| Equipment | | Cost Per hour |
|---|---|---|
| 1. | Loader - 950B ($2\frac{1}{2}$ cy bucket) | $ 113.20 |
| | Operator | 29.25 |
| | | $ 142.45 |
| 2. | Crane - Groves RT-580 20T | 78.80 |
| | Operator | 29.90 |
| | | $ 108.70 |
| 3. | Truck and Operator | $ 79.30 |
| 4. | Cat D-7G | $ 152.55 |
| | Operator | 29.90 |
| | | $ 182.40 |
| 5. | Backhoe (Cat 235) | $ 211.90 |
| | Operator | 29.90 |
| | | $ 241.80 |



Backhoe (BH) Cycle Time Estimates - 235 Backhoe

| Average | |
|---|---|
| Load Bucket | 6.5 sec. |
| Swing Bucket | 6.0 sec. |
| Dump Bucket | 2.5 sec. |
| Swing Empty Bucket | 5.0 sec. |
| **Total Average** | **20 sec. - 2.12 yds$^3$** |

Medium to hard digging (hard packed soil with up to 50% rock content) depth to 70% of machine's capability.

3 cy/min X 2.12 yds X 60 = production/hr. = 381.60 cu.yd/hr

Cut and fill yardages (Same Number - 1 cycle)

Crawler Tractor (D7G) Cycle Time Estimates

D7G Cut Material - 200 yd. run

Average Blade Load of 15 cu. yd.

| | | |
|---|---|---|
| Cycle time | 7.6 min | Loaded Average |
| | 4.0 min | Return |
| | 11.6 min | Cycle |

Efficiency 50 min/hr.

50 min/11.6 min cycle X 15 yds/cycle = 64.65 yds/hr.

| | | |
|---|---|---|
| 950B Loader Cycle Time | | .50 min. |
| 1. | Pile (10" material and smaller | +.01 min. |
| 2. | Common ownership of trucks | -.04 min. |
| 3. | 3/4" to 6" | .00 min. |
| | 113 cu yds./hr. | .53 min. |
| | 196 cu. yds/hr. Topsoil | |

### 3.6.7.2 Summary of Reclamation Cost Estimate

| | | |
|---|---|---|
| A. | Seal Portal | $ 2,994.00 |
| B. | Removal Structures | 22,205.00 |
| C. | Cleanup | 2,353.00 |
| D. | Soil Placement (Backfilling & Grading) | 37,081.00 |
| E. | Channel Restoration | 7,953.00 |
| F. | Reseeding and Fertilizer | 13,750.00 |
| G. | Mulching | 3,500.00 |
| H. | Protective Fencing | 6,000.00 |
| I. | Overhead and Contingency | 11,760.00 |
| J. | Maintenance and Monitoring | 2,500.00 |
| | 1985 Dollars | $ 110,096.00 |

### 3.6.7.3 Reclamation Cost Estimate for Co-Op Mine

A. Seal Portal

| | |
|---|---|
| Labor - 2 men X 179.20/man day X 5 days | 1,794.00 |
| Materials - 200 blocks/seal X 5 seals X 1.00/block | 1,000.00 |
| Mortar, sand, etc. | 200.00 |
| Subtotal | $ 2,994.00 |
| Subtotal A | $ 2,994.00 |

B. Removal Structures

Fan

| | |
|---|---|
| Labor - 2 men X 179.20/day X 2 days | 717.00 |
| Equipment (hauling) - 1 truck + operator X 4 hours X 79.35/hour | 317.00 |
| 20 T crane X 2 hrs X 78.80/hour | 158.00 |
| 2 hours X Crane Operator X 29.90/hr | 60.00 |
| Subtotal | $ 1,252.00 |

Structures and Conveyor (Principle)

| | |
|---|---|
| Labor - 3 men X 179.20/day X 2 days | 1,075.00 |
| Equipment (hauling) - 1 truck + Operator X 16 hrs X 79.35/hr. | 1,270.00 |
| 1 loader + operator X 16 hrs X 142.45 (950 B - $2\frac{1}{2}$ cv vd bucket) | 2,279.00 |
| Subtotal | 4,624.00 |



Substation Power Transformer

| | |
|---|---|
| Labor - 2 men X 179.20/day X 2 days | 717.00 |
| Hauling - 1 truck + operator X 16 hrs X 79.35 | 1,270.00 |
| Loader - 4 hrs X 142.45/hr (+operator) | 570.00 |
| Subtotal | $ 2,557.00 |

Bathhouses, Shop, Warehouse, I Mine Offices

| | |
|---|---|
| Labor - 2 men X 179.20/day X 3 days | $ 1,075.00 |
| Equipment (Hauling) - 1 truck + operator X 12 hrs X 79.35/hr | 952.00 |
| Loader - 4 hrs X 142.25/hr + oper. | 569.00 |
| Subtotal | $ 2,596.00 |

Water System

| | |
|---|---|
| Labor - 2 men X 179.20/day X 1 day | 358.00 |
| Hauling- 1 truck + operator X 4 hrs X 79.35/hr | 317.00 |
| Loader - 2 hrs X 142.25/hr + oper. | 285.00 |
| Subtotal | $ 960.00 |

Fuel Storage Tank and System

| | |
|---|---|
| Labor - 2 men X 179.20/day X 2 days | 717.00 |
| Hauling - 1 truck + operator X 16 hrs X 79.35/hr. | 1,270.00 |
| Loader - 8 hrs @ 142.25/hr + oper. | 1,138.00 |
| Subtotal | $ 3,125.00 |



Truck Loadout

| | |
|---|---|
| Labor - 2 men X 179.20 X 2 days | 717.00 |
| Lowboy truck + oper. @ 79.35/hr X 4 hr. | 317.00 |
| 1 20 ton crane 1 hr X 78.80 | 79.00 |
| Operator @ 29.90 X 1 | 30.00 |
| Subtotal | $ 1,143.00 |

## Stacking Facility

| | |
|---|---|
| Labor - 4 men X 179.20 X 1 day | 717.00 |
| Truck & operator 79.35 X 4 hrs | 317.00 |
| 1 20 ton Crane 2 hrs. X 78.80 | 316.00 |
| 1 950B Loader 118.55/hr X 4 hrs | 474.00 |
| 1 Crane operator 29.90 X 2 hrs. | 60.00 |
| Subtotal | $ 1,884.00 |

## Crusher Facility

| | |
|---|---|
| Labor - 2 men @ 179.20/day X 4 days | 1,434.00 |
| 1 20 T Crane 6 hrs X 78.80 | 473.00 |
| 1 Truck + operator 8 hr X 79.35 | 635.00 |
| 6 hrs Crane Operator X 29.90 | 180.00 |
| Subtotal | $ 2,088.00 |



## Oil Slack Load Out

| | |
|---|---|
| Labor - 2 men @ 179.20/day X 2 days | 717.00 |
| 1 20 T. Crane 2 hrs X 78.80 | 159.00 |
| 1 Truck + operator 4 hrs X 79.35 | 317.00 |
| 2 hrs Crane operator 29.90 | 60.00 |
| Subtotal | $ 1,253.00 |

## Watchman Facility

| | |
|---|---|
| 2 men X 1 day X 179.20 | 358.00 |
| D7G Crawler 2 hrs X 182.40 | 365.00 |
| Subtotal | $ 723.00 |

SOIL PLACEMENT - (Reference Area Post-Mining Contour Map)

| Areas | Earth Moved | Cu. Yds. | Cost/Hr.D7G | Cost/Hr.BH-235 | Time | Cost |
|---|---|---|---|---|---|---|
| Scale Area | cut | 889 | 182.40 | | 64.65 hr. | 2,508.00 |
| Sed. Pond B | fill | 450 | | 241.80 | 1.17 hr. | 282.90 |
| Sed. Pond A | fill | 1333 | | 241.80 | 3.49 hr. | 843.88 |
| Ditch to Pond A | fill | 377 | 182.40 | | 5.83 hr. | 1,063.39 |
| Bath House Area | cut | 1111 | 182.40 | | 17.18 hr. | 3,133.39 |
| Load Out | cut<br>fill | 3352<br>3352 | | 241.80 | 8.78 hr. | 2,123.00 |
| Road Coal Prep. | cut<br>fill | 2222<br>2222 | | 241.80 | 5.82 | 1,407.00 |
| Lower Rd.to Swith-Back | cut<br>fill | 3377<br>3377 | | 241.80 | 8.84 | 2,137.50 |
| Up Rd. to Portal | cut<br>fill | 6622<br>6622 | | 241.80 | 17.35 | 4,195.23 |
| Portal Fan Area | cut<br>fill | 4444<br>4444 | | 241.80 | 11.64 | 2,814.55 |
| **Total** | **cut**<br>**fill** | **21,820**<br>**21,777** | | | **19 days** | **20,510.00** |

| | | | |
|---|---|---|---|
| 8,000 cu. yds. topsoil - transport .65 miles = 950B Loader 41 hrs. | 142.45 | | 5,840.00 |
| dump and regrade - 2 trucks & operator = 41 hrs @ | 79.35 | | 3,253.00 |
| Spreading and ripping - D7G = 41 hrs. @ | 182.40 | | 7,478.00 |

Temporary Scale House reclaimed 10/1/85

Hiawatha Seam Portal reclaimed 6/30/85

C. Cleanup

| | |
|---|---|
| Labor - 2 men X 179.20/day X 4 days | 1,434.00 |
| Hauling - 1 truck + operator X 8 hrs X 79.35/hr | 635.00 |
| Loader (+operator) - 2 hrs X 142.45 | 285.00 |
| Subtotal | $ 2,353.00 |
| B & C Subtotal | $ 24,558.00 |

D. Soil Placement (Backfilling and Grading)

See Table D-1 p. 108E

| | |
|---|---|
| D Subtotal | $ 37,081.00 |

E. Channel Restoration

| | |
|---|---|
| Backhoe + operator X 241.80 X 24 hrs. | 5,803.00 |
| Labor - 4 men X 179.20/day X 3 days | 2,150.00 |
| Subtotal | $ 7,953.00 |



F. Reseeding & Fertilization (10 acres)

Hydroseeder, operator and driver

seed = $ 1,275.00

| | |
|---|---|
| Crew = $ 100/acre | 13,750.00 |
| Subtotal | $ 13,750.00 |

G. Mulching (10 acres)

| | | |
|---|---|---|
| Hydromulcher, operator and driver | | |
| $350/acre X 10 acres | | 3,500.00 |
| | Subtotal | 3,500.00 |

H. Protective Fencing (10 acres)

| | | |
|---|---|---|
| 6 foot high X 3,000 linear feet X | | |
| $2.00/foot installed | | $ 6,000.00 |
| | Subtotal | 6,000.00 |

I. Overhead and Contingency

| | | |
|---|---|---|
| 1. Baseball park seeding | | 2,400.00 |
| 2. Retaining wall removed | | 300.00 |
| 3. Borehole plugging | | 700.00 |
| 4. Contemporaneous reclamation | | 6,000.00 |
| 5. Administration | | 2,360.00 |
| | Subtotal | $ 11,760.00 |

J. Maintenance and Monitoring

| | | |
|---|---|---|
| 5 years @ $500.00/year | | 2,500.00 |
| | Subtotal | 2,500.00 |
| | **Total** | $ 110,096.00 |



Note all costs estimates are based on 1985 dollars

Co-Op will deposit with the Division of Oil, Gas & Mining, an irrevocable bank letter of credit upon the approval of bond amount.

## 3.6.8 Alluvial Valley Floor Determination UMC 785.19

Co-Op contends there are no alluvial valley floors within the permit area. This opinion is based on the following evidence:

1. The soils are of such a nature that both the water holding capacity and the rocky nature preclude any but the sparsest of vegetation cover (See Chapter 8 Soils).

makes no difference

2. The area receives less than 14" annual precipitation and has no evidence of subterrainian irrigation.

3. Water quality of the intermittant Bear Creek is marginal and the flows are tied to precipitation event rather than ground water interation.

4. The area has no history of agriculture attempts and the terrain is such as to preclude any but the minimum of level areas of small size to facilitate USC.

Co-Op Mine requests the Division to evaluate the site-specific conditions and render a judgement in this regard.

3.6.9. Temporary Cessation

In the event of a temporary cessation of operation, Co-Op will notify the Division within 48 hours of pending shut down and will submit all information regarding exact number of surface acres and the horizontal and vertical extent of sub-surface strata in the permit area prior to cessation or abandonment, extent and kind of surface reclamation, and identification of backfilling, regrading, revegetation, environmental monitoring, underground opening closures and water treatment activities that will continue during temporary cessation.

3.6.9.1 Temporary Portal Seals

Co-Op will seal portals which are not to be utilized for mine inspection or access during temporary cessations of operation. These seals will be constructed of woven wire and securely attached to the portal entry so as to make tresspass by men or animals prohibitive. All portals which are to be utilized will be posted with "No Tresspassing" and " Keep Out" notices. Where doors exist such as fan entries, this will also be locked and signed accordingly.

Each mine entry which is temporarily inactive, but has a further projected useful service under the approved permit application, shall be protected by barricades or other covering devices, fenced, and posted with signs, to prevent access into the entry and to identify the hazardous nature of the opening. These devices shall be periodically inspected and maintained in good operating condition by the person who conducts the underground coal mining activities.

Co-Op is committed to sealing all portals in the prescribed manner which are temporarily inactive in course of normal mining activities.

APPENDIX 3.3.6

INCORPORATED UNDER THE LAWS OF THE STATE OF UTAH

NUMBER

SHARES

# Huntington-Cleveland Irrigation Company

Capital $150,000 150,000 Shares

This Certifies that C. W. Kingston is the owner of

*****Three Hundred Thirty Three and 77/100***** Shares of the Capital Stock of

**Huntington-Cleveland Irrigation Company**

transferable only on the books of the Corporation by the holder hereof in person or by Attorney upon surrender of this Certificate properly endorsed.

IN WITNESS WHEREOF, the said Corporation has caused this Certificate to be signed by its duly authorized officers and its Corporate Seal to be hereunto affixed this 16 day of February A.D. 19 62

SECRETARY

PRESIDENT

SHARES $10 EACH



3-115

APPENDIX 3-G

ROAD RECLAMATION PLAN

## RECLAMATION PLAN

## MINE PORTAL ROAD

The following procedures are designed to revegetate and control erosion. They will satisfy the commitments made by Co-Op Mining Co. 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 reclamation will be of a permanent nature. (See Plate 3-1). The actual ground involved comprises approximately 3 acres of disturbance.

### METHODOLOGY

The actual implementation of abandonment and ultimate reclamation can be broken down into four major catagories and classification of types of work needed:

(1). Earth moving: redistribution of top soil and redistribution of road cut material to approximate original contour of surface.

(2). Clump planting of adjacent vegetation on recontoured surface.

(3). Seeding and mulching to re-establish interum species and reduce erosion until climax vegetation can be established.

(4). Intermittant stream channel restoration and reconstruction of permanent drainage.

PHASE # 1 EARTH MOVING

The road system can be brought back to a reasonable configuration by implementation of a large backhoe unit. The actual method will involve the pulling of surface material from the road surface and berm and placing it against the opposing high wall. This material will then be covered with approximately 1 foot of top soil by pulling material from about 10 feet below the road cut up onto the road surface and spreading and compacting this material with the front bucket, at the same time pulling the leading edge of the high wall down to alleviate the degree and angle of the high wall. All work done both above and below the road will take into consideration existing vegetation and all effort will be made to minimize disturbance and utilize existing vegetation. When there is no alternative other than disturbance, an effort will be made to relocate earth and maintain existing vegetation in place, attempting to relocate the vegetation in the proximity of the road disturbance. (See attachment # 2).

PHASES # 2 AND 3 REVEGETATION

This procedure involves a two phase program: (1). To clump plant existing vegetation in small basins along the recontoured road, and, (2). To hydromulch the entire area to supplement revegetation and control run-off until stabilization is complete and to prepare a site which will be stable enough for a period of time to allow vegetation

Stream Buffer Zones UMC 817.57

Co-Op has attempted to protect Bear Creek in all areas where existing structure and disturbance preclude the establishment of a buffer zone. This has been accomplished by earthen berms along roads adjacent to the stream, culverting in the area of the scale house, silt fences, and straw filters on all tributaries which pass distubed runoff from haul roads. In addition, all disturbed area runoff other than haul roads pass through a sediment pond prior to discharge into Bear Creek. The buffer zone that does exist will be properly posted and signed.

No additional disturbance is anticipated in the Bear Canyon drainage however, if in the future, expansion is required, Co-Op is committed in taking all necessary safeguards to ensure the integrity of Bear Creek and establishing an adequate buffer zone.

PHASE #4 DRAINAGE CHANNEL STABILIZATION AND RECONSTRUCTION

In conjunction with the recontouring, all drainage areas will re-establish to approximate original configuration. In order to minimize the loss of soil, all drainages will be lined with hygronomy blankets for approximately 10 feet above and below the areas of disturbance. In addition, where conditions warrant, rock rip rap may also be utilized to add yet another parameter of stability.

## CONCLUSIONS AND RECOMMENDATIONS

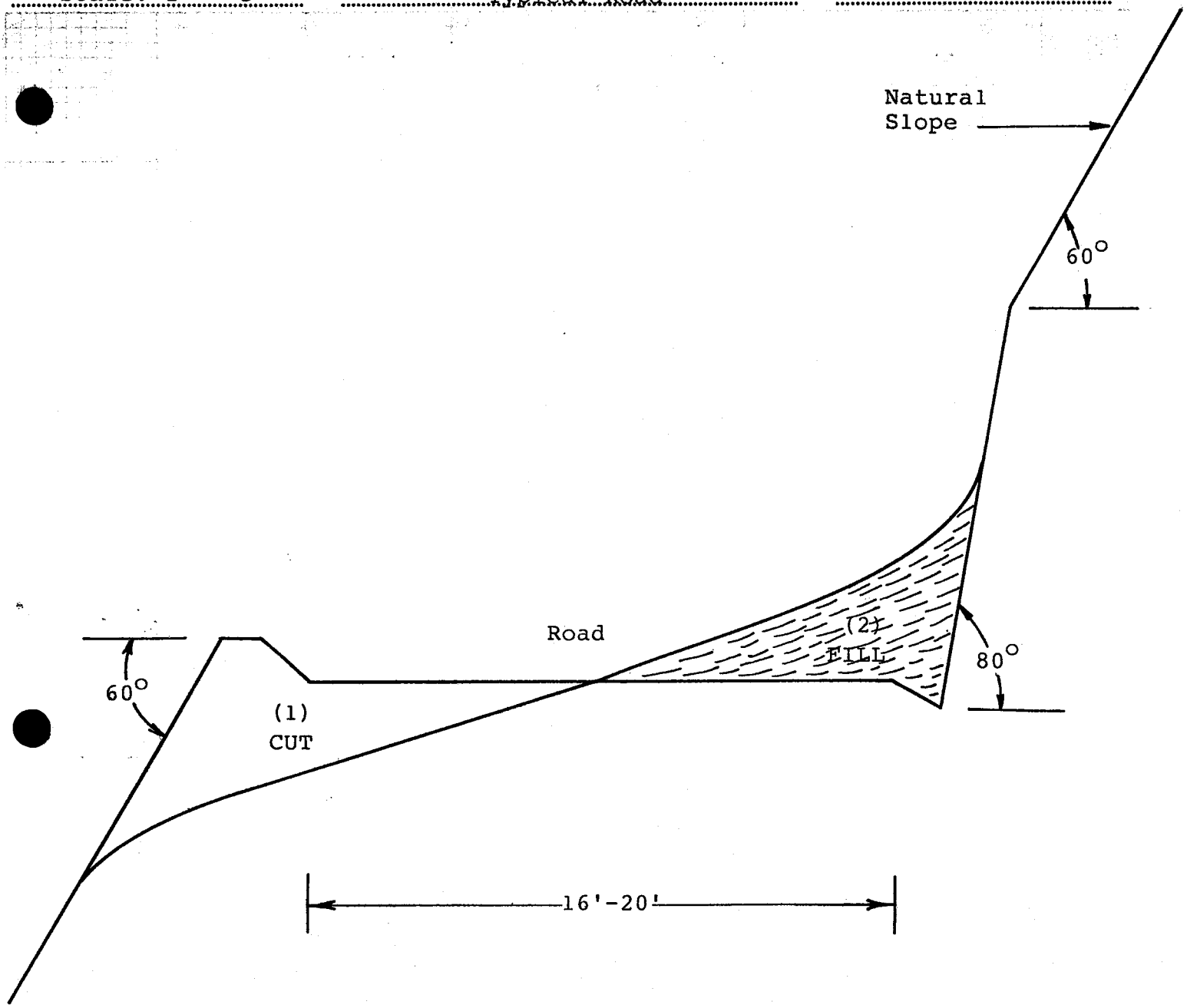
The advantages of this recommended procedure are as follows:

1. By utilizing a backhoe, associated disturbance will be kept minimal.
2. The clump planting procedure accomplishes all of the below:
   a. Immediate ground cover.
   b. Aesthetically pleasing upon completion.
   c. Maximize potential for native species to establish.
   d. Innoculation of soil with indigenous mycorrhiza.
   e. Modify and enhance the micro-environment surrounding each clump.
3. The hydroseeding, mulching, fertilization, and tackifying will virtually assure rapid establishment, thus minimizing wind and water erosion.
4. The channel liners are a proven method to eliminate erosion at the same time allowing for stabilization through revegetation.
5. A cost effective methodology to address a common problem associated with pre-law disturbance.

BY D. Guy DATE 5/11/85 SUBJECT Recontouring of Typical Road SHEET NO. 1 OF 1

CHKD. BY ..... DATE ..... JOB NO. .....

Scale: 1" = 5'




Note: Area (1) is placed in Area (2).

APPENDIX 3.3.4.A

EXISTING STRUCTURES

## EXISTING AND PROPOSED STRUCTURES

The Bear Canyon Mine has the following surface facilities:

- Temporary Scale House
- Truck Loadout
- Coal Storage Area and Stacking Facility
- Crusher Facility
- Principle Conveyor Structure
- Single building complex containing shops, parts warehouse, bathhouse and mine offices
- Mine run coal Receiver bin
- Fuel Storage Tanks
- Oil Slack Loadout
- Shop
- Non-coal Storage Yard
- Power Transformer
- Caretaker Dwelling

Work commenced on all structures June of 1982 with the exception of the proposed bathhouse, phase 2 loadout, and stacking tube. (A detailed plan of these proposed structures will be provided to the Division upon final drafting.)

The location of each of the listed structures is shown on Plate 2-2 Surface Facilities. Co-Op has sought interum approval for each structure in the course of construction, the hydrologic safegards have been implemented, top soil removed and stored, interum revegetation completed where earthwork is at final grade, and health and safety standards implemented as per MSHA standards.

All of the structures are to be reclaimed in the year 2033 and are detailed in Section 3.6.6. and 3.6.7 Bear Canyon MRP 4/30/84 submittal. In order to consolidate all previous plan submittals, current photographs were taken on 4/26/84 and are attached herein in a brief description of each facility is attached under "Facility Description" and is correlated to the representational photo. Also, Table 3.3.4.-1 lists each structure and the dates of construction, present state, etc.

## FACILITY DESCRIPTIONS

(1) Temporary Scale House

This structure consists of a 12' x 50' trailor which has temporarily been utilized as a scale office. It is to be removed and replaced by a more permanent structure in 1984. At present, all environmental safeguards are in place on an interum basis and permanent structures will be implemented upon completion. See Scale House Approval letter MRP Chapter 11 (approvals). Photo (1) see schematic "A" replacement structure.

(2) Fuel Storage Tank

There are 3 10,000 gal. fuel storage tanks installed at the downslope of the shop area. These tanks are contained within a natural berm of the slope with the only access by way of the disturbed drainage ditch leading directly to the sediment pond. The pond is designed to contain any spillage which could foreseeably occur. The area will be posted " No Smoking" and fire extinguishers are in place, all MSAH safety standards will be adhered to. See photo 2.

