

CO-OP MINING CO.

P.O. Box 15809
Salt Lake City, Utah 84115
Phone (801) 467-4003

June 24, 1983

TOPSOIL STOCKPILE CONSOLIDATION

Bear Canyon Mine

The following plan for handling of topsoil and consolidation of piles to one storage area has been prepared for Co-op Mining Company by Mel Coonrod. Please refer to the request made by Co-op Mining Company on June 1, 1983 and the subsequent visit to the minesite by Ev Hooper and John Whitehead to discuss possible storage sites.

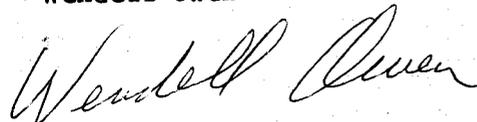
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DIVISION OF OIL
GAS & MINING

Co-op Mining Company

Wendell Owen



SOILS, PHYSICAL AND CHEMICAL PROPERTIES OF SOILS; RESULTS OF ANALYSIS, TESTS, TRIALS AND INTERIM RECLAMATION PLAN.

The 1982 Co-op field investigations provided information on the physical and chemical properties of soils in the permit area. A Soils Legend will be included for each soil in a map unit [Attachment 3A]. A rating for topsoil is included on this form, as are some chemical properties. In studies during the 1982 field season an onsite sampling was analyzed for the required chemical properties in all horizons [see Attachment 1-A].

SOIL SUBSTITUTE OR SUPPLEMENT

Not applicable.

SOIL REMOVAL, HANDLING, STORAGE, AND PROTECTION PLANS

To prevent suitable topsoil from being wasted or contaminated by waste materials, topsoil was removed from all new construction areas as a separate operation. The topsoil was stockpiled and will be consolidated and protected from wind and water erosion and contamination which might lessen its capability to support vegetation. The following subsections deal specifically with the various phases of the topsoil and subsoil handling plan.

Topsoil Removal

At the start of the construction phase, topsoil was collected from the area. Existing vegetation was removed and topsoil was collected prior to excavation or other surface disturbance operations within the affected areas.

The depth of topsoil removal in each case depends on the amount of A and B horizon material as defined in OSM Regulation 30 CFR 783.21 and 783.22. The topsoil removed in these areas consists of A horizon quality material

and B horizon quality material with virtually no distinctive difference. The C horizon material was not removed since it was not sufficiently capable of supporting diverse vegetation do to the excessive rock.

The equipment used for topsoil removal consisted of bulldozers, front-end loaders, and dump trucks. The use of bulldozers requires pushing of the topsoil to a collection point for loading into dump trucks or other means of transportation to the designated stockpile. Adequate supervisory personnel were present at the time of topsoil removal to instruct the equipment operators in the proper techniques of topsoil removal and to ensure that required horizons were removed and stored.

Topsoil Stockpile

Topsoil is presently being stored within areas of the permit boundary [see Map 1]. It is the Co-op intent to consolidate Pile #3 with Pile #4; to utilize Pile #2 which is principally rock and unsuitable as a growth media as rip-rap where ever the need arises; and to relocate Pile #1 which is primarily rock to the site of Pile #4 to be used as a top dressing upon final reclamation.

Plans involving topsoil storage can be labeled as "short term" or "long term" depending on completion of activities in each area and the reclamation schedule presented. These piles should be considered "long term".

Short-Term Topsoil Storage Areas

Short-term stockpiles of topsoil will be for areas to be reclaimed almost immediately upon cutting and at final grade. Topsoil will be redistributed promptly to minimize natural degradation processes.

Long-Term Topsoil Storage Areas

During any new construction of areas that will be used for the duration

of the mining operation within the permit area, topsoil will be collected and stockpiled. The topsoil will be used later for post-mining reclamation of the abandonment areas.

Topsoil Protection

The short-term topsoil stockpile will be sprayed with water or temporarily vegetated to retard erosion. The long-term topsoil stockpile will be protected by the following operational steps:

A stable surface will be provided in an area outside the influence of active operations.

As a stockpile is completed, it will be left in a rough condition to minimize erosion.

Stockpiles will be situated out of drainages to prevent water erosion.

