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CO-OP MINING COMPANY
ANNUAL REPORT 1994

Bear Canyon Mine
ACT/015/025

Trail Canyon Mine
ACT/015/021

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GAS & MINING PRICE UTAH

Prepared by

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for

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March 1995

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Co-Op Mining Company
Annual Report for 1994
Bear Canyon and Trail Canyon Mines

1 SCOPE

The following document contains information pertaining to Co-Op Mining Companies Bear Canyon and Trail Canyon Mines. Bear Canyon Mine is an active mine, under current production. Coal mining production was terminated in 1981 at Trail Canyon Mine and the mine has undergone extensive reclamation. Trail Canyon Mine remains under the required bond liability period. The Division approved Phase I Bond Release in the amount of $120,000 for the Trail Canyon Mine on July 18, 1994.

This report was compiled based on the letter of instruction received by Co-Op from the Division of Oil Gas and Mining on January 18, 1995.

COAL MINING AND RECLAMATION OPERATIONS FOR 1994

Permittee:	Co-Op Mining Company
Mine Name:	Bear Canyon Mine / Trail Canyon Mine
Mailing Address:	53 West Angelo Avenue Salt Lake City, Utah 84115
Company Representative:	Kimly C. Mangum, P.E., M.E.C.
Resident Agent:	Mr. Wendell Owen Co-Op Mining Co. P.O. Box 1245 Huntington, Utah 84528
Permit Number:	Bear Canyon Mine - ACT/015/025 Trail Canyon Mine - ACT/015/021
MSHA ID Number:	Bear Canyon #1 Mine - 42-01697 Bear Canyon #2 Mine - 42-02095 Trail Canyon Mine - 42-00081-0
Date of Initial Permanent Program Permit:	Bear Canyon Mine - Nov. 1, 1985 Trail Canyon Mine - May 30, 1989
Date of Permit Renewal:	Bear Canyon Mine - May 20, 1991 Trail Canyon Mine - May 30, 1994
Quantity of Coal Mined (tonnage) 1994:	409639 short tons

Updated Mine Sequence Maps for the Bear Canyon #1 Mine are attached as Plates 3-4A and 3-4B. No mining took place in the Tank Seam (Bear Canyon #2 Mine) in 1994.

2 WATER MONITORING

All water monitoring data for 1994 has been submitted to the Division quarterly. Copies of the summary pages are included in Appendix A and as Quattro Pro database files (enclosed).

2.1 Mine Discharge

The excess water encountered in the Bear Canyon Mine is discharged into Bear Creek in accordance with Co-Op Mining Company's UPDES permit number UTG040006 (Point 004). A copy of the Utah General Permit for Coal Mining can be found in Appendix 7-B of the Bear Canyon Mine PAP. The total amount of Water discharged by Co-Op in 1994 was approximately 87,121,000 gallons. This was an average flow of 166 gallons per minute. The monthly flows are summarized in Appendix A (NPDES).

Monthly flows varied from 114 gpm to 198 gpm. This variability in flow is due to the amount of water contained in the underground mine sumps, since the volume of water discharged from the sumps each month is not necessarily the same as the volume which flows into the mine. Some months, an excess amount of water is discharged (i.e. September), which often results in a reduction in discharge in other months while the sumps refill (i.e. October).

No mine water discharge occurred from the Trail Canyon Mine in 1994. All portals were sealed subsequent to 1989. No water was discharged from any of the sediment ponds for the Bear and Trail Canyon Mines in 1994.

2.2 Springs and Monitor Wells

The springs and wells monitored during 1994 included SBC-3, SBC-4, SBC-5, SBC-6, SBC-9, SBC-10, DH-1A, DH-2, DH-4, PS-1, TS-1, CS-1 and BP-1. A summary of the water monitoring for each point is included in Appendix A. Locations of these points are shown on Plate 7-4 of the Bear Canyon PAP and Plates 7-4 of the Trail Canyon PAP. Tables 2-1 and 2-2 show the 1994 monitoring matrix for Bear and Trail Canyon respectively.

Monitoring points SBC-9 and SBC-10 represent the flow of water into the Bear Canyon Mine. The flow remained fairly constant through 1994, with only a slight decline in flow through the year. This decline is consistent with the decline observed through 1993, and is characteristic of perched aquifer systems. A detailed discussion of the groundwater in the area of these springs can be found in Appendix 7-N of the Bear Canyon PAP. The 1994 underground water survey is included in the report as Plates 7-10A and 7-10B.

Table 2-1. Bear Canyon Monitoring Matrix - 1994

Location	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Upper Bear Creek BC-1		oper.			oper.	field	field	oper.	field	oper.		
Lower Bear Creek BC-2		oper.			oper.	field	field	oper.	field	oper.		
Rt Fork Bear Cr. BC-3		oper.			oper.	field	field	oper.	field	oper.		
Huntington Spr. (1) SBC-4		Base.			Base.			Base.		Base.		
Birch Spring (1) SBC-5		Base.			Base.			Base.		Base.		
Co-Op Dev Spring SBC-6		oper.			oper.			oper.		oper.		
1st N. Section #42 SBC-9		oper.			oper.			oper.		oper.		
2nd E. Bleeder #3 N SBC-10		oper.			oper.			oper.		oper.		
2nd W. Mon. Well DH-1A	level	oper.	level	level	oper.	level	level	oper.	level	oper.	level	level
3rd W. Mon. Well DH-2	level	oper.	level	level	oper.	level	level	oper.	level	oper.	level	level
3rd W. bldr Well DH-4	level	base.	level	level	base.	level	level	base.	level	base.	level	level

Notes:
1. SBC-4 and SBC-5 were also tested for oil and grease.
2. oper. = operational
   base. = baseline
3. See Tables 7.1-7 and 7.2-5 of the PAP for water quality parameters.

Table 2-2. Trail Canyon Monitoring Matrix - 1994

Location	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Upper Trail Creek UT-1					oper.					oper.		
Lower Trail Creek LT-1					oper.					oper.		
Portal Spring PS-1					oper.					oper.		
Trail Canyon Spring TS-1					oper.					oper.		
Co-Op Spring CS-1					oper.					oper.		
Ballpark Spring BP-1					oper.					oper.		
Birch Spring (1) SBC-5		base.			base.			base.		base.		
Sed. Pond Inlet SP-1					oper.					oper.		
Culvert TCC-6 Outlet CO-1				See Note # 3								
Sealed Mine Entries and access				See Note # 4								

Notes:

1. SBC-5 was monitored as part of the Bear Canyon monitoring (Same as Table 2-1).
2. oper. = operational
   base. = baseline
3. Sampling to occur during storm events or spring runoff at outlet to culvert TCC-6 when flows occur and tested for oper.
4. Unplanned discharges will be sampled on a quarterly basis until bond release. (No discharges have occurred).
5. See Tables 7.2-5 and 7.2-6 of the PAP for water quality parameters.

Monitor points DH-1A, DH-2 and DH-4 are all underground monitor wells which have been completed in the Spring Canyon Acquifer of the Starpoint Sandstone. Monitoring of DH-4 began in 1994 to replace monitor well DH-3, which was abandoned in November, 1993. Baseline data was collected from DH-4 in 1994. Table 2-3 shows a comparison of the average 1993 and 1994 data from these three points.

With the exception of the substitution of DH-4 for DH-3 at the Bear Canyon Mine, no other monitoring point changes were made in 1994. Some monitoring parameter changes were made for both the Bear Canyon and the Trail Canyon Mines. The changes from the 1993 parameter lists were approved by the Division on September 16, 1993 (ACT/015/021-93E and ACT/015/025-93H). The monitoring changes included monitoring metals in their dissolved form rather than in their total form. In addition to this change Acidity, Barium, Chromium, Fluoride, Mercury, Nickel, Silver, and Sulfide were deleted from the parameter list and the lab Specific Conductivity was added to the list. This revised parameter list was used by Co-Op during the 1994 water monitoring for all points.

Table 2-3. 1993 and 1994 monitoring data from underground wells

Parameters	DH-1A		DH-2		DH-3	DH-4
	1993	1994	1993	1994	1993	1994
Level (ft)	113.74	113.7	23.84	24.42	125.64	60.76
pH	7.21	7.39	7.02	7.23	7.17	7.17
Sp. Cond.	763	637	656	612	604	617
Temp.	11.0	10.7	11.3	15.9	11.1	11.1
TDS	465	341	336	393	331	360
Hardness	334	310	289	301	297	306
Al	1.50		N/D		N/D	N/D
As	0.001		0.007		0.008	N/D
B	0.09		0.12		0.07	0.18
CO3	N/D	N/D	N/D	N/D	N/D	N/D
HCO3	294	364	341	355	320	364
Cd	N/D		0.001		N/D	N/D
Ca	64.1	67.3	70	68.5	67.1	71
Cl-	9.9	4.5	3.5	4.8	4.8	4.5
Cu	0.01		N/D		0.003	N/D
Fe, Total	0.94	0.9	0.98	0.63	1.27	0.15
Fe, Diss.	0.65	N/D		N/D		N/D
Pb	N/D		N/D		N/D	N/D
Mg	42.2	34	33.5	31.3	31.4	31.3
Mn, Total	0.1	N/D	0.05	N/D	0.12	N/D
Mn, Diss.	N/D	N/D	N/D	N/D	N/D	N/D
Mo	0.2		0.3		N/D	N/D
NH3	0.18		0.11		0.03	N/D
NO2	0.02		0.01		0.003	N/D
NO3	0.06		0.04		0.018	0.075
K	21.2	10	2.0	N/D	0.6	0.5
PO4	0.01		0.006		0.005	N/D
Se	0.01		0.02		0.006	N/D
Na	18.98	6.7	12.1	5	2.73	3.25
Lab Cond.		619		582		576
SO4	135	35.5	28.5	27.5	30.3	28.5
Zn	.09		0.07		0.015	0.008

2.3 Surface Water

Surface water monitoring points for 1994 included BC-1, BC-2 and BC-3 for the Bear Canyon Mine and UT-1 and LT-1 for the Trail Canyon Mine. A summary of the water monitoring for each of these points is included in Appendix A. Monitoring point locations are shown on Plate 7-4 of the Bear Canyon PAP and Plates 7-4A and 7-4D of the Trail Canyon PAP. Tables 2-1 and 2-2 show the 1994 monitoring matrix for Bear and Trail Canyon respectively.

BC-1 and BC-2 are located along Bear Creek, the first upstream of the minesite and the second downstream of the minesite. A comparison of the data included in Appendix A indicates that the water quality at the downstream site was greatly improved over the quality at the upstream site. This conclusion is based on the reduction in concentrations of suspended solids, dissolved solids, hardness and sulfates, among other parameters, as well as an overall reduction in conductivity. These changes are the result of mine water, which is of a higher quality than the upstream Bear Creek water, being discharged into Bear Creek.

BC-3 is located in the right fork of Bear Creek upstream from the minesite. No flow was observed at this site in 1994.

UT-1 and LT-1 are located along Trail Creek, the first upstream and the second downstream from the reclaimed minesite. No flow was observed at UT-1 in 1994. The source of the water in LT-1, which was flowing in 1994, is from springs located within the residential area (PS-1, TS-1, CS-1 and BP-1).

3 CLIMATOLOGICAL DATA

A total of 7.9 inches of precipitation was measured at the Bear Canyon Precipitation Gauge during 1994, and 11.42 inches were measured in Trail Canyon. Precipitation decreased by 0.63 inches from 1993 at Bear Canyon and increased 0.21 inches at Trail Canyon. Rain gauge monitoring data is summarized in Appendix B and as Quattro Pro database files (enclosed).

4 SUBSIDENCE MONITORING

A monitoring network was installed in the summer of 1987, and has been monitored since that time. Monitoring stations are steel rebar with aluminum caps, set in concrete so weather, frost, heave or livestock/wildlife will not disturb them.

Ten permanent subsidence monitoring points (SMS-1 thru SMS-5, Con 6, and SMS-7 thru SMS-10) are located on the mine site area. SMS-1, SMS-3, and SMS-4 are common to both the Trail Canyon and Bear Canyon Permits. CON-6 and SMS-7 thru SMS-10 were established 22 September 1991.

Subsidence monitoring was performed in 1994 using the professional services of Blackhawk Engineering. The results of the survey are found in Appendix C. Monitoring point locations are shown on Plate 3-3 of the PAP.

No new areas were mined under in 1994 which required notification of surface property owners in accordance with R645-301-525.300.

No major mining sequence changes were made in 1994, with the exception of the permitting of the Bear Canyon #2 Mine (Tank Seam). The planned subsidence due to mining in the Tank Seam is discussed in Appendix 3-C of the Bear Canyon PAP.

5 VEGETATION MONITORING

Vegetation monitoring was performed in 1994 using the professional services of Mt. Nebo Scientific Research & Consulting. The results of the survey are found in Appendix D. All of the vegetation monitoring performing pertained to the Trail Canyon reclaimed minesite.

The only seeding performed in 1994 was the BTCA areas associated with the construction of the Tank Seam road and pad. The areas were seeded in the interim in accordance with Appendix 3-H of the Bear Canyon PAP.

6 ANNUAL IMPOUNDMENT INSPECTION

Copies of the Annual Sediment Pond Inspection Reports are attached with this report in Appendix E. The annual inspection was performed by Mangum Engineering Consultants and was certified by Kimly C. Mangum.

7 ANNUAL SOIL DATA

No data was required or was collected in 1994 associated with any overburden, spoil, refuse, roof, floor, or mid-seam data.

8 ANNUAL REPORT OF OFFICERS

A copy of the Profit Corporation Annual Report for C.W. Mining Company is included in Appendix F.

9 PERMIT STIPULATION STATUS

There are no open stipulations from the latest permit renewals. All stipulations to the Tank Seam permit approval have been met and approved per Division letters dated October 19, 1994 (ACT/015/025-94F) and January 24, 1995 (ACT/015/025-94I).

APPENDIX A

WATER MONITORING DATA

BEAR CANYON MINE

1994
WATER MONITORING DATA

WATER MONITORING REPORT

Property: Co-op
Station: BC-1
Location: Upper Bear
Type: Stream
Frequency: Quarterly - Field: June, July Sept.

Field Measurements	Date Sampled 2/09/94	5/24/94	6/22/94	7/19/94	8/17/94	9/12/94	10/18/94
Sampled By:	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.
Flow (gpm)	15	52	52	47	47	35	47
pH	8.3	8.1	8.6	8.6	8.4	8.35	8.77
Sp. Cond. (ohms)	1340	790	669	636	670	615	657
Temp (C)	-0.4	10.9	21.2	16.8	24.7	15.9	6.9
Diss. O. (ppm)	5.5	5.1	5.2	5.4	5.3	5.3	5.5

Lab Measurements							
Analyzed by:	CT&E	CT&E	N/A	N/A	CT&E	N/A	CT&E
Settleable Solids	N/D	50.0			N/D		N/D
Suspended Solids	12	6,250			237		1298
Dissolved Solids	621	920			430		380
Hardness (CaCO3)	515	386			306		320
Carbonate (CO3)	N/D	N/D			N/D		N/D
Bicarbonate (HCO3)	342	239			228		270
Calcium (Ca)	66	54			32		49
Chloride (Cl)	7	4			2		8
Iron (Fe) Total	0.2	47.7			3.5		10.7
Iron (Fe) Dissolved	N/D	N/D			N/D		N/D
Magnesium (Mg)	85	61			55		49
Manganese (Mn) Total	N/D	1.9			N/D		0.3
Manganese (Mn) Dissolved	N/D	N/D			N/D		N/D
Potassium (K)	4	4			5		N/D
Sodium (Na)	11	10			6		8
Conductivity (umhos/cm)	986	782			651		632
Sulfate (SO4)	280	1000			190		110
Oil & Grease	N/D	N/D			N/D		N/D
Cations	10.8	8.1			6.4		6.8
Anions	11.6	8.6			7.8		6.8
Cation/Anion Balance (%)	-5.4	2.8			-9.7		-0.1

WATER MONITORING REPORT

Property: Co-op
Station: BC-2
Location: Lower Bear
Type: Stream
Frequency: Quarterly - Field: June, July Sept.

Field Measurements	2/09/94	Date Sampled 5/24/94	6/22/94	7/20/94	8/18/94	9/01/94	10/18/94
Sampled by:	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.
Flow (gpm)	235	98	125	120	210	164	212
pH	8.35	7.98	8.53	8.42	8.34	8.16	8.62
Sp. Cond. (ohms)	787	600	598	523	583	628	578
Temp (C)	2.8	11.3	19.6	21	15.6	15.8	9
Diss. O. (ppm)	5.4	5.3	5.5	5.5	5.5	5.4	5.5

Lab Measurements							
Analyzed by:	CT&E	CT&E	N/A	N/A	CT&E	N/A	CT&E
Settleable Solids	N/D	5			N/D		N/D
Suspended Solids	17.0	1,120			79		624
Dissolved Solids	352	340			330		350
Hardness (CaCO3)	255	285			250		300
Carbonate (CO3)	N/D	N/D			N/D		N/D
Bicarbonate (HCO3)	296	269			254		330
Calcium (Ca)	51	50			36		62
Chloride (Cl)	30	3			1		7
Iron (Fe) Total	0.4	11.4			1		5.1
Iron (Fe) Dissolved	N/D	N/D			N/D		N/D
Magnesium (Mg)	31	39			39		35
Manganese (Mn) Total	N/D	0.2			N/D		N/D
Manganese (Mn) Dissolved	N/D	N/D			N/D		N/D
Potassium (K)	2.0	N/D			N/D		N/D
Sodium (Na)	20	6			N/D		6
Conductivity (umhos/cm)	637	568			523		575
Sulfate (SO4)	40	100			80		30
Oil & Grease	N/D	N/D			N/D		N/D
Cations	6	6			5		6.2
Anions	6.5	6.6			5.9		6.3
Cation/Anion Balance (%)	-4.6	4.9			-7.8		-0.2

WATER MONITORING REPORT

Property: Co-op
Station: BC-3
Location: Right Fork
Type: Stream
Frequency: Quarterly - Field: June, July Sept.

Field Measurements	Date Sampled 2/09/94	5/24/94	6/22/94	7/19/94	8/10/94	9/01/94	10/18/94
Sampled by:	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.
Flow (gpm)	Dry	Dry	Dry	Dry	Dry	Dry	Dry
pH	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sp. Cond. (ohms)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Temp (C)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Diss. O. (ppm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Lab Measurements							
Analyzed by:	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Settleable Solids							
Suspended Solids							
Dissolved Solids							
Hardness (CaCO3)							
Carbonate (CO3)							
Bicarbonate (HCO3)							
Calcium (Ca)							
Chloride (Cl)							
Iron (Fe) Total							
Iron (Fe) Dissolved							
Magnesium (Mg)							
Manganese (Mn) Total							
Manganese (Mn) Dissolved							
Potassium (K)							
Sodium (Na)							
Conductivity (umhos/cm)							
Sulfate (SO4)							
Oil & Grease							
Cations							
Anions							
Cation/Anion Balance (%)							

WATER MONITORING REPORT

Property:	Co-op
Station:	SBC-3
Location:	Rt. Fork Well
Type:	Well
Frequency:	Quarterly

Field Measurements	Date Sampled 2/09/94	5/30/94	8/29/94	10/19/94
Sampled by:	M.E.C.	M.E.C.	M.E.C.	M.E.C.
Depth (FS)	Dry	26.1	29.33	32.7
pH	N/A	7.2	7.29	7.3
Sp. Cond. (ohms)	N/A	4720	4810	4290
Temp (C)	N/A	9.2	9.2	8.8

Lab Measurements				
Analyzed by:	N/A	CT&E	CT&E	CT&E
TDS (mg/L)		4140	4180	4090
Hardness (CaCO3)		2868	2938	2920
Carbonate (CO3)		N/D	N/D	N/D
Bicarbonate (HCO3)		541	533	537
Calcium (Ca)		347	362	364
Chloride (Cl)		67	64	67
Iron (Fe) Total		0.4	N/D	1.1
Iron (Fe) Dissolved		N/D	N/D	N/D
Magnesium (Mg)		486	494	489
Manganese (Mn) Total		N/D	N/D	N/D
Manganese (Mn) Dissolved		N/D	N/D	N/D
Potassium (K)		23	24	21
Sodium (Na)		98	108	105
Conductivity (umhos/cm)		4420	4370	4340
Sulfate (SO4)		2500	2000	3000

WATER MONITORING REPORT

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

Field Measurements	Date Sampled 2/01/94	5/16/94	8/10/94	10/19/94
Sampled by:	M.E.C.	M.E.C.	M.E.C.	M.E.C.
Flow (gpm)	126	118	116	118
pH	7.6	7.5	6.7	7.7
Sp. Cond. (ohms)	544	400	400	270
Temp (C)	9	20	16	12

Lab Measurements				
Analyzed by:	CT&E	CT&E	CT&E	CT&E
TDS (mg/L)	298	310	310	330
Hardness (CaCO3)	288	284	286	310
Aluminum (Al)	N/D	N/D	N/D	N/D
Arsenic (As)	N/D	N/D	N/D	N/D
Boron (B)	N/D	N/D	0.1	0.1
Carbonate (CO3)	N/D	N/D	N/D	N/D
Bicarbonate (HCO3)	309	341	321	320.0
Cadmium (Cd)	N/D	N/D	N/D	N/D
Calcium (Ca)	69	66	70	74
Chloride (Cl)	4	5	6	7.0
Copper (Cu)	N/D	N/D	N/D	N/D
Iron (Fe) Total	N/D	N/D	N/D	N/D
Iron (Fe) Dissolved	N/D	N/D	N/D	N/D
Lead (Pb)	N/D	N/D	N/D	N/D
Magnesium (Mg)	28	29	27.0	30.0
Manganese (Mn) Tot.	N/D	N/D	N/D	N/D
Manganese (Mn) Dis.	N/D	N/D	N/D	N/D
Molybdenum (Mo)	N/D	N/D	N/D	N/D
Nitrogen (NH3)	N/D	N/D	N/D	N/D
Nitrite (NO2)	N/D	N/D	N/D	N/D
Nitrate (NO3)	0.4	0.3	0.3	0.3
Potassium (K)	N/D	N/D	N/D	N/D
Phosphate (PO4)	N/D	0.05	0.05	0.18
Selenium (Se)	N/D	N/D	N/D	N/D
Sodium (Na)	4	4	N/D	5
Conductivity (umhos/cm)	544	566	556	581
Sulfate (SO4)	34	60	60	40
Zinc (Z)	0.04	0.03	N/D	N/D

WATER MONITORING REPORT

Property: Co-op
Station: SBC-5
Location: Birch Springs
Type: Spring
Frequency: Quarterly-Baseline

Field Measurements	Date Sampled 2/01/94	5/16/94	8/10/94	10/06/94
Sampled by:	M.E.C.	M.E.C.	M.E.C.	M.E.C.
Flow (gpm)	24	23	22	22
pH	6.95	7.2	7.05	6.4
Sp. Cond. (ohms)	718	640	390	382
Temp (C)	8	21	15	12.5

Lab Measurements				
Analyzed by:	CT&E	CT&E	CT&E	CT&E
TDS (mg/L)	422	450	450	430
Hardness (CaCO3)	385	378	388	390
Aluminum (Al)	N/D	N/D	N/D	N/D
Arsenic (As)	N/D	N/D	N/D	N/D
Boron (B)	0.1	0.1	0.1	0.1
Carbonate (CO3)	N/D	N/D	N/D	N/D
Bicarbonate (HCO3)	364	374	378	366.00
Cadmium (Cd)	N/D	N/D	N/D	N/D
Calcium (Ca)	85	82	86	90
Chloride (Cl)	7	7	7	7.0
Copper (Cu)	N/D	N/D	N/D	N/D
Iron (Fe) Total	N/D	N/D	N/D	N/D
Iron (Fe) Dissolved	N/D	N/D	N/D	N/D
Lead (Pb)	N/D	N/D	N/D	N/D
Magnesium (Mg)	42	42	42	40
Manganese (Mn) Tot.	N/D	N/D	N/D	N/D
Manganese (Mn) Dis.	N/D	N/D	N/D	N/D
Molybdenum (Mo)	N/D	N/D	N/D	N/D
Nitrogen (NH3)	N/D	N/D	N/D	N/D
Nitrite (NO2)	N/D	N/D	0.01	N/D
Nitrate (NO3)	0.2	0.1	0.3	0.1
Potassium (K)	N/D	N/D	N/D	N/D
Phosphate (PO4)	0.03	0.02	0.04	0.14
Selenium (Se)	N/D	N/D	N/D	N/D
Sodium (Na)	7	6	N/D	N/D
Conductivity (umhos/cm)	718	752	748	757
Sulfate (SO4)	110	90	80	130
Zinc (Z)	N/D	0.04	N/D	N/D

WATER MONITORING REPORT

Property:	Co-op
Station:	SBC-6
Location:	COP Development Spring
Type:	Spring
Frequency:	Quarterly

Field Measurements	Date Sampled 2/09/94	5/18/94	8/10/94	10/18/94
Sampled by:	M.E.C.	M.E.C.	M.E.C.	M.E.C.
Flow (gpm)	Dry	Dry	Dry	Dry
pH	N/A	N/A	N/A	N/A
Sp. Cond. (ohms)	N/A	N/A	N/A	N/A
Temp (C)	N/A	N/A	N/A	N/A