(3) Truck Loadout Facility

The truck loadout is a conveyor system designed to load tractor-trailor trucks from any of the storage areas. It is electrically manipulated so as to minimize spillage. As each unit is loaded, the area is cleaned of spilled coal on a daily basis, and all runoff is contained. See photo 3.

(4) Shop

The shop building is for servicing of both underground and surface equipment. Major and minor repairs are implemented and it is used to inventory parts to be utilized on a continual roll over basis. The

building is heated with a coal furnace and is equipped with standard heavy equipment handling implements such as wenches, welders, etc. See photo 4.

(5) Oil Slack Loadout

The oil slack loadout is designed to handle oiled stoker coal, primarily for non-commercial clients. It maintains a 20,000 ton storage bin with an electrical controlled auger to load small tonnages. The bin is fed via of a hopper and conveyor which is loaded by way of an end loader. See photo 5.

(6) Coal Storage and Stacking Tubes

The coal storage yard (phase 1) is equipped with a system of conveyors wherein coal can be segragated according to size and is of a short term nature where the piles are constantly being consumed and replenished. The area also contains two 6000 gallon oil storage tanks which are used to store oil for stoker coal. All run-off is controlled, and passes through the primary sediment pond. See photo 6.

(7) Crusher Facility

This facility is primarily a coal segragation site where the various sizes of coal can be separated and then stacked in the designed locations. This area is controlled run-off and is passed through the sediment pond. See photo 7.

(8) Non-Coal Storage Yard

This area is utilized for all material which is in storage on the property with projected use and or salvage value. A schematic is attached as Figure 3.8.1. Historically, the site has been utilized for this purpose and is designed with hydrologic safeguards to protect the watershed. Additional work is anticipated to upgrade the hydrolo-

logic measure upon Division approval. See photo 8.

(9) Transformer Substation

This facility is the concern of the mine's power supplier, Utah Power & Light. However, Co-Op does maintain the fence, and enforces health and environmental safeguards. Th structure is pictured on photo 9.

(10) Conveyor Structure

This conveyor is the route by which the coal exits the mine. Photo 10 pictures the conveyor in the lower tight corner, and shows the progression of coal through the various structures to the truck load-out. It is also a good overview of the property showing relative locations of each structure 1 - 8. Pictured in this photo, center top, is Co-Op's topsoil stockpile, not listed as a structure but in evidence on the surface.

(11) Single Building Complex (New Scale House) Containing small shop, parts warehouse, formans bathhouse, and mine offices.

A schematic of this structure of attached construction, is underway with an anticipated completion date of fall 1986.

(12) Caretakers Residence

This is a single-wide 14X50 house trailor. A number of small pens and sheds attached for storage and housing a collection of domesticated fowl.

(13) Mine run Coal Receiver Bin

As the name implies, is approximately 50' X 100' bin where coal fall from the conveyor shute prior to traveling to the crusher is pictured in photo #7.

Co-Op is committed that all support facilities, mine disturbance or associated disturbance of any kind will be restored so as to prevent damage to fish, wildlife and related environmental values; and, minimize the possibility of additional contributions of suspended solids to streamflow or runoff outside the permit area.

Table 3.3.4.-1

| Existing Structure | Construction Dates | | Photo # | Reclamation Time Frame |
|---|---|---|---|---|
| | Beginning | Completion | | |
| Temporary Scale House | 10/1982 | 11/1983 | 1 | replace in 1985 |
| Fuel Storage Tanks | 10/1983 | 6/1984 | 2 | 2033 |
| Truck Loadout | 9/1982 | 4/1983 | 3 | 2033 |
| Shop | 10/1983 | 9/1984 | 4 | 2033 |
| Oil Slack Loadout | 4/1983 | 7/1983 | 5 | 2033 |
| Coal Storage & Stacking | 6/1980 | 4/1983 | 6 | 2033 |
| Crusher Facility | 4/1980 | 12/1985 | 7 | 2033 |
| Non-coal Storage Yd. | 3/1980 | 9/1984 | 8 | 2033 |
| Transformer Substation | 4/1980 | 6/1980 | 9 | 2033 |
| Conveyor Structure | 3/1980 | 6/1980 | 10 | 2033 |
| New Scale House (Modification approved) See Chapter 11 | 6/1984 | 10/1986 | | 2033 |
| Caretakers Dwelling | 6/1980 | 7/1981 | | 2033 |
| Bath House | 8/1984 | 11/1985 | | 2033 |
| Stacking Tube & Load-out (2nd Phase) | 4/1985 | 10/1985 | | 2033 |

# Chapter 11

# APPROVALS

Scott M. Matheson
*Governor*

James O. Mason, M.D., Dr.P.H.
*Executive Director*
*801-533-6111*

DIVISIONS
*Community Health Services*
*Environmental Health*
*Family Health Services*
*Health Care Financing*

OFFICES
*Administrative Services*
*Community Health Nursing*
*Management Planning*
*Medical Examiner*
*State Health Laboratory*

STATE OF UTAH
DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
150 West North Temple, P.O. Box 2500, Salt Lake City, Utah 84110-2500

Kenneth Lee Alkema, Director
Room 474 801-533-6121

December 20, 1983
533-6108

Wendell Owen
Co-Op Mining Company
P. O. Box 300
Huntington, Utah 84528

RE: Approval Order for Modifications to Air Pollution Control at Coal Mine, Emery County

Dear Mr. Owen:

On October 28, 1983, the Executive Secretary published a notice of intent to approve the modifications to the air pollution control equipment for the surface operations at your coal mine in Emery County. The 30 day public comment period has expired, and no comments were received.

This air quality approval order authorizes the modifications as proposed in your notice of intent dated October 14, 1983, with the following operating conditions:

1. All emission control equipment shall be properly installed, maintained, and operated as proposed in the notice of intent dated May 5, 1980, and subsequent information dated October 14, 1983.

2. No visible emissions from any point shall exceed 20% opacity as measured by EPA test Method 9.

3. Annual production of coal shall not exceed 200,000 tons without prior approval from the Executive Secretary in accordance with Section 3.1, UACR.

4. Crushers, screens, conveyors, and all transfer points shall be controlled by water sprays to minimize fugitive emissions. The water sprays shall operate whenever the mine is operating.

5. The haul roads and access roads shall be water sprayed to minimize fugitive dusts at least twice per eight hour shift unless daily precipitation exceeds 0.05 inches for that day.

6. The stockpile and loadout areas shall be sprayed (water or other suppressant) as dry conditions warrant or as determined necessary by the Executive Secretary.

7. A compliance inspection shall be performed within 30 days of the date of this approval order.

The fee for issuing this modified approval order is $179.17. (See enclosures for breakdown of costs.) The amount is payable to the Utah Department of Health, sent to the Executive Secretary of the Utah Air Conservation Committee, and is due within 30 days after the approval order date.

Sincerely,

Brent C. Bradford
Executive Secretary
Utah Air Conservation Committee

MRK/ads
cc: EPA Region VIII (J. Philbrook)
Southeastern District Health Dept.
Enclosures (2)

4367

ITEMIZED COSTS FOR NOTICE OF INTENT

The following are final costs incurred by the Bureau of Air Quality to review your modification and issue an approval order.

| | |
|---|---|
| Filing Fee | $ 50.00 |
| Engineering Review | 77.40 |
| Administrative | 51.77 |
| Total | $ 179.17 |

CHARGEABLE FEES - BUREAU OF AIR QUALITY

Source CO-OP Mining  Major ____  Minor X

Date Started ____  Non-Attainment ____  PSD X

Date Approved ____

NOTICE OF INTENT REVIEW

1. Pre-Design Date: 0  1. Engineer/Hours ____
   Engineer/Hours 0

   Filing Date: 10/14/83  2. $ 50.00

Engineering Review: Engineer/Date/Hours

Site Survey Date: 10-21 4 HR

Calculations:

____ Hours/Engineer $ ____

____ Hours/Engineer $ ____

TOTALS: 4 HRS @ 15/HR = 60 Hours with 29% fringe $ 77.40

2. Modeling:  TOTALS: Hours/Modeler 0

   Calculations:  Computer $ 0

   Analysis $ 0

3. Administrative Costs:

   Survey Travel $ 0

   Notice to Paper $ 46.35

   Hearing Travel $ 0

   Overhead @ 7% $ 5.42 (.07 x 77.40)

   SUBTOTALS $ 51.77

   FINAL TOTALS 4 HOURS $ 179.17 (50.00+77.40+51



MRK:wml

ADDENDUM TO: SEWAGE WASTE DISPOSAL AND HANDLING FACILITY

BEAR CANYON SCALE HOUSE - BEAR CANYON MINE

RE: letter 09/08/83 received Co-op 09/29/83 State of Utah, Department of Health

2. More detail must be provided on the proposed lift station:

a. Details of the lift station construction must be provided, ie., height, materials of construction, construction details etc., of the lift station wet well.

Co-op Reply:

The wet well will be constructed of 60 inch concrete culvert, 135 emulsion will be applied on both the inside and outside of the cylinder to an approximate thickness of 1/8th inch. The six ft. section of culvert will be set 4 inches into a 52" x 10" concrete pad (see Figure 2). The culvert will then be backfilled with sand to a depth of 5'6" leaving approximately 6" of the culvert end extending above the surface. A 4"

metal line from the 2,500 gal. septic tank will be welded into the 36" culvert at this point, a 3" metal line will be sealed at the same elevation on the opposing side (See figure 2). A 6" x 6' x 6' concrete pad will then be poured around the top of the culvert. A 2" depression to accomodate a conventional 60" manhole cover will be formed in place. See consturction diagram (Figure 3).

b. Details of the switches which will be used to activate pump and warning light must be provided.

Co-op Reply:

(See Figure 4)

c. The proximity of the lift station to the stream should be provided./Also provisions which would prevent waste water (if the lift station should flood) from entering the stream should be shown.

Co-op Reply

The wet well will be approximately 15 feet horizontal distance from the existing stream channel. However, Co-op is presently permitting a 200' 60" culvert that will seal this stretch of stream off for a minimum of 50' below the area of the well. In ad-

dition, the drainage from the entire pad area is designed to drain to the catch basin which will further ensure the intergrity of the stream.

d. Details of the screen over the lift station discharge line should be presented.

Co-op Reply:

A standard 100 mesh screen is provided on the intake portion of the pump unit. This, in combination with the 3 screen inlet pipe to the well, should maintain a relatively clear debris-free fluid in the well as well as the pump.

e. Details of the cover for the lift station should be provided.

Co-op Reply:

The cover is simply a standard 36" man-hole cover as provided by W. R. White Pipe Company of Price, UT.

f. Details of the lift station pump should be provided to ensure it is of adequate capacity and suitable for this application.

Co-op Reply:

If anything, a 200 gpm trash pump is oversized to accomodate a 300 gal. wet well, however, Co-op has contacted 3 pump manufacturers with the request for specifications and pricing. When a decision is reached, a set of specifications for the pump will be supplied to the Dept. of Health for the review and approval prior to purchase and/or installation.

3. The details of the 3 inch diameter sewer pipe crossing Bear Creek should be provided. These details should include relative elevation of the crossing pipe to the creek bottom, what type of pipe will be used, will the pipe be encased and if so what type of pipe will be used etc.

Co-op Reply:

3" PVC schedual 240# pipe will be installed at a depth of 40" - 48" at 10" from intersecting the 60" concrete culverted creek. This pipe will be run through a 6" PVC pipe for a distance of 40' which will by-pass the 60" culverted creek by a minimum of 10'.

# APPENDIX 3.3.6 A

STATE OF UTAH
NATURAL RESOURCES & ENERGY
Water Rights

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Dee C. Hansen, State Engineer

74 West Main Street • P.O. Box 718 • Price, UT 84501 • 801-637-1303

September 30, 1983

Division of Oil, Gas and Mining
Attn: Joseph C. Helfrich
4241 State Office Building
Salt Lake City, Utah 84114

Dear Mr. Helfrich:

At the request of Mr. Melvin Coonrod, consultant for Co-op Mining Company, please be advised that the above mentioned company has filed Change Application No. a-12921 (93-1067), of which a copy is enclosed, requesting the right to withdraw up to 0.25 sec.-ft. of water from a mine tunnel in Bear Canyon located at a point: N. 79 ft. & E. 75 ft. from the SW Cor. Sec. 26, T16S, R7E, SLB&M. It is proposed to use the water for mining and irrigation purposes within the SE¼, NE¼, T16S, R7E, SLB&M.

The change application was filed with this office on September 2, 1983. Normal processing time for such a request is 90-120 days, provided that there are no protests filed.

I trust that this brief explanation will help clarify their present water rights status. If I can assist further in any way please feel free to call on me.

Sincerely,

Mark P. Page

Mark P. Page
Area Engineer

cc: Melvin Coonrod
Co-op Mining Company

Enclosure

Form 114
25M 4-63

# IN THE ....SEVENTH.... JUDICIAL DISTRICT COURT, IN AND FOR THE COUNTY OF .....EMERY..... STATE OF UTAH

IN THE MATTER OF THE GENERAL DETERMINATION OF RIGHTS TO THE USE OF ALL WATER BOTH SURFACE AND UNDERGROUND WITHIN THE DRAINAGE AREA OF THE SAN RAFAEL RIVER IN SANPETE AND EMERY COUNTIES IN UTAH.

STATEMENT OF WATER USER'S CLAIM
CODE NO. 93 SERIAL NO. 1067
MAP NO. 21

NOTE: This blank is sent to you in accordance with Utah Law. The information called for herein will be used in connection with the adjudication of water rights on the above mentioned drainage area. All questions applicable to your claim must be answered fully, and one copy of this form must be filed with the Clerk of the District Court at .....Castle Dale....., Utah, within sixty (60) days from date of service of the attached Notice. A copy shall be filed with the State Engineer, State Capitol, Salt Lake City. Failure to file the attached Statement of the Water User's Claim with the Clerk of the District Court within the time stated will forever bar and estop you from asserting any right to the use of water from said drainage area.

1. Name of Claimant Charles W. Kingston
   862 East Garfield Avenue Interest Claimed Full
2. Address Salt Lake City, Utah 484110
3. Name of particular spring, spring area, stream, well, tunnel or drain from which water is diverted is Underground Water (Mine Tunnel) in Emery County.
4. Priority date claimed January 20, 1964 Date when water was first used .....
   Date when work on diverting system was first begun ..... Date when diverting system was completed ..... Nature of work .....
5. Class of Right (Indicate by X):
   (a)..... Right to surface water initiated by beneficial use before 1903 Claim No. .....
   (b)..... Right to underground water initiated before 1935 Claim No. .....
   (c)..... Right decreed by court, cite title of case .....
   (d) X Application filed, State Engineer's Office No. 35836 Cert. of App. No. Election
   (e)..... Right acquired by adverse use prior to 1939 Chng. a-6330
6. Nature (Indicate by X), Amount, and Annual Period of Use (by month & day):

| | | | | | | |
|---|---|---|---|---|---|---|
| (a) X | Irrigation | Sec. Ft. Inc. | from April 1 | to October 31 | (both dates incl.) |
| (b) ..... | Stockwatering | Sec. Ft. ..... | from ..... | to ..... | (both dates incl.) |
| (c) ..... | Domestic | Sec. Ft. ..... | from ..... | to ..... | (both dates incl.) |
| (d) ..... | Municipal | Sec. Ft. ..... | from ..... | to ..... | (both dates incl.) |
| (e) X Mining | | Sec. Ft. 0.25 | from January 1 | to December 31 | (both dates incl.) |

7. Direct Flow Appropriation (must be described with reference to U. S. Government Survey Corner)
   (a) Point of diversion from ~~well~~, tunnel ~~or drain~~ N. 210 ft. & W. 320 ft. from E¼ Cor. Sec. 22, T16S, R7E, SLB&M.
   (b) Description of spring area .....
   (c) Point of rediversion or point of return to natural channel .....
   (d) If flow is intermittently diverted, list by number or description, all rights involved .....
8. Where water is used for irrigation purposes:
   (a) Area irrigated in legal subdivisions of land by 40-acre tract. (All sources of water for same land or lands must be described in each instance by name or claim number) CLAIMS USED FOR PURPOSE DESCRIBED: 93-1067 on: 0.5 acre in SE¼NE¼ Sec. 22, T16S, R7E, SLB&M.
   (b) Do you get water under a ditch owned by several users..... If so, give names of all users and divisions of interest .....
9. Where water is used for Stockwatering:
   (a) Number of each kind of stock watered .....
   (b) All sources of water for same stock. (Describe by name or claim number) .....
10. Where water is used for Domestic: .....
    (a) Number of families or their equivalent ..... All sources of water for same use. (Describe by name or claim number) .....

FORM 108 Exchange Application No. _____

# APPLICATION FOR THE RIGHT OF EXCHANGE OF WATER STATE OF UTAH

For the purpose of obtaining permission to make an exchange of water, application is hereby made to State Engineer, based upon the following showing of facts submitted in accordance with the requirements of Sec. 73-3-20, Utah Code Annotated, 1953.

1. The name of the applicant is Mrs. Charles W.(Lavenda) Kingston
2. The post office address of the applicant is 862 E.Garfield Ave.SLC, Ut. 84110
3. The right to be exchanged was acquired by Application No. 35836 (93-1067)
   *(Give application No., certificate No., Decree, stock purchase, or other identification.)*
4. The quantity of water is 0.25 second-feet, or _____ acre-feet.
5. The period of use from January 1 *(Month)* *(Day)* to December 31 *(Month)* *(Day)*, inc.
6. The period of storage from _____ *(Month)* *(Day)* to _____ *(Month)* *(Day)*, inc.
7. The direct source of supply is Tunnel tributary to _____ in Emery county.
8. The point of diversion is* N 210' & W 320' from E¼ Cor. Sec. 22, T16S, R7E, SLM
9. The water is, or was, to be used for the following purposes:
   Irrigation SE¼ ne¼ Sec. 22, T16S, R7E, SLM
   Mining
   _____, Total 10 acres.
   *(Give place of use by legal subdivision of land)*

**THE FOLLOWING EXCHANGE IS PROPOSED**

10. 0.25 second-feet or _____ acre-feet of water represented by the foregoing right will be delivered from January 1 *(Month)* *(Day)* to December 31 *(Month)* *(Day)* incl. of each year, to satisfy other rights, into _____ at a point* N79' & E75' from the SW cor. Sec. 24 T16 R7E SLM
11. In exchange for the water delivered and described in par. 10, there will be _____ second-feet or _____ acre-feet diverted from _____ *(Month)* *(Day)* to _____ *(Month)* *(Day)* incl., of each year from a well _____ *(diameter and depth)* or stream _____, at a point* _____
12. The water will be used for
    Irrigation
    Mining, Total 10 acres.

**NOTE:** *The point of diversion, point of return or point of delivery must be located by course and distance or by rectangular distances with reference to some United States land survey corner.*

APPENDIX 3.3.11 - A

AGREEMENT

This agreement made and entered into this 3rd day of August 1983, by and between Emery County, a body corporate and politic (County), and Co-Op Mining Company, a Utah general partnership (Co-Op),

WHEREAS, there is an existing road in Emery County known as Bear Creek Road, and

WHEREAS, Co-Op requires extensive use of said road, and

WHEREAS, due to said extensive use, said road should be relocated for the health, safety and welfare of the citizens of County as well as others who may have occasion to use said road,

NOW, THEREFORE, be it agreed as follows:

1. The parties hereto agree and acknowledge that the southern 0.65 miles of the road known as Bear Creek Road is a County road. Said County road runs from State Road 31 in a northerly direction for approximately 0.65 miles to a presently existing gate. Thereafter the road is a private road.

2. That Co-Op will relocate the Bear Creek Road according to the plans and specifications prepared by the Emery County Engineer and described on the document entitled Bear Canyon County Road Relocation dated October 12, 1982.

3. Co-Op will relocate the Road according to the plans and specifications referred to above at their expense. Co-Op will reimburse County for engineering costs incurred by County concerning the preparation of said plans and specifications and site inspections up to One Thousand ($1,000.00) Dollars.

4. Co-Op will indemnify and defend County for any damage caused, or loss incurred to or claim made by any public or private individual, firm, group, association, partnership or corporation as a result of the construction conducted to relocate Bear Creek Road. Said indemnification will continue until such time as County approves the completed roadway and accepts the construction thereof.

5. Co-Op acknowledges and accepts the easements of North Emery Water Users and Huntington City which exist in, along and across the relocate Bear Creek Road. Said easements are in existence on the ground. Co-Op's acknowledgment thereof herein recognizes and preserves said easements.

6. Co-Op agrees to encase water lines of North Emery Water Users and Huntington City in nestable corrugated pipe pursuant to plans and specifications prepared by the Emery County Engineer.

7. Co-Op agrees to allow access to other property served by the relocated Bear Creek Road. Said access shall be allowed to the owner of the property, their successor in interest or any other individual, firm, group, association, partnership or corporation who requires access due to their association with the owner or because the owner has granted permission to the individual, firm, group, association, partnership or corporation to go upon his property. Co-Op will not withhold access due to the type of activity which the then owner or his agents, employees or invitees intend or in fact conduct.

8. Co-Op will provide a completion and performance bond to Emery County upon the execution hereof in the amount of Twenty-Five Thousand ($25,000.00) Dollars which will remain in force and effect for twelve (12) months after the date said road is accepted by County as indicated in paragraph 4 above.

9. Co-Op will provide liability insurance in an amount not less than Five Hundred Thousand ($500,000.00) Dollars to be in force during the construction of said road. Said policy will name County as an insured.

10. Co-Op agrees to complete said road in a timely manner not to exceed eighteen (18) months from the date of this agreement. County may make demand upon the bonding company under the bond provided pursuant to paragraph 8 above and secure completion of the relocation in the event construction is not completed within the agreed upon eighteen (18) months.

11. It is further understood that any additional improvements of the relocated Bear Creek Road will be at the expense of all primary users.

12. The Co-Op agrees to reclaim that portion of the old Bear Creek Road according to the specifications and requirements of the Bureau of Land Manager (BLM).

13. That the Co-Op agrees to provide Emery County with the necessary easement agreements with the Utah Department of Transportation.

14. Co-Op acknowleges and agrees to comply with standard number 6.3.8 "Protection Zone" of the Utah State Health Drinking Water Standards as it applies to supplies of drinking water in Bear Canyon.

15. County agrees to inspect the relocated Bear Creek Road within ten (10) days after notification by Co-Op of the completion thereof. County must within five (5) working days of said inspection accept the road or notify Co-Op of any deficiencies which must be then corrected by Co-Op within the time period outlined in paragraph 10 above. Should County fail to notify Co-Op of any deficiencies within five (5) working days, the road is deemed accepted by County and the twelve (12) month period indicated in pargaraph 8 above begins to run from the sixth (6th) day after inspection.

IN WITNESS WHEREOF, this agreement is executed the day and year above first written, at Castle Dale, Utah, pursuant to a resolution of the Emery County Board of Commissioners at a regularly scheduled meeting of the Board.

EMERY COUNTY, a body politic and corporate,

ATTEST

County Clerk

By Rue P. Ware
Chairman of the Emery County Board of Commissioners

IN WITNESS WHEREOF this agreement is executed at Huntington, Utah.
DATED this 3rd day of August, 1983.

