should make a determination as to when and what new sources should be incorporated into the monitoring plan.

CONCLUSIONS:

It is apparent after the survey, that surface water is widely dispersed over the majority of the proposed lease area. In this light, all effort should be made to maintain the integrity of the existing springs. However, due to the amount of overburden and depth of the coal seam, no adverse impacts appear likely; in fact, the general consequence of the existing mining operation with its associates sediment control structures and ponds has resulted in a positive benefit to Bear Creek in eliminating considerable sediment as the creek transverses the existing permit area.

Table 2

Recorded Water Rights

Table 2 Recorded Water Rights

W U C #	Name	Amount
93-116	Utah Power & Light	11.28 acre-ft
93-129	Nevada Electric Investment Co. (NEICO)	0.85 acre-ft
93-130	U. S. Forest Service	11.28 acre-ft
93-131	Peabody Coal Company/NEICO	
93-138	Nevada Electric Investment Co.	0.85 acre-ft
93-139	U. S. Forest Service	11.28 acre-ft
93-140	Utah State Division of State Lands	4.70 acre-ft
93-141	Nevada Electric Investment Co.	0.85 acre-ft
93-142	U. S. Forest Service	11.28 acre-ft
93-143	Nevada Electric Investment Co.	
93-144	U. S. Forest Service	11.28 acre-ft
93-146	Nevada Electric Investment Co.	
93-147	U. S. Bureau of Land Management	
93-148	U. S. Bureau of Land Management	
93-149	Nevada Electric Investment Co.	
93-150	Nevada Electric Investment Co.	
93-151	U. S. Forest Service	11.28 acre-ft
93-155	U. S. Bureau of Land Management	
93-156	A. U. Mines Incorporated	
93-157	A.U. Mines Incorporated	
93-158	Intermountain Power Agency	
93-165	U. S. Bureau of Land Management	
93-166	U. S. Forest Service	
93-188	U. S. Forest Service	11.28 acre-ft
93-190	U. S. Forest Service	11.28 acre-ft
93-192	U. S. Forest Service	1.47 acre-ft
93-193	U. S. Forest Service	1.47 acre-ft
93-195	U. S. Forest Service	11.28 acre-ft
93-196	Hiatt, Marena Madden, et al	0.24 acre-ft
93-199	Utah Power & Light	
93-202	U. S. Bureau of Land Management	
93-203	McKinnon, Malcolm N.	
93-210	McKinnon, Malcolm N.	
93-214	Utah Power & Light	
93-217	Utah Power & Light	
93-219	Huntington Cleveland Irrigation Co.	150.00 cfs
93-220	Huntington Cleveland Irrigation Co.	150.00 cfs
93-253	Huntington Cleveland Irrigation Co.	150.00 cfs
93-254	Huntington Cleveland Irrigation Co.	150.00 cfs
93-259	U. S. Forest Service	11.28 acre-ft
93-260	Hiatt, Marena Madden, et al	0.24 acre-ft
93-303	Huntington Cleveland Irrigation Co.	
93-304	Huntington Cleveland Irrigation Co.	150.00 cfs
93-309	Huntington Cleveland Irrigation Co.	150.00 cfs
93-310	Huntington Cleveland Irrigation Co.	150.00 cfs
93-390	Nevada Electric Investment Co.	
93-564	State of Utah Division of State Lands	

Table 2 Recorded Water Rights (cont)

W U C #	Name	Amount
93-928	Huntington Cleveland Irrigation Co.	
93-955	Utah Board of Water Resources (Storage in Huntington Reservoir)	
93-1063	State of Utah Board of Water Resources	
93-1067	Kingston, Charles W.	0.25 cfs
93-1115	Utah Power & Light	20.00 cfs
93-1137	Huntington Cleveland Irrigation Co.	
93-1182	Peabody Coal Co.	
93-1183	Utah Power & Light	
93-1187	U.S. Forest Service	
93-1408	U. S. Forest Service	0.97 acre-ft
93-1411	U. S. Forest Service	1.47 acre-ft
93-1427	U. S. Forest Service	
93-1428	U. S. Forest Service	
93-1429	U. S. Forest Service	11.28 acre-ft
93-1430	U. S. Forest Service	11.28 acre-ft
93-1431	U. S. Forest Service	11.28 acre-ft
93-1432	U. S. Forest Service	11.28 acre-ft
93-1433	U. S. Forest Service	11.28 acre-ft
93-1434	U. S. Forest Service	11.28 acre-ft
93-1435	U. S. Forest Service	11.28 acre-ft
93-1436	U. S. Forest Service	11.28 acre-ft
93-2193	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2194	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2195	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2196	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2197	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2198	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2199	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2200	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2201	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2202	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2203	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2204	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2205	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2206	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2207	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2208	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2209	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2210	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2220	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2221	Huntington Cleveland Irrigation Co.	77.25 cfs
93-2222	Huntington Cleveland Irrigation Co.	80.00 cfs
93-2223	Huntington Cleveland Irrigation Co.	45.00 cfs
93-2224	Huntington Cleveland Irrigation Co	77.25 cfs
93-2225	Huntington Cleveland Irrigation Co.	80.00 cfs
93-3171	Northwest Carbon Corporation	
93-3195	State of Utah Board of Water Resources	
93-3207	U. S. Bureau of Land Management	
93-3208	U. S. Bureau of Land Management	

Table 2 Recorded Water Rights (cont)

W U C #	Name	Amount
93-3209	U. S. Bureau of Land Management	
93-3211	U. S. Bureau of Land Management	
93-3033	Northwest Carbon Corporation	
93-3657	Co-Op Mining Company	15.0 acre-ft
e1621	Utah Power & Light	
e1730	Utah Power & Light	
e2504	Castle Valley Special Service District	

Note: This table includes all water rights on file with the Utah Division of Water Rights on the following sections; Sec. 9, 10, 11, 12, 13, 14, 15, 23, 24, 25, 26, 27, 35 36, T16S R7E S.L.B.M. and Sections; 19, 20, 29, 30, 31, 32, T16S R8E S.L.B.M.

Appendix 1

Laboratory Analysis

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: 0830
SITE: Fish Creek #1 (WH#-1)
LAB NO: F6832

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Lab pH (s.u.)	7.90
Lab conductivity, umhos/cm	817
Lab resistivity, ohm-m	12.2
Total dissolved solids (180), mg/l	562
Total dissolved solids (calc), mg/l	520
Total suspended solids, mg/l	20
Total alkalinity as CaC03, mg/l	243
Total hardness as CaC03, mg/l	421
Sodium absorption ratio	0.617
Fluoride, mg/l	0.24
Sulfide as H2S, mg/l	0.53
Nitrate, mg/l	<0.02
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.12

	mg/l	meq/l	
Bicarbonate as HC03	296	4.86	
Carbonate as C03	0	0	
Chloride	7.81	0.22	
Sulfate	213	4.44	
Calcium	49.7	2.48	
Magnesium	72.3	5.94	
Potassium	2.71	0.07	
Sodium	29.1	1.27	
Major cations		9.76	
Major anions		9.52	
Cation/anion difference		1.27	%

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: 0830
SITE: Fish Creek #1 (WHR-1)
LAB NO: F6832

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.3	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.11	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.29	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	ND	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Spring LF
SITE: Fish Creek #2 (FC-2)
LAB NO: F6833

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Lab pH (s.u.)	7.57
Lab conductivity, umhos/cm	528
Lab resistivity, ohm-m	18.9
Total dissolved solids (180), mg/l	272
Total dissolved solids (calc), mg/l	276
Total suspended solids, mg/l	9
Total alkalinity as CaC03, mg/l	273
Total hardness as CaC03, mg/l	283
Sodium absorption ratio	0.072
Fluoride, mg/l	0.20
Sulfide as H2S, mg/l	<0.1
Nitrate, mg/l	0.17
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.07

	mg/l	meq/l	
Bicarbonate as HC03	333	5.46	
Carbonate as C03	0	0	
Chloride	2.13	0.06	
Sulfate	9.05	0.19	
Calcium	72.6	3.62	
Magnesium	24.8	2.04	
Potassium	0.33	0.01	
Sodium	2.8	0.12	
Major cations		5.79	
Major anions		5.72	
Cation/anion difference		0.62	%

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Spring LF
SITE: Fish Creek #2 (FC-3)
LAB NO: F6833

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.1	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.27	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.05	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	ND	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Spring LF
SITE: Fish Creek #2 (FC-3)
LAB NO: F6833

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.1	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.27	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.05	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	ND	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	Head		
SITE:	Fish Creek #3 (RF-1)	DATE RECEIVED:	08/06/91
LAB NO:	F6834	DATE COLLECTED:	07/31/91

Lab pH (s.u.)	7.64
Lab conductivity, umhos/cm	472
Lab resistivity, ohm-m	21.2
Total dissolved solids (180), mg/l	270
Total dissolved solids (calc), mg/l	272
Total suspended solids, mg/l	10
Total alkalinity as CaC03, mg/l	254
Total hardness as CaC03, mg/l	270
Sodium absorption ratio	0.103
Fluoride, mg/l	0.20
Sulfide as H2S, mg/l	<0.1
Nitrate, mg/l	<0.02
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.05

	mg/l	meq/l	
Bicarbonate as HC03	310	5.09	
Carbonate as C03	0	0	
Chloride	2.23	0.06	
Sulfate	19.3	0.4	
Calcium	69.7	3.48	
Magnesium	23.4	1.93	
Potassium	0.73	0.02	
Sodium	3.9	0.17	
Major cations		5.59	
Major anions		5.55	
Cation/anion difference		0.32	%

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Head
SITE: Fish Creek #3 (RF-1)
LAB NO: F6834

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.1	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.21	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.10	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	ND	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Left/Right
SITE: Fish Creek #4 (WHR-3)
LAB NO: F6835

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Lab pH (s.u.)	8.29
Lab conductivity, umhos/cm	1100
Lab resistivity, ohm-m	9.12
Total dissolved solids (180), mg/l	822
Total dissolved solids (calc), mg/l	755
Total suspended solids, mg/l	100
Total alkalinity as CaC03, mg/l	213
Total hardness as CaC03, mg/l	585
Sodium absorption ratio	0.446
Fluoride, mg/l	0.33
Sulfide as H2S, mg/l	0.42
Nitrate, mg/l	<0.02
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.04

	mg/l	meq/l	
Bicarbonate as HC03	260	4.27	
Carbonate as C03	0	0	
Chloride	13.5	0.38	
Sulfate	413	8.6	
Calcium	68	3.39	
Magnesium	101	8.3	
Potassium	6.52	0.17	
Sodium	24.8	1.08	
Major cations		12.9	
Major anions		13.2	
Cation/anion difference		1.17	%

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2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Left/Right
SITE: Fish Creek #4 (w HR-3)
LAB NO: F6835

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.4	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.09	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.55	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.01	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	LF		
SITE:	Fish Creek #5 (SBC-16)	DATE RECEIVED:	08/06/91
LAB NO:	F6836	DATE COLLECTED:	07/30/91

Lab pH (s.u.)	8.19
Lab conductivity, umhos/cm	605
Lab resistivity, ohm-m	16.5
Total dissolved solids (180), mg/l	342
Total dissolved solids (calc), mg/l	366
Total suspended solids, mg/l	85
Total alkalinity as CaC03, mg/l	256
Total hardness as CaC03, mg/l	326
Sodium absorption ratio	0.26
Fluoride, mg/l	0.26
Sulfide as H2S, mg/l	0.24
Nitrate, mg/l	<0.02
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.29

	mg/l	meq/l	
Bicarbonate as HC03	312	5.12	
Carbonate as C03	0	0	
Chloride	4.97	0.14	
Sulfate	98.8	2.06	
Calcium	43.3	2.16	
Magnesium	53.1	4.36	
Potassium	1.93	0.05	
Sodium	10.8	0.47	
Major cations		7.04	
Major anions		7.31	
Cation/anion difference		1.9	%

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2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: LF
SITE: Fish Creek #5 (SBC-16)
LAB NO: F6836

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.7	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.16	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.66	<0.05
Manganese (Mn)	0.02	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	ND	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Right Fork
SITE: Fish Creek #6 (WPR-7)
LAB NO: F6837

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Lab pH (s.u.)	8.19
Lab conductivity, umhos/cm	434
Lab resistivity, ohm-m	23
Total dissolved solids (180), mg/l	214
Total dissolved solids (calc), mg/l	234
Total suspended solids, mg/l	10
Total alkalinity as CaC03, mg/l	205
Total hardness as CaC03, mg/l	224
Sodium absorption ratio	0.134
Fluoride, mg/l	0.19
Sulfide as H2S, mg/l	<0.1
Nitrate, mg/l	<0.02
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.15

	mg/l	meq/l
Bicarbonate as HC03	250	4.1
Carbonate as C03	0	0
Chloride	2.53	0.07
Sulfate	28	0.58
Calcium	51.6	2.57
Magnesium	23.2	1.91
Potassium	0.88	0.02
Sodium	4.6	0.2
Major cations		4.7
Major anions		4.76
Cation/anion difference		0.54 %

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2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Right Fork
SITE: Fish Creek #6 (w HR-7)
LAB NO: F6837

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.1	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.18	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.08	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.01	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.02	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Right Fork
SITE: Fish Creek #6 (WHR-7)
LAB NO: F6845 Lab Split

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Lab pH (s.u.)	8.35	
Lab conductivity, umhos/cm	429	
Lab resistivity, ohm-m	23.3	
Total dissolved solids (180), mg/l	208	
Total dissolved solids (calc), mg/l	229	
Total suspended solids, mg/l	<1	
Total alkalinity as CaC03, mg/l	196	
Total hardness as CaC03, mg/l	224	
Sodium absorption ratio	0.136	
Fluoride, mg/l	0.21	
Sulfide as H2S, mg/l	0	*
Nitrate, mg/l	<0.02	
Nitrite, mg/l	<0.02	
Ammonia, mg/l	0.13	

	mg/l	meq/l	
Bicarbonate as HC03	230	3.77	
Carbonate as C03	4.5	0.15	
Chloride	2.64	0.07	
Sulfate	28.4	0.59	
Calcium	50.5	2.52	
Magnesium	23.9	1.97	
Potassium	0.9	0.02	
Sodium	4.7	0.2	
Major cations		4.72	
Major anions		4.59	
Cation/anion difference		1.36	%

* Insufficient sample for duplicate analysis.

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CLIENT: Co-Op Coal
ID: Right Fork
SITE: Fish Creek #6 (WHF-7)
LAB NO: F6845 Lab Split

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Trace metals by AA (total concentration), mg/l

	Analytical	Detection
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.1	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.19	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.10	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	ND	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.02	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT:	Co-Op Coal	DATE REPORTED:	09/18/91
ID:	1444		
SITE:	Horse Point #7 (WHR-6)	DATE RECEIVED:	08/06/91
LAB NO:	F6838	DATE COLLECTED:	07/31/91

Lab pH (s.u.)		8.14
Lab conductivity, umhos/cm		518
Lab resistivity, ohm-m		19.3
Total dissolved solids (180), mg/l		294
Total dissolved solids (calc), mg/l		300
Total suspended solids, mg/l		4
Total alkalinity as CaC03, mg/l		295
Total hardness as CaC03, mg/l		297
Sodium absorption ratio		0.098
Fluoride, mg/l		0.20
Sulfide as H2S, mg/l		0.52
Nitrate, mg/l		<0.02
Nitrite, mg/l		<0.02
Ammonia, mg/l		0.09
	mg/l	meq/l
Bicarbonate as HC03	360	5.9
Carbonate as C03	0	0
Chloride	2.94	0.08
Sulfate	10.3	0.21
Calcium	83.3	4.16
Magnesium	21.7	1.79
Potassium	0.45	0.01
Sodium	3.9	0.17
Major cations		6.13
Major anions		6.2
Cation/anion difference		0.56 %

Inter·Mountain Laboratories, Inc.

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Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: 1444
SITE: Horse Point #7 (w HP-6)
LAB NO: F6838

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	1.2	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.33	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.03	<0.01
Iron (Fe)	1.60	<0.05
Manganese (Mn)	0.02	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	ND	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.07	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: LF Spring
SITE: Fish Creek #8 (MW-2)
LAB NO: F6839

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Lab pH (s.u.)	8.02
Lab conductivity, umhos/cm	515
Lab resistivity, ohm-m	19.4
Total dissolved solids (180), mg/l	262
Total dissolved solids (calc), mg/l	271
Total suspended solids, mg/l	185
Total alkalinity as CaC03, mg/l	268
Total hardness as CaC03, mg/l	272
Sodium absorption ratio	0.084
Fluoride, mg/l	0.29
Sulfide as H2S, mg/l	<0.1
Nitrate, mg/l	0.28
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.08

	mg/l	meq/l
Bicarbonate as HC03	328	5.37
Carbonate as C03	0	0
Chloride	2.23	0.06
Sulfate	8.23	0.17
Calcium	76.3	3.81
Magnesium	19.8	1.63
Potassium	0.4	0.01
Sodium	3.2	0.14
Major cations		5.58
Major anions		5.62
Cation/anion difference		0.36 %

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2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: LF Spring
SITE: Fish Creek #8 (WHR-2)
LAB NO: F6839

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	1.3	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.35	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.90	<0.05
Manganese (Mn)	0.02	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	ND	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2808 W Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 0945
SITE: Fish Creek Spring (SBC-14)
LAB NO: F6907

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	8.11
Lab conductivity, umhos/cm	533
Lab resistivity, ohm-m	18.8
Total dissolved solids (180), mg/L	312
Total dissolved solids (calc), mg/L	300
Total suspended solids, mg/L	10
Total alkalinity as CaC03, mg/L	302
Total hardness as CaC03, mg/L	302
Sodium absorption ratio	0.068
Fluoride, mg/L	0.18
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.27
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.14

	mg/L	meq/L
Bicarbonate as HC03	368	6.03
Carbonate as C03	0	0
Chloride	2.53	0.07
Sulfate	7.41	0.15
Calcium	83	4.14
Magnesium	23.1	1.9
Potassium	0.28	0.01
Sodium	2.7	0.12
Major cations		6.17
Major anions		6.28
Cation/anion difference		0.83 %

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 0945
SITE: Fish Creek Spring (SBC-14)
LAB NO: F6907

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al)	1.0	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.36	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.02	<0.01
Iron (Fe)	1.75	<0.05
Manganese (Mn)	0.03	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.34	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.04	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Right Fork
SITE: Bear Canyon #10 (SBC-15)
LAB NO: F6840

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Lab pH (s.u.)	7.96
Lab conductivity, umhos/cm	1480
Lab resistivity, ohm-m	6.76
Total dissolved solids (180), mg/l	1140
Total dissolved solids (calc), mg/l	1110
Total suspended solids, mg/l	13
Total alkalinity as CaC03, mg/l	412
Total hardness as CaC03, mg/l	891
Sodium absorption ratio	0.551
Fluoride, mg/l	0.37
Sulfide as H2S, mg/l	<0.1
Nitrate, mg/l	<0.02
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.07

	mg/l	meq/l
Bicarbonate as HC03	503	8.24
Carbonate as C03	0	0
Chloride	18.8	0.53
Sulfate	541	11.3
Calcium	114	5.68
Magnesium	148	12.2
Potassium	5.86	0.15
Sodium	37.8	1.64
Major cations		19.6
Major anions		20
Cation/anion difference		1.04 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: Right Fork
SITE: Bear Canyon #10 (SBC-15)
LAB NO: F6840

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.1	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.13	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.10	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	ND	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: 1130
SITE: URF #11 (MH-1)
LAB NO: F6841

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Lab pH (s.u.)	7.84
Lab conductivity, umhos/cm	770
Lab resistivity, ohm-m	13
Total dissolved solids (180), mg/l	468
Total dissolved solids (calc), mg/l	474
Total suspended solids, mg/l	8
Total alkalinity as CaC03, mg/l	381
Total hardness as CaC03, mg/l	445
Sodium absorption ratio	0.285
Fluoride, mg/l	0.34
Sulfide as H2S, mg/l	<0.1
Nitrate, mg/l	<0.02
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.07

	mg/l	meq/l
Bicarbonate as HC03	464	7.61
Carbonate as C03	0	0
Chloride	15.3	0.43
Sulfate	72.8	1.52
Calcium	85.9	4.29
Magnesium	56.1	4.61
Potassium	1.53	0.04
Sodium	13.8	0.6
Major cations		9.54
Major anions		9.56
Cation/anion difference		0.12 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: 1130
SITE: URF #11 (MW-1)
LAB NO: F6841

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/31/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.2	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.18	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.44	<0.05
Manganese (Mn)	0.15	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	ND	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

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Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: 1045
SITE: #12 (FBC-2)
LAB NO: F6842

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 08/01/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	10.4	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.69	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.02	<0.01
Iron (Fe)	7.60	<0.05
Manganese (Mn)	0.26	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.01	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.03	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

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Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: 1045
SITE: #12 (FBC-2)
LAB NO: F6842

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 08/01/91

Lab pH (s.u.)	8.06
Lab conductivity, umhos/cm	548
Lab resistivity, ohm-m	18.2
Total dissolved solids (180), mg/l	352
Total dissolved solids (calc), mg/l	305
Total suspended solids, mg/l	158
Total alkalinity as CaC03, mg/l	311
Total hardness as CaC03, mg/l	305
Sodium absorption ratio	0.122
Fluoride, mg/l	0.33
Sulfide as H2S, mg/l	<0.1
Nitrate, mg/l	<0.02
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.07

	mg/l	meq/l
Bicarbonate as HC03	379	6.22
Carbonate as C03	0	0
Chloride	2.33	0.07
Sulfate	5.76	0.12
Calcium	77.8	3.88
Magnesium	26.9	2.21
Potassium	0.89	0.02
Sodium	4.9	0.21
Major cations		6.33
Major anions		6.4
Cation/anion difference		0.58 %

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CLIENT: Co-Op Coal
ID: 1200
SITE: Spring #13 (FBC-3)
LAB NO: F6843

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 08/01/91

Lab pH (s.u.)		8.01
Lab conductivity, umhos/cm		456
Lab resistivity, ohm-m		21.9
Total dissolved solids (180), mg/l		274
Total dissolved solids (calc), mg/l		262
Total suspended solids, mg/l		47
Total alkalinity as CaC03, mg/l		252
Total hardness as CaC03, mg/l		258
Sodium absorption ratio		0.095
Fluoride, mg/l		0.20
Sulfide as H2S, mg/l		<0.1
Nitrate, mg/l		0.38
Nitrite, mg/l		<0.02
Ammonia, mg/l		0.05

	mg/l	meq/l
Bicarbonate as HC03	307	5.04
Carbonate as C03	0	0
Chloride	2.43	0.07
Sulfate	12.3	0.26
Calcium	72.4	3.61
Magnesium	18.8	1.55
Potassium	0.84	0.02
Sodium	3.5	0.15
Major cations		5.34
Major anions		5.4
Cation/anion difference		0.53 %

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Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: 1200
SITE: Spring #13 (FBC-3)
LAB NO: F6843

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 08/01/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.2	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.20	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.03	<0.01
Iron (Fe)	0.22	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.01	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1430
SITE: # 14 (SM14-4)
LAB NO: F6908

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/01/91

Lab pH (s.u.)	7.48
Lab conductivity, umhos/cm	514
Lab resistivity, ohm-m	19.5
Total dissolved solids (180), mg/L	396
Total dissolved solids (calc), mg/L	328
Total suspended solids, mg/L	1530
Total alkalinity as CaC03, mg/L	321
Total hardness as CaC03, mg/L	326
Sodium absorption ratio	0.111
Fluoride, mg/L	0.25
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	<0.02
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.28

	mg/L	meq/L
Bicarbonate as HC03	391	6.41
Carbonate as C03	0	0
Chloride	5.27	0.15
Sulfate	8.64	0.18
Calcium	86.3	4.3
Magnesium	27	2.22
Potassium	3.4	0.09
Sodium	4.6	0.2
Major cations		6.81
Major anions		6.74
Cation/anion difference		0.51 %

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2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1430
SITE: # 14 (SMH - 4)
LAB NO: F6908

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/01/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As)	0.008	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al)	6.7	<0.1
Boron (B)	0.07	<0.01
Barium (Ba)	0.49	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.02	<0.01
Iron (Fe)	9.51	<0.05
Manganese (Mn)	0.51	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.11	<0.01
Phosphorus (P)	1.2	<0.5
Zinc (Zn)	0.05	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1230 (5714-2)
SITE: # 15
LAB NO: F6909

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/02/91

Lab pH (s.u.)	8.03
Lab conductivity, umhos/cm	548
Lab resistivity, ohm-m	18.2
Total dissolved solids (180), mg/L	328
Total dissolved solids (calc), mg/L	315
Total suspended solids, mg/L	16
Total alkalinity as CaC03, mg/L	301
Total hardness as CaC03, mg/L	302
Sodium absorption ratio	0.145
Fluoride, mg/L	0.34
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	<0.02
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.12

	mg/L	meq/L
Bicarbonate as HC03	367	6.01
Carbonate as C03	0	0
Chloride	7.2	0.2
Sulfate	13	0.27
Calcium	81.7	4.07
Magnesium	23.9	1.96
Potassium	2.91	0.07
Sodium	5.8	0.25
Major cations		6.37
Major anions		6.48
Cation/anion difference		0.92 %

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CLIENT: Co - Op Coal
ID: 1230
SITE: # 15 (SMH-2)
LAB NO: F6909

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/02/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al)	1.3	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.24	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	1.24	<0.05
Manganese (Mn)	0.06	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.02	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1245
SITE: # 16 (SW # - 1)
LAB NO: F6910

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/02/91

Lab pH (s.u.)	8.36
Lab conductivity, umhos/cm	490
Lab resistivity, ohm-m	20.4
Total dissolved solids (180), mg/L	272
Total dissolved solids (calc), mg/L	269
Total suspended solids, mg/L	3
Total alkalinity as CaC03, mg/L	254
Total hardness as CaC03, mg/L	261
Sodium absorption ratio	0.137
Fluoride, mg/L	0.28
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.29
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.09

	mg/L	meq/L
Bicarbonate as HC03	303	4.97
Carbonate as C03	3.3	0.11
Chloride	5.27	0.15
Sulfate	15	0.31
Calcium	69.2	3.45
Magnesium	21.5	1.77
Potassium	0.61	0.02
Sodium	5.1	0.22
Major cations		5.46
Major anions		5.56
Cation/anion difference		0.89 %

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CLIENT: Co - Op Coal
ID: 1245
SITE: # 16 (SMH-1)
LAB NO: F6910

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/02/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al)	ND	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.22	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.01	<0.01
Iron (Fe)	0.10	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.03	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: 1221
SITE: Upper Fish Creek (FBC-1)
LAB NO: F6844

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Lab pH (s.u.)	8.19
Lab conductivity, umhos/cm	708
Lab resistivity, ohm-m	14.1
Total dissolved solids (180), mg/l	440
Total dissolved solids (calc), mg/l	391
Total suspended solids, mg/l	972
Total alkalinity as CaC03, mg/l	273
Total hardness as CaC03, mg/l	368
Sodium absorption ratio	0.229
Fluoride, mg/l	0.42
Sulfide as H2S, mg/l	<0.1
Nitrate, mg/l	0.21
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.05

	mg/l	meq/l
Bicarbonate as HC03	333	5.46
Carbonate as C03	0	0
Chloride	5.07	0.14
Sulfate	96.3	2.01
Calcium	53.4	2.67
Magnesium	57.1	4.69
Potassium	5.04	0.13
Sodium	10.1	0.44
Major cations		7.93
Major anions		7.63
Cation/anion difference		1.94 %

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Coal
ID: 1221
SITE: Upper Fish Creek (FBC-1)
LAB NO: F6844

DATE REPORTED: 09/18/91
DATE RECEIVED: 08/06/91
DATE COLLECTED: 07/30/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	7.0	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.20	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.03	<0.01
Iron (Fe)	7.10	<0.05
Manganese (Mn)	0.16	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.01	<0.01
Phosphorus (P)	0.5	<0.5
Zinc (Zn)	0.03	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1000
SITE: Tye Canyon 18 (FBC-1)
LAB NO: F6896

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	0.005	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	3.6	<0.1
Boron (B)	0.04	<0.01
Barium (Ba)	0.29	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.02	<0.01
Iron (Fe)	4.15	<0.05
Manganese (Mn)	0.11	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.12	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.05	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1000
SITE: Tye Canyon 18 (FBC-8)
LAB NO: F6896

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Lab pH (s.u.)	7.60
Lab conductivity, umhos/cm	440
Lab resistivity, ohm-m	22.7
Total dissolved solids (180), mg/L	250
Total dissolved solids (calc), mg/L	251
Total suspended solids, mg/L	40
Total alkalinity as CaC03, mg/L	237
Total hardness as CaC03, mg/L	231
Sodium absorption ratio	0.16
Fluoride, mg/L	0.26
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	<0.02
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.27

	mg/L	meq/L
Bicarbonate as HC03	289	4.73
Carbonate as C03	0	0
Chloride	6.18	0.17
Sulfate	11.9	0.25
Calcium	61.7	3.08
Magnesium	18.8	1.55
Potassium	4.4	0.11
Sodium	5.6	0.24
Major cations		4.98
Major anions		5.16
Cation/anion difference		1.72 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1020
SITE: Tye Canyon 19 (FBC -9)
LAB NO: F6897

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.4	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.21	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.05	<0.01
Iron (Fe)	0.76	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.11	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.03	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1020
SITE: Tye Canyon 19 (FGC-9)
LAB NO: F6897

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Lab pH (s.u.)	7.59
Lab conductivity, umhos/cm	480
Lab resistivity, ohm-m	20.8
Total dissolved solids (180), mg/L	252
Total dissolved solids (calc), mg/L	265
Total suspended solids, mg/L	<1
Total alkalinity as CaC03, mg/L	252
Total hardness as CaC03, mg/L	257
Sodium absorption ratio	0.136
Fluoride, mg/L	0.26
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.23
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.08

	mg/L	meq/L
Bicarbonate as HC03	307	5.03
Carbonate as C03	0	0
Chloride	5.17	0.15
Sulfate	14	0.29
Calcium	68.1	3.4
Magnesium	21.2	1.74
Potassium	0.45	0.01
Sodium	5	0.22
Major cations		5.37
Major anions		5.49
Cation/anion difference		1.07 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1015
SITE: Tie Fork 20
LAB NO: F6898

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	8.07
Lab conductivity, umhos/cm	471
Lab resistivity, ohm-m	21.2
Total dissolved solids (180), mg/L	250
Total dissolved solids (calc), mg/L	265
Total suspended solids, mg/L	15
Total alkalinity as CaC03, mg/L	233
Total hardness as CaC03, mg/L	257
Sodium absorption ratio	0.125
Fluoride, mg/L	0.16
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	<0.02
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.15

	mg/L	meq/L
Bicarbonate as HC03	284	4.66
Carbonate as C03	0	0
Chloride	4.06	0.11
Sulfate	31.3	0.65
Calcium	53.7	2.68
Magnesium	29.9	2.46
Potassium	1.58	0.04
Sodium	4.6	0.2
Major cations		5.38
Major anions		5.43
Cation/anion difference		0.41 %

Inter·Mountain Laboratories, Inc.

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Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1015
SITE: Tie Fork 20
LAB NO: F6898

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	ND	<0.1
Boron (B)	0.02	<0.01
Barium (Ba)	0.13	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.01	<0.01
Iron (Fe)	0.28	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.09	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1110
SITE: Hunting Canyon 21 (FEBC-11)
LAB NO: F6899

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.6	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.13	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.01	<0.01
Iron (Fe)	1.30	<0.05
Manganese (Mn)	0.05	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.16	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.02	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1110
SITE: Hunting Canyon 21 (FBC-11)
LAB NO: F6899

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	8.36
Lab conductivity, umhos/cm	329
Lab resistivity, ohm-m	30.4
Total dissolved solids (180), mg/L	182
Total dissolved solids (calc), mg/L	179
Total suspended solids, mg/L	20
Total alkalinity as CaC03, mg/L	167
Total hardness as CaC03, mg/L	169
Sodium absorption ratio	0.107
Fluoride, mg/L	0.12
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.03
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.14

	mg/L	meq/L
Bicarbonate as HC03	194	3.18
Carbonate as C03	5.1	0.17
Chloride	3.35	0.09
Sulfate	9.88	0.21
Calcium	52.3	2.61
Magnesium	9.39	0.77
Potassium	0.82	0.02
Sodium	3.2	0.14
Major cations		3.54
Major anions		3.65
Cation/anion difference		1.45 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1100
SITE: Head Trail 22 (FBC - W)
LAB NO: F6900

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Lab pH (s.u.)	7.74
Lab conductivity, umhos/cm	478
Lab resistivity, ohm-m	20.9
Total dissolved solids (180), mg/L	244
Total dissolved solids (calc), mg/L	250
Total suspended solids, mg/L	74
Total alkalinity as CaC03, mg/L	241
Total hardness as CaC03, mg/L	244
Sodium absorption ratio	0.15
Fluoride, mg/L	0.31
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.39
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.07

	mg/L	meq/L
Bicarbonate as HC03	294	4.82
Carbonate as C03	0	0
Chloride	8.01	0.23
Sulfate	9.05	0.19
Calcium	60	2.99
Magnesium	22.9	1.89
Potassium	0.4	0.01
Sodium	5.4	0.23
Major cations		5.13
Major anions		5.26
Cation/anion difference		1.3 %

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2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1100
SITE: Head Trail 22 (FBC-10)
LAB NO: F6900

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	1.7	<0.1
Boron (B)	0.02	<0.01
Barium (Ba)	0.27	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.01	<0.01
Iron (Fe)	1.27	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.03	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1100
SITE: Head Trail 22 (FB(-10)
LAB NO: F6902 Split

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Lab pH (s.u.)	7.86
Lab conductivity, umhos/cm	483
Lab resistivity, ohm-m	20.7
Total dissolved solids (180), mg/L	238
Total dissolved solids (calc), mg/L	257
Total suspended solids, mg/L	74
Total alkalinity as CaC03, mg/L	243
Total hardness as CaC03, mg/L	254
Sodium absorption ratio	0.164
Fluoride, mg/L	0.29
Sulfide as H2S, mg/L	*
Nitrate, mg/L	0.39
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.04

	mg/L	meq/L
Bicarbonate as HC03	296	4.86
Carbonate as C03	0	0
Chloride	7.91	0.22
Sulfate	10.3	0.21
Calcium	64.2	3.2
Magnesium	22.8	1.88
Potassium	0.44	0.01
Sodium	6	0.26
Major cations		5.35
Major anions		5.32
Cation/anion difference		0.29 %

* Insufficient sample to run duplicate analysis.

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1100
SITE: Head Trail 22 (FBC - 10)
LAB NO: F6902 Split

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/07/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	1.9	<0.1
Boron (B)	0.03	<0.01
Barium (Ba)	0.27	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	1.32	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.05	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co -Op Coal
ID: 1100
SITE: Hunington Canyon 23
LAB NO: F6901

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	7.80
Lab conductivity, umhos/cm	2050
Lab resistivity, ohm-m	4.88
Total dissolved solids (180), mg/L	1540
Total dissolved solids (calc), mg/L	1490
Total suspended solids, mg/L	652
Total alkalinity as CaC03, mg/L	545
Total hardness as CaC03, mg/L	1190
Sodium absorption ratio	0.642
Fluoride, mg/L	0.61
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	<0.02
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.05

	mg/L	meq/L	
Bicarbonate as HC03	665	10.9	
Carbonate as C03	0	0	
Chloride	81.9	2.31	
Sulfate	676	14.1	
Calcium	126	6.27	
Magnesium	213	17.5	
Potassium	10.6	0.27	
Sodium	50.9	2.21	
Major cations		26.2	
Major anions		27.3	
Cation/anion difference		1.98	%

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co -Op Coal
ID: 1100
SITE: Hunington Canyon 23
LAB NO: F6901

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	0.005	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	3.9	<0.1
Boron (B)	0.12	<0.01
Barium (Ba)	0.18	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.02	<0.01
Iron (Fe)	8.67	<0.05
Manganese (Mn)	0.32	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.03	<0.01
Phosphorus (P)	1.7	<0.5
Zinc (Zn)	0.04	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1500
SITE: # 24 (WHR-9)
LAB NO: F6911

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	8.16
Lab conductivity, umhos/cm	482
Lab resistivity, ohm-m	20.7
Total dissolved solids (180), mg/L	270
Total dissolved solids (calc), mg/L	262
Total suspended solids, mg/L	230
Total alkalinity as CaC03, mg/L	262
Total hardness as CaC03, mg/L	258
Sodium absorption ratio	0.065
Fluoride, mg/L	0.19
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.20
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.22

	mg/L	meq/L
Bicarbonate as HC03	320	5.24
Carbonate as C03	0	0
Chloride	3.04	0.09
Sulfate	6.58	0.14
Calcium	76.1	3.8
Magnesium	16.6	1.37
Potassium	0.22	0.01
Sodium	2.4	0.1
Major cations		5.27
Major anions		5.48
Cation/anion difference		1.87 %

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1500
SITE: # 24 (WHR-9)
LAB NO: F6911

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.7	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.36	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.71	<0.05
Manganese (Mn)	0.02	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.02	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1500
SITE: # 24 (WHR-9)
LAB NO: F6916 Lab Split

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	7.86
Lab conductivity, umhos/cm	485
Lab resistivity, ohm-m	20.6
Total dissolved solids (180), mg/L	288
Total dissolved solids (calc), mg/L	262
Total suspended solids, mg/L	47
Total alkalinity as CaC03, mg/L	264
Total hardness as CaC03, mg/L	261
Sodium absorption ratio	0.07
Fluoride, mg/L	0.24
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.20
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.18

	mg/L	meq/L
Bicarbonate as HC03	322	5.28
Carbonate as C03	0	0
Chloride	2.94	0.08
Sulfate	5.35	0.11
Calcium	72.9	3.64
Magnesium	19.3	1.59
Potassium	0.23	0.01
Sodium	2.6	0.11
Major cations		5.34
Major anions		5.48
Cation/anion difference		1.28 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1500
SITE: # 24 (WHP-9)
LAB NO: F6916 Lab Split

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.1	<0.1
Boron (B)	0.02	<0.01
Barium (Ba)	0.36	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.79	<0.05
Manganese (Mn)	0.03	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.01	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1100
SITE: # 25 (SBC-12)
LAB NO: F6912

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)		8.23	
Lab conductivity, umhos/cm		1910	
Lab resistivity, ohm-m		5.24	
Total dissolved solids (180), mg/L		1640	
Total dissolved solids (calc), mg/L		1560	
Total suspended solids, mg/L		2	
Total alkalinity as CaC03, mg/L		264	
Total hardness as CaC03, mg/L		1180	
Sodium absorption ratio		0.37	
Fluoride, mg/L		0.64	
Sulfide as H2S, mg/L		<0.1	
Nitrate, mg/L		0.27	
Nitrite, mg/L		<0.02	
Ammonia, mg/L		0.05	
	mg/L	meq/L	
Bicarbonate as HC03	322	5.28	
Carbonate as C03	0	0	
Chloride	9.43	0.27	
Sulfate	993	20.7	
Calcium	148	7.38	
Magnesium	198	16.2	
Potassium	24.5	0.63	
Sodium	29.2	1.27	
Major cations		25.5	
Major anions		26.2	
Cation/anion difference		1.4	%

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1100
SITE: # 25 (SBC-1)
LAB NO: F6912

DATE REPORTED: 09/16/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/L

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	0.032	<0.005

Trace metals by ICAP (total concentration), mg/L

	Analytical Result:	Detection Limit:
Aluminum (Al)	0.2	<0.1
Boron (B)	0.37	<0.01
Barium (Ba)	0.10	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.38	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.09	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Appendix 2

Existing Monitoring Points

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1205
SITE: BC -1
LAB NO: F6904 NPDES

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	8.14	
Lab conductivity, umhos/cm	746	
Lab resistivity, ohm-m	13.4	
Total dissolved solids (180), mg/L	404	*
Total dissolved solids (calc), mg/L	537	
Total suspended solids, mg/L	500	
Total alkalinity as CaC03, mg/L	270	
Total hardness as CaC03, mg/L	457	
Sodium absorption ratio	0.206	
Fluoride, mg/L	0.38	
Oil and grease (gravimetric), mg/L	<5	

	mg/L	meq/L
Bicarbonate as HC03	329	5.4
Carbonate as C03	0	0
Chloride	5.17	0.15
Sulfate	218	4.55
Calcium	62.9	3.14
Magnesium	72.9	5.99
Potassium	5.32	0.14
Sodium	10.1	0.44
Major cations		9.71
Major anions		10.1
Cation/anion difference		1.92 %

* Analyzed twice.

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Iron (Fe)	5.63	<0.05

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1137
SITE: BC -2
LAB NO: F6905 NPDES

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	8.17
Lab conductivity, umhos/cm	622
Lab resistivity, ohm-m	16.1
Total dissolved solids (180), mg/L	424
Total dissolved solids (calc), mg/L	436
Total suspended solids, mg/L	400
Total alkalinity as CaC03, mg/L	280
Total hardness as CaC03, mg/L	400
Sodium absorption ratio	0.157
Fluoride, mg/L	0.28
Oil and grease (gravimetric), mg/L	<5

	mg/L	meq/L
Bicarbonate as HC03	342	5.6
Carbonate as C03	0	0
Chloride	5.17	0.15
Sulfate	130	2.71
Calcium	61.9	3.09
Magnesium	59.8	4.92
Potassium	3.68	0.09
Sodium	7.2	0.31
Major cations		8.42
Major anions		8.46
Cation/anion difference		0.24 %

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Iron (Fe)	5.54	<0.05

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1140
SITE: NPDES
LAB NO: F6906

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	7.88
Lab conductivity, umhos/cm	557
Lab resistivity, ohm-m	18
Total dissolved solids (180), mg/L	362
Total dissolved solids (calc), mg/L	324
Total suspended solids, mg/L	<1
Total alkalinity as CaC03, mg/L	277
Total hardness as CaC03, mg/L	311
Sodium absorption ratio	0.116
Fluoride, mg/L	0.16
Oil and grease (gravimetric), mg/L	<5

	mg/L	meq/L
Bicarbonate as HC03	339	5.55
Carbonate as C03	0	0
Chloride	3.65	0.1
Sulfate	41.1	0.86
Calcium	77.8	3.88
Magnesium	28.5	2.34
Potassium	1.72	0.04
Sodium	4.7	0.2
Major cations		6.47
Major anions		6.51
Cation/anion difference		0.26 %

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Iron (Fe)	0.23	<0.05

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1105
SITE: SBC 4
LAB NO: F6913

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	8.34
Lab conductivity, umhos/cm	633
Lab resistivity, ohm-m	15.8
Total dissolved solids (180), mg/L	366
Total dissolved solids (calc), mg/L	366
Total suspended solids, mg/L	<1
Total alkalinity as CaC03, mg/L	300
Total hardness as CaC03, mg/L	346
Sodium absorption ratio	0.124
Fluoride, mg/L	0.19
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.27
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.04
Oil and grease (gravimetric), mg/L	<5

	mg/L	meq/L
Bicarbonate as HC03	360	5.9
Carbonate as C03	2.7	0.09
Chloride	4.06	0.11
Sulfate	57	1.19
Calcium	87.3	4.36
Magnesium	31.2	2.56
Potassium	1.43	0.04
Sodium	5.3	0.23
Major cations		7.19
Major anions		7.31
Cation/anion difference		0.86 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1105
SITE: SBC 4
LAB NO: F6913

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	ND	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.16	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	ND	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	ND	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1105
SITE: SBC 5
LAB NO: F6914

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	7.53
Lab conductivity, umhos/cm	788
Lab resistivity, ohm-m	12.7
Total dissolved solids (180), mg/L	480
Total dissolved solids (calc), mg/L	478
Total suspended solids, mg/L	1
Total alkalinity as CaC03, mg/L	325
Total hardness as CaC03, mg/L	441
Sodium absorption ratio	0.145
Fluoride, mg/L	0.16
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	0.03
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.03
Oil and grease (gravimetric), mg/L	<5

	mg/L	meq/L
Bicarbonate as HC03	397	6.51
Carbonate as C03	0	0
Chloride	5.78	0.16
Sulfate	121	2.52
Calcium	101	5.05
Magnesium	45.8	3.77
Potassium	2.2	0.06
Sodium	7	0.3
Major cations		9.19
Major anions		9.19
Cation/anion difference		0.03 %

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1105
SITE: SBC 5
LAB NO: F6914

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	ND	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.11	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	ND	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	ND	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.01	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1410
SITE: SBC 9
LAB NO: F6915

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	8.10
Lab conductivity, umhos/cm	565
Lab resistivity, ohm-m	17.7
Total dissolved solids (180), mg/L	340
Total dissolved solids (calc), mg/L	317
Total suspended solids, mg/L	18
Total alkalinity as CaC03, mg/L	286
Total hardness as CaC03, mg/L	312
Sodium absorption ratio	0.091
Fluoride, mg/L	0.17
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	<0.02
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.03
Oil and grease (gravimetric), mg/L	<5

	mg/L	meq/L
Bicarbonate as HC03	349	5.72
Carbonate as C03	0	0
Chloride	3.85	0.11
Sulfate	31.1	0.65
Calcium	75.5	3.77
Magnesium	29.9	2.46
Potassium	1.59	0.04
Sodium	3.7	0.16
Major cations		6.43
Major anions		6.48
Cation/anion difference		0.36 %

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1410
SITE: SBC 9
LAB NO: F6915

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	ND	<0.1
Boron (B)	0.04	<0.01
Barium (Ba)	0.15	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.02	<0.01
Iron (Fe)	0.53	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.25	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.22	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1410
SITE: SBC 9 Lab Split
LAB NO: F6917

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Lab pH (s.u.)	8.18
Lab conductivity, umhos/cm	561
Lab resistivity, ohm-m	17.8
Total dissolved solids (180), mg/L	340
Total dissolved solids (calc), mg/L	321
Total suspended solids, mg/L	<1
Total alkalinity as CaC03, mg/L	292
Total hardness as CaC03, mg/L	311
Sodium absorption ratio	0.091
Fluoride, mg/L	0.18
Sulfide as H2S, mg/L	<0.1
Nitrate, mg/L	<0.02
Nitrite, mg/L	<0.02
Ammonia, mg/L	0.04
Oil and grease (gravimetric), mg/L	*

	mg/L	meq/L	
Bicarbonate as HC03	356	5.83	
Carbonate as C03	0	0	
Chloride	4.16	0.12	
Sulfate	30.5	0.63	
Calcium	78	3.89	
Magnesium	28.3	2.33	
Potassium	1.61	0.04	
Sodium	3.7	0.16	
Major cations		6.42	
Major anions		6.59	
Cation/anion difference		1.29	%

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co - Op Coal
ID: 1410
SITE: SBC 9 Lab Split
LAB NO: F6917

DATE REPORTED: 09/11/91
DATE RECEIVED: 08/13/91
DATE COLLECTED: 08/08/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	ND	<0.1
Boron (B)	ND	<0.01
Barium (Ba)	0.15	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.01	<0.01
Iron (Fe)	0.55	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.25	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	0.22	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Mining
ID: 1130
SITE: NPDES
LAB NO: F6791

DATE REPORTED: 08/21/91
DATE RECEIVED: 08/01/91
DATE COLLECTED: 07/29/91

Lab pH (s.u.)	7.89
Lab conductivity, umhos/cm	522
Lab resistivity, ohm-m	19.2
Total dissolved solids (180), mg/l	300
Total dissolved solids (calc), mg/l	299
Total suspended solids, mg/l	3
Total alkalinity as CaC03, mg/l	247
Total hardness as CaC03, mg/l	283
Sodium absorption ratio	0.109
Oil and grease (gravimetric), mg/l	<5.0

	mg/l	meq/l
Bicarbonate as HC03	301	4.93
Carbonate as C03	0	0
Chloride	3.85	0.11
Sulfate	46.7	0.97
Calcium	64.5	3.22
Magnesium	29.7	2.45
Potassium	1.71	0.04
Sodium	4.2	0.18
Major cations		5.89
Major anions		6.01
Cation/anion difference		1.03 %

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Iron (Fe)	0.09	<0.05

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Mining
ID: 1100
SITE: SBC-4
LAB NO: F6794

DATE REPORTED: 08/21/91
DATE RECEIVED: 08/01/91
DATE COLLECTED: 07/29/91

Lab pH (s.u.)	8.17
Lab conductivity, umhos/cm	611
Lab resistivity, ohm-m	16.4
Total dissolved solids (180), mg/l	382
Total dissolved solids (calc), mg/l	365
Total suspended solids, mg/l	24
Total alkalinity as CaC03, mg/l	300
Total hardness as CaC03, mg/l	347
Sodium absorption ratio	0.117
Sulfide as H2S, mg/l	<0.10
Nitrate, mg/l	0.19
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.33
Oil and grease (gravimetric), mg/l	5.70

	mg/l	meq/l
Bicarbonate as HC03	365	5.99
Carbonate as C03	0	0
Chloride	3.85	0.11
Sulfate	58	1.21
Calcium	82.7	4.13
Magnesium	34.2	2.81
Potassium	1.55	0.04
Sodium	5	0.22
Major cations		7.19
Major anions		7.31
Cation/anion difference		0.8 %

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Iron (Fe)	0.27	<0.05
Manganese (Mn)	ND	<0.02

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Mining
ID: 1000
SITE: SBC-5
LAB NO: F6793

DATE REPORTED: 08/21/91
DATE RECEIVED: 08/01/91
DATE COLLECTED: 07/29/91

Lab pH (s.u.)	7.97
Lab conductivity, umhos/cm	819
Lab resistivity, ohm-m	12.2
Total dissolved solids (180), mg/l	508
Total dissolved solids (calc), mg/l	480
Total suspended solids, mg/l	<1
Total alkalinity as CaC03, mg/l	325
Total hardness as CaC03, mg/l	436
Sodium absorption ratio	0.148
Sulfide as H2S, mg/l	0.10
Nitrate, mg/l	<0.02
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.30
Oil and grease (gravimetric), mg/l	<5.0

	mg/l	meq/l
Bicarbonate as HC03	397	6.5
Carbonate as C03	0	0
Chloride	6.59	0.19
Sulfate	124	2.58
Calcium	99	4.94
Magnesium	46	3.79
Potassium	2.28	0.06
Sodium	7.1	0.31
Major cations		9.09
Major anions		9.26
Cation/anion difference		0.93 %

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Iron (Fe)	0.47	<0.05
Manganese (Mn)	ND	<0.02

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain Laboratories, Inc.
2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Mining
ID: 1215
SITE: SBC-9
LAB NO: F6792

DATE REPORTED: 09/04/91
DATE RECEIVED: 08/01/91
DATE COLLECTED: 07/29/91

Lab pH (s.u.)	8.20
Lab conductivity, umhos/cm	570
Lab resistivity, ohm-m	17.5
Total dissolved solids (180), mg/l	312
Total dissolved solids (calc), mg/l	318
Total suspended solids, mg/l	<1
Total alkalinity as CaC03, mg/l	290
Total hardness as CaC03, mg/l	315
Sodium absorption ratio	0.098
Fluoride, mg/l	0.17
Sulfide as H2S, mg/l	<0.10
Nitrate, mg/l	<0.02
Nitrite, mg/l	<0.02
Ammonia, mg/l	0.22

	mg/l	meq/l
Bicarbonate as HC03	354	5.8
Carbonate as C03	0	0
Chloride	1.62	0.05
Sulfate	31.5	0.66
Calcium	74.1	3.7
Magnesium	31.5	2.59
Potassium	1.64	0.04
Sodium	4	0.17
Major cations		6.51
Major anions		6.5
Cation/anion difference		0.07 %

2506 W. Main Street
Farmington, New Mexico 87401

CLIENT: Co-Op Mining
ID: 1215
SITE: SBC-9
LAB NO: F6792

DATE REPORTED: 09/04/91
DATE RECEIVED: 08/01/91
DATE COLLECTED: 07/29/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.001
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	ND	<0.1
Boron (B)	0.15	<0.01
Barium (Ba)	0.16	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	0.07	<0.01
Iron (Fe)	0.08	<0.05
Manganese (Mn)	ND	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	0.02	<0.01
Phosphorus (P)	0.8	<0.5
Zinc (Zn)	0.42	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

Inter-Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Co-op Coal
ID:
SITE: Birch Spring
LAB NO: F6545

DATE REPORTED: 07/24/91
DATE RECEIVED: 06/21/91
DATE COLLECTED: 06/17/91

Lab pH (s.u.)	7.84
Lab conductivity, umhos/cm	771
Lab resistivity, ohm-m	13
Total dissolved solids (180), mg/l	500
Total dissolved solids (calc), mg/l	483
Total suspended solids, mg/l	3
Total alkalinity as CaC03, mg/l	328
Total hardness as CaC03, mg/l	442
Sodium absorption ratio	0.145
Fluoride, mg/l	0.17
Nitrate, mg/l	0.05
Nitrite, mg/l	<0.01
Ammonia, mg/l	0.12

	mg/l	meq/l	
Bicarbonate as HC03	400	6.55	
Carbonate as C03	0	0	
Chloride	6.64	0.19	
Sulfate	123	2.57	
Calcium	101	5.02	
Magnesium	46.5	3.82	
Potassium	2.64	0.07	
Sodium	7	0.3	
Major cations		9.21	
Major anions		9.31	
Cation/anion difference		0.53	%

Inter-Mountain Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Co-op Coal
ID:
SITE: Birch Spring
LAB NO: F6545

DATE REPORTED: 07/24/91
DATE RECEIVED: 06/21/91
DATE COLLECTED: 06/17/91

Trace metals by AA (total concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As)	ND	<0.005
Cadmium (Cd)	ND	<0.05
Mercury (Hg)	ND	<0.0002
Lead (Pb)	ND	<0.2
Selenium (Se)	ND	<0.005

Trace metals by ICAP (total concentration), mg/l

	Analytical Result:	Detection Limit:
Aluminum (Al)	ND	<0.1
Boron (B)	0.02	<0.01
Barium (Ba)	0.13	<0.05
Chromium (Cr)	ND	<0.02
Copper (Cu)	ND	<0.01
Iron (Fe)	0.12	<0.05
Manganese (Mn)	0.02	<0.02
Molybdenum (Mo)	ND	<0.01
Nickel (Ni)	ND	<0.01
Phosphorus (P)	ND	<0.5
Zinc (Zn)	ND	<0.01

ND - Analyte "not detected" at the stated detection limit.

Wanda Orso
Water Lab Manager

APPENDIX 7-N

REVISED HYDROGEOLOGIC EVALUATION OF THE BEAR CANYON MINE PERMIT AND PROPOSED EXPANSION AREAS

CO-OP MINING COMPANY
Salt Lake City, Utah

Prepared By

EARTHFAX ENGINEERING, INC.
Midvale, Utah

April 26, 1993

Revised 1-31-95

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REVISED HYDROGEOLOGIC EVALUATION OF THE BEAR CANYON MINE PERMIT AND PROPOSED EXPANSION AREAS

1.0 INTRODUCTION

1.1 Scope

This report is an evaluation of the potential for operations at the Co-Op Mining Company Bear Canyon Mine to affect water quality and quantity at Birch and Big Bear Springs. The report also addresses revisions to the Bear Canyon permit area to allow incorporation of new Federal Coal leases U-024316 and U-024318, and the potential impacts that the lease expansions may have on the springs. This document is intended to supersede a previously-issued hydrogeologic evaluation report (EarthFax Engineering, 1991), which is herein updated and supplemented with additional hydrogeologic and water-quality data.

The work performed for this evaluation included:

1) A review of technical literature from the United States Geological Survey and the Utah Division of Water Resources, and permits on file with the Utah Division of Oil, Gas, and Mining.

2) Visits to the mine site to evaluate springs, collect historical spring flow data, tour accessible underground workings to evaluate groundwater inflow, and conduct preliminary water quality assessments (pH, temperature, and conductivity) of all accessible water sources.

3) A search of surface water and groundwater rights recorded with the Utah Division of Water Rights for the mine permit area and adjacent sections.

4) Discussions with Co-Op Mining representatives concerning historic groundwater inflows to the mine and the general operational history of the Bear Canyon mine.

5) Analysis of monthly precipitation, stream flow, spring flow, and geochemical data derived from monitoring stations in the vicinity of the Bear Canyon Mine.

6) Incremental drilling and aquifer testing of three borings from the mine floor to the Mancos Shale, and completion of the borings as monitoring wells.

7) Installation of dedicated purging and sampling systems in the monitoring wells, and collection of groundwater quality samples.

8) Drilling and installation of in-mine monitoring well DH-4 in January, 1994, to replace well DH-3, which was abandoned in November, 1993.

This report is divided into six sections, including this introduction. Section 2.0 is a description of area hydrogeology, Section 3.0 is a description of monitoring well installation and groundwater sampling, and aquifer testing is summarized in Section 4.0. Conclusions and recommendations are presented in Section 5.0, and references are contained in Section 6.0.

1.2 Background Information

The Bear Canyon Mine is located near the eastern margin of the Wasatch Plateau Coal Field in Bear Creek Canyon, a tributary to Huntington Creek Canyon (Figure 1-1). The mine is located approximately 9.5 miles west of Huntington, Utah.

Coal mining in the region of the study area began in the early 1900's. Mining operations have been or are presently being conducted by U.S. Fuel at Hiawatha, by Plateau Resources at Wattis, and by Co-Op Mining Company in the Trail Canyon and the Bear Creek

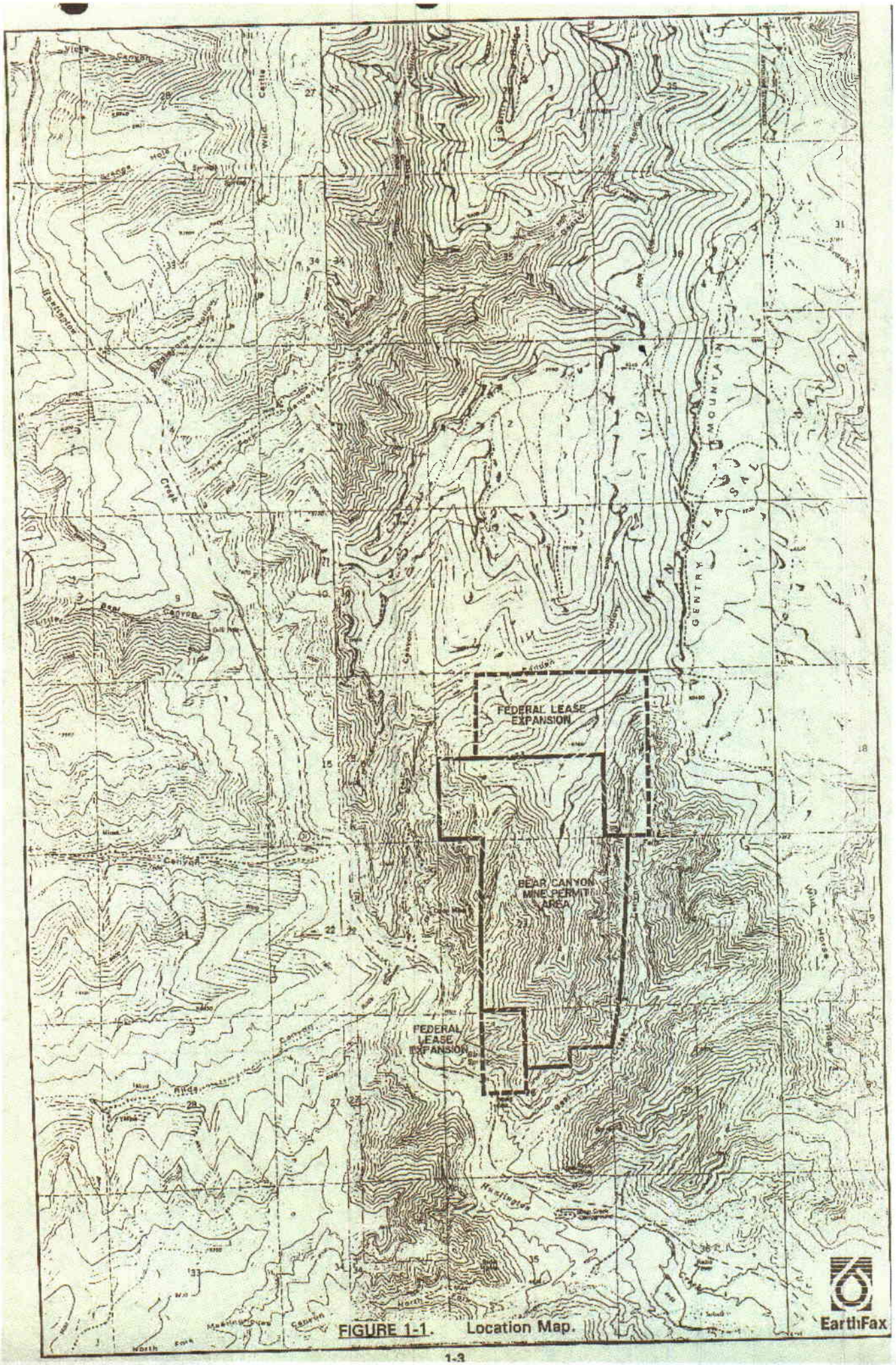

FIGURE 1-1. Location Map.

Canyon. All of these operations have intersected the faults with which Big Bear and Birch Springs are associated, although the Co-Op Mining Company Trail Canyon and Bear Canyon operations are closest to the springs. The Trail Canyon Mine discontinued operations in late 1982 and has since been sealed; operations have been continuous at the Bear Canyon Mine since 1982.

2.0 HYDROGEOLOGY

2.1 Climate

The Bear Canyon Mine permit and adjacent area (referenced herein as the study area) are located near the eastern margin of the Wasatch Plateau. Elevations within the study area range from approximately 6,500 to over 9,000 feet above sea level. This elevation range results in a significant variation in average annual precipitation amounts. At the higher elevations of the Wasatch Plateau, the average annual precipitation exceeds 40 inches.

Precipitation data has been collected at the Bear Canyon Mine since August 14, 1991. Because the period of Bear Canyon Mine precipitation records is short and because the data is collected at only one location, data from five surrounding precipitation recording stations were averaged to provide a more representative estimate of precipitation across the study area. The stations used in the averages are the NOAA weather stations at Hiawatha and Electric Lake and the SCS SNOWTEL stations at Stuart Ranger Station, Red Pine Ridge, and Cottonwood-Mammoth (Figure 2-1). The Bear Canyon Mine data, monthly precipitation data from each of the five stations and monthly five-station precipitation averages are presented in Appendix A.

2.2 Geology

2.2.1 General. Table 2-1 is a summary of stratigraphic relationships of the geologic units in the study area. The stratigraphic sequence of the lower Cretaceous-to-lower Tertiary section in the area suggests a regressive trend, from marine (Mancos Shale), through littoral and lagoonal (Blackhawk and Star Point Formations interbedded silt/mudstone and sandstone), to fluvial (Castlegate Sandstone, Price River Formation, and North Horn Formation sandstones and conglomerates), and lacustrine (Flagstaff Limestone) deposition.

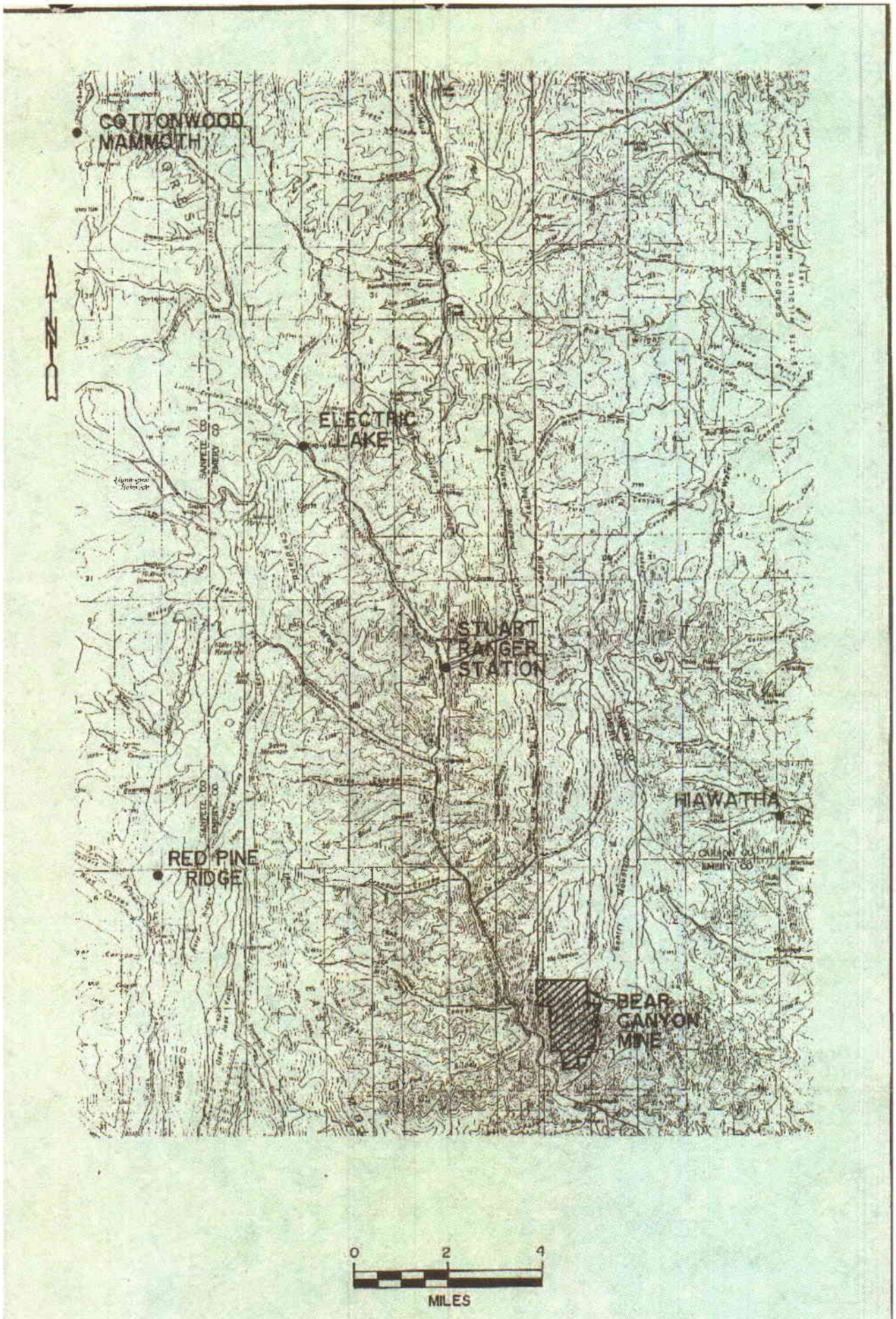

FIGURE 2-1. Location of Precipitation Monitoring Stations.

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Table 2-1

Stratigraphic relationships, thicknesses, lithologies, and water-bearing characteristics of geologic units in the upper drainages of Huntington and Cottonwood Creeks (adapted from Stokes, 1964)

System	Series	Formations and members	Thickness (feet)	Lithology and water-bearing characteristics
Quaternary	Holocene and Pleistocene		0-100	Alluvium and colluvium; clay, silt, sand, gravel, and boulders; yields water to springs that may cease to flow in late summer.
Tertiary	Eocene and Paleocene	Flagstaff Limestone	10-300	Light-gray, dense, cherty, lacustrine limestone with some interbedded thin gray and green-gray shale; light-red or pink calcareous siltstone at base in some places; yields water to springs in upland areas. (See table 9.)
	Paleocene	North Horn Formation	800±	Variegated shale and mudstone with interbeds of tan-to-gray sandstone; all of fluvial and lacustrine origin; yields water to springs. (See table 9.)
Cretaceous	Upper Cretaceous	Price River Formation	600-700	Gray-to-brown, fine-to-coarse, and conglomeratic fluvial sandstone with thin beds of gray shale; yields water to springs locally.
		Castlegate Sandstone	150-250	Tan-to-brown fluvial sandstone and conglomerate; forms cliffs in most exposures; yields water to springs locally.
		Blackhawk Formation	600-700	Tan-to-gray discontinuous sandstone and gray carbonaceous shales with coal beds; all of marginal marine and paludal origin; locally scour-and-fill deposits of fluvial sandstone within less permeable sediments; yields water to springs and coal mines, mainly where fractured or jointed.
		Star Point Sandstone	350-450	Light-gray, white, massive, and thin-bedded sandstone, grading downward from a massive cliff-forming unit at the top to thin interbedded sandstone and shale at the base; all of marginal marine and marine origin; yields water to springs and mines where fractured and jointed.
		Masuk Member Mancos Shale	600-800	Dark-gray marine shale with thin, discontinuous layers of gray limestone and sandstone; yields water to springs locally.

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Plate 1 depicts surface outcrops and geologic structures within the study area. Regionally, the strata in the study area dip to the south and southeast at an angle of two to three degrees (Brown, et al., 1987); this dip direction was confirmed by the stratigraphy observed during in-mine drilling conducted for this study, although dip angles determined from in-mine drilling ranged from 0.44 to 1.47 degrees. As shown on Plate 1, the Bear Canyon and Trail Canyon Mines are located in a complex graben bounded by the Pleasant Valley Fault (on the west) and the Bear Canyon Fault (on the east). Vertical displacements on both faults are approximately 100-150 feet. Brown, et al. (1987) describe a shattered zone within the graben, approximately two miles north of the current northernmost extent of the Bear Canyon Mine. In the portion of the graben within the permit area, only minor faulting (vertical displacements of 20 feet or less) has been identified, with the exception of the Blind Canyon fault (Plate 1), which is estimated to have approximately 220 feet of vertical displacement (down to the west) in the vicinity of the Bear Canyon Mine (Co-Op Mining Company, 1990a).

The major coal-bearing unit of the Wasatch Plateau Coal Field is the Blackhawk Formation. In the Bear Canyon mine, coal is removed from three seams within the Blackhawk Formation: the Tank and Blind Canyon seams (300 and 100 feet, respectively, above the Blackhawk/Star Point contact, and the Hiawatha seam, which thins and (in places) pinches out, and lies in direct contact with the Star Point Sandstone (Co-Op Mining Company, 1990a).

2.2.2 Stratigraphy of In-Mine Drillholes. Descriptive logging and aquifer testing was conducted in four in-mine drillholes installed as part of this study. During the investigation, it was revealed that the Star Point Sandstone beneath the permit area is comprised of three separate sandstone units (in descending order: the Spring Canyon, Storrs, and Panther Tongues) interbedded with two mudstone units (inferred to be tongues of the Blue Gate member of the Mancos Shale). In this report, the mudstone tongue between the Spring Canyon and Storrs is termed the Mancos No. 1 mudstone, and that between the Storrs and the Panther is termed the Mancos No. 2 mudstone. A similar intertonguing of Blue Gate shale with the three Star Point sandstone units has been documented in the area of the Scofield

S.W. and Scofield S.E. quadrangles, immediately north of the study area (Doelling, 1972). Characteristics of the three Star Point Sandstone aquifers are summarized in Section 2.5, and stratigraphic logs are contained in Appendix G.

2.3 Surface Water

2.3.1 Hydrology. Most of the study area is drained by two canyons, Trail Canyon (on the west) and Bear Canyon (on the east). Several smaller canyons drain the remaining southeast portion of Bear Canyon permit area. The Trail Canyon and Bear Canyon drainages contain intermittent streams, while the small drainages in the southeast portion of the permit area contain ephemeral streams. These streams discharge to Huntington Creek, the major drainage in the area.

The tributary streams primarily flow during the snowmelt period. From 65 to 80 percent of the annual discharge at the Huntington Creek gauging station (located near the Utah Power and Light diversion for the Deer Creek Power Plant) occurs during the snowmelt period from April through July (Danielson, et al., 1981). Flow records for the period from 1981 through 1983 and 1985 were obtained from Utah Power & Light. Data for the 1984 - 1985 water year are not available. Flow records for 1986 through September, 1991 were obtained from the U.S.G.S. Water Resources Division. Stream flow data are summarized in Appendix B.

2.3.2 Surface Water Quality. Danielson, et al. (1981) conducted surface water sampling of flows from selected streams in the study area. The waters sampled at the Huntington Creek gauging station were predominantly a calcium-bicarbonate water type. Waters sampled from the tributaries of Huntington Creek were predominantly a calcium-, magnesium-bicarbonate water type. During periods of low flow, the concentrations of sulfate in the tributaries were up to ten times greater than in Huntington Creek itself (Danielson, et al., 1981).

Stream water monitoring points BC-1 (Upper Bear Creek) and BC-2 (Lower Bear Creek) were monitored for stream flow six and seven times, respectively, during the period from February through November, 1990 and average flow rates are presented in Table 2-2. During 1990 average flow rates increased by 12 gpm from BC-1 to BC-2. Water samples were collected from both BC-1 and BC-2 three and four times, respectively, during 1990 (Co-Op Mining Company, 1990b) and averages of these data are presented in Table 2-2. These averages were examined using a Student's t-test to test the hypothesis that the differences between the mean values for BC-1 and the mean values for BC-2 are insignificant. The t-test for difference in means is defined by the following formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sigma \sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}$$

where

$$\sigma = \sqrt{\frac{N_1 s_1^2 + N_2 s_2^2}{N_1 + N_2 - 2}}$$

with: N_1 and N_2 = number of samples from the two populations,
X_1 and X_2 = the means of the two populations,
s_1 and s_2 = the standard deviations of the two populations.

If the absolute calculated t value is less than the table t value, the difference in the means of the two data sets is considered insignificant (Spiegel, 1961). Table 2-3 presents the results of the statistical analysis. According to the Student's t-test, the means of the 1990 parameters for BC-1 and BC-2 displayed in Table 2-2 are not significantly different. Thus, the data suggest that there is no significant difference between the surface water collected upstream from the mine at BC-1 and the surface water collected downstream from the mine at BC-2.

Prior to 1991, all water inflows to the mine were used in mining operations, and no discharge was made to the surface. Increased mine water inflow as development continued to the north made it necessary to begin discharging to Bear Creek in 1991. During 1991, discharge rates increased from 60 gpm to 194 gpm (Co-Op Mining Company, 1991). Mine water discharge in 1992 has typically been 300 gpm (Co-Op Mining Company, 1992a).

TABLE 2-2

Comparison of 1990 and 1991 Surface Water Monitoring Results for BC-1 and BC-2

	BC-1		BC-2	
	1990	1991	1990	1991
Average Flow Rate (gpm)	32	27	44	100
Average pH	8.1	8.0	8.2	8.0
Average Specific Conductance (mmhos)	1392	971	1170	837
Average TSS (mg/l)	1770	623	1712	342
Average TDS (mg/l)	1361	783	1066	793
Average Fe (mg/l)	4.1	26.3	3.8	4.0
Average Oil & Grease (mg/l)	<5	<5	60	<5

TABLE 2-3

Results of t-Test for BC-1 and BC-2, 1990

	BC-1		BC-2		Combined Statistics		
Parameter	Mean	Standard Deviation	Mean	Standard Deviation	σ	t (calc.)	Significant ?
Flow Rate (gpm)	32	17	44	22	21.59	0.99[a]	No
pH	8.1	0.08	8.2	0.16	0.14	1.25[a]	No
Specific Conductance (mmhos)	1392	1114	1170	772	934	0.42[a]	No
TSS (mg/l)	1770	2781	1712	2493	3100	0.02[b]	No
TDS (mg/l)	1361	1592	1066	1373	1740	0.22[b]	No
Fe (mg/l)	4.1	5.8	3.8	3.5	5.49	0.07[b]	No
Oil & Grease (mg/l)	<5	0.00	60	120	120	0.58[c]	No

[a] t (table) = 1.78 (Spiegel, 1961)
[b] t (table) = 1.94 (Spiegel, 1961)
[c] t (table) = 2.02 (Spiegel, 1961)

During the period from May through October 1991, Bear Creek stream flow was measured seven times. Average stream flow increased from Upper Bear Creek (BC-1) to Lower Bear Creek (BC-2) by 73 gpm (Table 2-4), due to discharge from the Bear Canyon Mine. Surface water samples were collected quarterly from both BC-1 and BC-2. Utilizing the Student's t-test defined above, the 1991 data suggest that the one significant difference between the surface water collected at BC-1 and at BC-2 is the increase in flow rate due to mine water discharge from the NPDES discharge point (Table 2-4).

Flow rates above the mine water discharge, specific conductance, TSS, and TDS concentrations generally decreased from 1990 to 1991. Total precipitation measured at Red Pine Ridge and Mammoth-Cottonwood also decreased from 26.20 and 22.30 inches, respectively in 1990, to 13.20 and 6.00 inches respectively, in 1991 (Appendix A). The decrease in precipitation caused a decrease in both runoff and recharge to springs. In turn, the erosion of sediments due to runoff decreased and likely caused the decrease in chemical and sediment concentrations. During November 1990 and February 1991, chemical concentrations in both BC-1 and BC-2 increased to several times the concentrations detected throughout the balance of each respective year. The fact that this increase occurs both upstream and downstream of the mine suggests that it is not related to mining activities.

The mine water discharge typically has a pH of 7.9 and a specific conductance of 546 mmhos. The TDS and TSS concentrations average 371 and 13 mg/l, respectively. Iron concentrations are typically 0.11 mg/l and oil and grease are usually less than detection. These concentrations are generally less than the corresponding concentrations at both the upper and lower Bear Creek monitoring stations (Co-Op Mining Company, 1991). Thus, it is unlikely that the mine water discharge decreases the quality of water in Bear Creek.

Mine water collected in sumps in the mine is discharged to Bear Creek, and is monitored according to guidelines in NPDES Permit number UTGO40000. During the months of January and March, 1992, TDS concentrations measured at the NPDES discharge point exceeded the maximum allowable concentration of 2,000 lbs./day. This increase was

TABLE 2-4

Results of t-Test for BC-1 and BC-2, 1991

	BC-1		BC-2		Combined Statistics		
Parameter	Mean	Standard Deviation	Mean	Standard Deviation	σ	t (calc.)	Significant ?
Flow Rate (gpm)	27	9	100	78	60	2.30[a]	Yes
pH	8.0	0.10	8.0	0.10	0.01	0.00[a]	No
Specific Conductance (mmhos)	971	747	837	511	979	0.26[a]	No
TSS (mg/l)	623	913	342	299	784	0.50[b]	No
TDS (mg/l)	783	633	793	679	758	0.02[b]	No
Fe (mg/l)	26.3	49	4.1	4.7	40	0.79[b]	No
Oil & Grease (mg/l)	<5	0.00	<5	0.00	0.00	0.00[b]	No

[a] t (table) = 1.77 (Spiegel, 1961)
[b] t (table) = 1.90 (Spiegel, 1961)

attributed to localized sulfur-bearing minerals in the mine's 3rd West section and the use of gypsum rock dust in the mine (Co-Op Mining Company, 1992a), which began in 1991 (Co-Op Mining Company, 1992b). This problem was corrected by using lime dust in the active sections of the mine. The 3rd West section is not presently active. Should mining resume in 3rd West, discharge from that part of the mine will be restricted (Co-Op Mining Company, 1992a).

2.4 Groundwater

The groundwater system in the study area has been investigated by Danielson, et al. (1981), Co-Op Mining Company (1986), and Montgomery (1991). The recharge, movement, and discharge of water within the groundwater system is dependent on climatic and geologic conditions in the study area. Although groundwater occurs in all of the geologic units listed in Table 2-1, none of the units are saturated everywhere (Danielson, et al., 1981).

2.4.1 Occurrence of Groundwater. The formations in the study area have been identified as having a combination of perched and regional water tables. In most of the study area, perched zones exist in the North Horn, Price River, Castlegate Sandstone and upper Blackhawk Formations.

Although a regional aquifer (termed the Star Point-Blackhawk Aquifer by Danielson, et al., 1981) has been proposed for the area, in-mine drilling and aquifer testing conducted for this study indicate that the three aquifers within the Star Point Sandstone have individual static water levels. Further, in the southernmost hole (DH-3) none of the three aquifers are fully saturated (Figure 2-2). The fact that the Star Point aquifers are separate and hydraulically distinct (a single water table does not transect the stratigraphic units as proposed by Danielson, et al. 1981) suggests that the "regional" aquifer in the study area is actually located below the Star Point/Mancos Shale contact.

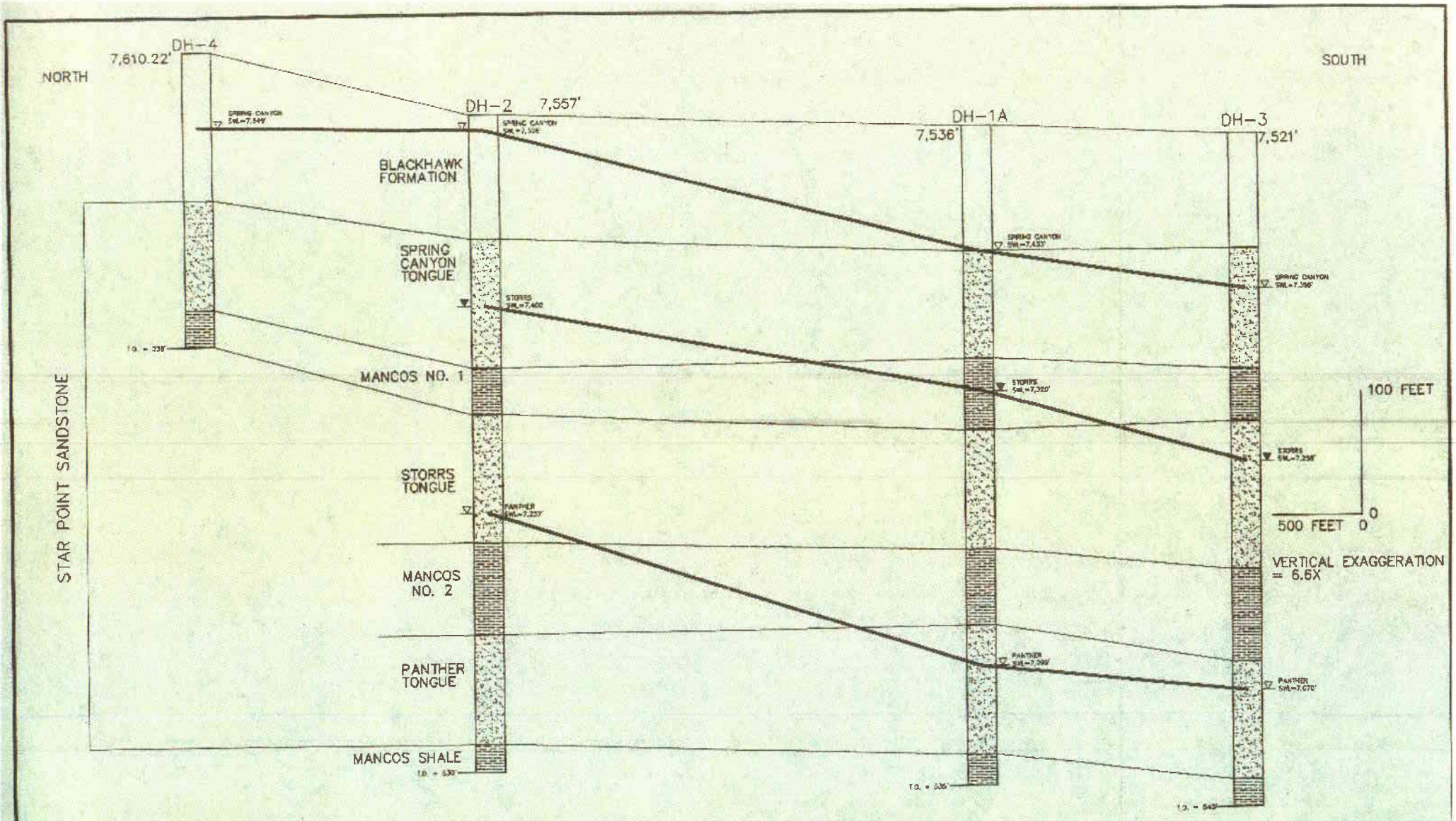

FIGURE 2-2. STRATIGRAPHIC AND HYDROLOGIC CROSS-SECTION THROUGH IN-MINE DRILLHOLES DH-1A, DH-2, DH-3 AND DH-4

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2.4.2 Recharge. Snow at the higher elevations provides the greatest source of groundwater recharge. Deuterium analyses of groundwater in the region indicate that most, if not all, groundwater is derived from snowmelt (Danielson et al., 1981). The percentage of water derived from snowmelt which recharges the groundwater system versus that which runs off to stream flow is controlled by the surface relief, the permeability of exposed strata, the depth of snowpack, and the rate of snowmelt. The highest recharge occurs in areas of low surface relief and on formations which have high permeability from fractures and/or solution openings.

In the study area, the criteria which encourage recharge from snowmelt are typical of the areas of exposed North Horn and upper Price River Formations. The main recharge area to the groundwater system in the area of the Bear Canyon Mine is expected to be the shattered zone identified by Brown, et al. (1987) in Section 1, 2, and the north half of Section 11, in Township 16 South, Range 7 East (Plate 1). An additional area of recharge could also be expected in the southern half of Section 11 and the northern half of Section 14, due to the surface exposure of North Horn Formation (Plate 1), however, this area is not as highly fractured as the area to the north.

Outcrops within the permit area include the Price River Formation, Castlegate Sandstone, Blackhawk Formation, Star Point Sandstone, and the Mancos Shale. Danielson, et al. (1981) indicate that recharge to the Blackhawk-Star Point aquifer from direct infiltration of snowmelt to formations which outcrop below the North Horn Formation is small in comparison to recharge through low relief surfaces on the North Horn Formation. In the study area, low-relief exposures of formations below the North Horn Formation and above the coal outcrops is limited due to the steepness of the canyons. Therefore, the potential for recharge through these formations to the regional groundwater system within the permit area is limited.

Co-Op Mining Company has conducted spring and seep surveys of the permit and adjacent area and has identified three springs and two seeps which occur above the coal seam. These water sources are located in the northern part of the permit and adjacent area.

As shown on the water rights map (Figure 2-3), no groundwater rights are found on the ridge overlying the Bear Canyon Mine. The only groundwater sources identified in the southern portion of the permit and adjacent area are Big Bear Spring and Birch Spring. These springs are located approximately 500 feet below the Blind Canyon seam mine floor, and issue from the contact between the Panther Tongue of the Star Point Sandstone and the Mancos Shale. The limited number of springs which occur in areas which overlie the mine is further indication that only limited recharge occurs in the Bear Canyon permit area.

2.4.3 Movement. The movement of groundwater in the study area is strongly controlled by faults and the dip of strata. Most of the water movement in the study area is through fractures, faults, and partings between the beds (Danielson, et al., 1981). According to Danielson, et al. (1981), a portion of the snowmelt recharge water is discharged close to the original recharge source, where the downward movement of water is impeded by impermeable beds of shale or mudstone. If lateral movement occurs close to the canyon edge, this movement continues until the land surface is encountered and discharge occurs as a perched spring. If the movement occurs on the interior of the mountain, the lateral movement continues until other vertically permeable lithologies or zones of fracturing are encountered.

Fracture-enhanced permeability allows water to pass vertically through strata which would normally impede flow. Depending on the extent to which the fractures are interconnected, vertical groundwater flow can be limited to a short distance, or it can extend to the regional water table (see Figure 2-4). Lines (1985) indicated that for the hydrogeologically similar area of Trail Mountain (south of the study area), despite a thick section of very low-permeability rock, some hydraulic connection exists between the perched aquifers and the proposed regional aquifer; such transfer occurs as downward unsaturated flow from perched aquifers to the regional aquifer along the fractures and faults.

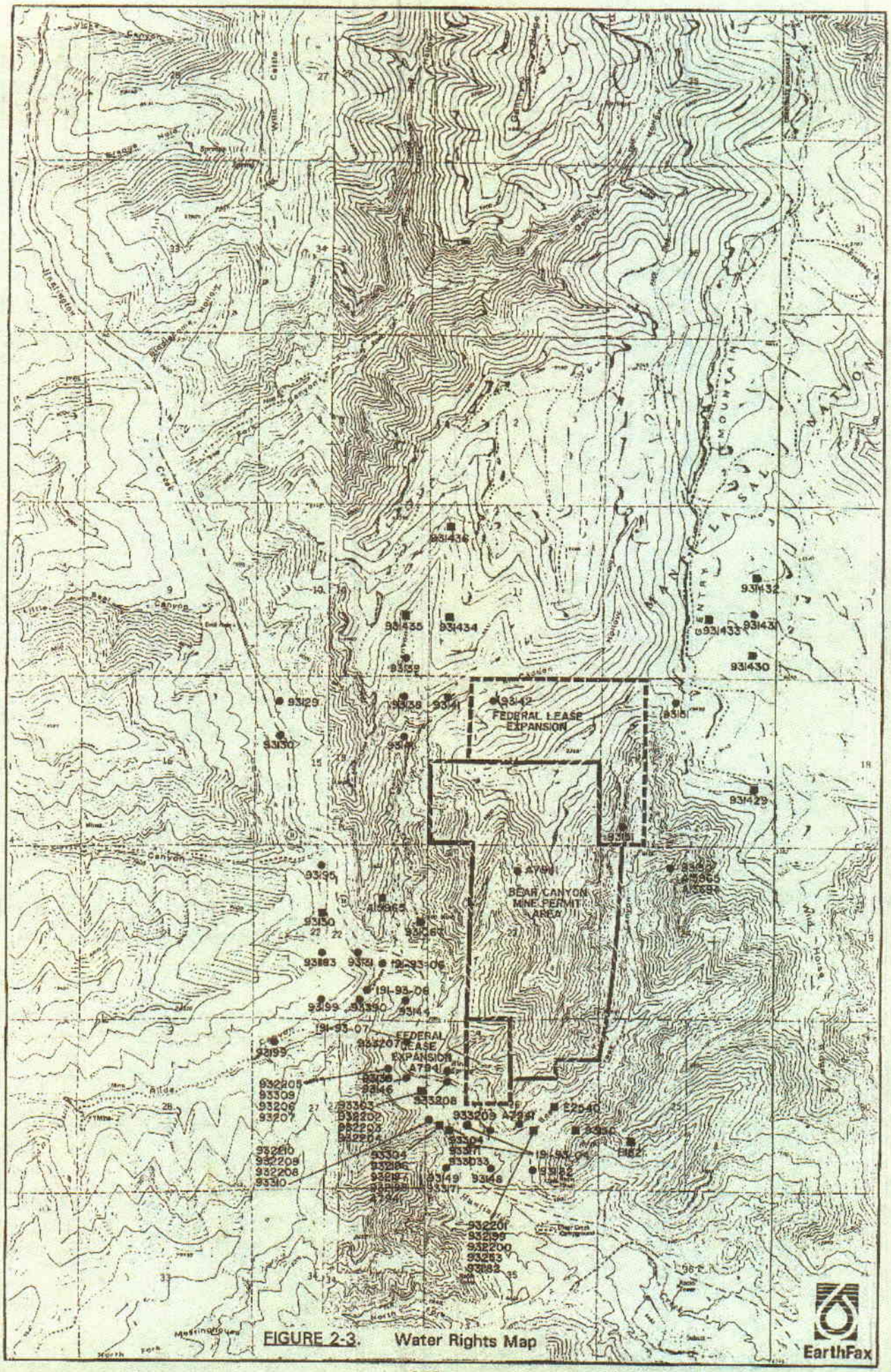

FIGURE 2-3. Water Rights Map

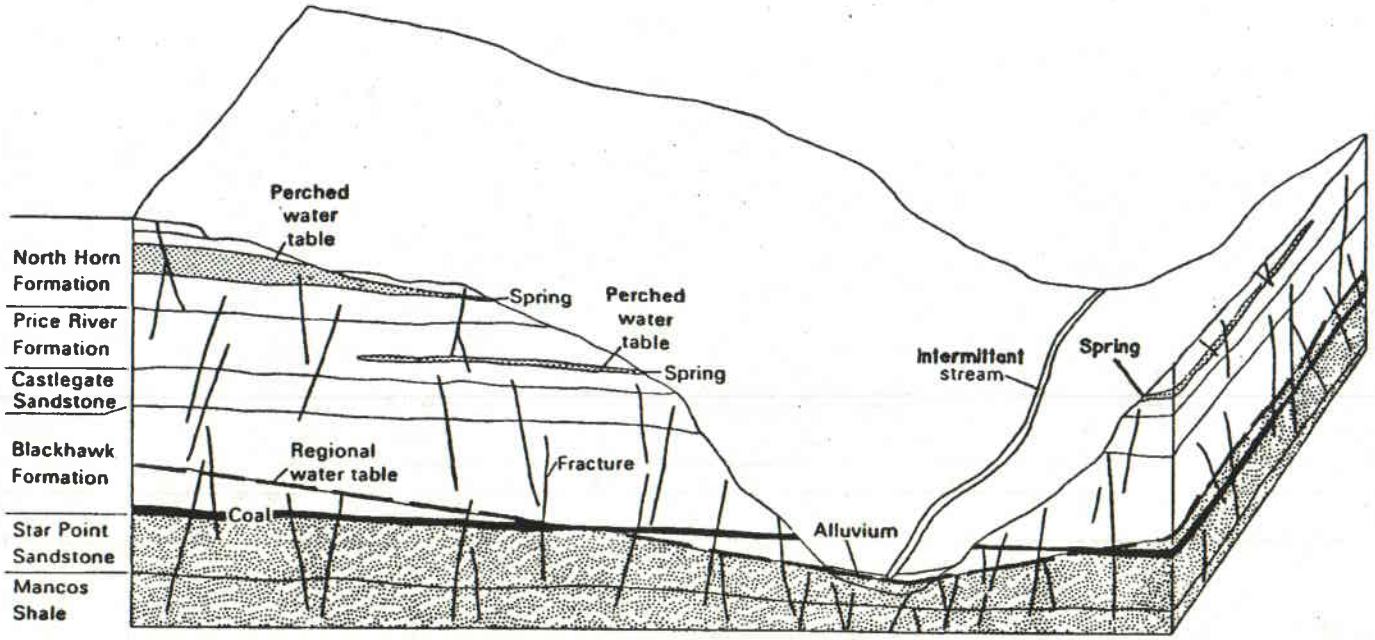

FIGURE 2-4. Generalized Block Diagram Showing Occurrence of Groundwater

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2.4.4 Discharge. Groundwater naturally discharges through springs, seeps, and by evapotranspiration. Some discharge from the groundwater system in the mine area may occur either by flow in the faults and fractures out of the Huntington Creek drainage or as subsurface flow to alluvial fill in the canyons, although such flow cannot be quantified. The major source of quantifiable discharge is springs. Within the area of the mine, two major springs have been identified: Big Bear Spring and Birch Spring. Two additional nearby springs (Tie Fork and Little Bear) have been identified outside the Bear Canyon Mine permit area. The locations of the springs are shown on Figure 2-5.

Big Bear Spring (maintained by the Castle Valley Special Services District) discharges from three prominent joints. Birch Spring (maintained by the North Emery Water Users Association) discharges from a normal fault which has approximately 20 feet of vertical displacement. Both springs issue from the lowest sandstone unit of the Star Point Sandstone (the Panther Tongue), where the Mancos Shale serves as a barrier to downward movement of groundwater (Montgomery, 1991). Tie Fork is not a true spring, but two flowing geophysical boreholes which have been developed by the Castle Valley Special Services District. Little Bear Spring issues from faults, and also is maintained by the Castle Valley Special Services District. Flow records for these springs have been obtained from the water companies and are presented in Appendix D. Big Bear Spring has an 12-year period of record (1981 to present), Birch Spring has a 4-year period of record (1989 to present), Tie Fork has an 9-year period of record (1984 to the present), and Little Bear Spring has an 11-year period of record (1982 to the present).

2.4.5 Inflow to Mine. According to Wendell Owen, the Bear Canyon Mine had water inflow to the old abandoned workings prior to the start of operations by Co-Op Mining Company in 1982. During the development of the East Bleeder entries (Plate 7-10A), water was encountered in two small faults subsidiary to the Bear Canyon Fault. Within a short time of this interception, the inflow to the abandoned workings ceased. The rate of inflow to the East Bleeders during development was approximately that which previously had flowed to the abandoned workings.

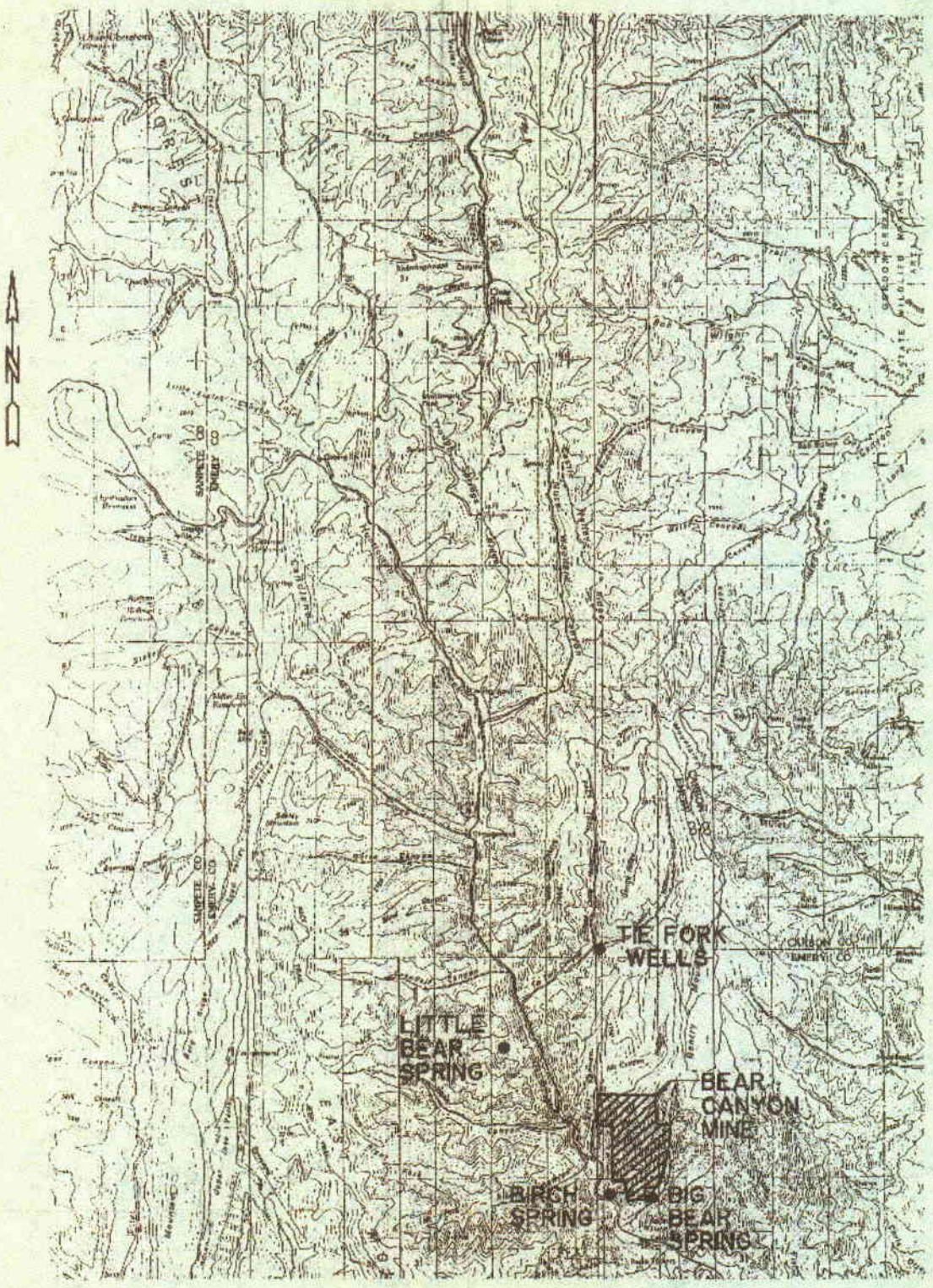

FIGURE 2-5. Locations of Springs in the Vicinity of the Mine Permit Area

Inflow to the East Bleeders continued until the summer of 1989, when water was encountered as the North Main entries were advanced northward. According to Wendell Owen, inflow to the East Bleeders gradually diminished and flow into the North Mains was approximately 110 gpm. As the North Main entries were advanced, former zones of inflow several crosscuts back from the working face would drain, and the inflow rate would diminish and eventually cease. This observed coordination between upgradient inflow interception and downgradient inflow cessation as mine development advanced northward indicates a high degree of hydraulic interconnection through fractures in the portion of the Blackhawk Formation which overlies the mine, and that this fracture system directs flows to the southeast, along the dip of the beds.

The current major area of water inflow to the mine is located at the north end of the North Mains entries (Plate 7-10A). Sumps located in the Second East and North Main entries in the area of the inflow are used to collect and store this water. A Portion of the water from these sumps is diverted for in-mine use. The remainder of the water is pumped to the surface and discharged into Bear Creek (such discharges are recorded in the annual reports). A portion of the inflow to the area of the North Mains is used for culinary purposes at the mine.

Additional minor inflows to the mine consist of small quantities from diffuse sources throughout the mine. During the February 1991 underground tour, only one small roof dripper was found with sufficient flow (0.1 gallon per minute) to be sampled. Values of pH, temperature, and conductivity measured at the time of sampling are presented in Table 2-5. At the time of the underground tour, Wendell Owen indicated that several of the areas surveyed had previously been much wetter; however, only limited water inflows were found during the survey. This pattern is similar to that observed in other mines (e.g., Deer Creek, Plateau, and others) in the Wasatch Plateau (Danielson et al., 1981). In areas which do not intersect faults upon initial mining, moderate water inflows occur from diffuse sources (primarily from roof bolts). Flows from such sources are generally less than one gallon per minute. Typically, the roof bolt intersects and provides a drain for a localized perched

TABLE 2-5

Field Parameter Results

Sample I.D.	pH (Units)	Temperature (°C)	Conductivity (μmhos/cm)
Big Bear Overflow	6.9	10.9	460
Seepage Above Big Bear Spring	8.1	12.4	2000
Roof dripper in 3rd West Entries	7.7	14.2	510

aquifer, often a sandstone lens, which has a limited extent and limited quantity of water in storage. Once the stored water is drained (typically in one or two months), recharge to the perched zone is not sufficient to maintain the previous flow, and the inflow is reduced or ceases entirely.

Inflows in the north ends of the North Main and Second East entries are through roof bolt holes and hairline fractures which are presumed to drain overlying perched aquifers in the Blackhawk Formation . An indeterminate amount of water flows upward through the floor in the area of the Second East entries, and probably originates from the Spring Canyon Tongue aquifer (extrapolation of the Spring Canyon piezometric surface determined during testing of three in-mine monitoring wells indicates it would be approximately 15 feet above the mine floor in the north end of Second East).

Because mine inflow is from numerous and diverse sources, and because measurements prior to 1992 were not metered, the precision and accuracy of the flow rate measurements is considered by Co-Op to be insufficient to demonstrate that flow rates decrease over time when mine advancement is halted. Flow meters were installed in 1992 to allow more accurate and precise measurement of inflows, and continued periodic monitoring of inflow rates will provide more reliable data from which more definitive conclusions regarding the nature of the inflows may be drawn. Based on observations by Co-Op personnel, however, consistency of inflows in the north ends of the North Main and Second East entries is related to the rate at which the entries are advanced northward. When advancement is relatively constant and new fractures are encountered and drained, inflows are relatively constant. When the entries are not advanced, as the fractures are drained of their storage the inflow rate decreases (as was evident in 1992).

2.4.6 Long-Term Impacts. Springs in the vicinity of the Bear Canyon Mine issue from joints at the contact between the Panther Tongue and the Mancos Shale. Water inflows to the mine through bolt holes and fractures are from perched zones, often of limited storage. Most of the inflow observed to migrate with northward mine advancement in the North Mains

and northern Second East areas is presumed to be due to the interception of stored water in fractures which drain a more laterally continuous perched aquifer. This concept is further supported by the observation that inflows to the Third West Bleeders diminished and eventually ceased as the North Mains and Second East entries were advanced northward in 1989.

The absence of springs and the presence of efflorescence on sandstone outcrops in areas of seepage in the downgradient (southern) portions of the permit area suggests that groundwater movement potential in aquifers perched above the Bear Canyon seam is limited. Additionally, the absence of spring flows from the strata above the Panther Tongue/Mancos Shale contact and the presence of efflorescence on sandstone outcrops indicates a slow rate of groundwater movement and that most of the groundwater that reaches the outcrop evaporates on contact with the atmosphere. Further, no drainage through the mine floor in areas of known faults, or other evidence of hydraulic connection between such perched zones and the springs which issue from the Panther Tongue/Mancos Shale contact has been found. Thus, dewatering and diversion of inflows such as those discussed in Section 2.4.5 are not expected to affect nearby spring water quality or quantity in either the long- or short-term.

Potential negative impacts to spring water quality due to water leaking from the old workings and flowing over mudstones and into the spring collection system will not occur, because pumping into the old workings will not occur. To prevent inadvertent or accidental discharge into the old workings, a locked valve has been installed in front of the pressure relief valve shown on Plate 7-10a.

After mining and associated dewatering/diversion operations cease, the local piezometric surface will recover toward pre-mining conditions. Although inflows are expected to diminish and cease once the perched zones are drained, if inflows continue after mining is completed, the abandoned mine will not flood because the strata dip to the south-southeast; natural flow through the subsided entries and drainage to the surface will prevent accumulation (flooding) in the mine. As shown on maps of Bear (Blind) Canyon Seam

structure and the 1990 water survey (Plates 6-4 and 7-10A, respectively, of the M&RP) mine inflows originating in the northern portions of the current mine and proposed expansion areas will be conveyed to the surface through the subsided entries and will ultimately discharge along the eastern limits of the mine, probably from the area of the present fan portal, which is the lowest-elevation coal outcrop in the lease area (7,440 feet).

Flooding of the old (pre-Co-Op) abandoned workings in the south end of the lease area and potential consequent impacts to water quality or quantity due to surface-flow contamination of springs 500 feet downslope from the coal outcrop will not occur; the lowest floor elevation of the sealed entries which lead into the old workings is 7,494 feet, or 54 feet above the elevation at the fan portal. Any post-abandonment inflow originating in the northern portions of the mine will be conveyed to the east, over the mine floor surface, well north of the old workings. Discharge from the fan portal will be conducted via culvert to channel RC-3 (Plate 7-7), which is designed to accommodate a 10-year, 6-hour flow of 3.77 cfs (1,700 gpm). The addition of a hypothetical 1.11 cfs (500 gpm) discharge from the mine would not require a change in channel design. Further, a hypothetical 2.22 cfs (1,000 gpm) discharge would require only that the channel riprap D_{50} be increased from 9 inches to 10 inches. Culvert sizing and other design details will be revised prior to mine reclamation, if required, when quantities and conditions are known. However, for current mine conditions, the reclamation plan is adequate to accommodate discharges in excess of those currently intercepted by the mine.

2.5 Summaries of Star Point Sandstone Aquifers

2.5.1 Spring Canyon Tongue. The Spring Canyon Tongue of the Star Point Sandstone is 88 feet thick at DH-1A, 103 feet thick at DH-2, 98 feet thick at DH-3, and 90 feet thick at DH-4. It is generally light gray with minor dark minerals, but varies from dark gray to white. The grains range in size from fine to medium, and are moderately well sorted, subangular to subround, and cemented with calcium carbonate. The unit is generally moderately- to well-indurated. Bedding is variable through the unit, from massive to laminated,

with muddy zones and partings and locally dense bioturbation. The contact with the overlying Hiawatha coal seam of the Blackhawk Formation is abrupt; the lower contact with the Mancos No. 1 mudstone tongue is gradational.

The static water level measured in the Spring Canyon aquifer during drilling and testing was 3 feet below the top of the unit in DH-1A, 71 feet above the top of the unit in DH-2, 25 feet below the top of the unit in DH-3, and 62 feet above the top of the unit in DH-4. Thus, the Spring Canyon aquifer is confined by the Hiawatha coal seam in the northernmost drillholes (DH-2 and DH-4), and unconfined in the remaining two (DH-1A and DH-3).

2.5.2 Storrs Tongue. The Storrs Tongue is 96 feet thick at DH-1A, 105 feet thick at DH-2, and 120 feet thick at DH-3 (the Storrs Tongue was not penetrated in DH-4). It is generally light gray to dark gray, with minor dark minerals. The grains range in size from very fine to fine, and are moderately well sorted, subangular to subround, and well cemented with calcium carbonate. The unit is generally well-indurated. Bedding is variable through the unit, from massive to laminated, with muddy zones and partings and locally dense bioturbation, particularly in the lower portion of the unit. The contacts with the overlying Mancos No. 1 and underlying Mancos No. 2 mudstones are gradational. The Storrs Tongue sandstone is generally finer-grained, more dense, more highly indurated, and less permeable (as demonstrated by aquifer tests, Section 4.0) than the other two Star Point Sandstone aquifers.

The static water level measured in the Storrs aquifer during drilling and testing was 30 feet above the bottom contact of the confining Mancos No. 1 mudstone in DH-1A, 89 feet above the bottom of the Mancos No. 1 in DH-2, and 23 feet below the top of the unit in DH-3. The Storrs is unconfined by the Mancos No. 1 mudstone in only the most southern drillhole (DH-3).

2.5.3 Panther Tongue. The Panther Tongue is 105 feet thick at DH-1A, 88 feet thick at DH-2, and 97 feet thick at DH-3. It is generally light gray with minor dark minerals, but, like the Spring Canyon and Storrs tongues, varies from dark gray to white. The grains range

in size from fine to coarse, and are poorly to moderately well sorted, round to subround, and poorly cemented with calcium carbonate. The unit is generally poorly to moderately-well indurated, and locally friable. Bedding is variable through the unit, from massive to laminated, with muddy partings and local bioturbation. The contact with the overlying Mancos No. 2 mudstone is gradational; the lower contact with the Mancos Shale is abrupt. The Panther Tongue sandstone is less dense, coarser-grained, less well-cemented, less indurated, and more permeable than the Spring Canyon and Storrs tongues.

The static water level measured in the Panther aquifer during drilling and testing was 33 feet below the top of the unit in DH-1A, 103 feet above the top of the unit in DH-2, and 27 feet below the top of the unit in DH-3. The Panther aquifer is confined by the Mancos No. 2 mudstone only in DH-2; unsaturated conditions exist in southern drillholes DH-1A and DH-3.

2.6 Groundwater Quality

Monitoring stations are sampled four times per year as a part of the Co-Op Coal Company hydrologic monitoring program (Plate 2). A summary of water-quality analyses for groundwater samples collected is presented in the Annual Hydrologic Monitoring Report (Co-Op Mining Company, 1991). Groundwater-quality samples are routinely collected in the permit and adjacent areas from the underground bleeders, monitoring wells, and springs associated with faults and joints in the Panther Tongue of the Star Point Sandstone.

The general character of the groundwater in the permit and adjacent areas is that of slightly alkaline calcium-bicarbonate water that contains low concentrations of total dissolved solids (TDS), nutrients, and metals. Field conductivity and pH range from 300 to 842 mg/l and from 6.1 to 8.1, respectively. TDS is typically 400 mg/l. Historically, acidity is zero and average alkalinity is 290 mg/l. Sulfate and magnesium concentrations are typically 70 and 40 mg/l, respectively. Iron and manganese concentrations are typically 0.3 and 0.1 mg/l, respectively.

Figure 2-6 presents a Piper diagram of average analytical results of the sampling events in 1991 for six groundwater monitoring points: Birch Spring (SBC-5, eight samples), North Mains (SBC-9, five samples), Ball Park Spring (BP-1, two samples), Big Bear Spring (SBC-4, eight samples), Co-Op Spring (CS-1, two samples), and Trail Canyon Spring (TS-1, two samples). The Piper diagram is divided into three fields: cations, anions, and the combined field. Values are in percent milliequivalents, and are plotted in the anion and cation fields and projected into a combined field. Spatial relationships that are repeated in all three fields are indicative of relationships between waters. The spatial relationships among the six waters differ from field to field. Birch Spring has the least similarity to the other waters. For example, Birch Spring water plots very close to mine water in the cation field, but it plots as an outlier in the anion field and in the combined field. This is due to a higher percentage of sulfate in Birch Spring water than in the mine water or the other spring water in the area. In fact, the mine water and BP-1 water have the lowest percentages of sulfate of the groundwater represented in the Piper diagram. Thus, the spatial relationships exhibited in the Piper diagram suggest that the mine water is of a higher quality than Birch Spring water. Furthermore, the difference in spatial relationships in the different fields suggests the waters are not hydraulically or chemically connected.

Figure 2-7 presents a series of Stiff diagrams which characterize waters from the same six groundwater monitoring points used in Figure 2-6. The six waters display a similar Stiff pattern, that of a calcium-bicarbonate water. Additionally, the Stiff patterns indicate that SBC-9 (North Mains) water has the lowest sulfate concentration (1.18 meq/l) and SBC-5 (Birch Spring) has the highest sulfate concentration (2.62 meq/l) of the groundwater sampled. SBC-4 (Big Bear Spring) water has a sulfate concentration of 1.36 meq/l. SBC-9 also has the lowest chloride value of the groundwaters sampled, while SBC-5 has the highest chloride value. This relationship between the sulfate and chloride concentrations does not suggest that the mine water could diminish the quality of the spring water in the area.

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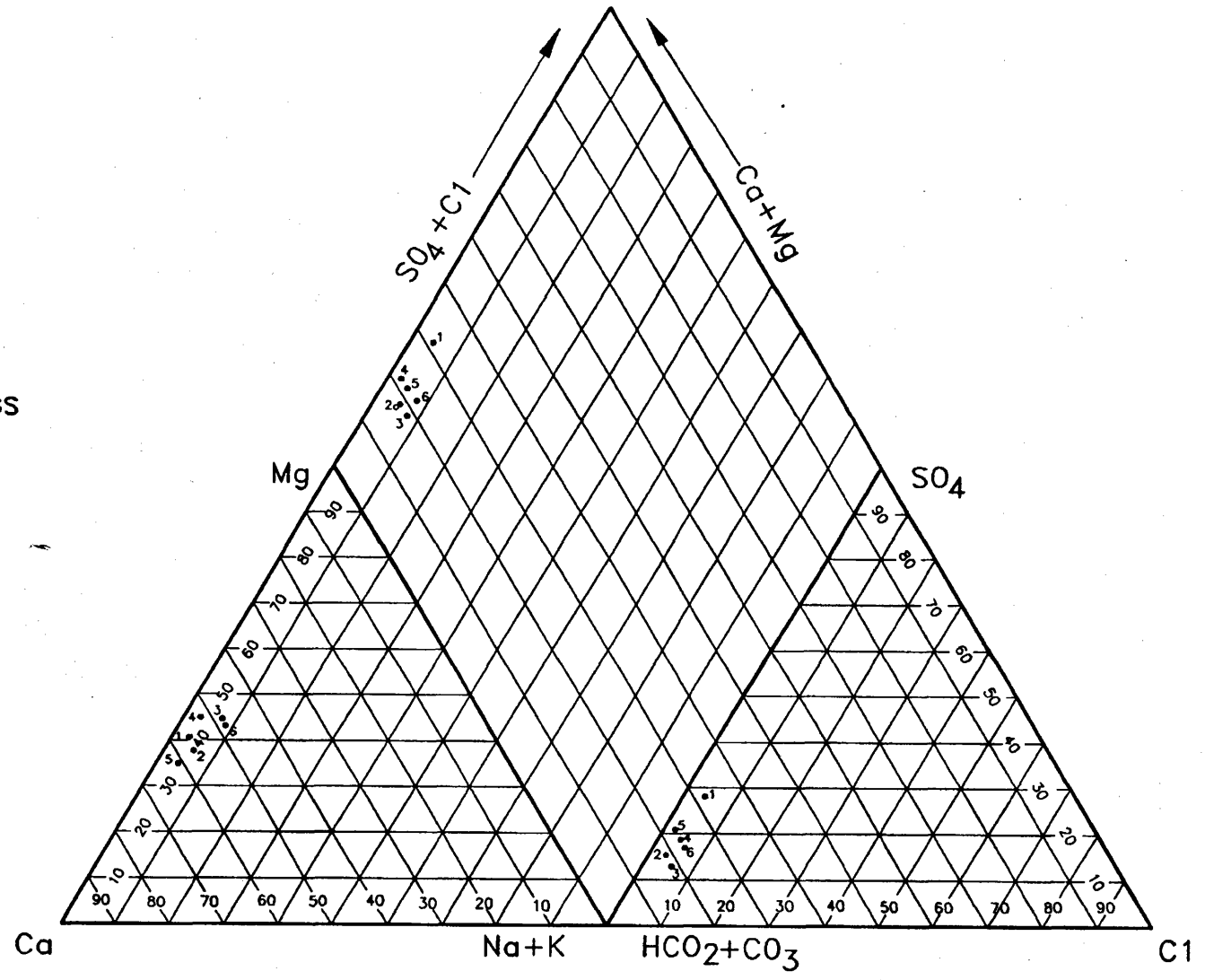

FIGURE 2-6. PIPER DIAGRAM OF AVERAGE GROUNDWATER ANALYTICAL RESULTS

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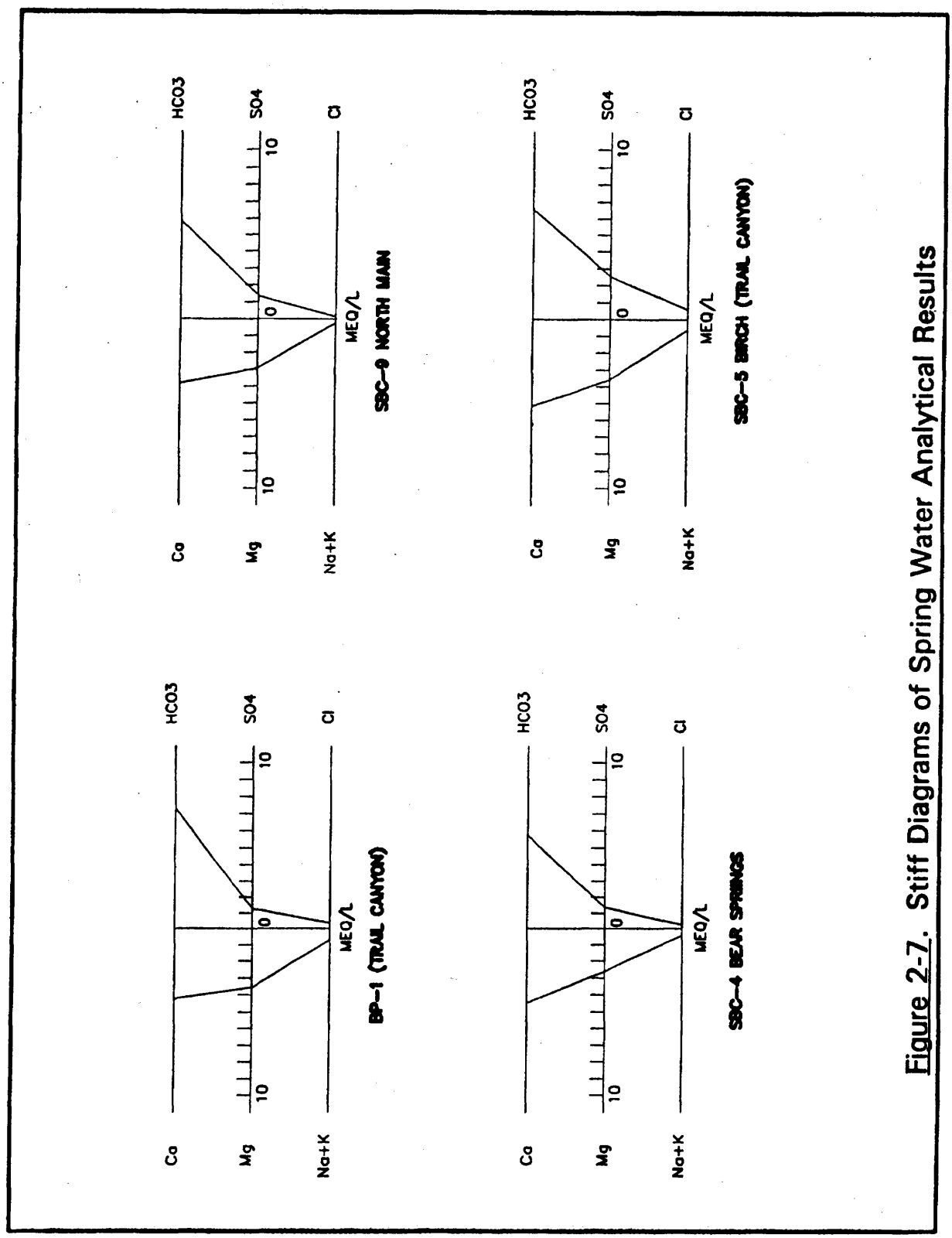
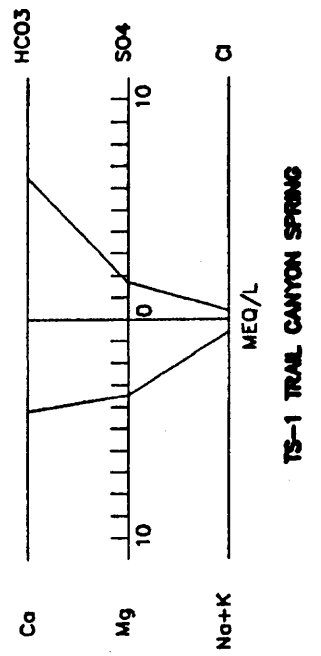


Figure 2-7. Stiff Diagrams of Spring Water Analytical Results



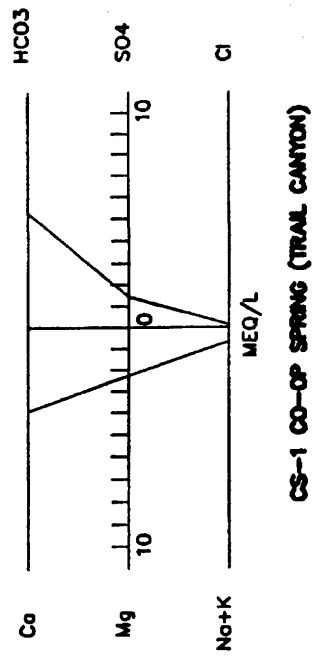


Figure 2-7 (continued). Stiff Diagrams of Spring Water Analytical Results

The major portion of water inflow to the mine is used within the mine or for culinary purposes by Co-Op Mining Company. According to the Co-Op Bear Canyon Mining and Reclamation Plan, the water which flows from Big Bear Spring (also called Huntington Spring)and Birch Spring is used by the Huntington community for culinary purposes (Co-Op Mining Company, 1985). Water collected in Trail Canyon from TS-1 (Trail Canyon Spring) is also used locally for culinary purposes. CS-1 (Co-Op Spring) was used in the past, but is no longer used for culinary purposes (Co-Op Mining Company, 1992a).

Wells in the permit and adjacent areas are either observation wells owned by Co-Op Mining, or exploration wells owned by Northwest Energy. Three new monitoring wells (DH-1A, DH-2, and DH-3, Plate 1) were drilled within the permit area for this study. DH-1A and DH-2 were drilled in late 1991 and DH-3 was drilled in early 1992. The three wells were completed in the Spring Canyon Tongue of the Star Point Sandstone, and were developed, tested, and sampled in May, 1992. The results of laboratory analyses of the monitoring well samples are summarized on Table 2-6, and complete analytical reports are presented in Appendix H.

In-mine monitoring well DH-4 was completed in the Spring Canyon Tongue in January, 1994 to replace well DH-3. DH-3 was abandoned in November, 1993 because the pillars were pulled in the 1st East section of the mine. Table 2-7 is a summary of minimum, maximum and mean analytical results for groundwater collected in 1994 from the four in-mine monitoring wells. Complete analytical reports for 1994 quarterly in-mine monitoring well samples are in Appendix I.

