

CO-OP MINING COMPANY

P.O. Box 1245
Huntington, Utah 84528



(801) 748-5238
Coal Sales (801) 748-5777

RECEIVED
FEB 17 1987

DIVISION OF
OIL, GAS & MINING

February 12, 1987

Mr. John Whitehead
Utah Division of Oil, Gas and Mining
355 West North Temple
#3 Triad Center Suite 350
Salt Lake City, Utah 84180-1203

RE: Bear Canyon Modification to
Include Mining Hiawatha Seam

Dear Mr. Whitehead:

Please find enclosed 8 copies of additional information on new drill hole log as per your request.

I hope this will expedite approval of the Hiawatha Seam.

Sincerely,

A handwritten signature in black ink, appearing to read "Mel Coonrod". The signature is stylized with a large, circular flourish at the end.

Mel Coonrod
Permitting & Compliance

MC/njc

5. Areas of saturation within the Blackhawk formation are limited to localized perched zones as encountered within the mine, which occur as three localized roof drip areas which collect as sumps on the mine floor in their immediate area of occurrence.

6. The fault crossing the mine workings several hundred feet within the mine portal is "tight" and allows very minor seepage from the mine sump in that area through to the underlying sediments. No seepage, flow or areas of concentrated seeps were observed at the immediate fault area within the mine.

7.1.3.2 MINE PLAN AREA AQUIFERS

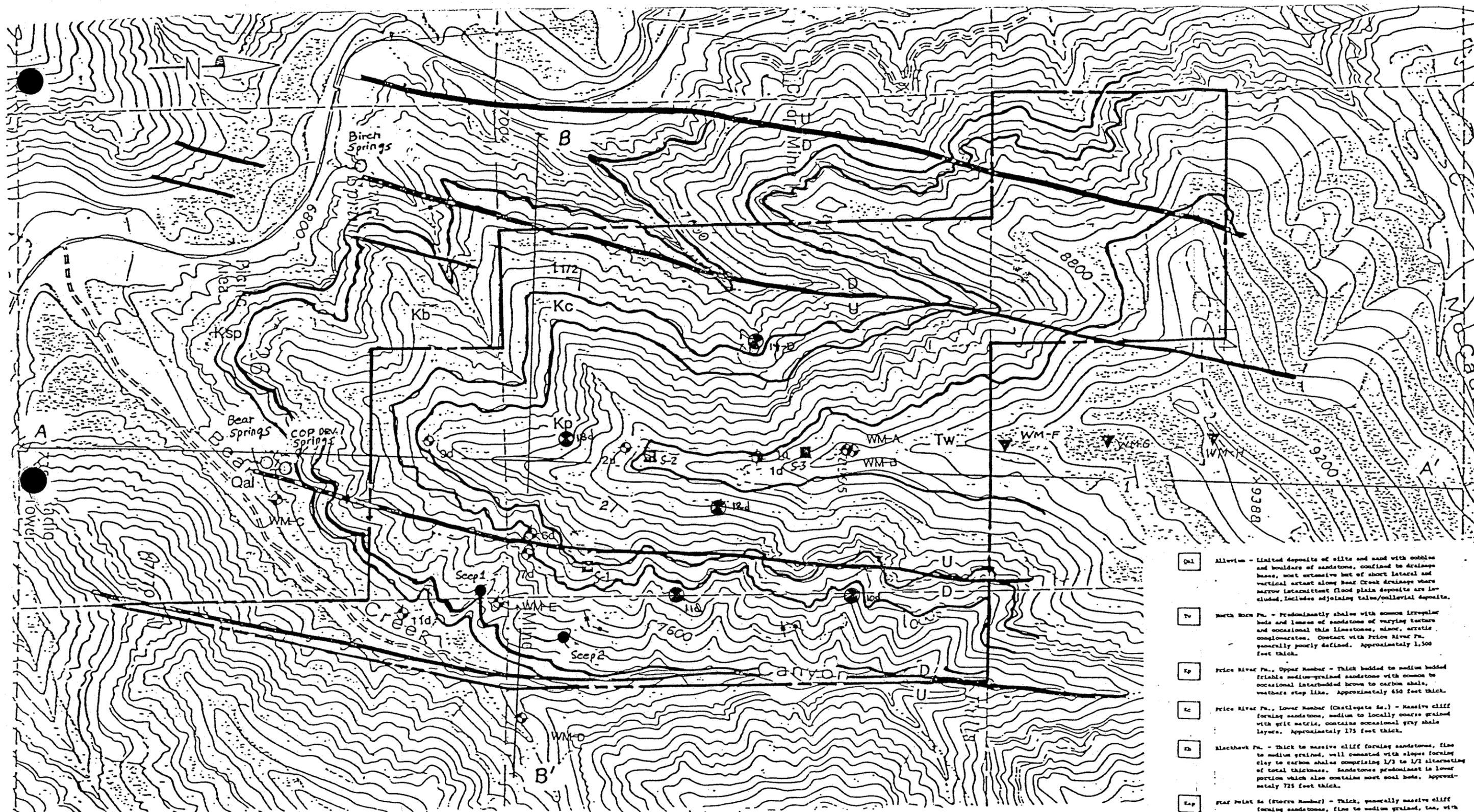
7.1.3.2.1 AQUIFER CHARACTERISTICS - DEPTH, HORIZONTAL EXTENT,

THICKNESS AND LITHOLOGY:

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DIVISION OF
OIL, GAS & MINING

Plate 3.4-1 identifies the mine lease area, aquifer outcrops, springs, seeps, mine water occurrences, and drill holes. Logs of six of the original drill holes and logs of eight additional drill holes are presented on Figures 7D-1 through 7D-8, Appendix D. Locations and logs of four test holes, based on geophysical log data provided by Nevada Power & Light Company, are presented on Figures 7D-9 and 7D-10, respectively, Appendix 7-D. Figures 7.1-1 and 7.1-2 represent generalized stratigraphic sections in the mine lease area along Sections AA' and BB' identified in Plate 3.4-1. These sections are taken parallel and perpendicular to the bedding strike in the area. Figure 7.1-3 presents a generalized stratigraphic section of the rock units in the permit area. Figure 7.1-4 presents a stratigraphic description of the Castlegate sandstone, Blackhawk formation and Star Point sandstone based on detailed

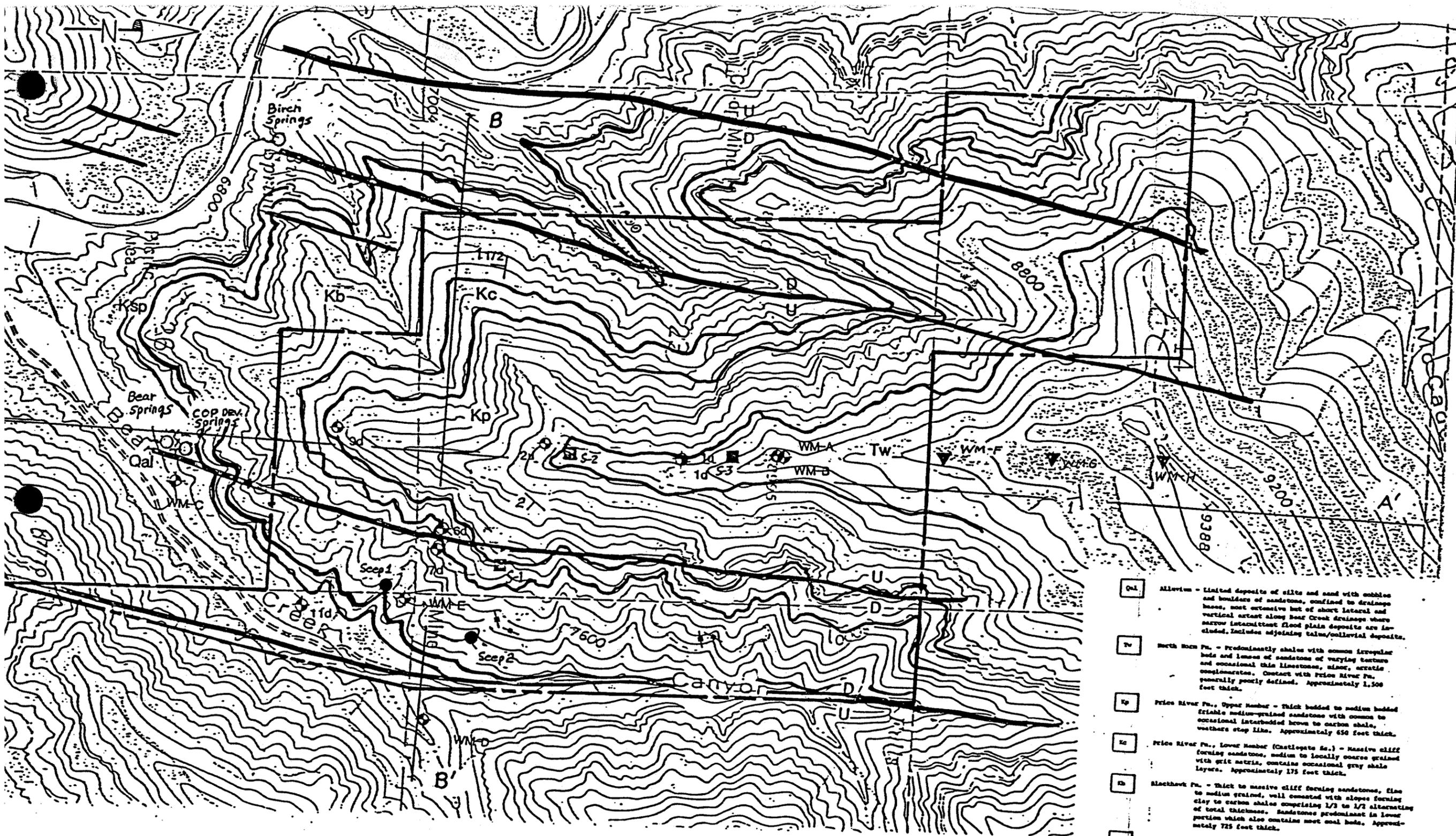


- Qal Alluvium - Limited deposits of silts and sand with cobbles and boulders of sandstone, confined to drainage basins, most extensive but of short lateral and vertical extent along Bear Creek drainage where narrow intermittent flood plain deposits are included. Includes adjoining talus/alluvial deposits.
- Tv North Horn Fm. - Predominantly shales with common irregular beds and lenses of sandstone of varying texture and occasional thin limestone, minor, argillite conglomeration. Contact with Price River Fm. generally poorly defined. Approximately 1,500 feet thick.
- Kp Price River Fm., Upper Member - Thick bedded to medium bedded friable medium-grained sandstone with common to occasional interbedded brown to carbon shales, weathers step like. Approximately 650 feet thick.
- Kc Price River Fm., Lower Member (Castlegate Eq.) - Massive cliff forming sandstone, medium to locally coarse grained with grit matrix, contains occasional gray shale layers. Approximately 175 feet thick.
- Th Blackhawk Fm. - Thick to massive cliff forming sandstone, fine to medium grained, well cemented with slopes forming clay to carbon shales comprising 1/3 to 1/2 alternating of total thickness. Sandstone predominant in lower portion which also contains most coal beds. Approximately 725 feet thick.
- Kp Star Point Eq. (Stover Member) - Thick, generally massive cliff forming sandstone, fine to medium grained, tan, with occasional separations by thin shale, siltstone layers. Approximately 120 feet thick.

- Parcel Boundary
 - Approximate formation contact.
 - U --- Approximate fault contact, with relative displacement shown.
 - Vertical/steeplly dipping joint(s).
 - 12 --- Bedding attitude.
 - --- Spring.
 - --- Well Hole location in indicated location (ODs, Well No. and zone, & indicate approximately 50' below base).
 - ▽ --- Proposed Observation Well.
 - --- Intermittent Seep.
 - --- Surface Projection of Mine Dump and related road/drop area.
- 2/15/87

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FEB 17 1987
DIVISION OF
OIL, GAS & MINING

		CO-OP MINING CO. <small>HUNTINGTON, UTAH</small>	
<small>DIVISIONS PLANNERS SURVEYORS GEOLOGISTS</small> <small>6200 SOUTH 200 WEST, SUITE 2-100</small> <small>MURKIN, UTAH 84409 891-223-0410</small>		GEOLOGIC MAP	
SCALE 1"=1000'	DRAWN BY L.S.	DATE 1/1/85	
BEAR CANYON		PLATE 34-1	



- Qal Alluvium - Limited deposits of silts and sand with cobbles and boulders of sandstone, confined to drainage basins, most extensive but of short lateral and vertical extent along Bear Creek drainage where narrow intermittent flood plain deposits are included. Includes adjoining talus/alluvial deposits.
- Tw North Horn Fm. - Predominantly shales with common irregular beds and lenses of sandstone of varying texture and occasional thin limestone or siltstone, erratic conglomerates. Contact with Price River Fm. generally poorly defined. Approximately 1,500 feet thick.
- Kp Price River Fm., Upper Member - Thick bedded to medium bedded friable medium-grained sandstone with common to occasional interbedded horizons of carbon shale, weathers step like. Approximately 650 feet thick.
- Kc Price River Fm., Lower Member (Castlegate M.) - Massive cliff forming sandstone, medium to locally coarse grained with grit matrix, contains occasional gray shale layers. Approximately 175 feet thick.
- Kb Blackhawk Fm. - Thick to massive cliff forming sandstones, fine to medium grained, well cemented with slopes forming clay to carbon shales comprising 1/3 to 1/2 alternating of total thickness. Sandstones predominant in lower portion which also contains root coal beds. Approximately 725 feet thick.
- Ksp Bear Point M. (Stover Member) - Thick, generally massive cliff forming sandstones, fine to medium grained, tan, with occasional separations by thin shale, siltstone layers. Approximately 120 feet thick.

Permit boundary
 Approximate formation contact
 Approximate fault contact, with relative displacement shown
 Vertical/steeplly dipping joint(s)
 Elevation
 Proposed Observation Well
 Intermittent Seep
 Surface Projection of Mine Seep and related roof dip etc.

Contour interval = 20 ft.
 1 inch = 100 feet
 1/4 inch = 25 feet
 1/8 inch = 12.5 feet
 1/16 inch = 6.25 feet

0000033

RSM CONSULTANTS, INC.
 ENGINEERS PLANNERS SURVEYORS GEOLOGISTS
 2200 SOUTH 200 WEST, SUITE 2-100
 MURRAY, UTAH 84111-2000-0410

CO-OP MINING CO.
 MOUNTAIN, UTAH
GEOLOGIC MAP
 SCALE: 1"=1,000'
 DRAWN BY: L.S.
 DATE: 1/1/85
BEAR CANYON | **PLATE 3.4-1**

Replaced
 3/31/87
 RUS

Mining Plans

Co-op Mining Company controls 1,115 acres in Emery County Utah, (1700 acres in Bear Canyon, 215 acres in Trail Canyon; see Figure 1-1). Mining has been conducted on this site from 1938 to the present time and 30 million tons of new, minable coal are estimated to remain in the Blackrock Bed within the permit application area. Production during the first five-year period will total 1 million to 1.5 million tons, with an average full capacity production of 400,000 ton/year reached by the fourth year. The exact figure will depend on market conditions, of course, (all figures are for raw tons).

Access to the reserves on the property is made through 3 portals. The middle seam portal (referred to as Portal 1) and the original Bear Canyon seam portal (Portal 2) are used primarily to recover coal from previously worked areas.

Since the mining in many areas involves working in the proximity of the old mine, main entry pillars will be columnized to provide vertical support and prevent "punching" by the pillars, which would produce unsafe working conditions and cause the loss of recoverable coal.

Mine Safety

The Bear Canyon Mine will comply with all federal, state, and local regulations for safety, security, and fire control in matters pertaining to signs, fences, hazardous and flammable materials, explosives, fire protection, monitoring of coal and refuse piles, routine accident reports, corrective actions, good housekeeping, and mine maps and records.

Operations Schedule

Annual production is scheduled to increase from 200,000 tons in 1983 to 400,000 tons by 1986. The mine operates three shifts per day for 240 days per year and employs 30 to 40 salaried and hourly workers. If production rises to 400,000 ton/year, employment will increase by a maximum of 5.

Permit Area

The permit area comprises lands owned by COP Development company, and two federal leases held on BLM and private surface.

the successors to the parties of the lease. Co-Op has Federal Lease U024316 and U024318. (See Appendix 2-F).

2.2.3 PURCHASE OF RECORD UNDER A REAL ESTATE CONTRACT FOR SURFACE AREA COAL

See Appendix 2-B Title Insurance Policy

2.2.4 OPERATOR, IF DIFFERENT FROM APPLICANT

Same as above.

2.2.5 RESIDENT AGENT OF THE APPLICANT (UMC 782.13)

Nathon Atwood
P.O. Box 1245
Huntington, Utah 84528
(801) 748-5238

2.2.6 BUSINESS DESIGNATION (partnership)

Officers and Directors of the Applicant

Earl W. Stoddard
P.O. Box 300
Huntington, Utah 84528

John Gustafson
1815 South 1100 West
Woods Cross, Utah 84087

R.L. Brown
3140 South Main
Salt Lake City, Utah 84115

2.2.7 CURRENT, PENDING OR PREVIOUS COAL MINING PERMITS IN THE U.S. HELD BY APPLICANT AND PRINCIPAL SHAREHOLDER SUBSEQUENT TO 1970

Act/015/021 Oil, Gas, and Mining Div.

Act/015/025 Oil, Gas, and Mining Div.

The final termination date for the mining operation is expected to be 2030.

2.6.3 Numbers of Surface Acres Affected

The anticipated disturbance by the Bear Canyon Mine totals about 10 acres. Plate 2-2 shows potential property expansion and future facilities of the mine.

2.6.4 Horizontal Extent of Underground Working for Each Phase

Section 3.4.8.3 tabulates the horizontal extent of underground working.

2.6.5 Vertical Extent for Each Phase

Plate 3-4 shows the mine development plan by seam during each of the next five years, then for each five-year period thereafter for the life of the mine.

Between 1983 and 1986, all production will be from the Middle Seam (see Section 3.4.1, Mining Plans).

In 1983 ----1986 recovery of the Middle Seam will occur on the Co-op fee land (see Plate 3-4) Production of the Hiawatha Seam should begin in 1987.

2.6.6 Mining in Excess of Five Years

The amount of reserves within the permit area is not minable in five years. The Co-op Coal Company anticipates continuing operations at the Bear Canyon Mine at least through the remainder of the twentieth century. Investments have accordingly been made and will continue to be made in facilities, equipment, property, and mineral and mining leases. Investment in much of the equipment and facilities will not have been recovered within five years. Furthermore, associated reclamation costs for disturbed areas will be substantial. For these reasons a permit term of 20 years is requested.

The information included in this application deals with the effects of the entire 20-year period of proposed mining (see Plate 3-4) New and updated information will be supplied as required.

2.7 PERSONAL INJURY AND PROPERTY DAMAGE INFORMATION

Co-op Coal Company carries public liability and

2.10 LOCATION OF PUBLIC OFFICE FOR FILING APPLICATION

The applicant has simultaneously filed complete copies of this application with the following agencies:

State of Utah 15 copies
Division of Oil, Gas, and Mining
655 W. N. T., 3 Triad Center Suite 350
Salt Lake City, UT 84111

8 copies to be forwarded to OSM

Emery County Clerk 1 copy
Emery County Courthouse
Castle Dale, UT 84513

2.11 NEWSPAPER ADVERTISEMENT/PROOF OF PUBLICATION

On the date of the filing of this application with Division of Oil, Gas, and Mining, the applicant has filed an advertisement with the Emery County Progress and Sun Advocate, local newspapers with circulation in Emery & Carbon counties sufficient to cover the locality of the applicant's operations. This advertisement follows the format required under 30 CFR 786.11-9a0 and UMC 786.11 (a). A copy of the publication is attached in Appendix 2D. Proof of publication has been submitted with the copy in Appendix 2D.

ages. It will use a total of 30 + miners working 3 shifts per day (2 production and 1 maintenance) and producing 400 + ton per shift per unit.

3.4.7.3 EMPLOYMENT

Total personnel will be 35, 5 of whom will be salaried and 30 hourly employees.

3.4.8 MINE PERMIT AREA

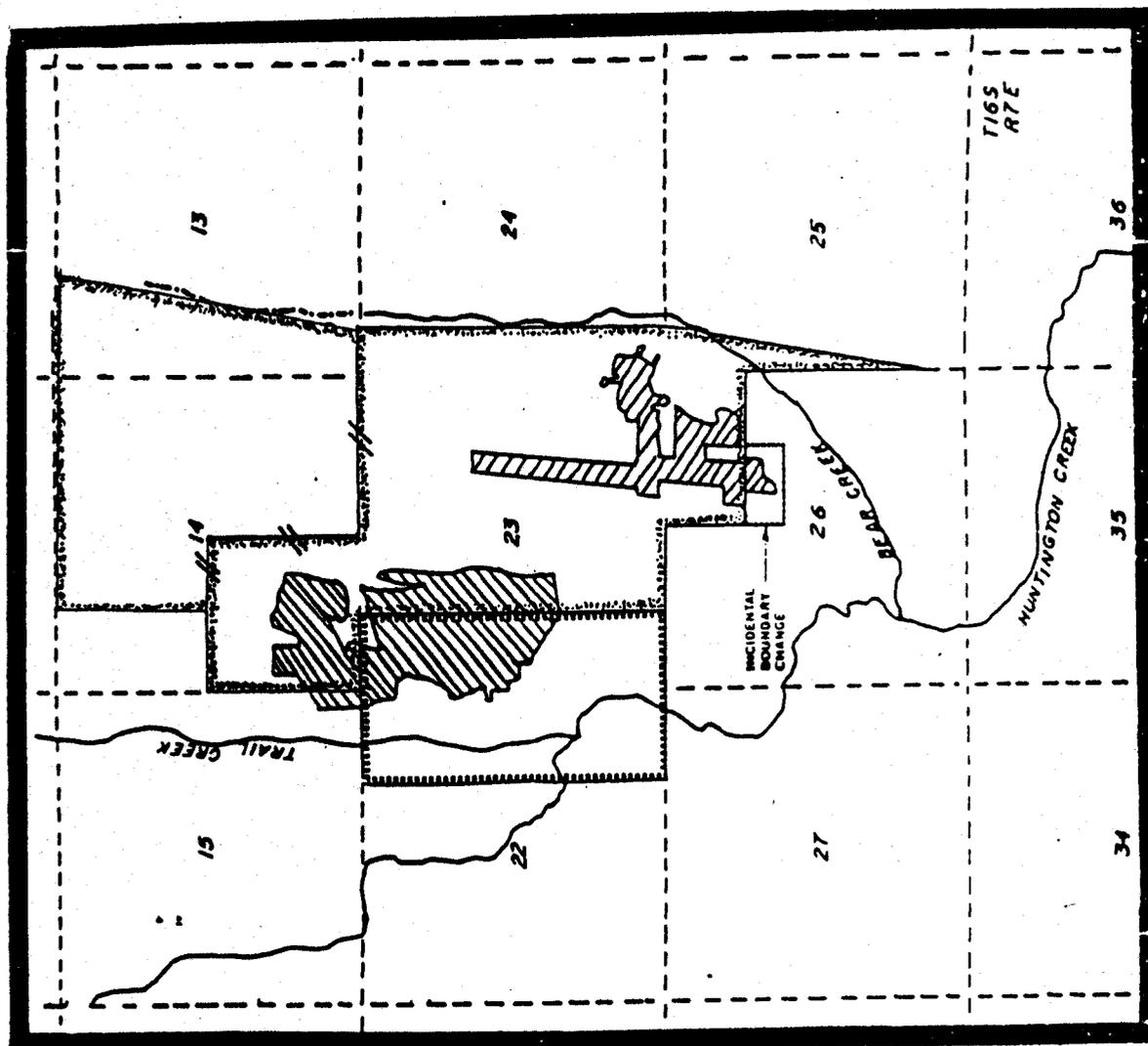
3.4.8 ACREAGE AND DELINEATION

The permit area comprises approximately 1700 acres located and outlined as shown on Plate 2-1.

The permit area is made up of properties owned in fee by COP Development Company, and two Federal Leases. (See Appendix 2-F).

3.4.8.2 MINING SEQUENCES

Plate 3-4 show the mining sequence on the property each year for the first five years and each five years thereafter for the life of the mine.



- KEY**
-  BEAR CANYON MINE PERMIT AREA
 -  TRAIL CANYON MINE PERMIT AREA
 -  BEAR CANYON MINE WORKINGS
 -  TRAIL CANYON MINE WORKINGS
 -  SECTION BOUNDARIES
 -  STREAMS



SCALE 1:24,000

TRAIL CANYON AND BEAR CANYON MINES:
PERMIT AREAS / MINE WORKINGS

FIGURE 3-4

Utah, Emery County, and private surface owners, and the Office of Surface Mining. (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.

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 hold 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

BLM U 024316

BLM U 024318

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 further lists the miner owners of each land parcel adjacent to the permit boundary.

4.3.2.4 MINERAL LEASES

U-024316

U-024318

(See Appendix 2-F).

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.

LOWER HUNTINGTON CANYON	FEET
Upper beds	0-6
Interval	200
Bear Canyon bed	0-10
Interval	40-60
Blind Canyon bed	0-10
Interval	40-60
Hiawatha	5-8
Star Point Sandstone	

Author's Note: Hiawatha to Blind Canyon interval can be as great as 110 feet.

Detailed description of Federal Leases as attached under Appendix 6-D.

TABLE 1 (AFTER DOELLING, 1972)

10.2 METHODOLOGY

10.2.1 Aquatic Resources

All water within the permit area is intermittent (Class 6). Runoff from the permit area flows into the Huntington Creek drainage. This is the only drainage which could potentially be affected by Co-Op's mining activities and the potential impact is expected to be insignificant. Bear Creek may receive some groundwater from the permit area while Huntington Creek eventually receives runoff from the disturbed areas.

The aquatic resource description of Bear Creek consists of a review of available information from previous surveys. Surveys have been conducted of both Bear and Huntington Creek although the potential for impact is considered to be minimal. Water quality determinations have been conducted by certified laboratories to establish baseline data and routine monitoring will continue as outlined in Chapter 7 on all surface and ground water within the permit area.

10.3 EXISTING WILDLIFE RESOURCES

10.3.1 Wildlife Habitat in the Mine Plan Area

The area of potential impact is covered by several important habitats that are used by species considered of "high interest" to various management agencies because of economic or recreation value. There are five major vegetation habitats from a faunal standpoint: pinyon-juniper, sagebrush, conifer, grass, and riparian.

Mine Site Location. This area is approximately 10 acres and is one area where surface construction will occur. It is covered primarily with pinyon and juniper trees, sagebrush, and rabbitbrush, with spruce trees in some of the side canyons. Basically it is a high, dry, desert environment.

Haul Road and Utility Corridors. Haul road and Utility corridors are both described as having the same general habitat as the Mine site with the addition of a narrow band of riparian habitat along Bear Creek.

eagle observations and the fact that their status is common has resulted in documentation of mostly opportunistic observations of aerie territories.

An active golden eagle nest site is extremely sensitive to disturbance within a one-half kilometer radius. This buffer zone is ranked as being of critical value to maintenance of the eagle population when the bird is actually utilizing the aerie; that period of time is normally between April 15 and June 15. The radius for a buffer zone may need to be increased to one kilometer if a disturbance were to originate from above and within direct line of sight to the eagle aerie.

To date there are no known high-priority concentration areas or critical roost trees for golden eagles on the project area. The mine plan and adjacent areas have been ranked as being of substantial value to golden eagles.

The northern bald eagle is an endangered winter resident (November 15 to March 15) of the local area. Note that no bald eagles are known to nest in Utah, however, historic data documents nesting activity by these birds in the State. There is no known historic evidence of the northern bald eagle nesting on the mine plan or adjacent areas.

The American peregrine falcon (relative abundance is endangered) and the prairie falcon (relative abundance is common) are yearlong residents of the mine plan and adjacent areas. Each of these species utilizes cliff nesting sites. To date there are no known aerie sites for cliff nesting falcons on the project area. However, suitable nesting habitat for the prairie falcon is widespread. Suitable nesting habitat for the American peregrine falcon cannot be found on the mine plan and adjacent areas. Since existence on the area by prairie falcons would not be unlikely, the project area has been ranked as being of substantial value to this cliff nesting falcon. However, the project area only is ranked as being of limited value to peregrine falcons.

For each falcon their aerie site while being utilized and a one-half kilometer radius would be ranked as being of critical value to maintenance of their populations. The falcon's period of use at the aerie site spans the spring and early summer period--prairie falcon, April 15 to June 30; peregrine falcon, March 1 to June 30.

The level of data relative to site specific use of the project area by cliff nesting falcons (not including the kestrel) is unsatisfactory and there could be aeries that have not been identified. Therefore, it is recommended that intensive surveys be initiated on the area for determination of locations for cliff falcon aerie sites.

the period of time when a high interest specie is present.

Haulage of coal between the various mine projects and distribution points should be planned so that impacts to wildlife are lessened; of special concern is haulage of coal through wintering areas for big game. It is recommended that the Company develop coal haulage contracts that require personnel involved with coal haulage to use extreme caution so that accidental collisions between motor vehicles and big game are reduced. Without doubt, a reduction in speed across winter ranges would alleviate this problem during the period between November 1 and May 15 each yr.

At present the most successful and cost effective technique for reducing deer-highway mortality is a system of warning reflectors. This system (manufactured by Streiter Corporation, 2100 Eighteenth Avenue, Rock Island Illinois 61201 and known as "Swareflex") is only of value at night time, but it is during darkness that most deer-highway mortality occurs. Streiter Corporation describes the effect of the reflector system as follow: "The headlights of approaching vehicles strike the wildlife reflectors which are installed on both sides of the road. Unnoticeable to the driver, these reflect red lights into the adjoining terrain and an optical warning fence is produced. Any approaching wildlife is [are] alerted and stops or returns to the safety of the countryside. Immediately after the vehicle has passed, the reflectors become inactive, thereby permitting the animals to cross safely."

Installation of a wildlife warning reflector system, a reduction in speed of coal-haulage trucks and other mine related traffic and increased awareness of wildlife values by mine associated employees should result in a reduction of deer-highway mortality problems. Such a reduction would represent satisfactory mitigation.

In instances where conveyors, slurry lines or any other structure having potential to be a barrier to big game movement is to be developed, passage structures must be provided. Generally speaking overpass and underpass type structures are recommended in order to allow passage of big game to habitats either side of any barrier. These crossings should be placed at the points to be identified from intensive study of big game movements in relation to the mine plan area. Such study would not be required if the structure was adequately elevated to allow uninhabited passage of big game along its entire length.

Underpasses should have a min clearance of three meters maintained across a span of at least five meters. Overpasses should be designed as a circular earthen ramp with the barrier bisecting the ramp into two equal halves as follows:

On either side of the conveyor a half-round ramp with a slope no greater than 3:1 on a five meters wide path placed at an angle 90 degrees to the conveyor and tapering around to a slope of 5:1 at

paths adjacent and parallel to the conveyor. The platform over the conveyor should be concrete or some other material that would not echo when being crossed by big game and should be of character similar to rock or natural earth.

Soils associated with either crossing style should be of the A or B horizons to allow for development of vegetation. Vegetative cover must be established in association with all crossing sites. This will lessen anxiety of individual animals using the site through development of a natural appearing environment.

Mature pinion or juniper trees and an abundance of browse plants need to be placed proximal to crossing points in order to provide a safe travelway. The browse plants will also serve as a permanent attraction for big game to crossing points. Additionally, a mixture of grass and forb seeds should be broadcast over each crossing point to stabilize the soil and enhance the forage situation.

Appropriately sized boulders may need to be placed at crossing sites in order to control off-road vehicles utilized in outdoor recreation.

Industrial developments are encouraged on habitat use areas that are ranked as being of limited value to wildlife. It should be noted, however, that reclamation is ultimately expected on any wildlife use area, regardless of its value to wildlife.

Raptor Survey 1987

The Co-Op Mine properties were surveyed in the spring of 1987. The survey was conducted in cooperation with the Utah Division of Wildlife Resources. The results of that survey are as follows:

<u>Species</u>	<u>Year</u>	<u>Nest ID#</u>	<u>Map Reference</u>
Golden Eagle	1987	282	187.282
Unknown Buteo	1981	79	281.79
Unknown Buteo	1981	78	281.87
Unknown Buteo	1981	83	281.83
Unknown Buteo	1981	80	281.80
Unknown Buteo	1981	81	281.81
Unknown Buteo	1981	84	281.84
Unknown Buteo	1981	85	281.85
Unknown Buteo	1981	86	281.86

A copy of Plate 3-3 is attached showing the survey area and nest locations.