Lab Measurements				
Analyzed by:	N/A	N/A	N/A	N/A
TDS (mg/l)				
Hardness (CaCO3)				
Carbonate (CO3)				
Bicarbonate (HCO3)				
Calcium (Ca)				
Chloride (Cl)				
Iron (Fe) Total				
Iron (Fe) Dissolved				
Magnesium (Mg)				
Manganese (Mn) Total				
Manganese (Mn) Dissolved				
Potassium (K)				
Sodium (Na)				
Conductivity (umhos/cm)				
Sulfate (SO4)				

WATER MONITORING REPORT

Property:	Co-op
Station:	SBC-9
Location:	Mine Sump #3
Type:	Sump
Frequency:	Quarterly

Field Measurements	Date Sampled 2/09/94	5/30/94	8/18/94	10/19/94
Sampled by:	M.E.C.	M.E.C.	M.E.C.	M.E.C.
Flow (gpm)	175	178	175	160
pH	7.96	7.64	7.03	8.08
Sp. Cond. (ohms)	608	605	770	551
Temp (C)	8.9	8.2	9.9	10

Lab Measurements				
Analyzed by:	CT&E	CT&E	CT&E	CT&E
TDS (mg/L)	349	300	420	330
Hardness (CaCO3)	307	302	327	320
Carbonate(CO3)	N/D	N/D	N/D	N/D
Bicarbonate (HCO3)	336	356	395	350
Calcium (Ca)	70	70	78	76
Chloride (Cl)	N/D	4	N/D	6
Iron (Fe)	N/D	N/D	N/D	N/D
Iron (Fe) Dissolved	N/D	N/D	N/D	N/D
Magnesium (Mg)	32	31	32	31
Manganese (Mn) Total	N/D	N/D	N/D	N/D
Manganese (Mn) Dissolved	N/D	N/D	N/D	N/D
Potassium (K)	N/D	N/D	N/D	N/D
Sodium (Na)	3	4	N/D	N/D
Conductivity (umhos/cm)	595	577	708	587
Sulfate (SO4)	70	31	30	36

WATER MONITORING REPORT

Property: Co-op
Station: SBC-10
Location: Mine Sump - 2nd East
Type: Sump
Frequency: Quarterly - Baseline

Field Measurements	Date Sampled 2/09/94	5/30/94	8/18/94	10/19/94
Sampled by:	M.E.C.	M.E.C.	M.E.C.	M.E.C.
Flow (gpm)	28	25	25	21
pH	8.05	7.7	7.85	7.56
Sp. Cond. (ohms)	611	620	625	551
Temp (C)	7.6	8.8	9.7	10.4

Lab Measurements				
Analyzed by:	CT&E	CT&E	CT&E	CT&E
TDS (mg/L)	338	330	340	360
Hardness (CaCO3)	316	304	282	290
Carbonate(CO3)	N/D	N/D	N/D	N/D
Bicarbonate (HCO3)	412	346	316	303
Calcium (Ca)	72	69	65	68
Chloride (Cl)	N/D	4.0	1.0	8
Iron (Fe) Total	N/D	N/D	N/D	N/D
Iron (Fe) Dissolved	N/D	N/D	N/D	N/D
Magnesium (Mg)	33.0	32.0	29	30.0
Manganese (Mn) Total	N/D	N/D	N/D	N/D
Manganese (Mn) Dissolved	N/D	N/D	N/D	N/D
Potassium (K)	N/D	N/D	N/D	N/D
Sodium (Na)	4	4	N/D	N/D
Conductivity (umhos/cm)	634	585	567	573
Sulfate (SO4)	70.0	6.0	50.0	70.0

WATER MONITORING REPORT

Property: Co-op
Station: DH-1A
Location: Monitor Well
Type: Well
Frequency: Quarterly - Monthly Depth

Field Measurements	Date Sampled 1/20/94	2/09/94	3/21/94	4/29/94	5/31/94	6/27/94	7/19/94	8/28/94	9/30/94	10/30/94	11/26/94	12/22/94
Sampled by:	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.
Depth From Top (ft)	114.1	113.25	113.25	113.8	113	113.5	113.1	116.5	113.3	113.7	113.5	113.5
pH	N/A	7.4	N/A	N/A	7.24	N/A	N/A	7.6	N/A	7.33	N/A	N/A
Sp. Cond. (ohms)	N/A	644	N/A	N/A	668	N/A	N/A	653	N/A	581	N/A	N/A
Temp (C)	N/A	10.7	N/A	N/A	10.2	N/A	N/A	10.7	N/A	11.2	N/A	N/A

Lab Measurements												
Analyzed by:	N/A	CT&E	N/A	N/A	CT&E	N/A	N/A	CT&E	N/A	CT&E	N/A	N/A
TDS (mg/L)		302			320			400		340		
Hardness (CaCO3)		314			305			321		300		
Carbonate (CO3)		N/D			N/D			N/D		N/D		
Bicarbonate (HCO3)		355			390			361		350		
Calcium (Ca)		63			66.0			74.0		66		
Chloride (Cl)		3			5.0			3.0		7.0		
Iron (Fe) Total		2			0.4			0.3		N/D		
Iron (Fe) Dissolved		N/D			N/D			N/D		N/D		
Magnesium (Mg)		38			34			33		32		
Manganese (Mn) Total		N/D			N/D			N/D		N/D		
Manganese (Mn) Dissolved		N/D			N/D			N/D		N/D		
Potassium (K)		13			10.0			9.0		8.0		
Sodium (Na)		7			6			7		N/D		
Conductivity (umhos/cm)		645			623			606		600		
Sulfate (SO4)		40			40.0			22.0		40.0		

WATER MONITORING REPORT

Property: Co-op
Station: DH-2
Location: Monitor Well
Type: Well
Frequency: Quarterly - Monthly Depth

Field Measurements	Date Sampled 1/20/94	2/10/94	3/21/94	4/29/94	5/31/94	6/27/94	7/19/94	8/29/94	9/30/94	10/26/94	11/26/94	12/22/94
Sampled by:	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.
Depth From Top (ft)	24.1	23.33	23.75	24.5	24.5	24.5	24.5	24.75	24.7	24.75	24.8	24.9
pH	N/A	7.27	N/A	N/A	7.02	N/A	N/A	7.39	N/A	7.24	N/A	N/A
Sp. Cond. (ohms)	N/A	638	N/A	N/A	603	N/A	N/A	628	N/A	578	N/A	N/A
Temp (C)	N/A	28.8	N/A	N/A	10.7	N/A	N/A	11.3	N/A	12.6	N/A	N/A

Lab Measurements												
Analyzed by:	N/A	CT&E	N/A	N/A	CT&E	N/A	N/A	CT&E	N/A	CT&E	N/A	N/A
TDS (mg/L)		312			300			630		330		
Hardness (CaCO3)		300			295			307		300		
Carbonate (CO3)		N/D			N/D			N/D		N/D		
Bicarbonate (HCO3)		342			373			355		350		
Calcium (Ca)		69			67.0			72.0		66		
Chloride (Cl)		5			4.0			4.0		6.0		
Iron (Fe) Total		0.6			0.6			0.70		0.6		
Iron (Fe) Dissolved		N/D			N/D			N/D		N/D		
Magnesium (Mg)		31			31			31.0		32		
Manganese (Mn) Total		N/D			N/D			N/D		N/D		
Manganese (Mn) Dissolved		N/D			N/D			N/D		N/D		
Potassium (K)		N/D			N/D			N/D		N/D		
Sodium (Na)		5			5			N/D		N/D		
Conductivity (umhos/cm)		586			585			578		577		
Sulfate (SO4)		29			30			23		28		

WATER MONITORING REPORT

Property: Co-op
Station: DH-4
Location: Monitor Well
Type: Well
Frequency: Quarterly - Monthly Depth
(Note: Well completed February, 1994)

Field Measurements	Date Sampled 2/15/94	3/21/94	4/29/94	5/31/94	6/27/94	7/19/94	8/31/94	9/30/94	10/27/94	11/26/94	12/22/94
Sampled by:	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.
Depth From Top (ft)	58.75	60	60.25	60.6	60.7	60.5	60.7	61.25	61.3	62	62.3
pH	723	N/A	N/A	7.14	N/A	N/A	7.2	N/A	7.12	N/A	N/A
Sp. Cond. (ohms)	668	N/A	N/A	630	N/A	N/A	623	N/A	546	N/A	N/A
Temp (C)	10.6	N/A	N/A	10.9	N/A	N/A	10.7	N/A	12.3	N/A	N/A

Lab Measurements											
Analyzed by:	CT&E	N/A	N/A	CT&E	N/A	N/A	CT&E	N/A	CT&E	N/A	N/A
TDS (mg/L)	342			350			400		350		
Hardness (CaCO3)	314			293			314		302		
Aluminum (Al)	N/D			N/D			N/D		N/D		
Arsenic (As)	N/D			N/D			N/D		N/D		
Boron (B)	0.1			0.4			0.1		0.1		
Carbonate (CO3)	N/D			N/D			N/D		N/D		
Bicarbonate (HCO3)	345			395			361		354		
Cadmium (Cd)	N/D			N/D			N/D		N/D		
Calcium (Ca)	73			68			73		70		
Chloride (Cl)	3			3			5		7.0		
Copper (Cu)	N/D			N/D			N/D		N/D		
Iron (Fe) Total	0.40			N/D			N/D		0.2		
Iron (Fe) Dissolved	N/D			N/D			N/D		N/D		
Lead (Pb)	N/D			N/D			N/D		N/D		
Magnesium (Mg)	32			30			32		31.0		
Manganese (Mn) Tot.	N/D			N/D			N/D		N/D		
Manganese (Mn) Dis.	N/D			N/D			N/D		N/D		
Molybdenum (Mo)	N/D			N/D			N/D		N/D		
Nitrogen (NH3)	N/D			N/D			N/D		N/D		
Nitrite (NO2)	N/D			N/D			N/D		N/D		
Nitrate (NO3)	0.3			N/D			N/D		N/D		
Potassium (K)	2			N/D			N/D		N/D		
Phosphate (PO4)	N/D			N/D			N/D		N/D		
Selenium (Se)	N/D			N/D			N/D		N/D		
Sodium (Na)	4			3			N/D		6		
Conductivity (umhos/cm)	555			593			565		591		
Sulfate (SO4)	30			30			26		28		
Zinc (Z)	N/D			0.03			N/D		N/D		

WATER MONITORING REPORT

Property: Co-op Mining Company
Station: NPDES
Location: Mine Discharge
Type: Permit UTG040006 (004)
Frequency: Monthly

Field Measurements	Date Sampled 1/19/94	2/09/94	3/21/94	4/20/94	5/24/94	6/1/94	7/11/94	8/17/94	9/01/94	10/18/94	11/22/94	12/22/94
Sampled by:	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.
Flow (gpm)	159.1	198	165.67	142	195	182	178	178	192	114.4	131	156.5
pH	7.71	7.85	7.94	7.68	7.75	8.1	7.58	7.76	7.5	7.88	7.62	7.9
Sp. Cond. (ohms)	359	670	583	643	630	740	641	636	616	594	646	594
Temp (C)	7.5	6.5	7.9	7.9	9.1	9.7	10.6	11.9	14.5	10.6	9.7	9.2

Lab Measurements												
Analyzed by:	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E	CT&E
Dissolved Solids	301	317	340	320	330	350	380	330	350	330	320	320
Suspended Solids	6.0	N/D	N/D	9.0	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Settleable Solids	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oil & Grease	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Iron (Fe)	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

Field Measurements	1/26/94	2/28/94	3/28/94	4/27/94	5/31/94	6/20/94	7/20/94	8/23/94	9/12/94	10/31/94	11/05/94	12/30/94
Sampled by:	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C.	M.E.C	M.E.C.	M.E.C.	M.E.C.	M.E.C.
pH	7.57	7.6	7.91	7.92	7.7	7.88	7.79	7.79	7.48	7.13	7.28	7.8
Sp. Cond. (ohms)	432	590	740	650	664	622	630	637	640	649	665	648
Temp (C)	7.6	8.5	7.1	8.2	8.8	10.2	11.3	10.5	11.6	9.1	8.6	9.1

TRAIL CANYON MINE

1994
WATER MONITORING DATA

WATER MONITORING REPORT

Property: Co-op
Station: UT-1
Location: Upper Trail Creek
Type: Stream
Frequency: Biannually

Field Measurements	Date Sampled 5/25/94	10/18/94
Sampled By:	M.E.C.	M.E.C.
Flow (gpm)	Dry	Dry
pH	N/A	N/A
Sp. Cond. (ohms)	N/A	N/A
Temp (C)	N/A	N/A
Diss. O. (ppm)	N/A	N/A

Lab Measurements		
Analyzed by:	N/A	N/A
Settleable Solids		
Suspended Solids		
Dissolved Solids		
Hardness (CaCO3)		
Carbonate (CO3)		
Bicarbonate (HCO3)		
Calcium (Ca)		
Chloride (Cl)		
Iron (Fe) Total		
Iron (Fe) Dissolved		
Magnesium (Mg)		
Manganese (Mn) Total		
Manganese (Mn) Diss.		
Potassium (K)		
Sodium (Na)		
Sulfate (SO4)		
Specific Conductivity		
Oil & Grease		
Anions		
Cations		
Cation/Anion Balance (%)		

WATER MONITORING REPORT

Property:	Co-op
Station:	LT-1
Location:	Lower Trail Creek
Type:	Stream
Frequency:	Biannually

Field Measurements	Date Sampled 5/24/94	10/18/94
Sampled By:	M.E.C.	M.E.C.
Flow (gpm)	35	23
pH	8.07	8.51
Sp. Cond. (ohms)	882	919
Temp (C)	10.9	8.3
Diss. O. (ppm)	5.4	5.1

Lab Measurements		
Analyzed by:	CT&E	CT&E
Settleable Sol. (mg/L)	N/D	N/D
TSS (mg/L)	4	N/D
TDS (mg/L)	480	520
Hardness (CaCO3)	415	470
Carbonate(CO3)	N/D	N/D
Bicarbonate (HCO3)	433	470
Calcium (Ca)	72	85
Chloride (Cl)	26	26
Iron (Fe) Total	N/D	N/D
Iron (Fe) Dissolved	N/D	N/D
Magnesium (Mg)	57	62
Manganese (Mn) Tot.	N/D	N/D
Manganese (Mn) Dis.	N/D	N/D
Potassium (K)	4	N/D
Sodium (Na)	21	20
Conduct. (umhos/cm)	856	915
Sulfate (SO4)	90	80
Oil & Grease (mg/L)	N/D	N/D
Cation/Anion Balance	2.7	0.5

WATER MONITORING REPORT

Property:	Co-op
Station:	PS-1
Location:	Portal Spring (AML)
Type:	Spring
Frequency:	Biannually

Field Measurements	Date Sampled 5/25/94	10/18/94
Sampled by:	M.E.C.	M.E.C.
Flow (gpm)	11	DRY
pH	7.29	N/A
Sp. Cond. (ohms)	835	N/A
Temp (C)	9.7	N/A

Lab Measurements		
Analyzed by:	CT&E	N/A
Settleable Sol. (mg/L)	N/D	
TSS (mg/L)	N/D	
TDS (mg/L)	470	
Hardness (CaCO3)	403	
Carbonate(CO3)	N/D	
Bicarbonate (HCO3)	425	
Calcium (Ca)	84	
Chloride (Cl)	11	
Iron (Fe) Total	N/D	
Iron (Fe) Dissolved	N/D	
Magnesium (Mg)	47	
Manganese (Mn) Tot.	N/D	
Manganese (Mn) Dis.	N/D	
Potassium (K)	2	
Sodium (Na)	10	
Conduct. (umhos/cm)	786	
Sulfate (SO4)	90	
Oil & Grease (mg/L)	N/D	
Cation/Anion Balance	3.8	

WATER MONITORING REPORT

Property: Co-op
Station: TS-1
Location: Trail Spring (AML)
Type: Spring
Frequency: Biannually

Field Measurements	Date Sampled 5/25/94	10/18/94
Sampled by:	M.E.C.	M.E.C.
Flow (gpm)	15	8
pH	7.1	7.47
Sp. Cond. (ohms)	900	829
Temp (C)	9.8	10.1

Lab Measurements		
Analyzed by:	CT&E	CT&E
Settleable Sol. (mg/L)	N/D	N/D
TSS (mg/L)	N/D	N/D
TDS (mg/L)	470	490
Hardness (CaCO3)	417	430
Carbonate(CO3)	N/D	N/D
Bicarbonate (HCO3)	447	440
Calcium (Ca)	83	88
Chloride (Cl)	15	18
Iron (Fe) Total	N/D	N/D
Iron (Fe) Dissolved	N/D	N/D
Magnesium (Mg)	51	52
Manganese (Mn) Tot.	N/D	N/D
Manganese (Mn) Dis.	N/D	N/D
Potassium (K)	2	N/D
Sodium (Na)	12	13
Conduct. (umhos/cm)	828	828
Sulfate (SO4)	70	120
Oil & Grease (mg/L)	N/D	N/D
Cation/Anion Balance	2	-4.7

WATER MONITORING REPORT

Property: Co-op
Station: CS-1
Location: Co-Op Spring
Type: Spring
Frequency: Biannually

Field Measurements	Date Sampled 5/31/94	10/18/94
Sampled by:	M.E.C.	M.E.C.
Flow (gpm)	18	15
pH	7.16	7.42
Sp. Cond. (ohms)	780	708
Temp (C)	11.1	12.5

Lab Measurements		
Analyzed by:	CT&E	CT&E
Settleable Sol. (mg/L)	N/D	N/D
TSS (mg/L)	N/D	16
TDS (mg/L)	410	400
Hardness (CaCO3)	387	380
Carbonate(CO3)	N/D	N/D
Bicarbonate (HCO3)	428	420
Calcium (Ca)	89	91
Chloride (Cl)	5	9
Iron (Fe) Total	N/D	N/D
Iron (Fe) Dissolved	N/D	N/D
Magnesium (Mg)	40	38
Manganese (Mn) Tot.	N/D	N/D
Manganese (Mn) Dis.	N/D	N/D
Potassium (K)	3	N/D
Sodium (Na)	5	5
Conduct. (umhos/cm)	731	706
Sulfate (SO4)	60	60
Oil & Grease (mg/L)	N/D	N/D
Cation/Anion Balance	-2.8	-2.7

WATER MONITORING REPORT

Property:	Co-op
Station:	BP-1
Location:	T.C. Ball Park Springs
Type:	Spring
Frequency:	Biannually

Field Measurements	Date Sampled 5/31/94	10/18/94
Sampled by:	M.E.C.	M.E.C.
Flow (gpm)	0.5	<0.1
pH	7.9	7.75
Sp. Cond. (ohms)	757	730
Temp (C)	11.1	9.1

Lab Measurements		
Analyzed by:	CT&E	CT&E
Settleable Sol. (mg/L)	N/D	N/D
TSS (mg/L)	N/D	N/D
TDS (mg/L)	410	420
Hardness (CaCO3)	379	400
Carbonate(CO3)	N/D	N/D
Bicarbonate (HCO3)	449	450
Calcium (Ca)	76	83
Chloride (Cl)	9	12
Iron (Fe) Total	N/D	N/D
Iron (Fe) Dissolved	N/D	N/D
Magnesium (Mg)	46	46
Manganese (Mn) Tot.	N/D	N/D
Manganese (Mn) Dis.	N/D	N/D
Potassium (K)	N/D	N/D
Sodium (Na)	9	9
Conduct. (umhos/cm)	729	744
Sulfate (SO4)	60	70
Oil & Grease (mg/L)	N/D	N/D
Cation/Anion Balance	-5.3	-4.5

WATER MONITORING REPORT

Property: Co-op
Station: SP-1
Location: Trail Sed. Pond Inlet
Type: Stream
Frequency: Biannually

Field Measurements	Date Sampled 5/31/94	10/18/94
Sampled By:	M.E.C.	M.E.C.
Flow (gpm)	Dry	Dry
pH	N/A	N/A
Sp. Cond. (ohms)	N/A	N/A
Temp (C)	N/A	N/A
Diss. O. (ppm)	N/A	N/A

Lab Measurements		
Analyzed by:	N/A	N/A
Settleable Sol. (mg/L)		
TSS (mg/L)		
TDS (mg/L)		
Hardness (CaCO3)		
Carbonate(CO3)		
Bicarbonate (HCO3)		
Calcium (Ca)		
Chloride (Cl)		
Iron (Fe) Total		
Iron (Fe) Dissolved		
Magnesium (Mg)		
Manganese (Mn) Tot.		
Manganese (Mn) Dis.		
Potassium (K)		
Sodium (Na)		
Conduct. (umhos/cm)		
Sulfate (SO4)		
Oil & Grease (mg/L)		
Cation/Anion Balance		

APPENDIX B

CLIMATOLOGICAL DATA

Precipitation - Bear Canyon

Date	Gauge Reading	Precipitation
01/01/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
01/26/94	0.00	
01/27/94	0.17	snow
01/28/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
02/06/94	0.00	
02/07/94	0.00	snowing
02/08/94	0.19	morning snow
02/09/94	0.00	lt. snow
02/10/94	0.31	snow/melt
02/11/94	0.02	melt
02/12/94	0.00	
02/13/94	0.00	
02/14/94	0.00	
02/15/94	0.00	
02/16/94	0.00	snowing
02/17/94	0.27	lt. snow/melt
02/18/94	0.00	
02/19/94	0.00	
02/20/94	0.31	snow
02/21/94	0.00	
02/22/94	0.02	lt. snow
02/23/94	0.00	
02/24/94	0.00	
02/25/94	0.00	
02/26/94	0.00	
02/27/94	0.04	lt. snow
02/28/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
03/10/94	0.00	
03/11/94	0.02	rain/lt. snow
03/12/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
03/18/94	0.00	
03/19/94	0.02	rain
03/20/94	0.00	
03/21/94	0.00	
03/22/94	0.00	
03/23/94	0.08	snow
03/24/94	0.00	
03/25/94	0.12	snow
03/26/94	0.00	

Date	Gauge Reading	Precipitation
03/27/94	0.00	
03/28/94	0.00	
03/29/94	0.00	
03/30/94	0.00	
03/31/94	0.00	
04/01/94	0.00	trace of snow
04/02/94	0.00	
04/03/94	0.03	rain/snow
04/04/94	0.00	
04/05/94	0.00	
04/06/94	0.00	
04/07/94	0.00	
04/08/94	0.00	
04/09/94	0.28	rain/snow
04/10/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
04/18/94	0.00	
04/19/94	0.00	lt. rain
04/20/94	0.00	lt. rain
04/21/94	0.01	lt. rain
04/22/94	0.00	
04/23/94	0.00	lt. rain
04/24/94	0.01	afternoon snow
04/25/94	0.03	snow
04/26/94	0.27	snow
04/27/94	0.44	snow
04/28/94	0.18	snow
04/29/94	0.05	morning snow
04/30/94	0.00	
05/01/94	0.05	rain
05/02/94	0.00	trace of rain
05/03/94	0.01	lt. rain
05/04/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
05/25/94	0.00	
05/26/94	0.09	thunderstorm
05/27/94	0.00	lt. rain
05/28/94	0.01	lt. rain
05/29/94	0.00	
05/30/94	0.00	
05/31/94	0.23	rain/snow
06/01/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
06/18/94	0.00	
06/19/94	0.06	rain

Precipitation - Bear Canyon

Date	Gauge Reading	Precipitation
06/20/94	0.01	lt. rain
06/21/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
07/01/94	0.00	
07/02/94	0.00	trace of rain
07/03/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
07/21/94	0.00	
07/22/94	0.06	afternoon rain
07/23/94	0.01	lt. rain
07/24/94	0.00	trace of rain
07/25/94	0.00	
07/26/94	0.00	trace of rain
07/27/94	0.30	
07/28/94	0.00	
07/29/94	0.00	
07/30/94	0.00	trace of rain
07/31/94	0.00	trace of rain
08/01/94	0.17	thunderstorm
08/02/94	0.05	trace of rain
08/03/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
08/08/94	0.00	
08/09/94	0.07	rain
08/10/94	0.02	lt. rain
08/11/94	0.01	lt. rain
08/12/94	0.03	rain
08/13/94	0.00	
08/14/94	0.08	rain
08/15/94	0.00	
08/16/94	0.00	
08/17/94	0.00	
08/18/94	0.31	thunderstorm
08/19/94	0.05	rain
08/20/94	0.01	lt. rain
08/21/94	0.04	rain
08/22/94	0.00	
08/23/94	0.03	showers
08/24/94	0.00	
08/25/94	0.00	
08/26/94	0.00	
08/27/94	0.03	rain
08/28/94	0.00	trace of rain
08/29/94	0.01	afternoon rain
08/30/94	0.02	afternoon rain

Date	Gauge Reading	Precipitation
08/31/94	0.04	afternoon rain
09/01/94	0.00	
09/02/94	0.13	thunderstorm
09/03/94	0.00	
09/04/94	0.00	
09/05/94	0.00	
09/06/94	0.00	
09/07/94	0.02	afternoon rain
09/08/94	0.00	
09/09/94	0.00	
09/10/94	0.00	
09/11/94	0.01	evening rain
09/12/94	0.02	afternoon rain
09/13/94	0.06	afternoon rain
09/14/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
09/19/94	0.00	
09/20/94	0.49	rain
09/21/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
09/28/94	0.00	
09/29/94	0.52	rain
09/30/94	0.15	rain/snow mix
10/01/94	0.01	lt. morning rain
10/02/94	0.00	
10/03/94	0.31	rain/snow
10/04/94	0.06	lt. rain
10/05/94	0.07	rain/sleet
10/06/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
10/13/94	0.00	
10/14/94	0.19	rain
10/15/94	0.29	snow
10/16/94	0.13	snow
10/17/94	0.01	lt. snow
10/18/94	0.01	lt. rain
10/19/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
11/01/94	0.00	
11/02/94	0.00	trace of snow
11/03/94	0.00	trace of snow
11/04/94	0.00	
11/05/94	0.00	

