

0011

MEC

Mangum
Engineering
Consultants

Annual Report
ACT/015/025 #6

388 East Boynton Road • Kaysville, Utah 84037 • (801) 544-3641

Pamela Grubaugh-Littig
Permit Supervisor
Utah Division of Oil Gas & Mining
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

30 March 1990

Ref: Co-Op Mining Co. Annual Report, Bear and Trail Canyon Mines,
Emery County, Utah.

Pam,

Attached is a copy of the referenced Annual Report along with the completed form requested by DOGM. Thank you for your cooperation in this matter.

Thank you,



Kimly C. Mangum, P.E.
Permitting & Compliance Consultant.

cc: Co-Op Mining Co.

**CO-OP MINING COMPANY
ANNUAL REPORT 1989**

**Bear Canyon Mine
ACT/015/025**

**Trail Canyon Mine
ACT/015/021**

WATER MONITORING

All water monitoring data for 1989 has been submitted to UDOGM in quarterly submittal. Copies of the summary pages for the year are included in Appendix C.

Appendix D contains a copy of the flow data from the Big Bear Spring for 1989, received from the Castle Valley Special Service District.

Co-Op Mining Company was assigned permit number UTG040006, Utah General Permit for Coal Mining, covering 5 discharge points by the Bureau of Water Pollution Control, Utah Department of Health, 8 May 1989. A copy of the permit is now included as Appendix 7-B in the Bear Canyon Mine PAP. No discharge was noted during 1989.

APPENDIX A
VEGETATION MONITORING



ENVIRONMENTAL INDUSTRIAL SERVICES

P.O. Box 358 - Desert Lake Road - Elmo, Utah 84521 - Telephone (801) 653-2606

Mel Coonrod - Vice-President

Co-Op Mining Co.
Annual Report 1989
Page A-2

March 21, 1990

Mr. Kim Mangum
388 East Boynton Road -
Kaysville, UT 84037

Re: Ocular Vegetation Inventory
Trail Canyon Mine and Bear
Canyon Mine, Co-Op Mining
Company As Required In
Approved M.R.P.

Dear Mr. Mangum:

As per your request, on September 14, 1989, I walked over the entire Trail Mine Property. The purpose was to: 1) identify problem areas relative to the absence of vegetation, 2) determine the presence of noxious weeds, 3) to identify potential problems associated with wildlife grazing, insect damage or excessive utilization by rodents, and 4) to make overall evaluations of success of reclamation relative to vegetative cover. The results of that inventory are:

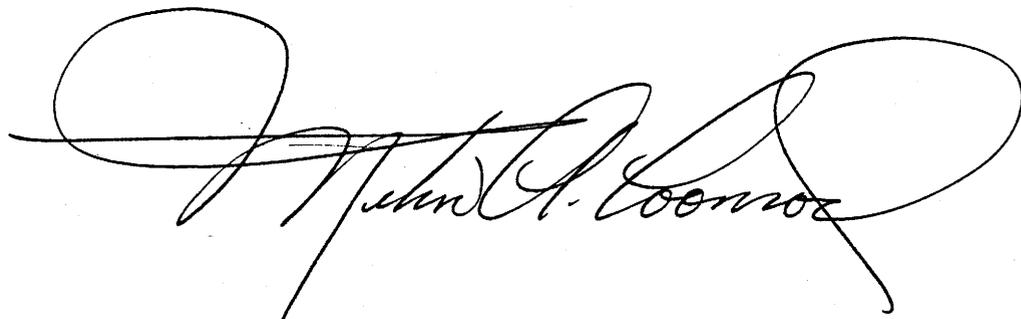
1. Problem areas: 4 small locations were observed where vegetation was absent and identified on the attached map. The areas were diverse; no single characteristic appeared common that would account for the failure of vegetation to establish. Collectively all of these areas would account for less than 1 acre and would have relatively slight effect on a quantitative inventory of reclamation success. However, vegetation success was very poor on the slope from upper to middle pads. This larger area (100+ sq. ft.), again, no single reason for failure was discernable, except the aspect and the slope. The area was reseeded, fertilized and mulched in October and will be re-examined during the 1990 growing season.
2. Noxious weeds: A variety of thistle, mouse-ear and dock are present on the reclaimed area, however, they constitute a small percentage of overall vegetation cover and appear to be in approximately the same ratio on adjacent undisturbed area surrounding the mine. The weed species should become less evident as the desirable species become better established.