Figure 2-8 presents Stiff diagrams of major ionic species in groundwater from the in-mine wells. Waters from DH-2 and DH-3 have Stiff patterns similar to those of the calcium-bicarbonate spring water depicted on Figure 2-7. Water from DH-1A has a calcium, magnesium, sodium, potassium-sulfate pattern. This pattern is distinctly different from other groundwater that has been sampled in the permit and adjacent areas and shows a relatively elevated sulfate level, which is presumed to be due to the dissolution of locally-occurring

TABLE 2-6

**Summary of Laboratory Analytical Results
for Groundwater From In-Mine Monitoring Wells**

ANALYTE (mg/l)	DH-1A	DH-2	DH-3
Aluminum	0.2	<0.1	<0.1
Arsenic	<0.05	<0.05	<0.05
Barium	0.071	0.127	0.129
Cadmium	<0.01	<0.01	<0.01
Calcium	38.9	51.9	50.9
Chromium	0.025	<0.01	<0.01
Copper	<0.01	<0.01	<0.01
Iron	0.505	0.280	0.220
Lead	<0.01	0.030	<0.01
Magnesium	20.1	29.5	28.9
Manganese	0.062	0.101	0.232
Mercury	<0.0005	<0.0005	<0.0005
Molybdenum	0.058	0.010	<0.01
Nickel	<0.01	<0.01	<0.01
Potassium	31.2	1.5	2.6
Selenium	<0.0005	<0.0005	<0.0005
Sodium	14.1	8.8	15.2
Zinc	<0.01	<0.01	<0.01
Oil & Grease	2.0[a]	<0.5	<0.5

[a] Oil and Grease expected (hydraulic fluid leak on rig).

TABLE 2-6 (Continued)

Summary of Laboratory Analytical Results for Groundwater From In-Mine Monitoring Wells

ANALYTE (mg/l)	DH-1A	DH-2	DH-3
TDS	285	330	339
Hardness as CaCO3	162	321	307
Boron	<0.05	0.064	0.061
Alkalinity as CaCO3	94	285	294
Bicarbonate	110	340	336
Carbonate	2.3	3.5	11.5
Hydroxide	0	0	0
Chloride	4.9	4.2	4.2
Fluoride	0.28	0.18	0.16
Ammonia	<0.2	0.64	0.22
Nitrate	0.42	0.74	<0.5
Phosphate	0.129	0.25	0.027
Sulfate	128	33	38
Sulfide	<0.1	<0.1	<0.1

TABLE 2-7

Minimum, Maximum and Mean Analytical Results for Groundwater From In-Mine Monitoring Wells

Parameter	DH-1A			DH-2			DH-3			DH-4		
	min	max	mean	min	max	mean	min	max	mean	min	max	mean
Water Level (ft)	115.83	112.17	113.74	26.25	22.00	23.84	126.20	125.1	125.66	62.30	58.75	60.76
pH	7.07	7.48	7.21	6.83	7.34	7.02	7.04	7.29	7.17	7.12	7.23	7.17
Cond.(mmhos)	620	986	762.5	623	749	655.75	591	611	604.25	546	668	616.75
Temperature (°C)	10.8	11.2	10.98	11.2	11.4	11.28	10.6	12.0	11.10	10.6	12.3	11.13
Analytes (mg/l)												
TDS	352	597	464.5	290	356	336.25	317	349	331.25	342	400	360.5
Hardness	224	391	333.7	237	316	289.25	236.9	366	296.73	302	314	305.75
Aluminum	0.99	2.0	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	<0.001	0.001	<0.001	<0.002	0.01	<0.01	<0.002	0.02	<0.02	<0.002	<0.002	<0.002
Boron	0.08	0.11	0.09	<0.04	0.17	<0.17	<0.04	0.11	<0.11	0.10	0.40	0.18
Carbonate	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bicarbonate	207	352	294	330	350	341	256	355	320	345	395	363.75
Cadmium	<.0002	<.0002	<.0002	<.0002	0.001	<.001	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
Calcium	41.9	82.0	64.13	65.0	75.0	69.68	52.0	84.0	67.1	68.0	73.0	71.0
Chloride	0.1	24.9	9.85	5.0	0.8	3.48	4.4	5.3	4.8	3.0	7.0	4.5
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

TABLE 2-7 (continued)

Minimum, Maximum and Mean Analytical Results for Groundwater From In-Mine Monitoring Wells

	DH-1A			DH-2			DH-3			DH-4		
	min	max	mean	min	max	mean	min	max	mean	min	max	mean
Iron (total)	0.40	2.24	0.94	0.51	2.17	0.98	0.23	1.64	1.27	<0.2	0.4	<0.4
Iron (diss.)	<0.2	0.9	<0.9	<0.20	0.41	<0.41	<0.20	1.40	<1.40	<0.2	<0.2	<0.2
Lead	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003
Magnesium	29	54.6	42.15	29.8	36.0	33.45	26	38	31.40	30	32	31.25
Manganese (total)	0.05	0.2	0.10	0.06	0.10	0.09	<0.1	0.37	<0.37	<0.1	<0.1	<0.1
Manganese (diss.)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	<0.1	<0.1	<0.1
Molybdenum	<0.2	0.2	<0.2	<0.2	0.3	<0.3	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2
Ammonia	<0.08	0.3	<0.3	<0.8	0.21	<0.21	<0.01	0.05	<0.05	<0.4	<0.4	<0.4
Nitrate	<0.01	0.09	<0.09	<0.07	0.07	<0.07	<0.01	0.03	<0.03	<0.01	0.03	<0.03
Nitrite	<0.02	0.02	<0.02	<0.02	0.01	<0.02	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Potassium	1.4	39.3	21.18	<0.1	2.0	<2.0	<0.1	1.9	<1.9	<2.0	2.0	<2.0
Phosphate	<0.008	0.014	<0.014	<0.008	0.006	<0.006	<0.008	0.01	<0.01	<0.02	<0.02	<0.02
Selenium	<.0004	0.02	<0.02	<.0004	0.022	<0.022	<.0004	0.019	<0.019	<0.01	<0.01	<0.01
Sodium	11	32.5	18.98	<0.2	22.9	<22.9	<0.01	4.3	<4.3	<1	6.0	<6.0
Sulfate	70	220	135	26.0	30.0	28.5	24.0	44.0	30.25	26	30	28.5
Zinc	0.05	0.16	0.09	<0.03	0.07	<0.07	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03

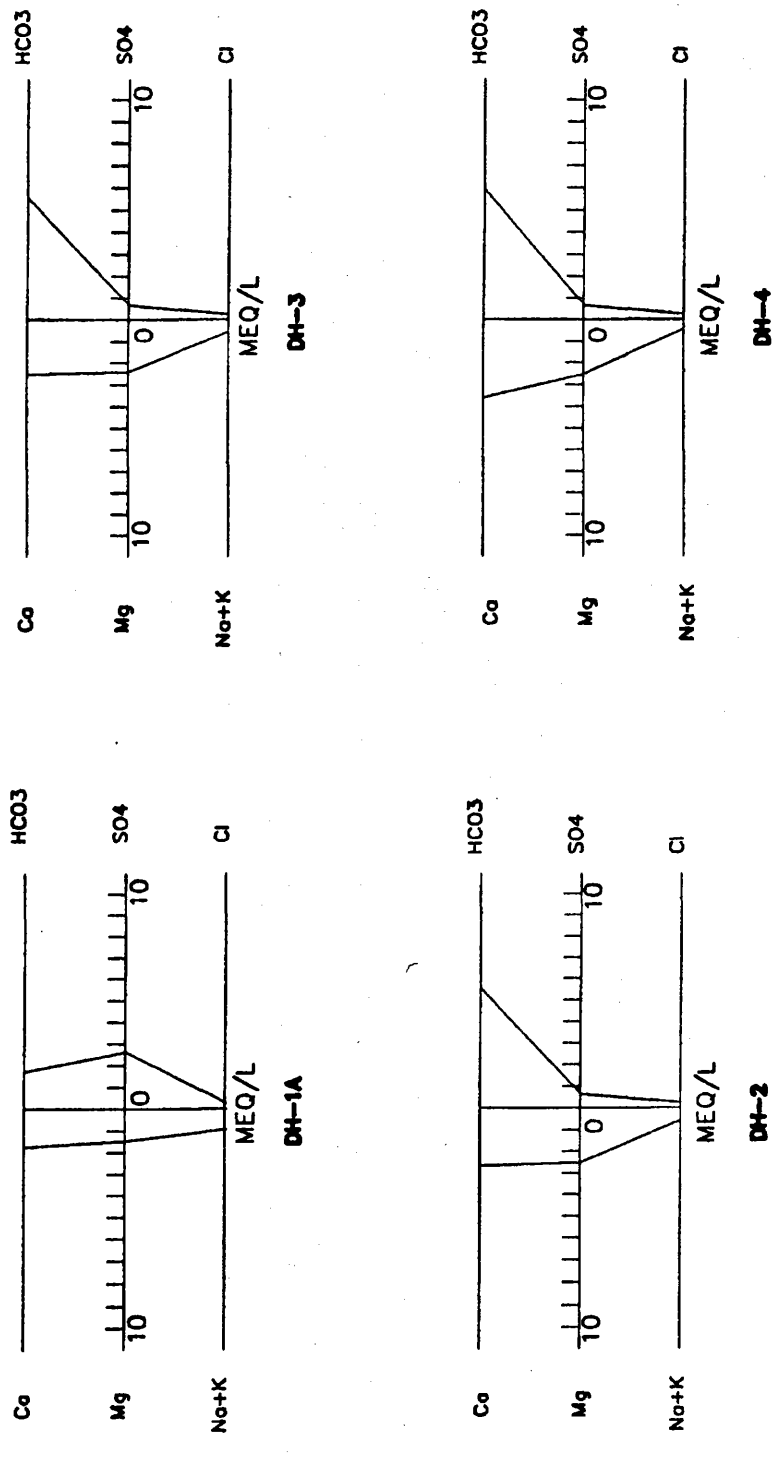


Figure 2-8. Stiff Diagrams of In-Mine Monitoring Well Analytical Results

sulfate salts. Groundwaters sampled from the in-mine wells have a TDS range of 290 to 597 mg/l. Dissolved iron concentrations range from less than 0.20 to 1.40 mg/l.

2.7 Spring Flow

Big Bear and Birch Springs were visited on February 18 and 19, 1991, during a site survey to evaluate the geology of the spring locations and to collect samples of discharge water, if available. No surface flow occurred at the Birch Spring and the collection system was locked. At Big Bear Spring, a sample was taken from the spring overflow from the northernmost joint.

A second sample was taken from seepage flow which occurs on the slope above the Big Bear Spring. The seepage originates from the cliffs at the contact between the Star Point Sandstone and Blackhawk Formation, and occurs in two areas approximately 100 yards apart. Seepage in each area appears to occur directly from the formation contact, along approximately 100 to 150 feet of the outcrop. The flow is difficult to quantify, but it is concentrated at several bedrock ledges, and was estimated at the time of the site visit to be approximately 10 gallons per minute. The easternmost seep occurs at a location that is in shade most of the day, and considerable accumulations of ice where found at this seep, due to continual freezing of the discharge. The pH, temperature, and conductivity values for these samples are presented in Table 2-5.

As indicated on Table 2-5, the electrical conductivity of water within the mine is similar to that of water from Big Bear Spring. Water from seeps above the spring is considerably different, with a conductivity approximately four times that of the spring samples, presumably due to the dissolution of gypsum from mudstone in the area from which the seeps issue.

Monthly flows from the Big Bear, Birch, and Little Bear springs and the Tie Fork wells were analyzed. Little Bear Spring and the Tie Fork wells were included in the analysis because of their long periods of record and their proximity to the mine permit area. The spring flows

were compared to five-station average monthly precipitation (see Appendix A) and stream flow for Huntington Creek gauging station above the Deer Creek Diversion (see Appendix B) plotted against time. These three plots were combined in a single graph to allow a direct comparison. For readability, the graph durations were limited to one year per sheet for each spring analyzed (an example is presented in Figure 2-9). All graphs are presented in Appendix E.

2.7.1 Little Bear Spring. Plots of flow from Little Bear Spring for the period of 1982 through 1985 show that the peak spring flows occur one month behind the peak stream flow in Huntington Creek. In 1986, the peaks occur in the same month, possibly indicating an early snowmelt. In 1987, the peak from Little Bear Spring was delayed by two months.

In the period from 1988 through 1990, no significant spring peak flow is evident. There was a gradual rise in the flow in the fall of 1988 and a gradual decline in early 1989. During 1991, peak spring flow occurred one month behind peak stream flow.

2.7.2 Tie Fork Wells. Flows from the Tie Fork wells show no seasonal variation, except for a period from July through November, 1988. By December, 1988 flows had returned to approximately the previous level and flows through 1991 have been essentially constant. This flow fluctuation corresponds to the flow increase in the Little Bear Spring, though the fluctuation of Little Bear was over a longer period.

2.7.3 Big Bear Spring. Plots of flow from Big Bear Spring show that peak flows during the period of 1980 through 1986 occurred about one month later than peak flows at the Huntington gauging station (above the Deer Creek Mine access road). In the 1987-1988 water year, the lag period between peaks in the stream and spring discharge is approximately two months. This increase in lag time is due to a combination of lower precipitation accumulations (28.4 inches average annual precipitation 1980-1986 versus 19.75 inches 1987-1990, see Appendix A) and shorter snowmelt period.

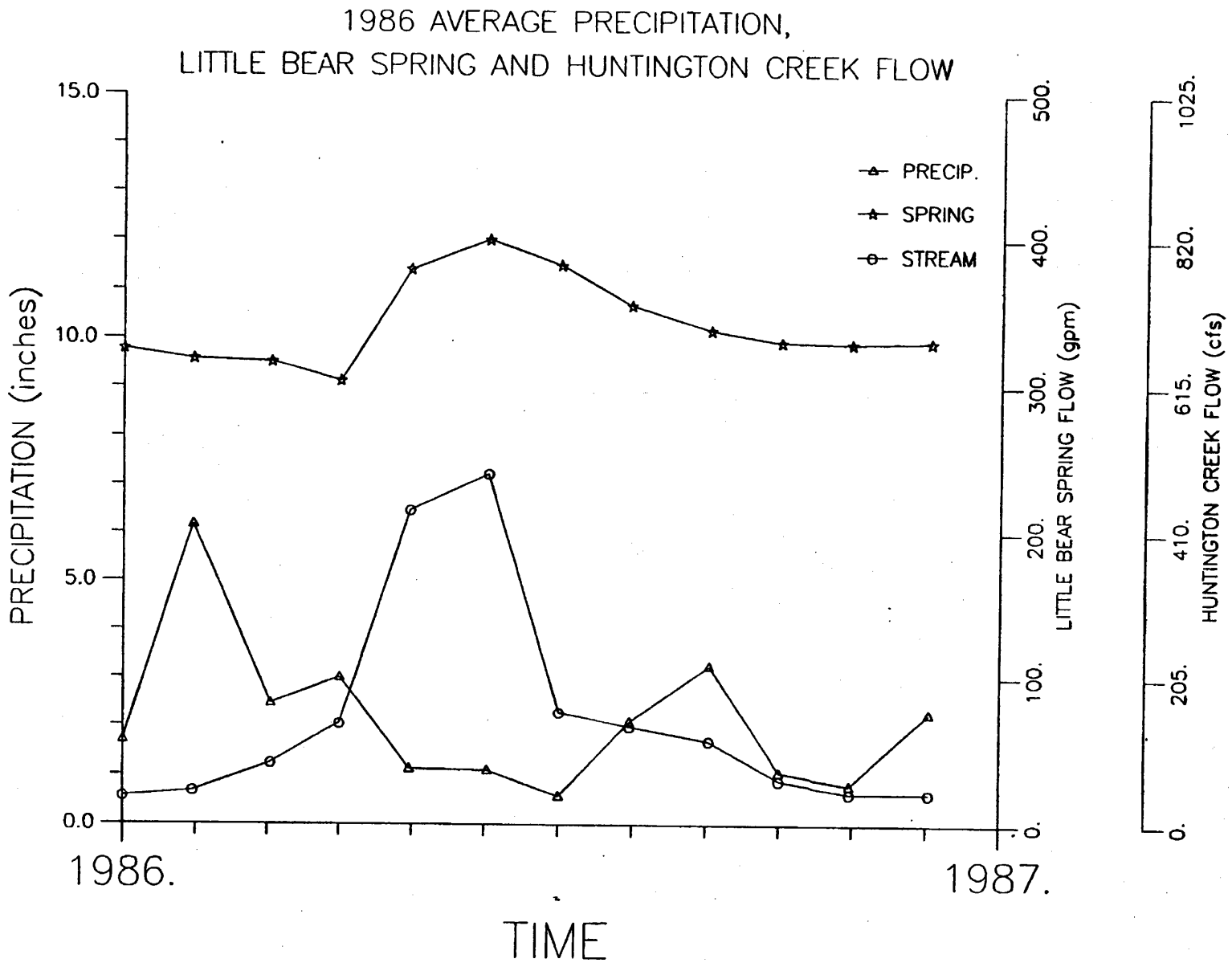


FIGURE 2-9. Example of Spring Flow Graph

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Year-by-year comparisons of the flow recessions at Big Bear Spring for the years 1980 through 1986 show very similar patterns; the slope line of the spring flow decline and the base flow level for the spring are generally the same from year to year. This indicates that the snowmelt recharge is greater than the volume required to recharge the groundwater system storage, and that excess water is being discharged from the system as peak flows through the spring. It also suggests that no outside influence (i.e., mining) affected the groundwater system.

For the period from 1988 to 1991, no snowmelt peak can be identified on the flow spring flow graphs. Also, a comparison of spring flow from years 1987 through 1991 indicates a general decline in flow. This is inferred to be due to the small amount of precipitation during this period. The quantity of snowmelt recharge during these years was not sufficient to create either of the following conditions: 1) completely fill the depleted storage in the system, (resulting in a base flow lower than that of the previous year), or 2) provide a spring flush (although recharge may be sufficient to restore deleted storage).

Under the first condition, the groundwater system is being drained and a new base flow condition will eventually be established, provided precipitation inputs are stabilized. Once the groundwater system was stabilized, the second condition would prevail until the precipitation (and recharge) increased sufficiently to fill the excess storage capacity in the groundwater system. It appears that the first condition occurred at the Big Bear Spring during the period of 1987 through 1991.

2.7.4 Birch Spring. The Birch Spring flow increased by almost 300 percent for a three month period and a reduction in water quality in the fall of 1989 (North Emery Water Users Association, 1991). Table 2-8 is a summary of water quality data before, during, and after the anomalously high flow event, and shows that water quality returned to normal once flow rates normalized. The reason for this fluctuation is unknown. The event occurred shortly after the Bear Canyon mine intercepted an inflow of about 110 gpm in the North Mains, though the response of the spring if this were a mine related impact would be a reduction in

TABLE 2-8

Summary of Birch Spring Analytical Results

Parameters	April 1987	October 1989	March 1991
pH	8.0	8.33	8.05
Conductivity (umhos/cm)	748	1090	812
TDS (mg/l)	412	810	484
TSS (mg/l)	2	56	1
Bicarbonate (mg/l)	392	367.17	376
Chloride (mg/l)	7	12.65	8.17
Sulfate (mg/l)	102	298.34	129
Calcium (mg/l)	87	128.01	101
Magnesium (mg/l)	48	71.82	42.5
Potassium (mg/l)	2	5.56	2.09
Sodium (mg/l)	7	10.80	6.1
Iron (mg/l)	<0.05	0.21	0.10
Manganese (mg/l)	<0.02	0.02	<0.02

flow rather than an increase. Montgomery (1991) attributed this flow rise to a release of collected water in the abandoned Trail Canyon Mine. This is highly unlikely as both the Trail Canyon and Bear Canyon Mines are above the regional water table, as discussed in Section 2.4.1. Additionally, a sustained discharge of 230 gallons per minute for 90 days would result in a cumulative flow volume of approximately 30 million gallons (92 ac-ft) of water. This would require a significant storage volume; assuming that four entries each 12 feet wide and 8 feet high were filled with water, they would need to be 2 miles long to be able to store the required volume of water to sustain this flow during a low flow period of the year. Prior to the increased flow at Birch Spring, the pillars were pulled in the Trail Canyon Mine. The subsidence of the mine significantly reduced the open area within the mine where water could collect. Portals on the down-dip side of the mine have been visually monitored on a regular basis since reclamation. No seepage has been observed at these portals, suggesting that the mine was dry before, during, and after the increased flow at Birch Springs (Co-Op Mining Company, 1992a). Given the contention that the area is extensively faulted and the faults and fractures are interconnected, the possibility of storing this volume of water as a perched water table above a large extent of the mine, without discharge occurring in other locations, is very unlikely.

An alternative source of the surge in flow could be the opening or connection of saturated fractures which previously did not convey water to Birch Spring. These fractures could have contained a significant volume of water which had built up over a long period of time. As these fractures drained, the flow contributed to the Birch Spring was sufficient to raise the water level in the fractures to a level which previously had not conveyed water. This would result in a flush of sediment and dissolved constituents, as reported by North Emery Water User Association, which had accumulated over time. Once the excess water in the fractures had drained the flow in the spring and the water quality returned to normal levels.

Because the period of record for Birch Spring is limited, and the published stream flow data for Huntington Creek do not include the period of record for Birch Spring, a comparison to stream flow prior to 1990 cannot be made.

The flows from Birch Spring show some seasonal fluctuation; however, three years of data do not provide sufficient information to identify the general flow characteristics. The available data (Appendix E) indicate that flow from the spring gradually diminished in 1990, an occurrence that was noted by the North Emery Water Users Association (verbal communication, 1991). Flow during 1991 was stable, with only slight fluctuations.

The declining flow at Birch Spring is considered a result of below-normal precipitation in the region over the past four to six years. Big Bear and Little Bear Springs also exhibited similar flow reductions. Here again, as proposed for Big Bear Spring, when recharge to the groundwater system is reduced below the amount required to replace the storage volume depleted by base flow discharge over the previous year, the discharge from the system at the various discharge locations is adjusted to balance the change in storage of the system.

2.8 Water Rights Search

To assist in understanding the potential impacts of the mining operations on the surrounding water resources, a search of the Utah State Water Rights records was conducted. The computer records were scanned for all water rights, surface and groundwater, which exist in the area of Sections 10 through 15 and 22 through 27 of Township 16 South, Range 7 East. The search included an area between one half and one mile beyond the permit boundary. The water rights which were identified are located on Figure 2-3 and presented in Appendix C.

There are three surface water rights within the permit and proposed expansion areas (Figure 2-3). No springs with water rights were identified above the coal seams within the permit or proposed expansion areas. In the adjacent area, 30 surface water rights and 29 groundwater rights were identified. Fifteen of the groundwater rights were associated with flows from Big Bear and Birch Springs. The remaining rights were associated with the mines or with small stockwatering springs north of the permit area.

3.0 MONITORING WELL INSTALLATION AND GROUNDWATER SAMPLING

3.1 Well Drilling

For the purpose of collecting stratigraphic and hydrologic data for this study, three holes were drilled from the mine floor (the base of the Blind Canyon coal seam) to the Mancos Shale (Figure 3-1). A Diamec model 251 hydraulic drilling rig was used by Co-Op personnel to drill the holes, and EarthFax Engineering geologists performed lithologic logging and aquifer testing within the Star Point Sandstone. The holes were later completed as monitoring wells, to allow groundwater quality in the uppermost aquifer below the mine to be characterized. Monitoring well DH-3 was abandoned in November, 1993, so that the pillars could be pulled in the 1st East section of the mine. A replacement monitoring well was installed in the 3rd West Bleeders section in January, 1994. Stratigraphic logs and completion diagrams for all four in-mine wells are contained in Appendix G.

The original drilling program specified the use of AW-size drilling rod and core barrels to produce a 1.89-inch diameter pilot hole, which would be enlarged by reaming to a diameter of 3 inches prior to aquifer testing. Difficulties in reaming the pilot hole required that larger BW-size equipment be used to produce a 2.36-inch diameter hole. No fluid additives or lost circulation material was used during drilling; only clear water was used as drilling fluid.

The holes were drilled and the aquifers were tested incrementally; i.e., as each aquifer was penetrated, drilling would cease, the aquifer would be isolated, and aquifer testing would be conducted. Because underlying impermeable shale was used as a seal at the bottom of the aquifer to be tested, a single packer was placed at the top of the subject aquifer. Aquifer testing procedures are discussed in Section 4.0.

3.1.1 Drill Hole DH-1A. To obtain detailed stratigraphic information, drill hole DH-1 was continuously cored with AW rod from the mine floor to a depth of 195 feet. Due to drill-

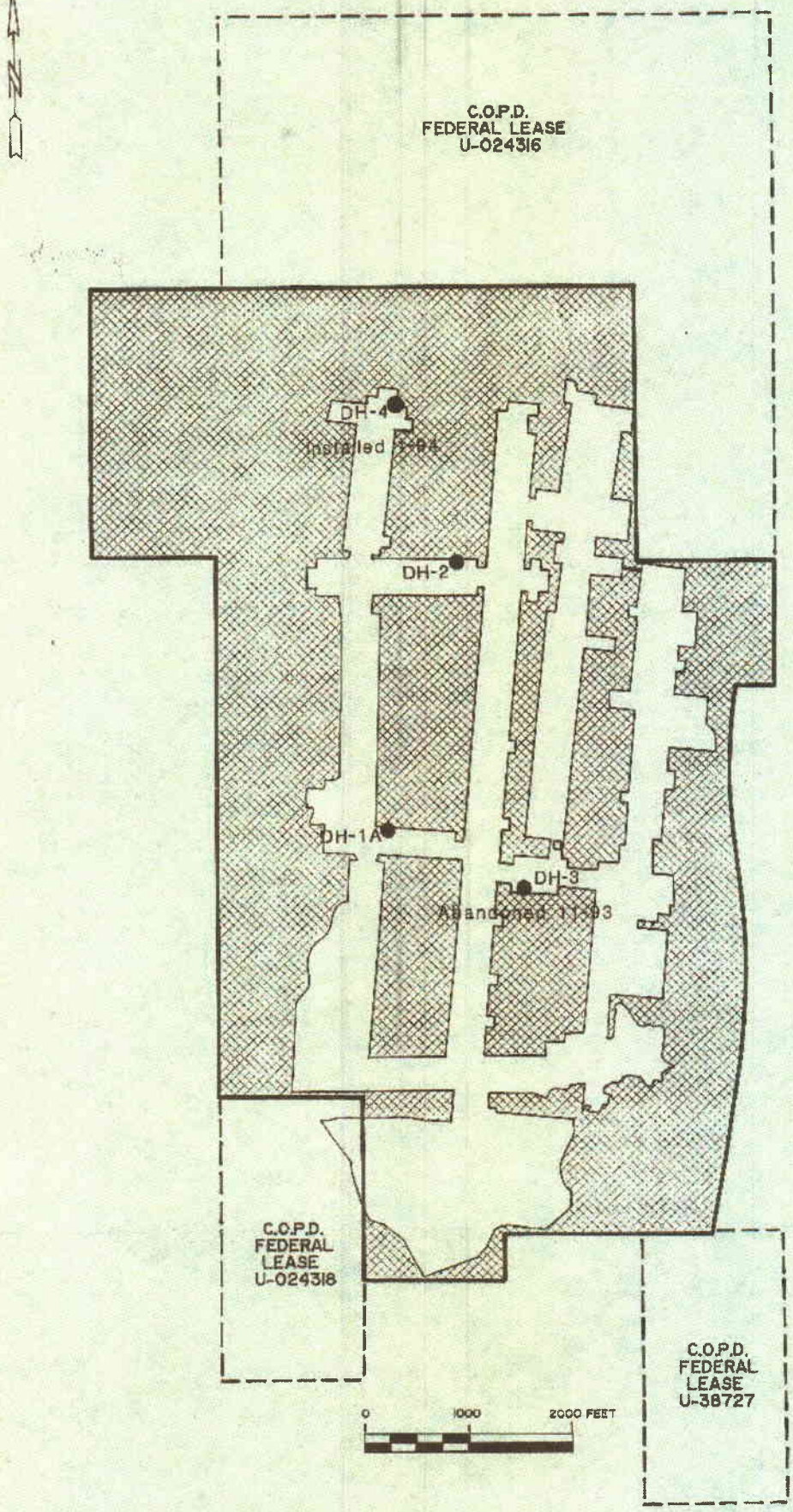

FIGURE 3-1. In-Mine Monitoring Well Locations

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stem instability during attempted reaming of the AW hole to a diameter of 3 inches, DH-1 was abandoned and a second hole (DH-1A) was offset approximately 20 feet to the east. DH-1A was drilled with BW rod to 195 feet (through the interval for which core had already been obtained from DH-1), and then cored continuously from 195 to 535 feet (total depth).

As core was retrieved from the borehole, it was cleaned, described, allowed to dry, and boxed. The core boxes were permanently labeled as to the hole and depth interval from which the samples were obtained. All core samples are in the possession of Co-Op Mining Company.

3.1.2 Drill Holes DH-2 and DH-3. Drill holes DH-2 and DH-3 (Figure 3-1) were cored selectively, across intervals within which stratigraphic contacts were expected (based on the stratigraphy observed in the continuous core from DH-1 and DH-1A). Table 3-1 is a summary of intervals cored in each of the drillholes. Lithologies of drilled intervals between core runs in DH-2 and DH-3 (Appendix G) were inferred from the color of drill cuttings. Because the bit used in drilling these intervals produces a fine rock powder, no grains or lithic fragments are contained in the drilling fluid returns. DH-2 was drilled to 530 feet, and DH-3 was drilled to 545 feet below the mine floor.

3.1.3 Drill Hole DH-4. Drill hole DH-4 was installed to replace abandoned well DH-3. DH-4 was drilled to a total depth of 238 feet and was terminated in the Mancos No. 1 Tongue.

3.2 Well Completion and Development

To plug the lower portion of the drillhole and isolate the Spring Canyon aquifer for well completion, DH-1A was filled with cement from a total depth of 535 feet to 171 feet below the mine floor. Due to binding of the tremie line during cement emplacement in DH-1A, gravity-emplaced granular bentonite was used to plug the lower portions of DH-2 (from 530 to 190 feet) and DH-3 (from 545 to 189 feet).

TABLE 3-1

Summary of Cored Intervals

Drillhole I.D.	Cored Interval (depth in feet below mine floor)	Stratigraphic Targets
DH-1	0 - 195'	Continuous core.
DH-1A	195 - 535'	Continuous core.
DH-2	95 - 106'	Blackhawk/Spring Canyon contact.
	190 - 245'	Spring Canyon/Mancos No. 1/Storrs contacts.
	335 - 430'	Storrs/Mancos No. 2/Panther contacts.
	500 - 530'	Panther/Mancos Shale contact.
DH-3	82 - 98'	Blackhawk/Spring Canyon contact.
	175 - 440'	Spring Canyon/Mancos No. 1/Storrs/ Mancos No. 2 /Panther contacts.
	500 - 545'	Panther/Mancos Shale contact.
DH-4	170-238'	Spring Canyon/Mancos No. 1 contact.

Each well was completed with 20 feet of 1.5-inch diameter, flush-threaded Schedule 40 PVC 10-slot screen set near the base of the Spring Canyon Tongue. Blank casing of the samespecification was used to complete the wells to the mine floor. A 20-40 mesh silica sand filter pack was emplaced in the annular space from the bottom of the screen to the top of the Spring Canyon Tongue, and granular bentonite was placed on top of the filter-pack to prevent infiltration of cement. The upper 50 feet of annular space was filled with neat cement. A 10-inch diameter cast-iron watertight manhole was cemented flush with the mine floor at each well. To further protect the monitoring wells, wooden barricades were installed across the mine openings on either side of each well. Well completion diagrams are contained in Appendix G.

The completed wells were developed with a 1-inch diameter stainless steel bailer attached to stainless steel cable. The bailer was used to surge and bail the well until the water was visibly clean.

3.3 Groundwater Sampling

3.3.1 Monitoring Wells. One-inch diameter bladder pumps were installed in each of the monitoring wells. The pumps can be driven with nitrogen or other non-flammable compressed gas, and are intrinsically safe for mine use. The sample lines, drive lines and the bladder are constructed of Teflon, and the pump body is stainless steel. The dedicated pumps are designed to be left in-place throughout the life of the wells, thus, the need for decontamination and storage of purging and sampling equipment between sampling rounds is eliminated.

To ensure the collection of samples representative of formation water, each well was purged of three casing volumes prior to sampling. Samples were collected in laboratory-supplied containers, and were stored in insulated ice chests at 4° C until delivery to the analytical laboratory. Laboratory analytical results for samples collected during the May 1992

sampling round are presented in Appendix H. Analytical results for 1994 quarterly sampling rounds are in Appendix I.

3.3.2 Additional Sampling Points. Groundwater-quality samples are routinely collected by Co-Op Mining personnel from the North Mains section of the mine (SBC-9 and SBC-10), Bear Creek (BC-1 and BC-2), and from springs associated with faults and joints in the Panther Tongue of the Star Point Sandstone (SBC-4, SBC-5, and BP-1). Samples are also collected from two locations in Trail Canyon: from the Hiawatha coal seam (TS-1), and a spring which issues from the Spring Canyon Tongue of the Star Point Sandstone (CS-1). Sampling locations are depicted on Plate 2.

3.4 Radioisotope Dating

Groundwater samples were collected from SBC-4 (Big Bear Spring), SBC-5 (Birch Spring), SBC-9 (North Mains), and SBC-10 (Mine Floor water) in April, 1992, and submitted for tritium analyses to the Rosenstiel School of Marine and Atmospheric Science Tritium Laboratory in Miami, Florida.

The results of the tritium analyses are presented in Table 3-2. Tritium concentrations (expressed as tritium units, TU) for Birch Spring (1.12 TU), North Mains (0.90 TU), and the floor water (1.73 TU) are within the same order of magnitude, whereas the concentration for Big Bear Spring (17.4 TU) is an order of magnitude greater.

According to Thiros and Cordy (1991), prior to above-ground nuclear weapons tests conducted from 1953 to 1969, the natural tritium concentration in precipitation was 8.7 TU. Assuming a half-life of 12.26 years, tritium levels in groundwater stored since 1952 would now be 0.95 TU, thus, water collected from SBC-9 (North Mains) sample is likely 100% pre-bomb groundwater (water stored since before 1953). Waters from SBC-5 (Birch Spring) and SBC-10 (floor water) are probably mixtures rich in stored pre-bomb groundwater, with a slight amount of post-bomb water.

TABLE 3-2

Tritium Analytical Results

Sampling Point I.D.	Location	Tritium Concentration
SBC-4	Big Bear Spring	17.2 TU
SBC-5	Birch Spring	1.12 TU
SBC-9	North Mains	0.90 TU
SBC-10	Floor Water	1.46 TU

There are three possible explanations for the relatively high concentration of tritium in the SBC-4 (Big Bear Springs) water: 1) The groundwater could be freshly recharged; current tritium concentrations in freshly fallen rain water in Utah range between 10 and 20 TU (Thiros, verbal communication, 1992); 2) it could be stored post-bomb water which originally had a very high concentration of tritium which has since decayed; or 3) water from Big Bear Springs could be a mixture of pre-bomb and post-bomb waters.

Because tritium concentrations in rainwater were greater than 1000 TU during periods of active above-ground weapons testing (Fritz and Fontes, 1980), the age of water from Big Bear Spring cannot be determined. Regardless of the source(s) of recharge to Big Bear Spring, the concentrations of tritium in the remaining groundwater samples (SBC-5, SBC-9, and SBC-10) suggest that Birch Spring water and the mine inflow are of similar age (pre-1953), and are not significantly recharged by modern precipitation.

4.0 AQUIFER TESTING

4.1 General

To estimate the hydraulic conductivities of the aquifers within the Star Point Sandstone, slug injection and withdrawal tests were conducted in each of the in-mine borings. To ensure that test results were representative of the individual aquifers, testing was done incrementally in DH-1A, DH-2, and DH-3; as each aquifer was penetrated, an inflatable packer was used to isolate the subject aquifer from over-and underlying formations. Only the Spring Canyon Tongue was tested in completed well DH-4; the procedures followed during testing of DH-4 were the same as those used during incremental testing of the other three wells, except that no packer was used.

A slug test consists of rapidly changing the water level in a well or borehole by means of the injection or withdrawal of a body of known volume (a "slug") into or from the water column. When the slug is rapidly lowered into the water column, the water level rises abruptly. Rapid withdrawal of the slug after the water level has fully recovered causes the water level to drop abruptly. The rate of water level recovery to static conditions is monitored through time.

The slug used in this investigation consisted of a five-foot length of 0.5-inch diameter 316-stainless steel rod attached to 0.05-inch diameter stainless steel cable. The five-foot long slug has a displacement of 11.78 cubic inches, which is equivalent to a displacement of 3.20 feet in the 0.625-inch inside diameter of the drill rod.

Although it is recognized that the radius of influence for slug tests is smaller than for the more conventional long-term pumping tests, slug tests are considered to provide adequate information about hydraulic conditions in areas where studies are not aimed at designing an exploitation program of the aquifer (Freeze and Cherry, 1979). Both the slug injection and

slug withdrawal tests produce similar results if performed under similar field conditions, and if a sufficient length of time is allowed to achieve maximum recovery of the water level.

4.2 Field Procedures

4.2.1 Water-Level and Total Depth Measurements. The static water level was measured with a pressure transducer in each subject aquifer prior to slug testing. The packer and transducer were placed at a known depth in the drillhole, and the water column height measured by the transducer was added to this known depth to approximate the water level. Total depth was determined by tallying the five-foot lengths of drill pipe as they were removed from the hole after a completed drilling or coring run.

Static water level and total depth measurements in the completed monitoring wells were made with an electric water-level indicator. Each of the measurements were made relative to the top of the protective surface casing. These values were used to determine the saturated thickness of the zone to be tested.

4.2.2 Open-Hole Slug Tests. During open-hole testing, an Instrumentation Northwest pressure transducer with an operating range of 0 to 50 pounds per square inch (up to 115.5 feet of water) was attached to the packer. Data derived from the transducer were recorded by a model 21X Micrologger manufactured by Campbell Scientific. The micrologger was programmed to record water-level changes to within 0.001 foot at either one-half second or one second intervals, depending on the response of the aquifer.

During the drilling program the bore hole was advanced through an aquifer into a confining unit. The top of the aquifer was then sealed off and isolated from overlying aquifers with a 2-inch diameter pneumatic packer (Aardvark model 12). The transducer was connected to the packer, and measured the height of the water column inside the drill stem. After pre-test measurements the slug was introduced through the drill stem and the test was recorded by the micrologger.

As data were collected, water-levels displayed by the micrologger were examined to monitor trends and the progress of the test. The accuracy and completeness of data were thereby reviewed before each test was terminated. Each test was allowed to proceed until the water-level recovered at least 95% of the height displaced by slug injection. All data were stored in the final memory of the micrologger and transferred to a data-storage module in the field. Data from the storage module were transferred to diskette storage in the office.

Following completion of the slug injection test and stabilization of the water-level, a slug withdrawal test was performed. Hence, a minimum of two tests were conducted in each well. When recovery was rapid, additional slug tests were performed. All data thus collected are on file with EarthFax Engineering.

4.2.3 Slug Tests in Completed Wells. Because the larger diameter of the well casing (1.5-inch) would permit a less restricted and more representative test (e.g., more smooth introduction and withdrawal of the slug, less turbulence within the water column) than that possible through the drill stem (0.625-inch) and packer, slug tests of the Spring Canyon Tongue aquifer were repeated after completion and development of DH-1A, DH-2, and DH-3 as monitoring wells (as noted, the only test of DH-4 was conducted after completion). The hydraulic characteristics of the Spring Canyon Tongue aquifer listed on Table 4-1 and contained in Appendix F are those obtained from tests conducted in the completed wells.

A pressure transducer with a maximum operating pressure of 10 pounds per square inch (23.1 feet of water) was used to measure water levels during the slug tests in the completed and developed wells. After pre-test measurements and programming of the micrologger, the pressure transducer was lowered into the water to a depth that was below the lowest point to which the slug would be lowered, but within the depth range of the transducer. The slug was then rapidly lowered into the water column in the monitoring well, and data were recorded as in the open-hole tests.

TABLE 4-1

Hydraulic Conductivity and Transmissivity Values

Well Identification and Test Number	Aquifer Saturated Thickness (ft)	Hydraulic Conductivity (ft/day)	Transmissivity (ft^2/day)	Average Linear Velocity (ft/day)
DH-1A SPRING	88.0	0.146	12.848	0.0443
DH-1A STORRS	97.0	0.031	3.007	0.0155
DH-1A PANTHER	70.0	0.732	51.24	0.1911
DH-2 SPRING	103.0	0.012	1.236	0.0036
DH-2 STORRS	106.0	78.422[a]	8,313[a]	39.21[a]
DH-2 PANTHER	88.0	0.025	2.200	0.0065
DH-3 SPRING	65.0	0.058	3.770	0.0176
DH-3 STORRS	87.0	0.008	0.070	0.0040
DH-3 PANTHER	72.0	0.096	6.912	0.0251
DH-4 SPRING	177.7	0.163	28.99	0.049

[a] Anomalous value (see Section 4.4)

4.3 Interpretation Procedures

Data recorded on the data-storage module in the field were transferred to diskette by means of either a model PC201 tape and serial I/O card and associated software or a PC208 software package and serial cable with adapter, both developed by Campbell Scientific. These data sets are stored as comma-delineated ASCII data files. The contents of each data file were subsequently transferred to an analytical program (AQTESOLV™), which allows rapid, graphical representation and log-linear regression analysis of test data.

Recently published microcomputer software AQTESOLV™ (Duffield and Rumbaugh, 1989) was used to evaluate the slug test data. The method of Bouwer and Rice (1976), which determines hydraulic conductivity for wells penetrating unconfined aquifers, is available in the AQTESOLV™ software for the evaluation of slug test data, and was used to estimate the hydraulic conductivities of aquifers tested for this study.

Values of time and actual water-level displacement due to injection or withdrawal of the slug are displayed on a semi-logarithmic plot (i.e., water-level displacement is represented on a logarithmic y-axis and time is represented on a normal arithmetic x-axis). The hydraulic conductivity is estimated from the equation:

$$K = \frac{r_c^2 \ln(R_e/r_w)}{2L} \frac{1}{t} \ln \frac{y_o}{y_t} \qquad (4\text{-}1)$$

where:

y_o	=	initial drawdown or residual drawdown in well due to instantaneous removal or injection of the slug from the well (ft)
y_t	=	drawdown in well at time t (ft)
L	=	length of well screen (ft)
r_c	=	radius of well casing (ft)
R_e	=	equivalent radius over which head loss occurs (ft)
r_w	=	radius of well, including gravel pack (ft)
H	=	static height of water in well (ft)
t	=	time (min)

and

$$\ln (R_e/r_w) = \left(\frac{1.1}{\ln (H/r_w)} + \frac{C}{L/r_w}\right)^{-1} \qquad (4\text{-}2)$$

where:

C = dimensionless parameter which is a function of L/r_w (see Equation 4-1);

and other parameters are previously defined.

According to Bouwer and Rice (1976), Equation (4-1) allows the hydraulic conductivity to be calculated from the water-level change in the well. Because the hydraulic conductivity, casing radius, well radius, the radius over which head loss occurs, and the screen length are constants, (1/t) ln y_o/y_t must also be a constant. Thus, the time-drawdown data should approximate a straight line if plotted in terms of ln y_o versus t. The quantity (1/t) ln y_o/y_t in Equation (4-1) is obtained from the first straight-line segment drawn through the field data.

The AQTESOLV™ software program prompts the user to supply values of well casing radius, drill hole radius, aquifer saturated thickness, well screen length, and static height of water in the well. Time and water-level data are read into the software program in the form of ASCII data files, which are down-loaded from the field data-logger.

Once the field data and constants are entered, the AQTESOLV™ software generates semi-log plots of the data and automatically fits a straight line to the data according to user-defined weighting. If the entire range of field data do not approximate a straight line, only those early data which form a valid straight-line segment are weighted by the user such that the software package produces the desired straight line approximation through the valid part of the data set.

The straight-line fit produced by AQTESOLV™ automatically determines the value of y_o (y-intercept) and an arbitrary value of y_t at time t to solve Equation (4-1). Based on user-defined values of screen length and drill hole radius, the software determines the value of C to evaluate R_e in Equation (4-2).

The software generates the straight line approximation by means of a nonlinear weighted least-squares parameter estimation technique, i.e., the Gauss-Newton linearization method (Duffield and Rumbaugh, 1989). The estimation technique minimizes the difference between observed and estimated values through iterative solution of the system of linearized equations until convergence is achieved. To ensure the fit of the straight line, the software prints out the values of actual water levels, calculated water levels, and residual values (the difference between the actual and calculated water levels) derived by the parameter estimation technique. Additionally, the statistical values of mean, standard deviation, and variance also are provided for the weighted residuals. These statistics indicate the goodness-of-fit of the straight line generated through the weighted slug test data by the estimation technique. Table 4-2 is a summary of the information collected in the field and subsequently used in the slug test analyses.

4.4 Aquifer Test Data and Results

Slug test plots for the wells tested are presented in Appendix F. Included with the time-drawdown plots are printouts of well constants and field data used to estimate values of hydraulic conductivity. Also listed in Appendix F are values of actual water levels, calculated water levels, and residual values (the difference between the actual and calculated water levels) derived by the parameter estimation technique. Statistical values of mean,standard deviation, and variance also are provided for the weighted residuals. Table 4-1 is a summary of aquifer saturated thickness, hydraulic conductivity, transmissivity, and average linear velocity values calculated for each well.

TABLE 4-2

Slug Test Input Data

Well Identification And Test Number	Static Water Level (ft btc*)	Diameter Of Casing (in)	Radius Of Borehole (in)	Screen Length (ft)	Total Depth (ft)	Aquifer Saturated Thickness (ft)
DH-1A SPRING	70.0	2.5	2.9	20.0	171.0	70.0
DH-1A STORRS	97.0	2.9	2.9	95.0	NA	97.0
DH-1A PANTHER	70.0	2.9	2.9	60.0	NA	70.0
DH-2 SPRING	160.0	2.5	2.9	20.0	190.0	160.0
DH-2 STORRS	106.0	2.9	2.9	104.0	NA	106.0
DH-2 PANTHER	190.0	2.9	2.9	86.0	NA	88.0
DH-3 SPRING	50.0	2.5	2.9	20.0	190.0	50.0
DH-3 STORRS	127.0	2.9	2.9	70.0	NA	72.0
DH-3 PANTHER	72.0	2.9	2.9	70.0	NA	72.0
DH-4 SPRING	62.0	2.5	2.9	20.0	190.0	177.7

* Below Top of Casing.

The hydraulic conductivity values used are taken directly from AQTESOLV™ plots, and a plot from each slug test is analyzed. Plots with convoluted or broken data lines are rejected. Plots from tests that were aborted prematurely or had other technical difficulties are also rejected. One plot was selected per formation, per hole from the remaining plots, based on goodness of fit.

According to Driscoll (1986), hydraulic conductivity indicates the quantity of water that will flow through a unit cross-sectional area of a porous media per unit time. Transmissivity is the transmission capability of an aquifer, and can be calculated by multiplying the saturated thickness of an aquifer by its hydraulic conductivity.

The horizontal rate of groundwater flow (or average linear velocity) of groundwater in each tested aquifer was calculated using a modified form of the Darcy equation (Freeze and Cherry 1979):

$$\bar{v} = (K/n)(dh/dl) \qquad (4\text{-}3)$$

where:

v	=	average linear groundwater velocity (ft/day).
K	=	hydraulic conductivity (ft/day).
n	=	porosity (fraction).
dh/dl	=	hydraulic gradient (ft/ft).

Calculation results are shown in Table 4-1. The results from all of the tests are deemed satisfactory, with the exception of tests run on the Storrs Tongue aquifer in DH-2. During analysis of test data for this aquifer and later field checks, it was discovered that the packer bladder had not seated properly during slug testing of this interval, and had allowed water to communicate around the packer. This fact explains the very large discrepancy between the values from this unit, as compared to values derived from Storrs tests in DH-1A and DH-3.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on this study the following conclusions are made:

- The groundwater system in the area of the Trail Canyon and Bear Canyon mines is mainly controlled by geologic structures (faults and fractures) and lithology.

- In the area of present development, the regional water table is located below both the Blind Canyon and Hiawatha seams in the Bear Canyon mine, as indicated by in-mine drilling and aquifer testing. The three aquifers within the Star Point Sandstone have separate, distinct static water levels, and are not fully saturated in the southern portion of the permit area.

- At the present time, there is no evidence to suggest that interception of water within the workings of the Bear Canyon mine has had an impact on water quantity or quality at Big Bear Spring or Birch Spring.

  -- Tritium analyses suggest that Bear Canyon Mine water is primarily relict "pre-bomb" water, and does not recharge Big Bear Spring which is "post-bomb" (more recently recharged) water.

  -- Analysis of Piper diagrams does not suggest a hydraulic relationship between Bear Canyon Mine water and the water from Birch Springs.

-- Analytical results of groundwater samples collected in 1991 indicate that water intercepted by and stored in sumps within the Bear Canyon Mine is of higher quality than that discharged at Big Bear and Birch Springs.

- o Mine water discharge may increase the quantity and improve the quality of water in Bear Creek.

- o Subsidence over the southwest portion of the Bear Canyon Mine cannot impact Birch Springs; Blind Canyon truncates the coal seam before it reaches Blind Canyon Fault or the fault and fracture zone associated with Birch Springs.

- o The recent reductions in spring flows appear to be the result of significant reductions in precipitation amounts over the last five to six years.

5.2 Recommendations

The following recommendations are presented to assist in addressing some of the concerns of the water companies and the Utah Division of Oil, Gas, and Mining:

- o Co-Op Mining Company should continue to periodically monitor flows and water quality at Big Bear and Birch Springs. Regular monitoring will ensure the collection of adequate data for the evaluation of potential mining-related impacts to the springs. Each round of flow monitoring and sample collection should be performed by the same individual, to reduce the possibility of error due to technique.

  Special attention should be paid to sampling and preservation techniques. Recently obtained comparative laboratory results should be reviewed and consideration should be given to the selection of a new laboratory. Quality

assurance/quality control samples should be submitted with each round of samples, to allow sampling techniques and laboratory performance to be evaluated.

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Appendix 7-N-A

Precipitation Data

Table A-1

1980 Precipitation Data Summary

Year	Month	Electrical Lake Precip.	Hiawatha Precip.	Stuart Ranger Precip.	Red Pine Ridge Precip.	Mammoth-Cottonwood Precip.	Average Precip.
1980	March	3.34	1.88	2.31	5.42	3.20	3.23
1980	April	1.27	0.76	3.15	3.26	2.10	2.11
1980	May	3.09	2.78	2.72	3.15	4.00	3.15
1980	June	0.12	0.00	0.52	0.00	0.10	0.15
1980	July	0.37	0.30	0.00	0.00	0.30	0.19
1980	August	0.38	0.82	0.00	0.00	0.70	0.38
1980	September	1.80	2.53	3.35	3.40	2.30	2.68
1980	October	1.45	2.07	0.00	0.00	2.10	1.12
1980	November	0.98	0.36	0.00	0.00	1.70	0.61
1980	December	0.32	0.00	2.35	4.45	0.30	1.48
	Total	NC	NC	NC	NC	NC	NC

* No Data Reported

NC Not Calculated (Record Incomplete)

Table A-1 (Continued)

1981 Precipitation Data Summary

Year	Month	Electrical Lake Precip.	Hiawatha Precip.	Stuart Ranger Precip.	Red Pine Ridge Precip.	Mammoth-Cottonwood Precip.	Average Precip.
1981	January	1.30	0.29	0.25	0.72	1.00	0.71
1981	February	1.04	0.30	1.45	3.54	2.10	1.67
1981	March	3.20	2.82	3.15	4.90	3.50	3.51
1981	April	1.45	0.84	1.84	3.45	1.20	1.76
1981	May	3.06	2.40	3.04	3.80	3.70	3.20
1981	June	0.39	0.20	0.00	1.27	1.00	0.57
1981	July	1.61	1.49	0.00	0.00	0.00	0.62
1981	August	2.73	2.64	0.00	0.00	1.90	1.45
1981	September	1.44	2.29	6.81	5.65	2.80	3.80
1981	October	4.18	3.71	0.00	0.00	0.00	1.58
1981	November	1.44	0.43	0.00	0.00	0.00	0.37
1981	December	4.79	1.21	0.00	17.10	9.40	6.50
	Total	26.63	18.62	16.54	40.43	26.60	25.74

* No Data Reported

NC Not Calculated (Record Incomplete)

Table A-1 (Continued)

1982 Precipitation Data Summary

Year	Month	Electrical Lake Precip.	Hiawatha Precip.	Stuart Ranger Precip.	Red Pine Ridge Precip.	Mammoth-Cottonwood Precip.	Average Precip.
1982	January	5.26	3.08	11.82	4.32	4.80	5.86
1982	February	1.66	0.36	1.36	3.34	2.3	1.80
1982	March	5.06	1.56	3.48	4.91	4.20	3.84
1982	April	1.11	1.11	0.45	1.52	2.50	1.34
1982	May	1.40	1.40	1.07	1.63	1.80	1.46
1982	June	0.59	0.59	0.26	0.81	1.00	0.65
1982	July	1.26	1.26	0.00	0.00	0.00	0.50
1982	August	2.29	2.29	0.00	0.00	0.00	0.92
1982	September	4.49	4.49	8.40	9.80	9.40	7.32
1982	October	1.88	1.88	0.00	0.00	0.00	0.75
1982	November	3.68	3.68	0.00	0.00	0.00	1.47
1982	December	2.76	2.76	5.58	12.10	10.50	6.74
	Total	31.44	24.46	32.42	28.43	36.50	32.65

* No Data Reported

NC Not Completed (Record Incomplete)

Table A-1 (Continued)

1983 Precipitation Data Summary

Year	Month	Electrical Lake Precip.	Hiawatha Precip.	Stuart Ranger Precip.	Red Pine Ridge Precip.	Mammoth-Cottonwood Precip.	Average Precip.
1983	January	2.41	0.96	1.12	2.30	1.80	1.72
1983	February	4.00	1.23	2.29	3.60	4.60	3.14
1983	March	4.30	2.04	4.94	6.18	4.30	4.35
1983	April	2.35	1.66	1.59	2.58	2.80	2.20
1983	May	2.81	1.04	2.50	2.70	3.60	2.53
1983	June	1.35	1.25	0.00	0.18	1.80	0.92
1983	July	1.34	2.74	0.00	0.00	0.00	0.82
1983	August	1.50	1.67	0.00	0.00	0.00	0.63
1983	September	2.88	2.15	7.26	7.02	8.10	5.48
1983	October	2.15	1.57	0.00	0.00	0.00	0.74
1983	November	4.81	2.98	0.00	0.00	5.00	2.56
1983	December	7.43	2.55	14.23	21.00	7.10	10.46
	Total	37.33	21.84	33.93	45.56	39.10	35.55

* No Data Reported

NC Not Calculated (Recorded Incomplete)

Table A-1 (Continued)

1984 Precipitation Data Summary

Year	Month	Electrical Lake Precip.	Hiawatha Precip.	Stuart Ranger Precip.	Red Pine Ridge Precip.	Mammoth-Cottonwood Precip.	Average Precip.
1984	January	1.27	0.22	0.40	0.80	0.90	0.72
1984	February	1.56	0.50	2.60	0.93	1.80	1.48
1984	March	2.77	0.69	1.06	2.73	2.70	1.99
1984	April	3.23	1.37	2.81	5.00	3.50	3.18
1984	May	1.73	0.66	2.37	3.38	1.30	1.89
1984	June	3.41	1.50	4.53	4.50	4.50	3.69
1984	July	2.55	2.56	0.00	0.00	2.40	1.50
1984	August	2.26	3.27	0.00	0.00	1.50	1.41
1984	September	1.47	0.76	6.00	5.90	2.70	3.37
1984	October	2.92	3.80	0.00	5.51	0.00	2.45
1984	November	2.63	0.79	0.00	0.00	5.40	1.76
1984	December	3.24	1.70	9.12	9.45	2.60	5.22
	Total	29.04	17.82	28.89	38.20	29.30	28.66

* No Data Reported

NC Not Calculated (Record Incomplete)

Table A-1 (Continued)

1985 Precipitation Data Summary

Year	Month	Electrical Lake Precip.	Hiawatha Precip.	Stuart Ranger Precip.	Red Pine Ridge Precip.	Mammoth-Cottonwood Precip.	Average Precip.
1985	January	1.54	0.41	0.63	1.15	2.10	1.17
1985	February	1.09	0.55	1.54	2.67	1.90	1.55
1985	March	3.54	1.13	2.60	4.16	2.40	2.77
1985	April	1.95	1.59	2.56	3.40	2.70	2.44
1985	May	1.19	2.18	1.51	3.16	1.90	2.00
1985	June	0.89	0.68	1.04	1.59	1.60	1.16
1985	July	3.04	4.02	0.00	4.11	3.00	2.83
1985	August	0.03	0.00	0.00	0.00	0.50	0.11
1985	September	2.24	2.79	5.70	2.74	2.40	3.17
1985	October	0.00	1.28	0.00	5.51	2.70	1.90
1985	November	6.62	2.05	0.00	0.00	6.30	2.99
1985	December	1.99	0.30	7.64	11.74	2.30	4.79
	Total	24.12	16.98	23.22	40.23	29.80	26.88

* No Data Reported

NC Not Calculated (Record Incomplete)

Table A-1 (Continued)

1986 Precipitation Data Summary

Year	Month	Electrical Lake Precip.	Hiawatha Precip.	Stuart Ranger Precip.	Red Pine Ridge Precip.	Mammoth-Cottonwood Precip.	Average Precip.
1986	January	1.81	0.13	2.02	3.10	1.40	1.69
1986	February	8.54	2.39	7.43	5.86	6.60	6.16
1986	March	2.48	1.36	1.88	3.41	3.10	2.45
1986	April	3.79	1.27	2.11	3.89	3.90	2.99
1986	May	1.62	0.38	0.00	1.90	1.70	1.12
1986	June	0.26	0.33	2.47	2.37	0.00	1.09
1986	July	1.01	1.28	0.00	0.00	0.60	0.58
1986	August	1.68	1.66	4.15	0.00	2.90	2.08
1986	September	2.73	2.22	1.75	6.10	3.40	3.24
1986	October	1.86	1.64	0.00	0.00	1.80	1.06
1986	November	1.98	0.22	0.00	0.00	1.80	0.80
1986	December	0.55	0.07	4.19	5.68	0.80	2.26
	Total	28.31	12.95	26.00	32.31	28.00	25.52

* No Data Recorded

NC Not Calculated (Record Incomplete)

Table A-1 (Continued)

1987 Precipitation Data Summary

Year	Month	Electrical Lake Precip.	Hiawatha Precip.	Stuart Ranger Precip.	Red Pine Ridge Precip.	Mammoth-Cottonwood Precip.	Average Precip.
1987	January	2.14	1.10	0.00	0.00	1.70	0.99
1987	February	2.07	0.97	3.97	6.80	2.50	3.26
1987	March	2.47	1.57	2.03	3.01	2.20	2.26
1987	April	1.03	1.31	1.40	2.41	1.60	1.55
1987	May	2.93	2.59	0.00	2.90	3.40	2.36
1987	June	0.79	0.52	4.73	4.37	1.90	2.46
1987	July	2.12	2.90	0.00	0.00	1.90	1.38
1987	August	1.22	1.54	0.00	0.00	1.40	0.83
1987	September	0.49	0.09	5.80	6.10	1.30	2.76
1987	October	1.39	2.34	2.00	3.02	0.90	1.93
1987	November	1.68	1.59	1.66	2.52	2.80	2.05
1987	December	3.50	0.92	1.99	3.03	2.50	2.39
	Total	21.83	17.44	23.58	34.16	24.10	24.33

* No Data Reported

NC Not Calculated (Record Incomplete)

Table A-1 (Continued)

1988 Precipitation Data Summary

Year	Month	Electrical Lake Precip.	Hiawatha Precip.	Stuart Ranger Precip.	Red Pine Ridge Precip.	Mammoth-Cottonwood Precip.	Average Precip.
1988	January	3.06	2.60	2.21	2.92	3.10	2.78
1988	February	0.72	0.06	2.08	3.40	0.60	1.37
1988	March	3.32	0.99	3.29	4.45	3.70	3.15
1988	April	2.14	1.73	2.79	4.15	2.00	2.56
1988	May	1.60	0.68	1.24	1.28	2.30	1.42
1988	June	0.86	1.38	0.77	1.33	0.60	0.99
1988	July	1.04	0.65	1.15	0.94	0.70	0.90
1988	August	2.23	1.08	1.50	2.08	1.50	1.68
1988	September	1.16	1.10	1.55	2.17	0.90	1.38
1988	October	1.20	0.84	1.78	1.20	1.00	1.20
1988	November	2.68	0.34	1.48	4.30	3.40	2.44
1988	December	1.91	1.44	1.77	3.70	2.70	2.30
	Total	21.92	12.89	21.61	31.92	22.50	22.17

* No Data Reported

NC Not Calculated (Record Incomplete)

Table A-1 (Continued)

1989 Precipitation Data Summary

Year	Month	Electrical Lake Precip.	Hiawatha Precip.	Stuart Ranger Precip.	Red Pine Ridge Precip.	Mammoth-Cottonwood Precip.	Average Precip.
1989	January	1.52	0.55	1.57	2.30	1.70	1.53
1989	February	1.99	0.44	1.48	1.90	2.00	1.56
1989	March	3.55	0.96	2.96	4.00	3.70	3.03
1989	April	0.35	0.40	1.18	1.70	1.00	0.93
1989	May	0.06	0.71	0.38	0.90	1.00	0.61
1989	June	1.54	0.78	0.24	1.20	1.80	1.11
1989	July	1.43	1.11	1.40	1.50	1.20	1.33
1989	August	1.37	2.21	1.28	1.60	3.00	1.89
1989	September	1.19	1.17	1.33	2.20	2.70	1.72
1989	October	1.21	0.32	1.30	1.80	2.10	1.35
1989	November	1.88	0.44	0.52	2.30	2.20	1.47
1989	December	0.70	0.07	2.20	1.90	1.20	1.21
	Total	16.79	9.16	15.84	23.30	23.60	17.74

* No Data Reported

NC Not Calculated (Record Incomplete)

Table A-1 (Continued)

1990 Precipitation Data Summary

Year	Month	Electrical Lake Precip.	Hiawatha Precip.	Stuart Ranger Precip.	Red Pine Ridge Precip.	Mammoth-Cottonwood Precip.	Average Precip.
1990	January	2.00	0.55	*	2.00	1.70	1.25
1990	February	4.06	1.80	*	4.00	3.90	2.75
1990	March	2.30	1.36	*	3.00	1.70	1.67
1990	April	2.00	0.92	*	3.10	2.30	1.66
1990	May	0.81	0.57	*	0.50	0.40	0.46
1990	June	1.87	0.81	*	2.00	2.60	1.46
1990	July	1.08	0.61	*	2.00	0.90	0.92
1990	August	0.62	1.06	*	0.70	1.50	0.78
1990	September	1.87	2.20	*	2.90	1.80	2.59
1990	October	1.32	0.57	*	1.80	2.10	1.28
1990	November	*	*	*	2.30	2.20	1.78
1990	December	*	*	*	1.90	1.20	1.08
	Total	NC	NC	NC	26.20	22.30	17.68

* No Data Recorded

NC Not Calculated (Report Incomplete)

Table A-1 (Continued)

1991 Precipitation Data Summary

Year	Month	Electrical Lake Precip.	Hiawatha Precip.	Stuart Ranger Precip.	Red Pine Ridge Precip.	Mammoth-Cottonwood Precip.	Average Precip.
1991	January	0.46	1.49	*	0.30	0.20	1.61
1991	February	0.19	1.61	*	0.80	0.20	0.70
1991	March	2.77	4.24	3.69	0.60	0.90	2.44
1991	April	0.41	3.06	2.57	0.30	0.60	1.39
1991	May	1.78	*	*	0.80	0.00	0.86
1991	June	0.94	*	*	0.00	0.50	0.48
1991	July	2.03	*	3.38	0.70	0.50	1.65
1991	August	1.78	*	*	0.50	0.50	0.93
1991	September	2.19	*	7.05	8.20	0.50	4.49
1991	October	0.29	*	*	0.50	0.70	0.50
1991	November	0.58		*	0.30	0.80	0.95
1991	December	*	*	*	0.20	0.60	0.40
	Total	NC	NC	NC	13.20	6.00	16.40

* No Data Recorded

NC Not Calculated (Record Incomplete)

Appendix 7-N-B

Stream Flow Data

Table B-1

Huntington Creek Average Monthly Flow (cfs)

Year	Jan Avg Flow	Feb Avg Flow	Mar Avg Flow	Apr Avg Flow	May Avg Flow	June Avg Flow	July Avg Flow	Aug Avg Flow	Sept Avg Flow	Oct Avg Flow	Nov Avg Flow	Dec Avg Flow
1981	26.9	28.9	28.1	61.9	100.0	85.5	135.0	87.8	56.8	34.5	19.3	0.0
1982	20.5	21.4	27.7	42.9	270.0	374.0	173.0	97.5	92.8	95.1	70.9	0.0
1983	45.5	26.3	39.4	55.0	315.0	1003.0	324.0	138.0	105.0	85.7	72.7	52.2
1984	54.0	60.5	65.0	143.0	853.0	823.0	292.0	173.0	175.0	*	*	*
1985	*	*	*	*	*	*	*	*	*	61.1	36.0	35.3
1986	39.1	46.6	84.2	139.0	442.0	493.0	155.0	135.0	115.0	61.1	43.3	43.4
1987	43.4	48.6	45.8	97.2	171.0	125.0	85.6	73.6	82.5	69.4	46.3	40.0
1988	29.9	28.3	26.1	47.5	157.0	149.0	98.2	73.1	62.4	48.5	35.9	14.7
1989	29.5	25.7	33.1	72.4	77.6	83.5	103.0	91.5	87.7	19.2	18.7	16.6
1990	17.8	19.7	22.9	47.7	80.5	83.5	67.1	69.2	56.9	44.9	22.6	17.2
1991	13.7	11.4	16.5	31.9	115.0	188.0	91.9	65.7	65.5	*	*	*

* Data Not Available.

Appendix 7-N-C

Water Rights Data

Table C-1

Summary of Water Rights

Water Rights Number	User Name	Source Name	Quantity (cfs)	Water Use	Priority Date
93 1435	USA Forest Service	Left Fork Trail Canyon Spring	.0110	Stockwatering	1875
93 139	USA Forest Service	Trail Canyon Creek	.0000	Stockwatering	1875
93 1436	USA Forest Service	Surface Runoff Spring	.0110	Stockwatering	1875
93 1434	USA Forest Service	McCadden Ridge Spring	.0110	Stockwatering	1875
93 1432	USA Forest Service	Unnamed Spring	.0110	Stockwatering	1875
93 1433	USA Forest Service	Tuttle Spring	.0110	Stockwatering	1875
93 1431	USA Forest Service	Unnamed Stream	.0110	Stockwatering	1875
93 1430	USA Forest Service	Boundary Spring	.0110	Stockwatering	1875
93 151	USA Forest Service	Bear Creek	.0000	Stockwatering	1875
93 1429	USA Forest Service	Wild Horse Flat Spring	.0110	Stockwatering	1875
93 142	USA Forest Service	McCadden Hollow	.0000	Stockwatering	1875
93 141	Nevada Electric Investment Co.	McCadden Hollow Stream	.0000	Stockwatering	1875
93 129	Nevada Electric Investment Co.	Huntington Creek	.0000	Stockwatering	1875
93 138	Nevada Electric Investment Co.	Trail Canton Creek	.0000	Domestic Stockwatering	1875

Table C-1 (Cont.)

Summary of Water Rights

Water Rights Number	User Name	Source Name	Quantity (cfs)	Water Use	Priority Date
93 130	USA Forest Service	Huntington Creek	.0000	Stockwatering	1875
93 195	USA Forest Service	Mill Fork Huntington Creek	.0000	Stockwatering	1875
a15965	Co-Op Mining Service	1) Spring 2) Mine Portal	.0000	Irrigation Domestic Mining	1991
93 1067	Charles W. Kingston	Underground Water Tunnel	.2500	Irrigation Mining	1964
93 1183	Utah Power & Light Co.	Huntington Creek	.0000	Stockwatering	1902
93 131	Peabody Coal Company Nevada Electric Investment Co.	Huntington Creek	.0000	Stockwatering	1875
93 144	USA Forest Service	Huntington Creek	.0000	Stockwatering	1875
93 390	Nevada Electric Investment Co.	Rilda Canyon	.0000	Stockwatering	1902
93 199	Utah Power & Light Co.	Rilda Canyon Creek	.0000	Stockwatering	1902
a7941	Huntington Cleveland Irrigation Company	Huntington Creek and Tributaries	392.2500	Irrigation Domestic Stockwatering Power Other	1974
93 150	Nevada Electric Investment Co.	Bear Creek	.0000	Stockwatering	1875
a13694	Mrs. Charles W. Kingston (Lavenda)	Bear Canyon Tunnel	.2500	Irrigation Domestic Mining Other	1985

Table C-1 (Cont.)

Summary of Water Rights

Water Rights Number	User Name	Source Name	Quantity (cfs)	Water Use	Priority Date
E1621	Utah Power & Light Co.	Well	.1100	Other	1979
93 3208	USA Bureau of Land Management	Huntington Creek	.0000	Stockwatering	1860
E2504	Castle Valley Special Service District	Bear Spring	.0000	Municipal	1987
93 2196	Huntington Cleveland Irrigation Company	Birch Spring	45.0000	Irrigation Domestic Stockwatering Power Other	1879
93 2198	Huntington Cleveland Irrigation Company	Birch Spring	80.0000	Irrigation Domestic Stockwatering Power Other	1888
93 304	Huntington Cleveland Irrigation Company	Birch Spring	150.0000	Irrigation Domestic Stockwatering Power Other	1876
93 2197	Huntington Cleveland Irrigation Company	Birch Spring	77.2500	Irrigation Domestic Stockwatering Power Other	1884

Table C-1 (Cont.)

Summary of Water Rights

Water Rights Number	User Name	Source Name	Quantity (cfs)	Water Use	Priority Date
93 2200	Huntington Cleveland Irrigation Company	Bear Canyon Spring	.0000	Irrigation Domestic Stockwatering Power Other	1884
93 253	Huntington Cleveland Irrigation Company	Bear Canyon Spring	150.0000	Irrigation Domestic Stockwatering Power Other	1876
93 1182	Peabody Coal Company	Bear Creek	.0000	Stockwatering	1902
93 2201	Huntington Cleveland Irrigation Company	Bear Canyon Spring	80.0000	Irrigation Domestic Stockwatering Power Other	1888
93 2199	Huntington Cleveland Irrigation Company	Bear Canyon Spring	45.0000	Irrigation Domestic Stockwatering Power Other	1879
93 3171	Northwest Carbon Corporation	Huntington Creek	.0000	Stockwatering	1875
93 3033	Northwest Carbon Corporation	Huntington Creek	.0000	Stockwatering	1875
93 143	Nevada Electric Investment Co.	Birch Spring	.0110	Stockwatering	1875
93 3209	USA Bureau of Land Management	Huntington Creek	.0000	Stockwatering	1860

Table C-1 (Cont.)

Summary of Water Rights

Water Rights Number	User Name	Source Name	Quantity (cfs)	Water Use	Priority Date
93 149	Nevada Electric Investment Company	Bear Creek	.0000	Stockwatering	1875
93 148	USA Bureau of Land Management	Bear Creek	.0000	Stockwatering	1902
93 3207	USA Bureau of Land Management	Huntington Creek	.0000	Stockwatering	1860
93 146	Nevada Electric Investment Company	Huntington Creek	.0000	Stockwatering	1875
93 303	Huntington Cleveland Irrigation Company	Spring	150.0000	Irrigation Domestic Stockwatering Power Other	1875
93 2202	Huntington Cleveland Irrigation Company	Unnamed Spring	45.0000	Irrigation Domestic Stockwatering Power Other	1879
93 2204	Huntington Cleveland Irrigation Company	Unnamed Spring	80.0000	Irrigation Domestic Stockwatering Power Other	1888
93 2203	Huntington Cleveland Irrigation Company	Unnamed Spring	77.2500	Irrigation Domestic Stockwatering Power Other	1884

Table C-1 (Cont.)

Summary of Water Rights

Water Rights Number	User Name	Source Name	Quantity (cfs)	Water Use	Priority Date
t91-93-06	PacifiCorp Electric Operations	Huntington Creek 2) Rilda C	.0000	Other	1991
t91-93-07	Nielson Construction Company	Huntington Creek	.0000	Other	1991
t91-93-04	Minchey Digging	Huntington Creek	.0000	Other	1991
93 2210	Huntington Cleveland Municipal	Gate Spring	80.0000	Domestic Municipal	1888
93 2209	Huntington Cleveland Municipal	Gate Spring	77.2500	Domestic Municipal	1884
93 2208	Huntington Cleveland Municipal	Gate Spring	45.0000	Domestic Municipal	1879
93 310	Huntington Cleveland Municipal	Gate Spring	150.0000	Domestic Municipal	1876
93 2207	Huntington Cleveland Irrigation Company	Unnamed Spring	80.0000	Domestic Municipal	1888
93 2206	Huntington Cleveland Irrigation Company	Unnamed Spring	77.2500	Domestic Municipal	1884
93 2205	Huntington Cleveland Irrigation Company	Unnamed Spring	45.0000	Domestic Municipal	1879
93 309	Huntington-Cleveland Irrigation	Unnamed Spring	150.0000	Domestic Municipal	1875

Appendix 7-N-D

Spring Flow Data

Table D-1

Big Bear Spring Average Monthly Flow (gpm)

Year	Jan Avg Flow	Feb Avg Flow	Mar Avg Flow	Apr Avg Flow	May Avg Flow	June Avg Flow	July Avg Flow	Aug Avg Flow	Sept Avg Flow	Oct Avg Flow	Nov Avg Flow	Dec Avg Flow
1980	223	228	226	225	228	340	365	304	245	230	239	233
1981	225	198	175	228	224	220	226	0	155	152	156	0
1982	161	159	155	152	154	213	243	198	174	168	167	0
1983	167	167	167	166	166	310	378	319	258	214	195	189
1984	189	191	187	187	198	335	321	299	245	209	203	202
1985	198	193	189	186	233	329	312	247	215	206	204	222
1986	171	190	186	182	208	304	305	249	211	198	197	193
1987	186	181	176	171	170	171	188	181	170	181	170	160
1988	153	151	147	143	147	151	157	152	151	155	151	146
1989	142	139	134	133	131	127	128	120	119	114	111	111
1990	110	110	112	109	104	104	104	105	107	110	108	125
1991	126	130	128	118	119	123	119	113	114	114	121	122

Table D-2

Big Bear Spring Average Monthly Flow (gpm)

Year	Jan Avg Flow	Feb Avg Flow	Mar Avg Flow	Apr Avg Flow	May Avg Flow	June Avg Flow	July Avg Flow	Aug Avg Flow	Sept Avg Flow	Oct Avg Flow	Nov Avg Flow	Dec Avg Flow
1982	296	291	286	283	321	435	438	409	356	337	330	325
1983	320	316	316	311	325	424	430	395	358	339	330	326
1984	325	326	322	324	368	423	409	377	352	340	335	332
1985	331	329	324	227	379	379	357	341	341	331	327	322
1986	326	319	317	304	380	400	383	356	339	331	330	331
1987	326	322	321	315	320	380	388	364	345	345	328	321
1988	313	31	309	314	318	327	340	327	345	366	366	285
1989	256	356	363	363	341	333	332	330	340	334	326	319
1990	308	302	295	282	278	271	270	275	280	277	272	265
1991	257	249	341	229	225	236	296	302	302	298	291	281

Table D-3

Big Bear Spring Average Monthly Flow (gpm)

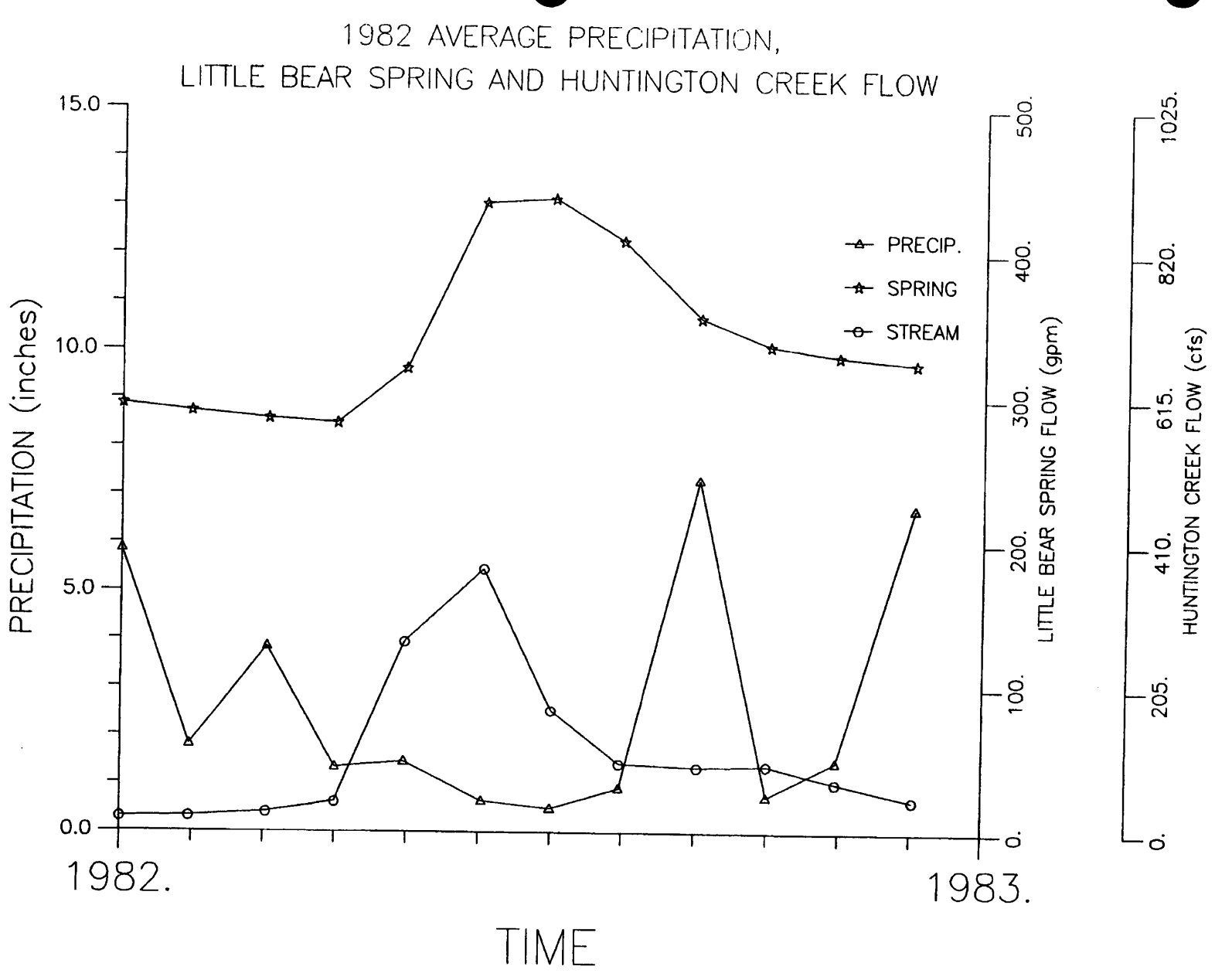
Year	Jan Avg Flow	Feb Avg Flow	Mar Avg Flow	Apr Avg Flow	May Avg Flow	June Avg Flow	July Avg Flow	Aug Avg Flow	Sept Avg Flow	Oct Avg Flow	Nov Avg Flow	Dec Avg Flow
1984	84	84	83	84	84	84	85	85	86	86	86	85
1985	85	85	84	85	85	85	85	85	86	87	86	85
1986	85	85	84	84	84	85	86	86	85	84	85	87
1987	85	85	86	85	86	86	86	85	84	89	85	83
1988	81	81	82	81	82	81	81	105	133	130	130	84
1989	104	106	104	102	101	101	99	98	98	97	96	96
1990	94	94	94	93	94	93	91	90	89	86	88	89
1991	88	89	88	89	88	89	86	86	86	85	85	84

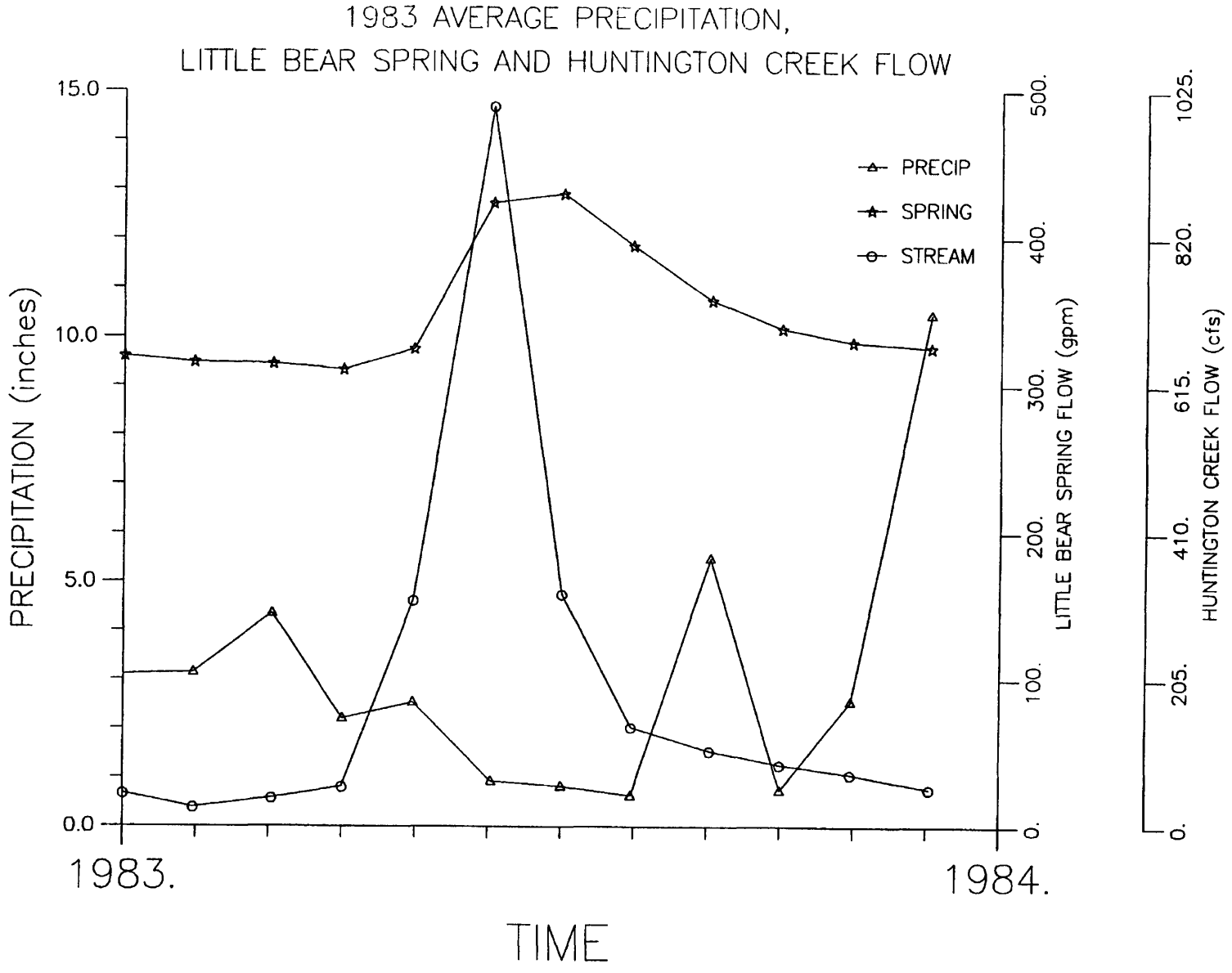
Table D-4

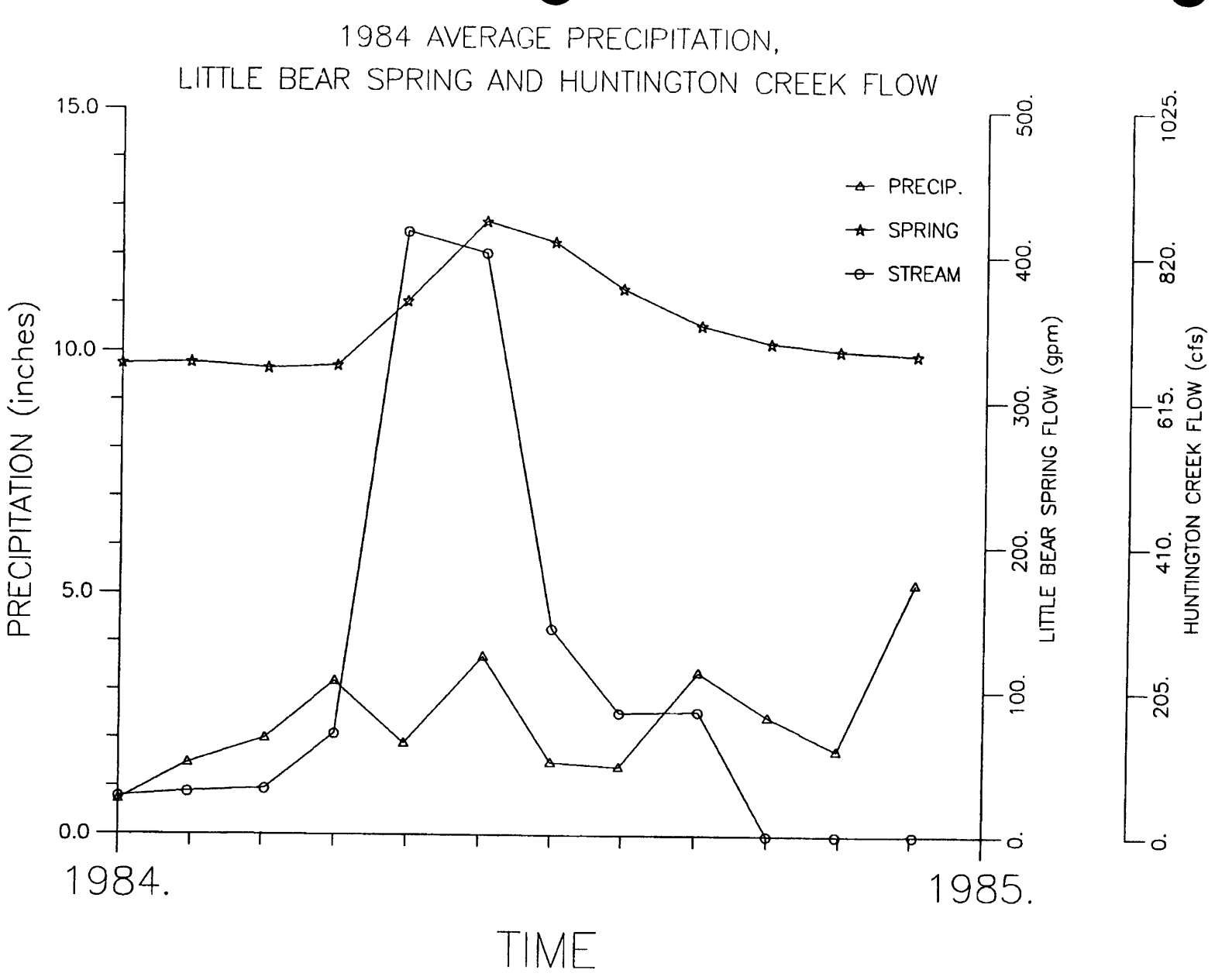
Birch Spring Average Monthly Flow (gpm)

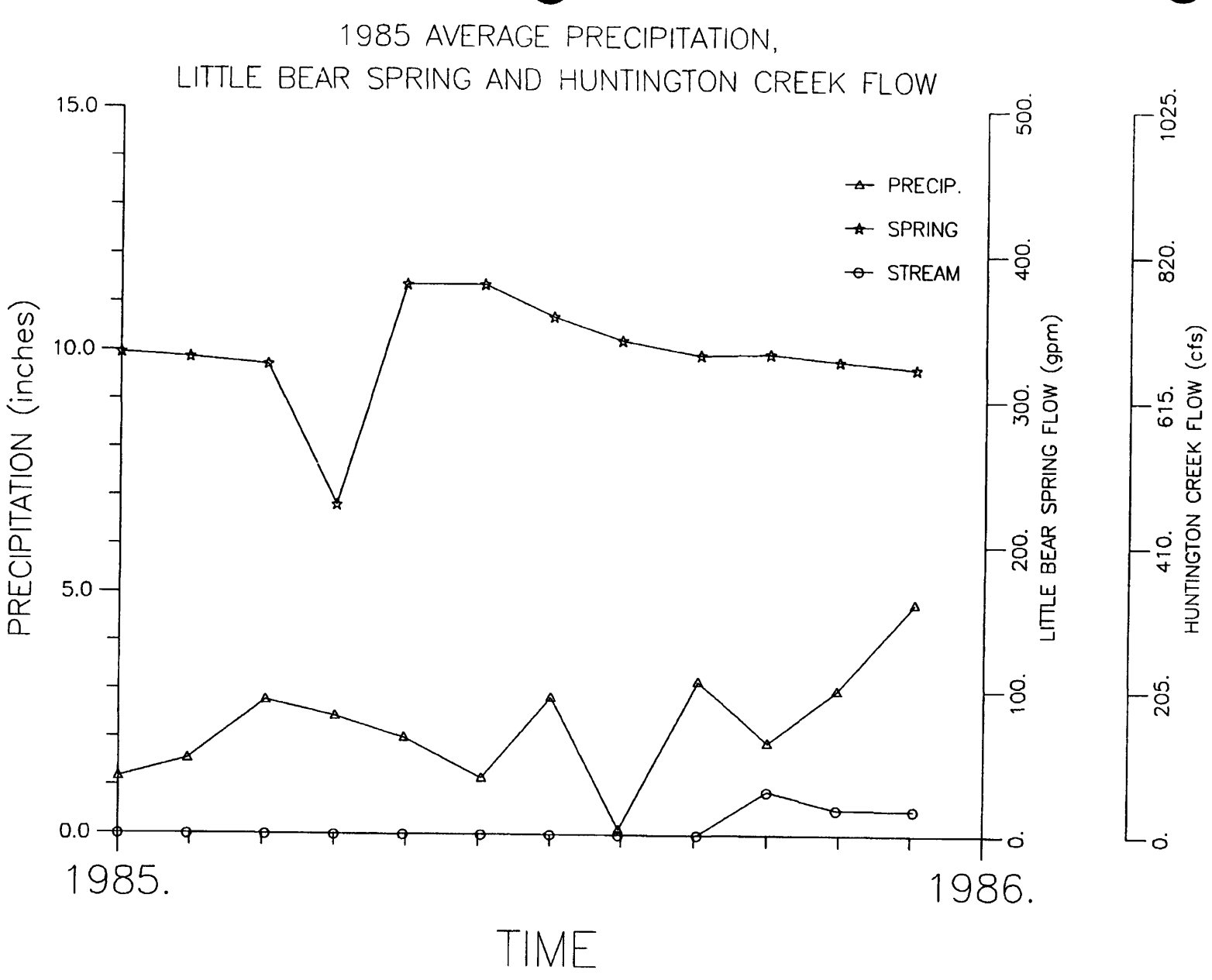
Year	Jan Avg Flow	Feb Avg Flow	Mar Avg Flow	Apr Avg Flow	May Avg Flow	June Avg Flow	July Avg Flow	Aug Avg Flow	Sept Avg Flow	Oct Avg Flow	Nov Avg Flow	Dec Avg Flow
1989	70	65	60	55	85	100	90	85	80	230	230	230
1990	230	70	65	60	70	85	75	55	40	40	38	37
1991	35	33	33	33	34	34	36	31	33	33	33	33

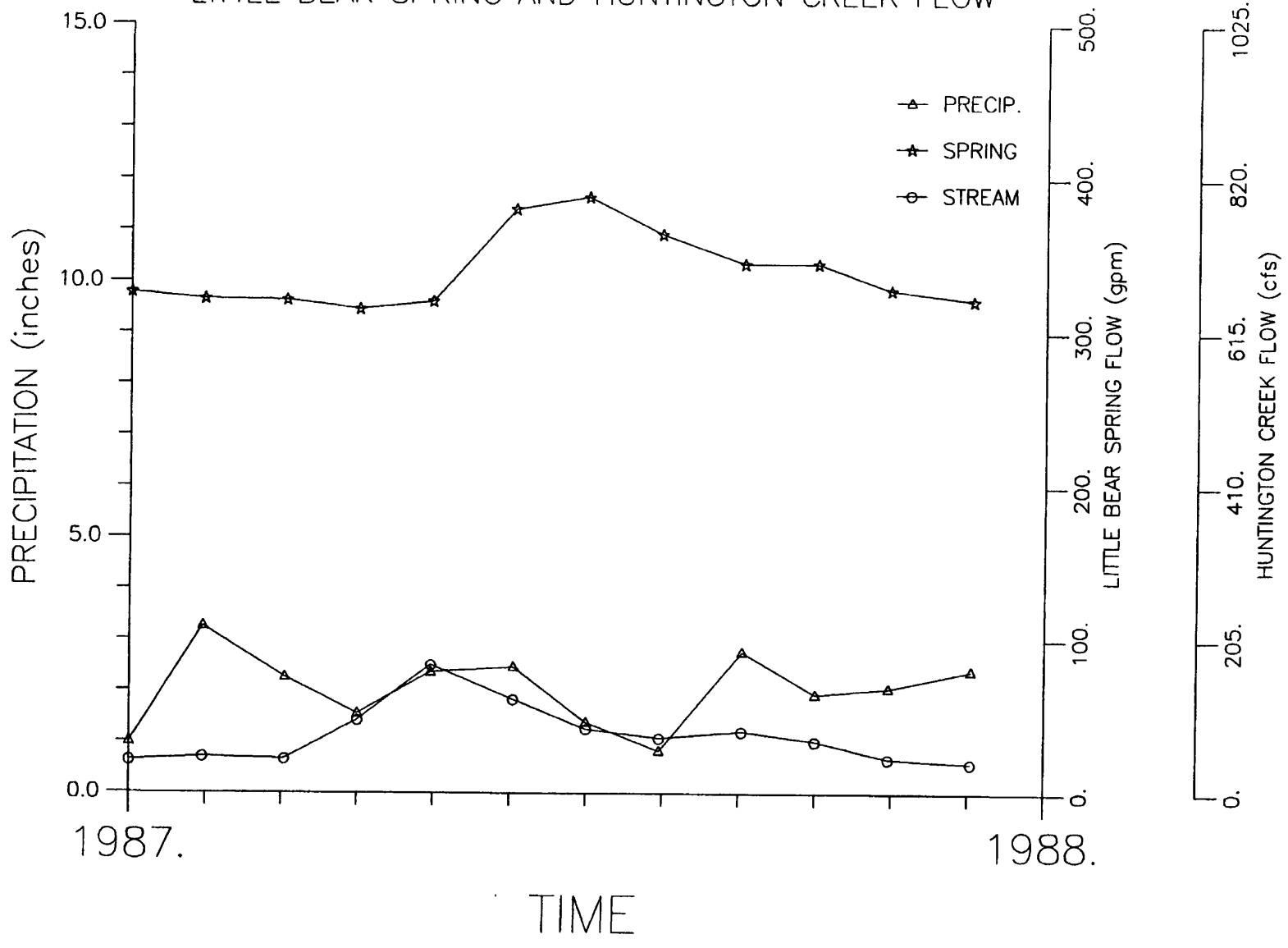
Appendix 7-N-E
Spring Flow Plots


1982 AVERAGE PRECIPITATION,
LITTLE BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
LITTLE BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1982.
1983.
TIME


1983 AVERAGE PRECIPITATION,
LITTLE BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP
SPRING
STREAM
LITTLE BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1983.
1984.
TIME


1984 AVERAGE PRECIPITATION,
LITTLE BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
LITTLE BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1984.
1985.
TIME


1985 AVERAGE PRECIPITATION,
LITTLE BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
LITTLE BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1985.
1986.
TIME


1987 AVERAGE PRECIPITATION,
LITTLE BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
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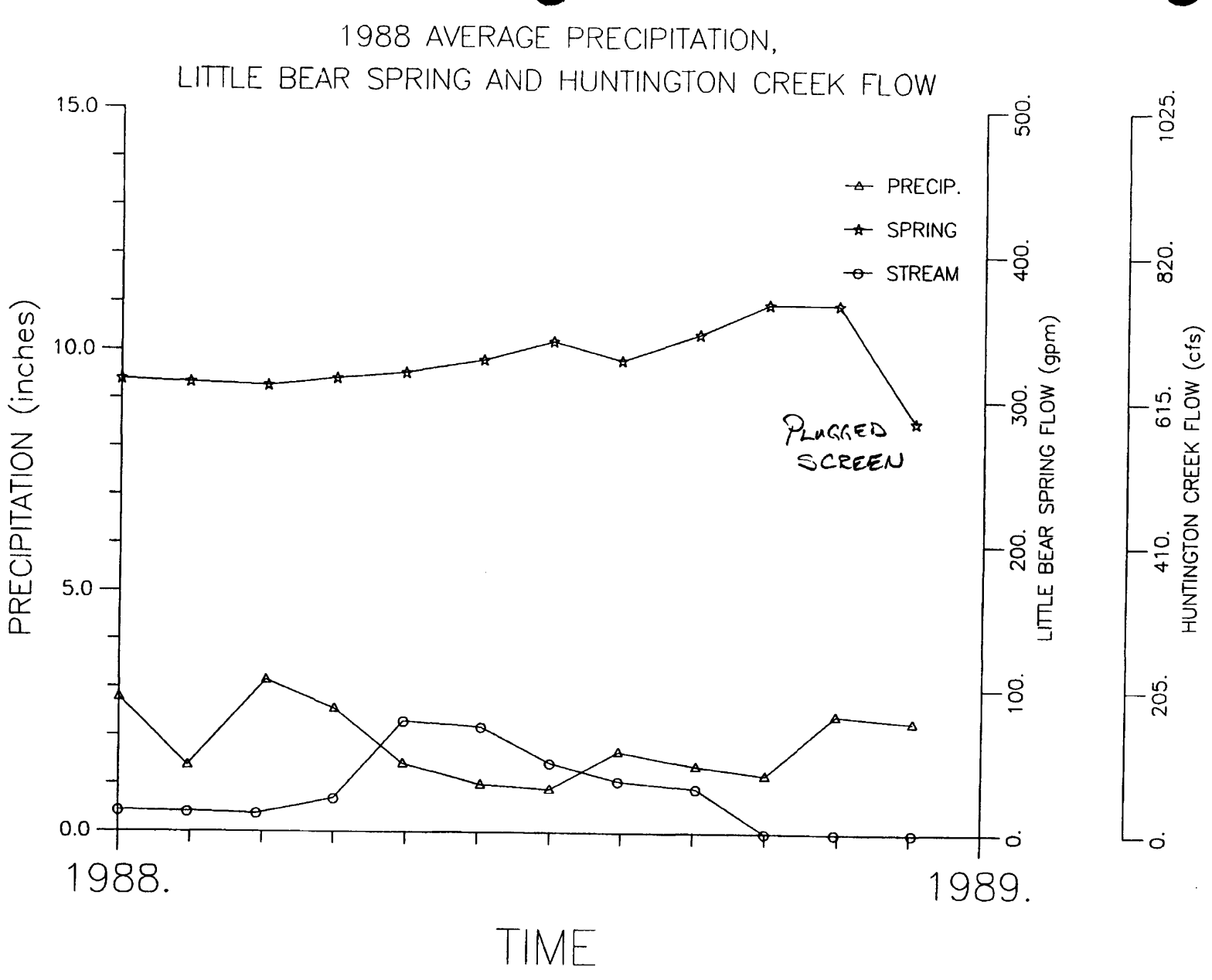
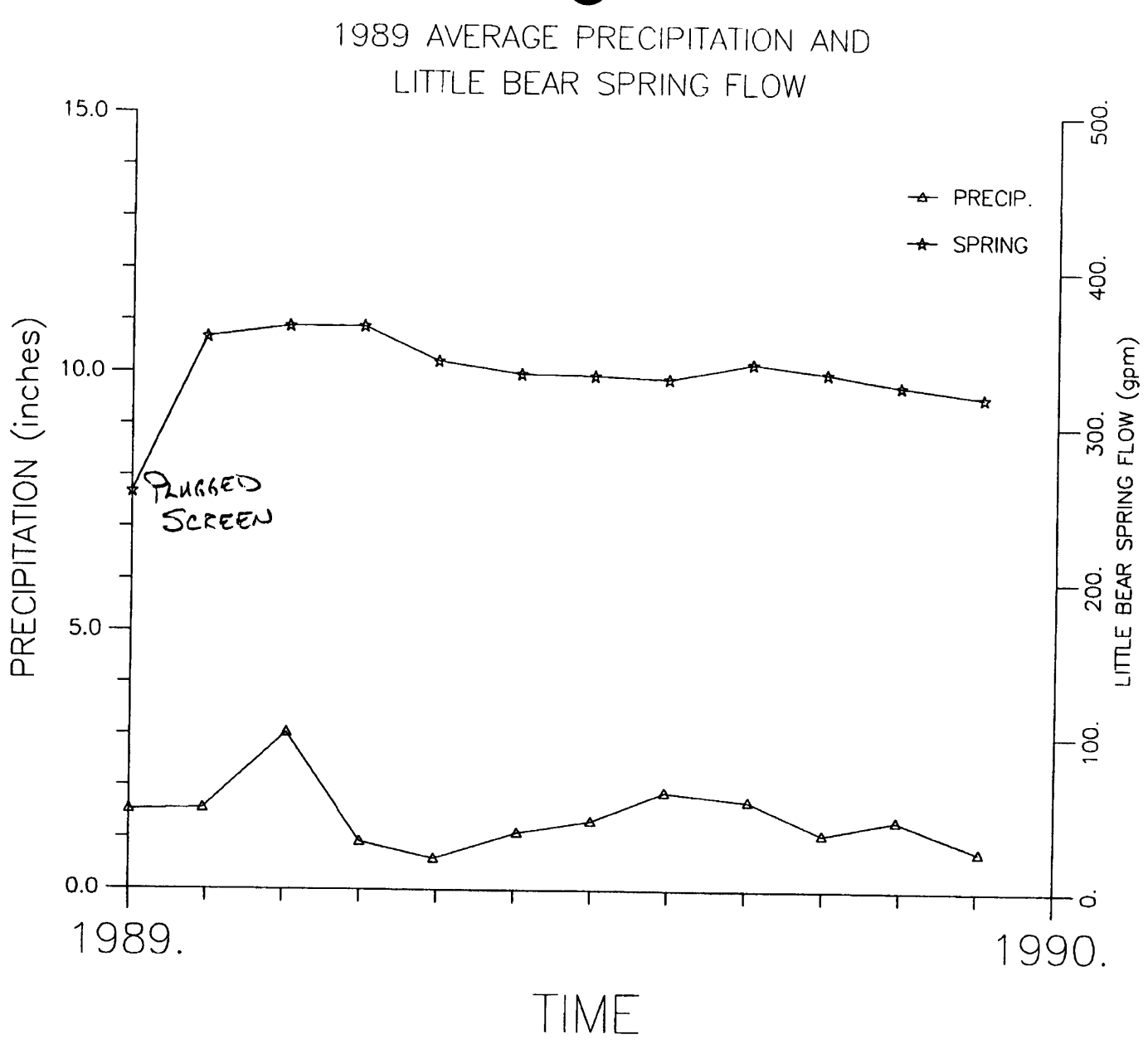
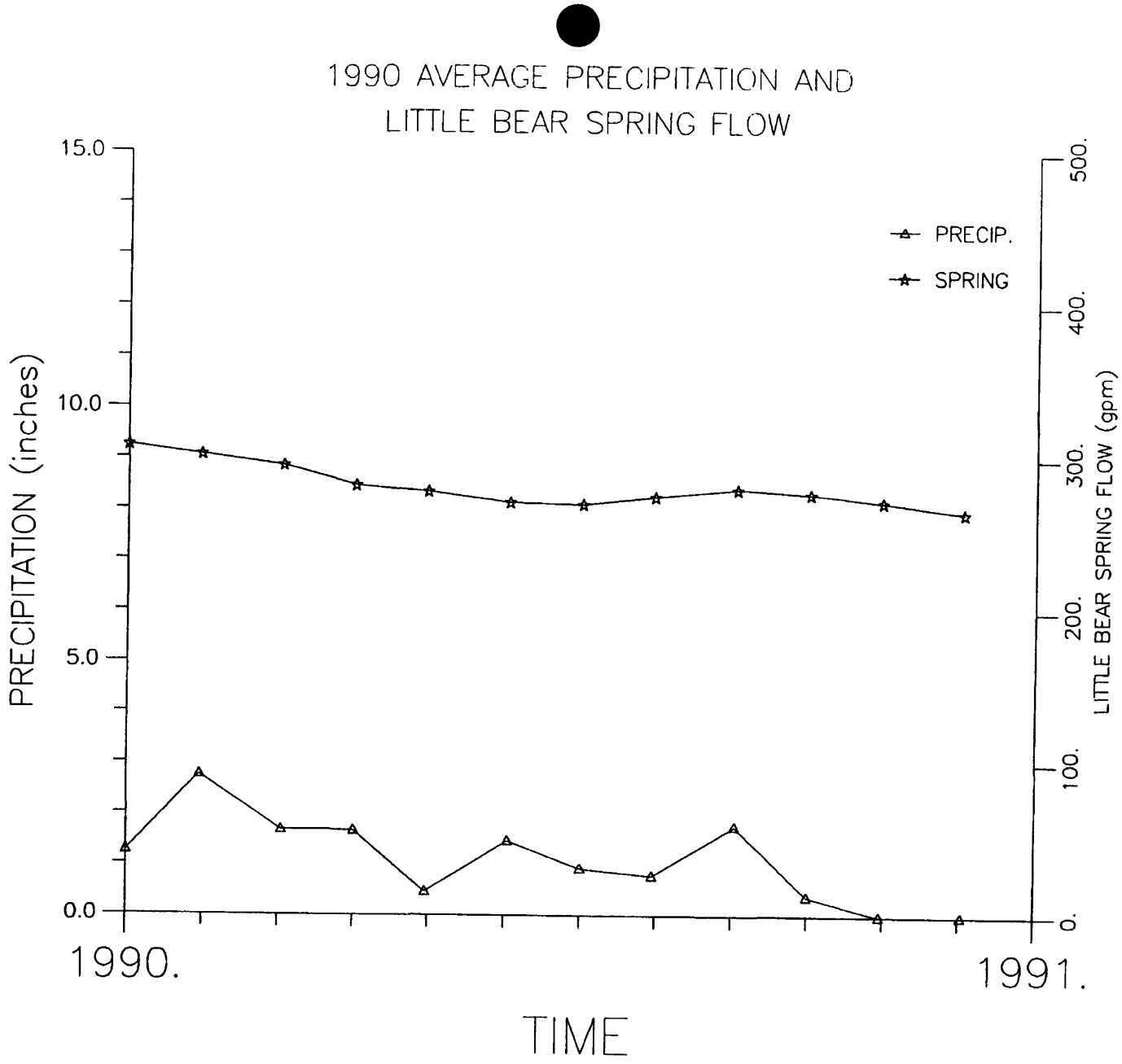
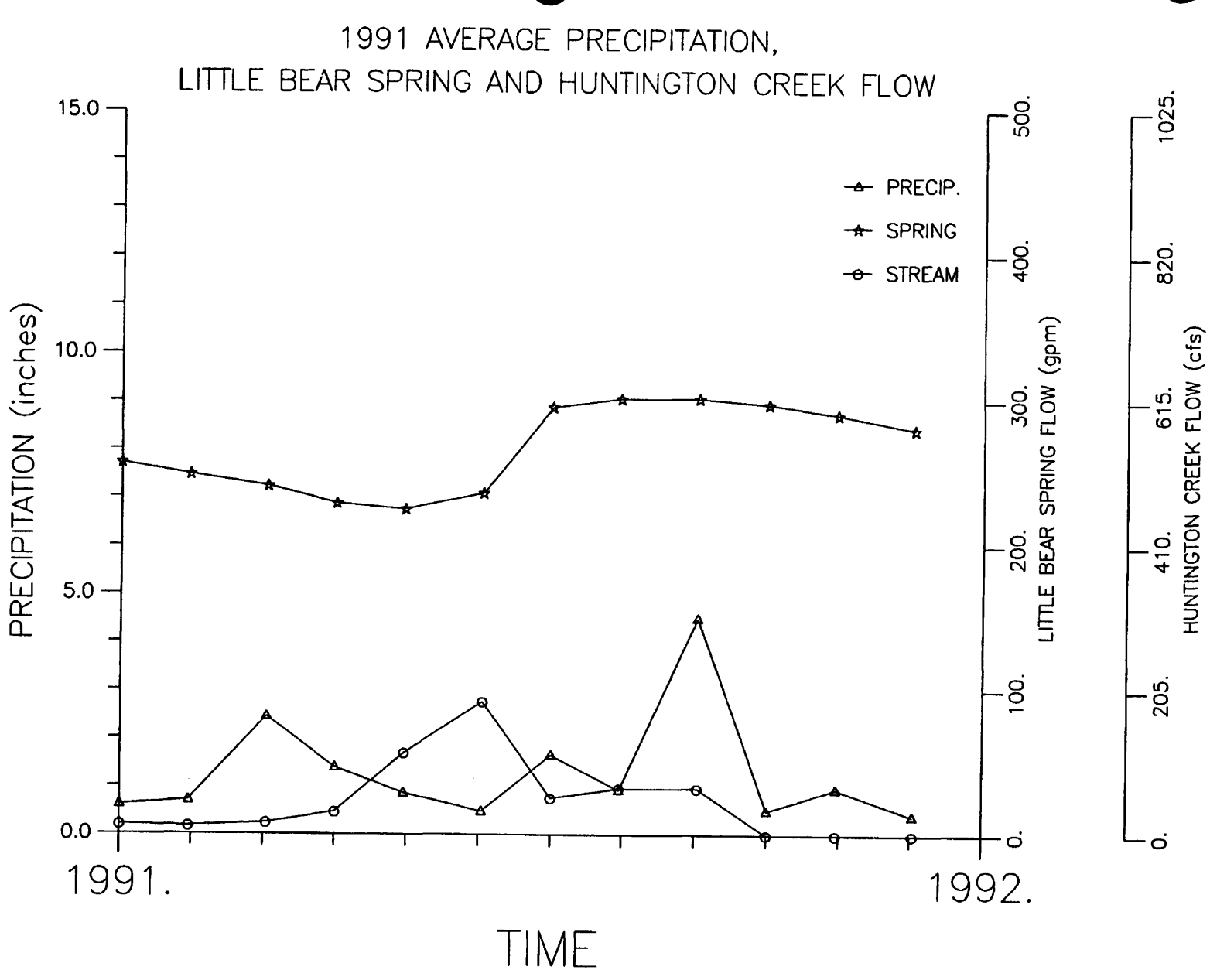
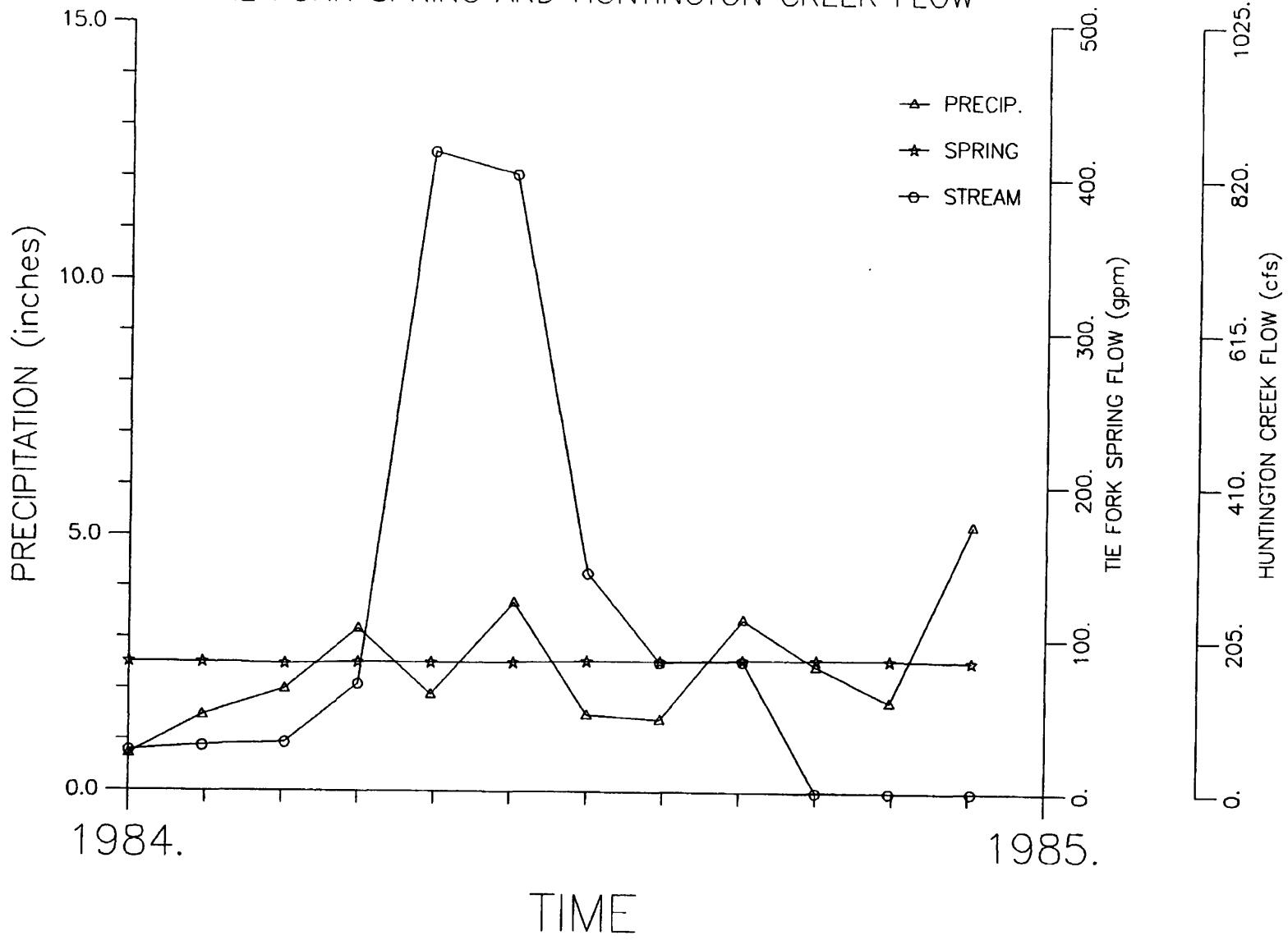
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
LITTLE BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1987.
1988.
TIME


1988 AVERAGE PRECIPITATION,
LITTLE BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
PLUGGED SCREEN
LITTLE BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1988.
1989.
TIME


1989 AVERAGE PRECIPITATION AND
LITTLE BEAR SPRING FLOW
15.0
10.0
5.0
0.0
PRECIPITATION (inches)
500.
400.
300.
200.
100.
0.
LITTLE BEAR SPRING FLOW (gpm)
PRECIP.
SPRING
PLUGGED
SCREEN
1989.
1990.
TIME


1990 AVERAGE PRECIPITATION AND
LITTLE BEAR SPRING FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
LITTLE BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
PRECIP.
SPRING
1990.
1991.
TIME