CO-OP MINING COMPANY, a Utah general partnership

By B W Stoddard
a General Partner

CO-OP MINING CO.
BOX 1245
HUNTINGTON, UTAH 84528

Aug. 8, 1983

SUBMITTAL



TO:

DIVISION OF OIL GAS AND MINING
4241 STATE OFFICE BUILDING
SALT LAKE CITY, UTAH 84114

Co-op Mining Co. submits the following plans for that portion of the haul road in the Bear Creek Canyon designated as a private road in the enclosed copy of the aggreement between Emery County and Co-op Mining Co. The road coincides with the existing Bear Canyon road, which follows the original contour of the land, minimizing additional disturbance or adverse effects on the environment. There will be no cut or fill sections, and no material side-cast. If any new area is disturbed, any suitable topsoil will first be removed and stockpiled as described in the topsoil plan previously submitted. At the time of final reclamation, the road will be reclaimed as outlined in the previously submitted reclamation plan, unless it is determined to be necessary for post mining land use. Hydrology for the drainage controls has been calculated by Horrocks Engineers (See appendage A). Culverts will be galvanized corrigated type.

Please see enclosed map, profile, and cross-section for construction detail. (Plate 3-5)

CO-OP MINING COMPANY

Wendell Owen

WENDELL OWEN

# APPENDIX 3 - B

Coal Mine Safety and Health
District 9

March 1, 1983

Mr. B. W. Stoddard
General Superintendent
Co-op Mining Company
P. O. Box 300
Huntington, UT 84528

Re: Bear Canyon Mine
I. D. No. 42-01697
Roof Control Plan

Dear Mr. Stoddard:

The roof control plan dated January 7, 1983, has been reviewed by MSHA personnel and is approved. As required by 30 CFR, 75.200, the plan shall be reviewed by MSHA every six months.

Sincerely,

John W. Barton
District Manager

JWB:J.S.Miller:mh

cc: Price
Orangeville
DTSC
State

ROOF CONTROL PLAN
General Information

Date 1-7-83 Mine I.D. No. 42-01697

A. Company Co-op Mining Co.

Address P.O. Box 15309 Salt Lake City, Utah 84115
city state

B. Mine Bear Canyon #1

Mine Location

Huntington (city) Emery (county) Utah (state)

C. Location (reference to nearest highway route, direction, and distance)

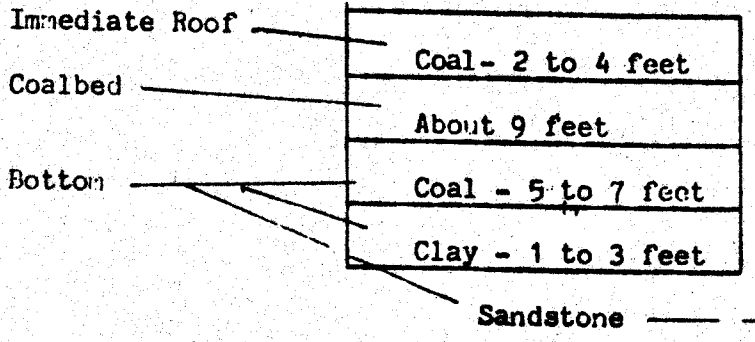
2 Miles East Off Route No. 31

D. Type(s) of plan Spot Bolting Plan

E. Area(s) of mine covered by the plan Development of entries, rooms and crosscuts

F. Maximum cover: 1700 Feet

Main Roof — — — — Sandstone — — Up to 80 ft. thick




G. Company Official's Signature Title Date

Roof Control Investigator

The Roof Control Plan approved this date hereby supersedes all previously approved plans

Approved by Date

Title

ROOF SUPPORT MATERIALS FOR RESIN GROUTED RODS

ROOS

Manufacturer's

Manufacturer Bermingham OR EQUIVELANT Designation 6 or 7 x 72

Minimum Length 72" Diameter 3/4 or 7/8

Type Steel #40 rebar Type Head square

Minimum Yield 40,000 lbs.

Dimensions of Rod: Head 1 1/8" Flange 1 1/8"

BEARING PLATES

Dimensions Generally $\frac{1}{4}$ x 6" x 6"

Shape Embossed or dished Center Hole Size approx. 7/8"

RESIN

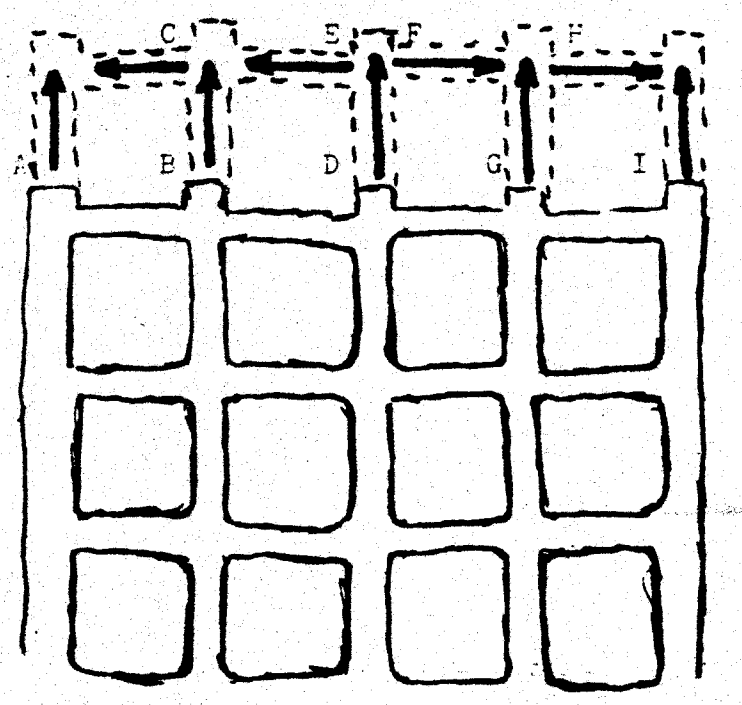
Manufacturer's

Manufacturer Celtite or equivelant Designation roof bolt cartridge

Type MV Size of Finishing Bit 1" +030

Prior approval shall be obtained before making any changes in the materials listed.

Sketch #1

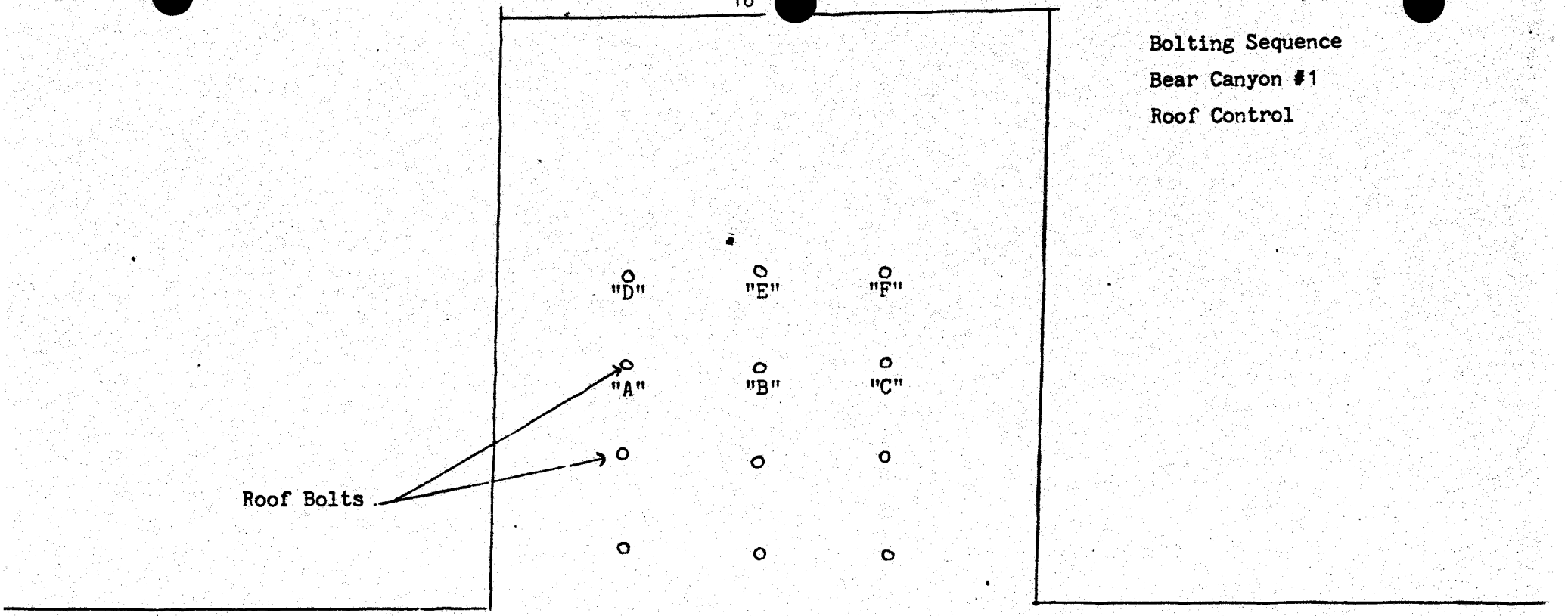



Sequence of Mining
Bear Canyon #1
Roof Control

Typical Section Mining Sequence

**Starting** on the far right (A) the entry or room is advanced the designated distance. Then the miner **pulls back** to (B) and this entry or room is advanced same as "A". Then a crosscut (C) is made to **join A and** B. The miner then pulls back to (D) and this entry or **room** is advanced same as "B" at **this time** a crosscut (E) is turned to the left to to join B and D then one is turned to the right **(F). The** miner pulls back to (G) and this entry or room then advances to crosscut (F), then a **crosscut** (H) is turned to the right. The miner is then moved to (I) and this entry or room is **advanced** to crosscut (H). This sequence is then repeated.

Bolting Sequence
Bear Canyon #1
Roof Control




Typical Sequence of Installing Bolts

Botls are installed on 5 foot centers. Bolts are installed from left to right. Starting from "A" to "B" to "C", then the sequence follow as in "D", "E" and "F".

SAFETY PRECAUTIONS FOR A SPOT BOLTING PLAN

1. For the purpose of this plan, where the roof is strong and competent, as determined by a responsible person of higher authority than the section foreman, an entry may be advanced a maximum of 120 feet prior to roof bolting. Adjoining crosscuts may be run in addition to entries prior to roof bolting. A written record that defines the approved area and is dated and signed by the responsible official shall be kept in a book that is available for examination by interested persons.

2. In the absence of properly recorded approval as described above, an area is to be fully supported. All active faces in a section in an approved area shall automatically revert to a full overhead support if: (a) a roof fall occurs in or inby the last open crosscut in an active section; (b) roof bolts (or crossbars) are installed or needed for a distance in excess of 16 linear feet within such area; or (c) roof bolts (or crossbars) are installed or needed frequently in the general area, regardless of the distance supported in each instance. The official immediately responsible for the area shall report such change to the mine foreman; and the mine foreman shall record the loss of approval for the area in the aforesaid record book. The area may be re-approved per preceding paragraph.

**U. S. Department of Labor**

Mine Safety and Health Administration
P O Box 25367
Denver, Colorado 80225
Coal Mine Safety & Health
District 9

September 19, 1983

Mr. B. W. Stoddard
Operator
Co-op Mining Company
P.O. Box 300
Huntington, UT 84528

Re: Bear Canyon No. 1 Mine, I.D. No. 42-01697
Six Month Review of Roof Control Plan with
Pillar Extraction Addendum

Dear Mr. Stoddard:

In regard to your requested addendum, dated September 11, 1983, pursuant to your pillar extraction plan, it has been reviewed by MSHA personnel and is approved.

Your currently approved roof control plan with the pillar extraction addendum has been reviewed by this office and appears to be satisfactory and is approved. This plan supercedes all previously approved roof control plans. As required by 30 CFR, 75.200, the approved plan will remain in effect for another six months. If future conditions warrant, the plan may have to be changed.

Sincerely,

for John W. Barton
District Manager

Enclosure

M. 11e v

Co-op Mining Company
Bear Canyon No. 1
P.O. Box 300
Huntinton, Utah 84528

U.S. Department of Labor
Mine Safety and Health Administration
Coal Mine Safety and Health
P.O. Box 25367
Denver, Colorado 80225
District 9

9-11-83

Dear Sir;

Please find enclosed a plan and sketches for roof control during pillar extraction. This is the same system we used in the old Co-op Mine I.D. No. 42-00081. Although pillar extraction conditions were far worse in the Co-op Mine we had real good results in safety and clean caves while using this system. Because of these reasons we feel this a safe plan to use in Bear Canyon No. 1.

This plan is an addition to the Roof Control Plan already in effect at the Bear Canyon No.1 Mine I.D. No.. 42-01697.

If there are any questions please contact Bill Stoddard At 801-748-2777.

Thank You;
Operator
B.W. Stoddard
B.W. Stoddard

9.14.83
HG

# TYPICAL ROOF CONTROL FOR PILLAR EXTRACTION

The following roof control plan is formulated for roof control during pillar recovery and is an addition to the roof control plan already in effect at the Bear Canyon #1 Mine I.D. No. 42-01697.

A. The plan now in effect is a minimum roof control plan and was formulated for normal roof conditions. Normal roof conditions means leaving 2 ft. to 4 ft. of top coal as the immidiate roof. Because the immidiate roof is coal, under normal conditions no roof support need be used while developing rooms.

B. This is a typical pillar extraction plan and is a general outline to follow. Any variation from this plan would be no less safe than the one given here.

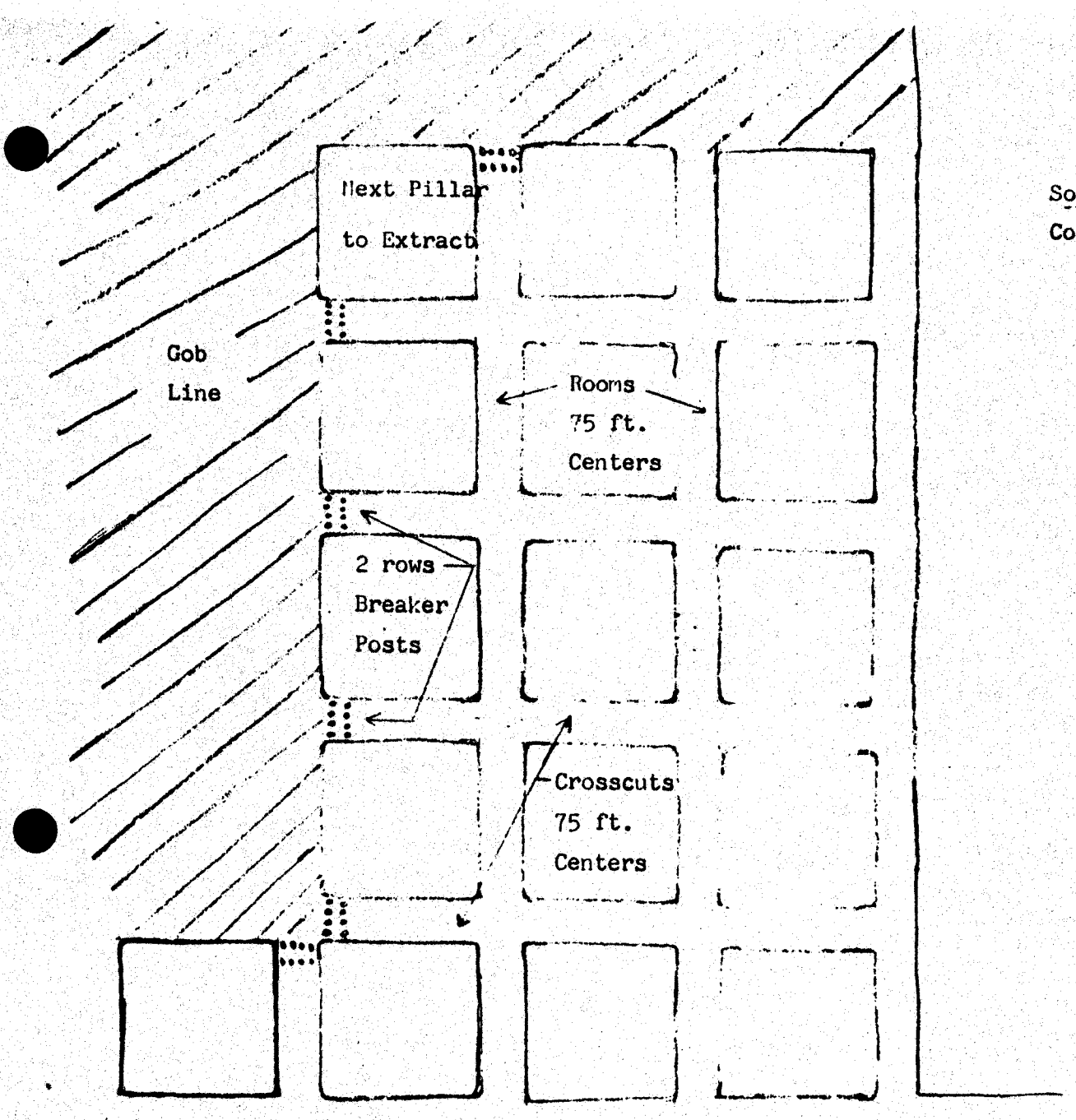
1. Rooms are run on 75 ft. centers and are 18 ft. to 20 ft. wide. crosscuts are run on 75 ft. centers and are run 18 ft. to 20 ft. wide. The total coal seam is about 19 ft. high. Rooms and crosscuts are developed about 9 ft. high. Four ft. of top coal is left for safe roof. About 6 ft. of bottom coal is left and this coal will be extracted with the pillars.

2. Two rows of breaker posts are set on 4 ft. centers across each opening leading into pillared areas. Such posts are installed near the breakline between the split being started and the gob. See sketch #1.

3. A row of turn posts set on 5 ft. centers will be installed leading into each pillar split. When this split is through the pillar 2 rows of breaker posts are installed next to the gob. Another set of turn posts is installed and the fender is split. A row of breaker posts is

set at the end of this split and the far stump is reduced in size enough to allow a cave. The close stump is then reduced enough to allow a cave. The remaining fender is mined from the crosscut in the same manner. It should be noted that if additional posts are needed they will be used. See sketch No's 2,3,4, and 5 for explanation of extracting a pillar.

4. The size of the posts being used will be not less than 6 inches in diameter. All posts shall be topped with a wooden cap piece. These cap pieces will not be less than 3" x 6" x 24" in size. Posts will be installed tight and on solid footing. Not more than two wooden wedges should be used to install a post.




ROOF CONTROL WHILE EXTRACTING PILLARS

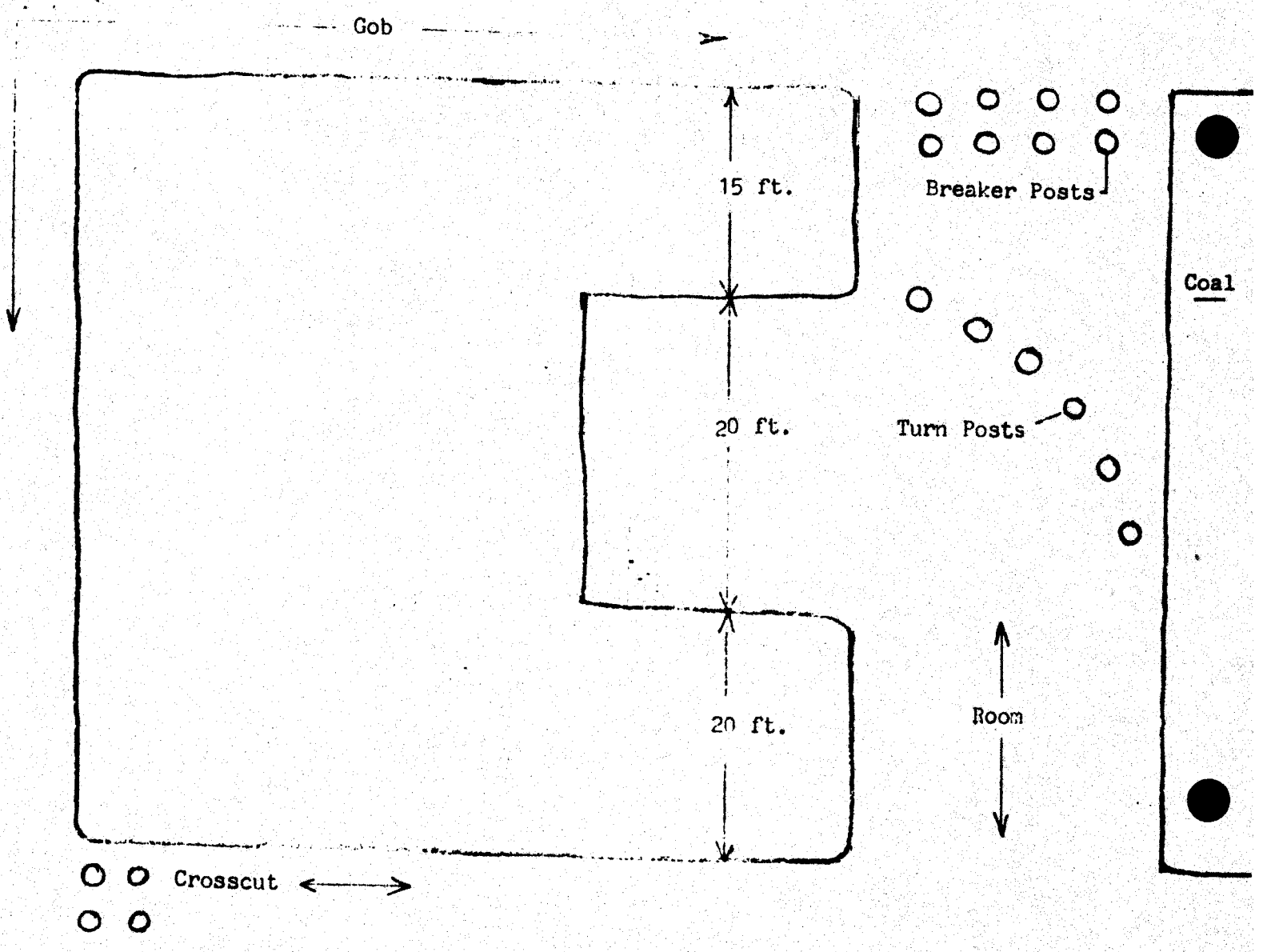
Two rows of breaker posts are set on 4 ft. centers across each opening leading into pillard areas. Such posts are installed near the break-line between the split being started and the gob.

Sketch No. 1

Bear Canyon No. 1

Mine I.D. No. 42-01697

Co-op Mining Co.




ROOF CONTROL WHILE EXTRACTING PILLARS

Starting Pillar Splits

Two rows of breaker posts are set on 4 ft. centers next to the gob line in both the room and crosscut. A row of turn posts is set on 5 ft. centers near the split being started. Pillars are approximatly 55 feet square. The split is about 20 ft. wide leaving about a 15 ft. fender next to the gob and 20 ft. next to the crosscut.

**Sketch No. 2**

**Bear Canyon No. 1**

**Mine I.D. No. 42-01697**

Co-op Mining Co.

# APPENDIX 3 - C

Appendix 3-C

# APPROVED INTERIM RECLAMATION PLAN

## Scope

The following procedures are designed to revegetate and control erosion. They will to a large degree satisfy the commitments made by the Co-op Mining Company in their permit while also satisfying OSM regulations as pertaining to wildlife concerns and interim reclamation for those areas which will be utilized during mining operations.

The areas in question are along and adjacent to the coal stockpile and the topsoil storage pile and are of a contemporaneous nature.

The actual ground involved comprises approximately 1.6 acres of disturbed land primarily deck slope disturbance and the topsoil pile. (See Plate 3-2 Map). The actual procedures involve a two phase program: (1) Earthwork to prepare a site which will be stable enough for a period of time to allow vegetation to become established, (2) Hydroseed and

mulch the entire area to supplement revegetation and control runoff until stabilization is complete.

## METHODOLOGY

### Phase 1 - Earth Moving

The pad down slopes will be brought back to a reasonable configuration by implementation of a crawler tractor. The actual method will involve smooth contouring of the existing soil and walking the crawler up and down the slope attempting to minimize compaction while at the same time creating small indentations by the grouser on the track. This methodology creates an enhanced micro-climate for the establishment of seed and guarantees sufficient compaction as to assure integrity and stability of enbankment and prohibit failure.