Storage piles will be vegetated with quick-growing, soil-stabilizing plants. Revegetation will involve the immediate seeding of stockpiles topsoil during the next planting season with the seed mixture recommended in a report on vegetation and plant community analysis [see Attachment 2A Seed List] in compliance with the requirements of the appropriate land management agency.

Signs will be posted to protect the stockpiles from accidental use as fill or from other inadvertent material contamination.

The establishment of noxious plant species will be prevented.

The stockpiled topsoil will not be removed or otherwise disturbed until required for the redistribution operation on a prepared, regraded disturbed area.

PLANS FOR REDISTRIBUTION OF SOILS

Prior to topsoil redistribution, regraded land will be scarified by a ripper-equipped tractor. The ground surface will be ripped to a suitable depth in order to reduce surface compaction, provide a roughened surface assuring topsoil adherence, and promote root penetration. Steep slope areas which must remain after abandonment will receive special ripping to create ledges, crevices, pockets, and screes. This will allow better soil retention and vegetation establishment.

Within a suitable time period prior to seeding, topsoil will be distributed on areas to be reclaimed. During this time, the topsoil will be allowed to settle and attain equilibrium with its natural environment. This procedure will be followed for areas in which facilities such as roadbeds, mine pads, and building sites are to be abandoned.

Topsoil redistribution procedures will ensure an approximate uniform thickness consistent with the proposed reclamation plan. Topsoil will be re-distributed at a time of the year suitable for establishment of permanent vegetation.

To minimize compaction of the topsoil following redistribution, travel on reclaimed areas will be limited. After topsoil has been applied, surface compaction will be reduced by using appropriate equipment running at a suitable depth. This operation will also help prepare a proper seed bed and protect the redistributed topsoil from wind and water erosion. ?

Co-op Mining will exercise care to guard against erosion during and after application to topsoil and will employ the necessary measures to ensure the stability of topsoil on graded slopes. The specific methods to be implemented will be defined in the attached Interim Plan. An example of the soil stabilization methodology that might be used includes the placement of crushed and heavier material at the toe of roadfill slopes, and the random placement of large rocks and boulders on the surface. This procedure will

enhance the microclimate as well as make the reclaimed area more aesthetically compatible with the undisturbed surroundings.

Phosphorus

Nitrogen

Soil pH and salinity

Soil texture

Chemical analysis for micronutrients will be conducted by testing soil extracts from the redistributed material. All necessary fertilization or neutralization, as determined by soil testing, will be done according to the final Reclamation Plan. *No final plan!*

EFFECTS OF MINING OPERATIONS ON TOPSOILS, NUTRIENTS, AND SOIL AMENDMENTS

Since the Co-op Mine is an underground mine, the impact of mining on soils will be minor overall. The impacts of surface operations and mining facilities on soil resources consist of coverage of soil by landfills and refuse, disturbance of soils during construction activities, erosion created by removing vegetation, reduced forage growth due to nutrient degradation, reduced livestock capacity, and particulate emissions to the air.

The areas in which soil has been disturbed to date within the permit area, includes the loadout area, future offices, shops and substations, roads, portal areas, and the topsoil storage areas. Additional acreage may be disturbed in the future if Co-op elects to proceed with certain projects it is considering.

MITIGATION AND CONTROL PLANS: SOILS TESTING PLAN

Detailed Interim Reclamation Plans [Attachment 4A] are attached and will be part of the Bear Canyon Mine Reclamation Plan in regard to stockpiling and long and short term plans and goals for final reclamation.

*Soil
Nutrients
Page should be
revised.*

SOIL TEST REPORT

NO. 7404.0

AGRICULTURAL CONSULTANTS, INC.