1991 AVERAGE PRECIPITATION,
LITTLE BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
LITTLE BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1991.
1992.
TIME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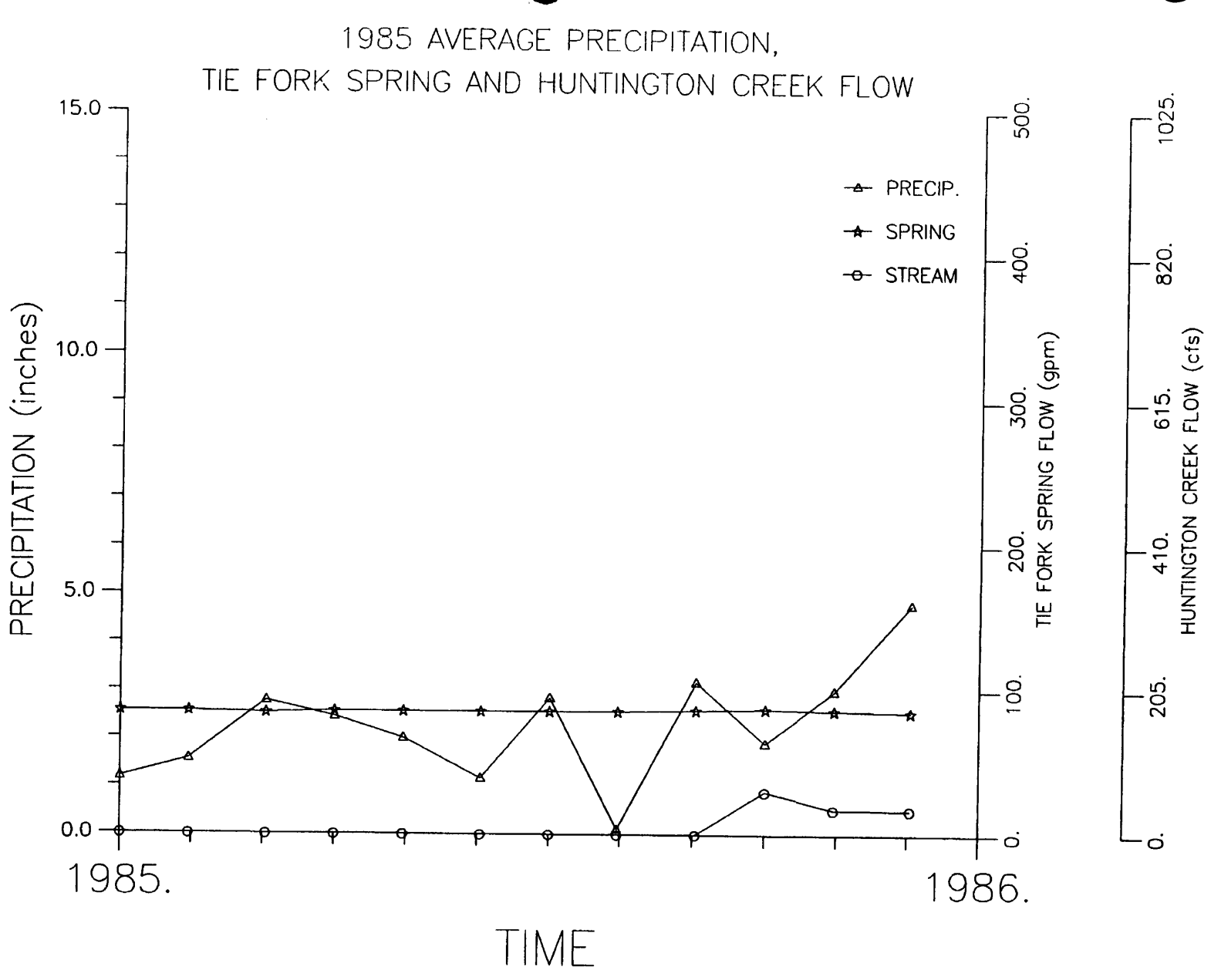
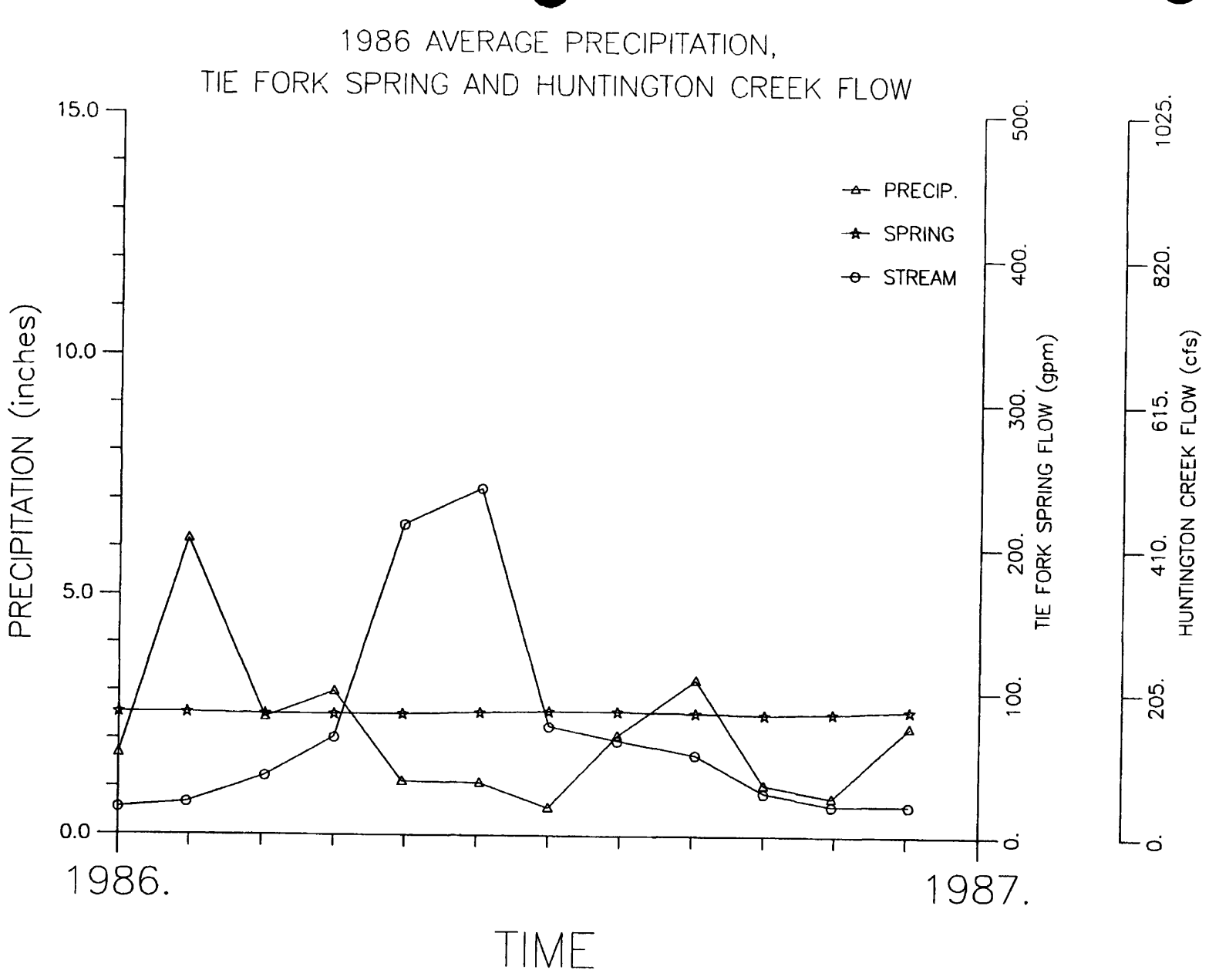
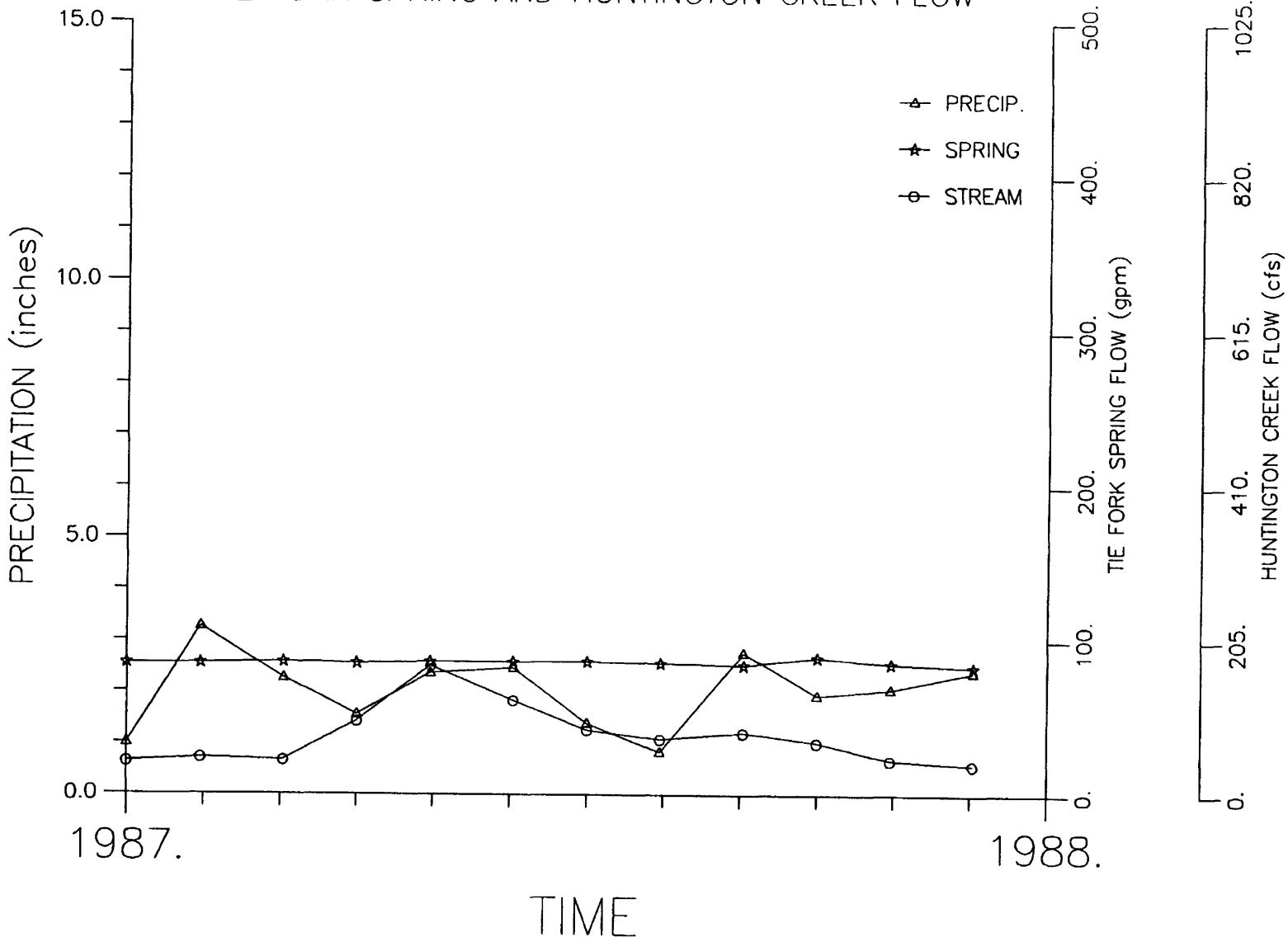
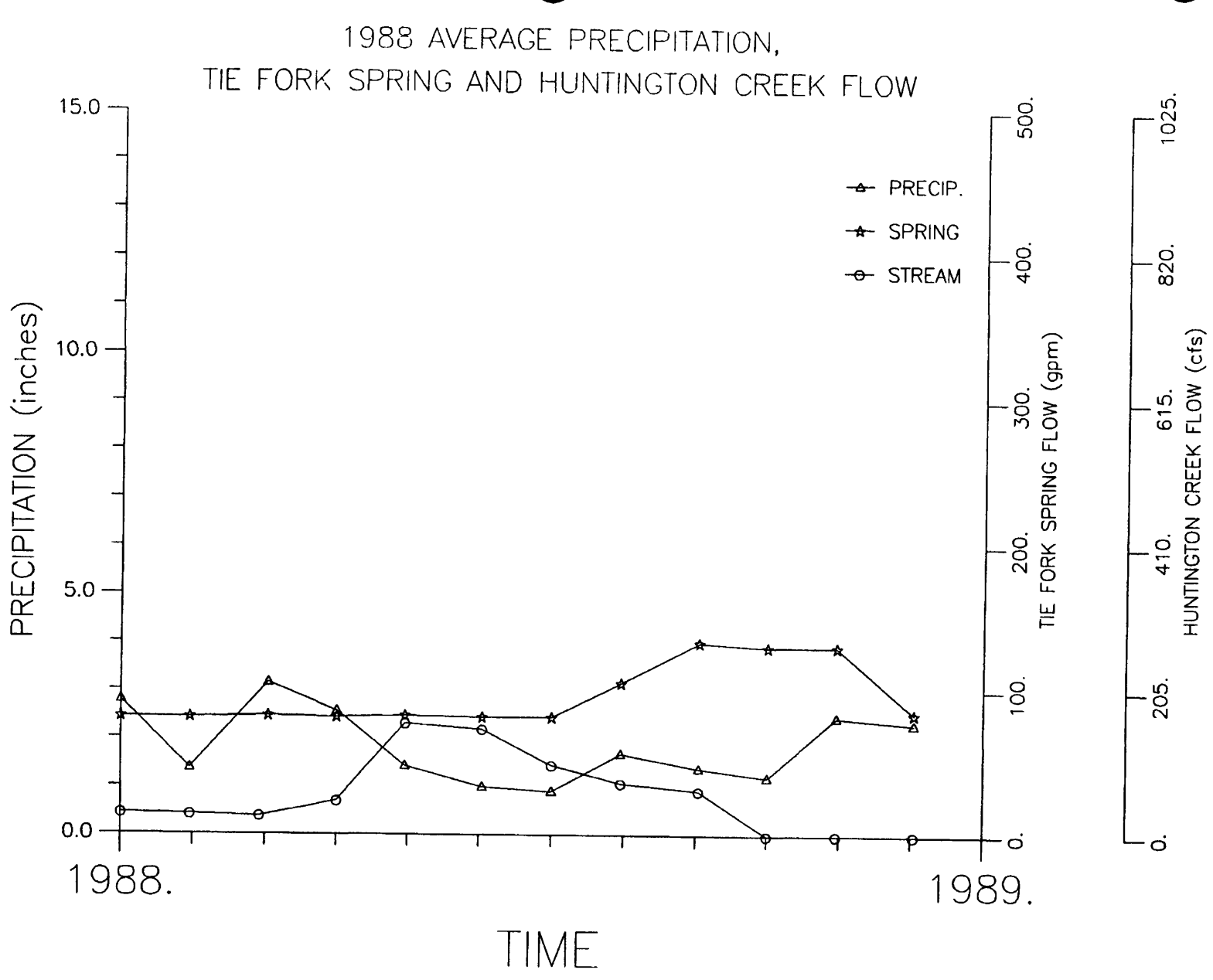
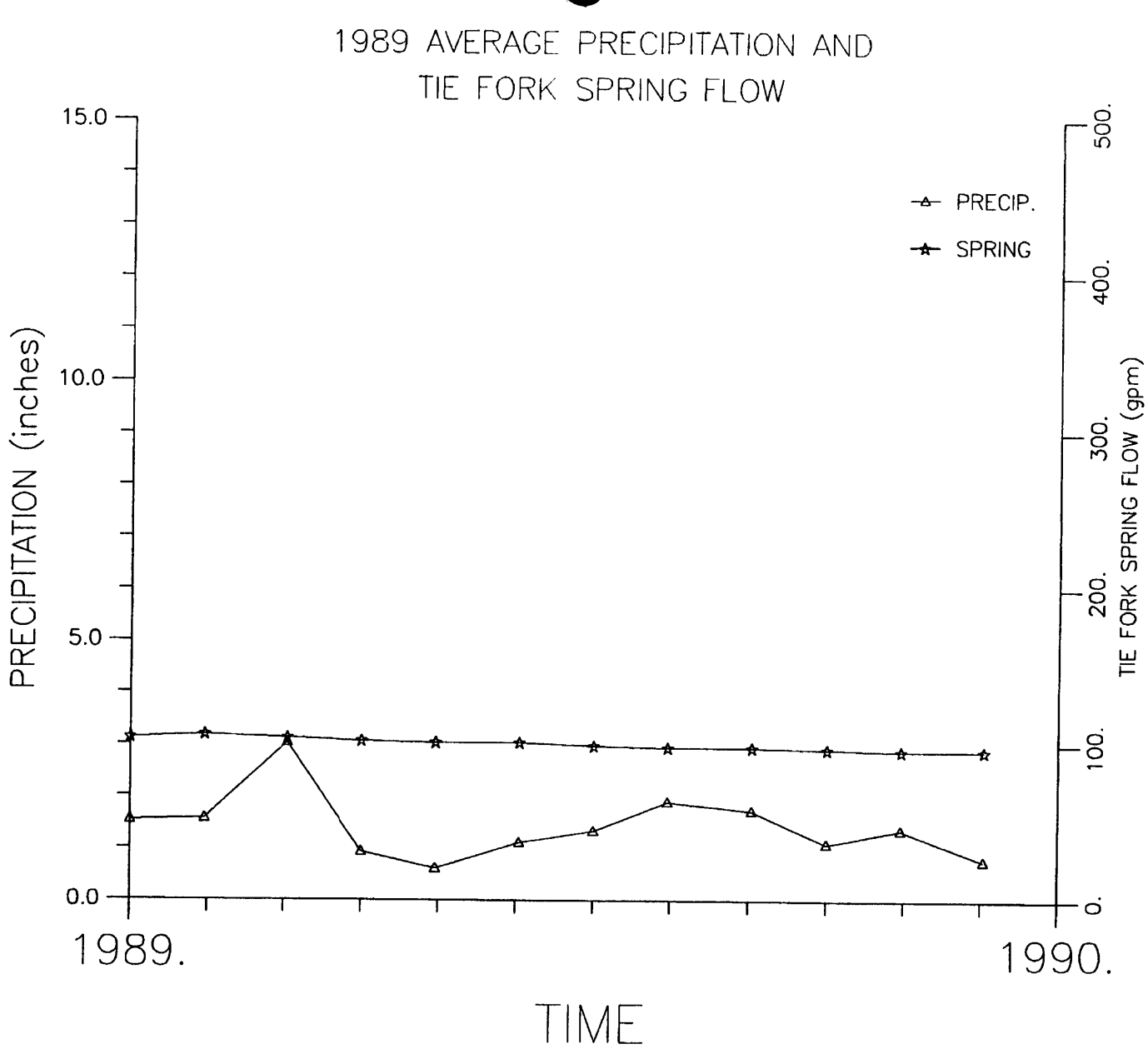
TIE FORK SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
TIE FORK SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1984.
1985.
TIME

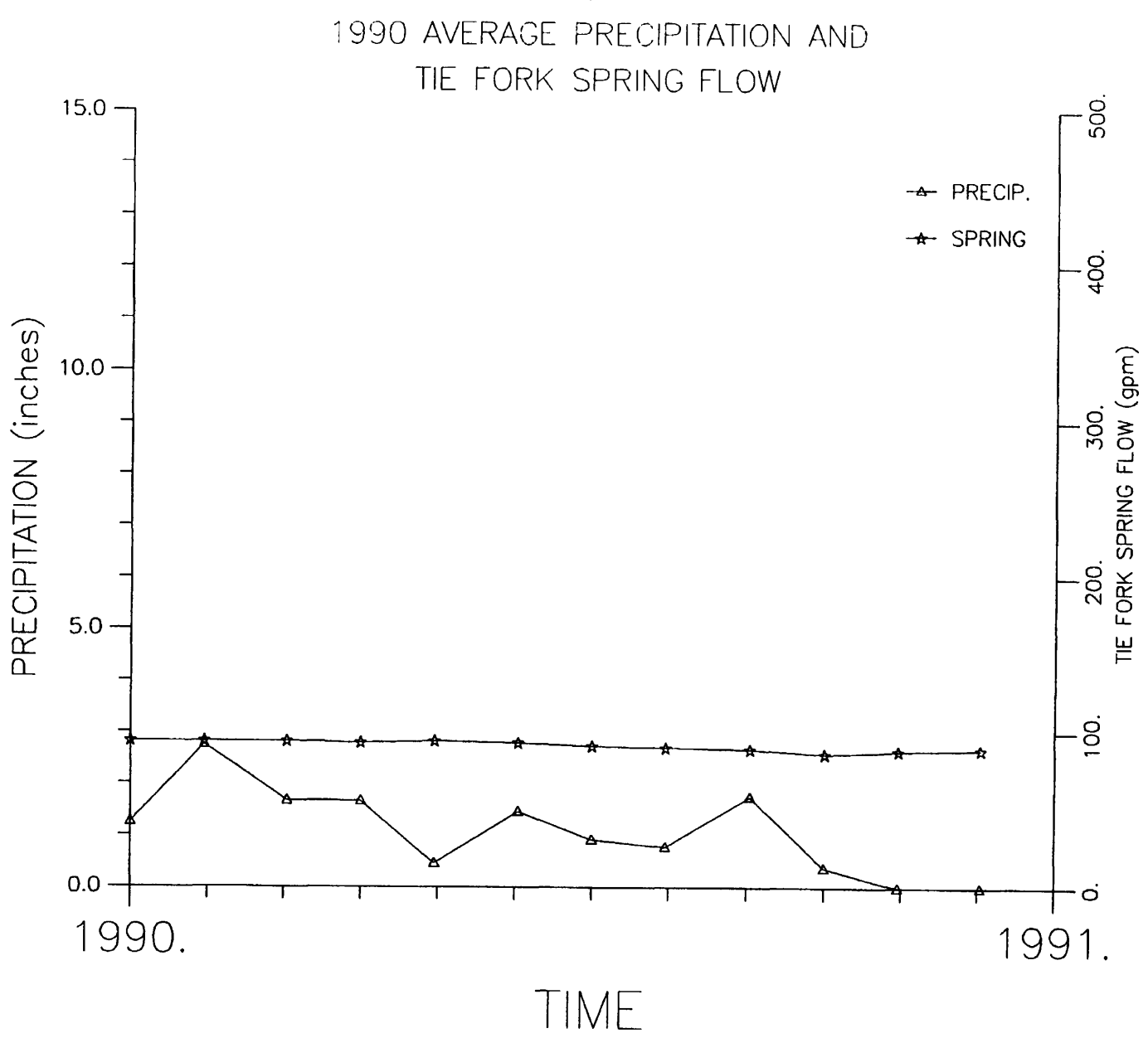

1985 AVERAGE PRECIPITATION,
TIE FORK SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
500.
400.
300.
200.
100.
0.
TIE FORK SPRING FLOW (gpm)
1025.
820.
615.
410.
205.
0.
HUNTINGTON CREEK FLOW (cfs)
1985.
1986.
TIME

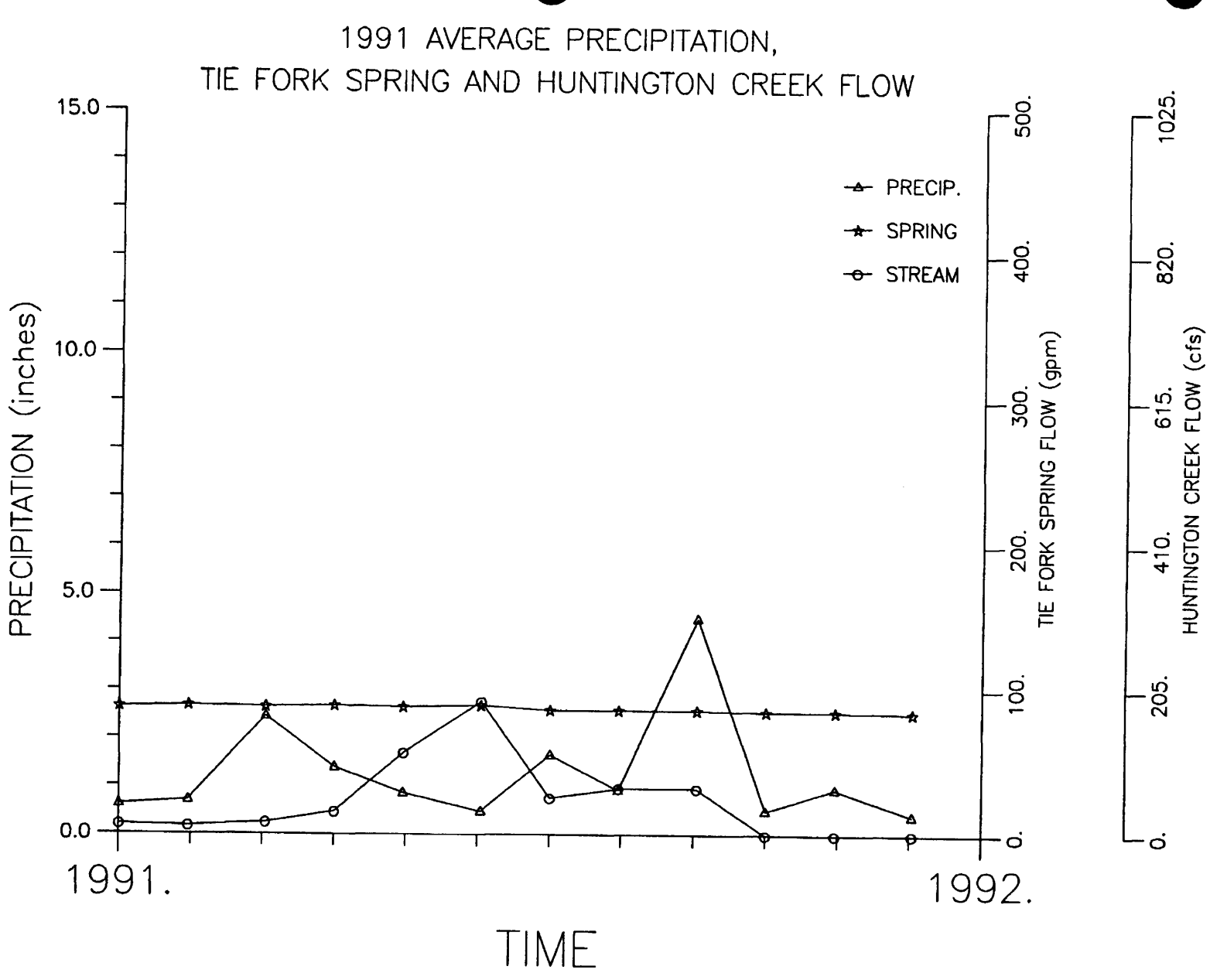

1986 AVERAGE PRECIPITATION,
TIE FORK SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
TIE FORK SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1986.
1987.
TIME


1987 AVERAGE PRECIPITATION,
TIE FORK SPRING AND HUNTINGTON CREEK FLOW
PRECIP.
SPRING
STREAM
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
TIE FORK SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1987.
1988.
TIME

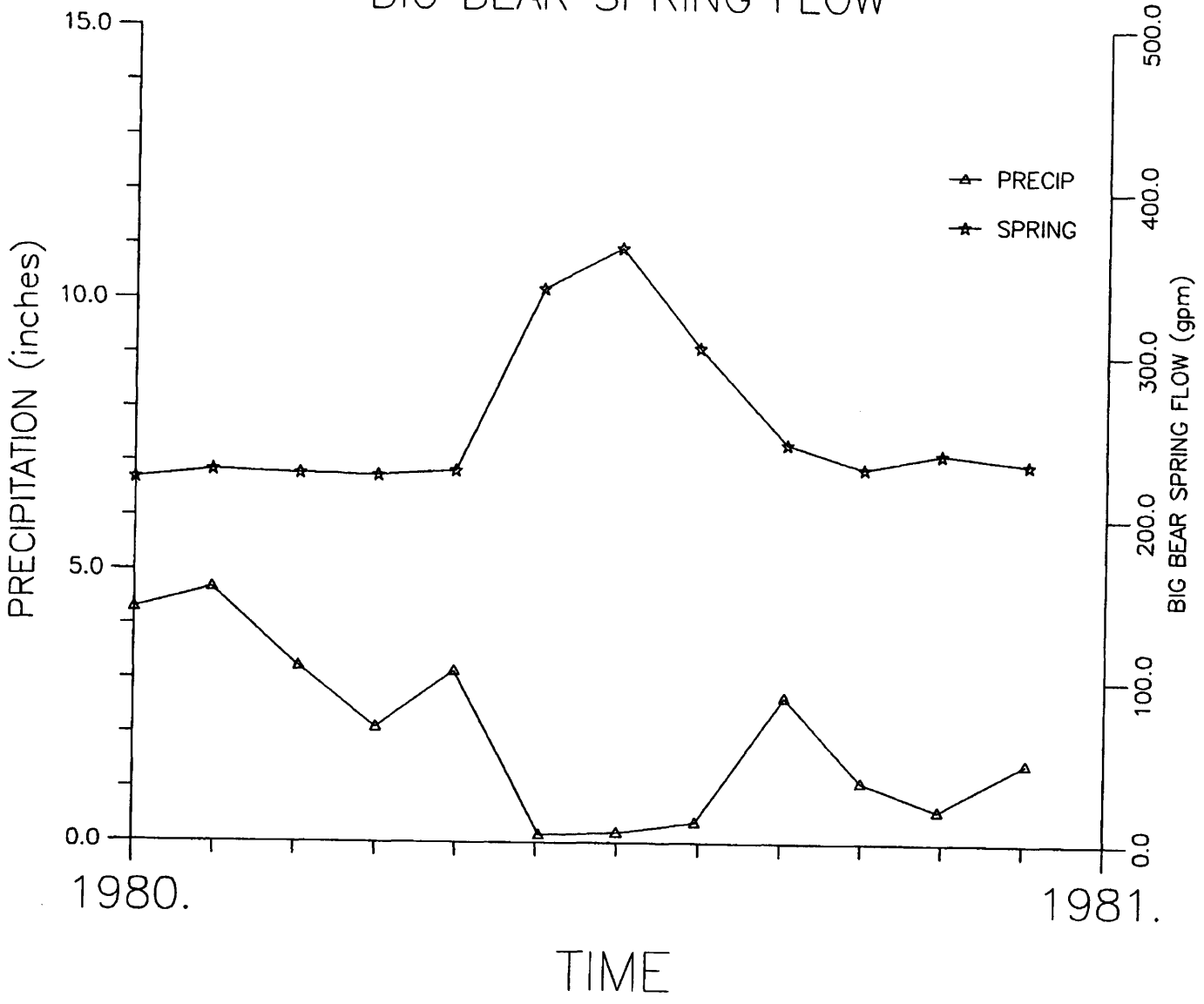

1988 AVERAGE PRECIPITATION,
TIE FORK SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
TIE FORK SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1988.
1989.
TIME

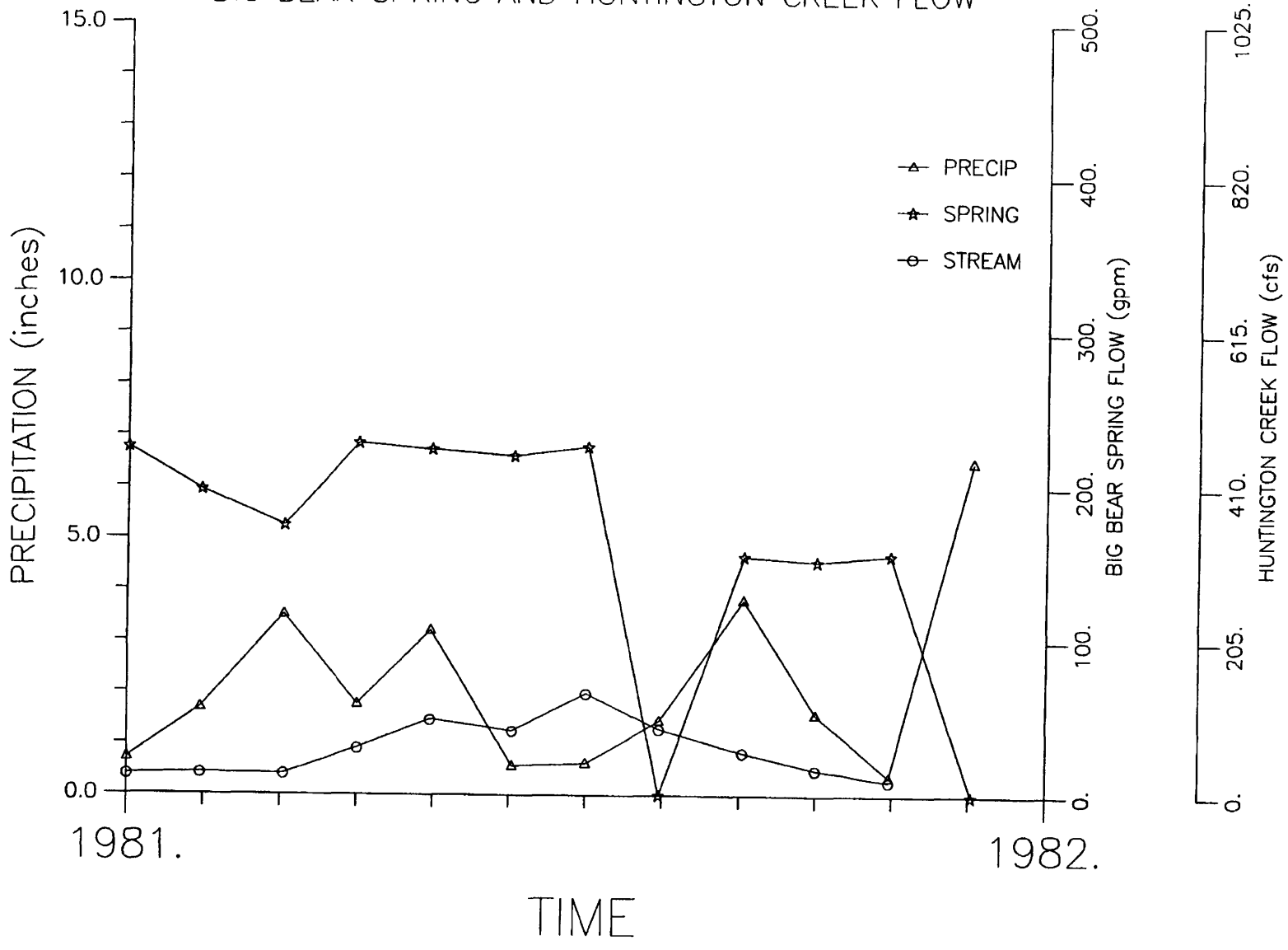

1989 AVERAGE PRECIPITATION AND
TIE FORK SPRING FLOW
PRECIP.
SPRING
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
500.
400.
300.
200.
100.
0.
TIE FORK SPRING FLOW (gpm)
1989.
1990.
TIME


1990 AVERAGE PRECIPITATION AND
TIE FORK SPRING FLOW
PRECIP.
SPRING
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
500.
400.
300.
200.
100.
0.
TIE FORK SPRING FLOW (gpm)
1990.
1991.
TIME


1991 AVERAGE PRECIPITATION,
TIE FORK SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
500.
400.
300.
200.
100.
0.
TIE FORK SPRING FLOW (gpm)
1025.
820.
615.
410.
205.
0.
HUNTINGTON CREEK FLOW (cfs)
1991.
1992.
TIME

1980 AVERAGE PRECIPITATION AND BIG BEAR SPRING FLOW

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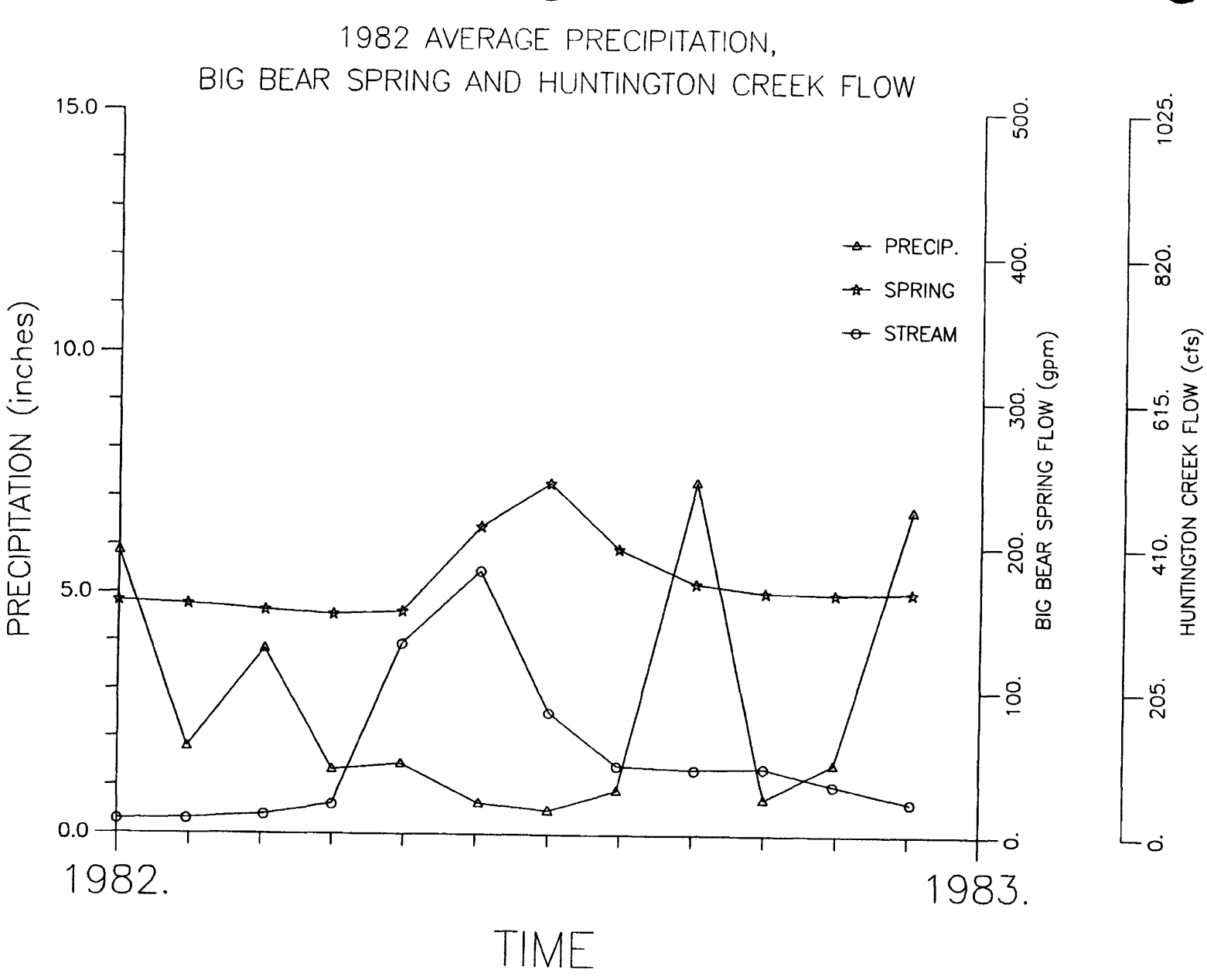
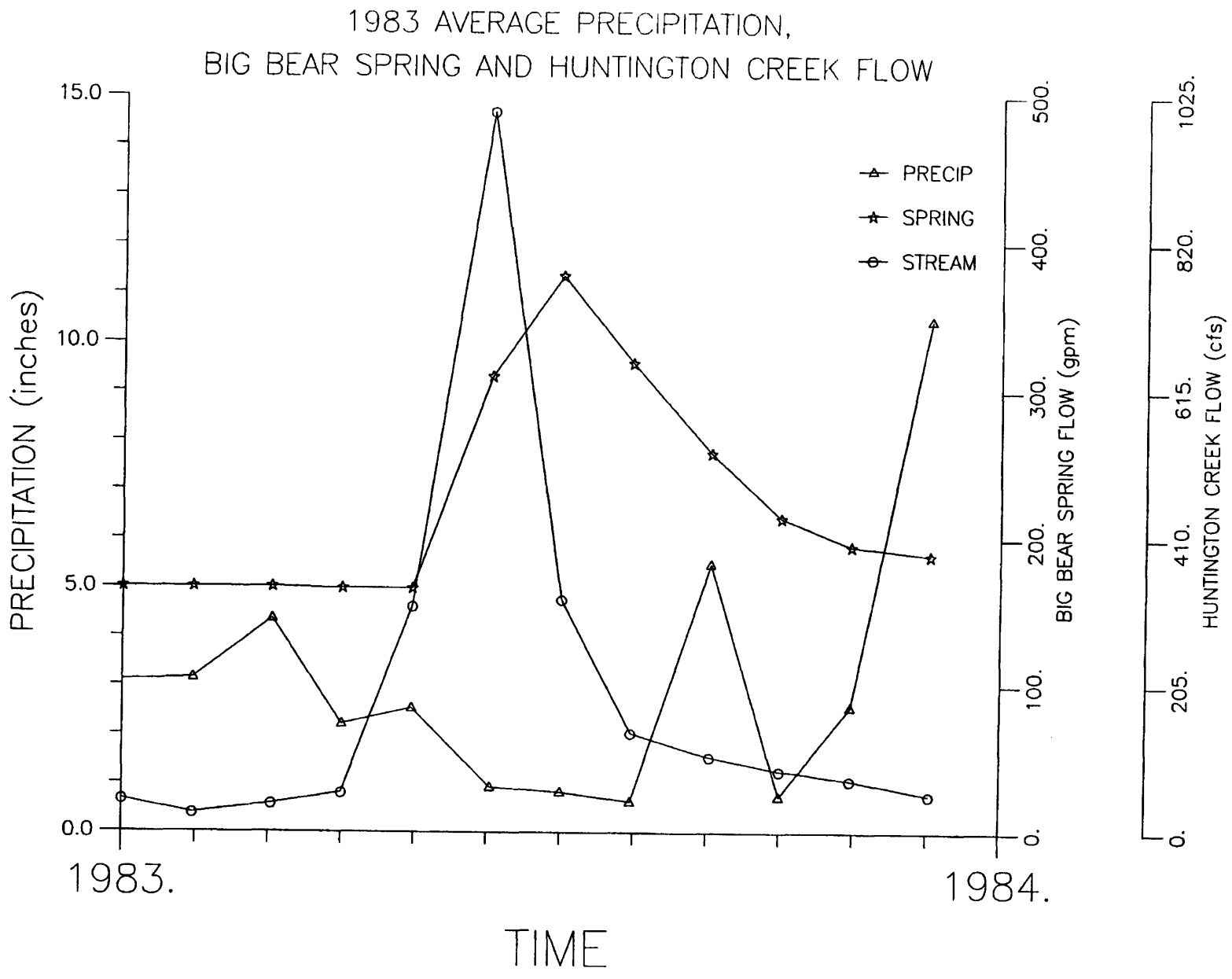
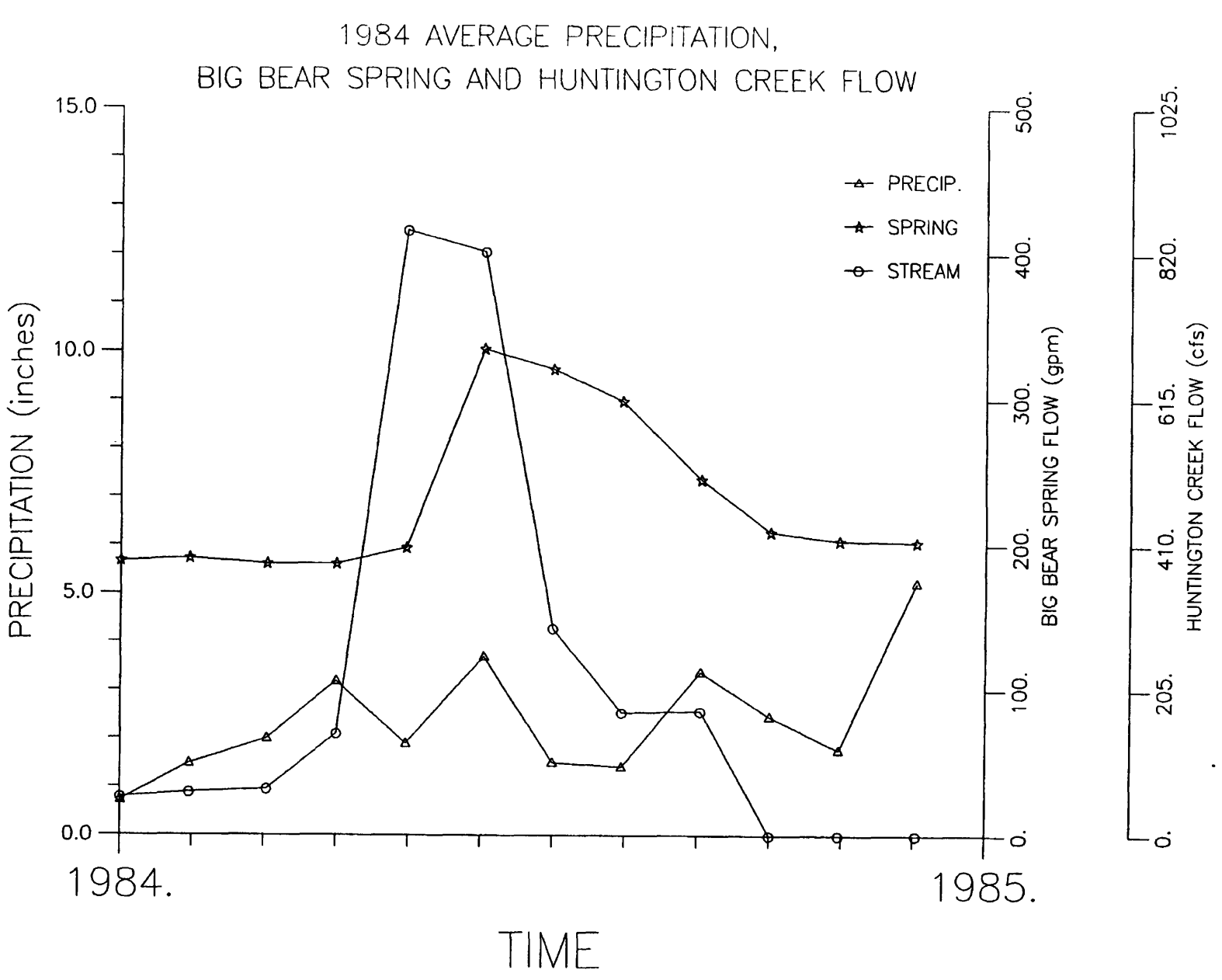
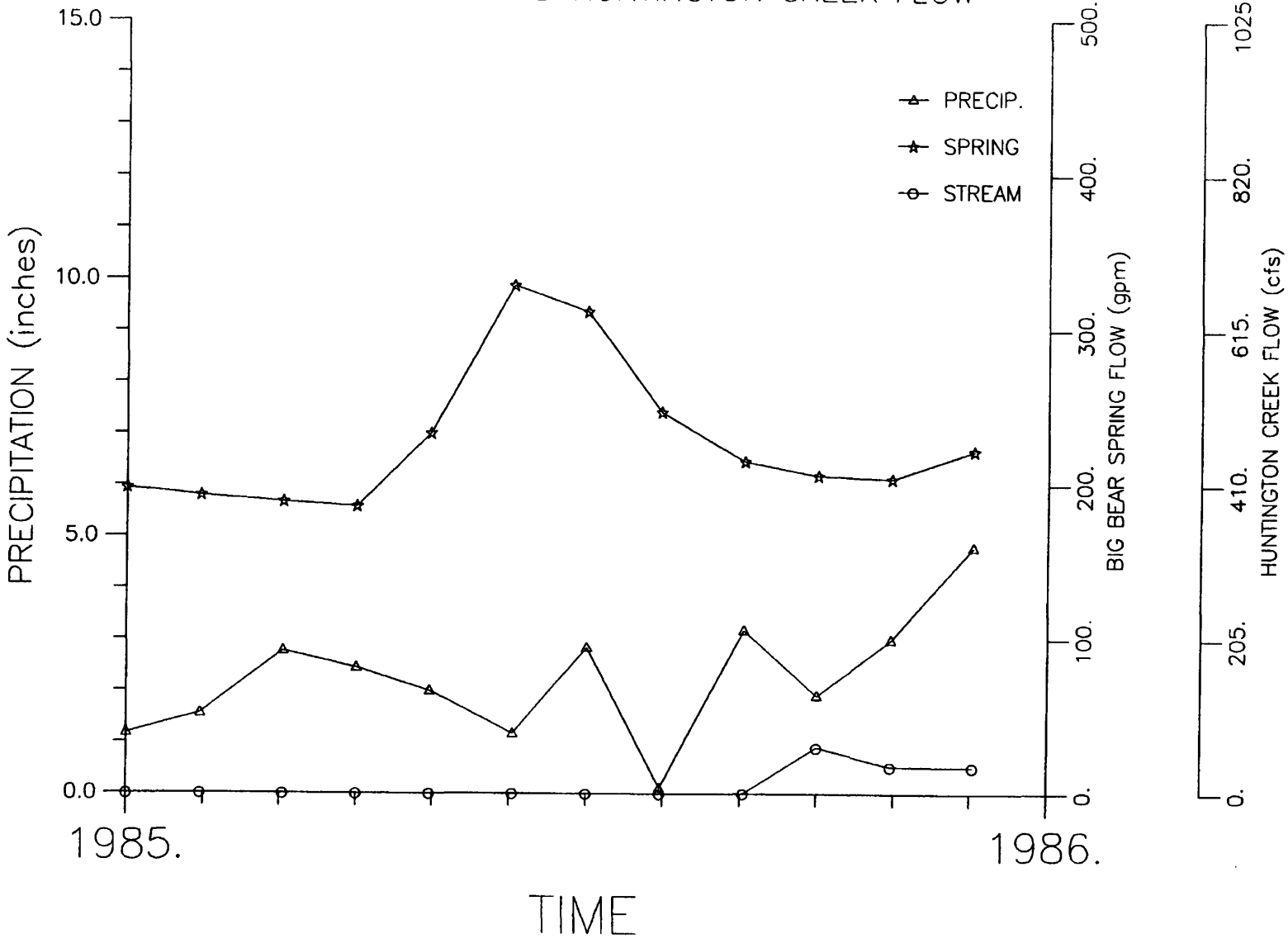
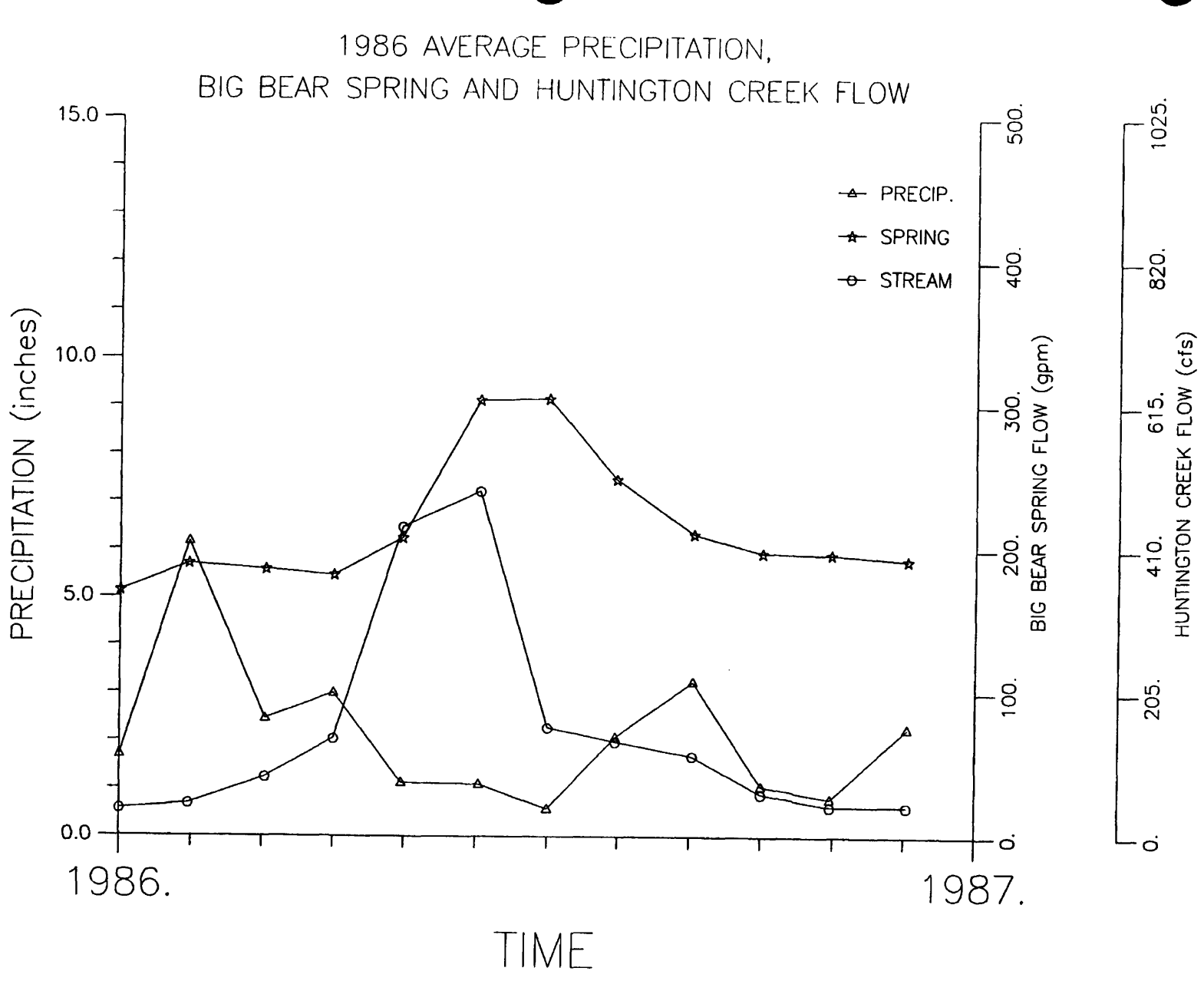
BIG BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP
SPRING
STREAM
BIG BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1981.
1982.
TIME

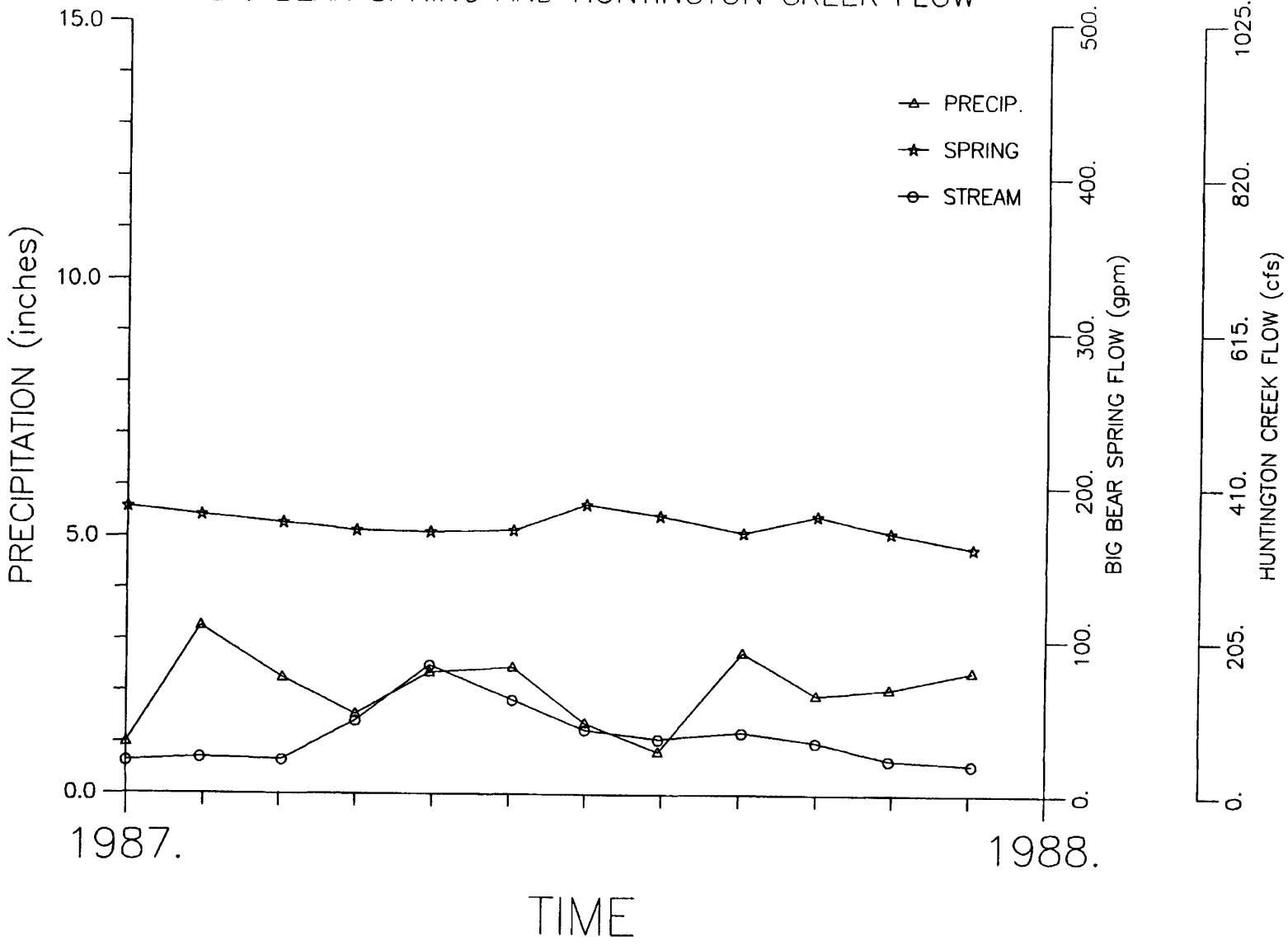

1982 AVERAGE PRECIPITATION,
BIG BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
BIG BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1982.
1983.
TIME

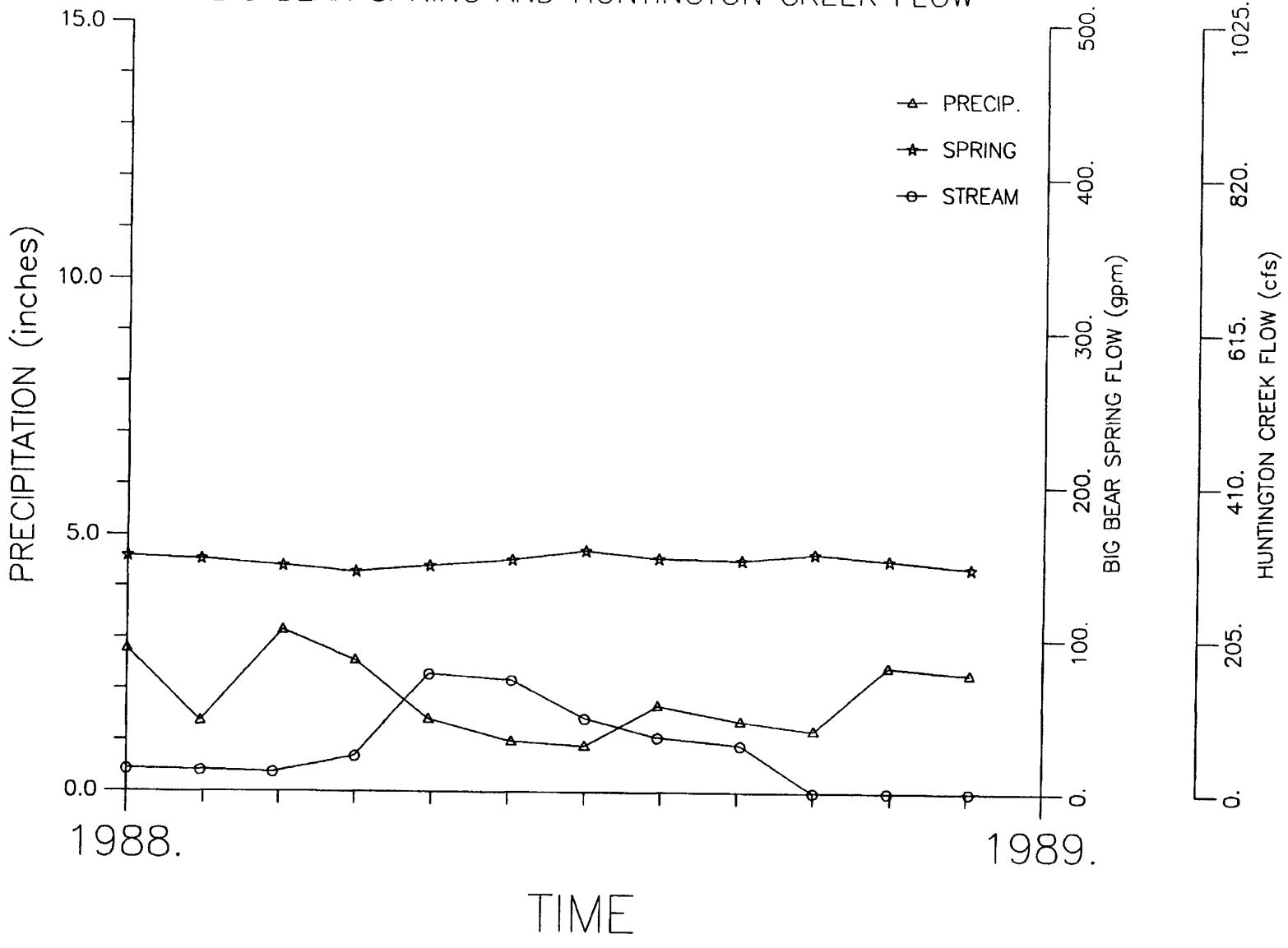

1983 AVERAGE PRECIPITATION,
BIG BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP
SPRING
STREAM
500.
400.
300.
200.
100.
0.
BIG BEAR SPRING FLOW (gpm)
1025.
820.
615.
410.
205.
0.
HUNTINGTON CREEK FLOW (cfs)
1983.
1984.
TIME

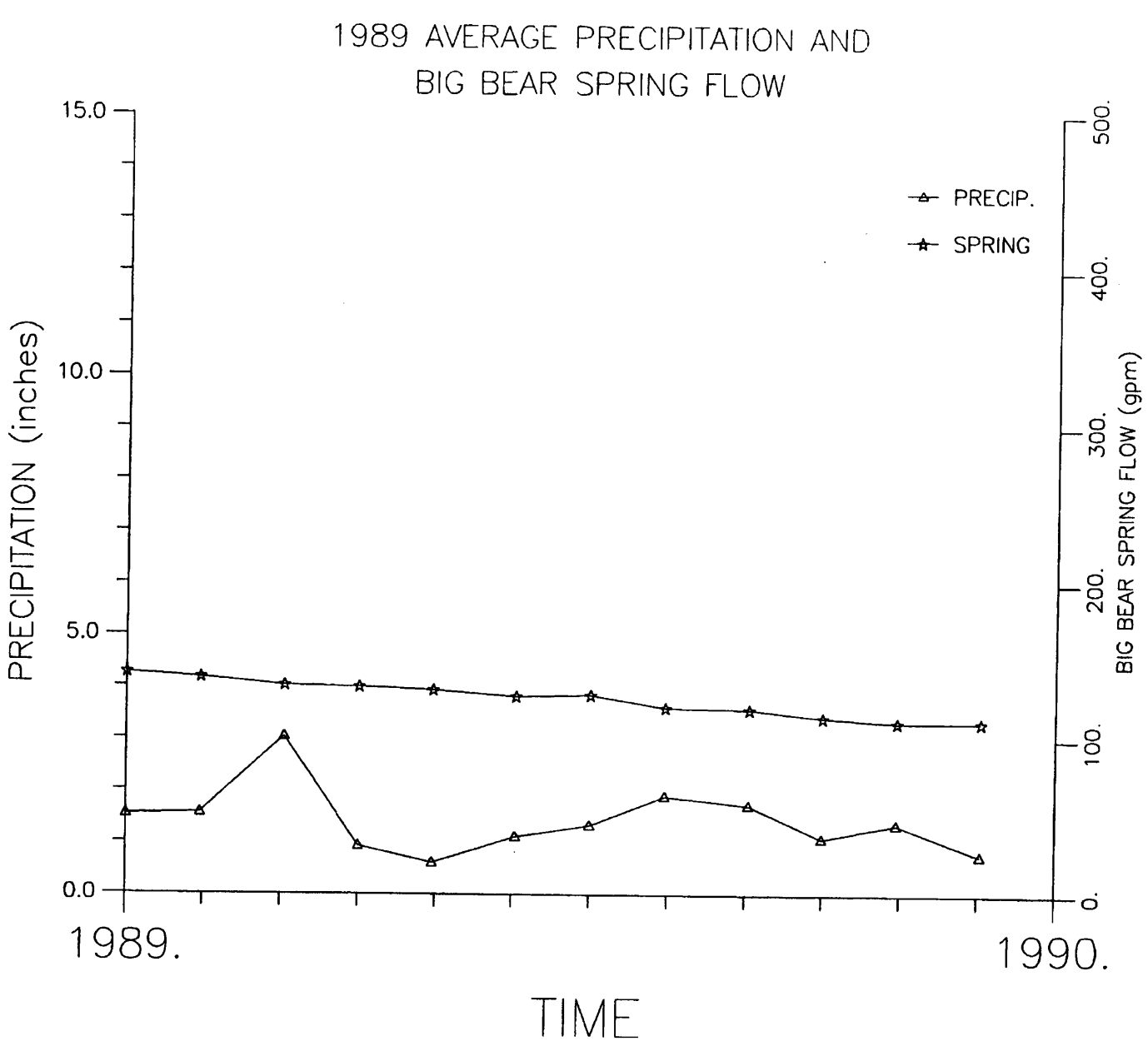

1984 AVERAGE PRECIPITATION,
BIG BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
BIG BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1984.
1985.
TIME

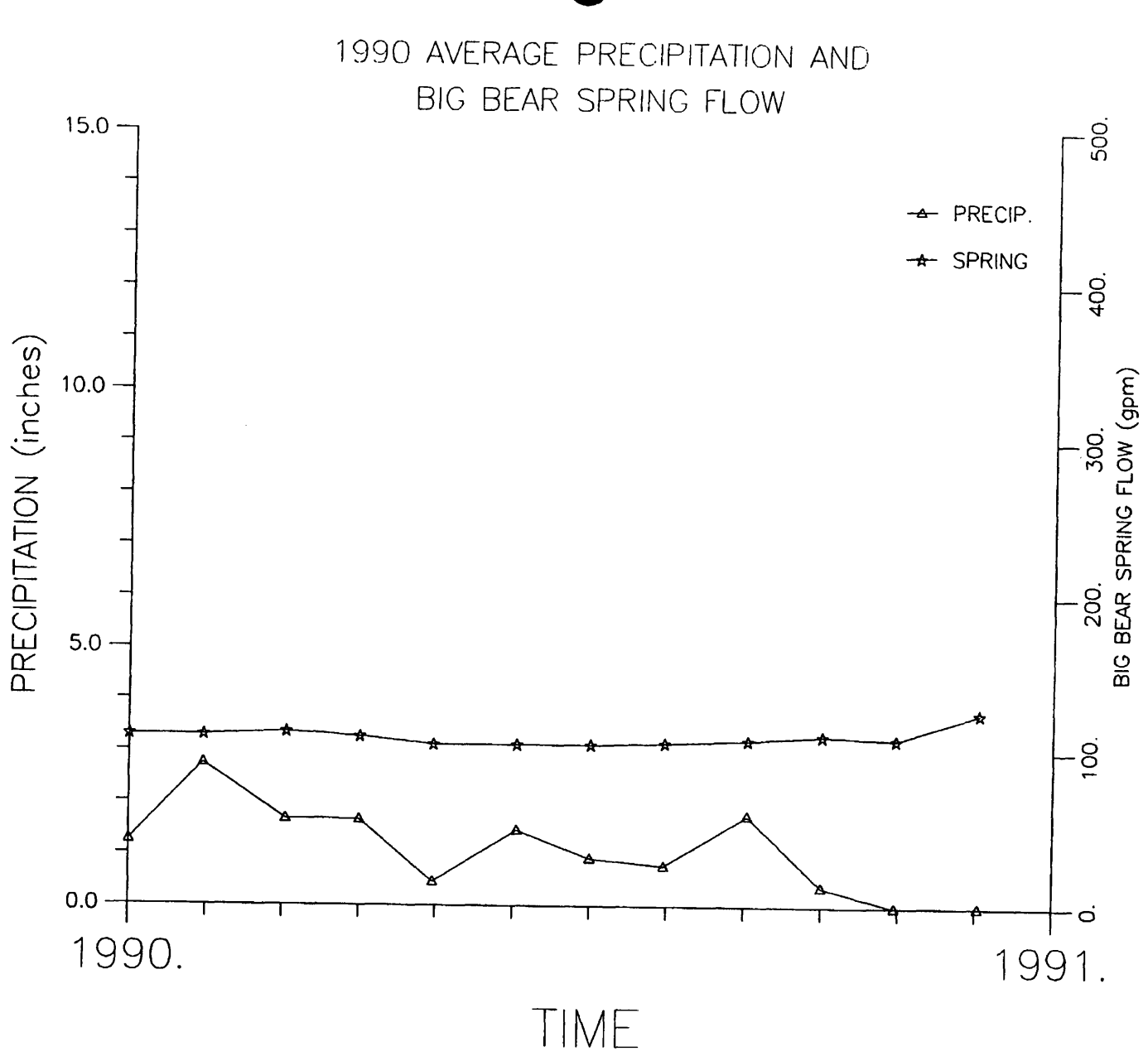

1985 AVERAGE PRECIPITATION,
BIG BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIP.
SPRING
STREAM
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
BIG BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1985.
1986.
TIME

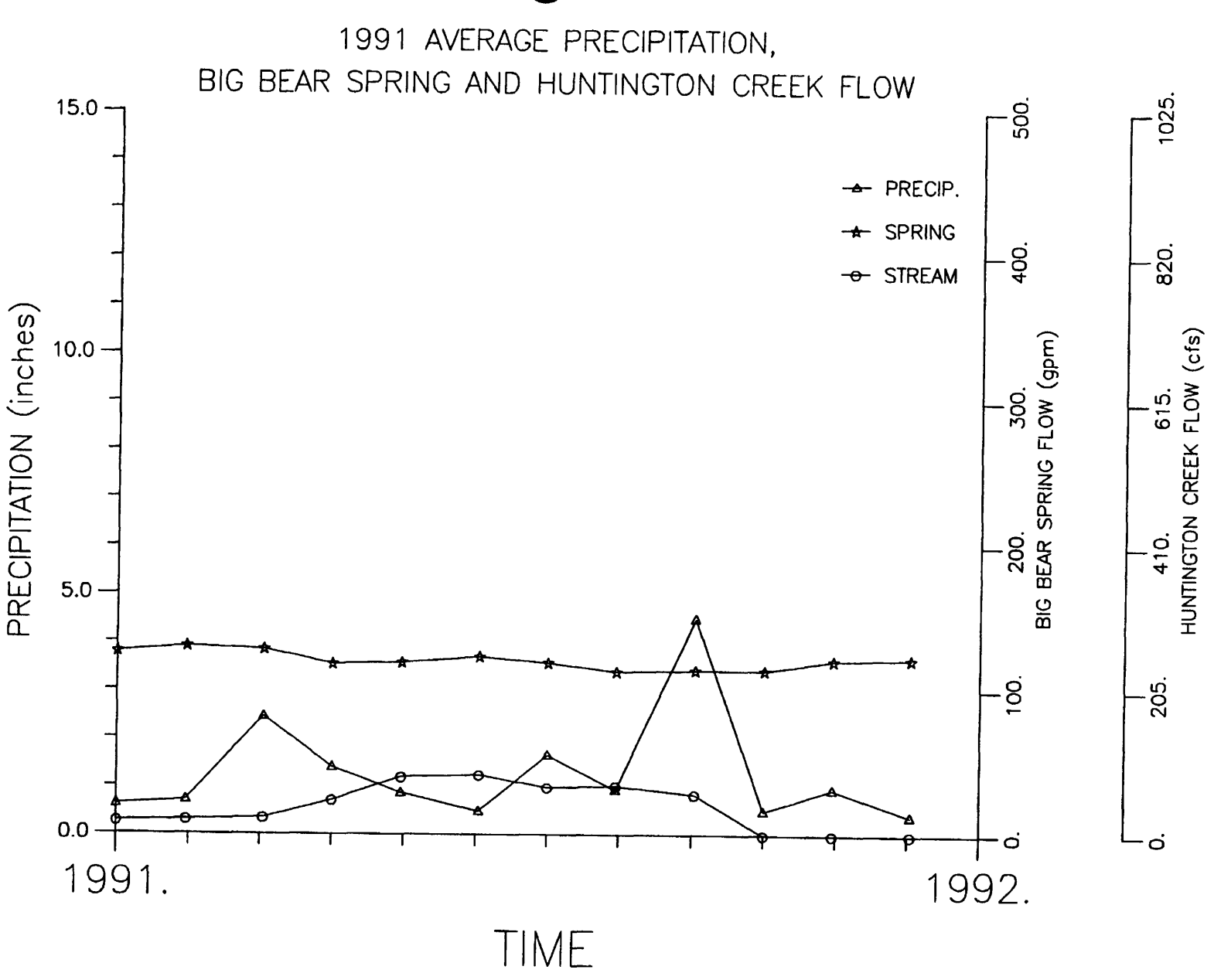

1986 AVERAGE PRECIPITATION,
BIG BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
500.
400.
300.
200.
100.
0.
BIG BEAR SPRING FLOW (gpm)
1025.
820.
615.
410.
205.
0.
HUNTINGTON CREEK FLOW (cfs)
1986.
1987.
TIME

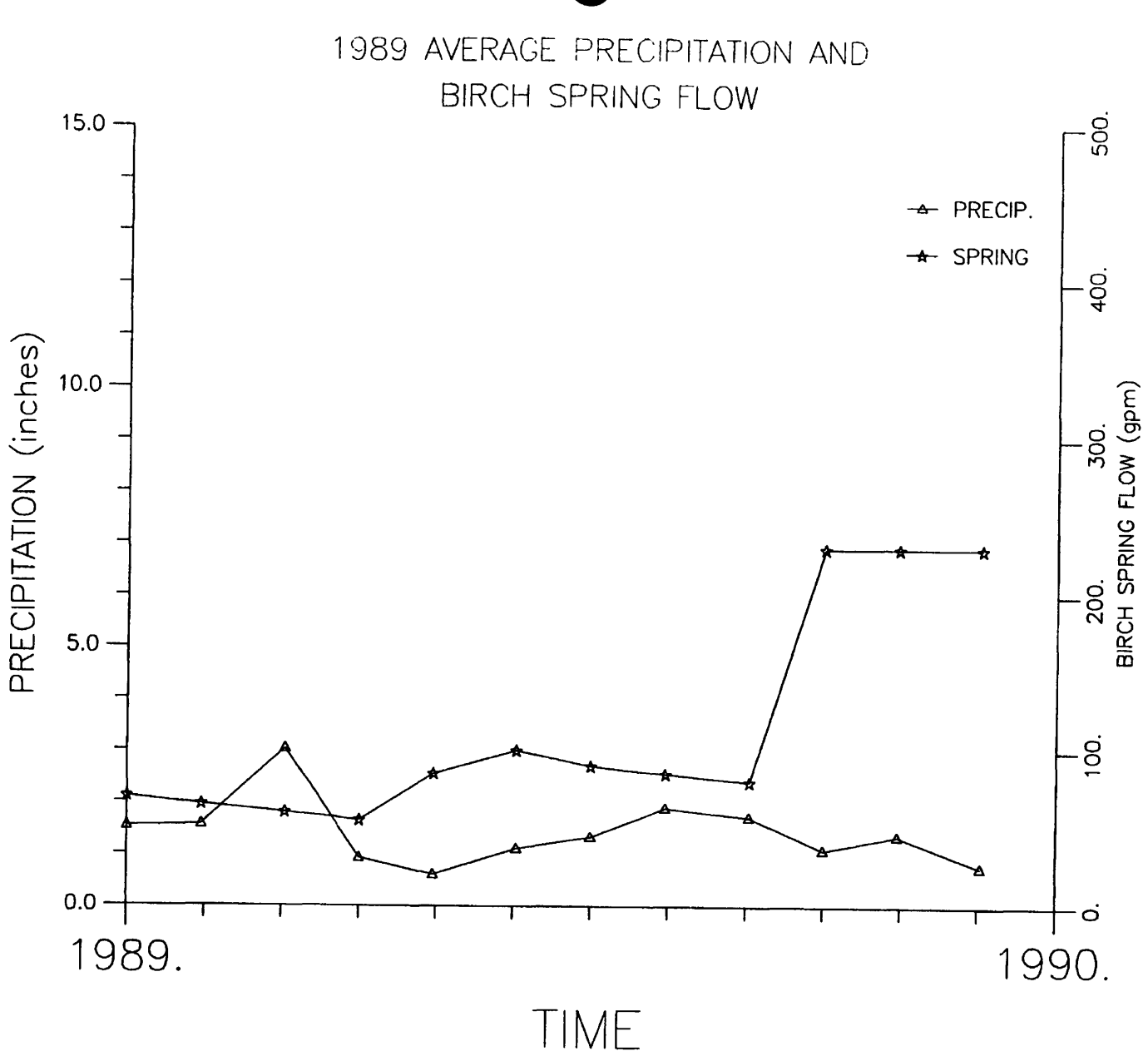

1987 AVERAGE PRECIPITATION,
BIG BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
BIG BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1987.
1988.
TIME

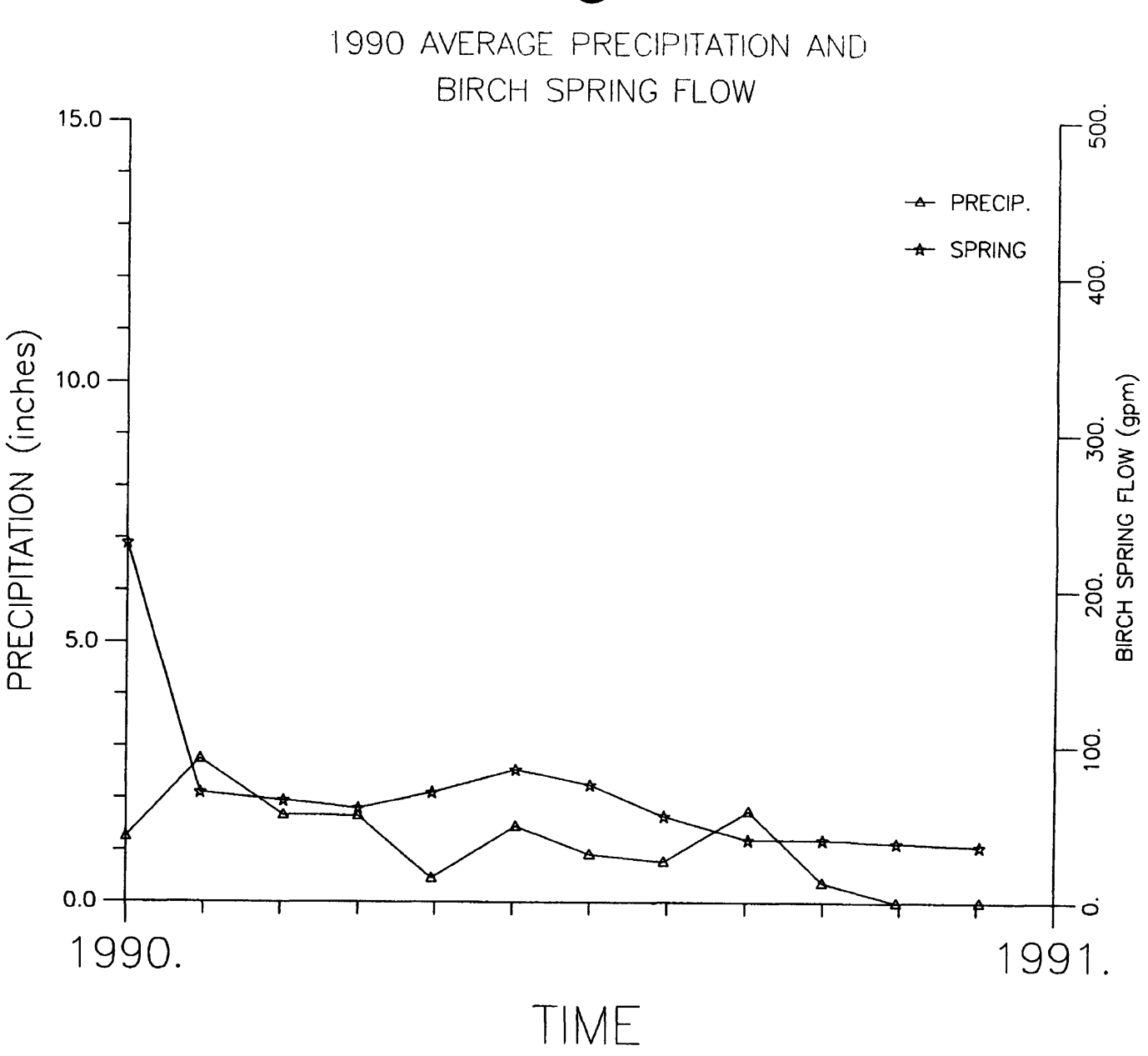

1988 AVERAGE PRECIPITATION,
BIG BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
500.
400.
300.
200.
100.
0.
BIG BEAR SPRING FLOW (gpm)
1025.
820.
615.
410.
205.
0.
HUNTINGTON CREEK FLOW (cfs)
1988.
1989.
TIME

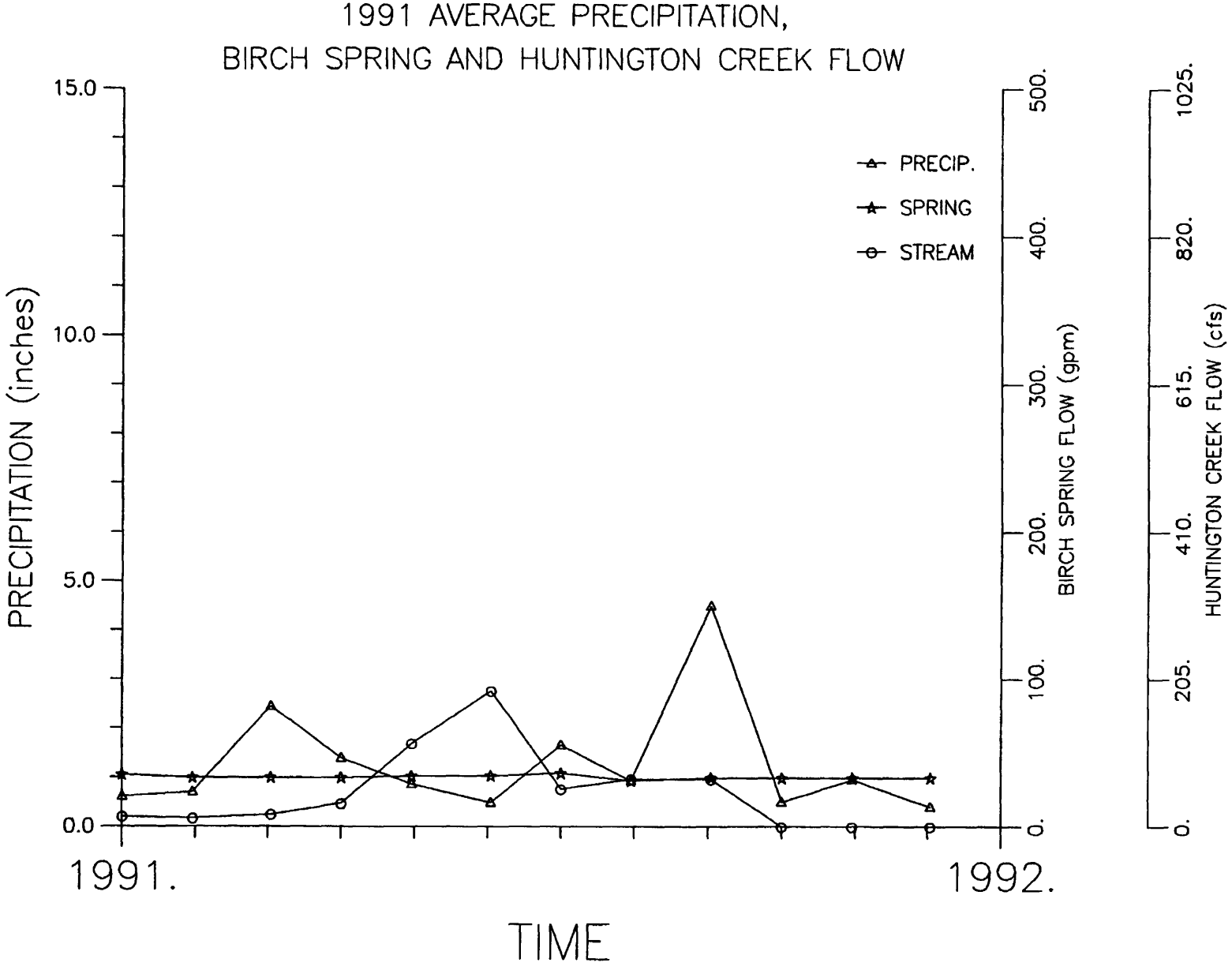

1989 AVERAGE PRECIPITATION AND
BIG BEAR SPRING FLOW
PRECIP.
SPRING
PRECIPITATION (inches)
BIG BEAR SPRING FLOW (gpm)
15.0
10.0
5.0
0.0
500.
400.
300.
200.
100.
0.
1989.
1990.
TIME


1990 AVERAGE PRECIPITATION AND
BIG BEAR SPRING FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
500.
400.
300.
200.
100.
0.
BIG BEAR SPRING FLOW (gpm)
1990.
1991.
TIME


1991 AVERAGE PRECIPITATION,
BIG BEAR SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
BIG BEAR SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1991.
1992.
TIME


1989 AVERAGE PRECIPITATION AND
BIRCH SPRING FLOW
PRECIP.
SPRING
PRECIPITATION (inches)
BIRCH SPRING FLOW (gpm)
15.0
10.0
5.0
0.0
500.
400.
300.
200.
100.
0.
1989.
1990.
TIME


1990 AVERAGE PRECIPITATION AND
BIRCH SPRING FLOW
PRECIP.
SPRING
PRECIPITATION (inches)
BIRCH SPRING FLOW (gpm)
15.0
10.0
5.0
0.0
500.
400.
300.
200.
100.
0.
1990.
1991.
TIME


1991 AVERAGE PRECIPITATION,
BIRCH SPRING AND HUNTINGTON CREEK FLOW
PRECIPITATION (inches)
15.0
10.0
5.0
0.0
PRECIP.
SPRING
STREAM
BIRCH SPRING FLOW (gpm)
500.
400.
300.
200.
100.
0.
HUNTINGTON CREEK FLOW (cfs)
1025.
820.
615.
410.
205.
0.
1991.
1992.
TIME

APPENDIX 7-N-F

Slug Test Plots and Time-Drawdown Data

A Q T E S O L V R E S U L T S
Version 1.10

05/12/92 00:21:42

TEST DESCRIPTION

Data set..... DH1SLUG1.AQT
Data set title..... DH-1A SPRING CANYON SLUG INJECT. TEST #1
Company..... EarthFax Engineering
Project..... UC-192-06
Client..... CO-OP Mine
Location..... Huntington Canyon
Test date..... 9-25-91
Test well..... DH-1A

Knowns and Constants:

No. of data points	1389
Radius of well casing	0.1
Radius of well	0.1
Aquifer saturated thickness	70
Well screen length	20
Static height of water in well	70
Log(Re/Rw)	4.94
A, B, C	0.000, 0.000, 6.905

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	1.0142E-004	+/-	7.9107E-006
y0 =	5.8607E-001	+/-	5.9286E-003

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:

Number of residuals	174
Number of estimated parameters	2
Degrees of freedom	172
Residual mean	2.459E-005
Residual standard deviation	0.0367

Residual variance..... 0.001347

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.016667	1.0033	0.58527	0.41803	1
0.033333	0.76386	0.58446	0.1794	1
0.05	0.62418	0.58367	0.040515	1
0.066667	0.57429	0.58287	-0.0085768	1
0.083333	0.49447	0.58207	-0.0876	1
0.1	0.53438	0.58127	-0.046893	1
0.11667	0.57429	0.58048	-0.0061882	1
0.13333	0.59425	0.57968	0.014566	1
0.15	0.57879	0.57889	-0.0001014	1
0.16667	0.57429	0.5781	-0.0038094	1
0.18333	0.57429	0.57731	-0.003019	1
0.2	0.57429	0.57652	-0.0022292	1
0.21667	0.57429	0.57573	-0.0014404	1
0.23333	0.57429	0.57494	-0.00065321	1
0.25	0.56431	0.57416	-0.0098466	1
0.26667	0.56431	0.57337	-0.0090611	1
0.28333	0.56431	0.57259	-0.0082771	1
0.3	0.56431	0.5718	-0.0074938	1
0.31667	0.56431	0.57102	-0.0067115	1
0.33333	0.56431	0.57024	-0.0059307	1
0.35	0.56431	0.56946	-0.0051506	1
0.36667	0.56431	0.56868	-0.0043715	1
0.38333	0.56431	0.5679	-0.0035939	1
0.4	0.55434	0.56713	-0.012787	1
0.41667	0.55434	0.56635	-0.012011	1
0.43333	0.55434	0.56558	-0.011237	1
0.45	0.55434	0.5648	-0.010463	1
0.46667	0.55434	0.56403	-0.0096902	1
0.48333	0.55434	0.56326	-0.008919	1
0.5	0.55434	0.56249	-0.0081484	1
0.51667	0.55884	0.56172	-0.0028789	1
0.53333	0.55434	0.56095	-0.0066108	1
0.55	0.55434	0.56018	-0.0058434	1
0.56667	0.55434	0.55942	-0.005077	1
0.58333	0.54436	0.55865	-0.014292	1
0.6	0.54436	0.55789	-0.013528	1
0.61667	0.54436	0.55712	-0.012765	1
0.63333	0.54436	0.55636	-0.012003	1
0.65	0.54886	0.5556	-0.0067416	1
0.66667	0.54436	0.55484	-0.010481	1
0.68333	0.54436	0.55408	-0.0097229	1
0.7	0.54436	0.55332	-0.0089648	1
0.71667	0.54436	0.55257	-0.0082078	1
0.73333	0.53438	0.55181	-0.017432	1
0.75	0.54436	0.55106	-0.0066973	1
0.76667	0.54436	0.5503	-0.0059434	1
0.78333	0.53438	0.54955	-0.015171	1
0.8	0.53438	0.5488	-0.014419	1
0.81667	0.53438	0.54805	-0.013668	1
0.83333	0.53438	0.5473	-0.012919	1
0.85	0.53438	0.54655	-0.01217	1

0.86667	0.53438	0.5458	-0.011422	1
0.88333	0.53438	0.54506	-0.010676	1
0.9	0.53438	0.54431	-0.0099305	1
0.91667	0.53438	0.54357	-0.0091858	1
0.93333	0.53438	0.54282	-0.0084426	1
0.95	0.53888	0.54208	-0.0031999	1
0.96667	0.53438	0.54134	-0.0069583	1
0.98333	0.5244	0.5406	-0.016198	1
1	0.5244	0.53986	-0.015459	1
1.0167	0.5244	0.53912	-0.014719	1
1.0333	0.5244	0.53838	-0.013984	1
1.05	0.5289	0.53765	-0.0087462	1
1.0667	0.5244	0.53691	-0.012509	1
1.0833	0.5244	0.53618	-0.011778	1
1.1	0.5244	0.53544	-0.011043	1
1.1167	0.5244	0.53471	-0.010309	1
1.1333	0.5244	0.53398	-0.0095807	1
1.15	0.5244	0.53325	-0.0088488	1
1.1667	0.5244	0.53252	-0.008118	1
1.1833	0.5244	0.53179	-0.0073925	1
1.2	0.5289	0.53106	-0.0021636	1
1.2167	0.5244	0.53034	-0.0059357	1
1.2333	0.51443	0.52961	-0.015183	1
1.25	0.51443	0.52889	-0.014457	1
1.2667	0.51443	0.52816	-0.013732	1
1.2833	0.51443	0.52744	-0.013013	1
1.3	0.51443	0.52672	-0.01229	1
1.3167	0.51443	0.526	-0.011568	1
1.3333	0.51443	0.52528	-0.010851	1
1.35	0.51443	0.52456	-0.010132	1
1.3667	0.51443	0.52384	-0.0094126	1
1.3833	0.51443	0.52313	-0.0086989	1
1.4	0.51443	0.52241	-0.0079819	1
1.4167	0.51443	0.5217	-0.0072659	1
1.4333	0.51443	0.52099	-0.0065552	1
1.45	0.51443	0.52027	-0.0058411	1
1.4667	0.51443	0.51956	-0.0051281	1
1.4833	0.51443	0.51885	-0.0044202	1
1.5	0.51443	0.51814	-0.0037091	1
1.5167	0.51443	0.51743	-0.002999	1
1.5333	0.51443	0.51672	-0.002294	1
1.55	0.50445	0.51602	-0.011566	1
1.5667	0.50445	0.51531	-0.010859	1
1.5833	0.50445	0.51461	-0.010157	1
1.6	0.50445	0.5139	-0.0094512	1
1.6167	0.50445	0.5132	-0.0087469	1
1.6333	0.50445	0.5125	-0.0080477	1
1.65	0.50445	0.5118	-0.0073453	1
1.6667	0.50445	0.51109	-0.0066438	1
1.6833	0.50445	0.5104	-0.0059475	1
1.7	0.50445	0.5097	-0.005248	1
1.7167	0.50445	0.509	-0.0045494	1
1.7333	0.50445	0.50831	-0.003856	1
1.75	0.50445	0.50761	-0.0031593	1
1.7667	0.50445	0.50691	-0.0024636	1
1.7833	0.50445	0.50622	-0.001773	1
1.8	0.50445	0.50553	-0.0010792	1
1.8167	0.50445	0.50484	-0.0003863	1

1.8333	0.50445	0.50415	0.00030148	1
1.85	0.50445	0.50346	0.00099245	1
1.8667	0.50445	0.50277	0.0016825	1
1.8833	0.50445	0.50208	0.0023674	1
1.9	0.49447	0.50139	-0.0069244	1
1.9167	0.49447	0.50071	-0.0062372	1
1.9333	0.49447	0.50003	-0.0055551	1
1.95	0.49447	0.49934	-0.0048697	1
1.9667	0.49447	0.49866	-0.0041854	1
1.9833	0.49447	0.49798	-0.003506	1
2	0.49447	0.49729	-0.0028235	1
2.0167	0.49447	0.49661	-0.0021419	1
2.0333	0.49447	0.49594	-0.0014653	1
2.05	0.49447	0.49526	-0.00078562	1
2.0667	0.49447	0.49458	-0.00010684	1
2.0833	0.49447	0.4939	0.00056696	1
2.1	0.49447	0.49323	0.0012439	1
2.1167	0.49447	0.49255	0.0019199	1
2.1333	0.49447	0.49188	0.0025909	1
2.15	0.49447	0.4912	0.0032651	1
2.1667	0.49447	0.49053	0.0039383	1
2.1833	0.49447	0.48986	0.0046066	1
2.2	0.49447	0.48919	0.005278	1
2.2167	0.49447	0.48852	0.0059485	1
2.2333	0.49447	0.48786	0.006614	1
2.25	0.48449	0.48719	-0.0026973	1
2.2667	0.49447	0.48652	0.0079504	1
2.2833	0.49447	0.48586	0.0086132	1
2.3	0.48449	0.48519	-0.00070086	1
2.3167	0.48449	0.48453	-3.5871E-005	1
2.3333	0.49447	0.48387	0.010604	1
2.35	0.48449	0.4832	0.0012874	1
2.3667	0.48449	0.48254	0.0019497	1
2.3833	0.48449	0.48188	0.0026071	1
2.4	0.48449	0.48122	0.0032675	1
2.4167	0.48449	0.48056	0.0039271	1
2.4333	0.48449	0.47991	0.0045818	1
2.45	0.48449	0.47925	0.0052395	1
2.4667	0.48449	0.47859	0.0058964	1
2.4833	0.48449	0.47794	0.0065484	1
2.5	0.48449	0.47729	0.0072035	1
2.5167	0.48449	0.47663	0.0078576	1
2.5333	0.48449	0.47598	0.008507	1
2.55	0.48449	0.47533	0.0091594	1
2.5667	0.48449	0.47468	0.0098108	1
2.5833	0.48449	0.47403	0.010458	1
2.6	0.48449	0.47338	0.011107	1
2.6167	0.48449	0.47273	0.011756	1
2.6333	0.48449	0.47209	0.0124	1
2.65	0.48449	0.47144	0.013047	1
2.6667	0.48449	0.4708	0.013693	1
2.6833	0.48449	0.47016	0.014335	1
2.7	0.48449	0.46951	0.014979	1
2.7167	0.48449	0.46887	0.015623	1
2.7333	0.479	0.46823	0.010771	1
2.75	0.48449	0.46759	0.016903	1
2.7667	0.47452	0.46695	0.0075739	1
2.7833	0.47452	0.46631	0.0082101	1

2.8	0.47452	0.46567	0.0088492	1
2.8167	0.479	0.46503	0.013967	1
2.8333	0.47452	0.4644	0.010121	1
2.85	0.47452	0.46376	0.010757	1
2.8667	0.47452	0.46313	0.011393	1
2.8833	0.47452	0.4625	0.012024	1
2.9	0.47452	0.46186	0.012658	1

==

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	1.0142E-004
y0 =	5.8607E-001

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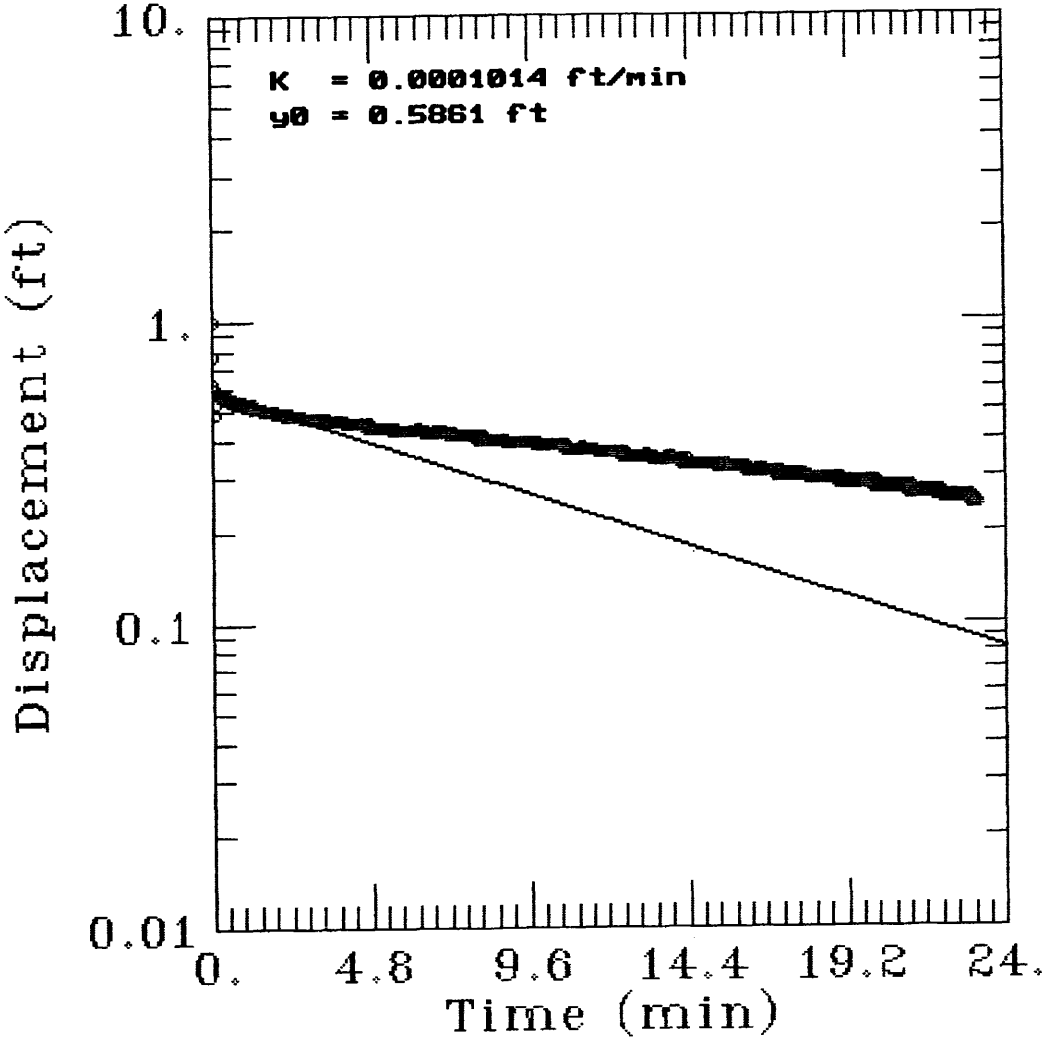
DH-1A SPRING CANYON SLUG INJECT. TEST #1



A Q T E S O L V R E S U L T S
Version 1.10

05/12/92 01:09:28

TEST DESCRIPTION

Data set..... STDH1AS3.AQT
Data set title..... DH-1A STORRS SLUG INJECTION TEST #3
Company..... EarthFax Engineering
Project..... UC-192-06
Client..... CO-OP Mine
Location..... Huntington Canyon
Test date..... 9-25-91
Test well..... DH-1A

Knowns and Constants:
- No. of data points..... 1406
- Radius of well casing..... 0.1
- Radius of well..... 0.1
- Aquifer saturated thickness..... 97
- Well screen length..... 95
- Static height of water in well..... 97
- Log(Re/Rw)..... 5.784
- A, B, C..... 0.000, 0.000, 12.295

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate	Std. Error
K =	2.1560E-005 +/-	3.2967E-007
y0 =	4.2164E-001 +/-	3.7066E-003

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
- Number of residuals..... 1406
- Number of estimated parameters.... 2
- Degrees of freedom..... 1404
- Residual mean..... -0.0002625
- Residual standard deviation..... 0.04893
- Residual variance..... 0.002394

Model Residuals:

Time	Observed	Calculated	Residual	Weight
2.7319E-009	1.6201	0.42164	1.1985	1
0.016667	1.2207	0.42115	0.79955	1
0.033333	1.1209	0.42065	0.70025	1
0.05	0.64886	0.42015	0.22871	1
0.066667	0.17236	0.41966	-0.2473	1
0.083333	0.29947	0.41916	-0.11969	1
0.1	0.42198	0.41867	0.0033118	1
0.11667	0.47189	0.41817	0.053716	1
0.13333	0.42198	0.41768	0.004299	1
0.15	0.39931	0.41719	-0.017878	1
0.16667	0.37206	0.4167	-0.044636	1
0.18333	0.44922	0.4162	0.033015	1
0.2	0.42198	0.41571	0.0062665	1
0.21667	0.44922	0.41522	0.033997	1
0.23333	0.37206	0.41473	-0.042673	1
0.25	0.39931	0.41424	-0.014934	1
0.26667	0.37206	0.41376	-0.041695	1
0.28333	0.39931	0.41327	-0.013957	1
0.3	0.37206	0.41278	-0.04072	1
0.31667	0.39931	0.41229	-0.012983	1
0.33333	0.37206	0.41181	-0.039746	1
0.35	0.39931	0.41132	-0.012011	1
0.36667	0.37206	0.41084	-0.038775	1
0.38333	0.39931	0.41035	-0.011041	1
0.4	0.39931	0.40987	-0.010557	1
0.41667	0.39931	0.40938	-0.010073	1
0.43333	0.37206	0.4089	-0.03684	1
0.45	0.39931	0.40842	-0.0091078	1
0.46667	0.39931	0.40794	-0.008626	1
0.48333	0.37206	0.40745	-0.035395	1
0.5	0.39931	0.40697	-0.0076641	1
0.51667	0.39931	0.40649	-0.007184	1
0.53333	0.37206	0.40601	-0.033954	1
0.55	0.37206	0.40554	-0.033475	1
0.56667	0.37206	0.40506	-0.032997	1
0.58333	0.39931	0.40458	-0.0052693	1
0.6	0.37206	0.4041	-0.032042	1
0.61667	0.37206	0.40363	-0.031565	1
0.63333	0.37206	0.40315	-0.031089	1
0.65	0.39931	0.40267	-0.0033635	1
0.66667	0.39931	0.4022	-0.0028885	1
0.68333	0.39931	0.40172	-0.002414	1
0.7	0.39931	0.40125	-0.0019401	1
0.71667	0.37206	0.40078	-0.028717	1
0.73333	0.37206	0.4003	-0.028244	1
0.75	0.39931	0.39983	-0.00052175	1
0.76667	0.39931	0.39936	-5.0068E-005	1
0.78333	0.39931	0.39889	0.00042103	1
0.8	0.37206	0.39842	-0.026358	1
0.81667	0.39931	0.39795	0.0013616	1
0.83333	0.39931	0.39748	0.0018311	1
0.85	0.37206	0.39701	-0.02495	1

0.86667	0.37206	0.39654	-0.024482	1
0.88333	0.39931	0.39607	0.0032361	1
0.9	0.39931	0.39561	0.0037033	1
0.91667	0.39931	0.39514	0.00417	1
0.93333	0.39931	0.39467	0.0046362	1
0.95	0.39931	0.39421	0.0051018	1
0.96667	0.39931	0.39374	0.0055668	1
0.98333	0.39931	0.39328	0.0060313	1
1	0.37206	0.39281	-0.020755	1
1.0167	0.39931	0.39235	0.0069587	1
1.0333	0.37206	0.39189	-0.019829	1
1.05	0.39931	0.39143	0.0078838	1
1.0667	0.39931	0.39096	0.0083456	1
1.0833	0.39931	0.3905	0.0088067	1
1.1	0.39931	0.39004	0.0092674	1
1.1167	0.39931	0.38958	0.0097276	1
1.1333	0.39931	0.38912	0.010187	1
1.15	0.37206	0.38866	-0.016604	1
1.1667	0.32213	0.38821	-0.066075	1
1.1833	0.32213	0.38775	-0.065617	1
1.2	0.32213	0.38729	-0.06516	1
1.2167	0.34938	0.38683	-0.037453	1
1.2333	0.39931	0.38638	0.012933	1
1.25	0.37206	0.38592	-0.013861	1
1.2667	0.37206	0.38547	-0.013406	1
1.2833	0.34938	0.38501	-0.035631	1
1.3	0.37206	0.38456	-0.012497	1
1.3167	0.39931	0.3841	0.015207	1
1.3333	0.32213	0.38365	-0.06152	1
1.35	0.34938	0.3832	-0.033817	1
1.3667	0.34938	0.38275	-0.033365	1
1.3833	0.34938	0.38229	-0.032914	1
1.4	0.39931	0.38184	0.017467	1
1.4167	0.34938	0.38139	-0.032012	1
1.4333	0.37206	0.38094	-0.0088825	1
1.45	0.34938	0.38049	-0.031113	1
1.4667	0.39931	0.38004	0.019266	1
1.4833	0.34938	0.3796	-0.030216	1
1.5	0.34938	0.37915	-0.029768	1
1.5167	0.34938	0.3787	-0.029321	1
1.5333	0.34938	0.37825	-0.028874	1
1.55	0.34938	0.37781	-0.028428	1
1.5667	0.34938	0.37736	-0.027982	1
1.5833	0.34938	0.37692	-0.027537	1
1.6	0.34938	0.37647	-0.027092	1
1.6167	0.34938	0.37603	-0.026648	1
1.6333	0.34938	0.37558	-0.026205	1
1.65	0.34938	0.37514	-0.025762	1
1.6667	0.34938	0.3747	-0.025319	1
1.6833	0.34938	0.37426	-0.024877	1
1.7	0.34938	0.37382	-0.024435	1
1.7167	0.32213	0.37337	-0.051244	1
1.7333	0.34938	0.37293	-0.023554	1
1.75	0.32213	0.37249	-0.050364	1
1.7667	0.32213	0.37205	-0.049925	1
1.7833	0.32213	0.37162	-0.049486	1
1.8	0.34938	0.37118	-0.021797	1
1.8167	0.32213	0.37074	-0.048609	1

1.8333	0.34938	0.3703	-0.020922	1
1.85	0.32213	0.36987	-0.047735	1
1.8667	0.34938	0.36943	-0.020049	1
1.8833	0.32213	0.36899	-0.046863	1
1.9	0.34938	0.36856	-0.019178	1
1.9167	0.32213	0.36812	-0.045993	1
1.9333	0.34938	0.36769	-0.018309	1
1.95	0.32213	0.36726	-0.045125	1
1.9667	0.34938	0.36682	-0.017442	1
1.9833	0.32213	0.36639	-0.044259	1
2	0.34938	0.36596	-0.016577	1
2.0167	0.32213	0.36553	-0.043395	1
2.0333	0.34938	0.36509	-0.015714	1
2.05	0.34938	0.36466	-0.015283	1
2.0667	0.34938	0.36423	-0.014853	1
2.0833	0.34938	0.3638	-0.014423	1
2.1	0.32213	0.36337	-0.041244	1
2.1167	0.34938	0.36295	-0.013565	1
2.1333	0.34938	0.36252	-0.013137	1
2.15	0.32213	0.36209	-0.03996	1
2.1667	0.34938	0.36166	-0.012282	1
2.1833	0.32213	0.36124	-0.039106	1
2.2	0.34938	0.36081	-0.01143	1
2.2167	0.32213	0.36038	-0.038254	1
2.2333	0.32213	0.35996	-0.037829	1
2.25	0.34938	0.35953	-0.010154	1
2.2667	0.34938	0.35911	-0.0097301	1
2.2833	0.32213	0.35869	-0.036557	1
2.3	0.34938	0.35826	-0.0088835	1
2.3167	0.32213	0.35784	-0.035711	1
2.3333	0.32213	0.35742	-0.035289	1
2.35	0.34938	0.357	-0.007617	1
2.3667	0.32213	0.35658	-0.034446	1
2.3833	0.34938	0.35616	-0.0067753	1
2.4	0.34938	0.35574	-0.0063551	1
2.4167	0.34938	0.35532	-0.0059354	1
2.4333	0.34938	0.3549	-0.0055164	1
2.45	0.34938	0.35448	-0.0050976	1
2.4667	0.32213	0.35406	-0.031929	1
2.4833	0.34938	0.35364	-0.0042619	1
2.5	0.34938	0.35322	-0.0038446	1
2.5167	0.32213	0.35281	-0.030678	1
2.5333	0.32213	0.35239	-0.030262	1
2.55	0.34938	0.35198	-0.002596	1
2.5667	0.32213	0.35156	-0.029431	1
2.5833	0.34938	0.35115	-0.0017661	1
2.6	0.34938	0.35073	-0.0013518	1
2.6167	0.34938	0.35032	-0.00093796	1
2.6333	0.32213	0.3499	-0.027775	1
2.65	0.32213	0.34949	-0.027362	1
2.6667	0.34938	0.34908	0.00030037	1
2.6833	0.32213	0.34867	-0.026538	1
2.7	0.32213	0.34826	-0.026127	1
2.7167	0.34938	0.34785	0.0015343	1
2.7333	0.34938	0.34744	0.0019445	1
2.75	0.32213	0.34703	-0.024896	1
2.7667	0.32213	0.34662	-0.024486	1
2.7833	0.34938	0.34621	0.0031726	1

2.8	0.34938	0.3458	0.0035811	1
2.8167	0.32213	0.34539	-0.023261	1
2.8333	0.34938	0.34498	0.0043964	1
2.85	0.34938	0.34458	0.0048035	1
2.8667	0.32213	0.34417	-0.02204	1
2.8833	0.34938	0.34376	0.0056159	1
2.9	0.32213	0.34336	-0.021228	1
2.9167	0.34938	0.34295	0.0064267	1
2.9333	0.34938	0.34255	0.0068311	1
2.95	0.34938	0.34214	0.0072353	1
2.9667	0.34938	0.34174	0.007639	1
2.9833	0.34938	0.34134	0.008042	1
3	0.34938	0.34094	0.0084447	1
3.0167	0.32213	0.34053	-0.018403	1
3.0333	0.34938	0.34013	0.0092485	1
3.05	0.34938	0.33973	0.0096499	1
3.0667	0.34938	0.33933	0.010051	1
3.0833	0.32213	0.33893	-0.016799	1
3.1	0.34938	0.33853	0.010851	1
3.1167	0.34938	0.33813	0.01125	1
3.1333	0.34938	0.33773	0.011649	1
3.15	0.32213	0.33733	-0.015203	1
3.1667	0.32213	0.33693	-0.014805	1
3.1833	0.34938	0.33654	0.012843	1
3.2	0.34938	0.33614	0.01324	1
3.2167	0.32213	0.33574	-0.013614	1
3.2333	0.34938	0.33535	0.014032	1
3.25	0.34938	0.33495	0.014428	1
3.2667	0.34938	0.33456	0.014823	1
3.2833	0.32213	0.33416	-0.012032	1
3.3	0.34938	0.33377	0.015612	1
3.3167	0.34938	0.33337	0.016006	1
3.3333	0.34938	0.33298	0.016399	1
3.35	0.32213	0.33259	-0.010458	1
3.3667	0.34938	0.3322	0.017184	1
3.3833	0.34938	0.3318	0.017576	1
3.4	0.34938	0.33141	0.017968	1
3.4167	0.32213	0.33102	-0.0088914	1
3.4333	0.29947	0.33063	-0.031161	1
3.45	0.34938	0.33024	0.019139	1
3.4667	0.32213	0.32985	-0.0077213	1
3.4833	0.32213	0.32946	-0.0073323	1
3.5	0.29947	0.32907	-0.029604	1
3.5167	0.34938	0.32869	0.020695	1
3.5333	0.32213	0.3283	-0.0061677	1
3.55	0.32213	0.32791	-0.0057803	1
3.5667	0.29947	0.32752	-0.028053	1
3.5833	0.34938	0.32714	0.022243	1
3.6	0.32213	0.32675	-0.0046212	1
3.6167	0.32213	0.32637	-0.0042357	1
3.6333	0.27222	0.32598	-0.053761	1
3.65	0.34938	0.3256	0.023784	1
3.6667	0.34938	0.32521	0.024168	1
3.6833	0.32213	0.32483	-0.0026985	1
3.7	0.29947	0.32445	-0.024975	1
3.7167	0.29947	0.32406	-0.024592	1
3.7333	0.32213	0.32368	-0.0015503	1
3.75	0.27222	0.3233	-0.051078	1

3.7667	0.29947	0.32292	-0.023447	1
3.7833	0.29947	0.32254	-0.023066	1
3.8	0.29947	0.32216	-0.022686	1
3.8167	0.27222	0.32178	-0.049555	1
3.8333	0.29947	0.3214	-0.021926	1
3.85	0.29947	0.32102	-0.021547	1
3.8667	0.29947	0.32064	-0.021168	1
3.8833	0.27222	0.32026	-0.04804	1
3.9	0.27222	0.31988	-0.047662	1
3.9167	0.29947	0.3195	-0.020035	1
3.9333	0.29947	0.31913	-0.019658	1
3.95	0.27222	0.31875	-0.046531	1
3.9667	0.29947	0.31838	-0.018905	1
3.9833	0.29947	0.318	-0.01853	1
4	0.29947	0.31762	-0.018155	1
4.0167	0.27222	0.31725	-0.04503	1
4.0333	0.29947	0.31688	-0.017406	1
4.05	0.29947	0.3165	-0.017032	1
4.0667	0.29947	0.31613	-0.016658	1
4.0833	0.27222	0.31576	-0.043536	1
4.1	0.29947	0.31538	-0.015913	1
4.1167	0.29947	0.31501	-0.015541	1
4.1333	0.29947	0.31464	-0.015169	1
4.15	0.27222	0.31427	-0.042048	1
4.1667	0.29947	0.3139	-0.014427	1
4.1833	0.29947	0.31353	-0.014057	1
4.2	0.29947	0.31316	-0.013687	1
4.2167	0.27222	0.31279	-0.040568	1
4.2333	0.29947	0.31242	-0.012949	1
4.25	0.29947	0.31205	-0.01258	1
4.2667	0.29947	0.31168	-0.012212	1
4.2833	0.27222	0.31131	-0.039095	1
4.3	0.29947	0.31095	-0.011477	1
4.3167	0.29947	0.31058	-0.01111	1
4.3333	0.27222	0.31021	-0.037994	1
4.35	0.27222	0.30985	-0.037628	1
4.3667	0.27222	0.30948	-0.037262	1
4.3833	0.29947	0.30912	-0.0096475	1
4.4	0.27222	0.30875	-0.036533	1
4.4167	0.27222	0.30839	-0.036168	1
4.4333	0.29947	0.30802	-0.0085548	1
4.45	0.29947	0.30766	-0.0081914	1
4.4667	0.29947	0.3073	-0.0078284	1
4.4833	0.27222	0.30694	-0.034716	1
4.5	0.27222	0.30657	-0.034354	1
4.5167	0.29947	0.30621	-0.0067421	1
4.5333	0.27222	0.30585	-0.033631	1
4.55	0.29947	0.30549	-0.0060201	1
4.5667	0.29947	0.30513	-0.0056597	1
4.5833	0.29947	0.30477	-0.0052999	1
4.6	0.29947	0.30441	-0.0049403	1
4.6167	0.27222	0.30405	-0.031831	1
4.6333	0.27222	0.30369	-0.031473	1
4.65	0.29947	0.30333	-0.0038642	1
4.6667	0.27222	0.30298	-0.030756	1
4.6833	0.27222	0.30262	-0.030399	1
4.7	0.27222	0.30226	-0.030042	1
4.7167	0.29947	0.30191	-0.0024353	1

4.7333	0.29947	0.30155	-0.0020793	1
4.75	0.27222	0.30119	-0.028974	1
4.7667	0.27222	0.30084	-0.028618	1
4.7833	0.29947	0.30048	-0.0010134	1
4.8	0.29947	0.30013	-0.00065883	1
4.8167	0.27222	0.29977	-0.027555	1
4.8333	0.29947	0.29942	4.8794E-005	1
4.85	0.29947	0.29907	0.00040209	1
4.8667	0.27222	0.29872	-0.026495	1
4.8833	0.27222	0.29836	-0.026143	1
4.9	0.29947	0.29801	0.0014593	1
4.9167	0.29947	0.29766	0.0018109	1
4.9333	0.27222	0.29731	-0.025088	1
4.95	0.27222	0.29696	-0.024737	1
4.9667	0.29947	0.29661	0.0028631	1
4.9833	0.29947	0.29626	0.0032128	1
5	0.29947	0.29591	0.0035624	1
5.0167	0.27222	0.29556	-0.023338	1
5.0333	0.29947	0.29521	0.0042601	1
5.05	0.29947	0.29486	0.0046084	1
5.0667	0.29947	0.29451	0.0049563	1
5.0833	0.27222	0.29417	-0.021946	1
5.1	0.29947	0.29382	0.0056507	1
5.1167	0.29947	0.29347	0.0059974	1
5.1333	0.29947	0.29313	0.0063434	1
5.15	0.27222	0.29278	-0.020561	1
5.1667	0.29947	0.29244	0.0070348	1
5.1833	0.29947	0.29209	0.0073796	1
5.2	0.29947	0.29175	0.0077242	1
5.2167	0.27222	0.2914	-0.019182	1
5.2333	0.29947	0.29106	0.0084121	1
5.25	0.29947	0.29071	0.0087555	1
5.2667	0.29947	0.29037	0.0090985	1
5.2833	0.29947	0.29003	0.009441	1
5.3	0.29947	0.28969	0.0097832	1
5.3167	0.29947	0.28935	0.010125	1
5.3333	0.27222	0.289	-0.016784	1
5.35	0.27222	0.28866	-0.016443	1
5.3667	0.29947	0.28832	0.011148	1
5.3833	0.29947	0.28798	0.011488	1
5.4	0.27222	0.28764	-0.015422	1
5.4167	0.27222	0.2873	-0.015083	1
5.4333	0.29947	0.28696	0.012506	1
5.45	0.29947	0.28663	0.012844	1
5.4667	0.29947	0.28629	0.013183	1
5.4833	0.27222	0.28595	-0.01373	1
5.5	0.29947	0.28561	0.013858	1
5.5167	0.29947	0.28528	0.014195	1
5.5333	0.29947	0.28494	0.014531	1
5.55	0.27222	0.2846	-0.012383	1
5.5667	0.29947	0.28427	0.015203	1
5.5833	0.29947	0.28393	0.015538	1
5.6	0.27222	0.2836	-0.011377	1
5.6167	0.27222	0.28326	-0.011042	1
5.6333	0.27222	0.28293	-0.010708	1
5.65	0.29947	0.28259	0.016876	1
5.6667	0.27222	0.28226	-0.010041	1
5.6833	0.27222	0.28193	-0.0097081	1

5.7	0.29947	0.2816	0.017875	1
5.7167	0.29947	0.28126	0.018207	1
5.7333	0.29947	0.28093	0.018539	1
5.75	0.27222	0.2806	-0.00838	1
5.7667	0.29947	0.28027	0.019201	1
5.7833	0.29947	0.27994	0.019532	1
5.8	0.29947	0.27961	0.019862	1
5.8167	0.27222	0.27928	-0.0070582	1
5.8333	0.29947	0.27895	0.020521	1
5.85	0.29947	0.27862	0.02085	1
5.8667	0.29947	0.27829	0.021179	1
5.8833	0.29947	0.27796	0.021507	1
5.9	0.29947	0.27763	0.021835	1
5.9167	0.29947	0.27731	0.022163	1
5.9333	0.27222	0.27698	-0.0047603	1
5.95	0.27222	0.27665	-0.0044335	1
5.9667	0.27222	0.27633	-0.004107	1
5.9833	0.29947	0.276	0.023469	1
6	0.29947	0.27568	0.023794	1
6.0167	0.29947	0.27535	0.02412	1
6.0333	0.24956	0.27503	-0.025466	1
6.05	0.29947	0.2747	0.024769	1
6.0667	0.27222	0.27438	-0.0021569	1
6.0833	0.27222	0.27405	-0.0018334	1
6.1	0.27222	0.27373	-0.00151	1
6.1167	0.29947	0.27341	0.026063	1
6.1333	0.27222	0.27308	-0.00086463	1
6.15	0.27222	0.27276	-0.00054242	1
6.1667	0.29947	0.27244	0.027029	1
6.1833	0.29947	0.27212	0.027351	1
6.2	0.27222	0.2718	0.00042176	1
6.2167	0.27222	0.27148	0.00074246	1
6.2333	0.29947	0.27116	0.028313	1
6.25	0.29947	0.27084	0.028633	1
6.2667	0.27222	0.27052	0.0017021	1
6.2833	0.27222	0.2702	0.0020211	1
6.3	0.27222	0.26988	0.0023399	1
6.3167	0.29947	0.26956	0.029908	1
6.3333	0.27222	0.26924	0.0029762	1
6.35	0.27222	0.26893	0.0032939	1
6.3667	0.22229	0.26861	-0.046319	1
6.3833	0.29947	0.26829	0.031178	1
6.4	0.29947	0.26798	0.031495	1
6.4167	0.27222	0.26766	0.0045607	1
6.4333	0.24956	0.26734	-0.017784	1
6.45	0.29947	0.26703	0.032442	1
6.4667	0.29947	0.26671	0.032757	1
6.4833	0.27222	0.2664	0.0058214	1
6.5	0.29947	0.26608	0.033386	1
6.5167	0.24956	0.26577	-0.01621	1
6.5333	0.27222	0.26546	0.0067631	1
6.55	0.27222	0.26514	0.0070763	1
6.5667	0.24956	0.26483	-0.015271	1
6.5833	0.29947	0.26452	0.034951	1
6.6	0.27222	0.26421	0.0080135	1
6.6167	0.22229	0.26389	-0.041605	1
6.6333	0.22229	0.26358	-0.041294	1
6.65	0.29947	0.26327	0.036197	1

6.6667	0.27222	0.26296	0.0092581	1
6.6833	0.22229	0.26265	-0.040362	1
6.7	0.24956	0.26234	-0.012782	1
6.7167	0.24956	0.26203	-0.012472	1
6.7333	0.22229	0.26172	-0.039433	1
6.75	0.22229	0.26141	-0.039125	1
6.7667	0.22229	0.26111	-0.038816	1
6.7833	0.24956	0.2608	-0.011238	1
6.8	0.24956	0.26049	-0.01093	1
6.8167	0.22229	0.26018	-0.037893	1
6.8333	0.24956	0.25988	-0.010316	1
6.85	0.24956	0.25957	-0.01001	1
6.8667	0.27222	0.25926	0.012957	1
6.8833	0.22229	0.25896	-0.036668	1
6.9	0.24956	0.25865	-0.0090921	1
6.9167	0.24956	0.25835	-0.008787	1
6.9333	0.22229	0.25804	-0.035752	1
6.95	0.22229	0.25774	-0.035448	1
6.9667	0.24956	0.25743	-0.0078737	1
6.9833	0.24956	0.25713	-0.0075702	1
7	0.24956	0.25683	-0.0072668	1
7.0167	0.22229	0.25652	-0.034234	1
7.0333	0.22229	0.25622	-0.033931	1
7.05	0.24956	0.25592	-0.0063589	1
7.0667	0.22229	0.25562	-0.033327	1
7.0833	0.22229	0.25532	-0.033026	1
7.1	0.24956	0.25501	-0.0054543	1
7.1167	0.24956	0.25471	-0.0051534	1
7.1333	0.24956	0.25441	-0.004853	1
7.15	0.22229	0.25411	-0.031823	1
7.1667	0.24956	0.25381	-0.004253	1
7.1833	0.24956	0.25351	-0.0039537	1
7.2	0.24956	0.25321	-0.0036546	1
7.2167	0.22229	0.25292	-0.030626	1
7.2333	0.24956	0.25262	-0.0030576	1
7.25	0.24956	0.25232	-0.0027595	1
7.2667	0.24956	0.25202	-0.0024618	1
7.2833	0.22229	0.25172	-0.029435	1
7.3	0.24956	0.25143	-0.0018676	1
7.3167	0.24956	0.25113	-0.0015709	1
7.3333	0.24956	0.25083	-0.0012748	1
7.35	0.22229	0.25054	-0.028249	1
7.3667	0.24956	0.25024	-0.00068321	1
7.3833	0.24956	0.24995	-0.00038812	1
7.4	0.24956	0.24965	-9.3197E-005	1
7.4167	0.22229	0.24936	-0.027069	1
7.4333	0.24956	0.24906	0.00049542	1
7.45	0.24956	0.24877	0.0007893	1
7.4667	0.22229	0.24848	-0.026187	1
7.4833	0.22229	0.24818	-0.025894	1
7.5	0.22229	0.24789	-0.025601	1
7.5167	0.24956	0.2476	0.0019612	1
7.5333	0.24956	0.24731	0.0022531	1
7.55	0.22229	0.24702	-0.024725	1
7.5667	0.24956	0.24672	0.0028364	1
7.5833	0.24956	0.24643	0.0031273	1
7.6	0.24956	0.24614	0.0034181	1
7.6167	0.22229	0.24585	-0.023561	1

7.6333	0.24956	0.24556	0.0039984	1
7.65	0.24956	0.24527	0.0042882	1
7.6667	0.24956	0.24498	0.0045776	1
7.6833	0.22229	0.24469	-0.022404	1
7.7	0.24956	0.2444	0.0051552	1
7.7167	0.24956	0.24412	0.0054436	1
7.7333	0.24956	0.24383	0.0057314	1
7.75	0.22229	0.24354	-0.021251	1
7.7667	0.24956	0.24325	0.0063065	1
7.7833	0.24956	0.24297	0.0065933	1
7.8	0.24956	0.24268	0.00688	1
7.8167	0.22229	0.24239	-0.020104	1
7.8333	0.24956	0.24211	0.0074522	1
7.85	0.24956	0.24182	0.0077379	1
7.8667	0.22229	0.24154	-0.019247	1
7.8833	0.24956	0.24125	0.008308	1
7.9	0.24956	0.24097	0.0085927	1
7.9167	0.24956	0.24068	0.008877	1
7.9333	0.24956	0.2404	0.0091608	1
7.95	0.22229	0.24012	-0.017826	1
7.9667	0.24956	0.23983	0.0097278	1
7.9833	0.24956	0.23955	0.010011	1
8	0.24956	0.23927	0.010293	1
8.0167	0.22229	0.23898	-0.016694	1
8.0333	0.24956	0.2387	0.010857	1
8.05	0.24956	0.23842	0.011139	1
8.0667	0.24956	0.23814	0.01142	1
8.0833	0.22229	0.23786	-0.015569	1
8.1	0.24956	0.23758	0.011982	1
8.1167	0.24956	0.2373	0.012262	1
8.1333	0.22229	0.23702	-0.014728	1
8.15	0.22229	0.23674	-0.014448	1
8.1667	0.24956	0.23646	0.013101	1
8.1833	0.24956	0.23618	0.01338	1
8.2	0.22229	0.2359	-0.013612	1
8.2167	0.24956	0.23562	0.013937	1
8.2333	0.24956	0.23535	0.014215	1
8.25	0.24956	0.23507	0.014492	1
8.2667	0.22229	0.23479	-0.0125	1
8.2833	0.22229	0.23451	-0.012223	1
8.3	0.22229	0.23424	-0.011947	1
8.3167	0.24956	0.23396	0.0156	1
8.3333	0.22229	0.23368	-0.011394	1
8.35	0.22229	0.23341	-0.011119	1
8.3667	0.22229	0.23313	-0.010843	1
8.3833	0.24956	0.23286	0.016702	1
8.4	0.22229	0.23258	-0.010294	1
8.4167	0.22229	0.23231	-0.010019	1
8.4333	0.22229	0.23204	-0.0097453	1
8.45	0.24956	0.23176	0.017798	1
8.4667	0.24956	0.23149	0.018072	1
8.4833	0.22229	0.23122	-0.0089251	1
8.5	0.24956	0.23094	0.018618	1
8.5167	0.24956	0.23067	0.01889	1
8.5333	0.22229	0.2304	-0.0081078	1
8.55	0.22229	0.23013	-0.0078359	1
8.5667	0.22229	0.22985	-0.0075644	1
8.5833	0.22229	0.22958	-0.0072933	1

8.6	0.24956	0.22931	0.020248	1
8.6167	0.22229	0.22904	-0.0067519	1
8.6333	0.22229	0.22877	-0.0064818	1
8.65	0.24956	0.2285	0.021058	1
8.6667	0.24956	0.22823	0.021328	1
8.6833	0.24956	0.22796	0.021597	1
8.7	0.24956	0.22769	0.021866	1
8.7167	0.24956	0.22743	0.022135	1
8.7333	0.24956	0.22716	0.022403	1
8.75	0.22229	0.22689	-0.0045993	1
8.7667	0.24956	0.22662	0.022938	1
8.7833	0.24956	0.22635	0.023206	1
8.8	0.22229	0.22609	-0.0037972	1
8.8167	0.22229	0.22582	-0.0035305	1
8.8333	0.22229	0.22555	-0.0032642	1
8.85	0.24956	0.22529	0.024272	1
8.8667	0.24956	0.22502	0.024538	1
8.8833	0.24956	0.22476	0.024803	1
8.9	0.22229	0.22449	-0.0022017	1
8.9167	0.24956	0.22423	0.025333	1
8.9333	0.22229	0.22396	-0.0016724	1
8.95	0.22229	0.2237	-0.0014081	1
8.9667	0.24956	0.22343	0.026126	1
8.9833	0.24956	0.22317	0.026389	1
9	0.24956	0.22291	0.026653	1
9.0167	0.22229	0.22264	-0.00035438	1
9.0333	0.24956	0.22238	0.027178	1
9.05	0.24956	0.22212	0.027441	1
9.0667	0.24956	0.22186	0.027703	1
9.0833	0.22229	0.2216	0.00069426	1
9.1	0.24956	0.22133	0.028226	1
9.1167	0.24956	0.22107	0.028487	1
9.1333	0.24956	0.22081	0.028748	1
9.15	0.22229	0.22055	0.0017381	1
9.1667	0.24956	0.22029	0.029268	1
9.1833	0.24956	0.22003	0.029528	1
9.2	0.24956	0.21977	0.029788	1
9.2167	0.24956	0.21951	0.030047	1
9.2333	0.24956	0.21925	0.030306	1
9.25	0.24956	0.219	0.030565	1
9.2667	0.24956	0.21874	0.030823	1
9.2833	0.22229	0.21848	0.0038109	1
9.3	0.24956	0.21822	0.031339	1
9.3167	0.24956	0.21796	0.031596	1
9.3333	0.24956	0.21771	0.031853	1
9.35	0.24956	0.21745	0.03211	1
9.3667	0.24956	0.21719	0.032367	1
9.3833	0.24956	0.21694	0.032623	1
9.4	0.22229	0.21668	0.0056088	1
9.4167	0.22229	0.21643	0.0058644	1
9.4333	0.24956	0.21617	0.03339	1
9.45	0.24956	0.21592	0.033645	1
9.4667	0.24956	0.21566	0.033899	1
9.4833	0.22229	0.21541	0.0068838	1
9.5	0.24956	0.21515	0.034408	1
9.5167	0.24956	0.2149	0.034662	1
9.5333	0.24956	0.21464	0.034915	1
9.55	0.22229	0.21439	0.0078985	1