3. Damage as a result of grazing, insects or rodent: There is considerable evidence of heavy utilization by deer, however, due to the vigor and abundance of desirable vegetation, the adverse effect on vegetative cover overall is negligible. There are no apparent problems associated with insects or rodents.
4. Overall success of reclamation: In general, the site is in fair condition with a few small problem areas (as noted above). Vegetative cover should average 30% to 60% of adjacent undisturbed areas with productivity potentially exceeding adjacent undisturbed areas in future years. Species diversification appears short of the desirable goal with grasses constituting the majority of the cover. Seedling plantings, the spring of 1990, should help correct this problem.

Conclusion: The property is in good condition and should not require any additional reclamation expenditure other than what is scheduled in 1990. The draught of 1988-89 has definitely been hard on emergent vegetation. I would anticipate additional germination in the spring of 1990.

All interim vegetation at the Bear Canyon Mine appeared to be well established with no significant change from 1988.

cc: Co-Op Mine



John A. Coenno

APPENDIX B
SUBSIDENCE MONITORING

APPENDIX C
WATER MONITORING

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-2

Property: Co-Op
Station: EC-1
Location: Upper Bear
Type: Stream
Frequency: Quarterly - Field: June, July,
Aug., Sept.

Field Measurements	Date Sampled							MEAN
	02/27/89	05/25/89	06/10/89	07/19/89	08/24/89	09/15/89	10/29/89	
Flow [gpm]	F	180	45	18	42	43	28.2	55.0
PH		8	8.1	8.1	8	8.1	8.1	8.05
Sp. Con. [ohms]		560	480	510	640	900	890	660
Temp [C]		5	5	5	5	6	1	4.87
Diss. O. [ppm]		9	N.A.	10	9	9	8	9

Lab. Meas. [mg/l]	Date Sampled				Mean
	02/27/89	05/25/89	06/24/89	10/29/89	
TDS		526	492	632	450
TSS		N.A.	935	658	798.5
O & G		N/A	N/A	N/A	N/A
Al CaCO3		384	203	257	241.00
Hd CaCO3		300	361	526	396.67
Ac CaCO3		0	0	0	0
HCO3		261.2	248.20	309	269.66
CO3		0	0	2.33	.79
Cl		3.24	6.01	6.33	5.19
SO4		100	199.6	291.8	199.6
Ca		35.60	52.38	79.17	55.79
Mg		50.3	56.03	79.96	63.09
K		3.59	5.30	7.49	5.46
Na		7.80	10.00	13.00	9.27
Ca&Mn		6.01	1.88	.84	2.94
Fe		1.92	2.4	1.85	1.99
Mn		1.70	.88	.15	.84

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-3

Property: Co-Op
Station: 90-2
Location: Lower Trail
Type: Stream
Frequency: Quarterly - Field: June, July, Aug., Sept.

