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MAY 9 1984

DIVISION OF OIL
& GAS

Summit Coal Company
Leonard J. Maki
8347 South Mesa Drive
Sandy, Utah 84092

April 16, 1984

Utah Division of Oil, Gas, & Mining
4241 State Office Building
Salt Lake City, Utah 84114

REF: March 29th letter, Initial
Review, Coal Exploration
Notice CEP/043/002

Mr. James W. Smith:

Attached is the additional information requested by the Division. The format is that of a question-answer. Each concern is stated in its entirety and the reply is addressed to each. In order to aid in the review, lengthy plans and/or data is addressed in the form of an appendix.

Summit Coal Company is concerned in implementing the exploration during the 1984 construction season. Your continued cooperation will be greatly appreciated.

Sincerely,



Leonard J. Maki

SUMMIT COAL COMPANY
ADDITIONAL DATA RELATIVE TO
EXPLORATION NOTICE CEP 043/002

APRIL 15, 1984

[UDOGM: UMC 776.12(3)(i)

"Wells BC-1, BC-3, and BC-4 are not discussed. Can any data be obtained from them which may be supplied to further evaluate expected groundwater interception occurrence and/or coal quality and reserve calculation?"

Summit Reply:

Attached under Appendix A are the drill logs for wells BC-1, BC-3, and BC-4.

No groundwater was intercepted during the drilling of these holes and the coal samples were used to aid in determining both reserves and quality. Due to the terrain and the degree of difficulty in attempting to determine the extent of the old Boyer Mine workings through drilling, the reserves for this portion of the lease area were estimated. However, a definitive measure of this variable is one of the underlining needs to proceed with an exploratory mine.

[UDOGM: UMC 776.12(3)(ii)

" (a) Since blasting is to be utilized, measures addressing these concerns should be discussed in the narrative."

Summit Reply:

Initial field reconnaissance indicates that the surface material can be excavated using conventional equipment; D8 crawler tractor, and 680 Case backhoe. In the event that on-site conditions dictate the use of explosives, Summit is committed to the following:

A. Blasting (UMC 817.61-68)

1. No surface blasting is expected to be used to start the entries. The coal near the surface is oxidized and soft and

- should not require blasting.
2. Only near surface blasting is expected.
 3. All blasting activities will comply with all State and Federal laws.
 4. All blasting activities will be conducted by persons certified by the Utah Industrial Commission as provided by 30 CFR 850.
 5. If requested, a pre-blast survey will be conducted prior to any surface blasting as required by UMC 817.62.
 6. All surface blasting will be conducted in compliance with UMC 817.65
 - a. Resident or owners of dwelling within $\frac{1}{2}$ mile will be notified 24 hours prior to blasting as required in UMC 817.65(a)
 - b. All surface blasting will be conducted between sunrise and sunset as required in UMC 817.65(b)
 - c. Warning, signals, and signs will be used in all surface blasting as required in UMC 817.11(f) and UMC 817.65(c)
 - d. The public and livestock will be protected from flyrock as required in UMC 817.65(d)
 - e. Airblast from blasting operations will be controlled as required in UMC 817.65(e)
 - f. All surface blasting operations will comply with regulation stated in UMC 817.65(f-k)
 7. Blast operations as to explosive per delay will comply with UMC 817.67 (a) and UMC 817.65(1)
 8. A record of blasting operations will be maintained as required in UMC 817.68

UDOGM: UMC 776.12(3)(ii)

" (b) Road construction has not been addressed sufficiently in light of the requirements of UMC 817.150-.166. Please discuss this area further, including references to these regulations."

Summit Reply:

Initially, all roads within the permit area are designed to meet all criteria outlined in UMC 817.160-.166 Class 2 roads.

The location of the roads are indicated on the EPA Plate 3-1. Careful consideration was given to the layout of the roads to minimize adverse impacts to the environment. The location complies with all restrictions relative to UMC 817.161. Summit Coal Company, in aligning the road, has considered the minimum amount of disturbance while maintaining a maximum grade of 10% or less on the portal mine road and a 15% or less grade on the road leading to the explosives storage area. Wherein, the maximum pitch grade is on one 140 foot section. All fill slopes will be maintained at 1 : 1.5 with a covering of top soil and revegetated upon the first available growing season after completion. Temporary erosion control measures will be the utilization of straw berms and diversion during construction.

Upon completion, the outside road will be bermed and graded to minimize erosion from surface water and the road will be crowned in such a manner as to concentrate the run-off on an interior ditch. See figure 2.

All ditches and culverts will be oversized to pass a 10 year 24 hour event (ref. UMC 817.163 see Plate 3-1). No drainages will be obscured or blocked, and a 24" culvert will divert undisturbed drainage under the roadway. All culverts will be spaced relative to grade as outlined in 817.163(i).

Surfacing is 6" of road base with 4" of crushed gravel. The roads will be graded and sprayed with water to minimize fugitive dust and enhance travel and decrease equipment maintenance (relative to UMC 817.164 and .165).

CEP/043/002

#4 of 5

SUMMIT COAL COMPANY

EXPLORATION PLAN

FEBRUARY 1984

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FEB 29 1984

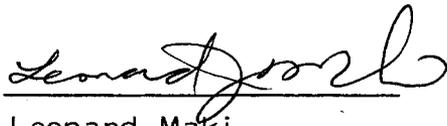
**DIVISION OF
OIL, GAS & MINING**

SUMMIT COAL COMPANY

Exploration Plan
To Mine More Than 250 Tons of Coal
Boyer Mine Project
Coalville Coal Field
Summit County, Utah

February 1984

Signed by



Leonard Maki

2-29-84

Date

Prepared by: Melvin A. Coonrod
Environmental
Consultant

Table of Contents

Introduction	Page
Project Proposal	4
Project Location	5
The Applicant	8
Responsible Representative	8
Land and Mineral Status, Legal to Mine Coal	8
Surface Ownership	8
Designation of Operator	12
Proof of Publication	15
 Natural Environment	
Soil and Climate	21
Prime Farm Land Determination	29
Surface Water	31
Graound Water	31
Fish and Wildlife	32
Threatened or Endangered Species	37
Geology	40
Land Use and Cultural Resources	41
Proposed Exploration Plan	43
Timetable	43
Equipment	44
Access	44
Archeological Survey	45
Noise	45

Table of Content (Cont.)