9.5667	0.22229	0.21414	0.0081514	1
9.5833	0.24956	0.21389	0.035674	1
9.6	0.24956	0.21363	0.035926	1
9.6167	0.24956	0.21338	0.036178	1
9.6333	0.24956	0.21313	0.03643	1
9.65	0.24956	0.21288	0.036681	1
9.6667	0.22229	0.21263	0.0096627	1
9.6833	0.22229	0.21238	0.0099134	1
9.7	0.24956	0.21213	0.037434	1
9.7167	0.24956	0.21188	0.037684	1
9.7333	0.24956	0.21163	0.037934	1
9.75	0.22229	0.21138	0.010914	1
9.7667	0.24956	0.21113	0.038433	1
9.7833	0.24956	0.21088	0.038682	1
9.8	0.22229	0.21063	0.011661	1
9.8167	0.22229	0.21038	0.01191	1
9.8333	0.24956	0.21013	0.039428	1
9.85	0.24956	0.20988	0.039676	1
9.8667	0.24956	0.20964	0.039923	1
9.8833	0.22229	0.20939	0.0129	1
9.9	0.19965	0.20914	-0.0094925	1
9.9167	0.19965	0.2089	-0.0092458	1
9.9333	0.24956	0.20865	0.040911	1
9.95	0.22229	0.2084	0.013887	1
9.9667	0.24956	0.20816	0.041403	1
9.9833	0.19965	0.20791	-0.0082619	1
10	0.24956	0.20767	0.041893	1
10.017	0.22229	0.20742	0.014869	1
10.033	0.19965	0.20718	-0.0075274	1
10.05	0.24956	0.20693	0.042628	1
10.067	0.22229	0.20669	0.015602	1
10.083	0.22229	0.20645	0.015845	1
10.1	0.19965	0.2062	-0.006551	1
10.117	0.24956	0.20596	0.043603	1
10.133	0.24956	0.20572	0.043845	1
10.15	0.22229	0.20547	0.016818	1
10.167	0.17236	0.20523	-0.032869	1
10.183	0.24956	0.20499	0.044572	1
10.2	0.24956	0.20475	0.044814	1
10.217	0.17236	0.2045	-0.032144	1
10.233	0.19965	0.20426	-0.0046135	1
10.25	0.19965	0.20402	-0.004372	1
10.267	0.19965	0.20378	-0.0041309	1
10.283	0.17236	0.20354	-0.031181	1
10.3	0.19965	0.2033	-0.0036508	1
10.317	0.24956	0.20306	0.046499	1
10.333	0.24956	0.20282	0.046738	1
10.35	0.17236	0.20258	-0.030222	1
10.367	0.17236	0.20234	-0.029983	1
10.383	0.24956	0.2021	0.047455	1
10.4	0.19965	0.20187	-0.0022161	1
10.417	0.17236	0.20163	-0.029267	1
10.433	0.19965	0.20139	-0.0017406	1
10.45	0.19965	0.20115	-0.0015025	1
10.467	0.19965	0.20091	-0.0012648	1
10.483	0.17236	0.20068	-0.028319	1
10.5	0.17236	0.20044	-0.028081	1
10.517	0.19965	0.2002	-0.00055455	1

10.533	0.19965	0.19997	-0.00031931	1
10.55	0.17236	0.19973	-0.027373	1
10.567	0.19965	0.1995	0.00015315	1
10.583	0.24956	0.19926	0.050298	1
10.6	0.19965	0.19903	0.00062309	1
10.617	0.17236	0.19879	-0.026432	1
10.633	0.19965	0.19856	0.0010919	1
10.65	0.19965	0.19832	0.0013266	1
10.667	0.17236	0.19809	-0.025729	1
10.683	0.17236	0.19786	-0.025496	1
10.7	0.17236	0.19762	-0.025262	1
10.717	0.19965	0.19739	0.0022613	1
10.733	0.17236	0.19716	-0.024797	1
10.75	0.17236	0.19692	-0.024564	1
10.767	0.19965	0.19669	0.002959	1
10.783	0.19965	0.19646	0.0031901	1
10.8	0.19965	0.19623	0.0034223	1
10.817	0.17236	0.196	-0.023636	1
10.833	0.19965	0.19577	0.0038846	1
10.85	0.19965	0.19553	0.004116	1
10.867	0.19965	0.1953	0.0043471	1
10.883	0.17236	0.19507	-0.022713	1
10.9	0.19965	0.19484	0.0048072	1
10.917	0.19965	0.19461	0.0050375	1
10.933	0.17236	0.19438	-0.022024	1
10.95	0.17236	0.19415	-0.021794	1
10.967	0.19965	0.19392	0.0057254	1
10.983	0.19965	0.1937	0.0059533	1
11	0.17236	0.19347	-0.021108	1
11.017	0.17236	0.19324	-0.020879	1
11.033	0.17236	0.19301	-0.020652	1
11.05	0.19965	0.19278	0.0068661	1
11.067	0.19965	0.19256	0.007094	1
11.083	0.17236	0.19233	-0.01997	1
11.1	0.19965	0.1921	0.0075476	1
11.117	0.19965	0.19188	0.0077747	1
11.133	0.19965	0.19165	0.0080001	1
11.15	0.17236	0.19142	-0.019063	1
11.167	0.19965	0.1912	0.0084529	1
11.183	0.19965	0.19097	0.0086776	1
11.2	0.17236	0.19075	-0.018387	1
11.217	0.17236	0.19052	-0.018161	1
11.233	0.19965	0.1903	0.0093526	1
11.25	0.19965	0.19007	0.0095776	1
11.267	0.19965	0.18985	0.0098022	1
11.283	0.17236	0.18962	-0.017265	1
11.3	0.19965	0.1894	0.010249	1
11.317	0.19965	0.18918	0.010473	1
11.333	0.19965	0.18895	0.010696	1
11.35	0.17236	0.18873	-0.016371	1
11.367	0.17236	0.18851	-0.016148	1
11.383	0.19965	0.18829	0.011364	1
11.4	0.19965	0.18806	0.011586	1
11.417	0.17236	0.18784	-0.015482	1
11.433	0.19965	0.18762	0.012029	1
11.45	0.19965	0.1874	0.012251	1
11.467	0.19965	0.18718	0.012472	1
11.483	0.17236	0.18696	-0.014598	1

11.5	0.19965	0.18674	0.012913	1
11.517	0.19965	0.18652	0.013134	1
11.533	0.19965	0.1863	0.013353	1
11.55	0.17236	0.18608	-0.013717	1
11.567	0.17236	0.18586	-0.013497	1
11.583	0.19965	0.18564	0.014012	1
11.6	0.19965	0.18542	0.014231	1
11.617	0.17236	0.1852	-0.01284	1
11.633	0.19965	0.18498	0.014668	1
11.65	0.19965	0.18476	0.014887	1
11.667	0.17236	0.18455	-0.012185	1
11.683	0.17236	0.18433	-0.011968	1
11.7	0.19965	0.18411	0.01554	1
11.717	0.19965	0.18389	0.015757	1
11.733	0.17236	0.18368	-0.011317	1
11.75	0.17236	0.18346	-0.011099	1
11.767	0.17236	0.18324	-0.010883	1
11.783	0.19965	0.18303	0.016623	1
11.8	0.19965	0.18281	0.016839	1
11.817	0.17236	0.18259	-0.010235	1
11.833	0.17236	0.18238	-0.01002	1
11.85	0.19965	0.18216	0.017485	1
11.867	0.17236	0.18195	-0.0095894	1
11.883	0.17236	0.18174	-0.0093757	1
11.9	0.19965	0.18152	0.018129	1
11.917	0.19965	0.18131	0.018344	1
11.933	0.17236	0.18109	-0.0087333	1
11.95	0.17236	0.18088	-0.0085192	1
11.967	0.17236	0.18067	-0.0083054	1
11.983	0.19965	0.18045	0.019197	1
12	0.17236	0.18024	-0.0078798	1
12.017	0.17236	0.18003	-0.0076668	1
12.033	0.17236	0.17982	-0.0074552	1
12.05	0.19965	0.1796	0.020047	1
12.067	0.17236	0.17939	-0.0070304	1
12.083	0.17236	0.17918	-0.0068196	1
12.1	0.17236	0.17897	-0.0066078	1
12.117	0.19965	0.17876	0.020894	1
12.133	0.17236	0.17855	-0.0061862	1
12.15	0.17236	0.17834	-0.0059752	1
12.167	0.19965	0.17812	0.021526	1
12.183	0.19965	0.17792	0.021735	1
12.2	0.17236	0.1777	-0.0053448	1
12.217	0.17236	0.17749	-0.0051347	1
12.233	0.19965	0.17729	0.022364	1
12.25	0.19965	0.17708	0.022573	1
12.267	0.17236	0.17687	-0.0045073	1
12.283	0.17236	0.17666	-0.0042995	1
12.3	0.17236	0.17645	-0.0040907	1
12.317	0.19965	0.17624	0.023408	1
12.333	0.19965	0.17604	0.023615	1
12.35	0.17236	0.17583	-0.003467	1
12.367	0.19965	0.17562	0.024031	1
12.383	0.19965	0.17541	0.024237	1
12.4	0.17236	0.17521	-0.0028454	1
12.417	0.17236	0.175	-0.0026383	1
12.433	0.19965	0.17479	0.024857	1
12.45	0.19965	0.17459	0.025064	1

12.467	0.19965	0.17438	0.02527	1
12.483	0.17236	0.17417	-0.0018148	1
12.5	0.17236	0.17397	-0.001609	1
12.517	0.19965	0.17376	0.025887	1
12.533	0.19965	0.17356	0.026091	1
12.55	0.17236	0.17335	-0.000994	1
12.567	0.19965	0.17315	0.026501	1
12.583	0.19965	0.17295	0.026704	1
12.6	0.19965	0.17274	0.026909	1
12.617	0.17236	0.17254	-0.00017703	1
12.633	0.17236	0.17233	2.5699E-005	1
12.65	0.19965	0.17213	0.027519	1
12.667	0.17236	0.17193	0.00043287	1
12.683	0.17236	0.17173	0.00063488	1
12.7	0.19965	0.17152	0.028128	1
12.717	0.19965	0.17132	0.028331	1
12.733	0.17236	0.17112	0.0012419	1
12.75	0.17236	0.17092	0.0014442	1
12.767	0.19965	0.17071	0.028936	1
12.783	0.19965	0.17051	0.029137	1
12.8	0.17236	0.17031	0.0020483	1
12.817	0.17236	0.17011	0.0022497	1
12.833	0.17236	0.16991	0.0024495	1
12.85	0.19965	0.16971	0.02994	1
12.867	0.17236	0.16951	0.002851	1
12.883	0.17236	0.16931	0.0030501	1
12.9	0.17236	0.16911	0.0032503	1
12.917	0.19965	0.16891	0.03074	1
12.933	0.19965	0.16871	0.030939	1
12.95	0.17236	0.16851	0.0038481	1
12.967	0.17236	0.16831	0.0040472	1
12.983	0.19965	0.16811	0.031535	1
13	0.17236	0.16792	0.0044437	1
13.017	0.17236	0.16772	0.0046422	1
13.033	0.19965	0.16752	0.032129	1
13.05	0.19965	0.16732	0.032327	1
13.067	0.17236	0.16712	0.0052351	1
13.083	0.17236	0.16693	0.0054314	1
13.1	0.19965	0.16673	0.032919	1
13.117	0.19965	0.16653	0.033116	1
13.133	0.17236	0.16634	0.0060215	1
13.15	0.17236	0.16614	0.0062181	1
13.167	0.19965	0.16595	0.033705	1
13.183	0.19965	0.16575	0.033899	1
13.2	0.19965	0.16555	0.034095	1
13.217	0.17236	0.16536	0.0070011	1
13.233	0.19965	0.16516	0.034485	1
13.25	0.19965	0.16497	0.034681	1
13.267	0.17236	0.16477	0.0075856	1
13.283	0.17236	0.16458	0.0077792	1
13.3	0.19965	0.16439	0.035264	1
13.317	0.19965	0.16419	0.035458	1
13.333	0.19965	0.164	0.035651	1
13.35	0.17236	0.16381	0.0085549	1
13.367	0.19965	0.16361	0.036038	1
13.383	0.19965	0.16342	0.036231	1
13.4	0.17236	0.16323	0.0091339	1
13.417	0.17236	0.16303	0.0093268	1

13.433	0.17236	0.16284	0.0095184	1
13.45	0.19965	0.16265	0.037001	1
13.467	0.19965	0.16246	0.037193	1
13.483	0.17236	0.16227	0.010094	1
13.5	0.17236	0.16207	0.010286	1
13.517	0.19965	0.16188	0.037767	1
13.533	0.19965	0.16169	0.037958	1
13.55	0.17236	0.1615	0.010859	1
13.567	0.19965	0.16131	0.03834	1
13.583	0.19965	0.16112	0.038529	1
13.6	0.19965	0.16093	0.03872	1
13.617	0.17236	0.16074	0.01162	1
13.633	0.19965	0.16055	0.039099	1
13.65	0.19965	0.16036	0.039288	1
13.667	0.19965	0.16017	0.039478	1
13.683	0.17236	0.15998	0.012376	1
13.7	0.19965	0.15979	0.039855	1
13.717	0.19965	0.15961	0.040044	1
13.733	0.17236	0.15942	0.012942	1
13.75	0.17236	0.15923	0.01313	1
13.767	0.19965	0.15904	0.040608	1
13.783	0.19965	0.15885	0.040795	1
13.8	0.17236	0.15867	0.013693	1
13.817	0.17236	0.15848	0.013881	1
13.833	0.14973	0.15829	-0.0085632	1
13.85	0.19965	0.15811	0.041544	1
13.867	0.19965	0.15792	0.041731	1
13.883	0.17236	0.15773	0.014626	1
13.9	0.14973	0.15755	-0.0078172	1
13.917	0.19965	0.15736	0.042289	1
13.933	0.19965	0.15718	0.042474	1
13.95	0.17236	0.15699	0.01537	1
13.967	0.17236	0.1568	0.015555	1
13.983	0.19965	0.15662	0.04303	1
14	0.19965	0.15644	0.043215	1
14.017	0.17236	0.15625	0.01611	1
14.033	0.17236	0.15607	0.016293	1
14.05	0.19965	0.15588	0.043768	1
14.067	0.19965	0.1557	0.043952	1
14.083	0.12245	0.15552	-0.033065	1
14.1	0.14973	0.15533	-0.0056013	1
14.117	0.19965	0.15515	0.044502	1
14.133	0.19965	0.15497	0.044685	1
14.15	0.17236	0.15478	0.017578	1
14.167	0.14973	0.1546	-0.0048693	1
14.183	0.19965	0.15442	0.045232	1
14.2	0.19965	0.15424	0.045415	1
14.217	0.12245	0.15405	-0.031603	1
14.233	0.12245	0.15387	-0.031422	1
14.25	0.14973	0.15369	-0.0039599	1
14.267	0.14973	0.15351	-0.0037783	1
14.283	0.12245	0.15333	-0.030878	1
14.3	0.12245	0.15315	-0.030697	1
14.317	0.19965	0.15297	0.046684	1
14.333	0.14973	0.15279	-0.0030559	1
14.35	0.12245	0.15261	-0.030155	1
14.367	0.14973	0.15242	-0.0026949	1
14.383	0.14973	0.15225	-0.0025158	1

14.4	0.17236	0.15207	0.020294	1
14.417	0.12245	0.15189	-0.029436	1
14.433	0.14973	0.15171	-0.0019776	1
14.45	0.14973	0.15153	-0.0017983	1
14.467	0.17236	0.15135	0.021011	1
14.483	0.12245	0.15117	-0.028721	1
14.5	0.12245	0.15099	-0.028543	1
14.517	0.14973	0.15081	-0.0010842	1
14.533	0.14973	0.15064	-0.00090701	1
14.55	0.12245	0.15046	-0.028009	1
14.567	0.14973	0.15028	-0.0005511	1
14.583	0.14973	0.1501	-0.00037453	1
14.6	0.17236	0.14993	0.022433	1
14.617	0.12245	0.14975	-0.0273	1
14.633	0.12245	0.14957	-0.027124	1
14.65	0.14973	0.1494	0.00033288	1
14.667	0.14973	0.14922	0.00050947	1
14.683	0.12245	0.14905	-0.026595	1
14.7	0.14973	0.14887	0.00086098	1
14.717	0.14973	0.14869	0.0010369	1
14.733	0.14973	0.14852	0.0012117	1
14.75	0.12245	0.14834	-0.025893	1
14.767	0.14973	0.14817	0.0015626	1
14.783	0.14973	0.14799	0.0017366	1
14.8	0.14973	0.14782	0.0019116	1
14.817	0.12245	0.14764	-0.025194	1
14.833	0.14973	0.14747	0.0022598	1
14.85	0.14973	0.1473	0.0024341	1
14.867	0.14973	0.14712	0.0026082	1
14.883	0.12245	0.14695	-0.024499	1
14.9	0.14973	0.14678	0.0029548	1
14.917	0.14973	0.1466	0.0031283	1
14.933	0.14973	0.14643	0.0033005	1
14.95	0.12245	0.14626	-0.023806	1
14.967	0.14973	0.14608	0.0036465	1
14.983	0.14973	0.14591	0.0038181	1
15	0.14973	0.14574	0.0039906	1
15.017	0.12245	0.14557	-0.023117	1
15.033	0.12245	0.1454	-0.022946	1
15.05	0.14973	0.14522	0.0045058	1
15.067	0.14973	0.14505	0.0046774	1
15.083	0.12245	0.14488	-0.022432	1
15.1	0.14973	0.14471	0.0050191	1
15.117	0.14973	0.14454	0.0051902	1
15.133	0.14973	0.14437	0.00536	1
15.15	0.12245	0.1442	-0.021749	1
15.167	0.12245	0.14403	-0.021579	1
15.183	0.14973	0.14386	0.0058703	1
15.2	0.14973	0.14369	0.0060404	1
15.217	0.12245	0.14352	-0.02107	1
15.233	0.14973	0.14335	0.0063789	1
15.25	0.14973	0.14318	0.0065483	1
15.267	0.14973	0.14301	0.0067176	1
15.283	0.12245	0.14284	-0.020394	1
15.3	0.14973	0.14268	0.0070544	1
15.317	0.14973	0.14251	0.0072231	1
15.333	0.14973	0.14234	0.0073905	1
15.35	0.12245	0.14217	-0.019721	1

15.367	0.14973	0.142	0.0077268	1
15.383	0.14973	0.14184	0.0078937	1
15.4	0.14973	0.14167	0.0080613	1
15.417	0.12245	0.1415	-0.019051	1
15.433	0.14973	0.14133	0.0083951	1
15.45	0.14973	0.14117	0.0085621	1
15.467	0.14973	0.141	0.008729	1
15.483	0.12245	0.14084	-0.018385	1
15.5	0.12245	0.14067	-0.018219	1
15.517	0.14973	0.1405	0.0092274	1
15.533	0.14973	0.14034	0.0093925	1
15.55	0.12245	0.14017	-0.017722	1
15.567	0.12245	0.14001	-0.017556	1
15.583	0.14973	0.13984	0.0098886	1
15.6	0.14973	0.13968	0.010054	1
15.617	0.12245	0.13951	-0.017061	1
15.633	0.14973	0.13935	0.010383	1
15.65	0.14973	0.13918	0.010548	1
15.667	0.14973	0.13902	0.010712	1
15.683	0.12245	0.13885	-0.016405	1
15.7	0.14973	0.13869	0.01104	1
15.717	0.14973	0.13853	0.011204	1
15.733	0.14973	0.13836	0.011366	1
15.75	0.12245	0.1382	-0.01575	1
15.767	0.14973	0.13804	0.011693	1
15.783	0.14973	0.13787	0.011855	1
15.8	0.14973	0.13771	0.012018	1
15.817	0.12245	0.13755	-0.015099	1
15.833	0.12245	0.13739	-0.014937	1
15.85	0.14973	0.13722	0.012505	1
15.867	0.14973	0.13706	0.012667	1
15.883	0.12245	0.1369	-0.014452	1
15.9	0.14973	0.13674	0.01299	1
15.917	0.14973	0.13658	0.013152	1
15.933	0.14973	0.13642	0.013312	1
15.95	0.12245	0.13626	-0.013806	1
15.967	0.14973	0.1361	0.013635	1
15.983	0.14973	0.13594	0.013795	1
16	0.12245	0.13577	-0.013325	1
16.017	0.12245	0.13561	-0.013164	1
16.033	0.14973	0.13545	0.014275	1
16.05	0.14973	0.13529	0.014435	1
16.067	0.12245	0.13513	-0.012685	1
16.083	0.12245	0.13498	-0.012526	1
16.1	0.14973	0.13482	0.014913	1
16.117	0.14973	0.13466	0.015073	1
16.133	0.14973	0.1345	0.015231	1
16.15	0.12245	0.13434	-0.01189	1
16.167	0.14973	0.13418	0.015549	1
16.183	0.14973	0.13402	0.015706	1
16.2	0.14973	0.13387	0.015865	1
16.217	0.12245	0.13371	-0.011257	1
16.233	0.14973	0.13355	0.01618	1
16.25	0.14973	0.13339	0.016338	1
16.267	0.12245	0.13323	-0.010784	1
16.283	0.12245	0.13308	-0.010628	1
16.3	0.14973	0.13292	0.01681	1
16.317	0.14973	0.13276	0.016967	1

16.333	0.12245	0.13261	-0.010157	1
16.35	0.12245	0.13245	-0.010001	1
16.367	0.14973	0.13229	0.017436	1
16.383	0.14973	0.13214	0.017591	1
16.4	0.12245	0.13198	-0.0095324	1
16.417	0.12245	0.13183	-0.0093763	1
16.433	0.14973	0.13167	0.018059	1
16.45	0.14973	0.13152	0.018214	1
16.467	0.14973	0.13136	0.01837	1
16.483	0.12245	0.13121	-0.008756	1
16.5	0.14973	0.13105	0.018679	1
16.517	0.14973	0.1309	0.018834	1
16.533	0.14973	0.13074	0.018988	1
16.55	0.12245	0.13059	-0.0081377	1
16.567	0.14973	0.13043	0.019297	1
16.583	0.14973	0.13028	0.01945	1
16.6	0.14973	0.13013	0.019604	1
16.617	0.14973	0.12997	0.019758	1
16.633	0.14973	0.12982	0.01991	1
16.65	0.14973	0.12967	0.020064	1
16.667	0.14973	0.12951	0.020217	1
16.683	0.12245	0.12936	-0.0069106	1
16.7	0.14973	0.12921	0.020522	1
16.717	0.14973	0.12906	0.020675	1
16.733	0.14973	0.1289	0.020827	1
16.75	0.12245	0.12875	-0.006301	1
16.767	0.14973	0.1286	0.021131	1
16.783	0.14973	0.12845	0.021282	1
16.8	0.14973	0.1283	0.021434	1
16.817	0.12245	0.12814	-0.0056942	1
16.833	0.14973	0.12799	0.021736	1
16.85	0.14973	0.12784	0.021888	1
16.867	0.14973	0.12769	0.022039	1
16.883	0.12245	0.12754	-0.0050912	1
16.9	0.14973	0.12739	0.02234	1
16.917	0.14973	0.12724	0.02249	1
16.933	0.14973	0.12709	0.02264	1
16.95	0.12245	0.12694	-0.0044902	1
16.967	0.14973	0.12679	0.02294	1
16.983	0.14973	0.12664	0.023089	1
17	0.14973	0.12649	0.023239	1
17.017	0.12245	0.12634	-0.0038919	1
17.033	0.12245	0.12619	-0.0037435	1
17.05	0.14973	0.12604	0.023686	1
17.067	0.12245	0.1259	-0.0034453	1
17.083	0.12245	0.12575	-0.0032974	1
17.1	0.14973	0.1256	0.024131	1
17.117	0.14973	0.12545	0.02428	1
17.133	0.12245	0.1253	-0.0028529	1
17.15	0.12245	0.12515	-0.0027048	1
17.167	0.12245	0.12501	-0.0025568	1
17.183	0.14973	0.12486	0.02487	1
17.2	0.14973	0.12471	0.025018	1
17.217	0.12245	0.12456	-0.002115	1
17.233	0.12245	0.12442	-0.0019686	1
17.25	0.14973	0.12427	0.025458	1
17.267	0.12245	0.12412	-0.0016746	1
17.283	0.12245	0.12398	-0.0015288	1

17.3	0.14973	0.12383	0.025898	1
17.317	0.14973	0.12369	0.026044	1
17.333	0.14973	0.12354	0.026189	1
17.35	0.12245	0.12339	-0.00094452	1
17.367	0.12245	0.12325	-0.00079866	1
17.383	0.14973	0.1231	0.026626	1
17.4	0.12245	0.12296	-0.00050833	1
17.417	0.12245	0.12281	-0.00036299	1
17.433	0.14973	0.12267	0.027061	1
17.45	0.14973	0.12252	0.027206	1
17.467	0.14973	0.12238	0.027351	1
17.483	0.12245	0.12224	0.00021493	1
17.5	0.14973	0.12209	0.027639	1
17.517	0.14973	0.12195	0.027784	1
17.533	0.12245	0.1218	0.00064701	1
17.55	0.12245	0.12166	0.00079099	1
17.567	0.14973	0.12152	0.028215	1
17.583	0.14973	0.12137	0.028358	1
17.6	0.12245	0.12123	0.001221	1
17.617	0.12245	0.12109	0.0013643	1
17.633	0.14973	0.12094	0.028787	1
17.65	0.14973	0.1208	0.02893	1
17.667	0.12245	0.12066	0.0017924	1
17.683	0.12245	0.12052	0.0019341	1
17.7	0.07253	0.12037	-0.047843	1
17.717	0.12245	0.12023	0.0022189	1
17.733	0.12245	0.12009	0.0023601	1
17.75	0.12245	0.11995	0.0025021	1
17.767	0.12245	0.11981	0.0026439	1
17.783	0.14973	0.11967	0.030065	1
17.8	0.12245	0.11952	0.0029261	1
17.817	0.12245	0.11938	0.0030674	1
17.833	0.14973	0.11924	0.030488	1
17.85	0.14973	0.1191	0.030629	1
17.867	0.14973	0.11896	0.030769	1
17.883	0.14973	0.11882	0.030909	1
17.9	0.09982	0.11868	-0.01886	1
17.917	0.14973	0.11854	0.03119	1
17.933	0.14973	0.1184	0.031329	1
17.95	0.12245	0.11826	0.0041891	1
17.967	0.09982	0.11812	-0.018301	1
17.983	0.09982	0.11798	-0.018162	1
18	0.14973	0.11784	0.031887	1
18.017	0.12245	0.1177	0.0047465	1
18.033	0.14973	0.11757	0.032165	1
18.05	0.14973	0.11743	0.032304	1
18.067	0.14973	0.11729	0.032443	1
18.083	0.07253	0.11715	-0.04462	1
18.1	0.09982	0.11701	-0.017191	1
18.117	0.14973	0.11687	0.032857	1
18.133	0.14973	0.11674	0.032994	1
18.15	0.07253	0.1166	-0.044068	1
18.167	0.09982	0.11646	-0.01664	1
18.183	0.14973	0.11632	0.033407	1
18.2	0.09982	0.11619	-0.016365	1
18.217	0.12245	0.11605	0.0064019	1
18.233	0.09982	0.11591	-0.016092	1
18.25	0.14973	0.11577	0.033955	1

18.267	0.14973	0.11564	0.034092	1
18.283	0.12245	0.1155	0.006948	1
18.3	0.07253	0.11537	-0.042835	1
18.317	0.14973	0.11523	0.034501	1
18.333	0.12245	0.11509	0.0073563	1
18.35	0.12245	0.11496	0.0074923	1
18.367	0.12245	0.11482	0.0076282	1
18.383	0.14973	0.11469	0.035043	1
18.4	0.12245	0.11455	0.0078987	1
18.417	0.12245	0.11442	0.0080341	1
18.433	0.09982	0.11428	-0.014461	1
18.45	0.09982	0.11415	-0.014326	1
18.467	0.14973	0.11401	0.035719	1
18.483	0.07253	0.11388	-0.041347	1
18.5	0.09982	0.11374	-0.013923	1
18.517	0.09982	0.11361	-0.013788	1
18.533	0.07253	0.11347	-0.040945	1
18.55	0.07253	0.11334	-0.040811	1
18.567	0.09982	0.11321	-0.013387	1
18.583	0.09982	0.11307	-0.013254	1
18.6	0.12245	0.11294	0.0095098	1
18.617	0.09982	0.11281	-0.012987	1
18.633	0.07253	0.11267	-0.040144	1
18.65	0.09982	0.11254	-0.012721	1
18.667	0.09982	0.11241	-0.012588	1
18.683	0.07253	0.11228	-0.039746	1
18.7	0.07253	0.11214	-0.039613	1
18.717	0.09982	0.11201	-0.012191	1
18.733	0.09982	0.11188	-0.012059	1
18.75	0.07253	0.11175	-0.039217	1
18.767	0.09982	0.11161	-0.011795	1
18.783	0.09982	0.11148	-0.011663	1
18.8	0.09982	0.11135	-0.011532	1
18.817	0.12245	0.11122	0.01123	1
18.833	0.07253	0.11109	-0.038559	1
18.85	0.09982	0.11096	-0.011138	1
18.867	0.07253	0.11083	-0.038297	1
18.883	0.07253	0.1107	-0.038167	1
18.9	0.07253	0.11057	-0.038036	1
18.917	0.09982	0.11044	-0.010615	1
18.933	0.09982	0.11031	-0.010485	1
18.95	0.09982	0.11018	-0.010355	1
18.967	0.07253	0.11004	-0.037515	1
18.983	0.09982	0.10992	-0.010096	1
19	0.09982	0.10979	-0.0099656	1
19.017	0.07253	0.10966	-0.037126	1
19.033	0.09982	0.10953	-0.009707	1
19.05	0.09982	0.1094	-0.0095775	1
19.067	0.09982	0.10927	-0.0094482	1
19.083	0.07253	0.10914	-0.03661	1
19.1	0.09982	0.10901	-0.0091908	1
19.117	0.09982	0.10888	-0.0090619	1
19.133	0.09982	0.10875	-0.008934	1
19.15	0.07253	0.10863	-0.036095	1
19.167	0.07253	0.1085	-0.035967	1
19.183	0.09982	0.10837	-0.0085496	1
19.2	0.07253	0.10824	-0.035711	1
19.217	0.07253	0.10811	-0.035584	1

19.233	0.07253	0.10799	-0.035457	1
19.25	0.09982	0.10786	-0.0080389	1
19.267	0.09982	0.10773	-0.0079114	1
19.283	0.09982	0.1076	-0.0077848	1
19.3	0.07253	0.10748	-0.034948	1
19.317	0.07253	0.10735	-0.034821	1
19.333	0.07253	0.10722	-0.034694	1
19.35	0.07253	0.1071	-0.034568	1
19.367	0.09982	0.10697	-0.0071511	1
19.383	0.09982	0.10685	-0.0070254	1
19.4	0.07253	0.10672	-0.034189	1
19.417	0.09982	0.10659	-0.0067729	1
19.433	0.09982	0.10647	-0.0066477	1
19.45	0.09982	0.10634	-0.0065219	1
19.467	0.09982	0.10622	-0.0063962	1
19.483	0.07253	0.10609	-0.033561	1
19.5	0.09982	0.10597	-0.006146	1
19.517	0.09982	0.10584	-0.0060207	1
19.533	0.09982	0.10572	-0.0058963	1
19.55	0.09982	0.10559	-0.0057714	1
19.567	0.07253	0.10547	-0.032937	1
19.583	0.07253	0.10534	-0.032813	1
19.6	0.09982	0.10522	-0.0053981	1
19.617	0.09982	0.10509	-0.0052737	1
19.633	0.09982	0.10497	-0.0051503	1
19.65	0.09982	0.10485	-0.0050262	1
19.667	0.09982	0.10472	-0.0049023	1
19.683	0.07253	0.1046	-0.032069	1
19.7	0.07253	0.10448	-0.031946	1
19.717	0.09982	0.10435	-0.0045321	1
19.733	0.09982	0.10423	-0.0044095	1
19.75	0.09982	0.10411	-0.0042863	1
19.767	0.09982	0.10398	-0.0041632	1
19.783	0.07253	0.10386	-0.031331	1
19.8	0.09982	0.10374	-0.0039183	1
19.817	0.07253	0.10362	-0.031086	1
19.833	0.09982	0.10349	-0.0036739	1
19.85	0.09982	0.10337	-0.0035516	1
19.867	0.09982	0.10325	-0.0034294	1
19.883	0.07253	0.10313	-0.030598	1
19.9	0.07253	0.10301	-0.030476	1
19.917	0.09982	0.10288	-0.0030644	1
19.933	0.07253	0.10276	-0.030234	1
19.95	0.09982	0.10264	-0.002822	1
19.967	0.07253	0.10252	-0.029991	1
19.983	0.07253	0.1024	-0.02987	1
20	0.07253	0.10228	-0.029749	1
20.017	0.07253	0.10216	-0.029628	1
20.033	0.09982	0.10204	-0.0022183	1
20.05	0.09982	0.10192	-0.0020977	1
20.067	0.07253	0.1018	-0.029267	1
20.083	0.07253	0.10168	-0.029148	1
20.1	0.09982	0.10156	-0.0017374	1
20.117	0.07253	0.10144	-0.028907	1
20.133	0.09982	0.10132	-0.0014982	1
20.15	0.09982	0.1012	-0.0013784	1
20.167	0.07253	0.10108	-0.028549	1
20.183	0.07253	0.10096	-0.02843	1

20.2	0.07253	0.10084	-0.028311	1
20.217	0.07253	0.10072	-0.028191	1
20.233	0.09982	0.1006	-0.00078314	1
20.25	0.09982	0.10048	-0.00066423	1
20.267	0.09982	0.10037	-0.00054545	1
20.283	0.09982	0.10025	-0.00042753	1
20.3	0.09982	0.10013	-0.00030903	1
20.317	0.07253	0.10001	-0.027481	1
20.333	0.07253	0.099893	-0.027363	1
20.35	0.07253	0.099775	-0.027245	1
20.367	0.07253	0.099657	-0.027127	1
20.383	0.09982	0.09954	0.00027995	1
20.4	0.09982	0.099422	0.00039761	1
20.417	0.09982	0.099305	0.00051513	1
20.433	0.07253	0.099188	-0.026658	1
20.45	0.09982	0.099071	0.00074905	1
20.467	0.07253	0.098954	-0.026424	1
20.483	0.09982	0.098838	0.00098243	1
20.5	0.09982	0.098721	0.0010993	1
20.517	0.09982	0.098604	0.0012159	1
20.533	0.09982	0.098488	0.0013318	1
20.55	0.09982	0.098372	0.0014482	1
20.567	0.09982	0.098255	0.0015645	1
20.583	0.07253	0.09814	-0.02561	1
20.6	0.07253	0.098024	-0.025494	1
20.617	0.09982	0.097908	0.0019118	1
20.633	0.07253	0.097793	-0.025263	1
20.65	0.09982	0.097678	0.0021425	1
20.667	0.09982	0.097562	0.0022579	1
20.683	0.09982	0.097447	0.0023725	1
20.7	0.09982	0.097332	0.0024877	1
20.717	0.09982	0.097217	0.0026028	1
20.733	0.09982	0.097103	0.002717	1
20.75	0.09982	0.096988	0.0028318	1
20.767	0.09982	0.096874	0.0029464	1
20.783	0.09982	0.09676	0.0030603	1
20.8	0.09982	0.096645	0.0031746	1
20.817	0.09982	0.096531	0.0032889	1
20.833	0.07253	0.096418	-0.023888	1
20.85	0.07253	0.096304	-0.023774	1
20.867	0.07253	0.09619	-0.02366	1
20.883	0.09982	0.096077	0.0037431	1
20.9	0.09982	0.095963	0.0038567	1
20.917	0.09982	0.09585	0.0039701	1
20.933	0.09982	0.095737	0.0040827	1
20.95	0.09982	0.095624	0.0041959	1
20.967	0.07253	0.095511	-0.022981	1
20.983	0.07253	0.095399	-0.022869	1
21	0.07253	0.095286	-0.022756	1
21.017	0.09982	0.095173	0.0046466	1
21.033	0.09982	0.095062	0.0047584	1
21.05	0.09982	0.094949	0.0048707	1
21.067	0.09982	0.094837	0.004983	1
21.083	0.09982	0.094726	0.0050944	1
21.1	0.09982	0.094614	0.0052064	1
21.117	0.07253	0.094502	-0.021972	1
21.133	0.07253	0.094391	-0.021861	1
21.15	0.09982	0.094279	0.0055408	1

21.167	0.09982	0.094168	0.0056523	1
21.183	0.09982	0.094057	0.0057629	1
21.2	0.09982	0.093946	0.0058741	1
21.217	0.09982	0.093835	0.0059851	1
21.233	0.07253	0.093725	-0.021195	1
21.25	0.09982	0.093614	0.0062062	1
21.267	0.09982	0.093503	0.0063168	1
21.283	0.07253	0.093393	-0.020863	1
21.3	0.07253	0.093283	-0.020753	1
21.317	0.07253	0.093173	-0.020643	1
21.333	0.09982	0.093063	0.0067568	1
21.35	0.09982	0.092953	0.0068668	1
21.367	0.09982	0.092843	0.0069767	1
21.383	0.09982	0.092734	0.0070858	1
21.4	0.09982	0.092625	0.0071954	1
21.417	0.09982	0.092515	0.0073049	1
21.433	0.09982	0.092406	0.0074136	1
21.45	0.07253	0.092297	-0.019767	1
21.467	0.07253	0.092188	-0.019658	1
21.483	0.09982	0.09208	0.0077402	1
21.5	0.09982	0.091971	0.0078491	1
21.517	0.09982	0.091862	0.0079578	1
21.533	0.09982	0.091754	0.0080657	1
21.55	0.09982	0.091646	0.0081742	1
21.567	0.09982	0.091537	0.0082825	1
21.583	0.09982	0.09143	0.0083901	1
21.6	0.07253	0.091322	-0.018792	1
21.617	0.07253	0.091214	-0.018684	1
21.633	0.07253	0.091107	-0.018577	1
21.65	0.07253	0.090999	-0.018469	1
21.667	0.07253	0.090891	-0.018361	1
21.683	0.07253	0.090785	-0.018255	1
21.7	0.09982	0.090677	0.0091426	1
21.717	0.09982	0.09057	0.0092498	1
21.733	0.09982	0.090464	0.0093562	1
21.75	0.07253	0.090357	-0.017827	1
21.767	0.09982	0.09025	0.00957	1
21.783	0.07253	0.090144	-0.017614	1
21.8	0.07253	0.090037	-0.017507	1
21.817	0.07253	0.089931	-0.017401	1
21.833	0.09982	0.089825	0.0099947	1
21.85	0.09982	0.089719	0.010101	1
21.867	0.09982	0.089613	0.010207	1
21.883	0.09982	0.089508	0.010312	1
21.9	0.09982	0.089402	0.010418	1
21.917	0.09982	0.089296	0.010524	1
21.933	0.07253	0.089191	-0.016661	1
21.95	0.07253	0.089086	-0.016556	1
21.967	0.07253	0.088981	-0.016451	1
21.983	0.09982	0.088876	0.010944	1
22	0.07253	0.088771	-0.016241	1
22.017	0.07253	0.088666	-0.016136	1
22.033	0.07253	0.088562	-0.016032	1
22.05	0.09982	0.088457	0.011363	1
22.067	0.09982	0.088353	0.011467	1
22.083	0.09982	0.088249	0.011571	1
22.1	0.09982	0.088145	0.011675	1
22.117	0.09982	0.08804	0.01178	1

22.133	0.07253	0.087937	-0.015407	1
22.15	0.09982	0.087833	0.011987	1
22.167	0.07253	0.087729	-0.015199	1
22.183	0.07253	0.087626	-0.015096	1
22.2	0.07253	0.087523	-0.014993	1
22.217	0.07253	0.087419	-0.014889	1
22.233	0.07253	0.087316	-0.014786	1
22.25	0.07253	0.087213	-0.014683	1
22.267	0.07253	0.08711	-0.01458	1
22.283	0.09982	0.087008	0.012812	1
22.3	0.09982	0.086905	0.012915	1
22.317	0.09982	0.086802	0.013018	1
22.333	0.09982	0.0867	0.01312	1
22.35	0.09982	0.086598	0.013222	1
22.367	0.09982	0.086495	0.013325	1
22.383	0.09982	0.086394	0.013426	1
22.4	0.07253	0.086292	-0.013762	1
22.417	0.09982	0.08619	0.01363	1
22.433	0.09982	0.086088	0.013732	1
22.45	0.07253	0.085987	-0.013457	1
22.467	0.07253	0.085885	-0.013355	1
22.483	0.07253	0.085784	-0.013254	1
22.5	0.09982	0.085683	0.014137	1
22.517	0.09982	0.085581	0.014239	1
22.533	0.07253	0.085481	-0.012951	1
22.55	0.09982	0.08538	0.01444	1
22.567	0.09982	0.085279	0.014541	1
22.583	0.09982	0.085179	0.014641	1
22.6	0.09982	0.085078	0.014742	1
22.617	0.09982	0.084977	0.014843	1
22.633	0.04991	0.084877	-0.034967	1
22.65	0.09982	0.084777	0.015043	1
22.667	0.09982	0.084677	0.015143	1
22.683	0.09982	0.084577	0.015243	1
22.7	0.09982	0.084477	0.015343	1
22.717	0.09982	0.084378	0.015442	1
22.733	0.09982	0.084278	0.015542	1
22.75	0.09982	0.084179	0.015641	1
22.767	0.09982	0.084079	0.015741	1
22.783	0.04991	0.083981	-0.034071	1
22.8	0.07253	0.083881	-0.011351	1
22.817	0.04991	0.083782	-0.033872	1
22.833	0.07253	0.083684	-0.011154	1
22.85	0.0226	0.083585	-0.060985	1
22.867	0.0226	0.083486	-0.060886	1
22.883	0.0226	0.083388	-0.060788	1
22.9	0.04991	0.083289	-0.033379	1
22.917	0.04991	0.083191	-0.033281	1
22.933	0.04991	0.083093	-0.033183	1
22.95	0.04991	0.082995	-0.033085	1
22.967	0.09982	0.082897	0.016923	1
22.983	0.04991	0.082799	-0.032889	1
23	0.0226	0.082702	-0.060102	1
23.017	0.04991	0.082604	-0.032694	1
23.033	0.04991	0.082507	-0.032597	1
23.05	0.04991	0.082409	-0.032499	1
23.067	0.04991	0.082312	-0.032402	1
23.083	0.04991	0.082215	-0.032305	1

23.1	0.04991	0.082118	-0.032208	1
23.117	0.04991	0.082021	-0.032111	1
23.133	0.04991	0.081924	-0.032014	1
23.15	0.0226	0.081828	-0.059228	1
23.167	0.04991	0.081731	-0.031821	1
23.183	0.04991	0.081635	-0.031725	1
23.2	0.04991	0.081538	-0.031628	1
23.217	0.04991	0.081442	-0.031532	1
23.233	0.04991	0.081346	-0.031436	1
23.25	0.04991	0.08125	-0.03134	1
23.267	0.04991	0.081154	-0.031244	1
23.283	0.04991	0.081059	-0.031149	1
23.3	0.04991	0.080963	-0.031053	1
23.317	0.04991	0.080867	-0.030957	1
23.333	0.04991	0.080772	-0.030862	1
23.35	0.04991	0.080677	-0.030767	1
23.367	0.04991	0.080581	-0.030671	1
23.383	0.04991	0.080487	-0.030577	1
23.4	0.04991	0.080392	-0.030482	1
23.417	0.04991	0.080297	-0.030387	1

==

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	2.1560E-005
y0 =	4.2164E-001

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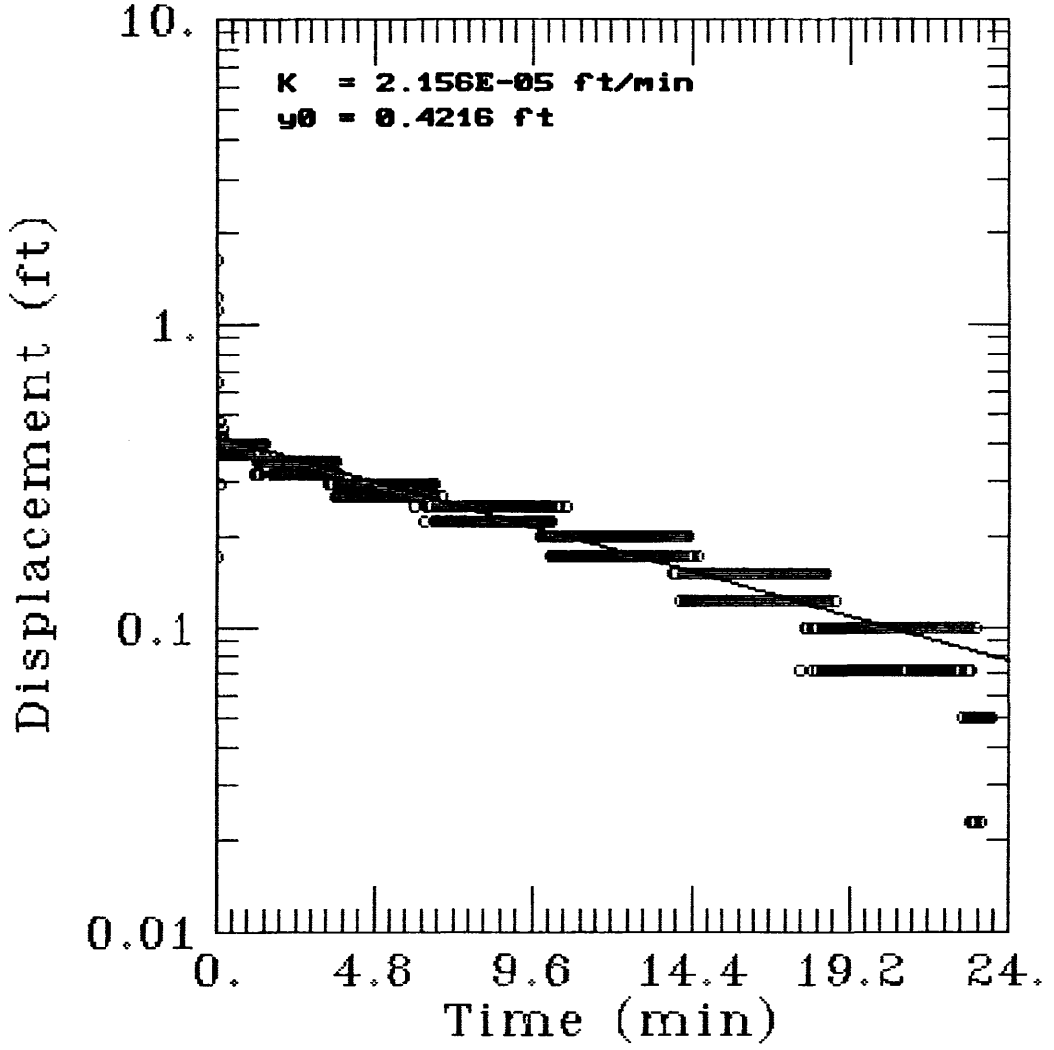
DH-1A STORRS SLUG INJECTION TEST #3



A Q T E S O L V R E S U L T S
Version 1.10

05/12/92 01:41:47

TEST DESCRIPTION

Data set..... DH1PANB1.AQT
Data set title..... DH-1A PANTHER SLUG WITHDRAWAL TEST #1
Company..... EarthFax Engineering
Project..... UC-192-06
Client..... CO-OP Mine
Location..... Huntington Canyon
Test date..... 9-25-91
Test well..... DH-1A

Knowns and Constants:

No. of data points	1183
Radius of well casing	0.1
Radius of well	0.1
Aquifer saturated thickness	70
Well screen length	60
Static height of water in well	70
Log(Re/Rw)	5.36
A, B, C	0.000, 0.000, 11.189

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	5.0803E-004	+/-	1.9809E-004
y0 =	2.5218E+000	+/-	6.3316E-002

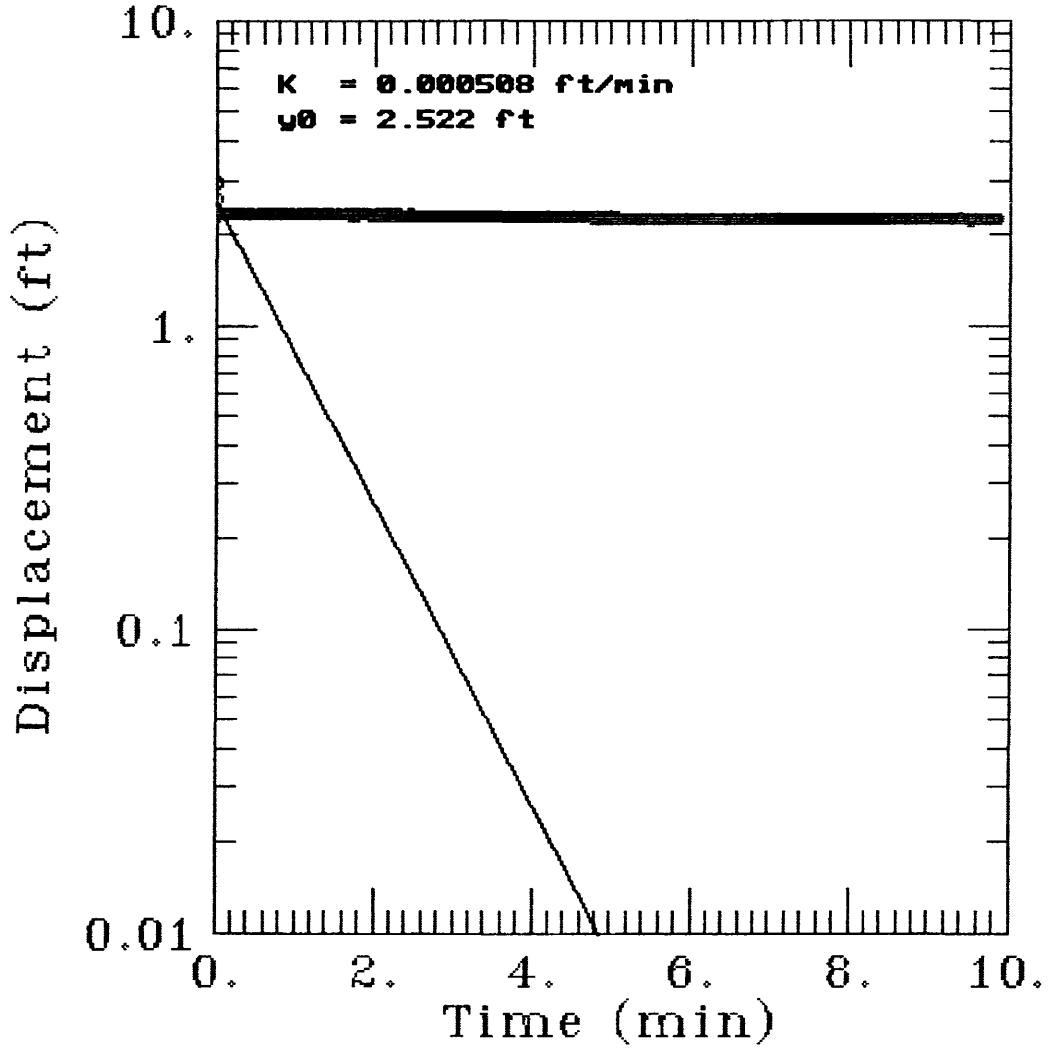
ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:

Number of residuals	7
Number of estimated parameters	2
Degrees of freedom	5
Residual mean	1.909E-005
Residual standard deviation	0.06857
Residual variance	0.004702

DH-1A PANTHER SLUG WITHDRAWAL TEST #1



Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.0083333	2.5909	2.498	0.092898	1
0.033333	2.3412	2.428	-0.086775	1
0.041667	2.3412	2.4051	-0.063872	1
0.058333	2.3412	2.3599	-0.018712	1
0.066667	2.3412	2.3377	0.0035497	1
0.075	2.3412	2.3156	0.025601	1
0.083333	2.3412	2.2938	0.047444	1

==

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	5.0803E-004
y0 =	2.5218E+000

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A Q T E S O L V R E S U L T S
Version 1.10

05/12/92 00:26:51

TEST DESCRIPTION

Data set..... DH2SLUG1.AQT
Data set title..... DH-2 SPRING CANYON SLUG INJECT. TEST #1
Company..... EarthFax Engineering
Project..... UC-192-06
Client..... CO-OP Mine
Location..... Huntington Canyon
Test date..... 9-25-91
Test well..... DH-1A

Knowns and Constants:

No. of data points	1293
Radius of well casing	0.0625
Radius of well	0.1
Aquifer saturated thickness	160
Well screen length	20
Static height of water in well	160
Log(Re/Rw)	5.446
A, B, C	0.000, 0.000, 6.905

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate	Std. Error
K =	8.9157E-006 +/-	1.2254E-006
y0 =	6.1118E-001 +/-	2.4554E-003

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:

Number of residuals	172
Number of estimated parameters	2
Degrees of freedom	170
Residual mean	4.871E-007
Residual standard deviation	0.01495
Residual variance	0.0002234

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.016667	0.74844	0.61101	0.13743	1
0.033333	0.7185	0.61084	0.10766	1
0.15	0.66861	0.60964	0.058968	1
0.16667	0.61871	0.60947	0.0092381	1
0.18333	0.60873	0.6093	-0.00057175	1
0.2	0.59875	0.60913	-0.010382	1
0.21667	0.59875	0.60896	-0.010211	1
0.25	0.59875	0.60862	-0.0098711	1
0.26667	0.59875	0.60845	-0.0097011	1
0.28333	0.59875	0.60828	-0.0095312	1
0.3	0.59875	0.60811	-0.0093612	1
0.31667	0.59875	0.60794	-0.0091913	1
0.33333	0.59875	0.60777	-0.0090215	1
0.35	0.59875	0.6076	-0.0088517	1
0.36667	0.59875	0.60743	-0.0086819	1
0.38333	0.59875	0.60726	-0.0085123	1
0.4	0.59875	0.60709	-0.0083426	1
0.41667	0.59875	0.60692	-0.008173	1
0.43333	0.59875	0.60675	-0.0080035	1
0.45	0.59875	0.60658	-0.007834	1
0.46667	0.59875	0.60641	-0.0076645	1
0.48333	0.59875	0.60625	-0.0074951	1
0.5	0.59875	0.60608	-0.0073257	1
0.51667	0.59875	0.60591	-0.0071564	1
0.53333	0.59875	0.60574	-0.0069872	1
0.55	0.59875	0.60557	-0.0068179	1
0.56667	0.59875	0.6054	-0.0066487	1
0.58333	0.59454	0.60523	-0.01069	1
0.6	0.59875	0.60506	-0.0063106	1
0.61667	0.59875	0.60489	-0.0061415	1
0.63333	0.59875	0.60472	-0.0059726	1
0.65	0.59875	0.60455	-0.0058036	1
0.66667	0.59875	0.60438	-0.0056347	1
0.68333	0.59875	0.60422	-0.0054659	1
0.7	0.59875	0.60405	-0.0052971	1
0.71667	0.59875	0.60388	-0.0051283	1
0.73333	0.59875	0.60371	-0.0049597	1
0.75	0.59875	0.60354	-0.004791	1
0.76667	0.59875	0.60337	-0.0046224	1
0.78333	0.59875	0.6032	-0.0044539	1
0.8	0.59875	0.60304	-0.0042853	1
0.81667	0.59875	0.60287	-0.0041168	1
0.83333	0.59875	0.6027	-0.0039485	1
0.85	0.59875	0.60253	-0.0037801	1
0.86667	0.59875	0.60236	-0.0036117	1
0.88333	0.59875	0.60219	-0.0034435	1
0.9	0.59875	0.60203	-0.0032752	1
0.91667	0.59875	0.60186	-0.003107	1
0.93333	0.59875	0.60169	-0.002939	1
0.95	0.59875	0.60152	-0.0027708	1
0.96667	0.59875	0.60135	-0.0026028	1
0.98333	0.59875	0.60118	-0.0024348	1

1	0.59875	0.60102	-0.0022668	1
1.0167	0.59875	0.60085	-0.0020986	1
1.0333	0.59875	0.60068	-0.0019314	1
1.05	0.59875	0.60051	-0.0017633	1
1.0667	0.59875	0.60035	-0.0015952	1
1.0833	0.59875	0.60018	-0.0014281	1
1.1	0.59875	0.60001	-0.0012601	1
1.1167	0.59875	0.59984	-0.0010922	1
1.1333	0.59875	0.59968	-0.00092529	1
1.15	0.59875	0.59951	-0.00075743	1
1.1667	0.59875	0.59934	-0.00058962	1
1.1833	0.59875	0.59917	-0.00042285	1
1.2	0.59454	0.59901	-0.0044651	1
1.2167	0.59875	0.59884	-8.746E-005	1
1.2333	0.59875	0.59867	7.9163E-005	1
1.25	0.59875	0.5985	0.00024674	1
1.2667	0.59875	0.59834	0.00041428	1
1.2833	0.59875	0.59817	0.00058076	1
1.3	0.59875	0.598	0.0007482	1
1.3167	0.59875	0.59783	0.00091559	1
1.3333	0.59875	0.59767	0.0010819	1
1.35	0.59875	0.5975	0.0012492	1
1.3667	0.59875	0.59733	0.0014165	1
1.3833	0.59875	0.59717	0.0015827	1
1.4	0.59875	0.597	0.0017498	1
1.4167	0.58877	0.59683	-0.008063	1
1.4333	0.59875	0.59667	0.002083	1
1.45	0.59875	0.5965	0.00225	1
1.4667	0.59875	0.59633	0.002417	1
1.4833	0.59875	0.59617	0.0025829	1
1.5	0.58877	0.596	-0.0072302	1
1.5167	0.58877	0.59583	-0.0070633	1
1.5333	0.58877	0.59567	-0.0068976	1
1.55	0.58877	0.5955	-0.0067308	1
1.5667	0.58877	0.59533	-0.0065641	1
1.5833	0.58877	0.59517	-0.0063985	1
1.6	0.58877	0.595	-0.0062319	1
1.6167	0.58877	0.59484	-0.0060653	1
1.6333	0.58877	0.59467	-0.0058998	1
1.65	0.58877	0.5945	-0.0057334	1
1.6667	0.58877	0.59434	-0.0055669	1
1.6833	0.58877	0.59417	-0.0054016	1
1.7	0.58877	0.59401	-0.0052353	1
1.7167	0.58877	0.59384	-0.005069	1
1.7333	0.58877	0.59367	-0.0049037	1
1.75	0.58877	0.59351	-0.0047376	1
1.7667	0.58877	0.59334	-0.0045714	1
1.7833	0.58877	0.59318	-0.0044063	1
1.8	0.58877	0.59301	-0.0042403	1
1.8167	0.58877	0.59284	-0.0040743	1
1.8333	0.58877	0.59268	-0.0039093	1
1.85	0.58877	0.59251	-0.0037434	1
1.8667	0.58877	0.59235	-0.0035776	1
1.8833	0.58877	0.59218	-0.0034128	1
1.9	0.58877	0.59202	-0.003247	1
1.9167	0.58877	0.59185	-0.0030813	1
1.9333	0.58877	0.59169	-0.0029166	1
1.95	0.58877	0.59152	-0.002751	1

1.9667	0.58877	0.59136	-0.0025854	1
1.9833	0.58877	0.59119	-0.0024209	1
2	0.58877	0.59103	-0.0022554	1
2.0167	0.58877	0.59086	-0.0020899	1
2.0333	0.58877	0.5907	-0.0019255	1
2.05	0.58877	0.59053	-0.0017602	1
2.0667	0.58877	0.59036	-0.0015949	1
2.0833	0.58877	0.5902	-0.0014306	1
2.1	0.58877	0.59004	-0.0012654	1
2.1167	0.58877	0.58987	-0.0011003	1
2.1333	0.58877	0.58971	-0.00093613	1
2.15	0.58877	0.58954	-0.00077105	1
2.1667	0.58877	0.58938	-0.00060603	1
2.1833	0.58877	0.58921	-0.00044204	1
2.2	0.58877	0.58905	-0.00027711	1
2.2167	0.58877	0.58888	-0.00011222	1
2.2333	0.58877	0.58872	5.163E-005	1
2.25	0.58877	0.58855	0.00021642	1
2.2667	0.58877	0.58839	0.00038117	1
2.2833	0.58877	0.58823	0.00054489	1
2.3	0.58877	0.58806	0.00070954	1
2.3167	0.58877	0.5879	0.00087415	1
2.3333	0.58877	0.58773	0.0010377	1
2.35	0.58877	0.58757	0.0012022	1
2.3667	0.58877	0.5874	0.0013667	1
2.3833	0.58877	0.58724	0.0015302	1
2.4	0.58877	0.58708	0.0016945	1
2.4167	0.58877	0.58691	0.0018589	1
2.4333	0.58877	0.58675	0.0020222	1
2.45	0.58877	0.58658	0.0021864	1
2.4667	0.58877	0.58642	0.0023506	1
2.4833	0.58456	0.58626	-0.0016962	1
2.5	0.58877	0.58609	0.0026779	1
2.5167	0.58877	0.58593	0.002842	1
2.5333	0.58877	0.58577	0.003005	1
2.55	0.58877	0.5856	0.0031689	1
2.5667	0.58456	0.58544	-0.00087713	1
2.5833	0.58877	0.58527	0.0034958	1
2.6	0.58877	0.58511	0.0036596	1
2.6167	0.58877	0.58495	0.0038234	1
2.6333	0.58877	0.58478	0.0039861	1
2.65	0.58877	0.58462	0.0041498	1
2.6667	0.58877	0.58446	0.0043135	1
2.6833	0.58877	0.58429	0.0044761	1
2.7	0.58877	0.58413	0.0046397	1
2.7167	0.58877	0.58397	0.0048032	1
2.7333	0.58877	0.5838	0.0049656	1
2.75	0.58877	0.58364	0.0051291	1
2.7667	0.58877	0.58348	0.0052924	1
2.7833	0.58877	0.58332	0.0054548	1
2.8	0.58877	0.58315	0.0056181	1
2.8167	0.58877	0.58299	0.0057813	1
2.8333	0.58877	0.58283	0.0059435	1
2.85	0.58877	0.58266	0.0061067	1
2.8667	0.58877	0.5825	0.0062698	1
2.8833	0.58877	0.58234	0.0064318	1
2.9	0.58877	0.58218	0.0065948	1
2.9167	0.58877	0.58201	0.0067578	1

2.9333	0.58877	0.58185	0.0069197	1
2.95	0.58877	0.58169	0.0070826	1
2.9667	0.58456	0.58152	0.0030354	1
2.9833	0.58877	0.58136	0.0074073	1

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	8.9157E-006
y0 =	6.1118E-001

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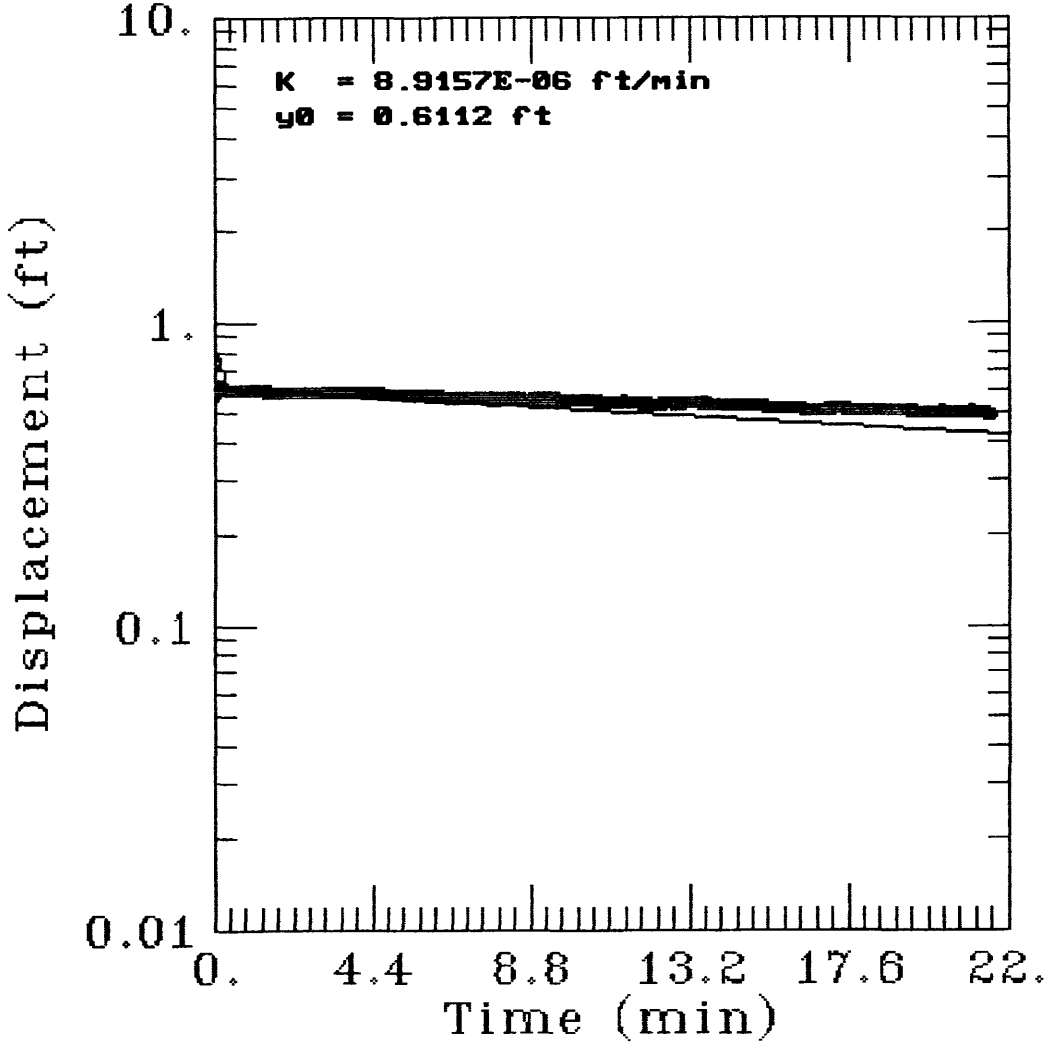
DH-2 SPRING CANYON SLUG INJECT. TEST #1



A Q T E S O L V R E S U L T S
Version 1.10

05/12/92 01:15:36

TEST DESCRIPTION

Data set..... STDH2S3.AQT
Data set title..... DH-2 STORRS SLUG INJECTION TEST #3
Company..... EarthFax Engineering
Project..... UC-192-06
Client..... CO-OP Mine
Location..... Huntington Canyon
Test date..... 9-25-91
Test well..... DH-1A

Knowns and Constants:
- No. of data points..... 941
- Radius of well casing..... 0.1
- Radius of well..... 0.1
- Aquifer saturated thickness..... 106
- Well screen length..... 104
- Static height of water in well..... 335
- Log(Re/Rw)..... 6.78
- A, B, C..... 0.000, 0.000, 12.441

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate	Std. Error
K =	5.4463E-002 +/-	5.0463E-002
y0 =	8.2896E-001 +/-	4.4838E-001

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
- Number of residuals..... 4
- Number of estimated parameters.... 2
- Degrees of freedom..... 2
- Residual mean..... 0.00599
- Residual standard deviation..... 0.2297
- Residual variance..... 0.05277

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.0016667	0.75421	0.62748	0.12673	1
0.0033333	0.24438	0.47497	-0.23059	1
0.005	0.30484	0.35953	-0.054688	1
0.0066667	0.45465	0.27214	0.18251	1