Precipitation - Bear Canyon

Date	Gauge Reading	Precipitation
11/06/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
11/16/94	0.00	
11/17/94	0.00	snow
11/18/94	0.00	snow
11/19/94	0.26	snow melt
11/20/94	0.02	snow melt
11/21/94	0.00	lt. snow
11/22/94	0.00	
11/23/94	0.00	
11/24/94	0.00	
11/25/94	0.00	
11/26/94	0.00	
11/27/94	0.00	evening snow
11/28/94	0.10	snow
11/29/94	0.00	
11/30/94	0.00	
12/01/94	0.00	
12/02/94	0.00	lt. snow
12/03/94	0.08	snow
12/04/94	0.00	
12/05/94	0.02	snow
12/06/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
12/11/94	0.00	
12/12/94	0.00	evening snow
12/13/94	0.08	snow
12/14/94	0.00	trace of snow
12/15/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
12/23/94	0.00	
12/24/94	0.18	snow
12/25/94	0.00	
12/26/94	0.00	
12/27/94	0.00	
12/28/94	0.00	
12/29/94	0.01	lt. snow
12/30/94	0.00	
12/31/94	0.00	

Precipitation - Trail Canyon

Date	Gauge Reading	Precipitation
06/04/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
06/18/94	0.00	
06/19/94	0.25	rain
06/20/94	0.01	lt. rain
06/21/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
07/01/94	0.00	
07/02/94	0.00	trace of rain
07/03/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
07/21/94	0.00	
07/22/94	0.40	thunderstorm
07/23/94	0.03	afternoon rain
07/24/94	0.02	afternoon rain
07/25/94	0.00	trace of rain
07/26/94	0.00	trace of rain
07/27/94	0.00	
07/28/94	0.00	
07/29/94	0.00	
07/30/94	0.06	afternoon rain
07/31/94	0.01	lt. rain
08/01/94	0.70	thunderstorm
08/02/94	0.00	trace of rain
08/03/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
08/08/95	0.00	
08/09/95	0.07	rain
08/10/95	0.04	rain
08/11/95	0.04	rain
08/12/95	0.09	rain
08/13/95	0.00	
08/14/95	0.02	rain
08/15/95	0.00	
08/16/95	0.00	
08/17/95	0.00	
08/18/95	0.14	thunderstorm
08/19/95	0.02	rain
08/20/95	0.05	evening rain
08/21/95	0.00	
08/22/95	0.00	
08/23/95	0.00	
08/24/95	0.00	

Date	Gauge Reading	Precipitation
08/25/95	0.00	
08/26/95	0.00	
08/27/95	0.07	afternoon rain
08/28/95	0.02	afternoon rain
08/29/95	0.02	afternoon rain
08/30/95	0.03	afternoon rain
08/31/95	0.20	afternoon rain
09/01/95	0.00	
09/02/95	0.30	thunderstorm
09/03/95	0.00	
09/04/95	0.00	
09/05/95	0.00	
09/06/95	0.00	
09/07/95	0.06	afternoon rain
09/08/95	0.00	
09/09/95	0.00	
09/10/95	0.00	
09/11/95	0.01	evening rain
09/12/95	0.05	afternoon rain
09/13/95	0.01	afternoon rain
09/14/95	0.00	
.	.	no precipitation
.	.	during this
.	.	period
09/19/94	0.00	
09/20/94	0.51	heavy rain
09/21/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
09/28/94	0.00	
09/29/94	0.90	rain
09/30/94	0.17	rain/snow
10/01/94	0.01	lt. morning rain
10/02/94	0.00	
10/03/94	0.45	rain/snow
10/04/94	0.15	lt. rain
10/05/94	0.16	rain/sleet
10/06/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
10/13/94	0.00	
10/14/94	0.36	rain
10/15/94	0.31	snow
10/16/94	0.19	snow
10/17/94	0.02	lt. snow
10/18/94	0.01	lt. afternoon rain
10/19/94	0.00	
10/20/94	0.00	
10/21/94	0.00	

Precipitation - Trail Canyon

Date	Gauge Reading	Precipitation
10/22/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
11/01/94	0.00	
11/02/94	0.00	trace of snow
11/03/94	0.00	trace of snow
11/04/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
11/16/94	0.00	
11/17/94	0.00	snow all day
11/18/94	0.58	snow/melt
11/19/94	0.00	
11/20/94	0.00	
11/21/94	0.02	lt. snow
11/22/94	0.00	
11/23/94	0.00	
11/24/94	0.00	
11/25/94	0.00	
11/26/94	0.00	
11/27/94	0.00	evening snow
11/28/94	0.22	snow/melt
11/29/94	0.00	
11/30/94	0.00	

Date	Gauge Reading	Precipitation
12/01/94	0.00	
12/02/94	0.00	snow
12/03/94	0.13	snow/melt
12/04/94	0.00	evening snow
12/05/94	0.12	snow/melt
12/06/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
12/11/94	0.00	
12/12/94	0.00	evening snow
12/13/94	0.00	snow
12/14/94	0.18	snow/melt
12/15/94	0.00	
.	.	no precipitation
.	.	during this
.	.	period
12/23/94	0.00	
12/24/94	0.24	snow
12/25/94	0.00	
12/26/94	0.00	
12/27/94	0.00	
12/28/94	0.00	
12/29/94	0.02	
12/30/94	0.00	
12/31/94	0.00	

APPENDIX C

SUBSIDENCE MONITORING

CO-OP MINING COMPANY
SUBSIDENCE MONITORING
TRAIL AND BEAR CANYON MINES

STATION	LOCATION	ELEVATION			CHANGE	
		7/19/87	10/03/93	08/28/94	Last	Acc.
SMS-1	Trail/Bear	9188.57	9188.40	9188.20	-0.20	-0.37
SMS-2	Bear Cyn.	8542.60	8542.03	8541.65	-0.38	-0.95
SMS-3	Trail Cyn.	8769.06	8768.78	8768.52	-0.26	-0.54
SMS-4	Trail Cyn.	8410.00	8409.69	8409.56	-0.13	-0.44
CON-5	Bear Cyn.	9379.91	9379.91	9379.91	-	-
CON-6	Bear Cyn.	9491.62	9491.62	9491.62	-	-
SMS-7	Bear Cyn.	9398.78	9398.78	9398.78	0.00	0.00
SMS-8	McCadden	9062.15	9062.17	9062.17	0.00	+0.02
SMS-9	Bear Cyn.	9348.91	9348.85	9348.87	+0.02	-0.04
SMS-10	Bear Cyn.	9331.62	9331.70	9331.71	+0.01	+0.09

Notes: (1) CON-6 and SMS-7 through SMS-10 established 9/22/91.
(2) The area was walked between all stations. No visible movement, cracks or other subsidence effects were noted during the survey, other than those shown on Plate 3-3.

REGISTERED PROFESSIONAL ENGINEER
DAN W. GUY
No. 154188
8/28/94
STATE OF UTAH

APPENDIX D

VEGETATION MONITORING

VEGETATION MONITORING OF THE TRAIL CANYON AREA

1994

FOR THE CO-OP MINING COMPANY

Prepared by

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for

CO-OP MINING COMPANY
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Huntington, Utah 84528

Report: Patrick Collins, Ph.D.

Report Date: March 1995
Fieldwork Date: July 1994

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VEGETATION MONITORING OF THE TRAIL CANYON AREAS

1994

SCOPE

The purpose of this document is to provide vegetation data and summaries of several areas that have been previously reclaimed by the CO-OP Mining Company. Additionally, the areas have been compared to a *Reference Area* selected earlier by representatives of CO-OP Mining Company and approved by the State of Utah, Division of Oil, Gas, & Mining (DOGM). This *Reference Area* will be used for a standard of revegetation success. The sample areas (types) included in this report were called: 1) *Reclaimed Slopes*, 2) *Reclaimed Pads*, 3) *Reclaimed Road*, and 4) *Reference Area*.

INTRODUCTION

General Site Description

The study area was located in Trail Canyon, a branch of Huntington Canyon. Huntington Canyon is located west of the town of Huntington, Utah. Several previously disturbed areas have been reclaimed and reseeded in an effort to provide permanent, self-perpetuating vegetative cover. Elevations of the reseeded areas in Trail Canyon range from 6,925 ft to nearly 7,275 ft above sea level. Slopes that surround the canyon were primarily dominated by pinyon-juniper, Salina wildrye and mountain brush communities. Prior to disturbance and development, the canyon bottoms were probably composed chiefly of sagebrush/grass and riparian communities. The vegetation of the reclaimed areas in the canyon were all the result of disturbances caused by previous mining activities.

The *Reference Area* that was previously selected by the CO-OP Mining Company was also located in Trail Canyon at approximately the same elevation as the reclaimed areas (see "Vegetation Sample Map"). The plant community of the *Reference Area* was pinyon-juniper/salina wildrye. It had an eastern exposure with a slope of approximately 30 degrees.

Data Compilation of Sample Areas

The areas that were sampled to estimate relative revegetation success were first divided into areas in close proximity, disturbance type, or had other environmental variables in common. For example, most of the reclaimed "slopes" in Trail Canyon were sampled. As an attempt to provide data for both small, site-specific areas as well as a general overview of the success of all slopes, the data were reported in three ways. First, the data were summarized and reported for smaller, localized areas. This provided site-specific information of the smaller sample areas. Next, the data of all slopes were *"combined"* to provide information on the relative success of the slopes in the area as a whole. Finally, the raw data from which the summary tables were based have also been provided in the report. This allows one to review each sample quadrat individually if desired, or to use the data for further scrutiny or additional statistical testing.

All data have been reported numerically by summary tables and on raw data spreadsheets. Additionally, the summarized data have been shown on graphs to provide immediate comparisons.

METHODS

Quantitative and qualitative data were taken on the vegetation of the reclaimed and reference areas. Sampling was conducted early in July, 1994. Methodologies used herein were performed in accordance with the guidelines supplied by the State of Utah, Division of Oil, Gas and Mining (DOGM).

Study Area Divisions

The study sites were divided into areas of close proximity and/or had similar environmental or physiognomic characteristics. These divisions were called: 1) *Reclaimed Slopes*, 2) *Reclaimed Pads*, 3) *Reclaimed Road*, and 4) *Reference Area*.

A sample map has been prepared to show the general location of each of the following sample areas. The division called *Reclaimed Slopes* included the following revegetated slopes in Trail Canyon study area:

Middle Slopes,
Slopes to Middle Pad,
Slopes near the Residents ,
Steep Slope Above Middle Pad.

The areas called *Reclaimed Pads* on the data sheets and summary tables included the following:

Lower Pad,
Middle Pad,

Slopes (nearby),
Picnic Area.

The *Reclaimed Road* included the following:

Reclaimed Road,
Substation Area.

The *Reference Area* included the only area chosen in Trail Canyon to represent the standard for revegetation success.

Transect and Quadrat Placement

Random/regular placement of sampling plots were designed as an attempt to provide unbiased accuracy of the data compiled. This was accomplished by establishing transect lines randomly placed on the *Reclaimed Slopes*, *Reclaimed Pads* and *Reference Area*. These transect lines were placed over the entire study areas to adequately represent the site. Regular points on the transect lines were then marked. From these marks, the sample points were determined by random distance numbers at right angles to the transect lines.

Quadrats were placed at predetermined regular intervals for the entire length of the *Reclaimed Road*. A random number was then chosen at each location.

Cover, Frequency and Composition

Cover estimates were made using ocular methods with meter square quadrats. Species composition and relative frequencies were also assessed from the quadrats. Overstory cover was that cover over 4 feet high. Additional information recorded on the raw data sheets were: estimated precipitation, slope, exposure, grazing use, animal disturbance and other appropriate notes. Plant nomenclature follows "A Utah Flora", (Welsh et al. 1993).

Woody Species Density

Density of woody plant species of the reclaimed and reference areas were recorded using belt transects. These 5 ft by 25 ft belts were placed randomly throughout the study areas. Total number of individuals by species were counted in each of the belt transects. The average number was then calculated followed by the number of individuals per acre.

Sample Adequacy & Statistical Summaries

Sampling adequacy tests for woody species density and cover were performed using formulas from "Statistical Methods" (Snedocor and Cochran 1980), with the goal that at least 80% of the samples were within 10% of the true mean for the plant communities of the area. The formula used is given below.

$$nmin = \left[\frac{1.28\,(s)}{x\,(.1)}\right]^2$$

where,

nmin = minimum adequate sample
s = standard deviation
x = sample mean
.1 = confidence interval

However, sample size was also influenced proportionately by the total area of each sample site within a given reclaimed area. In other words, the larger the revegetated area, the larger the sample size. Student's t-tests were employed to compare the reclaimed areas with the *Reference Area* in Trail Canyon.

Photographs

Color photographs of each sample area were taken at the time of sampling and submitted with this report.

Production

Total annual biomass was estimated by clipping, drying and weighing current annual productivity. "Double sampling" using four quadrats around the clipped and weighed plot was implemented.

Raw Data

The raw data were also submitted in the Appendix of this report which should facilitate future scrutiny of the data and further statistical testing if desired.

RESULTS

Site similarities and clarification rational warranted the reclaimed areas to be categorized into 4 general types called:

1) Reclaimed Slopes,
2) Reclaimed Pads,
3) Reclaimed Road,
4) Reference Area.

Within each type listed above, there may have also been more than one sample site. Similar sample sites within each type have been "consolidated" and reported which should provide insight for site-specific revegetation success. Following the site-specific summaries, the data have also been "combined" again into the 4 types shown above. These summaries also provide information on the revegetation success of each type as a whole.

Additionally, the raw data have also been provided in the Appendix of this report to show *very* detailed site-specific information on a quadrat-by-quadrat basis if needed.

In other words, one can look at revegetation success by: a) a quadrat-by-quadrat basis, b) by site-specific areas within each type, and c) the 4 general types provided above. *The "Vegetation Sample Map" included in this report should further clarify the locations of the sample areas and types.*

A brief description of the sample results of the "consolidated" and "combined" data have been provided below. Furthermore, data summary tables have also been provided in the subsequent pages. As mentioned above, the raw data spreadsheets have been provided in the Appendix.

Reclaimed Slopes A (*middle slopes, slope to middle pad, slope near residents*)

Total living cover of this area was consolidated (see "Vegetation Sample Map") and estimated to be 44.85% (Table 1). Grasses dominated the site comprising 71.51%, followed by shrubs at 21.87% and forbs at 6.61%. The most common species by cover and frequencies were bluebunch wheatgrass (*Elymus spicatus*), thickspike wheatgrass (*Elymus lanceolatus*) and rubber rabbitbrush (*Chrysothamnus nauseosus*). For cover estimates for each plant species refer to Table 2.

Woody species density of the area was estimated at 6,632 individuals per acre. The most common woody species by far was rubber rabbitbrush (Table 3). Biomass production was clipped, dried and weighed in the laboratory. Total annual production was estimated to be 609 pounds per acre, with the herbaceous species comprising

most of it (Table 4).

Reclaimed Slope B (*steep slope above middle pad*)

The study site had a slope that was reclaimed and was higher in elevation and much steeper than the above described slopes. Because the environmental variables that could influence establishment of vegetation appeared different, this area was summarized separately. The total living cover of this area was 25.00%. Grasses also dominated this site which were 67.78% of the cover (Table 5). Shrubs were relatively less important, whereas, grasses were more important when compared to the slopes above. Thickspike and bluebunch wheatgrasses were the most common species by cover, each having a total cover of 5.00% (Table 6).

Woody species density was estimated to be 4,888 plants per acre, all of which were rubber rabbitbrush (Table 7). Total annual biomass production was 228 pounds per acre (Table 8).

Reclaimed Slopes A-B (*combined*)

When all the slopes reported above were combined (see "Vegetation Sample Map") for a total living cover, the mean was 41.88%. Grasses comprised 70.95%, shrubs 20.11% and forbs 8.94% of the total living cover (Table 9). The same plants mentioned above for the "Reclaimed Slopes - A" were the dominant species, but

because of the larger sample size, the total species diversity was greater (Table 10).

The number of woody species per acre was estimated to be 6,323 (Table 11). Rubber rabbitbrush was again the most common shrub by far. Total annual production was 557 pounds per acre, most of which consisted of herbaceous species (Table 12).

Reclaimed Pads C (*lower pad and slopes*)

The *Reclaimed Pads* were areas that were relatively flat and presented a different array of environmental variables including soil/moisture relationships. The area we called "lower pad" and the slope south of it was separated from the other pad areas mostly due to its distance and elevational change from them (see "Vegetation Sample Map"). Total living cover of this site was estimated to be 44.13% (Table 13). Composition percentages of grasses and forbs were close when compared to the slope areas. The shrubs represented 39.54%, forbs 12.97%, and grasses 47.50% of the total living cover (Table 13). The most common species by cover and frequencies were the same as those previously reported for the slopes, but rubber rabbitbrush lead the others with 14.93% cover (Table 14).

Total woody species density of these areas was high at 11,681 individuals per acre (Table 15). Besides rubber rabbitbrush , big sagebrush (*Artemisia tridentata*) was an important component of the density. Total annual biomass production was estimated to be 1,010 pounds per acre (Table 16). Unlike the previous reported summaries,

however, the woody species were the major constituent of the production.

Reclaimed Pads D (*picnic area*)

Another area that was relatively flat was put in the "pad" type to measure revegetation success. This area was called the "picnic area". Again, due to the distance from the other pad areas, it was summarized separately. The total cover was 29.55% (Table 17). Like the pads above, shrubs represented most of the composition of the cover at 65.02% (Table 17). Rubber rabbitbrush lead the cover values at 17.09% followed by thickspike wheatgrass at 3.18% (Table 18).

The total woody species density was 8,807 individuals per acre (Table 19). Total annual production was 780 pounds per acre with herbaceous and woody species near equally represented (Table 20).

Reclaimed Pads E (*middle pad*)

Another relatively flat area that was put in the "pad" group we called the "middle pad". For the location of this area refer to the "Vegetation Sample Map". Total living cover of this area was 36.67% (Table 21). Grasses represented 50.83% and shrubs 40.65% of the living cover, respectively (Table 21). The rubber rabbitbrush mean cover was 13.33% and was observed in 100% of the sample quadrats. Thickspike wheatgrass was a close second at 11.67% and was observed in 83.33% of the quadrats

(Table 22).

Total woody species density was estimated at 9,293 plants per acre and was nearly all rubber rabbitbrush (Table 23). Total production was 713 pounds per acre (Table 24).

Reclaimed Pads C-E (combined)

When the above "pads" were combined to examine the overall revegetation success, the total mean total cover was 39.00% (Table 25). Shrubs and grasses were nearly equally represented at 46.71% and 41.02%, respectively. Forbs comprised the remaining composition at 12.27% of the total cover. The most common species were very similar as the above areas. Rubber rabbitbrush and bluebunch wheatgrass were the dominants by cover and frequency (Table 26).

Woody species density was high at 10,530 individuals per acre, most of which were rubber rabbitbrush, but had a fair representation of big sagebrush (Table 27). Total annual biomass production was 897 pounds per acre (Table 28).

Reclaimed Road and Substation Area Rd (combined)

The reclaimed road was relatively homogenous its entire length. Therefore, all of the data recorded were combined for a summary. The total living cover in this area was

33.38% (Table 29). Grasses represented nearly half of the living cover followed by forbs, then shrubs (Table 29). Slightly different species were common on this road, but bluebunch wheatgrass and rubber rabbitbrush continued to be the most common. The third most common species, however, was Sandberg bluegrass (*Poa secunda*), followed closely by alfalfa (*Medicago sativa*) and cicer milkvetch (*Astragalus cicer*). For cover by species refer to Table 30.

Total woody species density of the *Reclaimed Road* was 4,686 individuals per acre. Rubber rabbitbrush was again the most common woody species, but unlike the other areas, Fremont's buckwheat (*Eriogonum corymbosum*) was also an important species (Table 31). Total annual biomass production was 537 pounds per acre, 418 pounds of which were herbaceous and 119 pounds woody (Table 32).

Reference Area Ref

A *Reference Area* had been previously chosen by the CO-OP Mining Company and approved by DOGM to represent a standard for revegetation success. The *Reference Area* was also sampled to compare with the reclaimed areas at this time. The total living cover was estimated at 29.00% (Table 33). Grasses also dominated comprising 72.90% of the living cover, followed by shrubs and forbs at 22.34% and 4.76%, respectively. Clearly, the most common species in the area was Salina wildrye (*Elymus salinus*) having a mean cover of 21.23% and was observed on 96.67% of the sample quadrats (Table 34). Most common woody species by cover was Fremont's

buckwheat at 3.33%, whereas, the most common forb was hoary aster (*Machaeranthera canescens)* with only 0.50% mean cover (Table 34)..

The total woody species density was estimated to be 1,975 individual per acre (Table 35). Most common woody species by densities were Fremont's buckwheat, Mormon tea (*Ephedra viridis*), and rubber rabbitbrush. The total biomass production was 346 pounds per acre (Table 36). Herbaceous species was estimated 250 pounds per acre, whereas, woody species were about 100 pounds per acre.

DISCUSSION

Bar graphs have been prepared as an attempt to easily compare the total cover, composition, density and production summaries. Individual sample areas within the types have been graphed, followed by the value for the "combined" sample areas. The *Reference Area* has also been included in the graphs.

Upon review of the total living cover (Fig.1), one can note that nearly all the cover values of the reclaimed areas were greater than the *Reference Area*. The exception was the "steep slope " area, which had 25.00% living cover -- or 4.00% less than the Reference Area. When this relatively small acreage and the steep slope angle is considered for this area, the total cover value of the "steep slope" should still be considered a success for revegetation. When all of the slopes were combined (Fig. 1,

A-B), including the "steep slope", the cover value is well above that of the *Reference Area*. As a point of interest, Fig. 2 compares the percent composition of the species of each area compared to the *Reference Area*.

Fig. 3 illustrates the woody species densities of each area and the general types combined. As can be easily noted, all of the sample areas had a much greater number of woody species when compared to the *Reference Area*. This is due mostly to the successful establishment of rubber rabbitbrush on the reclaimed areas. The total annual biomass production of each area is shown on Fig. 4. The "steep slope" is the only area that fell somewhat short of the *Reference Area*.

Statistical tests were employed to compare differences between the reclaimed and reference areas. When the reclaimed slopes, pads and roads were each compared with the *Reference Area*, the results were statisticallly significant (Table 37). In each analysis results of the statistical tests suggested that the reclaimed areas had more living cover, density and biomass when compared to the *Reference Area*.

To summarize, all of the reclaimed areas appear to be establishing vegetation successfully. Most of the plants observed were desirable species and appeared capable of self-perpetuation, had good wildlife cover value, were aesthetically pleasing, and exceeded the revegetation standards of the *Reference Area*.

TABLE 1: Total cover and composition summary for the "Reclaimed Slopes" (A *middle slopes, slope to middle pad, slope near residents*) in Trail Canyon for the CO-OP Mining Company (see Sample Map).

TOTAL COVER	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
Living Cover	44.85	13.31	34
Litter	12.65	7.10	34
Bareground	22.35	12.67	34
Rock	20.15	9.59	34
COMPOSITION			
Shrubs	21.87	15.99	34
Forbs	6.61	10.73	34
Grasses	71.51	20.82	34

TABLE 2: Species cover and frequency summary for the "Reclaimed Slopes" (A *middle slopes, slope to middle pad, slope near residents*) in Trail Canyon for the CO-OP Mining Company (see Sample Map).

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
TREES & SHRUBS				
Artemisia tridentata	0.35	1.20	34	8.82
Chrysothamnus nauseosus	9.85	8.62	34	82.35
FORBS				
Artemisia ludoviciana	0.15	0.84	34	2.94
Astragalus cicer	0.44	1.87	34	5.88
Linum lewsii	0.15	0.84	34	2.94
Melilotus officinalis	0.44	1.42	34	0.44
Penstemon palmeri	0.24	0.97	34	5.88
Salsola pestifer	0.29	1.69	34	2.94
Sanquisorba minor	0.44	1.42	34	8.82
GRASSES				
Agropyron cristatum	2.06	6.08	34	14.71
Elymus cinereus	1.76	5.41	34	14.71
Elymus lanceolatus	7.21	9.17	34	55.88
Elymus spicatus	20.00	13.39	34	88.24
Stipa hymenoides	1.47	5.49	34	8.82

TABLE 3: Woody species densities of the "Reclaimed Slopes" (A *middle slopes, slope to middle pad, slope near residents*) in Trail Canyon for the CO-OP Mining Company (see Sample Map).