P.O. DRAWER 507 — 240 S. FIRST AVENUE

BRIGHTON, COLORADO 80601

303/659-2313

DATE RCVD 11-12-82

REPORTED 11-23-82

REPORT TO: CO-OP MINING COMPANY ATTN: MR. OWEN

BILL TO: SAME

GROWER: SAME

SAMPLE ID: BEAR UPPER PAD

TEXTURE <small>si=silt, silty sn=sand, sandy lo=loam, loamy cl=clay</small>	pH		CEC Meq /100g	SALT Mmhos /cm	Na Meq /100g	Lime %	OM %	Org N Lbs	AVAILABLE NUTRIENTS ppm (1)										
	H ₂ O	Buf							NO ₃	P(2)	K(2)	Ca	Mg	S(2)	B	Zn	Fe	Mn	Cu
N LD	8.3	7.0	9.5	1.9	0.2	8.7	0.9	31.5	9	1	44	2700	250	58	0.2	0.4	1.5	1.1	0.3
CROP	YIELD GOAL	CROP RESIDUE T/A	MNR T/A	RECOMMENDATIONS POUNDS PER ACRE															
				N	P ₂ O ₅	K ₂ O	Elem Sulfur	Lime	Mg	SO ₄ -S	Boron	Zinc	Iron	Mn	Cu				
DL Native Grasses	Average	-	0	50	60	70	0	0	0	0	0	0	0	0	0	0	0	0	0

1.ppm=parts per million or lbs element per million lbs soil. ppm x 2 = lbs/acre 6-7" depth. ppm x 3.5 = lbs/acre feet. 2. P x 2.3 = P₂O₅ K x 1.2 = K₂O S x 3 = SO₄-S
 Values reported but without specific remarks are considered to be within growth range of intended crop.

If poor moisture conditions reduce fertilization accordingly.

Dean Lansing

SOIL TEST REPORT

NO. 7406.0

AGRICULTURAL CONSULTANTS INC
 P.O. DRAWER 507 — 240 S. FIRST AVENUE
 BRIGHTON, COLORADO 80801
 303/659-2313

DATE RCVD

11-12-82

REPORTED

11-23-82

REPORT TO: CO-OP MINING COMPANY ATTN: MR. OWEN

BILL TO: SAME

GROWER: SAME

SAMPLE ID: SCALES BEAR

TEXTURE <small>si=silt, silty sa=sand, sandy lo=loam, loamy cl=clay</small>	pH		CEC Meq /100g	SALT Mmhos /cm	Na Meq /100g	Lime %	OM %	Org N Lbs	AVAILABLE NUTRIENTS ppm (1)										
	H ₂ O	Buf							NO ₃	P(2)	K(2)	Ca	Mg	S(2)	B	Zn	Fe	Mn	Cu
N LO	8.3	7.0	11.1	1.0	0.2	8.6	1.3	45.5	8	3	99	3400	210	31	0.6	0.6	3.8	2.0	0.3

CROP	YIELD GOAL	CROP RESIDUE T/A	MNR T/A	RECOMMENDATIONS POUNDS PER ACRE															
				N	P ₂ O ₅	K ₂ O	Elem Sulfur	Lime	Mg	SO ₄ -S	Boron	Zinc	Iron	Mn	Cu				
DL Native Grasses	Average	-	0	40	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0

1. ppm=parts per million or lbs element per million lbs soil. ppm x 2 = lbs/acre 6-7" depth. ppm x 3.5 = lbs/acre feet. 2. P x 2.3 = P₂O₅ K x 1.2 = K₂O S x 3 = SO₄

Values reported but without specific remarks are considered to be within growth range of intended crop.

If poor moisture conditions reduce fertilization accordingly.

Supervised by

Diann Lansing

AGRICULTURAL CONSULTANTS, INC.
P.O. DRAWER 507 — 240 S. FIRST AVENUE
BRIGHTON, COLORADO 80601
303/659-2313

SOIL TEST REPORT

NO. 7405.0

DATE RCVD 11-12-82
REPORTED 11-23-82

REPORT TO: CO-OP MINING COMPANY ATTN: MR. OWEN
BILL TO: SAME
GROWER: SAME
SAMPLE ID: BEAR POWER POLE

TEXTURE <small>si=silt, silty sn=sand, sandy lo=loam, loamy cl=clay</small>	pH		CEC Meq /100g	SALT Mmhos /cm	Na Meq /100g	Lime %	OM %	Org N Lbs	AVAILABLE NUTRIENTS ppm (1)										
	H ₂ O	Buf							NO ₃	P(2)	K(2)	Ca	Mg	S(2)	B	Zn	Fe	Mn	Cu
	8.0	7.0	38.7	4.6	0.3	9.1	1.8	45.0	6	1	90	9900	510	204	0.6	0.4	4.6	1.4	0.4