Field Measurements	Date Sampled							Mean
	02/27/89	05/25/89	06/19/89	07/19/89	08/24/89	09/15/89	10/29/89	
Flow [gpm]	UE	168	47	16.7	49	52	28	60.45
PH	8.1	8.0	8.1	8.1	8.1	8	8.4	8.1
Sp. Con. [chms]	900	550	360	490	640	740	890	653
Temp [C]	0	5	5	6	5	5	1	3.86
Diss. O. [ppm]	6	9	10	10	9	9	9	8.71

Lab. Meas. [ug/l]	Date Sampled				Mean
	02/27/89	05/25/89	08/24/89	10/29/89	
TDS	483	(See Lab Report)	482	604	524.7
TSS	4184	(See Lab Report)	1056	324	1854.7
D & G	7	<5.0	<.05	<.05	<.05
Al CaCO3	N/A	(Lost In Shipment)	207	279	243
Hd CaCO3	400	(Lost In Shipment)	367	514	427
Ac CaCO3	1	(Lost In Shipment)	0	0	0
HCO3	243	"	252.98	300.94	295.92
CO3	0	"	0	4.75	4.75
Cl	6	"	6.01	6.33	6.11
SO4	209	"	188.16	550.07	213.74
Ca	57	"	50.0	85.9	64.0
Mg	62	"	58.93	72.8	64.6
K	4	"	4.90	5.67	4.88
Na	3	"	12.00	12.40	11.18
Cu/Zn	1.13	"	1.50	.35	1.02
Fe	8.43	10.45	1.96	.83	5.43
Mn	.01	1.33	0.1	.05	.32

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-4

Property: Co-Op
Station: BC-6
Location: Rt. Fork Bear
Type: Stream
Frequency: Quarterly - Field: June, July, Aug., Sept.

Field Measurements Date Sampled
01/16/89 02/27/89 05/25/89 06/13/89 07/19/89 08/24/89 09/15/89 10/29/89 Mean

Flow [gpm] DRY DRY DRY DRY DRY DRY DRY DRY DRY

PH

Sp. Con. [ohms]

Temp [C]

Diss. O. [ppm]

Lab. Meas. [mg/l] Date Sampled
02/16/89 05/23/89 08/24/89 10/29/89 Mean

TDS DRY DRY DRY DRY DRY

TSS

O & G

Al CaCO3

Hd CaCO3

Ac CaCO3

HCO3

CO3

Cl

SO4

Ca

Mg

E

Na

Cat/An

Fe

Mn

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-5

Property: Co-Op
Station: SBC-2
Location: Portal
Type: Well
Frequency: Quarterly

Field Measurements	Date Sampled				Mean
	02/27/89	05/25/89	08/24/89	10/29/89	
Flow [gpm]	DRY	DRY	DRY	DRY	DRY
PH	See Field Notes				
Sp. Cond. [ohms]					
Temp. [C]					
Diss. O [ppm]					

Lab. Meas. [mg/l]

- TDS
- TSS
- O & G
- Al CaCO3
- Hd CaCO3
- Ac CaCO3
- HCO3
- CO3
- Cl
- SO4
- Ca
- Mg
- K
- Na
- Cat/An
- Fe
- Mn

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-6

Property: Co-Op
Station: SBC-3
Location: Creekwell
Type: Well
Frequency: Quarterly

Field Measurements	Date Sampled				Mean
	02/27/89	05/25/89	08/24/89	10/29/89	
Flow (FS)	DRY	DRY	47'	32'	39.5
PH			8.1	8.0	8.05
Sp. Cond. [ohms]			1940	2490	2215
Temp. [C]			4	4	4
Diss. O [ppm]			N/A	N/A	N/A

Lab. Meas. [mg/l]

TDS			2190	2355	2272.5
TSS			1472	1110	1291
O & G			N/A	N/A	N/A
Al CaCO3			430	438	434
Hd CaCO3			1500	1795	1647.5
Ac CaCO3			0	0	0
HCO3			524.7	533.85	529.28
CO3			0	0	0
Cl			65.34	60.09	62.80
SO4			1087.68	1404.04	1245.86
Ca			211.89	262.77	237.33
Mg			236.20	277.02	256.61
K			0	18.70	9.35
Na			12.00	69.50	40.75
Cat/An			.05	.38	.22
Fe			.22	7.26	3.67
Mn			.34	4.83	2.52