	NUMBER/ACRE	SAMPLE SIZE
Artemisia tridentata	358.75	34
Ceratoides lanata	20.50	34
Chrysothamnus nauseosus	6252.50	34
TOTAL	6631.75	34

TABLE 4: Dry weight annual production for the "Reclaimed Slopes" *(A middle slopes, slope to middle pad, slope near residents)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

LIFEFORM	LBS/ ACRE	STANDARD DEVIATION	SAMPLE* SIZE
Herbaceous	473.88	265.85	17.(85)
Woody Spp.	184.62	156.46	17.(85)
TOTAL PRODUCTION	608.62	330.27	17.(85)

TABLE 5: Total cover and composition summary for the "Reclaimed Slope" *(B steep slope above middle pad)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

TOTAL COVER	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
Living Cover	25.00	5.00	6
Litter	10.00	7.07	6
Bareground	48.33	12.47	6
Rock	16.67	11.43	6
COMPOSITION			
Shrubs	10.11	14.61	6
Forbs	22.11	20.33	6
Grasses	67.78	28.08	6

TABLE 6: Species cover and frequency summary for the "Reclaimed Slope" *(B steep slope above middle pad)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
TREES & SHRUBS				
Artemisia tridentata	0.83	1.86	6	16.67
Chrysothamnus nauseosus	1.83	2.27	6	50.00
FORBS				
Achillea millefolium	0.17	0.37	6	16.67
Linum lewsii	1.67	2.36	6	33.33
Medicago sativa	0.83	1.86	6	16.67
Melilotus officinalis	2.17	3.18	6	33.33
Salsola pestifer	0.83	1.86	6	16.67
GRASSES				
Agropyron cristatum	2.50	3.82	6	33.33
Elymus lanceolatus	5.00	4.08	6	83.33
Elymus spicatus	5.00	7.07	6	66.67
Poa secunda	3.33	5.53	6	33.33
Stipa hymenoides	0.83	1.86	6	16.67

TABLE 7: Woody species densities of the "Reclaimed Slope" *(B steep slope above middle pad)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

	NUMBER/ACRE	SAMPLE SIZE
Chrysothamnus nauseosus	4588.32	6
TOTAL	4888.32	6

TABLE 8: Dry weight annual production for the "Reclaimed Slope" *(B steep slope above middle pad)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

LIFEFORM	LBS/ ACRE	STANDARD DEVIATION	SAMPLE* SIZE
Herbaceous	220.94	118.31	3.(15)
Woody Spp.	7.44	6.61	3.(15)
TOTAL PRODUCTION	228.38	123.90	3.(15)

* Sample size shows the number of sample locations. The number of estimates recorded including "double sampling" is shown in parentheses.

TABLE 9: Total cover and composition summary for the "Reclaimed Slopes" *(A-B combined)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

TOTAL COVER	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
Living Cover	41.88	14.30	40
Litter	12.25	7.15	40
Bareground	26.25	15.68	40
Rock	19.63	9.96	40

TABLE 10: Species cover and frequency summary for the "Reclaimed Slopes" *(A-B combined)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
TREES & SHRUBS				
Artemisia tridentata	0.43	1.34	40	10.00
Chrysothamnus nauseosus	8.65	8.49	40	77.50
FORBS				
Achillea millefolium	0.03	0.16	40	2.50
Artemisia ludoviciana	0.13	0.78	40	2.50
Astragalus cicer	0.38	1.73	40	5.00
Linum lewsii	0.38	1.32	40	7.50
Medicago sativa	0.13	0.78	40	2.50
Melilotus officinalis	0.70	1.90	40	12.50
Penstemon palmeri	0.20	0.90	40	5.00
Salsola pestifer	0.38	1.73	40	5.00
Sanquisorba minor	0.38	1.32	40	7.50
GRASSES				
Agropyron cristatum	2.13	5.80	40	17.50
Elymus cinereus	1.50	5.02	40	12.50
Elymus lanceolatus	6.88	8.64	40	57.50
Elymus spicatus	17.75	13.74	40	82.50
Poa secunda	0.50	2.45	40	5.00
Stipa hymenoides	1.38	5.12	40	10.00

TABLE 11: Woody species densities of the "Reclaimed Slopes" *(A-B combined)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

	NUMBER/ACRE	SAMPLE SIZE
Artemisia tridentata	304.85	40.(200)
Chrysothamnus nauseosus	6001.19	40.(200)
Ceratoides lanata	17.42	40.(200)
TOTAL	6323.46	40.(200)

TABLE 12: Dry weight annual production for the "Reclaimed Slopes" *(A-B combined)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

LIFEFORM	LBS/ ACRE	STANDARD DEVIATION	SAMPLE* SIZE
Herbaceous	396.31	81.48	20.(100)
Woody Spp.	160.46	47.10	20.(100)
TOTAL PRODUCTION	556.77	107.91	20.(100)

* Sample size shows the number of sample locations. The number of estimates recorded including "double sampling" is shown in parentheses.

TABLE 13: Total cover and composition summary for the "Reclaimed Pads" *(C lower pad and slopes)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

TOTAL COVER	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
Living Cover	44.13	11.76	23
Litter	16.74	7.16	23
Bareground	21.74	9.51	23
Rock	17.39	6.23	23
COMPOSITION			
Shrubs	39.54	20.11	23
Forbs	12.97	14.12	23
Grasses	47.50	20.05	23

TABLE 14: Species cover and frequency summary for the "Reclaimed Pads" *(C lower pad and slopes)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
TREES & SHRUBS				
Artemisia tridentata	4.13	6.37	23	39.13
Chrysothamnus nauseosus	14.93	13.40	23	69.57
FORBS				
Aster foliaceus	0.65	2.24	23	8.70
Grindelia squarrosa	0.65	2.24	23	8.70
Linum lewsii	1.30	3.68	23	13.04
Machaeranthera canescens	0.22	1.02	23	4.35
Medicago sativa	0.22	1.02	23	4.35
Melilotus officinalis	1.30	3.37	23	17.39
Penstemon palmeri	0.22	1.02	23	4.35
Sanquisorba minor	0.65	2.24	23	8.70
GRASSES				
Agropyron cristatum	1.96	4.36	23	21.74
Bromus carinatus	0.22	1.02	23	4.35
Bromus tectorum	0.22	1.02	23	4.35
Elymus cinereus	2.17	5.68	23	17.39
Elymus lanceolatus	3.48	6.33	23	30.43
Elymus spicatus	10.87	11.48	23	65.22
Stipa hymenoides	1.74	3.49	23	21.74

TABLE 15: Woody species densities of the "Reclaimed Pads" *(C lower pad and slopes)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

	NUMBER/ACRE	SAMPLE SIZE
Artemisia tridentata	4545.00	23
Chrysothamnus nauseosus	7135.65	23
TOTAL	11680.65	23

TABLE 16: Dry weight annual production for the "Reclaimed Pads" *(C lower pad and slopes)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

LIFEFORM	LBS/ ACRE	STANDARD DEVIATION	SAMPLE* SIZE
Herbaceous	370.07	146.77	11.(55)
Woody Spp.	639.80	514.36	11.(55)
TOTAL PRODUCTION	1009.87	577.61	11.(55)

* Sample size shows the number of sample locations. The number of estimates recorded including "double sampling" is shown in parentheses.

TABLE 17: Total cover and composition summary for the "Reclaimed Pads" *(D picnic area)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

TOTAL COVER	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
Living Cover	29.55	9.64	10
Litter	10.91	2.87	10
Bareground	33.18	10.50	10
Rock	26.36	9.32	10
COMPOSITION			
Shrubs	65.02	30.28	10
Forbs	12.85	13.68	10
Grasses	22.13	24.98	10

TABLE 18: Species cover and frequency summary for the "Reclaimed Pads" *(D picnic area)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
TREES & SHRUBS				
Chrysothamnus nauseosus	17.09	7.14	10	90.91
FORBS				
Grindelia squarrosa	0.45	1.44	10	9.09
Medicago sativa	1.36	3.08	10	18.18
Penstemon palmeri	2.45	3.47	10	36.36
GRASSES				
Bromus carinatus	0.45	1.44	10	9.09
Elymus cinereus	0.45	1.44	10	9.09
Elymus lanceolatus	3.18	8.60	10	18.18
Elymus spicatus	2.73	4.45	10	36.36
Stipa hymenoides	1.36	4.31	10	9.09

TABLE 19: Woody species densities of the "Reclaimed Pads" *(D picnic area)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

	NUMBER/ACRE	SAMPLE SIZE
Artemisia tridentata	63.36	11
Chrysothamnus nauseosus	8648.64	11
Salix spp.	95.04	11
TOTAL	8807.04	11

TABLE 20: Dry weight annual production for the "Reclaimed Pads" *(D picnic area)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

LIFEFORM	LBS/ ACRE	STANDARD DEVIATION	SAMPLE* SIZE
Herbaceous	428.56	398.86	6.(30)
Woody Spp.	351.91	200.35	6.(30)
TOTAL PRODUCTION	780.46	501.32	6.(30)

* Sample size shows the number of sample locations. The number of estimates recorded including "double sampling" is shown in parentheses.

TABLE 21: Total cover and composition summary for the "Reclaimed Pads" *(E middle pad)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

TOTAL COVER	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
Living Cover	36.67	8.50	6
Litter	12.50	5.59	6
Bareground	20.83	10.57	6
Rock	30.00	16.58	6
COMPOSITION			
Shrubs	40.65	7.77	6
Forbs	8.52	9.02	6
Grasses	50.83	12.13	6

TABLE 22: Species cover and frequency summary for the "Reclaimed Pads" *(E middle pad)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
TREES & SHRUBS				
Artemisia tridentata	1.67	3.73	6	16.67
Chrysothamnus nauseosus	13.33	4.71	6	100.00
Gutierrezia sarothrae				
FORBS				
Grindelia squarrosa	1.67	2.36	6	33.33
Medicago sativa	0.83	1.86	6	16.67
GRASSES				
Elymus lanceolatus	1.67	2.36	6	33.33
Elymus spicatus	11.67	8.50	6	83.33
Stipa hymenoides	5.83	7.31	6	50.00

TABLE 23: Woody species densities of the "Reclaimed Pads" *(E middle pad)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

	NUMBER/ACRE	SAMPLE SIZE
Artemisia tridentata	116.16	6
Chrysothamnus nauseosus	9176.64	6
TOTAL	9292.80	6

TABLE 24: Dry weight annual production for the "Reclaimed Pads" *(E middle pad)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

LIFEFORM	LBS/ ACRE	STANDARD DEVIATION	SAMPLE* SIZE
Herbaceous	216.15	111.78	3.(15)
Woody Spp.	494.83	212.62	3.(15)
TOTAL PRODUCTION	712.97	150.34	3.(15)

* Sample size shows the number of sample locations. The number of estimates recorded including "double sampling" is shown in parentheses.

TABLE 25: Total cover and composition summary for the "Reclaimed Pads" *(C-E combined)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

TOTAL COVER	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
Living Cover	39.00	12.51	40
Litter	14.50	6.60	40
Bareground	24.75	11.23	40
Rock	21.75	10.70	40
COMPOSITION			
Shrubs	46.71	24.92	40
Forbs	12.27	13.45	40
Grasses	41.02	23.69	40

TABLE 26: Species cover and frequency summary for the "Reclaimed Pads" *(C-E combined)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
TREES & SHRUBS				
Artemisia tridentata	2.63	5.36	40	25.00
Chrysothamnus nauseosus	14.83	11.08	40	80.00
FORBS				
Aster foliaceus	0.38	1.73	40	5.00
Grindelia squarrosa	0.75	2.11	40	10.00
Linum lewsii	0.75	2.86	40	7.50
Machaeranthera canescens	0.13	0.78	40	2.50
Medicago sativa	0.63	2.00	40	10.00
Melilotus officinalis	0.75	2.63	40	10.00
Penstemon palmeri	0.80	2.23	40	12.50
Sanquisorba minor	0.38	1.73	40	5.00
GRASSES				
Agropyron cristatum	1.13	3.44	40	12.50
Bromus carinatus	0.25	1.09	40	5.00
Bromus tectorum	0.13	0.78	40	2.50
Elymus cinereus	1.38	4.47	40	12.50
Elymus lanceolatus	3.13	6.68	40	25.00
Elymus spicatus	8.75	10.29	40	60.00
Stipa hymenoides	2.25	4.74	40	22.50

TABLE 27: Woody species densities of the "Reclaimed Pads" *(C-E combined)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

	NUMBER/ACRE	SAMPLE SIZE
Artemisia tridentata	2647.74	40
Chrysothamnus nauseosus	7856.42	40
Salix spp.	26.13	40
TOTAL	10530.39	40

TABLE 28: Dry weight annual production for the "Reclaimed Pads" *(C-E combined)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

LIFEFORM	LBS/ ACRE	STANDARD DEVIATION	SAMPLE* SIZE
Herbaceous	364.83	256.73	20.(100)
Woody Spp.	531.69	425.04	20.(100)
TOTAL PRODUCTION	896.52	527.68	20.(100)

* Sample size shows the number of sample locations. The number of estimates recorded including "double sampling" is shown in parentheses.

TABLE 29: Total cover and composition summary for the "Reclaimed Road and Substation Area" *(Rd combined)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

TOTAL COVER	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
Living Cover	33.38	10.39	40
Litter	13.25	7.79	40
Bareground	20.88	11.83	40
Rock	32.50	15.89	40
COMPOSITION			
Shrubs	17.24	22.03	40
Forbs	33.87	29.72	40
Grasses	48.89	29.09	40

TABLE 30: Species cover and frequency summary for the "Reclaimed Road and Substation Area" *(Rd combined)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
TREES & SHRUBS				
Artemisia tridentata	0.75	1.79	40	15.00
Chrysothamnus nauseosus	4.05	5.36	40	47.50
Eriogonum corymbosum	0.45	2.16	40	5.00
Pinus ponderosa	0.13	0.78	40	2.50
FORBS				
Achillea millefolium	0.13	0.78	40	2.50
Artemisia ludoviciana	0.25	1.09	40	5.00
Aster chilensis	2.25	5.80	40	17.50
Astragalus cicer	1.38	3.87	40	15.00
Circium sp.	0.13	0.78	40	2.50
Linum lewsii	1.75	3.27	40	27.50
Medicago sativa	3.43	5.20	40	42.50
Penstemon palmeri	0.75	3.46	40	5.00
Salsola pestifer	1.25	4.71	40	5.00
Tragopogon dubius	0.13	0.78	40	2.50
GRASSES				
Agropyron cristatum	0.25	1.56	40	2.50
Bromus tectorum	0.13	0.78	40	2.50
Elymus lanceolatus	2.13	5.46	40	20.00
Elymus salinus	0.50	2.18	40	5.00
Elymus spicatus	7.95	9.60	40	52.50
Poa secunda	3.50	6.73	40	32.50
Stipa hymenoides	2.13	6.70	40	12.50

TABLE 31: Woody species densities of the "Reclaimed Road and Substation Area" (*Rd combined)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

	NUMBER/ACRE	SAMPLE SIZE
Artemisia tridentata	522.60	40.(200)
Chrysothamnus nauseosus	3161.73	40.(200)
Eriogonum corymbosum	975.52	40.(200)
Gutierrezia sarothrae	8.71	40.(200)
Pinus ponderosa	17.42	40.(200)
TOTAL	4685.98	40.(200)

TABLE 32: Dry weight annual production for the "Reclaimed Road and Substation Area" *(Rd combined)* in Trail Canyon for the CO-OP Mining Company (see Sample Map).

LIFEFORM	LBS/ ACRE	STANDARD DEVIATION	SAMPLE* SIZE
Herbaceous	417.90	260.44	20.(100)
Woody Spp.	119.14	156.08	20.(100)
TOTAL PRODUCTION	537.04	337.85	20.(100)

* Sample size shows the number of sample locations. The number of estimates recorded including "double sampling" is shown in parentheses.

TABLE 33: Total cover and composition summary for the "Reference Area" (Ref) in Trail Canyon for the CO-OP Mining Company (see Sample Map).

TOTAL COVER	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
Living Cover	29.00	9.52	30
Litter	16.67	9.07	30
Bareground	17.33	9.37	30
Rock	37.00	14.75	30
COMPOSITION			
Shrubs	22.34	26.22	30
Forbs	4.76	8.60	30
Grasses	72.90	25.48	30

TABLE 34: Species cover and frequency summary for the "Reference Area" (Ref) in Trail Canyon for the CO-OP Mining Company (see Sample Map).

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
TREES & SHRUBS				
Artemisia tridentata	0.33	1.80	30	3.33
Chrysothamnus nauseosus	0.67	2.81	30	6.67
Chrysothamnus viscidiflorus	0.17	0.90	30	3.33
Ephedra viridis	1.07	3.83	30	10.00
Eriogonum corymbosum	3.33	5.68	30	80.00
Gutierrezia sarothrae	0.53	1.73	30	6.67
Pinus edulis	0.33	1.80	30	3.33
FORBS				
Artemisia ludoviciana	0.23	0.96	30	6.67
Circium sp.	0.07	0.36	30	3.33
Erigeron sp.	0.20	0.91	30	3.33
Hymenoxys richardsonii	0.17	0.90	30	3.33
Machaeranthera canescens	0.50	1.50	30	10.00
Stanleya pinnata	0.17	0.90	30	3.33
GRASSES				
Elymus salinus	21.23	9.42	30	96.67

TABLE 35: Woody species densities of the "Reference Area" (Ref) in Trail Canyon for the CO-OP Mining Company (see Sample Map).

	NUMBER/ACRE	SAMPLE SIZE
Artemisia tridentata	23.24	30
Cercocarpus montanus	11.62	30
Ceratoides lanata	34.86	30
Chrysothamnus nauseosus	244.02	30
Chrysothamnus viscidiflorus	11.62	30
Ephedra viridis	302.12	30
Eriogonum corymbosum	1127.14	30
Gutierrezia sarothrae	185.92	30
Pinus edulis	34.86	30
TOTAL	1975.40	30

TABLE 36: Dry weight annual production for the "Reference Area" (Ref) in Trail Canyon for the CO-OP Mining Company (see Sample Map).

LIFEFORM	LBS/ ACRE	STANDARD DEVIATION	SAMPLE* SIZE
Herbaceous	249.72	91.43	15.(75)
Woody Spp.	99.19	102.31	15.(75)
TOTAL PRODUCTION	345.91	139.15	15.(75)

* Sample size shows the number of sample locations. The number of estimates recorded including "double sampling" is shown in parentheses.

TABLE 37: Statistical summary sheet for the Reclaimed Areas and Reference Area of Trail Canyon for the CO-OP Mining Company.

RECLAIMED SLOPES (A-B combined)			
Living Cover	x=41.88	s=14.30	n=40
Density	x=6323.46	s= --	n=40
Production	x=556.77	s=107.91	n=20(100)
REFERENCE AREA			
Living Cover	x=29.00	s=9.52	n=30
Density	x=1975.40	s= --	n=30
Production	x=345.91	s=139.15	n=15(75)
STATISTICAL ANALYSES			
Living Cover	t=4.271	df=	SL=p<.001
Density	t=**	df= --	SL= --
Production	t=5.054	df=33	SL=p<.001

RECLAIMED PADS (C-E combined)			
Living Cover	x=39.00	s=12.51	n=40
Density	x=10530.39	s= --	n=40
Production	x=896.52	s=527.68	n=20(100)
REFERENCE AREA			
Living Cover	x=29.00	s=9.52	n=30
Density	x=1975.40	s= --	n=30
Production	x=345.91	s=139.15	n=15(75)
STATISTICAL ANALYSES			
Living Cover	t=3.654	df=68	SL=p<.001
Density	t=**	df= --	SL= --
Production	t=3.927	df=33	SL=p<.001

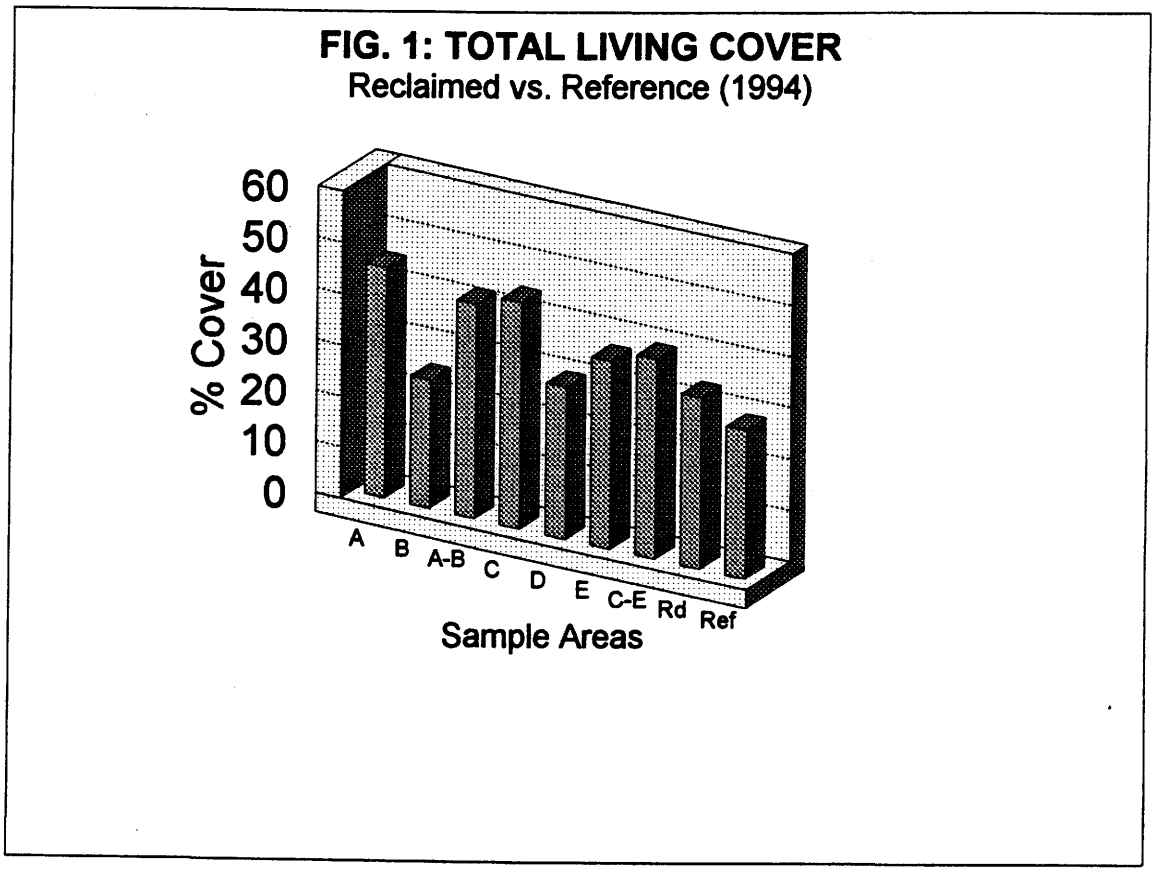
x = sample mean, s = sample standard deviation,
n = sample size, NS = nonsignificant,
** not calculated (differences obvious)

TABLE 37: (Continued)

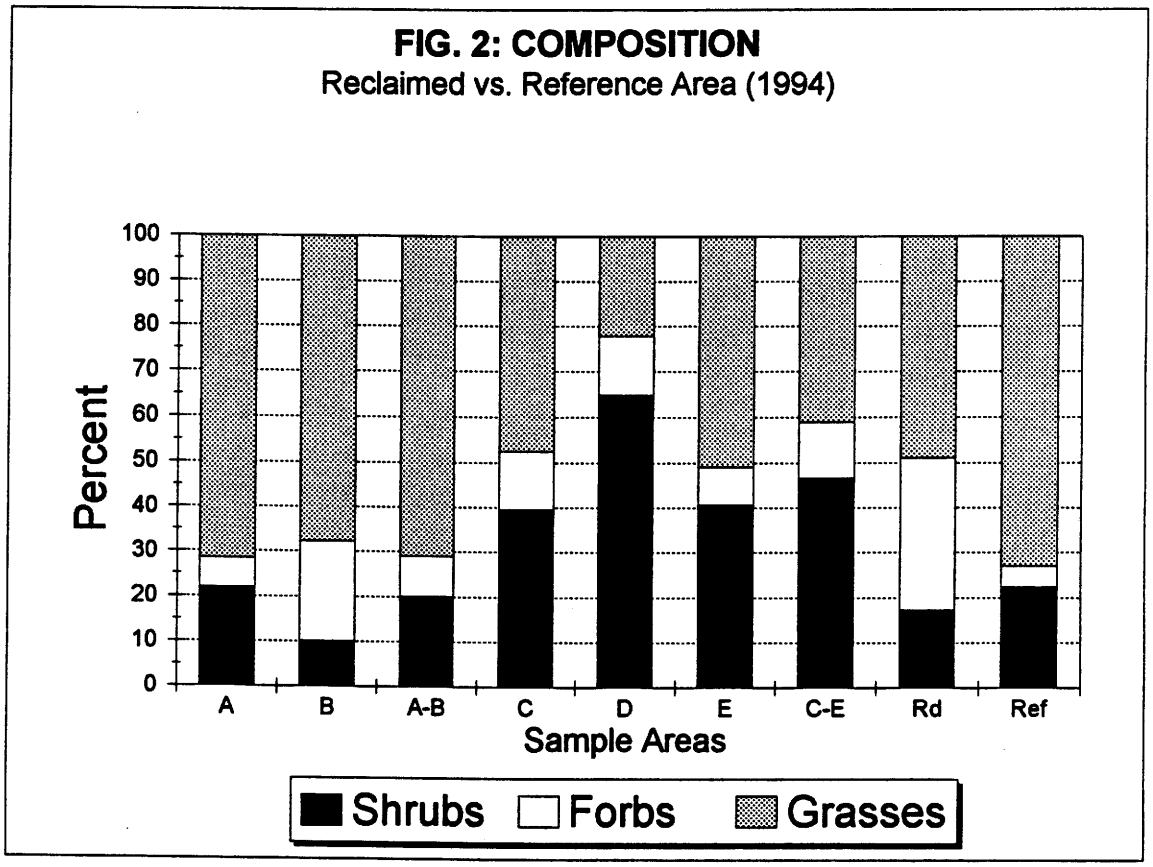
RECLAIMED ROAD & SUBSTATION (Rd combined)			
Living Cover	x=33.38	s=10.39	n=40
Density	x=4685.98	s= --	n=40
Production	x=537.04	s=337.85	n=20(100)
REFERENCE AREA			
Living Cover	x=29.00	s=9.52	n=30
Density	x=1975.40	s= --	n=30
Production	x=345.91	s=139.15	n=15(75)
STATISTICAL ANALYSES			
Living Cover	t=1.808	df=68	SL=p<.05
Density	t=**	df= --	SL= NS
Production	t=2.058	df=33	SL=p<.05

x = sample mean, s = sample standard deviation,
n = sample size, NS = nonsignificant,
** not calculated (differences obvious)