Co-Op Mining requests to suspend all future raptor surveys on their properties until such time that a survey is warranted. This request is based on Appendix R-1, correspondence from UDWR and R-2, DOGM Guidelines for Raptor Surveys. Co-Op will suspend raptor surveys based on the above as of March 1988 unless DOGM objects.

Appendix 2-D

OLD
STUFF

AFFIDAVIT OF PUBLICATION

STATE OF UTAH }
County of Carbon, } ss.

I, Dan Stockburger, on oath, say that I am
the General Manager of The Sun-Advocate,
a weekly newspaper of general circulation, published at Price,
State and County aforesaid, and that a certain notice, a true copy
of which is hereto attached, was published in the full issue of
such newspaper for Four (4)

consecutive issues, and that the first publication was on the
30th day of January, 19 87 and that the
last publication of such notice was in the issue of such newspaper
dated the 19th day of February, 19 87

Dan Stockburger

Subscribed and sworn to before me this
19th day of February, 19 87

Holly J. Baker
Notary Public.

My Commission expires MY COMMISSION EXPIRES OCTOBER 22, 1990

Publication fee, \$ 86.40

NOTICE OF FILING APPLICATION
The following application for an expansion of the coal lease with the Division of Oil, Gas and Mining under the laws of the State of Utah. A copy of the complete application is available for public inspection at the Emery County Recorder's Office, Emery County Courthouse, Castle Dale, Utah 84513. Written comment on the application should be submitted to the State of Utah Oil, Gas and Mining Division, 355 West North Temple, #3 Triad Center Suite 300, Salt Lake City, Utah 84100-1293.
The area to be mined can be found on the USGS Hiawatha quadrangle map. The approximate 900 acres of the existing permit area are on private property (see coal area) described as follows:
Township 16 South; Range 7 East SLBM
Sec. 14: SW $\frac{1}{4}$
Sec. 22 E $\frac{1}{2}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$, SW $\frac{1}{4}$
Sec. 24 All West of N-S Fault
Sec. 25 All West of N-S Fault
The expansion area is 800 acres and is made up of Federal Lease U-624116 and Federal Lease U-624118, and private fee property. The legal description is as follows:
Township 16S; Range 7 East SLBM
E $\frac{1}{2}$ NW $\frac{1}{4}$ of Sec. 25; E $\frac{1}{2}$; NE $\frac{1}{4}$ and SE $\frac{1}{4}$ of SW $\frac{1}{4}$ of Sec. 14; W $\frac{1}{2}$ of W $\frac{1}{2}$ of Sec. 22.
Filed for public inspection on January 24, 1987.

AFFIDAVIT OF PUBLICATION

STATE OF UTAH }
County of Carbon, } ss.

I, Dan Stockburger, on oath, say that I am
the General Manager of The Sun-Advocate,
a weekly newspaper of general circulation, published at Price,
State and County aforesaid, and that a certain notice, a true copy
of which is hereto attached, was published in the full issue of
such newspaper for Four (4)

consecutive issues, and that the first publication was on the
30th day of January, 19 87 and that the
last publication of such notice was in the issue of such newspaper
dated the 19th day of February, 19 87

Dan Stockburger

Subscribed and sworn to before me this
19th day of February, 19 87

Holly J. Baker
Notary Public.

My Commission expires MY COMMISSION EXPIRES OCTOBER 22, 1990

Publication fee, \$ 69.60

STATE OF UTAH
EMERY COUNTY
PUBLIC NOTICE

The Go Mining Company, Box 1248, Huntington, Utah, hereby announces its intent to file application to expand the existing underground mine into the Hiawatha Seam in the Bear Canyon Mine with the Division of Oil, Gas & Mining under the laws of the State of Utah. A copy of the complete application is available for public inspection at the Emery County Recorder's Office, Emery County Courthouse, Castle Dale, Utah 84513. Written comment on the application should be submitted to the State of Utah Oil, Gas and Mining Division, 265 West North Temple, #8 Triad Center Suite 200, Salt Lake City, Utah 84100-1208.

The area to be mined can be found on the USGS Hiawatha quadrangle map. The approximate 900 acres of the existing permit area are on private property (see coal area) described as follows:
Township 16 South; Range 7 East SLBM
Sec. 14; SW 1/4
Sec. 23 E 1/2, E 1/2 NW 1/4, E 1/2 SW 1/4, SW 1/4, SW 1/4
Sec. 24 All West of N-S Fault
Sec. 25 All West of N-S Fault
Published in the Sun Advocate January 31, February 5, 12 and 19, 1987.

APPENDIX 2-F

COPY OF FEDERAL LEASES



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
UTAH STATE OFFICE
136 E. SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111

IN REPLY REFER TO
3453
U-024316
U-024318
(U-942)

AUG 21 1980

CERTIFIED MAIL

DECISION

C.O.P. Coal Development Company	:	Coal
53 West Angelo Avenue	:	U-024316
Salt Lake City, Utah 84115	:	U-024318
	:	

Assignments Approved Bond Accepted

On April 25, 1980, Assignments of Coal leases U-024316 and U-024318, entered into on April 1, 1980 between Peabody Coal Company, as assignor, and C.O.P. Coal Development Company, as assignee, were filed in this office.

Satisfactory evidence of the qualifications and holdings of C.O.P. Coal Development Company has been filed and the lease accounts are in good standing. The assignments appear to meet the requirements of the regulations and are hereby approved effective September 1, 1980. Approval of the assignments does not constitute approval of any of the terms therein which may be in violation of the lease terms.

As required by the regulations in 43 CFR 3472.2(a), a Personal Bond and Power of Attorney, secured by \$5,000 cash, was filed in this office on August 20, 1980, for each coal lease. The bonds are satisfactory and are accepted effective August 20, 1980.

L. P. Lelick
Chief, Minerals Section

PARTIAL ASSIGNMENT OF FEDERAL COAL LEASE UTAH 824316

THIS ASSIGNMENT, made this 1st day of April, 1980, by PEABODY COAL COMPANY ("Assignor"), a Delaware Corporation at 301 North Memorial Drive, P.O. Box 235, St. Louis, Missouri 63166, to C.O.P. COAL DEVELOPMENT COMPANY ("Assignee"), a Utah corporation at 3753 South State Street, Salt Lake City, Utah 84115.

Assignor, for and in consideration of the sum of \$10.00 and other valuable consideration in hand paid by the Assignee, the receipt and sufficiency of which are hereby acknowledged, does ASSIGN, TRANSFER, CONVEY, AND, AS HEREINAFTER STATED, WARRANT unto Assignee, and to its successors, heirs, and assigns forever, all Assignor's right, title and interest in and to Assignor's leasehold estate, and all property rights of Assignor held in connection therewith, in that certain Coal Lease from the United States of America (Appendix E-1-1 attached), which bears serial number Utah 824316, but only insofar as said estate and rights relate to that certain real estate ("Federal Property"), which is described in Appendix E-1-2 affixed hereto and made a part hereof.

Assignee accepts the foregoing assignment and does hereby assume and agree to pay and discharge, or cause to be paid and discharged, all obligations and liabilities of Assignor under said Coal Lease from and after the date hereof, but only insofar as such obligations and liabilities relate to the said Federal Property.

The Assignor, for itself and for its successors, does represent, warrant, promise and agree to and with the Assignee, its successors, heirs and assigns, that Assignor has not done, or suffered to be done, anything whereby Assignor's estate in said Federal Property hereby granted is, or has been, in any manner encumbered or charged, except as herein recited; and that Assignor will warrant and forever defend Assignor's estate in said Property against all persons lawfully claiming, or to claim the same, by, through, or under Assignor.

The assignment is subject to grazing rights and to those rights-of-way, easements, leases, deed and plat restrictions, partitions, severances, encumbrances, licenses, reservations, and exceptions which are of record on this assignment date, and to all rights of persons in possession, and to physical conditions, encroachments and possessory rights which would be evident from an inspection of the Federal Property.

The Assignee agrees to reassign the said partial Federal Lease to Assignor, with special warranties of title, in the event the transactions contemplated by the Contract for the Sale of Real Estate dated April 1, 1980, between the parties are not closed by the Closing Date contained in said Contract.

STATE OF UTAH
COUNTY OF ENERGY
RECORDED FOR
1980 APR 1 12 02 PM
BOOK 116 PAGE 33
C. J. WILSON
COUNTY CLERK

FEDERAL PROPERTY

Ass 255-016 Township 16 South, Range 7 East, SLA (Utah)
nsider Section 13: W 1/2 W 1/2
reby Section 14: E 1/2 NW 1/4, NE 1/4
ATEI Containing 400 acres, more or less.

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STATE OF UTAH
COUNTY OF KANE
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PAGE 11-2

PARTIAL ASSIGNMENT OF FEDERAL COAL LEASE UTAH 024318

THIS ASSIGNMENT, made this 1st day of April, 1980, by PEABODY COAL COMPANY ("Assignor"), a Delaware Corporation at 301 North Memorial Drive, P.O. Box 235, St. Louis, Missouri 63166, to C.O.P. COAL DEVELOPMENT COMPANY ("Assignee"), a Utah corporation at 3753 South State Street, Salt Lake City, Utah 84115.

Assignor, for and in consideration of the sum of \$10.00 and other valuable consideration in hand paid by the Assignee, the receipt and sufficiency of which are hereby acknowledged, does ASSIGN, TRANSFER, CONVEY, AND, AS HEREINAFTER STATED, WARRANT unto Assignee, and to its successors, heirs, and assigns forever, all Assignor's right, title and interest in and to Assignor's leasehold estate, and all property rights of Assignor held in connection therewith, in that certain Coal Lease from the United States of America (Appendix E-2-1 attached), which bears serial number Utah 024318, but only insofar as said estate and rights relate to that certain real estate ("Federal Property"), which is described in Appendix E-2-2 affixed hereto and made a part hereof.

Assignee accepts the foregoing assignment and does hereby assume and agree to pay and discharge, or cause to be paid and discharged, all obligations and liabilities of Assignor under said Coal Lease from and after the date hereof, but only insofar as such obligations and liabilities relate to the said Federal Property.

The Assignor, for itself and for its successors, does represent, warrant, promise and agree to and with the Assignee, its successors, heirs and assigns, that Assignor has not done, or suffered to be done, anything whereby Assignor's estate in said Federal Property hereby granted is, or has been, in any manner encumbered or charged, except as herein recited; and that Assignor will warrant and forever defend Assignor's estate in said Property against all persons lawfully claiming, or to claim the same, by, through, or under Assignor.

The assignment is subject to grazing rights and to those rights-of-way, easements, leases, deed and plat restrictions, partitions, severances, encumbrances, licenses, reservations, and exceptions which are of record on this assignment date, and to all rights of persons in possession, and to physical conditions, encroachments and possessory rights which would be evident from an inspection of the Federal Property.

The Assignee agrees to reassign the said partial Federal Lease to Assignor, with special warranties of title, in the event the transactions contemplated by the Contract of Real Estate dated April 1, 1980, between the parties are not closed by the date of said Contract.

IN WITNESS WHEREOF, said Assignor has caused its corporate seal to be hereto affixed, and has caused its name to be signed to these presents by its Vice President of Resource Management and attested by its Assistant Secretary, the day and year first above written.

ATTEST:

PEABODY COAL COMPANY

Richard [Signature]
Title: Assistant Secretary

By James F. Hobbs
Title: Vice President
Resource Management

ACCEPTED BY C.O.P. COAL DEVELOPMENT COMPANY

By Joseph C. Kingston
Title: Vice President

STATE OF Missouri)
COUNTY OF St. Louis) ss.

On the 1st day of April, 1980, personally appeared before me JAMES F. HOBBS, who being by me duly sworn, did say that he is the Vice President, Resource Management of Peabody Coal Company, and that the attached instrument was signed in behalf of said corporation by authority of a resolution of the Board of Directors and said JAMES F. HOBBS acknowledged to me that said corporation executed the same.

Given under my hand and notarial seal this 1st day of April, 1980.

James C. Severn
Notary Public

My Commission Expires:

June 7, 1983

STATE OF Utah)
COUNTY OF Salt Lake) ss.

On the 1 day of April, 1980, personally appeared before me Joseph C. Kingston, who being by me duly sworn, did say that he is the Vice President of C.O.P. Coal Development Company and that the attached instrument was signed in behalf of said corporation by authority of a resolution of the Board of Directors and said Joseph C. Kingston acknowledged to me that said corporation executed the same.

Given under my hand and notarial seal this 1 day of April, 1980.

Carl E. [Signature]
Notary Public

My Commission Expires:

July 4, 1980

Assignment Approved Effective:

THIS INSTRUMENT PREPARED BY:
J. C. Severn, Attorney
301 North Memorial Drive
s, Missouri 63102

THE UNITED STATES OF AMERICA
By Chief Adjudication Branch
Bureau of Land Management

FEDERAL PROPERTY

255-018 Township 16 South, Range 7 East, SIM (Utah)
Section 26: E 1/2 NW 1/4

APPENDIX 6-D

RESOURCE RECOVERY AND PROTECTION PLAN

Resource Recovery

and

Protection Plan

Co-Op Mining Company

Bear Canyon No. 1 Mine

Federal Lease U-024318

Federal Lease U-024316

Introduction:

The following is a Resource Recovery and Protection Plan submitted for the Federal Leases U-024318 and U-024316. These leases lie adjacent to and beyond the existing Bear Canyon No.1 Mine, operated by Co-Op Mining Company. The leases are therefore a part of an LMU which includes both federal and non-federal coal. The non-federal coal is presently being mined under an approved Mining and Reclamation Plan; the federal coal will be mined in the future under a modification to the approved plan.

The following plan is addressed in the order of the 43 CFR 3482.1(c) Rules and Regulations, September 16, 1983.

ITEM (1) NAMES, ADDRESSES, LANDOWNERS, LEASE NUMBERS, ETC.

(a) Operation - The operator of the property is:

Co-Op Mining Company
53 West Angelo Ave.
Salt Lake City, Utah 84115
Telephone: (801) 486-5047

(b) Leases - The lessee of the federal leases is:

C.O.P Coal Development Co.
3140 So. Main St.
Salt Lake City, Utah 84115
Telephone: (801) 486-5047

(c) Lease Numbers - The federal leases involved in this R₂P₂ are:

U-024318 and U-024316, issued August 1, 1980.

(d) Surface Owners - The surface owners in this area are:

U.S. Forest Service, and
C.O.P Development Company

- (e) Mineral Owners - The mineral owners for the lease area is:
The United States of America
- (f) M.S.H.A. I.D.# - The I.D.# for the Bear Canyon No. 1 Mine is:
42-00081-0
- (g) Other - A property map is included as Plate 1 showing the surface and mineral ownership of both the federal and non-federal lands included in the mining operation.

ITEM (2) GENERAL GEOLOGIC DESCRIPTION

(a) Geologic Conditions:

General Stratigraphy

The exposed geologic column, in ascending order, consists of the Mancos Shale, the Star Point Sandstone, the coal-bearing Blackhawk Formation and the Castlegate Sandstone Member of the Price River Formation. All of these geologic units are Cretaceous in age. The Star Point Sandstone through the Price River Formation composes the Mesaverde Group in this locality.

The Mancos Shale forms the initial steep slopes rising from the washes which in turn is overlain by the initial cliff-forming Star Point Sandstone ("...thick-bedded to massive beds separated by subordinate Mancos-like shale"). (1)

(1) 1972, Central Utah Coal Fields: Sevier-Sanpete, Wasatch Plateau, BookCliffs & Emery, Monograph Series No. 3, U.G.M.S., H.H. Doelling.

The Blackhawk Formation is composed of alternating sandstone, shales, mudstones and coal representing marine, transitional and terrestrial varieties of sedimentation. Depositional environments of the Blackhawk Formation include littoral, lagoonal, estuarine and swamp type environments. The Blackhawk outcrops to form a step and slope topography slightly less resistant than the Star Point below and the Castlegate above. Multiple coal seams are found within the lower 350 feet of the Blackhawk.

The Castlegate Member of the Price River Formation makes up a massive resistant cliff-former above the Blackhawk.

Structure

The Bear Canyon Fault, which is part of the north-south trending Pleasant Valley Fault Zone, is the only major structural feature in the study area which has any effect on the mineability and continuity of the coal. Displacement on this particular fault is estimated by the author to be 200'+ in the vicinity of Bear Creek Campground on the north side of State Highway 31. The west side of the fault is down relative to the east side. In the vicinity of the Bear Canyon Mine Section 24, Township 16 South, Range 7 East, the fault is buried by alluvium, however, the fault trace expresses itself in the falls in the NW $\frac{1}{4}$, NW $\frac{1}{4}$ of Section 24, Township 16 South, Range 7 East and displacement at this point is apparently less than five feet. Strata immediately bordering the fault is disturbed and inconsistent in spatial attitude with equivalent strata in the study area east of the Bear

Canyon fault. This will no doubt have a limiting effect on the extent to which coal can be mined in the immediate vicinity of the fault. The Bear Canyon fault marks the western boundary of the study area.

Strata east of the fault are nearly horizontal in attitude providing excellent mining conditions.

Coal outcrops slightly lower in elevation in the southern portion of the area than in the northern portion.

Small faults noted in the field along outcrops were interpreted to be largely of non-tectonic origin (e.g. landslide and slump) by the author. Other faults observed did not express displacement of sufficient magnitude to be prohibitive to mining.

(b) Mineral Resources:

Coal

Multiple coal seams are found in the lower 350 feet of the Blackhawk Formation as was previously mentioned. In ascending order the seams are as follows: Hiawatha, Blind Canyon, Bear Canyon, and the upper beds, ⁽¹⁾ (see Table 1 - following:.

None of the coal lies at depths of more than 1,800 in the study area. Depth should not be a limiting factor in mining. It was noted in the field that strata situated at elevations consistent with the upper bed's structural horizon were badly burned and not of economic importance.

LOWER HUNTINGTON CANYON	FEET
Upper beds	0-6
Interval	200
Bear Canyon bed	0-10
Interval	40-60
Blind Canyon bed	0-10
Interval	40-60
Hiawatha	5-8
Star Point Sandstone	

Author's Note: Hiawatha to Blind Canyon interval can be as great as 110 feet.

TABLE 1 (AFTER DOELLING, 1972)

The Blind Canyon and Bear Canyon seams were measured and observed at various points in the study area by the author, however, these seams were traceable only locally in Bear Canyon. Limited traceability of these two seams is attributed to the lenticular nature of the seams, the extent of slope debris acting as cover and/or depositional irregularities. (2)

H.H. doelling indicates the Bear Canyon seam is present in Left Fork of Fish Creek Canyon (east of Bear Creek Canyon) with a thickness of 6.5 feet, however, this measurement was not verified. (1) Doelling also has a 17.3 foot measurement in the Bear Canyon seam in Bear Canyon that was not verified in the field possibly because this particular exposure has since been covered by slope debris.

A small adit approximately 50 feet in length and interpreted as penetrating the Bear Canyon seam (measurement M-5), and a longer adit approximately 300 feet in length and interpreted as penetrating the Blind Canyon seam (measurement M-7), were discovered in Bear Creek Canyon, Section 24, Township 16 South, Range 7 East. The full extent and history of these workings is not known. The fact that these two seams

(2) 1931, The Wasatch Plateau Coal Field, Utah, U.S.G.S. Bulletin 819, E.M. Spieker.

are not traceable for any significant area beyond these old workings indicates the subordinate nature of the Bear and Blind Canyon seams.

In the SW $\frac{1}{2}$, SW $\frac{1}{2}$ of Section 24, Township 16 South, Range 7 East the Bear Canyon Mine is located. Two seams were worked there, the upper of which is the Bear Canyon seam (elevation 7,420 feet) and the lower of which is the Hiawatha seam (elevation 7,340 feet). This interpretation is based on the seams stratigraphic position above the Star Point Sandstone. The Blind Canyon seam apparently has pinched out or been replaced in this locality. The mine lies on the west side of the Bear Canyon fault. The presence of the Hiawatha and Bear Canyon seams at the mine lend credence to the author's opinion that these seams are probably present across canyon to the east where they were not traceable nor measurable due to slope cover.

The Hiawatha seam was identified throughout the majority of the study area based on its stratigraphic relationship with the underlying Star Point Sandstone. The Star Point Sandstone is continuous and conspicuous within the area covered by this report. While the Hiawatha seam was not measured in Left Fork of Fish

Creek Canyon by this author or previous investigators (i.e. E.M. Spieker, H.H. Doelling), the presence of the Reichert Mine (Hiawatha seam - after Doelling) in Section 20, Township 16 South, Range 8 East suggests the interstitial presence of the Hiawatha seam in Left Fork. Where identified and measured, the Hiawatha seam achieved mineable thickness in all but one instance (3.3 feet - measurement M-2). However, coal thickness at outcrop is invariably thinner than the subsurface thickness. The Hiawatha seam averages 5.96 feet in thickness in the area inspected. Specific work accomplished is shown on the geologic map (Enclosure 1) and columnar outcrop sections (Figure 2 - following pages).

Well consolidated sandstone forms the roof and floor of the Hiawatha seam in the majority of locations inspected along outcrop. This situation provides excellent mining conditions and high coal recovery percentages as is demonstrated by 90 to 96 percent recovery of the Hiawatha seam at the King Mine approximately five miles NNE of the study area. (1)

Doelling states that "extensive mining under Gentry Mountain (a short distance due north of Bear Creek Canyon) reveals that the Hiawatha is continuous in the anticipated thickness". (1)

Exhibit 1

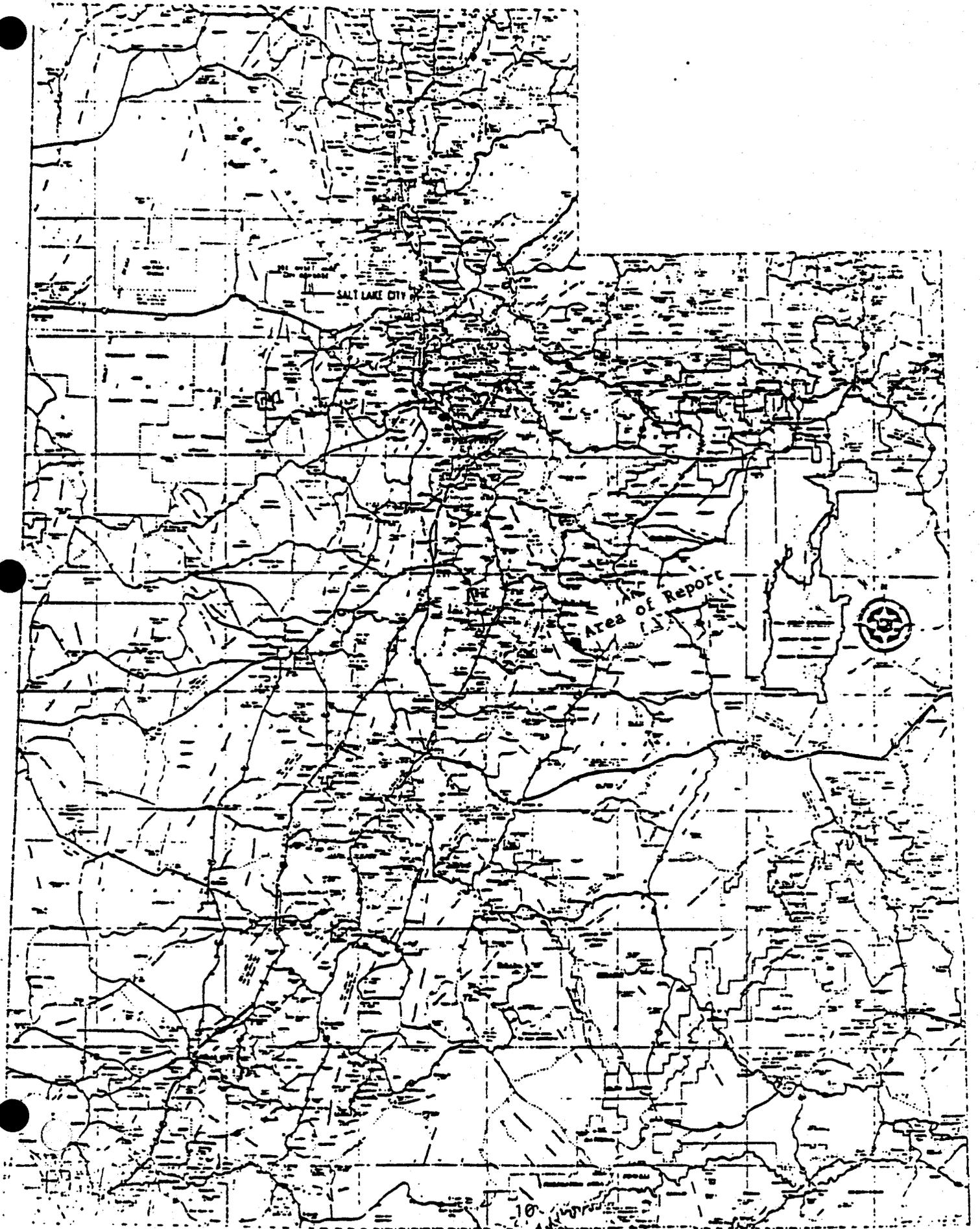
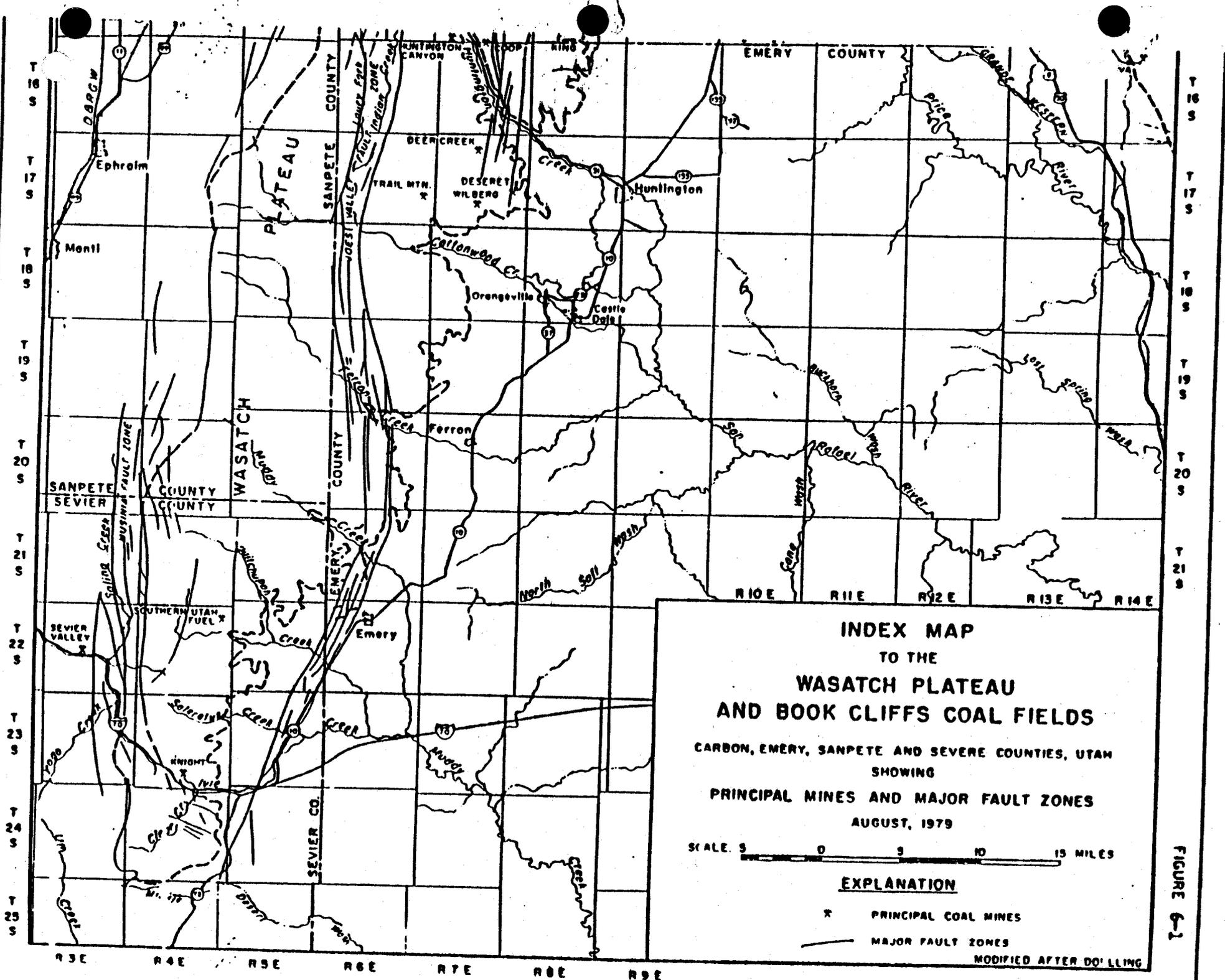


Figure 1



INDEX MAP
 TO THE
WASATCH PLATEAU
AND BOOK CLIFFS COAL FIELDS
 CARBON, EMERY, SANPETE AND SEVIER COUNTIES, UTAH
 SHOWING
 PRINCIPAL MINES AND MAJOR FAULT ZONES
 AUGUST, 1979