==

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

```
         Estimate
K  =    5.4463E-002
y0 =    8.2896E-001
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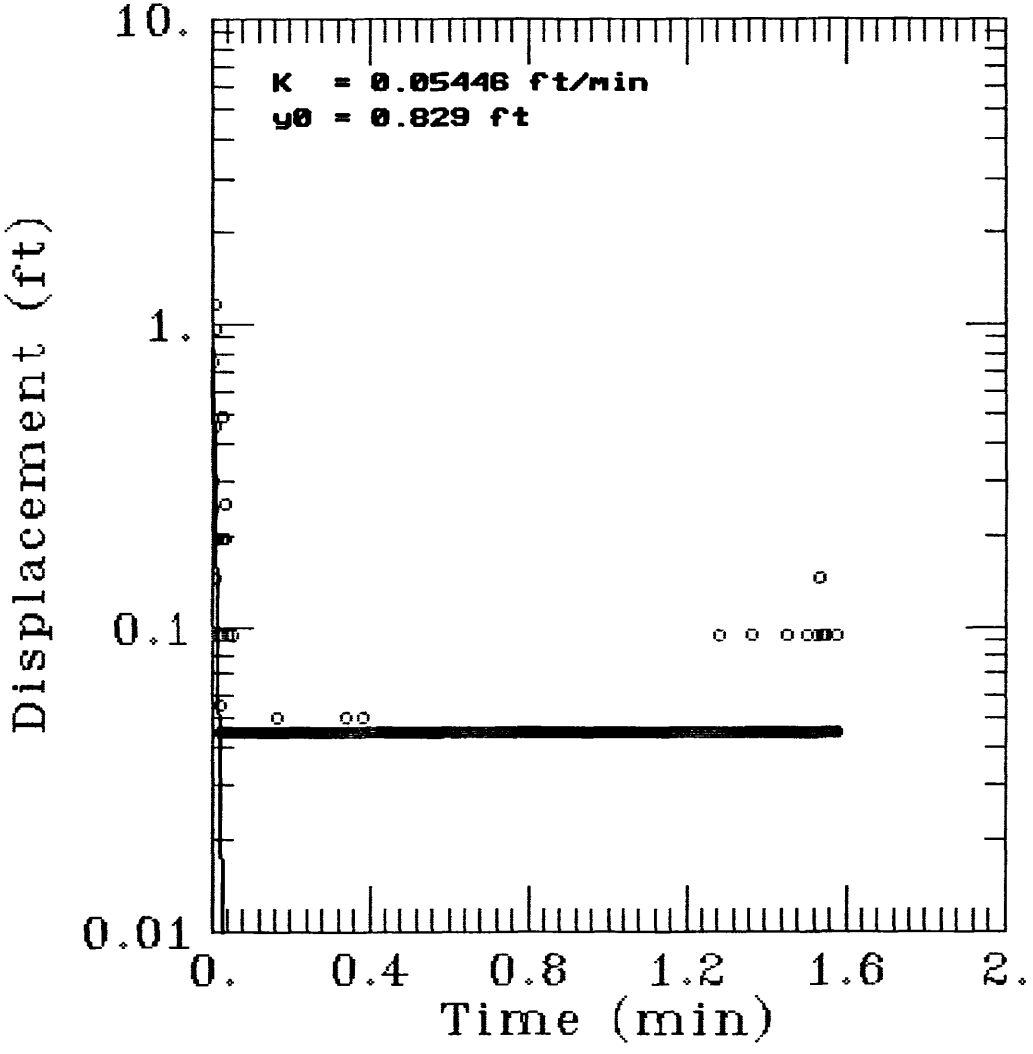
DH-2 STORRS SLUG INJECTION TEST #3



A Q T E S O L V R E S U L T S
Version 1.10

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TEST DESCRIPTION

Data set..... DH2PANS2.AQT
Data set title..... DH-2 PANTHER SLUG INJECTION TEST #2
Company..... EARTHFAX ENGINEERING
Project..... UC-192-06
Client..... CO-OP MINE
Location..... BEAR CANYON MINE
Test date..... 1-17-92
Test well..... DH-2

Knowns and Constants:
- No. of data points..... 1389
- Radius of well casing..... 0.1
- Radius of well..... 0.1
- Aquifer saturated thickness..... 88
- Well screen length..... 86
- Static height of water in well..... 190
- Log(Re/Rw)..... 6.259
- A, B, C..... 0.000, 0.000, 12.108

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ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

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RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	1.7629E-005	+/-	1.1944E-006
y0 =	5.7739E-001	+/-	5.0445E-003

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
- Number of residuals..... 287
- Number of estimated parameters.... 2
- Degrees of freedom..... 285
- Residual mean..... -1.023E-005
- Residual standard deviation..... 0.03926
- Residual variance..... 0.001541

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.083333	0.54905	0.57506	-0.02601	1
0.1	0.54905	0.5746	-0.025546	1
0.11667	0.54905	0.57413	-0.025083	1
0.13333	0.54905	0.57367	-0.024619	1
0.15	0.62737	0.57321	0.054164	1
0.16667	0.57747	0.57274	0.0047266	1
0.18333	0.54905	0.57228	-0.023231	1
0.2	0.54905	0.57182	-0.022769	1
0.21667	0.54905	0.57136	-0.022308	1
0.23333	0.54905	0.5709	-0.021846	1
0.25	0.3494	0.57044	-0.22104	1
0.26667	0.44922	0.56998	-0.12076	1
0.28333	0.827	0.56952	0.25748	1
0.3	0.49914	0.56906	-0.069915	1
0.31667	0.57747	0.5686	0.0088739	1
0.33333	0.54905	0.56814	-0.019087	1
0.35	0.57747	0.56768	0.0097914	1
0.36667	0.54905	0.56722	-0.01817	1
0.38333	0.54905	0.56676	-0.017713	1
0.4	0.54905	0.56631	-0.017255	1
0.41667	0.54905	0.56585	-0.016798	1
0.43333	0.54905	0.56539	-0.016341	1
0.45	0.54905	0.56493	-0.015885	1
0.46667	0.57747	0.56448	0.012991	1
0.48333	0.54905	0.56402	-0.014973	1
0.5	0.57747	0.56357	0.013902	1
0.51667	0.54905	0.56311	-0.014063	1
0.53333	0.57747	0.56266	0.014811	1
0.55	0.54905	0.5622	-0.013154	1
0.56667	0.54905	0.56175	-0.012701	1
0.58333	0.54905	0.5613	-0.012247	1
0.6	0.57747	0.56084	0.016626	1
0.61667	0.54905	0.56039	-0.011341	1
0.63333	0.54905	0.55994	-0.010889	1
0.65	0.57747	0.55949	0.017983	1
0.66667	0.54905	0.55904	-0.0099855	1
0.68333	0.54905	0.55858	-0.0095343	1
0.7	0.54905	0.55813	-0.0090834	1
0.71667	0.54905	0.55768	-0.0086329	1
0.73333	0.54905	0.55723	-0.0081828	1
0.75	0.54905	0.55678	-0.007733	1
0.76667	0.54905	0.55633	-0.0072836	1
0.78333	0.57747	0.55588	0.021585	1
0.8	0.54905	0.55544	-0.0063858	1
0.81667	0.57747	0.55499	0.022483	1
0.83333	0.67728	0.55454	0.12274	1
0.85	0.14974	0.55409	-0.40435	1
0.86667	0.64887	0.55364	0.095225	1
0.88333	0.54905	0.5532	-0.0041478	1
0.9	0.54905	0.55275	-0.0037013	1
0.91667	0.57747	0.55231	0.025165	1
0.93333	0.54905	0.55186	-0.0028093	1

0.95	0.54905	0.55141	-0.0023639	1
0.96667	0.57747	0.55097	0.026501	1
0.98333	0.54905	0.55052	-0.0014741	1
1	0.54905	0.55008	-0.0010297	1
1.0167	0.54905	0.54964	-0.0005856	1
1.0333	0.57747	0.54919	0.028278	1
1.05	0.57747	0.54875	0.028721	1
1.0667	0.57747	0.54831	0.029164	1
1.0833	0.57747	0.54786	0.029607	1
1.1	0.54905	0.54742	0.001629	1
1.1167	0.57747	0.54698	0.030491	1
1.1333	0.54905	0.54654	0.0025122	1
1.15	0.57747	0.5461	0.031373	1
1.1667	0.54905	0.54566	0.0033944	1
1.1833	0.57747	0.54522	0.032255	1
1.2	0.54905	0.54478	0.0042748	1
1.2167	0.57747	0.54434	0.033135	1
1.2333	0.54905	0.5439	0.0051538	1
1.25	0.54905	0.54346	0.0055929	1
1.2667	0.54905	0.54302	0.0060316	1
1.2833	0.54905	0.54258	0.0064698	1
1.3	0.57747	0.54214	0.035328	1
1.3167	0.54905	0.5417	0.0073455	1
1.3333	0.54905	0.54127	0.0077826	1
1.35	0.57747	0.54083	0.03664	1
1.3667	0.57747	0.54039	0.037076	1
1.3833	0.57747	0.53996	0.037512	1
1.4	0.54905	0.53952	0.0095281	1
1.4167	0.54905	0.53909	0.0099637	1
1.4333	0.57747	0.53865	0.038819	1
1.45	0.57747	0.53822	0.039254	1
1.4667	0.57747	0.53778	0.039688	1
1.4833	0.57747	0.53735	0.040122	1
1.5	0.57747	0.53691	0.040556	1
1.5167	0.57747	0.53648	0.040989	1
1.5333	0.57747	0.53605	0.041422	1
1.55	0.54905	0.53562	0.013435	1
1.5667	0.54905	0.53518	0.013867	1
1.5833	0.52757	0.53475	-0.0071809	1
1.6	0.52757	0.53432	-0.0067492	1
1.6167	0.57747	0.53389	0.043582	1
1.6333	0.57747	0.53346	0.044013	1
1.65	0.52757	0.53303	-0.0054564	1
1.6667	0.54905	0.5326	0.016454	1
1.6833	0.49914	0.53217	-0.033026	1
1.7	0.52757	0.53174	-0.0041667	1
1.7167	0.57747	0.53131	0.046163	1
1.7333	0.54905	0.53088	0.018171	1
1.75	0.49914	0.53045	-0.03131	1
1.7667	0.54905	0.53002	0.019028	1
1.7833	0.49914	0.52959	-0.030454	1
1.8	0.49914	0.52917	-0.030027	1
1.8167	0.49914	0.52874	-0.0296	1
1.8333	0.49914	0.52831	-0.029173	1
1.85	0.52757	0.52789	-0.00031639	1
1.8667	0.52757	0.52746	0.00010979	1
1.8833	0.52757	0.52703	0.00053537	1
1.9	0.54905	0.52661	0.022441	1

1.9167	0.49914	0.52618	-0.027044	1
1.9333	0.52757	0.52576	0.0018105	1
1.95	0.49914	0.52533	-0.026195	1
1.9667	0.52757	0.52491	0.0026591	1
1.9833	0.54905	0.52449	0.024563	1
2	0.49914	0.52406	-0.024924	1
2.0167	0.54905	0.52364	0.025409	1
2.0333	0.49914	0.52322	-0.024078	1
2.05	0.52757	0.5228	0.0047741	1
2.0667	0.52757	0.52237	0.0051961	1
2.0833	0.49914	0.52195	-0.022812	1
2.1	0.49914	0.52153	-0.022391	1
2.1167	0.49914	0.52111	-0.02197	1
2.1333	0.49914	0.52069	-0.021549	1
2.15	0.52757	0.52027	0.0073009	1
2.1667	0.52757	0.51985	0.0077209	1
2.1833	0.52757	0.51943	0.0081403	1
2.2	0.52757	0.51901	0.0085597	1
2.2167	0.52757	0.51859	0.0089787	1
2.2333	0.52757	0.51817	0.0093971	1
2.25	0.52757	0.51775	0.0098155	1
2.2667	0.52757	0.51734	0.010233	1
2.2833	0.49914	0.51692	-0.017779	1
2.3	0.49914	0.5165	-0.017362	1
2.3167	0.49914	0.51608	-0.016945	1
2.3333	0.49914	0.51567	-0.016528	1
2.35	0.49914	0.51525	-0.016112	1
2.3667	0.52757	0.51484	0.012734	1
2.3833	0.49914	0.51442	-0.015281	1
2.4	0.49914	0.51401	-0.014865	1
2.4167	0.49914	0.51359	-0.01445	1
2.4333	0.49914	0.51318	-0.014036	1
2.45	0.49914	0.51276	-0.013622	1
2.4667	0.49914	0.51235	-0.013208	1
2.4833	0.49914	0.51193	-0.012794	1
2.5	0.49914	0.51152	-0.012381	1
2.5167	0.49914	0.51111	-0.011968	1
2.5333	0.49914	0.5107	-0.011556	1
2.55	0.49914	0.51028	-0.011143	1
2.5667	0.52757	0.50987	0.017698	1
2.5833	0.52757	0.50946	0.01811	1
2.6	0.52757	0.50905	0.018521	1
2.6167	0.52757	0.50864	0.018932	1
2.6333	0.52757	0.50823	0.019343	1
2.65	0.49914	0.50782	-0.0086772	1
2.6667	0.52757	0.50741	0.020163	1
2.6833	0.49914	0.507	-0.0078578	1
2.7	0.49914	0.50659	-0.0074485	1
2.7167	0.49914	0.50618	-0.0070395	1
2.7333	0.52757	0.50577	0.021799	1
2.75	0.52757	0.50536	0.022207	1
2.7667	0.52757	0.50495	0.022615	1
2.7833	0.49914	0.50455	-0.0054074	1
2.8	0.49914	0.50414	-0.005	1
2.8167	0.49914	0.50373	-0.004593	1
2.8333	0.52757	0.50333	0.024243	1
2.85	0.52757	0.50292	0.02465	1
2.8667	0.49914	0.50251	-0.0033742	1

2.8833	0.49914	0.50211	-0.0029688	1
2.9	0.49914	0.5017	-0.0025634	1
2.9167	0.52757	0.5013	0.026272	1
2.9333	0.52757	0.50089	0.026676	1
2.95	0.52757	0.50049	0.02708	1
2.9667	0.52757	0.50009	0.027485	1
2.9833	0.49914	0.49968	-0.00054196	1
3	0.49914	0.49928	-0.00013855	1
3.0167	0.49914	0.49888	0.00026453	1
3.0333	0.49914	0.49847	0.00066705	1
3.05	0.49914	0.49807	0.0010695	1
3.0667	0.49914	0.49767	0.0014716	1
3.0833	0.52757	0.49727	0.030303	1
3.1	0.52757	0.49687	0.030705	1
3.1167	0.49914	0.49646	0.0026757	1
3.1333	0.49914	0.49606	0.0030763	1
3.15	0.49914	0.49566	0.0034768	1
3.1667	0.52757	0.49526	0.032307	1
3.1833	0.52757	0.49486	0.032707	1
3.2	0.52757	0.49446	0.033106	1
3.2167	0.49914	0.49406	0.0050752	1
3.2333	0.49914	0.49367	0.0054739	1
3.25	0.52757	0.49327	0.034302	1
3.2667	0.49914	0.49287	0.0062707	1
3.2833	0.49914	0.49247	0.0066683	1
3.3	0.49914	0.49207	0.0070659	1
3.3167	0.52757	0.49168	0.035893	1
3.3333	0.49914	0.49128	0.0078599	1
3.35	0.52757	0.49088	0.036687	1
3.3667	0.49914	0.49049	0.0086528	1
3.3833	0.49914	0.49009	0.0090486	1
3.4	0.49914	0.4897	0.0094442	1
3.4167	0.49914	0.4893	0.0098396	1
3.4333	0.44922	0.48891	-0.039686	1
3.45	0.47766	0.48851	-0.010851	1
3.4667	0.52757	0.48812	0.039453	1
3.4833	0.52757	0.48772	0.039847	1
3.5	0.49914	0.48733	0.011811	1
3.5167	0.49914	0.48694	0.012204	1
3.5333	0.52757	0.48654	0.041027	1
3.55	0.44922	0.48615	-0.03693	1
3.5667	0.44922	0.48576	-0.036537	1
3.5833	0.44922	0.48537	-0.036145	1
3.6	0.47766	0.48497	-0.0073136	1
3.6167	0.44922	0.48458	-0.035362	1
3.6333	0.47766	0.48419	-0.0065311	1
3.65	0.47766	0.4838	-0.0061402	1
3.6667	0.49914	0.48341	0.01573	1
3.6833	0.44922	0.48302	-0.0338	1
3.7	0.47766	0.48263	-0.0049696	1
3.7167	0.44922	0.48224	-0.03302	1
3.7333	0.44922	0.48185	-0.032631	1
3.75	0.44922	0.48146	-0.032242	1
3.7667	0.47766	0.48107	-0.0034132	1
3.7833	0.47766	0.48069	-0.003025	1
3.8	0.44922	0.4803	-0.031077	1
3.8167	0.44922	0.47991	-0.030689	1
3.8333	0.47766	0.47952	-0.001862	1

3.85	0.49914	0.47913	0.020005	1
3.8667	0.44922	0.47875	-0.029528	1
3.8833	0.44922	0.47836	-0.029142	1
3.9	0.47766	0.47798	-0.00031556	1
3.9167	0.49914	0.47759	0.02155	1
3.9333	0.44922	0.4772	-0.027984	1
3.95	0.44922	0.47682	-0.027599	1
3.9667	0.47766	0.47643	0.0012259	1
3.9833	0.49914	0.47605	0.02309	1
4	0.44922	0.47567	-0.026445	1
4.0167	0.44922	0.47528	-0.026061	1
4.0333	0.47766	0.4749	0.0027621	1
4.05	0.47766	0.47451	0.0031455	1
4.0667	0.44922	0.47413	-0.024911	1
4.0833	0.47766	0.47375	0.0039111	1
4.1	0.47766	0.47337	0.0042936	1
4.1167	0.44922	0.47298	-0.023764	1
4.1333	0.44922	0.4726	-0.023383	1
4.15	0.47766	0.47222	0.0054389	1
4.1667	0.47766	0.47184	0.0058202	1
4.1833	0.44922	0.47146	-0.022239	1
4.2	0.44922	0.47108	-0.021859	1
4.2167	0.44922	0.4707	-0.021478	1
4.2333	0.47766	0.47032	0.0073416	1
4.25	0.47766	0.46994	0.0077213	1
4.2667	0.44922	0.46956	-0.020339	1
4.2833	0.44922	0.46918	-0.01996	1
4.3	0.47766	0.4688	0.0088583	1
4.3167	0.47766	0.46842	0.0092368	1
4.3333	0.44922	0.46805	-0.018825	1
4.35	0.44922	0.46767	-0.018447	1
4.3667	0.47766	0.46729	0.01037	1
4.3833	0.44922	0.46691	-0.017693	1
4.4	0.44922	0.46654	-0.017316	1
4.4167	0.47766	0.46616	0.011501	1
4.4333	0.47766	0.46578	0.011877	1
4.45	0.44922	0.46541	-0.016187	1
4.4667	0.44922	0.46503	-0.015811	1
4.4833	0.44922	0.46466	-0.015436	1
4.5	0.47766	0.46428	0.013379	1
4.5167	0.44922	0.46391	-0.014686	1
4.5333	0.44922	0.46353	-0.014312	1
4.55	0.44922	0.46316	-0.013938	1
4.5667	0.47766	0.46278	0.014876	1
4.5833	0.47766	0.46241	0.01525	1
4.6	0.44922	0.46204	-0.012817	1
4.6167	0.44922	0.46166	-0.012444	1
4.6333	0.47766	0.46129	0.016369	1
4.65	0.44922	0.46092	-0.011699	1
4.6667	0.44922	0.46055	-0.011327	1
4.6833	0.44922	0.46018	-0.010955	1
4.7	0.47766	0.4598	0.017856	1
4.7167	0.44922	0.45943	-0.010213	1
4.7333	0.44922	0.45906	-0.009842	1
4.75	0.44922	0.45869	-0.0094713	1
4.7667	0.47766	0.45832	0.019339	1
4.7833	0.44922	0.45795	-0.0087312	1
4.8	0.44922	0.45758	-0.0083615	1

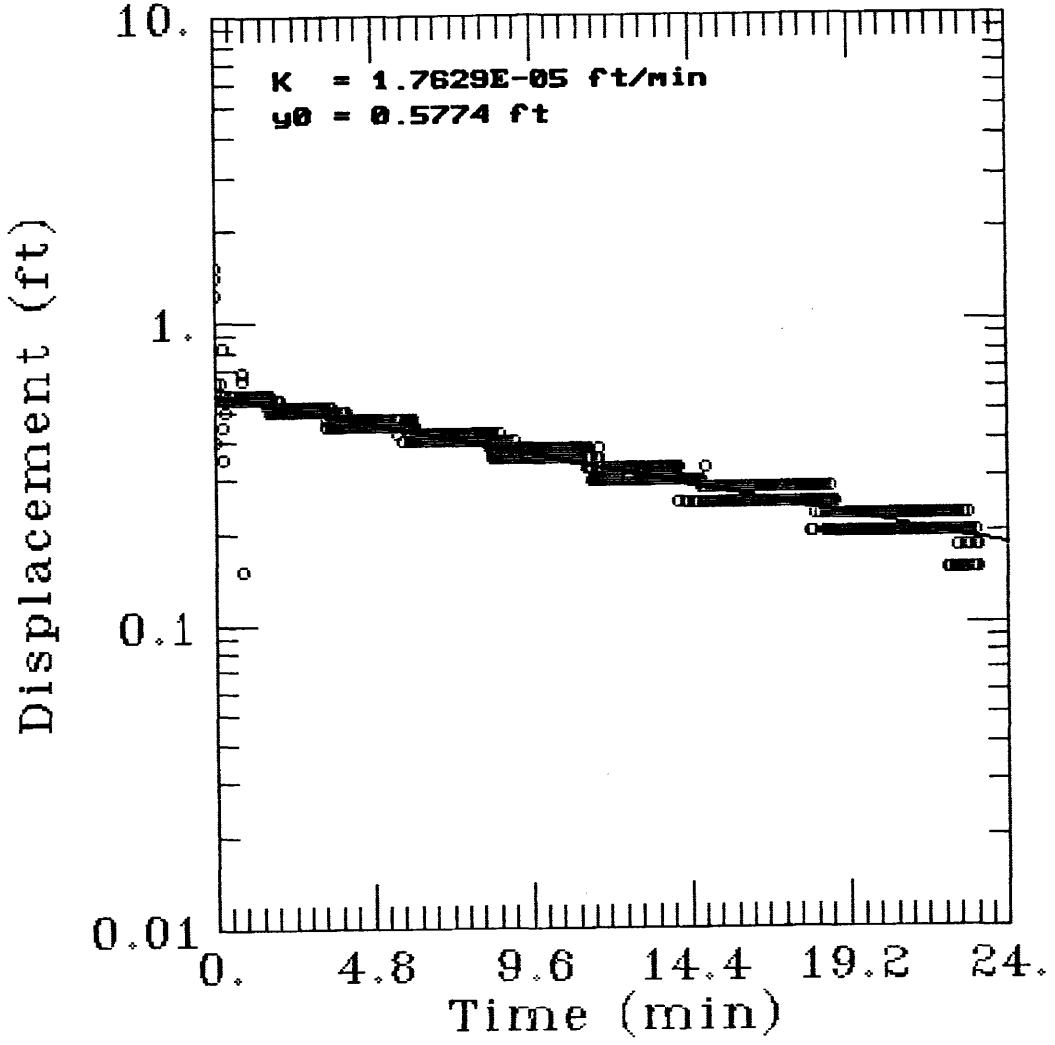
4.8167	0.47766	0.45721	0.020448	1
4.8333	0.47766	0.45684	0.020817	1
4.85	0.47766	0.45647	0.021186	1

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	1.7629E-005
y0 =	5.7739E-001

DH-2 PANTHER SLUG INJECTION TEST #2



A Q T E S O L V R E S U L T S
Version 1.10

05/12/92 00:31:40

TEST DESCRIPTION

Data set..... DH3SLUG1.AQT
Data set title..... DH-3 SPRING CANYON SLUG INJECT. TEST #1
Company..... EarthFax Engineering
Project..... UC-192-06
Client..... CO-OP Mine
Location..... Huntington Canyon
Test date..... 9-25-91
Test well..... DH-1A

Knowns and Constants:

No. of data points	1684
Radius of well casing	0.1
Radius of well	0.1
Aquifer saturated thickness	50
Well screen length	20
Static height of water in well	50
Log(Re/Rw)	4.728
A, B, C	0.000, 0.000, 6.905

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate	Std. Error
K =	4.0617E-005 +/-	3.2767E-006
y0 =	6.0298E-001 +/-	2.8161E-003

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:

Number of residuals	179
Number of estimated parameters	2
Degrees of freedom	177
Residual mean	1.704E-006
Residual standard deviation	0.01828
Residual variance	0.0003342

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.016667	0.7684	0.60264	0.16576	1
0.033333	0.75842	0.60229	0.15613	1
0.05	0.57879	0.60195	-0.02316	1
0.066667	0.56882	0.6016	-0.032785	1
0.083333	0.59875	0.60126	-0.0025104	1
0.1	0.59875	0.60092	-0.0021661	1
0.11667	0.59875	0.60057	-0.001822	1
0.13333	0.59875	0.60023	-0.0014782	1
0.15	0.59875	0.59988	-0.0011344	1
0.16667	0.59875	0.59954	-0.00079087	1
0.18333	0.59875	0.5992	-0.0004477	1
0.2	0.58877	0.59885	-0.010085	1
0.21667	0.59875	0.59851	0.00023845	1
0.23333	0.59875	0.59817	0.00058102	1
0.25	0.59875	0.59783	0.00092361	1
0.26667	0.58877	0.59748	-0.008714	1
0.28333	0.58877	0.59714	-0.008372	1
0.3	0.58877	0.5968	-0.00803	1
0.31667	0.58877	0.59646	-0.0076882	1
0.33333	0.58877	0.59612	-0.0073468	1
0.35	0.58877	0.59578	-0.0070054	1
0.36667	0.58877	0.59543	-0.0066642	1
0.38333	0.58877	0.59509	-0.0063234	1
0.4	0.58877	0.59475	-0.0059826	1
0.41667	0.58877	0.59441	-0.0056419	1
0.43333	0.58877	0.59407	-0.0053017	1
0.45	0.58877	0.59373	-0.0049615	1
0.46667	0.58877	0.59339	-0.0046214	1
0.48333	0.58877	0.59305	-0.0042818	1
0.5	0.58877	0.59271	-0.0039421	1
0.51667	0.58877	0.59237	-0.0036027	1
0.53333	0.58877	0.59203	-0.0032636	1
0.55	0.58877	0.59169	-0.0029245	1
0.56667	0.58877	0.59136	-0.0025857	1
0.58333	0.58877	0.59102	-0.0022472	1
0.6	0.58877	0.59068	-0.0019087	1
0.61667	0.58877	0.59034	-0.0015704	1
0.63333	0.57879	0.59	-0.011212	1
0.65	0.58877	0.58966	-0.00089459	1
0.66667	0.58877	0.58933	-0.00055688	1
0.68333	0.57879	0.58899	-0.010199	1
0.7	0.57879	0.58865	-0.0098622	1
0.71667	0.57879	0.58832	-0.0095252	1
0.73333	0.57879	0.58798	-0.0091883	1
0.75	0.57879	0.58764	-0.0088516	1
0.76667	0.57879	0.58731	-0.0085151	1
0.78333	0.58877	0.58697	0.0018012	1
0.8	0.57879	0.58663	-0.0078427	1
0.81667	0.57879	0.5863	-0.0075068	1
0.83333	0.57879	0.58596	-0.0071711	1
0.85	0.57879	0.58563	-0.0068356	1
0.86667	0.57879	0.58529	-0.0065002	1

0.88333	0.57879	0.58496	-0.0061651	1
0.9	0.57879	0.58462	-0.0058301	1
0.91667	0.57879	0.58429	-0.0054954	1
0.93333	0.57879	0.58395	-0.0051608	1
0.95	0.57879	0.58362	-0.0048264	1
0.96667	0.57879	0.58328	-0.0044923	1
0.98333	0.57879	0.58295	-0.0041583	1
1	0.57879	0.58261	-0.0038245	1
1.0167	0.57879	0.58228	-0.0034908	1
1.0333	0.57879	0.58195	-0.0031575	1
1.05	0.57879	0.58161	-0.0028242	1
1.0667	0.57879	0.58128	-0.0024911	1
1.0833	0.57879	0.58095	-0.0021584	1
1.1	0.57879	0.58062	-0.0018257	1
1.1167	0.57879	0.58028	-0.0014931	1
1.1333	0.57879	0.57995	-0.001161	1
1.15	0.57879	0.57962	-0.00082885	1
1.1667	0.57879	0.57929	-0.00049689	1
1.1833	0.57879	0.57896	-0.00016532	1
1.2	0.57879	0.57862	0.00016626	1
1.2167	0.57879	0.57829	0.00049765	1
1.2333	0.57879	0.57796	0.00082865	1
1.25	0.57879	0.57763	0.0011597	1
1.2667	0.56882	0.5773	-0.0084795	1
1.2833	0.57879	0.57697	0.0018209	1
1.3	0.56882	0.57664	-0.0078186	1
1.3167	0.57879	0.57631	0.0024816	1
1.3333	0.56882	0.57598	-0.0071585	1
1.35	0.56882	0.57565	-0.0068286	1
1.3667	0.56882	0.57532	-0.006499	1
1.3833	0.56882	0.57499	-0.0061697	1
1.4	0.56882	0.57466	-0.0058403	1
1.4167	0.56882	0.57433	-0.0055112	1
1.4333	0.56882	0.574	-0.0051825	1
1.45	0.56882	0.57367	-0.0048537	1
1.4667	0.56882	0.57335	-0.0045252	1
1.4833	0.56882	0.57302	-0.004197	1
1.5	0.56882	0.57269	-0.0038688	1
1.5167	0.56882	0.57236	-0.0035408	1
1.5333	0.56882	0.57203	-0.0032132	1
1.55	0.56882	0.57171	-0.0028856	1
1.5667	0.56882	0.57138	-0.0025582	1
1.5833	0.56882	0.57105	-0.0022312	1
1.6	0.56882	0.57072	-0.0019041	1
1.6167	0.56882	0.5704	-0.0015772	1
1.6333	0.56882	0.57007	-0.0012507	1
1.65	0.56882	0.56974	-0.00092426	1
1.6667	0.56882	0.56942	-0.00059795	1
1.6833	0.56882	0.56909	-0.00027203	1
1.7	0.56882	0.56877	5.3903E-005	1
1.7167	0.5289	0.56844	-0.03954	1
1.7333	0.56882	0.56811	0.00070501	1
1.75	0.56882	0.56779	0.0010304	1
1.7667	0.56882	0.56746	0.0013556	1
1.7833	0.55884	0.56714	-0.0082996	1
1.8	0.56882	0.56681	0.0020052	1
1.8167	0.56882	0.56649	0.0023298	1
1.8333	0.56882	0.56617	0.0026541	1

1.85	0.56882	0.56584	0.0029783	1
1.8667	0.55884	0.56552	-0.0066776	1
1.8833	0.56882	0.56519	0.0036261	1
1.9	0.56882	0.56487	0.0039498	1
1.9167	0.56882	0.56455	0.0042733	1
1.9333	0.56882	0.56422	0.0045964	1
1.95	0.56882	0.5639	0.0049196	1
1.9667	0.56882	0.56358	0.0052425	1
1.9833	0.55884	0.56325	-0.0044149	1
2	0.55884	0.56293	-0.0040923	1
2.0167	0.55884	0.56261	-0.0037699	1
2.0333	0.55884	0.56229	-0.0034479	1
2.05	0.55884	0.56197	-0.0031258	1
2.0667	0.55884	0.56164	-0.002804	1
2.0833	0.55884	0.56132	-0.0024825	1
2.1	0.57879	0.561	0.017789	1
2.1167	0.56882	0.56068	0.0081403	1
2.1333	0.56882	0.56036	0.0084612	1
2.15	0.55884	0.56004	-0.0011979	1
2.1667	0.55884	0.55972	-0.00087714	1
2.1833	0.55884	0.5594	-0.00055677	1
2.2	0.55884	0.55908	-0.00023639	1
2.2167	0.55884	0.55876	8.3802E-005	1
2.2333	0.55884	0.55844	0.00040362	1
2.25	0.55884	0.55812	0.00072345	1
2.2667	0.55884	0.5578	0.0010431	1
2.2833	0.55884	0.55748	0.0013624	1
2.3	0.55884	0.55716	0.0016816	1
2.3167	0.55884	0.55684	0.0020007	1
2.3333	0.55884	0.55652	0.0023195	1
2.35	0.55884	0.5562	0.0026382	1
2.3667	0.55884	0.55588	0.0029567	1
2.3833	0.55884	0.55557	0.0032749	1
2.4	0.55884	0.55525	0.0035931	1
2.4167	0.55884	0.55493	0.0039111	1
2.4333	0.56882	0.55461	0.014209	1
2.45	0.55884	0.55429	0.0045464	1
2.4667	0.55884	0.55398	0.0048638	1
2.4833	0.55884	0.55366	0.0051809	1
2.5	0.55884	0.55334	0.005498	1
2.5167	0.55884	0.55303	0.0058149	1
2.5333	0.54886	0.55271	-0.0038485	1
2.55	0.55884	0.55239	0.006448	1
2.5667	0.55884	0.55208	0.0067644	1
2.5833	0.55884	0.55176	0.0070804	1
2.6	0.55884	0.55144	0.0073964	1
2.6167	0.54886	0.55113	-0.0022678	1
2.6333	0.55884	0.55081	0.0080277	1
2.65	0.54886	0.5505	-0.0016369	1
2.6667	0.54886	0.55018	-0.0013216	1
2.6833	0.54886	0.54987	-0.0010067	1
2.7	0.54886	0.54955	-0.00069177	1
2.7167	0.54886	0.54924	-0.00037703	1
2.7333	0.54886	0.54892	-6.2655E-005	1
2.75	0.54886	0.54861	0.00025173	1
2.7667	0.54886	0.54829	0.00056593	1
2.7833	0.54886	0.54798	0.00087976	1
2.8	0.54886	0.54767	0.0011936	1

2.8167	0.54886	0.54735	0.0015073	1
2.8333	0.54886	0.54704	0.0018206	1
2.85	0.54886	0.54673	0.0021339	1
2.8667	0.54886	0.54641	0.002447	1
2.8833	0.54886	0.5461	0.0027597	1
2.9	0.54886	0.54579	0.0030725	1
2.9167	0.54886	0.54547	0.0033856	1
2.9333	0.54886	0.54516	0.0036967	1
2.95	0.54886	0.54485	0.0040095	1
2.9667	0.54886	0.54454	0.0043221	1
2.9833	0.54886	0.54423	0.0046327	1

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	4.0617E-005
y0 =	6.0298E-001

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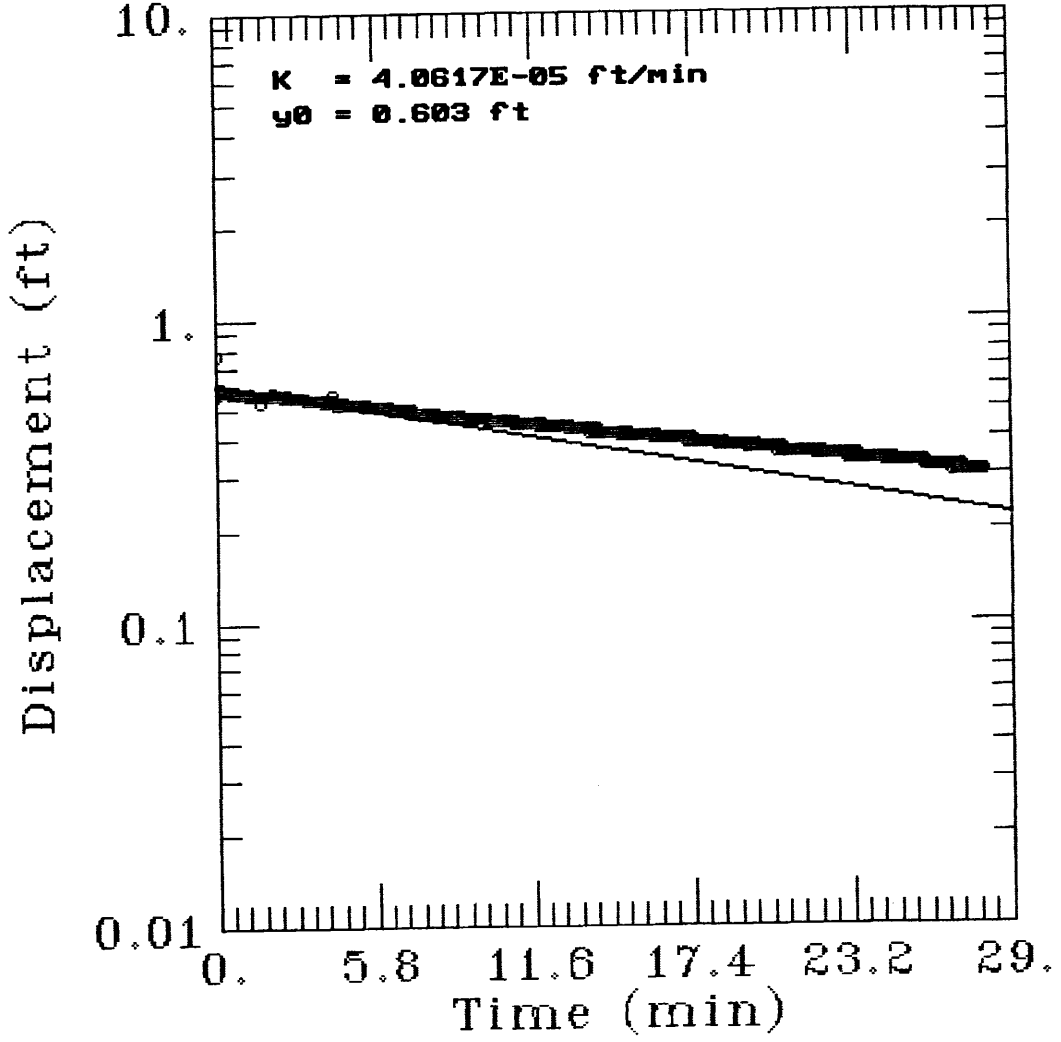
DH-3 SPRING CANYON SLUG INJECT. TEST #1



A Q T E S O L V R E S U L T S
Version 1.10

05/12/92 02:15:19

TEST DESCRIPTION

Data set..... DH3STSL2.AQT
Data set title..... DH-3 STORRS SLUG INJECTION TEST #2

Knowns and Constants:

No. of data points	2000
Radius of well casing	0.1
Radius of well	0.1
Aquifer saturated thickness	127
Well screen length	110
Static height of water in well	127
Log(Re/Rw)	6.05
A, B, C	0.000, 0.000, 12.519

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate	Std. Error
K =	5.9972E-006 +/-	3.7281E-008
y0 =	6.3024E-001 +/-	1.3504E-003

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:

Number of residuals	1996
Number of estimated parameters	2
Degrees of freedom	1994
Residual mean	-0.0002397
Residual standard deviation	0.02511
Residual variance	0.0006303

Model Residuals:

Time	Observed	Calculated	Residual	Weight

0.2	0.74344	0.62749	0.11595	1
0.21667	0.54375	0.62726	-0.083514	1
0.23333	0.59917	0.62704	-0.027866	1
0.25	0.59367	0.62681	-0.033138	1
0.26667	0.54924	0.62658	-0.077341	1
0.28333	0.59917	0.62635	-0.027183	1
0.31667	0.59367	0.6259	-0.032228	1
0.33333	0.59367	0.62567	-0.032	1
0.35	0.59917	0.62544	-0.026273	1
0.36667	0.59367	0.62522	-0.031546	1
0.38333	0.59917	0.62499	-0.025818	1
0.4	0.59367	0.62476	-0.031091	1
0.41667	0.64359	0.62453	0.019056	1
0.43333	0.59367	0.62431	-0.030637	1
0.45	0.69352	0.62408	0.06944	1
0.46667	0.54375	0.62385	-0.080104	1
0.48333	0.54924	0.62363	-0.074387	1
0.5	0.59367	0.6234	-0.02973	1
0.51667	0.59367	0.62317	-0.029504	1
0.53333	0.59367	0.62295	-0.029277	1
0.55	0.59367	0.62272	-0.029051	1
0.56667	0.59917	0.62249	-0.023324	1
0.58333	0.59917	0.62227	-0.023098	1
0.6	0.59917	0.62204	-0.022872	1
0.61667	0.59367	0.62182	-0.028146	1
0.63333	0.59367	0.62159	-0.02792	1
0.65	0.59367	0.62136	-0.027694	1
0.66667	0.54924	0.62114	-0.071898	1
0.68333	0.59367	0.62091	-0.027243	1
0.7	0.59367	0.62069	-0.027017	1
0.71667	0.59367	0.62046	-0.026791	1
0.73333	0.59367	0.62024	-0.026566	1
0.75	0.59367	0.62001	-0.026341	1
0.76667	0.54924	0.61979	-0.070545	1
0.78333	0.59367	0.61956	-0.02589	1
0.8	0.59367	0.61933	-0.025665	1
0.81667	0.59367	0.61911	-0.02544	1
0.83333	0.59367	0.61888	-0.025215	1
0.85	0.54924	0.61866	-0.06942	1
0.86667	0.59367	0.61844	-0.024765	1
0.88333	0.59367	0.61821	-0.02454	1
0.9	0.59367	0.61799	-0.024316	1
0.91667	0.59367	0.61776	-0.024091	1
0.93333	0.59367	0.61754	-0.023867	1
0.95	0.59367	0.61731	-0.023642	1
0.96667	0.59367	0.61709	-0.023418	1
0.98333	0.54924	0.61686	-0.067623	1
1	0.59367	0.61664	-0.022969	1
1.0167	0.59367	0.61642	-0.022745	1
1.0333	0.59367	0.61619	-0.022521	1
1.05	0.59367	0.61597	-0.022297	1
1.0667	0.59367	0.61574	-0.022073	1
1.0833	0.59367	0.61552	-0.02185	1
1.1	0.59367	0.6153	-0.021626	1
1.1167	0.59367	0.61507	-0.021402	1
1.1333	0.59367	0.61485	-0.021179	1
1.15	0.59367	0.61463	-0.020955	1
1.1667	0.59367	0.6144	-0.020732	1

1.1833	0.59367	0.61418	-0.020509	1
1.2	0.59367	0.61396	-0.020286	1
1.2167	0.59367	0.61373	-0.020062	1
1.2333	0.54924	0.61351	-0.064269	1
1.25	0.59367	0.61329	-0.019616	1
1.2667	0.59367	0.61306	-0.019393	1
1.2833	0.59367	0.61284	-0.019171	1
1.3	0.54924	0.61262	-0.063378	1
1.3167	0.59367	0.6124	-0.018725	1
1.3333	0.54924	0.61217	-0.062933	1
1.35	0.59367	0.61195	-0.01828	1
1.3667	0.59367	0.61173	-0.018058	1
1.3833	0.59367	0.61151	-0.017836	1
1.4	0.59367	0.61128	-0.017613	1
1.4167	0.59367	0.61106	-0.017391	1
1.4333	0.59367	0.61084	-0.017169	1
1.45	0.59367	0.61062	-0.016947	1
1.4667	0.59367	0.6104	-0.016725	1
1.4833	0.59917	0.61017	-0.011004	1
1.5	0.55473	0.60995	-0.055222	1
1.5167	0.59367	0.60973	-0.01606	1
1.5333	0.59367	0.60951	-0.015839	1
1.55	0.59367	0.60929	-0.015617	1
1.5667	0.59917	0.60907	-0.0098955	1
1.5833	0.59367	0.60884	-0.015174	1
1.6	0.55473	0.60862	-0.053893	1
1.6167	0.59367	0.6084	-0.014732	1
1.6333	0.54924	0.60818	-0.058941	1
1.65	0.59367	0.60796	-0.01429	1
1.6667	0.59367	0.60774	-0.014069	1
1.6833	0.59367	0.60752	-0.013848	1
1.7	0.59367	0.6073	-0.013627	1
1.7167	0.59917	0.60708	-0.0079063	1
1.7333	0.59367	0.60686	-0.013186	1
1.75	0.59367	0.60664	-0.012965	1
1.7667	0.59367	0.60641	-0.012745	1
1.7833	0.59367	0.60619	-0.012524	1
1.8	0.59367	0.60597	-0.012304	1
1.8167	0.59367	0.60575	-0.012084	1
1.8333	0.59367	0.60553	-0.011864	1
1.85	0.59367	0.60531	-0.011644	1
1.8667	0.54924	0.60509	-0.055854	1
1.8833	0.59367	0.60487	-0.011204	1
1.9	0.59367	0.60465	-0.010984	1
1.9167	0.59367	0.60443	-0.010764	1
1.9333	0.59367	0.60421	-0.010545	1
1.95	0.59367	0.60399	-0.010325	1
1.9667	0.59367	0.60378	-0.010105	1
1.9833	0.59367	0.60356	-0.0098861	1
2	0.59367	0.60334	-0.0096667	1
2.0167	0.59917	0.60312	-0.0039474	1
2.0333	0.59367	0.6029	-0.0092283	1
2.05	0.54924	0.60268	-0.053439	1
2.0667	0.59367	0.60246	-0.0087901	1
2.0833	0.54924	0.60224	-0.053001	1
2.1	0.59367	0.60202	-0.0083523	1
2.1167	0.54924	0.6018	-0.052563	1
2.1333	0.54924	0.60158	-0.052345	1

2.15	0.54924	0.60137	-0.052126	1
2.1667	0.54924	0.60115	-0.051908	1
2.1833	0.59367	0.60093	-0.0072592	1
2.2	0.59367	0.60071	-0.0070408	1
2.2167	0.54924	0.60049	-0.051252	1
2.2333	0.59367	0.60027	-0.0066043	1
2.25	0.59367	0.60006	-0.0063861	1
2.2667	0.55473	0.59984	-0.045108	1
2.2833	0.54924	0.59962	-0.05038	1
2.3	0.59367	0.5994	-0.0057321	1
2.3167	0.59367	0.59918	-0.0055143	1
2.3333	0.59917	0.59897	0.0002034	1
2.35	0.59367	0.59875	-0.0050789	1
2.3667	0.59917	0.59853	0.00063875	1
2.3833	0.59367	0.59831	-0.0046438	1
2.4	0.59367	0.5981	-0.0044263	1
2.4167	0.59367	0.59788	-0.0042089	1
2.4333	0.54924	0.59766	-0.048422	1
2.45	0.59367	0.59744	-0.0037745	1
2.4667	0.59367	0.59723	-0.0035573	1
2.4833	0.59917	0.59701	0.0021596	1
2.5	0.59367	0.59679	-0.0031234	1
2.5167	0.59367	0.59658	-0.0029065	1
2.5333	0.59367	0.59636	-0.0026897	1
2.55	0.59367	0.59614	-0.002473	1
2.5667	0.59367	0.59593	-0.0022563	1
2.5833	0.59367	0.59571	-0.0020398	1
2.6	0.59367	0.59549	-0.0018233	1
2.6167	0.59367	0.59528	-0.0016068	1
2.6333	0.59367	0.59506	-0.0013906	1
2.65	0.59367	0.59484	-0.0011743	1
2.6667	0.59367	0.59463	-0.00095804	1
2.6833	0.59367	0.59441	-0.00074203	1
2.7	0.59367	0.5942	-0.00052597	1
2.7167	0.59367	0.59398	-0.00030999	1
2.7333	0.59367	0.59376	-9.4211E-005	1
2.75	0.59367	0.59355	0.00012162	1
2.7667	0.59367	0.59333	0.00033736	1
2.7833	0.59917	0.59312	0.0060529	1
2.8	0.59367	0.5929	0.00076849	1
2.8167	0.59367	0.59269	0.00098401	1
2.8333	0.59367	0.59247	0.0011993	1
2.85	0.59367	0.59226	0.0014147	1
2.8667	0.59367	0.59204	0.0016299	1
2.8833	0.59367	0.59182	0.001845	1
2.9	0.59367	0.59161	0.0020601	1
2.9167	0.59367	0.59139	0.0022752	1
2.9333	0.59367	0.59118	0.00249	1
2.95	0.59367	0.59097	0.0027049	1
2.9667	0.59367	0.59075	0.0029197	1
2.9833	0.59367	0.59054	0.0031339	1
3	0.59367	0.59032	0.003349	1
3.0167	0.59367	0.59011	0.0035639	1
3.0333	0.59367	0.58989	0.0037775	1
3.05	0.59367	0.58968	0.0039923	1
3.0667	0.59367	0.58946	0.0042067	1
3.0833	0.59367	0.58925	0.0044208	1
3.1	0.59367	0.58904	0.004635	1

3.1167	0.59367	0.58882	0.0048491	1
3.1333	0.59367	0.58861	0.005063	1
3.15	0.59367	0.58839	0.0052769	1
3.1667	0.59367	0.58818	0.0054908	1
3.1833	0.59367	0.58797	0.0057045	1
3.2	0.59367	0.58775	0.0059182	1
3.2167	0.59367	0.58754	0.0061318	1
3.2333	0.59367	0.58732	0.0063453	1
3.25	0.59917	0.58711	0.012059	1
3.2667	0.59367	0.5869	0.0067722	1
3.2833	0.59367	0.58668	0.0069854	1
3.3	0.59367	0.58647	0.0071986	1
3.3167	0.59367	0.58626	0.0074118	1
3.3333	0.59367	0.58605	0.0076248	1
3.35	0.59367	0.58583	0.0078378	1
3.3667	0.59367	0.58562	0.0080507	1
3.3833	0.59367	0.58541	0.0082635	1
3.4	0.59367	0.58519	0.0084763	1
3.4167	0.59367	0.58498	0.008689	1
3.4333	0.59367	0.58477	0.0089015	1
3.45	0.59367	0.58456	0.009114	1
3.4667	0.59367	0.58434	0.0093265	1
3.4833	0.59917	0.58413	0.015039	1
3.5	0.59367	0.58392	0.0097511	1
3.5167	0.59367	0.58371	0.0099634	1
3.5333	0.59367	0.58349	0.010175	1
3.55	0.59367	0.58328	0.010387	1
3.5667	0.59367	0.58307	0.0106	1
3.5833	0.59367	0.58286	0.010811	1
3.6	0.59367	0.58265	0.011023	1
3.6167	0.59367	0.58244	0.011235	1
3.6333	0.59367	0.58222	0.011447	1
3.65	0.59367	0.58201	0.011658	1
3.6667	0.59367	0.5818	0.01187	1
3.6833	0.59367	0.58159	0.012081	1
3.7	0.59367	0.58138	0.012292	1
3.7167	0.59367	0.58117	0.012504	1
3.7333	0.59367	0.58096	0.012715	1
3.75	0.59367	0.58074	0.012926	1
3.7667	0.59367	0.58053	0.013137	1
3.7833	0.59367	0.58032	0.013348	1
3.8	0.59367	0.58011	0.013559	1
3.8167	0.59367	0.5799	0.01377	1
3.8333	0.59367	0.57969	0.013981	1
3.85	0.59367	0.57948	0.014191	1
3.8667	0.59367	0.57927	0.014402	1
3.8833	0.59367	0.57906	0.014612	1
3.9	0.59367	0.57885	0.014823	1
3.9167	0.59367	0.57864	0.015033	1
3.9333	0.59367	0.57843	0.015243	1
3.95	0.59367	0.57822	0.015454	1
3.9667	0.59367	0.57801	0.015664	1
3.9833	0.59367	0.5778	0.015874	1
4	0.59367	0.57759	0.016084	1
4.0167	0.59367	0.57738	0.016294	1
4.0333	0.59367	0.57717	0.016504	1
4.05	0.54375	0.57696	-0.033207	1
4.0667	0.59367	0.57675	0.016923	1

4.0833	0.59367	0.57654	0.017133	1
4.1	0.59367	0.57633	0.017342	1
4.1167	0.54924	0.57612	-0.026878	1
4.1333	0.59367	0.57591	0.017761	1
4.15	0.54924	0.5757	-0.02646	1
4.1667	0.59367	0.57549	0.018179	1
4.1833	0.59367	0.57528	0.018389	1
4.2	0.59367	0.57507	0.018598	1
4.2167	0.59367	0.57486	0.018807	1
4.2333	0.59367	0.57465	0.019016	1
4.25	0.59367	0.57445	0.019224	1
4.2667	0.59367	0.57424	0.019433	1
4.2833	0.59367	0.57403	0.019642	1
4.3	0.59367	0.57382	0.01985	1
4.3167	0.59367	0.57361	0.020059	1
4.3333	0.59367	0.5734	0.020267	1
4.35	0.59367	0.57319	0.020476	1
4.3667	0.59367	0.57299	0.020684	1
4.3833	0.59367	0.57278	0.020892	1
4.4	0.59367	0.57257	0.021101	1
4.4167	0.59367	0.57236	0.021309	1
4.4333	0.59367	0.57215	0.021517	1
4.45	0.59367	0.57195	0.021725	1
4.4667	0.59367	0.57174	0.021932	1
4.4833	0.59367	0.57153	0.02214	1
4.5	0.59367	0.57132	0.022348	1
4.5167	0.59367	0.57111	0.022556	1
4.5333	0.59367	0.57091	0.022763	1
4.55	0.59367	0.5707	0.022971	1
4.5667	0.59367	0.57049	0.023178	1
4.5833	0.54375	0.57028	-0.026535	1
4.6	0.54375	0.57008	-0.026327	1
4.6167	0.54924	0.56987	-0.02063	1
4.6333	0.59367	0.56966	0.024007	1
4.65	0.59367	0.56946	0.024214	1
4.6667	0.59367	0.56925	0.024421	1
4.6833	0.59367	0.56904	0.024628	1
4.7	0.54375	0.56884	-0.025086	1
4.7167	0.59367	0.56863	0.025041	1
4.7333	0.54375	0.56842	-0.024672	1
4.75	0.54375	0.56822	-0.024466	1
4.7667	0.54924	0.56801	-0.018769	1
4.7833	0.54375	0.5678	-0.024053	1
4.8	0.54375	0.5676	-0.023846	1
4.8167	0.49931	0.56739	-0.06808	1
4.8333	0.54375	0.56718	-0.023434	1
4.85	0.59367	0.56698	0.026692	1
4.8667	0.59367	0.56677	0.026898	1
4.8833	0.54375	0.56657	-0.022816	1
4.9	0.54375	0.56636	-0.02261	1
4.9167	0.54375	0.56615	-0.022404	1
4.9333	0.54375	0.56595	-0.022198	1
4.95	0.54375	0.56574	-0.021993	1
4.9667	0.54375	0.56554	-0.021787	1
4.9833	0.54924	0.56533	-0.016092	1
5	0.54375	0.56513	-0.021376	1
5.0167	0.54375	0.56492	-0.021171	1
5.0333	0.54375	0.56472	-0.020965	1

5.05	0.54375	0.56451	-0.02076	1
5.0667	0.54375	0.5643	-0.020555	1
5.0833	0.54375	0.5641	-0.02035	1
5.1	0.54375	0.56389	-0.020145	1
5.1167	0.54375	0.56369	-0.01994	1
5.1333	0.54375	0.56349	-0.019735	1
5.15	0.54375	0.56328	-0.01953	1
5.1667	0.54375	0.56308	-0.019326	1
5.1833	0.49931	0.56287	-0.063561	1
5.2	0.54375	0.56267	-0.018916	1
5.2167	0.54375	0.56246	-0.018712	1
5.2333	0.54375	0.56226	-0.018508	1
5.25	0.54375	0.56205	-0.018303	1
5.2667	0.54375	0.56185	-0.018099	1
5.2833	0.59367	0.56164	0.032025	1
5.3	0.54375	0.56144	-0.017691	1
5.3167	0.54375	0.56124	-0.017487	1
5.3333	0.49931	0.56103	-0.061723	1
5.35	0.54375	0.56083	-0.017079	1
5.3667	0.54375	0.56062	-0.016875	1
5.3833	0.54375	0.56042	-0.016671	1
5.4	0.54375	0.56022	-0.016468	1
5.4167	0.49931	0.56001	-0.060704	1
5.4333	0.54375	0.55981	-0.01606	1
5.45	0.54375	0.55961	-0.015857	1
5.4667	0.54375	0.5594	-0.015654	1
5.4833	0.54375	0.5592	-0.01545	1
5.5	0.54375	0.559	-0.015247	1
5.5167	0.54375	0.55879	-0.015044	1
5.5333	0.54375	0.55859	-0.014841	1
5.55	0.54375	0.55839	-0.014638	1
5.5667	0.54375	0.55818	-0.014435	1
5.5833	0.54375	0.55798	-0.014232	1
5.6	0.54375	0.55778	-0.014029	1
5.6167	0.49931	0.55758	-0.058267	1
5.6333	0.54375	0.55737	-0.013624	1
5.65	0.54375	0.55717	-0.013421	1
5.6667	0.54375	0.55697	-0.013219	1
5.6833	0.54375	0.55677	-0.013017	1
5.7	0.54375	0.55656	-0.012814	1
5.7167	0.49931	0.55636	-0.057052	1
5.7333	0.54375	0.55616	-0.01241	1
5.75	0.54924	0.55596	-0.0067176	1
5.7667	0.54375	0.55576	-0.012006	1
5.7833	0.54375	0.55555	-0.011804	1
5.8	0.54375	0.55535	-0.011602	1
5.8167	0.54375	0.55515	-0.0114	1
5.8333	0.54375	0.55495	-0.011198	1
5.85	0.54375	0.55475	-0.010996	1
5.8667	0.54375	0.55454	-0.010795	1
5.8833	0.54375	0.55434	-0.010593	1
5.9	0.54375	0.55414	-0.010392	1
5.9167	0.54375	0.55394	-0.01019	1
5.9333	0.49931	0.55374	-0.054429	1
5.95	0.54375	0.55354	-0.009788	1
5.9667	0.54375	0.55334	-0.0095868	1
5.9833	0.54375	0.55314	-0.0093857	1
6	0.54375	0.55293	-0.0091847	1

6.0167	0.54375	0.55273	-0.0089837	1
6.0333	0.54375	0.55253	-0.0087829	1
6.05	0.49931	0.55233	-0.053022	1
6.0667	0.54375	0.55213	-0.0083813	1
6.0833	0.54375	0.55193	-0.0081807	1
6.1	0.54375	0.55173	-0.0079801	1
6.1167	0.54375	0.55153	-0.0077796	1
6.1333	0.54375	0.55133	-0.0075792	1
6.15	0.54375	0.55113	-0.0073788	1
6.1667	0.54375	0.55093	-0.0071785	1
6.1833	0.54375	0.55073	-0.0069783	1
6.2	0.54375	0.55053	-0.0067782	1
6.2167	0.54375	0.55033	-0.006578	1
6.2333	0.54375	0.55013	-0.0063781	1
6.25	0.54375	0.54993	-0.0061782	1
6.2667	0.49931	0.54973	-0.050418	1
6.2833	0.49931	0.54953	-0.050219	1
6.3	0.54375	0.54933	-0.0055788	1
6.3167	0.54375	0.54913	-0.0053792	1
6.3333	0.54375	0.54893	-0.0051797	1
6.35	0.54375	0.54873	-0.0049801	1
6.3667	0.54375	0.54853	-0.0047807	1
6.3833	0.54375	0.54833	-0.0045814	1
6.4	0.54375	0.54813	-0.0043821	1
6.4167	0.54375	0.54793	-0.0041829	1
6.4333	0.54375	0.54773	-0.0039838	1
6.45	0.54375	0.54753	-0.0037847	1
6.4667	0.54375	0.54734	-0.0035857	1
6.4833	0.54375	0.54714	-0.0033869	1
6.5	0.54375	0.54694	-0.003188	1
6.5167	0.54375	0.54674	-0.0029892	1
6.5333	0.54375	0.54654	-0.0027906	1
6.55	0.54375	0.54634	-0.0025919	1
6.5667	0.54375	0.54614	-0.0023933	1
6.5833	0.54375	0.54594	-0.0021949	1
6.6	0.54375	0.54575	-0.0019965	1
6.6167	0.54375	0.54555	-0.0017981	1
6.6333	0.54375	0.54535	-0.0015999	1
6.65	0.49931	0.54515	-0.045842	1
6.6667	0.54375	0.54495	-0.0012035	1
6.6833	0.54375	0.54476	-0.0010056	1
6.7	0.54375	0.54456	-0.00080757	1
6.7167	0.54375	0.54436	-0.00060963	1
6.7333	0.54375	0.54416	-0.00041188	1
6.75	0.54375	0.54396	-0.00021408	1
6.7667	0.54375	0.54377	-1.6358E-005	1
6.7833	0.54375	0.54357	0.00018118	1
6.8	0.54375	0.54337	0.00037876	1
6.8167	0.54375	0.54317	0.00057627	1
6.8333	0.54375	0.54298	0.00077358	1
6.85	0.54375	0.54278	0.00097095	1
6.8667	0.54375	0.54258	0.0011682	1
6.8833	0.54375	0.54238	0.0013653	1
6.9	0.54375	0.54219	0.0015625	1
6.9167	0.54375	0.54199	0.0017596	1
6.9333	0.54375	0.54179	0.0019565	1
6.95	0.54375	0.5416	0.0021534	1
6.9667	0.54375	0.5414	0.0023503	1

6.9833	0.54375	0.5412	0.0025469	1
7	0.54375	0.54101	0.0027437	1
7.0167	0.54375	0.54081	0.0029403	1
7.0333	0.54375	0.54061	0.0031368	1
7.05	0.49931	0.54042	-0.041107	1
7.0667	0.54375	0.54022	0.0035297	1
7.0833	0.54375	0.54002	0.003726	1
7.1	0.54375	0.53983	0.0039222	1
7.1167	0.49931	0.53963	-0.040322	1
7.1333	0.54375	0.53944	0.0043145	1
7.15	0.54375	0.53924	0.0045106	1
7.1667	0.49931	0.53904	-0.039733	1
7.1833	0.54375	0.53885	0.0049024	1
7.2	0.54375	0.53865	0.0050983	1
7.2167	0.54375	0.53846	0.0052941	1
7.2333	0.54375	0.53826	0.0054897	1
7.25	0.54375	0.53806	0.0056853	1
7.2667	0.54375	0.53787	0.0058809	1
7.2833	0.54375	0.53767	0.0060763	1
7.3	0.54375	0.53748	0.0062717	1
7.3167	0.54375	0.53728	0.0064671	1
7.3333	0.54375	0.53709	0.0066623	1
7.35	0.54375	0.53689	0.0068575	1
7.3667	0.54375	0.5367	0.0070527	1
7.3833	0.54375	0.5365	0.0072476	1
7.4	0.49931	0.53631	-0.036997	1
7.4167	0.54375	0.53611	0.0076376	1
7.4333	0.54375	0.53592	0.0078323	1
7.45	0.49931	0.53572	-0.036413	1
7.4667	0.54375	0.53553	0.0082219	1
7.4833	0.54375	0.53533	0.0084164	1
7.5	0.54375	0.53514	0.008611	1
7.5167	0.54375	0.53494	0.0088055	1
7.5333	0.54375	0.53475	0.0089998	1
7.55	0.54375	0.53456	0.0091942	1
7.5667	0.54375	0.53436	0.0093885	1
7.5833	0.54375	0.53417	0.0095826	1
7.6	0.54375	0.53397	0.0097768	1
7.6167	0.54375	0.53378	0.0099709	1
7.6333	0.49931	0.53359	-0.034275	1
7.65	0.54375	0.53339	0.010359	1
7.6667	0.54375	0.5332	0.010553	1
7.6833	0.54375	0.533	0.010746	1
7.7	0.54375	0.53281	0.01094	1
7.7167	0.54375	0.53262	0.011134	1
7.7333	0.54375	0.53242	0.011327	1
7.75	0.54375	0.53223	0.011521	1
7.7667	0.54375	0.53204	0.011714	1
7.7833	0.54375	0.53184	0.011907	1
7.8	0.54375	0.53165	0.012101	1
7.8167	0.54375	0.53146	0.012294	1
7.8333	0.54375	0.53126	0.012487	1
7.85	0.54375	0.53107	0.01268	1
7.8667	0.54375	0.53088	0.012873	1
7.8833	0.54375	0.53068	0.013066	1
7.9	0.54375	0.53049	0.013259	1
7.9167	0.54375	0.5303	0.013452	1
7.9333	0.54375	0.53011	0.013644	1

7.95	0.54375	0.52991	0.013837	1
7.9667	0.54375	0.52972	0.01403	1
7.9833	0.54375	0.52953	0.014222	1
8	0.54375	0.52934	0.014415	1
8.0167	0.49931	0.52914	-0.029833	1
8.0333	0.54375	0.52895	0.014799	1
8.05	0.54375	0.52876	0.014992	1
8.0667	0.54375	0.52857	0.015184	1
8.0833	0.54375	0.52837	0.015376	1
8.1	0.54375	0.52818	0.015568	1
8.1167	0.54375	0.52799	0.01576	1
8.1333	0.54375	0.5278	0.015952	1
8.15	0.49931	0.52761	-0.028297	1
8.1667	0.54375	0.52741	0.016335	1
8.1833	0.54375	0.52722	0.016527	1
8.2	0.49931	0.52703	-0.027722	1
8.2167	0.54375	0.52684	0.01691	1
8.2333	0.54375	0.52665	0.017101	1
8.25	0.54375	0.52646	0.017293	1
8.2667	0.54375	0.52627	0.017484	1
8.2833	0.54375	0.52607	0.017675	1
8.3	0.54375	0.52588	0.017867	1
8.3167	0.54375	0.52569	0.018058	1
8.3333	0.49931	0.5255	-0.026191	1
8.35	0.54375	0.52531	0.01844	1
8.3667	0.54375	0.52512	0.018631	1
8.3833	0.49931	0.52493	-0.025619	1
8.4	0.54375	0.52474	0.019012	1
8.4167	0.54375	0.52455	0.019203	1
8.4333	0.50479	0.52436	-0.019566	1
8.45	0.54375	0.52417	0.019584	1
8.4667	0.54375	0.52398	0.019775	1
8.4833	0.49931	0.52378	-0.024475	1
8.5	0.54375	0.52359	0.020155	1
8.5167	0.54375	0.5234	0.020346	1
8.5333	0.49931	0.52321	-0.023904	1
8.55	0.54375	0.52302	0.020726	1
8.5667	0.54375	0.52283	0.020916	1
8.5833	0.49931	0.52264	-0.023334	1
8.6	0.54375	0.52245	0.021296	1
8.6167	0.54375	0.52226	0.021486	1
8.6333	0.49931	0.52207	-0.022764	1
8.65	0.54375	0.52188	0.021865	1
8.6667	0.54375	0.52169	0.022055	1
8.6833	0.49931	0.52151	-0.022195	1
8.7	0.54375	0.52132	0.022434	1
8.7167	0.54375	0.52113	0.022624	1
8.7333	0.54375	0.52094	0.022813	1
8.75	0.54375	0.52075	0.023002	1
8.7667	0.54375	0.52056	0.023192	1
8.7833	0.54375	0.52037	0.023381	1
8.8	0.54375	0.52018	0.02357	1
8.8167	0.54375	0.51999	0.023759	1
8.8333	0.54375	0.5198	0.023948	1
8.85	0.49931	0.51961	-0.020303	1
8.8667	0.54375	0.51942	0.024326	1
8.8833	0.54375	0.51924	0.024514	1
8.9	0.54375	0.51905	0.024703	1

8.9167	0.54375	0.51886	0.024892	1
8.9333	0.49931	0.51867	-0.01936	1
8.95	0.54375	0.51848	0.025269	1
8.9667	0.54375	0.51829	0.025457	1
8.9833	0.54375	0.5181	0.025646	1
9	0.54375	0.51792	0.025834	1
9.0167	0.49931	0.51773	-0.018418	1
9.0333	0.54375	0.51754	0.02621	1
9.05	0.54375	0.51735	0.026398	1
9.0667	0.54375	0.51716	0.026586	1
9.0833	0.54375	0.51698	0.026774	1
9.1	0.54375	0.51679	0.026962	1
9.1167	0.54375	0.5166	0.02715	1
9.1333	0.54375	0.51641	0.027338	1
9.15	0.54375	0.51622	0.027525	1
9.1667	0.54375	0.51604	0.027713	1
9.1833	0.54375	0.51585	0.027901	1
9.2	0.54375	0.51566	0.028088	1
9.2167	0.49931	0.51547	-0.016165	1
9.2333	0.54375	0.51529	0.028463	1
9.25	0.54375	0.5151	0.02865	1
9.2667	0.49931	0.51491	-0.015603	1
9.2833	0.54375	0.51473	0.029024	1
9.3	0.49383	0.51454	-0.020709	1
9.3167	0.49931	0.51435	-0.015042	1
9.3333	0.54375	0.51416	0.029585	1
9.35	0.49931	0.51398	-0.014668	1
9.3667	0.54375	0.51379	0.029959	1
9.3833	0.54375	0.5136	0.030146	1
9.4	0.49931	0.51342	-0.014108	1
9.4167	0.54375	0.51323	0.030519	1
9.4333	0.54375	0.51304	0.030705	1
9.45	0.54375	0.51286	0.030892	1
9.4667	0.49931	0.51267	-0.013362	1
9.4833	0.49931	0.51249	-0.013175	1
9.5	0.49931	0.5123	-0.012989	1
9.5167	0.54375	0.51211	0.031637	1
9.5333	0.49931	0.51193	-0.012617	1
9.55	0.54375	0.51174	0.032009	1
9.5667	0.54375	0.51155	0.032195	1
9.5833	0.49931	0.51137	-0.012059	1
9.6	0.54375	0.51118	0.032567	1
9.6167	0.54375	0.511	0.032753	1
9.6333	0.54375	0.51081	0.032938	1
9.65	0.49931	0.51063	-0.011316	1
9.6667	0.54375	0.51044	0.03331	1
9.6833	0.54375	0.51025	0.033495	1
9.7	0.44938	0.51007	-0.06069	1
9.7167	0.54375	0.50988	0.033866	1
9.7333	0.49383	0.5097	-0.015869	1
9.75	0.49931	0.50951	-0.010204	1
9.7667	0.49383	0.50933	-0.015498	1
9.7833	0.54375	0.50914	0.034607	1
9.8	0.49383	0.50896	-0.015128	1
9.8167	0.54375	0.50877	0.034977	1
9.8333	0.54375	0.50859	0.035161	1
9.85	0.49383	0.5084	-0.014574	1
9.8667	0.49383	0.50822	-0.014389	1

9.8833	0.54375	0.50803	0.035716	1
9.9	0.49931	0.50785	-0.0085396	1
9.9167	0.49931	0.50766	-0.008355	1
9.9333	0.54375	0.50748	0.036269	1
9.95	0.49383	0.5073	-0.013466	1
9.9667	0.49383	0.50711	-0.013282	1
9.9833	0.49383	0.50693	-0.013097	1
10	0.49383	0.50674	-0.012913	1
10.017	0.54375	0.50656	0.037191	1
10.033	0.49383	0.50638	-0.012545	1
10.05	0.49383	0.50619	-0.012361	1
10.067	0.49383	0.50601	-0.012177	1
10.083	0.54375	0.50582	0.037927	1
10.1	0.54375	0.50564	0.038111	1
10.117	0.44938	0.50546	-0.056075	1
10.133	0.49383	0.50527	-0.011442	1
10.15	0.49383	0.50509	-0.011258	1
10.167	0.54375	0.5049	0.038846	1
10.183	0.49383	0.50472	-0.010892	1
10.2	0.49931	0.50454	-0.0052277	1
10.217	0.54375	0.50435	0.039396	1
10.233	0.49383	0.50417	-0.010341	1
10.25	0.54375	0.50399	0.039762	1
10.267	0.49383	0.5038	-0.0099743	1
10.283	0.54375	0.50362	0.040128	1
10.3	0.49383	0.50344	-0.0096086	1
10.317	0.44938	0.50326	-0.053875	1
10.333	0.49383	0.50307	-0.0092431	1
10.35	0.49383	0.50289	-0.0090599	1
10.367	0.49383	0.50271	-0.0088768	1
10.383	0.49383	0.50252	-0.0086948	1
10.4	0.44938	0.50234	-0.052962	1
10.417	0.49383	0.50216	-0.0083289	1
10.433	0.44938	0.50198	-0.052597	1
10.45	0.49383	0.50179	-0.0079643	1
10.467	0.49383	0.50161	-0.0077816	1
10.483	0.44938	0.50143	-0.05205	1
10.5	0.49383	0.50125	-0.0074175	1
10.517	0.44938	0.50106	-0.051685	1
10.533	0.54375	0.50088	0.042866	1
10.55	0.49383	0.5007	-0.0068712	1
10.567	0.49383	0.50052	-0.0066889	1
10.583	0.49383	0.50034	-0.0065077	1
10.6	0.44938	0.50016	-0.050775	1
10.617	0.49383	0.49997	-0.0061434	1
10.633	0.49383	0.49979	-0.0059624	1
10.65	0.54375	0.49961	0.04414	1
10.667	0.49383	0.49943	-0.0055985	1
10.683	0.44938	0.49925	-0.049868	1
10.7	0.49383	0.49907	-0.0052359	1
10.717	0.44938	0.49888	-0.049504	1
10.733	0.49383	0.4987	-0.0048736	1
10.75	0.49383	0.49852	-0.004692	1
10.767	0.49383	0.49834	-0.0045105	1
10.783	0.49383	0.49816	-0.0043301	1
10.8	0.49383	0.49798	-0.0041487	1
10.817	0.49383	0.4978	-0.0039673	1
10.833	0.49383	0.49762	-0.0037872	1

10.85	0.49383	0.49744	-0.003606	1
10.867	0.49383	0.49725	-0.0034248	1
10.883	0.49383	0.49707	-0.0032448	1
10.9	0.49383	0.49689	-0.0030638	1
10.917	0.49383	0.49671	-0.0028829	1
10.933	0.49383	0.49653	-0.0027031	1
10.95	0.49383	0.49635	-0.0025223	1
10.967	0.44938	0.49617	-0.046792	1
10.983	0.49383	0.49599	-0.0021619	1
11	0.49383	0.49581	-0.0019813	1
11.017	0.49383	0.49563	-0.0018008	1
11.033	0.49383	0.49545	-0.0016214	1
11.05	0.49383	0.49527	-0.001441	1
11.067	0.49383	0.49509	-0.0012606	1
11.083	0.49383	0.49491	-0.0010814	1
11.1	0.49383	0.49473	-0.00090121	1
11.117	0.49383	0.49455	-0.00072105	1
11.133	0.49383	0.49437	-0.00054204	1
11.15	0.49383	0.49419	-0.00036202	1
11.167	0.49383	0.49401	-0.00018207	1
11.183	0.49383	0.49383	-3.2534E-006	1
11.2	0.44938	0.49365	-0.044273	1
11.217	0.49383	0.49347	0.00035633	1
11.233	0.49383	0.4933	0.00053495	1
11.25	0.49383	0.49312	0.00071458	1
11.267	0.49383	0.49294	0.00089414	1
11.283	0.44938	0.49276	-0.043377	1
11.3	0.49383	0.49258	0.001252	1
11.317	0.49383	0.4924	0.0014314	1
11.333	0.49383	0.49222	0.0016096	1
11.35	0.49383	0.49204	0.0017888	1
11.367	0.44938	0.49186	-0.042482	1
11.383	0.49383	0.49168	0.002146	1
11.4	0.44938	0.4915	-0.042125	1
11.417	0.44938	0.49133	-0.041946	1
11.433	0.49383	0.49115	0.0026819	1
11.45	0.49383	0.49097	0.0028608	1
11.467	0.49383	0.49079	0.0030395	1
11.483	0.44938	0.49061	-0.041233	1
11.5	0.49383	0.49043	0.0033958	1
11.517	0.49383	0.49026	0.0035744	1
11.533	0.49383	0.49008	0.0037519	1
11.55	0.44938	0.4899	-0.04052	1
11.567	0.44938	0.48972	-0.040341	1
11.583	0.49383	0.48954	0.004286	1
11.6	0.44938	0.48937	-0.039986	1
11.617	0.49383	0.48919	0.0046425	1
11.633	0.49383	0.48901	0.0048195	1
11.65	0.44938	0.48883	-0.039452	1
11.667	0.49383	0.48865	0.0051756	1
11.683	0.44938	0.48848	-0.039098	1
11.7	0.49383	0.4883	0.0055303	1
11.717	0.49383	0.48812	0.0057082	1
11.733	0.49383	0.48795	0.0058848	1
11.75	0.49383	0.48777	0.0060625	1
11.767	0.44938	0.48759	-0.03821	1
11.783	0.49383	0.48741	0.0064166	1
11.8	0.44938	0.48724	-0.037856	1

11.817	0.49383	0.48706	0.0067715	1
11.833	0.49383	0.48688	0.0069478	1
11.85	0.49383	0.4867	0.0071251	1
11.867	0.49383	0.48653	0.0073024	1
11.883	0.49383	0.48635	0.0074785	1
11.9	0.49383	0.48617	0.0076556	1
11.917	0.44938	0.486	-0.036617	1
11.933	0.49383	0.48582	0.0080085	1
11.95	0.49383	0.48564	0.0081854	1
11.967	0.49383	0.48547	0.0083623	1
11.983	0.49383	0.48529	0.008538	1
12	0.49383	0.48512	0.0087147	1
12.017	0.49383	0.48494	0.0088913	1
12.033	0.44938	0.48476	-0.035383	1
12.05	0.49383	0.48459	0.0092434	1
12.067	0.49383	0.48441	0.0094199	1
12.083	0.44938	0.48423	-0.034855	1
12.1	0.49383	0.48406	0.0097715	1
12.117	0.44938	0.48388	-0.034502	1
12.133	0.49383	0.48371	0.010123	1
12.15	0.44938	0.48353	-0.034151	1
12.167	0.49383	0.48335	0.010475	1
12.183	0.49383	0.48318	0.01065	1
12.2	0.49383	0.483	0.010826	1
12.217	0.49383	0.48283	0.011002	1
12.233	0.49383	0.48265	0.011177	1
12.25	0.49383	0.48248	0.011352	1
12.267	0.44938	0.4823	-0.032922	1
12.283	0.49383	0.48213	0.011703	1
12.3	0.49383	0.48195	0.011878	1
12.317	0.49383	0.48178	0.012054	1
12.333	0.49383	0.4816	0.012228	1
12.35	0.49383	0.48143	0.012404	1
12.367	0.44938	0.48125	-0.031871	1
12.383	0.49383	0.48108	0.012753	1
12.4	0.49383	0.4809	0.012928	1
12.417	0.44938	0.48073	-0.031347	1
12.433	0.44938	0.48055	-0.031173	1
12.45	0.49383	0.48038	0.013452	1
12.467	0.49383	0.4802	0.013627	1
12.483	0.49383	0.48003	0.013801	1
12.5	0.44938	0.47985	-0.030474	1
12.517	0.49383	0.47968	0.014151	1
12.533	0.44938	0.47951	-0.030126	1
12.55	0.49383	0.47933	0.014499	1
12.567	0.49383	0.47916	0.014673	1
12.583	0.49383	0.47898	0.014847	1
12.6	0.49383	0.47881	0.015021	1
12.617	0.44938	0.47863	-0.029254	1
12.633	0.49383	0.47846	0.015369	1
12.65	0.44938	0.47829	-0.028907	1
12.667	0.49383	0.47811	0.015717	1
12.683	0.49383	0.47794	0.01589	1
12.7	0.49383	0.47777	0.016064	1
12.717	0.49383	0.47759	0.016238	1
12.733	0.44938	0.47742	-0.028039	1
12.75	0.49383	0.47724	0.016585	1
12.767	0.44938	0.47707	-0.027691	1

12.783	0.49383	0.4769	0.016931	1
12.8	0.49383	0.47672	0.017105	1
12.817	0.49383	0.47655	0.017279	1
12.833	0.49383	0.47638	0.017451	1
12.85	0.44938	0.47621	-0.026825	1
12.867	0.49383	0.47603	0.017798	1
12.883	0.44938	0.47586	-0.02648	1
12.9	0.49383	0.47569	0.018144	1
12.917	0.49383	0.47551	0.018317	1
12.933	0.49383	0.47534	0.018489	1
12.95	0.49383	0.47517	0.018662	1
12.967	0.49383	0.47499	0.018835	1
12.983	0.49383	0.47482	0.019007	1
13	0.49383	0.47465	0.01918	1
13.017	0.49383	0.47448	0.019353	1
13.033	0.49383	0.47431	0.019525	1
13.05	0.49383	0.47413	0.019697	1
13.067	0.49383	0.47396	0.01987	1
13.083	0.44938	0.47379	-0.024409	1
13.1	0.49383	0.47362	0.020214	1
13.117	0.49383	0.47344	0.020386	1
13.133	0.49383	0.47327	0.020558	1
13.15	0.49383	0.4731	0.02073	1
13.167	0.44938	0.47293	-0.023548	1
13.183	0.49383	0.47276	0.021074	1
13.2	0.44938	0.47258	-0.023204	1
13.217	0.49383	0.47241	0.021418	1
13.233	0.49383	0.47224	0.021589	1
13.25	0.49383	0.47207	0.021761	1
13.267	0.49383	0.4719	0.021933	1
13.283	0.49383	0.47173	0.022104	1
13.3	0.49383	0.47155	0.022275	1
13.317	0.49383	0.47138	0.022447	1
13.333	0.49383	0.47121	0.022618	1
13.35	0.44938	0.47104	-0.021661	1
13.367	0.44938	0.47087	-0.021489	1
13.383	0.49383	0.4707	0.023131	1
13.4	0.49383	0.47053	0.023303	1
13.417	0.44938	0.47036	-0.020976	1
13.433	0.49383	0.47019	0.023644	1
13.45	0.44938	0.47001	-0.020635	1
13.467	0.49383	0.46984	0.023987	1
13.483	0.49383	0.46967	0.024157	1
13.5	0.49383	0.4695	0.024328	1
13.517	0.49383	0.46933	0.024499	1
13.533	0.49383	0.46916	0.024669	1
13.55	0.44938	0.46899	-0.019611	1
13.567	0.49383	0.46882	0.02501	1
13.583	0.49383	0.46865	0.02518	1
13.6	0.44938	0.46848	-0.0191	1
13.617	0.49383	0.46831	0.025521	1
13.633	0.49383	0.46814	0.025691	1
13.65	0.49383	0.46797	0.025861	1
13.667	0.44938	0.4678	-0.018419	1
13.683	0.49383	0.46763	0.026201	1
13.7	0.44938	0.46746	-0.018079	1
13.717	0.49383	0.46729	0.026541	1
13.733	0.49383	0.46712	0.02671	1

13.75	0.49383	0.46695	0.026881	1
13.767	0.44938	0.46678	-0.017399	1
13.783	0.49383	0.46661	0.02722	1
13.8	0.49383	0.46644	0.027389	1
13.817	0.49383	0.46627	0.027559	1
13.833	0.44938	0.4661	-0.016722	1
13.85	0.49383	0.46593	0.027898	1
13.867	0.49383	0.46576	0.028067	1
13.883	0.49383	0.46559	0.028236	1
13.9	0.49383	0.46542	0.028406	1
13.917	0.49383	0.46525	0.028575	1
13.933	0.49383	0.46509	0.028743	1
13.95	0.49383	0.46492	0.028913	1
13.967	0.49383	0.46475	0.029082	1
13.983	0.49383	0.46458	0.02925	1
14	0.49383	0.46441	0.02942	1
14.017	0.49383	0.46424	0.029589	1
14.033	0.49383	0.46407	0.029757	1
14.05	0.49383	0.4639	0.029926	1
14.067	0.49383	0.46374	0.030095	1
14.083	0.49383	0.46357	0.030262	1
14.1	0.49383	0.4634	0.030431	1
14.117	0.49383	0.46323	0.0306	1
14.133	0.49383	0.46306	0.030768	1
14.15	0.49383	0.46289	0.030936	1
14.167	0.49383	0.46273	0.031105	1
14.183	0.49383	0.46256	0.031272	1
14.2	0.49383	0.46239	0.031441	1
14.217	0.49383	0.46222	0.031609	1
14.233	0.49383	0.46205	0.031776	1
14.25	0.49383	0.46189	0.031945	1
14.267	0.49383	0.46172	0.032113	1
14.283	0.49383	0.46155	0.03228	1
14.3	0.44938	0.46138	-0.012002	1
14.317	0.49383	0.46121	0.032616	1
14.333	0.44938	0.46105	-0.011667	1
14.35	0.49383	0.46088	0.032951	1
14.367	0.49383	0.46071	0.033119	1
14.383	0.49383	0.46054	0.033285	1
14.4	0.49383	0.46038	0.033453	1
14.417	0.49383	0.46021	0.033621	1
14.433	0.44938	0.46004	-0.010663	1
14.45	0.49383	0.45988	0.033955	1
14.467	0.49383	0.45971	0.034122	1
14.483	0.49383	0.45954	0.034289	1
14.5	0.49383	0.45937	0.034456	1
14.517	0.49383	0.45921	0.034623	1
14.533	0.49383	0.45904	0.03479	1
14.55	0.49383	0.45887	0.034957	1
14.567	0.49383	0.45871	0.035124	1
14.583	0.49383	0.45854	0.03529	1
14.6	0.49383	0.45837	0.035457	1
14.617	0.49383	0.45821	0.035624	1
14.633	0.49383	0.45804	0.03579	1
14.65	0.49383	0.45787	0.035956	1
14.667	0.49383	0.45771	0.036123	1
14.683	0.49383	0.45754	0.036289	1
14.7	0.49383	0.45737	0.036455	1

14.717	0.49383	0.45721	0.036622	1
14.733	0.49383	0.45704	0.036787	1
14.75	0.49383	0.45688	0.036954	1
14.767	0.49383	0.45671	0.03712	1
14.783	0.49383	0.45654	0.037286	1
14.8	0.49383	0.45638	0.037452	1
14.817	0.44938	0.45621	-0.006832	1
14.833	0.49383	0.45605	0.037783	1
14.85	0.49383	0.45588	0.037949	1
14.867	0.49383	0.45571	0.038115	1
14.883	0.49383	0.45555	0.03828	1
14.9	0.49383	0.45538	0.038446	1
14.917	0.49383	0.45522	0.038612	1
14.933	0.49383	0.45505	0.038777	1
14.95	0.49383	0.45489	0.038942	1
14.967	0.49383	0.45472	0.039108	1
14.983	0.49383	0.45456	0.039273	1
15	0.49383	0.45439	0.039438	1
15.017	0.49383	0.45423	0.039604	1
15.033	0.49383	0.45406	0.039768	1
15.05	0.49383	0.4539	0.039933	1
15.067	0.49383	0.45373	0.040099	1
15.083	0.4439	0.45357	-0.0096671	1
15.1	0.49383	0.4534	0.040428	1
15.117	0.49383	0.45324	0.040593	1
15.133	0.49383	0.45307	0.040757	1
15.15	0.49383	0.45291	0.040922	1
15.167	0.49383	0.45274	0.041087	1
15.183	0.49383	0.45258	0.041251	1
15.2	0.49383	0.45241	0.041416	1
15.217	0.49383	0.45225	0.041581	1
15.233	0.49383	0.45209	0.041744	1
15.25	0.49383	0.45192	0.041909	1
15.267	0.49383	0.45176	0.042073	1
15.283	0.49383	0.45159	0.042237	1
15.3	0.49383	0.45143	0.042401	1
15.317	0.4439	0.45126	-0.0073643	1
15.333	0.49383	0.4511	0.042729	1
15.35	0.49383	0.45094	0.042893	1
15.367	0.49383	0.45077	0.043058	1
15.383	0.49383	0.45061	0.043221	1
15.4	0.49383	0.45045	0.043385	1
15.417	0.49383	0.45028	0.043549	1
15.433	0.49383	0.45012	0.043712	1
15.45	0.49383	0.44995	0.043876	1
15.467	0.49383	0.44979	0.04404	1
15.483	0.4439	0.44963	-0.0057276	1
15.5	0.44938	0.44946	-8.3895E-005	1
15.517	0.49383	0.4493	0.04453	1
15.533	0.49383	0.44914	0.044692	1
15.55	0.49383	0.44897	0.044856	1
15.567	0.49383	0.44881	0.045019	1
15.583	0.4439	0.44865	-0.0047481	1
15.6	0.49383	0.44848	0.045345	1
15.617	0.49383	0.44832	0.045509	1
15.633	0.49383	0.44816	0.045671	1
15.65	0.4439	0.448	-0.004096	1
15.667	0.49383	0.44783	0.045997	1

15.683	0.4439	0.44767	-0.0037707	1
15.7	0.49383	0.44751	0.046322	1
15.717	0.4439	0.44734	-0.0034447	1
15.733	0.49383	0.44718	0.046647	1
15.75	0.4439	0.44702	-0.00312	1
15.767	0.49383	0.44686	0.046973	1
15.783	0.4439	0.4467	-0.0027955	1
15.8	0.49383	0.44653	0.047297	1
15.817	0.4439	0.44637	-0.0024702	1
15.833	0.49383	0.44621	0.047621	1
15.85	0.49383	0.44605	0.047784	1
15.867	0.4439	0.44588	-0.0019837	1
15.883	0.4439	0.44572	-0.0018223	1
15.9	0.4439	0.44556	-0.00166	1
15.917	0.4439	0.4454	-0.0014978	1
15.933	0.4439	0.44524	-0.0013366	1
15.95	0.4439	0.44507	-0.0011744	1
15.967	0.4439	0.44491	-0.0010124	1
15.983	0.49383	0.44475	0.049079	1
16	0.4439	0.44459	-0.00068937	1
16.017	0.44938	0.44443	0.0049525	1
16.033	0.4439	0.44427	-0.00036661	1
16.05	0.49383	0.4441	0.049725	1
16.067	0.4439	0.44394	-4.3116E-005	1
16.083	0.4439	0.44378	0.00011757	1
16.1	0.4439	0.44362	0.00027917	1
16.117	0.39945	0.44346	-0.044009	1
16.133	0.4439	0.4433	0.00060123	1
16.15	0.4439	0.44314	0.00076265	1
16.167	0.4439	0.44298	0.00092402	1
16.183	0.4439	0.44282	0.0010844	1
16.2	0.4439	0.44265	0.0012456	1
16.217	0.4439	0.44249	0.0014068	1
16.233	0.4439	0.44233	0.001567	1
16.25	0.4439	0.44217	0.001728	1
16.267	0.4439	0.44201	0.001889	1
16.283	0.49383	0.44185	0.051979	1
16.3	0.4439	0.44169	0.0022099	1
16.317	0.4439	0.44153	0.0023708	1
16.333	0.4439	0.44137	0.0025306	1
16.35	0.4439	0.44121	0.0026913	1
16.367	0.4439	0.44105	0.002852	1
16.383	0.4439	0.44089	0.0030116	1
16.4	0.4439	0.44073	0.0031722	1
16.417	0.4439	0.44057	0.0033326	1
16.433	0.4439	0.44041	0.0034921	1
16.45	0.4439	0.44025	0.0036525	1
16.467	0.4439	0.44009	0.0038128	1
16.483	0.4439	0.43993	0.0039721	1
16.5	0.39945	0.43977	-0.040318	1
16.517	0.4439	0.43961	0.0042924	1
16.533	0.4439	0.43945	0.0044516	1
16.55	0.4439	0.43929	0.0046116	1
16.567	0.4439	0.43913	0.0047715	1
16.583	0.4439	0.43897	0.0049305	1
16.6	0.4439	0.43881	0.0050903	1
16.617	0.4439	0.43865	0.0052501	1
16.633	0.4439	0.43849	0.0054089	1

16.65	0.4439	0.43833	0.0055686	1
16.667	0.4439	0.43817	0.0057282	1
16.683	0.4439	0.43801	0.0058868	1
16.7	0.4439	0.43785	0.0060463	1
16.717	0.39945	0.43769	-0.038244	1
16.733	0.4439	0.43754	0.0063642	1
16.75	0.4439	0.43738	0.0065235	1
16.767	0.4439	0.43722	0.0066827	1
16.783	0.4439	0.43706	0.006841	1
16.8	0.4439	0.4369	0.0070002	1
16.817	0.4439	0.43674	0.0071592	1
16.833	0.39945	0.43658	-0.037133	1
16.85	0.4439	0.43642	0.0074763	1
16.867	0.4439	0.43626	0.0076352	1
16.883	0.4439	0.43611	0.0077931	1
16.9	0.39945	0.43595	-0.036498	1
16.917	0.39945	0.43579	-0.036339	1
16.933	0.4439	0.43563	0.0082684	1
16.95	0.4439	0.43547	0.0084271	1
16.967	0.4439	0.43531	0.0085856	1
16.983	0.4439	0.43516	0.0087432	1
17	0.4439	0.435	0.0089017	1
17.017	0.4439	0.43484	0.0090601	1
17.033	0.4439	0.43468	0.0092175	1
17.05	0.4439	0.43452	0.0093757	1
17.067	0.4439	0.43437	0.009534	1
17.083	0.4439	0.43421	0.0096912	1
17.1	0.4439	0.43405	0.0098493	1
17.117	0.4439	0.43389	0.010007	1
17.133	0.4439	0.43374	0.010164	1
17.15	0.4439	0.43358	0.010322	1
17.167	0.4439	0.43342	0.01048	1
17.183	0.4439	0.43326	0.010637	1
17.2	0.4439	0.43311	0.010795	1
17.217	0.4439	0.43295	0.010953	1
17.233	0.4439	0.43279	0.011109	1
17.25	0.4439	0.43263	0.011267	1
17.267	0.4439	0.43248	0.011424	1
17.283	0.4439	0.43232	0.011581	1
17.3	0.4439	0.43216	0.011738	1
17.317	0.4439	0.432	0.011896	1
17.333	0.4439	0.43185	0.012052	1
17.35	0.4439	0.43169	0.012209	1
17.367	0.4439	0.43153	0.012367	1
17.383	0.4439	0.43138	0.012523	1
17.4	0.44938	0.43122	0.01816	1
17.417	0.4439	0.43106	0.012837	1
17.433	0.4439	0.43091	0.012993	1
17.45	0.39945	0.43075	-0.0313	1
17.467	0.4439	0.43059	0.013307	1
17.483	0.4439	0.43044	0.013463	1
17.5	0.4439	0.43028	0.013619	1
17.517	0.39945	0.43012	-0.030674	1
17.533	0.4439	0.42997	0.013932	1
17.55	0.4439	0.42981	0.014088	1
17.567	0.4439	0.42966	0.014245	1
17.583	0.4439	0.4295	0.0144	1
17.6	0.4439	0.42934	0.014557	1

17.617	0.4439	0.42919	0.014713	1
17.633	0.39945	0.42903	-0.029582	1
17.65	0.4439	0.42888	0.015025	1
17.667	0.39945	0.42872	-0.029269	1
17.683	0.4439	0.42856	0.015336	1
17.7	0.4439	0.42841	0.015492	1
17.717	0.4439	0.42825	0.015648	1
17.733	0.4439	0.4281	0.015803	1
17.75	0.39945	0.42794	-0.028491	1
17.767	0.4439	0.42779	0.016115	1
17.783	0.4439	0.42763	0.01627	1
17.8	0.4439	0.42747	0.016425	1
17.817	0.4439	0.42732	0.016581	1
17.833	0.4439	0.42716	0.016736	1
17.85	0.4439	0.42701	0.016891	1
17.867	0.4439	0.42685	0.017047	1
17.883	0.4439	0.4267	0.017201	1
17.9	0.4439	0.42654	0.017357	1
17.917	0.4439	0.42639	0.017512	1
17.933	0.4439	0.42623	0.017666	1
17.95	0.4439	0.42608	0.017821	1
17.967	0.4439	0.42592	0.017977	1
17.983	0.4439	0.42577	0.018131	1
18	0.39945	0.42561	-0.026164	1
18.017	0.4439	0.42546	0.018441	1
18.033	0.4439	0.42531	0.018595	1
18.05	0.4439	0.42515	0.01875	1
18.067	0.4439	0.425	0.018904	1
18.083	0.4439	0.42484	0.019058	1
18.1	0.4439	0.42469	0.019213	1
18.117	0.4439	0.42453	0.019368	1
18.133	0.4439	0.42438	0.019521	1
18.15	0.4439	0.42422	0.019676	1
18.167	0.4439	0.42407	0.01983	1
18.183	0.4439	0.42392	0.019984	1
18.2	0.4439	0.42376	0.020138	1
18.217	0.39945	0.42361	-0.024158	1
18.233	0.4439	0.42345	0.020446	1
18.25	0.39945	0.4233	-0.02385	1
18.267	0.4439	0.42315	0.020754	1
18.283	0.4439	0.42299	0.020907	1
18.3	0.4439	0.42284	0.021061	1
18.317	0.4439	0.42268	0.021215	1
18.333	0.4439	0.42253	0.021368	1
18.35	0.4439	0.42238	0.021522	1
18.367	0.4439	0.42222	0.021676	1
18.383	0.4439	0.42207	0.021829	1
18.4	0.4439	0.42192	0.021983	1
18.417	0.4439	0.42176	0.022136	1
18.433	0.4439	0.42161	0.022289	1
18.45	0.4439	0.42146	0.022442	1
18.467	0.4439	0.4213	0.022596	1
18.483	0.4439	0.42115	0.022748	1
18.5	0.4439	0.421	0.022902	1
18.517	0.4439	0.42085	0.023055	1
18.533	0.4439	0.42069	0.023207	1
18.55	0.4439	0.42054	0.02336	1
18.567	0.4439	0.42039	0.023514	1

18.583	0.4439	0.42023	0.023666	1
18.6	0.4439	0.42008	0.023819	1
18.617	0.4439	0.41993	0.023972	1
18.633	0.4439	0.41978	0.024124	1
18.65	0.4439	0.41962	0.024277	1
18.667	0.4439	0.41947	0.024429	1
18.683	0.4439	0.41932	0.024581	1
18.7	0.4439	0.41917	0.024734	1
18.717	0.4439	0.41901	0.024887	1
18.733	0.4439	0.41886	0.025038	1
18.75	0.4439	0.41871	0.025191	1
18.767	0.4439	0.41856	0.025343	1
18.783	0.4439	0.41841	0.025495	1
18.8	0.4439	0.41825	0.025647	1
18.817	0.4439	0.4181	0.025799	1
18.833	0.4439	0.41795	0.025951	1
18.85	0.4439	0.4178	0.026103	1
18.867	0.39945	0.41764	-0.018195	1
18.883	0.4439	0.41749	0.026406	1
18.9	0.4439	0.41734	0.026558	1
18.917	0.4439	0.41719	0.02671	1
18.933	0.4439	0.41704	0.026861	1
18.95	0.4439	0.41689	0.027013	1
18.967	0.4439	0.41674	0.027165	1
18.983	0.4439	0.41658	0.027316	1
19	0.4439	0.41643	0.027467	1
19.017	0.39945	0.41628	-0.016831	1
19.033	0.39945	0.41613	-0.01668	1
19.05	0.4439	0.41598	0.027921	1
19.067	0.39945	0.41583	-0.016377	1
19.083	0.4439	0.41568	0.028223	1
19.1	0.39945	0.41553	-0.016075	1
19.117	0.4439	0.41537	0.028526	1
19.133	0.4439	0.41522	0.028676	1
19.15	0.4439	0.41507	0.028828	1
19.167	0.4439	0.41492	0.028979	1
19.183	0.4439	0.41477	0.029129	1
19.2	0.39945	0.41462	-0.01517	1
19.217	0.4439	0.41447	0.029431	1
19.233	0.4439	0.41432	0.029581	1
19.25	0.39945	0.41417	-0.014718	1
19.267	0.4439	0.41402	0.029883	1
19.283	0.4439	0.41387	0.030032	1
19.3	0.4439	0.41372	0.030183	1
19.317	0.4439	0.41357	0.030334	1
19.333	0.4439	0.41342	0.030484	1
19.35	0.4439	0.41327	0.030634	1
19.367	0.4439	0.41312	0.030785	1
19.383	0.4439	0.41297	0.030934	1
19.4	0.4439	0.41282	0.031084	1
19.417	0.4439	0.41267	0.031235	1
19.433	0.4439	0.41252	0.031384	1
19.45	0.4439	0.41237	0.031534	1
19.467	0.4439	0.41222	0.031685	1
19.483	0.4439	0.41207	0.031834	1
19.5	0.4439	0.41192	0.031984	1
19.517	0.4439	0.41177	0.032134	1
19.533	0.4439	0.41162	0.032283	1

19.55	0.4439	0.41147	0.032433	1
19.567	0.4439	0.41132	0.032583	1
19.583	0.4439	0.41117	0.032731	1
19.6	0.4439	0.41102	0.032881	1
19.617	0.4439	0.41087	0.033031	1
19.633	0.4439	0.41072	0.03318	1
19.65	0.4439	0.41057	0.033329	1
19.667	0.4439	0.41042	0.033479	1
19.683	0.4439	0.41027	0.033627	1
19.7	0.4439	0.41012	0.033777	1
19.717	0.4439	0.40997	0.033926	1
19.733	0.4439	0.40983	0.034074	1
19.75	0.4439	0.40968	0.034224	1
19.767	0.4439	0.40953	0.034373	1
19.783	0.4439	0.40938	0.034521	1
19.8	0.4439	0.40923	0.03467	1
19.817	0.4439	0.40908	0.034819	1
19.833	0.4439	0.40893	0.034967	1
19.85	0.4439	0.40878	0.035116	1
19.867	0.4439	0.40864	0.035265	1
19.883	0.4439	0.40849	0.035413	1
19.9	0.4439	0.40834	0.035562	1
19.917	0.4439	0.40819	0.03571	1
19.933	0.39398	0.40804	-0.014062	1
19.95	0.39945	0.40789	-0.0084435	1
19.967	0.4439	0.40774	0.036155	1
19.983	0.4439	0.4076	0.036303	1
20	0.4439	0.40745	0.036451	1
20.017	0.4439	0.4073	0.036599	1
20.033	0.4439	0.40715	0.036747	1
20.05	0.39945	0.407	-0.0075549	1
20.067	0.4439	0.40686	0.037043	1
20.083	0.4439	0.40671	0.037191	1
20.1	0.4439	0.40656	0.037339	1
20.117	0.4439	0.40641	0.037487	1
20.133	0.4439	0.40627	0.037634	1
20.15	0.39945	0.40612	-0.0066682	1
20.167	0.39945	0.40597	-0.0065203	1
20.183	0.39945	0.40582	-0.0063734	1
20.2	0.4439	0.40568	0.038224	1
20.217	0.39945	0.40553	-0.0060779	1
20.233	0.4439	0.40538	0.038519	1
20.25	0.4439	0.40523	0.038667	1
20.267	0.4439	0.40509	0.038814	1
20.283	0.39945	0.40494	-0.0054893	1
20.3	0.4439	0.40479	0.039108	1
20.317	0.39945	0.40464	-0.0051944	1
20.333	0.4439	0.4045	0.039402	1
20.35	0.39945	0.40435	-0.0049007	1
20.367	0.39398	0.4042	-0.010223	1
20.383	0.39945	0.40406	-0.0046071	1
20.4	0.39398	0.40391	-0.00993	1
20.417	0.39945	0.40376	-0.0043129	1
20.433	0.4439	0.40362	0.040283	1
20.45	0.4439	0.40347	0.04043	1
20.467	0.4439	0.40332	0.040577	1
20.483	0.39945	0.40318	-0.0037269	1
20.5	0.4439	0.40303	0.04087	1

20.517	0.39945	0.40288	-0.0034333	1
20.533	0.4439	0.40274	0.041163	1
20.55	0.39945	0.40259	-0.0031408	1
20.567	0.39398	0.40244	-0.0084642	1
20.583	0.39945	0.4023	-0.0028485	1
20.6	0.39398	0.40215	-0.008172	1
20.617	0.34951	0.40201	-0.052496	1
20.633	0.39398	0.40186	-0.0078801	1
20.65	0.39945	0.40171	-0.0022638	1
20.667	0.4439	0.40157	0.042333	1
20.683	0.34951	0.40142	-0.051912	1
20.7	0.4439	0.40128	0.042624	1
20.717	0.39398	0.40113	-0.0071498	1
20.733	0.39398	0.40098	-0.0070046	1
20.75	0.4439	0.40084	0.043061	1
20.767	0.39398	0.40069	-0.0067127	1
20.783	0.39398	0.40055	-0.0065676	1
20.8	0.39398	0.4004	-0.0064218	1
20.817	0.4439	0.40026	0.043644	1
20.833	0.39398	0.40011	-0.0061311	1
20.85	0.39398	0.39997	-0.0059854	1
20.867	0.39398	0.39982	-0.0058397	1
20.883	0.39398	0.39968	-0.005695	1
20.9	0.39398	0.39953	-0.0055495	1
20.917	0.4439	0.39938	0.044516	1
20.933	0.39398	0.39924	-0.0052594	1
20.95	0.4439	0.39909	0.044806	1
20.967	0.39398	0.39895	-0.0049687	1
20.983	0.39398	0.3988	-0.0048243	1
21	0.39398	0.39866	-0.0046791	1
21.017	0.39398	0.39851	-0.0045339	1
21.033	0.39398	0.39837	-0.0043897	1
21.05	0.39398	0.39822	-0.0042446	1
21.067	0.39398	0.39808	-0.0040996	1
21.083	0.34951	0.39794	-0.048426	1
21.1	0.39398	0.39779	-0.0038106	1
21.117	0.39398	0.39765	-0.0036658	1
21.133	0.39398	0.3975	-0.0035218	1
21.15	0.39398	0.39736	-0.0033771	1
21.167	0.39398	0.39721	-0.0032324	1
21.183	0.4439	0.39707	0.046831	1
21.2	0.39398	0.39692	-0.002944	1
21.217	0.39398	0.39678	-0.0027995	1
21.233	0.39398	0.39664	-0.0026559	1
21.25	0.39398	0.39649	-0.0025114	1
21.267	0.39398	0.39635	-0.0023671	1
21.283	0.39398	0.3962	-0.0022236	1
21.3	0.39398	0.39606	-0.0020793	1
21.317	0.39398	0.39592	-0.0019351	1
21.333	0.39398	0.39577	-0.0017918	1
21.35	0.39398	0.39563	-0.0016477	1
21.367	0.39398	0.39548	-0.0015036	1
21.383	0.39398	0.39534	-0.0013605	1
21.4	0.39398	0.3952	-0.0012165	1
21.417	0.39398	0.39505	-0.0010726	1
21.433	0.39398	0.39491	-0.00092961	1
21.45	0.39398	0.39477	-0.00078581	1
21.467	0.39398	0.39462	-0.00064206	1

21.483	0.39398	0.39448	-0.00049922	1
21.5	0.39398	0.39434	-0.00035557	1
21.517	0.39398	0.39419	-0.00021198	1
21.533	0.39398	0.39405	-6.9296E-005	1
21.55	0.39398	0.39391	7.4194E-005	1
21.567	0.39398	0.39376	0.00021763	1
21.583	0.39398	0.39362	0.00036016	1
21.6	0.39398	0.39348	0.00050349	1
21.617	0.39398	0.39333	0.00064677	1
21.633	0.39398	0.39319	0.00078914	1
21.65	0.39398	0.39305	0.00093232	1
21.667	0.39398	0.3929	0.0010754	1
21.683	0.39398	0.39276	0.0012177	1
21.7	0.39398	0.39262	0.0013607	1
21.717	0.39398	0.39248	0.0015037	1
21.733	0.39398	0.39233	0.0016457	1
21.75	0.39398	0.39219	0.0017886	1
21.767	0.39398	0.39205	0.0019314	1
21.783	0.39398	0.39191	0.0020733	1
21.8	0.39398	0.39176	0.002216	1
21.817	0.39398	0.39162	0.0023587	1
21.833	0.39398	0.39148	0.0025004	1
21.85	0.39398	0.39134	0.002643	1
21.867	0.39398	0.39119	0.0027855	1
21.883	0.39398	0.39105	0.0029271	1
21.9	0.39398	0.39091	0.0030695	1
21.917	0.39398	0.39077	0.0032118	1
21.933	0.39398	0.39063	0.0033533	1
21.95	0.34951	0.39048	-0.040974	1
21.967	0.39398	0.39034	0.0036377	1
21.983	0.39398	0.3902	0.003779	1
22	0.34951	0.39006	-0.040549	1
22.017	0.39398	0.38992	0.0040631	1
22.033	0.39398	0.38978	0.0042042	1
22.05	0.39398	0.38963	0.0043462	1
22.067	0.39398	0.38949	0.0044881	1
22.083	0.39398	0.38935	0.004629	1
22.1	0.39398	0.38921	0.0047708	1
22.117	0.39398	0.38907	0.0049126	1
22.133	0.39398	0.38893	0.0050534	1
22.15	0.39398	0.38878	0.005195	1
22.167	0.39398	0.38864	0.0053366	1
22.183	0.39398	0.3885	0.0054773	1
22.2	0.34951	0.38836	-0.038851	1
22.217	0.39398	0.38822	0.0057601	1
22.233	0.39398	0.38808	0.0059007	1
22.25	0.34951	0.38794	-0.038428	1
22.267	0.39398	0.3878	0.0061832	1
22.283	0.39398	0.38766	0.0063236	1
22.3	0.39398	0.38752	0.0064648	1
22.317	0.39398	0.38737	0.0066059	1
22.333	0.39398	0.38723	0.0067461	1
22.35	0.39398	0.38709	0.0068871	1
22.367	0.39398	0.38695	0.0070281	1
22.383	0.39398	0.38681	0.0071681	1
22.4	0.39398	0.38667	0.007309	1
22.417	0.39398	0.38653	0.0074498	1
22.433	0.34951	0.38639	-0.03688	1

22.45	0.39398	0.38625	0.0077304	1
22.467	0.39398	0.38611	0.007871	1
22.483	0.39398	0.38597	0.0080108	1
22.5	0.34951	0.38583	-0.036319	1
22.517	0.39398	0.38569	0.0082918	1
22.533	0.39398	0.38555	0.0084314	1
22.55	0.39398	0.38541	0.0085718	1
22.567	0.39398	0.38527	0.0087122	1
22.583	0.39398	0.38513	0.0088516	1
22.6	0.34951	0.38499	-0.035478	1
22.617	0.34951	0.38485	-0.035338	1
22.633	0.39398	0.38471	0.0092714	1
22.65	0.39398	0.38457	0.0094115	1
22.667	0.39398	0.38443	0.0095515	1
22.683	0.39398	0.38429	0.0096906	1
22.7	0.39398	0.38415	0.0098306	1
22.717	0.39398	0.38401	0.0099705	1
22.733	0.39398	0.38387	0.010109	1
22.75	0.39398	0.38373	0.010249	1
22.767	0.39398	0.38359	0.010389	1
22.783	0.39398	0.38345	0.010528	1
22.8	0.39398	0.38331	0.010667	1
22.817	0.39398	0.38317	0.010807	1
22.833	0.39398	0.38303	0.010946	1
22.85	0.39398	0.38289	0.011085	1
22.867	0.39398	0.38276	0.011225	1
22.883	0.39398	0.38262	0.011363	1
22.9	0.39398	0.38248	0.011503	1
22.917	0.39398	0.38234	0.011642	1
22.933	0.39398	0.3822	0.01178	1
22.95	0.39398	0.38206	0.011919	1
22.967	0.34951	0.38192	-0.032412	1
22.983	0.39398	0.38178	0.012197	1
23	0.34951	0.38164	-0.032134	1
23.017	0.34951	0.38151	-0.031995	1
23.033	0.39398	0.38137	0.012613	1
23.05	0.34951	0.38123	-0.031718	1
23.067	0.39398	0.38109	0.01289	1
23.083	0.39398	0.38095	0.013028	1
23.1	0.39398	0.38081	0.013167	1
23.117	0.39398	0.38067	0.013306	1
23.133	0.39398	0.38054	0.013444	1
23.15	0.39398	0.3804	0.013582	1
23.167	0.39398	0.38026	0.013721	1
23.183	0.39398	0.38012	0.013858	1
23.2	0.39398	0.37998	0.013997	1
23.217	0.39398	0.37984	0.014135	1
23.233	0.39398	0.37971	0.014273	1
23.25	0.39398	0.37957	0.014411	1
23.267	0.39398	0.37943	0.014549	1
23.283	0.39398	0.37929	0.014686	1
23.3	0.39398	0.37916	0.014825	1
23.317	0.39398	0.37902	0.014963	1
23.333	0.39398	0.37888	0.0151	1
23.35	0.39398	0.37874	0.015238	1
23.367	0.39398	0.3786	0.015376	1
23.383	0.39398	0.37847	0.015513	1
23.4	0.39398	0.37833	0.015651	1

23.417	0.39398	0.37819	0.015788	1
23.433	0.39398	0.37805	0.015925	1
23.45	0.39398	0.37792	0.016063	1
23.467	0.39398	0.37778	0.0162	1
23.483	0.39398	0.37764	0.016337	1
23.5	0.39398	0.37751	0.016475	1
23.517	0.39398	0.37737	0.016612	1
23.533	0.39398	0.37723	0.016749	1
23.55	0.39398	0.37709	0.016886	1
23.567	0.39398	0.37696	0.017023	1
23.583	0.39398	0.37682	0.01716	1
23.6	0.39398	0.37668	0.017297	1
23.617	0.39398	0.37655	0.017434	1
23.633	0.39398	0.37641	0.017571	1
23.65	0.39398	0.37627	0.017708	1
23.667	0.39398	0.37614	0.017845	1
23.683	0.39398	0.376	0.017981	1
23.7	0.39398	0.37586	0.018118	1
23.717	0.39398	0.37573	0.018255	1
23.733	0.39398	0.37559	0.018391	1
23.75	0.39398	0.37545	0.018527	1
23.767	0.39398	0.37532	0.018664	1
23.783	0.39398	0.37518	0.0188	1
23.8	0.39398	0.37504	0.018937	1
23.817	0.39398	0.37491	0.019073	1
23.833	0.39398	0.37477	0.019209	1
23.85	0.39398	0.37463	0.019345	1
23.867	0.39398	0.3745	0.019482	1
23.883	0.39398	0.37436	0.019617	1
23.9	0.39398	0.37423	0.019754	1
23.917	0.39398	0.37409	0.01989	1
23.933	0.34406	0.37395	-0.029895	1
23.95	0.39398	0.37382	0.020161	1
23.967	0.39398	0.37368	0.020298	1
23.983	0.39945	0.37355	0.025903	1
24	0.39398	0.37341	0.020569	1
24.017	0.39398	0.37328	0.020705	1
24.033	0.39398	0.37314	0.02084	1
24.05	0.39398	0.373	0.020976	1
24.067	0.39398	0.37287	0.021112	1
24.083	0.39398	0.37273	0.021247	1
24.1	0.39398	0.3726	0.021382	1
24.117	0.39398	0.37246	0.021518	1
24.133	0.39398	0.37233	0.021653	1
24.15	0.39398	0.37219	0.021788	1
24.167	0.39398	0.37206	0.021924	1
24.183	0.39398	0.37192	0.022059	1
24.2	0.39398	0.37179	0.022194	1
24.217	0.39398	0.37165	0.022329	1
24.233	0.34951	0.37152	-0.022006	1
24.25	0.39398	0.37138	0.022599	1
24.267	0.39398	0.37125	0.022734	1
24.283	0.39398	0.37111	0.022869	1
24.3	0.39398	0.37098	0.023004	1
24.317	0.39398	0.37084	0.023139	1
24.333	0.39398	0.37071	0.023273	1
24.35	0.39398	0.37057	0.023408	1
24.367	0.39398	0.37044	0.023543	1

24.383	0.39398	0.3703	0.023677	1
24.4	0.34951	0.37017	-0.020658	1
24.417	0.39398	0.37003	0.023947	1
24.433	0.39398	0.3699	0.024081	1
24.45	0.39398	0.36976	0.024216	1
24.467	0.39398	0.36963	0.02435	1
24.483	0.39398	0.3695	0.024484	1
24.5	0.39398	0.36936	0.024619	1
24.517	0.39398	0.36923	0.024753	1
24.533	0.39398	0.36909	0.024887	1
24.55	0.39398	0.36896	0.025021	1
24.567	0.39398	0.36882	0.025155	1
24.583	0.39398	0.36869	0.025289	1
24.6	0.34951	0.36856	-0.019047	1
24.617	0.39398	0.36842	0.025557	1
24.633	0.39398	0.36829	0.025691	1
24.65	0.39398	0.36816	0.025825	1
24.667	0.39398	0.36802	0.025959	1
24.683	0.34406	0.36789	-0.023828	1
24.7	0.34951	0.36775	-0.018244	1
24.717	0.39398	0.36762	0.02636	1
24.733	0.39398	0.36749	0.026493	1
24.75	0.34406	0.36735	-0.023293	1
24.767	0.39398	0.36722	0.026761	1
24.783	0.34951	0.36709	-0.017576	1
24.8	0.29958	0.36695	-0.067373	1
24.817	0.39398	0.36682	0.027161	1
24.833	0.29958	0.36669	-0.067106	1
24.85	0.34406	0.36655	-0.022493	1
24.867	0.39398	0.36642	0.027561	1
24.883	0.39398	0.36629	0.027693	1
24.9	0.34406	0.36615	-0.022093	1
24.917	0.39398	0.36602	0.02796	1
24.933	0.39398	0.36589	0.028093	1
24.95	0.39398	0.36575	0.028226	1
24.967	0.39398	0.36562	0.028359	1
24.983	0.29958	0.36549	-0.065909	1
25	0.39398	0.36536	0.028624	1
25.017	0.29958	0.36522	-0.065643	1
25.033	0.39398	0.36509	0.02889	1
25.05	0.39398	0.36496	0.029023	1
25.067	0.39398	0.36482	0.029155	1
25.083	0.39398	0.36469	0.029288	1
25.1	0.39398	0.36456	0.02942	1
25.117	0.34406	0.36443	-0.020367	1
25.133	0.34951	0.3643	-0.014785	1
25.15	0.34951	0.36416	-0.014652	1
25.167	0.34406	0.36403	-0.01997	1
25.183	0.39398	0.3639	0.030082	1
25.2	0.39398	0.36377	0.030215	1
25.217	0.39398	0.36363	0.030347	1
25.233	0.39398	0.3635	0.030479	1
25.25	0.29958	0.36337	-0.063789	1
25.267	0.39398	0.36324	0.030743	1
25.283	0.29958	0.36311	-0.063525	1
25.3	0.34406	0.36297	-0.018913	1
25.317	0.34406	0.36284	-0.018781	1
25.333	0.39398	0.36271	0.03127	1

25.35	0.39398	0.36258	0.031403	1
25.367	0.39398	0.36245	0.031535	1
25.383	0.29958	0.36231	-0.062734	1
25.4	0.34406	0.36218	-0.018122	1
25.417	0.34406	0.36205	-0.01799	1
25.433	0.39398	0.36192	0.032061	1
25.45	0.34406	0.36179	-0.017728	1
25.467	0.34406	0.36166	-0.017596	1
25.483	0.34406	0.36152	-0.017465	1
25.5	0.34406	0.36139	-0.017333	1
25.517	0.34406	0.36126	-0.017202	1
25.533	0.39398	0.36113	0.032849	1
25.55	0.29958	0.361	-0.061419	1
25.567	0.34406	0.36087	-0.016808	1
25.583	0.34406	0.36074	-0.016677	1
25.6	0.29958	0.36061	-0.061026	1
25.617	0.34406	0.36047	-0.016415	1
25.633	0.34406	0.36034	-0.016284	1
25.65	0.29958	0.36021	-0.060633	1
25.667	0.34406	0.36008	-0.016022	1
25.683	0.29958	0.35995	-0.060371	1
25.7	0.34406	0.35982	-0.01576	1
25.717	0.34406	0.35969	-0.015629	1
25.733	0.34951	0.35956	-0.010049	1
25.75	0.34406	0.35943	-0.015368	1
25.767	0.29958	0.3593	-0.059717	1
25.783	0.34406	0.35917	-0.015107	1
25.8	0.34406	0.35904	-0.014977	1
25.817	0.29958	0.35891	-0.059326	1
25.833	0.29958	0.35878	-0.059196	1
25.85	0.34406	0.35865	-0.014585	1
25.867	0.34406	0.35851	-0.014455	1
25.883	0.34406	0.35838	-0.014325	1
25.9	0.34406	0.35825	-0.014194	1
25.917	0.34406	0.35812	-0.014064	1
25.933	0.34406	0.35799	-0.013934	1
25.95	0.34406	0.35786	-0.013804	1
25.967	0.34406	0.35773	-0.013674	1
25.983	0.34406	0.3576	-0.013544	1
26	0.34406	0.35747	-0.013414	1
26.017	0.34406	0.35734	-0.013284	1
26.033	0.34406	0.35721	-0.013154	1
26.05	0.34406	0.35708	-0.013024	1
26.067	0.29958	0.35695	-0.057374	1
26.083	0.34406	0.35683	-0.012765	1
26.1	0.34406	0.3567	-0.012635	1
26.117	0.34406	0.35657	-0.012505	1
26.133	0.34406	0.35644	-0.012376	1
26.15	0.34406	0.35631	-0.012246	1
26.167	0.34406	0.35618	-0.012117	1
26.183	0.34406	0.35605	-0.011988	1
26.2	0.34406	0.35592	-0.011858	1
26.217	0.34406	0.35579	-0.011728	1
26.233	0.34406	0.35566	-0.0116	1
26.25	0.29958	0.35553	-0.05595	1
26.267	0.34406	0.3554	-0.011341	1
26.283	0.34406	0.35527	-0.011212	1
26.3	0.34406	0.35514	-0.011083	1

26.317	0.29958	0.35501	-0.055433	1
26.333	0.34406	0.35488	-0.010825	1
26.35	0.34406	0.35476	-0.010696	1
26.367	0.34406	0.35463	-0.010566	1
26.383	0.34406	0.3545	-0.010438	1
26.4	0.34406	0.35437	-0.010309	1
26.417	0.34406	0.35424	-0.01018	1
26.433	0.34406	0.35411	-0.010052	1
26.45	0.34406	0.35398	-0.0099228	1
26.467	0.34406	0.35385	-0.0097939	1
26.483	0.34406	0.35373	-0.0096658	1
26.5	0.34406	0.3536	-0.009537	1
26.517	0.34406	0.35347	-0.0094082	1
26.533	0.34406	0.35334	-0.0092803	1
26.55	0.34406	0.35321	-0.0091516	1
26.567	0.34406	0.35308	-0.009023	1
26.583	0.34406	0.35296	-0.0088952	1
26.6	0.34406	0.35283	-0.0087667	1
26.617	0.29958	0.3527	-0.053118	1
26.633	0.34406	0.35257	-0.0085105	1
26.65	0.34406	0.35244	-0.0083822	1
26.667	0.34406	0.35231	-0.0082538	1
26.683	0.34406	0.35219	-0.0081263	1
26.7	0.34406	0.35206	-0.0079981	1
26.717	0.34406	0.35193	-0.0078699	1
26.733	0.29958	0.3518	-0.052222	1
26.75	0.34406	0.35167	-0.0076144	1
26.767	0.34406	0.35155	-0.0074863	1
26.783	0.34406	0.35142	-0.0073591	1
26.8	0.34406	0.35129	-0.0072311	1
26.817	0.34406	0.35116	-0.0071032	1
26.833	0.34406	0.35104	-0.0069761	1
26.85	0.34406	0.35091	-0.0068482	1
26.867	0.34406	0.35078	-0.0067205	1
26.883	0.34406	0.35065	-0.0065935	1
26.9	0.34406	0.35053	-0.0064658	1
26.917	0.29958	0.3504	-0.050818	1
26.933	0.34406	0.35027	-0.0062113	1
26.95	0.34406	0.35014	-0.0060838	1
26.967	0.34406	0.35002	-0.0059563	1
26.983	0.29958	0.34989	-0.05031	1
27	0.34406	0.34976	-0.0057022	1
27.017	0.34406	0.34963	-0.0055748	1
27.033	0.34406	0.34951	-0.0054483	1
27.05	0.34406	0.34938	-0.005321	1
27.067	0.34406	0.34925	-0.0051938	1
27.083	0.34406	0.34913	-0.0050673	1
27.1	0.34406	0.349	-0.0049402	1
27.117	0.34406	0.34887	-0.0048131	1
27.133	0.29958	0.34875	-0.049167	1
27.15	0.34406	0.34862	-0.0045599	1
27.167	0.34406	0.34849	-0.0044329	1
27.183	0.34406	0.34837	-0.0043068	1
27.2	0.34406	0.34824	-0.0041799	1
27.217	0.34406	0.34811	-0.0040531	1
27.233	0.34406	0.34799	-0.0039271	1
27.25	0.34406	0.34786	-0.0038004	1
27.267	0.34406	0.34773	-0.0036737	1

27.283	0.34406	0.34761	-0.0035478	1
27.3	0.34406	0.34748	-0.0034213	1
27.317	0.34406	0.34735	-0.0032947	1
27.333	0.34406	0.34723	-0.003169	1
27.35	0.34406	0.3471	-0.0030426	1
27.367	0.34406	0.34698	-0.0029162	1
27.383	0.34406	0.34685	-0.0027906	1
27.4	0.34406	0.34672	-0.0026643	1
27.417	0.34406	0.3466	-0.002538	1
27.433	0.34406	0.34647	-0.0024126	1
27.45	0.34406	0.34635	-0.0022864	1
27.467	0.34406	0.34622	-0.0021603	1
27.483	0.34406	0.34609	-0.002035	1
27.5	0.34406	0.34597	-0.0019089	1
27.517	0.34406	0.34584	-0.001783	1
27.533	0.29958	0.34572	-0.046138	1
27.55	0.34406	0.34559	-0.0015319	1
27.567	0.34406	0.34547	-0.001406	1
27.583	0.34406	0.34534	-0.001281	1
27.6	0.34406	0.34522	-0.0011552	1
27.617	0.29958	0.34509	-0.04551	1
27.633	0.34406	0.34496	-0.00090462	1
27.65	0.34406	0.34484	-0.000779	1
27.667	0.29958	0.34471	-0.045133	1
27.683	0.34406	0.34459	-0.00052866	1
27.7	0.34406	0.34446	-0.00040318	1
27.717	0.34406	0.34434	-0.00027775	1
27.733	0.34406	0.34421	-0.00015311	1
27.75	0.29958	0.34409	-0.044508	1
27.767	0.34406	0.34396	9.753E-005	1
27.783	0.34406	0.34384	0.00022203	1
27.8	0.34406	0.34371	0.00034724	1
27.817	0.29958	0.34359	-0.044008	1
27.833	0.34406	0.34346	0.00059676	1
27.85	0.34406	0.34334	0.00072183	1
27.867	0.29958	0.34321	-0.043633	1
27.883	0.34406	0.34309	0.00097109	1
27.9	0.34406	0.34296	0.001096	1
27.917	0.34406	0.34284	0.0012209	1
27.933	0.34406	0.34271	0.001345	1
27.95	0.34406	0.34259	0.0014698	1
27.967	0.34406	0.34247	0.0015945	1
27.983	0.34406	0.34234	0.0017185	1
28	0.34406	0.34222	0.0018432	1
28.017	0.34406	0.34209	0.0019678	1
28.033	0.34406	0.34197	0.0020916	1
28.05	0.34406	0.34184	0.0022161	1
28.067	0.34406	0.34172	0.0023406	1
28.083	0.34406	0.3416	0.0024643	1
28.1	0.34406	0.34147	0.0025887	1
28.117	0.29958	0.34135	-0.041767	1
28.133	0.29958	0.34122	-0.041643	1
28.15	0.34406	0.3411	0.0029608	1
28.167	0.34406	0.34097	0.0030851	1
28.183	0.34406	0.34085	0.0032085	1
28.2	0.29958	0.34073	-0.041147	1
28.217	0.34406	0.3406	0.0034567	1
28.233	0.34406	0.34048	0.00358	1

28.25	0.34406	0.34036	0.0037039	1
28.267	0.34406	0.34023	0.0038279	1
28.283	0.34406	0.34011	0.003951	1
28.3	0.29958	0.33999	-0.040405	1
28.317	0.34406	0.33986	0.0041987	1
28.333	0.34406	0.33974	0.0043217	1
28.35	0.34406	0.33961	0.0044454	1
28.367	0.29958	0.33949	-0.039911	1
28.383	0.34406	0.33937	0.004692	1
28.4	0.34406	0.33924	0.0048155	1
28.417	0.34406	0.33912	0.0049391	1
28.433	0.34406	0.339	0.0050618	1
28.45	0.34406	0.33887	0.0051853	1
28.467	0.34406	0.33875	0.0053087	1
28.483	0.34406	0.33863	0.0054313	1
28.5	0.29958	0.33851	-0.038925	1
28.517	0.34406	0.33838	0.0056778	1
28.533	0.34406	0.33826	0.0058003	1
28.55	0.34406	0.33814	0.0059235	1
28.567	0.34406	0.33801	0.0060466	1
28.583	0.34406	0.33789	0.006169	1
28.6	0.34406	0.33777	0.006292	1
28.617	0.29958	0.33764	-0.038065	1
28.633	0.34406	0.33752	0.0065372	1
28.65	0.34406	0.3374	0.0066601	1
28.667	0.34406	0.33728	0.006783	1
28.683	0.34406	0.33715	0.0069051	1
28.7	0.34406	0.33703	0.0070279	1
28.717	0.34406	0.33691	0.0071506	1
28.733	0.29958	0.33679	-0.037207	1
28.75	0.34406	0.33666	0.0073952	1
28.767	0.34406	0.33654	0.0075178	1
28.783	0.34406	0.33642	0.0076396	1
28.8	0.34406	0.3363	0.0077621	1