	Page
Safety Features	45
People	45
Livestock and Wildlife	45
Fire Protection	45
General Health	45
Coal Analysis	49
Generalized Mining Plan	49
Abandonment and Rehabilitation Procedures	53
Roads and Road Repair	54
Revegetation	54
Seed Bed Preparation	54
Seeding	54
Seeding Dates	54
Seed Mixture and Rate	54
Summary	55

List of Figures

Figure Number		Page
1 & 2	Location Map of Summit Coal Property	6 & 7
7 - 1	General Geology Map	42
10- 1	Portal Detail	50

Tables

2-1 & 2-2	Coal Rights Ownership	9 & 7
6-1 - 6-4	Wildlife Species	33 - 37

List of Plates

2-2	Ownership
3-1	Surface Facilities
3-2	Mine Layout
7-1	Hydrology Map

Appendixes

2-1	Supporting Correspondance	13-16
2-2	Coal Ownership Lease Agreement	17
3-1	Prime Farm Land Determination	30
5	Sediment Pond Diagram	32
6A	Endangered Species	38-39
9-2	Access Correspondance	46
9-3	Reclamation Costs	47-48
11-1	Land Owner Correspondance	56
11-2	Seed Mix	57-58

PROJECT PROPOSAL

Summit Coal Company proposes to extract approximately 50,000 tons raw coal over a 12 month period to determine the feasibility to proceed in the re-establishment of the Boyer Mine. The necessity for an exploration permit in excess of 250 tons are as follows:

The site was previously worked, the records of the Old Boyer Mine as well as the actual location and extent of workings are not known in sufficient detail to determine the:

- A. Amount of coal removed
- B. The stability and condition of the old workings
- C. The actual direction and extent of the old works
- D. The degree of faulting which may have led to abandonment

An exploration mine, parallel to the approximate old works will allow a safe method of intersecting the old works at predetermined points. In this manner the actual extent of the mine can be determined in a safe and controlled manner. The exploration mine will determine conclusively, the actual conditions encountered relative to roof and floor as well as an extensive testing of mining conditions and coal quality and to some degree quantity relative to seam variation and faulting.

Faulting is also a prime concern. It is known to be extensive in a substantial portion of the coal field and the potential for a major fault which would make further development not feasible could be substantiated to a large degree.

The exploration of the old works through a controlled underground entry could have a major impact on the methodologies proposed in the present operation plan. If the old works can be made safe and utilized as ventilation or access portals to the reserves, considerable savings in both costs and potential disturbance could be avoided.

Also, a number of important variables relative to methane accumulation around water and potential subsidence could be evaluated.

The balance of this application deals in a cursory manner with those concerns relative to mining and associated environmental impacts. A detailed and much more specific information on the existing environment and potential impacts as well as mitigation is contained in the January 1984 submittal of Summit Coal Company's MRP.

1.1 PROJECT LOCATION

The mine is located on 15 acres of Fee land located in the NE quarter of Section 36, Township 3 North, Range 6 East, SLM. The property, which lies about 10 miles east of the town of Coalville, Utah, is accessed by a county paved road that extends past the property on the south side. "Unimproved" dirt roads extend on the property for access to the existing mine.

Coalville is located off of Interstate Highway 15 and has access to UP Railroad in the town of Coalville, Utah.

The project mine area lies within the Coalville Coal Field. There have been at least 1 small coal operation on the property. The Boyer Mine opened up in the early 1900's through 1956 and produced a small amount of coal. There is another mine located within 1 mile of the proposed location but is not presently producing coal.

See following Figures, 1-1, and 1-2.

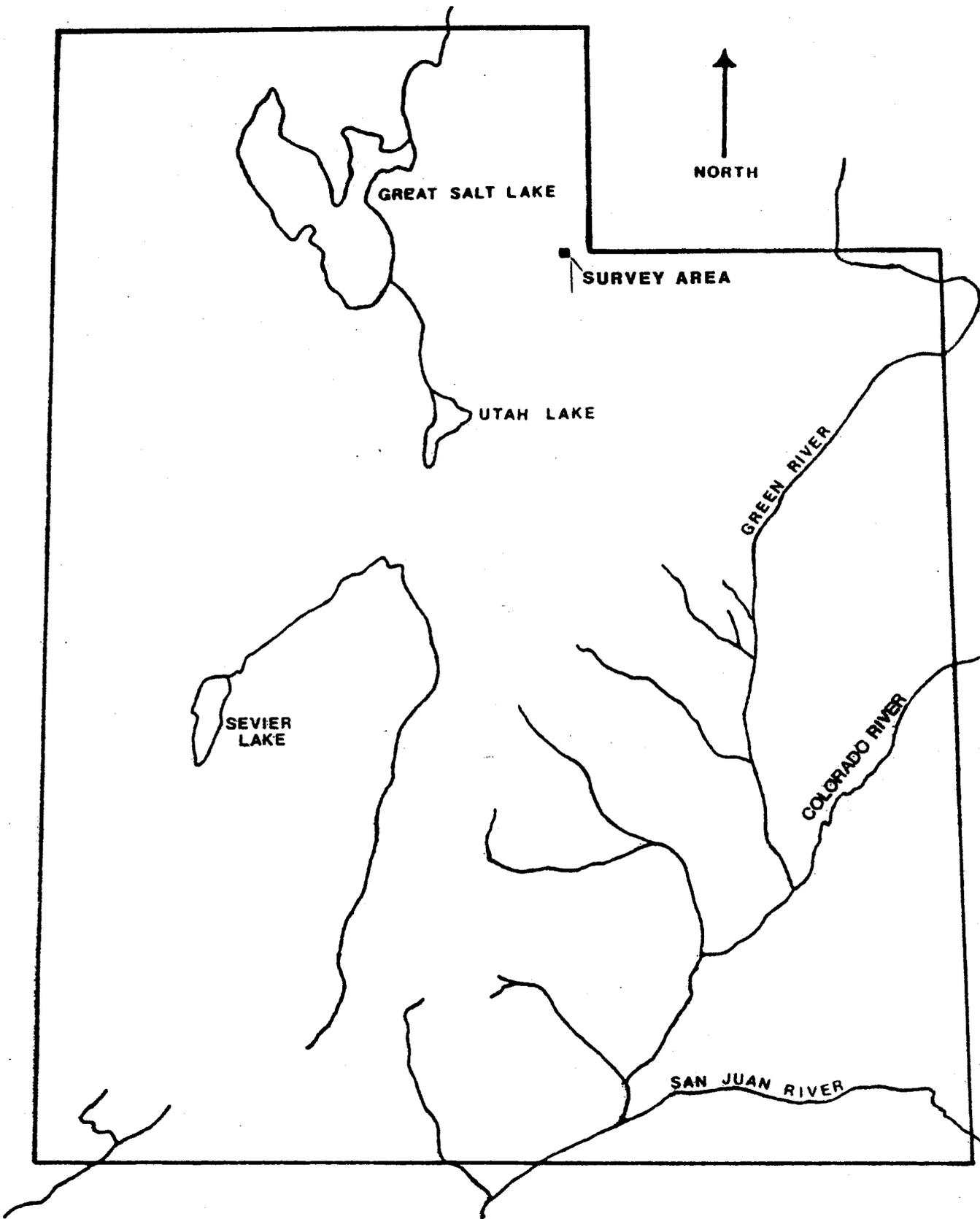
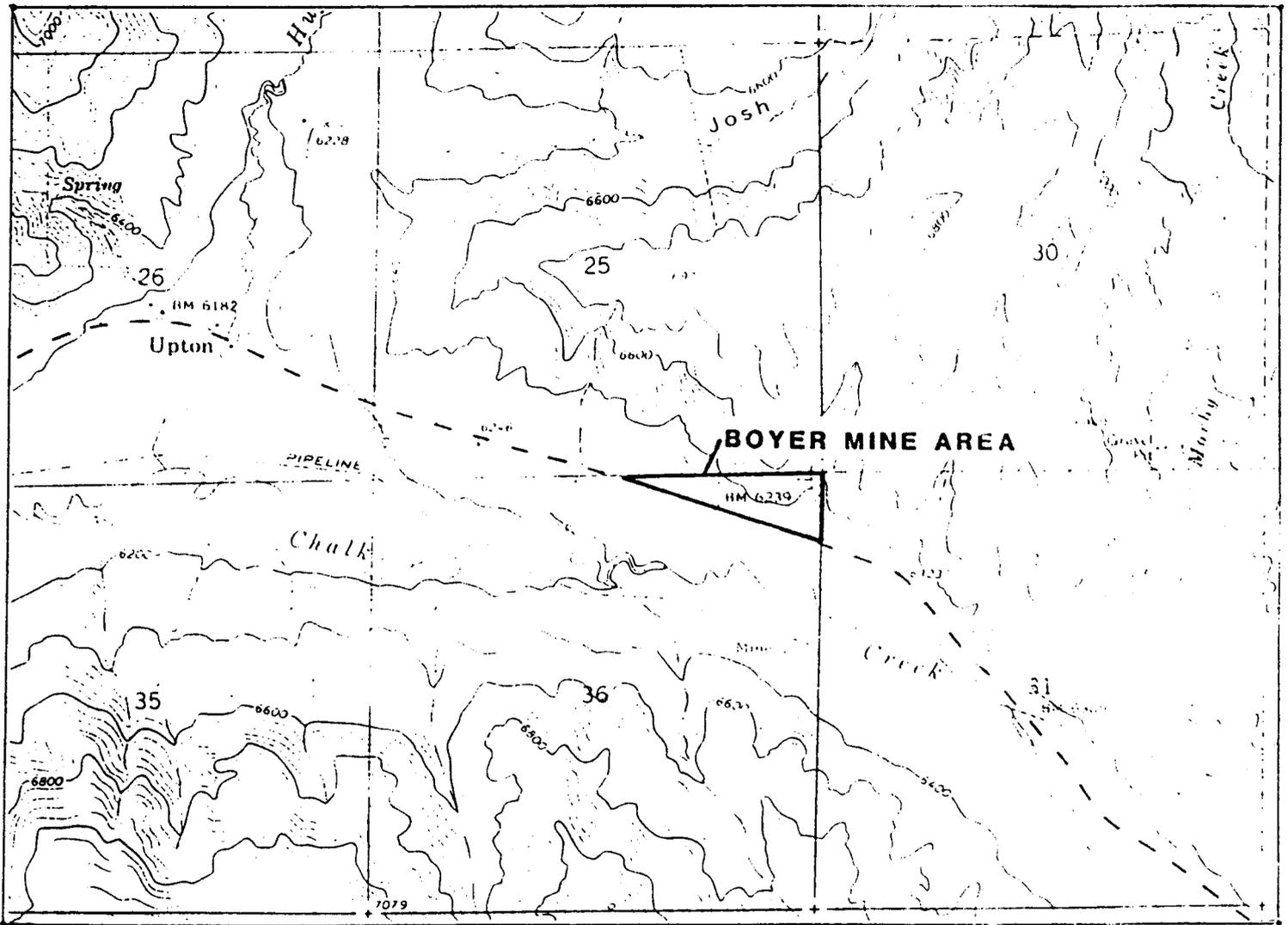
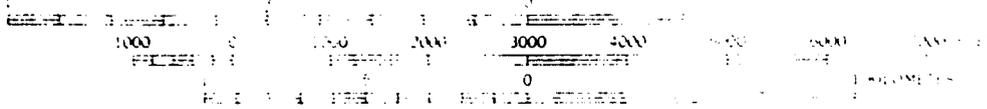