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-7

Property: Co-Op
Station: SBC-4
Location: Huntington Spring
Type: Spring
Frequency: Quarterly

Field Measurements	Date Sampled				Mean
	02/27/89	05/25/89	08/24/89	10/29/89	
Flow [gpm]	DRY	4.5	15	4.2	7.9
PH		7.6	7.9	7.9	7.8
Sp. Cond. [ohms]		560	500	540	533.3
Temp. [C]		4	4	2	2.7
Diss. O [ppm]		NA	N/A	N/A	N/A

Lab. Meas. [mg/l]					
TDS		172	322	317	270
TSS		NT	32	6	19
O & G		NA	N/A	N/A	N/A
Al CaCO3		273	276.48	281.16	276.88
Hd CaCO3		279	293.63	309.46	294.03
Ac CaCO3		<1	0	0	0
HCO3		330	337.31	343.02	336.8
CO3		0	0	0	0
Cl		3.24	5.45	5.27	4.65
SO4		25.92	23.52	25.92	25.12
Ca		63.70	76.98	90.96	77.21
Mg		29.13	24.70	20.07	24.63
K		1.11	0	1.88	.99
Na		6.40	12.00	400	139.47
Cat/An		1.74	.49	.78	1.03
Fe		.11	.06	<.05	.07
Mn		<.02	<.02	<.02	<.02

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-8

Property: Co-Op
Station: SBC-5
Location: Birch Spring
Type: Spring
Frequency: Quarterly

Field Measurements	Date Sampled				Mean
	02/27/89	05/25/89	08/24/89	10/29/89	
Flow [gpm]	DRY	DRY	DRY	129	129
PH				7.8	7.8
Sp. Cond. [ohms]				990	990
Temp. [C]				2	2
Diss. O [ppm]				N/A	N/A

Lab. Meas. [mg/l]			
TDS		710	710
TSS		56	56
O & G		N/A	N/A
Al	CaCO3	304.92	304.92
Hd	CaCO3	614.72	614.72
Ac	CaCO3	0	0
HCO3		367.17	367.17
CO3		2.38	2.38
Cl		12.65	12.65
SO4		298.34	298.34
Ca		128.01	128.01
Mg		71.82	71.82
K		5.56	5.56
Na		10.80	10.80
Cat/An		.92	.92
Fe		.21	.21
Mn		<.02	<.02

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-9

Property: Co-Op
Station: SBC-6
Location: Co-Op Dev. Spring
Type: Spring
Frequency: Quarterly

Field Measurements	Date Sampled				Mean
	02/27/89	05/25/89	08/24/89	10/29/89	

Flow [gpm]	DRY	DRY	DRY	DRY	DRY
------------	-----	-----	-----	-----	-----

PH

Sp. Cond. [ohms]

Temp. [C]

Diss. O [ppm]

Lab. Meas. [mg/l]

TDS

TSS

O & G

Al CaCO3

Hd CaCO3

Ac CaCO3

HCO3

CO3

Cl

SO4

Ca

Mg

K

Na

Cat/An

Fe

Mn

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-10

Property: Co-Op
Station: SEC-7
Location: #33 West
Type: Spring
Frequency: Quarterly

Field Measurements	Date Sampled				Mean
	02/27/89	05/25/89	08/28/89	11/29/89	
Flow [gpm]	17	18	18	18.7	18
PH	7.9	7.5	7.9	8.0	7.83
Sp. Cond. [ohms]	210	580	214	570	393.5
Temp. [C]	4	4	6	5	4.75
Diss. O [ppm]					

Lab. Meas. [mg/l] See Lab Sheet Baseline

TDS

TSS

O & G

Al CaCO3

Hd CaCO3

Ac CaCO3

HCO3

CO3

Cl

SO4

Ca

Mg

K

Na

Cat/An

Fe

Mn

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-11

Property: Co-Op
Station: SBC-8
Location: #30 East
Type: Spring
Frequency: Quarterly