28.817	0.29958	0.33618	-0.036595	1
28.833	0.34406	0.33605	0.0080062	1
28.85	0.34406	0.33593	0.0081286	1
28.867	0.34406	0.33581	0.0082509	1
28.883	0.34406	0.33569	0.0083725	1
28.9	0.34406	0.33557	0.0084947	1
28.917	0.34406	0.33544	0.0086169	1
28.933	0.34406	0.33532	0.0087383	1
28.95	0.34406	0.3352	0.0088604	1
28.967	0.34406	0.33508	0.0089825	1
28.983	0.34406	0.33496	0.0091038	1
29	0.34406	0.33483	0.0092257	1
29.017	0.34406	0.33471	0.0093477	1
29.033	0.29958	0.33459	-0.035011	1
29.05	0.34406	0.33447	0.0095907	1
29.067	0.34406	0.33435	0.0097125	1
29.083	0.34406	0.33423	0.0098335	1
29.1	0.34406	0.3341	0.0099552	1
29.117	0.34406	0.33398	0.010077	1
29.133	0.34406	0.33386	0.010198	1
29.15	0.29958	0.33374	-0.034161	1
29.167	0.34406	0.33362	0.010441	1
29.183	0.29958	0.3335	-0.033918	1
29.2	0.34406	0.33338	0.010683	1

29.217	0.34406	0.33326	0.010804	1
29.233	0.29958	0.33313	-0.033555	1
29.25	0.29958	0.33301	-0.033434	1
29.267	0.34406	0.33289	0.011168	1
29.283	0.34406	0.33277	0.011288	1
29.3	0.34406	0.33265	0.011409	1
29.317	0.29958	0.33253	-0.03295	1
29.333	0.34406	0.33241	0.011651	1
29.35	0.34406	0.33229	0.011772	1
29.367	0.34406	0.33217	0.011893	1
29.383	0.29958	0.33205	-0.032467	1
29.4	0.34406	0.33193	0.012134	1
29.417	0.34406	0.33181	0.012255	1
29.433	0.34406	0.33169	0.012375	1
29.45	0.34406	0.33156	0.012496	1
29.467	0.34406	0.33144	0.012616	1
29.483	0.34406	0.33132	0.012736	1
29.5	0.34406	0.3312	0.012857	1
29.517	0.29958	0.33108	-0.031502	1
29.533	0.34406	0.33096	0.013098	1
29.55	0.34406	0.33084	0.013218	1
29.567	0.34406	0.33072	0.013339	1
29.583	0.34406	0.3306	0.013458	1
29.6	0.29414	0.33048	-0.036341	1
29.617	0.34406	0.33036	0.013699	1
29.633	0.34406	0.33024	0.013819	1
29.65	0.34406	0.33012	0.013939	1
29.667	0.29958	0.33	-0.030421	1
29.683	0.29414	0.32988	-0.035742	1
29.7	0.34406	0.32976	0.014299	1
29.717	0.34406	0.32964	0.014419	1
29.733	0.29958	0.32952	-0.029942	1
29.75	0.29414	0.3294	-0.035262	1
29.767	0.34406	0.32928	0.014778	1
29.783	0.34406	0.32916	0.014897	1
29.8	0.24965	0.32904	-0.079393	1
29.817	0.29958	0.32892	-0.029343	1
29.833	0.34406	0.3288	0.015256	1
29.85	0.34406	0.32868	0.015376	1
29.867	0.34406	0.32856	0.015495	1
29.883	0.34406	0.32845	0.015614	1
29.9	0.34406	0.32833	0.015734	1
29.917	0.34406	0.32821	0.015853	1
29.933	0.34406	0.32809	0.015972	1
29.95	0.34406	0.32797	0.016092	1
29.967	0.34406	0.32785	0.016211	1
29.983	0.34406	0.32773	0.01633	1
30	0.34406	0.32761	0.016449	1
30.017	0.29958	0.32749	-0.027912	1
30.033	0.34406	0.32737	0.016687	1
30.05	0.29958	0.32725	-0.027674	1
30.067	0.24965	0.32713	-0.077485	1
30.083	0.34406	0.32702	0.017044	1
30.1	0.34406	0.3269	0.017163	1
30.117	0.29958	0.32678	-0.027198	1
30.133	0.34406	0.32666	0.0174	1
30.15	0.29414	0.32654	-0.032401	1
30.167	0.34406	0.32642	0.017638	1

30.183	0.34406	0.3263	0.017756	1
30.2	0.34406	0.32619	0.017875	1
30.217	0.34406	0.32607	0.017994	1
30.233	0.34406	0.32595	0.018112	1
30.25	0.29958	0.32583	-0.02625	1
30.267	0.24965	0.32571	-0.076061	1
30.283	0.29414	0.32559	-0.031453	1
30.3	0.34406	0.32547	0.018585	1
30.317	0.29414	0.32536	-0.031216	1
30.333	0.34406	0.32524	0.018822	1
30.35	0.29958	0.32512	-0.02554	1
30.367	0.29414	0.325	-0.030861	1
30.383	0.34406	0.32488	0.019176	1
30.4	0.34406	0.32477	0.019295	1
30.417	0.34406	0.32465	0.019413	1
30.433	0.29414	0.32453	-0.03039	1
30.45	0.24965	0.32441	-0.074762	1
30.467	0.29414	0.32429	-0.030153	1
30.483	0.29414	0.32418	-0.030036	1
30.5	0.24965	0.32406	-0.074408	1
30.517	0.29414	0.32394	-0.0298	1
30.533	0.29414	0.32382	-0.029683	1
30.55	0.29414	0.3237	-0.029565	1
30.567	0.29958	0.32359	-0.024007	1
30.583	0.29414	0.32347	-0.02933	1
30.6	0.29414	0.32335	-0.029212	1
30.617	0.24965	0.32323	-0.073584	1
30.633	0.29414	0.32312	-0.028977	1
30.65	0.29414	0.323	-0.02886	1
30.667	0.29414	0.32288	-0.028742	1
30.683	0.29414	0.32277	-0.028625	1
30.7	0.29414	0.32265	-0.028508	1
30.717	0.29414	0.32253	-0.02839	1
30.733	0.29414	0.32241	-0.028273	1
30.75	0.24965	0.3223	-0.072646	1
30.767	0.24965	0.32218	-0.072529	1
30.783	0.29414	0.32206	-0.027922	1
30.8	0.29414	0.32194	-0.027805	1
30.817	0.24965	0.32183	-0.072177	1
30.833	0.24965	0.32171	-0.072061	1
30.85	0.29414	0.32159	-0.027454	1
30.867	0.29958	0.32148	-0.021897	1
30.883	0.24965	0.32136	-0.07171	1
30.9	0.29414	0.32124	-0.027103	1
30.917	0.29414	0.32113	-0.026986	1
30.933	0.29414	0.32101	-0.02687	1
30.95	0.24965	0.32089	-0.071243	1
30.967	0.29414	0.32078	-0.026636	1
30.983	0.29414	0.32066	-0.02652	1
31	0.29414	0.32054	-0.026403	1
31.017	0.29414	0.32043	-0.026287	1
31.033	0.29414	0.32031	-0.026171	1
31.05	0.34406	0.32019	0.023866	1
31.067	0.29414	0.32008	-0.025938	1
31.083	0.29414	0.31996	-0.025822	1
31.1	0.29414	0.31985	-0.025705	1
31.117	0.29414	0.31973	-0.025589	1
31.133	0.29414	0.31961	-0.025473	1

31.15	0.29414	0.3195	-0.025357	1
31.167	0.29414	0.31938	-0.02524	1
31.183	0.29414	0.31926	-0.025125	1
31.2	0.29414	0.31915	-0.025008	1
31.217	0.24965	0.31903	-0.069382	1
31.233	0.29414	0.31892	-0.024777	1
31.25	0.29414	0.3188	-0.024661	1
31.267	0.29414	0.31868	-0.024544	1
31.283	0.24965	0.31857	-0.068919	1
31.3	0.29414	0.31845	-0.024313	1
31.317	0.29414	0.31834	-0.024197	1
31.333	0.29414	0.31822	-0.024082	1
31.35	0.24965	0.31811	-0.068456	1
31.367	0.29414	0.31799	-0.02385	1
31.383	0.29414	0.31788	-0.023735	1
31.4	0.24965	0.31776	-0.068109	1
31.417	0.24965	0.31764	-0.067994	1
31.433	0.24965	0.31753	-0.067879	1
31.45	0.29414	0.31741	-0.023273	1
31.467	0.29414	0.3173	-0.023157	1
31.483	0.24965	0.31718	-0.067533	1
31.5	0.29414	0.31707	-0.022927	1
31.517	0.29414	0.31695	-0.022812	1
31.533	0.29414	0.31684	-0.022697	1
31.55	0.29414	0.31672	-0.022582	1
31.567	0.29414	0.31661	-0.022466	1
31.583	0.29414	0.31649	-0.022352	1
31.6	0.29414	0.31638	-0.022236	1
31.617	0.29414	0.31626	-0.022121	1
31.633	0.29414	0.31615	-0.022007	1
31.65	0.29414	0.31603	-0.021892	1
31.667	0.29414	0.31592	-0.021776	1
31.683	0.29414	0.3158	-0.021662	1
31.7	0.29414	0.31569	-0.021547	1
31.717	0.29414	0.31557	-0.021432	1
31.733	0.29414	0.31546	-0.021318	1
31.75	0.24965	0.31534	-0.065693	1
31.767	0.29414	0.31523	-0.021088	1
31.783	0.29414	0.31511	-0.020974	1
31.8	0.24965	0.315	-0.065349	1
31.817	0.29414	0.31488	-0.020745	1
31.833	0.29414	0.31477	-0.020631	1
31.85	0.29414	0.31466	-0.020516	1
31.867	0.29414	0.31454	-0.020402	1
31.883	0.24965	0.31443	-0.064778	1
31.9	0.29414	0.31431	-0.020173	1
31.917	0.29414	0.3142	-0.020059	1
31.933	0.29414	0.31409	-0.019945	1
31.95	0.24965	0.31397	-0.064321	1
31.967	0.29414	0.31386	-0.019716	1
31.983	0.29414	0.31374	-0.019603	1
32	0.29414	0.31363	-0.019488	1
32.017	0.29414	0.31351	-0.019374	1
32.033	0.29414	0.3134	-0.019261	1
32.05	0.29414	0.31329	-0.019147	1
32.067	0.29414	0.31317	-0.019033	1
32.083	0.24965	0.31306	-0.063409	1
32.1	0.29414	0.31295	-0.018805	1

32.117	0.29414	0.31283	-0.018691	1
32.133	0.29414	0.31272	-0.018578	1
32.15	0.29414	0.3126	-0.018464	1
32.167	0.29414	0.31249	-0.01835	1
32.183	0.29414	0.31238	-0.018237	1
32.2	0.29414	0.31226	-0.018123	1
32.217	0.24965	0.31215	-0.0625	1
32.233	0.29414	0.31204	-0.017897	1
32.25	0.29414	0.31192	-0.017783	1
32.267	0.24965	0.31181	-0.06216	1
32.283	0.24965	0.3117	-0.062047	1
32.3	0.29414	0.31158	-0.017443	1
32.317	0.29414	0.31147	-0.01733	1
32.333	0.29414	0.31136	-0.017217	1
32.35	0.24965	0.31124	-0.061594	1
32.367	0.29414	0.31113	-0.01699	1
32.383	0.29414	0.31102	-0.016878	1
32.4	0.29414	0.3109	-0.016764	1
32.417	0.24965	0.31079	-0.061141	1
32.433	0.29414	0.31068	-0.016539	1
32.45	0.29414	0.31057	-0.016426	1
32.467	0.29414	0.31045	-0.016312	1
32.483	0.29414	0.31034	-0.0162	1
32.5	0.29414	0.31023	-0.016087	1
32.517	0.29414	0.31011	-0.015974	1
32.533	0.24965	0.31	-0.060352	1
32.55	0.24965	0.30989	-0.060239	1
32.567	0.29414	0.30978	-0.015636	1
32.583	0.29414	0.30966	-0.015524	1
32.6	0.29414	0.30955	-0.015411	1
32.617	0.24965	0.30944	-0.059789	1
32.633	0.29414	0.30933	-0.015187	1
32.65	0.29414	0.30921	-0.015074	1
32.667	0.24965	0.3091	-0.059451	1
32.683	0.29414	0.30899	-0.014849	1
32.7	0.24965	0.30888	-0.059227	1
32.717	0.29414	0.30876	-0.014624	1
32.733	0.24965	0.30865	-0.059003	1
32.75	0.29414	0.30854	-0.0144	1
32.767	0.24965	0.30843	-0.058778	1
32.783	0.29414	0.30832	-0.014176	1
32.8	0.24965	0.3082	-0.058554	1
32.817	0.29414	0.30809	-0.013952	1
32.833	0.29414	0.30798	-0.01384	1
32.85	0.29414	0.30787	-0.013728	1
32.867	0.29414	0.30776	-0.013616	1
32.883	0.29414	0.30764	-0.013505	1
32.9	0.29414	0.30753	-0.013393	1
32.917	0.29414	0.30742	-0.013281	1
32.933	0.29414	0.30731	-0.013169	1
32.95	0.29414	0.3072	-0.013057	1
32.967	0.24965	0.30709	-0.057436	1
32.983	0.29414	0.30697	-0.012834	1
33	0.29414	0.30686	-0.012723	1
33.017	0.24965	0.30675	-0.057101	1
33.033	0.29414	0.30664	-0.0125	1
33.05	0.29414	0.30653	-0.012388	1
33.067	0.24965	0.30642	-0.056767	1

33.083	0.29414	0.30631	-0.012166	1
33.1	0.29414	0.30619	-0.012054	1
33.117	0.29414	0.30608	-0.011943	1
33.133	0.29414	0.30597	-0.011832	1
33.15	0.29414	0.30586	-0.01172	1
33.167	0.24965	0.30575	-0.056099	1
33.183	0.29414	0.30564	-0.011498	1
33.2	0.29414	0.30553	-0.011387	1
33.217	0.29414	0.30542	-0.011276	1
33.233	0.29414	0.30531	-0.011165	1
33.25	0.29414	0.30519	-0.011054	1
33.267	0.24965	0.30508	-0.055433	1
33.283	0.29414	0.30497	-0.010833	1
33.3	0.29414	0.30486	-0.010721	1
33.317	0.29414	0.30475	-0.01061	1
33.333	0.24965	0.30464	-0.05499	1
33.35	0.29414	0.30453	-0.010389	1
33.367	0.24965	0.30442	-0.054768	1
33.383	0.24965	0.30431	-0.054658	1
33.4	0.29414	0.3042	-0.010057	1
33.417	0.29414	0.30409	-0.0099466	1
33.433	0.29414	0.30398	-0.0098365	1
33.45	0.29414	0.30387	-0.0097258	1
33.467	0.29414	0.30376	-0.0096151	1

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	5.9972E-006
y0 =	6.3024E-001

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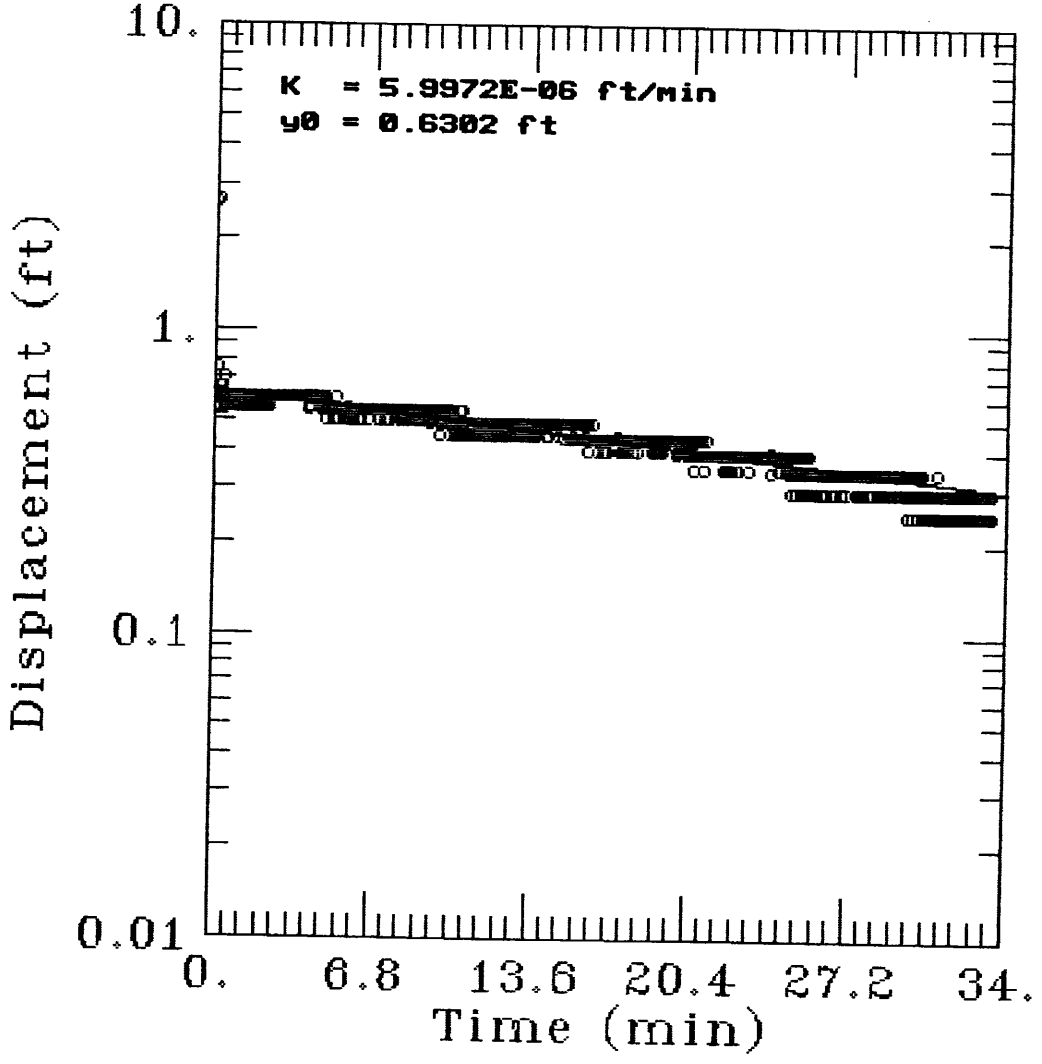
DH-3 STORRS SLUG INJECTION TEST #2



A Q T E S O L V R E S U L T S
Version 1.10

05/12/92 00:59:25

TEST DESCRIPTION

Data set..... DH3PANS2.AQT
Data set title..... DH-3 PANTHER SLUG INJECTION TEST #2
Company..... EARTHFAX ENGINEERING
Project..... UC-192-06
Client..... CO-OP MINE
Location..... BEAR CANYON MINE
Test date..... 1-17-92
Test well..... DH-2

Knowns and Constants:
- No. of data points..... 2000
- Radius of well casing..... 0.1
- Radius of well..... 0.1
- Aquifer saturated thickness..... 72
- Well screen length..... 70
- Static height of water in well..... 72
- Log(Re/Rw)..... 5.441
- A, B, C..... 0.000, 0.000, 11.627

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	6.6492E-005	+/-	8.3072E-006
y0 =	7.1181E-001	+/-	2.3288E-002

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
- Number of residuals..... 175
- Number of estimated parameters.... 2
- Degrees of freedom..... 173
- Residual mean..... 0.0002855
- Residual standard deviation..... 0.1296
- Residual variance..... 0.0168

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.066667	1.9962	0.70374	1.2925	1
0.083333	1.6843	0.70174	0.98256	1
0.11667	0.59886	0.69774	-0.098884	1
0.13333	0.59886	0.69576	-0.096898	1
0.15	0.7363	0.69378	0.042524	1
0.16667	0.63651	0.6918	-0.055291	1
0.18333	0.63651	0.68983	-0.053321	1
0.2	0.63651	0.68787	-0.051356	1
0.21667	0.63651	0.68591	-0.049398	1
0.23333	0.59886	0.68395	-0.085094	1
0.25	0.59886	0.68201	-0.083147	1
0.26667	0.63651	0.68006	-0.043555	1
0.28333	0.59886	0.67813	-0.079268	1
0.3	0.59886	0.6762	-0.077337	1
0.31667	0.59886	0.67427	-0.075412	1
0.33333	0.63651	0.67235	-0.035842	1
0.35	0.59886	0.67044	-0.071577	1
0.36667	0.59886	0.66853	-0.069668	1
0.38333	0.59886	0.66662	-0.067764	1
0.4	0.63651	0.66473	-0.028216	1
0.41667	0.59886	0.66283	-0.063973	1
0.43333	0.59886	0.66095	-0.062086	1
0.45	0.59886	0.65906	-0.060203	1
0.46667	0.59886	0.65719	-0.058327	1
0.48333	0.63651	0.65532	-0.018805	1
0.5	0.63651	0.65345	-0.016939	1
0.51667	0.63651	0.65159	-0.015078	1
0.53333	0.63651	0.64973	-0.013223	1
0.55	0.63651	0.64788	-0.011373	1
0.56667	0.59886	0.64604	-0.047178	1
0.58333	0.63651	0.6442	-0.0076883	1
0.6	0.63651	0.64236	-0.0058538	1
0.61667	0.59886	0.64053	-0.041675	1
0.63333	0.54896	0.63871	-0.089751	1
0.65	0.54896	0.63689	-0.087932	1
0.66667	0.54896	0.63508	-0.086118	1
0.68333	0.58661	0.63327	-0.04666	1
0.7	0.58661	0.63147	-0.044857	1
0.71667	0.54896	0.62967	-0.080708	1
0.73333	0.58661	0.62788	-0.041265	1
0.75	0.54896	0.62609	-0.077127	1
0.76667	0.54896	0.6243	-0.075345	1
0.78333	0.58661	0.62253	-0.035917	1
0.8	0.58661	0.62075	-0.034144	1
0.81667	0.58661	0.61899	-0.032376	1
0.83333	0.54896	0.61722	-0.068264	1
0.85	0.54896	0.61547	-0.066506	1
0.86667	0.54896	0.61371	-0.064754	1
0.88333	0.54896	0.61197	-0.063006	1
0.9	0.54896	0.61022	-0.061263	1
0.91667	0.58661	0.60849	-0.021876	1
0.93333	0.54896	0.60675	-0.057793	1

0.95	0.58661	0.60503	-0.018415	1
0.96667	0.58661	0.6033	-0.016692	1
0.98333	0.58661	0.60158	-0.014974	1
1	0.54896	0.59987	-0.050911	1
1.0167	0.58661	0.59816	-0.011553	1
1.0333	0.54896	0.59646	-0.0475	1
1.05	0.54896	0.59476	-0.045801	1
1.0667	0.58661	0.59307	-0.0064574	1
1.0833	0.58661	0.59138	-0.0047693	1
1.1	0.54896	0.58969	-0.040735	1
1.1167	0.58661	0.58802	-0.0014054	1
1.1333	0.58661	0.58634	0.00026839	1
1.15	0.58661	0.58467	0.0019384	1
1.1667	0.54896	0.58301	-0.034046	1
1.1833	0.58661	0.58135	0.0052631	1
1.2	0.58661	0.57969	0.0069189	1
1.2167	0.58661	0.57804	0.0085699	1
1.2333	0.58661	0.57639	0.010215	1
1.25	0.58661	0.57475	0.011857	1
1.2667	0.58661	0.57312	0.013494	1
1.2833	0.58661	0.57148	0.015125	1
1.3	0.54896	0.56986	-0.020897	1
1.3167	0.58661	0.56823	0.018376	1
1.3333	0.54896	0.56662	-0.017657	1
1.35	0.54896	0.565	-0.016043	1
1.3667	0.49905	0.56339	-0.064343	1
1.3833	0.58661	0.56179	0.02482	1
1.4	0.54896	0.56019	-0.01123	1
1.4167	0.54896	0.55859	-0.0096342	1
1.4333	0.53671	0.557	-0.020294	1
1.45	0.53671	0.55542	-0.018708	1
1.4667	0.49905	0.55384	-0.054786	1
1.4833	0.49905	0.55226	-0.053209	1
1.5	0.53671	0.55069	-0.013976	1
1.5167	0.49905	0.54912	-0.050068	1
1.5333	0.49905	0.54756	-0.048505	1
1.55	0.53671	0.546	-0.0092855	1
1.5667	0.53671	0.54444	-0.0077304	1
1.5833	0.53671	0.54289	-0.0061807	1
1.6	0.49905	0.54134	-0.042294	1
1.6167	0.49905	0.5398	-0.040753	1
1.6333	0.49905	0.53827	-0.039216	1
1.65	0.53671	0.53673	-2.3013E-005	1
1.6667	0.53671	0.5352	0.0015057	1
1.6833	0.53671	0.53368	0.0030291	1
1.7	0.53671	0.53216	0.0045491	1
1.7167	0.49905	0.53065	-0.031595	1
1.7333	0.49905	0.52913	-0.030085	1
1.75	0.53671	0.52763	0.0090823	1
1.7667	0.53671	0.52612	0.010585	1
1.7833	0.53671	0.52463	0.012083	1
1.8	0.53671	0.52313	0.013577	1
1.8167	0.53671	0.52164	0.015067	1
1.8333	0.49905	0.52016	-0.021108	1
1.85	0.53671	0.51868	0.018033	1
1.8667	0.53671	0.5172	0.01951	1
1.8833	0.49905	0.51573	-0.016677	1
1.9	0.53671	0.51426	0.022452	1

1.9167	0.53671	0.51279	0.023916	1
1.9333	0.49905	0.51133	-0.012284	1
1.95	0.53671	0.50988	0.026832	1
1.9667	0.53671	0.50843	0.028284	1
1.9833	0.49905	0.50698	-0.0079284	1
2	0.49905	0.50553	-0.0064844	1
2.0167	0.53671	0.50409	0.032615	1
2.0333	0.53671	0.50266	0.03405	1
2.05	0.49905	0.50123	-0.002178	1
2.0667	0.49905	0.4998	-0.00075045	1
2.0833	0.53671	0.49838	0.038332	1
2.1	0.53671	0.49696	0.039752	1
2.1167	0.53671	0.49554	0.041167	1
2.1333	0.53671	0.49413	0.042578	1
2.15	0.49905	0.49273	0.006325	1
2.1667	0.49905	0.49132	0.0077284	1
2.1833	0.53671	0.48992	0.046787	1
2.2	0.53671	0.48853	0.048182	1
2.2167	0.49905	0.48714	0.011914	1
2.2333	0.53671	0.48575	0.05096	1
2.25	0.49905	0.48437	0.014684	1
2.2667	0.48682	0.48299	0.0038333	1
2.2833	0.53671	0.48161	0.055098	1
2.3	0.48682	0.48024	0.0065798	1
2.3167	0.49905	0.47887	0.020178	1
2.3333	0.49905	0.47751	0.021541	1
2.35	0.44914	0.47615	-0.027009	1
2.3667	0.44914	0.47479	-0.025653	1
2.3833	0.48682	0.47344	0.013378	1
2.4	0.48682	0.47209	0.014727	1
2.4167	0.53671	0.47075	0.065961	1
2.4333	0.44914	0.46941	-0.020269	1
2.45	0.44914	0.46807	-0.018932	1
2.4667	0.44914	0.46674	-0.017599	1
2.4833	0.48682	0.46541	0.02141	1
2.5	0.48682	0.46408	0.022736	1
2.5167	0.44914	0.46276	-0.013623	1
2.5333	0.44914	0.46145	-0.012305	1
2.55	0.44914	0.46013	-0.010991	1
2.5667	0.44914	0.45882	-0.0096806	1
2.5833	0.48682	0.45751	0.029305	1
2.6	0.48682	0.45621	0.030608	1
2.6167	0.44914	0.45491	-0.0057722	1
2.6333	0.44914	0.45362	-0.0044773	1
2.65	0.44914	0.45233	-0.0031853	1
2.6667	0.44914	0.45104	-0.001897	1
2.6833	0.48682	0.44975	0.037067	1
2.7	0.48682	0.44847	0.038348	1
2.7167	0.48682	0.44719	0.039625	1
2.7333	0.44914	0.44592	0.003218	1
2.75	0.44914	0.44465	0.0044881	1
2.7667	0.48682	0.44339	0.043435	1
2.7833	0.48682	0.44212	0.044697	1
2.8	0.44914	0.44086	0.0082758	1
2.8167	0.44914	0.43961	0.0095315	1
2.8333	0.44914	0.43836	0.010783	1
2.85	0.44914	0.43711	0.012031	1
2.8667	0.48682	0.43586	0.050956	1

2.8833	0.44914	0.43462	0.014517	1
2.9	0.44914	0.43339	0.015755	1
2.9167	0.44914	0.43215	0.016989	1
2.9333	0.44914	0.43092	0.018217	1
2.95	0.48682	0.42969	0.057127	1
2.9667	0.44914	0.42847	0.020673	1
2.9833	0.48682	0.42725	0.059568	1

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	6.6492E-005
y0 =	7.1181E-001

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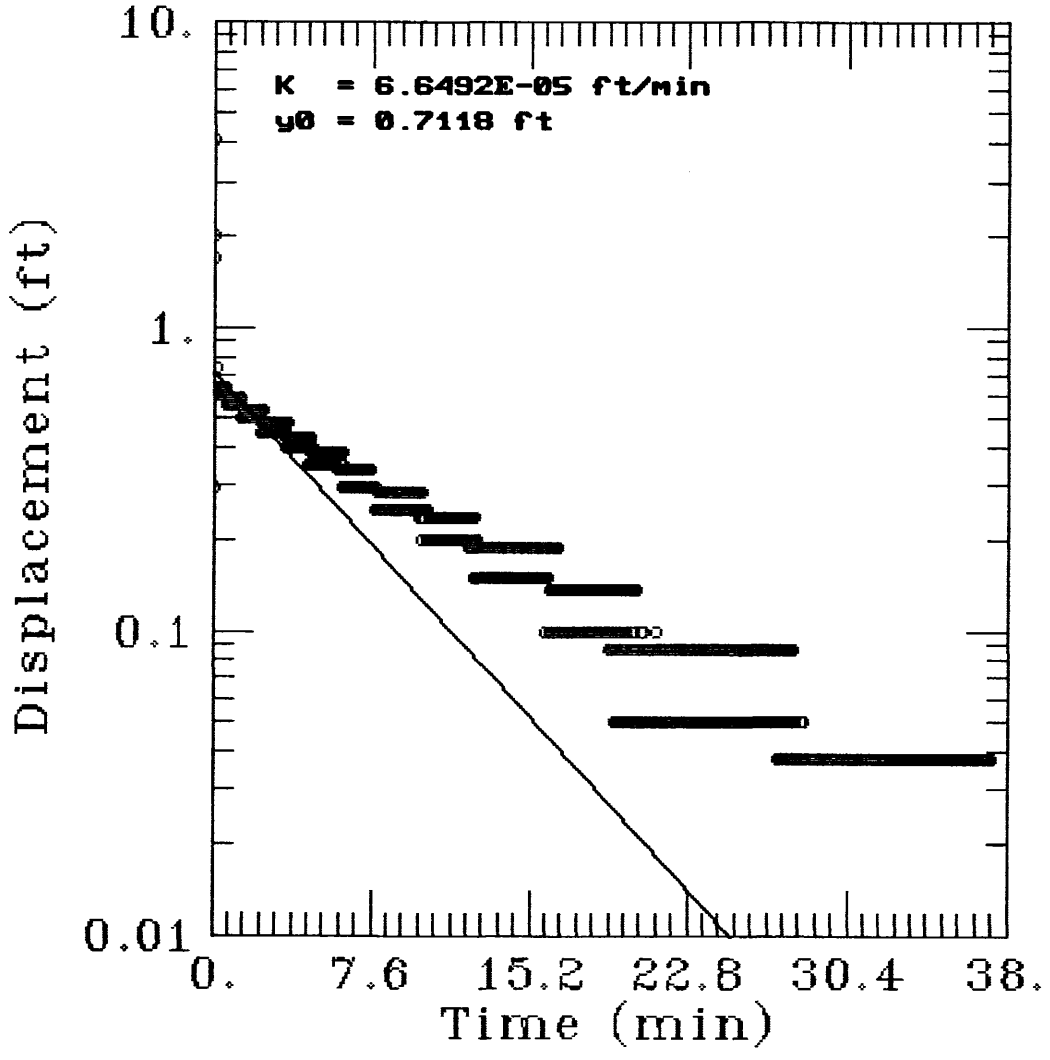
DH-3 PANTHER SLUG INJECTION TEST #2



A Q T E S O L V R E S U L T S
Version 1.10

04/25/94 11:35:16

TEST DESCRIPTION

Data set..... dh4slu#2.aqt
Data set title..... DH-4 SLUG TEST #2
Company..... EARTHFAX ENGINEERING, INC.
Project..... UC-192-09
Client..... CO-OP MINING COMPANY
Location..... BEAR CANYON MINE
Test date..... 3-14-94
Test well..... DH-4

Knowns and Constants:

No. of data points	2000
Radius of well casing	0.0625
Radius of well	0.099
Aquifer saturated thickness	177.7
Well screen length	20
Static height of water in well	177.7
Log(Re/Rw)	5.519
A, B, C	0.000, 0.000, 6.946

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate	Std. Error
K =	1.1330E-004 +/-	5.0615E-007
y0 =	1.9690E-001 +/-	6.1032E-004

ANALYSIS OF MODEL RESIDUALS

Residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:

Number of residuals	2000
Number of estimated parameters	2
Degrees of freedom	1998
Residual mean	0.00022
Residual standard deviation	0.007172
Residual variance	5.144E-005

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.025	0.27845	0.19587	0.08258	1
0.041667	0.24004	0.19519	0.044855	1
0.058333	0.19203	0.1945	-0.0024723	1
0.075	0.14403	0.19382	-0.049792	1
0.091667	0.13442	0.19314	-0.058724	1
0.10833	0.13442	0.19247	-0.058049	1
0.125	0.16323	0.1918	-0.028565	1
0.14167	0.19203	0.19112	0.00090539	1
0.15833	0.22084	0.19046	0.030384	1
0.175	0.24004	0.18979	0.05025	1
0.19167	0.24004	0.18913	0.050914	1
0.20833	0.23044	0.18846	0.041975	1
0.225	0.21124	0.18781	0.023434	1
0.24167	0.18243	0.18715	-0.0047187	1
0.25833	0.16323	0.18649	-0.023264	1
0.275	0.16323	0.18584	-0.022612	1
0.29167	0.16323	0.18519	-0.021962	1
0.30833	0.17283	0.18454	-0.011714	1
0.325	0.18243	0.1839	-0.0014686	1
0.34167	0.19203	0.18326	0.0087746	1
0.35833	0.20164	0.18261	0.019026	1
0.375	0.20164	0.18198	0.019664	1
0.39167	0.20164	0.18134	0.020301	1
0.40833	0.19203	0.18071	0.011325	1
0.425	0.18243	0.18007	0.002357	1
0.44167	0.17283	0.17944	-0.0066132	1
0.45833	0.16323	0.17882	-0.015586	1
0.475	0.16323	0.17819	-0.01496	1
0.49167	0.17283	0.17757	-0.0047369	1
0.50833	0.17283	0.17695	-0.0041159	1

0.525	0.18243	0.17633	0.006103	1
0.54167	0.18243	0.17571	0.0067197	1
0.55833	0.18243	0.1751	0.0073343	1
0.575	0.18243	0.17448	0.0079467	1
0.59167	0.17283	0.17387	-0.001043	1
0.60833	0.17283	0.17326	-0.00043489	1
0.625	0.16323	0.17266	-0.0094289	1
0.64167	0.16323	0.17205	-0.008825	1
0.65833	0.16323	0.17145	-0.0082232	1
0.675	0.16323	0.17085	-0.0076235	1
0.69167	0.16323	0.17026	-0.007026	1
0.70833	0.17283	0.16966	0.0031695	1
0.725	0.17283	0.16907	0.0037629	1
0.74167	0.17283	0.16848	0.0043542	1
0.75833	0.17283	0.16789	0.0049435	1
0.775	0.16323	0.1673	-0.0040693	1
0.79167	0.16323	0.16671	-0.0034842	1
0.80833	0.16323	0.16613	-0.0029011	1
0.825	0.16323	0.16555	-0.00232	1
0.84167	0.16323	0.16497	-0.001741	1
0.85833	0.16323	0.16439	-0.001164	1
0.875	0.16323	0.16382	-0.00058899	1
0.89167	0.16323	0.16325	-1.6019E-005	1
0.90833	0.16323	0.16268	0.00055495	1
0.925	0.16323	0.16211	0.0011239	1
0.94167	0.16323	0.16154	0.0016909	1
0.95833	0.16323	0.16097	0.0022559	1
0.975	0.15363	0.16041	-0.0067811	1
0.99167	0.15363	0.15985	-0.00622	1
1.0083	0.15363	0.15929	-0.005661	1
1.025	0.15363	0.15873	-0.0051038	1
1.0417	0.15363	0.15818	-0.0045486	1
1.0583	0.15363	0.15763	-0.0039954	1
1.075	0.15363	0.15707	-0.0034441	1
1.0917	0.15363	0.15652	-0.0028947	1
1.1083	0.15363	0.15598	-0.0023472	1
1.125	0.15363	0.15543	-0.0018017	1
1.1417	0.15363	0.15489	-0.001258	1
1.1583	0.15363	0.15435	-0.00071633	1
1.175	0.15363	0.15381	-0.00017648	1
1.1917	0.15363	0.15327	0.00036148	1
1.2083	0.15363	0.15273	0.00089753	1
1.225	0.15363	0.1522	0.0014317	1
1.2417	0.14403	0.15167	-0.0076359	1
1.2583	0.14403	0.15114	-0.0071055	1
1.275	0.14403	0.15061	-0.0065769	1
1.2917	0.14403	0.15008	-0.0060501	1
1.3083	0.14403	0.14956	-0.0055252	1

1.325	0.14403	0.14903	-0.0050021	1
1.3417	0.14403	0.14851	-0.0044808	1
1.3583	0.14403	0.14799	-0.0039614	1
1.375	0.14403	0.14747	-0.0034438	1
1.3917	0.14403	0.14696	-0.002928	1
1.4083	0.14403	0.14644	-0.002414	1
1.425	0.14403	0.14593	-0.0019018	1
1.4417	0.14403	0.14542	-0.0013914	1
1.4583	0.14403	0.14491	-0.00088279	1
1.475	0.14403	0.14441	-0.00037593	1
1.4917	0.14403	0.1439	0.00012915	1
1.5083	0.14403	0.1434	0.00063243	1
1.525	0.14403	0.1429	0.001134	1
1.5417	0.14403	0.1424	0.0016338	1
1.5583	0.14403	0.1419	0.0021318	1
1.575	0.13442	0.1414	-0.0069819	1
1.5917	0.13442	0.14091	-0.0064873	1
1.6083	0.13442	0.14041	-0.0059945	1
1.625	0.13442	0.13992	-0.0055034	1
1.6417	0.13442	0.13943	-0.005014	1
1.6583	0.13442	0.13895	-0.0045263	1
1.675	0.13442	0.13846	-0.0040403	1
1.6917	0.13442	0.13798	-0.003556	1
1.7083	0.13442	0.13749	-0.0030735	1
1.725	0.13442	0.13701	-0.0025926	1
1.7417	0.13442	0.13653	-0.0021133	1
1.7583	0.13442	0.13606	-0.0016358	1
1.775	0.13442	0.13558	-0.0011599	1
1.7917	0.13442	0.13511	-0.00068573	1
1.8083	0.13442	0.13463	-0.0002132	1
1.825	0.13442	0.13416	0.0002577	1
1.8417	0.13442	0.13369	0.00072695	1
1.8583	0.13442	0.13323	0.0011945	1
1.875	0.13442	0.13276	0.0016605	1
1.8917	0.13442	0.1323	0.0021249	1
1.9083	0.13442	0.13183	0.0025876	1
1.925	0.13442	0.13137	0.0030487	1
1.9417	0.13442	0.13091	0.0035082	1
1.9583	0.13442	0.13045	0.003966	1
1.975	0.12482	0.13	-0.0051777	1
1.9917	0.12482	0.12954	-0.004723	1
2.0083	0.12482	0.12909	-0.00427	1
2.025	0.12482	0.12864	-0.0038184	1
2.0417	0.12482	0.12819	-0.0033685	1
2.0583	0.12482	0.12774	-0.0029202	1
2.075	0.12482	0.12729	-0.0024734	1
2.0917	0.12482	0.12685	-0.0020282	1
2.1083	0.12482	0.1264	-0.0015845	1

2.125	0.12482	0.12596	-0.0011424	1
2.1417	0.12482	0.12552	-0.00070182	1
2.1583	0.12482	0.12508	-0.00026281	1
2.175	0.12482	0.12465	0.00017469	1
2.1917	0.12482	0.12421	0.00061065	1
2.2083	0.12482	0.12377	0.0010451	1
2.225	0.12482	0.12334	0.001478	1
2.2417	0.12482	0.12291	0.0019094	1
2.2583	0.12482	0.12248	0.0023393	1
2.275	0.12482	0.12205	0.0027677	1
2.2917	0.12482	0.12163	0.0031946	1
2.3083	0.11522	0.1212	-0.0059801	1
2.325	0.12482	0.12078	0.0040439	1
2.3417	0.12482	0.12035	0.0044663	1
2.3583	0.11522	0.11993	-0.0047128	1
2.375	0.11522	0.11951	-0.0042933	1
2.3917	0.11522	0.1191	-0.0038753	1
2.4083	0.11522	0.11868	-0.0034587	1
2.425	0.11522	0.11826	-0.0030437	1
2.4417	0.11522	0.11785	-0.00263	1
2.4583	0.11522	0.11744	-0.0022178	1
2.475	0.11522	0.11703	-0.0018071	1
2.4917	0.11522	0.11662	-0.0013978	1
2.5083	0.11522	0.11621	-0.00098989	1
2.525	0.11522	0.1158	-0.00058343	1
2.5417	0.11522	0.1154	-0.00017839	1
2.5583	0.11522	0.11499	0.00022521	1
2.575	0.11522	0.11459	0.00062742	1
2.5917	0.11522	0.11419	0.0010282	1
2.6083	0.11522	0.11379	0.0014276	1
2.625	0.11522	0.11339	0.0018256	1
2.6417	0.11522	0.113	0.0022222	1
2.6583	0.11522	0.1126	0.0026174	1
2.675	0.11522	0.11221	0.0030113	1
2.6917	0.11522	0.11182	0.0034037	1
2.7083	0.10562	0.11143	-0.0058052	1
2.725	0.11522	0.11104	0.0041845	1
2.7417	0.10562	0.11065	-0.0050271	1
2.7583	0.10562	0.11026	-0.0046401	1
2.775	0.10562	0.10987	-0.0042545	1
2.7917	0.10562	0.10949	-0.0038702	1
2.8083	0.10562	0.10911	-0.0034872	1
2.825	0.10562	0.10873	-0.0031056	1
2.8417	0.10562	0.10835	-0.0027253	1
2.8583	0.10562	0.10797	-0.0023464	1
2.875	0.10562	0.10759	-0.0019688	1
2.8917	0.10562	0.10721	-0.0015924	1
2.9083	0.10562	0.10684	-0.0012175	1

2.925	0.10562	0.10646	-0.00084379	1
2.9417	0.10562	0.10609	-0.00047142	1
2.9583	0.10562	0.10572	-0.00010037	1
2.975	0.10562	0.10535	0.0002694	1
2.9917	0.10562	0.10498	0.00063788	1
3.0083	0.10562	0.10461	0.0010051	1
3.025	0.10562	0.10425	0.001371	1
3.0417	0.10562	0.10388	0.0017356	1
3.0583	0.10562	0.10352	0.0020989	1
3.075	0.10562	0.10316	0.002461	1
3.0917	0.10562	0.1028	0.0028218	1
3.1083	0.10562	0.10244	0.0031813	1
3.125	0.10562	0.10208	0.0035396	1
3.1417	0.10562	0.10172	0.0038967	1
3.1583	0.10562	0.10137	0.0042525	1
3.175	0.10562	0.10101	0.004607	1
3.1917	0.09602	0.10066	-0.0046397	1
3.2083	0.09602	0.10031	-0.0042876	1
3.225	0.09602	0.099957	-0.0039368	1
3.2417	0.09602	0.099607	-0.0035872	1
3.2583	0.09602	0.099259	-0.0032388	1
3.275	0.09602	0.098912	-0.0028916	1
3.2917	0.09602	0.098566	-0.0025457	1
3.3083	0.09602	0.098221	-0.002201	1
3.325	0.09602	0.097877	-0.0018574	1
3.3417	0.09602	0.097535	-0.0015151	1
3.3583	0.09602	0.097194	-0.0011739	1
3.375	0.09602	0.096854	-0.00083399	1
3.3917	0.09602	0.096515	-0.00049523	1
3.4083	0.09602	0.096178	-0.00015768	1
3.425	0.09602	0.095841	0.00017872	1
3.4417	0.09602	0.095506	0.00051394	1
3.4583	0.09602	0.095172	0.00084797	1
3.475	0.09602	0.094839	0.0011808	1
3.4917	0.09602	0.094507	0.0015126	1
3.5083	0.09602	0.094177	0.0018431	1
3.525	0.09602	0.093848	0.0021725	1
3.5417	0.09602	0.093519	0.0025007	1
3.5583	0.09602	0.093192	0.0028278	1
3.575	0.09602	0.092866	0.0031538	1
3.5917	0.09602	0.092541	0.0034786	1
3.6083	0.09602	0.092218	0.0038022	1
3.625	0.09602	0.091895	0.0041248	1
3.6417	0.08642	0.091574	-0.0051538	1
3.6583	0.08642	0.091254	-0.0048335	1
3.675	0.08642	0.090934	-0.0045143	1
3.6917	0.08642	0.090616	-0.0041963	1
3.7083	0.09602	0.090299	0.0057206	1

3.725	0.08642	0.089984	-0.0035635	1
3.7417	0.08642	0.089669	-0.0032488	1
3.7583	0.08642	0.089355	-0.0029352	1
3.775	0.08642	0.089043	-0.0026226	1
3.7917	0.08642	0.088731	-0.0023112	1
3.8083	0.08642	0.088421	-0.0020009	1
3.825	0.08642	0.088112	-0.0016916	1
3.8417	0.08642	0.087803	-0.0013834	1
3.8583	0.08642	0.087496	-0.0010763	1
3.875	0.08642	0.08719	-0.0007703	1
3.8917	0.08642	0.086885	-0.00046534	1
3.9083	0.08642	0.086581	-0.00016147	1
3.925	0.08642	0.086279	0.00014137	1
3.9417	0.08642	0.085977	0.00044314	1
3.9583	0.08642	0.085676	0.00074384	1
3.975	0.08642	0.085376	0.0010435	1
3.9917	0.08642	0.085078	0.0013421	1
4.0083	0.08642	0.08478	0.0016397	1
4.025	0.08642	0.084484	0.0019362	1
4.0417	0.08642	0.084188	0.0022317	1
4.0583	0.08642	0.083894	0.0025261	1
4.075	0.08642	0.0836	0.0028196	1
4.0917	0.08642	0.083308	0.003112	1
4.1083	0.08642	0.083017	0.0034034	1
4.125	0.08642	0.082726	0.0036937	1
4.1417	0.08642	0.082437	0.0039831	1
4.1583	0.08642	0.082149	0.0042714	1
4.175	0.08642	0.081861	0.0045587	1
4.1917	0.08642	0.081575	0.004845	1
4.2083	0.08642	0.08129	0.0051303	1
4.225	0.07681	0.081005	-0.0041953	1
4.2417	0.07681	0.080722	-0.003912	1
4.2583	0.07681	0.08044	-0.0036297	1
4.275	0.07681	0.080158	-0.0033483	1
4.2917	0.07681	0.079878	-0.003068	1
4.3083	0.07681	0.079599	-0.0027886	1
4.325	0.07681	0.07932	-0.0025102	1
4.3417	0.07681	0.079043	-0.0022328	1
4.3583	0.07681	0.078766	-0.0019563	1
4.375	0.07681	0.078491	-0.0016808	1
4.3917	0.07681	0.078216	-0.0014063	1
4.4083	0.07681	0.077943	-0.0011327	1
4.425	0.07681	0.07767	-0.00086011	1
4.4417	0.07681	0.077398	-0.00058845	1
4.4583	0.07681	0.077128	-0.00031775	1
4.475	0.07681	0.076858	-4.7982E-005	1
4.4917	0.07681	0.076589	0.00022084	1
4.5083	0.07681	0.076321	0.00048871	1

4.525	0.07681	0.076054	0.00075565	1
4.5417	0.07681	0.075788	0.0010217	1
4.5583	0.07681	0.075523	0.0012867	1
4.575	0.07681	0.075259	0.0015509	1
4.5917	0.07681	0.074996	0.0018141	1
4.6083	0.07681	0.074734	0.0020764	1
4.625	0.07681	0.074472	0.0023378	1
4.6417	0.07681	0.074212	0.0025983	1
4.6583	0.07681	0.073952	0.0028578	1
4.675	0.07681	0.073694	0.0031165	1
4.6917	0.07681	0.073436	0.0033742	1
4.7083	0.07681	0.073179	0.0036311	1
4.725	0.07681	0.072923	0.003887	1
4.7417	0.07681	0.072668	0.0041421	1
4.7583	0.07681	0.072414	0.0043962	1
4.775	0.07681	0.07216	0.0046495	1
4.7917	0.07681	0.071908	0.0049019	1
4.8083	0.07681	0.071657	0.0051534	1
4.825	0.07681	0.071406	0.005404	1
4.8417	0.07681	0.071156	0.0056538	1
4.8583	0.07681	0.070907	0.0059027	1
4.875	0.07681	0.070659	0.0061507	1
4.8917	0.06721	0.070412	-0.0032022	1
4.9083	0.06721	0.070166	-0.0029559	1
4.925	0.06721	0.069921	-0.0027105	1
4.9417	0.06721	0.069676	-0.0024659	1
4.9583	0.06721	0.069432	-0.0022223	1
4.975	0.06721	0.069189	-0.0019794	1
4.9917	0.06721	0.068947	-0.0017374	1
5.0083	0.06721	0.068706	-0.0014963	1
5.025	0.06721	0.068466	-0.001256	1
5.0417	0.06721	0.068226	-0.0010165	1
5.0583	0.06721	0.067988	-0.00077787	1
5.075	0.06721	0.06775	-0.00054007	1
5.0917	0.06721	0.067513	-0.00030311	1
5.1083	0.06721	0.067277	-6.6969E-005	1
5.125	0.06721	0.067042	0.00016833	1
5.1417	0.06721	0.066807	0.00040282	1
5.1583	0.06721	0.066574	0.00063647	1
5.175	0.06721	0.066341	0.00086932	1
5.1917	0.06721	0.066109	0.0011014	1
5.2083	0.06721	0.065877	0.0013326	1
5.225	0.06721	0.065647	0.001563	1
5.2417	0.06721	0.065417	0.0017926	1
5.2583	0.06721	0.065189	0.0020214	1
5.275	0.06721	0.064961	0.0022494	1
5.2917	0.06721	0.064733	0.0024766	1
5.3083	0.06721	0.064507	0.002703	1

5.325	0.06721	0.064281	0.0029286	1
5.3417	0.06721	0.064057	0.0031535	1
5.3583	0.06721	0.063832	0.0033775	1
5.375	0.06721	0.063609	0.0036008	1
5.3917	0.06721	0.063387	0.0038232	1
5.4083	0.06721	0.063165	0.0040449	1
5.425	0.06721	0.062944	0.0042659	1
5.4417	0.06721	0.062724	0.004486	1
5.4583	0.06721	0.062505	0.0047054	1
5.475	0.06721	0.062286	0.004924	1
5.4917	0.06721	0.062068	0.0051419	1
5.5083	0.06721	0.061851	0.005359	1
5.525	0.06721	0.061635	0.0055753	1
5.5417	0.06721	0.061419	0.0057909	1
5.5583	0.05761	0.061204	-0.0035943	1
5.575	0.06721	0.06099	0.0062197	1
5.5917	0.06721	0.060777	0.0064331	1
5.6083	0.05761	0.060564	-0.0029544	1
5.625	0.05761	0.060353	-0.0027425	1
5.6417	0.05761	0.060141	-0.0025314	1
5.6583	0.06721	0.059931	0.0072789	1
5.675	0.05761	0.059721	-0.0021115	1
5.6917	0.05761	0.059513	-0.0019026	1
5.7083	0.05761	0.059304	-0.0016945	1
5.725	0.05761	0.059097	-0.001487	1
5.7417	0.05761	0.05889	-0.0012803	1
5.7583	0.05761	0.058684	-0.0010744	1
5.775	0.05761	0.058479	-0.0008691	1
5.7917	0.05761	0.058275	-0.00066456	1
5.8083	0.05761	0.058071	-0.00046075	1
5.825	0.05761	0.057868	-0.00025764	1
5.8417	0.05761	0.057665	-5.5237E-005	1
5.8583	0.05761	0.057464	0.00014646	1
5.875	0.05761	0.057263	0.00034743	1
5.8917	0.05761	0.057062	0.00054772	1
5.9083	0.05761	0.056863	0.00074729	1
5.925	0.05761	0.056664	0.00094618	1
5.9417	0.05761	0.056466	0.0011444	1
5.9583	0.05761	0.056268	0.0013419	1
5.975	0.05761	0.056071	0.0015387	1
5.9917	0.05761	0.055875	0.0017348	1
6.0083	0.05761	0.05568	0.0019302	1
6.025	0.05761	0.055485	0.0021249	1
6.0417	0.05761	0.055291	0.002319	1
6.0583	0.05761	0.055098	0.0025124	1
6.075	0.05761	0.054905	0.0027051	1
6.0917	0.05761	0.054713	0.0028971	1
6.1083	0.05761	0.054521	0.0030885	1

6.125	0.05761	0.054331	0.0032792	1
6.1417	0.05761	0.054141	0.0034692	1
6.1583	0.05761	0.053951	0.0036586	1
6.175	0.05761	0.053763	0.0038473	1
6.1917	0.05761	0.053575	0.0040353	1
6.2083	0.05761	0.053387	0.0042227	1
6.225	0.05761	0.053201	0.0044094	1
6.2417	0.05761	0.053014	0.0045955	1
6.2583	0.05761	0.052829	0.0047809	1
6.275	0.05761	0.052644	0.0049657	1
6.2917	0.05761	0.05246	0.0051498	1
6.3083	0.05761	0.052277	0.0053333	1
6.325	0.05761	0.052094	0.0055162	1
6.3417	0.05761	0.051912	0.0056984	1
6.3583	0.05761	0.05173	0.0058799	1
6.375	0.05761	0.051549	0.0060609	1
6.3917	0.05761	0.051369	0.0062412	1
6.4083	0.05761	0.051189	0.0064208	1
6.425	0.04801	0.05101	-0.0030001	1
6.4417	0.04801	0.050832	-0.0028217	1
6.4583	0.05761	0.050654	0.0069561	1
6.475	0.04801	0.050477	-0.0024668	1
6.4917	0.05761	0.0503	0.0073098	1
6.5083	0.05761	0.050124	0.0074857	1
6.525	0.04801	0.049949	-0.001939	1
6.5417	0.04801	0.049774	-0.0017643	1
6.5583	0.04801	0.0496	-0.0015902	1
6.575	0.04801	0.049427	-0.0014167	1
6.5917	0.04801	0.049254	-0.0012438	1
6.6083	0.04801	0.049082	-0.0010716	1
6.625	0.04801	0.04891	-0.0008999	1
6.6417	0.04801	0.048739	-0.00072883	1
6.6583	0.04801	0.048568	-0.00055837	1
6.675	0.04801	0.048398	-0.0003885	1
6.6917	0.04801	0.048229	-0.00021922	1
6.7083	0.04801	0.048061	-5.0536E-005	1
6.725	0.04801	0.047892	0.00011756	1
6.7417	0.04801	0.047725	0.00028507	1
6.7583	0.04801	0.047558	0.00045199	1
6.775	0.04801	0.047392	0.00061833	1
6.7917	0.04801	0.047226	0.00078409	1
6.8083	0.04801	0.047061	0.00094926	1
6.825	0.04801	0.046896	0.0011139	1
6.8417	0.04801	0.046732	0.0012779	1
6.8583	0.04801	0.046569	0.0014413	1
6.875	0.04801	0.046406	0.0016042	1
6.8917	0.04801	0.046243	0.0017665	1
6.9083	0.04801	0.046082	0.0019283	1

6.925	0.04801	0.045921	0.0020894	1
6.9417	0.03841	0.04576	-0.0073499	1
6.9583	0.04801	0.0456	0.0024101	1
6.975	0.04801	0.04544	0.0025696	1
6.9917	0.04801	0.045281	0.0027285	1
7.0083	0.04801	0.045123	0.0028869	1
7.025	0.04801	0.044965	0.0030447	1
7.0417	0.04801	0.044808	0.003202	1
7.0583	0.03841	0.044651	-0.0062413	1
7.075	0.04801	0.044495	0.0035149	1
7.0917	0.04801	0.044339	0.0036705	1
7.1083	0.03841	0.044184	-0.0057744	1
7.125	0.03841	0.04403	-0.0056199	1
7.1417	0.04801	0.043876	0.0041341	1
7.1583	0.03841	0.043722	-0.0053124	1
7.175	0.03841	0.043569	-0.0051595	1
7.1917	0.03841	0.043417	-0.0050071	1
7.2083	0.03841	0.043265	-0.0048553	1
7.225	0.03841	0.043114	-0.0047039	1
7.2417	0.03841	0.042963	-0.0045531	1
7.2583	0.03841	0.042813	-0.0044029	1
7.275	0.03841	0.042663	-0.0042531	1
7.2917	0.03841	0.042514	-0.0041039	1
7.3083	0.03841	0.042365	-0.0039552	1
7.325	0.03841	0.042217	-0.003807	1
7.3417	0.03841	0.042069	-0.0036594	1
7.3583	0.03841	0.041922	-0.0035122	1
7.375	0.03841	0.041776	-0.0033656	1
7.3917	0.03841	0.041629	-0.0032195	1
7.4083	0.04801	0.041484	0.0065261	1
7.425	0.03841	0.041339	-0.0029288	1
7.4417	0.03841	0.041194	-0.0027842	1
7.4583	0.03841	0.04105	-0.0026401	1
7.475	0.03841	0.040907	-0.0024966	1
7.4917	0.03841	0.040763	-0.0023535	1
7.5083	0.03841	0.040621	-0.0022109	1
7.525	0.03841	0.040479	-0.0020688	1
7.5417	0.03841	0.040337	-0.0019273	1
7.5583	0.03841	0.040196	-0.0017862	1
7.575	0.03841	0.040056	-0.0016456	1
7.5917	0.03841	0.039915	-0.0015055	1
7.6083	0.03841	0.039776	-0.0013659	1
7.625	0.03841	0.039637	-0.0012268	1
7.6417	0.03841	0.039498	-0.0010881	1
7.6583	0.03841	0.03936	-0.00094998	1
7.675	0.03841	0.039222	-0.00081231	1
7.6917	0.03841	0.039085	-0.00067513	1
7.7083	0.03841	0.038948	-0.00053843	1

7.725	0.03841	0.038812	-0.0004022	1
7.7417	0.03841	0.038676	-0.00026645	1
7.7583	0.03841	0.038541	-0.00013117	1
7.775	0.03841	0.038406	3.625E-006	1
7.7917	0.03841	0.038272	0.00013796	1
7.8083	0.03841	0.038138	0.00027181	1
7.825	0.03841	0.038005	0.00040521	1
7.8417	0.03841	0.037872	0.00053813	1
7.8583	0.03841	0.037739	0.0006706	1
7.875	0.02881	0.037607	-0.0087974	1
7.8917	0.02881	0.037476	-0.0086659	1
7.9083	0.03841	0.037345	0.0010652	1
7.925	0.03841	0.037214	0.0011958	1
7.9417	0.03841	0.037084	0.001326	1
7.9583	0.03841	0.036954	0.0014557	1
7.975	0.03841	0.036825	0.0015849	1
7.9917	0.03841	0.036696	0.0017137	1
8.0083	0.03841	0.036568	0.0018421	1
8.025	0.02881	0.03644	-0.00763	1
8.0417	0.03841	0.036313	0.0020974	1
8.0583	0.02881	0.036186	-0.0073756	1
8.075	0.03841	0.036059	0.002351	1
8.0917	0.03841	0.035933	0.0024771	1
8.1083	0.03841	0.035807	0.0026028	1
8.125	0.03841	0.035682	0.002728	1
8.1417	0.03841	0.035557	0.0028528	1
8.1583	0.03841	0.035433	0.0029772	1
8.175	0.03841	0.035309	0.0031011	1
8.1917	0.03841	0.035185	0.0032246	1
8.2083	0.03841	0.035062	0.0033477	1
8.225	0.03841	0.03494	0.0034703	1
8.2417	0.02881	0.034817	-0.0060075	1
8.2583	0.02881	0.034696	-0.0058857	1
8.275	0.03841	0.034574	0.0038357	1
8.2917	0.02881	0.034453	-0.0056434	1
8.3083	0.02881	0.034333	-0.0055229	1
8.325	0.03841	0.034213	0.0041972	1
8.3417	0.02881	0.034093	-0.0052832	1
8.3583	0.02881	0.033974	-0.0051639	1
8.375	0.02881	0.033855	-0.0050451	1
8.3917	0.02881	0.033737	-0.0049267	1
8.4083	0.02881	0.033619	-0.0048087	1
8.425	0.02881	0.033501	-0.0046911	1
8.4417	0.02881	0.033384	-0.0045739	1
8.4583	0.02881	0.033267	-0.0044572	1
8.475	0.03841	0.033151	0.0052592	1
8.4917	0.02881	0.033035	-0.0042249	1
8.5083	0.02881	0.032919	-0.0041093	1

8.525	0.02881	0.032804	-0.0039942	1
8.5417	0.02881	0.032689	-0.0038795	1
8.5583	0.02881	0.032575	-0.0037651	1
8.575	0.02881	0.032461	-0.0036512	1
8.5917	0.02881	0.032348	-0.0035376	1
8.6083	0.02881	0.032235	-0.0034245	1
8.625	0.02881	0.032122	-0.0033118	1
8.6417	0.02881	0.032009	-0.0031994	1
8.6583	0.02881	0.031897	-0.0030875	1
8.675	0.02881	0.031786	-0.0029759	1
8.6917	0.02881	0.031675	-0.0028647	1
8.7083	0.02881	0.031564	-0.0027539	1
8.725	0.02881	0.031454	-0.0026435	1
8.7417	0.02881	0.031344	-0.0025335	1
8.7583	0.02881	0.031234	-0.0024239	1
8.775	0.02881	0.031125	-0.0023147	1
8.7917	0.02881	0.031016	-0.0022058	1
8.8083	0.02881	0.030907	-0.0020973	1
8.825	0.02881	0.030799	-0.0019892	1
8.8417	0.02881	0.030691	-0.0018815	1
8.8583	0.02881	0.030584	-0.0017741	1
8.875	0.02881	0.030477	-0.0016672	1
8.8917	0.02881	0.030371	-0.0015606	1
8.9083	0.02881	0.030264	-0.0014544	1
8.925	0.02881	0.030159	-0.0013485	1
8.9417	0.02881	0.030053	-0.001243	1
8.9583	0.02881	0.029948	-0.0011379	1
8.975	0.02881	0.029843	-0.0010332	1
8.9917	0.02881	0.029739	-0.00092878	1
9.0083	0.02881	0.029635	-0.00082478	1
9.025	0.02881	0.029531	-0.00072112	1
9.0417	0.02881	0.029428	-0.00061783	1
9.0583	0.02881	0.029325	-0.00051491	1
9.075	0.02881	0.029222	-0.00041234	1
9.0917	0.02881	0.02912	-0.00031013	1
9.1083	0.02881	0.029018	-0.00020828	1
9.125	0.02881	0.028917	-0.00010679	1
9.1417	0.02881	0.028816	-5.6559E-006	1
9.1583	0.02881	0.028715	9.5137E-005	1
9.175	0.02881	0.028614	0.00019557	1
9.1917	0.02881	0.028514	0.00029565	1
9.2083	0.02881	0.028415	0.00039538	1
9.225	0.02881	0.028315	0.00049476	1
9.2417	0.02881	0.028216	0.0005938	1
9.2583	0.02881	0.028118	0.00069248	1
9.275	0.02881	0.028019	0.00079083	1
9.2917	0.02881	0.027921	0.00088883	1
9.3083	0.02881	0.027824	0.00098648	1

9.325	0.02881	0.027726	0.0010838	1
9.3417	0.01921	0.027629	-0.0084192	1
9.3583	0.02881	0.027533	0.0012774	1
9.375	0.02881	0.027436	0.0013737	1
9.3917	0.02881	0.02734	0.0014697	1
9.4083	0.02881	0.027245	0.0015653	1
9.425	0.01921	0.027149	-0.0079394	1
9.4417	0.02881	0.027054	0.0017555	1
9.4583	0.02881	0.02696	0.0018502	1
9.475	0.01921	0.026866	-0.0076555	1
9.4917	0.02881	0.026772	0.0020384	1
9.5083	0.02881	0.026678	0.0021321	1
9.525	0.01921	0.026585	-0.0073746	1
9.5417	0.02881	0.026492	0.0023184	1
9.5583	0.02881	0.026399	0.002411	1
9.575	0.02881	0.026307	0.0025033	1
9.5917	0.02881	0.026215	0.0025954	1
9.6083	0.02881	0.026123	0.002687	1
9.625	0.02881	0.026032	0.0027784	1
9.6417	0.02881	0.025941	0.0028695	1
9.6583	0.01921	0.02585	-0.0066398	1
9.675	0.01921	0.025759	-0.0065494	1
9.6917	0.02881	0.025669	0.0031407	1
9.7083	0.02881	0.02558	0.0032305	1
9.725	0.01921	0.02549	-0.0062801	1
9.7417	0.02881	0.025401	0.0034091	1
9.7583	0.02881	0.025312	0.0034979	1
9.775	0.02881	0.025224	0.0035865	1
9.7917	0.02881	0.025135	0.0036747	1
9.8083	0.02881	0.025047	0.0037626	1
9.825	0.02881	0.02496	0.0038502	1
9.8417	0.02881	0.024872	0.0039375	1
9.8583	0.02881	0.024785	0.0040245	1
9.875	0.01921	0.024699	-0.0054888	1
9.8917	0.02881	0.024612	0.0041976	1
9.9083	0.01921	0.024526	-0.0053163	1
9.925	0.01921	0.024441	-0.0052306	1
9.9417	0.01921	0.024355	-0.0051451	1
9.9583	0.02881	0.02427	0.0045401	1
9.975	0.01921	0.024185	-0.004975	1
9.9917	0.02881	0.0241	0.0047096	1
10.008	0.01921	0.024016	-0.0048061	1
10.025	0.01921	0.023932	-0.0047221	1
10.042	0.01921	0.023848	-0.0046384	1
10.058	0.01921	0.023765	-0.004555	1
10.075	0.01921	0.023682	-0.0044719	1
10.092	0.01921	0.023599	-0.004389	1
10.108	0.01921	0.023517	-0.0043065	1

10.125	0.01921	0.023434	-0.0042243	1
10.142	0.01921	0.023352	-0.0041423	1
10.158	0.01921	0.023271	-0.0040606	1
10.175	0.01921	0.023189	-0.0039792	1
10.192	0.01921	0.023108	-0.0038981	1
10.208	0.01921	0.023027	-0.0038173	1
10.225	0.02881	0.022947	0.0058632	1
10.242	0.01921	0.022866	-0.0036565	1
10.258	0.01921	0.022787	-0.0035765	1
10.275	0.01921	0.022707	-0.0034968	1
10.292	0.01921	0.022627	-0.0034174	1
10.308	0.01921	0.022548	-0.0033383	1
10.325	0.01921	0.022469	-0.0032594	1
10.342	0.01921	0.022391	-0.0031808	1
10.358	0.01921	0.022313	-0.0031025	1
10.375	0.01921	0.022234	-0.0030245	1
10.392	0.01921	0.022157	-0.0029467	1
10.408	0.01921	0.022079	-0.0028692	1
10.425	0.01921	0.022002	-0.002792	1
10.442	0.0096	0.021925	-0.012325	1
10.458	0.01921	0.021848	-0.0026384	1
10.475	0.02881	0.021772	0.0070381	1
10.492	0.01921	0.021696	-0.0024858	1
10.508	0.01921	0.02162	-0.0024099	1
10.525	0.01921	0.021544	-0.0023343	1
10.542	0.01921	0.021469	-0.0022589	1
10.558	0.01921	0.021394	-0.0021839	1
10.575	0.01921	0.021319	-0.002109	1
10.592	0.01921	0.021244	-0.0020344	1
10.608	0.01921	0.02117	-0.0019602	1
10.625	0.01921	0.021096	-0.0018861	1
10.642	0.01921	0.021022	-0.0018123	1
10.658	0.01921	0.020949	-0.0017388	1
10.675	0.01921	0.020876	-0.0016655	1
10.692	0.01921	0.020802	-0.0015925	1
10.708	0.01921	0.02073	-0.0015198	1
10.725	0.01921	0.020657	-0.0014472	1
10.742	0.01921	0.020585	-0.001375	1
10.758	0.01921	0.020513	-0.001303	1
10.775	0.01921	0.020441	-0.0012312	1
10.792	0.01921	0.02037	-0.0011597	1
10.808	0.01921	0.020299	-0.0010885	1
10.825	0.01921	0.020228	-0.0010175	1
10.842	0.01921	0.020157	-0.00094674	1
10.858	0.01921	0.020086	-0.00087627	1
10.875	0.01921	0.020016	-0.000806	1
10.892	0.01921	0.019946	-0.00073598	1
10.908	0.01921	0.019876	-0.00066625	1

10.925	0.01921	0.019807	-0.00059672	1
10.942	0.01921	0.019737	-0.00052743	1
10.958	0.01921	0.019668	-0.00045842	1
10.975	0.01921	0.0196	-0.00038961	1
10.992	0.01921	0.019531	-0.00032105	1
11.008	0.01921	0.019463	-0.00025277	1
11.025	0.01921	0.019395	-0.00018468	1
11.042	0.01921	0.019327	-0.00011683	1
11.058	0.01921	0.019259	-4.926E-005	1
11.075	0.01921	0.019192	1.8114E-005	1
11.092	0.01921	0.019125	8.5253E-005	1
11.108	0.01921	0.019058	0.00015212	1
11.125	0.01921	0.018991	0.00021879	1
11.142	0.01921	0.018925	0.00028522	1
11.158	0.01921	0.018859	0.00035139	1
11.175	0.01921	0.018793	0.00041736	1
11.192	0.01921	0.018727	0.0004831	1
11.208	0.01921	0.018661	0.00054858	1
11.225	0.01921	0.018596	0.00061386	1
11.242	0.01921	0.018531	0.00067891	1
11.258	0.01921	0.018466	0.0007437	1
11.275	0.01921	0.018402	0.0008083	1
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11.308	0.01921	0.018273	0.00093679	1
11.325	0.01921	0.018209	0.0010007	1
11.342	0.01921	0.018146	0.0010644	1
11.358	0.01921	0.018082	0.0011279	1
11.375	0.01921	0.018019	0.0011911	1
11.392	0.01921	0.017956	0.0012541	1
11.408	0.01921	0.017893	0.0013169	1
11.425	0.01921	0.01783	0.0013795	1
11.442	0.01921	0.017768	0.0014419	1
11.458	0.01921	0.017706	0.001504	1
11.475	0.01921	0.017644	0.001566	1
11.492	0.01921	0.017582	0.0016277	1
11.508	0.01921	0.017521	0.0016891	1
11.525	0.01921	0.01746	0.0017504	1
11.542	0.01921	0.017398	0.0018115	1
11.558	0.01921	0.017338	0.0018723	1
11.575	0.01921	0.017277	0.001933	1
11.592	0.0096	0.017217	-0.0076166	1
11.608	0.01921	0.017156	0.0020536	1
11.625	0.01921	0.017096	0.0021137	1
11.642	0.01921	0.017037	0.0021735	1
11.658	0.01921	0.016977	0.002233	1
11.675	0.01921	0.016918	0.0022924	1
11.692	0.01921	0.016858	0.0023516	1
11.708	0.01921	0.016799	0.0024105	1

11.725	0.01921	0.016741	0.0024693	1
11.742	0.01921	0.016682	0.0025279	1
11.758	0.01921	0.016624	0.0025862	1
11.775	0.01921	0.016566	0.0026443	1
11.792	0.01921	0.016508	0.0027023	1
11.808	0.01921	0.01645	0.00276	1
11.825	0.01921	0.016392	0.0028176	1
11.842	0.01921	0.016335	0.0028749	1
11.858	0.01921	0.016278	0.002932	1
11.875	0.01921	0.016221	0.002989	1
11.892	0.01921	0.016164	0.0030457	1
11.908	0.01921	0.016108	0.0031022	1
11.925	0.01921	0.016051	0.0031586	1
11.942	0.01921	0.015995	0.0032147	1
11.958	0.01921	0.015939	0.0032706	1
11.975	0.0096	0.015884	-0.0062836	1
11.992	0.01921	0.015828	0.003382	1
12.008	0.01921	0.015773	0.0034373	1
12.025	0.01921	0.015718	0.0034925	1
12.042	0.0096	0.015663	-0.0060625	1
12.058	0.01921	0.015608	0.0036022	1
12.075	0.01921	0.015553	0.0036568	1
12.092	0.0096	0.015499	-0.0058988	1
12.108	0.01921	0.015445	0.0037654	1
12.125	0.0096	0.015391	-0.0057905	1
12.142	0.01921	0.015337	0.0038733	1
12.158	0.01921	0.015283	0.0039269	1
12.175	0.01921	0.01523	0.0039804	1
12.192	0.01921	0.015176	0.0040337	1
12.208	0.01921	0.015123	0.0040867	1
12.225	0.01921	0.01507	0.0041396	1
12.242	0.0096	0.015018	-0.0054177	1
12.258	0.01921	0.014965	0.0042448	1
12.275	0.0096	0.014913	-0.0053128	1
12.292	0.01921	0.014861	0.0043494	1
12.308	0.0096	0.014809	-0.0052087	1
12.325	0.01921	0.014757	0.0044531	1
12.342	0.01921	0.014705	0.0045048	1
12.358	0.01921	0.014654	0.0045562	1
12.375	0.01921	0.014603	0.0046074	1
12.392	0.01921	0.014551	0.0046585	1
12.408	0.01921	0.014501	0.0047094	1
12.425	0.01921	0.01445	0.0047601	1
12.442	0.0096	0.014399	-0.0047993	1
12.458	0.01921	0.014349	0.004861	1
12.475	0.0096	0.014299	-0.0046988	1
12.492	0.01921	0.014249	0.0049612	1
12.508	0.01921	0.014199	0.005011	1

12.525	0.01921	0.014149	0.0050607	1
12.542	0.01921	0.0141	0.0051102	1
12.558	0.01921	0.01405	0.0051595	1
12.575	0.01921	0.014001	0.0052087	1
12.592	0.0096	0.013952	-0.0043524	1
12.608	0.01921	0.013904	0.0053064	1
12.625	0.0096	0.013855	-0.0042549	1
12.642	0.01921	0.013806	0.0054035	1
12.658	0.0096	0.013758	-0.0041582	1
12.675	0.0096	0.01371	-0.0041101	1
12.692	0.01921	0.013662	0.0055479	1
12.708	0.01921	0.013614	0.0055957	1
12.725	0.0096	0.013567	-0.0039667	1
12.742	0.0096	0.013519	-0.0039193	1
12.758	0.01921	0.013472	0.005738	1
12.775	0.01921	0.013425	0.0057851	1
12.792	0.0096	0.013378	-0.0037779	1
12.808	0.01921	0.013331	0.0058789	1
12.825	0.0096	0.013284	-0.0036845	1
12.842	0.01921	0.013238	0.005972	1
12.858	0.0096	0.013192	-0.0035917	1
12.875	0.0096	0.013146	-0.0035456	1
12.892	0.0096	0.0131	-0.0034996	1
12.908	0.01921	0.013054	0.0061562	1
12.925	0.01921	0.013008	0.0062019	1
12.942	0.0096	0.012963	-0.0033626	1
12.958	0.0096	0.012917	-0.0033173	1
12.975	0.0096	0.012872	-0.0032721	1
12.992	0.0096	0.012827	-0.0032271	1
13.008	0.0096	0.012782	-0.0031822	1
13.025	0.0096	0.012738	-0.0031375	1
13.042	0.0096	0.012693	-0.003093	1
13.058	0.0096	0.012649	-0.0030486	1
13.075	0.0096	0.012604	-0.0030043	1
13.092	0.0096	0.01256	-0.0029603	1
13.108	0.0096	0.012516	-0.0029163	1
13.125	0.01921	0.012473	0.0067374	1
13.142	0.01921	0.012429	0.0067811	1
13.158	0.0096	0.012385	-0.0027855	1
13.175	0.0096	0.012342	-0.0027421	1
13.192	0.0096	0.012299	-0.002699	1
13.208	0.0096	0.012256	-0.002656	1
13.225	0.0096	0.012213	-0.0026131	1
13.242	0.0096	0.01217	-0.0025704	1
13.258	0.01921	0.012128	0.0070822	1
13.275	0.0096	0.012085	-0.0024854	1
13.292	0.01921	0.012043	0.0071669	1
13.308	0.0096	0.012001	-0.002401	1

13.325	0.0096	0.011959	-0.002359	1
13.342	0.0096	0.011917	-0.0023172	1
13.358	0.0096	0.011876	-0.0022755	1
13.375	0.0096	0.011834	-0.002234	1
13.392	0.0096	0.011793	-0.0021926	1
13.408	0.0096	0.011751	-0.0021513	1
13.425	0.0096	0.01171	-0.0021102	1
13.442	0.0096	0.011669	-0.0020693	1
13.458	0.0096	0.011628	-0.0020285	1
13.475	0.01921	0.011588	0.0076222	1
13.492	0.01921	0.011547	0.0076627	1
13.508	0.0096	0.011507	-0.0019069	1
13.525	0.0096	0.011467	-0.0018666	1
13.542	0.0096	0.011427	-0.0018265	1
13.558	0.0096	0.011387	-0.0017866	1
13.575	0.0096	0.011347	-0.0017467	1
13.592	0.0096	0.011307	-0.001707	1
13.608	0.0096	0.011268	-0.0016675	1
13.625	0.0096	0.011228	-0.0016281	1
13.642	0.0096	0.011189	-0.0015888	1
13.658	0.0096	0.01115	-0.0015497	1
13.675	0.0096	0.011111	-0.0015107	1
13.692	0.01921	0.011072	0.0081382	1
13.708	0.0096	0.011033	-0.0014331	1
13.725	0.0096	0.010995	-0.0013945	1
13.742	0.0096	0.010956	-0.0013561	1
13.758	0.01921	0.010918	0.0082922	1
13.775	0.0096	0.01088	-0.0012796	1
13.792	0.0096	0.010841	-0.0012415	1
13.808	0.0096	0.010804	-0.0012036	1
13.825	0.0096	0.010766	-0.0011658	1
13.842	0.0096	0.010728	-0.0011281	1
13.858	0.0096	0.010691	-0.0010906	1
13.875	0.0096	0.010653	-0.0010532	1
13.892	0.0096	0.010616	-0.001016	1
13.908	0.0096	0.010579	-0.00097885	1
13.925	0.0096	0.010542	-0.00094184	1
13.942	0.0096	0.010505	-0.00090496	1
13.958	0.0096	0.010468	-0.00086823	1
13.975	0.0096	0.010432	-0.00083161	1
13.992	0.0096	0.010395	-0.00079512	1
14.008	0.0096	0.010359	-0.00075878	1
14.025	0.0096	0.010323	-0.00072254	1
14.042	0.0096	0.010286	-0.00068643	1
14.058	0.0096	0.01025	-0.00065046	1
14.075	0.0096	0.010215	-0.00061461	1
14.092	0.0096	0.010179	-0.00057887	1
14.108	0.0096	0.010143	-0.00054328	1

14.125	0.0096	0.010108	-0.0005078	1
14.142	0.0096	0.010072	-0.00047244	1
14.158	0.01921	0.010037	0.0091728	1
14.175	0.0096	0.010002	-0.00040211	1
14.192	0.0096	0.0099671	-0.00036712	1
14.208	0.0096	0.0099323	-0.00033228	1
14.225	0.0096	0.0098975	-0.00029753	1
14.242	0.0096	0.0098629	-0.0002629	1
14.258	0.0096	0.0098284	-0.00022842	1
14.275	0.0096	0.009794	-0.00019404	1
14.292	0.0096	0.0097598	-0.00015978	1
14.308	0.0096	0.0097257	-0.00012566	1
14.325	0.0096	0.0096916	-9.1632E-005	1
14.342	0.0096	0.0096577	-5.7728E-005	1
14.358	0.0096	0.009624	-2.3963E-005	1
14.375	0.0096	0.0095903	9.7044E-006	1
14.392	0.0096	0.0095567	4.3254E-005	1
14.408	0.0096	0.0095233	7.6666E-005	1
14.425	0.0096	0.00949	0.00010998	1
14.442	0.0096	0.0094568	0.00014318	1
14.458	0.0096	0.0094238	0.00017624	1
14.475	0.0096	0.0093908	0.00020921	1
14.492	0.0096	0.0093579	0.00024206	1
14.508	0.0096	0.0093252	0.00027478	1
14.525	0.0096	0.0092926	0.0003074	1
14.542	0.0096	0.0092601	0.00033991	1
14.558	0.0096	0.0092277	0.00037228	1
14.583	0.0096	0.0091793	0.00042065	1
14.6	0.0096	0.0091472	0.00045277	1
14.617	0.0096	0.0091152	0.00048477	1
14.633	0.0096	0.0090834	0.00051663	1
14.65	0.0096	0.0090516	0.00054841	1
14.667	0.0096	0.0090199	0.00058008	1
14.683	0.0096	0.0089884	0.00061161	1
14.7	0.0096	0.0089569	0.00064305	1
14.717	0.0096	0.0089256	0.00067439	1
14.733	0.0096	0.0088944	0.00070559	1
14.75	0.0096	0.0088633	0.00073671	1
14.767	0.0096	0.0088323	0.00076772	1
14.783	0.0096	0.0088014	0.0007986	1
14.8	0.0096	0.0087706	0.00082938	1
14.817	0.0096	0.0087399	0.00086007	1
14.833	0.0096	0.0087094	0.00089062	1
14.85	0.0096	0.0086789	0.00092109	1
14.867	0.0096	0.0086485	0.00095145	1
14.883	0.0096	0.0086183	0.00098169	1
14.9	0.0096	0.0085882	0.0010118	1
14.917	0.0096	0.0085581	0.0010419	1

14.933	0.0096	0.0085282	0.0010718	1
14.95	0.0096	0.0084984	0.0011016	1
14.967	0.0096	0.0084686	0.0011314	1
14.983	0.0096	0.008439	0.001161	1
15	0.0096	0.0084095	0.0011905	1
15.017	0.0096	0.0083801	0.0012199	1
15.033	0.0096	0.0083508	0.0012492	1
15.05	0.0096	0.0083216	0.0012784	1
15.067	0.0096	0.0082925	0.0013075	1
15.083	0.0096	0.0082635	0.0013365	1
15.1	0.0096	0.0082346	0.0013654	1
15.117	0.0096	0.0082058	0.0013942	1
15.133	0.0096	0.0081771	0.0014229	1
15.15	0.0096	0.0081485	0.0014515	1
15.167	0.0096	0.00812	0.00148	1
15.183	0.0096	0.0080916	0.0015084	1
15.2	0.0096	0.0080633	0.0015367	1
15.217	0.0096	0.0080351	0.0015649	1
15.233	0.0096	0.008007	0.001593	1
15.25	0.0096	0.0079789	0.0016211	1
15.267	0.0096	0.007951	0.001649	1
15.283	0.0096	0.0079232	0.0016768	1
15.3	0.0096	0.0078955	0.0017045	1
15.317	0.0096	0.0078679	0.0017321	1
15.333	0.0096	0.0078404	0.0017596	1
15.35	0.01921	0.007813	0.011397	1
15.367	0.0096	0.0077856	0.0018144	1
15.383	0.0096	0.0077584	0.0018416	1
15.4	0.0096	0.0077313	0.0018687	1
15.417	0.0096	0.0077042	0.0018958	1
15.433	0.0096	0.0076773	0.0019227	1
15.45	0.0096	0.0076504	0.0019496	1
15.467	0.0096	0.0076237	0.0019763	1
15.483	0.0096	0.007597	0.002003	1
15.5	0.0096	0.0075704	0.0020296	1
15.517	0.0096	0.007544	0.002056	1
15.533	0.0096	0.0075176	0.0020824	1
15.55	0.0096	0.0074913	0.0021087	1
15.567	0.0096	0.0074651	0.0021349	1
15.583	0.0096	0.007439	0.002161	1
15.6	0.0096	0.007413	0.002187	1
15.617	0.0096	0.007387	0.002213	1
15.633	0.0096	0.0073612	0.0022388	1
15.65	0.0096	0.0073354	0.0022646	1
15.667	0.0096	0.0073098	0.0022902	1
15.683	0.0096	0.0072842	0.0023158	1
15.7	0.0096	0.0072587	0.0023413	1
15.717	0.0096	0.0072333	0.0023667	1

15.733	0.0096	0.0072081	0.0023919	1
15.75	0.0096	0.0071828	0.0024172	1
15.767	0.0096	0.0071577	0.0024423	1
15.783	0.0096	0.0071327	0.0024673	1
15.8	0.0096	0.0071077	0.0024923	1
15.817	0.0096	0.0070829	0.0025171	1
15.833	0.0096	0.0070581	0.0025419	1
15.85	0.0096	0.0070334	0.0025666	1
15.867	0.0096	0.0070088	0.0025912	1
15.883	0.0096	0.0069843	0.0026157	1
15.9	0.0096	0.0069599	0.0026401	1
15.917	0.0096	0.0069355	0.0026645	1
15.933	0.0096	0.0069113	0.0026887	1
15.95	0.0096	0.0068871	0.0027129	1
15.967	0.0096	0.006863	0.002737	1
15.983	0.0096	0.006839	0.002761	1
16	0.0096	0.0068151	0.0027849	1
16.017	0.0096	0.0067912	0.0028088	1
16.033	0.0096	0.0067675	0.0028325	1
16.05	0.0096	0.0067438	0.0028562	1
16.067	0.0096	0.0067202	0.0028798	1
16.083	0.0096	0.0066967	0.0029033	1
16.1	0.0096	0.0066733	0.0029267	1
16.117	0.0096	0.00665	0.00295	1
16.133	0.0096	0.0066267	0.0029733	1
16.15	0.0096	0.0066035	0.0029965	1
16.167	0.0096	0.0065804	0.0030196	1
16.183	0.0096	0.0065574	0.0030426	1
16.2	0.0096	0.0065345	0.0030655	1
16.217	0.0096	0.0065116	0.0030884	1
16.233	0.0096	0.0064889	0.0031111	1
16.25	0.0096	0.0064662	0.0031338	1
16.267	0.0096	0.0064435	0.0031565	1
16.283	0.0096	0.006421	0.003179	1
16.3	0.0096	0.0063986	0.0032014	1
16.317	0.0096	0.0063762	0.0032238	1
16.333	0.0096	0.0063539	0.0032461	1
16.35	0.0096	0.0063317	0.0032683	1
16.367	0.0096	0.0063095	0.0032905	1
16.383	0.0096	0.0062874	0.0033126	1
16.4	0.0096	0.0062654	0.0033346	1
16.417	0.0096	0.0062435	0.0033565	1
16.442	0.0096	0.0062108	0.0033892	1
16.458	0.0096	0.0061891	0.0034109	1
16.475	0.0096	0.0061674	0.0034326	1
16.492	0.0096	0.0061459	0.0034541	1
16.508	0.0096	0.0061244	0.0034756	1
16.525	0.0096	0.006103	0.003497	1

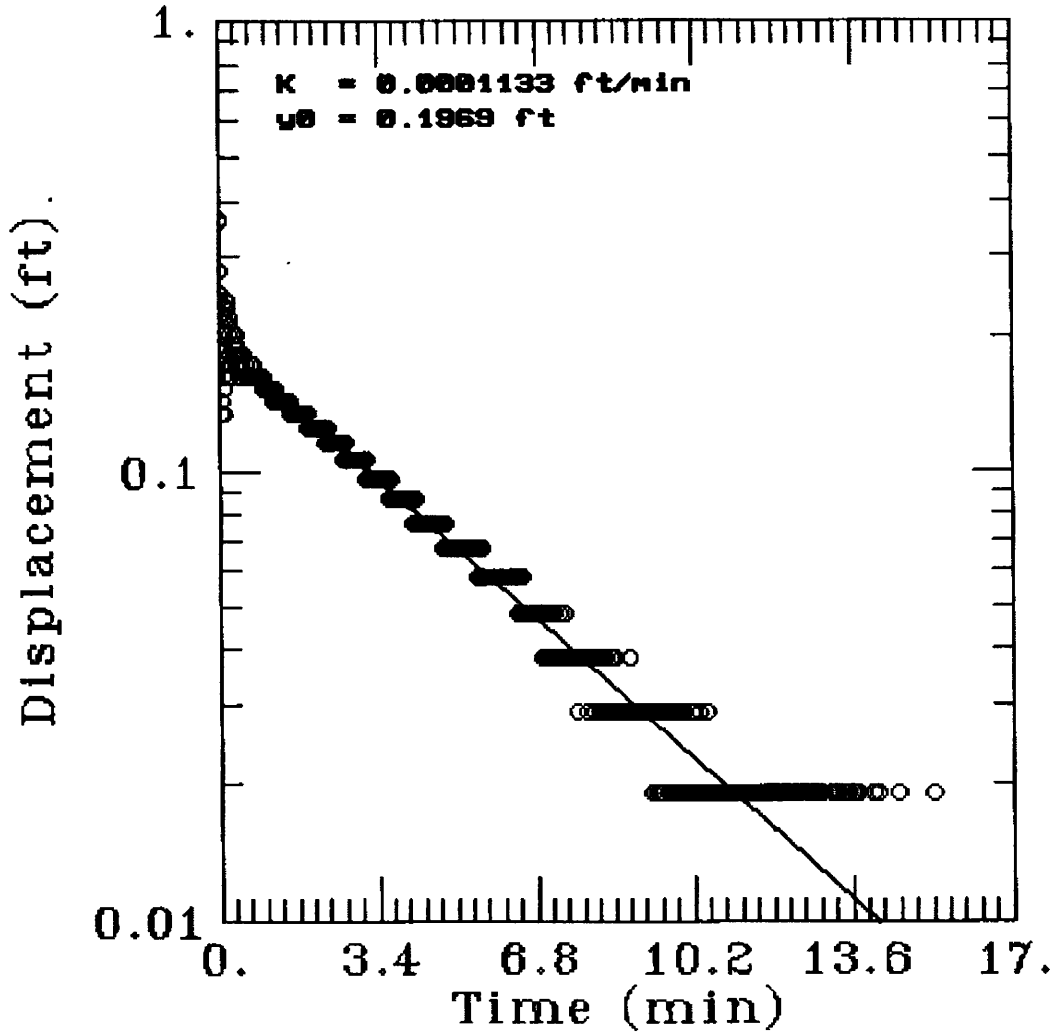
16.542	0.0096	0.0060816	0.0035184	1
16.558	0.0096	0.0060603	0.0035397	1
16.575	0.0096	0.0060391	0.0035609	1
16.592	0.0096	0.006018	0.003582	1
16.608	0.0096	0.005997	0.003603	1
16.625	0.0096	0.005976	0.003624	1
16.658	0.0096	0.0059343	0.0036657	1
16.675	0.0096	0.0059135	0.0036865	1
16.692	0.0096	0.0058928	0.0037072	1
16.708	0.0096	0.0058722	0.0037278	1

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	1.1330E-004
y0 =	1.9690E-001

DH-4 SLUG TEST #2



AQTESOLV RESULTS
Version 1.10

04/25/94 11:50:18

TEST DESCRIPTION

Data set..... dh4bai#2.aqt
Data set title..... DH-4 BAIL TEST #2
Company..... EARTHFAX ENGINEERING, INC.
Project..... UC-192-09
Client..... CO-OP MINING COMPANY
Location..... BEAR CANYON MINE
Test date..... 3-14-94
Test well..... DH-4

Knowns and Constants:
- No. of data points..... 2000
- Radius of well casing..... 0.0625
- Radius of well..... 0.099
- Aquifer saturated thickness..... 177.7
- Well screen length..... 20
- Static height of water in well..... 177.7
- Log(Re/Rw)..... 5.519
- A, B, C..... 0.000, 0.000, 6.946

ANALYTICAL METHOD

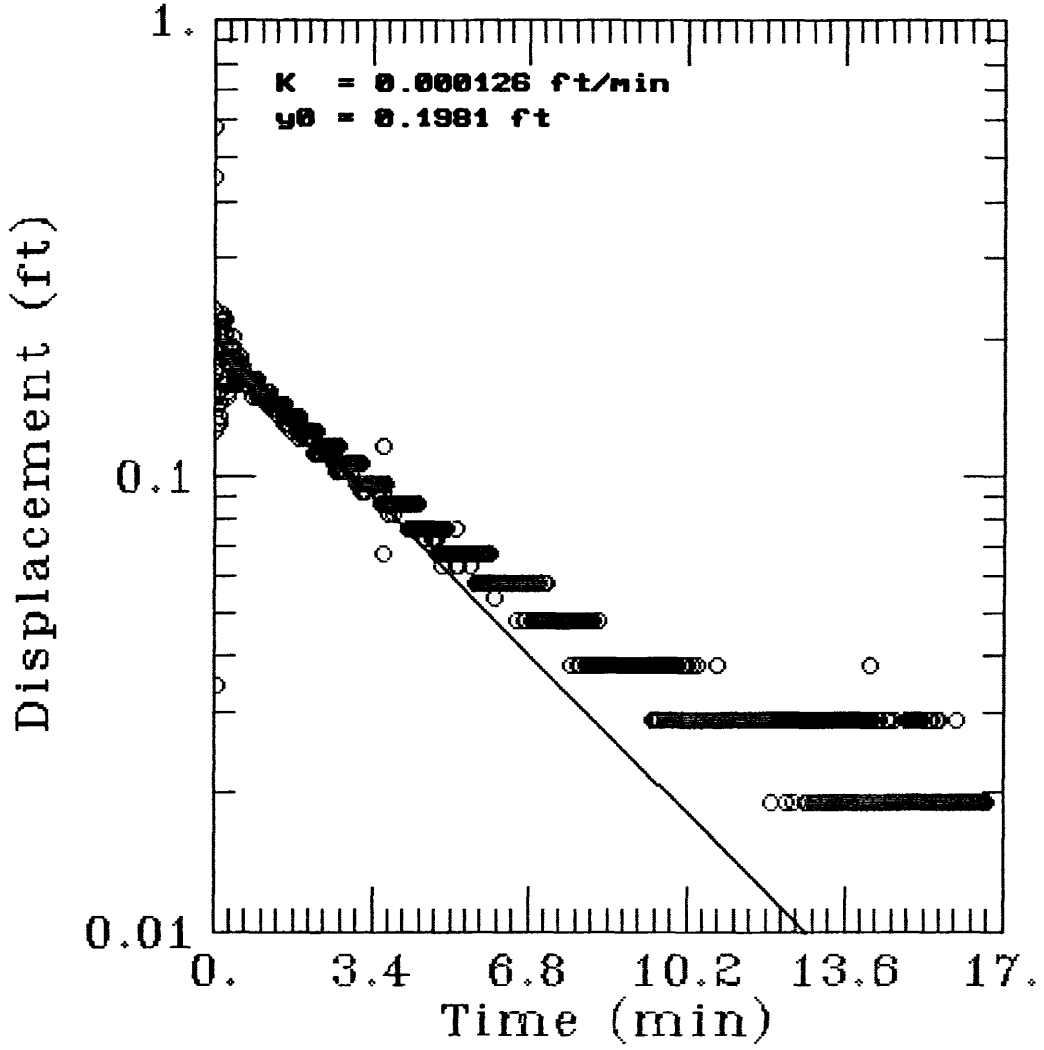
Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	1.2604E-004	+/-	6.2655E-006
y0 =	1.9807E-001	+/-	3.3820E-003

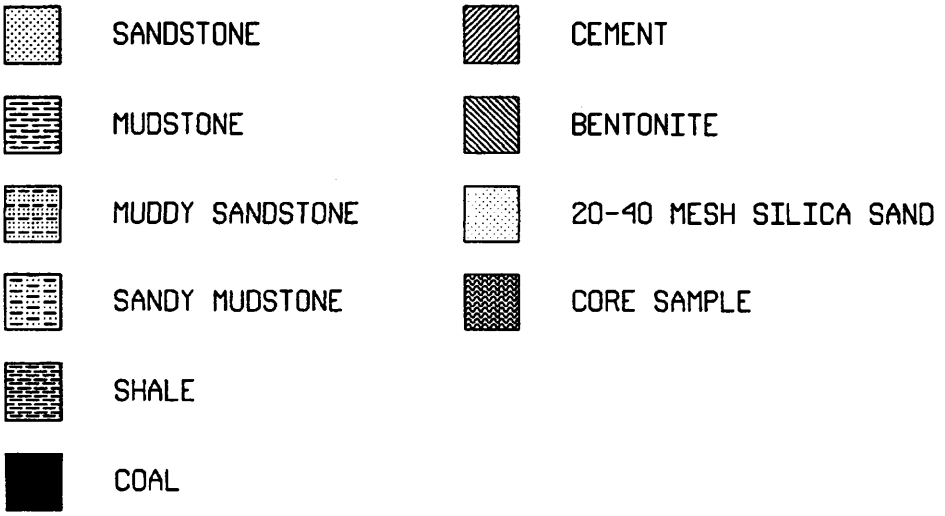
DH-4 BAIL TEST #2



APPENDIX 7-N-G

Stratigraphic Logs and Completion Diagrams for In-Mine Drillholes DH-1A, DH-2, DH-3 and DH-4

KEY TO SYMBOLS



EARTHFAX ENGINEERING, INC. HYDROGEOLOGIC LOG

Project Name: GROUND WATER INVESTIGATION Owner/Client: CO-OP MINING COMPANY	Boring/Well Number: DH-1A Boring/Well Location: 395059.18 N 2112761.51 E
Project Number: UC-192-06	Reference Elevation: 7535.71 Reference Point: MINE FLOOR
Date Drilled: 06 AUG 1991 Logged by: JDG	Drilling Contractor: CO-OP MINE PERSONNEL Drilling Method: HYDRAULIC ROTARY Rig Type:DIAMEC 251
First occurrence of G.W.: 114.0' Static W.L.: 114.0' Dates Measured: 06 AUG 91 21 APR 92	Boring Depth (ft): 535' Well Depth (ft): 171' Boring Diameter (in): 2.9"

DEPTH (FT)	GRAPHICAL LOG	LITHOLOGIC DESCRIPTION AND OBSERVATIONS	SAMPLE LOC.	WELL COMPLETION DETAILS
0		COAL: Bottom coal. Good core.		Slip Cap with Cover
		MUDSTONE: Gray. Hard. Good core. Carbonaceous banding.		
10		SANDSTONE: Very Fine grained. Sub-rounded grains. Finely laminated. Gray to light gray color. Occasional carbonaceous stringers.		
20		Medium cross-bed sets.		Cement
30		Carbonaceous stringers.		
40		Carbonaceous stringers.		
50		Gray-white color with dark gray carbonaceous stringers on cross-beds.		
		SANDY MUDSTONE: Fine laminations. Varying proportions of sand and silt.		
60		SANDSTONE: Clean, with carbonaceous stringers on cross-beds between intervals of clean sand.		
70		Carbonaceous stringers and low angle cross-beds.		Bentonite Grout
80				
90		COAL: Hiawatha Coal seam.		
100				

EARTHFAX ENGINEERING, INC. HYDROGEOLOGIC LOG

Project Name: GROUND WATER INVESTIGATION	Boring/Well Number: DH-1A
Owner/Client: CO-OP MINING COMPANY	Boring/Well Location: 395059.18 N 2112761.51 E
Project Number: UC-192-06	Reference Elevation: 7535.71
	Reference Point: MINE FLOOR
Date Drilled: 06 AUG 1991	Drilling Contractor: CO-OP MINE PERSONNEL
Logged by: JDG	Drilling Method: HYDRAULIC ROTARY Rig Type:DIAMEC 251
First occurrence of G.W.: 114.0' Static W.L.: 114.0'	Boring Depth (ft): 535' Well Depth (ft): 171'
Dates Measured: 06 AUG 91 21 APR 92	Boring Diameter (in): 2.9"

DEPTH (FT)	GRAPHICAL LOG	LITHOLOGIC DESCRIPTION AND OBSERVATIONS	SAMPLE LOC.	WELL COMPLETION DETAILS
0		COAL: Bottom coal. Good core.		Slip Cap with Cover
		MUDSTONE: Gray. Hard. Good core. Carbonaceous banding.		
10		SANDSTONE: Very Fine grained. Sub-rounded grains. Finely laminated. Gray to light gray color. Occasional carbonaceous stringers.		
20		Medium cross-bed sets.		Cement
30		Carbonaceous stringers.		
40		Carbonaceous stringers.		
50		Gray-white color with dark gray carbonaceous stringers on cross-beds.		
		SANDY MUDSTONE: Fine laminations. Varying proportions of sand and silt.		
60		SANDSTONE: Cleon, with carbonaceous stringers on cross-beds between intervals of cleon sand.		
70		Carbonaceous stringers and low angle cross-beds.		Bentonite Grout
80				
90		COAL: Hiawatha Coal seam.		
100				

Project Name: GROUND WATER INVESTIGATION Owner/Client: CO-OP MINING COMPANY	Boring/Well Number: DH-1A Boring/Well Location: 395059.18 N 2112761.51 E
Project Number: UC-192-06	Reference Elevation: 7535.71 Reference Point: MINE FLOOR
Date Drilled: 06 AUG 1991 Logged by: JDG	Drilling Contractor: CO-OP MINE PERSONNEL Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 114.0' Static W.L.: 114.0' Dates Measured: 06 AUG 91 21 APR 92	Boring Depth (ft): 535' Well Depth (ft): 171' Boring Diameter (in): 2.9"

DEPTH (FT)	GRAPHICAL LOG	LITHOLOGIC DESCRIPTION AND OBSERVATIONS	SAMPLE LOG	WELL COMPLETION DETAILS
100		SANDSTONE: Light gray-white colored. Spring Canyon Tongue of the Star Point Sandstone.		
		Fine-medium, rounded grains. Laminated.		
110		Fewer carbonaceous stringers. Low angle cross-beds.		
120				1.5" PVC Casing
		Carbonaceous stringers increase.		
130		Horizontal laminations. Massive bedded.		
140				20-40 Mesh Silica Sand
150		Massive bedded. Fine-medium grained. Low angle cross-beds. Dark minerals.		
160				1.5" PVC Slot Screen
		Locally dense carbonaceous stringers.		
170		Fining to fine-very fine grained.		Threaded End Plug
		Coarsening to fine-medium grained.		
180		MUDDY SANDSTONE: Dark gray colored.		Cement Plug
190		MUDSTONE: Sandy. Dark brown-gray colored. Mancos No. 1.		
		SANDY MUDSTONE: Marbled		
200				

Project Name: GROUND WATER INVESTIGATION	Boring/Well Number: DH-1A
Owner/Client: CO-OP MINING COMPANY	Boring/Well Location: 395059.18 N 2112761.51 E
Project Number: UC-192-06	Reference Elevation: 7535.71
	Reference Point: MINE FLOOR
Date Drilled: 06 AUG 1991	Drilling Contractor: CO-OP MINE PERSONNEL
Logged by: JDG	Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 114.0' Static W.L.: 114.0'	Boring Depth (Ft): 535' Well Depth (Ft): 171'
Dates Measured: 06 AUG 91 21 APR 92	Boring Diameter (in): 2.9"

DEPTH (FT)	GRAPHICAL LOG	LITHOLOGIC DESCRIPTION AND OBSERVATIONS	SAMPLE LOC.	WELL COMPLETION DETAILS
200		SANDY MUDSTONE: Alternating marbled and laminated muddy inter-beds.		
210				
220		MUDSTONE: Gray-brown colored. Marbled. Laminated.		
		SANDY MUDSTONE: Marbled. Laminated. Laminations increasing. Sand decreasing. Sandy.		
230				
240				
250		SANDSTONE: Fine-very fine grained. Clean. Low angle cross-beds. Storrs Tongue of the Star Point Sandstone.		
		MUDDY SANDSTONE: Laminated. Marbled. Bioturbated. Sand and mud proportions vary locally.		
260				
270				
280				
290		SANDSTONE: Clean. Low angle cross-beds. occasional carbonaceous stringers.		
300				

EARTHFAX ENGINEERING, INC. HYDROGEOLOGIC LOG

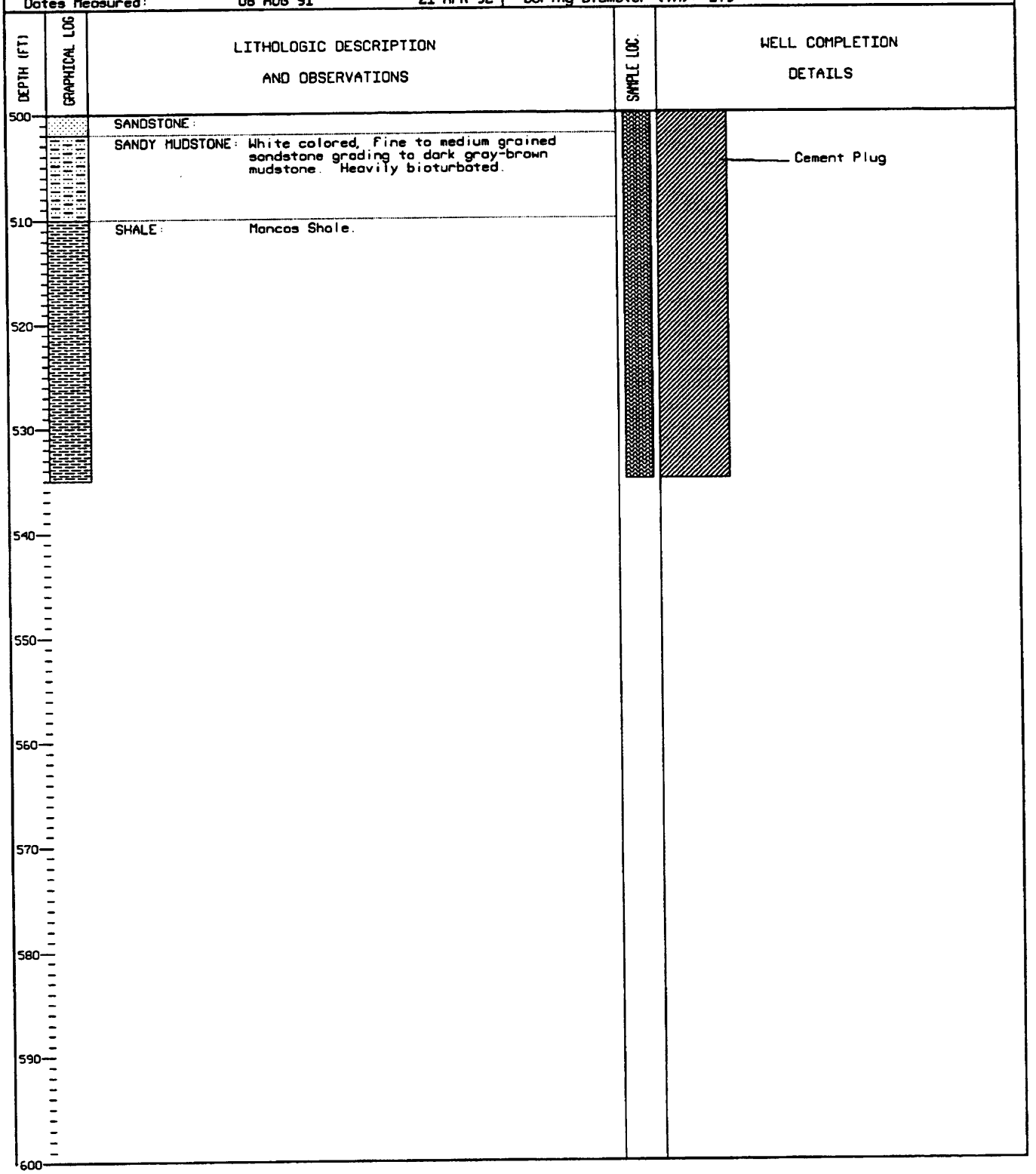
Project Name: GROUND WATER INVESTIGATION Owner/Client: CO-OP MINING COMPANY	Boring/Well Number: DH-1A Boring/Well Location: 395059.18 N 2112761.51 E
Project Number: UC-192-06	Reference Elevation: 7535.71 Reference Point: MINE FLOOR
Date Drilled: 06 AUG 1991 Logged by: JDG	Drilling Contractor: CO-OP MINE PERSONNEL Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 114.0' Static W.L.: 114.0' Dates Measured: 06 AUG 91 21 APR 92	Boring Depth (ft): 535' Well Depth (ft): 171' Boring Diameter (in): 2.9"

DEPTH (FT)	GRAPHICAL LOG	LITHOLOGIC DESCRIPTION AND OBSERVATIONS	SAMPLE LOC.	WELL COMPLETION DETAILS
300		SANDSTONE: Occasional carbonaceous partings. Pyritized fracture.		
310				
		MUDDY SANDSTONE: Mud increasing downward. Laminated. Bioturbated.		
320				
330				
340				
		MUDSTONE: Occasionally sandy. Marbled. Laminated. Dark gray colored. Locally bioturbated. Mancos No. 2.		
350				
360				
370				
380		SANDY MUDSTONE: Marbled. Bioturbated. Varies to mudstone locally.		
390				
400				

Project Name: GROUND WATER INVESTIGATION Owner/Client: CO-OP MINING COMPANY	Boring/Well Number: DH-1A Boring/Well Location: 395059.18 N 2112761.51 E
Project Number: UC-192-06	Reference Elevation: 7535.71 Reference Point: MINE FLOOR
Date Drilled: 06 AUG 1991 Logged by: JDG	Drilling Contractor: CO-OP MINE PERSONNEL Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 114.0' Static W.L.: 114.0' Dates Measured: 06 AUG 91 21 APR 92	Boring Depth (Ft): 535' Well Depth (ft): 171' Boring Diameter (in): 2.9"

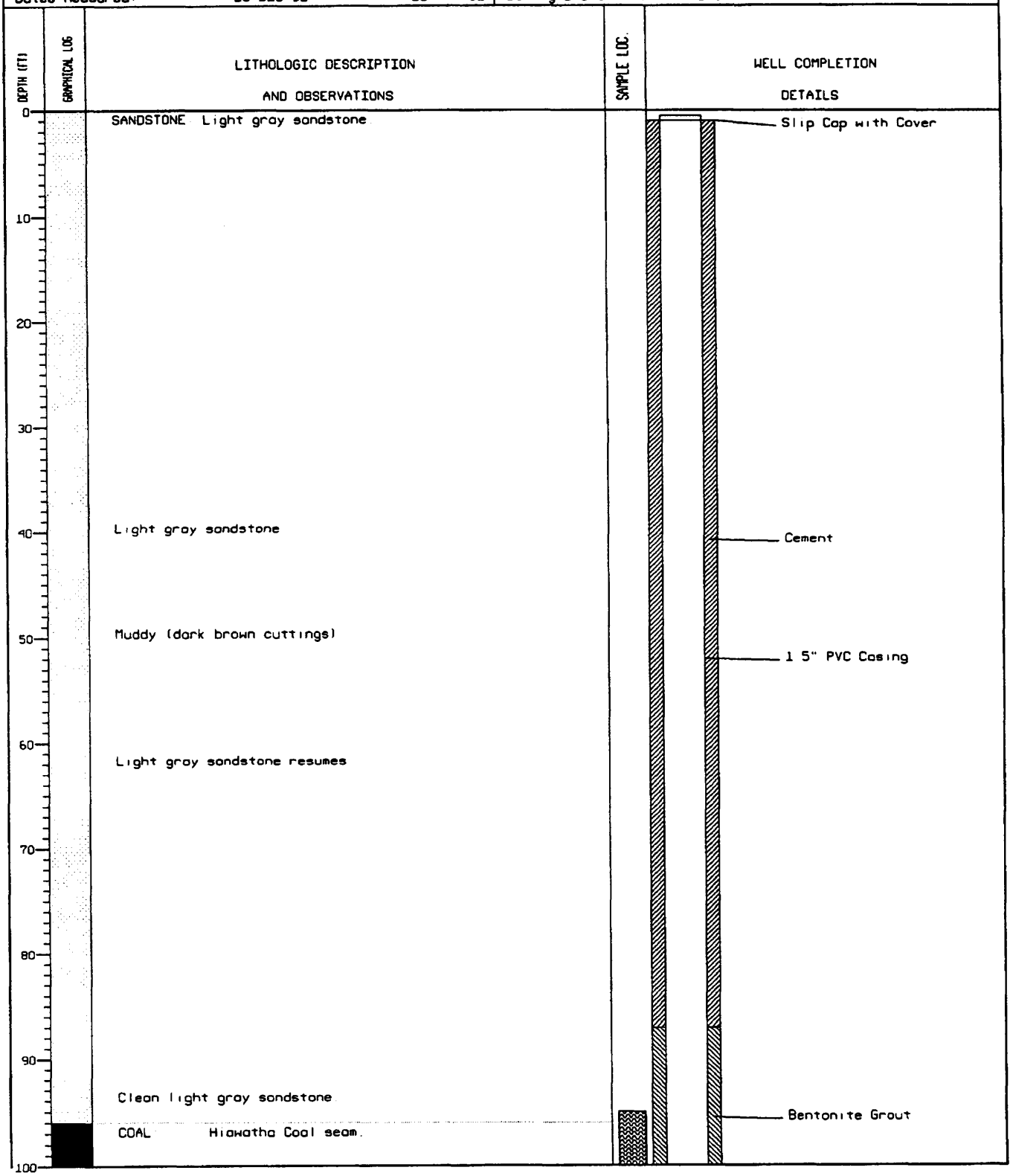
DEPTH (FT)	GRAPHICAL LOG	LITHOLOGIC DESCRIPTION AND OBSERVATIONS	SAMPLE LOC.	WELL COMPLETION DETAILS
400		SANDY MUDSTONE:		
		SANDSTONE: Low angle cross-beds. Fine-coarse grained. Dark minerals. Occasional muddy partings. Thin-medium bedding. Moderate-poor sorting. Appears to be more pourous than upper units. Panther Tongue of the Star Point Sandstone.		
410				
420				
430		Circulation loss.		
440				
450				
460		Mud-lined fracture.		
470				
480		Losing circulation.		
		Muddy bands in white sandstone increasing.		
490				
500				

Project Name: GROUND WATER INVESTIGATION	Boring/Well Number: DH-1A
Owner/Client: CO-OP MINING COMPANY	Boring/Well Location: 395059.18 N 2112761.51 E
Project Number: UC-192-06	Reference Elevation: 7535.71
	Reference Point: MINE FLOOR
Date Drilled: 06 AUG 1991	Drilling Contractor: CO-OP MINE PERSONNEL
Logged by: JDG	Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 114.0' Static W.L.: 114.0'	Boring Depth (ft): 535' Well Depth (ft): 171'
Dates Measured: 06 AUG 91 21 APR 92	Boring Diameter (in): 2.9"

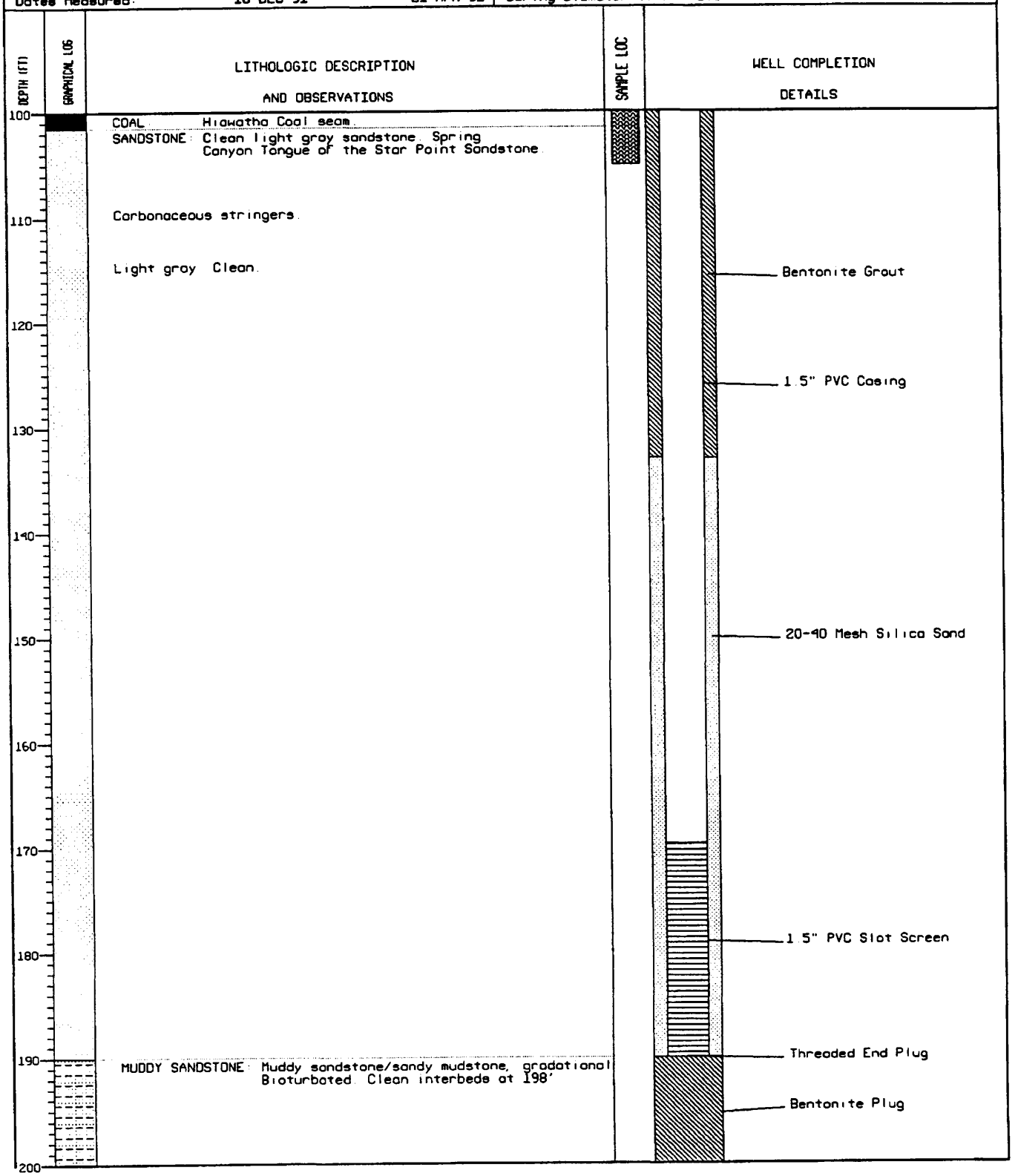


EARTHFAX ENGINEERING, INC. DRILLING LOG

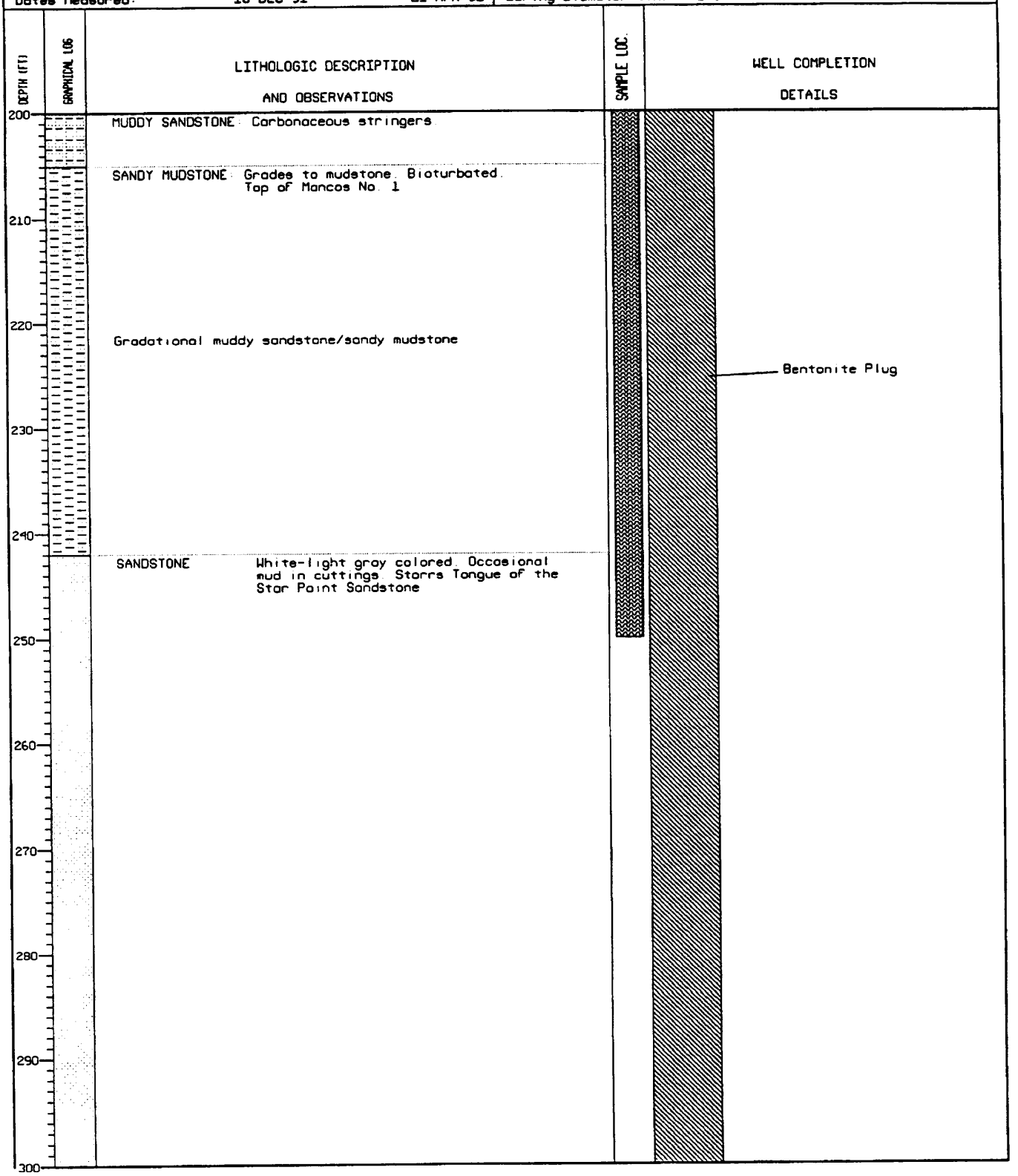
Project Name: GROUND WATER INVESTIGATION Owner/Client: CO-OP MINING COMPANY	Boring/Well Number: DH-2 Boring/Well Location: 397775.88 N 2112519.39 E
Project Number: UC-192-06	Reference Elevation: 7557.18 Reference Point: MINE FLOOR
Date Drilled: 16 DEC 1991 Logged by: JDG & AM	Drilling Contractor: CO-OP MINE PERSONNEL Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 22.98 Static W.L.: 22.98 Dates Measured: 16 DEC 91 21 APR 92	Boring Depth (ft): 530' Well Depth (ft): 190' Boring Diameter (in): 2.9"



Project Name: GROUND WATER INVESTIGATION Owner/Client: CO-OP MINING COMPANY	Boring/Well Number: DH-2 Boring/Well Location: 397775.88 N 2112519.39 E
Project Number: UC-192-06	Reference Elevation: 7557.18 Reference Point: MINE FLOOR
Date Drilled: 16 DEC 1991 Logged by: JDG & AM	Drilling Contractor: CO-OP MINE PERSONNEL Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 22.98' Static W.L.: 22.98 Dates Measured: 16 DEC 91 21 APR 92	Boring Depth (ft): 530' Well Depth (ft): 190' Boring Diameter (in): 2.9"



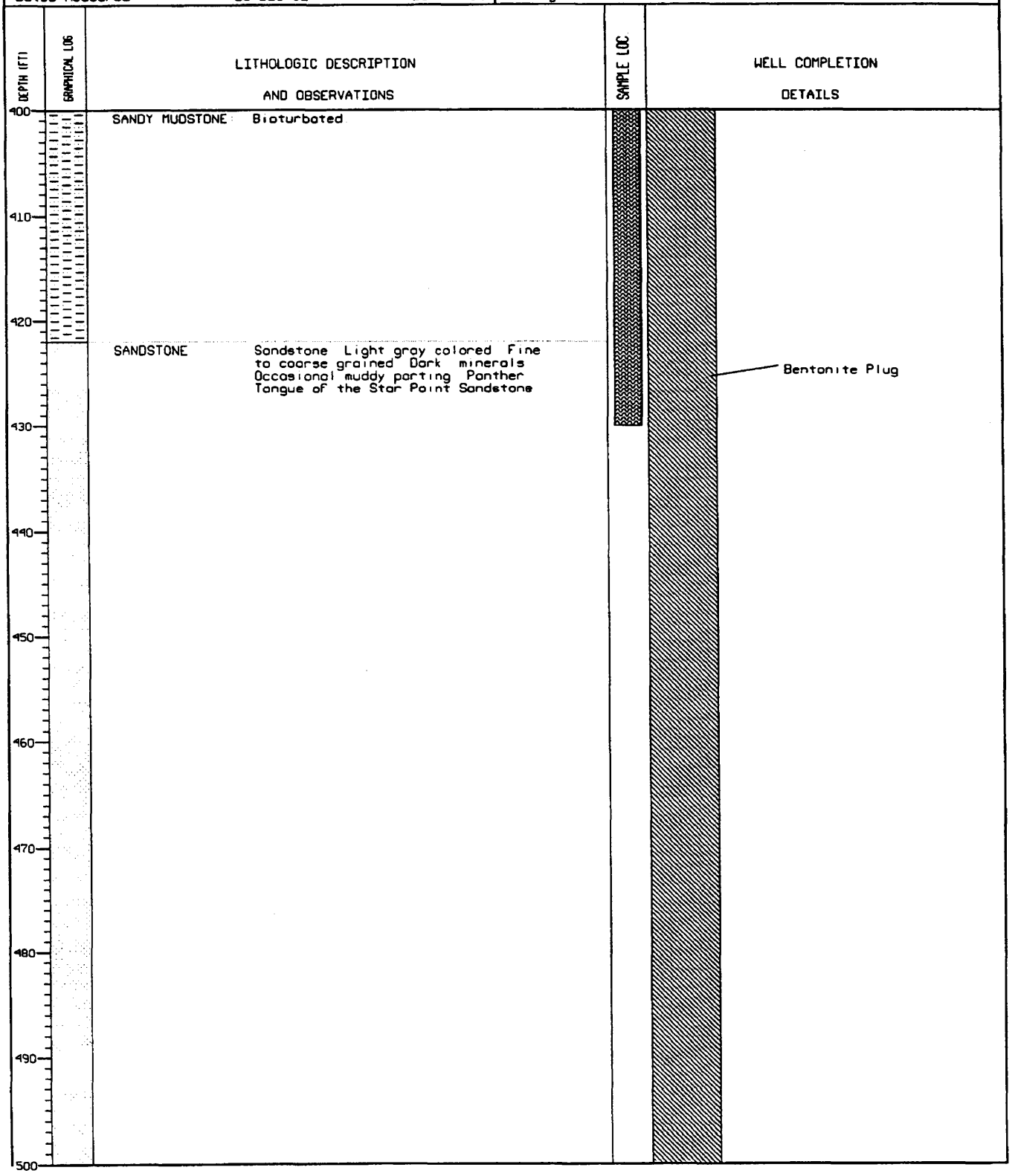
Project Name: GROUND WATER INVESTIGATION	Boring/Well Number: DH-2
Owner/Client: CO-OP MINING COMPANY	Boring/Well Location: 397775.88 N 2112519.39 E
Project Number: UC-192-06	Reference Elevation: 7557.18
	Reference Point: MINE FLOOR
Date Drilled: 16 DEC 1991	Drilling Contractor: CO-OP MINE PERSONNEL
Logged by: JDG & AM	Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 22.98' Static W.L.: 22.98'	Boring Depth (ft): 530' Well Depth (ft): 190'
Dates Measured: 16 DEC 91 21 APR 92	Boring Diameter (in): 2.9"



Project Name: GROUND WATER INVESTIGATION	Boring/Well Number: DH-2
Owner/Client: CO-OP MINING COMPANY	Boring/Well Location: 397775.88 N 2112519.39 E
Project Number: UC-192-06	Reference Elevation: 7557.18
	Reference Point: MINE FLOOR
Date Drilled: 16 DEC 1991	Drilling Contractor: CO-OP MINE PERSONNEL
Logged by: JDG & AM	Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 22.98' Static W.L.: 22.98'	Boring Depth (ft): 530' Well Depth (ft): 190'
Dates Measured: 16 DEC 91 21 APR 92	Boring Diameter (in): 2.9"

DEPTH (FT)	GRAPHICAL LOG	LITHOLOGIC DESCRIPTION AND OBSERVATIONS	SAMPLE LOC	WELL COMPLETION DETAILS
300		SANDSTONE Light gray. Clean.		
310				
320				Bentonite Plug
330				
		MUDDY SANDSTONE: Muddy sandstone/sandy mudstone, gradational. Carbonaceous laminations		
340				
		MUDSTONE Top of Moncos No. 2		
350				
360				
370				
380				
390		SANDY MUDSTONE: Bioturboted.		
400				

Project Name: GROUND WATER INVESTIGATION	Boring/Well Number: DH-2
Owner/Client: CO-OP MINING COMPANY	Boring/Well Location: 397775.88 N 2112519.39 E
Project Number: UC-192-06	Reference Elevation: 7557.18
	Reference Point: MINE FLOOR
Date Drilled: 16 DEC 1991	Drilling Contractor: CO-OP MINE PERSONNEL
Logged by: JDG & AM	Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 22.98' Static W.L.: 22.98'	Boring Depth (ft): 530' Well Depth (ft): 190'
Dates Measured: 16 DEC 91 21 APR 92	Boring Diameter (in): 2.9"



Project Name: GROUND WATER INVESTIGATION Owner/Client: CO-OP MINING COMPANY	Boring/Well Number: DH-2 Boring/Well Location: 397775.88 N 2112519.39 E
Project Number: UC-192-06	Reference Elevation: 7557.18 Reference Point: MINE FLOOR
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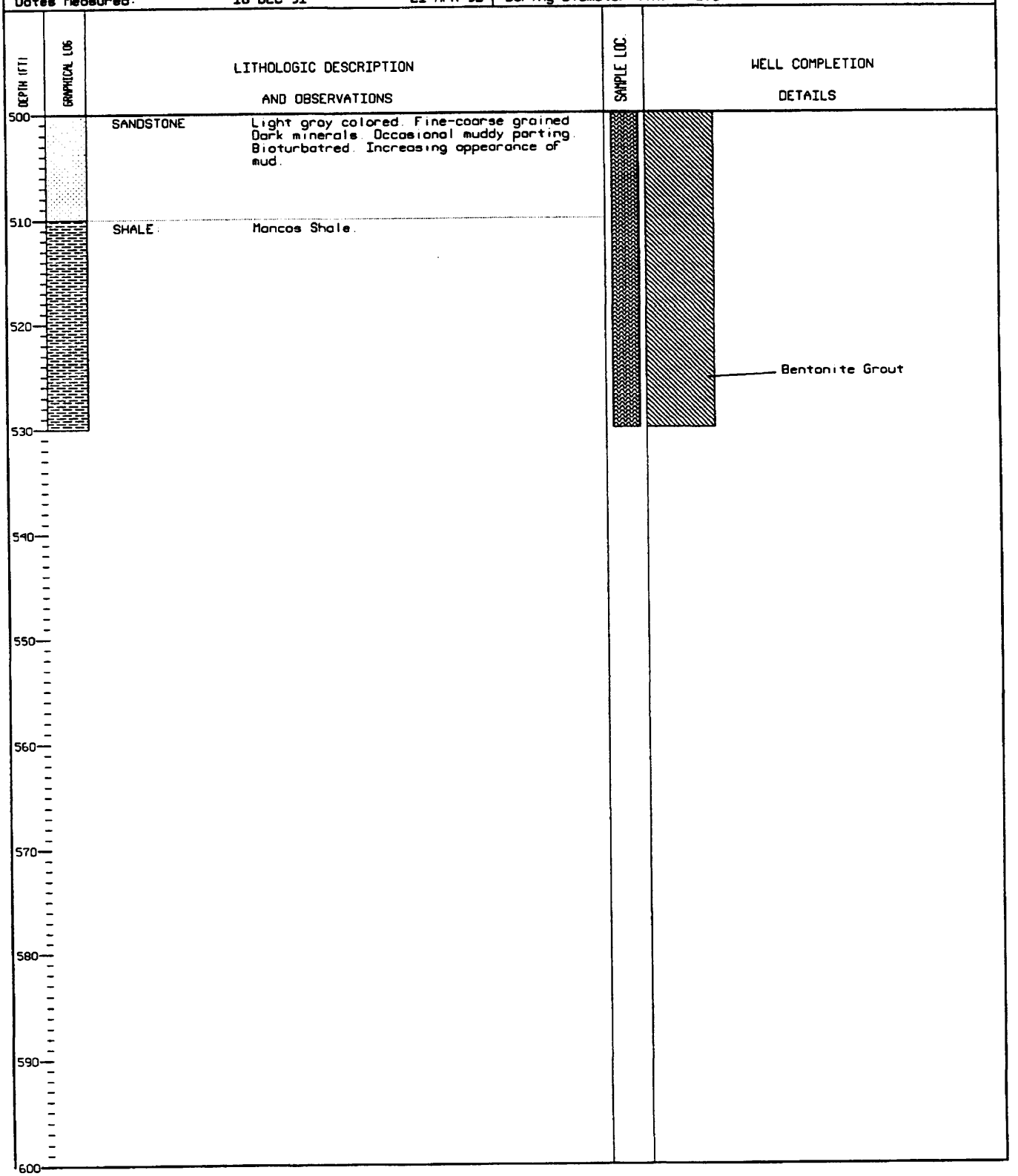
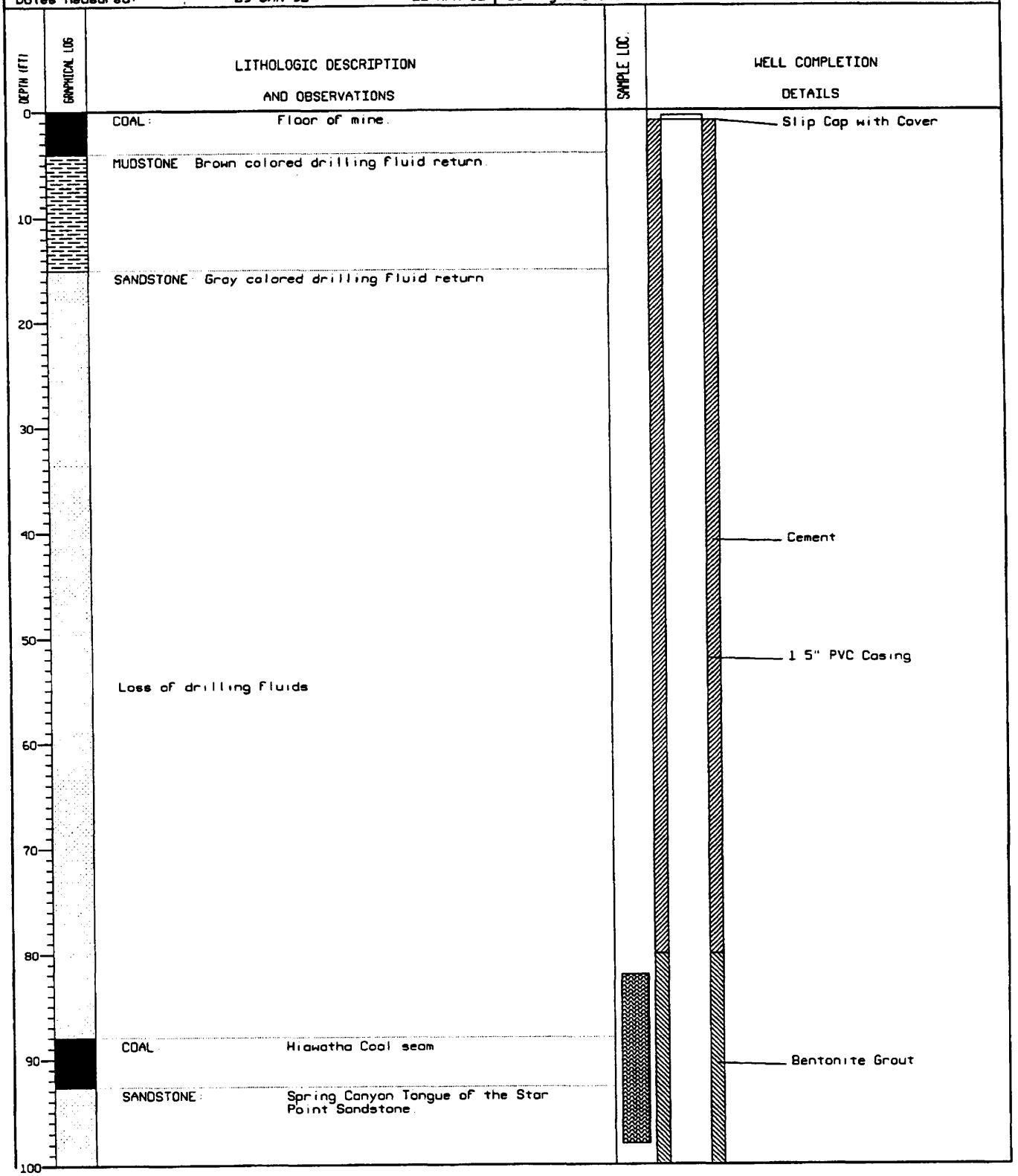
First occurrence of G.W.: 22.98' Static W.L.: 22.98' Dates Measured: 16 DEC 91 21 APR 92	Boring Depth (ft): 530' Well Depth (ft): 190' Boring Diameter (in): 2.9"



EARTHFAX ENGINEERING, INC. DRILLING LOG

Project Name: GROUND WATER INVESTIGATION Owner/Client: CO-OP MINING COMPANY	Boring/Well Number: DH-3 Boring/Well Location: 394514.78 N 2113242.89 E
Project Number: UC-192-06	Reference Elevation: 7520.94 Reference Point: MINE FLOOR
Date Drilled: 29 JAN 1992 Logged by: JRP	Drilling Contractor: CO-OP MINE PERSONNEL Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 125.28' Static W.L.: 125.28' Dates Measured: 29 JAN 92 21 APR 92	Boring Depth (ft): 545' Well Depth (ft): 190' Boring Diameter (in): 2.9"



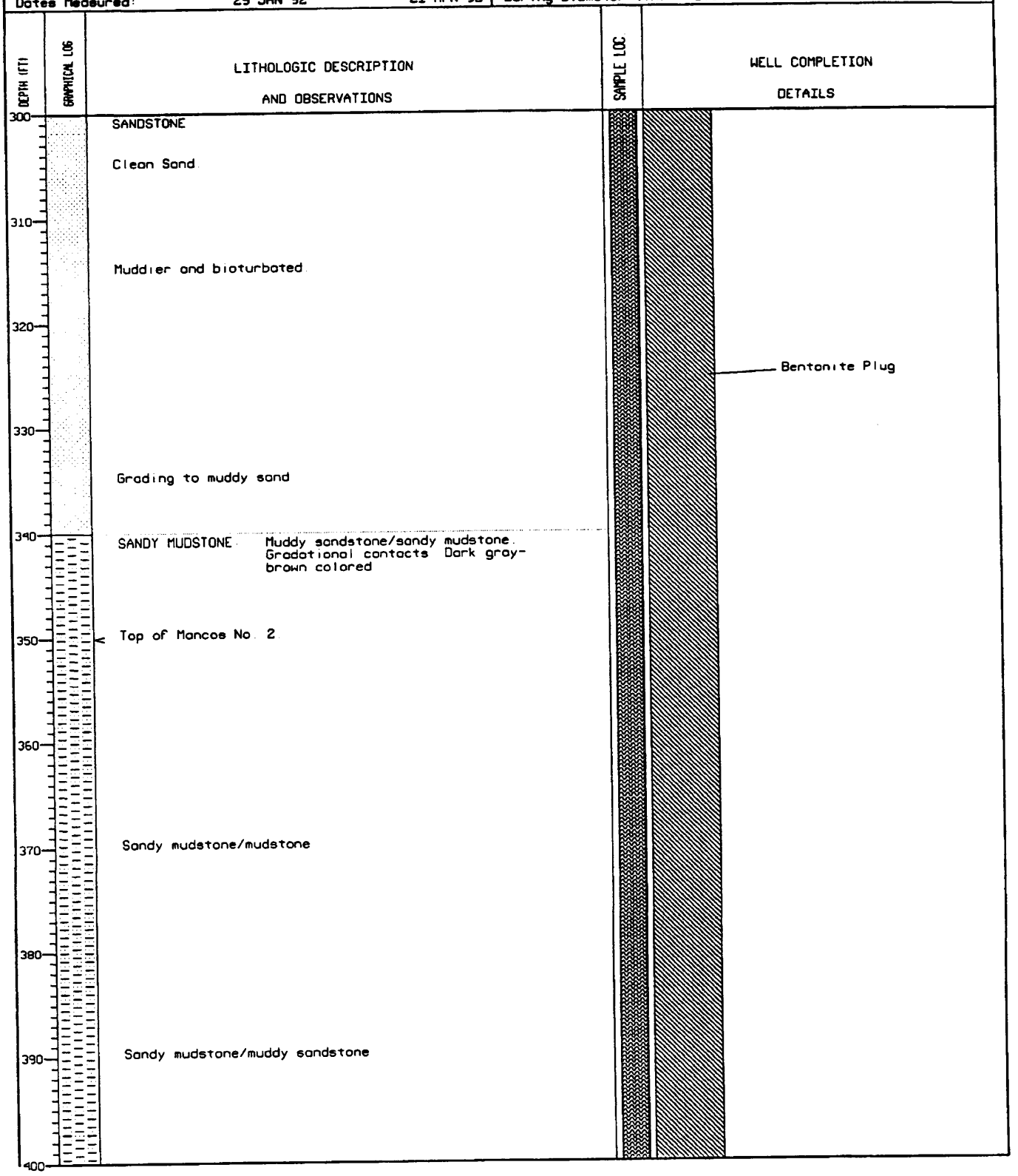
Project Name: GROUND WATER INVESTIGATION	Boring/Well Number: DH-3
Owner/Client: CO-OP MINING COMPANY	Boring/Well Location: 394514.78 N 2113242.89 E
Project Number: UC-192-06	Reference Elevation: 7520.94
	Reference Point: MINE FLOOR
Date Drilled: 29 JAN 1992	Drilling Contractor: CO-OP MINE PERSONNEL
Logged by: JRP	Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 125.28' Static W.L.: 125.28'	Boring Depth (ft): 545' Well Depth (ft): 190'
Dates Measured: 29 JAN 92 21 APR 92	Boring Diameter (in): 2.9"

DEPTH (FT)	GRAPHICAL LOG	LITHOLOGIC DESCRIPTION AND OBSERVATIONS	SAMPLE LOC.	WELL COMPLETION DETAILS
100		SANDSTONE: Drilled blind. No sample.		
110				
120				1.5" PVC Casing
130				
140				20-40 Mesh Silica Sand
150				
160				
170				
180		MUDDY SANDSTONE: Muddy sandstone/sandy mudstone. Fine-very fine grained. Gray colored. Massive-laminated bedding. Bioturbated. Well cemented. Very hard. Reacts with HCl.		1.5" PVC Slot Screen
190		Top of Moncos No. 1.		Threaded End Plug
				Bentonite Plug
200				

Project Name: GROUND WATER INVESTIGATION	Boring/Well Number: DH-3
Owner/Client: CO-OP MINING COMPANY	Boring/Well Location: 394514.78 N 2113242.89 E
Project Number: UC-192-06	Reference Elevation: 7520.94
	Reference Point: MINE FLOOR
Date Drilled: 29 JAN 1992	Drilling Contractor: CO-OP MINE PERSONNEL
Logged by: JRP	Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 125.28' Static W.L.: 125.28'	Boring Depth (ft): 545' Well Depth (ft): 190'
Dates Measured: 29 JAN 92 21 APR 92	Boring Diameter (in): 2.9"

DEPTH (FT)	GRAPHICAL LOG	LITHOLOGIC DESCRIPTION AND OBSERVATIONS	SAMPLE LOC.	WELL COMPLETION DETAILS
200		SANDY MUDSTONE: Sandy mudstone/muddy sandstone. Gradational contacts. Medium-very Fine grained. Dull luster. Gritty-smooth feel. Unweathered. Sandy units are gray (5Y6/1). Muddy units are gray-brown (5Y4/1). Hard. Predominantly quartz with minor dark minerals. Mica along muddy partings. Laminated. Low angle cross-beds. Bioturbated. Non-fractured. Cores are in excellent condition.		
210				
220				Bentonite Plug
230		SANDSTONE: Sandstone/muddy sandstone. Gray colored. Fine grained. Storrs Tongue of the Star Point Sandstone.		
240		Muddy and bioturbated.		
250		Laminated and bioturbated.		
260		Sand increasing.		
270				
280				
290		Sand and muddy sand.		
300				

Project Name: GROUND WATER INVESTIGATION	Boring/Well Number: DH-3
Owner/Client: CO-OP MINING COMPANY	Boring/Well Location: 394514.78 N 2113242.89 E
Project Number: UC-192-06	Reference Elevation: 7520.94
	Reference Point: MINE FLOOR
Date Drilled: 29 JAN 1992	Drilling Contractor: CO-OP MINE PERSONNEL
Logged by: JRP	Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 125.28' Static W.L.: 125.28'	Boring Depth (ft): 545' Well Depth (ft): 190'
Dates Measured: 29 JAN 92 21 APR 92	Boring Diameter (in): 2.9"



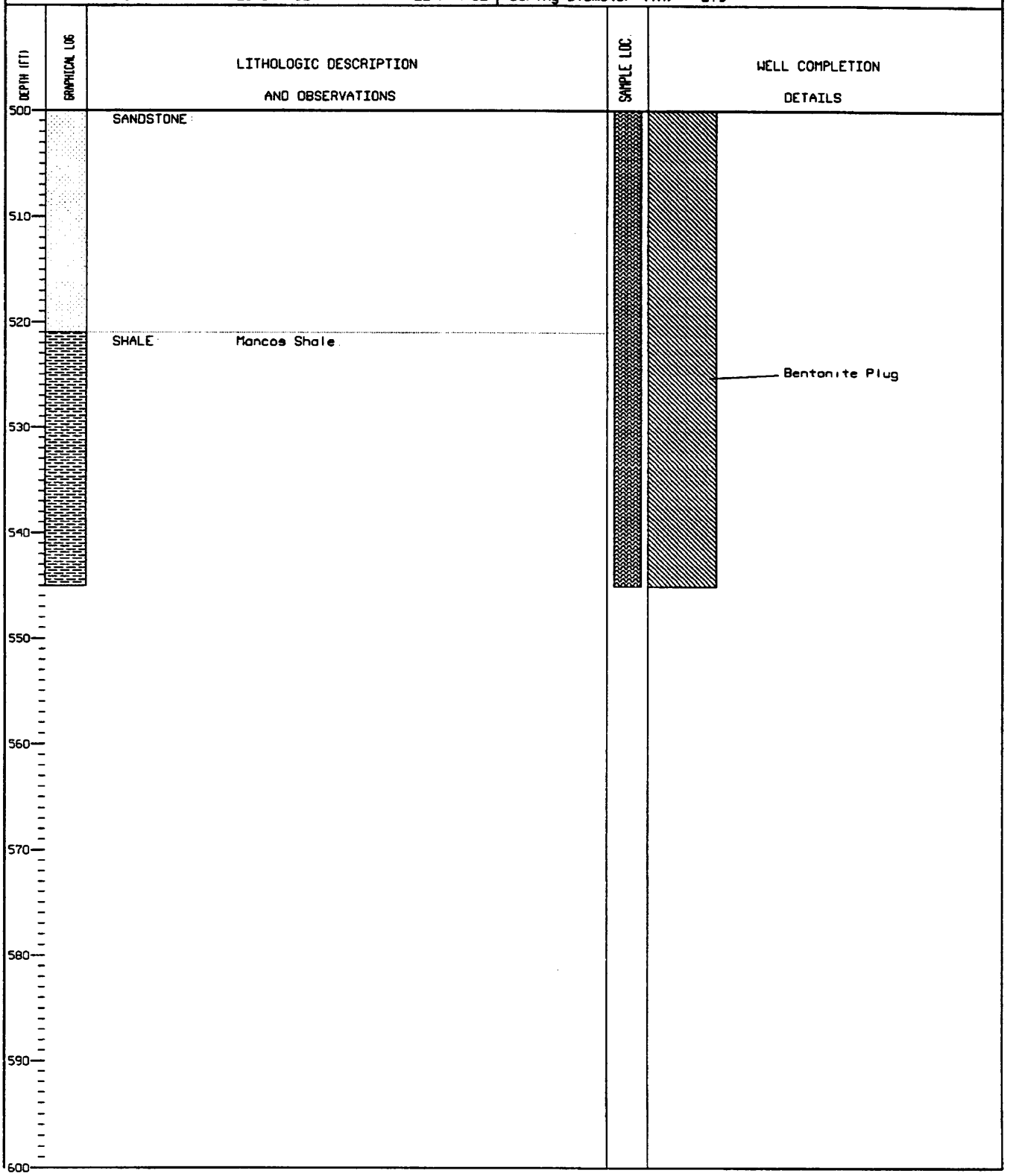
EARTHFAX ENGINEERING, INC. DRILLING LOG

Project Name: GROUND WATER INVESTIGATION Owner/Client: CO-OP MINING COMPANY	Boring/Well Number: DH-3 Boring/Well Location: 394514.78 N 2113242.89 E
Project Number: UC-192-06	Reference Elevation: 7520.94 Reference Point: MINE FLOOR
Date Drilled: 29 JAN 1992 Logged by: JRP	Drilling Contractor: CO-OP MINE PERSONNEL Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 125.28' Static W.L.: 125.28' Dates Measured: 29 JAN 92 21 APR 92	Boring Depth (ft): 545' Well Depth (ft): 190' Boring Diameter (in): 2.9"

DEPTH (ft)	GRAPHICAL LOG	LITHOLOGIC DESCRIPTION AND OBSERVATIONS	SAMPLE LOG	WELL COMPLETION DETAILS
400		SANDY MUDSTONE:		
410				
420				
		SANDSTONE: Medium-fine grained. Sub-angular to sub-rounded grain texture. Moderate sorting. Little or no weathering. Gray colored with dark minerals. Hard. Predominantly quartz, with muscovite along muddy partings. Calcite cement. Massive bedded with laminations locally. Bioturbated. Few fractures. Core is in excellent condition. Panther Tongue of the Star Point Sandstone.		Bentonite Grout
430				
440				
450				
460				
470				
480				
490				
500				

EARTHFAX ENGINEERING, INC. DRILLING LOG

Project Name: GROUND WATER INVESTIGATION	Boring/Well Number: DH-3
Owner/Client: CO-OP MINING COMPANY	Boring/Well Location: 394514.78 N 2113242.89 E
Project Number: UC-192-06	Reference Elevation: 7520.94
	Reference Point: MINE FLOOR
Date Drilled: 29 JAN 1992	Drilling Contractor: CO-OP MINE PERSONNEL
Logged by: JRP	Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First occurrence of G.W.: 125.28' Static W.L.: 125.28'	Boring Depth (ft): 545' Well Depth (ft): 190'
Dates Measured: 29 JAN 92 21 APR 92	Boring Diameter (in): 2.9"



EARTHFAX ENGINEERING, INC.

Project Name: GROUNDWATER INVESTIGATION	Boring/Well Number: DH-4
Owner/Client: CO-OP MINING COMPANY	Boring/Well Location: N399277.59 E22111993.14
Project Number: UC-192-09	Reference Elevation (ft): 7610.22
	Reference Point: MINE FLOOR
Date Drilled: 1-31-94	Drilling Contractor: CO-OP MINE PERSONNEL
Logged By: CR	Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First Occurrence of G.W. (ft): 57 Static W.L. (ft): 62.30	Boring Depth (ft): 238 Well Depth (ft): 238
Date Measured: 1-31-94	Boring Diameter (in): 2.9

DEPTH (FT) | GRAPHICAL LOG | STRATIGRAPHIC DESCRIPTION AND OBSERVATIONS | WELL COMPLETION DETAILS

0 – 15' MUDSTONE: Blackhawk Fm.

15 – 90' SANDSTONE: Gray.

90 – 98' MUDSTONE:

98 – 100' SANDSTONE:

0 – 100'
Bentonite Grout

0 – 100'
1.5 " Flush Thread PVC Casing, Sch 40

EarthFax

Project Name: GROUNDWATER INVESTIGATION Owner/Client: CO-OP MINING COMPANY	Boring/Well Number: DH-4 Boring/Well Location: N399277.59 E22111993.14
[redacted]ct Number: UC-192-09	Reference Elevation (ft): 7610.22 Reference Point: MINE FLOOR
Date Drilled: 1-31-94 Logged By: CR	Drilling Contractor: CO-OP MINE PERSONNEL Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First Occurrence of G.W. (ft): 57 Static W.L. (ft): 62.30 Date Measured: 1-31-94	Boring Depth (ft): 238 Well Depth (ft): 238 Boring Diameter (in): 2.9

DEPTH (FT) | GRAPHICAL LOG

STRATIGRAPHIC DESCRIPTION AND OBSERVATIONS

100 – 111' SANDSTONE:

111 – 112' MUDSTONE:

112 – 116' SANDSTONE:

116 – 120' COAL: Hiawatha Seam.

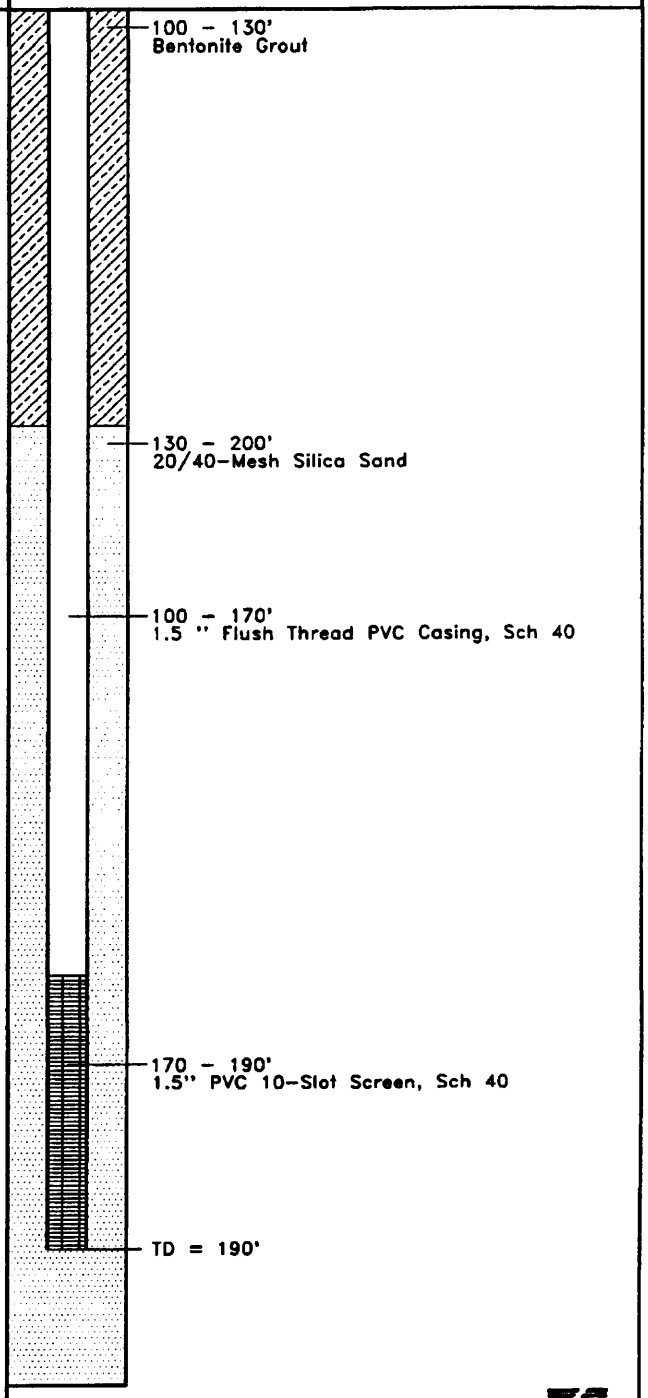
120 – 122' MUDSTONE: Starpoint Sandstone
Spring Canyon Tongue.

122 – 180' SANDSTONE:
Very fine grained sandstone with occasional muddy partings and bioturbations.

180 – 190' MUDDY SANDSTONE:
Muddy laminations occurring at low angles with occasional bioturbations.

190 – 200' SANDSTONE:
Clean sandstone with occasional bioturbations.
Alternating muddy sandstone/sandstone.

WELL COMPLETION DETAILS



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EARTHFAX ENGINEERING, INC.

Project Name: GROUNDWATER INVESTIGATION	Boring/Well Number: DH-4
Owner/Client: CO-OP MINING COMPANY	Boring/Well Location: N399277.59 E22111993.14
Project Number: UC-192-09	Reference Elevation (ft): 7610.22
	Reference Point: MINE FLOOR
Date Drilled: 1-31-94	Drilling Contractor: CO-OP MINE PERSONNEL
Logged By: CR	Drilling Method: HYDRAULIC ROTARY Rig Type: DIAMEC 251
First Occurrence of G.W. (ft): 57 Static W.L. (ft): 62.30	Boring Depth (ft): 238 Well Depth (ft): 238
Date Measured: 1-31-94	Boring Diameter (in): 2.9

DEPTH (FT)	GRAPHICAL LOG	STRATIGRAPHIC DESCRIPTION AND OBSERVATIONS	WELL COMPLETION DETAILS
200		200 - 202' SANDSTONE:	200 - 238' 20/40-Mesh Silica Sand
205		202 - 209' MUDDY SANDSTONE: Mud fraction increasing, increasing bioturbations.	
210		209 - 218' SANDY MUDSTONE: Mancos No. 1 Tongue.	
215			
220		218 - 238' MUDDY SANDSTONE:	
225			
230			
235			
240			

EarthFax

APPENDIX 7-N-H

Groundwater Analytical Reports for May 8, 1992 Sampling Round of In-Mine Monitoring Wells DH-1A, DH-2, and DH-3.

CHEMTECH

ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 6-04-92

TO: Co-op Mining
P.O. Box 1245
Huntington, Utah 84528

SAMPLE ID: Lab #U077637 - Project #C-192-06, DH-1, 5-08-92

DATE SUBMITTED: 5-13-92

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED
TDS, mg/l	285
Hardness as $CaCO_3$, mg/l	162
Boron as B, mg/l	<.05
Alkalinity as $CaCO_3$, mg/l	94
Bicarbonate as HCO_3, mg/l	110
Carbonate as CO_3, mg/l	2.3
Hydroxide as OH, mg/l	0
Chloride as Cl, mg/l	4.9
Fluoride as F, mg/l	0.28
Ammonia as NH_3-N, mg/l	<.2
Nitrate as NO_3-N, mg/l	0.42
Phosphate as PO_4-P, mg/l	0.129
Sulfate as SO_4, mg/l	128
Sulfide as S, mg/l	<.1

Rex Henderson

CHEMTECH

ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 6-04-92

TO: Co-op Mining
P.O. Box 1245
Huntington, Utah 84528

SAMPLE ID: Lab #U077637 - Project #C-192-06, DH-1, 5-08-92

DATE SUBMITTED: 5-13-92

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED
Aluminum as Al (Diss), mg/l	0.2
Arsenic as As (Diss), mg/l	<.05
Barium as Ba (Diss), mg/l	0.071
Cadmium as Cd (Diss), mg/l	<.01
Calcium as Ca (Diss), mg/l	38.9
Chromium as Cr (Diss), mg/l	0.025
Copper as Cu (Diss), mg/l	<.01
Iron as Fe (Diss), mg/l	0.505
Lead as Pb (Diss), mg/l	<.01
Magnesium as Mg (Diss), mg/l	20.1
Manganese as Mn (Diss), mg/l	0.062
Mercury as Hg (Diss), mg/l	<.0005
Molybdenum as Mo (Diss), mg/l	0.058
Nickel as Ni (Diss), mg/l	<.01
Potassium as K, mg/l	31.2
Selenium as Se, mg/l	<.005
Sodium as Na, mg/l	14.1
Zinc as Zn, mg/l	<.01
Oil & Grease, mg/l	2.0

Rex Henderson

CHEMTECH

ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 6-04-92

TO: Co-op Mining
P.O. Box 1245
Huntington, Utah 84528

SAMPLE ID: Lab #U077638 - Project #C-192-06, DH-2, 5-08-92

DATE SUBMITTED: 5-13-92

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED
TDS, mg/l	330
Hardness as $CaCO_3$, mg/l	321
Boron as B, mg/l	0.064
Alkalinity as $CaCO_3$, mg/l	285
Bicarbonate as HCO_3, mg/l	340
Carbonate as CO_3, mg/l	3.5
Hydroxide as OH, mg/l	0
Chloride as Cl, mg/l	4.2
Fluoride as F, mg/l	0.18
Ammonia as NH_3-N, mg/l	0.64
Nitrate as NO_3-N, mg/l	0.74
Phosphate as PO_4-P, mg/l	0.025
Sulfate as SO_4, mg/l	33
Sulfide as S, mg/l	<.1

Rex Henderson

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ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 6-04-92

TO: Co-op Mining
P.O. Box 1245
Huntington, Utah 84528

SAMPLE ID: Lab #U077638 - Project #C-192-06, DH-2, 5-08-92

DATE SUBMITTED: 5-13-92

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED
Aluminum as Al (Diss), mg/l	<.1
Arsenic as As (Diss), mg/l	<.05
Barium as Ba (Diss), mg/l	0.127
Cadmium as Cd (Diss), mg/l	<.01
Calcium as Ca (Diss), mg/l	51.9
Chromium as Cr (Diss), mg/l	<.01
Copper as Cu (Diss), mg/l	<.01
Iron as Fe (Diss), mg/l	0.280
Lead as Pb (Diss), mg/l	0.030
Magnesium as Mg (Diss), mg/l	29.5
Manganese as Mn (Diss), mg/l	0.101
Mercury as Hg (Diss), mg/l	<.0005