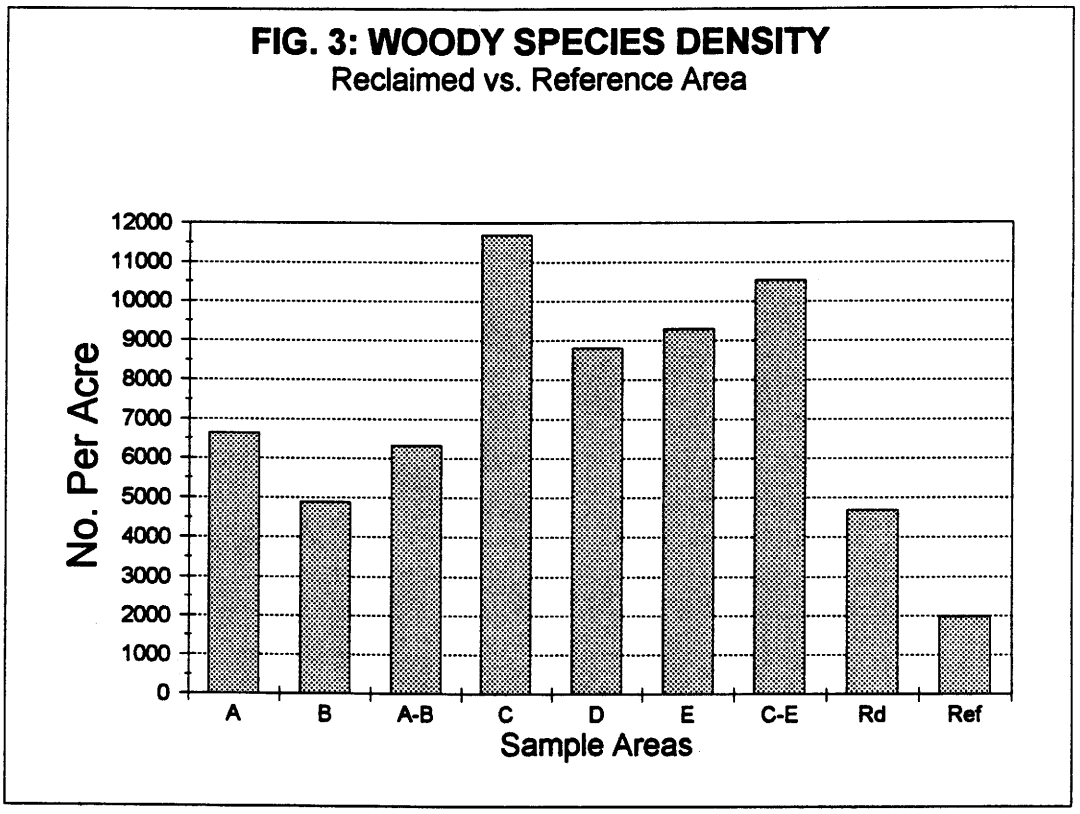
FIGURES & GRAPHS



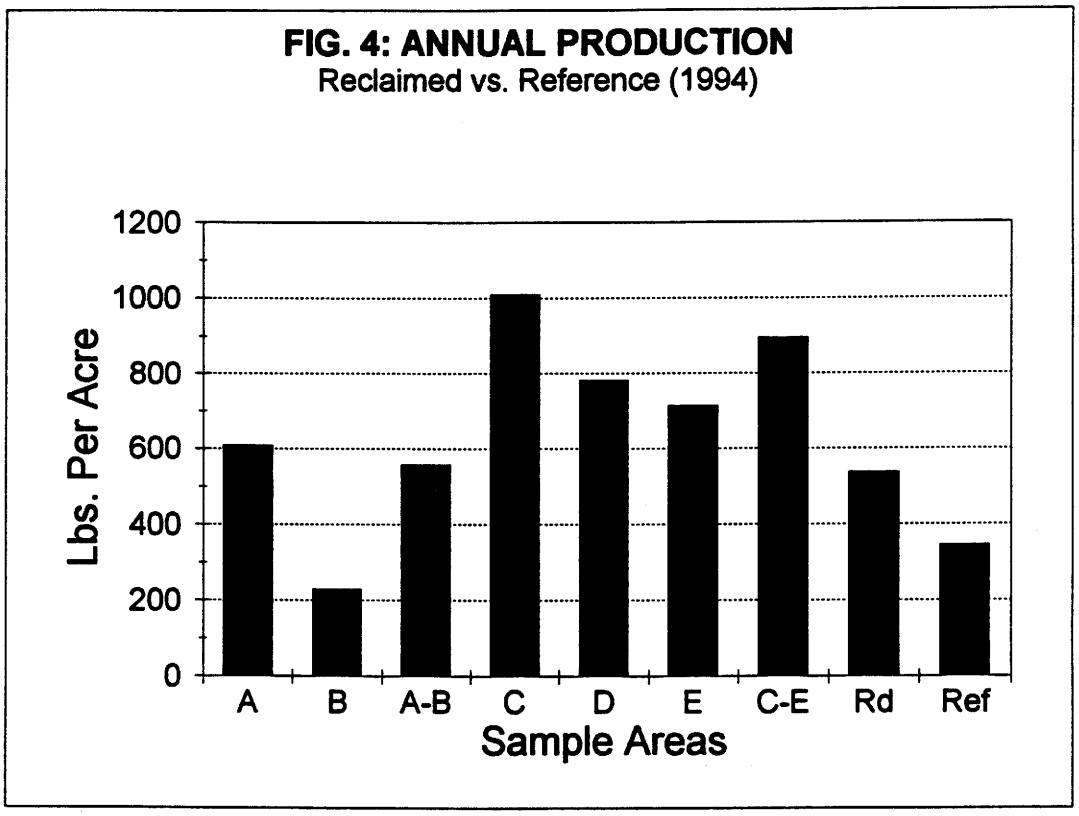
A = Reclaimed Slopes (*middle slopes, slope to middle pad, slope near residents*)
B = Reclaimed Slope (*steep slope above middle pad*)
A-B = A & B (*combined*)
C = Reclaimed Pads (*lower pad & slopes*)
D = Reclaimed Pads (*picnic area*)
E = Reclaimed Pads (*middle pad*)
C-E = A thru E (*combined*)
Rd = Reclaimed Road & Substation (*combined*)
Ref = Reference Area



A = Reclaimed Slopes (*middle slopes, slope to middle pad, slope near residents*)
B = Reclaimed Slope (*steep slope above middle pad*)
A-B = A & B (*combined*)
C = Reclaimed Pads (*lower pad & slopes*)
D = Reclaimed Pads (*picnic area*)
E = Reclaimed Pads (*middle pad*)
C-E = A thru E (*combined*)
Rd = Reclaimed Road & Substation (*combined*)
Ref = Reference Area

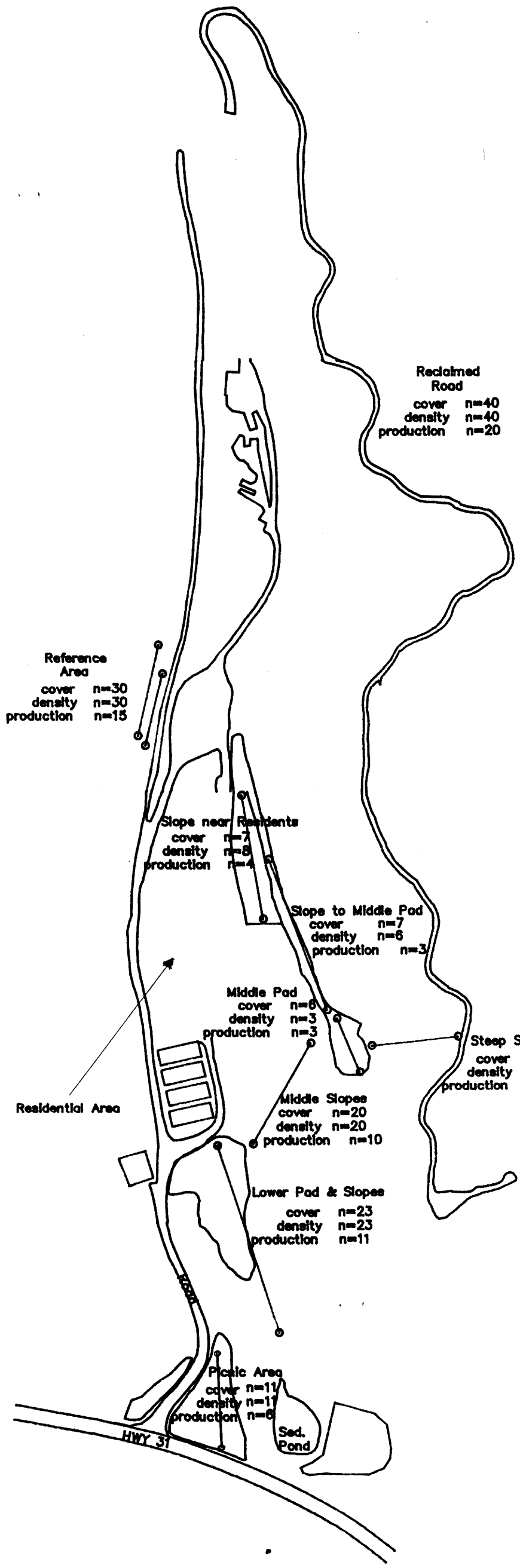


A = Reclaimed Slopes (*middle slopes, slope to middle pad, slope near residents*)
B = Reclaimed Slope (*steep slope above middle pad*)
A-B = A & B (*combined*)
C = Reclaimed Pads (*lower pad & slopes*)
D = Reclaimed Pads (*picnic area*)
E = Reclaimed Pads (*middle pad*)
C-E = A thru E (*combined*)
Rd = Reclaimed Road & Substation (*combined*)
Ref = Reference Area



A = Reclaimed Slopes (*middle slopes, slope to middle pad, slope near residents*)
B = Reclaimed Slope (*steep slope above middle pad*)
A-B = A & B (*combined*)
C = Reclaimed Pads (*lower pad & slopes*)
D = Reclaimed Pads (*picnic area*)
E = Reclaimed Pads (*middle pad*)
C-E = A thru E (*combined*)
Rd = Reclaimed Road & Substation (*combined*)
Ref = Reference Area

VEGETATION SAMPLE MAP



RECEIVED
3 1995
DIV OF OIL, GAS & MINING

VEGETATION SAMPLE MAP (1994)
FOR
TRAIL CANYON
CO-OP MINING COMPANY
(OWNER)

MT. NEBO SCIENTIFIC
RESEARCH AND CONSULTING

DRAWN	J. MAGENO
CHECKED	P. COLLINS
DATE	3-21-95
SCALE	1"=300'

SAMPLE.DWG

COLOR PHOTOGRAPHS

Reclaimed Pads (middle pad)

Reclaimed Pads (picnic area)

Reclaimed Road

Trail Canyon Reference Area

Reclaimed Slopes (middle slopes)

Reclaimed Slopes (slopes near residents)

Reclaimed Slopes (steep slope above middle pad)

Reclaimed Pads (lower pad)

APPENDIX

Raw Data

CO-OP MINE
Reclaimed Slopes
Middle Slopes, Slopes to Middle Pad & Slope near Residents
Exposure: W
Slope: 5-37 deg
Area: 3.97 acres
Sample Date: 7 July 1994

	Middle Slope (#'s 1-20)									
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
TREES & SHRUBS										
Chrysothamnus nauseosus	20.00	0.00	20.00	0.00	15.00	5.00	5.00	5.00	15.00	20.00
Artemisia tridentata	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	5.00
FORBS										
Penstemon palmeri	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00
Melilotus officinalis	5.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Artemisia ludoviciana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sanguisorba minor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Linum lewsii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Salsola pestifer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Astragalus cicer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES										
Elymus lanceolatus	25.00	20.00	5.00	5.00	0.00	15.00	15.00	25.00	0.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus spicatus	5.00	15.00	15.00	20.00	35.00	35.00	30.00	35.00	40.00	45.00
Elymus cinereus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Agropyron cristatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COVER										
Total Living Cover	55.00	35.00	45.00	25.00	50.00	60.00	50.00	65.00	55.00	70.00
Litter	20.00	10.00	10.00	10.00	20.00	10.00	10.00	15.00	10.00	5.00
Bareground	10.00	35.00	20.00	40.00	20.00	15.00	15.00	10.00	20.00	20.00
Rock	15.00	20.00	25.00	25.00	10.00	15.00	25.00	10.00	15.00	5.00
% COMPOSITION										
Shrubs	36.36	0.00	44.44	0.00	30.00	11.67	10.00	7.69	27.27	35.71
Forbs	9.09	0.00	11.11	0.00	0.00	5.00	0.00	0.00	0.00	0.00
Grasses	54.55	100.00	44.44	100.00	70.00	83.33	90.00	92.31	72.73	64.29

11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00
25.00	5.00	5.00	5.00	10.00	5.00	5.00	0.00	0.00	0.00	20.00	5.00	5.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	0.00	10.00	0.00	0.00	40.00	10.00	0.00	5.00	0.00	0.00	0.00
0.00	0.00	30.00	0.00	10.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
25.00	0.00	5.00	10.00	10.00	25.00	0.00	10.00	45.00	20.00	35.00	15.00	35.00
0.00	0.00	0.00	0.00	0.00	0.00	20.00	25.00	5.00	5.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50.00	30.00	40.00	25.00	35.00	35.00	65.00	45.00	60.00	30.00	55.00	25.00	45.00
10.00	10.00	5.00	10.00	5.00	25.00	20.00	10.00	10.00	15.00	5.00	5.00	25.00
15.00	40.00	30.00	40.00	35.00	20.00	5.00	10.00	20.00	35.00	10.00	20.00	20.00
25.00	20.00	25.00	25.00	25.00	20.00	10.00	35.00	10.00	20.00	30.00	50.00	10.00
50.00	33.33	12.50	20.00	28.57	14.29	7.69	0.00	0.00	0.00	36.36	20.00	11.11
0.00	33.33	0.00	0.00	14.29	14.29	0.00	0.00	0.00	0.00	0.00	20.00	11.11
50.00	33.33	87.50	80.00	57.14	71.43	92.31	100.00	100.00	100.00	63.64	60.00	77.78

Slope to Middle Pad (#'s 21-27) Slope near Residents (#'s 28-34)

24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00
5.00	0.00	20.00	5.00	25.00	10.00	35.00	10.00	10.00	10.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00
0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00
10.00	10.00	10.00	10.00	5.00	10.00	0.00	0.00	0.00	5.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35.00	15.00	15.00	0.00	25.00	0.00	20.00	30.00	15.00	10.00	5.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	25.00	5.00	10.00	5.00	25.00	0.00
50.00	30.00	45.00	20.00	60.00	45.00	60.00	50.00	40.00	50.00	25.00
25.00	10.00	10.00	5.00	30.00	25.00	5.00	20.00	10.00	10.00	5.00
10.00	20.00	20.00	50.00	5.00	20.00	15.00	10.00	25.00	20.00	60.00
15.00	40.00	25.00	25.00	5.00	10.00	20.00	20.00	25.00	20.00	10.00
10.00	0.00	44.44	25.00	41.67	22.22	58.33	20.00	25.00	20.00	40.00
0.00	16.67	0.00	25.00	0.00	0.00	0.00	0.00	25.00	0.00	40.00
90.00	83.33	55.56	50.00	58.33	77.78	41.67	80.00	50.00	80.00	20.00

CO-OP MINE
Reclaimed Slopes
Middle Slopes & Slopes to Middle Pad
Exposure: W
Slope: 5-37 deg
Area: 3.97 acres
Sample Date: 7 July 1994

Mean	SDev	Freq	
			TREES & SHRUBS
9.85	8.62	82.35	Chrysothamnus nauseosus
0.35	1.21	8.82	Artemisia tridentata
			FORBS
0.24	0.97	5.88	Penstemon palmeri
0.44	1.42	8.82	Melilotus officinalis
0.15	0.84	2.94	Artemisia ludoviciana
0.44	1.42	8.82	Sanguisorba minor
0.15	0.84	2.94	Linum lewsii
0.29	1.69	2.94	Salsola pestifer
0.44	1.87	5.88	Astragalus cicer
			GRASSES
7.21	9.17	55.88	Elymus lanceolatus
1.47	5.49	8.82	Stipa hymenoides
20.00	13.39	88.24	Elymus spicatus
1.76	5.41	14.71	Elymus cinereus
2.06	6.08	14.71	Agropyron cristatum

		COVER
44.85	13.31	Total Living Cover
12.65	7.10	Litter
22.35	12.67	Bareground
20.15	9.59	Rock
		% COMPOSITION
21.87	15.99	Shrubs
6.61	10.73	Forbs
71.51	20.82	Grasses

CO-OP MINE
Reclaimed Slopes
Steep Slope Above Middle Pad
Exposure: W
Slope: 5-37 deg
Area: 3.97 acres
Sample Date: 7 July 1994

Steep Slopes (#'s 35-40)

	35.00	36.00	37.00	38.00	39.00	40.00	Mean	SDev	Freq
TREES & SHRUBS									
Chrysothamnus nauseosus	1.00	5.00	0.00	5.00	0.00	0.00	1.83	2.27	50.00
Artemisia tridentata	0.00	5.00	0.00	0.00	0.00	0.00	0.83	1.86	16.67
FORBS									
Linum lewsii	0.00	0.00	0.00	0.00	5.00	5.00	1.67	2.36	33.33
Medicago sativa	0.00	5.00	0.00	0.00	0.00	0.00	0.83	1.86	16.67
Salsola pestifer	5.00	0.00	0.00	0.00	0.00	0.00	0.83	1.86	16.67
Achillea millefolium	1.00	0.00	0.00	0.00	0.00	0.00	0.17	0.37	16.67
Melilotus officinalis	8.00	5.00	0.00	0.00	0.00	0.00	2.17	3.18	33.33
GRASSES									
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	5.00	0.83	1.86	16.67
Agropyron cristatum	0.00	0.00	0.00	10.00	5.00	0.00	2.50	3.82	33.33
Elymus spicatus	5.00	0.00	5.00	0.00	0.00	20.00	5.00	7.07	66.67
Elymus lanceolatus	5.00	5.00	10.00	0.00	10.00	0.00	5.00	4.08	83.33
Poa secunda	0.00	0.00	0.00	15.00	5.00	0.00	3.33	5.53	33.33
COVER									
Total Living Cover	25.00	25.00	15.00	30.00	25.00	30.00	25.00	5.00	
Litter	5.00	5.00	10.00	25.00	10.00	5.00	10.00	7.07	
Bareground	30.00	60.00	60.00	35.00	45.00	60.00	48.33	12.47	
Rock	40.00	10.00	15.00	10.00	20.00	5.00	16.67	11.43	
% COMPOSITION									
Shrubs	4.00	40.00	0.00	16.67	0.00	0.00	10.11	14.61	
Forbs	56.00	40.00	0.00	0.00	20.00	16.67	22.11	20.33	
Grasses	40.00	20.00	100.00	83.33	80.00	83.33	67.78	28.07	

CO-OP MINE
Reclaimed Slopes
Combined
Exposure: W
Slope: 5-37 deg
Area: 3.97 acres

Sample Date: 7 July 1994	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
TREES & SHRUBS										
Chrysothamnus nauseosus	20.00	0.00	20.00	0.00	15.00	5.00	5.00	5.00	15.00	20.00
Artemisia tridentata	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	5.00
FORBS										
Penstemon palmeri	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00
Melilotus officinalis	5.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Artemisia ludoviciana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sanguisorba minor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Linum lewsii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Salsola pestifer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Astragalus cicer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medicago sativa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Achillea millefolium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES										
AGDA	25.00	20.00	5.00	5.00	0.00	15.00	15.00	25.00	0.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus spicatus	5.00	15.00	15.00	20.00	35.00	35.00	30.00	35.00	40.00	45.00
Elymus cinereus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Agropyron cristatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poa secunda	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COVER										
Total Living Cover	55.00	35.00	45.00	25.00	50.00	60.00	50.00	65.00	55.00	70.00
Litter	20.00	10.00	10.00	10.00	20.00	10.00	10.00	15.00	10.00	5.00
Bareground	10.00	35.00	20.00	40.00	20.00	15.00	15.00	10.00	20.00	20.00
Rock	15.00	20.00	25.00	25.00	10.00	15.00	25.00	10.00	15.00	5.00
% COMPOSITION										
Shrubs	36.36	0.00	44.44	0.00	30.00	11.67	10.00	7.69	27.27	35.71
Forbs	9.09	0.00	11.11	0.00	0.00	5.00	0.00	0.00	0.00	0.00
Grasses	54.55	100.00	44.44	100.00	70.00	83.33	90.00	92.31	72.73	64.29

11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00
25.00	5.00	5.00	5.00	10.00	5.00	5.00	0.00	0.00	0.00	20.00	5.00	5.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	0.00	10.00	0.00	0.00	40.00	10.00	0.00	5.00	0.00	0.00	0.00
0.00	0.00	30.00	0.00	10.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
25.00	0.00	5.00	10.00	10.00	25.00	0.00	10.00	45.00	20.00	35.00	15.00	35.00
0.00	0.00	0.00	0.00	0.00	0.00	20.00	25.00	5.00	5.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50.00	30.00	40.00	25.00	35.00	35.00	65.00	45.00	60.00	30.00	55.00	25.00	45.00
10.00	10.00	5.00	10.00	5.00	25.00	20.00	10.00	10.00	15.00	5.00	5.00	25.00
15.00	40.00	30.00	40.00	35.00	20.00	5.00	10.00	20.00	35.00	10.00	20.00	20.00
25.00	20.00	25.00	25.00	25.00	20.00	10.00	35.00	10.00	20.00	30.00	50.00	10.00
50.00	33.33	12.50	20.00	28.57	14.29	7.69	0.00	0.00	0.00	36.36	20.00	11.11
0.00	33.33	0.00	0.00	14.29	14.29	0.00	0.00	0.00	0.00	0.00	20.00	11.11
50.00	33.33	87.50	80.00	57.14	71.43	92.31	100.00	100.00	100.00	63.64	60.00	77.78

24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00
5.00	0.00	20.00	5.00	25.00	10.00	35.00	10.00	10.00	10.00	10.00	1.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	5.00	0.00
0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
10.00	10.00	10.00	10.00	5.00	10.00	0.00	0.00	0.00	5.00	0.00	5.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35.00	15.00	15.00	0.00	25.00	0.00	20.00	30.00	15.00	10.00	5.00	5.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	25.00	5.00	10.00	5.00	25.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50.00	30.00	45.00	20.00	60.00	45.00	60.00	50.00	40.00	50.00	25.00	25.00	25.00
25.00	10.00	10.00	5.00	30.00	25.00	5.00	20.00	10.00	10.00	5.00	5.00	5.00
10.00	20.00	20.00	50.00	5.00	20.00	15.00	10.00	25.00	20.00	60.00	30.00	60.00
15.00	40.00	25.00	25.00	5.00	10.00	20.00	20.00	25.00	20.00	10.00	40.00	10.00
10.00	0.00	44.44	25.00	41.67	22.22	58.33	20.00	25.00	20.00	40.00	4.00	40.00
0.00	16.67	0.00	25.00	0.00	0.00	0.00	0.00	25.00	0.00	40.00	56.00	40.00
90.00	83.33	55.56	50.00	58.33	77.78	41.67	80.00	50.00	80.00	20.00	40.00	20.00

CO-OP MINE
Reclaimed Slopes
Combined
Exposure: W
Slope: 5-37 deg
Area: 3.97 acres
Sample Date: 7 July 1994

37.00	38.00	39.00	40.00	Mean	SDev	Freq	
							TREES & SHRUBS
0.00	5.00	0.00	0.00	8.65	8.49	77.50	Chrysothamnus nauseosus
0.00	0.00	0.00	0.00	0.43	1.34	10.00	Artemisia tridentata
							FORBS
0.00	0.00	0.00	0.00	0.20	0.90	5.00	Penstemon palmeri
0.00	0.00	0.00	0.00	0.70	1.90	12.50	Melilotus officinalis
0.00	0.00	0.00	0.00	0.13	0.78	2.50	Artemisia ludoviciana
0.00	0.00	0.00	0.00	0.38	1.32	7.50	Sanguisorba minor
0.00	0.00	5.00	5.00	0.38	1.32	7.50	Linum lewsii
0.00	0.00	0.00	0.00	0.38	1.73	5.00	Salsola pestifer
0.00	0.00	0.00	0.00	0.38	1.73	5.00	Astragalus cicer
0.00	0.00	0.00	0.00	0.13	0.78	2.50	Medicago sativa
0.00	0.00	0.00	0.00	0.03	0.16	2.50	Achillea millefolium
							GRASSES
10.00	0.00	10.00	0.00	6.88	8.64	57.50	AGDA
0.00	0.00	0.00	5.00	1.38	5.12	10.00	Stipa hymenoides
5.00	0.00	0.00	20.00	17.75	13.74	82.50	Elymus spicatus
0.00	0.00	0.00	0.00	1.50	5.02	12.50	Elymus cinereus
0.00	10.00	5.00	0.00	2.13	5.80	17.50	Agropyron cristatum
0.00	15.00	5.00	0.00	0.50	2.45	5.00	Poa secunda
							COVER
15.00	30.00	25.00	30.00	41.88	14.30		Total Living Cover
10.00	25.00	10.00	5.00	12.25	7.15		Litter
60.00	35.00	45.00	60.00	26.25	15.68		Bareground
15.00	10.00	20.00	5.00	19.63	9.96		Rock
							% COMPOSITION
0.00	16.67	0.00	0.00	20.11	16.34		Shrubs
0.00	0.00	20.00	16.67	8.94	13.80		Forbs
100.00	83.33	80.00	83.33	70.95	22.10		Grasses