Figure1-1

General Survey Location



SCALE 1:24,000



PROJECT: Boyer Mine Development

T. 3 N

COUNTY: Summit

R. 6 E

LEGEND: Project Area, Mine Location

QUAD: Upton, Utah 7.5 min.

Figure I-2



LAND AND MINERAL STATUS
AND RIGHT TO MINE COAL

2.1 SCOPE

This chapter provides all relevant and required information about the ownership and control of persons involved in the operation of the proposed Boyer Mine, ownership and control of lands in the exploration area.

2.2 IDENTIFICATION OF INTERESTS [UMC 782.13]

Applicant:

Summit Coal Company, Inc.
P.O. Drawer 7
Coalville, Utah 84017

2.2.1 Owners of Record of Surface Area

Tom and Vern Boyer - Land and Livestock
Coalville, Utah 84017

Plate 2-1 shows the property within and contiguous to the exploration area. Table 2-1 lists the fee owners of the mineral property rights.

TABLE 2-1

COAL RIGHTS OWNERS

Jesse W. Fox, Jr.
H. S. Young

Albert E. Boyer
John R. Boyer
Elizabeth Arnold
Annie Perry
Rosa Rogers
Dena Boyer
Lester Boyer
Wilwood Boyer
Elwood Boyer
Maggie Boyer
Marie Boyer
Rosa Boyer
Joseph LaVern Boyer
Lyle E. Boyer
William Leo Boyer
Mary Leah B. Neilson
Ella M. Pace
Linda B. Bennett
Blaine E. Boyer
Kathy Violet Wilde
Charlotte Ann Boyer
Fern J. Boyer
Dee F. Boyer
Gerald G. Boyer
Gregory J. Boyer
Stephen W. Boyer
Brent W. Boyer

Owners of Mineral, Oil,
and Gas Rights

TABLE 2-1A
(Continuation)

1. $S\frac{1}{2}$ $S\frac{1}{2}$, Sec. 25, T3N, R6E; and that portion of Sec. 36, T3N, R7E, that is north of the county highway and a strip of land between the county highway and Chalk Creek running about 800 feet west from the east side of Sec. 36.

Surface rights belong to:

LaVern Boyer RFD, Coalville, Utah 84017

Mineral Rights belong to:

William L and Lorene Boyer	Coalville, Utah	84017
Lyle and Helen, Boyer	Coalville, Utah	84017
Joseph LaVern and Marcey Boyer	Coalville, Utah	84017
Angus and Ella M. Pace	Coalville, Utah	84017
Blaine and Dorothy Boyer	Coalville, Utah	84017
Kathy and Kevin Wilde	Coalville, Utah	84017
Linda and Norman Shipley	Coalville, Utah	84017
Charlotte Boyer	Coalville, Utah	84017
Woodrow and Leah B Nielson	Coalville, Utah	84017
Fern J., Gregory J., Gerald G., Stephen W., Brent W., and Dee F., Boyer	5050 Ben Lomond Ave. Ogden, Utah	84404

2. A strip of land between the county highway and Chalk Creek about 1,300 feet long in the $NE\frac{1}{4}$ of Sec 36 containing about 15 acres.

Surface rights belong to William L and Lorene B. Boyer,
RFD Coalville, Utah 84017

Mineral rights same as Item 1.