Field Measurements	Date Sampled				Mean
	02/27/89	05/25/89	08/24/89	11/29/89	
Flow [gpm]	21	31	12	12	19
PH	7.9	7.6	7.9	7.9	7.83
Sp. Cond. [ohms]	200	580	560	593	483
Temp. [C]	4	4	6	5	4.75
Diss. O [ppm]					

Lab. Meas. [mg/l] See Lab Sheet Baseline

TDS

TSS

O & G

Al CaCO3

Hd CaCO3

Ac CaCO3

HCO3

CO3

Cl

SO4

Ca

Mg

K

Na

Cat/An

Fe

Mn

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-12

Property: Co-Op
Station: Ut-1
Location: Upper Trail Creek
Type: Stream
Frequency: Bi-Annual

Field Measurements Date Sampled
05/25/89 10/29/89 Mean

Flow [gpm] DRY DRY DRY

PH

Sp. Cond. [ohms]

Temp. [C]

Diss. O [ppm]

Lab. Meas. [mg/l]

TDS

TSS

O & G

Al CaCO3

Hd CaCO3

Ac CaCO3

HCO3

CO3

Cl

SO4

Ca

Mg

K

Na

Cat/An

Fe

Mn

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-13

Property: Co-Op
Station: LT-2
Location: Lower Trail
Type: Stream
Frequency: Bi-Annual

Field Measurements	Date Sampled		Mean
	05/25/89	10/29/89	
Flow [gpm]	68	87	77.5
PH	8.0	8.3	8.1
Sp. Cond. [ohms]	750	7.40	7.45
Temp. [C]	6	2	4
Diss. O [ppm]	10	9	9.5

Lab. Meas. [mg/l]			
TDS	338	506	422
TSS	N/A	2	2
O & G	N/A	<5.0	<5
Al CaCO3	322	380	351
Hd CaCO3	404	459	431.5
Ac CaCO3	<1	0	0
HCO3	389.5	444.47	417
CO3	0	9.5	9.5
Cl	16.2	21.09	18.65
SO4	82.3	83.95	83.13
Ca	10.35	94.33	52.33
Mg	92	54.38	73.19
K	5.11	5.89	5.5
Na	16.40	17.90	17.15
Cat/An	1.81	.80	1.31
Fe	<.05	.05	<.05
Mn	<.02	.02	<.02

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-15

Property: Co-Op
Station: TS-1
Location: Trail Canyon Spring
Type: Spring
Frequency: Bi-Annual

Field Measurements	Date Sampled		Mean
	05/25/89	10/29/89	
Flow [gpm]	21	4.2	12.1
PH	7.7	8.0	7.85
Sp. Cond. [ohms]	800	890	845
Temp. [C]	4	2	3
Diss. O [ppm]	N/A	N/A	N/A

Lab. Meas. [mg/l]			
TDS	296	479	387.5
TSS	N/A	10	10
O & G	N/A	N/A	N/A
Al CaCO3	358	368.28	363.14
Hd CaCO3	432	448	440
Ac CaCO3	<.1	0	0
HCO3	434	449	441.5
CO3	0	0	0
Cl	16.20	13.71	15
SO4	81.07	79.01	80
Ca	8.76	102.75	55.76
Mg	99.75	46.71	73.23
K	3.18	3.93	3.56
Na	10.5	11.6	11
Cat/An	.79	.92	.86
Fe	<.05	<.05	<.05
Mn	<.02	<.02	<.02

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-16

Property: Co-Op
Station: CS-1
Location: Trail Co-Op S
Type: Spring
Frequency: Bi-Annual

Field Measurements	Date Sampled		Mean
	05/25/89	10/29/89	
Flow [gpm]	42	50	46
PH	7.8	8.3	8
Sp. Cond. [ohms]	650	470	515
Temp. [C]	4	4	4
Diss. O [ppm]	N/A	N/A	N/A