CROP	YIELD GOAL	CROP RESIDUE T/A	MNR T/A	RECOMMENDATIONS POUNDS PER ACRE														
				N	P ₂ O ₅	K ₂ O	Elem Sulfer	Lime	Mg	SO ₄ -S	Boron	Zinc	Iron	Mn	Cu			
DL Native Grasses	Average	-	0	50	50	90	0	0	0	0	0	0	0	0	0	0	0	0

1.ppm=parts per million or lbs element per million lbs soil. ppm x 2 = lbs/acre 6-7" depth. ppm x 3.5 = lbs/acre feet. 2. P x 2.3 = P₂O₅ K x 1.2 = K₂O S x 3 = SO₄
Values reported but without specific remarks are considered to be within growth range of intended crop.

If poor moisture conditions reduce fertilization accordingly.

Supervised by *Diann Lansing*
ATTACHMENT 1-A

ATTACHMENT #2-A

RECOMMENDED SEED MIX
BEAR CREEK MINE
CO-OP MINING COMPANY

SPECIES	RATE* PER ACRE	APPROXIMATE NO. SEEDS/FT ²
<u>GRASSES</u>		
<u>Agropyron dasystachyum</u>	3	12
Thickspike wheatgrass		
<u>A. spicatum</u>	8	22
Bluebunch wheatgrass		
<u>Elymus Salina</u>	1.5	15
Salina wildrye		
<u>Oryzopsis hymenoides</u>	3	12
Indian ricegrass		
<u>Poa secunda</u>	1	21
Sandberg bluegrass		
<u>FORBS</u>		
<u>Achillea millifolium</u>	.15	10
Western yarrow		
<u>Aster chilensis</u>	.15	9
Pacific aster		
<u>Hedysarum boreale</u>	9	7
Northern sweetvetch		
<u>Lupinus sericeus</u>	20	6
Silky sweetvetch		
<u>Penstemon Palmeri</u>		
Palmer penstemon		
or		
<u>P. Strictus</u>	.5	7
Rocky Mountain Penstemon		

Attachment #2-A

SHRUBS

<u>Amelanchier Utahensis</u>	4	4
Utah serviceberry		
<u>Artemisia tridentata ssp. vaseyana</u>	.15	9
Big sagebrush		
<u>Cercocarpus ledifolius</u>	6	7
Curleaf Mountain mahogany		
<u>Chrysothamnus nauseosus var. albicaulus</u>	.5	5
Whitestem rubber rabbitbrush		
<u>Sambucus cerulea</u>	.8	4
Blue elderberry		
For hydroseeding	59.75	159
1/2 application for drill seeded areas	30.00	

* Rate is pure live seed to be broadcast and lightly covered.

ATTACHMENT 3-A

SOIL LEGEND

SOIL SYMBOL

SOIL MAPPING UNIT NAME

D2E

Datino bouldery fine sandy loam,
5 to 20 percent slopes

D1G

Datino very stony fine sandy loam,
55 to 70 percent slopes

DESCRIPTION OF THE SOILS

D2E Datino bouldery fine sandy loam, 5 to 20 percent slopes

This Datino soil is very deep and well drained. It occurs on moderately steep alluvial fans and some sloping flood plains at elevations of 7,100 to 7,140 feet [2,165 to 2,177 meters]. This soil formed in alluvium and colluvium derived mainly from sandstone and shale. The average annual precipitation is 14 to 16 inches [36 to 41 centimeters]. Mean annual air temperature is 42 to 45 degrees F. [5 to 7 degrees C.], mean annual soil temperature is 44 to 47 degrees F. [6 to 8 degrees C.], and the average freeze-free season is about 80 to 110 days.

Slopes are 5 to 20 percent and mostly East facing. They are short and concave-convex.

Vegetation is dominantly pinyon, Utah juniper, salina wildrye, squirreltail, big sagebrush, Douglas-fir, and Rocky Mountain juniper.