SCALE 0 5 10 15 MILES

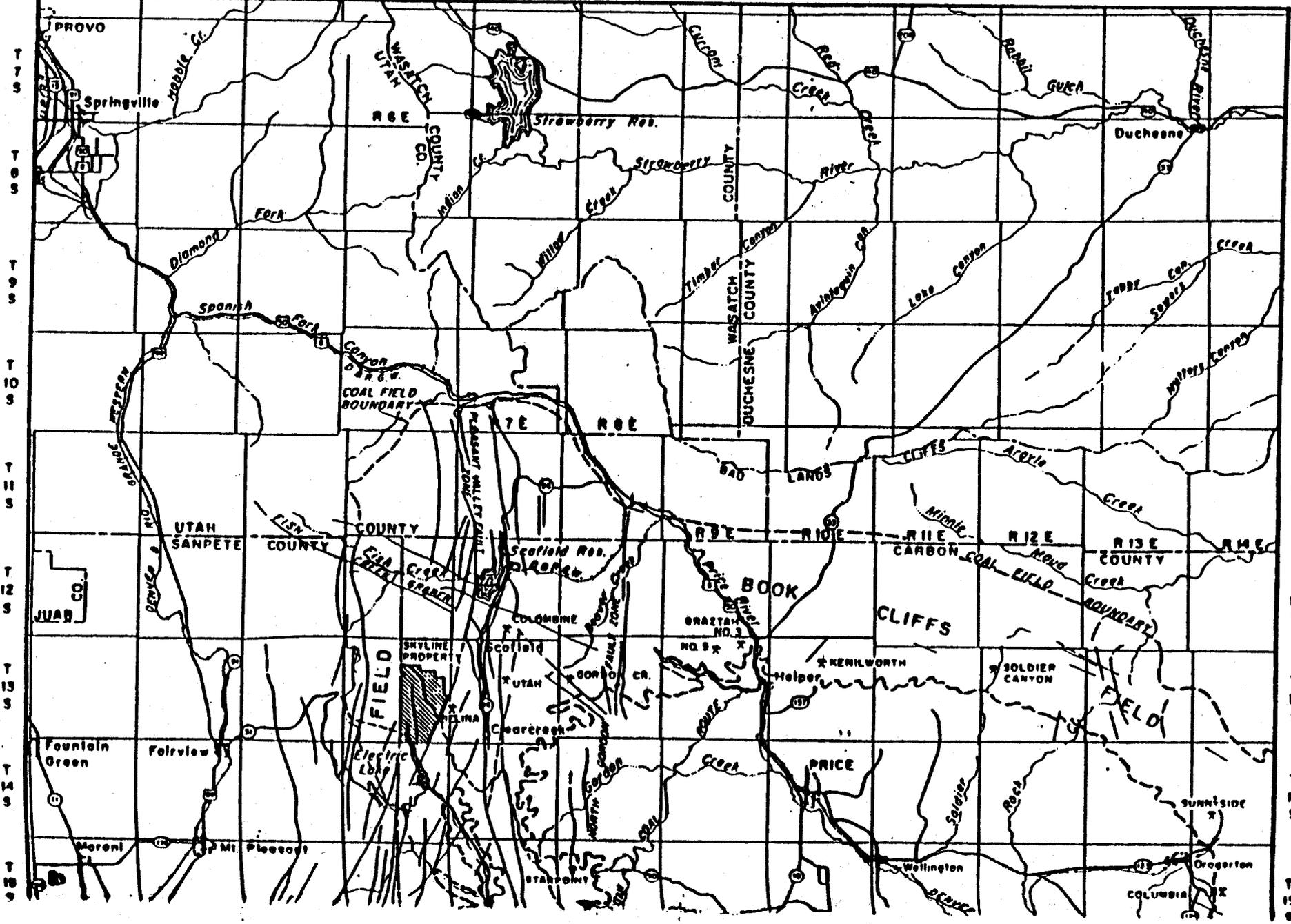
EXPLANATION

X PRINCIPAL COAL MINES
 — MAJOR FAULT ZONES

MODIFIED AFTER DO'LLING

FIGURE 6-1

R 3 E R 4 E R 5 E R 12 W R 11 W R 10 W R 9 W R 8 W R 7 W R 6 W R 5 W R 4 W

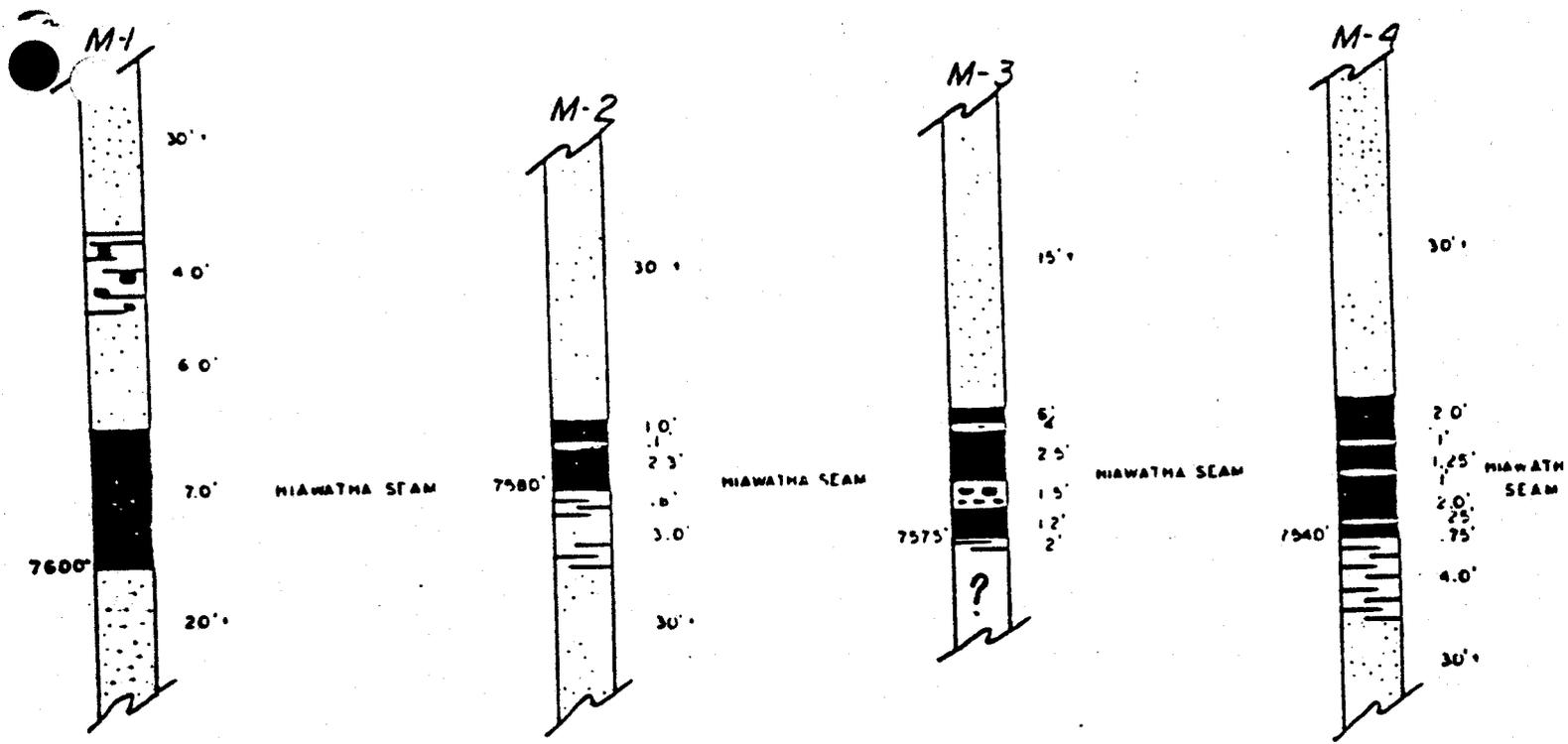


6-3

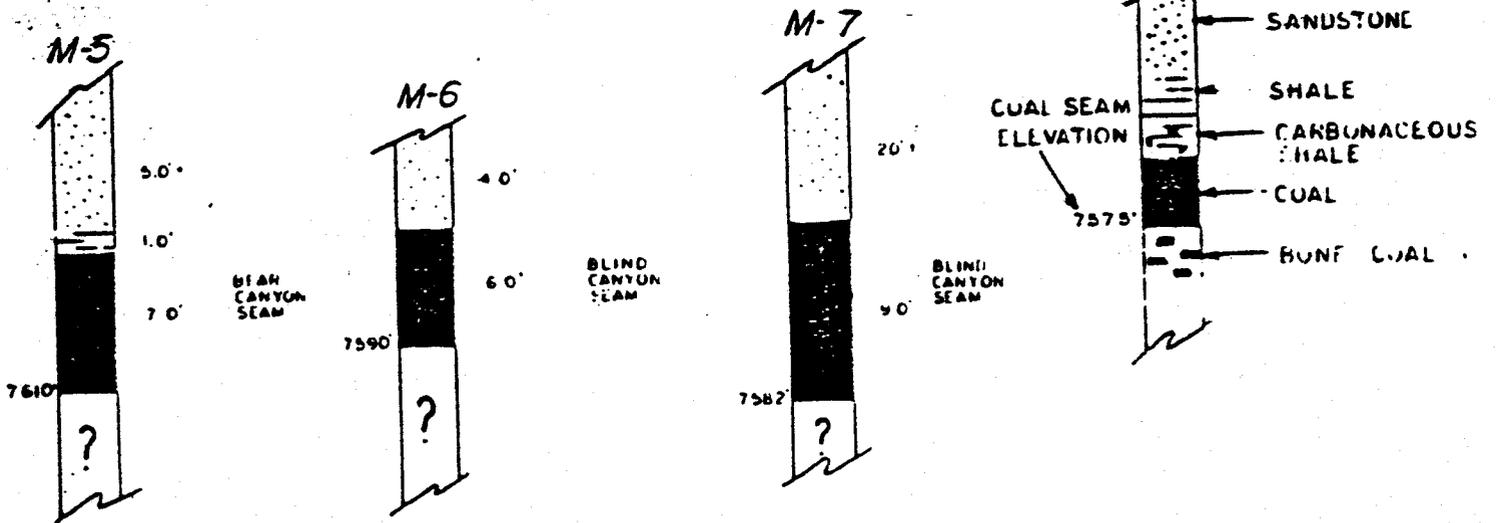
12

T 7 S
T 8 S
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T 11 S
T 12 S
T 13 S
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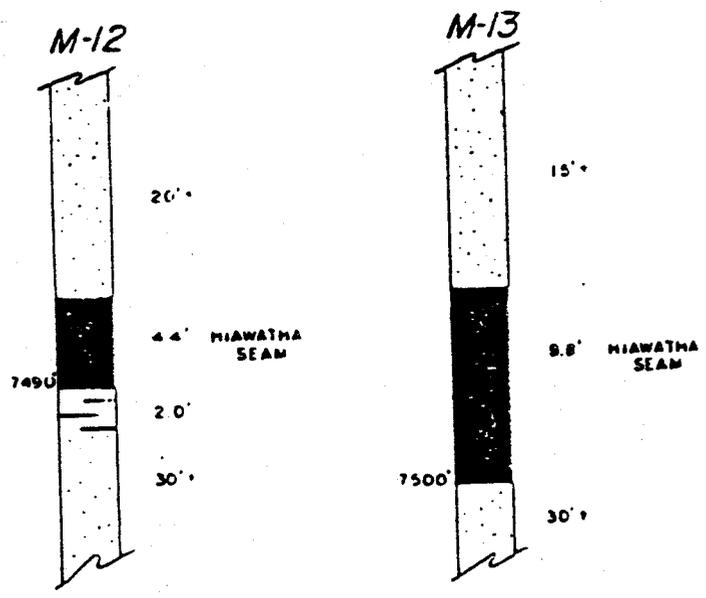
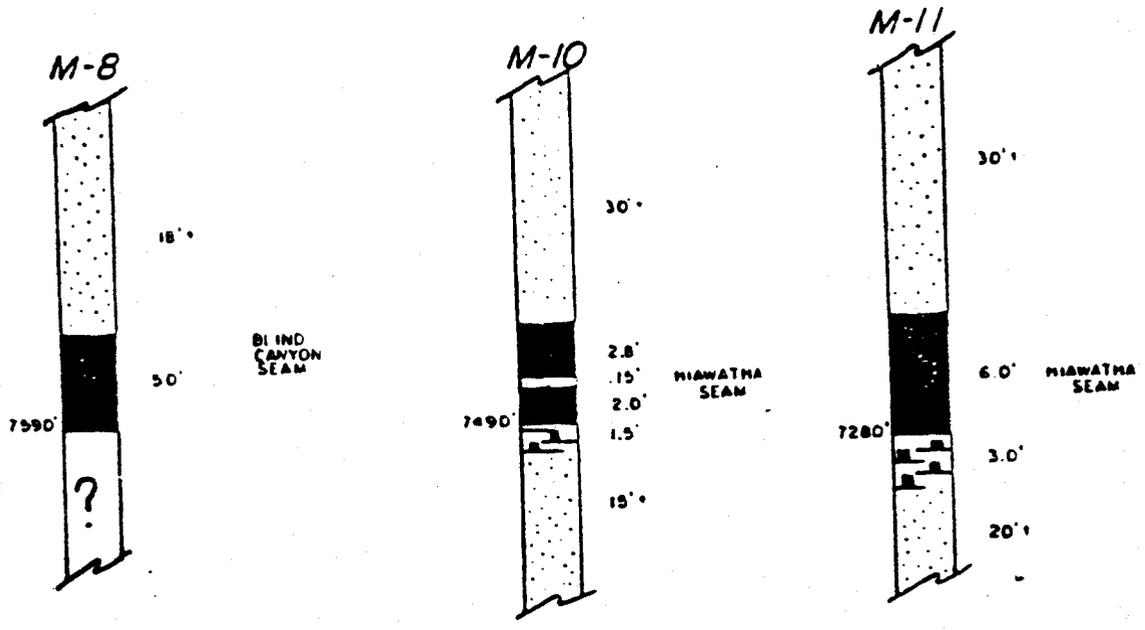
— EXPLANATION —



COLUMNAR OUTCROP
 SECTIONS
 LOWER HUNTINGT
 CANYON EMERY COUNT
 UTAH

Figure 2

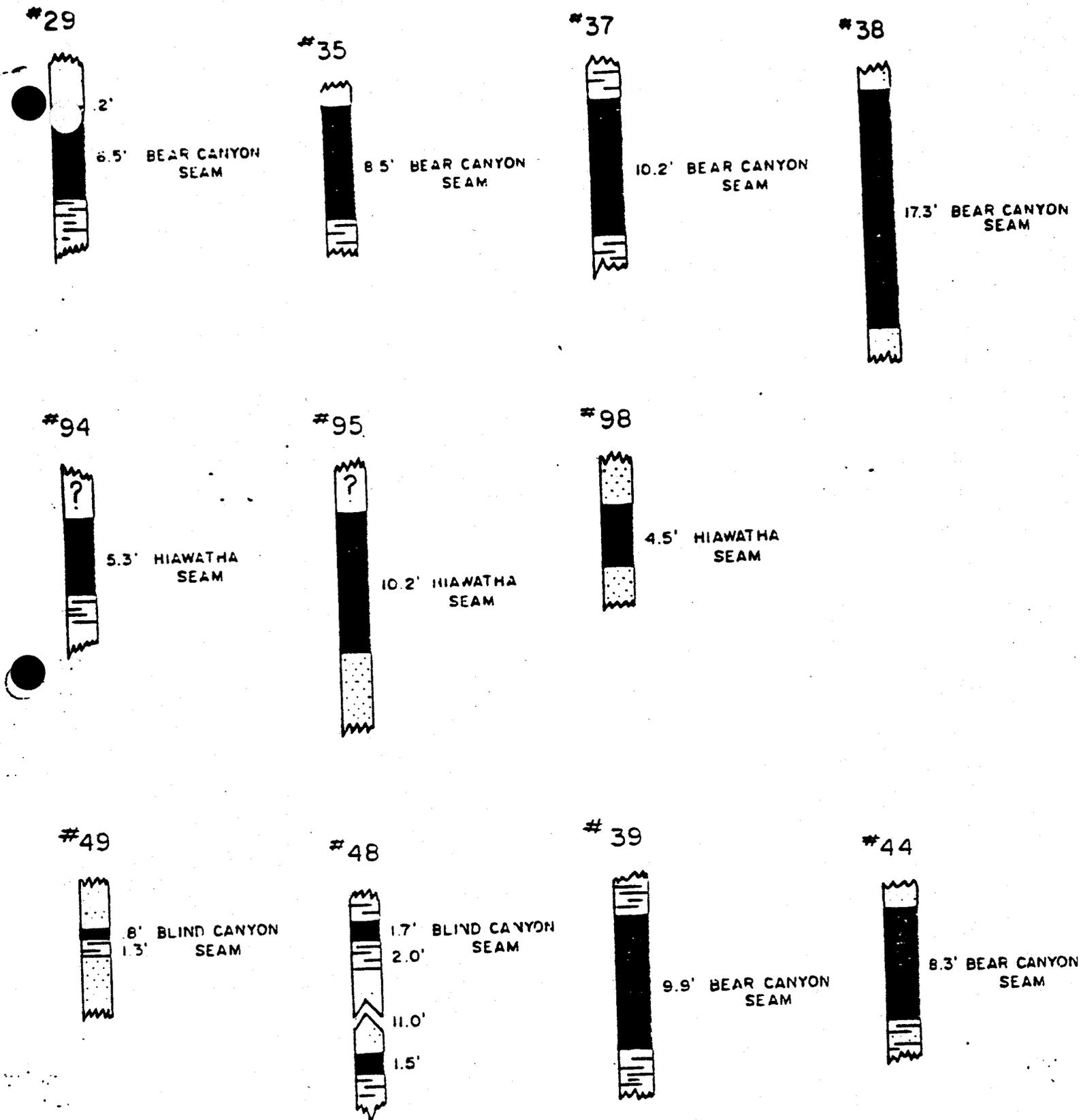
Vertical Scale 1" = 10'



COLUMNAR OUTCROPPING SECTIONS
 LOWER HUNTINGTON
 CANYON EMERY COUNTY
 UTAH

Figure 2

Vertical Scale 1"=10'



Vertical Scale 1" = 10'

COLUMNAR OUTCROP SECTIONS
(after Doelling, 1972)
LOWER HUNTINGTON CANYON
EMERY COUNTY, UTAH

Figure 2

HENRY MTNS.

CASTLE VALLEY

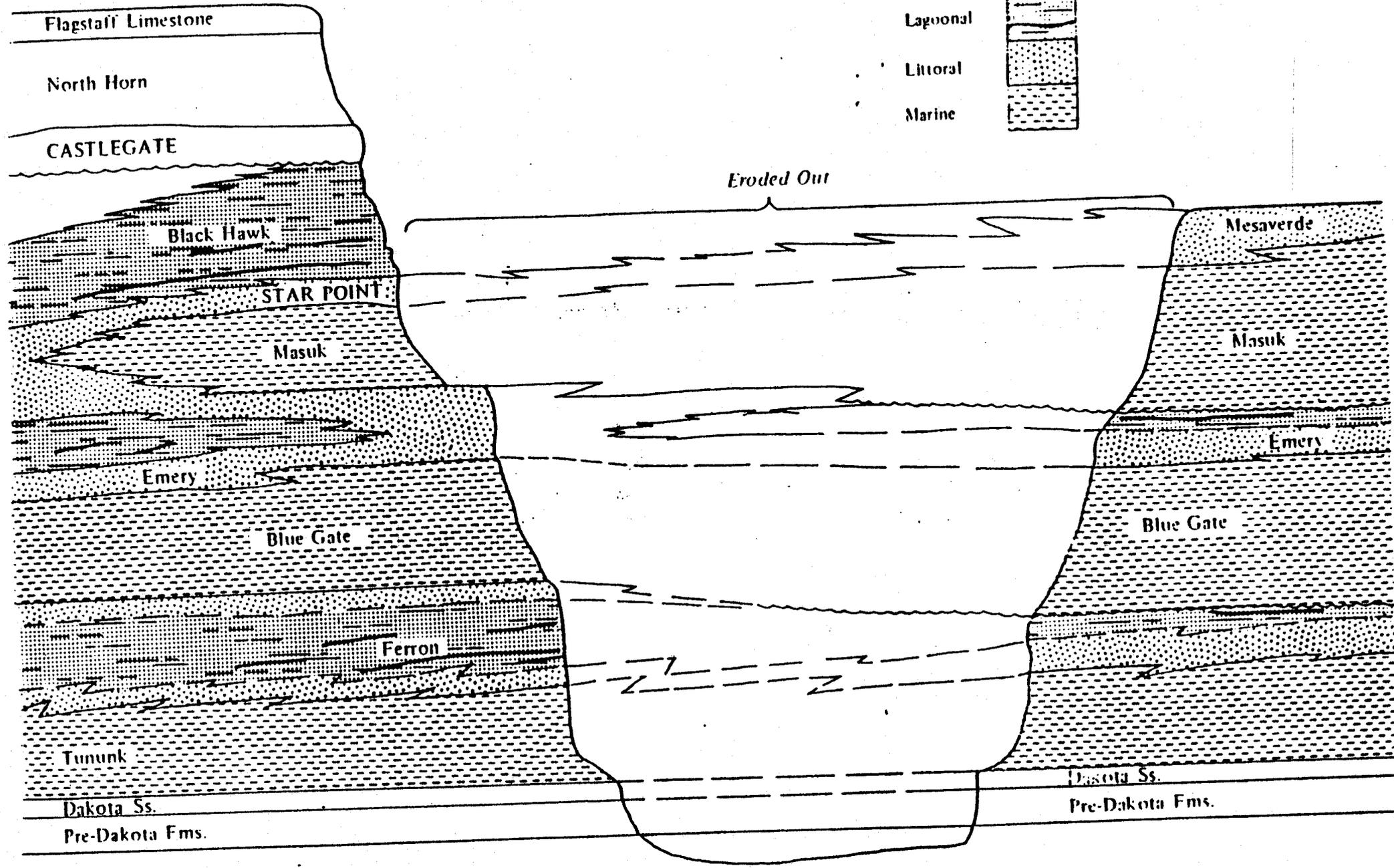
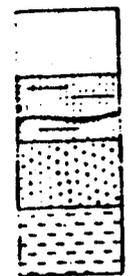
CENTRAL WASATCH PLATEAU

Continental

Lagoonal

Littoral

Marine



Central Wasatch Plateau to the Henry Mountains.

System	Series	Stratigraphic Unit	Thickness (feet)	Description		
TERTIARY	Eocene	Green River Formation	-	Chiefly greenish lacustrine shale and siltstone.		
		Wasatch Group	Cotton Formation	300-1,500	Varicolored shale with sandstone and limestone lens thickest to the north.	
	Paleocene		Flagstaff Limestone	200-1,500	Dark yellow-gray to cream limestone, evenly bedded with minor amounts of sandstone, shale and volcanic ash, ledge former.	
			North Horn Formation (Lower Wasatch)	500-2,500	Variegated shales with subordinate sandstone, conglomerate and freshwater limestone, thickens to north slope former.	
	CRETACEOUS	?				
Maestrichthian						
Campanian		Mesaverde Group	Price River Formation	600-1,000	Gray to white gritty sandstone interbedded with subordinate shale and conglomerate, ledge and slope former.	
			Castlegate Sandstone	150- 500	White to gray, coarse-grained often conglomeratic sandstone, cliff former, weathers to shades of brown.	
			Blackhawk Formation <i>MAJOR COAL SEAMS</i>	700-1,000	Yellow to gray, fine- to medium-grained sandstone interbedded with subordinate gray and carbonaceous shale, several thick coal seams.	
			Star Point Sandstone	90-1,000	Yellow-gray massive cliff-forming sandstone, often several tongues separated by Masuk Shale, thick westward.	
Santonian		Mancos Shale	Masuk Shale	300-1,300	Yellow to blue-gray sandy shale, slope former, thickest north and central plateau area, thins southward.	
			Emery Sandstone <i>COAL (?)</i>	50- 800	Yellow-gray friable sandstone tongue or tongues, slope former, may contain coal (?) in south part plateau if mapping is correct, thickens to west south. Coal may be present in subsurface to west.	
			Coniacian	Blue Gate Member	1,500-2,400	Pale blue-gray, nodular and irregularly bedded mudstone and siltstone with several arenaceous beds, weathers into low rolling hills and badlands, thickens northerly.
				Turonian	Ferron Sandstone Member <i>MAJOR COAL SEAMS</i>	50- 950
			Cenomanian		Tununk Shale Member	400- 650
				Albian	Dakota Sandstone	0- 60
		<i>MINOR COAL.</i>				

Figure 5. Generalized section of rock formations, Wasatch Plateau coal field.

(c) Maps A general geologic map is included as Plate 2.

ITEM (3) DESCRIPTION OF PROPOSED MINING OPERATION

(i) Coal Analyses

(a) Coal Analyses - Typical coal analyses for the Bear Canyon and Hiawatha Seams are included as Exhibit 2.

(b) Coal Quality - The coal is generally described as a low-sulfur medium-volatile bituminous grade. The coal analyses in Exhibit 1 will confirm this description. Some dilution (approximately 5%⁺) of roof or floor rock will normally occur during mining, causing a slight increase in the as-received ash and a slight decrease in the as-received B.T.U.; however, normal ash values will still run below 10% with B.T.U. values above 12,000. The sulfur will stay at or below 0.5%.

		<u>Average</u>
(c)	<u>B.T.U.</u>	
	Blind Canyon	13,014
	Hiawatha	12,719
(d)	<u>Ash</u>	
	Blind Canyon	4.5
	Hiawatha	6.2
(e)	<u>Moisture</u>	
	Blind Canyon	6.8
	Hiawatha	5.6
(f)	<u>Sulfur</u>	
	Blind Canyon	0.53
	Hiawatha	0.61
(g)	<u>Volatile Matter</u>	
	Blind Canyon	43.8
	Hiawatha	42.3
(h)	<u>Fixed Carbon</u>	
	Blind Canyon	45.7
	Hiawatha	45.7

(ii) Mining Methods

(a) Mining Methods

Mining in both the Bear Canyon and Hiawatha Seams will be done by continuous miners. The miners will discharge into shuttle cars (diesel or electric) which carry the coal to the feeder breaker. The feeder breaker discharges the coal onto the belt conveyor where it is taken out of the mine.

The main entries consist of a five-entry system on 80' - 100' centers to be driven to the property limits. Sub-mains consisting of five entries on 83' centers are then driven off the mains and room-and-pillar panels are developed off the submains. Rooms are developed within the panels on 70' - 83' centers. The pillars are then recovered according to the approved plan. Timber is installed to support the roof and provide for breaker control of caving roof. Retreat mining of this type will provide a recovery of 75% - 78% within the panels. As the panel retreat is completed, the sub-mains will be pulled back to the barrier pillars left along the mains. The mains will be pulled upon final retreat of the mine operation.

Mining plans and sequences for the Bear Canyon and Hiawatha Seams are shown on Plates 3-1 and 3-1A respectively. As can be seen, the lower seam workings are planned to be columnized with the upper as closely as practiceable. The mining plan sequence allows for recovery of the upper seam areas prior to final recovery of the lower seam. This procedure is consistent with accepted engineering practice in multiple seam mining.

Retreat Mining

Underground coal mining procedures follow two basic approaches to the recovery of involved reserves. These are advancing and retreating. Sometimes considerable advantage can be developed and then mined from the most remote area back to the portal. However, this is not generally possible. As a result, development work and mining are usually accomplished simultaneously as the workings advance into the property. Depending upon the mine layout, this can become retreating and mine back to the portal. Thus, we have an advance-retreat situation for the entire property.

This concept can be applied to various parts of the main entries, submain entries and even panels.

If mining advances along both sides of any set of entries from their starting point to their termination, the system is advancing; if mining is not started until the entries reach their limit and then begins at the termination point on both sides, the system is retreating. If mining begins at the initiating point of the entries on one side and advances to the end, then moves to the other and works out to the starting point, it becomes an advance-retreat system. Frequently this method is attractive, as it permits high production work to proceed in combination with development, creates favorable strata control conditions and, if done properly, facilitates ventilation and enhances safety of the operation. An overall advance-retreat system is used, the faces will retreat along the panel entries.

Advance-retreat is not to be confused with first and second mining, which applies primarily to room and pillar work. First mining refers to the excavation of rooms and entries, leaving the intervening pillars of coal in place. Second mining can accompany first mining as it advances into a solid block of coal, in which case it is advancing; or it can retreat through an area which has been first-mined. The former is probably the safer and preferred method. It will be used where second mining is applicable in the Bear Canyon Mine.

(b) Mining Equipment

Equipment Selection

Co-Op Mining Company will utilize the equipment described in the following list for its mining operation and will acquire any additional equipment as required to maintain a sound mining operation.

Surface Equipment

Vibrating screens
crushers
conveyors
Front end loaders
road grader
crawler tractor
fork lift

Underground Equipment

continuous miner
electric shuttle cars
belt line with feeder-breaker
roof bolter

scoop
 service vehicle
 personnel carrier
 boss buggy
 rock dusters
 water pumps
 supply tractor
 stopper
 power center

- (c) Mining Sequence - Mining plans and sequences for the Bear Canyon and Hiawatha Seams are shown on Plates 3-1 and 3-1A, respectively.
- (d) Production Rate - The projected production rate from this mine (both seams) is 300,000 tons of raw coal per year. This is based on 3 continuous miner sections producing a total of 1250 tons per day with 2 production shifts operating 240 days per year.
- (e) Stripping Rates - NA
- (f) Highwall Limits - NA
- (g) Acres Affected - The total surface disturbance for this mining operation is approximately 10 acres. This disturbance is only for the surface facilities for the underground mine, and is located on fee (non-federal) land.

(iii) Coal Reserves

(a) Federal Lease Reserves

		<u>In-Place</u>	<u>Recoverable</u>
<u>U-024318</u>	Bear Canyon	Mined Out	Mined Out
	Hiawatha	<u>87,000</u>	<u>43,500</u>
	Total	87,000	43,500

		<u>In-Place</u>	<u>Recoverable</u>
<u>U-024316</u>	Bear Canyon	6,621,000	3,310,500
	Hiawatha	<u>3,310,500</u>	<u>1,655,250</u>
	Total	9,931,500	4,965,750

(b) LMU Reserves

		<u>In-Place</u>	<u>Recoverable</u>
Non-Federal	Bear Canyon	13,065,000	6,532,500
	Hiawatha	<u>6,968,000</u>	<u>3,484,000</u>
	Total	20,033,000	10,016,500

(c) Coal Reserve Base - The reserve is based on acreage in each of the leases and non-federal areas, times an average coal height of 10' for the Bear Canyon Seam and 5' for the Hiawatha Seam, times 80 pounds per cubic foot, divided by 2000 pounds per ton. The total acreage is reduced by the 200' outcrop barrier and 100' property boundary barrier to provide a mineable in-place tonnage.

(d) Mineable Reserve Base - The mineable, in-place tonnage is the total reserve as described in (c) above, minus the 200' outcrop barrier and 100' property boundary barrier.

(e) Recoverable Coal Reserves - Recoverable reserves are based on 50% of in-place reserves. The 50% figure has proven to be a good estimate of recoverable reserve on an entire property.

(iv) Method of Abandonment

(a) Protect Coal Reserves

Conservation of Coal Resources

Maximum recovery of this reserve will be practiced from the time Co-Op Mine begins mining on this property. In addition, mining plans have established mine layouts to reach all areas of the property and, at the same time, by the adoption of pillar recovery techniques in room and pillar work, raise the percentage of recovery of reserves in the mining area to the maximum. Whereas room and pillar methods without pillar mining recover approximately 50% of the coal, the above procedures show recovery of close to 60% overall.

Seams will be mined to a minimum thickness of 5 feet which is the lower limit for operation of the equipment that must also mine to full seam heights of 10 feet or more.

Barrier pillars to protect main and submine entries have been made large enough (200 feet or greater) to assure prevention of the entries for their useful life. When the area they service is mined out, the entry pillars will be recovered on the way out.

Recovery Factors

Various factors and combinations of factors affect the amount of coal recovered from any given area of a reserve. Natural conditions such as incompetent roof strata, soft floor strata, water, depth of overburden and residual tectonic forces in the strata influence operating procedures can significantly influence the amount of overall recovery.

Present indications of natural conditions within the permit area are encouraging. Roof and floor conditions are generally satisfactory with the exception of some faulting, which may create difficulties.

Burned areas of coal along the outcrops also are not definitely delineated. This will affect the total in-place reserve estimate if such burning if such burning has penetrated the seam to a greater distance than anticipated.

Co-Op Coal Company's engineers have assured recovery of the highest percentage of in-place reserves by adoption of sound engineering principles in design and strict observance of these principles in operation.

Projected Maximum Recovery and Rate

The mining systems adopted by Bear Canyon Mine for use on this property will assure maximum recovery of the most advanced current mining technology and equipment. Pillar recovery in room and pillar work follows procedures that assure thorough and uniform removal of the coal to maintain effective roof control over the working and adjacent areas.

Co-Op Coal Company plans to extract all coal reserves to the extent allowed by economics, safety conditions and prudent mining practice, from the lands it controls.

The "upper seam" in this area is the Upper Bear Canyon Bed, which

is probably just a split off the main Bear Canyon Seam in which the mine is located. This seam lies only 15' to 20' above the Bear Canyon Seam at the minesite, and is evidenced only by a ledge and some burning. Speiker and Doelling have both referred to a probable upper split of the Bear Canyon Seam in this area, likely with a small lateral extent and little, if any, mining potential. An additional seam outcrops about 200' above the mine portals; however, this is one of the "upper beds" listed on Table 1, page 5 and again is not considered to have any economic potential due to limited lateral extent and extreme burning of seams in this horizon.(Doelling).

Due to the burning, questionable lateral extent and inability to trace these upper seams (or splits), and due to the close proximity of the upper Bear Canyon split to the main bed presently being mined, there are no plans to enter or mine these upper seams.

These seams (of splits) are not considered as mineable reserves; therefore, the seam presently being mined is considered the uppermost, mineable seam in the area. This is consistent with mining practices recommended for multiple seam areas.

The reserves shown previously reflect mineable coal only Bear Canyon and Hiawatha Seams. These reserve estimates are based on numerous outcrop measurements as well as in-seam measurements, both in Bear Canyon and Trail Canyon. Based on these measurements, and using a 2500' radius of influence from a known coal height, it was determined that an average coal height of 10' was an acceptable (although

conservative) figure to use for the Bear Canyon Seam. By the same method, an average height of 5' was determined for the Hiawatha Seam. The reserves in place were then calculated by multiplying the number of acres of mineable coal by 1972 tons/acre ft. (80 lbs./cu. ft. coal in place) times the average coal height for each seam. The recoverable coal reserves was then estimated by multiplying the in-place reserve by a recovery factor of 50%. A 60% recovery factor could be used based on actual recovery experience by Co-Op Mining Company in the seams in this area; however, the 50% factor was used to assure the reserves estimate is conservative.

Co-Op plans to enter the Hiawatha Seam at a later date, although, at this time it is not known precisely when that will occur, or at what location. It is possible that access to the lower Hiawatha Seam may prove to be most economic through new portals in the outcrop; however as mining progresses, and fault location and displacements are better delineated, it may become even more feasible and less environmentally destructive to enter the lower seam through rock tunnels.