### Phase 2 - Seeding and Mulching

The entire area of disturbance will be hydroseeded during October, 1983. The seed mix and rate of application is attached. Hydro-seeding and mulching will be carried out in conjunction with the earth work of Phase 1. Recommendations for the hydroseeding and mulching operation are as follows:

This methodology involves the use of a hydro-seeder to apply the seed and tac to all disturbed areas and then to overspray the seeding with a wood-fiber mulch (approximately 2,000 lbs. per acre, long fiber) in combination with fertilizer and additional tacifying agents.

Co-op will follow the above recommendations.

The following rates of material should be utilized:

(Rates of tac were developed with respect to velocity and erosive power of water which is proportional to the square root of the slope). An emperical factor was determined from laboratory and field studies to arrive at the minimum tac to fiber ratio. Thus, 60 pounds of tac per ton of fiber is about minimum for slopes up to 20% and the emperical factor is determined as 60 ÷ 25% = 12. A 25% slope is about maximum for the minimum amount of tac. For a 100% slope ( 1 : 1 or 45 ) the ratio of tac to fiber is calculated as:

## SUGGESTED RATIOS OF TAC TO FIBER FOR HYDRO-SEEDING AND HYDRO-MULCHING TO SERVE AS MULCH OR SOIL BINDER

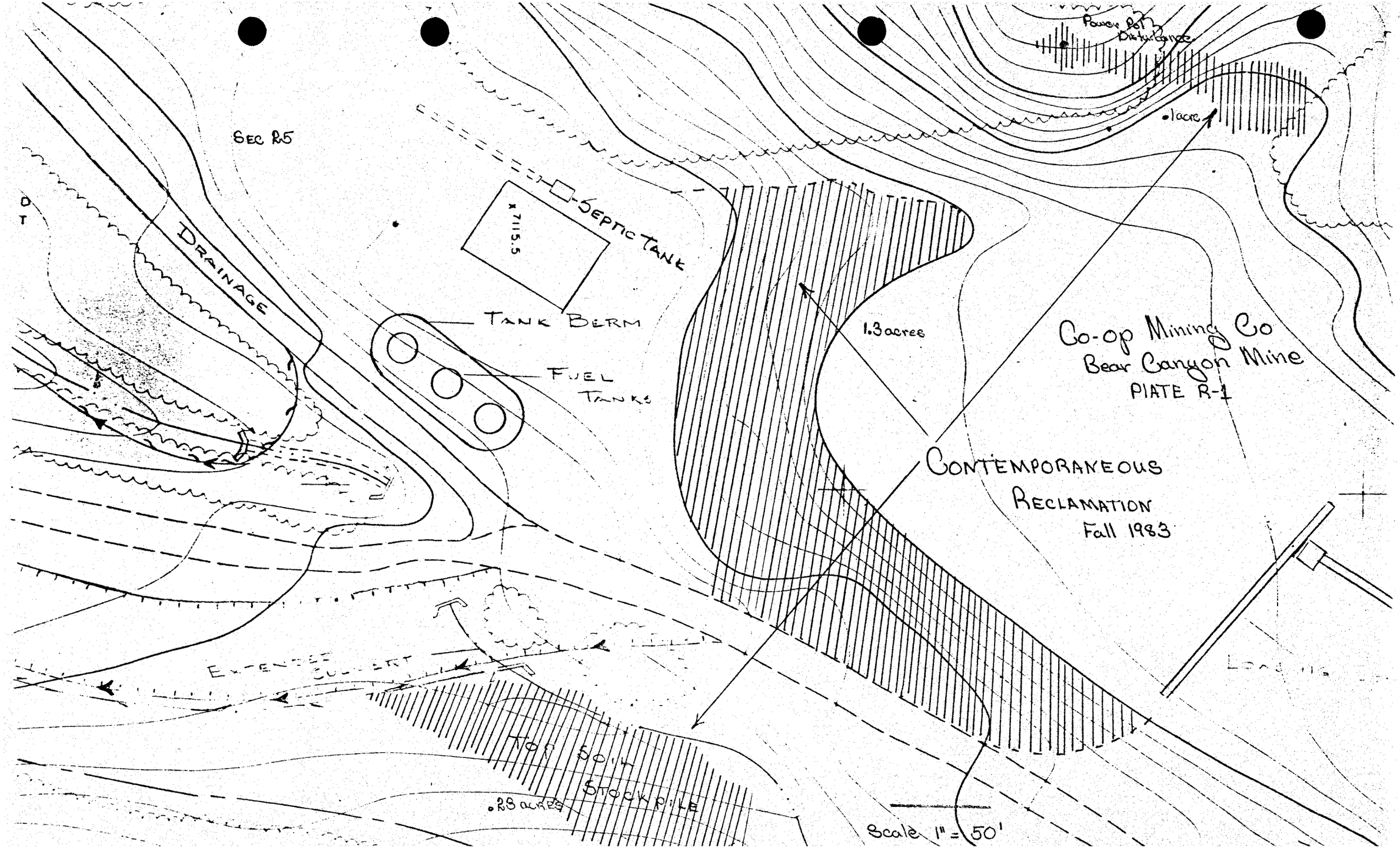
| SLOPE ANGLE | SLOPE RATIO Rise:Run | PERCENT SLOPE | LBS. TAC Per Ton FIBER | RATIO TAC TO FIBER |
|---|---|---|---|---|
| 14° | 1 : 4 | 25% | 60 (min.) | 1 : 30 |
| 26° | 1 : 2 | 50% | 80 | 1 : 25 |
| 33° | 1 : 1½ | 66% | 100 | 1 : 20 |
| 45° | 1 : 1 | 100% | 120 | 1 : 16 |
| 57° | 1½ : 1 | 150% | 140 | 1 : 14 |
| 64° | 2 : 1 | 200% | 160 (min.) | 1 : 12 |

# RECOMMENDED SEED MIX FOR INTERIM RECLAMATION

## BEAR CANYON MINE

## CO-OP MINING COMPANY

| SPECIES | RATE PER ACRE HYDROSEED |
|---|---|
| **GRASSES** | |
| Agropyron dasystachyum<br>Thickspike Wheatgrass | 6 |
| A. spicatum<br>Bluebunch Wheatgrass | 8 |
| Elymus Salina<br>Salina Wildrye | 1.5 |
| Oryzopsis hymenoides<br>Indian Ricegrass | 3 |
| Poa secunda<br>Sandberg Bluegrass | 2 |
| **FORBS** | |
| Ladak Alfalfa | 2 |
| Yellow Sweet Clover | 2 |
| **COVER CROP** | |
| Oats | 20 |


Sec R5
Septic Tank
7115.5
Drainage
Tank Berm
Fuel Tanks
Power Pol
Distribution
.1acre
1.3acres
Co-op Mining Co
Bear Canyon Mine
PIATE R-1
Contemporaneous
Reclamation
Fall 1983
Extended
Culvert
Top Soil
Stockpile
.28 acres
Scale 1" = 50'

# APPENDIX 3 - D

# 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.

Co-op Mining Company

Wendell Owen

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 vertually 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

Topesoil is presently being stored within areas of the permit boundary [see Map 1]. It is the Co-op intent to consolidate Piles #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 redistributed 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 toptopsoil 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 fill 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.

## 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 [Appendix 3-C] 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 TEST REPORT

NO. 7406.0

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: SCALES BEAR

| TEXTURE (s=silt, silty s=sand, sandy o=loam, loamy c=clay | pH | | CEC Meq /100g | SALT Mmhos /cm | Na Meq /100g | Lime % | OM % | Org N Lbs | AVAILABLE NUTRIENTS ppm (1) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | Buf | | | | | | | $NO_3$ | P(2) | K(2) | Ca | Mg | S(2) | B | Zn | Fe | Mn | Cu |
| 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 | $P_2O_5$ | $K_2O$ | Elem Sulfer | 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 |

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 = $P_2O_5$ K x 1.2 = $K_2O$ S x 3

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 Dave 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$^2$ |
|---|---|---|
| GRASSES | | |
| Agropyron dasystachyum<br>Thickspike wheatgrass | 3 | 12 |
| A. spicatum<br>Bluebunch wheatgrass | 8 | 22 |
| Elymus Salina<br>Salina wildrye | 1.5 | 15 |
| Oryzopsis hymenoides<br>Indian ricegrass | 3 | 12 |
| Poa secunda<br>Sandberg bluegrass | 1 | 21 |
| FORBS | | |
| Achillea millifolium<br>Western yarrow | .15 | 10 |
| Aster chilensis<br>Pacific aster | .15 | 9 |
| Hedysarum boreale<br>Northern sweetvetch | 9 | 7 |
| Lupinus sericeus<br>Silky sweetvetch | 20 | 6 |
| Penstemon Palmeri<br>Palmer penstemon<br>or<br>P. Strictus<br>Rocky Mountain Penstemon | .5 | 7 |

Attachment #2-A

SHRUBS

| | | |
|---|---|---|
| Amelanchier Utahensis<br>Utah serviceberry | 4 | 4 |
| Artemisia tridentata ssp. vaseyana<br>Big sagebrush | .15 | 9 |
| Cercocarpus ledifolius<br>Curlleaf Mountain mahogany | 6 | 7 |
| Chrysothamnus nauseosus var. albicaulus<br>Whitestem rubber rabbitbrush | .5 | 5 |
| Sambucus cerulea<br>Blue elderberry | .8 | 4 |
| 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 percipitation 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 greeze-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 dominatly 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.

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.

All - - 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.

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.

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, wildlife 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.

All - - 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 course 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.

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.].

APPENDIX 3 - E

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

**Reply to**
Instrument Analysis Division
490 Orchard Street
Golden, CO 80401

November 23, 1981

Phone: 303-278-9521

Mr. Jack Blair
Commercial Testing & Engineering Co.
139 South Main Street
Helper, UT 84526

Co-op Mining Co.
Lab No. 57-7609

Re: IAD #97-H654-335-01

## Analytical Report

One sample was received for analyses on October 28, 1981. This sample was given our identification IAD #97-H654-335-01.

A portion of the sample (≈100 g) was extracted at $pH_5$ for 24 hours according to the procedures of EPA/Test Methods for Evaluating Solid Wastes, SW-846, 1980, EP Toxicity. The sample required ≈170 mls of 0.5 N acetic acid to adjust the pH to 5. The extracted solution was brought to volume (2000 ml) and filtered with a 0.45 µm membrane filter. A portion of the filtered extract solution was acidified with nitric acid prior to metals analyses.

The solution was analyzed for Lead, Silver, Barium, Cadmium, and Chromium by flame atomic absorption; for Arsenic and Selenium by hydride generation atomic absorption; and for Mercury by cold vapor flameless atomic absorption using a permanganate/persulfate digestion and the gold amalgamation analytical technique to concentrate the Mercury.

The results of these determinations are presented in Table No. I and are reported in milligrams per litre (mg/L) in the filtered extract solution. The EP Toxic maximum contaminant levels are also presented.

Table No. I
(mg/L)

EP Toxicity

| Parameter | Co-Op Mining 57-7609 | Maximum Contaminant Levels |
|---|---|---|
| Arsenic | <0.001 | 5.0 |
| Selenium | <0.001 | 1.0 |
| Mercury | 0.0004 | 0.2 |
| Silver | <0.005 | 5.0 |
| Barium | 1.1 | 100 |
| Chromium | <0.01 | 5.0 |
| Cadmium | <0.005 | 1.0 |
| Lead | <0.05 | 5.0 |

If there are any questions concerning these results, please call.

Bruce A. Hale
Section Supervisor

M. L. Jacobs, Ph.D., Mngr.
Instrumental Analysis Div.

BAH/cl

UMC 817.103 Covering Coal and Acid and Toxic Forming materials

The PH, acid-base potential, texture and electrical conductivity of these materials must be included in the data reported.

Co-op Reply

The Co-op has submitted a sample to CT&E testing for this data at the time this submittal was prepared. A copy of the report will be sent directly to the UDOGM upon receipt. In the interim, the Co-op will commit to removing any and all such material should it be on the site. Also, the Co-op does not feel this regulation is applicable, for the area in question is not to be utilized in a manner which will constitute the stockpiling or storage of coal and/or refuse.

COMMERCIAL TESTING & ENGINEERING CO.

Reply to
Instrumental Analysis Division
490 Orchard Street
Golden, CO 80401

July 22, 1983

Phone: 303-278-9521

Mr. Jack Blair
CT & E Co.
224 South Carbon Ave.
Price, Utah 84501

CO-OP MINING COMPANY
Pond Sample
Lab No. 57-13312

Re: IAD # 97-M179-335-01

## Analytical Report

One coal sample was received for analysis on July 12, 1983. This sample was assigned our IAD identification # 97-M179-335-01.

The sample was prepared to No.10 mesh size in accordance with the procedure of U.S.D.A. Handbook #60. Electrical Conductivity and pH were determined in accordance with the same publication.

Acid/Base Potential was determined in accordance with the procedure of the Environmental Protection Agency,EPA-670/2-74-070. This procedure is used for the Wyoming DEQ and in telephone conversation with the Utah Division of Oil, Gas & Mining we were advised that this procedure is acceptable for the requirements of the State of Utah.

The results of these determinations are presented in Table No.I and are reported in units as indicated in the Table.

Table No. I

| Parameter | 57-13312 |
|---|---|
| pH,paste (Standard Units) | 7.6 |
| Electrical Conductivity (μmhos/cm) | 195 |
| Acidity Potential* | 0 |
| Neutralization Potential* | 29.8 |
| Acid/Base Potential* | 29.8 |

*Values are reported in Tons $CaCO_3$ Equivalent / 1000 Tons.

Texture determination was not performed as the sample is carbolithic and thus the determination of Sand, Silt and Clay fractions is not applicable in this case.

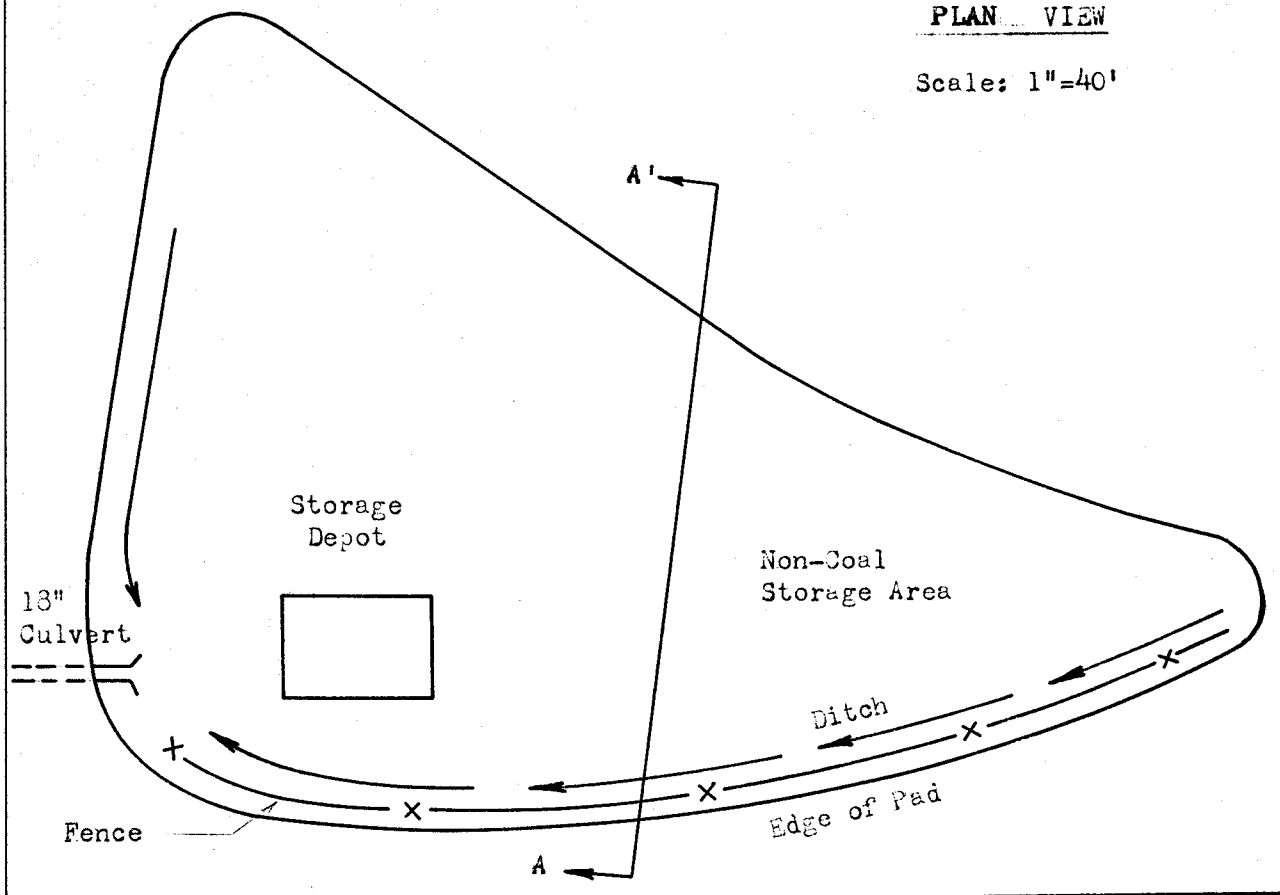
If you have any questions concerning these results, please call.

Harold A. Connell
Assistant Lab Manager

R.L. Taylor, Ph.D., Manager 22 Jul 83
Instrumental Analysis Division

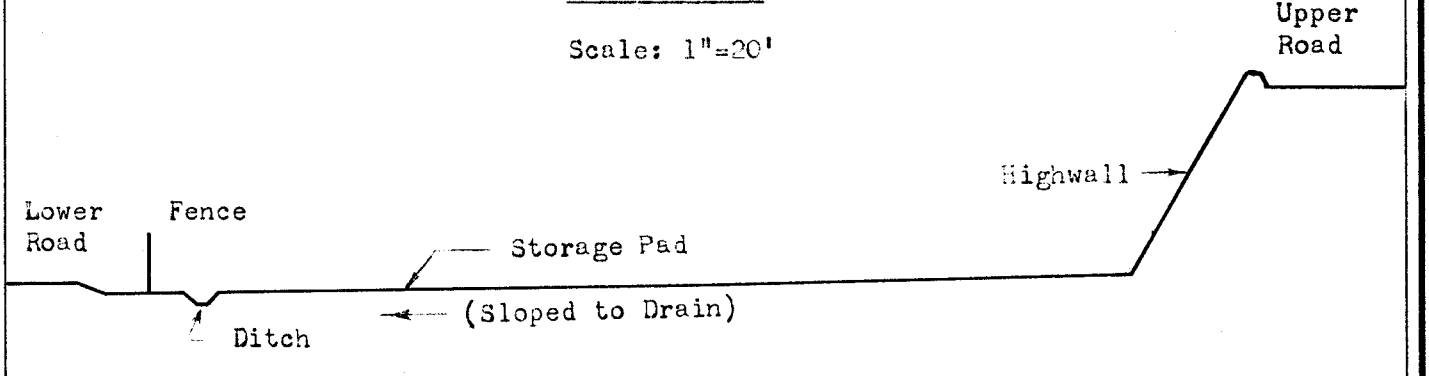
PLAN VIEW

Scale: 1"=40'

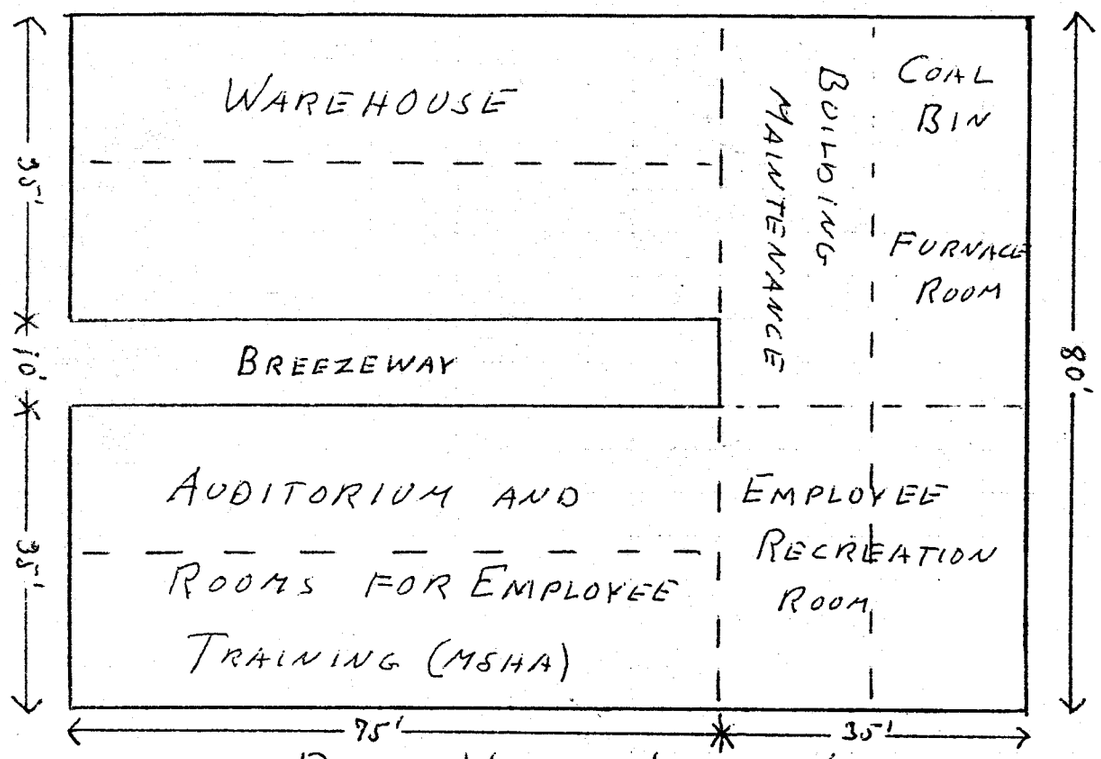



SECTION A-A'

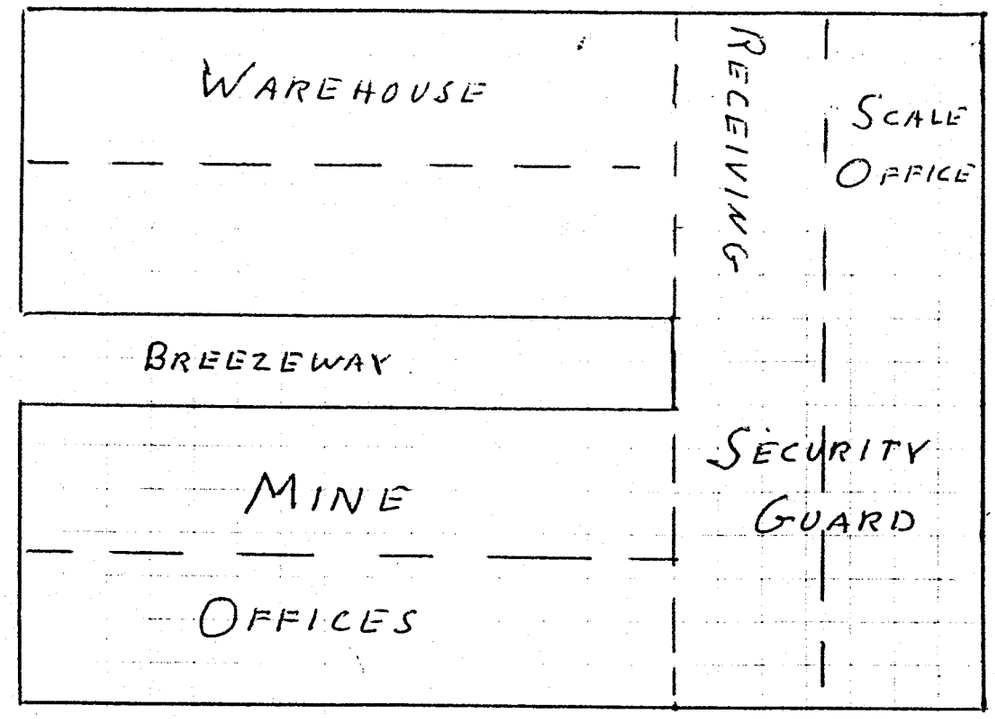
Scale: 1"=20'




| | | |
|---|---|---|
| NON-COAL STORAGE AREA | BEAR CANYON | FIGURE NO. 3.8.1 |

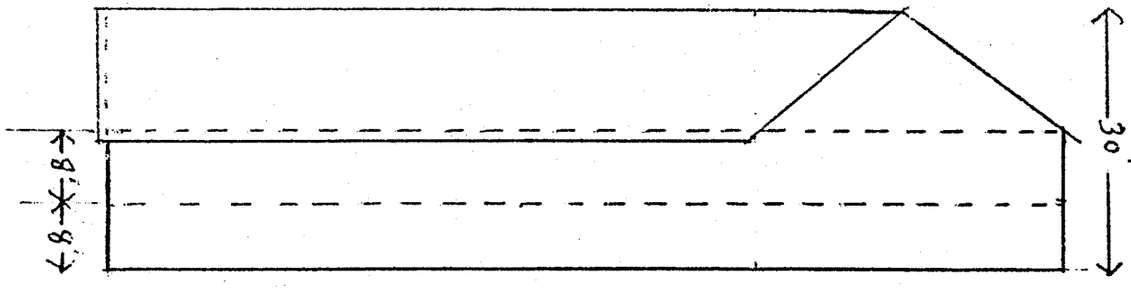



PLAN VIEW - LOWER LEVEL

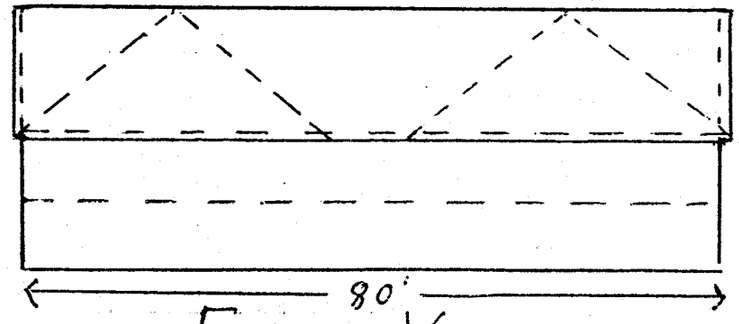



PLAN VIEW - UPPER LEVEL

110'




SIDE VIEW




FRONT VIEW

TABLE 3-6

Parameters Included in Surface Water and Groundwater Monthly Monitoring Plan

1. Flow (gpm)
2. pH
3. Temperature (°C)
4. Total Dissolved Solids (mg/l)
5. Dissolved Calcium (mg/l)
6. Dissolved Iron (mg/l)
7. Dissolved Magnesium (mg/l)
8. Dissolved Potassium (mg/l)
9. Dissolved Sodium (mg/l)
10. Dissolved Bicarbonate (mg/l)
11. Dissolved Carbonate (mg/l)
12. Dissolved Chloride (mg/l)
13. Dissolved Nitrate (mg/l)
14. Dissolved Sulfate (mg/l)
15. Total Suspended Solids (mg/l)

Note: See Figure 7-4 for reporting format.