Lab. Meas. [mg/l]			
TDS	256	421	339
TSS	N/A	1	1
O & G	N/A	N/A	N/A
Al CaCO3	340	337	338
Hd CaCO3	392	402	397
Ac CaCO3	<1	0	0
HCO3	412	405.82	408.9
CO3	0	2.38	1.19
Cl	3.24	7.38	5.31
SO4	59.26	60.08	60
Ca	7.96	116.22	62
Mg	90.55	27.27	58.9
K	2.80	3.47	3.14
Na	9.00	4.60	6.8
Cat/An	1.05	.84	.95
Fe	<.05	<.05	<.05
Mn	<.02	<.02	<.02

WATER MONITORING REPORT

Co-Op Mining Co.
Annual Report 1989
Page C-17

Property: Co-Op
Station: BP-1
Location: Field
Type: Spring
Frequency: Bi-Annual

Field Measurements	Date Sampled		Mean
	05/25/89	10/29/89	
Flow [gpm]	DRY	1.7	1.7
PH		8.1	8.1
Sp. Cond. [ohms]		1440	1440
Temp. [C]		1	1
Diss. O [ppm]		N/A	N/A

Lab. Meas. [mg/l]			
TDS		742	742
TSS		50	50
O & G		N/A	N/A
Al	CaCO3	467.28	467.28
Hd	CaCO3	652.61	652.61
Ac	CaCO3	0	0
HCO3		570.08	570.08
CO3		0	0
Cl		16.87	16.87
SO4		202.05	202.05
Ca		153.28	153.28
Mg		65.71	65.71
K		6	6
Na		17.80	17.80
Cat/An		.18	.18
Fe		.17	.17
Mn		.03	.03

APPENDIX D
BIG BEAR SPRING MONITORING

CASTLE VALLEY SPECIAL SERVICE DISTRICT

P.O. BOX 877
CASTLE DALE, UTAH 84513
TELEPHONE (801) 381-5333

January 29, 1990

DORR W. HANSON
Chairman
DARREL V. LEAMASTER
Manager

Co-op Mining Co.
Annual Report 1989
Page D-2

Mr Wendell Owen
Co-op Mining Company
Huntington, Utah 84528

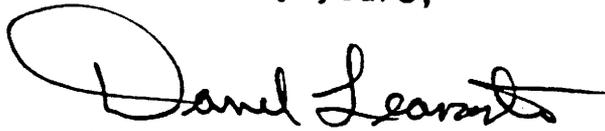
Re: 1989 Flow of Big Bear Spring -

Dear Mr Owen:

Enclosed is a copy of the flow data from the Big Bear Spring
for 1989.

This information is provided per our agreement for monitoring
purposes.

Very truly yours,



Darrel V. Leamaster
District Manager

cc: Huntington City

BIG BEAR SPRING

1989

<u>MONTH</u>	<u>TOTAL FLOW (Gallon</u>	<u>AVERAGE GPM FLOW</u>
January	6,319,000	142
February	5,592,000	139
March	5,998,000	134
April	5,764,000	133
May	5,844,000	131
June	5,475,000	127
July	5,705,000	128
August	5,348,000	120
September	5,147,000	119
October	5,087,000	114
November	4,813,000	111
December	4,956,000	111
Totals	66,048,000	127