Rider Seams

The only potentially "mineable" rider seams in the area are the "upper beds" some 200' above the Bear Canyon portals, and the Upper Bear Canyon (Blind Canyon) Seam 15' - 20' above the Bear Canyon Seam. As discussed on page 27 of this plan these seams have been verified in the field as having no economic potential due to extreme burning of the "upper beds", and the small lateral extent and

close proximity of the Upper Bear Canyon Bed. For this reason, the Bear Canyon Seam is considered the uppermost mineable seam in this area. No rider seams of any importance are known to exist in the interval between the Bear Canyon and the Hiawatha Seams. The Hiawatha Seam is therefore considered to be the lowest, and only other economically recoverable coal seam in the permit area.

- (b) Protect Other Resources - Upon completion of mining, Co-Op Mining Company is committed to the reclamation of the disturbed area of the minesite. This reclamation will assure that natural, as well as man-made resources are protected. In addition, the company has committed to a subsidence monitoring and control program. This program will evaluate subsidence effects, and allow for restoration of any renewable resources affected by subsidence from the underground mining.

ITEM (4) MAPS AND CROSS SECTIONS

(i) Plan Map of Area to be Mined

- (a) Plan Map - A map is provided as Plate 1, showing the following:
1. Federal Lease Boundaries and Numbers
 2. LMU Boundaries
 3. Surface Improvements, Ownership and Boundaries
 4. Coal Outcrop, Dips and Strikes
 5. Location of Existing and Abandoned Mines

(ii) Isopach Maps

- (a) Coal Isopach Maps - Provided in Plates 4-1 and 4-1A for the Bear Canyon and Hiawatha Seams, respectively.

(b) Overburden - Provided in Plates 5-1 and 5-1A for the Bear canyon and Hiawatha Seams, respectively.

(c) Interburden - Provided in Plate 6 for the interval between the Bear Canyon and Hiawatha Seams.

(iii) Typical Structure Cross Section

(a) Cross Sections - Provided in Plate 7-1 and 7-1A for the Bear Canyon and Hiawatha Seams, respectively.

(iv) General Surface Mine Layout - N/A

(v) General Underground Mine Layout

(a) Mining Sequence - Mining by year for the first 5 years and in 5-year increments thereafter is shown on Plates 3-1 and 3-1A.

(b) Entries, Barriers, etc. - All projected entries and coal barriers are shown on Plates 3-1 and 3-1A.

(c) Location of Left Pillars - All proposed coal to be left is shown on Plates 3-1 and 3-1A as outcrop barriers and property barriers to be left as required by law. All other coal, including barriers between panels and main entries will be pulled on final retreat if possible.

(d) Typical Panel Recovery - A sketch of a typical panel recovery is shown in attached Exhibit 3.

(vi) Auger Mining - N/A

ITEM (5) GENERAL RECLAMATION SCHEDULE

(a) General Schedule

Reclamation Plan

Co-Op Mining Company, upon completion of mining on this permit area, will reclaim all disturbed surface areas as diligently and rapidly as possible, to restore the property to a variety of alternative uses.

The postmining land uses will be grazing, recreation, wildlife and mineral. Portals will be closed and concrete foundations will be buried with fill material.

Where physically possible, disturbed areas will be scarified, sloped, topsoiled and seeded or planted before the next growing season. The site will be revegetated with a mixture of grasses, forbs, brush and trees as agreed upon with the appropriate land management agencies. Reclaimed areas will be maintained until stable up to five years. Seed will be planted with the best techniques available at that time.

Proposed access roads to the mine portals, will be reclaimed and revegetated. This will accomplish a dual purpose of controlling runoff and revegetating the hillsides with vegetation comparable to existing growth.

The initial step in the reclamation plan is to seal all large-diameter openings by backfilling these openings with non-combustible material, (earth and small rock) adjacent to the portals. The seals will be

designed such that mine drainage, if any, will not enter surface water bodies.

For a more detailed description of the sealing of openings, see Section entitled, Sealing of Mine Openings, Drill Holes, Wells, etc.

The next step in reclamation would be the removal of all surface structures, equipment and road blacktop. Once this has been accomplished, all solid waste generated in the abandonment operation will be collected and removed from the reclaiming areas. Additional information concerning this aspect of the reclamation plan is present in Section 3.6.3.2., Removal of Surface Structures.

Backfilling of the subterranean portion of the silos, holes and depressions will be the next reclamation activity. Once the backfilling is completed, the disturbed areas will be graded and recontoured.

Reclamation Timetable

A suitably permanent and diverse vegetation cover to be established on all affected areas of land.

Land reclamation will take place as soon as possible after surface disturbance. All cut and fill slopes resulting from construction of access roads and coal yards will be stabilized and revegetated at the

first seasonal opportunity. Areas occupied by support facilities such as roads, office buildings, shops, coal handling structures and conveyors will not be reclaimed until conclusion of the mining operations. Demolition and removal of structures should commence in March, April 2033. Portal seals and grading should commence in June and be completed by September 2033. Drill and hydroseeding and stream enhancement work should be completed by October 30th. The area should be monitored during July, 2034, and again during July 2035. At this point shrub and tree density, as a result of planting, can be determined. When the vegetation standard is achieved, the sediment control structures will be removed.

Contemporaneous Reclamation

Interim Reclamation (during operations) will occur in areas that are no longer needed or that require short-term stabilization. These areas will be seeded and mulched. Other areas may be reclaimed at different times during the operation as specific activities are concluded. This same procedure will apply to any area which becomes available during the life of the mine, and will be implemented upon the first available favorable season.

Soil Removal and Storage

To prevent suitable topsoil from being wasted or contaminated by spoil or other waste materials, topsoil will be removed from any new construction areas as a separate operation. The topsoil will

be stockpiled 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. There is approximately 2,600 cu. yds. of topsoil on-site in Bear Canyon. The balance of 5,500 cu. yds. has been purchased from RACO Company and was tested to insure its compatibility.

Topsoil Removal

At the start of any construction phase, topsoil has been collected from the area where useable soil existed. Existing vegetation has been removed and the topsoil collected prior to excavation or other surface disturbance operations within 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 in these areas consists of A horizon quality material and B horizon quality material. The C horizon material was not removed since it is not sufficiently capable of supporting diverse vegetation.

The equipment used for topsoil removal consisted of bulldozers, front-end loaders and dump trucks. The use of bulldozers require 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 insure that required horizons were removed and stored.

Topsoil Stockpile

During any stockpiling operation, unnecessary compaction was prevented by limiting the equipment traffic over the stockpile. 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.

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. (such as pipeline trenches, etc.)

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:

- o A stable surface will be provided in an area outside the influence of active operation.
- o As a stockpile is completed, it will be left in a rough condition to minimize erosion.
- o Stockpiles will be situated and protected to prevent water erosion and sprayed with a tacifying agent.
- o Storage piles will be vegetated with quickgrowing soil-stabilizing plants.
- o Signs will be posted to protect the stockpiles from accidental use as fill or from other inadvertant material contamination.
- o The establishment of noxious plant series will be prevented.

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

Topsoil Redistribution

Prior to topsoil redistribution, regraded land will be scarified by a ripper-equipped tractor. The ground surface will be ripped to a depth of 14" in order to reduce surface compaction, provide a roughened surface to assure topsoil adherence and promote root penetration.

Within a ten day period prior to seeding, topsoil will be distributed on all 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 all areas in which facilities such as roadbed, mine pads and building sites are to be abandoned.

Topsoil redistribution procedures will insure approximate uniform thickness of 6" consistent with the proposed reclamation plan. Topsoil will be redistributed within a ten day period prior to seeding and 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 a disk running at a 6" depth. This operation will also help prepare a proper seed bed and protect the redistributed topsoil from wind and water erosion.

Co-Op Mining Company will exercise care to guard against erosion during and after application of topsoil and will employ the necessary

measure to insure the stability of topsoil on graded slopes.

Final Abandonment

Co-Op Mining Company anticipates that the postmining land uses of the permit area will be the same as the premining. State and local governments have not proposed any land use changes for the postmining period. This section delineates the abandonment and reclamation steps to be taken which will allow a return to the original land use once mining operations are complete. In general, disturbed portions of the mine plan area will be returned to their original wildlife/grazing habitat.

Method of Achieving and Supporting Postmining Land Uses

The following presents the abandonment steps and revegetation/reclamation activities which represent the method of achieving and supporting postmining land uses. The activities are organized in the approximate order of execution.

Sealing of Mine Openings, Drill Holes, Wells, etc.

Exploratory Holes, Bore Holes, and Wells

Upon abandonment of drilling operations, all drill holes are to be cemented with an approved slurry. The slurry mixture will consist of 5.2 - 5.5 gal. of water per bag of cement. Co-Op is committed

to plugging all drill holes with 5 feet of cement as required by rule M3(5) UMLR Act of 1975.

Shafts

The shafts will be filled bottom to collar with non-combustible material. A cap consisting of a 6 inch thick reinforced concrete slab will be used as a seal.

The cap will be equipped with a 2 inch diameter vent pipe and will extend for a distance of 15 feet below the surface of the shaft collar.

Mine Entries

Seals will be installed in all entries as soon as mining is completed and the mine is to be abandoned. The seals will be located at least 25 feet inside the portal mouth entry. Prior to installation, all loose material within 3 feet of the seal will be removed from the roof, rib and floor. The mine entry seals will be made of solid concrete blocks (average minimum compressive strength of 1,800 lfb/in² tested in accordance with ASTM C140-70) and mortar (1 part cement, 3 parts sand and no more than 7 gallons of water per sack of cement) to form a wall two blocks thick.

Seals will be installed in the following manner:

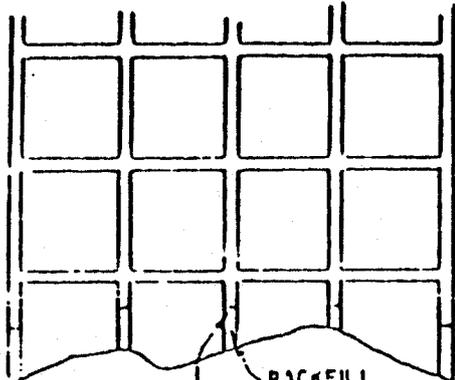
The seal will be recessed at least 16 inches deep into the rib and 12 inches deep into the floor. No recess will be made into the roof. The recess will be made into the floor. No recesses will be made

into the roof. The blocks will be at least 6 inches high, except in the top course and 8 inches wide.

The blocks will be laid and mortared in a transverse pattern. In the bottom course, each block will be laid with its long axis parallel to the rib. The long axis in succeeding courses will be perpendicular to the long axis block in the preceding course. An interlaced pilaster will be constructed in the center. The seals will have a total thickness of 16 inches. Where conditions permit, the portal seals will be graded to conform with existing surface contours and seeded. In those instances where sizable highwalls established in preparing the portal site cannot be returned to original contours, the opening in front of the wall will be filled with non-combustible material as above and the portal and entire exposed seam on the highwall will be covered with 6 to 8 feet of non-combustible material, graded, covered with suitable material and seeded.

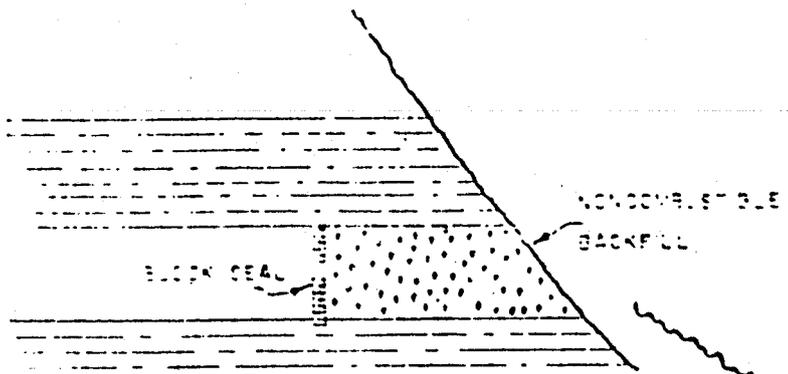
Removal of Surface Structures

Co-Op Mining Company will restore disturbed land-surface areas to their approximate premining conditions, to the extent technologically and economically feasible. All surface facilities including support facilities will be removed and restored to prevent damage to fish, wildlife, and associated environmental values.



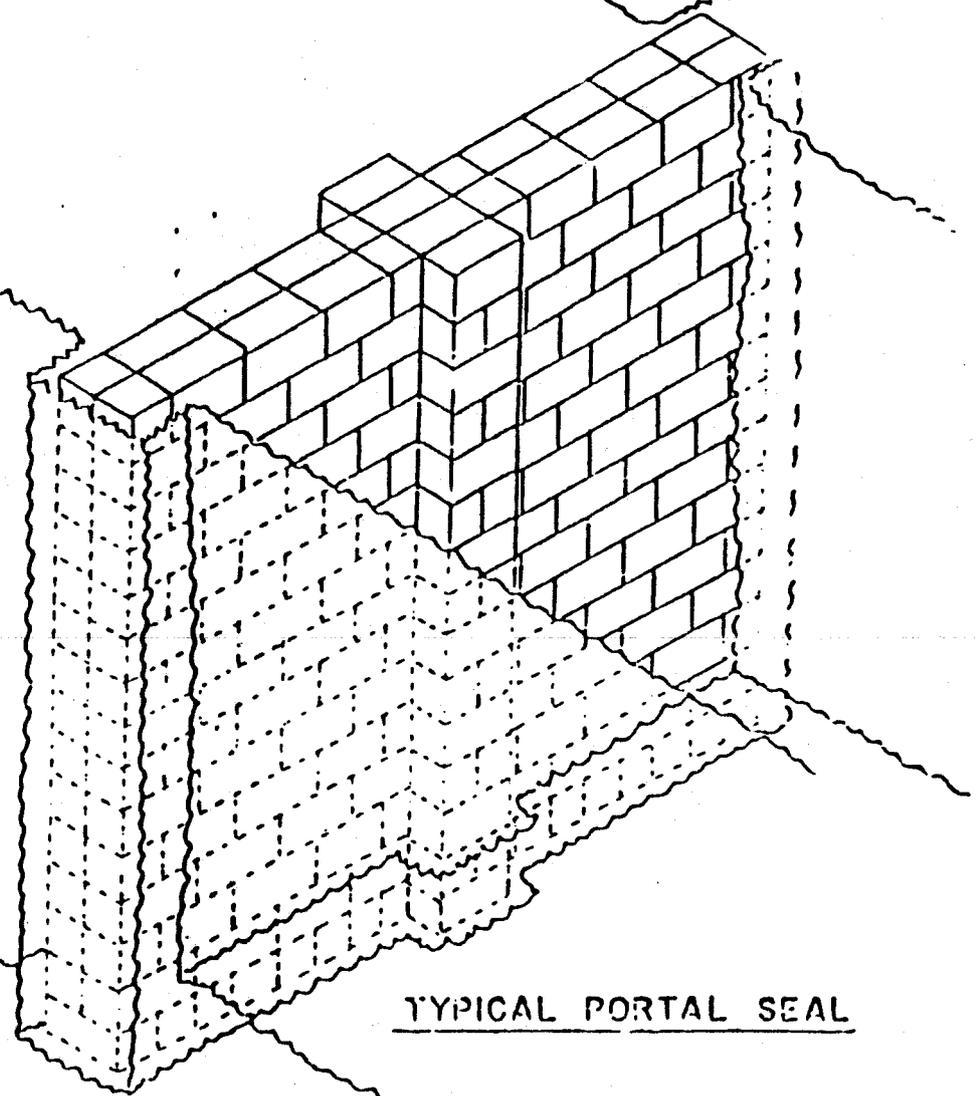
BLOCK SEAL
BACKFILL
OUTCROP

PLAN VIEW



BLOCK SEAL
NONCOMPRESSIBLE
BACKFILL

SECTION VIEW



TYPICAL PORTAL SEAL

PORTAL SEALS

41

Building Removal

Office, shop, storage, scale, buildings and bath house:

- o Each structure will be removed
- o Foundations will be removed if they are close to the surface. Deeper foundations will be fractured and covered with at least 3 feet of dirt.

Road Abandonment

The access road and small support roads will be reclaimed. Culverts and blacktop surfacing material will be removed. Reclamation would then include recontouring, ripping, adding cross drains, water bars, topsoil and seed.

Mine Operational System Removal

Systems such as domestic water will be phased out and removed or buried.

Area Cleanup

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

Disposition of Dams, Ponds and Diversions

After the disturbed areas are stabilized and runoff is comparable to the area's premining conditions without detention time, the site drainage system will be removed. The site drainage system areas will be backfilled and revegetated. All ponds will be drained and allowed to dry; thereafter they will be backfilled and revegetated.

Natural drainage pattern will be returned to a horizontal drainage pattern similar to the original.

Backfilling and grading plans

The objective of the proposed backfilling, soil stabilizing, compacting, contouring and grading process is to achieve a reclaimed surface which all provide a variety of topographic features enhancing post-mining land use.

Reclamation earthwork activities will be conducted as outline in the section entitled, Schedule of Reclamation. The steps to be taken in the backfill, soil stabilization, compaction, contouring and grading problems are described in the following subsections.

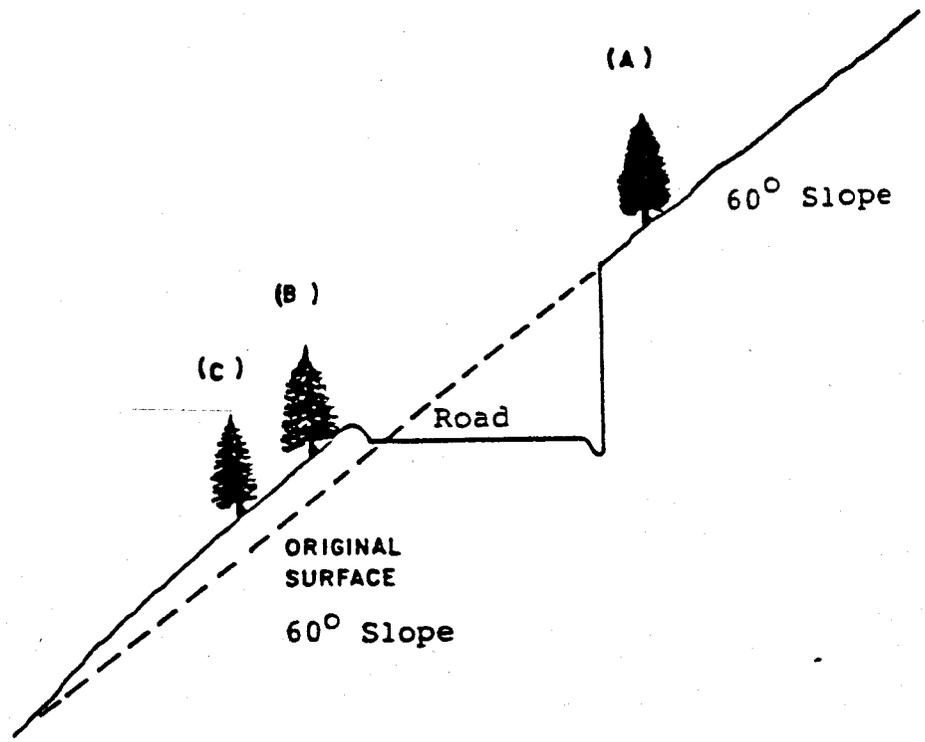
Backfilling operations, utilizing equipment such as rubber-tired scrapers, front-end loaders and dump trucks, will be conducted in the portal and treatment facility areas. Holes or depressions will be filled when the mining operation is concluded. Compaction operations

utilizing equipment such as sheeps-foot tampers, will be conducted to stabilize all filled holes and depressions. The portal fill material will be put in place with an LHD (load, haul, dump) unit to insure proper backfilling.

In general, the backfilling and grading operation will take place in the following manner:

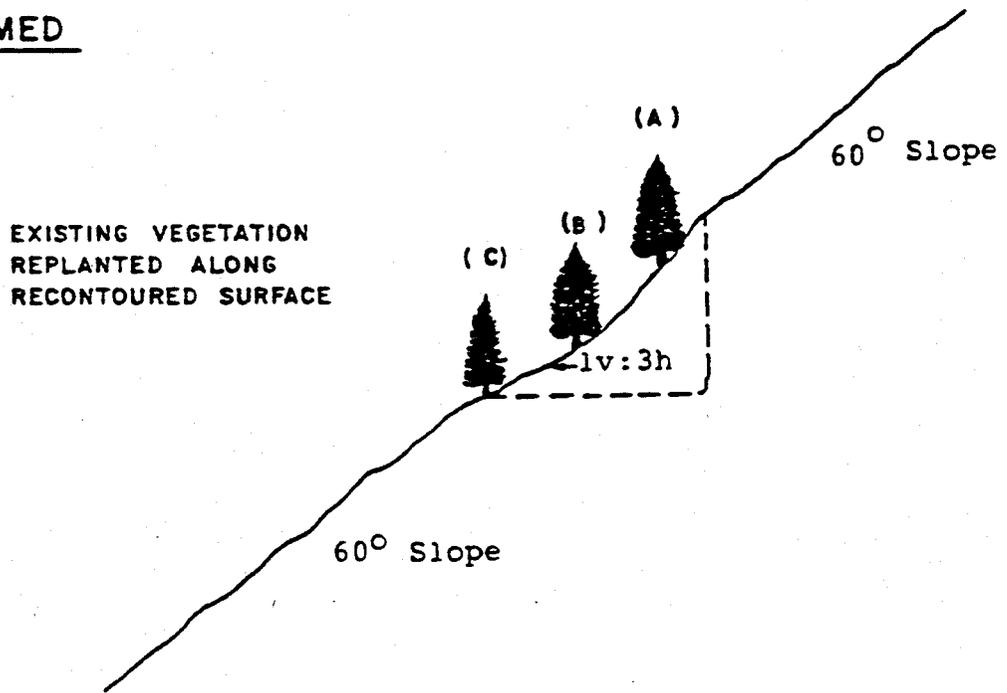
1. All mining portals will be sealed and backfilled as previously described.
2. Solid waste generated in the facilities removal will be collected and removed to an approved landfill.
3. A backhoe and dozer will work in conjunction to remove the outer edge of the operational benches and compact it against the highwall. This will be accomplished by the backhoe reaching over the edge of the bank approximately 20' pulling the material back. The dozer will then push and compact this material from the highwall outward to reach a bench slope of approximately 1v:3h for drainage purposes.
4. This operation will start on the upper bench and work across the bench to the upper access road.

EXISTING



Scale: 1"=20'

RECLAIMED



Scale: 1"=20'

TYPICAL SLOPE RECLAMATION

ATTACHMENT 2

FIGURE
NO.
3.6.4.-A

5. The backhoe and dozer will work in the same manner to eliminate the access road, working down to the lower pad.
6. The above procedure will continue on down the canyon reshaping the mine yard and disturbed area to the configuration shown on the approved plan.
7. As backfilling and grading is completed, operational areas will be scarified by ripping to a depth of 14" with a dozer where possible. Steep slopes will receive ripping to create ledges, crevices, pockets and screes. This will reduce compaction and prevent topsoil slippage, and improve soil retention and vegetation establishment in the cat tracks. The area will be walked over to create grouser marks which run parallel to the slope.
8. Topsoil will be spread over the disturbed areas after the grading and ripping is complete.
9. Upon completion of the above, the area will be reseeded as per the plan.
10. Material used for the recontouring will be taken from side slopes or other existing embankments within the disturbed area. In general, material to be compacted or used for fill will be taken from a side slope or embankment close enough to allow for pushing into place by a dozer, rather than loading and hauling by truck.

Recontouring

The cut slopes will be constructed in a manner which will achieve a 3:1 safety factor and physical stability. This design will prevent slides and other related erosional damage. Upon abandonment, slopes will only be reduced to the amount physically possible. This amount will be limited to the reach of a backhoe, approximately 20'. Steep slopes and highwalls are inaccessible to conventional equipment, and thus, cannot be reduced or flattened appreciably during reclamation. Stability analysis on these areas have confirmed that they have a factor of safety greater than 1.3 as they presently exist.

Stability and the designated post-mining land use can be achieved without extensive backfilling and return to the approximate original contour.

In February 1981, a slope stability analysis was performed by Dames & Moore on the Bear Canyon Mine access road. The purpose of this study was to analyze the static safety factor of the side-cast cut and fill slopes along this road. The conclusion of this study was that the slope stability had a safety factor ranging from a minimum of 1.43 to 2.15. This study was performed on the soil characteristics of the down-cast material which was not compacted. This is the same material that will be partially pulled back and compacted against the highwalls, increasing both the cohesion and unit weight of material and increasing the safety factor above the minimum of 1.43. This will result in a factor of safety well above the required 1.3.

Removal or Reduction of Highwall

Highwalls will be reduced to the extent practiceable to develop a static safety factor of at least 1.3. Only those highwalls that can be lessened by reaching with a backhoe will be reduced. Highwalls greater than 20' in height will be left; however, these highwalls are shown to have a stability safety of greater than 1.3 by the following analyses:

A 1981 slope stability study of the Bear Creek Mine Access Road by Dames & Moore indicated a static safety factor of 1.43 to 2.15. This study was performed to analyze the static safety factor of the side-cast cut and fill slopes along the Bear Creek Portal Access Road. The maximum static safety factor of 2.15 was achieved in the trial arc which included the highwall area. As a further note on page 5 of their Feb. 20, 1981 report, they indicate, "It should be noted that the factor of safety of the trial arc which cuts deep into the slope does not consider the presence of bedrock, increasing strength of the natural soils with depth, or the effect of the calcium carbonate cementation in the soil. If the above were incorporated into the analysis, the factor of safety would be significantly higher." Since the highwalls are commonly made up of varying layers of bedrock material, it is reasonable to assume their strength and stability will increase accordingly.

As a further check on the highwall stability, a separate

analysis was performed using a different method. This analysis uses the Hoek method, and is based on rock parameters typical of those contained in the Blackhawk Formation of the Wasatch Plateau. The safety factor is calculated using the following parameters:

Maximum Slope Height	100'
Slope Angle	80
Rock Mass Cohesion	65 psi
Rock Mass Friction Angle	31
Rock Mass Bulk Density	155 lbs/ft ³

Based on these parameters, and utilizing the Hoek charts included as Fig. 3.6.4.2.A and Fig. 3.6.4.2.B, the highwalls have a safety factor of 2.61 for dry conditions and 2.40 for saturated conditions.

The residual highwall will have a static safety factor of greater than 1.3 and will be compatible with the geomorphic processes of the area. The rock types common in the highwall are very similar to those in surrounding vertical cliffs; therefore, the highwalls will react similarly to the geomorphic processes in this area.

Terracing and Erosion Control

The need to terrace some of the steeper slopes within the mine plan area currently is not anticipated.

Figure 36.4.2.A

(DRY CONDITIONS)

CIRCULAR FAILURE CHART NUMBER 1

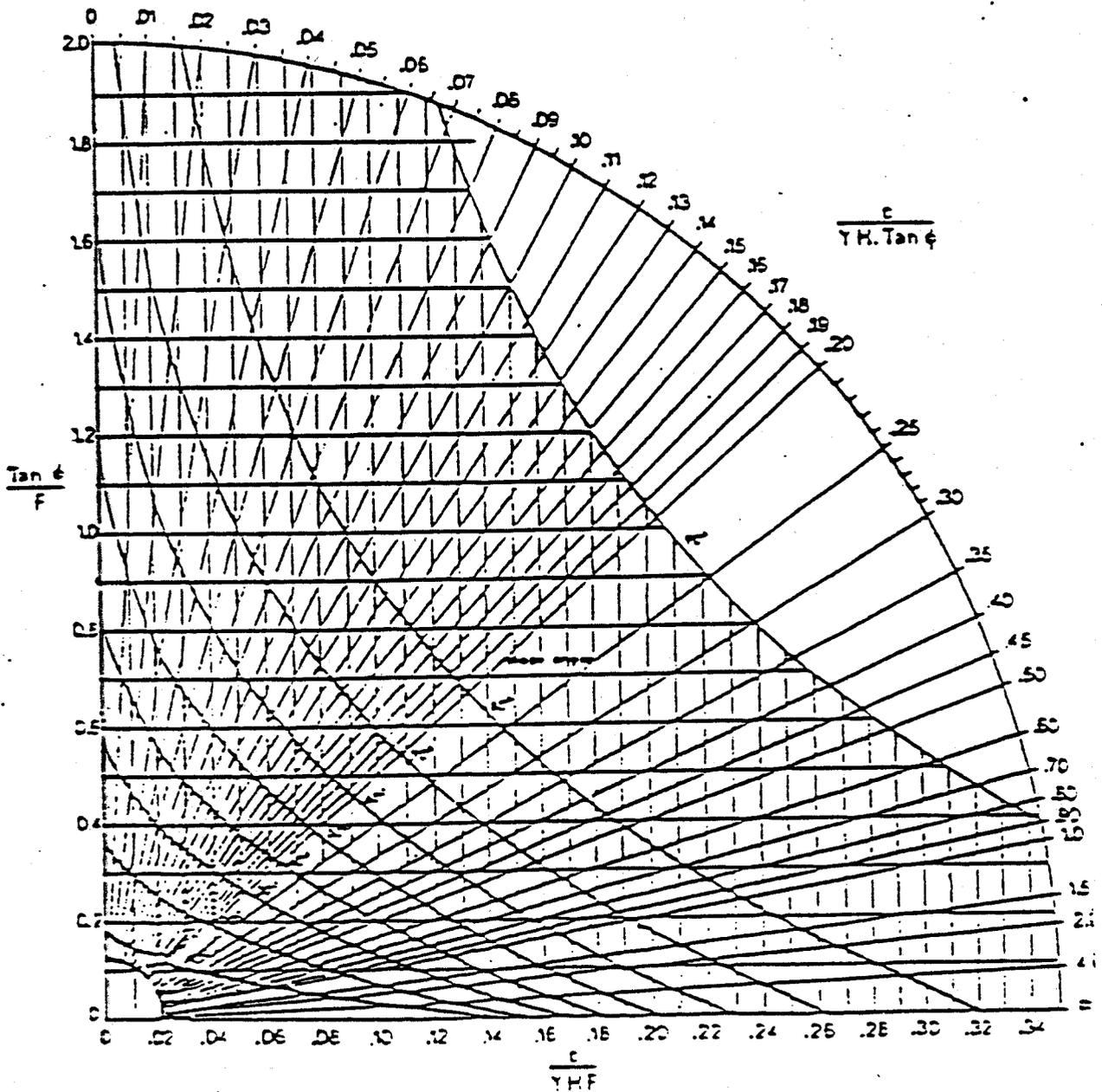
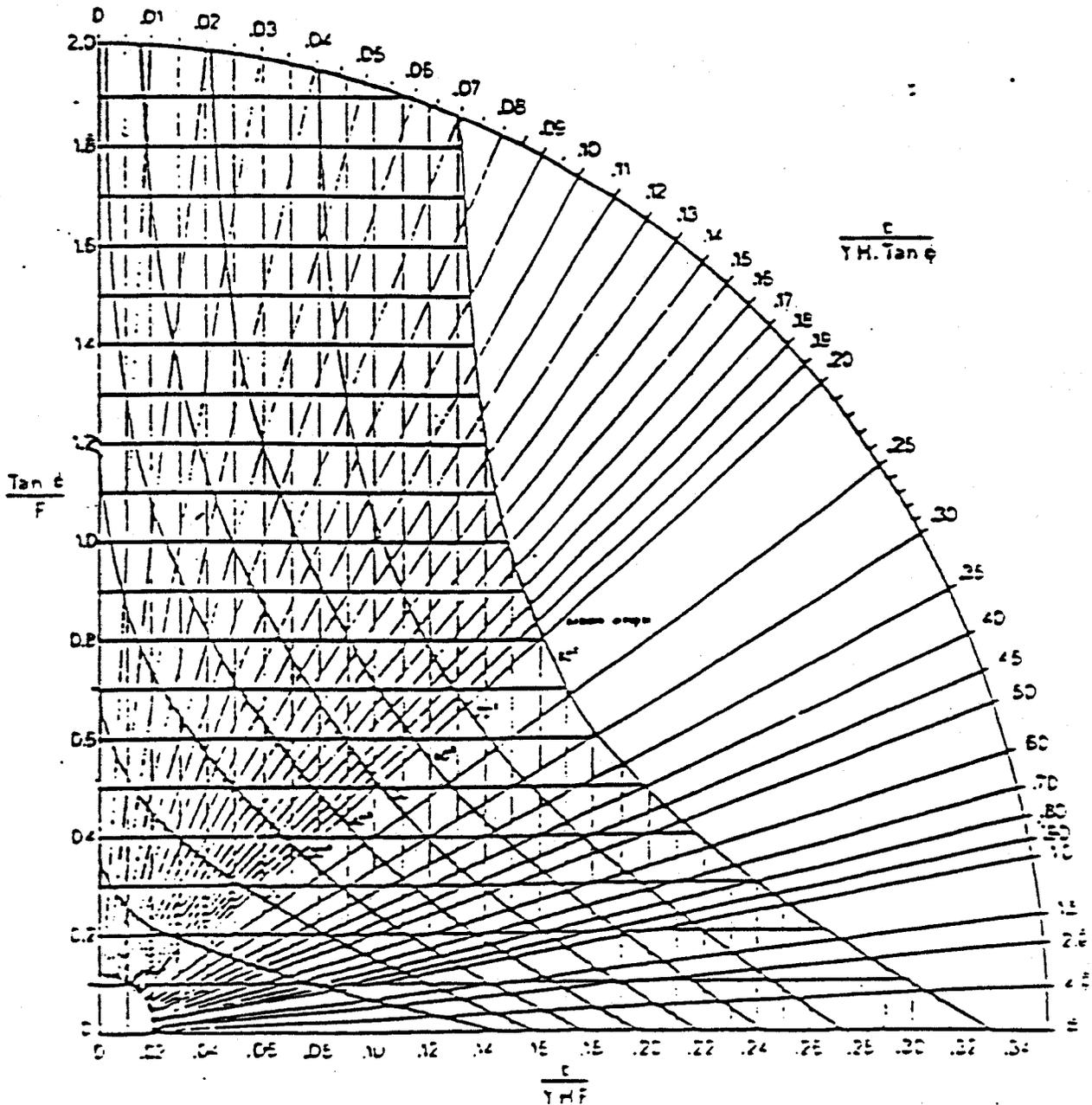


Figure 3.6.4.2.B

(SATURATED CONDITIONS)

CIRCULAR FAILURE CHART NUMBER 5



Erosion control measures which will be employed are specific to each situation. Mulching to reduce and limit rainfall impact will be a widely used erosion control practice.