APPENDIX 3-F

# SLOPE STABILITY ANALYSIS

Removal or Reduction of Highwalls

The highwalls will be reduced along the pad and road areas where feasible. This will be accomplished by recovering material from the edge of pad and road fill areas with a backhoe and placing it against the base of the highwall. The material will be compacted with a cat to promote stability of the backfill. Erosion controls, such as straw dikes or water bars, will be placed below the backfilled areas to minimize washing of the fill material. The backfill material is native, consisting of material originally generated from the construction of the highwall areas and compacted into the road or pad fill areas.

Complete rock highwalls will be left in some areas to lessen the probability of erosion on backfilled materials or to minimize the amount of additional disturbance that would result from highwall reduction (see Plate 3-20).

The rationale for leaving or reducing the highwalls is based on the following:

1. Natural cliffs are common in the Blackhawk Formation, and in this area. The highwalls proposed to be left are similar in height and exposure to existing cliffs in the area and will therefore be compatible with existing topography.

2. The highwalls will provide habitat for cliff-dwelling wildlife, and the pad areas will provide for other wildlife grazing. This proposal is therefore compatible with the post-mining land use of wildlife habitat;

3. The rock highwalls could be partially shot down; however, this would extend the disturbance furthur up the steep slopes, resulting in more exposure and erosion potential;

4. The proposed highwalls to be left or reduced are on the south facing slopes in the area. These are the steeper slopes in the area, as well as the slopes more commonly containing rock exposures similar to the proposed highwalls

5. The fill areas at the base of the highwalls will be stabilized by reseeding and the use of erosion controls as discussed earlier. The toe of these areas will be terraces or gentle slopes (less that 10%) adding to their stability. These will eventually take the appearance of "talus slopes" a common structure at the base of exposed cliffs in this area. The natural weathering of cliffs and highwalls will be very similar, providing for a furthur compatibility with the geomorphic processes of the area.

6. The existing (and proposed) highwalls will be stable. There are no seeps known to exist in any areas where highwalls are proposed to be left. The stability analysis

run on this site show the highwalls of the pad and road areas to have a static safety factor of 2.61 for dry conditions and a factor of 2.41 for saturated conditions. Each of these far exceed the 1.3 safety factor required for highwalls proposed to be left or reduced. (Details on the stability analysis are included in the next section.)

## STABILITY ANALYSES

### Highwall Stability

Highwalls at the site face south, southeast, and east. The highwalls are nearly vertical, with an average slope of IV:.2H, or 80°.

The highwall stability analysis is based on a rotational shear analysis using the Hoek method. Compressive strengths of materials in the Blackhawk Formation are highly variable, ranging from 290 PSI for soft shale to more than 20,000 PSI for certain sandstones. An average value of 5,000 PSI has been used for this analysis. This is a very conservative figure, based on the relative proportions of sandstones and shales in the exposed highwalls.

Cohesion can be calculated from compressive strength by the following formula:

$$C_i = \frac{Co}{2} \tan\left(45 - \frac{\theta}{2}\right);$$

where:

$C_i$ = Intact rock shear strangth or cohesion

Co= Intact rock compressive strength

$\theta$ = Internal friction angle.

Using a typical internal friction angle of 45 for Wasatch Plateau rock types, and a 5,000 PSI compressive strength, a cohesion or intact rock strength of approximately 1,000 PSI is found. Since the 1,000 PSI value is for intact or solid rock, the value must be adjusted fo compensate for jointing and fracturing common to all rock masses. A method of relating fracture intensity and cohesion was developed by Stimpson and Ross-Brown and can be found in the article entitled, "Estimating the Cohesive Strength of Randomly Jointed Rock Masses", Mining Engineering, Vol. 31, No. 2, pp. 182-188. Based on this method and using a conservative figure of 4 joints per meter, a .065 factor is determined for calculating Cm or rock mass cohesion. Based on a $C_i$ of 1,000 PSI, Cm becomes 65 PSI.

A typical or average rock mass bulk density of 155 lbs/ft$^3$ was selected for the analysis, and a slightly conservative, but commonly used value of 31° was selected for the rock mass sliding friction angle.

The following parameters were used with the Hoek slope chart (Hoek, E., and J.W. Bray, 1981, Rock Slope Engineering, Revised Third Edition, IMM, London):

H = Maximum Slope Height - 100'

$\theta$ = Slope Angle (average) - 80°

$C_m$ - Rock Mass Cohesion - 65 psi

$\phi$ = Rock Mass Friction Angle - 31°

$\gamma$ = Rock Mass Bulk Density - 155 lbs/ft3

Plotting the above parameters on the Circular Failure Charts Nos. 1 and 5, it can be seen that the projected highwalls will have a safety factor of 2.61 under dry conditions and 2.40 under saturated conditions. It should be noted that the safety factors exceed the required 1.5 safety factor.

Embankment Stability

Embankment or backfill will be placed in lifts not to exceed 36" and will be compacted to 90% Slopes will not exceed 1V:1.5H or 33.7°. Soil properties are based on those used in the "Slope Stability Analyses for the Bear Creek Portal and Access Road", by Dames and Moore, February 20, 1981.

A rotational shear analysis was performed using the Hoek method to determine stability of the backfilled slopes. The following parameters were used for the slopes.

H = Embankment Height - 30'

$\theta$ = Slope Angle - 33.7°

$C_m$ = Soil Cohesion @ 90% Compaction - 4.375 psi

$\phi$ = Friction Angle - 26°

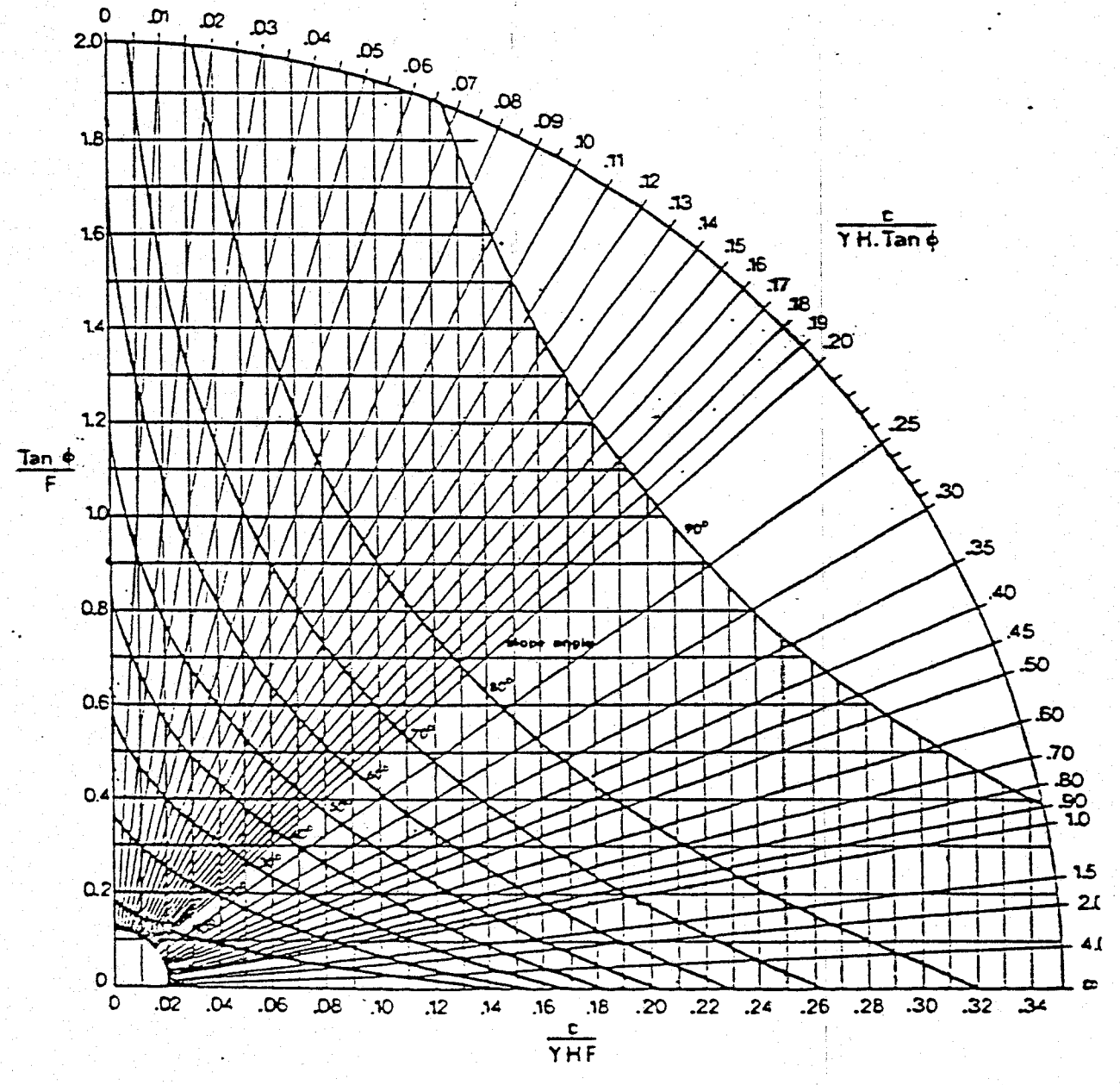
= Rock Mass Bulk Density (90%) - 108 lbs/ft$^3$

Based on the above criteria, backfilled slopes are found to have an expected safety fector of a maximum of 2.21 for dry conditions to

a minimum of 1.68 for saturated conditions. Both cases exceed the required static safety factor of 1.3. It should also be noted that the previous slope stability analyses by Dames & Moore resulted in static safety factors ranging from a minimum of 1.43 to 2.15 for side-cast cut and fill material in this area.

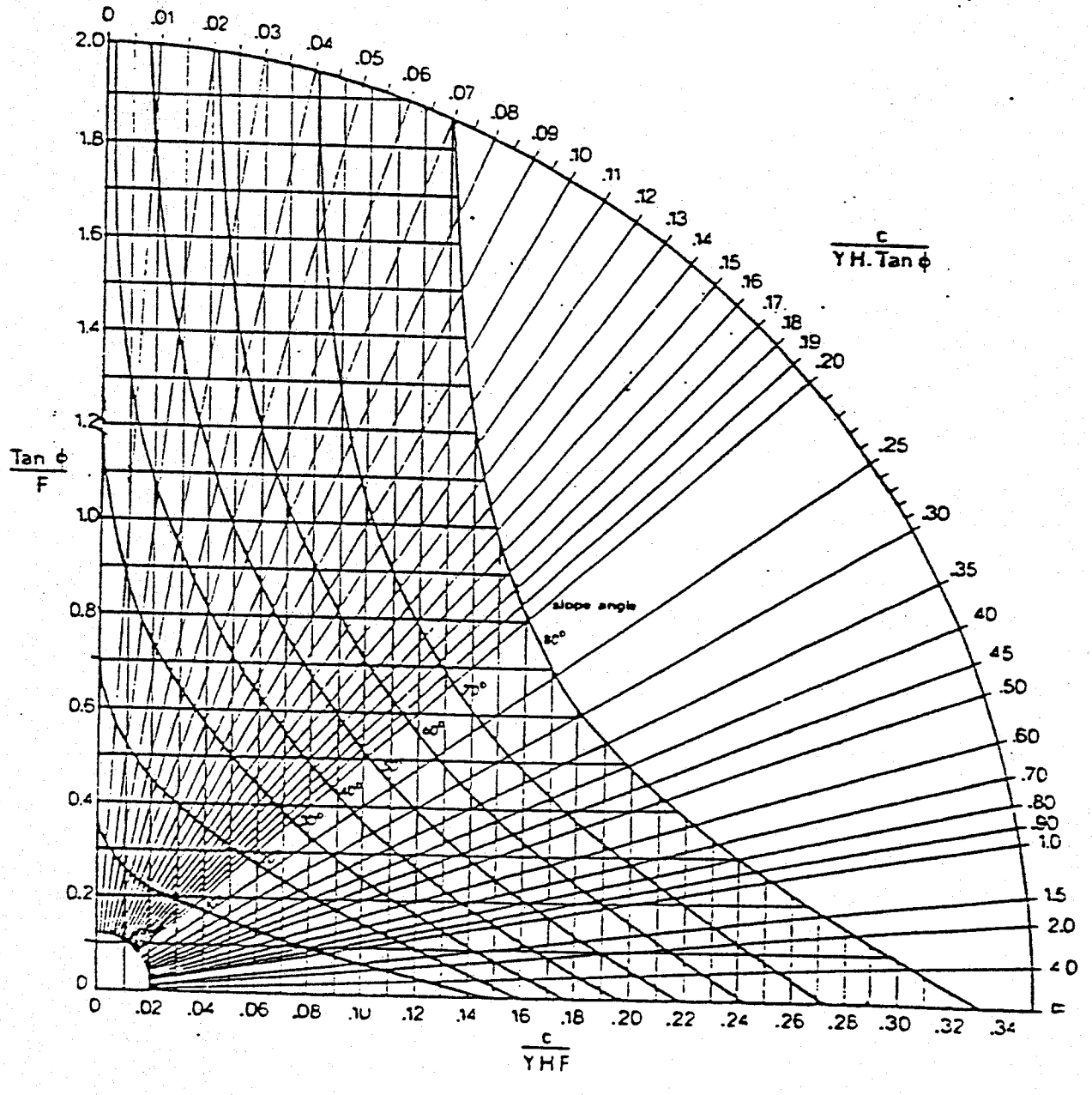
(DRY CONDITIONS)

# CIRCULAR FAILURE CHART NUMBER 1



(SATURATED CONDITIONS)

# CIRCULAR FAILURE CHART NUMBER 5



# STABILITY ANALYSES

## Highwall Stability

Highwalls at the site face south, southeast, and east. The highwalls are nearly vertical, with an average slope of IV:.2H, or 80°.

The highwall stability analysis is based on a rotational shear analysis using the Hoek method. Compressive strengths of materials in the Blackhawk Formation are highly variable, ranging from 290 PSI for soft shale to more than 20,000 PSI for certain sandstones. An average value of 5,000 PSI has been used for this analysis. This is a very conservative figure, based on the relative proportions of sandstones and shales in the exposed highwalls.

There are 2 joint sets typically found in this area. The major set has a strike of about N 10° E and dips 80° to vertical. The minor set has a strike of approximately N 70° W and also dips greater than 80°. The bedding in the highwall area is nearly flat.

Cohesion can be calculated from compressive strength by the following formula:

$$C_i = \frac{Co}{2}\tan(45 - \frac{\theta}{2});$$

where:

$C_i$= Intact rock shear strength or cohesion

Co= Intact rock compressive strength

$\theta$ = Internal friction angle.

Using a typical internal friction angle of 45° for Wasatch Plateau rock types, and a 5,000 PSI compressive strength, a cohesion or intact rock strength of approximately 1,000 PSI is found. Since the 1,000 PSI value is for intact or solid rock, the value must be adjusted to compensate for jointing and fracturing common to all rock masses A method of relating fracture intensity and cohesion was developed by Stimpson and Ross-Brown and can be found in the article entitled, "Estimating the Cohesive Strength of Randomly Jointed Rock Masses", Mining Engineering, Vol. 31, No. 2, pp. 182-188. Based on this method and using a conservative figure of 4 joints per meter, a .065 factor is determined for calculating Cm or rock mass cohesion. Based on a $C_i$ of 1,000 PSI, Cm becomes 65 PSI.

A typical or average rock mass bulk density of 155 lbs./ft.$^3$ was selected for the analysis, and a slightly conservative, but commonly used value of 31° was selected for the rock mass sliding friction angle.

The following parameters were used with the Hoek slope chart (Hoek, E., and J. W. Bray, 1981, Rock Slope Engineering, Revised Third Edition, IMM, London):

H = Maximum Slope Height - 100'

$\theta$ = Slope Angle (average) - 80°

$C_m$ = Rock Mass Cohesion - 65 PSI

$\phi$ = Rock Mass Friction Angle - 31°

$\gamma$ = Rock Mass Bulk Density - 155 lbs./ft.$^3$

Plotting the above parametes on the Circular Failure Charts Nos. 1 and 5, it can be seen that the projected highwalls will have a safety factor or 2.61 under dry conditions and 2.40 under saturated conditions. It should be noted that the safety factors exceed the required 1.5 safety factor.



Embankment Stability

Embankment or backfill will be placed in lifts not to exceed 36" and will be compacted to 90% of the laboratory obtained T-99 Standard Proctor. Slopes will not exceed 1V:1.5H or 33.7°. Soil properties are based on those used in the "Slope Stability Analyses for the Bear Creek Portal and Access Road", by Dames and Moore, February 20, 1981, and the "Geotechnical Consultation, Bear Creek Portal", by Dames and Moore, December 29, 1980, and the "Bear Creek Canyon Mine Site, Sedimentation Pond "A" Stability Analysis", by Horrocks and Corollo Engineers on July 12, 1984.

Based on the proposed plan, and the results of samples taken during the above studies, the following parameters were established for the safety factor calculations:

(1) H = Embankment Height = 30'; this represents the maximum height of compacted embankment proposed in the plan;

(2) $\theta$ = Slope Angle = 33.7°; this is the maximum slope (1V:1.5H) proposed for the reclaimed embankments;

(3) $C_m$ = Soil Cohesion @ 90% Compaction = 4.375 PSI; Actual Cohesion tests on compacted native material at this site showed a cohesion value of 700 PSF at a density of 118 lbs./ft.$^3$ and a compaction value ranging from 89% to 94%. (See Sediment Pond "A" Stability Analysis", by Horrocks & Corollo Engineers, July 12, 1984.) To provide for maximum safety in the calculation, the cohesion factor is reduced by the compaction factor.

700 pfs X 0.9 = 630 psf = 4.375 psi;



(4) $\phi$ = Friction Angle = 26°; This angle is based on the measurements taken and reported in the Feb. 20, 1981 Dames & Moore Slope Stability Analysis on the Bear Creek Portal and Access Road;

(5) $\Upsilon$ = Rock Mass Bulk Density (90%) = 108 lbs/ft.$^3$; Once again, this is a conservative number, established by taking actual values of 118 to 120 lbs./ft$^3$ as reported in the above reference stability analysis,

and allowing for 90% compaction - 120 X 0.90 = 108 lbs./ft.$^3$.