CO-OP MINE
Reclaimed Pads
Lower Pad & Slopes
Exposure: Variable
Slope: 1-5 deg
Area: 3.49 acre
Date: 6 July 1994

	Lower Pad & Slopes (#'s 1-23)									
	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
TREES & SHRUBS										
Chrysothamnus nauseosus	5.00	30.00	40.00	15.00	10.00	10.00	10.00	25.00	10.00	35.00
Artemisia tridentata	0.00	5.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
FORBS										
Machaeranthera canescens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Linum lewsii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aster foliaceus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
Penstemon palmeri	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Melilotus officinalis	5.00	0.00	0.00	0.00	5.00	0.00	5.00	0.00	0.00	0.00
Sanguisorba minor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	10.00	0.00
Grindelia squarrosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medicago sativa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES										
Bromus tectorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Agropyron cristatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
Elymus lanceolatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	10.00
Stipa hymenoides	0.00	0.00	10.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromus carinatus	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus cinereus	25.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
Elymus spicatus	0.00	25.00	0.00	0.00	10.00	15.00	25.00	5.00	30.00	5.00
COVER										
Total Living Cover	45.00	60.00	50.00	35.00	25.00	35.00	40.00	40.00	50.00	60.00
Litter	20.00	10.00	10.00	5.00	25.00	25.00	15.00	25.00	25.00	15.00
Bareground	25.00	10.00	15.00	35.00	25.00	20.00	20.00	15.00	10.00	5.00
Rock	10.00	20.00	25.00	25.00	25.00	20.00	25.00	20.00	15.00	20.00
% COMPOSITION										
Shrubs	11.11	58.33	80.00	71.43	40.00	28.57	25.00	62.50	20.00	58.33
Forbs	22.22	0.00	0.00	0.00	20.00	0.00	12.50	12.50	20.00	8.33
Grasses	66.67	41.67	20.00	28.57	40.00	71.43	62.50	25.00	60.00	33.33

11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00
15.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	25.00	35.00	35.00	20.00	0.00
0.00	10.00	10.00	25.00	5.00	5.00	0.00	10.00	0.00	0.00	0.00	0.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	15.00	0.00	10.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	15.00	0.00	5.00	0.00	0.00	15.00	0.00	5.00
0.00	20.00	0.00	0.00	5.00	0.00	20.00	15.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	5.00	0.00	0.00	5.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	5.00	5.00	0.00	0.00	0.00	25.00	30.00	10.00	30.00	25.00
55.00	30.00	35.00	40.00	25.00	30.00	40.00	40.00	55.00	65.00	65.00	50.00	45.00
10.00	20.00	10.00	10.00	25.00	25.00	25.00	20.00	15.00	5.00	10.00	25.00	10.00
20.00	30.00	40.00	35.00	35.00	35.00	10.00	20.00	20.00	25.00	20.00	10.00	20.00
15.00	20.00	15.00	15.00	15.00	10.00	25.00	20.00	10.00	5.00	5.00	15.00	25.00
27.27	33.33	42.86	62.50	20.00	16.67	0.00	25.00	45.45	53.85	53.85	40.00	33.33
45.45	0.00	42.86	25.00	40.00	16.67	12.50	12.50	0.00	0.00	7.69	0.00	0.00
27.27	66.67	14.29	12.50	40.00	66.67	87.50	62.50	54.55	46.15	38.46	60.00	66.67

CO-OP MINE
Reclaimed Pads
Lower Pad & Slopes
Exposure: Variable
Slope: 1-5 deg
Area: 3.49 acre
Date: 6 July 1994

Mean	SDev	Freq	
			TREES & SHRUBS
14.13	13.40	69.57	Chrysothamnus nauseosus
4.13	6.37	39.13	Artemisia tridentata
			FORBS
0.22	1.02	4.35	Machaeranthera canescens
1.30	3.68	13.04	Linum lewsii
0.65	2.24	8.70	Aster foliaceus
0.22	1.02	4.35	Penstemon palmeri
1.30	3.37	17.39	Melilotus officinalis
0.65	2.24	8.70	Sanguisorba minor
0.65	2.24	8.70	Grindelia squarrosa
0.22	1.02	4.35	Medicago sativa
			GRASSES
0.22	1.02	4.35	Bromus tectorum
1.96	4.36	21.74	Agropyron cristatum
3.48	6.33	30.43	Elymus lanceolatus
1.74	3.49	21.74	Stipa hymenoides
0.22	1.02	4.35	Bromus carinatus
2.17	5.68	17.39	Elymus cinereus
10.87	11.48	65.22	Elymus spicatus

		COVER
44.13	11.76	Total Living Cover
16.74	7.16	Litter
21.74	9.51	Bareground
17.39	6.23	Rock
		% COMPOSITION
39.54	20.11	Shrubs
12.97	14.12	Forbs
47.50	20.05	Grasses

CO-OP MINE
Reclaimed Pads
Picnic Area
Exposure: Variable
Slope: 1-5 deg
Area: 3.49 acres
Sample Date: 6 July 1994

Picnic Area (#'s 24-34)

	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00
TREES & SHRUBS											
Chrysothamnus nauseosus	20.00	0.00	15.00	15.00	15.00	18.00	15.00	30.00	25.00	15.00	20.00
FORBS											
Penstemon palmeri	5.00	0.00	5.00	0.00	0.00	7.00	0.00	0.00	0.00	10.00	0.00
Grindelia squarrosa	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
Medicago sativa	0.00	5.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES											
Bromus carinatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00
Elymus cinereus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
Elymus spicatus	5.00	0.00	5.00	0.00	0.00	15.00	0.00	0.00	0.00	5.00	0.00
Elymus lanceolatus	0.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
COVER											
Total Living Cover	30.00	35.00	35.00	15.00	15.00	40.00	20.00	35.00	40.00	40.00	20.00
Litter	10.00	10.00	10.00	15.00	5.00	15.00	15.00	10.00	10.00	10.00	10.00
Bareground	35.00	35.00	40.00	40.00	55.00	30.00	40.00	30.00	25.00	15.00	20.00
Rock	25.00	20.00	15.00	30.00	25.00	15.00	25.00	25.00	25.00	35.00	50.00
% COMPOSITION											
Shrubs	66.67	0.00	42.86	100.00	100.00	45.00	75.00	85.71	62.50	37.50	100.00
Forbs	16.67	14.29	42.86	0.00	0.00	17.50	25.00	0.00	0.00	25.00	0.00
Grasses	16.67	85.71	14.29	0.00	0.00	37.50	0.00	14.29	37.50	37.50	0.00

CO-OP MINE
Reclaimed Pads
Picnic Area
Exposure: Variable
Slope: 1-5 deg
Area: 3.49 acres
Sample Date: 6 July 1994

Mean	SDev	Freq	
			TREES & SHRUBS
17.09	7.14	90.91	Chrysothamnus nauseosus
			FORBS
2.45	3.47	36.36	Penstemon palmeri
0.45	1.44	9.09	Grindelia squarrosa
1.36	3.08	18.18	Medicago sativa
			GRASSES
0.45	1.44	9.09	Bromus carinatus
1.36	4.31	9.09	Stipa hymenoides
0.45	1.44	9.09	Elymus cinereus
2.73	4.45	36.36	Elymus spicatus
3.18	8.60	18.18	Elymus lanceolatus
			COVER
29.55	9.64		Total Living Cover
10.91	2.87		Litter
33.18	10.50		Bareground
26.36	9.32		Rock
			% COMPOSITION
65.02	30.28		Shrubs
12.85	13.68		Forbs
22.13	24.98		Grasses

CO-OP MINE
Reclaimed Pads
Middle Pad
Exposure: Variable
Slope: 1-5 deg
Area: 3.49 acres
Sample Date: 6 July 1994

Middle Pad (#'s 35-40)

	35.00	36.00	37.00	38.00	39.00	40.00	Mean	SDev	Freq
TREES & SHRUBS									
Chrysothamnus nauseosus	20.00	20.00	10.00	10.00	10.00	10.00	13.33	4.71	100.00
Artemisia tridentata	0.00	0.00	0.00	0.00	0.00	10.00	1.67	3.73	16.67
FORBS									
Medicago sativa	0.00	0.00	0.00	0.00	0.00	5.00	0.83	1.86	16.67
Grindelia squarrosa	0.00	0.00	5.00	5.00	0.00	0.00	1.67	2.36	33.33
GRASSES									
Stipa hymenoides	0.00	0.00	0.00	5.00	20.00	10.00	5.83	7.31	50.00
Elymus spicatus	20.00	25.00	10.00	0.00	5.00	10.00	11.67	8.50	83.33
Elymus lanceolatus	0.00	0.00	0.00	5.00	5.00	0.00	1.67	2.36	33.33
COVER									
Total Living Cover	40.00	45.00	25.00	25.00	40.00	45.00	36.67	8.50	
Litter	10.00	25.00	10.00	10.00	10.00	10.00	12.50	5.59	
Bareground	40.00	10.00	15.00	10.00	25.00	25.00	20.83	10.57	
Rock	10.00	20.00	50.00	55.00	25.00	20.00	30.00	16.58	
% COMPOSITION									
Shrubs	50.00	44.44	40.00	40.00	25.00	44.44	40.65	7.77	
Forbs	0.00	0.00	20.00	20.00	0.00	11.11	8.52	9.02	
Grasses	50.00	55.56	40.00	40.00	75.00	44.44	50.83	12.13	

CO-OP MINE
Reclaimed Pads
Combined
Exposure: Variable
Slope: 1-5 deg
Area: 3.49 acres

Sample Date: 6 July 1994	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
TREES & SHRUBS										
Chrysothamnus nauseosus	5.00	30.00	40.00	15.00	10.00	10.00	10.00	25.00	10.00	35.00
Artemisia tridentata	0.00	5.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
FORBS										
Machaeranthera canescens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Linum lewsii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aster foliaceus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
Penstemon palmeri	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Melilotus officinalis	5.00	0.00	0.00	0.00	5.00	0.00	5.00	0.00	0.00	0.00
Sanguisorba minor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	10.00	0.00
Grindelia squarrosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medicago sativa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES										
Bromus tectorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Agropyron cristatum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
Elymus lanceolatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	10.00
Stipa hymenoides	0.00	0.00	10.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromus carinatus	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus cinereus	25.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
Elymus spicatus	0.00	25.00	0.00	0.00	10.00	15.00	25.00	5.00	30.00	5.00
COVER										
Total Living Cover	45.00	60.00	50.00	35.00	25.00	35.00	40.00	40.00	50.00	60.00
Litter	20.00	10.00	10.00	5.00	25.00	25.00	15.00	25.00	25.00	15.00
Bareground	25.00	10.00	15.00	35.00	25.00	20.00	20.00	15.00	10.00	5.00
Rock	10.00	20.00	25.00	25.00	25.00	20.00	25.00	20.00	15.00	20.00
% COMPOSITION										
Shrubs	11.11	58.33	80.00	71.43	40.00	28.57	25.00	62.50	20.00	58.33
Forbs	22.22	0.00	0.00	0.00	20.00	0.00	12.50	12.50	20.00	8.33
Grasses	66.67	41.67	20.00	28.57	40.00	71.43	62.50	25.00	60.00	33.33

11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00
15.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	25.00	35.00	35.00	20.00	0.00
0.00	10.00	10.00	25.00	5.00	5.00	0.00	10.00	0.00	0.00	0.00	0.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	15.00	0.00	10.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	15.00	0.00	5.00	0.00	0.00	15.00	0.00	5.00
0.00	20.00	0.00	0.00	5.00	0.00	20.00	15.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	5.00	0.00	0.00	5.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	5.00	5.00	0.00	0.00	0.00	25.00	30.00	10.00	30.00	25.00
55.00	30.00	35.00	40.00	25.00	30.00	40.00	40.00	55.00	65.00	65.00	50.00	45.00
10.00	20.00	10.00	10.00	25.00	25.00	25.00	20.00	15.00	5.00	10.00	25.00	10.00
20.00	30.00	40.00	35.00	35.00	35.00	10.00	20.00	20.00	25.00	20.00	10.00	20.00
15.00	20.00	15.00	15.00	15.00	10.00	25.00	20.00	10.00	5.00	5.00	15.00	25.00
27.27	33.33	42.86	62.50	20.00	16.67	0.00	25.00	45.45	53.85	53.85	40.00	33.33
45.45	0.00	42.86	25.00	40.00	16.67	12.50	12.50	0.00	0.00	7.69	0.00	0.00
27.27	66.67	14.29	12.50	40.00	66.67	87.50	62.50	54.55	46.15	38.46	60.00	66.67

24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00
20.00	0.00	15.00	15.00	15.00	18.00	15.00	30.00	25.00	15.00	20.00	20.00	20.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	5.00	0.00	0.00	7.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	5.00	0.00	0.00	15.00	0.00	0.00	0.00	5.00	0.00	20.00	25.00
30.00	35.00	35.00	15.00	15.00	40.00	20.00	35.00	40.00	40.00	20.00	40.00	45.00
10.00	10.00	10.00	15.00	5.00	15.00	15.00	10.00	10.00	10.00	10.00	10.00	25.00
35.00	35.00	40.00	40.00	55.00	30.00	40.00	30.00	25.00	15.00	20.00	40.00	10.00
25.00	20.00	15.00	30.00	25.00	15.00	25.00	25.00	25.00	35.00	50.00	10.00	20.00
66.67	0.00	42.86	100.00	100.00	45.00	75.00	85.71	62.50	37.50	100.00	50.00	44.44
16.67	14.29	42.86	0.00	0.00	17.50	25.00	0.00	0.00	25.00	0.00	0.00	0.00
16.67	85.71	14.29	0.00	0.00	37.50	0.00	14.29	37.50	37.50	0.00	50.00	55.56

CO-OP MINE
Reclaimed Pads
Combined
Exposure: Variable
Slope: 1-5 deg
Area: 3.49 acres
Sample Date: 6 July 1994

37.00	38.00	39.00	40.00	Mean	SDev	Freq	
							TREES & SHRUBS
10.00	10.00	10.00	10.00	14.83	11.08	80.00	Chrysothamnus nauseosus
0.00	0.00	0.00	10.00	2.63	5.36	25.00	Artemisia tridentata
							FORBS
0.00	0.00	0.00	0.00	0.13	0.78	2.50	Machaeranthera canescens
0.00	0.00	0.00	0.00	0.75	2.86	7.50	Linum lewsii
0.00	0.00	0.00	0.00	0.38	1.73	5.00	Aster foliaceus
0.00	0.00	0.00	0.00	0.80	2.23	12.50	Penstemon palmeri
0.00	0.00	0.00	0.00	0.75	2.63	10.00	Melilotus officinalis
0.00	0.00	0.00	0.00	0.38	1.73	5.00	Sanguisorba minor
5.00	5.00	0.00	0.00	0.75	2.11	10.00	Grindelia squarrosa
0.00	0.00	0.00	5.00	0.63	2.00	10.00	Medicago sativa
							GRASSES
0.00	0.00	0.00	0.00	0.13	0.78	2.50	Bromus tectorum
0.00	0.00	0.00	0.00	1.13	3.44	12.50	Agropyron cristatum
0.00	5.00	5.00	0.00	3.13	6.68	25.00	Elymus lanceolatus
0.00	5.00	20.00	10.00	2.25	4.74	22.50	Stipa hymenoides
0.00	0.00	0.00	0.00	0.25	1.09	5.00	Bromus carinatus
0.00	0.00	0.00	0.00	1.38	4.47	12.50	Elymus cinereus
10.00	0.00	5.00	10.00	8.75	10.29	60.00	Elymus spicatus
							COVER
25.00	25.00	40.00	45.00	39.00	12.51		Total Living Cover
10.00	10.00	10.00	10.00	14.50	6.60		Litter
15.00	10.00	25.00	25.00	24.75	11.23		Bareground
50.00	55.00	25.00	20.00	21.75	10.70		Rock
							% COMPOSITION
40.00	40.00	25.00	44.44	46.71	24.92		Shrubs
20.00	20.00	0.00	11.11	12.27	13.45		Forbs
40.00	40.00	75.00	44.44	41.02	23.69		Grasses

CO-OP MINE
Reclaimed Road & Substation Area
Combined
Exposure: Variable
Slope: Variable
Area: 2.09 acres

Sample Date: 7 July 1994	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
TREES & SHRUBS										
Chrysothamnus nauseosus	0.00	5.00	5.00	0.00	0.00	0.00	10.00	5.00	0.00	5.00
Artemisia tridentata	5.00	0.00	0.00	0.00	5.00	0.00	5.00	5.00	0.00	0.00
Pinus ponderosa	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
Eriogonum corymbosum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
FORBS										
Penstemon palmeri	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Achillea millefolium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
Circium sp.	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
Medicago sativa	5.00	5.00	0.00	5.00	10.00	5.00	0.00	0.00	0.00	0.00
Artemisia ludoviciana	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Linum lewsii	0.00	5.00	5.00	5.00	15.00	0.00	5.00	0.00	0.00	5.00
Astragalus chilensis	0.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.00
Astragalus cicer	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
Tragopogon dubius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Salsola pestifer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES										
Bromus tectorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poa secunda	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	5.00
Elymus salinus	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
Agropyron cristatum	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus spicatus	30.00	15.00	20.00	0.00	0.00	15.00	10.00	5.00	10.00	0.00
Elymus lanceolatus	0.00	0.00	10.00	0.00	5.00	0.00	0.00	0.00	10.00	0.00
COVER										
Total Living Cover	50.00	35.00	40.00	50.00	35.00	25.00	40.00	25.00	20.00	20.00
Litter	35.00	25.00	10.00	25.00	10.00	10.00	10.00	5.00	5.00	10.00
Bareground	5.00	25.00	25.00	20.00	15.00	5.00	15.00	10.00	10.00	15.00
Rock	10.00	15.00	25.00	5.00	40.00	60.00	35.00	60.00	65.00	55.00
% COMPOSITION										
Shrubs	10.00	14.29	12.50	0.00	14.29	20.00	37.50	40.00	0.00	50.00
Forbs	10.00	42.86	12.50	80.00	71.43	20.00	37.50	20.00	0.00	25.00
Grasses	80.00	42.86	75.00	20.00	14.29	60.00	25.00	40.00	100.00	25.00

11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00
0.00	5.00	0.00	2.00	15.00	15.00	0.00	0.00	10.00	10.00	5.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	13.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	5.00	5.00	0.00	0.00	0.00	7.00	0.00	0.00	5.00	25.00	10.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
5.00	0.00	10.00	0.00	0.00	5.00	0.00	0.00	15.00	5.00	0.00	10.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	35.00	5.00	0.00	0.00	0.00	8.00	20.00	10.00	15.00	5.00	0.00	0.00
10.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35.00	50.00	20.00	15.00	25.00	40.00	15.00	25.00	40.00	50.00	35.00	25.00	40.00
10.00	15.00	25.00	5.00	5.00	15.00	10.00	5.00	10.00	15.00	10.00	25.00	10.00
20.00	10.00	45.00	35.00	30.00	10.00	25.00	5.00	15.00	20.00	15.00	25.00	15.00
35.00	25.00	10.00	45.00	40.00	35.00	50.00	65.00	35.00	15.00	40.00	25.00	35.00
0.00	10.00	0.00	100.00	60.00	37.50	0.00	0.00	25.00	30.00	14.29	0.00	12.50
28.57	10.00	25.00	0.00	0.00	50.00	46.67	0.00	12.50	30.00	71.43	40.00	50.00
71.43	80.00	75.00	0.00	40.00	12.50	53.33	100.00	62.50	40.00	14.29	60.00	37.50

24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00
5.00	0.00	0.00	20.00	5.00	0.00	10.00	10.00	0.00	0.00	15.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	5.00	0.00	5.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	5.00	0.00	5.00	0.00
0.00	15.00	0.00	5.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	0.00	0.00	0.00	5.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	25.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	35.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00
35.00	0.00	0.00	10.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	10.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	20.00	25.00
0.00	0.00	0.00	0.00	0.00	5.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
40.00	45.00	25.00	35.00	40.00	30.00	30.00	30.00	10.00	35.00	35.00	40.00	50.00
10.00	25.00	20.00	10.00	10.00	10.00	10.00	10.00	5.00	25.00	10.00	15.00	25.00
10.00	20.00	25.00	30.00	30.00	30.00	10.00	25.00	60.00	10.00	30.00	25.00	15.00
40.00	10.00	30.00	25.00	20.00	30.00	50.00	35.00	25.00	30.00	25.00	20.00	10.00
12.50	0.00	0.00	57.14	12.50	0.00	33.33	33.33	0.00	0.00	42.86	0.00	10.00
0.00	66.67	100.00	14.29	0.00	83.33	33.33	0.00	100.00	57.14	0.00	25.00	40.00
87.50	33.33	0.00	28.57	87.50	16.67	33.33	66.67	0.00	42.86	57.14	75.00	50.00

CO-OP MINE
Reclaimed Road & Substation Area
Combined
Exposure: Variable
Slope: Variable
Area: 2.09 acres
Sample Date: 7 July 1994

37.00	38.00	39.00	40.00	Mean	SDev	Freq	
							TREES & SHRUBS
0.00	0.00	0.00	0.00	4.05	5.36	47.50	Chrysothamnus nauseosus
0.00	0.00	0.00	0.00	0.75	1.79	15.00	Artemisia tridentata
0.00	0.00	0.00	0.00	0.13	0.78	2.50	Pinus ponderosa
0.00	0.00	0.00	0.00	0.45	2.16	5.00	Eriogonum corymbosum
							FORBS
0.00	0.00	0.00	0.00	0.75	3.46	5.00	Penstemon palmeri
0.00	0.00	0.00	0.00	0.13	0.78	2.50	Achillea millefolium
0.00	0.00	0.00	0.00	0.13	0.78	2.50	Circium sp.
0.00	0.00	0.00	15.00	3.43	5.20	42.50	Medicago sativa
0.00	0.00	0.00	0.00	0.25	1.09	5.00	Artemisia ludoviciana
0.00	0.00	0.00	5.00	1.75	3.27	27.50	Linum lewsii
5.00	15.00	0.00	0.00	2.25	5.80	17.50	Astragalus chilensis
0.00	0.00	0.00	20.00	1.38	3.87	16.00	Astragalus cicer
0.00	0.00	0.00	0.00	0.13	0.78	2.50	Tragopogon dubius
0.00	0.00	0.00	0.00	1.25	4.71	5.00	Salsola pestifer
							GRASSES
0.00	0.00	0.00	0.00	0.13	0.78	2.50	Bromus tectorum
20.00	0.00	0.00	0.00	2.13	6.70	12.50	Stipa hymenoides
0.00	0.00	0.00	0.00	3.50	6.73	32.50	Poa secunda
0.00	0.00	0.00	0.00	0.50	2.18	5.00	Elymus salinus
0.00	0.00	0.00	0.00	0.25	1.56	2.50	Agropyron cristatum
0.00	20.00	0.00	5.00	7.95	9.60	52.50	Elymus spicatus
0.00	0.00	30.00	0.00	2.13	5.46	20.00	Elymus lanceolatus
							COVER
25.00	35.00	30.00	45.00	33.38	10.39		Total Living Cover
5.00	5.00	25.00	5.00	13.25	7.79		Litter
45.00	5.00	30.00	20.00	20.88	11.83		Bareground
25.00	55.00	15.00	30.00	32.50	15.89		Rock
							% COMPOSITION
0.00	0.00	0.00	0.00	17.24	22.03		Shrubs
20.00	42.86	0.00	88.89	33.87	29.72		Forbs
80.00	57.14	100.00	11.11	48.89	29.09		Grasses

CO-OP MINE
Trail Mountain Reference Area
Exposure: E
Slope: 35 deg
Area: 1 acre

Sample Date: 8 July 1994	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00
TREES & SHRUBS											
Eriogonum corymbosum	10.00	5.00	20.00	10.00	10.00	0.00	0.00	0.00	0.00	0.00	10.00
Ephedra viridis	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chrysothamnus viscidiflor	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
Artemisia tridentata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00
Gutierrezia sarothrae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
Chrysothamnus nauseosus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pinus edulis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FORBS											
Stanleya pinnata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hymenoxys richardsonii	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
Artemisia ludoviciana	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	5.00
Machaeranthera canescens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	5.00	0.00
Erigeron sp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Circium sp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES											
Elymus salinus	25.00	30.00	30.00	15.00	5.00	30.00	13.00	20.00	20.00	20.00	15.00
COVER											
Total Living Cover	35.00	40.00	50.00	25.00	20.00	30.00	20.00	25.00	30.00	25.00	35.00
Litter	30.00	20.00	10.00	15.00	10.00	5.00	10.00	10.00	25.00	10.00	5.00
Bareground	20.00	15.00	25.00	20.00	5.00	20.00	20.00	10.00	10.00	20.00	5.00
Rock	15.00	25.00	15.00	40.00	65.00	45.00	50.00	55.00	35.00	45.00	55.00
% COMPOSITION											
Shrubs	28.57	25.00	40.00	40.00	75.00	0.00	0.00	0.00	33.33	0.00	42.86
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	35.00	20.00	0.00	20.00	14.29
Grasses	71.43	75.00	60.00	60.00	25.00	100.00	65.00	80.00	66.67	80.00	42.86