Included in mapping are small areas of a similar soil except with 20 percent gravel and cobbles in the surface layer.

Attachment 3-A

In a typical profile the surface layer is brown, bouldery fine sandy loam and cobbly loam about 10 inches [25 centimeters] thick. The subsoil is light brown very stony loam about 28 inches [71 centimeters] thick. The substratum is light reddish brown cobbly fine sandy loam to a depth of 60 inches [1.5 meters] or more.

Permeability is moderate. Available water capacity is 6 inches [15 centimeters] to a depth of 60 inches [1.5 meters]. Organic matter content in the surface layer is 4 percent. Effective rooting depth is about 60 inches [1.5 meters]. Surface runoff is medium and erosion hazard is moderate under potential native vegetation and high if vegetation is removed and the soil is left bare. Erodibility is low. This soil is used for range, wildlife habitat and mining operations.

Taxonomic classification is loamy-skeletal, mixed Typic Haploboralls.

A typical pedon of Datino bouldery fine sandy loam, 5 to 20 percent was described on the cut about 200 feet East and 1,100 feet South of the NW corner of Section 25, T16S, R7E.

A11 - - 0 to 2 inches [0 to 5 centimeters] brown [10YR 5/3] bouldery fine sandy loam, dark brown [10YR 3/3] when moist; moderate fine granular structure; loose, very friable, slightly sticky, non-plastic; common very fine to medium, few coarse roots; 10 percent boulders, 10 percent stones, 5 percent cobbles, 10 percent gravel; slightly calcareous; moderately alkaline [8.0]; abrupt smooth boundary.

A12 - - 2 to 10 inches [5 to 25 centimeters]; brown [10YR 5/3] cobbly loam, dark brown [10YR 3/3] when moist; moderate medium granular structure; soft, friable, slightly sticky, slightly plastic; common very fine to medium, few coarse roots; 10 percent cobble and 10 percent gravel; moderately calcareous; moderately alkaline [ph 8.2]; clear smooth boundary.

Attachment 3-A

B2 - - 10 to 38 inches [25 to 96 centimeters]; light brown 7.5YR 6/4] very stony loam, brown [7.5YR 4/4] when moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine to medium roots; 1 percent boulders, 30 percent stone, 10 percent cobbles, 20 percent gravel; moderately calcareous; strongly alkaline [ph 8.5]; abrupt wavy boundary.

C1 - - 38 to 60 inches [96 to 152 centimeters] light reddish brown [5YR 6/4] cobbly fine sandy loam, reddish brown [5YR 4/4] when moist; massive; soft, very friable, slightly sticky, non-plastic; few very fine and fine roots; 10 percent cobbles, 5 percent gravel; strongly calcareous; strongly alkaline [ph 8.6].

D1G Datino - Rock Outcrop Complex, 55 to 70 percent slopes

This map unit is on very steep canyon sideslopes. Slopes are short and concave-convex. Elevation is 7,140 to 7,600 feet [2,177 to 2,318 meters]. The average annual precipitation is 14 to 16 inches [36 to 41 centimeters]. Mean annual air temperature is 42 to 44 degrees F. [6 to 7 degree C.] and the average frost-freeze season is 80 to 110 degrees.

This unit is 75 percent Datino very stony fine sandy loam, 55 to 70 percent slopes in single and concave areas and 15 percent rock outcrop on ridges.

Included in this unit is about 10 percent of a shallow soil that is about 6 to 15 inches in depth, associated with the rock outcrop.

The Datino soil is very deep and well drained. This soil formed in colluvium derived mainly from sandstone and shale. Slopes are 55 to 70 percent and East facing. They are short and concave-convex. Vegetation is dominantly pinyon, Utah juniper, Rocky Mountain juniper, salina wildrye, Douglas-fir, curlleaf mountain mahogany.

Attachment 3-A

In a typical profile the surface layer is brown or yellowish brown, very stony fine sandy loam about 16 inches [41 centimeters] thick. The subsoil is very pale brown, very stony sandy clay loam about 20 inches [51 centimeters] thick. The substratum is very pale brown, very stony silty clay loam to a depth of more than 60 inches [152 centimeters].