A rotational shear analysis was performed using the Hoek method to determine stability of the backfilled slopes. The following parameters were used for the slopes:



H = Embankment Height - 30'

$\theta$ = Slope Angle - 33.7°

$C_m$ = Soil Cohesion @ 90% Compaction - 4.375 psi

$\phi$ = Friction Angle - 26°

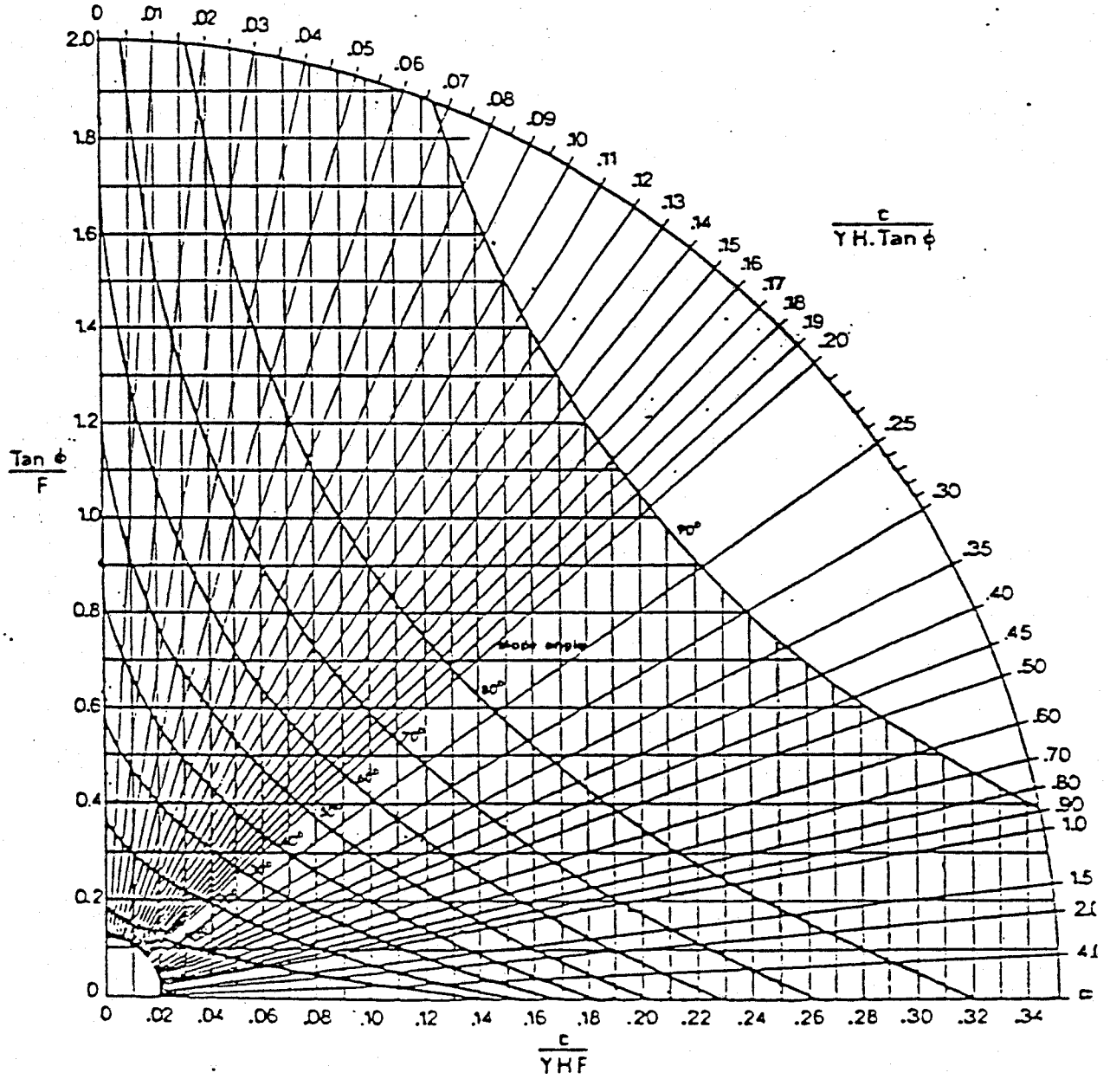
I = Rock Mass Bulk Density (90%) - 108 lbs./ft.$^3$

Based on the above criteria, backfilled slopes are found to have an expected safety factor of a maximum of 2.21 for dry conditions to a minimum of 1.68 for saturated conditions. Both cases exceed the required static safety factor of 1.3. It should also be noted that the previous slope stability analyses by Dames & Moore resulted in static safety factors ranging from a minimum of 1.43 to 2.15 for side-cast cut and fill material in this area.

Note: The embankment compaction factors and cohesion values are based on previous tests performed in the Bear Canyon area. Although the tests were not site specific, they were run on the existing soils which are the same as those to be used in reclamation. The values used for rock compressive strengths were taken from rock parameters typical of the Blackhawk Formation in the Wasatch Plateau, and commonly used and accepted for this type of calculations.

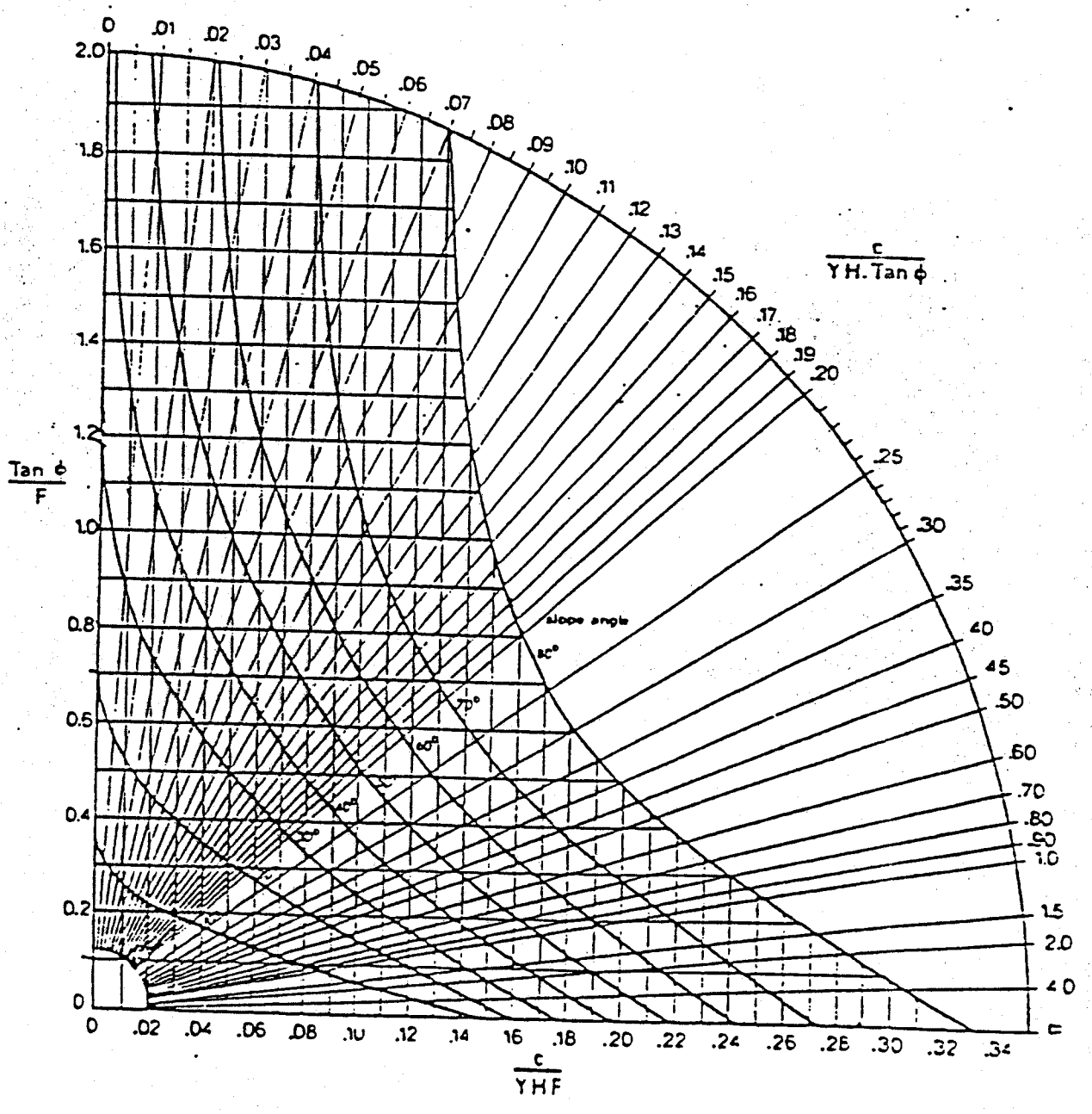
(DRY CONDITIONS)

# CIRCULAR FAILURE CHART NUMBER 1



(SATURATED CONDITIONS)

# CIRCULAR FAILURE CHART NUMBER 5



If it is determined necessary, Co-Op will commit to taking site specific tests on the soils and highwall rock to further verify the factors of safety. These tests would be performed prior to reclamation, or at the discretion of the Division.



Removal or Reduction of Highwalls

The highwalls will be reduced along the pad and road areas where feasible. This will be accomplished by recovering material from the edge of pad and road fill areas with a backhoe and placing it against the base of the highwall. The material will be compacted with a cat to promote stability of the backfill. Erosion controls, such as straw dikes or water bars, will be placed below the backfilled areas to minimize washing of the fill material. The backfill material is native, consisting of material originally generated from the construction of the highwall areas and compacted into the road or pad fill areas.

Complete rick highwalls will be left in some areas to lessen the probability of erosion on backfilled materials or to minimize the amount of additional disturbance that would result from highwall reduction (see Plate 3-2).

The rationale for leaving or reducing the highwalls is based on the following:

1. Natural cliffs are common in the Blackhawk Formation, and in this area. The highwalls proposed to be left are similar in height and exposure to existing cliffs in the area and will therefore be compatible with existing topography.



2. The highwalls will provide habitat for cliff-dwelling wildlife, and the pad areas will provide for other wildlife grazing. This proposal is therefore compatiable with the post-mining land use of wildlife habitat;

3. The rock highwalls could be partially shot down; however, this would extend the disturbance furthur up the steep slopes, resulting in more exposure and erosion potential;

4. The proposed highwalls to be left or reduced are on the south facing slopes in the area. These are the steeper slopes in the area, as well as the slopes more commonly containing rock exposures similar to the proposed highwalls

5. The fill areas at the base of the highwalls will be stabilized by reseeding and the use of erosion controls as discussed earlier. The toe of these areas will be terraces or gentle slopes (less than 10%) adding to their stability. These will eventually take the appearance of "talus slopes" a common structure at the base of exposed cliffs in this area. The natural weathering of cliffs and highwalls

will be very similar, providing for a furthur compatibility with the geomorphic processes of the area.

6. The existing (and proposed) highwalls will be stable. There are no seeps known to exist in any areas where highwalls are proposed to be left. The stability analysis run on this site show the highwalls of the pad and road areas to have a static safety factor of 2.61 for dry conditions and a factor of 2.41 for saturated conditions. Each of these far exceed the 1.3 safety factor required for highwalls proposed to be left or reduced. (Details on the stability analysis are included in the next section).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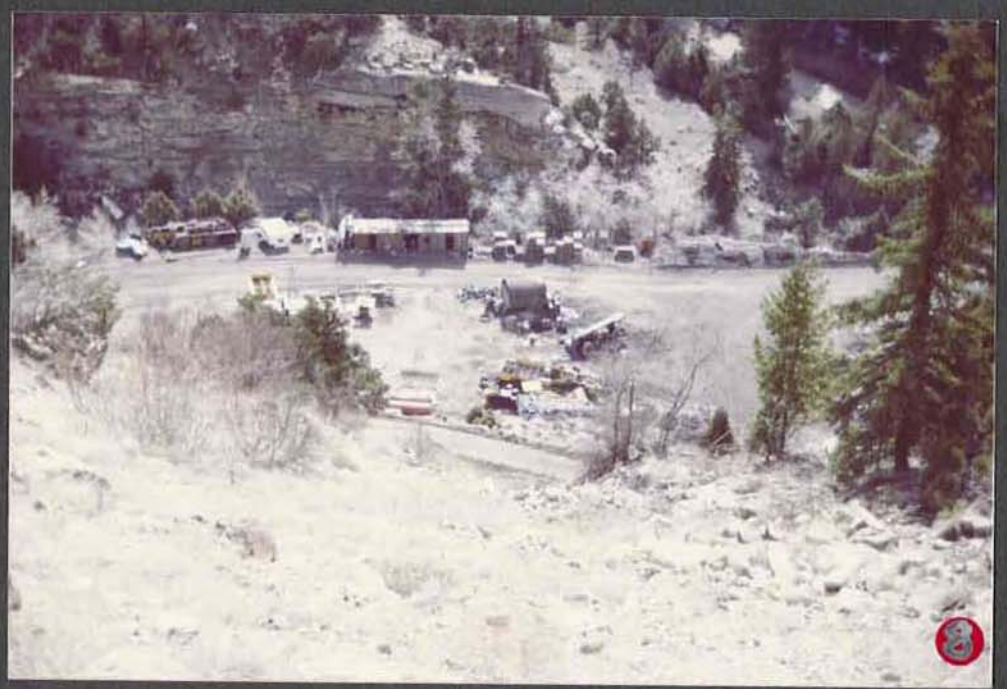
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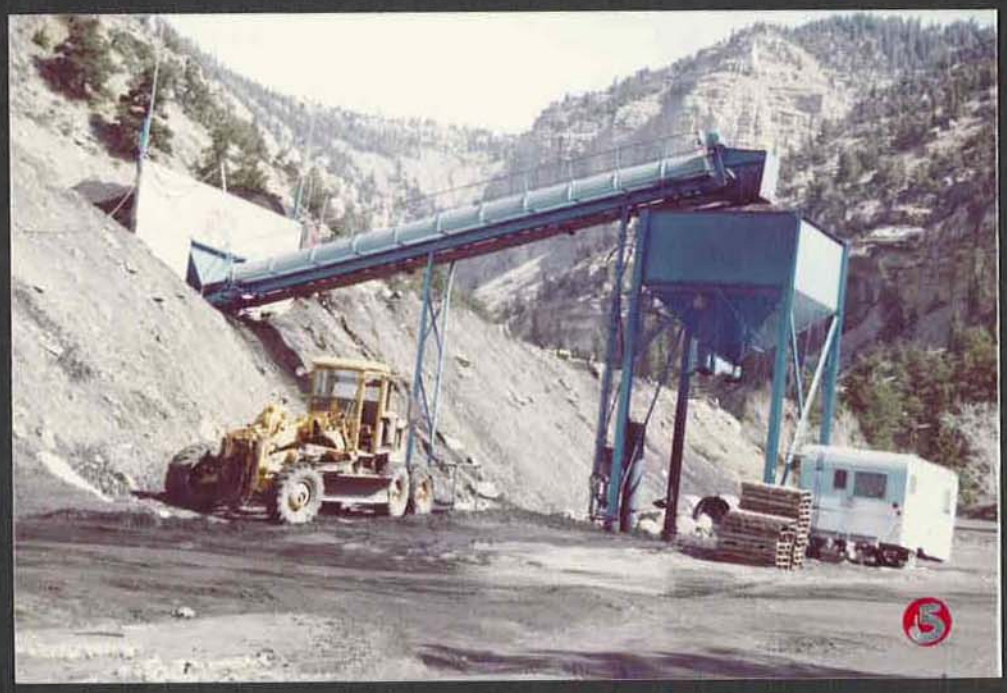
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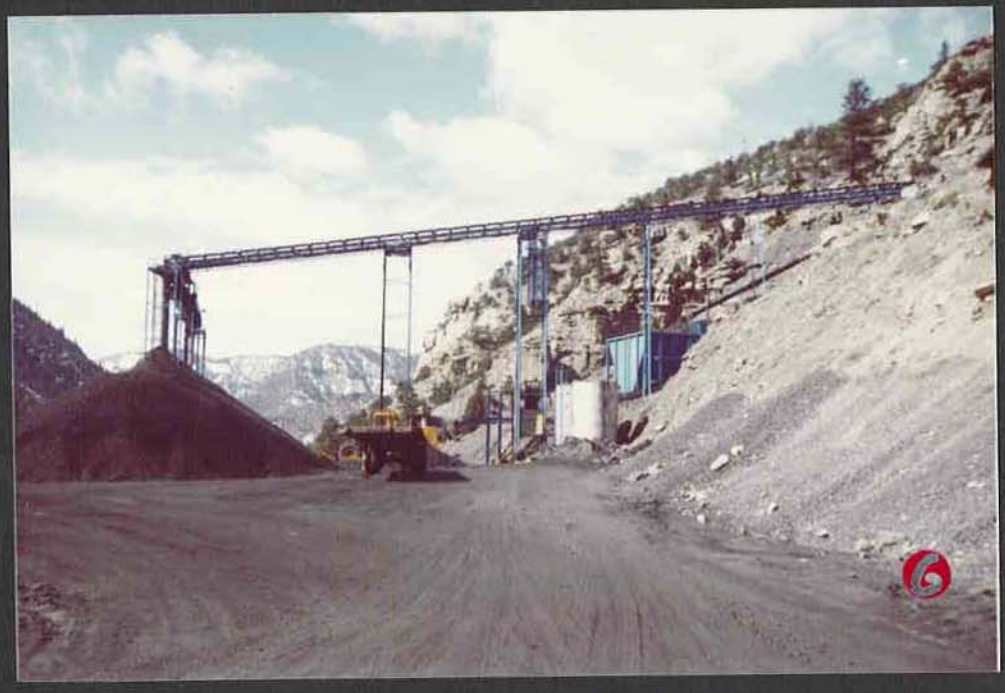
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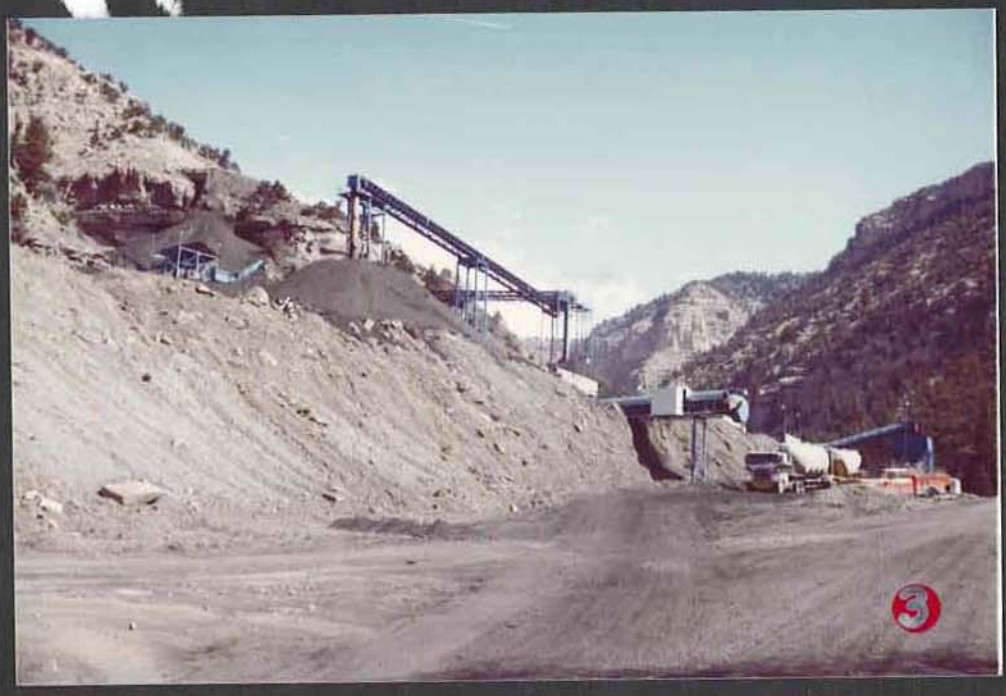
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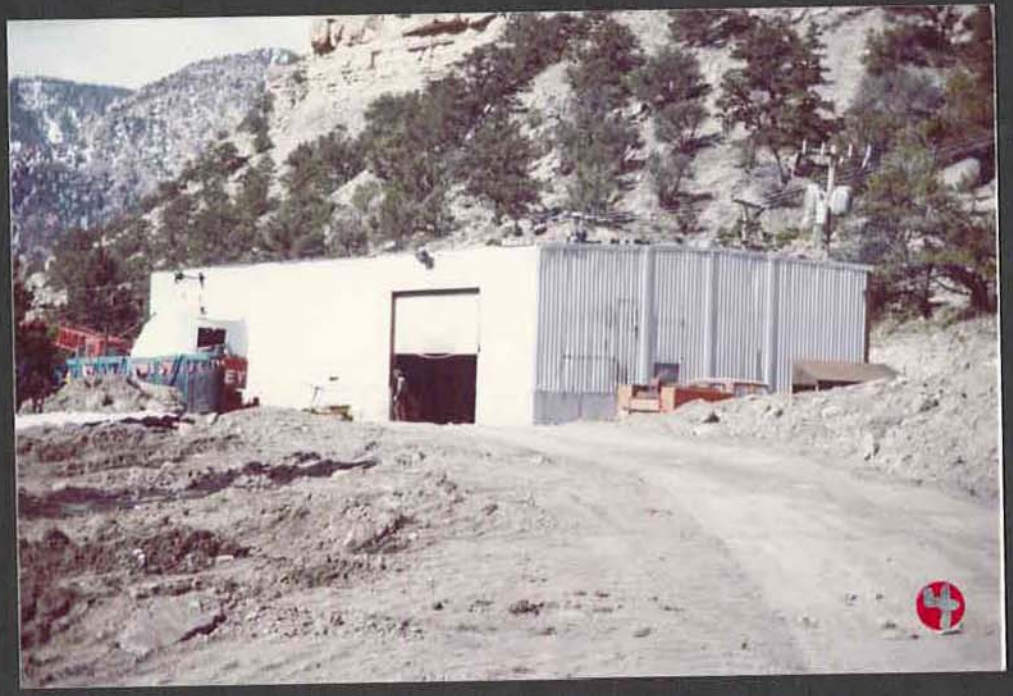
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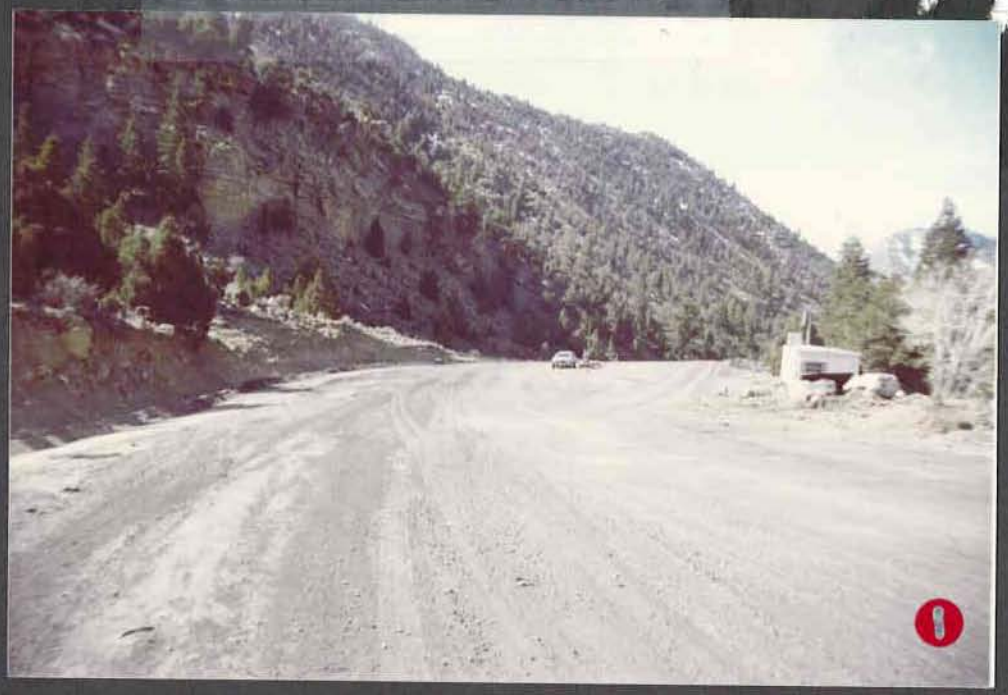
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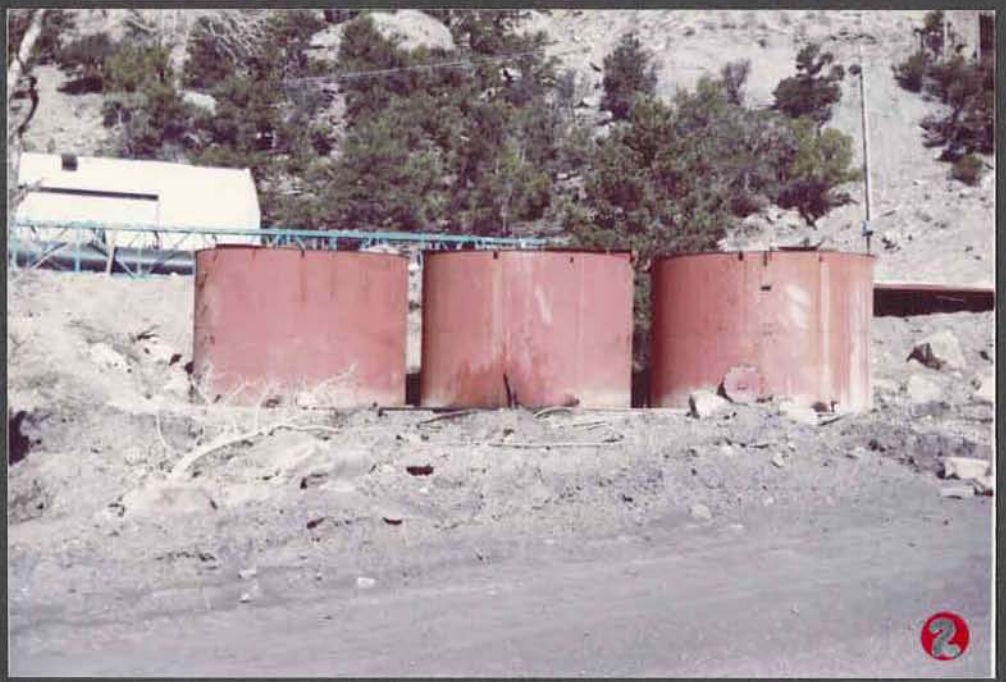
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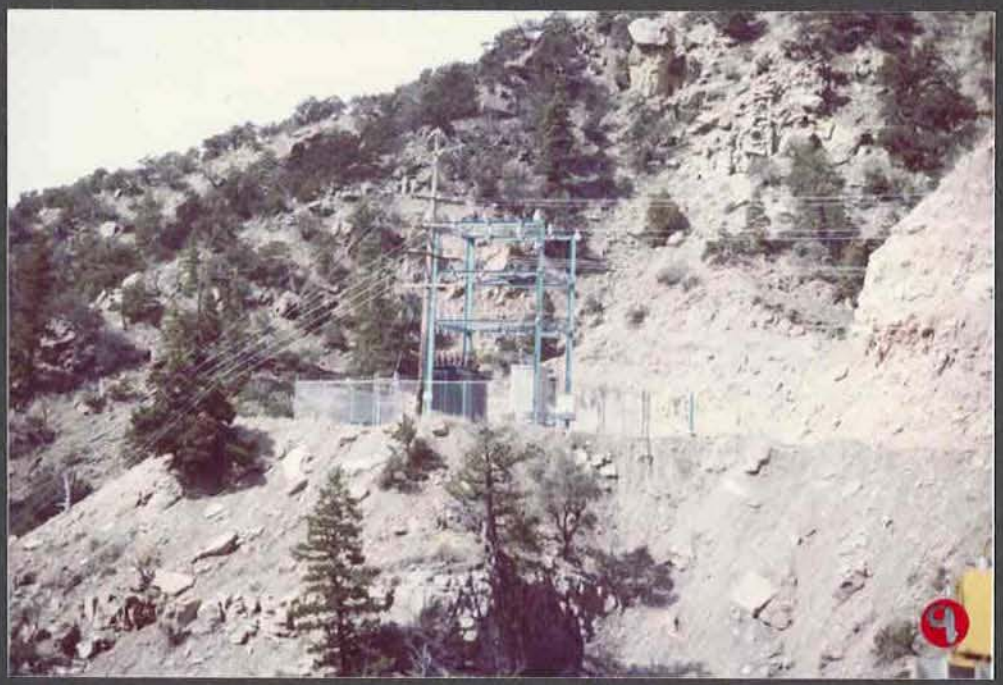
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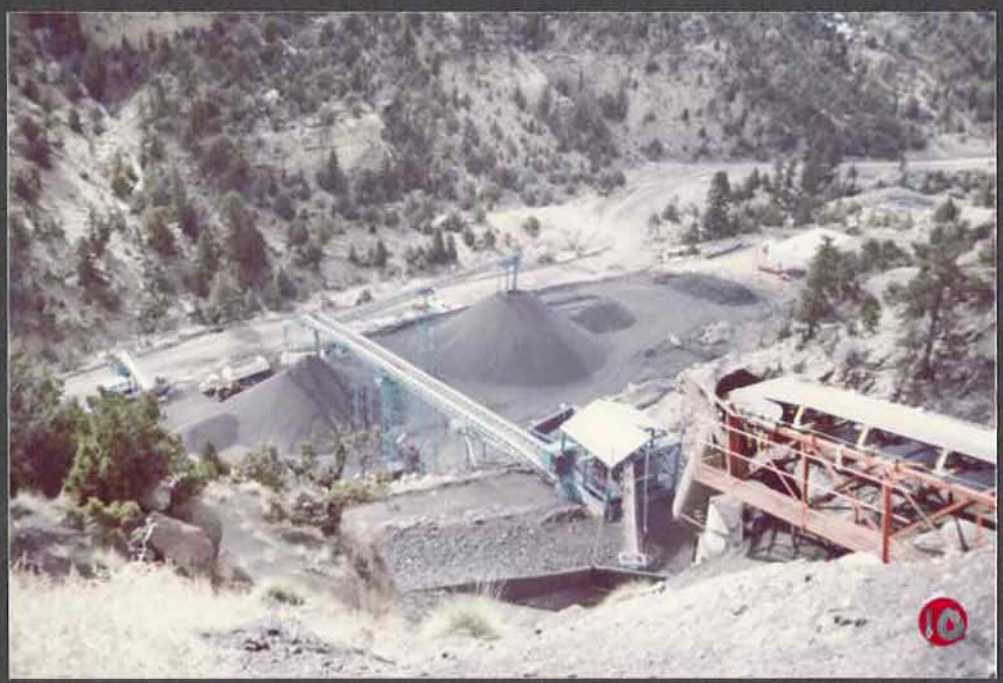
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GAS & MINING