Molybdenum as Mo (Diss), mg/l	0.010
Nickel as Ni (Diss), mg/l	<.01
Potassium as K, mg/l	1.5
Selenium as Se, mg/l	<.005
Sodium as Na, mg/l	8.8
Zinc as Zn, mg/l	<.01
Oil & Grease, mg/l	<.5

Rex Henderson

CHEMTECH

ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 6-04-92

TO: Co-op Mining
P.O. Box 1245
Huntington, Utah 84528

SAMPLE ID: Lab #U077639 - Project #C-192-06, DH-3, 5-07-92

DATE SUBMITTED: 5-13-92

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED
TDS, mg/l	339
Hardness as $CaCO_3$, mg/l	307
Boron as B, mg/l	0.061
Alkalinity as $CaCO_3$, mg/l	294
Bicarbonate as HCO_3, mg/l	336
Carbonate as CO_3, mg/l	11.5
Hydroxide as OH, mg/l	0
Chloride as Cl, mg/l	4.2
Fluoride as F, mg/l	0.16
Ammonia as NH_3-N, mg/l	0.22
Nitrate as NO_3-N, mg/l	<.5
Phosphate as PO_4-P, mg/l	0.027
Sulfate as SO_4, mg/l	38
Sulfide as S, mg/l	<.1

Rex Henderson

CHEMTECH

ANALYTICAL LABORATORY

6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 6-04-92

TO: Co-op Mining
P.O. Box 1245
Huntington, Utah 84528

SAMPLE ID: Lab #U077639 - Project #C-192-06, DH-3, 5-07-92

DATE SUBMITTED: 5-13-92

CERTIFICATE OF ANALYSIS

PARAMETER	DETECTED
Aluminum as Al (Diss), mg/l	<.1
Arsenic as As (Diss), mg/l	<.05
Barium as Ba (Diss), mg/l	0.129
Cadmium as Cd (Diss), mg/l	<.01
Calcium as Ca (Diss), mg/l	50.9
Chromium as Cr (Diss), mg/l	<.01
Copper as Cu (Diss), mg/l	<.01
Iron as Fe (Diss), mg/l	0.220
Lead as Pb (Diss), mg/l	<.01
Magnesium as Mg (Diss), mg/l	28.9
Manganese as Mn (Diss), mg/l	0.232
Mercury as Hg (Diss), mg/l	<.0005
Molybdenum as Mo (Diss), mg/l	<.01
Nickel as Ni (Diss), mg/l	<.01
Potassium as K, mg/l	2.6
Selenium as Se, mg/l	<.005
Sodium as Na, mg/l	15.2
Zinc as Zn, mg/l	<.01
Oil & Grease, mg/l	<.5

Rex Henderson

APPENDIX 7-N-I

Groundwater Analytical Reports for 1994 Quarterly Sampling Rounds of In-Mine Monitoring Wells DH-1A, DH-2, DH-3 and DH-4.

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)

March 24, 1993

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

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: February 18, 1993

Date received: February 19, 1993

DTL-1A
Rec'd 1030 hr.
Sampled 1344 hr.

Analysis report no. 59-12891

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	207	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Alkalinity, Total	170	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Aluminum	0.99	.5	mg/l	EPA 202.1	03-08-1993 12:45 ED
Anions	5.84	----	meq/l	---------	---------- ----- --
Arsenic	0.001	.002	mg/l	EPA 206.2	03-22-1993 08:55 ED
Barium	0.03	.03	mg/l	EPA 208.1	03-08-1993 12:45 ED
Boron	0.08	.01	mg/l	EPA 212.3	03-09-1993 10:00 LM
Cadmium	0.000	.00	mg/l	EPA 213.2	03-17-1993 08:15 ED
Calcium	41.9	.1	mg/l	EPA 215.1	03-04-1993 13:30 ED
Cations	6.07	----	meq/l	---------	---------- ----- --
Chloride	0.1	.1	mg/l	EPA 325.3	03-08-1993 08:00 LM
Chromium	0.00	.001	mg/l	EPA 218.2	03-09-1993 09:56 ED
Conductivity	560	2	umhos/cm	EPA 120.1	03-04-1993 15:30 LS
Copper	0.000	.01	mg/l	EPA 220.1	03-05-1993 10:00 ED
Fluoride	0.16	.01	mg/l	EPA 340.2	02-24-1993 09:00 LS
Hardness, Total	224	1	mg/l $CaCO_3$	---------	03-04-1993 13:30 ED
Iron	2.24	.02	mg/l	EPA 236.1	03-05-1993 08:40 ED
Iron, Dissolved	0.90	.02	mg/l	EPA 236.1	03-05-1993 08:40 ED
Lead	0.000	.001	mg/l	EPA 239.2	03-08-1993 14:20 ED
Magnesium	29.00	.01	mg/l	EPA 242.1	03-04-1993 13:30 ED
Manganese	0.07	.01	mg/l	EPA 243.1	03-05-1993 08:40 ED
Mercury	0.000	.002	mg/l	EPA 245.1	03-23-1993 13:55 ED
Molybdenum	0.00	.1	mg/l	EPA 246.1	03-08-1993 12:45 ED

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)

March 24, 1993

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

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: February 18, 1993

Date received: February 19, 1993

DTL-1A
Rec'd 1030 hr.
Sampled 1344 hr.

Analysis report no. 59-12891

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nickel	0.02	.02	mg/l	EPA 249.1	03-05-1993 10:20 ED
Nitrogen, Ammonia	0.05	.01	mg/l	EPA 350.3	03-05-1993 08:30 LS
Nitrogen, Nitrate	0.03	.01	mg/l	EPA 353.3	02-19-1993 11:00 LM
Nitrogen, Nitrite	0.00	.01	mg/l	EPA 354.1	02-19-1993 11:00 LM
Oil & Grease	1.3	1	mg/l	EPA 413.1	03-03-1993 08:00 LM
Phosphorus, Total	0.01	.01	mg/l	EPA 365.2	03-01-1993 09:00 LM
Potassium	39.30	.01	mg/l	EPA 258.1	03-04-1993 13:30 ED
Selenium	0.020	.002	mg/l	EPA 270.2	03-22-1993 08:55 ED
Sodium	13.40	.01	mg/l	EPA 273.1	03-04-1993 13:30 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	03-01-1993 08:00 LM
Solids, Total Dissolved	352.0	.5	mg/l	EPA 160.1	02-26-1993 12:30 LM
Solids, Total Suspended	28.0	.5	mg/l	EPA 160.2	02-26-1993 12:30 LM
Sulfate	120.0	.1	mg/l	EPA 375.4	03-08-1993 08:50 LS
Sulfide	1.60	.1	mg/l	EPA 376.1	03-01-1993 08:00 LM
Zinc	0.07	.01	mg/l	EPA 289.1	03-05-1993 10:00 ED
Cation/Anion Balance	2.00	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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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 18, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled May 26, 1993

Date received May 26, 1993

DH-1A
Rec'd 0830 hr.
Sampled 0710 hr.

NOTE: Due to lab error, Zinc bottle was unperserved.
Fluoride was not distilled.

Analysis report no. 59-13105

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	352	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	289	2	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Aluminum	<1.00	1	mg/l	EPA 202.1	06-15-1993 12:40 ED
Anions	10.95	----	meq/l	---------	---------- ----- --
Arsenic	<0.003	.003	mg/l	EPA 206.2	06-07-1993 14:35 ED
Barium	<0.20	.2	mg/l	EPA 208.1	06-15-1993 11:50 ED
Boron	0.11	.04	mg/l	EPA 212.3	06-14-1993 15:00 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	06-04-1993 14:15 ED
Calcium	66.6	.03	mg/l	EPA 215.1	06-07-1993 09:20 ED
Cations	9.83	----	meq/l	---------	---------- ----- --
Chloride	24.9	.5	mg/l	EPA 325.3	06-03-1993 10:00 LM
Chromium	<0.0002	.0003	mg/l	EPA 218.2	06-10-1993 12:25 ED
Copper	<0.030	.03	mg/l	EPA 220.1	06-14-1993 16:55 ED
Fluoride	0.11	.02	mg/l	EPA 340.2	06-02-1993 07:30 LS
Hardness, Total	391	.03	mg/l $CaCO_3$	---------	06-07-1993 09:20 ED
Iron	0.40	.05	mg/l	EPA 236.1	06-14-1993 09:25 ED
Iron, Dissolved	0.40	.05	mg/l	EPA 236.1	06-07-1993 11:05 ED
Lead	<0.030	.003	mg/l	EPA 239.2	06-09-1993 11:05 ED
Magnesium	54.60	.007	mg/l	EPA 242.1	06-07-1993 10:00 ED
Manganese	0.05	.03	mg/l	EPA 243.1	06-07-1993 10:40 ED
Mercury	0.0017	.0002	mg/l	EPA 245.1	06-17-1993 15:30 ED
Molybdenum	<0.20	.2	mg/l	EPA 246.1	06-16-1993 11:20 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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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 18, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: May 26, 1993

Date received: May 26, 1993

DH-1A
Rec'd 0830 hr.
Sampled 0710 hr.

NOTE: Due to lab error, Zinc bottle was unperserved.
Fluoride was not distilled.

Analysis report no. 59-13105

rameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
ckel	<0.08	.08	mg/l	EPA 249.1	06-15-1993 10:10 ED
Nitrogen, Ammonia	<0.08	.08	mg/l	EPA 350.3	06-09-1993 10:15 LS
Nitrogen, Nitrate	0.09	.01	mg/l	EPA 353.3	05-28-1993 10:30 LM
Nitrogen, Nitrite	<0.02	.02	mg/l	EPA 354.1	05-26-1993 11:00 LM
Oil & Grease	0.3	1	mg/l	EPA 413.1	06-11-1993 07:30 LM
Phosphorus, Total	0.014	.008	mg/l	EPA 365.2	06-09-1993 13:30 LM
Potassium	24.00	.1	mg/l	EPA 258.1	06-07-1993 12:05 ED
Selenium	0.004	.004	mg/l	EPA 270.2	06-08-1993 13:35 ED
Sodium	32.50	.2	mg/l	EPA 273.1	06-07-1993 11:30 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	05-26-1993 14:00 LS
Solids, Total Dissolved	597.0	14	mg/l	EPA 160.1	06-02-1993 10:30 LM
Solids, Total Suspended	19.0	7	mg/l	EPA 160.2	06-02-1993 10:30 LM
Sulfate	220.0	1	mg/l	EPA 375.4	06-07-1993 10:15 LS
Sulfide	1.40	.1	mg/l	EPA 376.1	05-28-1993 14:00 LM
Zinc	0.07	.03	mg/l	EPA 289.1	06-15-1993 09:20 ED
Cation/Anion Balance	-5.39	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:DH-1A

Kind of sample Water
reported to us

Rec'd 1030 hr.
Sampled 1842 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: NITRATE HOLDING TIME EXPIRED WHEN RECEIVED AT LAB!
FLUORIDE NOT DISTILLED.

Date sampled August 31, 1993

Date received September 3, 1993

Analysis report no. 59-13482

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	341	2	mg/l	$CaCO_3$ EPA 310.1	09-14-1993 1030	LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$ EPA 310.1	09-14-1993 1030	LS
Alkalinity, Total	280	2	mg/l	$CaCO_3$ EPA 310.1	09-14-1993 1030	LS
Aluminum	2	.05	mg/l	EPA 200.7	09-15-1993 1616	SE
Anions	8.39	----	meq/l	---------	---------- ----	--
Arsenic	<0.002	.002	mg/l	EPA 206.2	09-21-1993 1015	SM
Barium	0.2	.005	mg/l	EPA 200.7	09-15-1993 1616	SE
Boron	0.08	.01	mg/l	EPA 200.7	09-16-1993 0130	SE
Cadmium	<0.0050	.005	mg/l	EPA 200.7	09-15-1993 1616	SE
Calcium	82.0	.1	mg/l	EPA 200.7	09-15-1993 1616	SE
Cations	8.48	----	meq/l	---------	---------- ----	--
Chloride	7.4	.5	mg/l	EPA 325.3	09-07-1993 1300	LM
Chromium	<0.0	.005	mg/l	EPA 200.7	09-15-1993 1616	SE
Copper	0.01	.005	mg/l	EPA 200.7	09-15-1993 1616	SE
Fluoride	0.20	.02	mg/l	EPA 340.2	09-13-1993 1400	LS
Hardness, Total	381.8	.03	mg/l	$CaCO_3$ ---------	09-15-1993 1616	SE
Iron	0.55	.01	mg/l	EPA 200.7	09-15-1993 1616	SE
Lead	<0.050	.05	mg/l	EPA 200.7	09-15-1993 1616	SE
Magnesium	43.00	.1	mg/l	EPA 200.7	09-15-1993 1616	SE
Manganese	0.15	.01	mg/l	EPA 200.7	09-15-1993 1616	SE
Mercury	<0.0040	.0002	mg/l	EPA 245.1	09-21-1993 1000	SM
Molybdenum	<0.1	.1	mg/l	EPA 200.7	09-15-1993 1616	SE
Nickel	<0.01	.01	mg/l	EPA 200.7	09-15-1993 1616	SE
Nitrogen, Ammonia	0.25	.08	mg/l	EPA 350.3	09-22-1993 0800	LS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:DH-1A

Kind of sample reported to us: Water

Rec'd 1030 hr.
Sampled 1842 hr.

Sample taken at: Co-op

Sample taken by: Co-op

NOTE: NITRATE HOLDING TIME EXPIRED WHEN RECEIVED AT LAB!
FLUORIDE NOT DISTILLED.

Date sampled: August 31, 1993

Date received: September 3, 1993

Analysis report no. 59-13482

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Nitrogen, Nitrate	0.07	.01	mg/l	EPA 353.3	09-17-1993 0830	LM
Nitrogen, Nitrite	0.02	.02	mg/l	EPA 354.1	09-03-1993 1300	LM
Oil & Grease	<1	1	mg/l	EPA 413.1	09-08-1993 1310	LM
Phosphorus, Total	<0.008	.008	mg/l	EPA 365.2	09-15-1993 0720	LM
Potassium	1.4	.1	mg/l	EPA 200.7	09-15-1993 1616	SE
Selenium	<0.004	.002	mg/l	EPA 270.2	09-20-1993 1900	SM
Sodium	19.0	.1	mg/l	EPA 200.7	09-15-1993 1616	SE
Solids, Total Dissolved	514	14	mg/l	EPA 160.1	09-03-1993 1130	LM
Sulfate	130	1	mg/l	EPA 375.4	09-24-1993 0800	LS
Sulfide	<0.9	.1	mg/l	EPA 376.1	09-03-1993 1515	ED
Zinc	0.16	.005	mg/l	EPA 200.7	09-15-1993 1616	SE
Cation/Anion Balance	0.51	----	%	---------	---------- -----	--

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: 708-953-8306

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 16, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-1A

Kind of sample reported to us Water

Rec'd 1700 hr.
Sampled 0913 hr.

Sample taken at Co-op

NOTE: Holding time expired when Sulfate was run.

Sample taken by Co-op

Date sampled October 26, 1993

Date received October 26, 1993

Analysis report no. 59-13672A

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	276	2	mg/l	$CaCO_3$	EPA 310.1	11-01-1993 1212	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	11-01-1993 1212	LS
Alkalinity, Total	276	2	mg/l	$CaCO_3$	EPA 310.1	11-01-1993 1212	LS
Aluminum	<2	1	mg/l		EPA 202.1	12-06-1993 1330	DW
Anions	7.20	----	meq/l		---------	---------- -----	--
Arsenic	<0.010	.003	mg/l		EPA 206.2	11-23-1993 1115	DW
Boron	0.10	.04	mg/l		EPA 212.3	12-09-1993 1330	LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125	ED
Calcium	66.0	.03	mg/l		EPA 215.1	11-08-1993 1450	ED
Cations	7.20	----	meq/l		---------	---------- -----	--
Chloride	7.0	.5	mg/l		EPA 325.3	11-22-1993 0930	LM
Conductivity	682.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Copper	<0.20	.03	mg/l		EPA 220.1	11-09-1993 1520	ED
Hardness, Total	338.0	.03	mg/l	$CaCO_3$	---------	11-08-1993 1450	ED
Iron	0.58	.05	mg/l		EPA 236.1	11-08-1993 1315	ED
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-08-1993 0920	ED
Lead	<0.400	.003	mg/l		EPA 239.2	11-05-1993 1000	ED
Magnesium	42.00	.007	mg/l		EPA 242.1	11-08-1993 1630	ED
Manganese	0.08	.03	mg/l		EPA 243.1	11-08-1993 1100	ED
Manganese, Dissolved	<0.1	.03	mg/l		EPA 243.1	12-02-1993 0830	DW
Molybdenum	0.2	.2	mg/l		EPA 246.1	12-06-1993 1620	DW
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000	LS
Nitrogen, Nitrate	<0.10	.01	mg/l		EPA 353.3	11-03-1993 1000	LM
Nitrogen, Nitrite	0.00	.02	mg/l		EPA 354.1	10-27-1993 1100	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

December 16, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-1A

Kind of sample Water
reported to us

Rec'd 1700 hr.
Sampled 0913 hr.

Sample taken at Co-op

NOTE: Holding time expired when Sulfate was run.

Sample taken by Co-op

Date sampled October 26, 1993

Date received October 26, 1993

Analysis report no. 59-13672A

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorus, Ortho	0.000	.003	mg/l	EPA 365.2	10-27-1993 1130 LM
Potassium	20.0	.1	mg/l	EPA 258.1	11-09-1993 1315 ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400 DW
Sodium	11.0	.2	mg/l	EPA 273.1	11-09-1993 1135 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	10-27-1993 0740 LM
Solids, Total Dissolved	395	14	mg/l	EPA 160.1	10-29-1993 0730 LM
Solids, Total Suspended	11	7	mg/l	EPA 160.2	11-02-1993 0800 LM
Sulfate	70	1	mg/l	EPA 375.4	12-09-1993 0900 LS
Zinc	0.05	.03	mg/l	EPA 289.1	12-06-1993 1500 DW
Cation/Anion Balance	0.50	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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Member of the SGS Group (Société Générale de Surveillance)

March 24, 1993

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

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled February 22, 1993

Date received February 23, 1993

DH-2
Rec'd 1630 hr.
Sampled 1403 hr.

Analysis report no. 59-12897

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	2	1	mg/l $CaCO_3$	EPA 305.1	03-04-1993 10:20 LS
Alkalinity, Bicarbonate	344	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Alkalinity, Total	282	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Aluminum	0.00	.5	mg/l	EPA 202.1	03-08-1993 12:45 ED
Anions	6.15	----	meq/l	---------	---------- ----- --
Arsenic	0.003	.002	mg/l	EPA 206.2	03-22-1993 08:55 ED
Barium	0.00	.03	mg/l	EPA 208.1	03-08-1993 12:45 ED
Boron	0.11	.01	mg/l	EPA 212.3	03-09-1993 10:00 LM
Cadmium	0.001	.00	mg/l	EPA 213.2	03-17-1993 08:15 ED
Calcium	70.4	.1	mg/l	EPA 215.1	03-04-1993 13:30 ED
Cations	6.66	----	meq/l	---------	---------- ----- --
Chloride	0.8	.1	mg/l	EPA 325.3	03-08-1993 08:00 LM
Chromium	0.00	.001	mg/l	EPA 218.2	03-19-1993 09:56 ED
Copper	0.000	.01	mg/l	EPA 220.1	03-05-1993 10:00 ED
Fluoride	0.15	.01	mg/l	EPA 340.2	02-24-1993 09:00 LS
Hardness, Total	316	1	mg/l $CaCO_3$	---------	03-04-1993 13:30 ED
Iron	0.51	.02	mg/l	EPA 236.1	03-05-1993 08:40 ED
Iron, Dissolved	0.41	.02	mg/l	EPA 236.1	03-05-1993 08:40 ED
Lead	0.000	.001	mg/l	EPA 239.2	03-08-1993 14:20 ED
Magnesium	34.00	.01	mg/l	EPA 242.1	03-04-1993 13:30 ED
Manganese	0.09	.01	mg/l	EPA 243.1	03-05-1993 08:40 ED
Mercury	0.900	.002	mg/l	EPA 245.1	03-22-1993 13:55 ED
Molybdenum	0.00	.1	mg/l	EPA 246.1	03-08-1993 12:45 ED
Nickel	0.06	.02	mg/l	EPA 249.1	03-05-1993 10:00 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

March 24, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: February 22, 1993

Date received: February 23, 1993

DH-2
Rec'd 1630 hr.
Sampled 1403 hr.

Analysis report no. 59-12897

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	0.03	.01	mg/l	EPA 350.3	03-05-1993 08:30 LS
Nitrogen, Nitrate	0.03	.01	mg/l	EPA 353.3	02-19-1993 11:00 LM
Nitrogen, Nitrite	0.00	.01	mg/l	EPA 354.1	02-19-1993 11:00 LM
Oil & Grease	0.0	1	mg/l	EPA 413.1	03-03-1993 08:00 LM
Phosphorus, Total	0.00	.01	mg/l	EPA 365.2	03-01-1993 09:00 LM
Potassium	0.00	.01	mg/l	EPA 258.1	03-04-1993 13:30 ED
Selenium	0.022	.002	mg/l	EPA 270.2	03-22-1993 08:55 ED
Sodium	8.10	.01	mg/l	EPA 273.1	03-04-1993 13:30 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	03-01-1993 08:00 LM
Solids, Total Dissolved	356.0	.5	mg/l	EPA 160.1	02-26-1993 12:30 LM
Solids, Total Suspended	2.0	.5	mg/l	EPA 160.2	02-26-1993 12:30 LM
Sulfate	30.0	.1	mg/l	EPA 375.4	03-08-1993 08:50 LS
Sulfide	3.40	.1	mg/l	EPA 376.1	03-01-1993 08:00 LM
Zinc	0.07	.01	mg/l	EPA 289.1	03-05-1993 10:20 ED
Cation/Anion Balance	3.91	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
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TEL: (801) 653-2311
FAX: (801) 653-2436

June 18, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

Sample taken at Co-op

Sample taken by Co-op

Date sampled May 25, 1993

Date received May 26, 1993

DH-2
Rec'd 0830 hr.
Sampled 0920 hr.

NOTE: Due to lab error, Zinc bottle was unperserved.
Fluoride was not distilled.

Analysis report no. 59-13104

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	340	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	279	2	mg/l $CaCO_3$	EPA 310.1	05-26-1993 13:00 LS
Aluminum	<1.00	1	mg/l	EPA 202.1	06-15-1993 12:40 ED
Anions	6.18	----	meq/l	---------	---------- ----- --
Arsenic	<0.003	.003	mg/l	EPA 206.2	06-07-1993 14:35 ED
Barium	0.20	.2	mg/l	EPA 208.1	06-15-1993 11:50 ED
Boron	0.17	.04	mg/l	EPA 212.3	06-14-1993 15:00 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	06-04-1993 14:15 ED
Calcium	68.3	.03	mg/l	EPA 215.1	06-07-1993 09:20 ED
Cations	6.14	----	meq/l	---------	---------- ----- --
Chloride	3.9	.5	mg/l	EPA 325.3	06-03-1993 10:00 LM
Chromium	<0.0002	.0003	mg/l	EPA 218.2	06-10-1993 12:25 ED
Copper	<0.030	.03	mg/l	EPA 220.1	06-14-1993 16:55 ED
Fluoride	0.15	.02	mg/l	EPA 340.2	06-02-1993 07:30 LS
Hardness, Total	293	.03	mg/l $CaCO_3$	---------	06-07-1993 09:20 ED
Iron	0.55	.05	mg/l	EPA 236.1	06-07-1993 11:05 ED
Lead	<0.003	.003	mg/l	EPA 239.2	06-09-1993 11:05 ED
Magnesium	29.80	.007	mg/l	EPA 242.1	06-07-1993 10:00 ED
Manganese	0.08	.03	mg/l	EPA 243.1	06-07-1993 10:40 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	06-17-1993 15:30 ED
Molybdenum	<0.20	.2	mg/l	EPA 246.1	06-16-1993 11:20 ED
Nickel	<0.08	.08	mg/l	EPA 249.1	06-15-1993 10:10 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

June 18, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample Water
reported to us

Sample taken at Co-op

Sample taken by Co-op

Date sampled May 25, 1993

Date received May 26, 1993

DH-2
Rec'd 0830 hr.
Sampled 0920 hr.

NOTE: Due to lab error, Zinc bottle was unperserved.
Fluoride was not distilled.

Analysis report no. 59-13104

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	0.08	.08	mg/l	EPA 350.3	06-09-1993 10:15 LS
Nitrogen, Nitrate	0.07	.01	mg/l	EPA 353.3	05-28-1993 10:30 LM
Nitrogen, Nitrite	<0.02	.02	mg/l	EPA 354.1	05-26-1993 11:00 LM
Oil & Grease	<1.0	1	mg/l	EPA 413.1	06-11-1993 07:30 LM
Phosphorus, Total	0.005	.008	mg/l	EPA 365.2	06-09-1993 13:30 LM
Potassium	2.00	.1	mg/l	EPA 258.1	06-07-1993 12:05 ED
Selenium	<0.004	.004	mg/l	EPA 270.2	06-08-1993 13:35 ED
Sodium	5.40	.2	mg/l	EPA 273.1	06-07-1993 11:30 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	05-26-1993 14:00 LS
Solids, Total Dissolved	346.0	14	mg/l	EPA 160.1	06-02-1993 10:30 LM
Solids, Total Suspended	0.0	7	mg/l	EPA 160.2	06-02-1993 10:30 LM
Sulfate	30.0	1	mg/l	EPA 375.4	06-07-1993 10:15 LS
Sulfide	1.00	.1	mg/l	EPA 376.1	05-28-1993 14:00 LM
Zinc	<0.03	.03	mg/l	EPA 289.1	06-15-1993 09:20 ED
Cation/Anion Balance	-0.28	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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November 1, 1993

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

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-2

Kind of sample reported to us Water

Rec'd 1030 hr.
Sampled 1812 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled August 31, 1993

Date received September 3, 1993

NOTE: Fluoride not distilled. Possilbe matrix interference with Arsenic and Selenium. Nitrite holding time expired when received at Lab.

Analysis report no. 59-13483

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	330	2	mg/l	$CaCO_3$	EPA 310.1	09-14-1993 1030	LS
Alkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	09-14-1993 1030	LS
Alkalinity, Total	271	2	mg/l	$CaCO_3$	EPA 310.1	09-14-1993 1030	LS
Aluminum	<1	1	mg/l		EPA 202.1	10-28-1993 1630	ED
Anions	5.90	----	meq/l		---------	---------- -----	--
Arsenic	0.010	.003	mg/l		EPA 206.2	10-29-1993 1450	ED
Barium	<1.0	.2	mg/l		EPA 208.1	10-28-1993 1720	ED
Boron	0.08	.04	mg/l		EPA 212.3	10-28-1993 1330	LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	10-11-1993 1000	ED
Calcium	65.0	.03	mg/l		EPA 215.1	10-12-1993 1330	ED
Cations	7.20	----	meq/l		---------	---------- -----	--
Chloride	4.2	.5	mg/l		EPA 325.3	09-07-1993 1300	LM
Chromium	<0.1	.0003	mg/l		EPA 218.2	10-15-1993 0950	ED
Copper	<0.05	.03	mg/l		EPA 220.1	10-27-1993 1550	ED
Fluoride	0.21	.02	mg/l		EPA 340.2	09-13-1993 1400	LS
Hardness, Total	311.0	.03	mg/l	$CaCO_3$	---------	10-12-1993 1330	ED
Iron	2.17	.05	mg/l		EPA 236.1	10-12-1993 1700	ED
Lead	<0.200	.003	mg/l		EPA 239.2	10-15-1993 1040	ED
Magnesium	36.00	.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
Mercury	0.0003	.0002	mg/l		EPA 245.1	10-12-1993 1530	ED
Molybdenum	<0.2	.2	mg/l		EPA 246.1	10-29-1993 1105	ED
Nickel	<1.00	.08	mg/l		EPA 249.1	10-27-1993 1150	ED
Nitrogen, Ammonia	0.21	.08	mg/l		EPA 350.3	09-22-1993 0800	

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

November 1, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-2

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: August 31, 1993

Date received: September 3, 1993

Rec'd 1030 hr.
Sampled 1812 hr.

NOTE: Fluoride not distilled. Possilbe matrix interference with Arsenic and Selerium. Nitrite holding time expired when received at Lab.

Analysis report no. 59-13483

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Nitrogen, Nitrate	0.02	.01	mg/l	EPA 353.3	09-17-1993 0830	LM
Nitrogen, Nitrite	0.01	.02	mg/l	EPA 354.1	09-03-1993 1300	LM
Oil & Grease	<1	1	mg/l	EPA 413.1	09-08-1993 1310	LM
Phosphorus, Total	<0.008	.008	mg/l	EPA 365.2	09-15-1993 0720	LM
Potassium	2.0	.1	mg/l	EPA 258.1	10-13-1993 1250	ED
Selenium	0.009	.004	mg/l	EPA 270.2	10-24-1993 1610	ED
Sodium	22.9	.2	mg/l	EPA 273.1	10-18-1993 1650	ED
Solids, Total Dissolved	353	14	mg/l	EPA 160.1	09-03-1993 1130	LM
Sulfate	26	1	mg/l	EPA 375.4	09-24-1993 0800	LS
Sulfide	<0.9	.1	mg/l	EPA 376.1	09-03-1993 1515	ED
Zinc	<0.03	.03	mg/l	EPA 289.1	10-27-1993 1300	ED
Cation/Anion Balance	9.80	----	%	---------	---------- -----	--

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

December 10, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-2

Kind of sample Water
reported to us

Rec'd 1445 hr.
Sampled 0945 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE:Holding time expired when Sulfate was run.

Date sampled October 29, 1993

Date received October 29, 1993

Analysis report no. 59-13691

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
lkalinity, Bicarbonate	350	2	mg/l	$CaCO_3$	EPA 310.1	11-05-1993 0845	LS
lkalinity, Carbonate	<1	1	mg/l	$CaCO_3$	EPA 310.1	11-05-1993 0845	LS
lkalinity, Total	287	2	mg/l	$CaCO_3$	EPA 310.1	11-05-1993 0845	LS
luminum	<2	1	mg/l		EPA 202.1	12-06-1993 1330	DW
Anions	4.80	----	meq/l		---------	---------- -----	--
Arsenic	<0.010	.003	mg/l		EPA 206.2	11-23-1993 1115	DW
Boron	<0.10	.04	mg/l		EPA 212.3	12-09-1993 1530	LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125	ED
Calcium	75.0	.03	mg/l		EPA 215.1	11-08-1993 1450	ED
Cations	4.80	----	meq/l		---------	---------- -----	--
Chloride	5.0	.5	mg/l		EPA 325.3	11-22-1993 0930	LM
Conductivity	465.00	0.2	umhos/cm		EPA 120.1	11-29-1993 1500	LS
Copper	<0.20	.03	mg/l		EPA 220.1	11-09-1993 1520	ED
Hardness, Total	237.0	.03	mg/l	$CaCO_3$	---------	11-08-1993 1450	ED
Iron	0.74	.05	mg/l		EPA 236.1	11-08-1993 1315	ED
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-08-1993 0920	ED
Lead	<0.400	.003	mg/l		EPA 239.2	11-05-1993 1000	ED
Magnesium	34.00	.007	mg/l		EPA 242.1	11-08-1993 1630	ED
Manganese	0.09	.03	mg/l		EPA 243.1	11-08-1993 1100	ED
Manganese, Dissolved	<0.1	.03	mg/l		EPA 243.1	12-08-1993 1010	ED
Molybdenum	0.3	.2	mg/l		EPA 246.1	12-06-1993 1620	DW
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000	LS
Nitrogen, Nitrate	<0.10	.01	mg/l		EPA 353.3	11-10-1993 1030	LM
Nitrogen, Nitrite	0.00	.02	mg/l		EPA 354.1	10-30-1993 0920	LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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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 10, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-2

Kind of sample reported to us Water

Rec'd 1445 hr.
Sampled 0945 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Holding time expired when Sulfate was run.

Date sampled October 29, 1993

Date received October 29, 1993

Analysis report no. 59-13691

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorus, Ortho	0.006	.003	mg/l	EPA 365.2	10-30-1993 1000 LM
Potassium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315 ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400 DW
Sodium	<10.0	.2	mg/l	EPA 273.1	11-09-1993 1135 ED
Solids, Total Dissolved	290	14	mg/l	EPA 160.1	11-02-1993 0730 LM
Sulfate	28	1	mg/l	EPA 375.4	12-08-1993 0945 LS
Zinc	<0.02	.03	mg/l	EPA 289.1	12-06-1993 1500 DW
Cation/Anion Balance	-1.80	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

Original Watermarked For Your Protection

TERMS AND CONDITIONS ON REVERSE

COMMERCIAL TESTING & ENGINEERING CO.
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TEL: (801) 653-2311
FAX: (801) 653-2436

April 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample Water
reported to us

Sample taken at Co-op

Sample taken by Co-op

Date sampled February 19, 1993

Date received February 19, 1993

DH-3
Rec'd 1030 hr.
Sampled 0906 hr.

ADDED CARBONATES

Analysis report no. 59-12892

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	256	1	mg/l $CaCO_3$	EPA 310.1	03-04-1993 10:20 LS
Alkalinity, Carbonate	03-04-1993	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
Aluminum	0.00	.5	mg/l	EPA 202.1	03-08-1993 12:45 ED
Anions	5.04	----	meq/l	---------	---------- ----- --
Arsenic	0.001	.002	mg/l	EPA 206.2	03-22-1993 08:55 ED
Barium	0.00	.03	mg/l	EPA 208.1	03-08-1993 12:45 ED
Boron	0.08	.01	mg/l	EPA 212.3	03-09-1993 10:00 LM
Cadmium	0.000	.00	mg/l	EPA 213.2	03-17-1993 08:15 ED
Calcium	67.8	.1	mg/l	EPA 215.1	03-04-1993 13:30 ED
Cations	6.20	----	meq/l	---------	---------- ----- --
Chloride	4.4	.1	mg/l	EPA 325.3	03-08-1993 08:00 LM
Chromium	0.00	.001	mg/l	EPA 218.2	03-19-1993 09:56 ED
Copper	0.000	.01	mg/l	EPA 220.1	03-05-1993 10:20 ED
Fluoride	0.16	.01	mg/l	EPA 340.2	02-24-1993 09:00 LS
Hardness, Total	301	1	mg/l $CaCO_3$	---------	03-04-1993 13:30 ED
Iron	1.59	.02	mg/l	EPA 236.1	03-05-1993 08:40 ED
Iron, Dissolved	1.40	.02	mg/l	EPA 236.1	03-05-1993 08:40 ED
Lead	0.000	.001	mg/l	EPA 239.2	03-08-1993 14:20 ED
Magnesium	32.00	.01	mg/l	EPA 242.1	03-04-1993 13:30 ED
Manganese	0.37	.01	mg/l	EPA 243.1	03-05-1993 08:40 ED
Mercury	0.060	.002	mg/l	EPA 245.1	03-23-1993 13:55 ED
Molybdenum	0.00	.1	mg/l	EPA 246.1	03-08-1993 12:45 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

Original Watermarked For Your Protection

TERMS AND CONDITIONS ON REVERSE

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

April 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us Water

DH-3
Rec'd 1030 hr.
Sampled 0906 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled February 19, 1993

Date received February 19, 1993

ADDED CARBONATES

Analysis report no. 59-12892

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nickel	0.02	.02	mg/l	EPA 249.1	03-05-1993 10:20 ED
Nitrogen, Ammonia	0.05	.01	mg/l	EPA 350.3	03-05-1993 08:30 LS
Nitrogen, Nitrate	0.03	.01	mg/l	EPA 353.3	02-19-1993 11:00 LM
Nitrogen, Nitrite	0.00	.01	mg/l	EPA 354.1	02-19-1993 11:00 LM
Oil & Grease	0.6	1	mg/l	EPA 413.1	03-03-1993 08:00 LM
Phosphorus, Total	0.01	.01	mg/l	EPA 365.2	03-01-1993 09:00 LM
Potassium	0.00	.01	mg/l	EPA 258.1	03-04-1993 13:30 ED
Selenium	0.019	.002	mg/l	EPA 270.2	03-22-1993 08:55 ED
Sodium	4.30	.01	mg/l	EPA 273.1	03-04-1993 13:30 ED
Solids, Settleable	0.0	.5	mg/l	EPA 160.5	03-01-1993 08:00 LM
Solids, Total Dissolved	342.0	.5	mg/l	EPA 160.1	02-26-1993 12:30 LM
Solids, Total Suspended	8.0	.5	mg/l	EPA 160.2	02-26-1993 12:30 LM
Sulfate	44.0	.1	mg/l	EPA 375.4	03-08-1993 08:50 LS
Sulfide	1.60	.1	mg/l	EPA 376.1	03-01-1993 08:00 LM
Zinc	0.07	.01	mg/l	EPA 289.1	03-05-1993 10:20 ED
Cation/Anion Balance	9.15	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

July 9, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample reported to us: Water

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: May 28, 1993

Date received: May 28, 1993

DH-3
Rec'd 1255 hr.
Sampled 1200 hr.

NOTE: Due to fast transport time, sample was unable to chill. Fluoride was not distilled.

Analysis report no. 59-13120

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	340	2	mg/l HCO_3	EPA 310.1	06-08-1993 12:00 LS
Alkalinity, Carbonate	0	1	mg/l CO_3	EPA 310.1	06-08-1993 12:00 LS
Alkalinity, Total	279	2	mg/l $CaCO_3$	EPA 310.1	06-08-1993 12:00 LS
Aluminum	<1.00	1	mg/l	EPA 202.1	06-15-1993 12:40 ED
Anions	6.18	----	meq/l	---------	---------- ----- --
Arsenic	0.013	.003	mg/l	EPA 206.2	07-07-1993 09:50 ED
Barium	<0.20	.2	mg/l	EPA 208.1	06-15-1993 11:50 ED
Boron	0.11	.04	mg/l	EPA 212.3	06-14-1993 15:00 LM
Cadmium	<0.0002	.0002	mg/l	EPA 213.2	06-09-1993 13:10 ED
Calcium	64.6	.03	mg/l	EPA 215.1	06-14-1993 11:20 ED
Cations	5.81	----	meq/l	---------	---------- ----- --
Chloride	4.5	.5	mg/l	EPA 325.3	06-03-1993 10:00 LM
Chromium	<0.0003	.0003	mg/l	EPA 218.2	06-10-1993 12:25 ED
Copper	<0.030	.03	mg/l	EPA 220.1	06-14-1993 16:55 ED
Fluoride	0.12	.02	mg/l	EPA 340.2	06-02-1993 07:30 LS
Hardness, Total	283	.03	mg/l $CaCO_3$	---------	06-14-1993 11:20 ED
Iron	1.64	.05	mg/l	EPA 236.1	06-14-1993 09:25 ED
Iron, Dissolved	0.08	.05	mg/l	EPA 236.1	06-14-1993 09:25 ED
Magnesium	29.60	.007	mg/l	EPA 242.1	06-14-1993 11:40 ED
Manganese	0.03	.03	mg/l	EPA 243.1	06-14-1993 10:40 ED
Mercury	<0.0002	.0002	mg/l	EPA 245.1	06-17-1993 15:30 ED
Molybdenum	<0.20	.2	mg/l	EPA 246.1	06-16-1993 11:20 ED
Nickel	<0.08	.08	mg/l	EPA 249.1	06-15-1993 10:10 ED
Nitrogen, Ammonia	0.08	.08	mg/l	EPA 350.3	06-09-1993 10:15 LS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

July 9, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

Kind of sample Water
reported to us

DH-3
Rec'd 1255 hr.
Sampled 1200 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled May 28, 1993

Date received May 28, 1993

NOTE: Due to fast transport time, sample was unable to chill. Fluoride was not distilled.

Analysis report no. 59-13120

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Nitrate	0.01	.01	mg/l	EPA 353.3	05-28-1993 10:30 LM
Nitrogen, Nitrite	<0.02	.02	mg/l	EPA 354.1	05-28-1993 15:00 LM
Oil & Grease	<1.0	1	mg/l	EPA 413.1	06-11-1993 07:30 LM
Phosphorus, Total	0.01	.008	mg/l	EPA 365.2	06-09-1993 13:30 LM
Potassium	0.50	.1	mg/l	EPA 258.1	06-14-1993 12:30 ED
Selenium	0.004	.004	mg/l	EPA 270.2	07-06-1993 12:30 ED
Sodium	3.30	.2	mg/l	EPA 273.1	06-14-1993 12:10 ED
Solids, Settleable	<0.5	.5	mg/l	EPA 160.5	05-28-1993 15:00 LM
Solids, Total Dissolved	349.0	14	mg/l	EPA 160.1	06-07-1993 13:00 LS
Solids, Total Suspended	1.0	7	mg/l	EPA 160.2	06-07-1993 13:00 LS
Sulfate	29.0	1	mg/l	EPA 375.4	06-14-1993 12:40 LS
Sulfide	23.00	.9	mg/l	EPA 376.1	05-28-1993 14:00 LM
Zinc	0.06	.03	mg/l	EPA 289.1	06-15-1993 09:20 ED
Cation/Anion Balance	-3.01	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:DH-3

Kind of sample reported to us Water

Rec'd 1030 hr.
Sampled 1740 hr.

Sample taken at Co-op

NOTE:NITRATE HOLDING TIME EXPIRED WHEN RECEIVED AT LAB.

Sample taken by Co-op

Date sampled August 31, 1993

NOTE: DUE TO SPILLAGE IN LAB, METALS WERE RUN ON PLAIN BOTTLE. FLUORIDE NOT DISTILLED.

Date received September 3, 1993

Analysis report no. 59-13481

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	329	2	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220	LS
Alkalinity, Carbonate	0	1	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220	LS
Alkalinity, Total	270	2	mg/l	$CaCO_3$	EPA 310.1	09-08-1993 1220	ED
Aluminum	<1	.05	mg/l		EPA 200.7	09-15-1993 1616	SE
Anions	5.92	----	meq/l		---------	---------- -----	--
Arsenic	<0.002	.002	mg/l		EPA 206.2	09-21-1993 1015	SM
Barium	0.1	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Boron	<0.05	.01	mg/l		EPA 200.7	09-16-1993 0130	SE
Cadmium	<0.0050	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Calcium	52.0	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Cations	4.92	----	meq/l		---------	---------- -----	--
Chloride	5.3	.5	mg/l		EPA 325.3	09-07-1993 1300	LM
Chromium	<0.0	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Copper	<0.01	.005	mg/l		EPA 200.7	09-15-1993 1616	SE
Fluoride	0.17	.02	mg/l		EPA 340.2	09-13-1993 1400	LS
Hardness, Total	236.9	.03	mg/l	$CaCO_3$	---------	09-15-1993 1616	SE
Iron	0.23	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Lead	<0.050	.05	mg/l		EPA 200.7	09-15-1993 1616	SE
Magnesium	26.00	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Manganese	<0.01	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Mercury	<0.0004	.0002	mg/l		EPA 245.1	09-21-1993 1000	SM
Molybdenum	<0.1	.1	mg/l		EPA 200.7	09-15-1993 1616	SE
Nickel	0.02	.01	mg/l		EPA 200.7	09-15-1993 1616	SE
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	09-22-1993 0800	LS

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

October 14, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

ID:DH-3

Kind of sample reported to us Water

Rec'd 1030 hr.
Sampled 1740 hr.

Sample taken at Co-op

NOTE:NITRATE HOLDING TIME EXPIRED WHEN RECEIVED AT LAB.

Sample taken by Co-op

Date sampled August 31, 1993

NOTE: DUE TO SPILLAGE IN LAB, METALS WERE RUN ON PLAIN BOTTLE. FLUORIDE NOT DISTILLED.

Date received September 3, 1993

Analysis report no. 59-13481

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Nitrogen, Nitrate	0.03	.01	mg/l	EPA 353.3	09-17-1993 0830	LM
Nitrogen, Nitrite	0.01	.02	mg/l	EPA 354.1	09-03-1993 1300	LM
Oil & Grease	<1	1	mg/l	EPA 413.1	09-08-1993 1310	LM
Phosphorus, Total	<0.008	.008	mg/l	EPA 365.2	09-15-1993 0720	LM
Potassium	1.9	.1	mg/l	EPA 200.7	09-15-1993 1616	SE
Selenium	<0.002	.002	mg/l	EPA 270.2	09-20-1993 1900	SM
Sodium	3.3	.1	mg/l	EPA 200.7	09-15-1993 1616	SE
Solids, Total Dissolved	317	14	mg/l	EPA 160.1	09-03-1993 1130	LM
Sulfate	24	1	mg/l	EPA 375.4	09-24-1993 0800	LS
Sulfide	<0.9	.1	mg/l	EPA 376.1	09-03-1993 1515	ED
Zinc	<0.01	.005	mg/l	EPA 200.7	09-15-1993 1616	SE
Cation/Anion Balance	-9.16	----	%	---------	---------- -----	--

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

December 9, 1993

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-3S

Kind of sample reported to us Water

Rec'd 1200 hr.
Sampled 1210 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Holding times expired when Sulfate and TDS were run.

Date sampled October 21, 1993

Date received October 22, 1993

Analysis report no. 59-13661

Parameter	Result	MDL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	355	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	291	2	mg/l	$CaCO_3$	EPA 310.1	10-28-1993 1850	ED
Aluminum	<2	1	mg/l		EPA 202.1	12-06-1993 1330	DW
Anions	6.30	----	meq/l		---------	---------- -----	--
Arsenic	0.020	.003	mg/l		EPA 206.2	11-23-1993 1115	DW\
Boron	0.10	.04	mg/l		EPA 212.3	12-07-1993 1400	LM
Cadmium	<0.0200	.0002	mg/l		EPA 213.2	11-05-1993 1125	ED
Calcium	84.0	.03	mg/l		EPA 215.1	11-08-1993 1450	ED
Cations	7.30	----	meq/l		---------	---------- -----	--
Chloride	5.0	.5	mg/l		EPA 325.3	11-19-1993 1000	LM
Conductivity	582.00	0.2	umhos/cm		EPA 120.1	10-28-1993 0945	ED
Copper	<0.20	.03	mg/l		EPA 220.1	11-09-1993 1520	ED
Hardness, Total	366.0	.03	mg/l	$CaCO_3$	---------	11-08-1993 1450	ED
Iron	1.62	.05	mg/l		EPA 236.1	11-08-1993 1315	ED
Iron, Dissolved	<0.20	.05	mg/l		EPA 236.1	12-01-1993 1500	DW
Lead	<0.400	.003	mg/l		EPA 239.2	11-05-1993 1000	ED
Magnesium	38.00	.007	mg/l		EPA 242.1	11-08-1993 1630	ED
Manganese	0.07	.03	mg/l		EPA 243.1	11-08-1993 1100	ED
Manganese, Dissolved	<0.1	.03	mg/l		EPA 243.1	12-02-1993 0830	DW
Molybdenum	<0.2	.2	mg/l		EPA 246.1	12-06-1993 1620	DW
Nitrogen, Ammonia	<0.08	.08	mg/l		EPA 350.3	11-08-1993 1000	LS
Nitrogen, Nitrate	<0.10	.01	mg/l		EPA 353.3	10-23-1993 0955	LM
Nitrogen, Nitrite	0.01	.02	mg/l		EPA 354.1	10-23-1993 0935	LM

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

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-3S

Kind of sample reported to us Water

Rec'd 1200 hr.
Sampled 1210 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Holding times expired when Sulfate and TDS were run.

Date sampled October 21, 1993

Date received October 22, 1993

Analysis report no. 59-13661

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorus, Ortho	0.001	.003	mg/l	EPA 365.2	10-23-1993 0930 LM
Potassium	<10.0	.1	mg/l	EPA 258.1	11-09-1993 1315 ED
Selenium	<0.010	.004	mg/l	EPA 270.2	12-02-1993 1400 ED
Sodium	<10.0	.2	mg/l	EPA 273.1	11-09-1993 1135 ED
Solids, Total Dissolved	317	14	mg/l	EPA 160.1	10-29-1993 0730 LM
Sulfate	24	1	mg/l	EPA 375.4	11-30-1993 1000 LS
Zinc	<0.02	.03	mg/l	EPA 289.1	12-06-1993 1500 DW
Cation/Anion Balance	7.30	----	%	---------	---------- ----- --

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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February 28, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-4

Kind of sample reported to us Water

Rec'd 1310 hr.
Sampled No Sample Time or Date Given

Sample taken at Co-op

Sample taken by Co-op

Date sampled ------

Date received February 16, 1994

Analysis report no. 59-13903

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	345	1	mg/l as HCO_3	SM4500-CO_2-D	02-21-1994 1330 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM4500-CO_2-D	02-21-1994 1330 LS
Alkalinity, Total	283	1	mg/l as $CaCO_3$	EPA 310.1	02-21-1994 1330 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	02-22-1994 1400 DW
Anions	6.40	----	meq/l	---------	---------- ----- --
Arsenic, Total	<0.01	0.01	mg/l	EPA 206.2	02-24-1994 1630 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	02-23-1994 1600 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	02-22-1994 1630 DW
Calcium, Dissolved	73	1	mg/l	EPA 215.1	02-22-1994 1000 DW
Cations	6.40	----	meq/l	---------	---------- ----- --
Chloride	3	1	mg/l	SM4500-Cl-B	02-21-1994 1430 LS
Conductivity	555	1	umhos/cm	SM2510-B	02-24-1994 0940 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	02-23-1994 0730 DW
Hardness, Total	314	1	mg/l as $CaCO_3$	SM2340-B	02-22-1994 1000 DW
Iron, Total	0.4	0.2	mg/l	EPA 236.1	02-17-1994 1430 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	02-21-1994 1630 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	02-23-1994 0900 DW
Magnesium, Dissolved	32	1	mg/l	EPA 242.1	02-22-1994 1130 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	02-17-1994 1500 DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	02-22-1994 0730 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	02-22-1994 1430 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	02-18-1994 0945 ED
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l	EPA 353.3	02-16-1994 1330 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	02-16-1994 1510 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

February 28, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-4

Kind of sample reported to us Water

Rec'd 1310 hr.
Sampled No Sample Time or Date Given

Sample taken at Co-op

Sample taken by Co-op

Date sampled ------

Date received February 16, 1994

Analysis report no. 59-13903

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	02-17-1994 1130 LM
Potassium, Dissolved	2	2	mg/l	EPA 258.1	02-21-1994 1700 DW
Selenium, Total	<0.01	0.01	mg/l	EPA 270.2	02-24-1994 1300 DW
Sodium, Dissolved	4	1	mg/l	EPA 273.1	02-22-1994 0800 DW
Solids, Total Dissolved	342	10	mg/l	EPA 160.1	02-17-1994 0830 LM
Sulfate	30	1	mg/l	EPA 375.4	02-21-1994 1045 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	02-22-1994 1600 DW
Cation/Anion Balance	0.60	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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TEL: (801) 653-2311
FAX: (801) 653-2436

June 14, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-4

Kind of sample reported to us Water

Rec'd 1250 hr.
Sampled 1356 hr.

Sample taken at Co-op

Sample taken by Co-op

Date sampled May 31, 1994

Date received June 1, 1994

Analysis report no. 59-14103

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	395	1	mg/l as HCO_3	SM2320-B	06-06-1994 1055 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	06-06-1994 1055 LS
Alkalinity, Total	324	1	mg/l as $CaCO_3$	EPA 310.1	06-06-1994 1055 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	06-07-1994 1000 DW
Anions	7.20	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	06-08-1994 1130 DW
Boron, Dissolved	0.4	0.1	mg/l	EPA 212.3	06-09-1994 1130 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	06-07-1994 0900 DW
Calcium, Dissolved	68	1	mg/l	EPA 215.1	06-06-1994 1400 DW
Cations	6.00	----	meq/l	---------	---------- ----- --
Chloride	3	1	mg/l	SM4500-Cl-B	06-01-1994 1220 LS
Conductivity	593	1	umhos/cm	SM2510-B	06-02-1994 1500 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	06-07-1994 0730 DW
Hardness, Total	293	1	mg/l as $CaCO_3$	SM2340-B	06-06-1994 1400 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	06-09-1994 1015 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	06-06-1994 0830 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	06-06-1994 1700 DW
Magnesium, Dissolved	30	1	mg/l	EPA 242.1	06-06-1994 1500 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	06-09-1994 1100 DW
Manganese, Dissolved	<0.1	0.1	mg/l	EPA 243.1	06-06-1994 0715 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	06-07-1994 1100 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	06-01-1994 1330 ED
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l	EPA 353.3	06-07-1994 1600 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	06-02-1994 1005 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hunt D

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • TEL: 708-953-9300 FAX: 708-953-9308

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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 14, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-4

Kind of sample reported to us: Water

Rec'd 1250 hr.
Sampled 1356 hr.

Sample taken at: Co-op

Sample taken by: Co-op

Date sampled: May 31, 1994

Date received: June 1, 1994

Analysis report no. 59-14103

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	06-01-1994 1345	LM
Potassium, Dissolved	<2	2	mg/l	EPA 258.1	06-06-1994 1115	DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	06-08-1994 0800	DW
Sodium, Dissolved	3	1	mg/l	EPA 273.1	06-06-1994 1230	DW
Solids, Total Dissolved	350	10	mg/l	EPA 160.1	06-03-1994 0800	LM
Sulfate	30	1	mg/l	EPA 375.4	06-08-1994 1330	LS
Zinc, Dissolved	0.03	0.03	mg/l	EPA 289.1	06-07-1994 0830	DW
Cation/Anion Balance	9.10	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hart CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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

September 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-4

Kind of sample reported to us Water

Rec'd 1230 hr.
Sampled 1105 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Dissolved metals filtered at Lab.

Date sampled August 31, 1994

Date received August 31, 1994

Analysis report no. 59-14375

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	361	1	mg/l as HCO_3	SM2320-B	09-01-1994 0830 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	09-01-1994 0830 LS
Alkalinity, Total	296	1	mg/l as $CaCO_3$	EPA 310.1	09-01-1994 0830 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	09-08-1994 1530 DW
Anions	6.60	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	09-02-1994 1100 ED
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	09-14-1994 1300 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	09-08-1994 1200 DW
Calcium, Dissolved	73	5	mg/l	EPA 215.1	09-09-1994 0930 DW
Cations	6.30	----	meq/l	---------	---------- ----- --
Chloride	5	1	mg/l	SM4500-Cl-B	09-06-1994 1200 LS
Conductivity	565	1	umhos/cm	SM2510-B	09-07-1994 1015 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	09-08-1994 1200 DW
Hardness, Total	314	10	mg/l as $CaCO_3$	SM2340-B	09-09-1994 0930 DW
Iron, Total	<0.2	0.2	mg/l	EPA 236.1	09-13-1994 1030 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	09-09-1994 1430 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	09-08-1994 1100 DW
Magnesium, Dissolved	32	2	mg/l	EPA 242.1	09-09-1994 1030 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	09-13-1994 1000 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	09-09-1994 1330 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	09-09-1994 1800 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	09-08-1994 0930 ED
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l	EPA 353.3	09-08-1994 1030 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	09-01-1994 1100 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

September 15, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-4

Kind of sample reported to us Water

Rec'd 1230 hr.
Sampled 1105 hr.

Sample taken at Co-op

Sample taken by Co-op

NOTE: Dissolved metals filtered at Lab.

Date sampled August 31, 1994

Date received August 31, 1994

Analysis report no. 59-14375

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	09-01-1994 1030 LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	09-09-1994 1300 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	09-06-1994 1030 ED
Sodium, Dissolved	<5	5	mg/l	EPA 273.1	09-09-1994 1230 DW
Solids, Total Dissolved	400	10	mg/l	EPA 160.1	09-02-1994 1500 LM
Sulfate	26	1	mg/l	EPA 375.4	09-08-1994 1030 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	09-08-1994 1330 DW
Cation/Anion Balance	-2.50	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jerry Stout CD

Manager, Huntington Laboratory

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November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-4

Kind of sample reported to us Water

Rec'd 1630 hr.
Sampled 1118 hr.

Sample taken at Co-op

NOTE: Dissolved metals filtered at Lab.

Sample taken by Co-op

Date sampled October 27, 1994

Date received October 27, 1994

Analysis report no. 59-14521

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	354	1	mg/l as HCO_3	SM2320-B	10-31-1994 0810 LS
Alkalinity, Carbonate	<1	1	mg/l as CO_3	SM2320-B	10-31-1994 0810 LS
Alkalinity, Total	290	1	mg/l as $CaCO_3$	EPA 310.1	10-31-1994 0810 LS
Aluminum, Dissolved	<2	2	mg/l	EPA 202.1	11-02-1994 1600 DW
Anions	6.60	----	meq/l	---------	---------- ----- --
Arsenic, Dissolved	<0.01	0.01	mg/l	EPA 206.2	10-31-1994 1530 DW
Boron, Dissolved	0.1	0.1	mg/l	EPA 212.3	11-03-1994 1330 LM
Cadmium, Dissolved	<0.02	0.02	mg/l	EPA 213.1	11-02-1994 1730 DW
Calcium, Dissolved	70	5	mg/l	EPA 215.1	11-01-1994 1500 DW
Cations	6.30	----	meq/l	---------	---------- ----- --
Chloride	7	1	mg/l	SM4500-Cl-B	10-31-1994 0800 LS
Conductivity	591	1	umhos/cm	SM2510-B	11-01-1994 0930 ED
Copper, Dissolved	<0.2	0.2	mg/l	EPA 220.1	11-03-1994 1230 DW
Hardness, Total	302	10	mg/l as $CaCO_3$	SM2340-B	11-01-1994 1500 DW
Iron, Total	0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Iron, Dissolved	<0.2	0.2	mg/l	EPA 236.1	11-02-1994 1200 DW
Lead, Dissolved	<0.2	0.2	mg/l	EPA 239.1	11-02-1994 1700 DW
Magnesium, Dissolved	31	2	mg/l	EPA 242.1	11-02-1994 0730 DW
Manganese, Total	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Manganese, Dissolved	<0.2	0.2	mg/l	EPA 243.1	11-02-1994 1100 DW
Molybdenum, Dissolved	<0.2	0.2	mg/l	EPA 246.1	10-31-1994 1730 DW
Nitrogen, Ammonia	<0.4	0.4	mg/l	EPA 350.3	11-04-1994 0915 ED
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l	EPA 353.3	11-02-1994 0930 LM
Nitrogen, Nitrite	<0.01	0.01	mg/l	EPA 354.1	10-28-1994 0730 LM

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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

November 10, 1994

CO-OP MINE
P.O. Box 1245
Huntington UT 84528

Sample identification by
CO-OP MINE

DH-4

Kind of sample reported to us Water

Rec'd 1630 hr.
Sampled 1118 hr.

Sample taken at Co-op

NOTE: Dissolved metals filtered at Lab.

Sample taken by Co-op

Date sampled October 27, 1994

Date received October 27, 1994

Analysis report no. 59-14521

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Phosphorous, Ortho-PO_4	<0.02	0.02	mg/l	SM4500-P-E	10-28-1994 0930 LM
Potassium, Dissolved	<5	5	mg/l	EPA 258.1	11-02-1994 0900 DW
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	10-31-1994 1400 DW
Sodium, Dissolved	6	5	mg/l	EPA 273.1	11-02-1994 0830 DW
Solids, Total Dissolved	350	10	mg/l	EPA 160.1	11-01-1994 0830 LS
Sulfate	28	1	mg/l	EPA 375.4	11-02-1994 1000 LS
Zinc, Dissolved	<0.03	0.03	mg/l	EPA 289.1	11-03-1994 1300 DW
Cation/Anion Balance	-2.10	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

Appendix 7-O

BEAR CREEK STREAM ALTERATION PERMIT

Norman H. Bangerter
Governor
Dee C. Hansen
Executive Director
Robert L. Morgan
State Engineer

State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER RIGHTS

1636 West North Temple, Suite 220
Salt Lake City, Utah 84116-3156
801-538-7240

September 2, 1992

W J Owen
Co Op Mining Company
P O Box 1245
Huntington UT 84528

RE: Stream Channel Alteration Permit Number 92-93-02SA to install a 60" culvert in Bear Creek.
EXPIRATION DATE: September 2, 1993

Gentlemen:

Your application to Alter Natural Stream Number 92-93-02SA is hereby approved pursuant to the requirements of Section 73-3-29 of the Utah Code Annotated, 1953. This approval also constitutes compliance with Section 404 (e) of the Clean Water Act (33 USC 1344) pursuant to General Permit 040 issued to the State of Utah by the U.S. Army Corps of Engineers on October 15, 1987.

Work performed under this permit is subject to the following conditions:

1. Work should be accomplished during a period of low flow. Sediment introduced into stream flows during construction must be controlled to prevent increases in turbidity downstream. This can be accomplished either by diverting flows away from the construction area or by constructing sediment control structures.

2. Impacts to the stream channel and surrounding environment must be minimized. Vegetation should not be destroyed, but if some disturbance is necessary, then revegetating with native species will be required, especially replacement of woody shrubs. The channel contours and configuration must not be changed.

3. Riprap must only consist of clean, properly sized, angular rock. Riprap must be keyed deeply into the streambed to prevent undercutting. A filter should be placed behind riprap if necessary (i.e. soils are fine grained, non-cohesive, and erodible). Material such as bricks, concrete, or other demolition debris or refuse will not be allowed.

4. Wet cement is toxic to aquatic organisms, and its introduction into waters of the United States would constitute a violation of the Clean Water Act. Wet cement or concrete may not be allowed to enter stream flows. Water must be excluded from areas where concrete or cement is used until it has set. Contaminated water pumped from the construction area may not be discharged in a manner to allow it to enter flows. Equipment used during this type of work must be washed well away from the channel.

Within 30 days after the completion of this project, the State Engineer's office must be contacted for a compliance inspection. Failure to provide such notification would invalidate U. S. Army Corps of Engineers General Permit 040, thereby placing the applicant in violation of Section 404 of the Clean Water Act.

Arrangements for this compliance may be made through either of the contacts listed below:

Jim Wells — Division of Water Rights/Dam Safety
Mark Page — Regional Engineer

This Decision is subject to the provisions of Rule R655-6 of the Division of Water Rights and to Sections 63-46b-13 and 73-3-14 of the Utah Code Annotated, 1953 as amended, which provide for filing either a Request for Reconsideration with the State Engineer, or an appeal with the appropriate District Court. A Request for Reconsideration is not a prerequisite for a court appeal. A court appeal must be filed within 30 days after the date of this Decision, or if a Request for Reconsideration has been filed, within 30 days after the date the Request for Reconsideration is denied. A request for Reconsideration is considered denied when no action is taken 20 days after the Request is filed.

If you have any questions or need further clarification, please feel free to contact Jim Wells at 538-7374.

Sincerely,

Robert L. Morgan

Robert L. Morgan, P.E.
State Engineer

RLM/jw/sh

pc: Brooks Carter - Corps of Engineers
Bob Mairley - EPA
Bob Freeman - U. S. Fish & Wildlife
Jim Dykman - State History
Carolyn Wright - State Planning
Mark Page - Regional Engineer
Ken Phippen - Regional Wildlife Habitat Manager
Habitat Manager - Wildlife Resources

PERMIT APPLICATION

TO ALTER A NATURAL CHANNEL IN THE STATE OF UTAH

1 Application Number 92-93-025A

Applicant's Name (Last, First, M.I.)	Authorized Agent	Telephone No. & Area Code
Co-Op Mining Company	W. J. Owen	(801) 381-2450

Address (Street, RFD. Box Number, City, State, Zip)

P.O. Box 1245, Huntington, Utah 84528

Quarter Section(s)	Section(s)	Township(s)	Range(s) & Base
SW¼, NW¼	Sec. 25	T16S	R7E SLB&M

County	Watercourse to be altered	Drainage Area
Emery County	Bear Creek	Bear Canyon

Common Description or Address of Proposed Project

Bear Canyon Co-Op Mine

2 Nature of proposed alteration (Check applicable boxes)

- ☐ fill
- ☐ remove
- ☐ abandon
- ☐ install
- ☒ bank protection
- ☐ excavate
- ☐ construct
- ☐ realign
- ☐ maintain
- ☒ instream structure
- ☐ bridge
- ☐ riprap
- ☐ channel
- ☐ diversion works
- ☐ other _____
- ☒ culvert
- ☐ wetland
- ☐ obstruction
- ☐ watercourse
- ☐ other _____

3 Estimated Cost of Project

$ $10,000.00 to 20,000.00

4 Project Plans

Plans included? Yes Number of attachments THREE

5 Brief Explanation of Project

Install 60" Culvert, Approx. 30 linear feet, in Bear Creek. Reinforce Bank with riprap in area of a proposed sediment pond outlet.

6 Justification (Explain why this project is needed)

1. Build new facilities

7 Detrimental Effects (Anticipated changes to the water and related land resources, including unavoidable detrimental effects)

Incidental increase in disturbed area. No apparent long-term detrimental effects.

8 Alternatives (other alternatives to the proposed action)

Maintain the status quo

9 Names and addresses of adjoining property owners, lessees, etc.

COP Development Co.
3140 South Main Street
Salt Lake City, Utah 84115

10 Estimated Starting Date of Project	Estimated Completion Date of Project
July 1992	September, 1992

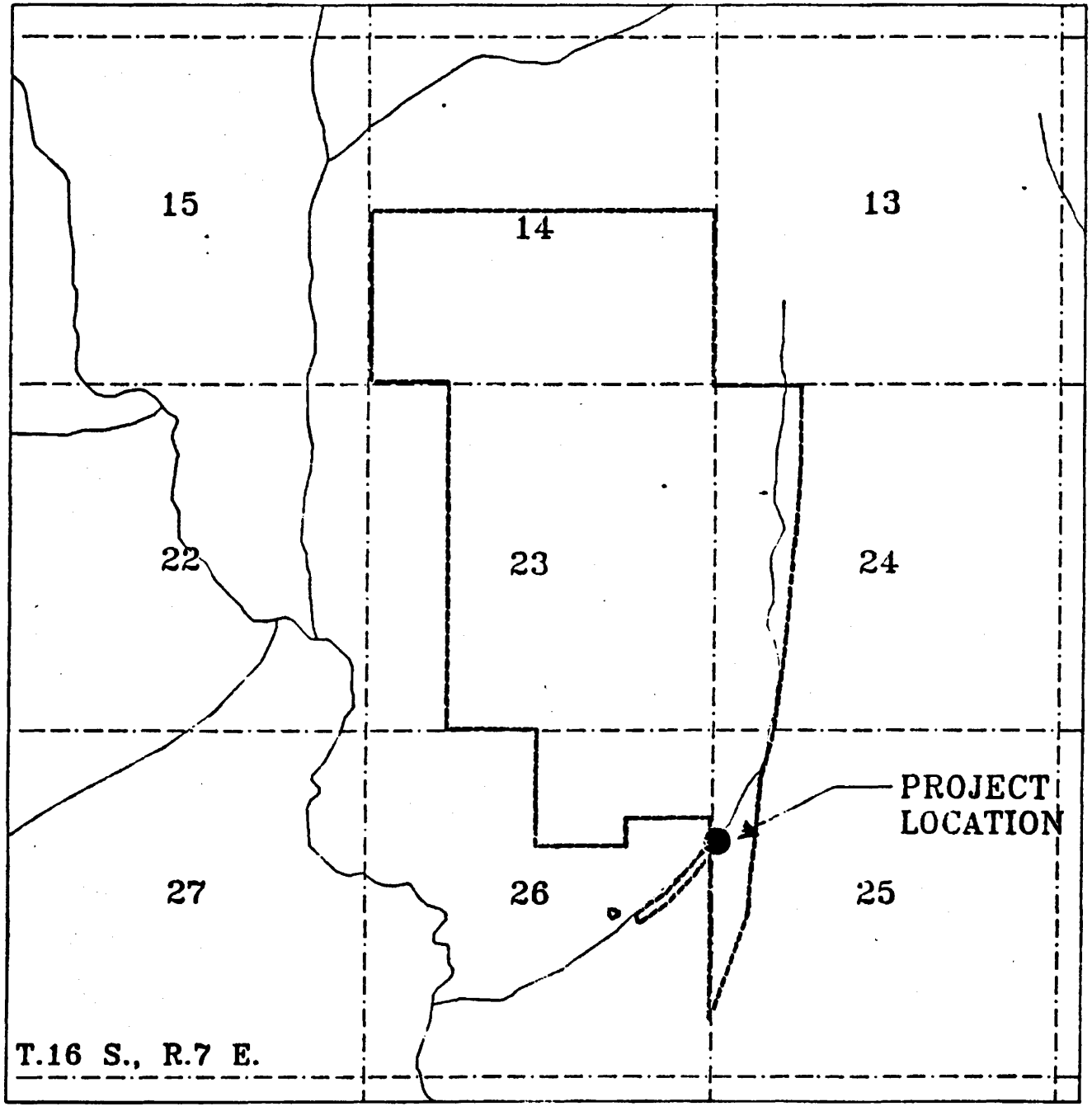
I hereby make application pursuant to 73-3-29, Utah Code Annotated, 1953, and all other supporting rules for a permit to alter a natural channel in the State of Utah. If approved, this work will be done in accordance with conditions of approval, supporting maps, plans and other information submitted with this application. The information submitted and statements made concerning this application are true and correct to the best of my knowledge.

Signature of Owner or Authorized Agent	Date
[signature]	6/2/92

FOR OFFICE USE ONLY

Recommendations of the Area Engineer Approve Reject

Area Engineer	Date



KEY

BEAR CANYON PERMIT

SECTION LINE

STREAMS

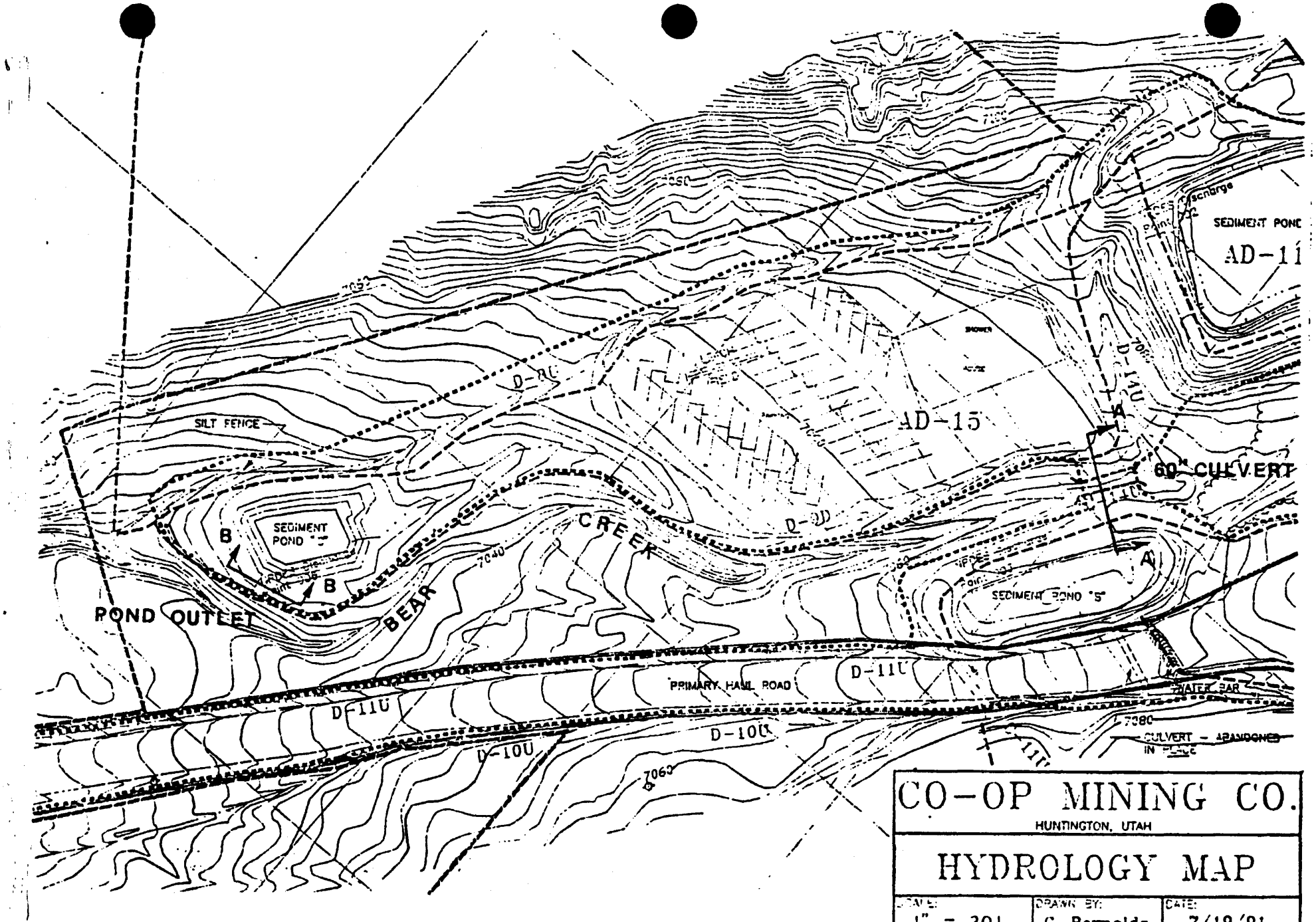
N

CO-OP MINING CO.
HUNTINGTON, UTAH

LOCATION MAP

SCALE: 1" = 2400'	DRAWN BY: C. Reynolds	DATE: 8-12-98

BEAR CANYON | PLATE



CO-OP MINING CO.

HUNTINGTON, UTAH

HYDROLOGY MAP

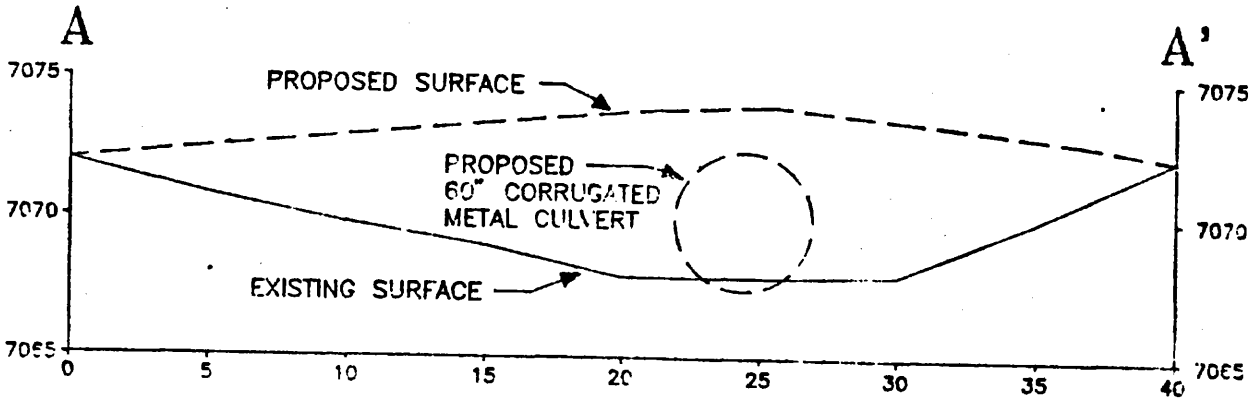
SCALE:	DRAWN BY:	DATE:
1" = 30'	C. Reynolds	7/19/91

BEAR CANYON	PLATE 7-1B

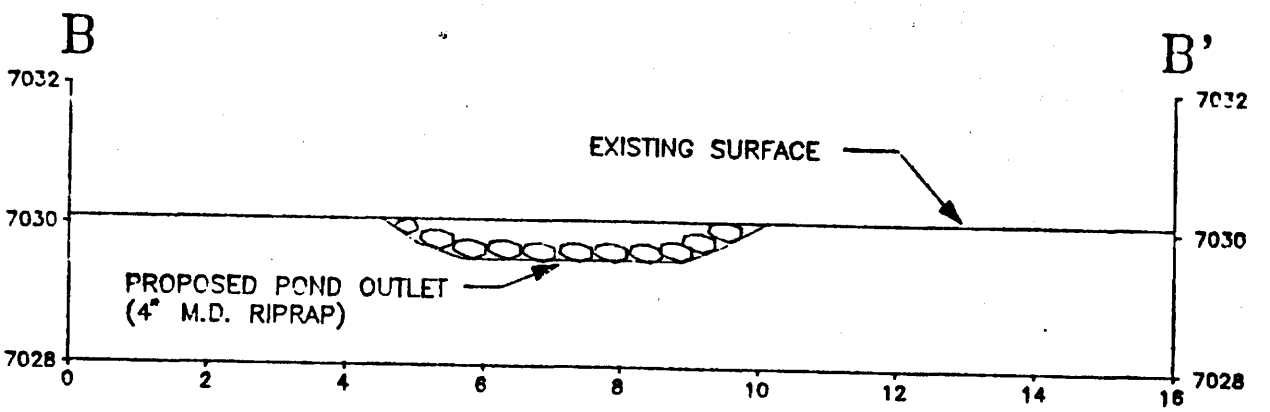
PARTIAL

CO-OP Mining Company
Bear Canyon Mine
Proposed Bear Creek Culvert
and sediment pond outlet
Cross-Sections

SECTION A-A'



SECTION B-B'



JOINT PERMIT APPLICATION FORM

U. S. ARMY CORPS OF ENGINEERS - FOR SECTIONS 404 AND 10
UTAH STATE ENGINEER'S OFFICE - FOR NATURAL STREAM CHANNELS

Application Number _____ / _____
(Assigned by:) Corps State Engineer

Applicant's Name (Last, First M.I.)	Authorized Agent	Telephone Number and Area Code
Co-Op Mining Company	Charles Reynolds	(435) 687-2450

Applicant's Address (Street, RFD, Box Number, City, State, Zip)

P. O. Box 1245, Huntington, Utah, 84528

PROJECT LOCATION

Quarter Section(s)	Section	Township	Range	Base & Meridian
A = NW¼ B = SW¼ C,D,E,F = SE¼	A = 25 B,C,D,E,F = 24	T 16 S	R 7 E	SLBM

County	Watercourse to be altered	Check one: ___Within city limits X Outside city limits
Emery	Bear Creek, Rt. Fork Drain.	List town or nearest town: Huntington

Project location or address:

Bear Canyon Mine, Bear Canyon

Brief description of project:

Project consists of placing 1 84" Culvert in the Bear Creek Channel to replace an existing bridge (Permit # 93-93-09SA). Also to culvert 5 locations in the Right Fork intermittent and ephemeral channels to provide for road crossing and pad area construction.

Purpose (justification) of project:

To expand mining operations into the right fork canyon for the purpose of mining the Wild Horse Ridge coal leases

Is this a single and complete project or is it part of a larger project, continuing project, or other related activities? If so, please describe the larger project or other related activities.

This is a single project, but it is associated with the Existing bear Canyon Mine operation.

If project includes the discharge of dredged or fill material:

Cubic yards of material:

N/A

Acreage or square footage of waters of the United States, including wetlands, affected by the project:

Source and type of fill material:

Alternatives (other ways to accomplish the project purpose):

None

Names and addresses of adjacent property owners or other individuals who may be affected by this project:

C.O.P. Coal Development Company (Surface Landowner)
3212 Sout State St.
Salt lake City, Utah 84115

List other authorizations required by Federal, state or local governments (i.e.; National Flood Insurance Program), and the status of those authorizations.

Approval from the Utah State Division of Oil, Gas & Mining (ACT/015/025)
Application currently under review. DOGM approval pending approval of Stream Alteration permit & resolution of additional technical deficiency issues.

Estimated starting date of project	Estimated completion date
7-01-00	9-01-01

(If project has already been partially or totally completed, indicate date of work. Indicate existing work on drawings)

Application is hereby made for a permit or permits to authorize the activities described herein. I certify that I am familiar with the information contained in the application, and that to the best of my knowledge and belief such information is true, complete and accurate. I further certify that I possess the authority to undertake the proposed activities or am acting as the duly authorized agent of the applicant.

Signature of applicant Charles Reynolds Date 2-3-00

I hereby certify that _____ is acting as my agent for this project.

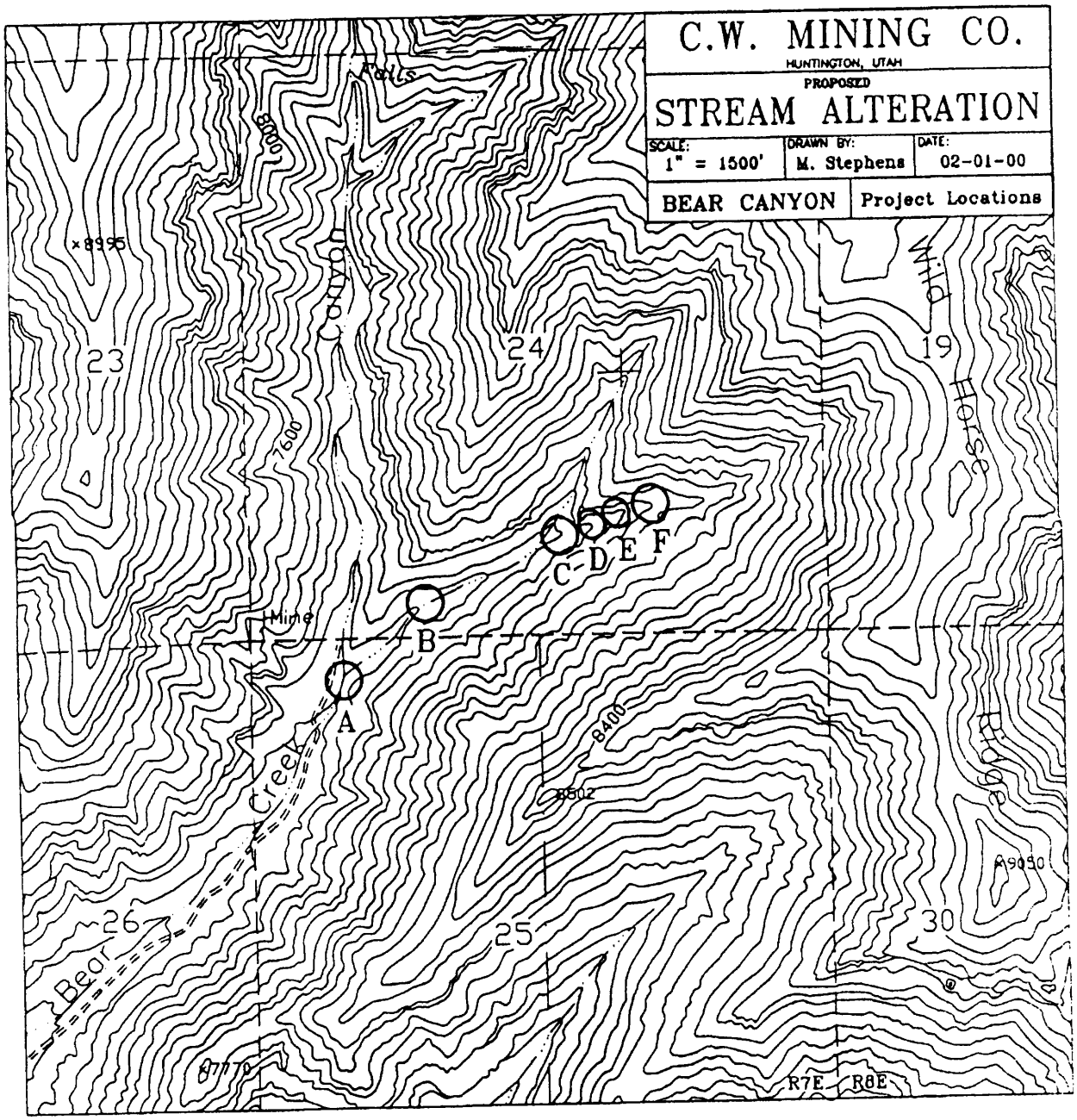
Agent's address and telephone number

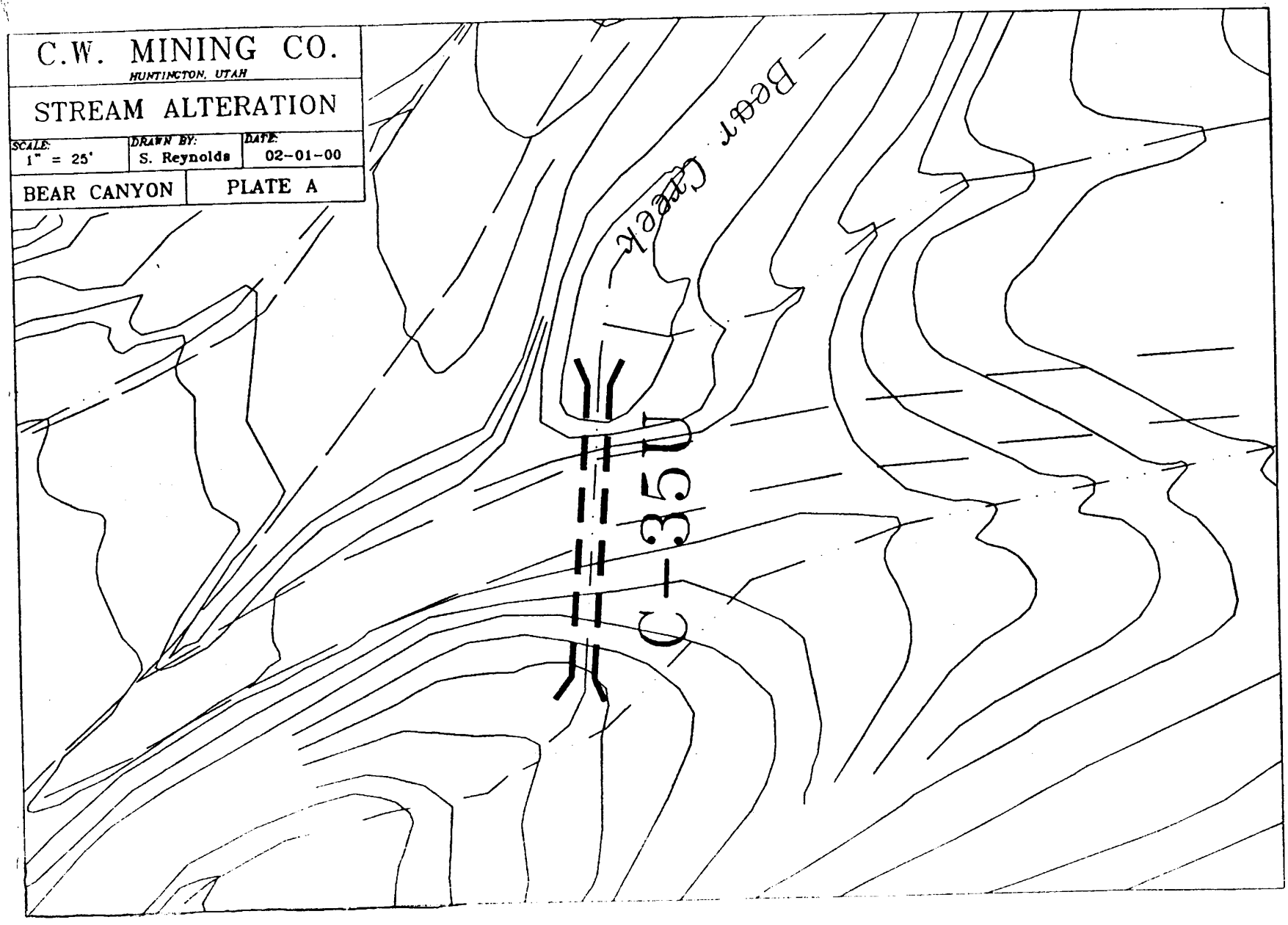
INSTRUCTIONS

Applications which do not include the following will not be processed.

For a complete application, you MUST include the following on 8 1/2 by 11 paper (for large projects, multiple sheets with a key may be used) Clear, hand-drawn plans approximately to scale are acceptable.

1. An accurate location map (USGS quadrangle map preferred)
2. A plan view of the proposed activity (as seen from above) including dimensions of work.
3. A cross-section view of the proposed activity (may use typical cross-section for large projects) including dimensions
4. For projects which include wetlands, an accurate wetland delineation must be prepared in accordance with the current method required by the Corps.


C.W. MINING CO.
HUNTINGTON, UTAH
PROPOSED
STREAM ALTERATION
SCALE: 1" = 1500'
DRAWN BY: M. Stephens
DATE: 02-01-00
BEAR CANYON
Project Locations
Falls
Canyon
Wild Horse Ridge
Mine
Bear Creek
A
B
C
D
E
F
23
24
19
26
25
30
8000
7600
8400
8502
9050
8995
7770
R7E
R8E

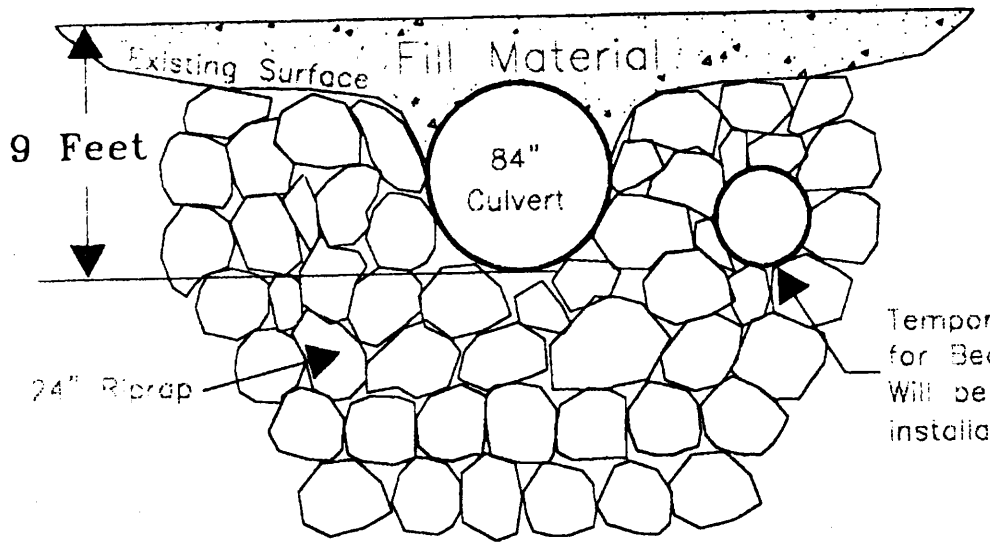

C.W. MINING CO.
HUNTINGTON, UTAH
STREAM ALTERATION
SCALE: 1" = 25'
DRAWN BY: S. Reynolds
DATE: 02-01-00
BEAR CANYON
PLATE A
Bear Creek
C-35

C.W. MINING CO.

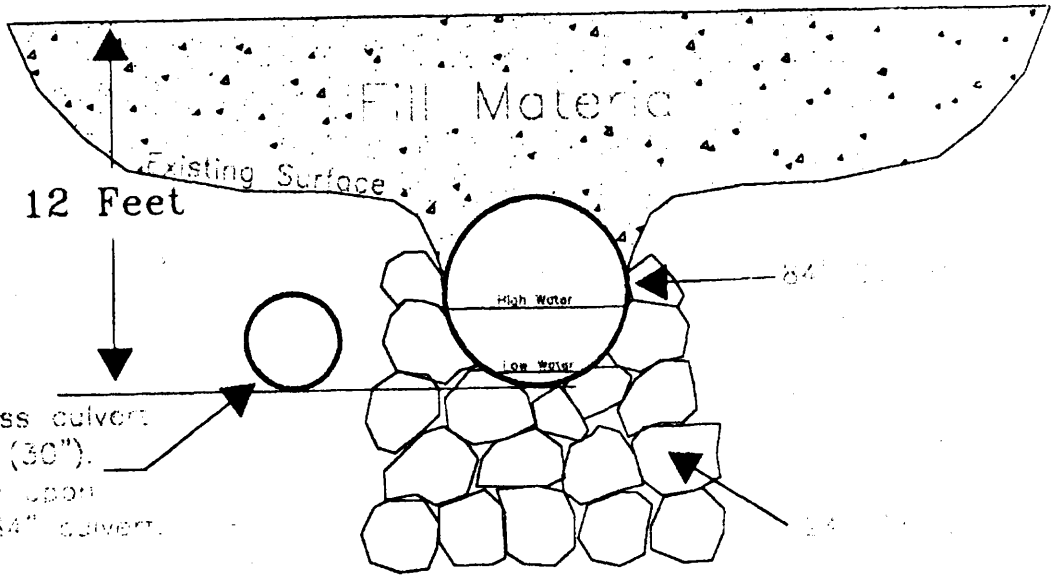
PROJECT AREA A

Not To Scale	Drawn by C. Reynolds	Date 04-14-00
BEAR CANYON	Wild Horse Ridge	

Inlet



Outlet



Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT C-35U

Comment: SEE PLATE 7-1F

Solve For Actual Depth

Given Input Data:

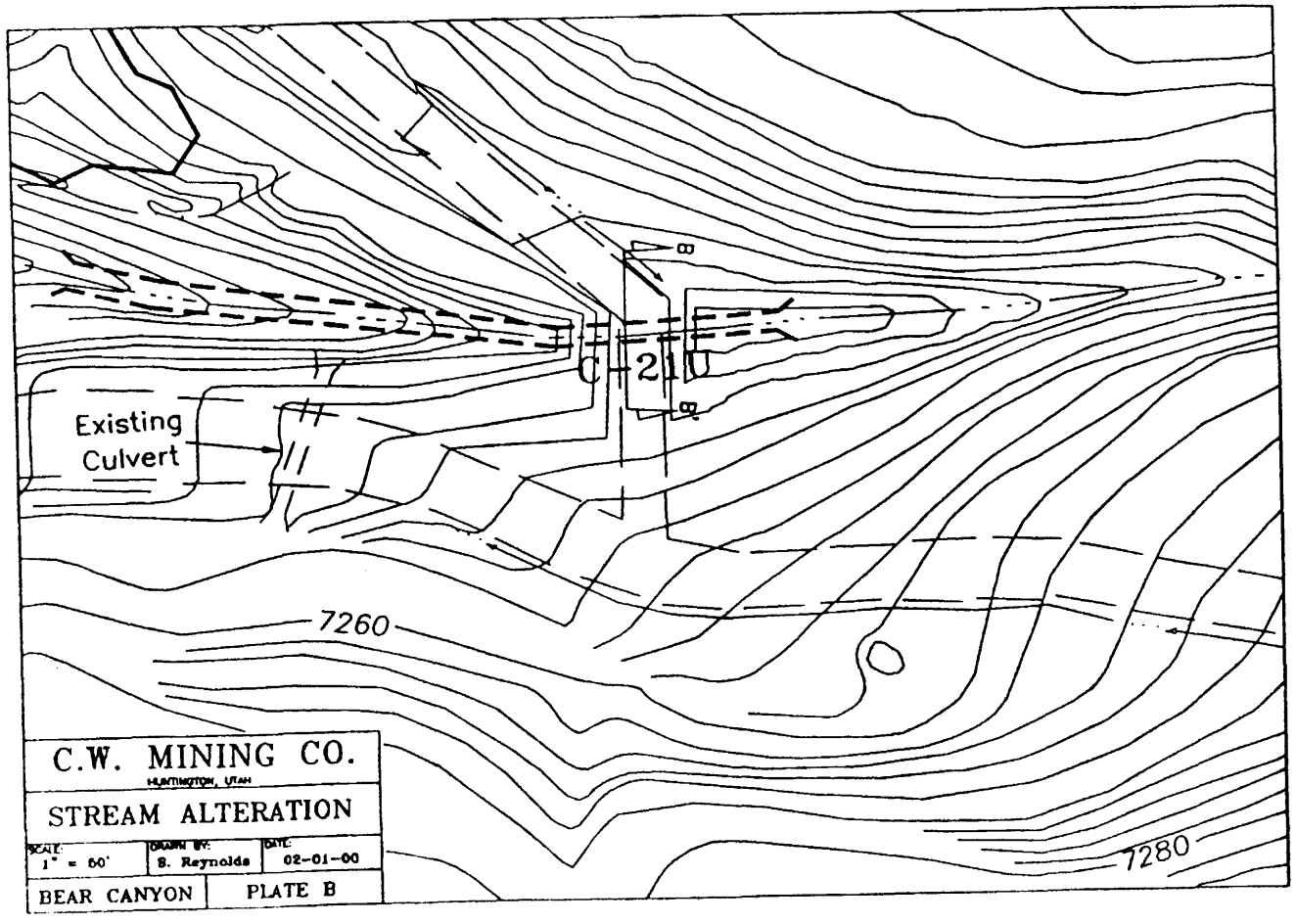
Diameter.....	5.00 ft
Slope.....	0.0600 ft/ft
Manning's n.....	0.024
Discharge.....	108.18 cfs

Computed Results:

Depth.....	1.92 ft
Velocity.....	15.56 fps
Flow Area.....	6.95 sf
Critical Depth....	2.97 ft
Critical Slope....	0.0135 ft/ft
Percent Full.....	38.43 %
Full Capacity.....	345.56 cfs
QMAX @.94D.....	371.72 cfs
Froude Number.....	2.29 (flow is Supercritical)

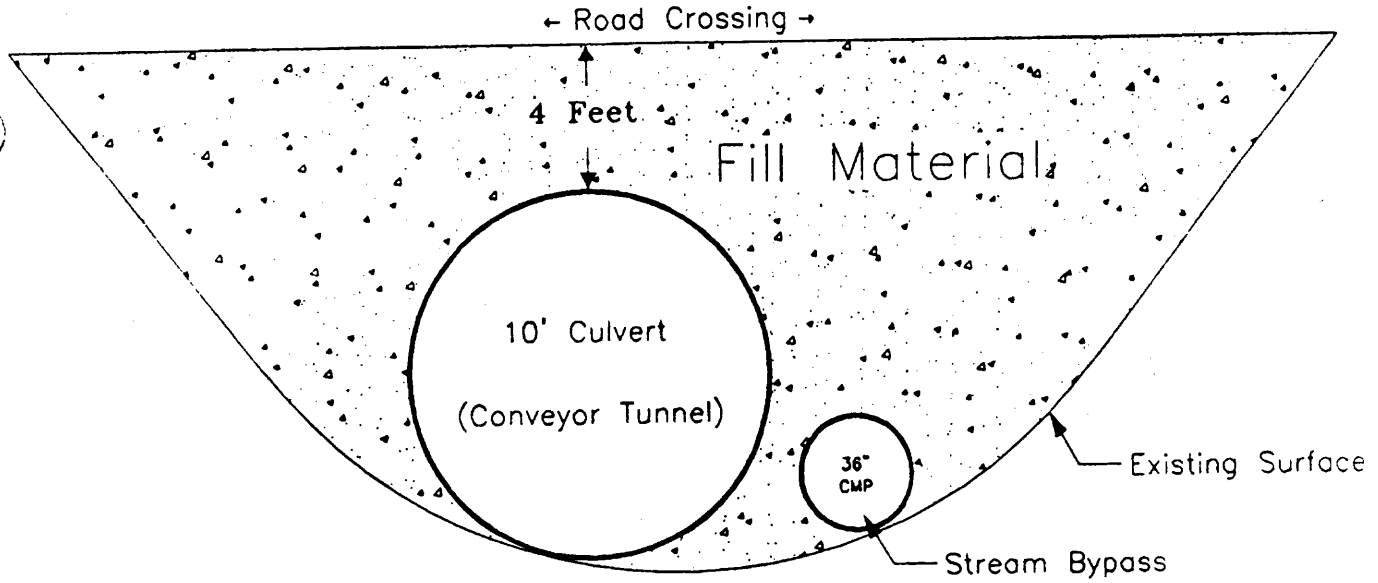
Minimum required riprap conditions = 24" m.d. riprap at outlet

Open Channel Flow Module, Version 3.3 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd. * Waterbur


Existing
Culvert
C-21D
7260
7280
C.W. MINING CO.
HUNTINGTON, UTAH
STREAM ALTERATION
SCALE: 1" = 50'
DRAWN BY: S. Reynolds
DATE: 02-01-00
BEAR CANYON
PLATE B

C.W. MINING CO. HUNTINGTON, UTAH		
PROJECT AREA B		
SCALE: Fit	DRAWN BY: M. Stephens	DATE: 02-01-00
BEAR CANYON	Wild Horse Ridge	

CROSS-SECTION VIEW B-B'



Note: Flow In Channel Is Ephemeral

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: C-21U

Comment: SEE PLATE 7-1F

Solve For Actual Depth

Given Input Data:

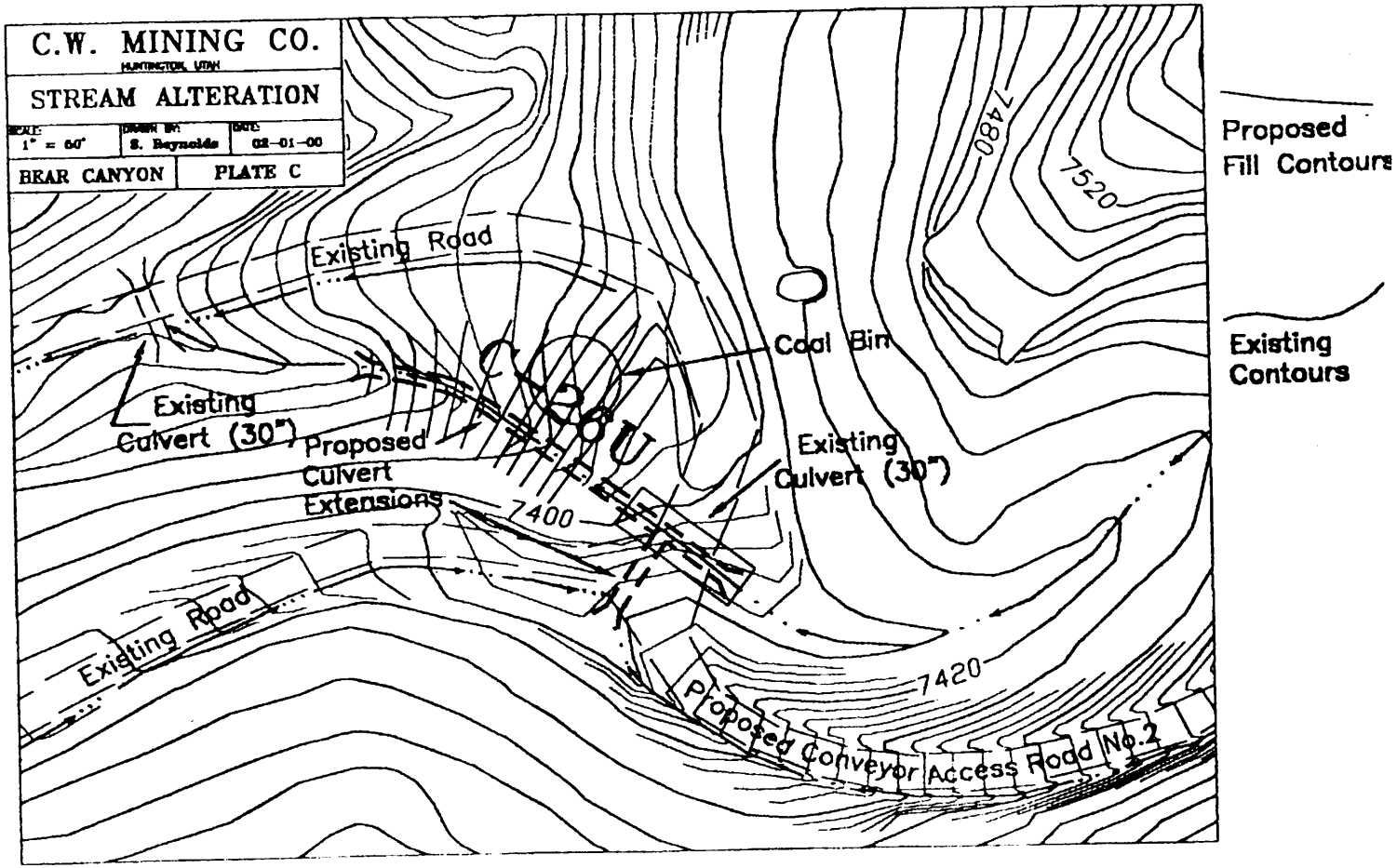
Diameter.....	3.00 ft
Slope.....	0.0600 ft/ft
Manning's n.....	0.024
Discharge.....	43.09 cfs

Computed Results:

Depth.....	1.48 ft
Velocity.....	12.44 fps
Flow Area.....	3.46 sf
Critical Depth....	2.14 ft
Critical Slope....	0.0194 ft/ft
Percent Full.....	49.23 %
Full Capacity.....	88.50 cfs
QMAX @.94D.....	95.20 cfs
Froude Number.....	2.04 (flow is Supercritical)

Minimum required riprap conditions = 12" m.d. riprap at outlet

Open Channel Flow Module, Version 3.3 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708


C.W. MINING CO.
HUNTINGTON, UTAH
STREAM ALTERATION
SCALE: 1" = 60'
DRAWN BY: S. Reynolds
DATE: 02-01-00
BEAR CANYON
PLATE C
Existing Road
Existing Culvert (30")
Proposed Culvert Extensions
Coal Bin
Existing Culvert (30")
7400
7420
7480
7520
Existing Road
Proposed Conveyor Access Road No.2
Proposed Fill Contours
Existing Contours

C.W. MINING CO.

HUNTINGTON, UTAH

PROJECT AREA C

SCALE:	DRAWN BY:	DATE:
Fit	M. Stephens	02-01-00

BEAR CANYON	Wild Horse Ridge

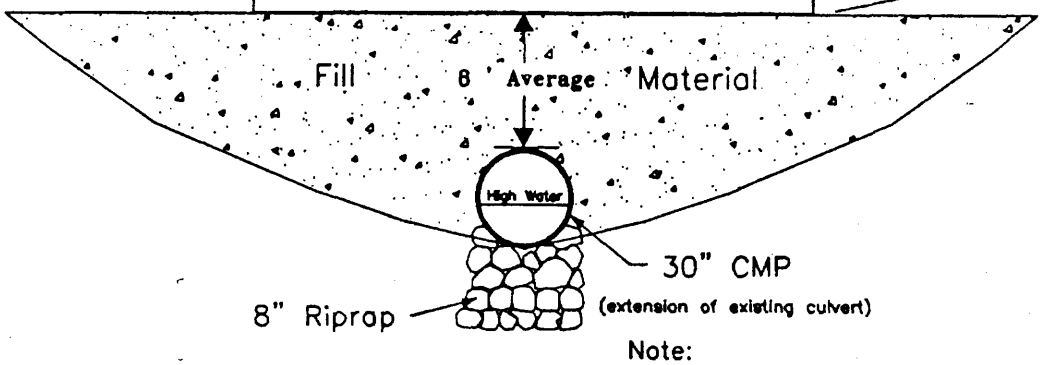
CONVEYOR

COAL

STORAGE

SILO

CONVEYOR



Note:
Flow in channel
is intermitent.

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT C-26U

Comment: SEE PLATE 7-1G

Solve For Actual Depth

Given Input Data:

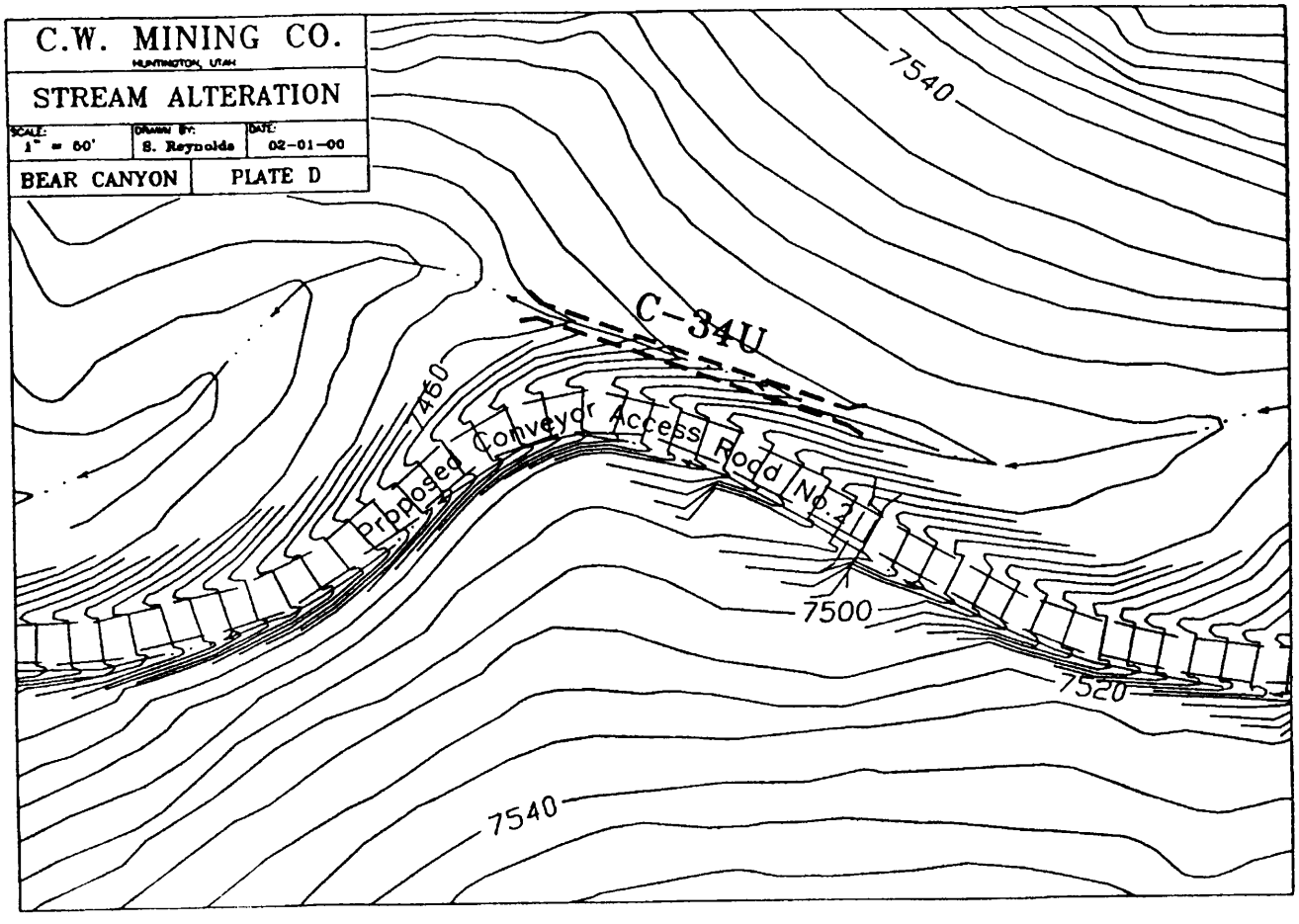
Diameter.....	2.50 ft
Slope.....	0.0600 ft/ft
Manning's n.....	0.024
Discharge.....	19.69 cfs

Computed Results:

Depth.....	1.04 ft
Velocity.....	10.19 fps
Flow Area.....	1.93 sf
Critical Depth....	1.51 ft
Critical Slope....	0.0172 ft/ft
Percent Full.....	41.59 %
Full Capacity.....	54.42 cfs
QMAX @.94D.....	58.54 cfs
Froude Number.....	2.03 (flow is Supercritical)

Minimum required riprap conditions = 8" m.d. riprap at outlet

Open Channel Flow Module, Version 3.3 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708


C.W. MINING CO.
HUNTINGTON, UTAH
STREAM ALTERATION
SCALE: 1" = 50'
DRAWN BY: S. Reynolds
DATE: 02-01-00
BEAR CANYON
PLATE D
7540
C-34U
7460
Proposed Conveyor Access Road No. 1
7500
7520
7540

C.W. MINING CO.

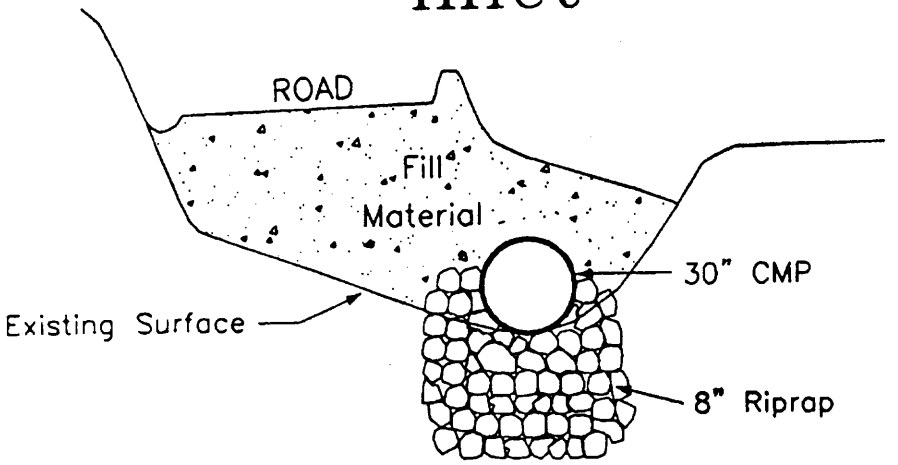
HUNTINGTON, UTAH

PROJECT AREA D

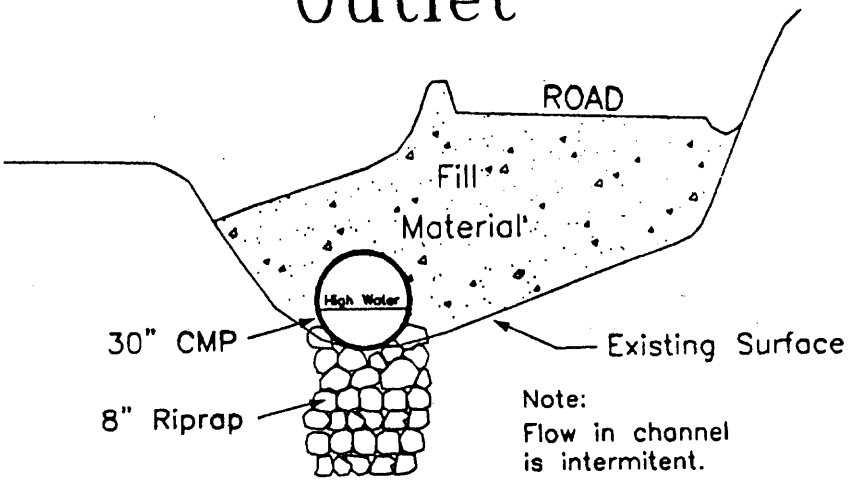
SCALE:	DRAWN BY:	DATE:
Fit	M. Stephens	02-01-00

BEAR CANYON	Wild Horse Ridge

Inlet



Outlet



Note:
Flow in channel
is intermitent.

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT C-34U

Comment: SEE PLATE 7-1G

Solve For Actual Depth

Given Input Data:

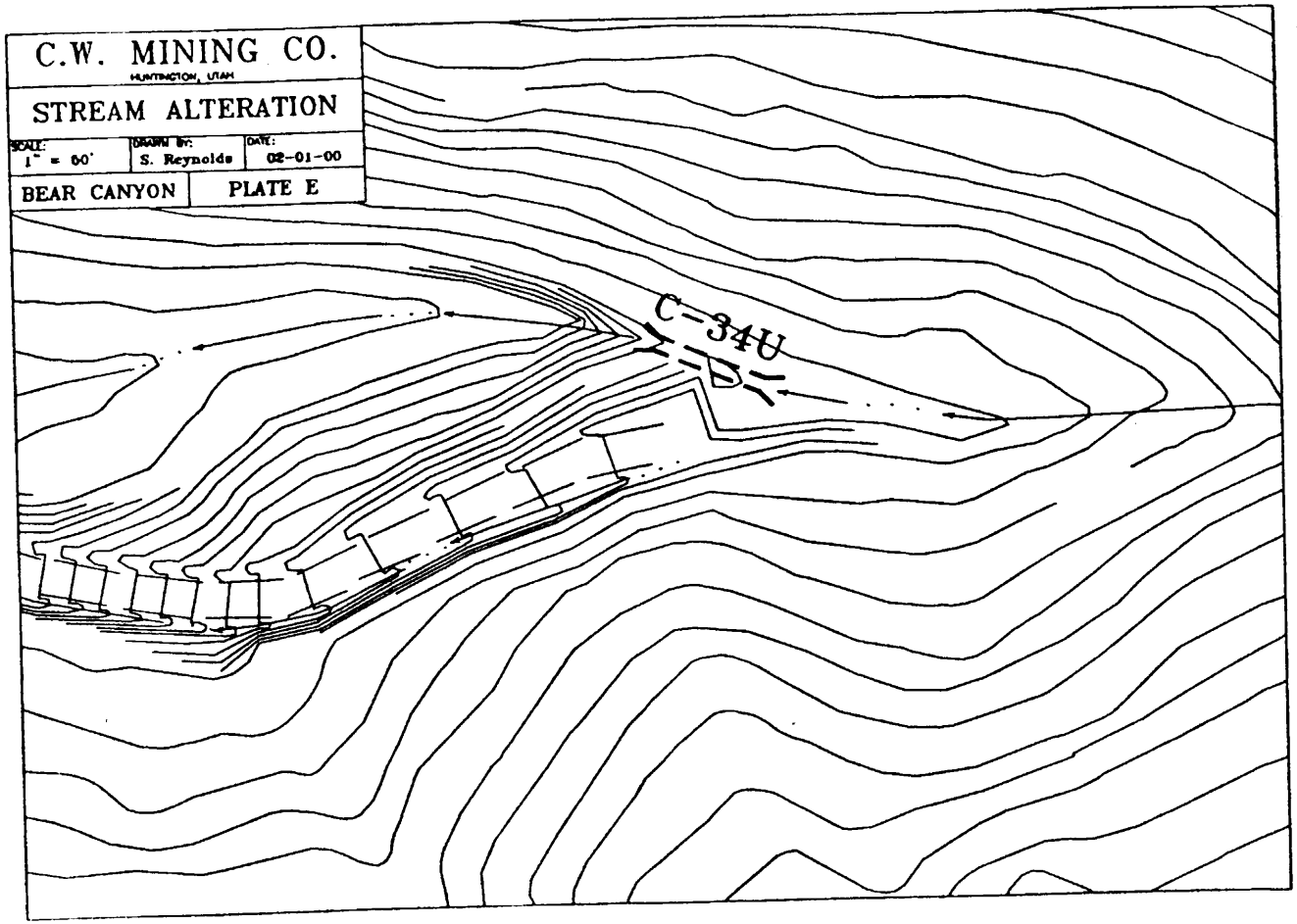
Diameter.....	2.50 ft
Slope.....	0.0600 ft/ft
Manning's n.....	0.024
Discharge.....	17.86 cfs

Computed Results:

Depth.....	0.99 ft
Velocity.....	9.93 fps
Flow Area.....	1.80 sf
Critical Depth....	1.43 ft
Critical Slope....	0.0166 ft/ft
Percent Full.....	39.43 %
Full Capacity.....	54.42 cfs
QMAX @.94D.....	58.54 cfs
Froude Number.....	2.04 (flow is Supercritical)

Minimum required riprap conditions = 8" m.d. riprap at outlet

Open Channel Flow Module, Version 3.3 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708


C.W. MINING CO.
HUNTINGTON, UTAH
STREAM ALTERATION
SCALE: 1" = 60'
DRAWN BY: S. Reynolds
DATE: 02-01-00
BEAR CANYON
PLATE E
C-34U

C.W. MINING CO.

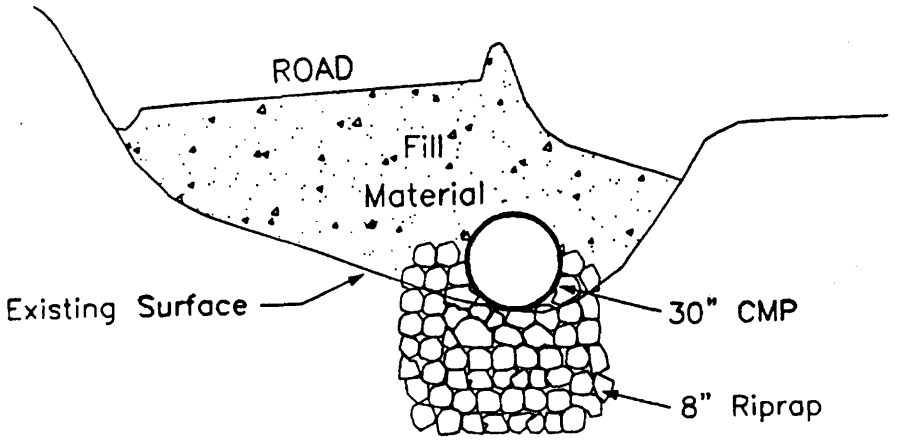
HUNTINGTON, UTAH

PROJECT AREA E

SCALE:	DRAWN BY:	DATE:
Fit	M. Stephens	02-01-00

BEAR CANYON	Wild Horse Ridge

Inlet



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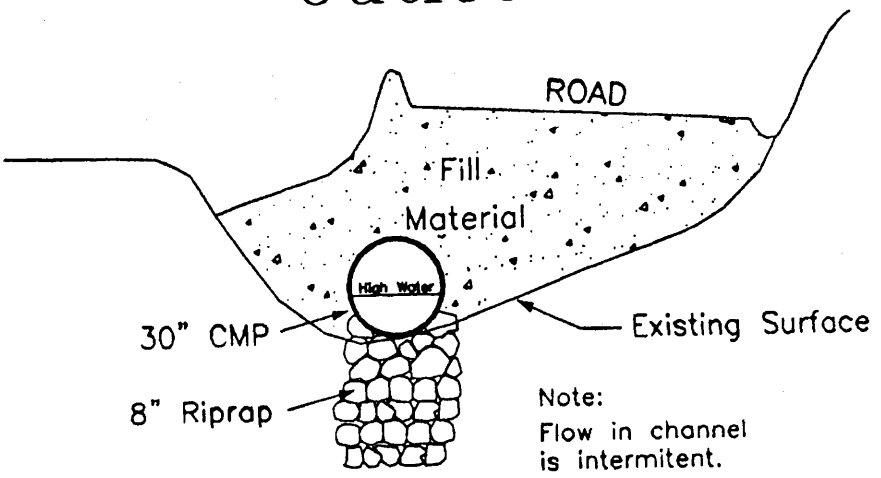


Note:
Flow in channel
is intermitent.

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT C-34U

Comment: SEE PLATE 7-1G

Solve For Actual Depth

Given Input Data:

Diameter.....	2.50 ft
Slope.....	0.0600 ft/ft
Manning's n.....	0.024
Discharge.....	17.86 cfs

Computed Results:

Depth.....	0.99 ft
Velocity.....	9.93 fps
Flow Area.....	1.80 sf
Critical Depth....	1.43 ft
Critical Slope....	0.0166 ft/ft
Percent Full.....	39.43 %
Full Capacity.....	54.42 cfs
QMAX @.94D.....	58.54 cfs
Froude Number.....	2.04 (flow is Supercritical)

Minimum required riprap conditions = 8" m.d. riprap at outlet

Open Channel Flow Module, Version 3.3 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

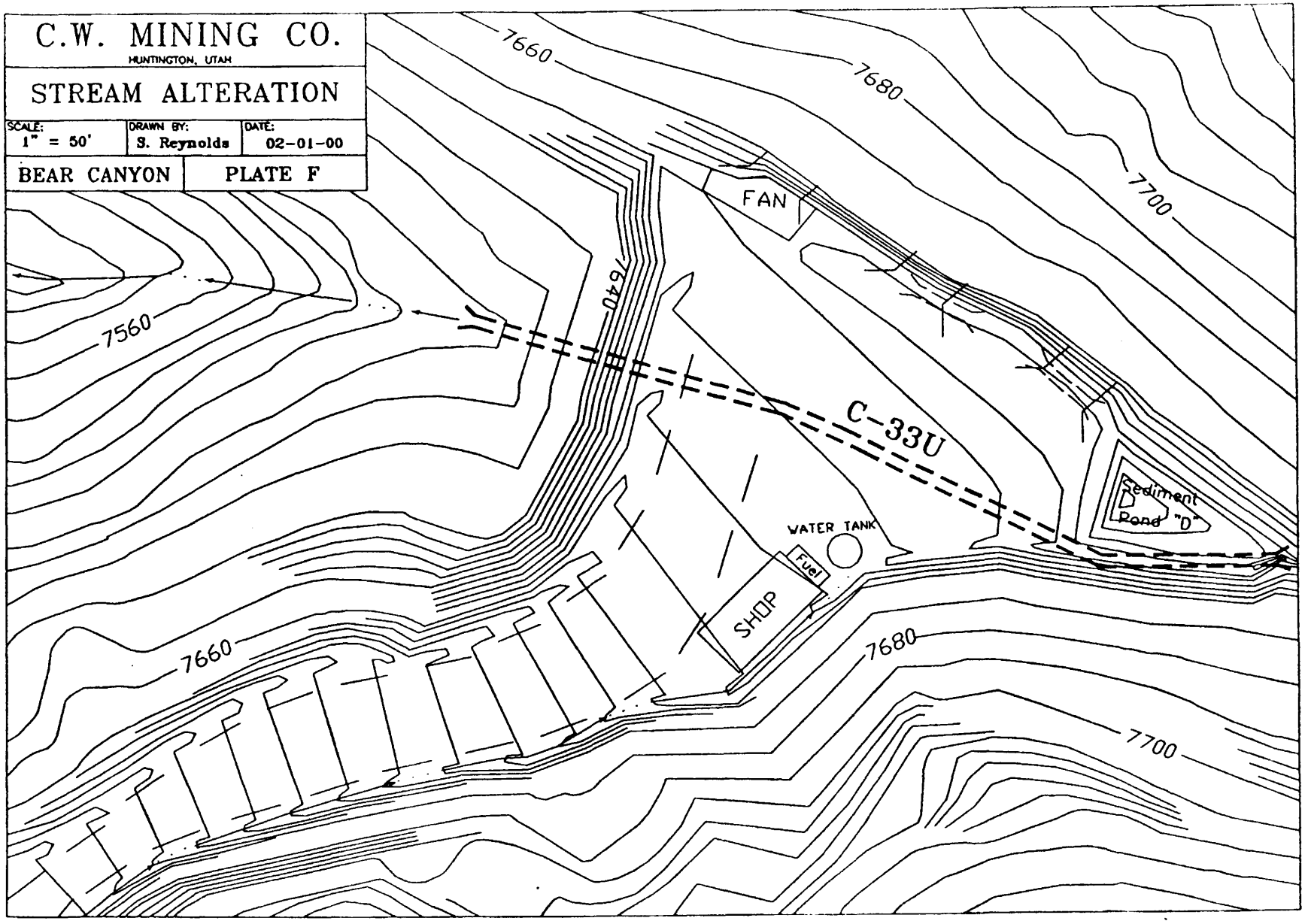
C.W. MINING CO.

HUNTINGTON, UTAH

STREAM ALTERATION

SCALE:	DRAWN BY:	DATE:
1" = 50'	S. Reynolds	02-01-00

BEAR CANYON	PLATE F



C.W. MINING CO.

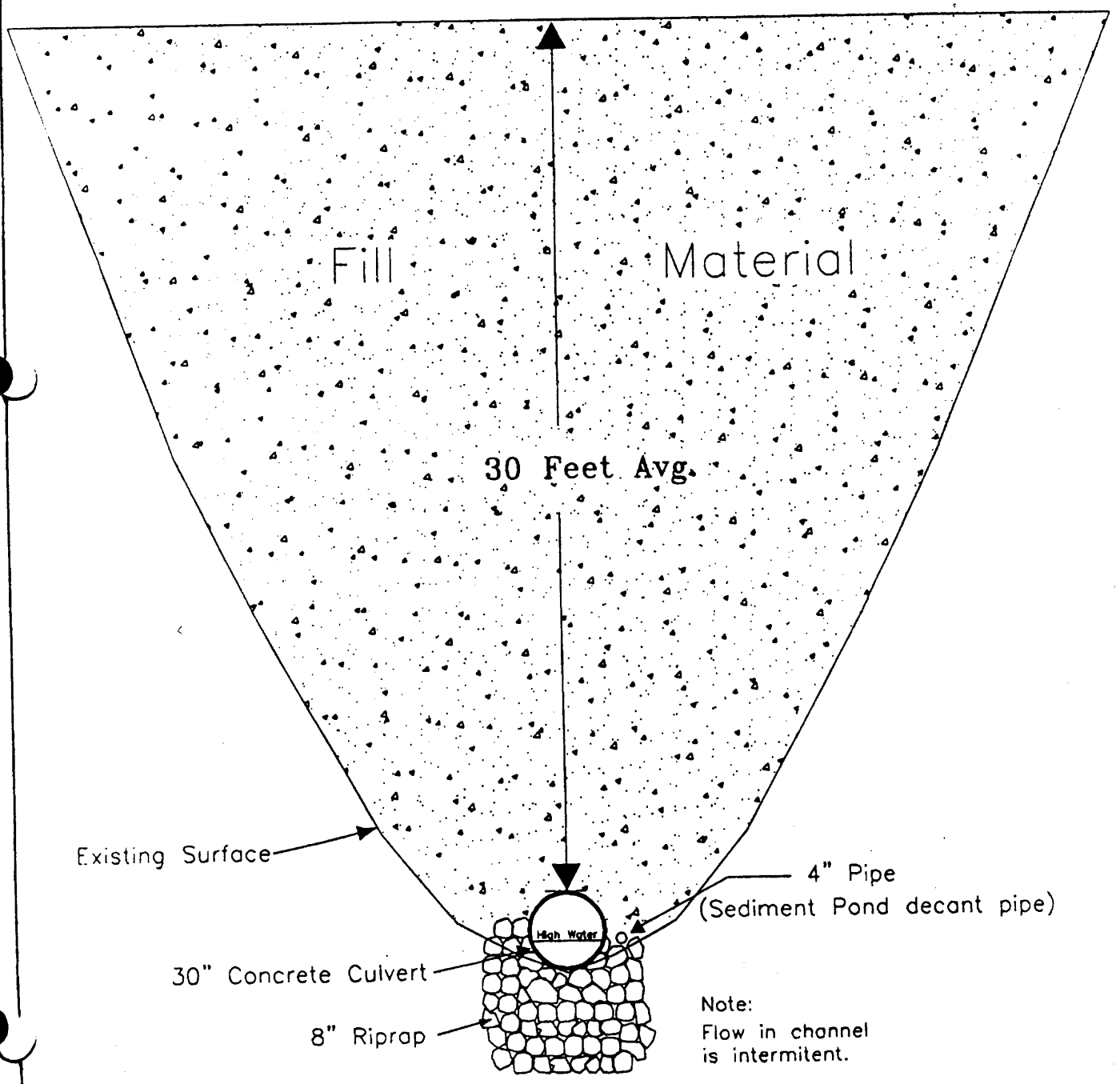
HUNTINGTON, UTAH

PROJECT AREA F

SCALE:	DRAWN BY:	DATE:
Fit	M. Stephens	02-01-00

BEAR CANYON	Wild Horse Ridge

Outlet



Note:
Flow in channel
is intermitent.

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT C-33U

Comment: SEE PLATE 7-1G

Solve For Actual Depth

Given Input Data:

Diameter.....	2.50 ft
Slope.....	0.0600 ft/ft
Manning's n.....	0.024
Discharge.....	14.42 cfs

Computed Results:

Depth.....	0.88 ft
Velocity.....	9.37 fps
Flow Area.....	1.54 sf
Critical Depth....	1.28 ft
Critical Slope....	0.0156 ft/ft
Percent Full.....	35.14 %
Full Capacity.....	54.42 cfs
QMAX @.94D.....	58.54 cfs
Froude Number.....	2.06 (flow is Supercritical)

Minimum required riprap conditions = 8" m.d. riprap at outlet

Open Channel Flow Module, Version 3.3 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER RIGHTS

Michael O. Leavitt
Governor
Kathleen Clarke
Executive Director
Robert L. Morgan
State Engineer

1594 West North Temple, Suite 220
PO Box 146300
Salt Lake City, Utah 84114-6300
801-538-7240
801-538-7467 (Fax)

April 10, 2001

Charles Reynolds
Co-op Mining Company
P.O. Box 1245
Huntington, UT 84528

RE: Stream Channel Alteration Permit Number 00-93-01SA for placement of culverts on Bear Creek and on the right fork of Bear Creek in Emery County.
EXPIRATION DATE: April 10, 2002

Your application to Alter a Natural Stream Channel Number 00-93-01SA is hereby approved pursuant to the requirements of Section 73-3-29 of the Utah Code Annotated, 1953. This approval also constitutes compliance with Section 404 (e) of the Clean Water Act (33 USC 1344) pursuant to General Permit 040 issued to the State of Utah by the U.S. Army Corps of Engineers on October 15, 1987.

Work performed under this permit is subject to the following conditions:

1. The expiration date of this approved application is April 10, 2002. The expiration date may be extended, at the State Engineer's discretion, by submitting a written request outlining the need for the extension and the reasons for the delay in completing the proposed stream alteration.

2. A copy of this approved permit must be kept on-site at any time the work under this approved permit is in progress.

3. Culverts shall be placed at locations that will minimize the possibility of washouts. Areas adjacent to meanders must be avoided as water may be directed toward the edges, rather than the center of the culvert. Culverts must be placed at GRADE and create no change in the profile of the stream bottom to avoid upstream erosion. Fill, adjacent to the culvert, must be adequately compacted to prevent piping and washout of the crossing. Particular attention should be shown to the outlet of the Bear Creek culvert.

4. Impacts to the stream channel and surrounding environment must be minimized. Vegetation should not be destroyed, but if some disturbance is necessary, then revegetating with native species will be required, especially of woody shrubs. The channel contours and configuration must not be changed except in the case of bank contouring for stabilization purposes.

5. Work must be accomplished during a period of low flow. Sediment introduced into stream flows during construction must be controlled to prevent increases in turbidity downstream. Flows must be diverted away from the construction area using a non-erodible coffer dam.

6. Excavated material and construction debris may not be wasted in any stream channel or placed in flowing waters, this will include material such as grease, oil, joint coating, or any other possible pollutant. Excess materials must be wasted at an upland site well away from any channel. Construction materials, bedding material, excavated material, etc. may not be stockpiled in riparian or channel areas.

7. Riprap must consist of only clean, properly sized, angular rock. Riprap must be keyed deeply into the stream bed to prevent undercutting. A filter shall be placed behind riprap if necessary (i.e., if soils are fine grained, non-cohesive, and/or erodible). Demolition debris or refuse will not be allowed, nor material such as bricks, concrete, asphaltic material [either natural (tar sand, oil shale, etc.) or man made].

8. Erosion control measures and revegetation success must be monitored and reported to this office prior to the compliance inspection.

9. Removal of culverts as part of the reclamation process must follow Best Management Practices.

10. Culverts must be designed to withstand depth of fill, buildings, and construction activities. Methods such as use of concrete encased pipes may need to be utilized, especially for culverts shown on plates F and C.

11. Approval of this application does not authorize trespass, easements, rights-of-way, or any other access or land use permits. It is the responsibility of the applicant to obtain any such authorizations as may be necessary for this proposal.

12. Within 30 days after the completion of this project, the State Engineer's office must be contacted for a compliance inspection. Failure to provide such notification would invalidate U.S. Army Corps of Engineers General Permit 040, thereby placing the applicant in violation of Section 404 of the Clean Water Act.

This Decision is subject to the provisions of Rule R655-6 of the Division of Water Rights and to Sections 63-46b-13 and 73-3-14 of the Utah Code Annotated, 1953 as amended, which provide for filing either a Request for Reconsideration with the State Engineer, or an appeal with the appropriate District Court. A Request for Reconsideration must be filed with the State Engineer within 20 days of the date of this decision. However, a Request for Reconsideration is not a prerequisite for a court appeal. A court appeal must be filed within 30 days after the date of this Decision, or if a Request for Reconsideration has been filed, within 30 days after the date the Request for Reconsideration is denied. A Request for Reconsideration is considered denied when no action is taken 20 days after the Request is filed.

If you have any questions or need further clarification, please contact Daren Rasmussen at 801-538-7377.

Sincerely,

Robert L. Morgan

Robert L. Morgan, P.E.
State Engineer

RLM/dr/jm

pc: Mike Schwinn - Corps of Engineers
Dave Ruiter - EPA
Field Supervisor - U.S. Fish & Wildlife
Jim Dykmann - State History
Carolyn Wright - State Planning
Mark Page - Regional Engineer
Derris Jones - Regional Wildlife Habitat Manager
Bill Bradwisch - Aquatic Habitat Coordinator

JOINT PERMIT APPLICATION FORM

U. S. ARMY CORPS OF ENGINEERS - FOR SECTIONS 404 AND 10
UTAH STATE ENGINEER'S OFFICE - FOR NATURAL STREAM CHANNELS

Application Number _____ / _____
(Assigned by:) Corps State Engineer

Applicant's Name (Last, First M.I.)	Authorized Agent	Telephone Number and Area Code
CO-OP Mining Company	Charles Reynolds	(435) 687-2450

Applicant's Address (Street, RFD, Box Number, City, State, Zip)
P.O. Box 1245 Huntington Utah, 84528

PROJECT LOCATION

Quarter Section(s)	Section	Township	Range	Base & Meridian
A,B = SW1/4 C = SE 1/4	24	T16S	R7E	SLBM

County	Watercourse to be altered	Check one: ___Within city limits ___ Outside city limits
Emery	Bear Creek, Right Fork Drain	List town or nearest town: Huntington

Project location or address:
Bear Canyon Mine, Bear Canyon

Brief description of project:
At point A the stream will be culverted for 80'. At point B&C a tower will be placed over the stream and it will be disturbed during construction

Purpose (justification) of project:
Construction of Additional Facilities

Is this a single and complete project or is it part of a larger project, continuing project, or other related activities? If so, please describe the larger project or other related activities.
This project is part of the Wild Horse Ridge Surface Construction Project.

If project includes the discharge of dredged or fill material:

Cubic yards of material: N/A

Acreage or square footage of waters of the United States, including wetlands, affected by the project:

Source and type of fill material:

Alternatives (other ways to accomplish the project purpose):

None

Names and addresses of adjacent property owners or other individuals who may be affected by this project:

C.O.P. Coal Development Co. (Surface Landowner)
3212 S. State St.
Salt Lake City, Ut. 84115

List other authorizations required by Federal, state or local governments (i.e.; National Flood Insurance Program), and the status of those authorizations.

Approval from Utah State Division of Oil, Gas & Mining (ACT/015/025)
Application is currently under review.

Estimated starting date of project	Estimated completion date
8-15-01	8-29-01

(If project has already been partially or totally completed, indicate date of work. Indicate existing work on drawings)

Application is hereby made for a permit or permits to authorize the activities described herein. I certify that I am familiar with the information contained in the application, and that to the best of my knowledge and belief such information is true, complete and accurate. I further certify that I possess the authority to undertake the proposed activities or am acting as the duly authorized agent of the applicant.

Signature of applicant	Date

I hereby certify that _____ is acting as my agent for this project.

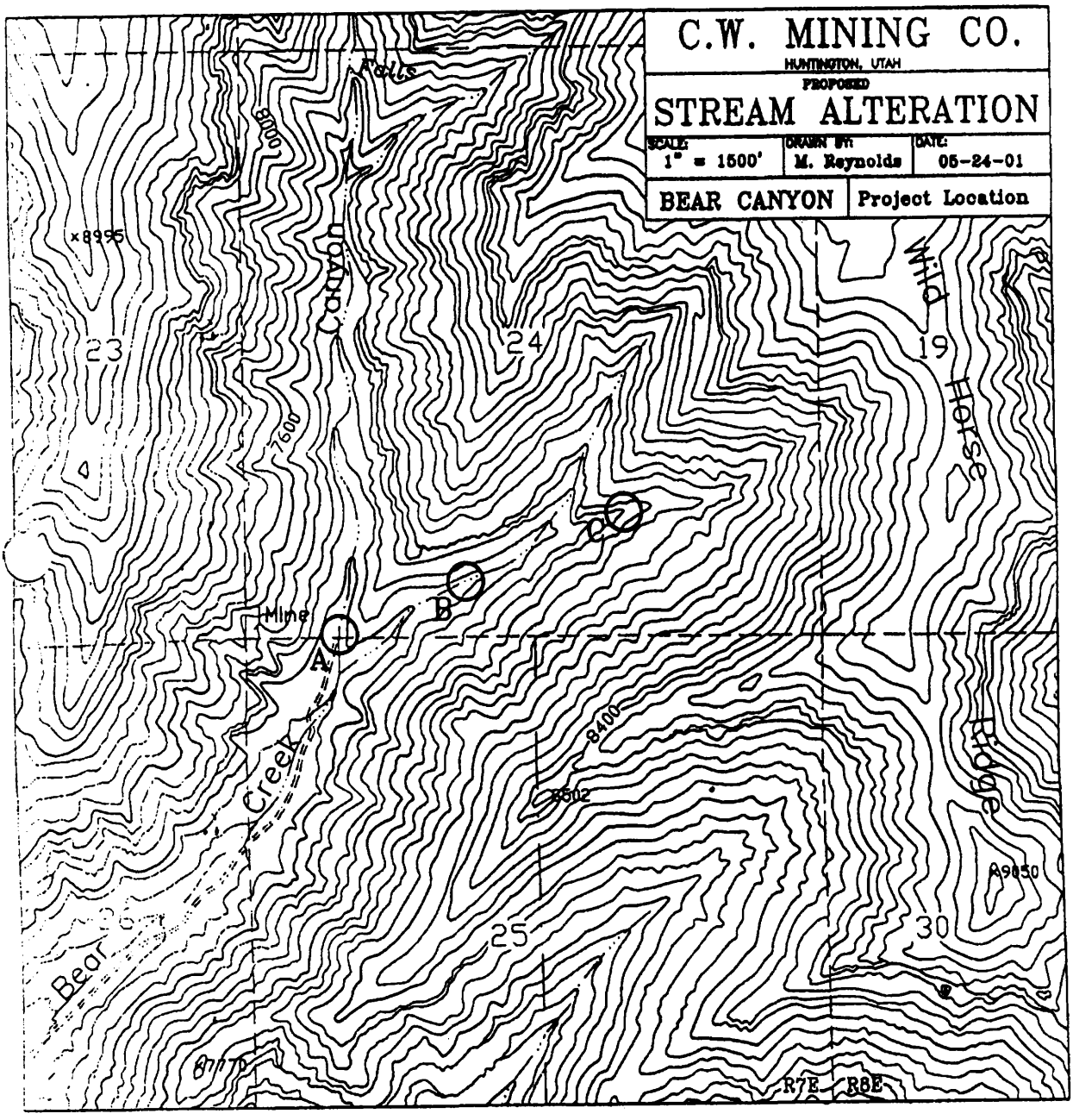
Agent's address and telephone number

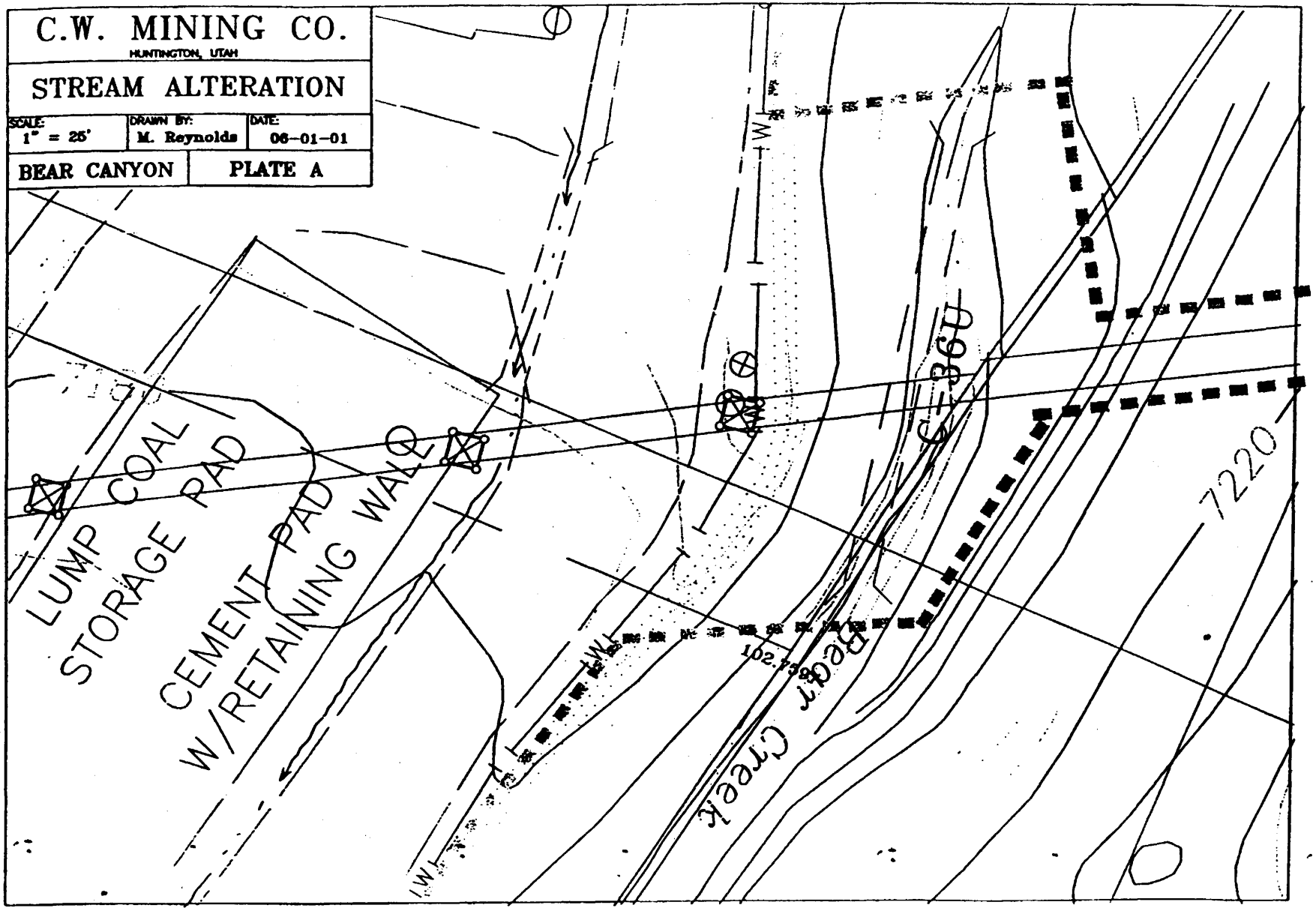
INSTRUCTIONS

Applications which do not include the following will not be processed.

For a complete application, you **MUST** include the following on **8 1/2 by 11 paper (for large projects, multiple sheets with a key may be used)** Clear, hand-drawn plans approximately to scale are acceptable.

1. An accurate location map (USGS quadrangle map preferred)
2. A plan view of the proposed activity (as seen from above) including dimensions of work.
3. A cross-section view of the proposed activity (may use typical cross-section for large projects) including dimensions
4. For projects which include wetlands, an accurate wetland delineation must be prepared in accordance with the current method required by the Corps.


C.W. MINING CO.
HUNTINGTON, UTAH
PROPOSED
STREAM ALTERATION
SCALE: 1" = 1500'
DRAWN BY: M. Reynolds
DATE: 05-24-01
BEAR CANYON
Project Location
Falls
8000
x8995
Canyon
23
24
19
Wild
Horse
7600
Mine
A
B
C
Creek
8400
8502
Ridge
x9050
25
30
Bear
R7E
R8E


C.W. MINING CO.
HUNTINGTON, UTAH
STREAM ALTERATION
SCALE: 1" = 25'
DRAWN BY: M. Reynolds
DATE: 06-01-01
BEAR CANYON
PLATE A
LUMP COAL STORAGE PAD
CEMENT PAD W/RETAINING WALL
Bear Creek
C-36U
7220
102.759

C.W. MINING CO.

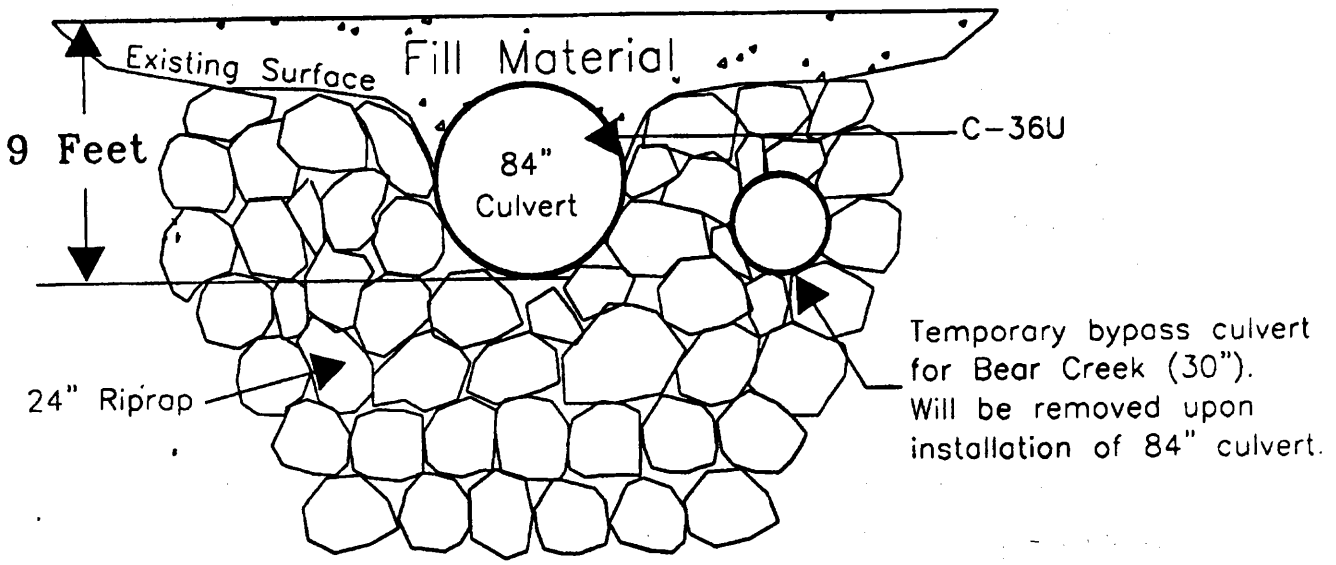
HUNTINGTON, UTAH

PROJECT AREA A

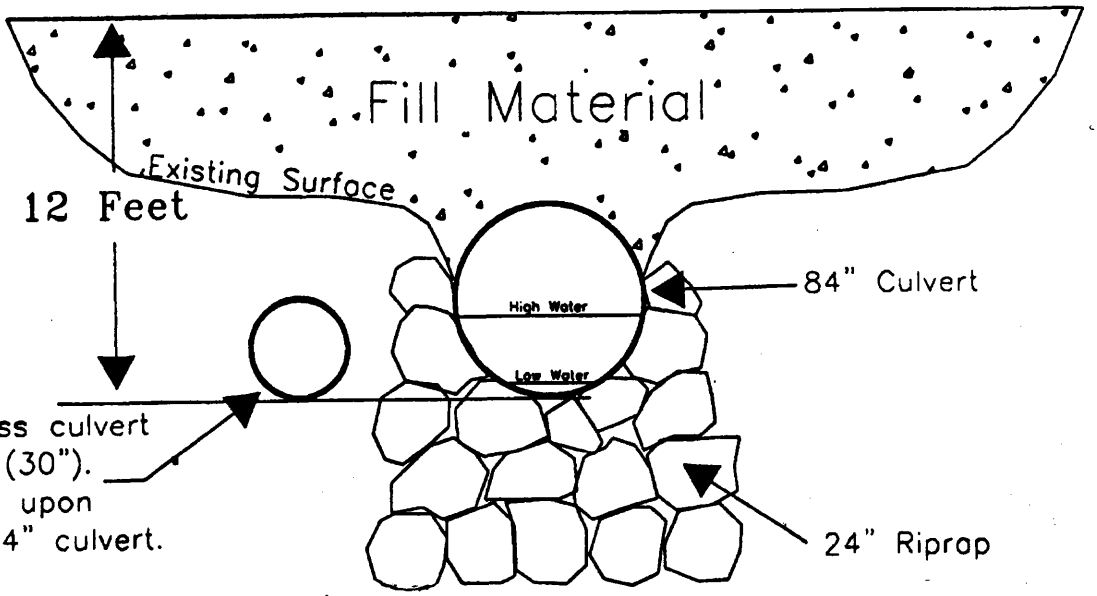
SCALE:	DRAWN BY:	DATE:
Not To Scale	M. Reynolds	05-24-01

BEAR CANYON	Bear Creek Culvert Addition

Inlet



Outlet

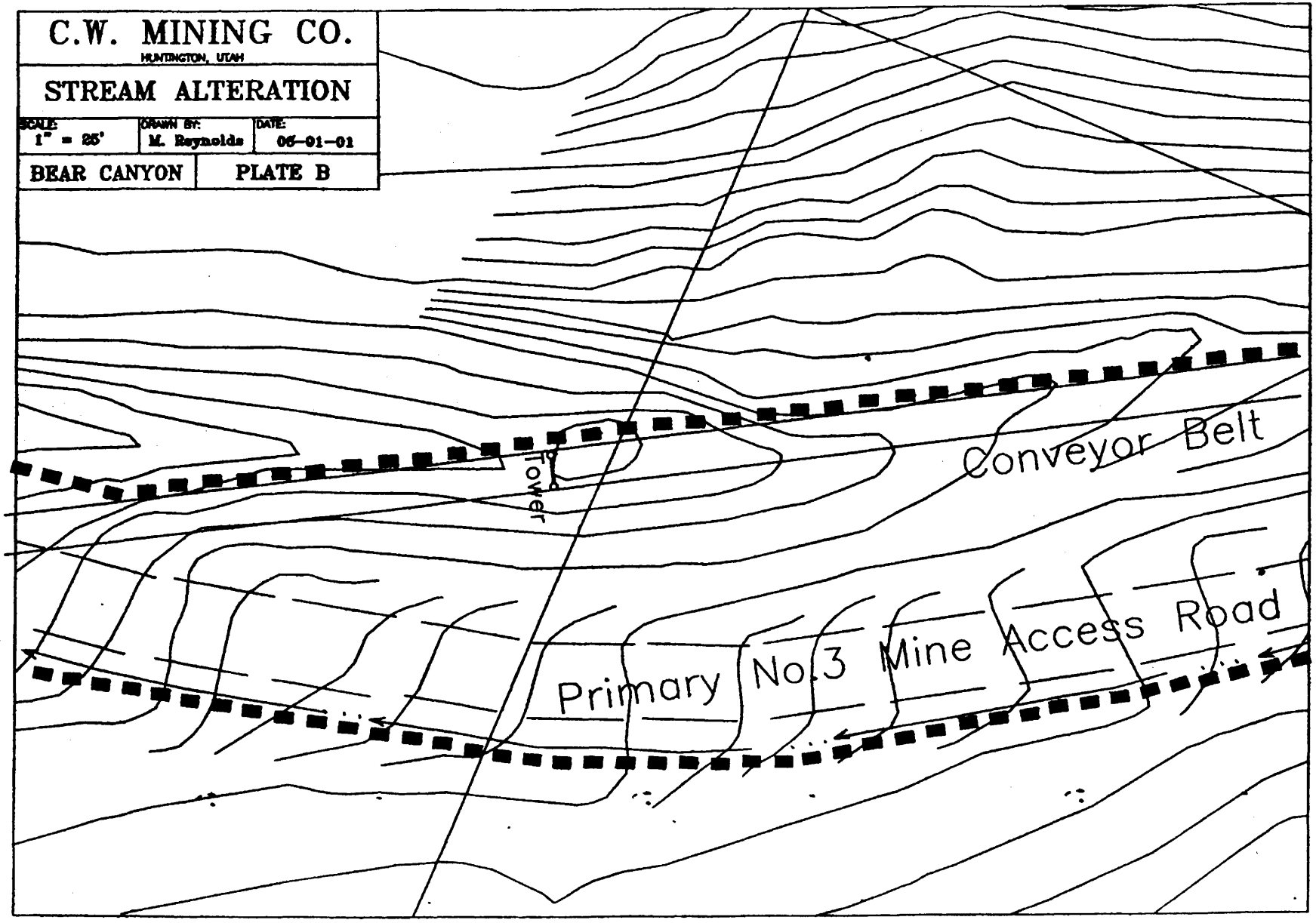


Worksheet
Worksheet for Circular Channel

Project Description	
Worksheet	C-36U
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.024	
Slope	0.060000	ft/ft
Diameter	84	in
Discharge	412.70	cfs

Results		
Depth	3.45	ft
Flow Area	18.9	ft²
Wetted Perimeter	10.69	ft
Top Width	7.00	ft
Critical Depth	5.35	ft
Percent Full	49.2	%
Critical Slope	0.016383	ft/ft
Velocity	21.88	ft/s
Velocity Head	7.44	ft
Specific Energy	10.88	ft
Froude Number	2.35	
Maximum Discharg	911.73	cfs
Discharge Full	847.56	cfs
Slope Full	0.014226	ft/ft
Flow Type	Supercritical	


C.W. MINING CO.
HUNTINGTON, UTAH