Permeability is moderate to 36 inches [91 centimeters] and moderately slow below 36 inches. Available water capacity is 6.5 inches [16 centimeters] to a depth of 60 inches [1.5 meters]. Organic matter content in the surface layer is about 4 percent. Effective rooting depth is about 60 inches [1.5 meters]. Surface runoff is rapid and erosion hazard is high under potential native vegetation and very high if vegetation is removed and the soil is left bare. Erodibility is low. This soil is used for range, wild-life habitat, and mining operation.

Taxonomic classification is loamy-skeletal, mixed Typic Haploboralls.

A typical pedon of Datino very stony fine sandy loam, 55 to 70 percent slopes was described on the bank about 150 feet North of the old mine portal about 300 feet North and 300 feet East of the SW corner of Section 24, T16S, R7E.

A11 - - 0 to 3 inches [0 to 8 centimeters]; brown [10YR 5/3] very stony fine sandy loam, dark brown [10YR 3/3] when moist; moderate fine granular structure; soft, very friable, non-sticky, non-plastic; many very fine, few medium and coarse roots; moderately calcareous; moderately alkaline [ph 8.4]; abrupt amooth boundary.

A12 - - 3 to 16 inches [8 to 41 centimeters]; yellowish brown [10YR 5/4] stony fine sandy loam, dark brown [10YR 3/3] when moist; weak medium granular structure; soft, friable, non-sticky, non-plastic; many very fine and fine, few medium and coarse roots; 2 percent boulders, 10 percent stones, 10 percent cobbles, 10 percent gravel; moderately calcareous; moderately alkaline [ph 8.4]; clear smooth boundary.

Attachment 3-A

B2 - - 16 to 36 inches [41 to 91 centimeters] very pale brown [10YR 7/3] very stony sandy clay loam, pale brown [10YR 6/3] when moist; weak medium subangular blocky structure; slightly hard, firm, slightly sticky, plastic; common very fine and fine roots; many fine pores; 2 percent boulders, 15 percent stones, 15 percent cobbles, 10 percent gravel; moderately calcareous; strongly alkaline [ph 8.6]; abrupt wavy boundary.

C1 - - 36 to 60 inches [91 to 152 centimeters] very pale brown [10YR 8/4] stony silty clay loam, light yellowish brown [10YR 6/4] when moist; moderate medium and coarse subangular blocky structure; hard, firm, sticky plastic; few very fine and fine roots, common fine pores; 2 percent boulders, 10 percent stones, 10 percent cobbles, 5 percent gravel; strongly calcareous; strongly alkaline [ph 8.9.].

ATTACHMENT 4-A

INTERIM RECLAMATION PLAN

BEAR CANYON MINE

The following procedures are designed to revegetate and control erosion. They will satisfy the commitments made by the Co-op Mining Company in their permit application and all applicable portions under CFR 784.13. The area in question will be along and adjacent to the main mine access, the disturbance associated with topsoil relocation, and the slope apposing the proposed office and bathhouse areas. The reclamation will be of an interim nature [see Attachment #1-Map]. The actual ground involved comprises approximately 5 acres of disturbance.

METHODOLOGY

The actual implementation of topsoil relocation and interim reclamation can be broken down into three major categories and classification of types of work needed.

1. Earth moving: relocation of topsoil and redistribution of slope material to approximate original contour of the surface.
2. Seeding and mulching to re-establish interim species and reduce erosion.
3. The berm construction around the topsoil pile - to contain any soil which may be inadvertently lost during the time necessary to establish vegetation.

PHASE #1 - EARTH MOVING

- A. The slope area can be brought back to a reasonable configuration by implementation of a crawler tractor. The actual method will involve the redistribution of existing soil to approximately the original

configuration and contour prior to the disturbance. On completion of contouring, the area will be scarified and ripped to a depth of 1 foot to alleviate any compaction due to previous uses. This will be accomplished with a ripper bar mounted behind a crawler tractor. The ripping as well as the track configuration enhances the potential for revegetation. All work done both above and below the slope area will take into consideration; existing vegetation and all effort should be made to minimize disturbance and utilize existing vegetation. When there is no alternative other than disturbance, an effort can be made to relocate earth and maintain existing vegetation in place, attempting to relocate the vegetation in the proximity of the slope disturbance.