3. $W\frac{1}{2}$, Sec. 30 T3N, R7E:

Surface rights: Bow Valley Coal Resources Inc.

Mineral rights: Utah Land Board

4. $NW\frac{1}{4}$ Sec. 31, T3N, R7E, except items 5. and 6.

Surface rights: Wayne Jones RFD Coalville, Utah 84017

Mineral rights: Champlin Petroleum Co.

5. A strip of land about 200 feet wide on the west side of the $NW\frac{1}{4}$ of Sec 31, T3N, R7E extending from the county highway to Chalk Creek

Surface rights: Merrill and Freda Orgill RFD Coalville, Utah

Mineral rights: Champlin Petroleum Co.

6. Not adjacent to the proposed coal mine area. Approximately 10 acres in the $NW\frac{1}{4}$, Sec 31, T3N, R7E

Surface rights:

Ward Dean and Wilma Morby	Coalville, Utah 84017
Melvin and Valene Shaw	Coalville, Utah 84017
Gail and Lorene Billings	Coalville, Utah 84017
Fern J. Boyer	5050 Ben Lomond Ave. Ogden, Utah 84404

Mineral rights: Champlin Petroleum Co.

2.2.2 Owners of Record of Surface and Subsurface Areas
Contiguous to the Proposed Permit Area

Plate 2-1 displays the parcels of land contiguous to the permit boundaries. The parcels are designated with lower case letters.

<u>Owners</u>	<u>Address</u>
J. S. Wilde	Salt Lake City, Utah
A. & E. Pace	Coalville, Utah
L. E. Boyer	Coalville, Utah
F. J. Boyer	Ogden, Utah
W. L. Boyer	Coalville, Utah
J. L. Boyer	Coalville, Utah
W. Jones	Coalville, Utah
Bow Valley	Denver, Colorado

2.3 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 Appendix 2-2.

2.4 MAP SHOWING LEGAL BOUNDARIES

Legal boudaries of the permit area and contiguous area are shown on Plate 2-1.

2.4.1 Unsuitability Criteria

No portion of the area to be disturbed is within an area designated as unsuitable for mining under the provision of 30 CFR 764 and 765. To the best of the applicant's knowledge, no portion of the area to be disturbed is under study

for designation as unsuitable for mining in an administrative proceeding under 30 CFR 764 and 765.

In addition, the exploration area includes no cemeteries, no national trails, no wild and scenic rivers, no wilderness or wilderness study areas, and no significant harvestable forest cover.

2.5 WAIVER OF OWNERS OF NEARBY OCCUPIED DWELLINGS

Applicant does not propose to conduct or locate facilities within 300 feet of an occupied dwelling.

2.6 PERMIT TERM INFORMATION - ANTICIPATED FOR EACH PHASE

2.6.1 Starting Date

Starting dates anticipated for each phase of exploration are dependent on permit approvals, however, it is hoped that work could commence by early spring 1984 and the exploration could theoretically be completed within 12 calendar months from approval.

2.6.2 Termination Dates

Termination dates anticipated for each phase of exploration are nebulous at this time although a detailed time table of each phase of exploration will be supplied to the Division prior to any work commencing with a "not to exceed" timetable of 1 year.

The final termination date for the exploration operation is expected to be mid summer 1985.

2.6.3 Numbers of Surface Acres Affected

The anticipated disturbance by the exploration area totals less than 10 acres.

2.6.4 Horizontal and Vertical Extent of Underground Working for Each Phase

Plate 2-3 shows the anticipated phases of the underground exploration activities.

2.7 PERSONAL INJURY AND PROPERTY DAMAGE INFORMATION

Summit Coal Company will carry public liability and property damage insurance in due force. The policy will also bear a rider requiring the insurer to notify DOGM if the policy is cancelled. A copy of the certificate of insurance and rider will be supplied to the Utah Division of Oil, Gas, and Mining.

2.8 PROPOSED PERFORMANCE BOND

The applicant will, upon approval of this application, file copies of a Performance Bond. Reclamation costs relevant to this bond are detailed in Section 93.

2.9 OTHER LICENSES AND PERMITS

The other permits and licenses dealing with land use, air and water quality, water rights, and health and safety laws and regulations are presently being applied for and will be submitted to the Division upon approval. (See Appendix 2-1 Supporting Correspondance).

APPENDIX 2-1

SUPPORTING CORRESPONDANCE

APPENDIX 2-1

Coalville, Utah
June 17, 1983

Mr. Jim Smith
State of Utah
Division of Oil, Gas and Mining
Box 4241
State Office Building
Salt Lake City, Utah

Dear Mr. Smith;

In regard to the peoposed coal mine in the Chalk Creek area of Summit County, in the N $\frac{1}{2}$ N $\frac{1}{2}$ Sec. 36 and S $\frac{1}{2}$ S $\frac{1}{2}$ Sec. 25 T3N R6E, we as property and mineral right owners in that area desire to have this mine developed.

We feel that as mineral right owners we have the right of access to the coal we own. We now have an opportunity to have our coal mined and if this opportunity is lost another may not be forthcoming in the forseeeable future, if ever.

Development of the proposed mine would not have any adverse effect upon property values or the general ecological status of the area. The area of the surface development of the proposed mine is small-less than 20. acres-. It would have no more effect upon wildlife habitat etc. then would the development of homes. Also there has been a coal mine in operation on this site, as well as the existing coal mine across the canyon, so coal mining is not new or unheard of at this site.

Some of us own land adjacent to the proposed mine and do not feel that our property values would be depreciated by the development of this mine.

Sincerely

William L. Boyer
William L. Boyer

Lorene B. Boyer
Lorene B. Boyer

Lyle E. Boyer
Lyle E. Boyer

Helen W. Boyer
Helen W. Boyer

Woodrow Nielson
Woodrow Nielson

Leah B. Nielson
Leah B. Nielson

Summit County State of Utah

COMMISSIONERS
GERALD E. YOUNG
CLIFTON BLONQUIST
ROY PERRY

P. O. Box 128
COALVILLE, UTAH
84017

REED D. PACE, COUNTY CLERK
ROBERT H. WILLIAMS, TREASURER
ALAN SPRIGGS, RECORDER
ROBERT ADKINS, ATTORNEY
FRED ELZ, SHERIFF
LEO O. FRAZIER, ASSESSOR

June 7, 1983

Dr. G. A. Shirazi, Director
Division of Oil, Gas & Mining
Utah State Department of Natural Resources
4241 State Office Building
Salt Lake City, UT 84114

Dear Dr. Shirazi:

For some months there has been a proposal for a new coal mine to be developed in the Chalk Creek area, east of Coalville, Summit County. You may be aware that the Chalk Creek Basin is part of the Overthrust Belt, rich in natural gas and oil reserves.

This is to state the position of the County with respect to the proposed mine. The Commission does not oppose the project and is especially interested in the prospects of employment and economic stimulation which could come to the Coalville area if the mine were to be able to open and operate successfully.

The operator is aware of the County permitting requirements and the project will be reviewed as appropriate by county officials. We hope that your office will give full consideration to this project. If you have any questions concerning this project or its relationship in the County please feel free to contact Stan Strebel, Director, Summit County Planning Office (336-2334).