Soil Redistribution and Stabilization

Prior to redistribution, the regraded land will be scarified by a ripper-equipped tractor. The ground will be ripped to a depth of 14" to reduce surface compaction, provide a roughened surface to assure topsoil adherence and promote vegetational root penetration.

Within a 10 day period to seeding, topsoil will be distributed on all 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 all areas in which facilities such as roadbeds, mine pads and building sites are to be abandoned.

Topsoil redistribution procedures will insure an approximate 6" thickness consistent with the proposed reclamation plan. Topsoil will be redistributed in the fall of the year suitable for establishing permanent vegetation.

To minimize compaction of the redistributed topsoil, travel on reclaimed areas will be limited. After topsoil has been applied, surface compaction will be reduced with disk to a depth of 6". This operation helps prepare a proper seedbed and protect the redistributed topsoil from wind and water erosion. Co-Op Mining Company will exercise

care to guard against erosion during and after application of topsoil and will employ the necessary measures to insure the stability of topsoil on graded slopes.

In addition to the vegetative stabilization discussed earlier, physical stabilization of the soil is also planned. An example of the soil stabilization methodology that will be used includes the placement of crushed and heavier material at the toe of roadfill slopes.

Revegetation Plan

All disturbed areas will be planted and revegetated during the first appropriate season following grading and topsoil redistribution procedures and will include the addition of remedial soil treatments. A permanent, diverse vegetative cover, selected on the basis of UDWR recommendations, will be established on all reclaimed areas. The proposed reclamation schedule is presented in the Schedule of Reclamation. The following subsections describe the major aspects of the proposed revegetation plan.

Soil Preparation

Scarifying Areas

Operational areas will be scarified to reduce compaction and to prevent topsoil slippage. Steep slope areas which must remain after abandonment will receive special ripping to create ledges, crevices,

pickets and screens and are referred to as cat track terraces. This will allow better soil retention and vegetation establishment.

Fertilization and Neutralization

The topsoil will be tested before it is seeded to determine the type and amount of fertilizer or neutralizer required. Soil analysis will measure the following components:

- o Soil Texture
- o phosphorus
- o Nitrogen
- o Soil pH and salinity

Chemical analyses for micronutrients will be conducted by testing soil extract potassium, calcium and magnesium for atomic absorption analyzer. Ammonium acetate will be used to extract potassium, calcium and magnesium for atomic absorption analysis. Phosphorus will be determined with sodium bicarbonate extraction and colorimetric analysis. The Kjeldahl method will be used for determination of total nitrogen. Soil texture will be determined by a Bouyoucus hydrometer method (sodium hexametaphosphate dispersing agent). Soil pH will be determined on a 1:1 soil/water mixture tested with an electrode pH meter. Salinity will be analyzed by using a Wheatstone conductivity cell on an extract of each soil sample.

All necessary fertilization or neutralization, as determined by soil testing will be done.

Seeding and Transplanting

Steep slopes will be seeded with a hydroseeder. Gently sloping and flat areas will be seeded with a drill seeder. Many shrubs and all trees will be planted by hand setting to insure a permanent plant cover.

Species and Amounts/Acre Shrubs, Trees, Grasses and Forbs - Different Plans for Different Areas

With UDWR recommendations and the 1981 vegetation field study as a basis, a suitable permanent, effective and diverse vegetative cover of species native to the permit area, or appropriate substitutes, will be established on all affected areas.

Plants used to revegetate the disturbed sites will be selected specifically for the vegetative community to be established in the given area.

The dominant species used for each vegetative type was chosen on the basis of pre-mine diversity values, available seed source and enhancement of post-mining land use.

The species ultimately selected for use and the numbers or amounts per acre will depend also on the steepness and exposure of the slopes to be revegetated.

Seedlings will be planted in April - May or September - October depending on availability and sequence of completion, plants will be grouped to provide wildlife cover. Spacing within the group is on a 1-m (3.25 foot) interval and will be correlated to the reference area.

Mulching

On all reclaimed areas a wood fiber mulch will be used to enhance the moisture retention required for seed germination. Mulch will have tackifier to adhere to the soil. The steeper slopes will require a hydromulch of a more permanent nature and/or the addition of burlap or soil-retaining matting. Mulch with tackifying agent will be used on steep banks.

Irrigation

Since the species used for reclamation are known for their survival characteristics, it is felt that artificial application of additional water will not be required. Should lower than average precipitation or irregularities in distribution of precipitation occur following the initiation of reclamation procedures which temporarily precludes vegetation establishment, a preferred course of action would be to replant problem area.

Management

Deer and rodent use of areas planted with tree and shrub species

will be observed yearly. If heavy use of the planted trees and shrubs by deer appears probable, appropriate protection measures will be taken. Also, should significant rodent damage become likely, a control program may be developed in conjunction with UDWR and appropriate land management agencies.

Vegetative Monitoring, Revegetation Success Assessment and Test Plots on Interim Revegetation

All interim seeded areas will be inspected at the end of each growing season to determine the success of the seeding program for a period of at least five years (reclamation years 1-5). Where success is not apparent, as represented by achievement of 80% original cover during the 5-year period, monitoring will be immediately investigated to determine the possible failure cause(s), so that positive steps can be taken to establish the desired interim vegetation during the next seasonal opportunity. Planting and/or seeding will be implemented on a contemporaneous basis as soon as backfilling or grading are complete. This effort will insure a temporary cover of small grains, grasses or legumes until a permanent cover can be established.

Standard methods will be applied to determine the degree of success for revegetation attempts.

Schedule of Reclamation

The general timetable for completing the major steps in reclamation is:

- 2033 Landfills and solid wastes will be regraded and seeded as they are completed.
- 2033 Underground mine openings will be closed and sealed as they are abandoned.
- 2033 Surface facilities will be removed as they become unnecessary.
- 2033-2034 The completion of surface reclamation will be in as short a time as possible after operations cease.

Reclamation Monitoring

Upon completion, the reclaimed area will be monitored to determine when bond release parameters are achieved. If the monitoring indicates inadequacies, and rills and/or gullies develop on reclaimed areas, the damage will be addressed in such a manner to allow re-application of seed and mulch and tack the next available growing season. Earthwork will constitute; (1) the diversion of water concentrations away from eroded areas with small hand-made berms, (2) distribution of additional soil if necessary to fill gullies, (3) recontouring with equipment as warranted and, (4) re-application of seed, tack, mulch and fertilizer.

If gullies constitute an overall change in drainage pattern, a plan to

stabilize and modify drainage pattern will be submitted to the Division for approval prior to implementation.

The monitoring procedures will be the same sampling methodologies which were incorporated in establishment of the reference areas with the exception of productivity. Starting in year 3 after reclamation, years 1 and 2 will be ocular estimates with the intent of identifying problem areas. When plant establishment is obtained, the area will be monitored every two years until bond release. Both the final reclaimed area and reference area will be sampled for cover, density, (woody plants) and species composition. Productivity will be determined using the Harvest method after reclamation appears successful.

(b) Included - The general reclamation plan and schedule for this mine is included with this submittal.

(c) Cross Referenced - N/A

ITEM (6) DUPLICATED DATA - N/A

ITEM (7) MAXIMUM ECONOMIC RECOVERY

(a) M.E.R.

See Section (Item) 3(iv)(a) This submittal

EXHIBIT 2

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES, 220 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 AREA CODE 312 726-8434

WESTERN DIVISION MANAGER

H. D. PALMER



PLEASE ADDRESS ALL CORRESPONDENCE TO
224 South Carbon Avenue
Price, Utah 84501
Phone: (801) 637-7540

March 2, 1982

CO-OP MINING CO
P.O. Box 300
Huntington, Utah 84528

Sample Identification

Co-op Mining Co.
#2

Kind of sample reported to us Coal
Sample taken at xxxxx
Sample taken by Co-op Mining Co.
Date sampled xxxxx
Date received 2-26-82

Analysis report no. 57-8990

SHORT PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	4.70	xxxxx
% Ash	7.49	7.86
Btu/lb	12937	13575
% Sulfur	0.41	0.43

% Air Dry Loss = 3.07
Moisture, Ash-free Btu = 14733
Pounds of SO₂ per 10⁶ Btu = 0.63
Moist, Mineral matter free Btu * = 14088
(Based on as rec'd moisture)*
Pounds of Sulfur per 10⁶ Btu = 0.32

JB/dt

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jack Blair
JACK D. BLAIR, Manager, Price Laboratory



Original Copy Watermarked
For Your Protection

Sample No. WP-8-75

U.S.G.S. Serial No. D174679

Location Co-op Mine

Face channel Sample

Sec. 22. T. 16 S. R. 7 E.

Seam Bear Canyon Seam

Formation Blackhawk

Thickness Sampled 7'

Date Sampled May 8, 1975

Proximate Analysis

	AD	AR	Dry	MAF
M	4.4	6.1		
VM	45.6	44.8	47.7	50.8
FC	44.1	43.3	46.2	49.2
Ash	5.9	5.8	6.1	
Btu/lb.	13140	12910	13740	14640

Ultimate Analysis

	AD	AR	Dry	MAF
H	5.9	5.9	5.6	6.0
C	72.6	71.4	76.0	80.9
N	1.3	1.3	1.4	1.5
O	13.8	15.1	10.4	11.1
S	0.5	0.5	0.5	0.5

FORMS OF SULFUR: Sulfate Pyritic Organic

As-received	0.02	0.16	0.30
Moist.-free	0.02	0.17	0.32
M. and ash-free	0.02	0.18	0.35

Free-swelling index No. 2 1/2

TRACE ELEMENTS BY VARIOUS DETERMINATIONS (Coal as received)

As (ppm) 1 F (ppm) <20 Hg (ppm) 0.03 Sb (ppm) 0.1 Se (ppm) 1.3

TRACE ELEMENTS, MOSTLY ATOMIC ABSORPTION ON ASH

Ag (%) <u>2.33</u>	Cu (ppm) <u>97</u>	Zn (ppm) <u>19</u>
As (%) <u>2.96</u>	Li (ppm) <u>84</u>	Mn (ppm) <u>200</u>
Ba (ppm) <u><1</u>	Pb (ppm) <u>25</u>	

DELAYED NEUTRON DETERMINATION OF URANIUM AND THORIUM

ppm Th 5.0247 ppm U

SEMI-QUANTITATIVE 6-STEP SPECTROGRAPHIC ANALYSIS OF THE ASH

G=Greater than 10%; N=Not detected; L=Detected, but below limit of determination

Fe % <u>5.0</u>	Eu (ppm) <u>N</u>	Pb (ppm) <u>30</u>	W (ppm) <u>N</u>	Y (%) <u>N</u>
Mo % <u>1.5</u>	Pb <u>N</u>	Pd <u>N</u>	Y <u>30</u>	Zn (%) <u>N</u>
Sa % <u>6</u>	Cd <u>N</u>	Pt <u>N</u>	Zn <u>N</u>	Zn (%) <u>N</u>
Ti % <u>0.3</u>	Co <u>10</u>	Sb <u>N</u>	Zn <u>200</u>	Zn (%) <u>N</u>
U (%) <u>---</u>	Cr <u>70</u>	Sc <u>15</u>	Ce <u>N</u>	Zn (%) <u>3</u>
V (ppm) <u>150</u>	Cu <u>70</u>	Sr <u>N</u>	Ga <u>20</u>	Zn (%) <u>N</u>

As (ppm) <u>N</u>	La (ppm) <u>N</u>	Sr (ppm) <u>500</u>	Ge (ppm) <u>20</u>	Al % <u>7.0</u>
Au <u>N</u>	Mo <u>15</u>	Te <u>N</u>	Hf <u>N</u>	N % <u>---</u>
B <u>1500</u>	Nb <u>L20</u>	U <u>N</u>	In <u>N</u>	K % <u>N</u>
Ba <u>1500</u>	Ni <u>20</u>	V <u>70</u>	Li <u>N</u>	S % <u>N</u>

LOOKED FOR ONLY WHEN La OR Ce FOUND:

F	Fusibility of ash temp. °F.
ID	Initial Deform. <u>2190</u>
SM	Softening <u>2250</u>
Eu	Fluid <u>2300</u>

Ash Composition

AL2O3	11.0%
SO3	7.9% <u>8.4%</u>
CL	40.10%
CAO	24.0%
SI02	25.6% <u>24.0%</u>
P2O5	0.74%
TI02	0.71%
MnO	40.020%
FE2O3	7.6%
K2O	0.17%

% Ash determined gravimetrically ashed at 525° C. -6.8%

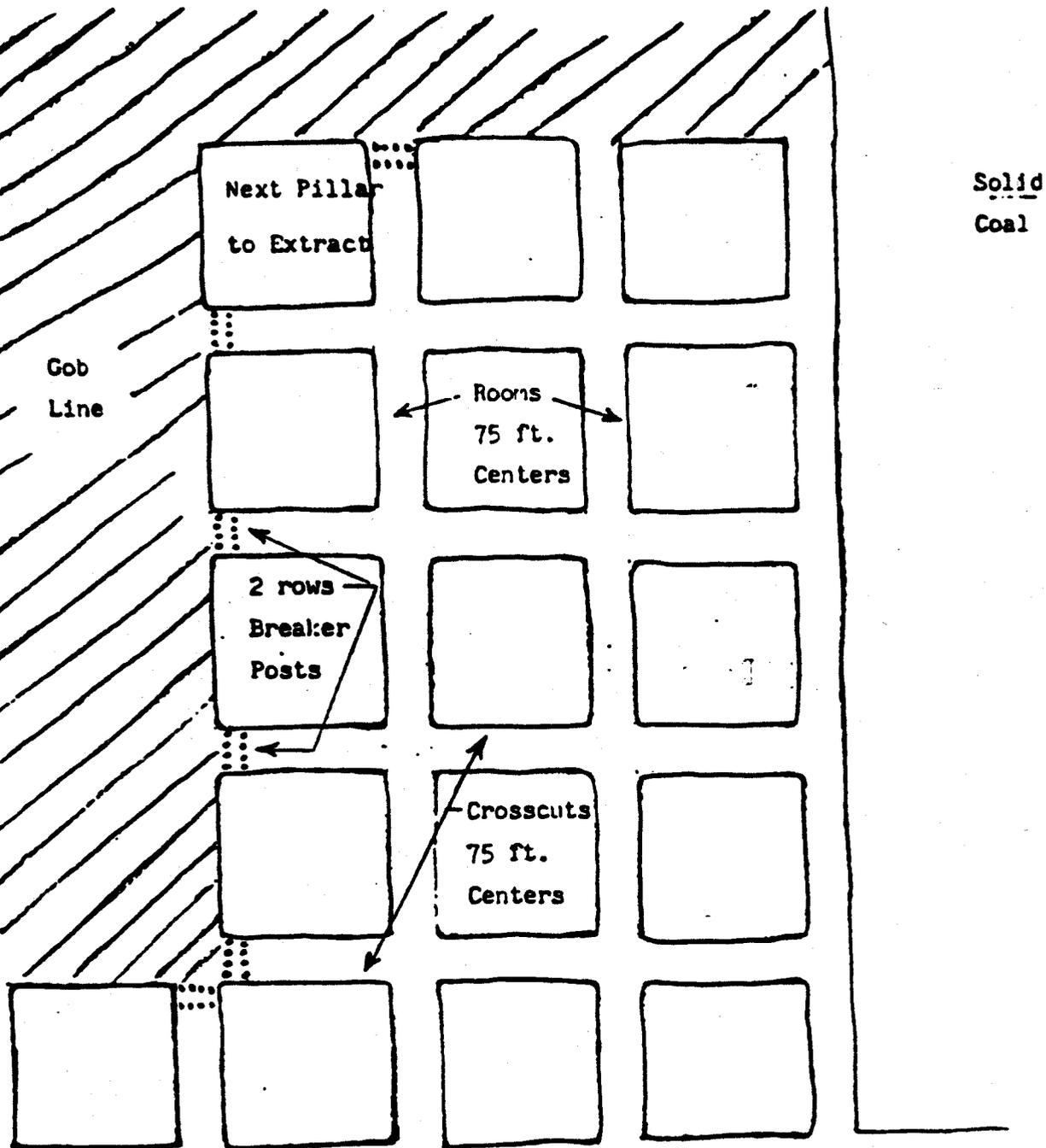
AVERAGE COAL ANALYSES, HIAWATHA NE QUADRANGLE

	No. Analyses	As-received (percent)	
		Average	Range
BEAR CANYON BED			
Moisture	6	6.8	4.5-10.9
Volatile matter	6	43.8	37.4-46.0
Fixed carbon	6	45.7	44.9-46.0
Ash	6	4.5	3.8- 5.8
Sulfur	6	0.53	0.5- 0.6
Btu/lb	6	13,014	10,840-13,530
BLIND CANYON BED			
Moisture	10	4.8	3.8- 5.3
Volatile matter	9	41.7	40.2-44.7
Fixed carbon	9	44.3	39.2-48.3
Ash	10	8.9	5.8-12.4
Sulfur	8	0.58	0.5- 0.6
Btu/lb	9	12,492	11,700-13,080
HIAWATHA BED			
Moisture	370	5.6	0.7 -11.0
Volatile matter	357	42.3	36.3 -46.4
Fixed carbon	357	45.7	38.3 -52.7
Ash	359	6.2	3.3 -11.2
Sulfur	330	0.61	0.29- 1.1
Btu/lb	365	12,719	11,521-13,600

TABLE 2 (AFTER DOELLING, 1972)

EXHIBIT 3

TYPICAL PANEL RECOVERY



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.

Bear Canyon No. 1
 Mine I.D. No. 42-01697
 Co-op Mining Co.

5. Areas of saturation within the Blackhawk formation are limited to localized perched zones as encountered within the mine, which occur as three localized roof drip areas which collect as sumps on the mine floor in their immediate area of occurrence.
6. The fault crossing the mine workings several hundred feet within the mine portal is "tight" and allows very minor seepage from the mine sump in that area through to the underlying sediments. No seepage, flow or areas of concentrated seeps were observed at the immediate fault area within the mine.

7.1.3.2 MINE PLAN AREA AQUIFERS

7.1.3.2.1 AQUIFER CHARACTERISTICS - DEPTH, HORIZONTAL EXTENT,

THICKNESS AND LITHOLOGY:

Plate 3.4-1 identifies the mine lease area, aquifer outcrops, springs, seeps, mine water occurrences, and drill holes. Logs of six of the original drill holes and logs of three additional drill holes are presented on Figures 7D-1 through 7D-8, Appendix D. Locations and logs of four test holes, based on geophysical log data provided by Nevada Power & Light Company, are presented on Figures 7D-9 and 7D-10, respectively, Appendix 7-D. Figures 7.1-1 and 7.1-2 represent generalized stratigraphic sections in the mine lease area along Sections AA' and BB' identified in Plate 3.4-1. These sections are taken parallel and perpendicular to the bedding strike in the area. Figure 7.1-3 presents a generalized stratigraphic section of the rock units in the permit area. Figure 7.1-4 presents a stratigraphic description of the Castlegate sandstone, Blackhawk formation and Star Point sandstone based on detailed

000007

*Revised
3/31/87
RV5*

Hole 10 Down

Elevation 7,509



0-3 Coal

3-13 Gray Shale

13-19 Coal

19-40 Gray Shale

40 (Trace Coal)

40-65 Red Sandstone

65-70 Coal

70-200 White Sandstone

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OIL, GAS & MINING

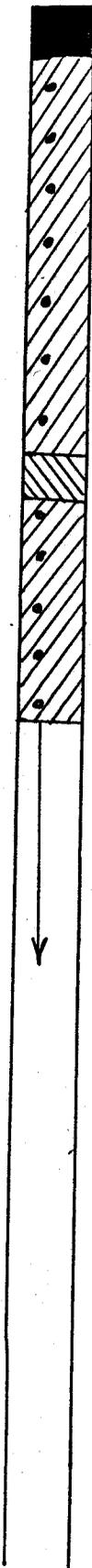
No water encountered

Figure 6-A (7-D)

2/15/87

Hole 12 Down

Elevation 7,516



0 - 5 Coal

5 - 50 Gray Shale

50 - 55 Black Slate

55 - 80 Gray Shale

80 - Lost circulation

(2 additional holes drilled same area - lost circulation on each at approximately 80')

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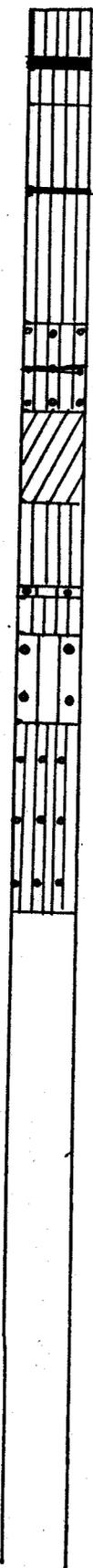
No water encountered

Figure 6-C (7-D)

2/15/87

Hole 13 Down

Elevation 7,505'.4"



0 - 5	Hard White Shale
5 - 6	Coal
6 - 20	Hard White Shale
20 - 20.3	Coal
20 - 35	Hard White Shale
30 - 35	Hard White Shale/Mixed Brown Shale
35 - 40	Brown Shale
40 - 50	Tan Shale
50 - 60	Hard White Shale
60 - 61	(Oxidized Coal) Mixed Brown Slate
60 - 65	Hard White Shale
65 - 75	Brown Slate mixed Sandstone
75 - 100	Brown Slate mixed White Shale

No water encountered

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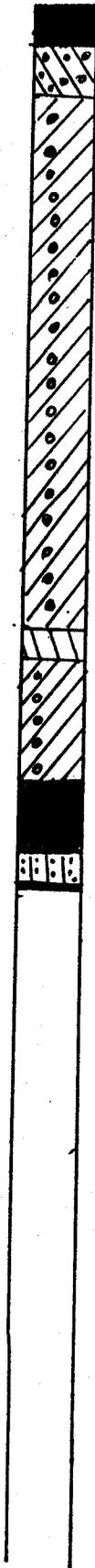
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Figure 6-D (7-D)

2/15/87

Elevation 7,507.8

Hole 14 Down



- 0 - 5 Coal
- 5 - 10 Brown Shale (Some coal)
- 10 - 70 Gray Shale
- 70 - 76 Soft Brown Shale
- 76 - 88'9" Gray Shale
- 88'9" - 95' Coal
- 95 - 98 Brown Shale with some coal
- 98 - 100 Coal

No water encountered

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Figure 6-E (7-E)

2/15/87

CO-OP MINING COMPANY

P.O. Box 1245
Huntington, Utah 84528



(801) 748-5238
Coal Sales (801) 748-5777

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FEB 17 1987

DIVISION OF
OIL, GAS & MINING

February 12, 1987

Mr. John Whitehead
Utah Division of Oil, Gas and Mining
355 West North Temple
#3 Triad Center Suite 350
Salt Lake City, Utah 84180-1203

RE: Bear Canyon Modification to
Include Mining Hiawatha Seam

Dear Mr. Whitehead:

Please find enclosed 8 copies of additional information on new drill
hole log as per your request.

I hope this will expedite approval of the Hiawatha Seam.

Sincerely,

Mel Coonrod
Permitting & Compliance

MC/njc

5. Areas of saturation within the Blackhawk formation are limited to localized perched zones as encountered within the mine, which occur as three localized roof drip areas which collect as sumps on the mine floor in their immediate area of occurrence.
6. The fault crossing the mine workings several hundred feet within the mine portal is "tight" and allows very minor seepage from the mine sump in that area through to the underlying sediments. No seepage, flow or areas of concentrated seeps were observed at the immediate fault area within the mine.

7.1.3.2 MINE PLAN AREA AQUIFERS

7.1.3.2.1 AQUIFER CHARACTERISTICS - DEPTH, HORIZONTAL EXTENT,

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Plate 3.4-1 identifies the mine lease area, aquifer outcrops, springs, seeps, mine water occurrences, and drill holes. Logs of six of the original drill holes and logs of three additional drill holes are presented on Figures 7D-1 through 7D-8, Appendix D. Locations and logs of four test holes, based on geophysical log data provided by Nevada Power & Light Company, are presented on Figures 7D-9 and 7D-10, respectively, Appendix 7-D. Figures 7.1-1 and 7.1-2 represent generalized stratigraphic sections in the mine lease area along Sections AA' and BB' identified in Plate 3.4-1. These sections are taken parallel and perpendicular to the bedding strike in the area. Figure 7.1-3 presents a generalized stratigraphic section of the rock units in the permit area. Figure 7.1-4 presents a stratigraphic description of the Castlegate sandstone, Blackhawk formation and Star Point sandstone based on detailed

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3.6.7.2 Major Modification to Mine the Hiawatha Seam
(Modification of Existing Bond Amount)

**DIVISION OF
OIL, GAS & MINING**

Co-Op Mining will enter the Hiawatha Seam through a portion of old works which were partially covered during road construction to the upper portal. The area in question is presently disturbed and will not constitute an additional area to revegetate, alter natural drainage reconstruction or significantly alter the post-mining contour map in any way.

A new coal receiving bin identical to the existing structure will be constructed as well as approximately 200 additional feet of conveyor; these two structures along with 2 new portals and a small support pad will necessitate the following costs associated with final reclamation:

Hiawatha Seam Revision Costs:

A. Seal & Backfill Portals	
AMR Cost - 3,500/seal	
including backfill X 2 seals =	\$ 7,000.00
B. Structures and Conveyor (Secondary)	
Labor - 3 men X \$184.40/day X 2 days	\$ 1,106.40
Equipment (hauling) 1 truck + operator	
X 16 hrs X \$90.65/hr	\$ 1,450.40
1 loader + operator X 16 hrs X \$140.70	
(950B - 2½ cu. yd. bucket)	\$ 2,251.20
Crane - 2 hrs. @ \$121.85/hr.	\$ 243.70
Subtotal	\$ 5,051.70
C. Hiawatha Receiving Bin	
Labor - 2 men @ \$184.40/day X 2 days	\$ 737.60
1 20 T Crane - 4 hrs X \$121.85	487.40
1 Truck + Operator - 4 hrs X \$90.65	362.60
Subtotal	\$ 1,587.60

AMENDMENT TO

APPROVED Mining & Reclamation Plan
Approved, Division of Oil, Gas & Mining

3-115

10/3/86

by JJH date 10-16-86

Costs in present bond will change to 1986 costs. The revised bonding costs are: (Should be added to 1986 Dollars) Reclamation Costs for Hiawatha Seam revision (see below)

\$ 204,703.00

\$ 13,639.00

\$ 218,342.00

10%

\$ 21,834.00

\$ 240,176.00 (1986 dollars)

Escalate @ 1.62%

1987 - \$ 244,067

1988 - 248,021

1989 - 252,039

1990 - 256,122

Presently have \$ 237,545 posted in (1990 dollars) (ILOC)
Will add \$ 18,577 more upon approval of surface facilities.

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*Pages 3-117 and 3-118 (to be deleted)

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10/3/86

by jjh date 10-16-86

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approximations to determine the required characteristics and sized of the required channels or conduit as the case may be to convey the projected discharges.

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Appendix 7-F contains the computer programs and printouts used in sizing the ditches and culverts. Refer to Plate 7-1 for locations of the various structures and Plate 7-5 for areas used in calculations.

The following pages contain summaries of the ditch and culvert sizes.

7.2.5.2.0 ADDITIONAL CONTROL FOR HIAWATHA SEAM MINING

As shown on Plate 2-2, the outslope of the proposed Hiawatha Seam portal pad will encroach upon the ephemeral channel between D-1D and d-2D on Plate 7-8. It is proposed to install a 15" flexible culvert as shown in Figure 7-F1 and 7-F2 to convey the drainage from the upper areas of the channel beneath the pad. The outlet protection for the flexible culvert shown on Plate 2-2 will adhere to the specifications as indicated on pages 83-B3, B4 and page 64A Bear Canyon MRP. The rip-rap and filter blanket specification will be adhered to as specified.

The pad and channel will be constructed prior to placing the flexible culvert in the excavated channel. The culvert will be backfilled and all heavy equipment will be precluded from the area to avoid an accidental crushing of the buried culvert. The flexible culvert is designed to withstand being buried but will not hold up under

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7-12-86
10-3-86

by 80h date 10-16-84

heavy equipment traffic. This channel is included in drainage area AD-1 (Plate 7-5). The maximum water this channel is calculated to flow is shown on Table 7.2-8 as 1.5 cfs (Ditch D-2D). Calculations for this ditch are shown in Appendix 7-F under Runoff Ditch Sizing. Based on this flow, the culvert is sized as shown on Table 7.2-7 (Revised Summary of Culvert Sizes). The new culvert is designated C-4D, and matches the criteria for culvert C-1D. The headwater depth above the top of the culvert inlet is proposed to be 1' more than adequate to carry the expected flow. Energy dissipators will be placed as indicated in the following sections (7.2.5.2.1 and 7.2.5.2.2)

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The outslope of the pad will be protected by the installation of 6" M.D. rock along the area where drainage will occur. The only drainage that will reach the toe of the pad is that from the upper pad to the lower; the majority of the drainage above will be conveyed through the culvert. The 6" rock will be more than adequate, since the approved plan calls for natural 6" rip-rap in the post-mining channel that will carry not only the disturbed drainage AD-1, but the undisturbed drainage from AU-3 as well.

The ditch in this area has been measured, and typical section is shown on Plate 7-8 as cross-section D-D. The ditch profile is also shown on this plate as Profile "F". Plate 7-8A is a typical section of the proposed channel restoration in the area of the portal pad and culvert, after their removal and upon final reclamation.