B. Topsoil Relocation

Presently the Co-op maintain 4 topsoil pile areas [labelled 1-4 on Map 1]. Through a joint effort with the Utah Division of Oil, Gas and Mining a decision to consolidate these 4 areas to one central pile was reached. It was further agreed that do to the excessive rock in Piles #1 and #2, that this material did not constitute a suitable growth media and would not be considered as topsoil for estimating soil requirements on future reclamation. Pile #3-3A, 3B and 3C will be relocated and consolidated with Pile #4 during July thru August of 1983. The total volume of soil can then be accurately determined and the Co-op will advise the Division of both volume and any additional needs.

Stockpile #2 is presently 85 to 90% rock and is ideally situated to be utilized as rip-rap both for the existing sediment pond and the reoccurring need in ditch maintainence. It is the Co-op's desire to leave this pile in place to be utilized for the above purpose until such time as the area can be reclaimed.

Pile #1 is also principally rock: this material is ideally suited to

be redistributed on the surface of reclaimed areas. This procedure will perform the following functions:

- [1] To enhance the microclimate of the surface and help the re-establishment of vegetation.
- [2] To provide cover and protection for wildlife during and after vegetation establishment.
- [3] To make the area more aesthetically compatible with the native undisturbed surrounding.
- [4] Act as one additional parameter in soil stabilization.

Pile #1 will also be relocated and placed at the toe of the slope of Pile #4 until final reclamation commences.

CONCLUSIONS AND RECOMMENDATIONS

The advantages of this recommended procedure are as follows:

By utilizing a crawler tractor, associated disturbance will be kept minimal.

The hydro-seeding and mulching accomplishes all of the below:

Immediate ground cover.

Aesthetically pleasing upon completion.

Maximize potential for native species to establish.

Modify and enhance the micro-environment of the disturbed site.

The hydro-seeding, mulching, fertilization, and tackifying will virtually assure rapid establishment, thus minimizing wind and water erosion.

A cost effective methodology to address a common problem associated with mine disturbance.

The area will be monitored until such time as the 70% confidence level is achieved and the area is fully revegetated.

ESTIMATE OF RECLAMATION COSTS ON
BEAR CANYON MINE - INTERIM RECLAMATION

All costs are based on known costs - contract amount on work either in progress or completed in the preceeding 12 months.

<u>TYPE OF ACTIVITY</u>	<u>COST PER ACRE</u>
<u>Hydromulching and Seeding</u>	
Application of seed & tackifyer equipment and labor only	\$ 175.00/acre
Application of mulch, fertilizer, and tac equipment and labor only	275.00/acre
<u>Mobilization [Utah Area]</u>	
Mulch	Job 500.00
	380.00/acre
Tac @ \$1.60/# 140#/acre	224.00/acre
Fertilizer @ \$23.00/100#	23.00/acre
<u>Drill Seeding</u>	
JD 450 crawler @ \$45.00/hour	240.00/acre
estimate 8 hours/acre	360.00/acre
<u>Seed</u>	
Variable - current quote	165.00/acre
Planting and site preparation	93.00/acre
Nursery stock	.50 each

ESTIMATE OF TOTAL COST ON RECLAMATION
APPROXIMATELY 5 ACRES

5 Acres Hydroseeding	\$ 2,250.00
5 Acres Hydromulching and Fertilizing	3,250.00
Mobilization in Utah	500.00
Crawler Tractor	720.00
Seed [current bid - Maple Leaf Supply]	330.00
Planting and Site Preparation	186.00
Nursery Stock \$1,500/acre	<u>7,500.00</u>
	<u>\$ 14,286.00</u>

Cost comparables received from:

- U.S.F.S. Fishlake National Forest
- Plateau Mining Company - test plot data
- Kaiser Mining Company - Slaughter Canyon Road
- Getty Coal CV Ridge - reclamation
- B & R Reclamation Company - Kennelworth, Utah
- Soldier Creek Sewage Pond
- Trail Mountain Reclamation
- Plateau - wildlife enhancement area
- Mountain Resources - drill site reclamation