Sincerely,

Summit County Board of Commissioners


Gerald Young, Chairman

CC/jr

COALVILLE CITY

(Best Little City by a Dam Site)

P. O. Box 188

Coalville, Utah 84017

Telephone 336-5981

1007
MAY 11 1983

May 6, 1983

DEPARTMENT OF OIL, GAS AND MINING
State Office Building
Salt Lake City, Utah 84114
Attention: Mr. Jim Smith

RE: Proposed Coal Mine
East of Coalville

Dear Mr. Smith:

As Mayor of Coalville City, I am writing to encourage your department to give speedy and favorable consideration to the request for a new coal mine East of Coalville. I understand Mr. William Blonquist and Associates have filed for permission to open a mine.

With the depressed oil situation in our area, many people have had to move on. A coal mine would help to give us some stable jobs for our people.

Thank you for whatever help you can give.

Sincerely,

COALVILLE CITY MUNICIPAL CORPORATION

Marilyn W. Johnson
Marilyn W. Johnson
Coalville City Mayor

MSJ:vdr

Summit County

State of Utah

P.O. Box 128
COALVILLE, UTAH
84017

COMMISSIONERS
GERALD E. YOUNG
CLIFTON BLONQUIST
RON PERRY

REED D. PACE, COUNTY CLERK
ROBERT H. WILLIAMS, TREASURER
ALAN SPRIGGS, RECORD
ROBERT ADKINS, ATTORNEY
FRED ELEY, SHERIFF
LEO O. FRAZIER, ASSESSOR

November 9, 1983

Summit Coal Company
William C. Blonquist
P.O. Box 294
Coalville, UT 84017

Dear Mr. Blonquist:

This is to confirm action taken by the Summit County Planning Commission at their regular meeting held November 8, 1983, with respect to your request for a conditional use permit for an underground coal mine and the associated support facilities located in Sections 25, 36 T3N, R6E SLB&M.

It was the decision of the Planning Commission to approve this request, subject to your obtaining the necessary access permit onto the county road (Chalk Creek Road) from the County Road Superintendent, Bruce Rowser.

Should you have any questions concerning this matter, please contact the Summit County Planning Office at 336-2334.

Sincerely,



Jerry Smith, Assistant Director
Summit County Planning Office

JS/jr

cc: Leonard Maki
Bruce Rowser

APPENDIX 2-2

COAL MINING SURFACE LEASE AGREEMENT

COAL MINING SURFACE LEASE AGREEMENT

THIS LEASE AGREEMENT is made and entered into by and between SUMMIT COAL COMPANY, INC., of Coalville, Summit County, Utah, herein referred to as "Lessee", and Tom + Vern Boyd Land
and Livestock, of Coalville, Summit County, Utah, herein referred to as "Lessor".

RECITALS

A. Lessee has entered into a written coal mining agreement to prospect for and develop certain coal which is believed to be located under the surface of Lessor's property.

B. Lessor desires to enter into a lease agreement with Lessee to permit Lessee to explore for and to develop the subsurface coal underlying Lessor's real property.

NOW THEREFORE, in consideration of the covenants herein contained the parties agree as follows:

1. Premises. Lessor hereby leases to Lessee and Lessee hereby leases from Lessor the following described real property for the purposes and uses herein defined, located in Summit County, Utah, and more particularly described as follows:

The South $\frac{1}{2}$ of the South $\frac{1}{2}$ of Section 25; and the North $\frac{1}{2}$ of the North $\frac{1}{2}$ of Section 36; said sections located in Township 3 North, Range 6 East, Salt Lake Base and Meridian.

2. Term. The term of this lease shall be for a period of three years, and for successive periods as hereinafter defined.

3. Covenant to Explore and Mine. Lessee shall have the right to enter upon the premises for the purpose of exploring for and mining coal. Lessee shall have the right to excavate and construct roads and other access as Lessee deems necessary for exploration and mining. Lessee shall have the right to fence up to twenty (20) acres, fifteen (15) acres of which shall be contiguous, the location of which is described in Exhibit "A" attached hereto and incorporated herein by this reference, which fifteen (15) acres have been marked on the ground by the parties by stakes and shall be identified more particularly with a legal description and survey at the time of fencing the same. Such legal description shall be added to exhibit A. The remaining five (5) acres shall be identified by lessee as the same becomes necessary

Balance of Lease Agreement available upon written request.

3. NATURAL ENVIRONMENT

The descriptions of the natural environment as contained here have been developed using the information from several sources: A complete compilation of all source material and detailed analysis are contained in "Summit Coal Company, Boyer Mine, Reclamation Plan" submitted to DOGM January 1984.

3.1 EXISTING ENVIRONMENT

The climate of the Boyer Mine area is typical of subalpine areas in the Northern region of Utah. In general, the summer season is short with maximum temperature reading (F) in the 80's and minimum readings in the 40's. Fall and spring seasons are erratic in nature with snow precipitation occurring as early as September and as late as the first part of June. Winters in this subalpine area are often severe, with recorded temperatures of -30 F or below at times. Major snowfalls occur in the months of December, January, and February. Snow frequently remains on the ground from November until April in depths varying up to 6 ft. Winds are generally light to moderate with an estimated maximum average speed below 20 m.p.h. The prevailing wind direction within the general area of the mine site is from the Northeast. Winds are generally parallel to the canyons except during storm periods. Wind speed varies from canyon to canyon.

Estimated annual average background total suspended particulate (TSP) in rural, Northern Utah is approximately 30 to 35 ug/m³ (AeroVironment, 1977). Because of the proximity to the existing mine, background TSP could be higher than the average background total for typical rural areas.

3.2 SOILS

The exploration area had a soil survey conducted May 1981 by the Soil Conservation Service. The soil that could be potentially impacted are described herein. More detailed information is available in the Soil Conservation Office.

3.2.1 Soil Information

SOIL LEGEND

<u>Soil Symbol</u>	<u>Soil Mapping Unit Name</u>
1E	Bezzant gravelly loam, 25 to 40 percent slopes
2B	Moweba gravelly loam, 2 to 5 percent slopes
3G	Richville gravelly loam, 40 to 70 percent slopes

Description of the Soils

1E Bezzant gravelly loam, 25 to 40 percent slopes

3.2.2 Soils Description

This Bezzant soil is deep and well drained. It occurs on mountainsides at elevations of 6,400 to 6,800 feet. This soil formed in colluvium and alluvium from sandstone and quartzite.

The average annual precipitation is 16 to 25 inches. Mean annual air temperature is 42 to 45 F. and the freeze-free season is 60 to 80 days.

Slopes are 25 to 40 percent, south and east facing. They are short in length and convex in shape.

Vegetation is big sagebrush, bluebunch wheatgrass, cheatgrass, rabbitbrush, scattered juniper, and mountain mahogany.

Included in mapping are small areas of rock outcrop.