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7-12-86

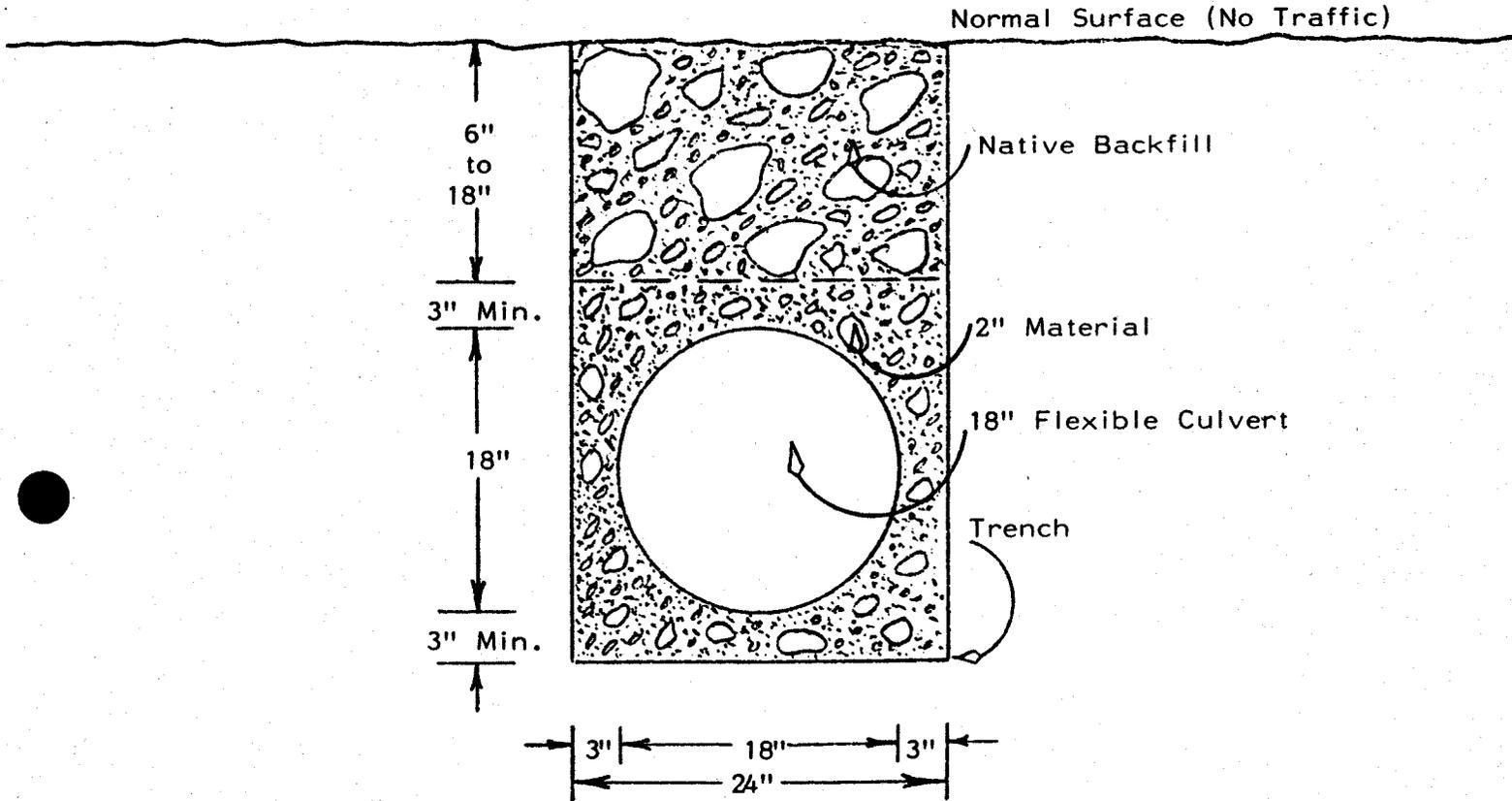
10-3-86

by J. J. H. date 10-16-86

Figure 7-F1

CROSS-SECTION OF
BURIED FLEXIBLE CULVERT

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Scale 1" = 1'

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by JGH date 10-16-86
48-1A

10/3/86

HMC 800 5
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3.6.7.2 Major Modification to Mine the Hiawatha Seam
(Modification of Existing Bond Amount

**DIVISION OF
OIL, GAS & MINING**

Co-Op Mining will enter the Hiawatha Seam through a portion of old works which were partially covered during road construction to the upper portal. The area in question is presently disturbed and will not constitute an additional area to revegetate, alter natural drainage reconstruction or significantly alter the post-mining contour map in any way.

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Subtotal	\$ 1,587.60

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APPROVED Mining & Reclamation Plan
Approved, Division of Oil, Gas & Mining ³⁻¹¹⁵

10/3/86

by ggw date 10/16/86

Costs in present bond will change to 1986 costs. The revised bonding costs are: (Should be added to 1986 Dollars) Reclamation Costs for Hiawatha Seam revision (see below)

\$ 204,703.00

\$ 13,639.00

\$ 218,342.00

10%

\$ 21,834.00

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Escalate @ 1.62%

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1988 - 248,021

1989 - 252,039

1990 - 256,122

Presently have \$ 237,545 posted in (1990 dollars) (ILOC)
Will add \$ 18,577 more upon approval of surface facilities.

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*Pages 3-117 and 3-118 (to be deleted)

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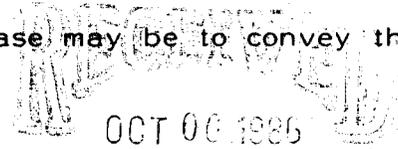
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by Jgh date 10/16/86 3-116

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approximations to determine the required characteristics and sized of the required channels or conduit as the case may be to convey the projected discharges.



Appendix 7-F contains the computer programs and printouts used in sizing the ditches and culverts. Refer to Plate 7-1 for locations of the various structures and Plate 7-5 for areas used in calculations.

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The following pages contain summaries of the ditch and culvert sizes.

7.2.5.2.0 ADDITIONAL CONTROL FOR HIAWATHA SEAM MINING

As shown on Plate 2-2, the outslope of the proposed Hiawatha Seam portal pad will encroach upon the ephemeral channel between D-1D and d-2D on Plate 7-8. It is proposed to install a 15" flexible culvert as shown in Figure 7-F1 and 7-F2 to convey the drainage from the upper areas of the channel beneath the pad. The outlet protection for the flexible culvert shown on Plate 2-2 will adhere to the specifications as indicated on pages 83-B3, B4 and page 64A Bear Canyon MRP. The rip-rap and filter blanket specification will be adhered to as specified.

The pad and channel will be constructed prior to placing the flexible culvert in the excavated channel. The culvert will be backfilled and all heavy equipment will be precluded from the area to avoid an accidental crushing of the buried culvert. The flexible culvert is designed to withstand being buried but will not hold up under

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48-1

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heavy equipment traffic. This channel is included in drainage area AD-1 (Plate 7-5). The maximum water this channel is calculated to flow is shown on Table 7.2-8 as 1.5 cfs (Ditch D-2D). Calculations for this ditch are shown in Appendix 7-F under Runoff Ditch Sizing. Based on this flow, the culvert is sized as shown on Table 7.2-7 (Revised Summary of Culvert Sizes). The new culvert is designated C-4D, and matches the criteria for culvert C-1D. The headwater depth above the top of the culvert inlet is proposed to be 1' more than adequate to carry the expected flow. Energy dissipators will be placed as indicated in the following sections (7.2.5.2.1 and 7.2.5.2.2)

The outslope of the pad will be protected by the installation of 6" M.D. rock along the area where drainage will occur. The only drainage that will reach the toe of the pad is that from the upper pad to the lower; the majority of the drainage above will be conveyed through the culvert. The 6" rock will be more than adequate, since the approved plan calls for natural 6" rip-rap in the post-mining channel that will carry not only the disturbed drainage AD-1, but the undisturbed drainage from AU-3 as well.

The ditch in this area has been measured, and typical section is shown on Plate 7-8 as cross-section D-D. The ditch profile is also shown on this plate as Profile "F". Plate 7-8A is a typical section of the proposed channel restoration in the area of the portal pad and culvert, after their removal and upon final reclamation.

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10-3-86

by JJH date 10-16-86

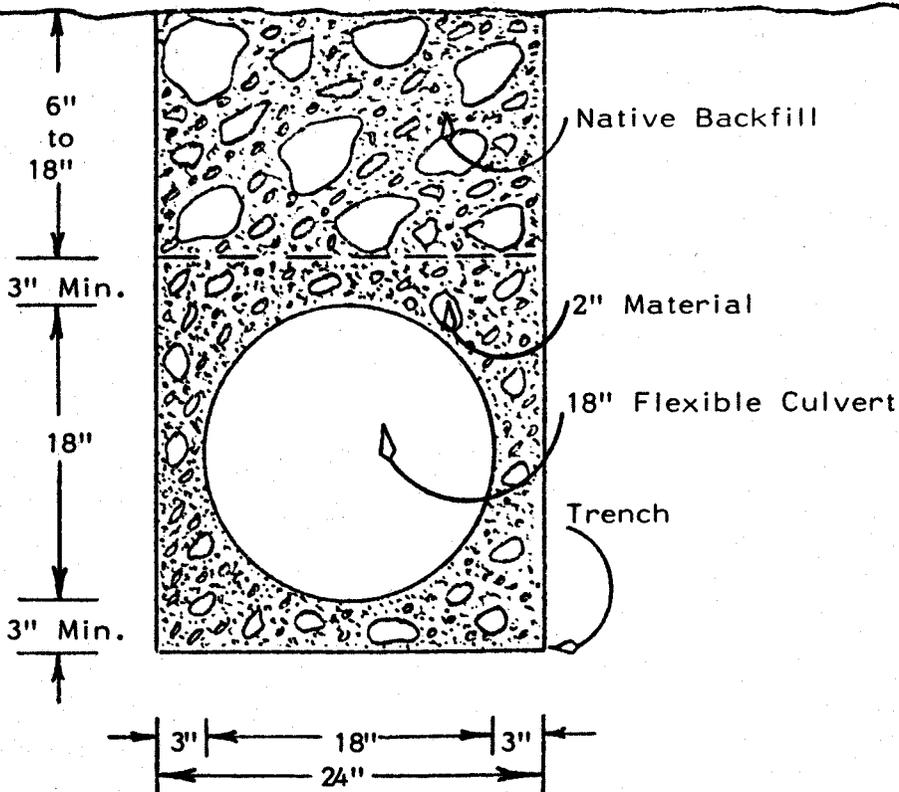
Figure 7-F1

CROSS-SECTION OF
BURIED FLEXIBLE CULVERT

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Normal Surface (No Traffic)



Scale 1" = 1'

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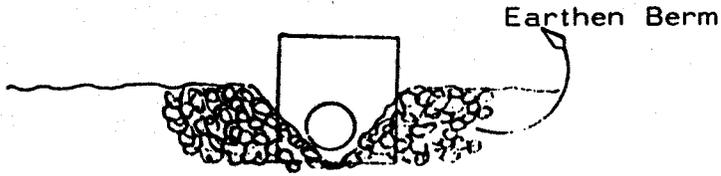
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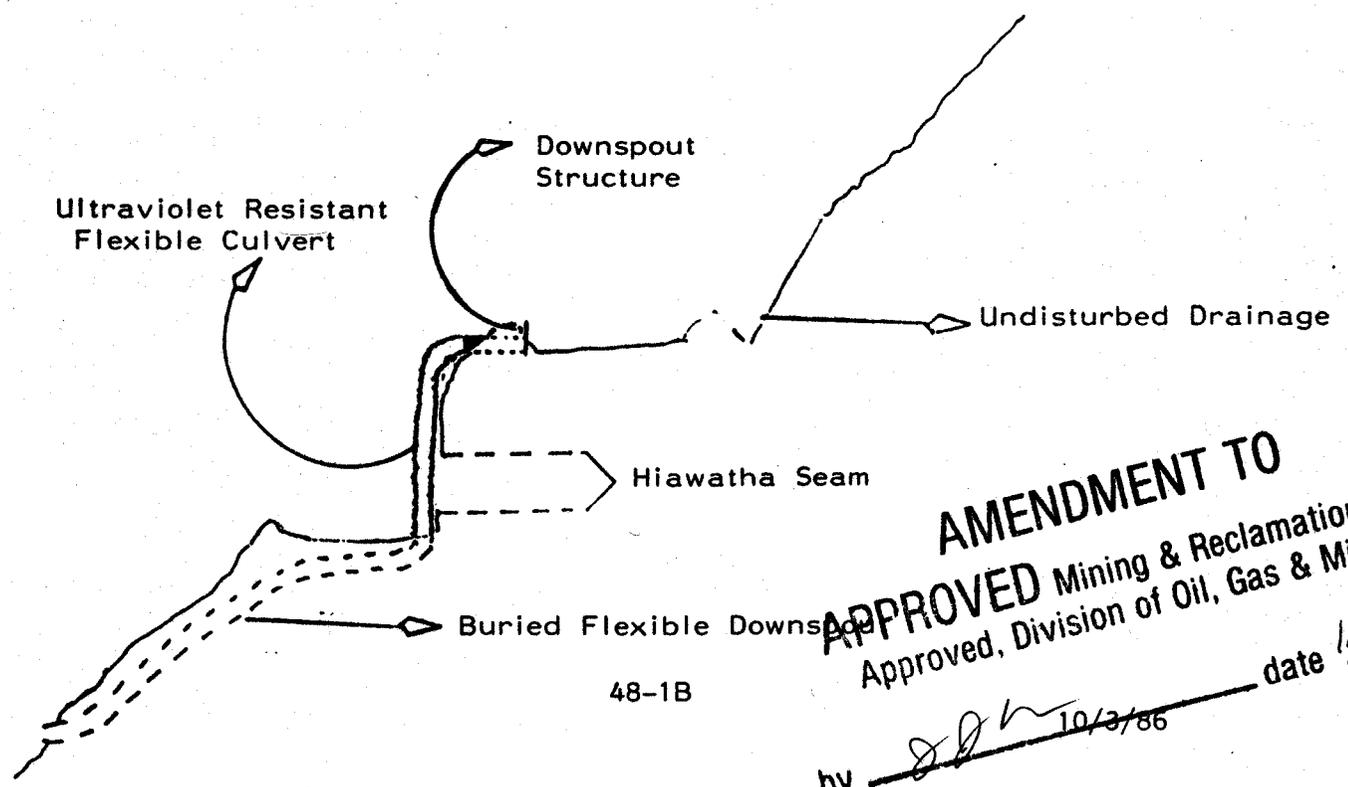
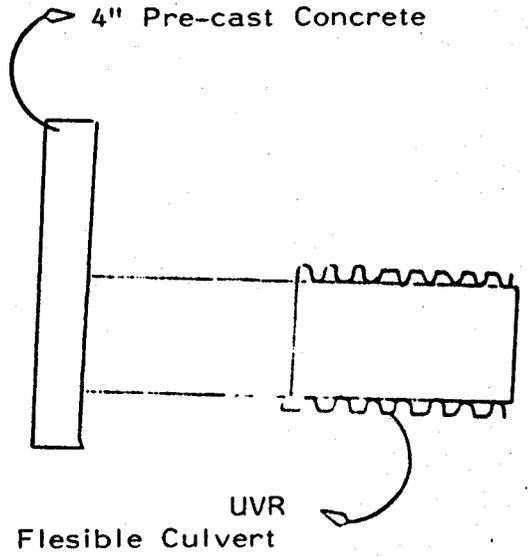
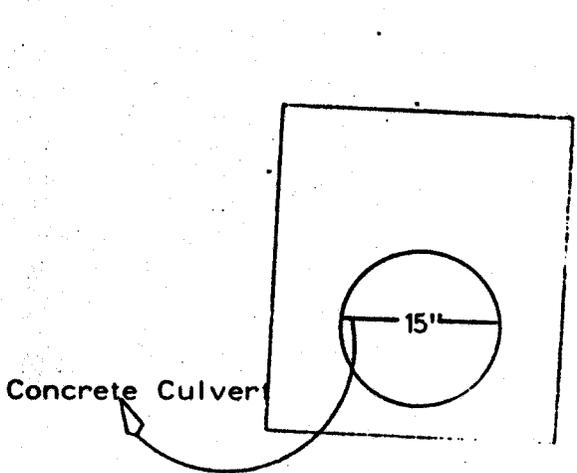
Figure 7F-2

DOWNSPOUT STRUCTURE



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3.1 SCOPE

This part describes the action and procedures of Co-op Mining Company to satisfy the requirements for underground mining operations and reclamation.

3.2 SURFACE FACILITIES - EXISTING

The mine which existed at the proposed site has been abandoned for over 30 years and subsequently there is no evidence of long existing facilities.

3.3 SURFACE FACILITIES - NEW

Subsection 3.3.1 and 3.3.2 deal exclusively with proposed new facilities.

3.3.1 SITE SELECTION AND PREPARATION OF PROPOSED FACILITIES

Plate 2-2 is an overlay of the new location of all surface facilities. In addition an accurate determination of where each facility is in relation to the existing topographic as well as structural fixtures such as highways.

3.3.2 PORTALS

The Mine has 3 existing portals (Fan, Intake & Belt). A fourth Intake portal is proposed for Blind Canyon in 1986. (See Plate 3-4. Appendix 3-1.)

BOND

Co-Op Mining Company
 Bear Canyon Mine
 ACT/015/025, Emery County, Utah

3.6.7.1

Detailed Timetable for Completion of Major Reclamation Processes

The following schedule of reclamation is proposed to be initiated within 90 days (weather permitting) of final abandonment of the mining operation:

	<u>Acc. Time</u>
1. Seal Portal - 1 week	1 week
2. Remove Structures - 2 weeks	3 weeks
3. Soil Placement (backfilling and grading)	
A. Upper Pad - 1 week (including road)	4 weeks
B. Channel Restoration - 1 week	5 weeks
C. Lower Pad and Diversions - 1 week (including road)	6 weeks
4. Seeding Material and Handling - 1 week	7 weeks
5. Reseeding and Fertilizing - 1 week	8 weeks
6. Mulching - .5 week	8.5 weeks
7. Protective Fencing - 2 weeks	
(concurrently)	
	<u>8.5 weeks</u>

The above reclamation tasks are, therefore, proposed to be completed within 8.5 weeks following the start of reclamation activities.

Labor - Hourly Rates from 1985 Means Site Work Cost Data

Equipment Operator = \$29.25
 Truck Driver = \$22.90
 Average Helper = \$22.20
 Foreman = \$32.20
 Crane Operator = \$29.90
 Welder = \$33.50

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Equipment - Hourly Rates from 1985 Means Site Work Cost Data

Cost Per Hour

1. Loader - 950E (2-1/2 cy bucket) - \$100 + \$17.65 Operator	\$117.65 29.25 <u>\$146.90</u>
2. Crane - Groves RT-580 20T - \$69.75 = \$12.35 Operator	\$ 82.10 29.90 <u>\$112.00</u>
3. Truck and Operator	\$ 85.15
4. Cat D-7G - \$137.50 + \$20.35 Operator	\$157.85 29.25 <u>\$187.10</u>
Ripper (three shanks = \$24.90 + oper/hr)	\$ 27.15
5. Backhoe (Cat 235) - \$185.00 + \$26.90 Operator	\$211.90 29.25 <u>\$241.15</u>
6. Acetylene Torch	\$ 6.40
7. Lowboy (truck/trailer) @ \$93.30	\$ 93.30
8. Cat D-3 - \$39.50 + \$5.70 Operator	\$ 45.20 <u>\$ 29.25</u> \$ 74.45

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Backhoe (BH) Cycle Time Estimates - 235 Backhoe (From Cat Performance Handbook)

Average	
Load Bucket	6.5 sec
Swing Bucket	6.0 sec
Dump Bucket	2.5 sec
Swing Empty Bucket	5.0 sec
Total Average	<u>20.0 sec</u> - 2.12 yds ³

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

3 cy/min x 2.12 yds x 60 = production/hr = 381.60 cu yd/hr or 180 cycles/hr.

Cut and fill yardages (same number - 1 cycle)

Crawler Tractor (D7G) Cycle Time Estimates (From Cat Performance Handbook)

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

Efficiency 50 min/hr

50 min/11.6 min cycle x 15 yds/cycle = 64.65 yds/hr

950B Loader Cycle Time (From Cat Performance Handbook)
.50 min

1. Pile (10 inches material and smaller) + .01 min
 2. Common ownership of trucks - .04 min
 3. 3/4 inch to 6 inch .00 min
- 113 cu yds/hr .53 min
- 196 cu yds/hr topsoil

Summary of Reclamation Cost Estimate

A. Seal Portal and Backfill	\$ 10,500.00
B. Removal Structures	\$ 28,023.00
C. Solid Waste Removal	\$ 2,703.00
D. Soil Placement (backfilling and grading)	\$ 36,146.00
E. Channel Restoration	\$ 19,797.00
F. Reseeding and Fertilizer	\$ 7,512.00
G. Mulching	\$ 9,093.00
H. Protective Fencing	\$ 6,000.00
I. Baseball Park Seeding	\$ 2,520.00

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J. Retaining Wall Removal	\$	482.00
K. Borehole Plugging	\$	344.00
L. Maintenance and Monitoring of Subsidence, Vegetation and Erosion (10-yr bond liability period)	\$	19,460.00
M. Hydrology Monitoring (10-year bond liability period)	\$	23,166.00
N. Supervision (8-1/2 weeks)	\$	11,050.00
O. Mobilization and Demobilization	\$	2,500.00
		\$179,296.00
	10% Contingency	17,930.00
		\$197,226.00 (1985 dollars)

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1986 - \$204,703.00
 1987 - \$212,461.00
 1988 - \$220,513.00
 1989 - \$228,871.00
 1990 - \$237,545.00

Note: Section 3.6.7.2 (page 3-116)
 Modification cost adjustment

Reclamation Costs

A. Seal and Backfill Portals	\$	10,500.00
AMR Costs - \$3,500/seal including backfill x 3 seals	\$	10,500.00
B. Removal Structures		
<u>Fan</u>		
Labor - 2 men x \$179.20/day x 2 days	\$	717.00
Equipment (hauling) - truck + operator x 4 hrs X \$85.15/hr		340.60
20 T crane x 2 hrs x \$112.00/hr		224.00
		\$1,281.60
	SUBTOTAL	

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Structures and Conveyor (principle)

Labor - 3 men x \$179.20/day x 2 days	\$1,075.20
Equipment (hauling) - 1 truck + operator x 16 hrs x \$85.15/hr	1,362.40
1 loader + operator x 16 hrs x \$146.90 (950B - 2-1/2 cu yd bucket)	2,350.40
Crane - 2 hrs @ \$112.00/hr	224.00
SUBTOTAL	<u>\$5,012.00</u>

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Substation Power Transformer

Labor - 2 men x \$179.20/day x 2 days	\$ 716.80
Hauling - 1 truck + operator x 16 hrs x \$85.15	1,362.40
Loader - 4 hrs x \$146.90/hr (+ operator)	587.60
SUBTOTAL	<u>\$2,666.80</u>

Scale House Complex Including Bathhouses, Shop, Warehouse, One Mine Office (same building)

Labor - 2 men x \$179.20/day x 3 days	\$1,075.20
Equipment (hauling) - 1 truck + operator x 16 hrs x \$85.15/hr	1,362.40
Loader - 8 hrs x \$146.90/hr + operator	1,175.20
SUBTOTAL	<u>\$3,612.80</u>

Water System (10,000 gal & 12,000 gal tanks)

Labor - 2 men X \$179.20/day X 1 day	\$ 358.40
Hauling - 1 truck + operator x 4 hrs x \$85.15/hr	340.60
Loader - 2 hrs x \$146.90/hr + operator	293.80
Acetylene Torch - 4 hrs @ \$6.40/hr	25.60
Welder - 4 hrs @ \$33.50/hr	134.00
SUBTOTAL	<u>\$1,152.40</u>

Fuel Storage Tank and System

Labor - 2 men x \$179.20/day x 2 days	\$ 716.80
Hauling - 1 truck + operator x 16 hrs x \$85.15/hr	1,362.40
Loader - 8 hrs @ \$146.90/hr + operator	1,175.20
Acetylene Torch - 2 hrs @ \$6.40/hr	12.80
Welder - \$33.50/hr x 2 hrs	67.00
SUBTOTAL	<u>\$3,334.20</u>

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Truck Loadout

Labor - 48 hrs @ \$29.25/hr	\$1,404.00
Lowboy truck + operator @ \$93.30/hr x 5.5 hrs	513.15
1 580 Crane 2 hrs x \$113.20	226.00
10 yd dump @ \$79.30	475.80
Torch - 4 hrs @ \$6.40/hr	26.00
Welder - 4 hrs x \$33.50/hr	134.00
950B Loader @ \$146.90/hr x 4 hrs	587.60
D-7 Crawler Tractor - 4 hrs @ \$187.10/hr	748.40
SUBTOTAL	<u>\$4,114.95</u>

Stacking Facility and Coal Bins

Labor - 4 men x \$179.20/day x 1 day	\$ 716.80
Truck and operator \$85.15 x 4 hrs	340.60
1 20 ton Crane 4 hrs x \$112.00	448.00
1 950B Loader \$146.90/hr x 4 hrs	587.60
Acetylene Torch - 2 hrs @ \$6.40/hr	12.80
Welder - 2 hrs @ \$33.50/hr	67.00
SUBTOTAL	<u>\$2,172.80</u>

Crusher Facility

Labor - 2 men @ \$179.20/day x 4 days	\$1,433.60
1 20 T Crane - 8 hrs X \$112.00/hr	896.00
1 Truck + operator - 8 hrs x \$85.15	681.20
Torch + Welder @ 4 hrs @ \$39.90/hr	159.60
SUBTOTAL	<u>\$3,170.40</u>

Oil Slack Loadout

Labor - 2 men @ \$179.20/day x 2 days	\$ 716.80
1 20 T Crane - 4 hrs X \$112.00	448.00
1 Truck + operator - 4 hrs x \$85.15	340.60
SUBTOTAL	<u>\$1,505.40</u>

C. Waste Removal

Labor - 2 men x \$179.20/day x 4 days	\$1,434.00
Hauling - 1 truck + operator x 8 hrs x \$85.15/hr	681.20
Loader (+ operator) - 4 hrs x \$146.90	587.60
SUBTOTAL	<u>\$2,702.80</u>

D. Soil Placement and Seeded Material & Handling

SUBTOTAL. \$38,954.01

E. Channel Restoration (pulling culverts, reshaping channel, riprap and gabion structures)

Backhoe + operator x \$241.80 x 48 hrs	\$11,575.00
Labor - 4 men x \$179.20/day x 4 days	2,867.00
Cat x 1 day @ \$187.10/hr	1,496.80
Gabion Structures @ \$63.00/sy (53.3 sy)	3,356.00
Miscellaneous Riprap - \$500.00	500.00
SUBTOTAL	<u>\$19,796.80</u>

F. Reseeding and Fertilization (5 ac)

Hydroseeding, operator and driver (from page 9-25 of the MRP)

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Seeding = 853/ac x 20% reseeding rate	\$5,118.00
Shrubs (1,752/ac x 2 ac) @ \$.63/plant	1,107.52
\$93.00/ac x 2 ac (labor)	186.00
SUBTOTAL	<u>\$7,511.52</u>

G. Mulching (5 ac) (from page 9-25)

Hydromulcher, operator and driver

\$843/ac x 5 ac x 20% reseeding rate	\$8,092.80
Straw bales for sediment control	500.00
Mobilization of hydromulcher	500.00
SUBTOTAL	<u>\$9,092.80</u>

H. Protected Fencing (10 ac)

6 ft high x 3,000 linear ft x \$2.00/ft installed

SUBTOTAL	<u>\$6,000.00</u>
----------	-------------------

I. Baseball Park Seeding

3 ac orill seeding @ \$240.00/ac	\$ 720.00
600 lbs seed @ \$3.00/lb	1,800.00
SUBTOTAL	<u>\$2,520.00</u>

J. Retaining Wall Remov. 1

2 hrs backhoe @ \$241.15	\$482.30
SUBTOTAL	<u>\$482.30</u>

K. Borehole Plugging

5 yds cement @ \$51.00/yd	\$255.00
4 hrs labor @ \$22.20/hr	88.80
SUBTOTAL	<u>\$343.80</u>

L. Maintenance and/or Monitoring for Subsidence, Vegetation and Erosion (bond for 10-year bond liability period)

Vegetation - 1 person (truck, expenses) - 3 days	\$ 500.00/yr
Erosion - D-1 for 1 day @ \$74.45/hr	595.60/yr
1 day to field check erosion - 8 hrs @ \$25/hr	200.00/yr
<u>Subsidence</u>	
2 day field survey @ \$200/day	
1 day certified surveyor @ \$250/day	650.00/yr
	<u>\$1,946.60/yr</u>
	SUBTOTAL
10 yrs x \$1,946.00 = \$19,460.00	

M. Hydrology Monitoring, Quarterly

Labor - 4 days annually @ \$179.20/day	\$ 716.80
Laboratory work - \$400.00/quarter x 4	1,600.00
	<u>\$2,316.80/yr</u>
	SUBTOTAL
10 yrs X \$2,316.80 = \$23,168.00	

N. Supervision - 8-1/2 weeks @ \$1,288/week

	\$11,050.00
	<u>\$11,050.00</u>
	SUBTOTAL

O. Mobilization and Demobilization of 5 pieces of equipment @ \$500 each

	\$2,500.00
	<u>\$2,500.00</u>
	SUBTOTAL

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SOIL PLACEMENT
(Reference Area Postmining Contour Map)

Areas	Earth Moved	Cu Yds	Cost/Hr D7G	Cost/Hr BH-235	Time	Cost
Scale Area	Cut	889	\$187.10		13.7 hr	\$ 2,573.00
Sediment Pond B	Fill	450		\$241.15	1.18 hr	\$ 284.37
Sediment Pond A	Fill	1,333		\$241.15	3.49 hr	\$ 847.38
Ditch to Pond A	Fill	377	\$187.10		5.83 hr	\$ 1,091.05
Bathhouse Area	Cut	1,111	\$187.10		17.18 hr	\$ 3,215.28
Loadout	Cut	3,352		\$241.15	8.78 hr	\$ 2,118.27
	Fill	3,352		\$241.15		
Road Coal Preparation	Cut	2,222		\$241.15	5.82 hr	\$ 1,404.18
	Fill	2,222				
Lower Road to Switchback	Cut	3,377		\$241.15	8.85 hr	\$ 2,134.08
	Fill	3,377				
Upper Road to Portal	Cut	6,622		\$241.15	17.35 hr	\$ 4,184.74
	Fill	6,622				
Total	Cut	17,376				\$17,847.36
	Fill	17,333				

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8,000 cu yds topsoil - transport :65 mi = 950B Loader 41 hrs
 - \$146.90/hr = \$ 6,022.90

Dump and regrade - 2 trucks and operator = 41 hrs @ \$85.15/hr \$ 3,491.15

Spreading and ripping (3 shank ripper) - D7G = 41 hrs @ \$214.25/hr \$ 8,764.25

\$18,298.30

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3.6.7.2 Major Modification to Mine the Hiawatha Seam
(Modification of Existing Bond Amount)

Co-Op Mining will enter the Hiawatha Seam through a portion of old works which were partially covered during road construction to the upper portal. The area in question is presently disturbed and will not constitute an additional area to revegetate, alter natural drainage reconstruction or significantly alter the post-mining contour map in any way.

A new coal receiving bin identical to the existing structure will be constructed as well as approximately 200 additional feet of conveyor; these two structures along with 2 new portals and a small support pad will necessitate the following costs associated with final reclamation:

Reclamation Cost:

A. Seal & Backfill Portals

ARM Cost - 3,500/seal
including backfill x 2 seals = 7,000.00

B. Structures and Conveyor (Secondary)

Labor - 3 men x \$179.20/day x 2 days 1,075.20
Equipment (hauling) 1 truck + operator
x 16 hrs x \$85.15/hr 1,362.40
1 loader + operator x 16 hrs x \$146.90
(950B - 2½ cu yd bucket) 2,350.40
Crane - 2 hrs @ \$112.00/hr 224.00
Subtotal \$5,012.00

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C. Hiawatha Receiving Bin		
Labor - 2 men @ \$179.20/day x 2 days		\$716.80
1 20 T Crane - 4 hrs x \$112.00		448.00
1 Truck + operator - 4 hrs x \$85.15		<u>340.60</u>
	Subtotal	\$1,505.40

*Carry over from page 3-109

Total	\$179,298.00
+ modification	<u>13,517.00</u>
Total	192,815.00
10% contingency	<u>19,281.00</u>
	\$ 212,096.00

1987 - 218,458.
 1988 - 225,011.
 1989 - 231,761.
 1990 - 238,714.

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*Pages 3-117 and 3-118 (to be deleted)

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.

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approximations to determine the required characteristics and sizes of the required channels or conduit as the case may be to convey the projected discharges.

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Appendix 7-F contains the computer programs and printouts used in sizing the ditches and culverts. Refer to Plate 7-1 for locations of the various structures and Plate 7-5 for areas used in calculations.