12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00
0.00	20.00	5.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00
25.00	15.00	45.00	35.00	15.00	25.00	20.00	10.00	10.00	25.00	15.00	15.00	30.00
30.00	40.00	50.00	45.00	15.00	25.00	40.00	25.00	20.00	25.00	20.00	20.00	30.00
5.00	25.00	25.00	25.00	25.00	20.00	15.00	35.00	10.00	10.00	10.00	20.00	20.00
10.00	10.00	5.00	5.00	5.00	5.00	25.00	15.00	30.00	10.00	35.00	25.00	20.00
55.00	25.00	20.00	25.00	55.00	50.00	20.00	25.00	40.00	55.00	35.00	35.00	30.00
0.00	50.00	10.00	11.11	0.00	0.00	50.00	60.00	50.00	0.00	25.00	15.00	0.00
16.67	12.50	0.00	11.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00
83.33	37.50	90.00	77.78	100.00	100.00	50.00	40.00	50.00	100.00	75.00	75.00	100.00

CO-OP MINE
Trail Mountain Reference Ar
Exposure: E
Slope: 35 deg
Area: 1 acre
Sample Date: 8 July 1994

25.00	26.00	27.00	28.00	29.00	30.00	Mean	SDev	Freq	
									TREES & SHRUBS
0.00	0.00	0.00	0.00	0.00	0.00	3.33	5.68	30.00	Eriogonum corymbosum
0.00	0.00	7.00	0.00	0.00	0.00	1.07	3.83	10.00	Ephedra viridis
0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.90	3.33	Chrysothamnus viscidiflorus
0.00	0.00	0.00	0.00	0.00	0.00	0.33	1.80	3.33	Artemisia tridentata
0.00	0.00	8.00	0.00	0.00	0.00	0.53	1.73	6.67	Gutierrezia sarothrae
0.00	0.00	0.00	0.00	5.00	0.00	0.67	2.81	6.67	Chrysothamnus nauseosus
0.00	0.00	0.00	0.00	0.00	0.00	0.33	1.80	3.33	Pinus edulis
									FORBS
0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.90	3.33	Stanleya pinnata
0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.90	3.33	Hymenoxys richardsonii
0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.96	6.67	Artemisia ludoviciana
0.00	0.00	0.00	0.00	0.00	0.00	0.50	1.50	10.00	Machaeranthera canescens
0.00	1.00	0.00	0.00	0.00	0.00	0.20	0.91	3.33	Erigeron sp.
0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.36	3.33	Circium sp.
									GRASSES
25.00	29.00	0.00	15.00	30.00	30.00	21.23	9.42	96.67	Elymus salinus
									COVER
25.00	30.00	15.00	15.00	35.00	30.00	29.00	9.52		Total Living Cover
10.00	20.00	5.00	10.00	40.00	20.00	16.67	9.07		Litter
35.00	10.00	30.00	30.00	20.00	25.00	17.33	9.37		Bareground
30.00	40.00	50.00	45.00	5.00	25.00	37.00	14.75		Rock
									% COMPOSITION
0.00	0.00	100.00	0.00	14.29	0.00	22.34	26.22		Shrubs
0.00	3.33	0.00	0.00	0.00	0.00	4.76	8.60		Forbs
100.00	96.67	0.00	100.00	85.71	100.00	72.90	25.48		Grasses

COOP

RECLAIMED SLOPES

PRODUCTION

7-7-94

MID SLOPES	Wt.Herb.g/m2	proportion	Tot.Herb.g/m	Herb. lbs/m2	Herb.lbs/Ac	Wt.Wood.g/m2	proportion	Tot.Wood.g/m	Wood. lbs/m2	Wood. lbs/Ac	Tot.lbs/Ac	prop. a
1.00	30.00	0.50	60.00	0.13	535.40	24.00	0.50	48.00	0.11	428.32	963.72	0.50
2.00	18.00	0.50	36.00	0.08	321.24	20.00	0.50	40.00	0.09	356.93	678.17	1.00
3.00	18.00	0.50	36.00	0.08	321.24	10.00	0.50	20.00	0.04	178.47	499.71	1.00
4.00	32.00	0.50	64.00	0.14	571.09	6.00	0.50	12.00	0.03	107.08	678.17	1.00
5.00	39.00	0.50	78.00	0.17	696.02	13.00	0.50	26.00	0.06	232.01	928.03	1.00
6.00	17.00	0.50	34.00	0.07	303.39	25.00	0.50	50.00	0.11	446.17	749.56	1.20
7.00	14.00	0.50	28.00	0.06	249.85	2.00	0.50	4.00	0.01	35.69	285.55	1.00
8.00	6.00	0.50	12.00	0.03	107.08	12.00	0.50	24.00	0.05	214.16	321.24	1.00
9.00	31.00	0.50	62.00	0.14	553.25	1.00	0.50	2.00	0.00	17.85	571.09	0.60
10.00	58.00	0.50	116.00	0.26	1035.11	0.00	0.50	0.00	0.00	0.00	1035.11	1.00

SLOPE TO MID PAD	Wt.Herb.g/m2	proportion	Tot.Herb.g/m	Herb. lbs/m2	Herb.lbs/Ac	Wt.Wood.g/m2	proportion	Tot.Wood.g/m	Wood. lbs/m2	Wood. lbs/Ac	Tot.lbs/Ac	prop. a
1.00	14.00	0.50	28.00	0.06	249.85	24.00	0.50	48.00	0.11	428.32	678.17	1.00
2.00	17.00	0.50	34.00	0.07	303.39	3.00	0.50	6.00	0.01	53.54	356.93	0.50
3.00	19.00	0.50	38.00	0.08	339.09	4.00	0.50	8.00	0.02	71.39	410.47	1.00

SLOPE NEAR RES.	Wt.Herb.g/m2	proportion	Tot.Herb.g/m	Herb. lbs/m2	Herb.lbs/Ac	Wt.Wood.g/m2	proportion	Tot.Wood.g/m	Wood. lbs/m2	Wood. lbs/Ac	Tot.lbs/Ac	prop. a
1.00	27.00	0.50	54.00	0.12	481.86	13.00	0.50	26.00	0.06	232.01	713.87	1.00
2.00	31.00	0.50	62.00	0.14	553.25	4.00	0.50	8.00	0.02	71.39	624.63	0.25
3.00	31.00	0.50	62.00	0.14	553.25	18.00	0.50	36.00	0.08	321.24	874.49	1.00
4.00	40.00	0.50	80.00	0.18	713.87	32.00	0.50	64.00	0.14	571.09	1284.96	0.70

STEEP SLOPE	Wt.Herb.g/m2	proportion	Tot.Herb.g/m	Herb. lbs/m2	Herb.lbs/Ac	Wt.Wood.g/m2	proportion	Tot.Wood.g/m	Wood. lbs/m2	Wood. lbs/Ac	Tot.lbs/Ac	prop. a
1.00	24.00	0.50	48.00	0.11	428.32	1.00	0.50	2.00	0.00	17.85	446.17	1.00
2.00	18.00	0.50	36.00	0.08	321.24	1.00	0.50	2.00	0.00	17.85	339.09	0.25
3.00	11.00	0.50	22.00	0.05	196.31	0.00	0.50	0.00	0.00	0.00	196.31	0.50

a Herb lbs/Ac	a Wood lbs/Ac	a Tot lbs/Ac	prop. b	b Herb lbs/Ac	b Wood lb/Ac	b Tot lbs/Ac	prop. c	c Herb lbs/Ac	c Wood lbs/Ac	c Tot lbs/Ac	prop. d	d Herb lbs/Ac	d Wood lbs/Ac
267.70	214.16	481.86	0.65	348.01	278.41	626.42	0.10	53.54	42.83	96.37	0.30	160.62	128.50
321.24	356.93	678.17	0.75	678.92	267.70	946.62	0.75	240.93	267.70	508.63	1.00	321.24	356.93
321.24	178.47	499.71	1.00	500.71	178.47	679.17	1.60	513.98	285.55	799.53	1.30	417.61	232.01
571.09	107.08	678.17	1.20	679.37	128.50	807.87	1.00	571.09	107.08	678.17	1.00	571.09	107.08
696.02	232.01	928.03	1.50	929.53	348.01	1277.54	1.00	696.02	232.01	928.03	1.00	696.02	232.01
364.07	535.40	899.47	1.20	900.67	535.40	1436.07	1.00	303.39	446.17	749.56	1.00	303.39	446.17
249.85	35.69	285.55	1.00	286.55	35.69	322.24	1.25	312.32	44.62	356.93	1.25	312.32	44.62
107.08	214.16	321.24	1.30	322.54	278.41	600.95	1.00	107.08	214.16	321.24	1.00	107.08	214.16
331.95	10.71	342.66	1.00	343.66	17.85	361.50	1.00	553.25	17.85	571.09	0.50	276.62	8.92
1035.11	0.00	1035.11	1.00	1036.11	0.00	1036.11	1.20	1242.13	0.00	1242.13	1.30	1345.64	0.00

a Herb lbs/Ac	a Wood lbs/Ac	a Tot lbs/Ac	prop. b	b Herb lbs/Ac	b Wood lb/Ac	b Tot lbs/Ac	prop. c	c Herb lbs/Ac	c Wood lbs/Ac	c Tot lbs/Ac	prop. d	d Herb lbs/Ac	d Wood lbs/Ac
249.85	428.32	678.17	1.00	249.85	428.32	678.17	0.10	24.99	42.83	67.82	0.20	49.97	85.66
151.70	26.77	178.47	1.25	379.24	66.92	446.17	1.00	303.39	53.54	356.93	0.50	151.70	26.77
339.09	71.39	410.47	0.50	169.54	35.69	205.24	0.70	237.36	49.97	287.33	3.00	1017.26	214.16

a Herb lbs/Ac	a Wood lbs/Ac	a Tot lbs/Ac	prop. b	b Herb lbs/Ac	b Wood lb/Ac	b Tot lbs/Ac	prop. c	c Herb lbs/Ac	c Wood lbs/Ac	c Tot lbs/Ac	prop. d	d Herb lbs/Ac	d Wood lbs/Ac
481.86	232.01	713.87	1.00	481.86	232.01	713.87	1.70	819.16	394.41	1213.57	1.00	481.86	232.01
138.31	17.85	156.16	1.00	553.25	71.39	624.63	2.00	1106.49	142.77	1249.27	1.00	553.25	71.39
553.25	321.24	874.49	1.25	691.56	401.55	1093.11	0.75	414.93	240.93	655.86	1.75	968.18	562.17
499.71	399.77	899.47	0.70	499.71	399.77	899.47	1.00	713.87	571.09	1284.96	1.00	713.87	571.09

a Herb lbs/Ac	a Wood lbs/Ac	a Tot lbs/Ac	prop. b	b Herb lbs/Ac	b Wood lb/Ac	b Tot lbs/Ac	prop. c	c Herb lbs/Ac	c Wood lbs/Ac	c Tot lbs/Ac	prop. d	d Herb lbs/Ac	d Wood lbs/Ac
428.32	17.85	446.17	0.50	214.16	8.92	223.08	1.00	428.32	17.85	446.17	1.00	428.32	17.85
80.31	4.46	84.77	0.10	32.12	1.78	33.91	0.20	64.25	3.57	67.82	0.20	64.25	3.57
98.16	0.00	98.16	0.70	137.42	0.00	137.42	1.00	196.31	0.00	196.31	1.00	196.31	0.00

d Tot lbs/Ac	Mean Herb	Std Herb	Mean Wood	Std Wood	Mean lbs/Ac	Tot. Std
289.12	273.05	164.50	218.44	131.60	491.50	296.10
678.17	376.71	154.27	321.24	43.72	697.95	140.61
649.62	414.96	83.35	210.59	42.83	625.55	114.37
678.17	592.75	43.31	111.36	8.57	704.11	51.88
928.03	742.72	93.40	255.21	46.40	997.93	139.80
749.56	434.98	234.03	481.86	43.72	916.84	266.03
356.93	282.18	28.02	39.26	4.37	321.44	31.93
321.24	150.17	86.18	227.01	25.70	377.18	111.88
285.55	411.74	117.73	14.63	3.97	426.38	120.78
1345.64	1138.82	130.77	0.00	0.00	1138.82	130.77

d Tot lbs/Ac	Mean Herb	Std Herb	Mean Wood	Std Wood	Mean lbs/Ac	Tot. Std
135.63	164.90	104.34	282.69	178.87	447.59	283.21
178.47	257.88	91.02	45.51	16.06	303.39	107.08
1231.42	420.47	305.25	88.52	64.26	508.99	369.52

d Tot lbs/Ac	Mean Herb	Std Herb	Mean Wood	Std Wood	Mean lbs/Ac	Tot. Std
713.87	549.32	134.92	264.49	64.96	813.81	199.88
624.63	580.91	308.03	74.96	39.75	655.86	347.78
1530.35	636.23	187.61	369.43	108.94	1005.66	296.55
1284.96	628.20	104.92	502.56	83.93	1130.76	188.85
	Tot. Mean Herb.=	Tot. Std. Herb. =	Tot. Mean Wood. =	Tot. Std. Wood. =	Tot. Mean Total =	Tot. Std. Total =
	473.88	265.85	184.62	156.46	608.62	330.27

d Tot lbs/Ac	Mean Herb	Std Herb	Mean Wood	Std Wood	Mean lbs/Ac	Tot. Std
446.17	385.49	85.66	16.06	3.57	401.55	89.23
67.82	112.43	105.57	6.25	5.87	118.68	111.44
196.31	164.90	40.42	0.00	0.00	164.90	40.42
	Tot. Mean Herb.=	Tot. Std. Herb. =	Tot. Mean Wood. =	Tot. Std. Wood. =	Tot. Mean Total =	Tot. Std. Total =
	220.94	118.31	7.44	6.61	228.38	123.90

Combined	*Tot. Mean Herb.=*	*Tot. Std. Herb. =*	*Tot. Mean Wood. =*	*Tot. Std. Wood. =*	*Tot. Mean Total =*	*Tot. Std. Total =*
	396.31	81.48	160.46	47.10	556.77	107.91

COOP

RECLAIMED PADS

PRODUCTION

7-6-94

Pad picnic	Wt.Herb.g/m2	proportion	Tot.Herb.g/m	Herb. lbs/m2	Herb.lbs/Ac	Wt.Wood.g/m2	proportion	Tot.Wood.g/m	Wood. lbs/m2	Wood. lbs/Ac	Tot.lbs/Ac	prop. a	a Herb lbs/Ac
1.00	7.00	0.50	14.00	0.03	124.93	24.00	0.50	48.00	0.11	428.32	553.25	2.00	249.85
2.00	17.00	0.50	34.00	0.07	303.39	0.00	0.50	0.00	0.00	0.00	303.39	0.70	212.38
3.00	17.00	0.50	34.00	0.07	303.39	24.00	0.50	48.00	0.11	428.32	731.71	0.80	242.71
4.00	47.00	0.50	94.00	0.21	838.79	21.00	0.50	42.00	0.09	374.78	1213.57	1.00	838.79
5.00	3.00	0.50	6.00	0.01	53.54	35.00	0.50	70.00	0.15	624.63	678.17	0.15	8.03
6.00	36.00	0.50	72.00	0.16	642.48	14.00	0.50	28.00	0.06	249.85	892.33	0.80	513.98

Lower pad	Wt.Herb.g/m2	proportion	Tot.Herb.g/m	Herb. lbs/m2	Herb.lbs/Ac	Wt.Wood.g/m2	proportion	Tot.Wood.g/m	Wood. lbs/m2	Wood. lbs/Ac	Tot.lbs/Ac	prop. a	a Herb lbs/Ac
1.00	22.00	0.50	44.00	0.10	392.63	23.00	0.50	46.00	0.10	410.47	803.10	1.00	392.63
2.00	11.00	0.50	22.00	0.05	196.31	88.00	0.50	176.00	0.39	1570.51	1766.82	0.25	49.08
3.00	13.00	0.50	26.00	0.06	232.01	31.00	0.50	62.00	0.14	553.25	785.25	1.00	232.01
4.00	29.00	0.50	58.00	0.13	517.55	13.00	0.50	26.00	0.06	232.01	749.56	0.60	310.53
5.00	14.00	0.50	28.00	0.06	249.85	44.00	0.50	88.00	0.19	785.25	1035.11	1.25	312.32
6.00	56.00	0.50	112.00	0.25	999.41	61.00	0.40	152.50	0.34	1360.81	2360.22	0.60	599.65
7.00	11.00	0.50	22.00	0.05	196.31	6.00	0.50	12.00	0.03	107.08	303.39	1.00	196.31
8.00	29.00	0.50	58.00	0.13	517.55	34.00	0.50	68.00	0.15	606.79	1124.34	1.00	517.55
9.00	26.00	0.50	52.00	0.11	464.01	10.00	0.50	20.00	0.04	178.47	642.48	0.80	371.21
10.00	17.00	0.50	34.00	0.07	303.39	11.00	0.50	22.00	0.05	196.31	499.71	1.00	303.39
11.00	19.00	0.50	38.00	0.08	339.09	33.00	0.25	132.00	0.29	1177.88	1516.97	1.00	339.09

Mid Pads	Wt.Herb.g/m2	proportion	Tot.Herb.g/m	Herb. lbs/m2	Herb.lbs/Ac	Wt.Wood.g/m2	proportion	Tot.Wood.g/m	Wood. lbs/m2	Wood. lbs/Ac	Tot.lbs/Ac	prop. a	a Herb lbs/Ac
1.00	15.00	0.50	30.00	0.07	267.70	34.00	0.50	68.00	0.15	606.79	874.49	1.00	267.70
2.00	4.00	0.50	8.00	0.02	71.39	43.00	0.50	86.00	0.19	767.41	838.79	0.80	57.11
3.00	18.00	0.50	36.00	0.08	321.24	11.00	0.50	22.00	0.05	196.31	517.55	1.00	321.24

a Wood lbs/Ac	a Tot lbs/Ac	prop. b	b Herb lbs/Ac	b Wood lb/Ac	b Tot lbs/Ac	prop. c	c Herb lbs/Ac	c Wood lbs/Ac	c Tot lbs/Ac	prop. d	d Herb lbs/Ac	d Wood lbs/Ac	d Tot lbs/Ac
856.64	1106.49	0.75	93.69	321.24	414.93	0.70	87.45	299.82	387.27	0.35	43.72	149.91	193.64
0.00	212.38	0.20	60.68	0.00	60.68	1.25	379.24	0.00	379.24	2.00	606.79	0.00	606.79
342.66	585.37	3.00	910.18	1284.96	2195.14	1.00	303.39	428.32	731.71	0.50	151.70	214.16	365.86
374.78	1213.57	2.00	1677.59	749.56	2427.14	3.00	2516.38	1124.34	3640.72	0.50	419.40	187.39	606.79
93.69	101.73	1.00	53.54	624.63	678.17	0.20	10.71	124.93	135.63	1.00	53.54	624.63	678.17
199.88	713.87	0.30	192.74	74.96	267.70	0.50	321.24	124.93	446.17	1.00	642.48	249.85	892.33

a Wood lbs/Ac	a Tot lbs/Ac	prop. b	b Herb lbs/Ac	b Wood lb/Ac	b Tot lbs/Ac	prop. c	c Herb lbs/Ac	c Wood lbs/Ac	c Tot lbs/Ac	prop. d	d Herb lbs/Ac	d Wood lbs/Ac	d Tot lbs/Ac
410.47	803.10	1.00	392.63	410.47	803.10	1.00	392.63	410.47	803.10	1.00	392.63	410.47	803.10
392.63	441.70	0.35	68.71	549.68	618.39	1.00	196.31	1570.51	1766.82	0.80	157.05	1256.40	1413.45
553.25	785.25	1.00	232.01	553.25	785.25	1.00	232.01	553.25	785.25	1.60	371.21	885.19	1256.40
139.20	449.74	1.40	724.57	324.81	1049.38	0.35	181.14	81.20	262.35	1.00	517.55	232.01	749.56
981.57	1293.88	2.00	499.71	1570.51	2070.21	1.50	374.78	1177.88	1552.66	6.00	1499.12	4711.52	6210.64
816.48	1416.13	0.35	349.79	476.28	826.08	0.20	199.88	272.16	472.04	1.00	999.41	1360.81	2360.22
107.08	303.39	0.50	98.16	53.54	151.70	1.00	196.31	107.08	303.39	1.00	196.31	107.08	303.39
606.79	1124.34	0.50	258.78	303.39	562.17	0.30	155.27	182.04	337.30	1.00	517.55	606.79	1124.34
142.77	513.98	1.00	464.01	178.47	642.48	0.75	348.01	133.85	481.86	1.00	464.01	178.47	642.48
196.31	499.71	1.00	303.39	196.31	499.71	1.00	303.39	196.31	499.71	1.00	303.39	196.31	499.71
1177.88	1516.97	1.00	339.09	1177.88	1516.97	1.00	339.09	1177.88	1516.97	0.75	254.31	883.41	1137.72

a Wood lbs/Ac	a Tot lbs/Ac	prop. b	b Herb lbs/Ac	b Wood lb/Ac	b Tot lbs/Ac	prop. c	c Herb lbs/Ac	c Wood lbs/Ac	c Tot lbs/Ac	prop. d	d Herb lbs/Ac	d Wood lbs/Ac	d Tot lbs/Ac
606.79	874.49	1.00	267.70	606.79	874.49	1.30	348.01	788.82	1136.83	0.75	200.77	455.09	655.86
613.92	671.03	1.00	71.39	767.41	838.79	0.50	35.69	383.70	419.40	1.10	78.53	844.15	922.67
196.31	517.55	1.00	321.24	196.31	517.55	1.00	321.24	196.31	517.55	1.00	321.24	196.31	517.55

COMBINED

Mean Herb	Std Herb	Mean Wood	Std Wood	Mean lbs/Ac	Std Tot
119.93	69.94	411.19	239.78	531.12	309.72
312.49	181.43	0.00	0.00	312.49	181.43
382.28	269.73	539.68	380.80	921.96	650.53
1258.19	750.24	562.17	335.21	1820.36	1085.45
35.87	21.66	418.50	252.65	454.38	274.30
462.59	178.97	179.89	69.60	642.48	248.58
Tot. Mean Herb.=	**Tot. Std. Herb. =**	**Tot. Mean Wood. =**	**Tot. Std. Wood. =**	**Tot. Mean Total =**	**Tot. Std. Total =**
428.56	**398.86**	**351.91**	**200.35**	**780.46**	**501.32**

Mean Herb	Std Herb	Mean Wood	Std Wood	Mean lbs/Ac	Std Tot
392.63	0.00	410.47	0.00	803.10	0.00
133.49	62.88	1067.94	503.05	1201.44	565.93
259.85	55.68	619.64	132.78	879.48	188.46
450.27	187.75	201.85	84.16	652.12	271.92
587.15	463.41	1845.34	1456.43	2432.50	1919.84
629.63	327.83	857.31	446.38	1486.94	774.21
176.68	39.26	96.37	21.42	273.05	60.68
393.34	155.61	461.16	182.44	854.50	338.05
422.25	51.67	162.40	19.87	584.66	71.54
303.39	0.00	196.31	0.00	499.71	0.00
322.13	33.91	1118.99	117.79	1441.12	151.70
Tot. Mean Herb.=	**Tot. Std. Herb. =**	**Tot. Mean Wood. =**	**Tot. Std. Wood. =**	**Tot. Mean Total =**	**Tot. Std. Total =**
370.07	**146.77**	**639.80**	**514.36**	**1009.87**	**577.61**

Mean Herb	Std Herb	Mean Wood	Std Wood	Mean lbs/Ac	Std Tot
270.38	46.68	612.85	105.80	883.23	152.47
62.82	15.24	675.32	163.87	738.14	179.12
321.24	0.00	196.31	0.00	517.55	0.00
Tot. Mean Herb.=	**Tot. Std. Herb. =**	**Tot. Mean Wood. =**	**Tot. Std. Wood. =**	**Tot. Mean Total =**	**Tot. Std. Total =**
218.15	**111.78**	**494.83**	**212.62**	**712.97**	**150.34**

Tot. Mean Herb.=	**Tot. Std. Herb. =**	**Tot. Mean Wood. =**	**Tot. Std. Wood. =**	**Tot. Mean Total =**	**Tot. Std. Total =**
364.83	**256.73**	**531.69**	**425.04**	**896.52**	**527.68**