In a typical profile the surface layer is grayish brown gravelly loam about 7 inches thick. The upper subsoil is brown very gravelly loam about 9 inches thick. The lower subsoil is brown very gravelly sandy loam about 20 inches thick. The substratum is pale brown extremely cobbly sandy loam about 12 inches thick.

Permeability is moderately rapid. Available water capacity is 3.5 inches to a depth of 48 inches. Organic matter content in the surface layer is 2 to 4 percent. Effective rooting depth is 48 inches. Surface runoff is slow and erosion hazard is slight under potential native vegetation and rapid if vegetation is removed and the soil is left bare. Erodibility is moderate. This soil is used for range and wildlife habitat.

Taxonomic classification of this soil is loamy-skeletal, mixed frigid Typic Calcixerolls.

A typical pedon on Bezzant gravelly loam 25 to 40 percent slopes, was described about 400 feet west and 500 feet south of NE corner, Section 36, T3N, R6E.

A -- 0 to 7 inches; grayish brown (10 YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) when moist; weak fine and medium granular structure; soft, very friable, slightly sticky, slightly plastic; common very fine and fine roots; few very fine tubular pores; estimated 25 percent gravel, 5 percent cobbles; neutral reaction (PH 6.6); abrupt smooth boundary.

B1 -- 7 to 16 inches; brown (10 YR 5/3) very gravelly loam, dark brown (10YR 3/3) when moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; few very fine tubular pores; estimated 30 percent gravel, 10 percent cobbles; neutral reaction (PH 6.8); clear smooth boundary.

B2 -- 16 to 36 inches; brown (10 YR 5/3) very gravelly sandy loam, dark brown (10 YR 4/3) when moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky, nonplastic; common very fine and fine roots; few very fine tubular pores; estimated 30 percent gravel, 10 percent cobbles; neutral reaction (PH 6.8) clear smooth boundary.

CK -- 36 to 48 inches; pale brown (10 YR 6/3) extremely cobbly sandy loam, dark brown (10 YR 4/3) when moist; massive; slightly hard, very friable, nonsticky, nonplastic; few very fine roots; estimated 40 percent cobbles, 20 percent gravel; slightly calcareous, carbonates are disseminated; mildly alkaline reaction (PH 7.6); clear smooth boundary.

1B Moweba gravelly loam, 2 to 5 percent slopes

This moweba soil is deep and well drained. It occurs on alluvial fans at the foot of mountain slopes at elevations of 6200 to 6300 feet. This soil is formed in alluvium derived mainly from sandstone and quartzite.

The average annual precipitation is 18 to 25 inches. Mean annual air temperature is 42 to 45^o F. and the freeze-free season is 60 to 70 days.

Slopes are 2 to 5 percent, south and east facing. They are short in length and concave-convex in shape.

Vegetation is big sagebrush, rabbitbrush, cheatgrass, blue-bunch wheatgrass, and few scattered juniper.

In a typical profile the surface layer is brown loam about 6 inches thick. The next layer is brown very stony clay loam about 14 inches thick. The subsoil is pale brown gravelly loam and very gravelly clay loam about 20 inches thick. The substratum is pale brown extremely cobbly loam about 20 inches thick.

Permeability is moderate. Available water capacity is 6.5 inches to a depth of 60 inches. Organic matter content in the surface layer is 3 to 5 percent. Effective rooting depth is 40 to 60 inches. Surface runoff is very slow and erosion hazard is slight under potential native vegetation and slight if vegetation is removed and the soil is left bare. Erodibility is moderate. This soil is used for range and wildlife habitat.

Taxonomic classification of this soil is loamy-skeletal, mixed frigid, Pachic Ultic Haploxerolls.

A typical pedon of Moweba gravelly loam, 2 to 5 percent slopes, was described about 100 feet west and 650 feet south of NE corner of Section 36.

A1 -- 0 to 6 inches; brown (10 YR 5/3) gravelly loam, very dark brown (10 YR 2/2) when moist; moderate fine and very fine granular that parts to weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine, common fine and few coarse roots; common very fine tubular pores; estimated 15 percent gravel and 5 percent cobbles; neutral reaction (PH 7.0); clear smooth boundary.

A2 -- 6 to 20 inches; brown (10 YR 5/3) very strong clay loam, very dark grayish brown (10 YR 3/2) when moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine and few medium roots; common very fine tubular pores; estimated 15 percent stones, 15 percent cobbles, 25 percent gravel; neutral reaction (PH 7.0); clear smooth boundary.

Bw1 -- 20 to 30 inches; pale brown (10 YR 6/3) gravelly clay loam, dark brown (10 YR 4/3) when moist; strong medium subangular blocky structure; slightly hard, friable, sticky, plastic; few very fine and fine roots; few very fine tubular pores; estimated 25 percent gravel; neutral reaction (PH 7.0); clear smooth boundary.

BC -- 30 to 40 inches; pale brown (10 YR 6/3) very gravelly clay loam, dark brown (10 YR 4/3) when moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine roots; estimated 35 percent gravel, 5 percent cobbles; neutral reaction (PH 7.2); clear smooth boundary.

C -- 40 to 60 inches; pale brown (10 YR 6/3) extremely cobbly loam, brown (10 YR 5/3) when moist; massive; slightly hard, friable, slightly sticky, slightly plastic; estimated 50 percent cobbles, 20 percent gravel; mildly alkaline reaction (PH 7.4).

2G Richville loam, 40 to 70 percent slopes

This Richville soil is deep and well drained. It occurs on mountainsides at elevations of 6400 to 6800 feet. This soil formed in colluvium from shale, sandstone and quartzite.

The average annual precipitation is 16 to 25 inches. Mean annual air temperature is 42 to 45° F. and the freeze-free season is 60 to 80 days.

Slopes are 40 to 70 percent mainly northeast and southeast facing. They are short to medium in length and convex in shape.

Vegetation is big sagebrush, gambel oak, serviceberry, bluebunch wheatgrass, cheatgrass, basin wildrye, mountain mahogany and few scattered juniper.

Included in mapping are small areas of rock outcrop and soils that are less than 20 inches over bedrock.

In a typical profile the surface layer is pale brown loam about 4 inches thick. The upper subsoil is pale brown gravelly clay loam about 20 inches thick. The lower subsoil is very pale brown very sandy clay loam about 17 inches thick. The substratum is very pale brown soft fractured shale and sandstone 20 inches or more thick.

Permeability is moderate. Available water capacity is 6.25 inches to a depth of 60 inches. Organic matter content in the surface layer is 1 to 3 percent. Effective rooting depth is 40 to 60 inches. Surface runoff is rapid and erosion hazard is high under potential native vegetation and very rapid if vegetation is removed and the soil is left bare. Erodibility is moderate. This soil is used for range and wildlife habitat.

Taxonomic classification of this soil is fine-loamy, mixed, frigid, Calcixerollic Xerochrepts.

A typical pedon of Richville loam, 40 to 70 percent slopes was described about 300 feet west, 150 south of NE corner, Section 36, T3N, R6E.