The following pages contain summaries of the ditch and culvert sizes.

7.2.5.2.0 ADDITIONAL CONTROL FOR HIAWATHA SEAM MINING

As shown on Plate 2-2, the outslope of the proposed Hiawatha Seam portal pad will encroach upon the ephemeral channel between D-1D and D-2D on Plate 7-8. It is proposed to install a 15" flexible culvert as shown, to convey the drainage from the upper areas of the channel beneath the pad. This channel is included in drainage area AD-1 (Plate 7-5). The maximum water this channel is calculated to flow is shown on Table 7.2-8 as 1.5 cfs (Ditch D-2D). Calculations for this ditch are shown in Appendix 7-F under Runoff Ditch Sizing. Based on this flow, the culvert is sized as shown on Table 7.2-7 (Revised Summary of Culvert Sizes). The new culvert is designated C-4D, and matches the criteria for culvert C-1D. The headwater depth above the top of the culvert inlet is proposed to be 1' - more than adequate to carry the expected flow. Energy dissipators will be placed as indicated in the following sections (7.2.5.2.1 and 7.2.5.2.2).

The outslope of the pad will be protected by the installation of 6" M.D. rock along the area where drainage will occur. The only drainage that will reach the toe of the pad is that from the upper pad to the lower - the majority of the drainage above will be conveyed through the culvert. The 6" rock will be more than adequate, since the approved plan calls for natural 6" rip-rap in the post-mining channel that will carry not only the disturbed drainage AD-1, but the undisturbed drainage from AU-3 as well.

The ditch in this area has been measured, and typical section is shown on Plate 7-8 as cross-section D-D. The ditch profile is also shown on this plate as Profile "F". Plate 7-8A is a typical section of the proposed channel restoration in the area of the portal pad and culvert, after their removal and upon final reclamation.

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7.1.7 GROUND WATER MONITORING PLAN

Monitoring activities will focus on determining water levels, discharge and water quality fluctuations in relevant aquifers or ground water occurrences in the mine area. Data will be collected from mine roof seeps and sumps, future encounters, if any, by drill holes within the mine, observation wells and springs. Procedures to correlate ground water discharge and contamination of Bear Creek will also be used, following procedures by Waddell, et. al., (1983). The objectives of the monitoring plan are to (1) identify potential impacts during and after mining, and (2) provide on-going base line data on aquifer characteristics and ground water occurrences.

The monitoring activities will be timed to determine the approximate seasonal variations with time for the piezometric heads and water volumes encountered and water quality parameters, for the declining and rising limbs of the annual weather cycle. It is proposed that samples will be collected at about February 1, May 1, August 1, and November 1, at all sites. In addition to these monitoring activities, data shall be routinely collected at all new drill holes and other encounters in the mine, where significant in-flows are encountered.

Springs below the mines will be sampled to determine discharge and water quality parameters and their possible variation with time. These springs include Bear Springs, COP Development Springs, and Birch Springs (Plate 3.4-1). Water quality parameters to be measured are listed in Table 7.1-4. However, periodic checks will be made of the mine area to determine any possible impacts not currently expressed at the surface. This information will be used to estimate seasonal fluctuations, aquifer recharge, and consistent long-term changes and to confirm the formations contributing to spring flow.

0000020

The water levels in the mine sumps (Plate 3.4-1) will be recorded quarterly by level measurements and water samples submitted for quality analysis to a qualified laboratory. This information will be used to assess leakage rates and possible contamination. As mining progresses, three observation wells (WM-F, G, and H) will be drilled through the underlying Hiawatha coal seam, at the base of the Blackhawk formation and a minimum of 25 feet into the underlying Star Point sandstone formation. These well locations are identified in Plate 3.4-1. Locations of these wells are approximate and site conditions and mine personnel will determine their exact locations. The purpose of these wells will be for the collection of piezometric surface and water quality data, as encountered. These three wells are located in areas of projected mining activity and will be drilled upon approval of these monitoring sites. These wells are located such as to determine the extent or occurrence of ground water within the depths of impact of the mining activities on the ground water regime. Any ground waters encountered by these wells will be sampled and will be used to correlate with the water quality data from Bear Springs, Birch Springs, and COP Development Spring to provide a check on estimates of ground water contamination. These springs are focused on since their flow is the sole use of ground water to be possibly affected by the mining activities.

The existing and proposed data collection sites selected are expected to provide a representative cross section for hydrologic data across the mine area based on the flow directions projected.

An Annual Hydrologic Monitoring Report will be submitted yearly to DOGM summarizing water quality and quantity data gathered during the monitoring activities outlined above. In addition, the report shall include a yearly update of the mine inflow survey which incorporates a mine workings map identifying all wet areas of the mine and the type of inflow (seep, fractures, etc.).

CO-OP MINING COMPANY

P.O. Box 1245
Huntington, Utah 84528



(801) 748-5238
Coal Sales (801) 748-5777

RECEIVED
JUL 16 1986

July 14, 1986

**DIVISION OF
OIL, GAS & MINING**

Mr. John Whitehead
Utah Division of Oil, Gas & Mining
355 West North Temple
#3 Triad Center Suite 350
Salt Lake City, Utah 84180-1203

RE: Hiawatha Seam Revision, Co-Op
Mining Co. Bear Canyon Mine
ACT/015/025

Dear John:

Please find enclosed Co-Op's reply to the Division's Deficiency Document of April 29, this year.

If you have any questions, please call me.

Sincerely,

A large, stylized handwritten signature in black ink, appearing to read 'Melvin A. Coonrod'. The signature is fluid and cursive, with a large loop at the end.

Melvin A. Coonrod
Permitting & Compliance

MC/njc

3.1 SCOPE

This part describes the action and procedures of Co-op Mining Company to satisfy the requirements for underground mining operations and reclamation.

3.2 SURFACE FACILITIES - EXISTING

The mine which existed at the proposed site has been abandoned for over 30 years and subsequently there is no evidence of long existing facilities.

3.3 SURFACE FACILITIES - NEW

Subsection 3.3.1 and 3.3.2 deal exclusively with proposed new facilities.

3.3.1 SITE SELECTION AND PREPARATION OF PROPOSED FACILITIES

Plate 2-2 is an overlay of the new location of all surface facilities. In addition an accurate determination of where each facility is in relation to the existing topographic as well as structural fixtures such as highways.

3.3.2 PORTALS

The Mine has 3 existing portals (Fan, Intake & Belt). A fourth Intake portal is proposed for Blind Canyon in 1986. (See Plate 3-4. Appendix 3-I.)

BOND

Co-Up Mining Company
Bear Canyon Mine
ACT/015/025, Emery County, Utah

3.6.7.1

Detailed Timetable for Completion of Major Reclamation Processes

The following schedule of reclamation is proposed to be initiated within 90 days (weather permitting) of final abandonment of the mining operation:

	<u>Acc. Time</u>
1. Seal Portal - 1 week	1 week
2. Remove Structures - 2 weeks	3 weeks
3. Soil Placement (backfilling and grading)	
A. Upper Pad - 1 week (including road)	4 weeks
B. Channel Restoration - 1 week	5 weeks
C. Lower Pad and Diversions - 1 week (including road)	6 weeks
4. Seedbed Material and Handling - 1 week	7 weeks
5. Reseeding and Fertilizing - 1 week	8 weeks
6. Mulching - .5 week	8.5 weeks
7. Protective Fencing - 2 weeks	
	(concurrently)
	<u>8.5 weeks</u>

The above reclamation tasks are, therefore, proposed to be completed within 8.5 weeks following the start of reclamation activities.

Labor - Hourly Rates from 1985 Means Site Work Cost Data

Equipment Operator = \$29.25
Truck Driver = \$22.90
Average Helper = \$22.20
Foreman = \$32.20
Crane Operator = \$29.90
Welder - \$33.50

Equipment - Hourly Rates from 1985 Means Site Work Cost Data

	<u>Cost Per Hour</u>
1. Loader - 950L (2-1/2 cy bucket) - \$100 + \$17.65 Operator	\$117.65 29.25 <u>\$146.90</u>
2. Crane - Groves RT-580 20T - \$69.75 = \$12.35 Operator	\$ 82.10 29.90 <u>\$112.00</u>
3. Truck and Operator	\$ 65.15
4. Cat D-7G - \$137.50 + \$20.35 Operator	\$157.85 29.25 <u>\$187.10</u>
Ripper (three shanks = \$24.90 + 2.25 oper/hr)	\$ 27.15
5. Backhoe (Cat 235) - \$185.00 + \$26.90 Operator	\$211.90 29.25 <u>\$241.15</u>
6. Acetylene Torch	\$ 6.40
7. Lowboy (truck/trailer) @ \$93.30	\$ 93.30
8. Cat D-3 - \$39.50 + \$5.70 Operator	\$ 45.20 <u>\$ 29.25</u> \$ 74.45

Backhoe (BH) Cycle Time Estimates - 235 Backhoe (From Cat Performance Handbook)

Average	
Load Bucket	6.5 sec
Swing Bucket	6.0 sec
Dump Bucket	2.5 sec
Swing Empty Bucket	5.0 sec
Total Average	<u>20.0 sec</u> - 2.12 yds ³

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

3 cy/min x 2.12 yds x 60 = production/hr = 381.60 cu yd/hr or 180 cycles/hr.

Cut and fill yardages (same number - 1 cycle)

Crawler Tractor (D7G) Cycle Time Estimates (From Cat Performance Handbook)

D7G Cut Material - 200 yd run

Average Blade Load of 15 cu yd

Cycle Time	7.6 min - Loaded Average
	4.0 min - Return
	<u>11.6 min</u>

Efficiency 50 min/hr

50 min/11.6 min cycle x 15 yds/cycle = 64.65 yds/hr

950B Loader Cycle Time (From Cat Performance Handbook)
.50 min

- | | |
|--|----------------|
| 1. Pile (10 inches material and smaller) | + .01 min |
| 2. Common ownership of trucks | - .04 min |
| 3. 3/4 inch to 6 inch | <u>.00 min</u> |
| 113 cu yds/hr | .53 min |
| 196 cu yds/hr topsoil | |

Summary of Reclamation Cost Estimate

A. Seal Portal and Backfill	\$ 10,500.00
B. Removal Structures	\$ 28,023.00
C. Solid Waste Removal	\$ 2,703.00
D. Soil Placement (backfilling and grading)	\$ 36,146.00
E. Channel Restoration	\$ 19,797.00
F. Reseeding and Fertilizer	\$ 7,512.00
G. Mulching	\$ 9,093.00
H. Protective Fencing	\$ 6,000.00
I. Baseball Park Seeding	\$ 2,520.00

J. Retaining Wall Removal	\$ 482.00
K. Borehole Plugging	\$ 344.00
L. Maintenance and Monitoring of Subsidence, Vegetation and Erosion (10-yr bond liability period)	\$ 19,460.00
M. Hydrology Monitoring (10-year bond liability period)	\$ 23,168.00
N. Supervision (8-1/2 weeks)	\$ 11,050.00
O. Mobilization and Demobilization	\$ 2,500.00
	\$179,296.00
10% Contingency	<u>17,930.00</u>
	\$197,228.00 (1985 dollars)

1986 - \$204,703.00
1987 - \$212,461.00
1988 - \$220,513.00
1989 - \$228,871.00
1990 - \$237,545.00

Note: Section 3.6.7.2 (page 3-116)
Modification cost adjustment

Reclamation Costs

A. Seal and Backfill Portals	\$ 10,500.00
AMR Costs - \$3,500/seal including backfill x 3 seals	\$ 10,500.00
B. Removal Structures	
<u>Fan</u>	
Labor - 2 men..x \$179.20/day x 2 days	\$ 717.00
Equipment (hauling) - truck + operator x 4 hrs X \$85.15/hr	340.60
20 T crane x 2 hrs x \$112.00/hr	<u>224.00</u>
	SUBTOTAL \$1,261.60

Structures and Conveyor (principle)

Labor - 3 men x \$179.20/day x 2 uays	\$1,075.20
Equipment (hauling) - 1 truck + operator x 16 hrs x \$85.15/hr	1,362.40
1 loader + operator x 16 hrs x \$146.90 (950B - 2-1/2 cu yd bucket)	2,350.40
Crane - 2 hrs @ \$112.00/hr	224.00
SUBTOTAL	<u>\$5,012.00</u>

Substation Power Transformer

Labor - 2 men x \$179.20/day x 2 days	\$ 716.80
Hauling - 1 truck + operator x 16 hrs x \$85.15	1,362.40
Loader - 4 hrs x \$146.90/hr (+ operator)	587.60
SUBTOTAL	<u>\$2,666.80</u>

Scale House Complex Including Bathhouses, Shop, Warehouse,
One Mine Office (same building)

Labor - 2 men x \$179.20/day x 3 days	\$1,075.20
Equipment (hauling) - 1 truck + operator x 16 hrs x \$85.15/hr	1,362.40
Loader - 8 hrs x \$146.90/hr + operator	1,175.20
SUBTOTAL	<u>\$3,612.80</u>

Water System (10,000 gal & 12,000 gal tanks)

Labor - 2 men X \$179.20/day X 1 day	\$ 358.40
Hauling - 1 truck + operator x 4 hrs x \$85.15/hr	340.60
Loader - 2 hrs x \$146.90/hr + operator	293.80
Acetylene Torch - 4 hrs @ \$6.40/hr	25.60
Weloer - 4 hrs @ \$33.50/hr	134.00
SUBTOTAL	<u>\$1,152.40</u>

Fuel Storage Tank and System

Labor - 2 men x \$179.20/day x 2 days	\$ 716.80
Hauling - 1 truck + operator x 16 hrs x \$85.15/hr	1,362.40
Loader - 8 hrs @ \$146.90/hr + operator	1,175.20
Acetylene Torch - 2 hrs @ \$6.40/hr	12.80
Welder - \$33.50/hr x 2 hrs	67.00
SUBTOTAL	<u>\$3,334.20</u>

Truck Loadout

Labor - 48 hrs @ \$29.25/hr	\$1,404.00
Lowboy truck + operator @ \$93.30/hr x 5.5 hrs	513.15
1 580 Crane 2 hrs x \$113.20	226.00
10 yd dump @ \$79.30	475.80
Torch - 4 hrs @ \$6.40/hr	26.00
Welder - 4 hrs x \$33.50/hr	134.00
950B Loader @ \$146.90/hr x 4 hrs	587.60
D-7 Crawler Tractor - 4 hrs @ \$187.10/hr	748.40
	<hr/>
SUBTOTAL	\$4,114.95

Stacking Facility and Coal Bins

Labor - 4 men x \$179.20/day x 1 day	\$ 716.80
Truck and operator \$85.15 x 4 hrs	340.60
1 20 ton Crane 4 hrs x \$112.00	448.00
1 950B Loader \$146.90/hr x 4 hrs	587.60
Acetylene Torch - 2 hrs @ \$6.40/hr	12.80
Welder - 2 hrs @ \$33.50/hr	67.00
	<hr/>
SUBTOTAL	\$2,172.80

Crusher Facility

Labor - 2 men @ \$179.20/day x 4 days	\$1,433.60
1 20 T Crane - 8 hrs X \$112.00/hr	896.00
1 Truck + operator - 8 hrs x \$85.15	681.20
Torch + Welder @ 4 hrs @ \$39.90/hr	159.60
	<hr/>
SUBTOTAL	\$3,170.40

Oil Slack Loadout

Labor - 2 men @ \$179.20/day x 2 days	\$ 716.80
1 20 T Crane - 4 hrs X \$112.00	448.00
1 Truck + operator - 4 hrs x \$85.15	340.60
	<hr/>
SUBTOTAL	\$1,505.40

C. Waste Removal

Labor - 2 men x \$179.20/day x 4 days	\$1,434.00
Hauling - 1 truck + operator x 8 hrs x \$85.15/hr	681.20
Loader (+ operator) - 4 hrs x \$146.90	587.60
	<hr/>
SUBTOTAL	\$2,702.80

D. Soil Placement and Seedbed Material & Handling

SUBTOTAL	\$38,954.01
----------	-------------

E. Channel Restoration (pulling culverts, reshaping channel, riprap and gabion structures)

Backhoe + operator x \$241.80 x 48 hrs	\$11,575.00
Labor - 4 men x \$179.20/day x 4 days	2,867.00
Cat x 1 day @ \$187.10/hr	1,496.80
Gabion Structures @ \$63.00/sy (53.3 sy)	3,358.00
Miscellaneous Riprap - \$500.00	500.00
SUBTOTAL	<u>\$19,796.80</u>

F. Reseeding and Fertilization (5 ac)

Hydroseeding, operator and driver (from page 9-25 of the MRP)

Seeding = 853/ac x 20% reseeding rate	\$5,118.00
Shrubs (1,752/ac x 2 ac) @ \$.63/plant	2,207.52
\$93.00/ac x 2 ac (labor)	\$ 186.00
SUBTOTAL	<u>\$7,511.52</u>

G. Mulching (5 ac) (from page 9-25)

Hydromulcher, operator and driver

\$843/ac x 5 ac x 20% reseeding rate	\$8,092.80
Straw bales for sediment control	500.00
Mobilization of hydromulcher	500.00
SUBTOTAL	<u>\$9,092.80</u>

H. Protected Fencing (10 ac)

6 ft high x 3,000 linear ft x \$2.00/ft installed

SUBTOTAL	<u>\$6,000.00</u>
----------	-------------------

I. Baseball Park Seeding

3 ac orill seeding @ \$240.00/ac
600 lbs seed @ \$3.00/lb

SUBTOTAL	<u>\$ 720.00</u>
	<u>1,800.00</u>
	<u>\$2,520.00</u>

J. Retaining Wall Remov.1

2 hrs backhoe @ \$241.15

SUBTOTAL	<u>\$482.30</u>
	<u>\$482.30</u>

K. Borehole Plugging

5 yds cement @ \$51.00/yd
4 hrs labor @ \$22.20/hr

SUBTOTAL	<u>\$255.00</u>
	<u>88.50</u>
	<u>\$343.50</u>

L. Maintenance and/or Monitoring for Subsidence, Vegetation and Erosion (bond for 10-year bond liability period)

Vegetation - 1 person (truck, expenses) - 3 days	\$ 500.00/yr
Erosion - D- for 1 day @ \$74.45/hr	595.60/yr
1 day to field check erosion - 8 hrs @ \$25/hr	200.00/yr
<u>Subsidence</u>	
2 day field survey @ \$200/day	650.00/yr
1 day certified surveyor @ \$250/day	250.00/yr
SUBTOTAL	<u>\$1,946.00/yr</u>
10 yrs x \$1,946.00 = \$19,460.00	

M. Hydrology Monitoring, Quarterly

Labor - 4 days annually @ \$179.20/day	\$ 716.80
Laboratory work - \$400.00/quarter x 4	1,600.00
SUBTOTAL	<u>\$2,316.80/yr</u>
10 yrs X \$2,316.80 = \$23,168.00	

N. Supervision - 8-1/2 weeks @ \$1,288/week	\$11,050.00
SUBTOTAL	<u>\$11,050.00</u>

O. Mobilization and Demobilization of 5 pieces of equipment @ \$500 each	\$2,500.00
SUBTOTAL	<u>\$2,500.00</u>

SOIL PLACEMENT
(Reference Area Postmining Contour Map)

Areas	Earth Moveo	Cu Yds	Cost/Hr D7G	Cost/Hr BH-235	Time	Cost
Scale Area	Cut	889	\$187.10		13.7 hr	\$ 2,573.00
Sediment Pond B	Fill	450		\$241.15	1.18 hr	\$ 284.37
Sediment Pond A	Fill	1,333		\$241.15	3.49 hr	\$ 847.38
Ditch to Pond A	Fill	377	\$187.10		5.83 hr	\$ 1,091.05
Bathhouse Area	Cut	1,111	\$187.10		17.18 hr	\$ 3,215.28
Loadout	Cut	3,352		\$241.15	8.78 hr	\$ 2,118.27
	Fill	3,352		\$241.15		
Road Coal Preparation	Cut	2,222		\$241.15	5.82 hr	\$ 1,404.18
	Fill	2,222				
Lower Road to Switchback	Cut	3,377		\$241.15	8.85 hr	\$ 2,134.08
	Fill	3,377				
Upper Road to Portal	Cut	6,622		\$241.15	17.35 hr	\$ 4,184.74
	Fill	6,622				
Total	Cut	17,376				\$17,847.36
	Fill	17,333				

SEEDBED MATERIAL AND HANDLING

8,000 cu yds topsoil - transport :65 mi = 950B Loader 41 hrs	
- \$146.90/hr =	\$ 6,022.90
Dump and regrade - 2 trucks and operator = 41 hrs @ \$85.15/hr	\$ 3,491.15
Spreading and ripping (3 shank ripper) - D7G = 41 hrs @ \$214.25/hr	\$ 8,764.25
	<u>\$18,298.30</u>

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3.6.7.2 Major Modification to Mine the Hiawatha Seam
(Modification of Existing Bond Amount)

Co-Op Mining will enter the Hiawatha Seam through a portion of old works which were partially covered during road construction to the upper portal. The area in question is presently disturbed and will not constitute an additional area to revegetate, alter natural drainage reconstruction or significantly alter the post-mining contour map in any way.

A new coal receiving bin identical to the existing structure will be constructed as well as approximately 200 additional feet of conveyor; these two structures along with 2 new portals and a small support pad will necessitate the following costs associated with final reclamation:

Reclamation Cost:

A. Seal & Backfill Portals

ARM Cost - 3,500/seal
including backfill x 2 seals = 7,000.00

B. Structures and Conveyor (Secondary)

Labor - 3 men x \$179.20/day x 2 days 1,075.20
Equipment (hauling) 1 truck + operator
x 16 hrs x \$85.15/hr 1,362.40
1 loader + operator x 16 hrs x \$146.90
(950B - 2½ cu yd bucket) 2,350.40
Crane - 2 hrs @ \$112.00/hr 224.00
Subtotal \$5,012.00

C. Hiawatha Receiving Bin	
Labor - 2 men @ \$179.20/day x 2 days	\$716.80
1 20 T Crane - 4 hrs x \$112.00	<u>448.00</u>
1 Truck + operator - 4 hrs x \$85.15	<u>340.60</u>
Subtotal	\$1,505.40

*Carry over from page 3-109

Total	\$179,298.00
+ modification	<u>13,517.00</u>
Total	192,815.00
10% contingency	<u>19,281.00</u>
	\$ 212,096.00

1987 - 218,458.
 1988 - 225,011.
 1989 - 231,761.
 1990 - 238,714.

*Pages 3-117 and 3-118 (to be deleted)

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.

H/C
8-19-85

approximations to determine the required characteristics and sizes of the required channels or conduit as the case may be to convey the projected discharges.

Appendix 7-F contains the computer programs and printouts used in sizing the ditches and culverts. Refer to Plate 7-1 for locations of the various structures and Plate 7-5 for areas used in calculations.

The following pages contain summaries of the ditch and culvert sizes.

7.2.5.2.0 ADDITIONAL CONTROL FOR HIAWATHA SEAM MINING

As shown on Plate 2-2, the outslope of the proposed Hiawatha Seam portal pad will encroach upon the ephemeral channel between D-1D and D-2D on Plate 7-8. It is proposed to install a 15" flexible culvert as shown, to convey the drainage from the upper areas of the channel beneath the pad. This channel is included in drainage area AD-1 (Plate 7-5). The maximum water this channel is calculated to flow is shown on Table 7.2-8 as 1.5 cfs (Ditch D-2D). Calculations for this ditch are shown in Appendix 7-F under Runoff Ditch Sizing. Based on this flow, the culvert is sized as shown on Table 7.2-7 (Revised Summary of Culvert Sizes). The new culvert is designated C-4D, and matches the criteria for culvert C-1D. The headwater depth above the top of the culvert inlet is proposed to be 1' - more than adequate to carry the expected flow. Energy dissipators will be placed as indicated in the following sections (7.2.5.2.1 and 7.2.5.2.2).

The outslope of the pad will be protected by the installation of 6" M.D. rock along the area where drainage will occur. The only drainage that will reach the toe of the pad is that from the upper pad to the lower - the majority of the drainage above will be conveyed through the culvert. The 6" rock will be more than adequate, since the approved plan calls for natural 6" rip-rap in the post-mining channel that will carry not only the disturbed drainage AD-1, but the undisturbed drainage from AU-3 as well.

The ditch in this area has been measured, and typical section is shown on Plate 7-8 as cross-section D-D. The ditch profile is also shown on this plate as Profile "F". Plate 7-8A is a typical section of the proposed channel restoration in the area of the portal pad and culvert, after their removal and upon final reclamation.

7.1.7 GROUND WATER MONITORING PLAN

Monitoring activities will focus on determining water levels, discharge and water quality fluctuations in relevant aquifers or ground water occurrences in the mine area. Data will be collected from mine roof seeps and sumps, future encounters, if any, by drill holes within the mine, observation wells and springs. Procedures to correlate ground water discharge and contamination of Bear Creek will also be used, following procedures by Waddell, et. al., (1983). The objectives of the monitoring plan are to (1) identify potential impacts during and after mining, and (2) provide on-going base line data on aquifer characteristics and ground water occurrences.

The monitoring activities will be timed to determine the approximate seasonal variations with time for the piezometric heads and water volumes encountered and water quality parameters, for the declining and rising limbs of the annual weather cycle. It is proposed that samples will be collected at about February 1, May 1, August 1, and November 1, at all sites. In addition to these monitoring activities, data shall be routinely collected at all new drill holes and other encounters in the mine, where significant in-flows are encountered.

Springs below the mines will be sampled to determine discharge and water quality parameters and their possible variation with time. These springs include Bear Springs, COP Development Springs, and Birch Springs (Plate 3.4-1). Water quality parameters to be measured are listed in Table 7.1-4. However, periodic checks will be made of the mine area to determine any possible impacts not currently expressed at the surface. This information will be used to estimate seasonal fluctuations, aquifer recharge, and consistent long-term changes and to confirm the formations contributing to spring flow.

The water levels in the mine sumps (Plate 3.4-1) will be recorded quarterly by level measurements and water samples submitted for quality analysis to a qualified laboratory. This information will be used to assess leakage rates and possible contamination. As mining progresses, three observation wells (WM-F, G, and H) will be drilled through the underlying Hiawatha coal seam, at the base of the Blackhawk formation and a minimum of 25 feet into the underlying Star Point sandstone formation. These well locations are identified in Plate 3.4-1. Locations of these wells are approximate and site conditions and mine personnel will determine their exact locations. The purpose of these wells will be for the collection of piezometric surface and water quality data, as encountered. These three wells are located in areas of projected mining activity and will be drilled upon approval of these monitoring sites. These wells are located such as to determine the extent or occurrence of ground water within the depths of impact of the mining activities on the ground water regime. Any ground waters encountered by these wells will be sampled and will be used to correlate with the water quality data from Bear Springs, Birch Springs, and COP Development Spring to provide a check on estimates of ground water contamination. These springs are focused on since their flow is the sole use of ground water to be possibly affected by the mining activities.

The existing and proposed data collection sites selected are expected to provide a representative cross section for hydrologic data across the mine area based on the flow directions projected.

An Annual Hydrologic Monitoring Report will be submitted yearly to DOGM summarizing water quality and quantity data gathered during the monitoring activities outlined above. In addition, the report shall include a yearly update of the mine inflow survey which incorporates a mine workings map identifying all wet areas of the mine and the type of inflow (seep, fractures, etc.).

000021

2.2.2 HOLDERS OF LEASEHOLD INTEREST IN SURFACE AREA
AND COAL RIGHTS

The names and addresses of holders of record in Leasehold interest are listed below:

Coal mining lease by and between Co-Op Company and Peabody Coal Company, executed Dec. 1st, 1975. See Plate IV-1.

Area T16S, R7E SLBM
Sec. 14 SW $\frac{1}{4}$
Sec. 23 E $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$, SW $\frac{1}{4}$
Sec. 24 all West of N-S Fault
Sec. 25 all West of N-S Fault

The right to mine and remove from, and use for purposes incident to mining, including access roads, camp facilities, surface operations, storage of coal, and other activities. Also unrestricted use of all access roads leading to and from property. Lease is binding on the successors to the parties of the lease.

2.2.3. PURCHASE OF RECORD UNDER A REAL ESTATE CONTRACT
FOR SURFACE AREA COAL

See Appendix 2-B Title Insurance Policy

2.2.4 OPERATOR, IF DIFFERENT FROM APPLICANT

Same as above.

2.2.9 MINE NAME AND M.S.H.A IDENTIFICATION

The name of the mining operation for which this application is submitted is:

Trail Canyon Mine- Co-Op Mining Company

The M.S.H.A. Identification Number is:

MSHA #42-00081-0

2.2.10 APPLICANT'S INTEREST IN AREAS CONTIGUOUS TO PROPOSED PERMIT AREA

None

2.3 COMPLIANCE INFORMATION (UMC 782.14)

See Appendix 2-A

2.4 RIGHT OF ENTRY AND OPERATION INFORMATION (UMC 782.15)

The applicant's right to enter the lands and to conduct operations in the permit area is based on the documents listed in Section 2.4.1. It should be noted that the applicant's right is not subject to any pending litigation. Easements are included under Appendix 2-E.

2.4.1 DOCUMENT DESCRIPTION

The following documents support Co-Op Mining Company's right

2.5.2 WAIVER UNDER UMC 786.19(d)(2)

Not Applicable

2.5.3 WAIVER OF OWNERS OF NEARBY OCCUPIED DWELLINGS

Applicant does not propose to conduct or locate surface facilities within 300 feet of an occupied dwelling. The occupants have petitioned Co-Op to commence reclamation as soon as possible.

2.6 PERMIT TERM INFORMATION - ANTICIPATED FOR EACH PHASE

2.6.1 STARTING DATE (Applicable Only to Reclamation Activities)

Starting dates anticipated for each phase of reclamation are dependent on permit approvals, however, it is hoped that work could commence by early spring 1986 and the mine could theoretically be reclaimed by fall that same year.

2.6.2 TERMINATION DATES

Termination dates anticipated for each phase of reclamation are nebulous at this time although a detailed estimate of reclamation activities are included in the Bonding Section and a projection of 1 year appears realistic for completion

TABLE 3-1

COAL RESERVES - TRAIL CANYON MINE

Coal Seam	Surface Acres of Seam	Avg. Thickness of Coal	Coal Reserves	
			In Place	Recoverable
Bear Canyon Seam	750	10'	*Mined	Out
Hiawatha Seam	800	5'	1,790,000	900,000
TOTAL			1,790,000	900,000

* These are estimates only, with no intent to mine these reserves.

Appendix 2-D

APPENDIX 2-E

APPENDIX 2-E

Currently, only one easement and one right-of-way intersect Co-op Mining Company Permit Area. Utah Power and Light Company has a power line easement attached herein and Emery County has a Road-Right-of-way addressed in Appendix 3.3.11-A.

There exists a Facto Right-of-way in the form of a water line owned and maintained by the Emery County Special Service District, however this Right-of-way is presently disputed and is pending legal solution.

3.1 SCOPE

This part describes the action and procedures of Co-Op Mining Company to satisfy the requirements for underground mining operations and reclamation.

3.2 SURFACE FACILITIES - EXISTING

The mine which existed at Trail Canyon has been abandoned for over 4 years and subsequently there has been some salvage of existing facilities. The facilities are detailed in Table 3.2-1 and shown on Plate 2-2.

3.3 SURFACE FACILITIES - NEW

There are no new surface facilities associated with mining, however, the reclamation plan details some minor improvements relative to recreation and post mining land use.

3.3.1 SITE SELECTION AND PREPARATION OF PROPOSED FACILITIES

Plate 3-2 is an overlay of the new location of all recreation facilities. In addition, an accurate determination of where each facility is in relation to the existing topographic as well as structural fixtures such highways.

3.3.9 SEDIMENTATION CONTROL AND WATER TREATMENT FACILITIES

This facility will be maintained as long as it is required to meet the effluent limitations of applicable federal or state laws for runoff or drainage. When it is no longer required as a sediment pond, it will be allowed to fill with silt to approximately 2' of the over flow structure and maintained in this configuration as an ice rink in winter and a source of wildlife water during the balance of the year.

3.3.10 STORAGE, WASTE AND REFUSE AREAS

Co-Op disposed of underground development waste in abandoned areas underground in line with UMC 817.71-74 and MSHA regulations.