APPENDIX 3-G

ROADS

Class I Roads

The Bear Canyon Haul Road is approximately 1800' long from the gate to the scale house as shown on Plates 3-5 and 2-2. As shown on the map, this portion of the road has been included in the Permit Area. This Class I road is constructed 30' wide and is surfaced with 6" of 3/4" gravel, crowned in the middle as shown on the cross section. Drainage will be provided along the road by ditches with a minimum depth of 1.8 feet. Erosion protection, such as straw bales at 100' intervals or 6" median diameter rip rap on a bed of -1" gravel 6" thick, shall be provided in all areas where velocities are expected to exceed 5 ft. per sec.. Culverts are installed as shown on the drawings; In addition, the two proposed 30" CMP culverts are now in place as indicated on the map. Culvert inlets will be protected by rock-lining or concrete headwalls. In areas where culverts are placed, at least 30" of headwater depth is available to allow for a avariance to allow the 18" culverts to pass the 10-year, 24-hour storm event. The culvert on the submitted drawing is to scale, and was installed with a trash rack to prevent plugging, a rock headwall at the inlet, and rip rap at the outlet to prevent erosion.

This road will be maintained in such a manner that the performance standards will be met throughout the life of

the entire transportation facility, including maintainance of the surface, shoulders, parking and side areas, and erosion control structures for safe and efficient utilization of the road.



Upon completion of the operation and reclamation of the mine site disturbed area, it is anticipated that this portion of the Bear Canyon Road will also be reclaimed. This will occur at approximately the same time as the final removal of the sedimentation pond and diversions on the mine site. The road surfacing material will be removed and either salvaged or disposed of within the pond site and buried. The reclamation will then be accomplished by ripping up the remaining base, spreading the material across the (roadway) disturbed area, and planting the area with the approved seed mix. During this time, all culverts shall be removed and either salvaged or disposed of in an approved landfill, and the natural drainage patterns shall be restored.

Class II Roads

The mine area and portal access road is approximately 2,112' long. A cross-section and profile of this road is shown on Plate 3-5. Culvert locations and ditches are also shown on this drawing, as well as on Plate 3-1. This road is primarily used for access to the mine portals and

other facilities. The road was originally constructed for access to the old Bear Mine, and has since been widened and fitted with proper drainage controls to protect the environment. The road is designed, used and maintained to meet the requirements of UMC 817.151 - 817.156, and to control or minimize erosion and siltation, air and water pullution, and damage to public or private property.

The road is located along the canyon floor above the stream, and along the stable slope leading to the portals. The overall grade of the road does not exceed I:V:10h (10%) and the maximum pitch grade does not exceed IV:6.5h (15%). The horizontal alignment is consistent with the existing topography and with the volume, speed, and weight of anticipated traffic.

As mentioned earlier, the initial road was constructed under pre-law conditions, using the cut/fill side-cast method. A stability analyses was performed on the road by Dames & Moore in 1981 (Appendix 3-F). Their conclusion was that the Bear Canyon Portal Access Road has a stability factor of safety of a minimum of 1.43, and ranges upward to 2.15.

There are 3 other Class II roads within the Permit Area. Following is a description of each of these:

1. Road to Sediment Pond A - This road is 430" long, and was constructed to allow access to the Sediment Pond and to facilitate cleaning of the drainage to the pond. The road has an overall slope of approximately 4.0% and does not exceed 15% at any point. The horizontal alignment is consistent with the existing topography and with the volume, speed, and weight of anticipated traffic.

2. Road to the coal preparation facility - This road is 600' long, and was constructed to provide access to the Coal Preparation Facility. The road has an overall slope of approximately 10.0%, and does not exceed 15% at any point. The horizontal alignment is consistent with the existing topography and with the volume speed, and weight of the anticipated traffic.

3. Bathhouse Road - This road is 160' long, and provides access to the bathhouse. The road has an overall slope of approximately 3.0%, and does not exceed 15% at any point. The horizontal alignment is consistent with the existing topography and with the volume, speed, and weight of the anticipated traffic.

Ditches and culverts have been added to the roads to control run-off and safely pass the run-off from a 10-year, 24-hour precipitation event. (See Plates 3-1 and 3-5). Ditches shall be maintained at a minimum depth of 1.8 feet, and at least 30" of headwater depth will be maintained at the inlet of the 18" culverts. Culverts are fitted with trash racks to prevent plugging, and buried and compacted a minimum of 30" to prevent crushing. In areas where velocities of run-off exveed 5 fps, erosion protection such as straw bales at 100' intervals or 6" median diameter rip rap on a bed of 2" gravel/sand 6" thick shall be maintained. Culvert spacing conforms with the requirements of UMC 817.153(c)(z) (i) Rock or concrete headwalls shall be provided at the inlet to all culverts, and rip rap or other erosion protection shall be provided at the outlet.

The roads are surfaces with 4" of -3/4 gravel, and is maintained in such a manner that the approved design standards are met throughout the life of the facility. Damage to the roads from use or weather events shall be promptly repaired.

These roads shall be removed upon completion of the mining operation. The timing and procedure of removal and reclamation is discussed in detail uner the Backfilling and Grading Plan in Sec. 3.6.4.

Class III Roads

The only Class III Road on the permit area is a jeep trail that was constructed pre-law, probably as a cattle trail. This road is shown on Plate 2-2, Surface Facilities Map. The road is blocked off and is not used; therefore, no maintenance or reclamation plan is proposed for this trail.



All roads shall be maintained in such a manner to prevent damage to fish, wildlife, and related environmental values. This is accomplished by:

1. Maintaining hydrologic controls, such as ditches, culverts, diversions and sedimentation ponds to assure that disturbed drainage is conveyed away from undisturbed drainages and either held or cleaned before releases.

2. Watering of roads as necessary to reduce fugitive dust.

3. Protection of wildlife within the permit area and reporting of sightings of threatened and endangered species.

4. Contemperaneous reclamation.

5. Advocating good-housekeeping practices to reduce the possibility of contamination of surface waters in the area.

6. Co-Op is committed that all support facilities will be restored to prevent damage to fish, wildlife, and related environmental values and the possibility of additional contributions of suspended solids to streamflow or runoff outside the permit area will be minimal.

APPENDIX 3-5-8A

# SUBSIDENCE CONTROL AND MONITORING PLAN

5/10/85

Structures

No manmade structures occur anywhere above the Bear Canyon Permit Area.



Renewable Resources

The renewable resources that exist above the mine area are of a hydrologic and vegetative nature.

The vegetation resource above the mining area consists of some rangeland for grazing of stock and wildlife and limited potential for timbering. Again, past mining in the area has indicated no surface effects upon this resource. If subsidence should occur, the effects would be minimal, possible resulting in some fractures or slight depressions. The effect upon the vegetation resource would also be minimal, since subsidence (should it occur) is not likely to destroy vegetation, but merely displace it. It is not expected that subsidence will have any negative effect upon the plant communities or even become evident on the surface. Should this happen, mitigation measures may include: filling of fractures, regrading of broken areas, replanting degraded areas, intensified monitoring.

The hydrologic resources above the mining area consists primarily of a potential recharge zone for groundwater resources (springs) located in the strata below the mining. While it is unlikely that mining

activities will have any effect upon the springs, there is some potential for mining to have an effect upon the upper recharge zones. The potential effect of mining on the hydrologic regime, as well as any proposed mitigation measures are discussed in detail in Chapter 7 of the PAP.



Mining Methods

Mining at the Bear Creek Mine is conducted by the room and pillar method. This method may result in 75% - 80% extraction within the pillar panels, with an overall extraction of approximately 50% for the entire reserve. Longwall mining is not currently a proposed mining method for this mine.

A 200' barrier is porposed to be left between the mining and the coal outcrop, and a 100' barrier will be left between mining and property boundaries.

It is not proposed to leave any other coal permanently in place for protection of resources above the mine, since thw resources that could potentially be affected by subsidence are not localized, but exist above the entire area. It is therefore proposed that subsidence protection measures will be employed only at the outcrops (and property boundaries), and that the company be prepared to implement mitigation measures as proposed if such resources are negatively impacted.

Subsidence

Subsidence can normally be expected to occur over areas where second mining has taken place (pillaring). Based on the geologic interruptions within a mine, subsidence becomes very difficult to predict, due to the variable nature of the mining panels. However, the attached Figure will give an estimate of the maximum subsidence that may be expected in mines studied in the Western U.S. Maximum subsidence for an average panel in the Bear Canyon Mine has been estimated from Figure 1, using the following criteria:

Panel Width - 600'

Average Depth $\pm$ 800'

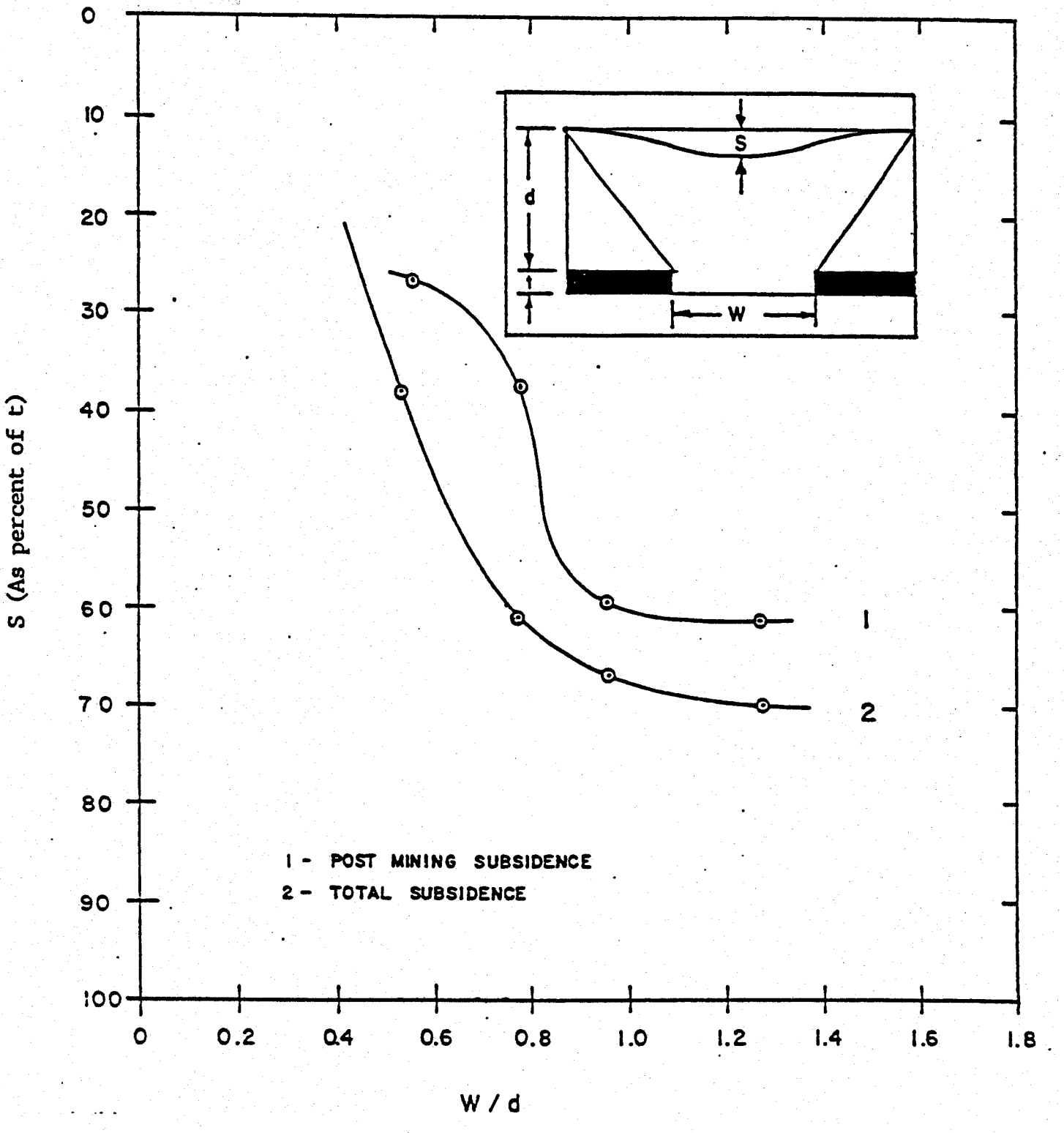
Width/Depth Ratio - 0.75

Seam Thickness - 9.0'

Based on this criteria and the graph, subsidence could reach a maximum of 5.40' directly over a pillared panel. However, since past pillaring has been performed in this general area as much as 40 years ago, and there are ano obvious surface expressions of resulting subsidence, it is expected that this figure will be substantially less, if even measureable.

If both the upper and lower seams are extracted, maximum subsidence has been estimated from Figure 3-6 for the lower seam as follows:

Figure 1




Maximum subsidence, as a percentage of seam thickness, versus width/depth ratio for room and pillar mining at Somerset, Colorado (after Dunrud, 1980).

Panel Width - 600'

Average Depth - 860'

Width/Depth Ratio - 0.70

Seam Thickness - 5.0'

Based on the graph, subsidence for the lower seam could reach 3.20' directly over a pillared panel, and 8.60' if both seams are pillared. Again, past experience in this area shows no indication that subsidence would be this drastic.

Monitoring

Since subsidence may occur over any underground extraction, it is proposed to set up and maintain a monitoring network as described below.

It is proposed to install two permanent subsidence monitoring points, one at each end of the property, to allow for an on-going evaluation of subsidence or other mining-related surface impacts. The stations shall be monitored at nominal 6-month intervals, for changes in elevation, tilt or rotation. In addition, a field investigation shall be made at least once per year, and any obvious subsidence or mine related surface effects will be noted and located on a map. A copy of the results of the subsidence survey and map will be available for inspection at the office, and a summary of the survey results will be sent to the Division within 60 days following the final survey for the year.

It is proposed to use the SMS, or the Subsidence Monitoring System, described in detail in the following pages. This system is available commercially, and if approved by the Division, the program will be implemented in the Spring/Summer of 1985. The monitoring program will continue until the completion of reclamation has occurred. Location of monitoring stations are shown on Plate 3-3.

During the operation, all owners of property within the area that could be impacted by subsidence shall be notified by mail six months prior to mining beneath their property and be informed of:

1. Specific areas mining will take place
2. Dates of underground operations that could cause subsidence in the area.

3. Measures to be taken to prevent and or control adverse surface effects.

Co-Op Mining Co. furthur commits to the following course of action should subsidence cause any material damage or a reduction in value of structures or land.

1. Restore, rehabilitate, or remove and replace, to the extent technologically and economically feasible, each meterially damaged structure, feature or value promptly after the material damage from subsidence is suffered, to the condition it would be in if no subsidence had occurred and restore, to the extent technologically and economically feasible, those surface lands that were reduced in reasonably foreseeable use as a result of such subsidence to a condition capable of supporting before subsidence; or

2. Purchase the damaged structure or feature (except structures or features owned by the person who conducted the underground coal mining activities) for its pre-subsidence fair market value. The person conducting the underground coal mining operation shall promptly, after the material damage or reduction in value or reasonably foreseeable use from subsidence occurs, to the extent technologically and economically feasible, restore the purchased structure or the structure owned by the person conducting the underground mining operations, restore those surface lands that were materially damaged or reduced in value or reasonable foreseeable use by such subsidence,

to a condition capable and approporate of supporting the structure, and any other foreseeable uses such surface lands were capable of supporting before mining. Nothing in the paragraph shall be deemed to grant or authorize an exercise of the power of condemnation or the right of eminent domain by any person engaged in underground coal mining activities; or

3. Compensate the owner of any surface structure in the full amount of the diminution in value resulting from subsidence, by purchase prior to mining of a noncancellable premium prepaid insurance policy or other means approved by the Division as assuring before mining begins that payments will occur; indemnify every person owning an interest in the surface for all damages suffered as a result of the subsidence; and, to the extent technologically and economically feasible, fully restore the land to a condition capable of maintaining reasonably foreseeable uses which it could support before subsidence.

SUBSIDENCE MONITORING SYSTEM

Introduction: The Subsidence Monitoring System (SMS) is a complete subsidence and surface effects monitoring system for underground coal mines. The system consists of a monitoring tower and graduated base plate, which, when properly installed, allows for easy measurement of elevation changes, as well as magnitude and direction of tilt and rotation of the station. The SMS stations can be purchased separately and owner-installed, or they can be purchased with installation included. Precise surveying is required for initial set-up, as with all monitoring stations.

Purpose: The SMS is designed to assist underground coal operators to comply with the requirements of the subsidence monitoring and protection portion of the Surface Mining Regulations administered under the Office of Surface Mining (and related State Agencies) and the 43 CFR 3246 regulations under the Bureau of Land Management.

This station offers complete "subsidence" or "surface effects" data for undermined areas, by facilitating the measurement of elevation change, degree and direction of tilt, as well as rotation. Most subsidence stations are nothing more than a survey point and provide only data on elevation changes, completely ignoring the other common surface effects of underground mining - ground tilt and rotation. By determining all applicable surface effects, and correlating such effects with known mining conditions, the operator has a much better chance of predicting potential surface effects of the operation, and supporting those predictions as required.

The question of subsidence has long been a "gray area", not only in the industry, but particularly in the regulations. Laws require prediction (and generally monitoring) of mine subsidence; however, until recently, no definite guidelines or criteria have been pushed by

the agencies. This is changing with the advent of the "Permanent Program Approvals" required by the surface mining agencies, and the gradual "maturing" of the agencies themselves. The SMS is designed to allow an operator to get into and remain in compliance with the regulations, and when properly implemented, this system is guaranteed to comply with the requirements of the law and provide adequate data to allow reasonable prediction of surface effects from underground mining.

The SMS stations are initially somewhat more costly and complicated than conventional subsidence monitoring "points", however, not only will they provide more complete and reliable data, they will also result in cost savings as the monitoring program continues. The following is a partial list of the positive attributes of this system:

(1) Permanent installation.

(2) Elevations can be shot directly from long distance, reducing manpower and field costs.

(3) Station monitoring (other than elevation) requires only a plumb-bob and 60' of string, reducing time and effort from packing survey instruments over the mountainous terrain.



(4) Station monitoring can be done in conjunction with required field inspections and/or aerial flagging visits.

(5) The system works extremely well with an aerial monitoring program, reducing survey time and costs.

(6) Provide measurement of elevation, as well

as magnitude and direction of ground tilt and/or rotation.

(7) Meets or exceeds agency guidelines.

(8) Assures continued compliance, even if requirements are more strictly enforced or made more stringent.

The SMS is proposed to the industry for two main reasons:

1. To provide for complete and reliable data on the actual surface effects of underground mining.

2. To provide data that will enable companies and agencies to better predict possible surface effects of underground mining under various cover and extractions conditions.

With reliable data, it is conceivable that this program could ultimately result in the ability to predict that no surface effects will occur under certain mining conditions, possibly eliminating the need for further monitoring in the future. Thus, the ultimate goal of the SMS may very well become the elimination of its need under certain circumstances.