A -- 0 to 4 inches; pale brown (10 YR 6/3) loam, dark brown (10 YR 3/3) when moist; weak fine granular that parts to weak fine subangular blocky structure; soft, very friable, sticky, slightly plastic; many very fine and fine, common medium and few coarse roots; common very fine tubular pores; estimated 10 percent gravel; neutral reaction (PH 6.6); clear smooth boundary.

B1 -- 4 to 10 inches; pale brown (10 YR 6/3) gravelly clay loam, dark grayish brown (10 YR 4/2) when moist; weak fine and medium subangular blocky structure; slightly hard, friable, sticky, plastic; many very fine and fine, and common medium and few coarse roots; common very fine and fine tubular pores; estimated 25 percent gravel; neutral reaction (PH 6.8); gradual smooth boundary.

B2 -- 10 to 24 inches; pale brown (10 YR 6/3) gravelly clay loam, dark grayish brown (10 YR 4/2) when moist; weak fine and medium subangular blocky structure; hard, friable, sticky, plastic; common very fine and fine and few medium roots; common very fine and fine tubular pores; estimated 15 percent gravel; neutral reaction (PH 6.8); clear smooth boundary.

BCK -- 24 to 41 inches; very pale brown (10 YR 7/3) very cobbly sandy clay loam, brown (10 YR 5/3) when moist; weak fine and medium subangular blocky structure; hard, friable, sticky, slightly plastic; common very fine and fine and few medium roots; few very fine tubular pores; estimated 25 percent cobbles, 15 percent gravel and 5 percent stones; carbonates are disseminated; mildly alkaline

reaction (Ph 7.6); abrupt irregular boundary.

Cr -- 41 to 60 inches; weathered sandstone and shale that breaks down to sandy clay loam, very pale brown (10YR 8/3) pale brown (10 YR 6/3) when moist; carbonates are disseminated; mildly alkaline (Ph 7.8).

3.2.3 Prime Farmland Determination

The entire exploration 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 exploration area. (See Appendix 3.1 Negative Declaration SCS).

APPENDIX 3.1

PRIME FARMLAND DETERMINATION - UMC 783.27)
CORRESPONDANCE

[Prime Farmland Determination - UMC 783.27]



United States
Department of
Agriculture

Soil
Conservation
Service

P. O. Box 11350
Salt Lake City, UT 84147

April 13, 1983

William C. Blonquist
President
Summit Coal Co.
P. O. Box 294
Coalville, Utah 84017

Dear Mr. Blonquist:

Your request concerning the extent of prime farmland in the NW 1/4, NW 1/4, NW 1/4 of sec. 36, T. 3 N., R 6 E. Summit County, Utah has been forwarded to this office with the field report. According to the field report and our data, there are no soils in the area concerned that qualify as prime farmland. The soils are too steep, gravelly and stony to qualify for prime farmland. Also, irrigation water is not available to the location described.

We are retaining the associated maps and data in this office for future reference. If we can be of service in the future, please call on us.

Sincerely,


FERRIS P. ALLGOOD
State Soil Scientist



4.0 SURFACE WATER

The exploration area is located at the bottom of a hill next to the confluence of a gully with Chalk Creek's north bank. No known stream gauging stations are located near or upstream from the mine on either stream. Chalk Creek is a perennial stream, primarily fed by snowmelt while the gully is most likely ephemeral. Since no stream flow quantity or quality data is available near the mine, an accurate quantification of these values was not possible in this preliminary study. In general, it is known that the quality of water in Chalk Creek is quite good in the upstream reaches and deteriorates as it progresses downstream. It is anticipated that water samples be collected from both Chalk Creek and the gully and submitted to a qualified laboratory for analysis, for baseline information prior to beginning mining operations.

5.0 GROUND WATER

The mine is located in T3N and R63, near the town of Upton in Summit County, Utah, at an altitude of 6,239 feet, adjacent to Chalk Creek. Westward flowing Chalk Creek is the trunk stream into which all drainage from north and south empties. The alluvium of Chalk Creek constitutes the principal domain for ground water supply. Some water is also known to exist in the other geologic formations (Knight, Wanship, Wasatch and Frontier) in the area. Stark (1953), presents a description of the areal geology of the Upton area and Yates, et al. (1982) present some data on ground water resources in the Chalk Creek Drainage west of the mine. The use of ground water in the area does not appear to be significant at present. Small to moderate amounts (3-560gpm) of fresh to slightly saline water are yielded by the rocks in the area. The alluvium is quite permeable and can yield up to 2,000 gpm at some locations.

In general, data from only a few wells is available on the quantity

and quality of ground water in the region. Only one spring has been mapped by the USGS in a two-mile radius around the mine.

A hydrology map is included indicating the clear water and disturbed are drainages. (Plate 7-1), also a diagram of the proposed sediment retention pond. (Appendix 5).

6.0 WILDLIFE

The purpose of this is to inventory the wildlife resources in the Summit exploration area. The study includes birds, amphibians, reptiles, and mammals. Analysis entailed a review of the applicable literature, consultation with the relevant agencies, field analysis, and impact evaluation. The existing species that may located within the permit area are attached. (Table 6.1-6.4).

In sum, this study uncovers a minimum impact on wildlife from the proposed exploration operation of the mine. Since the Boyer Mine has been worked intermittantly since the early 1900's, the ecosystem has already stabilized to some degree with mining.

All water within the permit area is ephemeral (Class 6). Runoff from the permit area flows into the Chalk Creek drainage. This is the only drainage which could potentially be affected by the exploration activities and the potential impact is expected to be insignificant. Chalk Creek may receive some groundwater from the area, as well as runoff from the disturbed areas. Surveys have been conducted on this stream, and the potential for impact is considered to be minimal. There are no threatened or endangered species within the area. See (Appendix 6A relates to correspondance from UDWR).

Species* List and Classification of Mammals Whose Published Ranges Overlap
the Expansion Area of Summit Coal Company

<u>Mammal</u>	<u>Range</u>					
	<u>Pinyon Juniper</u>	<u>Desert Shrub</u>	<u>Sagebrush</u>	<u>Conifer Aspen</u>	<u>Shaded Slopes</u>	<u>High- Interest Species</u>
Masked Shrew					UR	
Mirriam Shrew	UR	UR	UR		UR	
Dusky Shrew					UR	
Little Brown Myotis	CS	CS	CS		CS	
Fringed Myotis	US	US	US			
California Myotis	US	US	US			
Small-footed Myotis		US	US			
Silver-haired Bat					US	
Big Brown Bat					US	
Hoary Bat					US	
Townsend's Bib-eared Bat	US	US			US	
Brasilian Free-tailed Bat	US	US	US		US	
Nuttall's Cottontail				UR	UR	X
Desert Cottontail	CR	CR	CR			X
Snowshoe Hare				CR	CR	X
White-tailed Jackrabbit		UR	UR		UR	X
Black-tailed Jackrabbit	CR	CR	CR			X
Least Chipmunk	AR	AR	AR	CR	CR	
Cliff Chipmunk	CR	CR			CR	
Uinta Chipmunk	AR	AR	AR	CR	CR	
Yellow-bellied Marmot				CR	CR	

TABLE 6-1

* Scientific names of species are listed in Appendix 10A

Mammal

	Range					
	<u>Pinyon Juniper</u>	<u>Desert Shrub</u>	<u>Sagebrush</u>	<u>Conifer Aspen</u>	<u>Mixed Shrub & Grasses</u>	<u>High- Interest Species</u>
Ermine				UR		X
Long-tailed Weasel	CR	CR	CR	CR	CR	X
Badger	CR	CR	CR	CR	CR	X
Striped Skunk	CR	CR	CR	CR	CR	X
Mountain Lion (Cougar)	UR	UR	UR	UR	UR	X
Bobcat	CR	CR	CR	CR	CR	X
Wapiti or Elk					CW	X
Mule Deer	CR	CR	CR	CR	CR	X
Moose					CR	X

A = Abundant
 C = Common
 U = Uncommon
 Ca = Casual or Rare
 R = Permanent Resident
 S = Summer Only
 W = Winter Only

TABLE 6-1 (cont.)