COOP

RECLAIMED ROAD

PRODUCTION

7-7-94

AREA	Wt.Herb.g/m2	proportion	Tot.Herb.g/m	Herb. lbs/m2	Herb.lbs/Ac	Wt.Wood.g/m2	proportion	Tot.Wood.g/m	Wood. lbs/m2	Wood. lbs/Ac	Tot.lbs/Ac	prop. a	a Herb lbs/Ac
1.00	28.00	0.50	56.00	0.12	499.71	1.00	0.50	2.00	0.00	17.85	517.55	1.00	499.71
2.00	43.00	0.50	86.00	0.19	767.41	11.00	0.50	22.00	0.05	196.31	963.72	1.00	767.41
3.00	42.00	0.50	84.00	0.19	749.56	1.00	0.50	2.00	0.00	17.85	767.41	1.00	749.56
4.00	27.00	0.50	54.00	0.12	481.86	26.00	0.50	52.00	0.11	464.01	945.87	1.20	578.23
5.00	16.00	0.50	32.00	0.07	285.55	0.00	0.50	0.00	0.00	0.00	285.55	1.00	285.55
6.00	29.00	0.50	58.00	0.13	517.55	0.00	0.50	0.00	0.00	0.00	517.55	1.00	517.55
7.00	13.00	0.50	26.00	0.06	232.01	0.00	0.50	0.00	0.00	0.00	232.01	1.00	232.01
8.00	6.00	0.50	12.00	0.03	107.08	13.00	0.50	26.00	0.06	232.01	339.09	0.50	53.54
9.00	8.00	0.50	16.00	0.04	142.77	0.00	0.50	0.00	0.00	0.00	142.77	1.00	142.77
10.00	40.00	0.50	80.00	0.18	713.87	21.00	0.50	42.00	0.09	374.78	1088.65	0.50	356.93
11.00	10.00	0.50	20.00	0.04	178.47	6.00	0.50	12.00	0.03	107.08	285.55	1.00	178.47
12.00	22.00	0.50	44.00	0.10	392.63	4.00	0.50	8.00	0.02	71.39	464.01	1.00	392.63
13.00	49.00	0.50	98.00	0.22	874.49	0.00	0.50	0.00	0.00	0.00	874.49	1.00	874.49
14.00	14.00	0.50	28.00	0.06	249.85	13.00	0.50	26.00	0.06	232.01	481.86	1.00	249.85
15.00	38.00	0.50	76.00	0.17	678.17	11.00	0.50	22.00	0.05	196.31	874.49	1.50	1017.26
16.00	21.00	0.50	42.00	0.09	374.78	25.00	0.50	50.00	0.11	446.17	820.95	1.00	374.78
17.00	21.00	0.50	42.00	0.09	374.78	0.00	0.50	0.00	0.00	0.00	374.78	1.00	374.78
18.00	20.00	0.50	40.00	0.09	356.93	0.00	0.50	0.00	0.00	0.00	356.93	1.00	356.93
19.00	4.00	0.50	8.00	0.02	71.39	0.00	0.50	0.00	0.00	0.00	71.39	0.25	17.85
20.00	12.00	0.50	24.00	0.05	214.16	0.00	0.50	0.00	0.00	0.00	214.16	0.25	53.54

a Wood lbs/Ac	a Tot lbs/Ac	prop. b	b Herb lbs/Ac	b Wood lb/Ac	b Tot lbs/Ac	prop. c	c Herb lbs/Ac	c Wood lbs/Ac	c Tot lbs/Ac	prop. d	d Herb lbs/Ac	d Wood lbs/Ac	d Tot lbs/Ac
17.85	517.55	1.00	499.71	17.85	517.55	1.00	499.71	17.85	517.55	1.20	599.65	21.42	621.06
196.31	963.72	1.00	767.41	196.31	963.72	0.50	383.70	98.16	481.86	1.00	767.41	196.31	963.72
17.85	767.41	1.00	749.56	17.85	767.41	1.00	749.56	17.85	767.41	1.50	1124.34	26.77	1151.11
556.82	1135.05	1.00	481.86	464.01	945.87	0.30	144.56	139.20	283.76	0.30	144.56	139.20	283.76
0.00	285.55	1.00	285.55	0.00	285.55	1.00	285.55	0.00	285.55	0.50	142.77	0.00	142.77
0.00	517.55	0.50	258.78	0.00	258.78	1.00	517.55	0.00	517.55	0.50	258.78	0.00	258.78
0.00	232.01	1.00	232.01	0.00	232.01	1.50	348.01	0.00	348.01	0.50	116.00	0.00	116.00
116.00	169.54	3.00	321.24	696.02	1017.26	2.00	214.16	464.01	678.17	1.00	107.08	232.01	339.09
0.00	142.77	3.00	428.32	0.00	428.32	1.00	142.77	0.00	142.77	1.00	142.77	0.00	142.77
187.39	544.32	1.50	1070.80	562.17	1632.97	3.00	2141.60	1124.34	3265.94	1.00	713.87	374.78	1088.65
107.08	285.55	1.00	178.47	107.08	285.55	1.00	178.47	107.08	285.55	1.00	178.47	107.08	285.55
71.39	464.01	1.00	392.63	71.39	464.01	2.00	785.25	142.77	928.03	1.00	392.63	71.39	464.01
0.00	874.49	1.00	874.49	0.00	874.49	1.00	874.49	0.00	874.49	0.70	612.14	0.00	612.14
232.01	481.86	1.00	249.85	232.01	481.86	0.70	174.90	162.40	337.30	0.50	124.93	116.00	240.93
294.47	1311.73	1.00	678.17	196.31	874.49	1.00	678.17	196.31	874.49	1.00	678.17	196.31	874.49
446.17	820.95	1.00	374.78	446.17	820.95	0.50	187.39	223.08	410.47	0.30	112.43	133.85	246.28
0.00	374.78	1.00	374.78	0.00	374.78	1.00	374.78	0.00	374.78	1.00	374.78	0.00	374.78
0.00	356.93	1.00	356.93	0.00	356.93	1.20	428.32	0.00	428.32	1.30	464.01	0.00	464.01
0.00	17.85	0.75	53.54	0.00	53.54	0.50	35.69	0.00	35.69	2.00	142.77	0.00	142.77
0.00	53.54	1.00	214.16	0.00	214.16	0.50	107.08	0.00	107.08	0.75	160.62	0.00	160.62

Mean Herb	Std Herb	Mean Wood	Std Wood	Mean lbs/Ac	Std Tot
519.69	39.98	18.56	1.43	538.26	41.40
690.67	153.48	176.68	39.26	867.35	192.74
824.52	149.91	19.63	3.57	844.15	153.48
366.21	184.37	352.65	177.54	718.86	361.91
256.99	57.11	0.00	0.00	256.99	57.11
414.04	126.77	0.00	0.00	414.04	126.77
232.01	73.37	0.00	0.00	232.01	73.37
160.62	95.78	348.01	207.51	508.63	303.29
199.88	114.22	0.00	0.00	199.88	114.22
999.41	614.09	524.69	322.40	1524.10	936.49
178.47	0.00	107.08	0.00	285.55	0.00
471.15	157.05	85.66	28.55	556.82	185.61
822.02	104.94	0.00	0.00	822.02	104.94
209.88	51.45	194.89	47.77	404.76	99.22
745.99	135.63	215.94	39.26	961.93	174.90
284.83	112.68	339.09	134.15	623.92	246.83
374.78	0.00	0.00	0.00	374.78	0.00
392.63	45.15	0.00	0.00	392.63	45.15
64.25	43.13	0.00	0.00	64.25	43.13
149.91	62.44	0.00	0.00	149.91	62.44
Tot. Mean Herb.=	Tot. Std. Herb. =	Tot. Mean Wood. =	Tot. Std. Wood. =	Tot. Mean Total =	Tot. Std. Total =
417.90	260.44	119.14	156.08	537.04	337.85

COOP

Reference

PRODUCTION

7-7-94

AREA	Wt.Herb.g/m2	proportion	Tot.Herb.g/m	Herb. lbs/m2	Herb.lbs/Ac	Wt.Wood.g/m2	proportion	Tot.Wood.g/m	Wood. lbs/m2	Wood. lbs/Ac	Tot.lbs/Ac	prop. a	a Herb lbs/Ac
1.00	15.00	0.50	30.00	0.07	267.70	5.00	0.50	10.00	0.02	89.23	356.93	1.00	267.70
2.00	16.00	0.50	32.00	0.07	285.55	9.00	0.50	18.00	0.04	160.62	446.17	0.75	214.16
3.00	2.00	0.50	4.00	0.01	35.69	17.00	0.50	34.00	0.07	303.39	339.09	1.00	35.69
4.00	18.00	0.50	36.00	0.08	321.24	0.00	0.50	0.00	0.00	0.00	321.24	1.50	481.86
5.00	12.00	0.50	24.00	0.05	214.16	7.00	0.50	14.00	0.03	124.93	339.09	0.70	149.91
6.00	12.00	0.50	24.00	0.05	214.16	9.00	0.50	18.00	0.04	160.62	374.78	1.20	256.99
7.00	14.00	0.50	28.00	0.06	249.85	9.00	0.50	18.00	0.04	160.62	410.47	1.00	249.85
8.00	25.00	0.50	50.00	0.11	446.17	4.00	0.50	8.00	0.02	71.39	517.55	0.75	334.62
9.00	3.00	0.50	6.00	0.01	53.54	0.00	0.50	0.00	0.00	0.00	53.54	1.00	53.54
10.00	11.00	0.50	22.00	0.05	196.31	16.00	0.50	32.00	0.07	285.55	481.86	1.00	196.31
11.00	4.00	0.50	8.00	0.02	71.39	7.00	0.50	14.00	0.03	124.93	196.31	1.00	71.39
12.00	13.00	0.50	26.00	0.06	232.01	3.00	0.50	6.00	0.01	53.54	285.55	1.00	232.01
13.00	16.00	0.50	32.00	0.07	285.55	0.00	0.50	0.00	0.00	0.00	285.55	1.00	285.55
14.00	15.00	0.50	30.00	0.07	267.70	0.00	0.50	0.00	0.00	0.00	267.70	0.50	133.85
15.00	16.00	0.50	32.00	0.07	285.55	0.00	0.50	0.00	0.00	0.00	285.55	1.00	285.55

a Wood lbs/Ac	a Tot lbs/Ac	prop. b	b Herb lbs/Ac	b Wood lb/Ac	b Tot lbs/Ac	prop. c	c Herb lbs/Ac	c Wood lbs/Ac	c Tot lbs/Ac	prop. d	d Herb lbs/Ac	d Wood lbs/Ac
89.23	356.93	1.20	321.24	107.08	428.32	1.00	267.70	89.23	356.93	1.00	267.70	89.23
120.46	334.62	1.00	335.62	160.62	496.24	0.40	114.22	64.25	178.47	0.30	85.66	48.19
303.39	339.09	0.50	339.59	151.70	491.28	0.60	21.42	182.04	203.45	0.40	14.28	121.36
0.00	481.86	3.00	484.86	0.00	484.86	1.00	321.24	0.00	321.24	1.00	321.24	0.00
87.45	237.36	0.80	238.16	99.94	338.10	1.00	214.16	124.93	339.09	3.00	642.48	374.78
192.74	449.74	0.80	450.54	128.50	579.03	0.75	160.62	120.46	281.08	1.00	214.16	160.62
160.62	410.47	0.75	411.22	120.46	531.69	1.00	249.85	160.62	410.47	1.00	249.85	160.62
53.54	388.16	0.75	388.91	53.54	442.45	1.00	446.17	71.39	517.55	0.70	312.32	49.97
0.00	53.54	2.00	55.54	0.00	55.54	6.00	321.24	0.00	321.24	1.00	53.54	0.00
285.55	481.86	1.00	482.86	285.55	768.41	3.00	588.94	856.64	1445.58	0.75	147.23	214.16
124.93	196.31	0.50	196.81	62.46	259.28	1.00	71.39	124.93	196.31	0.50	35.69	62.46
53.54	285.55	0.50	286.05	26.77	312.82	1.00	232.01	53.54	285.55	2.00	464.01	107.08
0.00	285.55	1.00	286.55	0.00	286.55	1.00	285.55	0.00	285.55	1.00	285.55	0.00
0.00	133.85	1.00	134.85	0.00	134.85	0.70	187.39	0.00	187.39	1.00	267.70	0.00
0.00	285.55	1.00	286.55	0.00	286.55	0.50	142.77	0.00	142.77	0.50	142.77	0.00

d Tot lbs/Ac	Mean Herb	Std Herb	Mean Wood	Std Wood	Mean lbs/Ac	Tot. Std
356.93	278.41	21.42	92.80	7.14	371.21	28.55
133.85	207.04	96.02	110.83	47.21	317.87	142.73
135.63	89.33	125.40	212.38	76.75	301.71	123.26
321.24	386.09	79.43	0.00	0.00	386.09	79.43
1017.26	291.77	177.79	162.40	107.18	454.18	284.27
374.78	259.29	100.39	152.59	25.90	411.88	99.23
410.47	282.13	64.55	152.59	16.06	434.72	48.49
362.29	385.64	55.35	59.96	9.42	445.60	64.19
53.54	107.48	106.88	0.00	0.00	107.48	106.88
361.39	322.33	178.48	385.49	237.19	707.82	392.45
98.16	89.33	55.49	99.94	30.60	189.27	51.67
571.09	289.22	89.87	58.89	26.23	348.11	111.99
285.55	285.75	0.40	0.00	0.00	285.75	0.40
267.70	198.30	59.89	0.00	0.00	198.30	59.89
142.77	228.64	70.11	0.00	0.00	228.64	70.11
	Tot. Mean Herb.=	Tot. Std. Herb. =	Tot. Mean Wood. =	Tot. Std. Wood. =	Tot. Mean Total =	Tot. Std. Total =
	246.72	91.43	99.19	102.31	345.91	139.15

APPENDIX E

ANNUAL IMPOUNDMENT CERTIFICATION

1994 ANNUAL IMPOUNDMENT CERTIFICATION REPORT

1. **I, hereby certify, in accordance with the approved plan that with respect to the following facility.**

Name of Permittee:	Co-Op Mining Company
Permit No.:	ACT/015/025
Mine Name:	Bear Canyon Mine
Water Impoundment Identification:	Sediment Pond "A"
Inspection Date:	12-19-94

2. **I, or persons under my supervision have conducted adequate inspections of the maintenance of the structure; and**

3. **The maintenance has been performed in accordance with the Utah State Coal Program; and**

4. **The attached report is certified in accordance with the rules of professional conduct promulgated by the Utah Board of Examiners for Engineers; and**

5. **The attached report addresses the following points:**

   (a) **any appearances of instability, structural weakness or other hazardous conditions;**
   (b) **depth and elevation of impoundment water;**
   (c) **existing storage capacity;**
   (d) **existing or required monitoring procedures and instrumentation; and**
   (e) **any other aspects of the structure affecting stability.**

6. **Comments**

1994 ANNUAL IMPOUNDMENT CERTIFICATION REPORT cont.

On 19 December 1994, an inspection of Co-Op Mining Company, Bear Canyon Mine Sediment pond "A" revealed the following:

A. The pond has been constructed and maintained in accordance with the approved plan.

B. The pond's dam appeared sound with no signs of instability or hazardous conditions.

C. The water (ice) elevation was 7084.5, 1.5 feet below sediment cleanout level (7086 ft (60 percent cleanout level)) and 3.5 feet below decant level. Pond slopes and the ice were covered with 3 in. of snow.

D. The existing storage capacity was 2.27 acre-feet which is greater than the 1.57 acre-feet required by the approved plan.

E. Ponds are inspected quarterly for structural problems. Discharge monitoring is conducted monthly and reports are submitted to the Division and Utah Department of Health (UTG040006, Utah General Permit for Coal Mining. Discharge Point 002) as required in the approved plan. No discharge was noted in 1994.

Based on this field inspection, Pond "A" has been certified as required by R645-301-514.310 through R645-301-514.313. I do hereby certify that the above information is a true and accurate representation of the pond at this time.

name

2-1-95
date

LICENSED PROFESSIONAL ENGINEER
No. 136686
KIMLY O. MANGUM
2/1/95
STATE OF UTAH

1994 ANNUAL IMPOUNDMENT CERTIFICATION REPORT

1. **I, hereby certify, in accordance with the approved plan that with respect to the following facility.**

Name of Permittee:	Co-Op Mining Company
Permit No.:	ACT/015/025
Mine Name:	Bear Canyon Mine

Water Impoundment Identification:	Sediment Pond "B"
Inspection Date:	12-19-94'

2. **I, or persons under my supervision have conducted adequate inspections of the maintenance of the structure; and**

3. **The maintenance has been performed in accordance with the Utah State Coal Program; and**

4. **The attached report is certified in accordance with the rules of professional conduct promulgated by the Utah Board of Examiners for Engineers; and**

5. **The attached report addresses the following points:**

   (a) **any appearances of instability, structural weakness or other hazardous conditions;**
   (b) **depth and elevation of impoundment water;**
   (c) **existing storage capacity;**
   (d) **existing or required monitoring procedures and instrumentation; and**
   (e) **any other aspects of the structure affecting stability.**

6. **Comments**

1994 ANNUAL IMPOUNDMENT CERTIFICATION REPORT cont.

On 19 December 1994, an inspection of Co-Op Mining Company, Bear Canyon Mine Sediment pond "B" revealed the following:

A. The pond has been constructed and maintained in accordance with the approved plan.

B. The pond's dam appeared sound with no signs of instability or hazardous conditions.

C. The water (ice) elevation was 7062.5, 0.4 feet below sediment cleanout level (7062.9 ft (60 percent cleanout level)) and 2.4 feet below decant level. Ice was covered with 3 in. of snow.

D. The existing storage capacity was 0.28 acre-feet which is greater than the 0.185 acre-feet required by the approved plan.

E. Ponds are inspected quarterly for structural problems. Discharge monitoring is conducted monthly and reports are submitted to the Division and Utah Department of Health (UTG040006, Utah General Permit for Coal Mining. Discharge Point 003) as required in the approved plan. No discharge was noted in 1994.

Based on this field inspection, Pond "B" has been certified as required by R645-301-514.310 through R645-301-514.313. I do hereby certify that the above information is a true and accurate representation of the pond at this time.

name

2-1-95
date

LICENSED PROFESSIONAL ENGINEER
No. 136686
KIMLY C. MANGUM
STATE OF UTAH

1994 ANNUAL IMPOUNDMENT CERTIFICATION REPORT

1. **I, hereby certify, in accordance with the approved plan that with respect to the following facility.**

Name of Permittee: Co-Op Mining Company
Permit No.: ACT/015/025
Mine Name: Bear Canyon Mine

Water Impoundment Identification: Sediment Pond "C"
Inspection Date: 12-19-94'

2. **I, or persons under my supervision have conducted adequate inspections of the maintenance of the structure; and**

3. **The maintenance has been performed in accordance with the Utah State Coal Program; and**

4. **The attached report is certified in accordance with the rules of professional conduct promulgated by the Utah Board of Examiners for Engineers; and**

5. **The attached report addresses the following points:**

   (a) **any appearances of instability, structural weakness or other hazardous conditions;**
   (b) **depth and elevation of impoundment water;**
   (c) **existing storage capacity;**
   (d) **existing or required monitoring procedures and instrumentation; and**
   (e) **any other aspects of the structure affecting stability.**

6. **Comments**

1994 ANNUAL IMPOUNDMENT CERTIFICATION REPORT cont.

On 19 December 1994, an inspection of Co-Op Mining Company, Bear Canyon Mine Sediment pond "C" revealed the following:

A. The pond has been constructed and maintained in accordance with the approved plan.

B. The pond's dam appeared sound with no signs of instability or hazardous conditions.

C. The water (ice) elevation was 7028, 2.3 feet below sediment cleanout level (7030.3 ft (60 percent cleanout level)). Ice was covered with 3 in. of snow.

D. The existing storage capacity was 0.35 acre-feet which is greater than the 0.195 acre-feet required by the approved plan.

E. Ponds are inspected quarterly for structural problems. Discharge monitoring is conducted monthly and reports are submitted to the Division and Utah Department of Health (UTG040006, Utah General Permit for Coal Mining. Discharge Point 006) as required in the approved plan. No discharge was noted in 1994.

Based on this field inspection, Pond "C" has been certified as required by R645-301-514.310 through R645-301-514.313. I do hereby certify that the above information is a true and accurate representation of the pond at this time.

Kimly C Mangum
name

2-4-95
date

LICENSED PROFESSIONAL ENGINEER
No. 136686
KIMLY C. MANGUM
2/95
STATE OF UTAH

1994 ANNUAL IMPOUNDMENT CERTIFICATION REPORT

1. **I, hereby certify, in accordance with the approved plan that with respect with the following facility.**

Name of Permittee:	Co-Op Mining Company
Permit No.:	ACT/015/021
Mine Name:	Trail Canyon Mine

Water Impoundment Identification:	Trail Canyon Sediment Pond
Inspection Date:	12-19-94

2. **I, or persons under my supervision have conducted adequate inspections of the maintenance of the structure; and**

3. **The maintenance has been performed in accordance with the Utah State Coal Program; and**

4. **The attached report is certified in accordance with the rules of professional conduct promulgated by the Utah Board of Examiners for Engineers; and**

5. **The attached report addresses the following points:**

   (a) **any appearances of instability, structural weakness or other hazardous conditions;**
   (b) **depth and elevation of impoundment water;**
   (c) **existing storage capacity;**
   (d) **existing or required monitoring procedures and instrumentation; and**
   (e) **any other aspects of the structure affecting stability.**

6. **Comments**

1994 ANNUAL IMPOUNDMENT CERTIFICATION REPORT cont.

On 19 December 1994, an inspection of Co-Op Mining Company, Trail Canyon revealed the following:

A. The pond has been constructed and maintained in accordance with the approved plan.

B. The pond's dam appeared sound with no signs of instability or hazardous conditions.

C. The pond was dry. Elevation was 6943.8, 0.35 feet below sediment cleanout level (6944.15 ft (60 percent cleanout level)). Area was covered with 2 in. of snow.

D. The existing storage capacity was 1.84 acre-feet which is greater than the 1.082 acre-feet required by the approved plan.

E. Ponds are inspected quarterly for structural problems. Discharge monitoring is conducted monthly and reports are submitted to the Division and Utah Department of Health (UTG040006, Utah General Permit for Coal Mining. Discharge Point 006) as required in the approved plan. No discharge was noted in 1994.

Based on this field inspection, the Trail Canyon Sediment Pond has been certified as required by R645-301-514.310 through R645-301-514.313. I do hereby certify that the above information is a true and accurate representation of the pond at this time.

Kimly C Mangum
name

2-6-95
date

LICENSED PROFESSIONAL ENGINEER
No. 136686
KIMLY C. MANGUM
2/95
STATE OF UTAH

APPENDIX F

ANNUAL REPORT OF OFFICERS

002

STATE OF UTAH
DEPARTMENT OF COMMERCE
DIVISION OF CORPORATIONS AND COMMERCIAL CODE

PROFIT CORPORATION ANNUAL REPORT

The following information is on file in this office. All profit corporations must file their annual reports and corrections within the month Their anniversary date. Failure to do so will result in Delinquency, Suspension, then Revocation or Involuntary Dissolution of the corporate charter. THIS BOX MUST BE COMPLETED

CORPORATE NAME, REGISTERED AGENT, REGISTERED OFFICE, CITY, STATE & ZIP

CORPORATION # 104145
D 08/10/83

1. C. W. MINING COMPANY
2. CARL E. KINGSTON
3. 53 WEST ANGELO AVE
4. SALT LAKE CITY UT 84115

MAKE ALL CORRECTIONS IN THIS COLUMN

(Print New Agent Name) NEW AGENT MUST SIGN ABOVE

NEW REGISTERED STREET ADDRESS REQUIRED

(New City) UTAH (Zip)
REGISTERED AGENT MUST BE IN UTAH

WHEN CHANGING THE REGISTERED AGENT THE NEW AGENT MUST SIGN.

5. INCORPORATED IN THE STATE AND UNDER THE LAWS OF: UTAH

6. ADDRESS OF THE PRINCIPAL OFFICE IN THE HOME STATE.

(Street Address) (State or Country)
(City) (ZIP)

7. BUSINESS PURPOSE: BITUMINOUS COAL & LIGNITE(SURFACE)

OFFICERS DOMESTIC PROFIT CORPORATIONS ARE REQUIRED TO LIST A CORPORATE OFFICER

8. PRESIDENT B.W. STODDARD
ADDRESS P.O. BOX 300
CITY, STATE & ZIP HUNTINGTON, UT. 84528
9. VICE PRESIDENT J.A. GUSTAFSON
ADDRESS 1815 SOUTH 1100 WEST
CITY, STATE & ZIP WOODS CROSS, UT. 84087
10. SECRETARY D.J. SANDERS
ADDRESS 53 W ANGELO AVE
CITY, STATE & ZIP SALT LAKE CITY UT 84115
11. TREASURER D.J. SANDERS
ADDRESS 53 W ANGELO AVE
CITY, STATE & ZIP SALT LAKE CITY UT 84115

DIRECTORS IF YOU HAVE LESS THAN 3 SHAREHOLDERS YOU MAY LIST LESS THAN 3 DIRECTORS

12. DIRECTOR B.W. STODDARD
ADDRESS P.O. BOX 300
CITY, STATE & ZIP HUNTINGTON, UT. 84528
13. DIRECTOR J.A. GUSTAFSON
ADDRESS 1815 SOUTH 1100 WEST
CITY, STATE & ZIP WOODS CROSS, UT. 84087
14. DIRECTOR D.J. SANDERS
ADDRESS 53 W ANGELO AVE
CITY, STATE & ZIP SALT LAKE CITY UT 84115

Under penalties of perjury and as an authorized officer, I declare that this annual report and, if applicable, the statement change of registered office and/or agent, has been examined by me and is, to the best of my knowledge and belief, true, correct, and complete.

15. BY D. J. Sanders (MUST BE SIGNED BY A CORPORATE OFFICER)
16. Treasurer (Title or Position)
17. June 21 (Date) 1994

IF THERE ARE NO CHANGES FROM THE PREVIOUS YEAR, PLEASE DETACH THE COUPON BELOW AND RETURN IT IN THE ENCLOSED ENVELOPE WITH YOUR PAYMENT. YOU MAY KEEP THE ABOVE REPORT FOR YOUR RECORDS.

MAKE ALL CORRECTIONS ON THE FORM ABOVE

FORM NBB231