3.3.11 TRANSPORTATION, ROADS AND PARKING AREAS

Some roads and parking areas will be maintained post mining as transportation corridors for the community of Trail Canyon. The balance will be removed and revegetated during reclamation (See Plate 3-2).

The Trail Canyon Road is approximately 2,600' long from the hyway through the residential area. This road is constructed 16' wide and will be surfaced with 6" of road base

This road shall be removed during the reclamation operation. The timing and procedure of removal and reclamation is discussed in detail under the Backfilling and Grading Plan in Sec. 3.6.4.

All roads, conveyors and other facilities shall be removed 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 drainages are either held or cleaned before releases.

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

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

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

How?

5. 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 stream-flow or runoff outside the permit area will be minimal.

3.3.12 TOPSOIL STORAGE PILES

Due to the pre-law nature of the disturbance, no topsoil has been stored on site.

3.3.13 EXPLOSIVES STORAGE AND HANDLING

Co-Op does have an explosive facility within the permit area. Co-Op does not anticipate the use of explosives in their reclamation operation.

3.3.14 RELOCATION OR USE OF PUBLIC ROADS

There will be no alteration of existing public roads.

3.3.14.1 PROTECTIVE MEASURES

Access roads will be posted with speed and road information signs upon entrance to the property; use of these roads during reclamation will be restricted to authorized personnel. Security is maintained by adequate security personnel.

June 30, 1986; (phase 2) earth moving July 1 - Aug. 30, Sept. 1, 1986, scheduled for revegetation by Nov. 1, 1986. Construction of park complex to begin on or about Aug. 15, 1986, scheduled for completion on or about Oct. 1, 1986.

3.4 OPERATION

No mining operations will be conducted at Trail Canyon.

3.4.1 MINING PLANS

There are three seams in the Trail Canyon Property, the Upper Bear, (upper), the Bear or Blind canyon seam (middle), and Hiawatha (lower). The old existing mine is in the middle seam. Our projected plan is to abandon mining in the entire permit area.

3.4.1.1 PORTALS, SHAFTS, AND SLOPES

See Plate 2-1.

3.4.1.2 MINING METHODS

Not applicable

3.4.1.3 ABANDONED MINE DEVELOPMENT

See Plate 3-4

3.4.1.5 ROOD CONTROL, VENTILATION, WATER SYSTEMS, DUST SUPPRESSION, DEWATERING AND ELECTRICAL

a. ROOF CONTROL

Not Applicable

b. VENTILATION

Not applicable

c. DEWATERING, WATER SYSTEMS AND DUST SUPPRESSION

Water generated in the mine was collected in sumps and used at the mine. Some water from the roof was collected and pumped directly outside for use in the bathhouses and as drinking water in the offices. Tests for potability were made bi-monthly. Water also served for sprays on the machines at the working faces, on the coal at belt heads and transfer points and for the wash plant. Presently, water generated is used by the Bear Canyon Mine; there is no discharge to surface waters. However, a National Pollution Discharge Elimination System (NPDES) permit has been obtained in case increased volumes are encountered.

3.4.2.3 PROTECTION OF NATURAL SURFACE STRUCTURES AND STREAMS

Co-Op was committed to maintain a minimum of a 200' barrier pillar to the outcrop to minimize detrimental impacts to nesting raptor in the event of an escarpment failure. The stream channel lies well below the elevation where mining occurred.

3.4.2.4 PROPERTY BOUNDARIES

Area boundaries of individual leases and fee property are shown in Plate 2-1. Total area covered by this permit is that enclosed the the heavy outside line. Protection of these lines and property adjacent to the permit area is provided by continuous barrier pillars 100 feet, wide enough to prevent subsidence across the boundary resulting from angle of draw.

3.4.2.4.1 BUILDINGS WITHIN 1,000 FEET OF PERMIT AREA

No buildings lie within 1,000 feet of the permit area.

with existing surface contours and seeded. In those instances where sizable highwalls established in preparing the portal site cannot be returned to original contours, the opening in front of the wall was filled with non-combustible material as above and the portal and entire exposed seam on the highwall was covered with 6 to 8 feet of noncombustible material, graded, covered with suitable material and seeded.

3.6.3.2 REMOVAL OF SURFACE STRUCTURES

Co-Op Mining Company will restore disturbed land-surface areas to their approximate premining conditions, to the extent technologically and economically feasible. All surface facilities including support facilities will be removed and restored to prevent damage to fish, wildlife, and associated environmental values.

BUILDING REMOVAL

Office, shop, storage, scale, buildings and bath house:

- o Each structure will be removed.

5. The backhoe and dozer will work in the same manner to eliminate the access road, working down to the lower road. A typical cross-section of the reclaimed road cut is shown in Fig. 3.6.4-A.
6. The above procedure will continue on down the canyon reshaping the mine yard and disturbed area to the configuration shown on Plate 3-2, Postmining Topography.
7. As backfilling and grading is completed, operational areas will be scarified by ripping to a depth of 14" with a dozer where possible. Steep slopes will receive ripping to create ledges, crevices, pockets and scree. These areas are shown on the Post mining Topography Plate 3-2 as cat track terraces. This will reduce compaction and prevent topsoil slippage, and improve soil retention and vegetation establishment in the cat tracks. The area will be walked over to create grouser marks which run parallel to the slope.
8. Topsoil will be spread over the disturbed areas after the grading and ripping is complete.
9. Upon completion of the above, the area will be reseeded as per the plan.

3.6.4.3 TERRACING AND EROSION CONTROL

The need to terrace some of the steeper slopes within the mine plan area currently is not anticipated.

Erosion control measures which will be employed are specific to each situation. Mulching to reduce and limit rainfall impact will be a widely used erosion control practice.

3.6.4.4 SOIL REDISTRIBUTION AND STABILIZATION

Prior to redistribution, the regraded land will be scarified by a ripper-equipped tractor. The ground will be ripped to a depth of 14" to reduce surface compaction, provide a roughened surface to assure topsoil adherence and promote vegetational root penetration.

Within a 10 day period to seeding, topsoil will be distributed on all 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 all areas in which facilities such as roadbeds, mine pads and building sites are to be abandoned.

the first appropriate season following grading and topsoil redistribution procedures and will include, the addition of remedial soil treatment. A permanent, diverse vegetative cover, selected on the basis of UDWR recommendations, will be established on all reclaimed areas. The proposed reclamation schedule is presented in Section 3.6.6., Schedule of Reclamation. The following subsections describe the major aspects of the proposed revegetation plan.

3.6.5.1 SOIL PREPARATION

SCARIFYING AREAS

Operational areas will be scarified to reduce compaction and to prevent topsoil slippage. Steep slope areas which must remain after abandonment will receive special ripping to create ledges, crevices, pickets^{of wood?} and screens^{pile of rocks} and are referred to as cat track terraces. This will allow better soil retention and vegetation establishment.

3.6.5.1.2 FERTILIZATION AND NEUTRAL- IZATION - UMC 817.25

The topsoil will be tested before it is seeded to determine the type and amount of fertilizer or neutralizer

reclamation is:

1981	Underground mine openings will be closed and sealed as they are abandoned.
April-June 1986	Surface facilities will be removed.
June-Sept 1986	Recontouring - earthwork.
Sept-Oct. 1986	Revegetation

The completion of surface reclamation will be in as short a time as possible after permit approval.

(Above timetable dependent on permit approval)

3.6.6.1 DETAILED TIMETABLE FOR COMPLETION OF EACH MAJOR STEP IN RECLAMATION

The specific timetable for completing each major step or phase in reclamation is not applicable for all. Reclamation will commence upon permit approval (year 1986).

3.6.6.2 RECLAMATION MONITORING

Upon completion, the reclaimed area will be moni-

The purpose of the above procedures is to demonstrate that based on cover, production, woody plant density, and species diversity, the disturbed areas have been returned to stable plant communities capable of withstanding the intended post-mining land use.

3.6.7 SCHEDULE OF RECLAMATION FOR CO-OP TRAIL CANYON MINE

3.6.7.1 DETAILED TIMETABLE FOR COMPLETION OF MAJOR RECLAMATION PROCESSES

The following schedule of reclamation is proposed to be initiated within 90 days (weather permitting) of final abandonment of the mining operation:

	<u>Acc. Time</u>
1. Seal Portal - 1 week	1 week
2. Remove Structures - 3 weeks	4 weeks
3. Soil Placement (backfilling and grading)	
a. Upper pad - 1 week (including road)	5 weeks
b. Lower pad and diversion - 1 week (including road)	6 weeks
4. Seedbed Material and handling - 1 week	7 weeks
5. Reseeding and Fertilizing - .5 week	7.5 weeks
6. Mulching - .5 week	8 weeks
	<hr/> 8 weeks

The preceding reclamation tasks are therefore proposed to be completed within 8 weeks following the start of reclamation activities.

3.6.7.2 RECLAMATION COST AND BONDING

In lieu of estimating reclamation cost, Co-Op proposes on awarding contracts based on the approved plan for all work to be completed 1986 (subject to permit approval). During the interim, the existing reclamation bond shall remain in force.

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

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 1986. The monitoring program will continue until the completion of reclamation and bond release has occurred. Location of monitoring stations are shown on Plate 3-3.

Co-Op Mining Co. further 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 materially 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 reasonable 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

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 9.20' 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 yearly 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.

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 LaSal 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 Indus-

Co-Op Mining Company has granted cattle drive right-of-ways, and utility corridors, such as power lines, telephone lines and water pipes. These are also shown in Plate 2-1.

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.

* The mineral resources contained within the permit area will be assessed. The abandonment assessment will insure that oil and gas development will be possible at the conclusion of reclamation. Measures taken to protect the unmined coal, such as portal sealing, will also be assessed. No other mineral resources are known to be present in commercial quantities.

4.5.6 COMPATIBILITY WITH LAND USE POLICIES AND PLANS

Letters have been sent out to each surface owner for comments regarding postmining land use policies and plan (Appendix 4-A). This permit application will address all concerns voiced therein.

GROUND WATER

Management Objective. "Improve and maintain watershed conditions to reduce overland flows and to recharge the underground aquifer. Reduce soil losses from the unit where feasible. Protect perennial springs and ground water and maintain or improve water quality to meet the standards for existing or possible future uses of water".

IMPACTS

Approximately 10 acres of soil are disturbed within the permit

4.6.2 GROWTH CAPABILITY

The ability of Trail Canyon City to accept additional population is important in terms of water and sewage systems and the availability of land for expansion. The limiting factor to growth in Trail Canyon is primarily usable land. There is a potential for up to 6 more residences, however, there is no plan at this time to expand the existing community.

4.6.3 LABOR FORCE

There are a number of local reclamation contractors in the area. Also, Carbon and Emery counties have experienced high unemployment with the decline in the coal industry. Short term employment of this nature is highly desirable and available labor appears to be abundant.

possible effects on the surface water. Trail Canyon is projected to be reclaimed in 1986. This reclamation will further enhance the protection of the surface water by removing old mining structures, coal piles and pads, and by regrading and revegetating disturbed areas. As a further protection measure, the sewage system for the proposed Trail Canyon City will be re-evaluated and improved as necessary.

As indicated in the previous section, the flow in Trail Canyon is intermittent and is thought to be fed primarily by snowmelt and direct runoff. The absence of significant springs in the area indicates that any impacts on the surface hydrology from the old mine workings would be minimal or non-existent.

7.2.4 MONITORING PLANS

In the past, Co-Op Mining Company has monitored two stations on Trail Creek, one above (north) of the mine plan area and one below (south). The monitoring location above the mining area is approximately 100' upstream from where the mine road crosses Trail Creek at the northern permit boundary. The monitoring location downstream is located approximately 100' south of the highway (U-31) on Trail Creek prior to entering the Huntington River. (See Plate 7-1).

Water monitoring samples will be taken on a quarterly basis for 2 years following reclamation, and bi-annually (2 per annum) for the succeeding years until bond release. The following field measurements will be taken during each sample period: Flow, pH, Specific

former road area. Loose rock check dams will be installed at each point where main ephemeral drainages cross the restored upper road. A design typical of these check dams is shown in Figure 7.3-3. The locations are shown on Plate 7-4. A 6" M.D. rip-rap will be extended from the apron across the reclaimed section of road for additional erosion control. Since the check dam will reduce the velocity to nearly zero, and the maximum expected flow is 13.22 cfs (Area C₂), the 6" M.D. rock will be more than adequate for erosion control. Silt fencing will be utilized along the lower edge of the reclaimed portal pad area as shown on Plate 7-4. Cross sections of the reclaimed upper road are shown on Plate 3-1, and a typical section is shown on Plate 7-4. The middle road to the coal pad areas will also be removed; however, drainage from this area will flow to a disturbed runoff diversion ditch and be conveyed to the ponds. Disturbed area runoff from the minesite will continue to flow to the sediment pond. Runoff from the townsite and upper access road (substantial road) will flow to Trail Creek as it did originally. All disturbed areas (except roads) will be revegetated, and disturbed area diversion ditches and the sediment pond will remain in place until revegetation is complete. All culverts and other controls no longer needed for runoff control will be removed.

7.3.2 RESTORATION OF NATURAL CHANNELS

Upon reclamation, natural drainages will be allowed to return to their previous courses, with the exception of the drainage from the minesite area which will continue to be diverted to the pond. Erosion

controls will be provided where side drainages cross reclaimed sections of road if necessary.

There are presently 3 large culverts in place along the main drainage Trail Creek. It is proposed to leave these culverts in place, since the area is to become a permanent townsite, and will continue to use existing access roads. There are no other modifications or restoration activities proposed for the main Trail Creek channel. (Support calculations for all remaining culverts are shown in Section 7.3.4).

7.3.3 SEDIMENTATION POND AND DIVERSIONS

Two disturbed runoff diversions are proposed to be left in place to collect runoff from the mine site area. These diversions will continue to direct flow from the disturbed (reclaimed) area to the sediment pond until bond release. Upon bond release, these diversions may be removed and regraded if deemed necessary by the City. Sizing of the diversions and a typical section is shown in Section 7.3.5 and on Plate 7-4 respectively.

The sedimentation pond will remain in place until bond release, or until revegetation of disturbed areas is deemed adequate. The pond is then projected to remain in place as an ice skating rink for the townsite. At that time, it will no longer function as a sediment or runoff control structure; therefore, the existing size and design of the structure is adequate, and no upgrade will be required. Details of pond design and stability are shown in Appendix 7-A and 7-B of this P.A.P. Existing and future pond configurations are shown on Plates 7-2, 7-2A, and 7-4.

7.3.4 POST-MINING CULVERT DESIGN

The following culverts are projected to remain in place after reclamation and until bond release:

TCC-1 - 72" x 44' CMP at the Upper Road crossing of Trail Creek.
TCC-2 - 54" x 60' CMP at the Middle Road crossing of Trail Creek.
TCC-3 - 54" x 60' CMP at the Fire Station crossing of Trail Creek.
TCC-4 - 54" x 220' CMP at the Lower Road crossing of Trail Creek.
TCC-5 - 24" x 160' CMP on the East Side Disturbed Diversion.

The location of each of the culverts are shown on the "Post-Mining Hydrology Map" Plate 7-4.

The culverts are designed to carry the expected runoff from a 10 year-24 hour event, except the main Trail Creek culverts, which are sized to carry a 50 year-24 hour storm. Calculations and culvert sizing is shown on Tables 7.3.-1, 7.3-2 and Figure 7.3-1.

7.3.5 POST MINING DIVERSION DESIGN

Two disturbed diversions are projected to remain in place after reclamation to direct runoff to the sedimentation pond. An additional, undisturbed diversion will remain on the west side of the road to divert natural drainage away from the mine site and roadway. These diversion will remain in place until bond release.

The location and a typical section of each of the diversions is shown on the "Post Mining Hydrology", Plate 7-4.

7.3.7 POST MINING MAINTENANCE AND MONITORING

All drainage controls, culverts, ditches, pond, etc. left in place after reclamation, (see Plate 7-4), will be maintained as necessary to remain operational until bond release.

Maintenance may include: cleaning of culverts and ditches, cleaning sediment from the pond, regrading of areas of erosion, replacement of erosion controls, and such other measures as may be necessary to maintain the integrity of the hydrologic control system.

Monitoring of the surface water flows will continue until bond release. The schedule and details of the monitoring program are discussed in Section 7.2.4 of this Permit Application Package.

CHAPTER 8

SOIL RESOURCES

TABLE OF CONTENTS

- 8.1 Scope
 - 8.2 Methodology
 - 8.3 Soil Resource Information of Mine Plan Area (783.21)
 - 8.3.1 Soils Identification
 - 8.3.2 Soils Description
 - 8.3.3 Present and Potential Productivity of Existing Soils
 - 8.4 Prime Farmland Investigation & Determination (783.27)
 - 8.5 Soils, Physical and Chemical Properties of Soils and Results of Analysis, Tests and Trials (784.13 and 817.21)
 - 8.6 Use of Selected Overburden Materials or Substitutes (783.21 and 817.23)
 - 8.7 Plans for Removal, Storage and Protection of Soils (784.13, 817.22 and 817.23)
 - 8.8 Plans for Redistribution of Soils (784.13 and 817.24)
 - 8.9 Nutrients and Soil Amendments
 - 8.10 Effects of Mining Operations on Soils, Nutrients and Soil Amendments to be Used (817.25)
 - 8.11 Mitigation and Control Plans
- Appendix 8-A Soil Test Reports

8.1 SCOPE

All areas in Trail Canyon were disturbed pre-law, thus, no pre-mining data is available, however, at the request of Wendell Owen, representing Co-Op Mining company, and the San Rafael Soil Conservation District, the Soil Conservation Service performed a soil and vegetation survey on a mine property in Huntington Canyon. The surveys were designated to comply with the March 1979 Permanent Regulatory Program Requirements to the Office of Surface Mining Reclamation and Enforcement, Department of Interior. (See Appendix 8-B SCS Report).

8.2 METHODOLOGY

The survey covers approximately 23 acres on Bear Creek in Huntington Canyon, Emery County, Section 25, T16S, R7E, SLBM. Each soil is identified with a three letter symbol. It should be noted that the entire Trail Canyon Mine disturbance area had been disturbed from previous mining activities. Therefore, the soil characteristics were projected from the surrounding areas. All areas having the same symbol are essentially the same kind of soils. There may be small areas of other soils included within the delineation that are slightly differ-

8.4 PRIME FARMLAND DETERMINATION

The entire permit area is deemed unsuitable for prime farmland based on:

1. There is no available water rights of an agricultural nature in conjunction with and of the land within the permit area.
2. The vast majority of the permit area is excessively steep to farm.
3. The nature of the soils (excessive rock) prohibit farming activities.

Based on all of the above the only conclusion possible is there are no Prime Farmlands within the permit area.

8.5 SOILS, PHYSICAL AND CHEMICAL PROPERTIES

Soil testing, were conducted on those soils to be transported into the permit area and are attached (see Appendix 8-A). Co-Op is presently testing additional soil which is in place adjacent to the portal

roads and upper pad fill material. It is felt that this material is a suitable growth medium. The results of these tests will be provided to the Division on their return.

8.6 USE OF SELECTED OVERBURDEN MATERIALS OR SUBSTITUTES

Total estimate of topsoil to be transported to the site is 2,560 cu. yds. The areas where this material will be utilized is shown on Plate 3-2.

Additional material is not anticipated with the reclamation of the portal road and upper pad due to the fact that existing material at these sites are in place and are presently supporting a diverse vegetation community. Topsoil necessary to cover the remaining areas with 6" of soil where there is no available growth media on site is 3.26 acres. The balance of the 10 acres has the native material available and redistributed on interim reclaimed areas or it is available as down east material along the pre-law existing road.

At present the mine is deficient approximately 2500 cubic yards. However, this material is available

off-site. Co-Op has purchased in excess of 3500 cubic yards from R.D. Campbell property in Carbon County, Utah. The preliminary tests indicate the soil is comparable or better than what was present prior to disturbance.

8.7 PLANS FOR REMOVAL, STORAGE AND PROTECTION OF SOILS

Due to the prelaw nature of the disturbance, no soils were stockpiled at the Trail Canyon Mine.

8.8 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 depth of 14" 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 ten day 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 insure an approximate uniform thickness of 6 inches as stated in the reclamation plan. Topsoil will be redistributed in the fall of the year suitable for establishment of permanent vegetation.

To minimize compaction of the topsoil following redistribution, travel on reclaimed areas will not be allowed. After topsoil has been applied, surface compaction will be reduced by using a D-6 Crawler tractor and disking to a 6" depth. This operation will also help prepare a proper seed bed and protect the redistribution topsoil from wind and water erosion.

Co-Op Mining will exercise care to guard against erosion during and after application of topsoil and will employ wood fiber mulch and tacifiers to insure the stability of topsoil on graded slopes.

The areas in which soil has been disturbed to date within the permit area, includes the loadout area, offices, shops and substations, roads and portal areas. No additional acreage will be disturbed in the future except what is incidental during reclamation operations.

8.11 MITIGATION AND CONTROL PLANS

Co-Op is committed to take whatever steps are necessary to minimize loss of soil through erosion. Whenever rills or gullies become in evidence, Co-Op will fill, regrade, rip rap and re-seed tacify and mulch. This work will commence prior to significant loss. (Rills and gullies, less than 9").

trapping and causing small areas of snow retention.

PHASE 5 PLANTING

The planting of seedlings will be done within 2 years of the seeding on wildlife areas in order to evaluate the number and species of seedlings necessary to insure both composition and stocking of woody species to maximize utilization by wildlife and domestic grazing. On recreation areas, larger trees (2" DBH) will be planted concurrently with seedlings. The species and numbers of individual plants are correlated to the reference area which was established during July of 1983. Stocking is discussed and listed in Section 9.5.1.1 end of seed list.

PLANTING PROCEDURE

Planting will be done utilizing a powered auger with a capability of drilling a 3 inch plus diameter hole to a depth of 16 inches. The roots of the seedling will be arranged in as near natural position as possible paying special attention not to "J" the root tips. (Fig. 9-1).

By holding the seedling at the root crown, soil will be compacted back around the roots being careful to leave no air pockets or loose dirt (which would constitute settling). The tree will be firm when light pressure is exerted on the needles and standing in an erect position. Only hands shall be used to pack soil around the tree,

Huntington Creek

The aquatic resource description of Trail Creek consists of a review of available information from previous surveys. Water quality determinations were conducted by certified laboratories. A biological community most likely occurs in Trail Creek on an intermittent basis. Being present during a portion of those years when runoff is exceptionally high followed by wetter than usual summer and fall precipitation.

10.2.2 TERRESTRIAL RESOURCES

This research was designed to qualitatively evaluate the terrestrial vertebrate components in habitats which may have been affected by the mine as well as the reclamation of the Trail Canyon mine. The following methodologies were used:

1. Conduct a literature review and detailed analysis of Utah Division of Wildlife Resources'(UDWR) information and initial report and wildlife plan for the Trail Canyon Mine project and geographic area of concern.

Special emphasis was given to location of published literature pertinent to the geographic area and habitat types in question. In addition, surrounding mine plans were reviewed for pertinent data.

Reptiles

Based on a review of the literature, it was determined that probably 18 species of reptiles (See Appendix 10-A Bear Canyon MRP) occupy the expansion area; this area is considered to be a substantial value habitat for all species. All reptiles have some protection under the Utah code, but since the species listed are all widespread throughout similar habitats in Utah, none are treated as high interest species and, therefore, are not individually discussed.

Amphibians

Based on the literature review, it was determined that probably six species of amphibians (See Appendix 10-A Bear Canyon MRP) inhabit the proposed area of concern which provides substantial value habitat for the three species listed. All amphibians are legally protected in Utah, but since the species listed are all widespread throughout

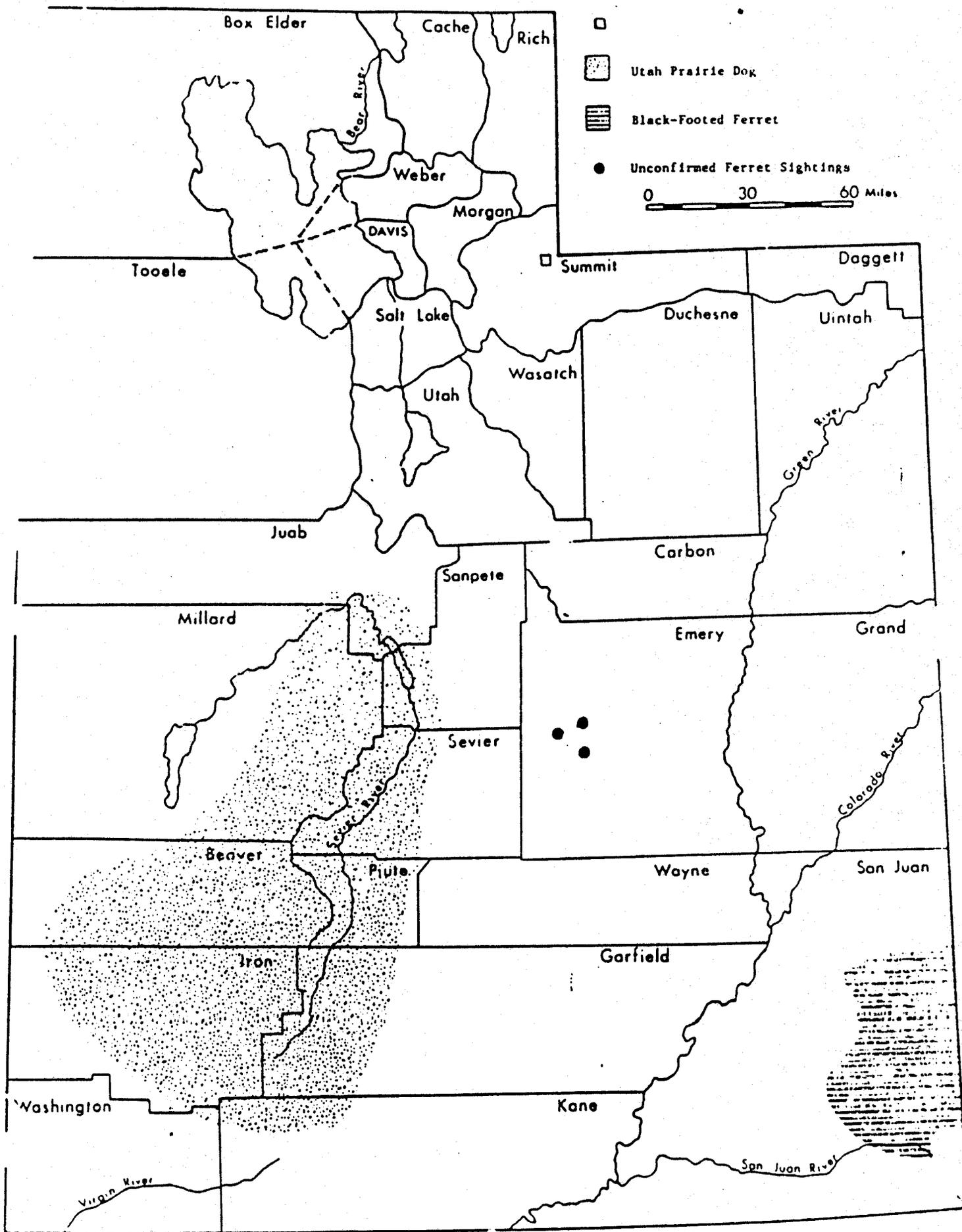


FIGURE 10-5. Endangered Mammalian Species in Relation to Proposed Impact Area

similar habitats in Utah, none are treated as high interest species, and therefore, are not individually discussed.

10.3.3 SPECIES OF SPECIAL SIGNIFICANCE

10.3.3.1 THREATENED AND ENDANGERED SPECIES

There are no endangered or threatened species of mammals in the mine plan area, nor are there any in proximity close enough to be considered (Figure 10-5). Co-Op is committed to notify the Division in the event any T & E species were observed on the permit area, as well as any critical habitat.

Official U.S. Fish and Wildlife Service Section 7 opinions relating to the aquatic resources of Huntington drainages have indicated that no threatened or endangered species of fish or other aquatic organisms have been found in these waters. The organisms of Trail Creek, as presently known, are all common and widely distributed throughout streams of Utah, and none are rare in the intermountain region.

10.3.3.2 RAPTORS

Two species of endangered raptors may be found in the mine plan area. These are the bald eagle and peregrine falcon. There are no known roosting trees or nesting sites within the permit area according to a survey conducted by the Raptor Biologist from the U.S. Fish and Wildlife Service.

ADditional studies will be made during the raptor breeding seasons in April 1986 to determine the presence or absence of raptor nesting sites in the permit area, and their proximity to the area to be reclaimed.

10.4 EXPECTED IMPACTS OF RECLAMATION OPERATIONS ON FISH AND WILDLIFE

10.4.1 AQUATIC WILDLIFE

The mine is an existing mine and as such should have no additional impact on Trail Creek. The reclamation effort will have a minor impact during actual construction but from henceforth, the impacts will be of a positive nature as vegetation becomes established. Natural conditions will be less stressful to the aquatic life when existing mining facilities are removed and the area totally reclaimed.

Trail Creek is a marginal quality stream and as such should be protected. The only foreseeable impact from the Co-Op Mine project would be from subsidence of source aquifers causing a reduction in the total flow. There are no new planned surface disturbances adjacent to Trail Creek. Since the creek is a considerable distance from the mine and since the areas of disturbance will be small, associated with reclamation, the impact will be insignificant. Subsidence, if it should occur, would have only a minor impact, and then not on Huntington Creek itself.

10.4.2 TERRESTRIAL WILDLIFE

Mammals

Only those mammals of major concern to management agencies are individually discussed briefly here and in more detail in Appendix 10-A Bear Canyon MRP.

Mule Deer

Mule deer on the Trail Canyon Mine Permit area are considered part of herd unit 33 by UDWR. Historically, through 1977, this herd experienced the same general fluctuations as the other herd units of the state. Populations decreased in the early 1970's primarily due to severe climatic conditions, but took a general upswing through the summer 1977. Then there

But, in the case of the Trail Canyon Mine, which was in operation, pre-law reclamation design is the only mitigation that does apply. The terrestrial wildlife inhabiting and utilizing the area of concern are accustomed to the present facilities and have adjusted their behavior, including migration patterns, so the change could be of more impact than would retaining the status quo. In this light, the existing upper road will be reclaimed in such a manner to allow a contoured migration path above the residential area.

The reclamation project will take into consideration potential conflict with deer and elk reproductive activity and the small acreage involved will be restored as quickly as possible by redistribution of topsoil within the disturbed area, with immediate reseeding and replanting of native seeds and vegetation. Because of the small size of the area, natural reseeding will also occur from the surrounding area. The seral stage habitat created will be beneficial to deer, who readily utilize seral stages of pinyon-juniper sites.

The ball park and picnic area is proposed for a site within mule deer wintering range. The area will be reseeded and revegetated with grass species that are proven for their value as winter browse for mule deer. The most successful methods known to management agencies will be used. Care will be taken to control detrimental wildlife use while the area is stabilizing.

Little riparian habitats exist within the area, there will be little impact by the proposed action. Water is such a limiting resource

Raptor nests have been safeguarded from subsidence by maintaining a minimum of a 100' barrier to the outcrop in the abandoned mine.

10.6 STREAM BUFFER ZONE DETERMINATION BY DOGM

Current surface facilities are in the lower reaches of the Trail Creek drainage, which is a tributary of Huntington Creek drainage. An appropriate sedimentation pond has been constructed. This, coupled with drainage ditches, clear water diversion, water bars, and wind erosion control measures within Co-Op disturbed areas, will assure protection from reclamation impacts of aquatic resources far downstream from the mine. Thus, no aquatic biological community determinations have been made relative to surface activities.

10.7 FISH AND WILDLIFE MONITORING

Trail Creek does not warrant a biological or habitat monitoring effort since all further activities will serve to enhance the existing situation.

Trail Creek is a marginal quality stream and as such has had a baseline description of its quality. Data collected has been correlated with water quality and hydrology measurements discussed in Chapter 7. If subsidence should become evident in the drainage area that contributes to Trail Creek, monitoring of aquatic macroinvertebrates and habitat changes will be enstated using approved methodology to collect data as the base for impact evaluation.

Co-Op has committed to monitor all existing power transmission lines in order to determine use by raptors. In the event use is observed, Co-Op will take all necessary measures to insure the poles and/or structures are safe. No new poles or power transmission facilities will be constructed.

Co-Op is further committed to report the presence of any Golden eagles observed on the property to the Division.

10.8 BIBLIOGRAPHY

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