STREAM ALTERATION
SCALE: 1" = 25'
DRAWN BY: M. Reynolds
DATE: 06-01-01
BEAR CANYON
PLATE B
Tower
Conveyor Belt
Primary No.3 Mine Access Road

C.W. MINING CO.

HUNTINGTON, UTAH

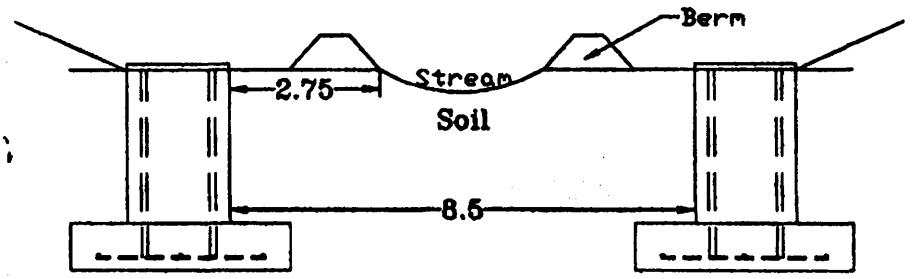
PROJECT AREA B

SCALE:	DRAWN BY:	DATE:
Not To Scale	M. Reynolds	05-31-01

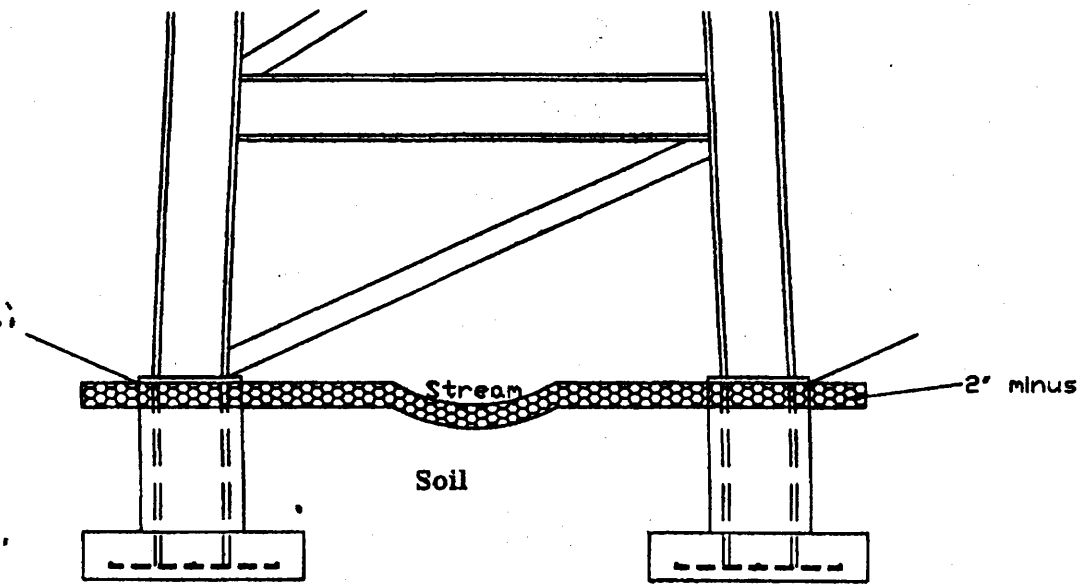
BEAR CANYON	Bear Creek Culvert Addition

Pre-Construction

During Construction



Post-Construction



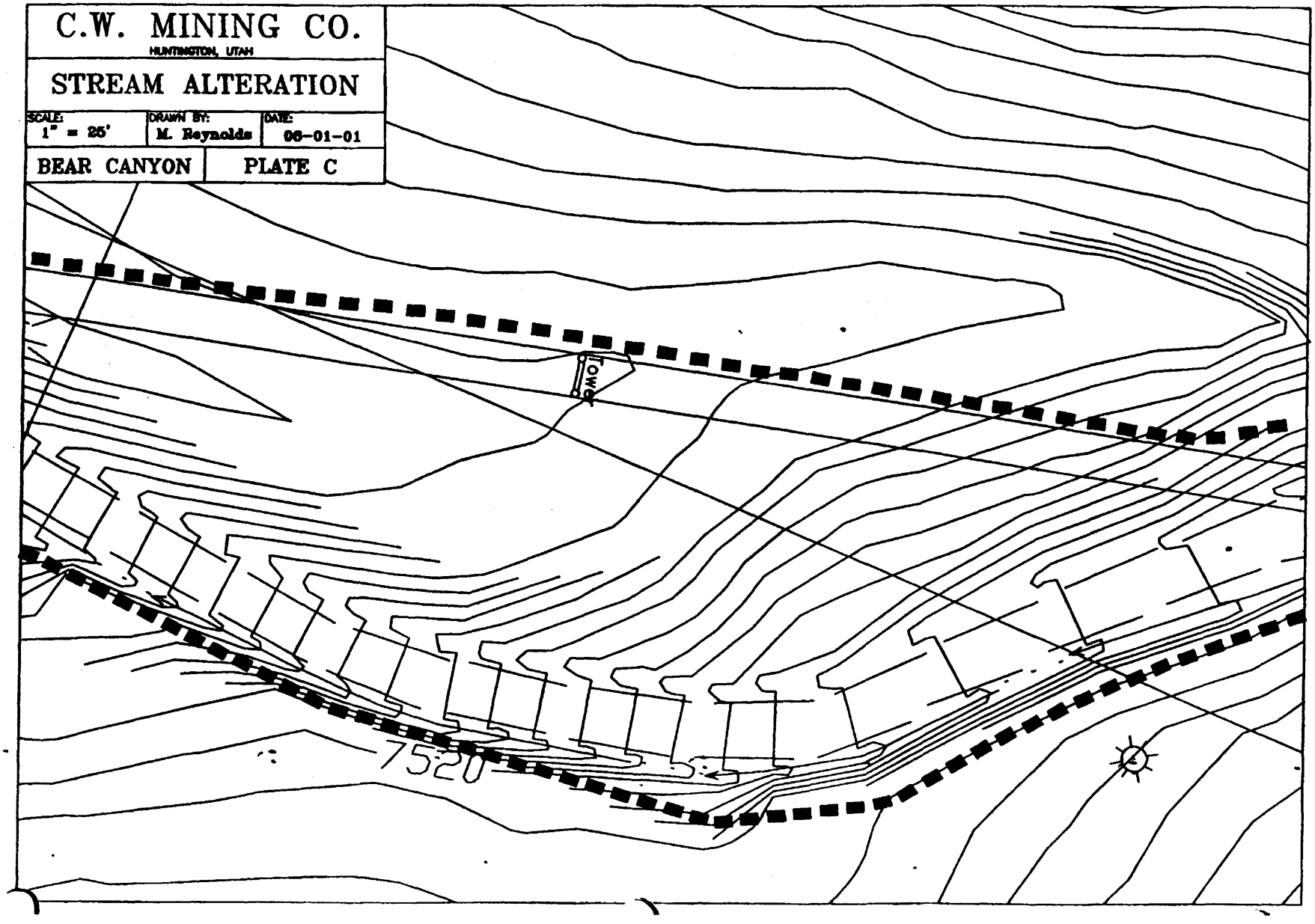
C.W. MINING CO.

HUNTINGTON, UTAH

STREAM ALTERATION

SCALE:	DRAWN BY:	DATE:
1" = 25'	M. Reynolds	06-01-01

BEAR CANYON	PLATE C



C.W. MINING CO.

HUNTINGTON, UTAH

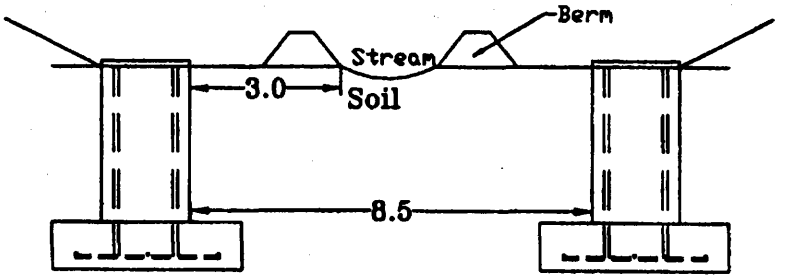
PROJECT AREA C

SCALE:	DRAWN BY:	DATE:
Not To Scale	M. Reynolds	05-31-01

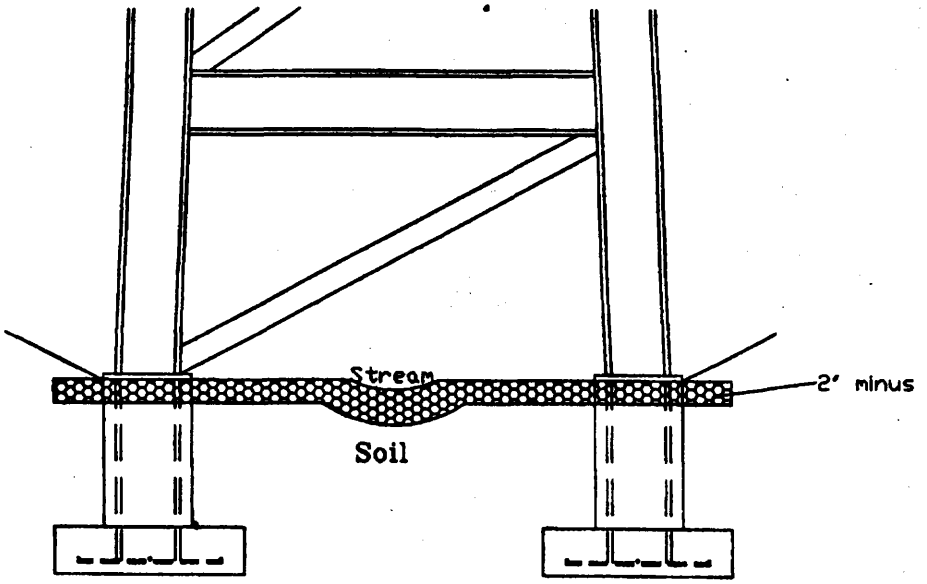
BEAR CANYON	**Bear Creek Culvert Addition**

Pre-Construction

During Construction



Post-Construction



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER RIGHTS

Michael O. Leavitt
Governor
Kathleen Clarke
Executive Director
Robert L. Morgan
State Engineer

1594 West North Temple, Suite 220
PO Box 146300
Salt Lake City, Utah 84114-6300
801-538-7240
801-538-7467 (Fax)

August 28, 2001

Charles Reynolds
CO-OP Mining Coming
P.O. Box 1245
Huntington, UT 84528

RE: Stream Channel Alteration Permit Number 01-93-07SA for mining construction and culvert placement on the right fork of Bear Creek in Emery County.
EXPIRATION DATE: August 28, 2002

Your application to Alter a Natural Stream Channel Number 01-93-07SA is hereby approved pursuant to the requirements of Section 73-3-29 of the Utah Code Annotated, 1953. This approval also constitutes compliance with Section 404 (e) of the Clean Water Act (33 USC 1344) pursuant to General Permit 040 issued to the State of Utah by the U.S. Army Corps of Engineers on October 15, 1987.

Work performed under this permit is subject to the following conditions:

1. The expiration date of this approved application is August 28, 2002. The expiration date may be extended, at the State Engineer's discretion, by submitting a written request outlining the need for the extension and the reasons for the delay in completing the proposed stream alteration.

2. A copy of this approved permit must be kept on-site at any time the work under this approved permit is in progress.

3. Work must be done during low flows. Any flow at the time of construction must be bypassed as proposed on the drawings. This project must be done in a way to limit added sedimentation, hydrocarbons, and coal fines into the stream.

4. A sufficient length of culvert must be installed to allow for stable slopes on the fill over the culvert.

5. Erosion and sediment control measures must be implemented, monitored, and success reported prior to the compliance inspection to minimize the impact to Bear and Huntington Creeks.

6. Sites B and C are on dry channels, but best management practices must be employed to maintain occasional flood flow events.

7. All sites must be vegetated with appropriate grasses and woody vegetation. Proper stream form and function must be restored and vegetation success reported prior to the compliance inspection. Also, plans for reclamation of the stream, once mining is completed, must be addressed in the Utah Division of Oil, Gas, and Mining documentation (CO-OP Mine Plans).

8. Excavated material and construction debris may not be wasted in any stream channel or placed in flowing waters, this will include material such as grease, oil, joint coating, or any other possible pollutant. Excess materials must be wasted at an upland site well away from any channel. Construction materials, bedding material, excavated material, etc. may not be stockpiled in riparian or channel areas. Equipment must also be cleaned and fueled outside of the riparian area.

9. Approval of this application does not authorize trespass, easements, rights-of-way, or any other access or land use permits. It is the responsibility of the applicant to obtain any such authorizations as may be necessary for this proposal.

10. Within 30 days after the completion of this project, the State Engineer's office must be contacted for a compliance inspection. Failure to provide such notification would invalidate U.S. Army Corps of Engineers General Permit 040, thereby placing the applicant in violation of Section 404 of the Clean Water Act.

This Decision is subject to the provisions of Rule R655-6 of the Division of Water Rights and to Sections 63-46b-13 and 73-3-14 of the Utah Code Annotated, 1953 as amended, which provide for filing either a Request for Reconsideration with the State Engineer, or an appeal with the appropriate District Court. A Request for Reconsideration must be filed with the State Engineer within 20 days of the date of this decision. However, a Request for Reconsideration is not a prerequisite for a court appeal. A court appeal must be filed within 30 days after the date of this Decision, or if a Request for Reconsideration has been filed, within 30 days after the date the Request for Reconsideration is denied. A Request for Reconsideration is considered denied when no action is taken 20 days after the Request is filed.

If you have any questions or need further clarification, please contact Daren Rasmussen at 801-538-7377.

Sincerely,

Robert L. Morgan

Robert L. Morgan, P.E.
State Engineer

RLM/dr/jm

pc: Corps of Engineers
Dave Ruiter - EPA
Field Supervisor - U.S. Fish & Wildlife
Jim Dykmann - State History
Carolyn Wright - State Planning
Mark Page - Regional Engineer
Derris Jones - Regional Wildlife Habitat Manager
Bill Bradwisch - Aquatic Habitat Coordinator

After further evaluation C.W. Mining Co. elected not to alter the stream in Area A. The stream was never culverted in this location and culvert C-36U is located in a different area.

Appendix 7-P

This Appendix Intentionally Left Blank

Appendix 7-Q Abandoned Equipment

On January 14,2003 a roof fall occurred in the Hiawatha seam of the # 1 Bear Canyon Mine. This roof fall buried a coal hauler, a distribution box, and a shop trailer. After the roof fall all remaining equipment was removed from the section and the area was sealed off. This is a concern for ground water contamination since water monitoring site SBC-11 is in the area as well as floor and roof seeps. The entry where the equipment was left is higher then the surrounding entries so water should flow around it. In January of 2004 the portals to the #1 mine were sealed. Prior to sealing the portals C.W. Mining shot a channel through all high spots between the portals and all water sources to insure that the water would gradually flow out the portals. To make sure the water wouldn't seep in to the floor or be blocked by a roof fall a pipeline was laid between the sources and the portals. A heavy duty polyethylene pipe was used because it could withstand the impact and pressures of a roof fall. The only concern was that a sharp edge could puncture the pipe. To prevent this from happening and to further protect the pipe crib blocks were laid on either side of the pipe and crib blocks, sand, and/or crushed coal was laid over the pipe. The location of the pipeline and the roof fall are shown on the figure plate 7-10B. The elevation of the coal seam is also shown on plate 7-10B. A typical cross-section of the pipeline is shown in figure 7P-1. C. W. Mining uses the water for mine and culinary use and will continue to monitor it for the life of the mine. The path of the water is illustrated on the diagram. A copy of the MSHA accident report has also been included. The area of the roof fall is also shown on plate 7-10B.

Potential contaminants to ground water from buried equipment are battery acid, lead, and oil. Current water sampling will detect and quantities are listed below.

15 Gallons of R & O 150 in the gear boxes.

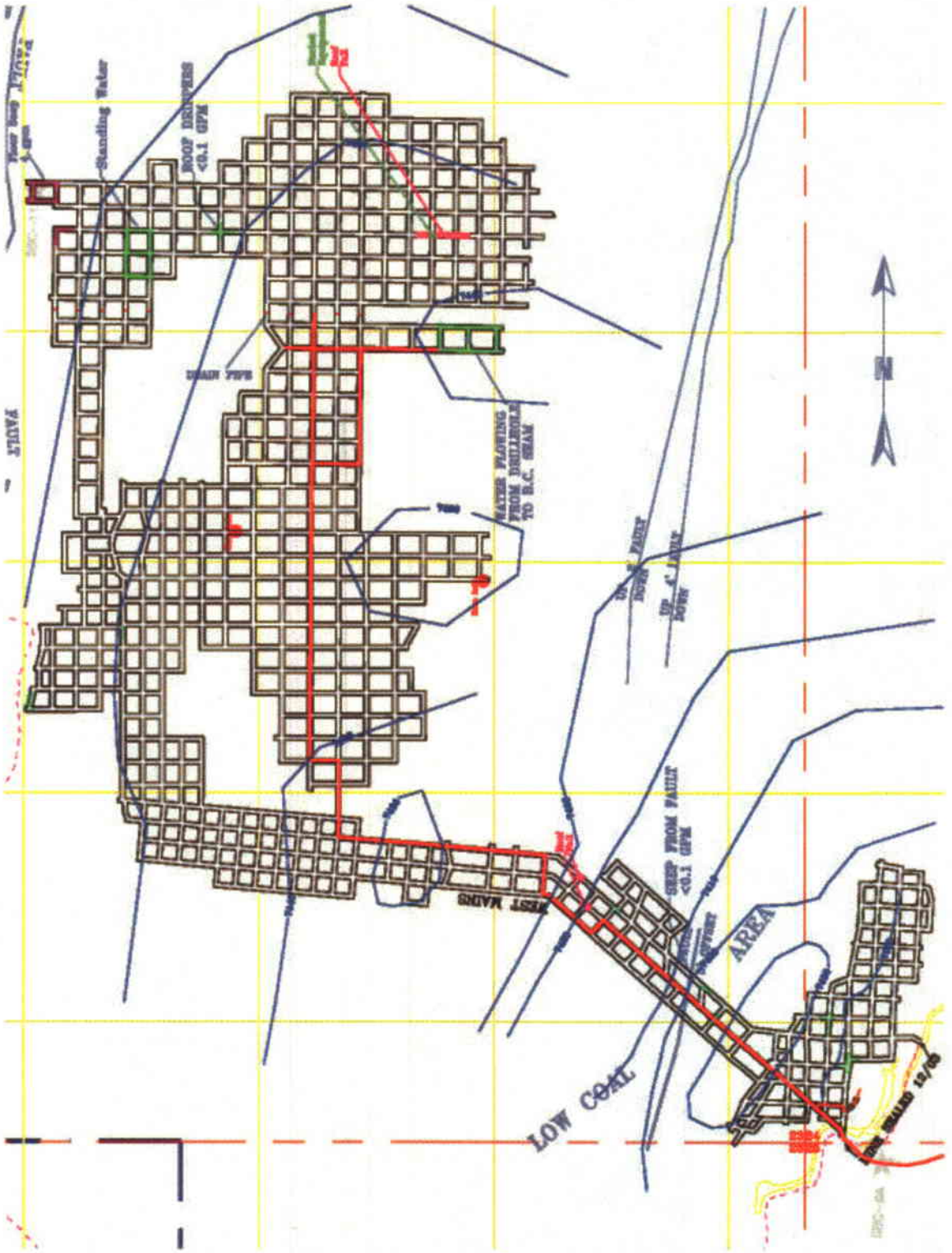
50-55 Gallons of Hydraulic oil.

20-28 gallons of battery acid in the batteries.

8,768 lbs of lead.

MSD's for the substances have been included.

Figure 7Q-1 Hiawatha Seam Mine Water



...ine Accident, Injury and Illness Report

U.S. Department of Labor

Mine Safety and Health Administration

● Section A—Identification Data — Approved For Use Through 06/30/92, OMB Number 1219-0007

MSHA ID Number: 42-01697 | Contractor ID | Report Category: ☐ Metal/Nonmetal Mining ☑ Coal Mining | ☐ Check here if report pertains to contractor.

Mine Name: C W mining company | Company Name: Bear Canyon #1

● Section B—Complete for Each Reportable Accident Immediately Reported to MSHA

1. Accident Code (circle applicable code — see instructions) 01 — Death 02 — Serious Injury 03 — Entrapment
04 — Inundation 05 — Gas or Dust Ignition 06 — Mine Fire 07 — Explosives (08 — Roof Fall)
09 — Outburst 10 — Impounding Dam 11 — Hoisting 12 — Offsite Injury

2. Name of Investigator: Ken Defa

3. Date Investigation Started: Month 1 | Day 14 | Year 03

4. Steps Taken to Prevent Recurrence of Accident: Section was abandoned

● Section C—Complete for Each Reportable Accident, Injury or Illness

5. Circle the Codes Which Best Describe Where Accident/Injury/Illness Occurred (see instructions)

(a) Surface Location: 02 Surface at Underground Mine 30 Mill, Preparation Plant, etc. 03 Strip/Open Pit Mine 04 Surface Auger Operation
05 Culm Bank/Refuse Pile 06 Dredge Mining 12 Other Surface Mining 17 Independent Shops (with own MSHA ID) 99 Office Facilities

(b) Underground Location: 01 Vertical Shaft 02 Slope/Inclined Shaft 03 Face (04 Intersection) 05 Underground Shop/Office 06 Other

(c) Underground Mining Method: 01 Longwall 02 Shortwall 03 Conventional Stoping (05 Continuous Mining) 06 Hand 07 Caving 08 Other

6. Date of Accident: Month 1 | Day 14 | Year 03

7. Time of Accident: 6:45 ☒ am ☐ pm

8. Time Shift Started: 6:00 ☑ am ☐ pm

9. Describe Fully the Conditions Contributing to the Accident/Injury/Illness, and Quantify the Damage or Impairment:
Roof fall in 1st Left entry at 5 Xcut #5
X-Cut - aprox. 130' X 20' x 20' high. A coal Hauler, A D-Box and A shop trailer were lost in the fall

10. Equipment Involved | Type | Manufacturer | Model Number

11. Name of Witness to Accident/Injury/Illness

12. Number of Reportable Injuries or Illnesses Resulting from This Occurrence

13. Name of Injured/Ill Employee

14. Sex ☐ Male ☐ Female

15. Date of Birth: Month | Day | Year

16. Last Four Digits of Social Security Number

17. Regular Job Title

☐ 18. Check if this injury/illness resulted in death.

☐ 19. Check if injury/illness resulted in permanent disability (include amputation, loss of use, & permanent total disability).

20. What Directly Inflicted Injury or Illness?

21. Nature of Injury or Illness

22. Part of Body Injured or Affected

23. Occupational Illness (circle applicable code—see instructions) 21 Occupational Skin Diseases
22 Dust Diseases of the Lungs 23 Respiratory Conditions (toxic agents) 24 Poisoning (toxic materials)
25 Disorders (physical agents) 26 Disorders (repeated trauma) 29 Other

24. Employee's Work Activity When Injury or Illness Occurred

Experience	Years	Weeks
25. Experience in This Job Title		
26. Experience at This Mine		
27. Total Mining Experience		

● Section D—Return to Duty Information — *Answer 30 & 31 when case is closed*

☐ 28. Permanently Transferred or Terminated (if checked, complete items 29, 30, & 31)

29. Date Returned to Regular Job at Full Capacity (for item 28): Month | Day | Year

30. Number of Days Away from Work (if none, enter 0)

31. Number of Days Restricted Work Activity (if none, enter 0)

Person Completing Form (name): Ken Defa | Title: Superintendent

Date This Report Prepared (month, day, year): 1/17/03 | Area Code and Phone Number: (435) 687-5777

MSHA Form 7000-1, July 91 (Revised)

For Official Use Only
Degree
Accident Type
Accident Class
Scheduled Charge
Keyword

Page 3 Mail This Copy to Denver Safety and Health Technology Center, P.O. Box 25367, Denver, Colorado 80225 When Return to Duty Information is Complete if It was Not Present on Page 1 When Mailed.

FUCHS LUBRICANTS CO.

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFICATION: . . . : RENOLIN AW68 Hyd oil (reg)

MANUFACTURER IDENTIFICATION

Company Name.	: FUCHS LUBRICANTS CO.
Address	: 17050 LATHROP AVE.
	HARVEY IL 60426
Telephone	: 708-333-8900
Emergency Contact	: Regulatory Compliance Department
Emergency Telephone . . .	: 708-333-8900 (8am - 5pm CST, M-F)
	800-255-3924 (24 Hours)

MSDS PRINT DATE . . . . . : 09/13/2002

* EMERGENCY OVERVIEW

This product is a liquid that is insoluble in water. Direct eye contact may cause temporary irritation. Short term skin exposure is not expected to be irritating. Inhalation and ingestion are not anticipated routes of exposure during normal conditions of use.

* HMIS Rating: Health- 1 Flammability- 1 Reactivity- 0 PPE- X

SECTION 2 - COMPONENT DATA

Components listed in this section may contribute to the potential hazards associated with exposure to the concentrate. The product may contain additional non-hazardous or trade-secret components.

Mineral Oil Cas#: proprietary Percent: > 90

Exposure Limit:

ACGIH TLV:	5 mg/m3 (as mist)
ACGIH STEL:	10 mg/m3 (as mist)
OSHA PEL:	5 mg/m3 (as mist)

- Carcinogenic Components: This product contains no carcinogens.

SECTION 3 - HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS and SYMPTOMS from SHORT TERM/ACUTE EXPOSURE:

- EYE EXPOSURE -

This product is not expected to cause eye irritation under normal conditions of use. Symptoms of temporary eye irritation and redness may result upon direct contact or when exposed to high mist levels in poorly ventilated areas.

- SKIN EXPOSURE -

Short term skin contact is not expected to cause skin irritation. Prolonged or repeated direct exposure to the skin may result in

PRODUCT NAME: RENOLIN AW68

This product is stable.

SECTION 11 - TOXICOLOGICAL INFORMATION

EYE EFFECTS:
No further toxicological data known.

SKIN EFFECTS:
No further toxicological data known.

ORAL EFFECTS:
No further toxicological data known.

INHALATION EFFECTS:
No further toxicological data known.

OTHER:
No further data known.

SECTION 12 - ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:
This product has not been evaluated for ecotoxicity. As with any industrial chemical, exposure to the environment should be prevented and minimized wherever possible.

ENVIRONMENTAL FATE:
The degree of biodegradability and persistence of this product has not been determined.

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL:
Ensure that collection, transport, treatment, and disposal of waste product, containers and rinsate complies with all applicable laws and regulations. Note that use, mixture, processing, or contamination of the product may cause the material to be classified as a hazardous waste. It is the responsibility of the product user or owner to determine at the time of disposal, whether the product is regulated as a hazardous waste.

SECTION 14 - TRANSPORT INFORMATION

DOT HAZARDOUS MATERIAL INFORMATION:
* Not otherwise DOT regulated.

SECTION 15 - REGULATORY INFORMATION

FEDERAL REGULATIONS:

PRODUCT NAME: RENOLIN AW68

SARA 313:
This product contains NONE of the substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Clean Water Act / Oil Pollution Act:
This product contains mineral oil and is subject to regulation by Section 311 of the Clean Water Act and the Oil Pollution Act. Releases of the product into or leading to surface waters must be reported to the National Response Center at 1-800-424-8802.

CERCLA Reportable Quantity:
Any components listed below have been assigned a reportable quantity (RQ) by the Federal EPA. Releases of the product into the environment that exceed the RQ for a particular component must be reported to the National Response Center at 1-800-424-8802.

Component	RQ

Toxic Substances Control Act:
The components of this product are listed on the TSCA Inventory.

Ozone Depleting Substances:
This product contains no ozone depleting substances as defined by the Clean Air Act.

Hazardous Air Pollutants:
Any components listed below are defined by the Federal EPA as hazardous air pollutants.

Component

STATE REGULATIONS:
This product contains mineral oil, and as used, may be regulated by state used oil regulations. Check with the appropriate state agency to determine whether such a regulation exists.

No further data known.

SECTION 16 - OTHER INFORMATION

Prepared by . . . . . : Corporate Regulatory Compliance
Date of issue . . . . . : 09/13/2002
Last Revision Date . . . . . : 03/17/2000
L0175

FUCHS LUBRICANTS CO.

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFICATION: . . . : POWERGEAR EP5 (Gear Oil)

MANUFACTURER IDENTIFICATION

Company Name.	FUCHS LUBRICANTS CO.
Address	17050 LATHROP AVE.
	HARVEY IL 60426
Telephone	708-333-8900
Emergency Contact	Regulatory Compliance Department
Emergency Telephone . . .	708-333-8900 (8am - 5pm CST, M-F)
	800-255-3924 (24 Hours)

MSDS PRINT DATE . . . . . : 09/13/2002

* EMERGENCY OVERVIEW

This product is a liquid that is insoluble in water. Direct eye contact may cause minor, short term irritation. Short term skin exposure is not expected to be irritating. Inhalation and ingestion are not anticipated routes of exposure during normal conditions of use.

* HMIS Rating: Health- 1 Flammability- 1 Reactivity- 0 PPE- X

SECTION 2 - COMPONENT DATA

Components listed in this section may contribute to the potential hazards associated with exposure to the concentrate. The product may contain additional non-hazardous or trade-secret components.

Mineral Oil Cas#: proprietary Percent: < 95

Exposure Limit:

ACGIH TLV:	5 mg/m3 (as mist)
ACGIH STEL:	10 mg/m3 (as mist)
OSHA PEL:	5 mg/m3 (as mist)

- Carcinogenic Components: This product contains no carcinogens.

SECTION 3 - HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS and SYMPTOMS from SHORT TERM/ACUTE EXPOSURE:

- EYE EXPOSURE -

This product is not expected to cause eye irritation under normal conditions of use. Symptoms of slight eye irritation may result when direct contact occurs, or when exposed to high mist levels in poorly ventilated areas.

- SKIN EXPOSURE -

Short term skin contact is not expected to cause skin irritation. Prolonged or repeated direct exposure to the skin may result in

symptoms of irritation and redness. In severe cases, prolonged or repeated contact may result in dermatitis accompanied by symptoms of irritation, itching, dryness, cracking and/or inflammation.

- INHALATION -
This product has low volatility and so is not expected to cause respiratory tract irritation during normal conditions of use. Exposure to high mist levels in poorly ventilated areas may cause upper respiratory tract irritation and difficulty breathing.

- INGESTION -
Ingestion may cause slight stomach irritation and discomfort.

POTENTIAL CHRONIC HEALTH EFFECTS:
No further data known.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:
No further data known.

CARCINOGENICITY:
This product is not listed as a known or suspected carcinogen by IARC, OSHA, or the NTP.

SECTION 4 - FIRST AID MEASURES

EYE CONTACT:
Upon direct eye contact, hold eyelids open and flush with a steady, gentle stream of water for at least 15 minutes. If irritation is due to exposure to mist or vapors, remove the individual to fresh air. If irritation persists, flush the eyes with clean water until the irritation subsides. If symptoms persist, contact a physician.

SKIN CONTACT:
Remove product from the skin by washing with a mild soap and water. Contaminated clothing should be removed to prevent prolonged exposure. If symptoms of exposure persist, contact a physician.

INHALATION:
Inhalation is not an expected route of exposure. If respiratory irritation or distress occurs, remove the employee to fresh air. Contact a physician or other medical professional if irritation or distress persists.

INGESTION:
If small amounts are ingested, first aid measures are not likely to be necessary. If larger amounts are ingested or if symptoms of ingestion occur, dilute stomach contents with two glasses of water or milk. (NOTE: Do NOT give anything by mouth to an unconscious person.) Do not induce

PRODUCT NAME: POWERGEAR EP5

SARA 313:
This product contains NONE of the substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Clean Water Act / Oil Pollution Act:
This product contains mineral oil and is subject to regulation by Section 311 of the Clean Water Act and the Oil Pollution Act. Releases of the product into or leading to surface waters must be reported to the National Response Center at 1-800-424-8802.

CERCLA Reportable Quantity:
Any components listed below have been assigned a reportable quantity (RQ) by the Federal EPA. Releases of the product into the environment that exceed the RQ for a particular component must be reported to the National Response Center at 1-800-424-8802.

Component	RQ

Toxic Substances Control Act:
The components of this product are listed on the TSCA Inventory.

Ozone Depleting Substances:
This product contains no ozone depleting substances as defined by the Clean Air Act.

Hazardous Air Pollutants:
Any components listed below are defined by the Federal EPA as hazardous air pollutants.

Component

STATE REGULATIONS:
This product contains mineral oil, and as used, may be regulated by state used oil regulations. Check with the appropriate state agency to determine whether such a regulation exists.

No further data known.

SECTION 16 - OTHER INFORMATION

Prepared by . . . . . : Corporate Regulatory Compliance
Date of issue . . . . . : 09/13/2002
Last Revision Date . . . . . : 07/01/2002
C3601223

PRODUCT NAME: POWERGEAR EP5

This product is stable.

SECTION 11 - TOXICOLOGICAL INFORMATION

EYE EFFECTS:
No further toxicological data known.

SKIN EFFECTS:
No further toxicological data known.

ORAL EFFECTS:
No further toxicological data known.

INHALATION EFFECTS:
No further toxicological data known.

OTHER:
No further data known.

SECTION 12 - ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:
This product has not been evaluated for ecotoxicity. As with any industrial chemical, exposure to the environment should be prevented and minimized wherever possible.

ENVIRONMENTAL FATE:
The degree of biodegradability and persistence of this product has not been determined.

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL:
Ensure that collection, transport, treatment, and disposal of waste product, containers and rinsate complies with all applicable laws and regulations. Note that use, mixture, processing, or contamination of the product may cause the material to be classified as a hazardous waste. It is the responsibility of the product user or owner to determine at the time of disposal, whether the product is regulated as a hazardous waste.

SECTION 14 - TRANSPORT INFORMATION

DOT HAZARDOUS MATERIAL INFORMATION:
* Not otherwise DOT regulated.

SECTION 15 - REGULATORY INFORMATION

FEDERAL REGULATIONS:

Buggy/Scrap Batteries ATTN: Mark 681-2084

EAST PENN manufacturing co., inc.

Deka

– Material Safety Data Sheet –

Lead Acid Battery Wet, Filled with Acid

SECTION I

Manufacturer's Name:
East Penn Manufacturing Co., Inc.
Deka Road, Lyon Station, PA 19536
Telephone Number for Information: (610) 682-6361
Emergency Telephone Number: CHEMTREC: 1-800-424-9300,
In Washington D.C. or outside continental U.S., call 1-202-483-7616

Date: April 2000

Trade Name: Electric Storage battery, SLI or Industrial battery
Classification: Battery wet, filled with acid, electric storage
UN2794

SECTION II
HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components Specific Chemical Identity (Common Name (s))	OSHA PEL	ACGIH TLV	Range Percent By Weight	Average
Lead, CAS #7439921	0.05 mg/m³	0.05 mg/m³	43-70	65
Sulfuric Acid, CAS #7664939	1.00 mg/m³	1.00 mg/m³	20-44	25
Antimony, CAS #7440360	0.50 mg/m³	0.50 mg/m³	0-4	<1
Arsenic, CAS #7440382	0.01 mg/m³	0.01 mg/m³	<.01	-
Polypropylene, CAS #9003070	-	-	5-10	8
Calcium, CAS #7440702	1.0 mg/m³	1.0 mg/m³	<1	<1

SECTION III
PHYSICAL/CHEMICAL CHARACTERISTICS

Electrolyte (Sulfuric Acid):
Appearance and Odor: Clear, Odorless, Colorless
Boiling Point: approximately 235° F
Evaporation Rate (Butyl Acetate=1): less than 1.0
Melting Point: N/A

Solubility in Water: Completely
Specific Gravity (H_2O=1): 1.220 – 1.325
Vapor Density (AIR=1): N/A
Vapor Pressure (mm Hg): 13

SECTION IV
FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): Non-Flammable
Extinguishing Media: Class ABC extinguisher, CO_2
Flammable Limits: *Hydrogen Gas
LEL: 4% UEL 74%
Special Fire Fighting Procedures: Cool exterior of battery if exposed to fire to prevent rupture. The acid mist and vapors in a fire situation are corrosive. Wear special respiratory protection (SCBA) and clothing.
Unusual Fire and Explosion Hazards: *Hydrogen gas, which may explode if ignited, is produced by this battery, especially when charging. Use adequate ventilation; avoid open flames, sparks, or other sources of ignition.

SECTION V
REACTIVITY DATA

Stability: Stable Condition to Avoid: Prolonged overcharging, sources of ignition

Incompatibility (Materials to Avoid): Sulfuric Acid: Contact with combustibles and organic materials may cause fire and explosion. Also reacts violently with strong reducing agents, metals, strong oxidizers and water. Contact with metals may produce toxic sulfur dioxide fumes and may release flammable hydrogen gas.

Hazardous Decomposition of By-Products: Sulfuric Acid: Excessive overcharging or fire may create Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, and hydrogen.
Lead Compounds: Contact with strong acid or base or presence of nascent hydrogen may generate highly toxic arsine gas.

SECTION VI
HEALTH HAZARD DATA

Route(s) of Entry: Not Applicable under normal use. (Inhalation, skin contact, and ingestion)

Health Hazards (Acute and Chronic): Do not open battery, avoid contact with internal components. Internal components are Oxide lead and electrolyte. Short term exposure: Sulfuric acid may cause irritation of eyes, nose, and throat. Prolonged contact may cause severe burns. Long term exposure: Repeated contact causes irritation and skin burns. Repeated exposure to mist may cause erosion of teeth, chronic eye irritation and/or chronic inflammation of the nose, throat, and bronchial tubes.
TARGET ORGAN: (Electrolyte) respiratory system, eyes, skin, and teeth

Carcinogenicity:
Sulfuric Acid: The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mist containing sulfuric acid" as a Category 1 carcinogen, a substance that is carcinogenic to humans. This classification does not apply to liquid forms of sulfuric acid contained within a battery. Inorganic acid mist (sulfuric acid mist) is not generated under normal use of this product. Misuse of the product such as overcharging, may result in the generation of sulfuric acid mist.
Lead Compounds: Lead is listed as a 2B carcinogen, likely in animals at extreme doses. Proof of carcinogenicity in humans is lacking at present.
Arsenic: Listed by National Toxicology Program (NTP), IARC, OSHA and NIOSH as a carcinogen only after prolonged exposure at high levels.

Signs and Symptoms of Exposure: Acid contact may cause irritation of eyes, nose and throat. Breathing of mist may produce respiratory difficulty. Contact with eyes and skin causes irritation and skin burns. Sulfuric acid is a CORROSIVE chemical.

Medical Conditions Generally Aggravated by Exposure: Sulfuric Acid Mist exposure may aggravate medical conditions such as, pulmonary edema, bronchitis, emphysema, dental erosion, and tracheobronchitis. Pregnant women and children must be protected from lead exposure.

Emergency and First Aid Procedures: (Sulfuric Acid)
1) Flush contacted area with large amounts of water for at least 15 minutes. Remove contaminated clothing and obtain medical attention if necessary. Eye wash and/or emergency shower should be readily available.
2) If swallowed, give large volumes of water. DO NOT induce vomiting, obtain medical treatment.

SECTION VII
PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material is Released or Spilled: *SULFURIC ACID*: Dilute spill cautiously with five to six volumes of water and gradually neutralize with sodium bicarbonate, soda ash or lime. When exposure level is not known, wear NIOSH approved positive pressure self-contained breathing apparatus. Reference North American Emergency Response Guidebook, #154.
Waste Disposal Method: Lead-acid batteries are completely recyclable. For information on returning batteries to East Penn for recycling, contact your East Penn Representative. Dispose of any collected material in accordance with local, state or applicable federal regulations.
Precautions to be Taken in Handling and Storing: Store away from reactive material as defined in Section V, Reactivity Data. Place cardobrd between layers of stacked batteris to avoid damage and short circuit. Do not allow metallic materials to simultaneously contact both terminals.
Other Precautions: Sodium bicarbonate, soda ash, sand, or lime should be kept in same general area for emergency use. Keep away from sources of ignition during charging see Section IV on generation of hydrogen gas. If battery case is broken, avoid direct contact with internal components.

SECTION VIII
CONTROL MEASURES

Respiratory Protection (Specific Type): Respirator required when PEL is exceeded or employee witnesses respiratory irritation. (see Section VI, Health Hazard Data).
Ventilation: Must be provided when charging in an enclosed area. (29CFR1910.178(g) and .305(j)(7)
Mechanical (general): Acceptable at 1 to 4 air exchanges/hour or to maintain air concentrations below the PEL.
Local Exhaust: Preferred
Other: Local building/fire codes may require explosion proof fans and equipment
Protective Gloves: Acid resistant
Eye Protection: Preferred, safety glasses, goggles, face shield
Other Protective Clothing or Equipment: Acid resistant aprons, boots, and protective clothing
Work Hygienic Practices: Good Personal hygiene and work practices are mandatory.

SECTION IX
OTHER REGULATORY INFORMATION

NFPA Hazard Rating	Sulfuric Acid	Lead
Health (Blue)	3	3
Flammability (Red)	0	0
Reactivity (Yellow)	2	0

Note: Sulfuric acid is water-reactive if concentrated.

U.S. DOT: Battery Wet, Filled with Acid

Hazard Class/Division	8
ID Number	UN2794
Packing Group	III
Label Requirement	Corrosive

RCRA: Spent lead-acid batteries are not regulated as hazardous waste when recycled. Spilled sulfuric acid is a characteristic hazardous waste, EPA hazardous waste number D002 (corrosivity).

CERCLA (Superfund) and EPCRA (Emergency Planning and Community Right to Know ACT)

a) Reportable Quantity (RQ) for spilled 100% sulfuric acid is 1000 lbs.
b) Sulfuric acid is a listed "Extremely Hazardous Substance" under EPCRA with a Threshold Planning Quantity (TPQ) of 1000 lbs.
c) EPCRA Section 312 Tier II reporting required for batteries if sulfuric acid is present in quantities of 500 lbs or more and/or lead is present in quantities of 10,000 lbs or more.

California Prop 65: This product contains chemicals known to the State of California to cause cancer, birth defects and other reproductive harm.

For additional information concerning East Penn Manufacturing Co., Inc. products or questions concerning the content of this MSDS please contact your East Penn representative.

This information is accurate to the best of East Penn Mfg. Co.'s knowledge or obtained from sources believed by East Penn to be accurate. Before using any product, read all warnings and directions on the label.

TO: ED EDDINS FROM:BOB FLICKER FAX NO. (703) 669-8699

MATERIAL SAFETY DATA SHEET NUMBER OF PAGES -2- 8-910 91:8203

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)
EPM lead alloy parts

Note: Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name: East Penn Manufacturing Co., Inc.	Emergency Telephone Number: (215)682-6361
Address (Number, Street, City, State, and ZIP Code): Deka Road	Telephone Number for Information: (215)682-6361
Lyon Station, PA 19536	Date Prepared: June 27, 1989
	Signature of Preparer (optional):

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))		OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
Lead	(7439-92-1)	0.05mg/m^3	0.15mg/m^3	(SARA III)	≥94.0%
Antimony	(7440-36-0)	0.5 mg/m^3	0.5 mg/m^3	(SARA III)	2.8-6.0%
Arsenic	(7440-38-2)	0.01mg/m^3	0.2mg/m^3		≤0.2%
Tin	(7440-31-5)	2.0 mg/m^3	2.0 mg/m^3		≤0.4%

Additional elements such as copper, silver, nickel, etc. may be present, however, their concentration is less than 0.05%.

Section III — Physical/Chemical Characteristics

Boiling Point: lead	1740°C	Specific Gravity (H_2O = 1)	11.3 (at 20°C)
Vapor Pressure (mm Hg): 1mmHg at 973°C		Melting Point	328°C
Vapor Density (AIR = 1): not applicable (n/a		Evaporation Rate (Butyl Acetate = 1)	n/a

Solubility in Water: insolubie

Appearance and Odor: bluish-gray soft metal

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
not available	not available		

Extinguishing Media
Dry chemical and/or carbon dioxide. Use water fog or alcohol foam for larger fires.

Special Fire Fighting Procedures
Highly toxic lead fumes may evolve when the metal is heated. Wear protective clothing and a self-contained breathing apparatus.

Unusual Fire and Explosion Hazards
Lead dust is a moderate fire and explosion hazard when exposed to heat or flame. Lead pigs and parts may contain cavities of moisture when stored in a wet environment; entrapped moisture may expand explosively when melted or heated.

Published by THE BUREAU OF NATIONAL AFFAIRS, INC., Washington, D.C. 20037

31 920a

REFERENCE FILE

Section V — Reactivity Data

Stability			Conditions to Avoid
	Unstable		Lead material is stable under normal conditions.
	Stable	X	

Incompatibility (Materials to Avoid) Avoid oxidizing agents and active metals. Contact with disodium acetyl chlorine trifluoride, or fused ammonium nitrate poses an explosion risk. Contact with sodium azide can form a lead azide which is a detonating compound.

Hazardous Decomposition or Byproducts Thermal oxidization products are highly toxic lead fume.

Hazardous Polymerization			Conditions to Avoid
	May Occur		
	Will Not Occur	X	

Section VI — Health Hazard Data

Route(s) of Entry: Inhalation? Skin? Ingestion?

Health Hazards (Acute and Chronic)

The handling of lead alloy parts presents few health hazards itself. However, prolonged exposure to lead fume or dust can result in lead poisoning. Lead accumulates in the bone and body organs and is eliminated from the body slowly.

Carcinogenicity: NTP? IARC Monographs? OSHA Regulated? 29CFR 1910.1025

Signs and Symptoms of Exposure Short term: headache, nausea, vomiting, abdominal spasms, fatigue, weight loss, anemia, pain in legs, arms, joints. Long term: CNS damage, kidney dysfunction and potential reproductive hazard. Symptoms of lead exposuremay be confined by the presence of elevated levels of lead in the blood.

Medical Conditions Generally Aggravated by Exposure Pregnant women should be protected from excessive exposure.

Emergency and First Aid Procedures EYE & SKIN: Flush contacted area with water for about 15 min. If irritation persists, seek medical attention. INHALATION: Remove victim to fresh air area. If breathing stopped, give artificial respiration. Seek medical attention. INGESTION: Do not induce vomiting. Seek medical attention.

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material Is Released or Spilled
No special precautions are necessary for spills of cast lead alloy parts.

Waste Disposal Method
Scrap metal can be reclaimed for reuse. Follow federal, state and local regulations for disposal.

Precautions to Be Taken in Handling and Storing
Store in dry area.

Other Precautions Always use good hygiene practices when handling lead and its compounds. Recommended practice includes showering at the end of each work shift, lead contaminated clothing should be properly laundered, wash thoroughly after handling and before eating, drinking and smoking.

Section VIII — Control Measures

Respiratory Protection (Specify Type)
When exposure concentrations exceed the PEL, appropriate respiratory protection is required.

Ventilation		
	Local Exhaust	Special
	Mechanical (General)	Other

Protective Gloves Protective clothing, gloves, and respirators are recommended where lead fume or dust is generated. Eye Protection Face shield is recommended for handling molten material.

Other Protective Clothing or Equipment

Work/Hygienic Practices
Good hygiene and housekeeping practices are essential. Avoid breathing lead dust or fumes.

symptoms of irritation and redness. In severe cases, prolonged or repeated contact may result in dermatitis accompanied by symptoms of irritation, itching, dryness, cracking and/or inflammation.

- INHALATION -
This product has low volatility and so is not expected to cause respiratory tract irritation during normal conditions of use. Exposure to high mist levels in poorly ventilated areas may cause upper respiratory tract irritation and difficulty breathing.

- INGESTION -
Ingestion may cause slight stomach irritation and discomfort.

POTENTIAL CHRONIC HEALTH EFFECTS:
No further data known.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:
No further data known.

CARCINOGENICITY:
This product is not listed as a known or suspected carcinogen by IARC, OSHA, or the NTP.

SECTION 4 - FIRST AID MEASURES

EYE CONTACT:
Upon direct eye contact, hold eyelids open and flush with a steady, gentle stream of water for at least 15 minutes. If irritation is due to exposure to mist or vapors, remove the individual to fresh air. If irritation persists, flush the eyes with clean water until the irritation subsides. If symptoms persist, contact a physician.

SKIN CONTACT:
Remove product from the skin by washing with a mild soap and water. Contaminated clothing should be removed to prevent prolonged exposure. If symptoms of exposure persist, contact a physician.

INHALATION:
Inhalation is not an expected route of exposure. If respiratory irritation or distress occurs, remove the employee to fresh air. Contact a physician or other medical professional if irritation or distress persists.

INGESTION:
If small amounts are ingested, first aid measures are not likely to be necessary. If larger amounts are ingested or if symptoms of ingestion occur, dilute stomach contents with two glasses of water or milk. (NOTE: Do NOT give anything by mouth to an unconscious person.) Do not induce

Chapter 8

R645-301-800 Bonding and Insurance

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Chapter 8 Bonding

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R645-301-800 Bonding

This chapter describes bonding and reclamation cost estimates for Co-Op Mining Company.

R645-301-830 Determination of a Bond Amount

Reclamation Cost and Bonding

Labor Hourly Rates from 1998 Means Site Work Cost Data and CAT performance handbook,

Equipment Operator	= 47.15
Truck Driver	= 36.60
Laborer	= $32.50
Labor foreman	= $44.70
Crane Operator	= 47.15

Equipment Hourly Rates from 1998 Means Site Work Cost Data (Rate includes monthly rental and operating cost)

a.	01590-200-4560 Front End Loader - Cat 980 (6 cu yd bucket)	$ 96.82
	Operator	45.95
		$142.77
b.	01590-600-2500 Crane - 25 Ton Capacity ($538.85 /day)	$ 86.57
	Operator	47.15
		$133.72
c.	01590-200-4360 Cat - D9N -	$144.85
	Operator	45.95
		$190.80
d.	01590-200-0300 Backhoe (Cat 330BL)	$107.18
	Operator	45.95
		$153.13
e.	02320-200-0320 Dump Truck (6 Ton)	$ 66.38
	Operator	36.60
		$ 102.98
f.	6 X 4 45,000 lbs 8-10 CY (20-1) (2QCD) Truck	$ 31.78
	Operator	36.60
		$ 68.38

Backhoe (BH) Cycle Time Estimates - 330BL Backhoe

(From Cat Performance Handbook)

Average

Load Bucket	5.4 Sec
Swing Bucket	4.2 Sec
Dump Bucket	2.4 Sec
Swing Empty Bucket	4.2 Sec
	16.2 Sec - 1.83 cu yd

Medium to hard digging (hard packed soil with up to 50 pct rock content) depth to 70 pct of machine's capability.

(5.22 cycles/min)(1.83 cu yd)(60) = production/hr = 573.6 cu yd/hr (222 cycles/hr)
Efficiency - 50 min/hr - (406 cu yd/hr)(50 min/60 min) = 478 cu yd/hr (185 cycles/hr)

Crawler Tractor (D9) Production Estimates (From Cat performance Handbook)

D9 Average dozing distance - 200 ft
Average Blade Load of 18.8 cu yd

From Production Chart, Production = 680 cu yd/hr

a.	Hard-packed or hard to cut material	0.80
b.	Job efficiency (55 min/60 min)	0.92

Dozing Production = (680 cu yd/hr)(0.80)(0.92)= 500 cu yd/hr

Ripping:

From Production chart for seismic velocity = 3.5
Production = 1,750 cu yd/hr
Efficiency 55 min/hr
Ripping Production = (1,750 cu yd/hr)(0.92) = 1,610 cu yd/hr

980 Loader Cycle Time

(From Cat Performance Handbook)			0.55 min
a.	3/4 inch to 6 inch		0.00 min
b.	Pile (10 ft or less)	+	0.01 min
c.	3/4 inch to 6 inch	-	0.04 min
			0.52 min

(60 min/hr)/(0.52 min/cycle) = 115.4 cycles/hr
Efficiency 50 min/hr - (115.4 cycles/hr)(6 cu yd/cycle)(50 min/60 min) = 577 cu yd/hr (96 cycles/hr)

Summary of Reclamation Cost Estimate

Direct Costs		
a.	Seal Portals and Backfill	$ 112,500
b.	Removal of Structures	$ 210,403
c.	Soil Placement and Ripping	$ 178,617
d.	Channel Restoration	$ 403,728
e.	Revegetation	$ 462,968
f.	Monitor Well Plugging	$ 5,000
Total Direct Costs:		$ 1,373,216
Indirect Costs		
g.	Maintenance and Monitoring (10%)	$ 137,322
h.	Contingency (5%)	$ 68,661
i.	Engineering Redesign (2.5%)	$ 34,330
j.	Mobilization and Demobilization (5%)	$ 68,661
k.	Contract Management Fee (2.5%)	$ 34,330
Total Indirect Costs:		$ 343,304
Total Reclamation Cost (2001 dollars)		**$ 1,716,520**

Escalated Values	Escalation Factor
2002 - 1,770,075	3.12% (est)
2003 - 1,825,302	3.12% (est)
2004 - 1,882,251	3.12% (est)
2005 - 1,940,978	3.12% (est)

The total bond currently posted, rounded to the nearest $1,000, is **$1,825,000**.

Reclamation Costs

a. **Seal and Backfill Portals**

AMR Costs- $ 12,500/seal including backfill x 9 seals $112,500

b. **Removal Structures**

All estimates with 10 digit numbers are from 2001 Means Site Work cost Data. Most of the steel and equipment will be salvaged for scrap or reuse. M&P Enterprises in Huntington, Utah, will pick up and pay $40.00/ton for scrap iron & equipment if placed in 30 cu yd (8ft wide x 20 ft long x 5 ft high) dumpsters or loaded with crane on their trucks. Reclamation costs assume the steel will be picked up on site, but the mine receives no payment for the steel. D&R Salvage in Castle Dale will accept the steel without a dump fee. Therefore no dump fee is included for steel. Means cost data includes disposal to 20 miles, which is the approximate distance to the Nielson Construction landfill in Emery County. Dump fee for Nielson Construction landfill is $7.00 typically.

Sales-Receiving-Scale House Complex

02220-100-0100 (Mixture type Building, includes disposal)
Volume = (34 ft) (83 ft) (16 ft) = 45,152 cu ft
Cost = ($ 0.24 /cu ft) (45,152 cu ft) = $ 10,837
Dump Fee = ((45,152 cu ft) / 27) * 0.3 rubble volume * 1.35 tons/cy) ($7.00/ton) = $4,741
Time = (45,152 cu ft) / (20,100 cu ft/day) = 2.25 days

Concrete Demolition
Total Footing Volume =(0.67 ft)(2 ft)(234 ft) = (313.6 cu ft) / 27 = 11.6 cu yds
Total Foundation Volume = (0.67 ft)(4 ft)(234 ft) = (627.1 cu ft) / 27 = 23.2 cu yds
Floor Volume = (83 ft)(34 ft)(0.33 ft) = (931.3 cu ft) / 27 = 34.5 cu yds
Total Volume = 69.3 cu. yds
Cost = (69.3 CY) ($12.78/CY) = $886

Time = (234 L.F.)/(300 L.F./day) + (234 ft)(4 ft)/(140 s.f./day) + (83 ft)(34 ft)/(500 s.f./day) = 13.10 days

02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)
Cost = ($10.69/cu. yd.) (69.3 cu yds) (1.3 swell factor) = $963
Time = 90.1 cu. yds. / (232 cu. yds./day) = 0.40 days

Cost Subtotal	$17,427
Time Subtotal	15.75 days

Scalehouse Area Pavement

02220-875-1750 (Pavement Removal 3")
Area = 800 square yards
Cost = ($ $ 3.85 /sq yd) (800 sq yd) = $ 3,080
Time = (800 sq yd) / (420 sq yd/day) = 1.90 days

Disposal at landfill
Volume = (67 CY) (2 tons/yd) (1.3 swell factor) = 174 Tons
16 ton truck; distance to haul approx. 40 miles round trip = 3 trips/day
Time = (67 cu yd)/(48cu yd/day) = 1.4 days
Dump Fee = (174 Tons) ($7.00/ton) = $1,218

01590-200- 5300 Dump Truck Cost = ($ 823.88/day) (1.4 days) = $ $ 1,154

Cost Subtotal	$ 5,452
Time Subtotal	3.3 days

Shower House

02220-100-0100 (Framed Portion, includes disposal)
Volume = (92 ft) (50 ft) (8 ft) = 36,800 cu ft
Cost = ($ 0.24 /cu ft) (36,800 cu ft) = $ 8,832
Dump Fee = ((36,800 cu ft) / 27) (0.3 rubble volume) (1.35 tons/cy) ($7.00/ton) = $3,864
Time = (36,800 cu ft) / (20,100 cu ft/day) = 1.83 days

02220-100-0080 (Masonry Portion, includes disposal)
Volume = (92 ft) (50 ft) (8 ft) = 36,800 cu ft
Boot wash Volume = (12 ft) (5.5 ft) (8 ft) = 528 cu ft
Cost = ($ 0.24 /cu ft) (37,328 cu ft) = $ 8,959
Dump Fee = ((37,328 cu ft) / 27) (0.3 rubble volume) (1.35 tons/cy) ($7.00/ton) = $3,919
Time = (37,328 cu ft) / (20,100 cu ft/day) = 1.86 days

Concrete Demolition
Foundation Volume = (0.67 ft) (2 ft) (284 ft) = (380.6 cu ft) / 27 = 14.1 cu yds
Footing Volume = (0.67 ft) (2 ft) (319 ft) = (427.5 cu ft) / 27 = 15.8 cu yds
Floor Volume = (92 ft) (50 ft) (0.33 ft) = (1518 cu ft) / (27) = 56.2 cu yds
Boot wash Floor Volume =(12 ft) (5.5 ft)(0.33 ft) = (21.8) / 27 = 0.81 cu yds
Total Volume = 86.9 cu yds
Cost = (86.9 CY) ($12.78/CY) = $1,111
Time = (638 s.f.) / (180 s.f./day) + (319 L.F.) / (300 L.F./day) + (4,666 s.f.) / (500 s.f./day) = 13.94 days

02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)
Volume = (86.9 CY) (1.3 swell factor) = 113.0
Cost = (113 CY) ($10.69/CY) = $1,208
Time = (113 cu. yds) / (232 cu. yds/day) = 0.49 days

Cost Subtotal	$ 27,893
Time Subtotal	18.12 days

Shop

02220-100-0012 (Steel Building, includes disposal)
Volume = (40 ft) (93 ft) (14 ft) = 52,080 cu ft
Cost = ($ 0.22 /cu ft) (52,080 cu ft) = $ 11,458
Time = 52,080 cu ft / (21,500 cu ft/day) = 2.42 days

Concrete Demolition
Foundation Volume = (0.67 ft) (4 ft) (197.5 ft) = (649.7 cu ft) / 27 = 24.1 cu yd
Footing Volume = (0.67 ft) (2 ft) (266 ft) = (356.4 cu ft) / 27 = 13.2 cu yd
Floor Volume = (40 ft) (93 ft) (0.33 ft) = (1,228 cu ft) / 27 = 45.5 cu yd
Total Volume = 82.8 cu. yd
Cost = (82.8 cu yd) ($12.78/cu yd) = $1,058
Time = (790 s.f.) / (140 s.f./day) + (266 L.F.) / (300 L.F./day) + (3,720 s.f.) / (400 s.f./day) = 9.30 days

02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)
Volume = (82.8 cu yd) (1.3 swell factor) = 107.6 cu yd
Cost = (107.6 cu yd) ($10.69/cu yd) = $1150
Time = (107.6 cu yd) / (232 cu yd/day) = 0.46 days

Cost Subtotal	$13,666
Time Subtotal	12.18 days

Machine Shop

02220-100-0012 (Steel Building, includes disposal)
Volume = (30 ft) (45 ft) (10 ft) = 13,500 cu ft
Cost = ($ 0.22 /cu ft) (13,500 cu ft) = $ 2,970
Time = (13,500 cu ft) / (21,500 cu ft/day) = 0.63 days

Concrete Demolition
Foundation Volume = (0.67 ft) (1 ft) (135 ft) = (90.5 cu ft) / 27 = 3.4 cu yd
Footing Volume = (0.67 ft) (2 ft) (150 ft) = (201 cu ft) / 27 = 7.4 cu yd
Floor Volume = (30 ft) (45 ft) (0.33 ft) = (445.5 cu ft) / 27 = 16.5 cu yd
Total Volume = 27.3 cu yd
Cost = (27.3 cu yd) ($12.78cu yd) = $349

Time = (135 s.f.) / (140 s.f./day) + (150 L.F.) / (300 L.F./day) + (1,200 s.f.) / (400 s.f./day) = 4.46 days

02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)
Total Volume = (27.3 cu yd) (1.3 swell factor) = 35.5 cu yd
Cost = ($10.69 /cu yd)(35.5 cu yd) = $380
Time = (35.5 cu yd) / (232 cu yd/day) = 0.15 days

Cost Subtotal	$ 3,699
Time Subtotal	5.24 days

Hilfiker Retaining Wall

02220-100-0012 (Steel Building, includes disposal)

Volume = (1,584 sq ft) (0.02 ft) = 32 cu ft
Cost = (32 cu ft) ($0.22/cu ft) = $7
Dump Fee = (32 / 27 cu yd) (0.3 Demolished volume) (1.35 Ton/cu yd) ($7.00/Ton) = $3
Time = (32) / (21,500 cu ft/day) = .01 days

Cost Subtotal	$10
Time Subtotal	.01 days

Coal Processing/Crusher Facility (Tipple)

Primary Structure = 27 ft x 40 ft Approx. (25% is 25 ft high, 50% is 17 ft high, and 25% is 8 ft high.)
Secondary Structure = 20 ft x 30 ft x 51 ft high

02220-100-0012 (Steel Building, includes disposal)
Volume$_1$ = (27 ft) (40 ft) [(25%) (25 ft) + (50%) (17 ft) + (25%) (8 ft)] = 18,090 c.f.
Volume$_2$= (20 ft) (30 ft) (51 ft) = 30,600 c.f.
Cost = ($ 0.22 /cu ft) (48,690 cu ft) = $ 10,712
Dump Fee = (48,690 / 27 cu yd) (0.3 Demolished volume) (1.35 Ton/cu yd) ($7.00/Ton) = $5,113
Time = (48,690 cu ft) / (21,500 cu ft/day) = 2.26 days

02220-100-0100 (Control House, Mixture type, includes disposal)
Volume = (12 ft)(20 ft)(10ft) = 2,400 cu ft
Cost = ($ 0.24 /cu ft) (2,400 cu ft) = $ 576
Dump Fee = (2400 / 27 cu yd) (0.3 Demolished volume) (1.35 Ton/cu yd) ($7.00/Ton) = $252
Time = (2,400 cu ft) / (20,100 cu ft/day) = 0.12 days
Concrete Demolition
Primary Structure Footings = (2 ft x 2 ft x 1.5 ft x 11) / 27 = 2.4 cu yd
Secondary Structure Footings = (3 ft x 3 ft x 2 ft x 4) / 27 = 2.6 cu yd
Primary Structure Floor = (27 ft x 40 ft x (3.5"/12)) / 27 = 11.7 cu yd
Secondary Structure Floor = (20 ft x 30 ft x (3.5"/12)) / 27 = 6.5 cu yd
Total Volume = 2.4 + 2.6 + 11.7 + 6.5 = 23.2 cu yd
Cost = (23.2 cu yd) ($12.78/cu yd) = $297
Time = (38 L.F.) / (300 L.F./day) + (1,680 s.f.) / (400 s.f./day) = 4.33 days

02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)
Total Volume = (23.2 cu yd) (1.3 swell factor) = 30.2 cu yd
Cost =($10.69 /cu. yd.) (30.2 cu yds) = $323
Time = (30.2 cu yds) / (232 cu yds/day) = 0.13 days

Cost Subtotal	$ 17,273
Time Subtotal	6.81 days

Substation Power Transformers

Bear Canyon and Wild Horse Ridge Substations:

(8) Steel I-columns spaced 16 ft apart:
(4) 12 in x 5½ in x 32ft columns and
(4) 7 in x 4.5 in x 32 ft columns.
(17) 7 in x 4.5 in x 16 ft I-beams.
Average beam/column thickness approx. ⅜ in. Cut each column and beam twice.
Cut length = 2 cuts [(4 members) (12 in + 11 in) + (21 members) (7" + 9")] = 856" = 71 ft.
Assume ½ in plate can be cut twice as fast as 1" plate, etc.

02220-790-0010 (Torch Cutting, 1 in Plate)
Equivalent length for 1 in plate) = (⅜) (71 ft) = 26.6 ft
Cutting Cost = ($8.95 /ft) (26.6 ft) = $238
Cutting Time = (26.6 ft) / (85 ft/day) = 0.31 days

02220-300-1570 (750 KVA Transformer)
Cost = 6 Transformers x $665/trans. = $3,990
Time = 6 Trans / (0.45/day) = 13.33 days

Equipment Loading
Assume each beam takes 10 min average and each transformer, etc. takes 20 min average to load with crane.
Transformers, etc.
Time = (25 pieces) (10 min) + (6 pieces) (20 min) = 6.2 hrs = 0.77 days
01590-600-2500 (Crane Loading)
Crane + operator = (6.2 hrs) ($133.72 /hr) = $846
01590-200-5300 (Dump Truck and CLAB)
Truck + operator = (6.2 hrs) ($102.99/hr) (2) = $1,277
CLAB = (6.2 hrs) ($35.75/hr) (2) = $443

Concrete Demolition
Slab Volume=(19 ft) (19ft) (6/12) = (180.5 cu ft) / 27 = 6.69 CY x 2 slabs = 13.4 cu yd
Cost = ($12.78 /cu yd) (13.4 cu yd) = $171
Time = 13.4 cu yd / (45 cu yd/day) = 0.30 days

02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)
Volume = 13.4 cu yd x 1.3 swell factor = 17.4 cu yd
Cost = ($10.69 /cu yd) (17.4 cu yd) = $186
Time = (17.4 cu yd) / (232 cu yd/day) = 0.08 days

02220-875-0700 (Chain Link Fence)
Length = 157 ft x 2 = 314 ft
Cost = ($2.51/ft) (314 ft) = $ 788
Time = (314 ft) / (280 ft/day) = 1.12 days

Cost Subtotal	$ 7,939
Time Subtotal	15.91 days

Coal Storage Bin

Approx. 20 ft x 20 ft high bin (½ in plate with stiffeners, tapers down at bottom) with (4) 12 in I-beams (30 ft legs) and angles for cross bracing.

Cut into pieces and load in dumpster. Assume average thickness of bin w/stiffeners, etc. equal to ⅝ in plate. Cut each side 3 places and each leg twice.
Approx cut length= (3 cuts) (4 sides) (20 ft) + (2 cuts) (4 legs) (32 in / 12) = 261.3 ft

02220-790-0010 (Torch Cutting, 1 in Plate)
Equivalent length (For 1 in plate) = (⅝) (261.3 ft) = 163.3 ft
Cutting cost = ($8.95 /ft) (163.3 ft) = $1,462
Cutting time = (163.3 ft) / (32 ft/day) = 5.10 days

01590-600-2500 (Crane - 25 Ton), 01590-200-5300 (Dump Truck - 16 Ton)
Assume each piece takes 20 min. average to load in dumpster with crane after cutting.
Number of pieces = 12 plates + 4 legs = 16 pieces
Time = 16 (.33 hr) = 5.28 hrs
Crane + operator = (5.28 hrs) ($ 132.52 /hr) = $700
Dump Truck = (5.28 hrs) ($102.99/hr) (2) = $1088
CLAB = (5.28 hrs) ($35.75/hr) (2) = $378
Time = 0.66 days

Concrete Demolition
Wall Volume = (60 ft) (6 ft) (1ft) = 360 cu ft
Footing Volume = (4) (3 ft) (3 ft) (1 ft) = 36 cu ft
Slab Volume = (30 ft) (30 ft) (8"/12) = 600 cu ft
Volume = 360 + 36 + 600 = 996 cu ft / 27 = 36.9 cu yd
Cost = ($12.78 /cu yd) (36.9 cu yd) = $ 472
Time = (36.9 cu yd) / (35 cu yd/day) = 1.05 days

02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)
Volume = 36.8 cu yd * 1.3 swell factor = 47.8 cu yd
Cost = ($10.69/cu yd (47.8 cu yd) = $511
Time = (47.8 cu yd) / (232 cu yd/day) = 0.21 days

Cost Subtotal	$ 4,612
Time Subtotal	7.02 days

Lump Coal Bin

Approx. 30 ft x 36 ft x 20 ft high bin (½ in plate with leg/stiffeners around outside, tapers down at bottom). Cut into pieces and load in dumpster. Assume average thickness of bin with stiffeners, etc. equal to ⅝ in plates.

Cut 2 Sides 4 places and 2 sides 5 places.
Approx. cut length = (4 cuts) (2 sides) (20 ft) + (5 cuts) (2 sides) (20 ft) = 360 ft

02220-790-0010 (Torch Cutting, 1 Plate)
Equivalent length (for 1 in plate) = (⅝) (360 ft) = 225 ft
Cutting cost = ($ 8.95/ft) (225 ft) = $ 2,014
Cutting time = 225 ft / (32 ft/day) = 7.03 days

01590-600-2500 (Crane - 25 Ton), 01590-200-5300 (Dump Truck - 16 Ton)
Assuming each piece takes 10 min. average to load in dumpster with crane after cutting.
Number of pieces = 18 plates + 8 legs = 26 pieces
Time = 26 (0.17 hrs) = 4.42 hrs
Crane + operator = (4.42 hrs) ($ 133.72/day) = $591
Dump Truck = (4.42 hrs) ($102.99/hr) (2) = $910
CLAB = (4.42 hrs) ($35.75/hr) (2) = $316
Time = 0.55 days

Concrete Demolition
Footing Volume = [2 (36ft) + 30 ft] (2ft) (1ft) = 204 cu ft / 27 = 7.56 cu yd
Cost = ($12.78/cu yd) (7.56 cu yd) = $97
Load and Haul = (7.56) (1.3 swell factor) ($4.39) = $43
Time = (7.56 cu yd) / (25 ft/day) = 0.30 days
02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)
Volume = 7.56 cu yd * 1.3 swell factor = 9.8 cu yd
Cost = ($ 10.69/cu yd) (9.8 cu yd) = $ 105
Time = (9.8 cu yd) / (232 cu yd/day) = 0.04 days

Cost Subtotal	$ 4,033
Time Subtotal	7.92 days

Coal Recovery Bin Foundation

02220-875-5200 (Reinforced Concrete)
Volume = (2.5 ft) (1 ft) (12 ft) (4) + (12 ft) (12 ft) (0.33 ft) = (167.52 cu ft) / 27 = 6.2 cu yd
Cost = ($12.78/cu yd) (6.2 cu yd) = $79
Time = (6.2 cu yd) / (25 cu yd/day) = 0.25 days

02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)
Volume = 6.2 cu yd * 1.3 swell factor = 8.1 cu yd
Cost = ($ 10.69/cu yd) (8.1 cu yd) = $87
Time = (8.1 cu yd) / (232 cu yd/day) = 0.03 days

Cost Subtotal	$ 166
Time Subtotal	0.28 days

Wild Horse Ridge Coal Storage Bin

Approx. 30 ft high x 50 ft diameter bin (½ in plate with stiffeners, tapers down at bottom) with (4) 12 in I-beams (30 ft legs).
Circumference = 157 ft.
Cut into pieces and load in dumpster. Assume average thickness of bin w/stiffeners, etc. equal to ⅝ in plate.
Cut sides into 20 ft x 8 ft pieces and each leg twice.
Approx cut length= (3 cuts)(157 ft) + (8 cuts)(30 ft) + (2 cuts) (4 legs) (32 in / 12) = 732.3 ft

02220-100-0010 (Torch Cutting, 1 in Plate)
Equivalent length (For 1 in plate) = (⅝) (732.3 ft) = 457.7 ft
Cutting cost =($8.95 /ft) (457.7 ft) = $4,096
Cutting time = (457.7 ft) / (32 ft/day) = 14.3 days

01590-600-2500 (Crane - 25 Ton), 01590-200-5300 (Dump Truck - 16 Ton)
Assume each piece takes 10 min. average to load in dumpster with crane after cutting.
Number of pieces = 32 plates + 8 legs = 40 pieces
Time = 40 (.17 hr) = 6.80 hrs
Crane + operator = (6.80 hrs) ($133.72 /hr) = $909
Truck + operator = (6.80 hrs) ($102.99 /hr) (2) = $1400
CLAB = (6.80 hrs) ($35.75 /hr) (2) = $486
Time = 0.85 days

Concrete Demolition
Wall Volume = (120 ft) (6 ft) (0.67 ft) = 482 cu ft
Footing Volume = (4) (3 ft) (3 ft) (1 ft) = 36 cu ft
Slab Volume = (60 ft) (50 ft) (0.5 ft) = 1,500 cu ft
Volume = 482 + 36 + 1,500 = cu ft / 27 =74.7 cu yd
Cost =($12.78 /cu yd) (74.7 cu yd) = $955
Time = (74.7 cu yd) / (35 cu yd/day) = 2.13 days

02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)
Volume = (74.7 cu yd) (1.3 swell factor) = 97 cu yd
Cost =($10.69/cu yd) (97 cu yd) = $1,037
Time = (97 cu yd) / (232 cu yd/day) = 0.42 days

Cost Subtotal	$8,883
Time Subtotal	17.7 days

Ditch D-8D Concrete Crossing Structure

Concrete Demolition

Volume = (35 ft) (12 ft) (0.67 ft) = (281.4 cu ft) / 27 = 10.4 cu yd
Cost = ($ 12.78/cu yd) (10.4 cu yd) = $ 133
Time = (10.4 cu yd) / (45 cu yd/day) = 0.23 days

02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)

Volume = (10.4 cu yd) (1.3 swell factor) = 13.5 cu yd
Cost = ($ 10.69/cu yd) (13.5 cu yd) = $ 144
Time = (13.5 cu yd) / (232 cu yd/day) = 0.06 days

Cost Subtotal	$ 277
Time Subtotal	0.29 days

Lump Coal Storage Pad

Concrete Demolition

Wall Volume = (38ft) (4ft) (1ft) + (80ft) (4ft) (1ft) = (472 cu ft) / 27 = 17.5 cu yd
Slab Volume = (38 ft) (80 ft) (0.67) = (2,027 cu ft) / 27 = 75.1 cu yd
Total Volume = 17.5 + 75.1 = 92.6 cu yd
Cost = ($ 12.78/cu yd) (92.6 cu yd) = $ 1,183
Time = (92.6 cu yd) / (35 cu yd/day) = 2.65 days

02220-875-5550 (Concrete disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)

Volume = (92.6 cu yd) (1.3 swell factor) = 120.4 cu yd
Cost = ($ 10.69/cu yd) (120.4 cu yd) = $ 1,287
Time = (120.4 cu yd) / (232 cu yd/day) = 0.52 days

Cost Subtotal	$ 2,470
Time Subtotal	3.17 days

Equipment Wash Pad

Concrete Demolition

Volume = (25 ft) (40 ft) (0.5 ft) = (500 cu ft) / 27 = 18.5 cu yd
Cost = ($ 12.78/cu yd) (18.5 cu yd) = $ 236
Time = (18.5 cu yd) / (45 cu yd/day) = 0.41 days

02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)

Volume = (18.52 cu yd) (1.3 swell factor) = 24.1 cu yd
Cost = ($ 10.69/cu yd) (24.1 cu yd) = $ 258
Time = (24.1 cu yd) / (232 cu yd/day) = 0.10 days

Cost Subtotal	$ 494
Time Subtotal	0.51 days

Transformer Pad by Shop

Concrete Demolition

Volume = (9 ft) (11 ft) (0.5 ft) = (49.5 cu ft) / 27 = 1.8 cu yd
Cost = ($ 12.78 /cu yd) (1.8 cu yd) = $ 23
Time = (1.8 cu yd) / (45 cu yd/day) = 0.04 days

02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320 (16 ton truck)

Volume = (1.8 cu yd) (1.3 swell factor) = 2.3 cu yd
Cost = ($ 10.69/cu yd) (2.3 cu yd) = $ 25
Time = (2.3 cu yd) / (232 cu yd/day) = 0.01 days

Cost Subtotal	$ 48
Time Subtotal	0.05 days

Water Tanks

Four tanks approx. 14 ft diam. x 10 ft high and one tank approx. 10 ft diam. x 20 ft high with average 3 in diam. x ¼ in pipe top and bottom.

14 ft diam. tank area = 153.9 sq ft
10 ft diam. tank area = 78.5 sq ft

02220-100-0012 (Structure Demolition, includes disposal)

Volume = (10 ft) (153.9 sq ft) (4) + (20 ft) (78.5 sq ft) (1) = (7,726cu ft) / 27 = 286.2 cu yd
Cost = ($ 5.94/cu yd) (286.2 cu yd) = 1,700
Assume each tank takes 1 hour
Time = (1 hr) (5) = 0.625 day

Cost Subtotal	$ 1,700
Time Subtotal	0.625 days

Fuel Storage, Coal Spray and Antifreeze Tanks

(2) Tanks approx 13.5 ft diam. x 10 ft high
(1) Tank approx 11.5 ft diam. x 23 ft high
(3) Tanks approx 9 ft diam. x 19 ft high
(1) Tank approx 4 ft diam. x 11 ft long
(1) Tank approx 7 ft diam x 7 ft high w/ 9.5 ft diam x 5 ft high outer tank
(8) Tanks - Total

13.5 ft diam. tank area = 143.1 sq ft
11.5 ft diam. tank area = 103.9 sq ft
9 ft diam. tank area = 63.6sq ft
4 ft diam. tank area = 12.6 sq ft
7 ft diam. tank area = 38.5 sq ft

02220-100-0012 (Structure Demolition, includes disposal)
Volume = (10 ft) (143.1 sq ft) (2) + (23 ft) (103.9 sq ft) (1) + (19 ft) (63.6 sq ft) (3) + (11 ft) (12.6 sq ft) (1) + (7 ft) (38.5 sq ft) (1) = (9285 cu ft) / 27 = 343.9cu yd
Cost = ($ 5.94/cu yd) (343.9 cu yd) = 1,364
Assume each tank takes 1 hour
Time = (1 hr) (8) = 1 day

Cost Subtotal	$ 2,043
Time Subtotal	1.03 day

Fuel Lines

02300-900-0610 (Excavate pipeline)
Trench Length = 360 ft x 2 ft x 3.5 ft
Volume = (360 ft) (2 ft) (3.5 ft) = (2,520 cu ft) / 27 = 93.3 cu yd
Cost = ($ 2.41/cu yd) (93.3 cu yd) = $ 225
Time = (93.3 cu yd) / (600 cu yd/day) = 0.16 days

02220-875-3200 (Pipe Removal)
Pipe length = 400 ft x 2 pipes = 800 ft
Cost = ($ 6.95/ft) (800 ft) = $ 5,560
Time = (800 ft) / (160 ft/day) = 5 days

02300-900-3080 (Backfill trench)
Volume = 93.3 cu yd
Cost = ($ 1.56/cu yd) (93.3 cu yd) = $ 146
Time = (93.3 cu yd) / (600 cu yd/day) = 0.16 days

Cost Subtotal	$ 5,931
Time Subtotal	5.32 days

Fans

3 Fans; below are approx dimensions for all fans.

Fan enclosure and explosion doors, ⅛ in steel plate welded, approx dimensions:

(4) 10.5 ft x 10.5 ft plate
(2) 11 ft x 5 ft plate
(1) 7½ ft x 13 ft plate
(1) 4 ft x 9 ft diam. fan
(1) 15 ft long x 10 ft diam., taper to 9 ft diam x ¾ horn (3, 5 ft sections bolted).
(1) 4 ft x 9 ft diam. x ¾ in ring between fan and horn

Torch cut plates, and bolts (assumed jammed)

Approx cut length = (2) (4) (10.5 ft) + (2) (2) (11 ft) + (2) (1) (13 ft) = 154 ft (2 cuts per plate) * 3 = 462ft

02220-790-0010 (Torch Cutting, 1 in Plate)

Equivalent length (for 1 in plate) = (⅛) (462 ft) = 57.75 ft
Cutting Cost = ($ 8.95 /ft) (57.75 ft) = $517
Cutting Time = (57.75 ft) / (32 ft/day) = 1.8 days

Horn sections and ring bolted together with ¾ in diam bolts at 1 ft spacing.

Number of Bolts = (3 Seems) [(pi) (10 ft)] = 95 bolts

02220-790-0040 (Torch Cutting 1 in diam Bar)

Equivalent bolts (for 1 in diam) = (¾) (95 bolts) = 72 bolts
Cutting Cost = ($ 1.36 /bolt) (72 bolts) (3 fans) = $294
Cutting Time =(72 bolts) / (210 bolts/day) = 0.34 days (3 fans) = 1.02 days

01590-600-2500 (Crane - 25 Ton), 01590-200-5300 (Dump Truck - 16 Ton)

Assume each piece takes 10 min. average to load with crane after cutting.
Number of pieces = 3 fans [7 plates + 1 fan + 3 horn sections + 1 ring] = 36 pieces
Time = 36 (0.17 hr) = 6.12 hrs
Crane + operator = (6.12 hrs) ($133.72/hr) = $818
Truck and operator + CLAB - (6.12 hr) ($138.74) (2) = $1,698
Time = 0.77 days

Concrete Demolition

Footing Volume = [2 (2 ft) (7½ ft) (8/12)] (3 fans) = 60 cu ft
Slab Volume = (13 ft) (16 ft) (8/12) (3 fans) = 416 cu ft
Volume = (60 + 416)/27 = 17.63 cu yd
Cost = ($ 12.78 /cu yd) (17.63 cu yd) = $ 225
Time = (17.63 cu yd) / (45 cu yd/day) = 0.39 days

02220-875-5550 (Concrete Disposal on Site), 002315-400-1300 (3 CY loader), 02320-200-0320 (16 ton truck)

Volume = (17.63 cu yd) (1.3 swell factor) = 22.9 cu yd
Cost = ($10.69 /cu yd) (22.9 cu yd) = $ 245
Time = (22.9 cu yd) / (232 cu yd/day) = 0.10 days

Cost Subtotal	$ 3,797
Time Subtotal	4.08 days

Structures and Conveyors (Including Loadouts)

Below are approximate average dimensions used to estimate all conveyors and support towers. Typical conveyor truss approx 5 ft x 5 ft x 40 ft long sections with angles at corners and bar or angle cross members with 2 ft wide walkway. Some conveyors also contain an underpan approx ¼" thick x 11 ft lineal width.

Conveyor length = 6,230 ft
Underpan length = 2,340 ft

Typical conveyor Tower.
(4) 8 in diam. x ¼ in pipe x 60 ft high legs (average) spaced 8 ft apart with 6 in diam. x ¼ in pipe cross members at approx 45° angle.

Number of Towers = 39

02220-100-0012 (Metal Structure Demolition, includes disposal)
Volume = (6230 ft) (5 ft) (5ft) + (60 ft) (8 ft) (8ft) (39) = (305,510 cu ft) / 27 = 11,315.2 cu yd
Cost = ($ 5.94 / cu yd) (11,315.2) = $ 67,212

Concrete Demolition
Volume = (39 towers + 8 ground footings) (4) (3ft) (3ft) (1ft) = (1,692 cu ft) / 27 = 62.6 cu yd
Cost = ($ 12.78/cu yd) (62.6 cu yd) = $ 800
Time = (62.6 cu yd) / (45 cu yd/day) = 1.39 days

02220-875-5550 (Concrete Disposal on Site), 002315-400-1300 (3 CY loader), 02320-200-0320 (16 ton truck)
Volume = 62.6 cu yd * 1.3 swell factor = 81.4 cu yd
Cost = ($ 10.69/cu yd) (81.4 cu yd) = $ 870
Time = (81.4 cu yd) /(232 cu yd/day) = 0.35 days

Cost Subtotal	$ 68,882
Time Subtotal	34.44 days

Building Enclosure for Tank Seam Belt Portal

02220-100-0012 (Steel Building, includes disposal)
Volume = (12 ft) (12 ft) (8 ft) = 1,152 cu ft
Cost = ($ 0.22/cu ft) (1,152 cu ft) = $ 253
Time = (1,152 cu ft) / (21,500 cu ft/day) = 0.05 days

Cost Subtotal	$ 253
Time Subtotal	0.05 days

Septic Tanks

Assume tanks will be disposed of at their current location, so removal of tanks will not be necessary.

# of Tanks:		
	1	Shop Building
	1	Scalehouse
	2	Bathhouse

02315-400-0260 (Excavation of Tank), 02315-900-3080 (Backfill Trench)
Tank Volume = (10 ft) (10 ft) (3 ft) (4) = (1200 cu ft) / 27 = 44.4 cu yd
Cost = ($3.13 / cu yd) (44.4 cu yd.) = $139
Average Time = 2 Tanks/day; Time = 2 days (concurrent with Bathhouse removal)

Concrete Demolition
Average Volume = 1.5 cu yd/Tank x 4 Tanks = 6 cu yd *
Cost = ($ 12.78/cu yd) (6 cu yd) = $ 77
Time = (6 cu yd) / (45 cu yd/day) = .13 days

02220-875-5550 (Concrete Disposal on Site)
Average Volume = 1.5 cu yd/Tank x 4 Tanks = 6 cu yd * 1.3 swell factor = 8 cu yd
Cost = ($ 10.69/cu yd) (8 cu yd) = $ 85
Time = (8 cu yd) /(232 cu yd/day) = 0.03 days

Cost Subtotal	$ 756
Time Subtotal	0.16 days

Loadout Watchman's Shack

Trailer House 8 ft x 8 ft x 7 ft high
Load with crane and haul off. Assume 2 hours to load, 2 hours to haul:

02220-100-0100 (Mixed Material Building)
Volume = (8 ft) (8 ft) (7 ft) = 448 cu ft
Cost = ($ 0.24 / cu ft) (448 cu ft) = $108
Dump Fee = ((448 cu ft) / 27) (.3 rubble volume) (1.35 tons/cycle) ($7.00 / ton) = $47

Cost Subtotal	$155
Time Subtotal	0.5 days

Powder and Cap Magazines

2 Steel structures: Approx. 5 ft x 6 ft x 8 ft high
Load into dumpster. Assume 15 minutes/structure

02220-100-0012 (Steel Building Demolition, includes disposal)
Volume = (5 ft) (6 ft) (8 ft) (2) = 480 ft cu ft
Cost = (480 cu ft) ($0.22 / cu ft) = $106
Time = 0.06 days

Cost Subtotal	$ 106
Time Subtotal	0.06 days

Conveyor Belt Tunnels

6" reinforced concrete walls, roof and floor. Dimensions = 8' W x 7' H
Total length of tunnels = 470'

Concrete Demolition

Volume = (470 ft) [(7 ft) (2) + (8 ft) (2)] (0.5 ft) = 7,050 cu ft / 27 = 261 cu yd
Cost = ($12.78/cu yd) (261 cu yd) = $3,336
Time = (261 cu yd) / (45 cu yd/day) = 5.8 days

02220-875-5550 (Concrete Disposal on Site), 002315-400-1300 (3 CY loader), 02320-200-0320 (16 ton truck)

Volume = 261 cu yd * 1.3 swell factor = 339 cu yd
Cost = ($10.69/cu yd) (339 cu yd) = $3,624
Time = (339 cu yd) /(232 cu yd/day) = 1.46 days

Cost Subtotal	$6,960
Time Subtotal	7.26 Days

Power Lines & Poles

Power Pole Removal: (50 poles)($100/pole) = $5,000
Wire length: (8,700 ft) ($11.30/100 ft) = $983

Cost Subtotal	$5,983
Time Subtotal	2 Days (est)

Fuel Containment Enclosure

8" reinforced concrte walls (160 ft. in length), and 6" floor.

Concrete Demolition

Volume = [(160 ft.) (2.5 ft) (.67) + (1,500 ft²) (0.5 ft) = 1018 cu ft / 27 = 38 cu yd
Cost = ($12.78/cu yd) (38 cu yd) = $486
Time = (38 cu yd) / (45 cu yd/day) = 0.84 days

02220-875-5550 (Concrete Disposal on Site), 002315-400-1300 (3 CY loader), 02320-200-0320 (16 ton truck)

Volume = 38 cu yd * 1.3 swell factor = 49 cu yd
Cost = ($10.69/cu yd) (49 cu yd) = $528
Time = (49 cu yd) / (232 cu yd/day) = 0.21 days

Total remove structures	
Cost Total	$ 210,403
Time Total	168.86 days

Soil Placement and Ripping

Soil Placement Volume Summary: (See Tables 3L-1 and 8.9-3)

Tank Seam Access Road & Portal Pad (TS-10 & TS-11)

See Appendix 3-H.

Cut Subtotal	20,310 cu yds
Fill Subtotal	20,310 cu yds

Upper Storage Pad (TS-8)

See Appendix 3-L, Table 3L-7

Cut Subtotal	3,666 cu yds
Fill subtotal	5,618 cu yds

Portal Pad Area & Road (TS-7)

See Appendix 3-L, Table 3L-6.

Section E-E	Cut (250 sq ft) x (340 ft) = 85,000 cu ft = 3,148 cu yds	
	Fill (350 sq ft) x (340 ft) = 119,000 cu ft = 4,408 cu yds	
Section F-F	Cut (450 sq ft) x (210 ft) = 94,500 cu ft = 3,500 cu yds	
	Fill (450 sq ft) x (210 ft) = 94,500 cu ft = 3,500 cu yds	
	Cut Subtotal	6,445 cu yds
	Fill subtotal	18,037 cu yds

Portal Access Road (TS-6)

See Appendix 3-L, Table 3L-5.

Section H-H	Cut (140 sq ft) x (1,500 ft) = 210,000 cu ft =	8,126 cu yds
	Fill (165 sq ft) x (1,500 ft) = 247,500 cu ft =	5,573 cu yds

Coal Storage Pad (TS-5)

See Appendix 3-L, Table 3L-4.

Cut Subtotal	40,585 cu yds
Fill Subtotal	25,157 cu yds

Scale House and Sediment Pond B (TS-3)
See Appendix 3L, Table 3L-2

Cut Subtotal	1,454 cu yds
Fill Subtotal	1,454 cu yds

Sediment Pond "A" (TS-4)
See Appendix 3-L, Table 3L-3.

Cut (350 sq ft) x (120ft) = 42,000 cu ft =	3,460 cu yds
Fill (350 sq ft) x (120ft) = 42,000 cu ft =	3,460 cu yds

Shower House and Sediment Pond C (TS-9)
See Appendix 3-L, Table 3L–8.

Cut (500 sq ft) x (185ft) = 92,500 cu ft =	5,851 cu yds
Fill (500 sq ft) x (185ft) = 92,500 cu ft =	5,851 cu yds

Wild Horse Ridge (TS-12 thru TS-15)
See Appendix 3-O, Table 3O-2, 3 & 4

Cut Subtotal =	23,641 cu yds
Fill Subtotal =	23,641 cu yds

Note: Approximately 12,500 cu yds of the Wild Horse Ridge volume will be regraded using a D9 dozer, and the remaining volume will regraded using a 330BL Excavator.

Wild Horse Ridge Tank Seam (TS-16 thru TS-17)
See Appendix 3-P.

Cut Subtotal	11,089 cu yds
Fill Subtotal	11,089 cu yds

Cut Total =	112,025 cu yds
Fill Total =	112,025 cu yds

SOIL PLACEMENT

Areas		Earth		Equipment			
Time							
Cost		Moved	Cu Yds	Used	Cost/hr	(hrs)	
Tank Seam Access Road		Cut	20,310	330BL	$153.13	20.2	$ 3,093
& Portal Pad (TS-10 & TS-11)	Fill	20,310					
		Hauled	10,661				
Upper Storage Pad	Cut	3,666		330BL	$153.13	14.6	$ 2,236
(TS-8)		Fill	7,022				
Portal Pad Area & Road		Cut	6,445	330BL	$153.13	37.7	$5,773
(TS-7)		Fill	18,037				
Portal Access Road	Cut	8,126		330BL	$153.13	11.65	$ 1,784
(TS-6)		Fill	5,573				
		Excess Cut	2,553	included in fill volumes above			
Coal Storage Pad		Cut	40,585	D9 Cat	$190.80	50.3	$ 9,597
(TS-5)		Fill	25,157				
		Excess Cut	15,428	included in fill volumes above			
Scale House/ Sed Pond B		Cut	1,454	D9 Cat	$190.80	2.9	$ 553
(TS-3)		Fill	1,454				
Sediment Pond "A"	Cut	3,460		D9 Cat	$190.80	6.9	$ 1,317
(TS-4)		Fill	3,460				
Shower House/ Sed Pond C	Cut	5,851		D9 Cat	$190.80	11.7	$ 2,232
(TS-9)		Fill	5,851				
Wild Horse Ridge Area***	Cut	11,141		330BL	$153.13	23.3	$ 3,568
(TS-12 thru TS-15)		12,500		D9 Cat	$190.80	25.0	$ 4,770
		Fill	23,641				
Wild Horse Ridge Tank Seam	Cut	1,016		D9 Cat	$153.13	1.87	$ 286
			10,073	330BL	$190.80	20.1	$ 3,835
(TS-16 thru TS-17)	Fill	11,089					
Totals		Cut	110,462			219.82	$ 39,044
		Fill	110,708			(27.48 days)	

*See Appendix 3-L and the following page.

**Excess Cut will be hauled from TS-5 and TS-6 to TS-7 and TS-8, as discussed in Appendix 3-L.

***Wild Horse Ridge material being relocated with the excavator will be hauled an average distance of 200 ft, as shown on the following pages.

HAULING

They will be loaded with the 330BL.

Round trip time for 1 truck = (load time) + (dump time) + 2(haul time):
330BL load time = 4 cycles * .3 min/cycle = 1.2 min.

Round trip time (with 330BL) = 1.2 + .8 + 2(haul time) = 2.0 min. + 2(haul time)

Tank Seam Access Road & Portal Pad Area

Of the total soil to be moved (20,310 cu yd) 10,661 cu yd will need to be hauled from one part of this area to another as needed.

Material will be loaded with 330BL.
Avg. haul time = 2.8 min.
Round trip time for 1 truck load (with 330BL): = 2.0 + 2(2.8) = 7.65 min.
Number of loads = 10,661 cu yd/10 cu yd truck = 1,066 loads
330BL time = (7.65 min) (hr/60 min) (1,066 loads) / 4 trucks = 34 hrs = 1.5 days

330BL cost = ($146.92/hr) (34hrs) =	$ 4,995
Dump Truck cost = ($68.38/hr) (34 hrs) (4 trucks) =	$ 9,300
	$ 14,295

Excess Cut From Coal Storage Pad and Portal Access Road to Upper Areas:

Avg. haul time = 6 min.
Round trip time for 1 truck load (980 Loader) =2.0 + 2(6) = 6 min.
Number of loads = 18,046 cu yd / 14 cu yd truck = 1,289 loads
Hauling time = (17 min.)(hr/60 min)(1,289 loads)/14 trucks = 26.1 hrs
= 3.3 days (concurrent with soil placement)

980G EROPS (9-26) (3Q00) cost = ($142.77/hr) (6.1 hrs) =	$ 3,726
Dump Truck cost = ($68.38/hr)(21.3 hrs)(14 trucks)=	$ 24,986
	$ 28,712

Moving Excavator material for Wild Horse Ridge regrading:

Avg. Distance = 200 ft = 0.04 miles @ avg. Speed of 7 MPH; haul time = 0.34 min.
Round trip time for 1 truck load (980 Loader) = 5.88 + 2(0.34) = 6.56 min.
Number of loads = (11,141 cu yd) / (10 cu yd truck) = 1,114 loads
Hauling =(6.56 min)(hr/60 min)(1,114 loads)/(3 trucks)= 40.6 hrs = 5.1 days (concurrent w/soil placement)

Topsoil must be hauled from the storage area to the Upper Conveyor Access Road and the Portal Pad:
2,171 cu yds will be hauled an average distance of 2,000 ft. (60)(0.38 miles)/(7 MPH) = 3.25 min.
4,860 cu yds will be hauled an average distance of 4,500 ft. (60)(0.85 miles)/(7 MPH) = 7.29 min.
Round trip 1 = 5.88 + 2(3.25) = 12.38 min.; Number of loads = (2,171 cu yd)/(10 cu yd truck) = 217 Loads

Hauling = (12.38 min)(hr/60 min)(217)/(3 trucks) = 14.9 hrs = 1.9 days (concurrent w/soil placement)
Round trip 2 = 5.88 + 2(7.29) = 20.46 min.; Number of loads = (4,860 cu yd)/(10 cu yd truck) = 486 Loads
Hauling = (20.46 min) (hr/60 min)(486)/(3 trucks) = 55.2 hrs = 6.9 days (concurrent w/soil placement)

980 loader cost = ($142.77/hr) (40.6 + 14.9 + 55.2 hrs) =	$15,805
Dump Truck cost = ($68.38/hr) (40.6 + 14.9 + 55.2 hrs) (3 trucks) =	$23,788
	$39,593

Moving Excavator material for WHR Tank Seam regrading.

Avg. Distance = 390 ft = 0.07 miles @ avg. Speed of 7 MPH; haul time = 0.49 min.
Round trip time for 1 truck load (980 Loader) = 5.88 + 2(0.49) = 6.86 min.
Number of loads = (10,095 cu yd) / (10 cu yd truck) = 1,110 loads
Hauling =(6.86 min)(hr/60 min)(1,110 loads)/(3 trucks)= 42.3 hrs = 5.3 days (concurrent w/soil placement)

980 loader cost = ($142.77/hr) (42.3 hrs) =	$6,039
Dump Truck cost = ($68.38/hr) (42.3 hrs) (3 trucks) =	$8,677
	$14,716

Cost Subtotal	**$ 97,316**
Time Subtotal	**9.9 days**

Hauling Material to Fill Borehole

10,560 cu yd will need to be hauled from the Blind Canyon Seam portal.
Round trip time:
- Loader haul time = 0.3 miles @ 7 mph x 2 loads = 5.14 min. to haul
- Loader cycle time = 2 cycles/(106 cycles/hr) = 1.13 min. to load
- Truck haul time = 1.1 miles @ 7 mph = 9.43 min.

Total cycle time = 15.70 min.
Number of loads = 10,560 cu yd/10 cu yd truck = 1,056 loads
980 Loader time = (15.7 min) (hr/60 min) (1,056 loads) /13 trucks = 21.2 hrs.
= 2.65 days (concurrent with soil placement)

CAT 330BL cost = ($153.13/hr) (21.2 hrs) =	$3,384
980 Loader cost = ($142.77/hr) (21.2 hrs) =	$3,027
Dump Truck cost = ($68.38/hr) (21.2 hrs) (13 trucks) =	$18,846
	$ 25,257

Cost Subtotal	**$ 25,257**
Time Subtotal	**2.65 days**

Soil Placement Cost Subtotal =	$ 39,044
Hauling Excess Cut Cost Subtotal =	$ 97,316
Filling Borehole Cost Subtotal =	$ 25,257

Cost Total	**$178,617**
Time Total	**36.2**

d. Channel Restoration

EXCAVATION OF RECLAIMED CHANNELS

Channel	Channel Length[1] (ft)	Channel Area[2] (sq ft)	Channel Volume (cu yd)	Culvert Diam. (in)	Culvert Length (ft)	Culvert Area (sq ft)	Culvert Volume (cu yd)	Excavated Volume (cu yd)
RC-1	320	42	498	N/A				498
RC-2	640	64.5	1,529	30	150	4.9	27	
				18	350	1.77	23	1,479
RC-3	1,030	64.5	2,461	18	200	1.77	13	2,448
RC-4	160	39	231	12	170	0.79	5	226
RC-5	165	30	183	12	170	0.79	5	178
RC-6	25	48	44	--	--	--	--	44
RC-7	80	238	705	36	80	7.1	21	451
				120	80	78.5	233	
RC-8	50	192	356	30	50	4.9	9	347
RC-9	510	204	3,853	30	510	4.9	93	3,844
RC-10	160	255	1,511	60	160	19.63	116	1,395
RC-11	40	32	47	18	40	1.77	3	44
RC-12	230	36	307	--	--	--	—	307
Totals			11,725				563	11,261

Notes:
1 See plates 7-8A, 7-8B.
2 See appendix 7-H.

022 254 1320 Excavation

Volume = 11,269 cu yds
Time =11,269 cu yds/(330 cu yd/hr) = 34.14 hrs = 4.3 days
Cost = (11,269 cu yd) ($11.56/cu yd) = $130,270

RCP Culverts (RC-10):

Concrete Demolition

Volume = pi(5 ft)(4/12)(140 ft) = 733 cu ft/27 = 27.15 cu yd
Cost = ($12.78 /cu yd) (27.15 cu yd) = $347
Time = 27.15 cu yd/(45 cu yd/day) = 0.60 days

02220-875-5550 (Concrete Disposal on Site)
002315-400-1300 (3 CY loader)
02320-200-0320 (16 ton truck)

Volume = (27.15 cu yd) (1.3 swell factor) = 35.3 cu yd
Cost =($10.69/cu yd)(35.3 cu yd) = $ 377
Time = 35.3 cu yd/(232 cu yd/day) = 0.15 days

Cost Subtotal	$130.994
Time Subtotal	5.05 days

RIP RAP VOLUME SUMMARY

Reclaimed Channel	Reclaimed Length[1] (ft)	Rip Rap Area [2] (sq ft)	Rip Rap Volume (cu yd)
RC-1	320	24.1	376
RC-2	640	34.0	806
RC-3	1,030	34.0	1,297
RC-4	160	21.4	127
RC-5	165	16.4	100
RC-6	25	10.7	10
RC-7	80	131.4	389
RC-8	50	105.5	195
RC-9	510	112.3	2,121
RC-10	160	152	901
RC-11	40	10.7	16
RC-12	230	19.9	169
RC-RD2	950	4.5	158
RC-RD4	730	4.5	122
RC-RD8	1,010	3.9	146
RC-RD9	650	4.5	108
RC-RD12	300	1.4	15
RC-RD13	380	1.4	20
RC-RD20	329	0.6	7
RC-RD21	186	0.2	1
Total			7,084

Notes:
1 See plates 7-7, 7-7A, 7-8A, 7-8B.
2 See appendix 7-H.

022 712 0100 Riprap machine placed for slope protection
Total volume = 7,084 cu yd
Cost = ($38.5 /cu yd) (7,084 cu yd) = $272,734
Time = (7,084 cu yd) / (62 cu yd/day) = 114.3 days

e. Revegetation

Hydroseeding (Section 9.5)

C0150256 (Hydro Spreader)
Area = 38.3 acres = 1,669 MSF
Cost = ($19.85/MSF) (1,669 MSF) = $33,130

C0150255 (Tractor Spreader)
Area = 38.3 acres = 1,669 MSF
Cost = ($10.28/MSF) (1,669 MSF) = $17,157

C0150251 (Seed Material)
Area =38.3 acres
Cost = ($974.10/acre) (38.3) = $37,308

C0150253 (Hydromulch)
Area = 38.3
Cost = ($410.25/acre) (38.3) = $15,712

C0150252 (3,704 Seedlings)
Cost = ($0.77 each) (3834) = $2,952

02370-550-0120 Install Matting (Section 9.5)
Cost = ($7.5 sys) (29,040) = $ 217,800

02315-400-0260 (Pocking)
Cost = ($1.56/cu yd) (29,689 cu yd) = $46,315

Assume 25% reseeding = $92,594

Time = (38.3 acres) / (4 acres/day) = 9.58 days

Cost Total $462,968
Time Total 9.58 days

f. Monitor Well Plugging
Assume $5,000 per well

The above listed costs include reclamation costs added between 1985 and the latest modification.