Principle: The SMS is designed to serve as a permanent subsidence monitoring point. It can either be used in conjunction with a conventional elevation survey, or with elevations determined from an aerial survey. In addition to providing an elevation base, this station readily displays direction and magnitude of tilt and/or rotation. The following procedure should be followed each time the station is checked:

(1) An elevation should be determined at the center of the base plate This can be accomplished by:

(a) A conventional level survey from a known, undisturbed benchmark.

(b) Shooting the station from a distant, known benchmark and calculating the new elevation by use of the vertical angle;



(c) Performing an aerial survey to determine new elevations; Note that the SMS lends itself very well to (a) & (b) above, both of which require a minimum of manpower and time.

(2) An inspection of the surface around and between stations should be made, and any possible subsidence effects should be noted.

(3) A plumb-bob should than be hung from the hook inside the station cap, and allowed to swing freely about 1/8" above the base plate. If the point of the bob hangs directly over the center of the base plate, no tilt has occurred. If the plumb-bob point rests outside of the base plate center, the direction of tilt can be closely estimated from the compass on the base plate, and the degree of tilt can be read directly off the concentric rings on the plate. Record the results and;

(4) Remove the plumb-bob. Next, tie one end of the 50' - 60' string onto the south reference point and stretch the line through the station legs, tying it off on the north reference point. (The line should be free and taut between the points.) Now observe the location of the line in relation to the north-south line on the base plate. If the lines coincide, no rotation has occurred. If the line does not match the base plate north-south line, the degree and direction of rotation can be readily determined from the compass on the plate. It should be noted that the direction of rotation will be opposite to that shown on the compass. (Example: If the line matches the N 15 E bearing line on the plate, the degree of rotation is 15 , and the direction of

actual rotation is N 15° W.)

(5) Record all results and proceed to the next station.

A great deal of time and effort can be saved by locating several (or all) of the SMS stations in view of a single benchmark or reference station. In this manner, vertical angles can be shot to all visible stations from a minimum number of set-ups. The stations are made to allow for direct readings over a long distance, eliminating the need for a rodman to go to each station. This allows for completion of the elevation survey in a single step, eliminating the need to pack a transit or level to each of the stations. The only apparatus required for the rotation and tilt determinations is the plumb-bob and 60' of string.

The SMS system is even further simplified when used in conjunction with an aerial survey. Once initial elevations are determined, all that is required is a visit to each station to install (or check) the aerial flagging - of course, the tilt and rotation should be monitored at this time, with elevations to be determined during the aerial survey. In this situation, no transits or levels are needed at all, beyond the initial installation.

## SUBSIDENCE MONITORING SYSTEM
## SPECIFICATION SHEET

1 - 6' aluminum tower, graduated in 0.1' intervals, painted red and white with black numerals. Note: Tower is 8' long, allowing for 2' in ground.

1 - 6.28" diameter, aluminum baseplate, inscribed in 15° compass increments and $\frac{1}{2}$° tilt indicator.

1 - North Reference Point

1 - South Reference Point

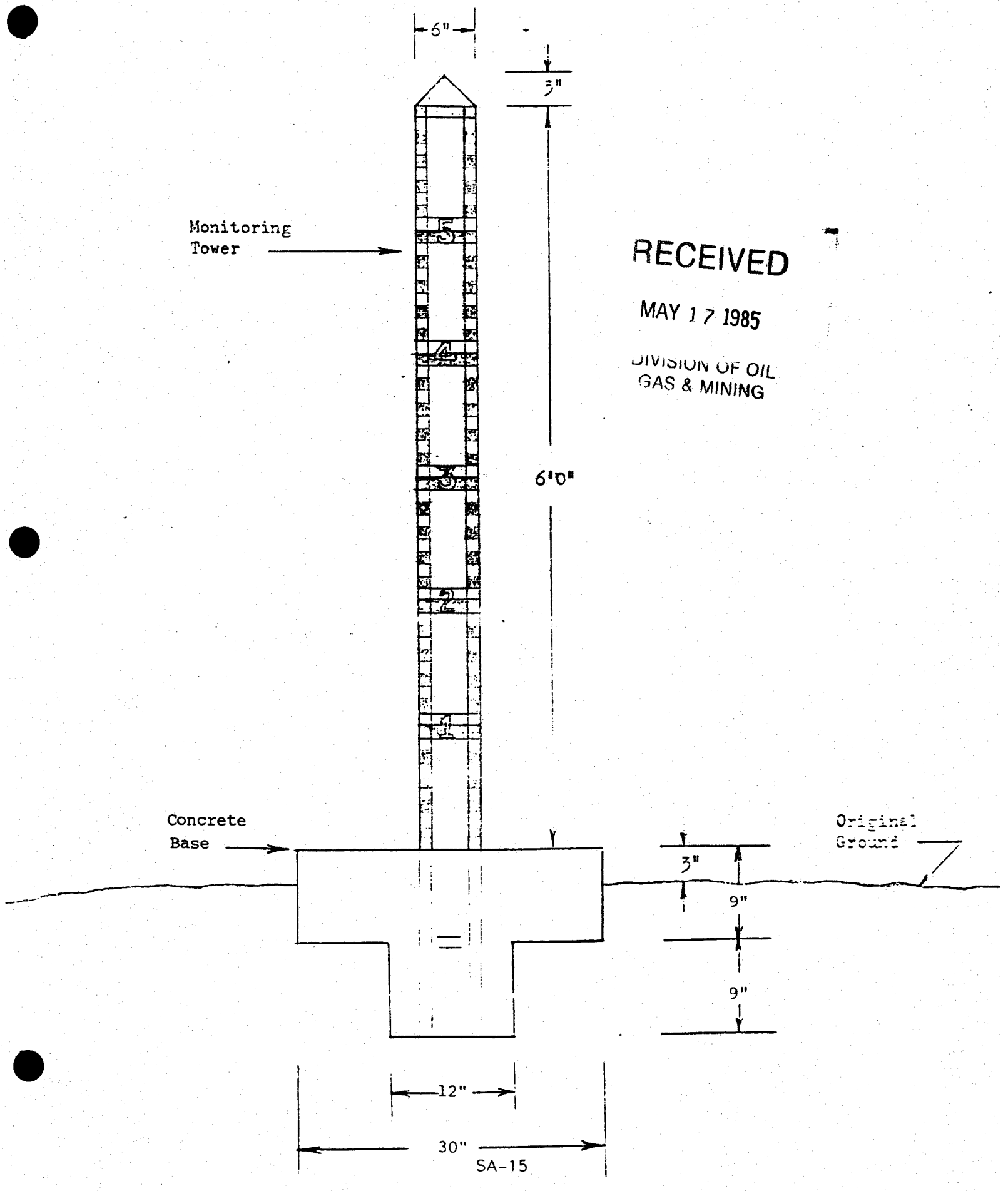
1 - Plumb-bob Hook

1 - 2" X 4" Brass Name Plate

6 ft.$^3$ Concrete for Installation (Provided only with installation package).

SMS MONITORING STATION

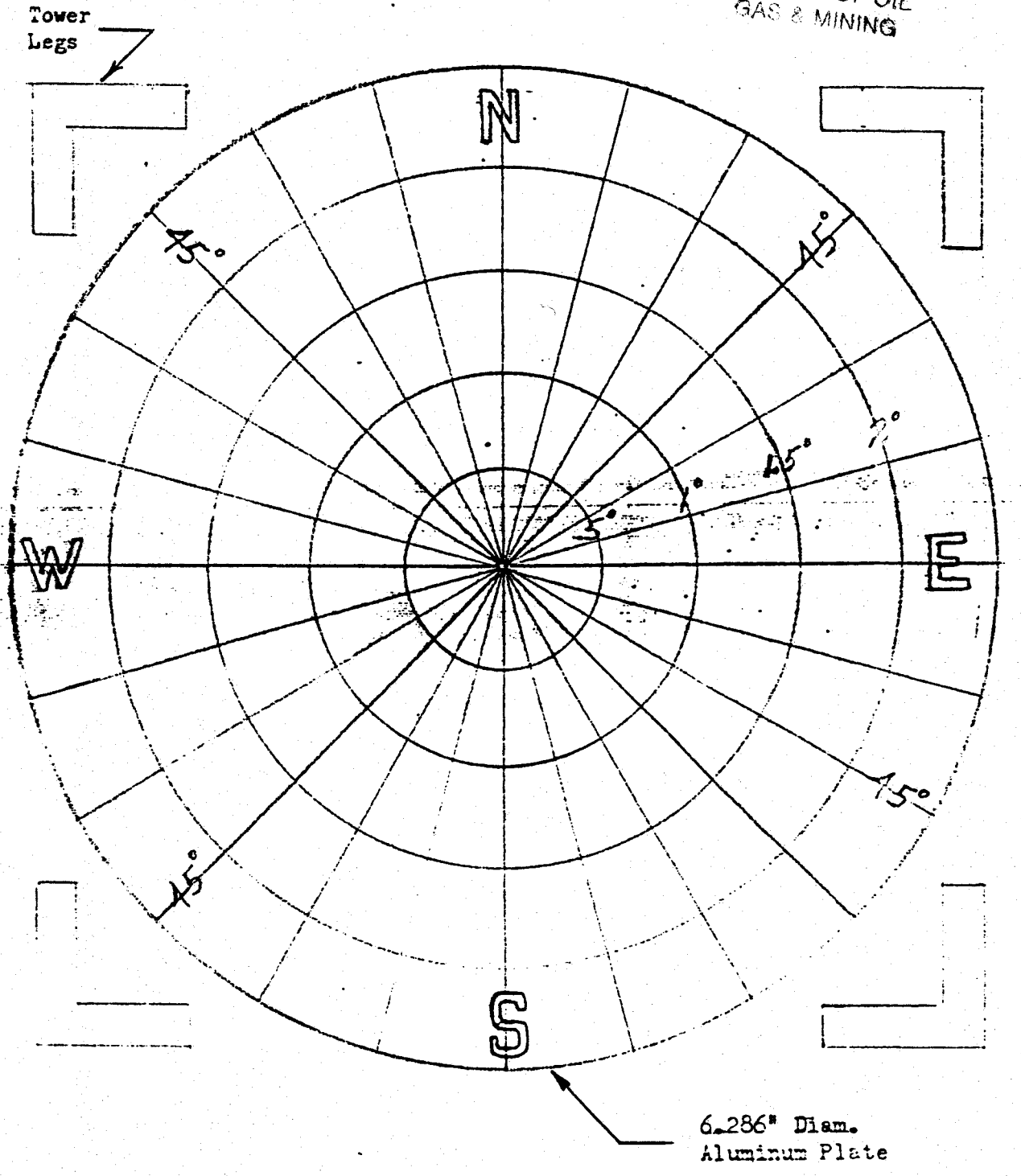
Scale: 1"=1'

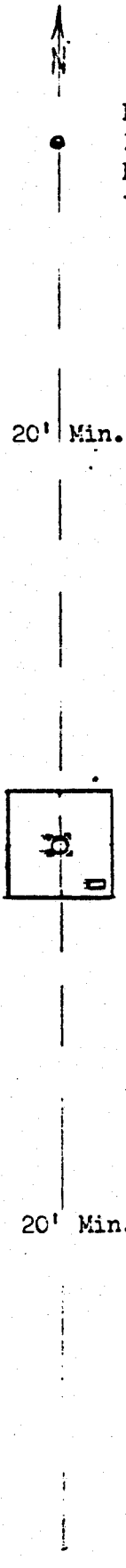


## SMS BASE PLATE

(Actual Size)










SMS STATION LAYOUT
(Plan View)

# CHAPTER 4

# LAND STATUS, LAND USE AND POSTMINING LAND USE

CHAPTER 4

Table of Contents

## 4.1 SCOPE

This chapter describes the status of the land within and adjacent to the permit boundaries of the Co-Op Coal Company's property located in the La Sal Mountain Range. Current land uses are described, along with plans for post mining land use. A brief discussion of socioeconomics is also included.

## 4.2 METHODOLOGY

This chapter is based mainly on the collection and review of existing published information. Existing legal documents and maps were used to support the section on land status. The discussion of current land use is based on scientific data and expert testimony from representatives of the SCS, BLM, UDWR, and the U. S. Forest Service, supplemented by information from a field survey of local, state, and federal land use policies and plans.

## 4.3 LAND STATUS

### 4.3.1 Surface Land Status/Mine Plan Area

The land within the Co-Op Mining Company's permit area fall under the jurisdiction of the State of

Utah, Emery County, and private surface owners. [See Plate 2-1].

County zoning ordinances classify the permit area as Industrial, to be used for "mining".

#### 4.3.1.1 Ownership

Plate 2-1 shows the ownership of property within and contiguous to the permit boundaries. Land parcels within or adjacent to the permit boundaries are designated by capital letters. The fee owner of surface and mineral property rights, and holder of record of leasehold surface and mineral interests within the permit boundary is Cop Development Co.

#### 4.3.1.2 Surface Managing Authorities

Plate 2-1 also shows the surface managing authorities for each parcel within the permit boundaries. These local, state, and federal managing authorities are Emery County, State of Utah, and the U.S. Forest Service.

The Emery County zoning ordinance zones the coal property for mining.

#### 4.3.1.3 Utility Corridors and Other Rights-of-Way

Co-Op Mining Company has been granted a mine access right-of-way in Section 26 [see Plate 7-1]. Utility corridors, such as power lines, telephone lines and water pipes, are also shown in Plate 7-1.

#### 4.3.1.4 Special Use Permits and Leases

Co-Op Mining Company leases land owned by Cop Development Company. Special Use permits and leases are not applicable.

Grazing, oil and gas, and other mineral leases for the permit area are owned by Cop Development.

### 4.3.2 Mineral Ownership/Mine Plan Area

Other than coal, no minerals of value have been mined within the lease and permit area. No other mineral resources are known to be present in commercial quantities.

4.3.2.1 Coal Ownership and Mines [Permit Area and Contiguous Areas]

Coal ownership and mines in the permit area and contiguous areas are shown in Plate 2-1. The names and addresses of the owners of coal in the area are listed in Section 4.3.1.1.

4.3.2.2 Coal Leases

The following coal leases are held by the Co-Op Mining Company adjacent to the permit area. For the locations of these coal leases, please refer to Plates 2-1, 2-1-A.

Trail Canyon Permit area

Bear Canyon Premit Area

4.3.2.3 Mineral Ownership and Mining Map

Plate 2-1 shows the mineral ownership of land parcels adjacent to the permit boundaries. Section 4.3.1.1 lists the fee owners of mineral property. Table 2-1 furthur lists the miner owners of each land parcel adjacent to the permit boundary.

#### 4.3.2.4 Mineral Leases

Not Applicable

#### 4.3.2.5 Oil and Gas Ownership and Wells

No oil and gas interests are represented.

#### 4.3.2.6 Oil and Gas Leases

No oil and gas lease interests are represented.

## 4.4 LAND USE

The land in the project area and adjacent areas is used for mining, cattle grazing, recreation, and wildlife. Recreational uses consist primarily of hunting, camping, and picnicking. Past and present land uses of the project area and the region as a whole are discussed in the following sections.

### 4.4.1 Regional Land Use

The South East Utah coal region encompasses lands in federal, state, county, and private ownership. Land use management plans for public and National Forest lands generally allow for mine and mine-related

activities. Coal mining has been an integral part of the region's economy. Mining and related construction activity dominate employment in Emery county. Active mining is going on in areas adjacent to the project area and one new mine has been proposed adjacent on the east of the permit area.

Historically, the livestock industry has been an integral part of the region's economy. Early settlers depended on range land for grazing sheep, cattle and horses. As time passed, grazing operations became smaller, more numerous, and directly associated with small farms. Timber also has been tied to an integral part of the economy of the region, but on a much smaller scale than the livestock industry. Early settlers needed fenceposts, corral poles, house logs, mine timber, railroad ties and lumber; numerous small sawmills supplied local needs. As time passed and needs diminished, most mills went out of business. Little timber has been harvested for commercial purposes in the past 20 years.

Recreational use of the general region of the permit area consists of hunting, camping and picnicking. Snowmobiling also occurs where the slopes are not too steep.

## 4.4.2 Land Use in the Mine Plan Area

### 4.4.2.1 Existing Use

The Co-Op Mining property and adjacent area is currently used for grazing, recreation and coal mining.

Plate 2-1 coupled with Tables 2-1 2-2 show the fee ownership and leasehold interests adjacent to the permit boundary and the fee ownership of contiguous areas. This information provides a guide to the land uses of the various parcels.

The surface under which Co-Op Mining Company has leases is managed by the Co-Op Mining Company's owners under multiple use and sustained yield concepts. Present management emphasizes livestock grazing and wildlife; and watershed development. Coal preparation and management facilities are located on fee land.

Grazing

Private land owned by Cop Development Company is not grazed presently.

Recreation

Recreational use of the area affected by mining operations consists primarily of hunting and camping. Heavy hunting of mule deer occurs on the area. Camping frequently occurs on land adjacent to the property.

Forestry

There is no merchantable timber although much of the area is covered by pinyon pine and juniper.

Mining

The type and extent of mining activities are discussed in detail in Chapters 3 and 12.

4.4.2.2 Historical Use

Historically, the area in question was [illegible] of an active coal mine. However, during last five years, land use within the per boundary has not changed in any essenti

### 4.4.2.3 Land Capability and Productivity Before Any Mining

Present land capability and productivity will be only slightly reduced compared to the after mining capability. Mining activities have proceeded on the current lease areas of the Co-Op Mining Company historically with only minor effects on productive capabilities in terms of soils, topography, vegetation or hydrology. The soils indigenous to the area affected by the operations are described in Chapter 8. Vegetation is discussed in Chapter 9.

Surface water in the permit area is limited to surface run-off that flows most heavily during the spring and early summer months and then normally dry up. The quality and quantity of this water and of the ground water will be identified in Chapter 7.

### 4.4.2.4 Land Productivity Before Mining in Terms of Average Yield of Food, Fiber, Forage or Wood Products

Land productivity in terms of plant products

before any mining will not differ greatly from future productivity. Early settlers depended upon range land for grazing sheep, cattle and horses. Timbering was active, but on a much smaller scale than grazing. Early settlers needed fenceposts, corral poles, house logs and railroad ties.

The permit area affected by Surface operations and facilities of the underground Bear Canyon mine is capable of supporting limited grazing and recreational uses. Farming in the area is prohibited by the steep and rocky terrain.

Current and future land use will suit the physical features of the mine plan area, which is mostly steep and rocky. Such land is well suited for management as a multi-use area and coal mining fits appropriately into the overall land use scheme.

Land productivity data were obtained from the U.S. Soil Conservation Service.

#### 4.4.2.5 Previous Mining

The Bear Canyon mine was started in 1896 and was worked until 1906. Then reopened in 1938 and worked intermittantly until 1957. At this point the mine was abandoned until Co-Op Mining re-entered in 1981.

##### 4.4.2.5.1 Mining Method

Room and pillar mining with continuous mining methods will be used with pillar recovery as mining conditions permit. The room and pillar system is the only logical choice for recovering the coal in the old workings and for driving development openings into the virgin areas.

All proposed mining will be done with continuous mining methods; coal loaded directly into diesel or electric shuttle cars, then to a belt system. The coal is transported directly out of the mine to a stockpile and then trucked to potential markets principally along the Wasatch front.

All proposed mining will be underground, with a minimum of surface disturbances. The current mining method is described in Chapters 3 and 12 in detail.

4.4.2.5.2 Coal Seams and Other Minerals Mined

Coal

The Co-Op Mining Company is located outside of Huntington, Utah, with the mine portal at approximately 7,300 feet above sea level. The coal-bearing strata are in the Blackhawk Formation. Coal will be extracted from 3 seams, which, from uppermost to lowermost, are the Upper, Bear Canyon, and, Lower seams. When mining began in the late 1800's, entry was made into the Bear Canyon Seam and coal extracted from it first. Mining has never been expanded into the other seams.

Minerals

No other minerals are known to exist within the permit area.

#### 4.4.2.5.3 Extent of Coal Removal

The quantity of coal presently removed from the old workings is unknown.

### 4.4.3 Land Use During Operations

Mining has been in progress in the permit area in past years and land use presently and during operation is described in Section 4.4.2.1 [Existing Use] and in Section 4.4.2.2 [Historical Use]. Therefore, the subsections below describe the differences between current land use as opposed to land use during mining or future land use.

#### 4.4.3.1 Effect of Operation on Land Use [On-Site and Adjacent]

There has been no significant land-use disturbance in the lease area due to mining activities since 1957. Land use should remain the same: recreation, grazing, wildlife and mining.

The simultaneous production of oil, gas, and coal should present no major conflicts. Though other minable coal seams may be at greater depths, the oil and gas zones are at sufficient depths to result in no overlap

between oil and gas zones and coal seams. Therefore, the production of oil, gas, and coal should be compatible.

#### 4.4.3.2 Mitigation of Effects of Operation

The operation of the Bear Canyon, as with any mine, will have some environmental effects.

## 4.5 POSTMINING LAND USE

### 4.5.1 Method of Achieving and Supporting Postmining Land Use

Chapter 3 present, in detail, the abandonment steps and revegetation/reclamation activities to be used to achieve the proposed postmining land uses.

Area Cleanup

Solid waste generated in the abandonment operation will be collected and removed.

## Return of Other Drainages to Natural State

Natural drainage will be returned to patterns similar to the original patterns to the extent that this is physically possible. [See Appendix 7-G .]

## Recontouring of the General Area

Grading and backfilling will be done to achieve a final contour suitable for the wildlife/grazing habitat specified as the postmining land use.

* Operational benches will not be removed. Their banks will be reduced whenever possible; their surface areas will have a 33h:1v slope for drainage.

* Side hill cuts will be reduced to the maximum extent physically possible. The cuts which are already physically stable will not be reduced.

## Wind Protection Barriers

In addition to the wind protection provided by the abandonment slopes, rock wind barriers will be constructed by a small portion of the rock generated during the

mining operation. During abandonment small piles of this rock will be formed on the upper decks to provide protection from wind for wildlife.

Scarifying Areas

Operational areas will be scarified to reduce compaction and to prevent topsoil slippage. Steep slope areas which must remain after abandonment will recieve special ripping to create ledges, crevices, pockets and screes. This will allow better soil retention and vegetation establishment.

Distribution of Topsoil

Topsoil from the stockpile will be spread over the distsurbed areas in such a manner as to prevent excessive compaction.

Fertilization and Neutralization

Fertilization or neutralization determined as necessary by soil testing will be done.

Seeding and Tree Planting

Vegetation will be established to prevent erosion,

mining operation. During abandonment small piles of this rock will be formed on the upper decks to provide protection and stability to reclaimed areas.

Scarifying Areas

Operational areas will be s[illegible]ed to reduce compaction and to prevent topsoil slipp[illegible] Steep slope areas which must remain after abandonment will recieve special ripping to create ledges, crevices, pockets and screes. This will allow better soil retention and vegetation establishment.

Distribution of Topsoil

Topsoil from the stockpile will be spread over the distsurbed areas in such a manner as to prevent excessive compaction.

Fertilization and Neutralization

Fertilization or neutralization determined as necessary by soil testing will be done.

Seeding and Tree Planting

Vegetation will be established to prevent erosion,

to optimize the edge effect and to provide cover. Perennial woody species will be emphasized, along with those of proven nutritional value and ability to support wildlife. The types and amounts of such vegetation are discussed in Section 9.7 and Appendix 9D.

Moisture Retention

If operational testing determines that moisture retention is necessary, the following systems may be used:

* Straw - - Terrace benches

* Mulch - - Wood mulch may be sprayed on terrace banks

* Soil Retention Blanket - - Wood fiber held by plastic net may be used on steeper banks

* Jute Mesh and Straw - - Burlap material holding straw may be used on the steepest banks

* Tacifier - - Mulch with tacifying agent may be used on steep banks