3762 J NW
(RILDA CANYO

4364

FAIRVIEW 36 MI

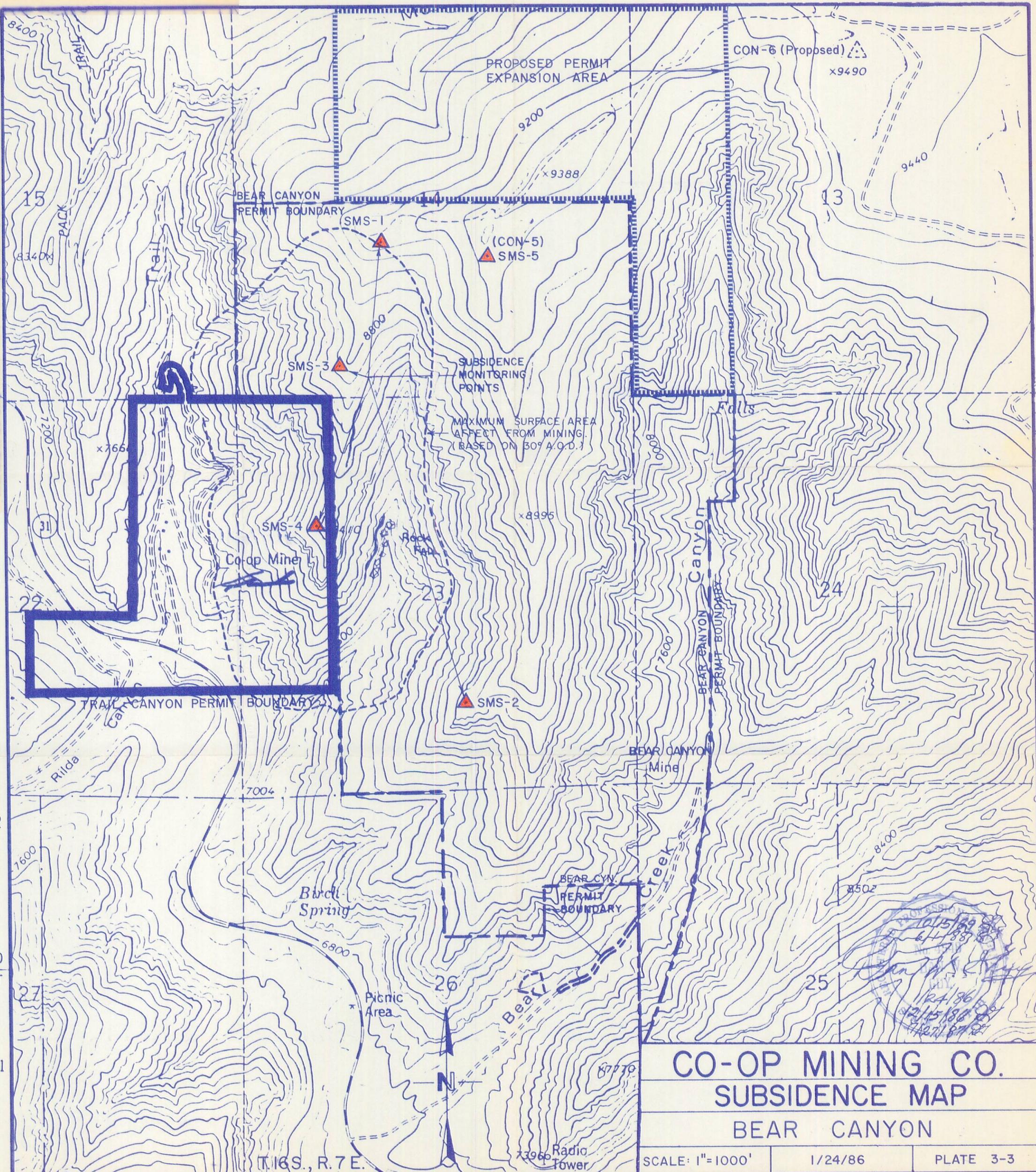
4363

25'

4362

1000
FEET

4361



CO-OP MINING CO.
SUBSIDENCE MAP
BEAR CANYON

SCALE: 1"=1000' 1/24/86 PLATE 3-3

REV. 12/15/86 REV. 6/1/88
 REV. 7/27/87 REV. 10/15/89

10/15/89
6/1/88
12/15/86
7/27/87

T. 16 S., R. 7 E.