TABLE 16-2

Birds of the Mine Site and Haul Road of the Expansion Area

Summit County, Utah

Name	Season of Occupancy	Status
Turkey vulture	spring, summer, fall	uncommon
Red-tailed hawk	all year	common
Swainson's hawk	spring, summer, fall	uncommon
Ferruginous hawk	spring, summer, fall	uncommon
Golden eagle	all year	uncommon
Bald eagle	winter	rare
Marsh hawk	all year	uncommon
Prairie falcon	all year	common
Peregrine falcon	all year	rare
Sparrow hawk	all year	common
Chukar	all year	unknown
Mourning dove	spring, summer	common
Great-horned owl	all year	uncommon
Poor-will	spring, summer	common
Common night hawk	spring, summer	common
Black-chinned hummingbird	spring, summer	common
Broad-tailed hummingbird	spring, summer	common
Common flicker	all year	common
Hairy woodpecker	all year	uncommon
Downy woodpecker	all year	uncommon
Western kingbird	spring, summer	common
Ash-throated flycatcher	spring, summer	common
Say's phoebe	spring, summer	common
Gray flycatcher	spring, summer	uncommon
Violet-green swallow	spring, summer	common
Horned lark	all year	common
Black-billed magpie	all year	common
Raven	all year	common
Crow	spring, fall, winter	common
Pinon jay	all year	common
Mountain chickadee	all year	common
Plain titmouse	all year	uncommon
Bushtit	all year	uncommon
Bewick's wren	spring, summer	uncommon
Robin	all year	common
Mountain bluebird	spring, summer, fall	uncommon
Blue-gray gnatcatcher	spring, summer	uncommon
Cedar waxwing	all year	uncommon
Loggerhead shrike	spring, summer	uncommon
Starling	spring, summer, fall	uncommon
Gray vireo	spring, summer	uncommon
Solitary vireo	spring, summer	uncommon
House finch	all year	common
Pine siskin	all year	common
Lark sparrow	spring, summer	common
Chipping sparrow	spring, summer	common
Sage grouse	all year	uncommon
Pigmy owl	all year	uncommon
Long-eared owl	all year	uncommon
Saw-whet owl	all year	uncommon
White-throated swift	spring, summer	uncommon
Cassin's kingbird	spring, summer	uncommon
Western flycatcher	spring, summer	uncommon
Scrub jay	all year	uncommon
White breasted nuthatch	all year	uncommon
Western bluebird	all year	uncommon
Townsend's solitaire	all year	uncommon
Black-throated gray warbler	spring, summer	common
Scott's oriole	spring, summer	uncommon
Rufous-sided towhee	all year	uncommon
Brewer's sparrow	spring, summer, fall	uncommon
Black-chinned sparrow	spring, summer	uncommon

Species* List and Classification of Reptiles Whose Published Ranges Overlap
the Expansion Area of Summit Coal Company

Reptiles

	Range					
	<u>Pinyon Juniper</u>	<u>Desert Shrub</u>	<u>Sagebrush</u>	<u>Conifer Forest</u>	<u>Mixed Forest</u>	<u>High Alpine</u>
Fence Lizard	US				US	
Sagebrush Lizard	CS	CS	CS		CS	
Mountain Short-horned Lizard	CS	CS	CS	U	CS	
Utah Rubber Boa				US		
Wandering Garter Snake	US	US	US	US	US	
Western of Yellow-bellied Racer	US	US	US		US	
Striped Whipsnake	US	US	US			
Gopher Snake	CS	CS	CS		CS	
Milk Snake	US	US	US			
Utah Mountain Kingsnake	US				US	
Night Snake		US	US			
Western Basin Rattlesnake	CS	CS	CS		CS	

* Scientific names of species listed in Appendix 10-A

C = Common
U = Uncommon
S = Summer Only

TABLE 6-3

Species* List and Classification of Amphibians Whose Published Ranges Overlap
the Expansion Area of Summit Coal Company

Amphibian

	Range				
	<u>Pinon Juniper</u>	<u>Desert Shrub</u>	<u>Sagebrush</u>	<u>Conifer Aspen</u>	<u>Mixed Shrub Forest</u> <u>High- Forest</u>
Great Basin Spadefoot Toad		CS	CS		
Woodhouse's Toad		US	US		
Northern Leopard Frog		CS	CS		

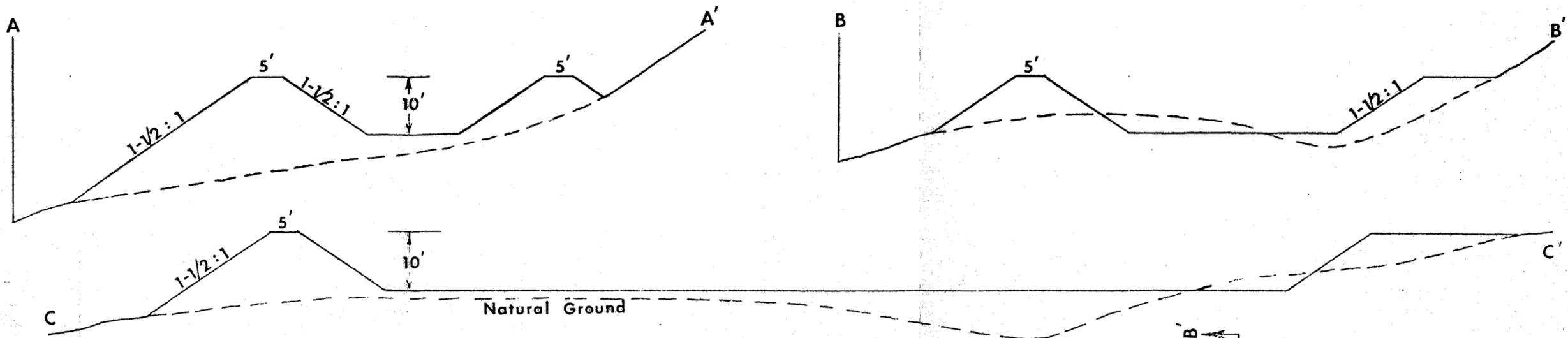
TABLE 6-4

* Scientific names of species are listed in Appendix 10A

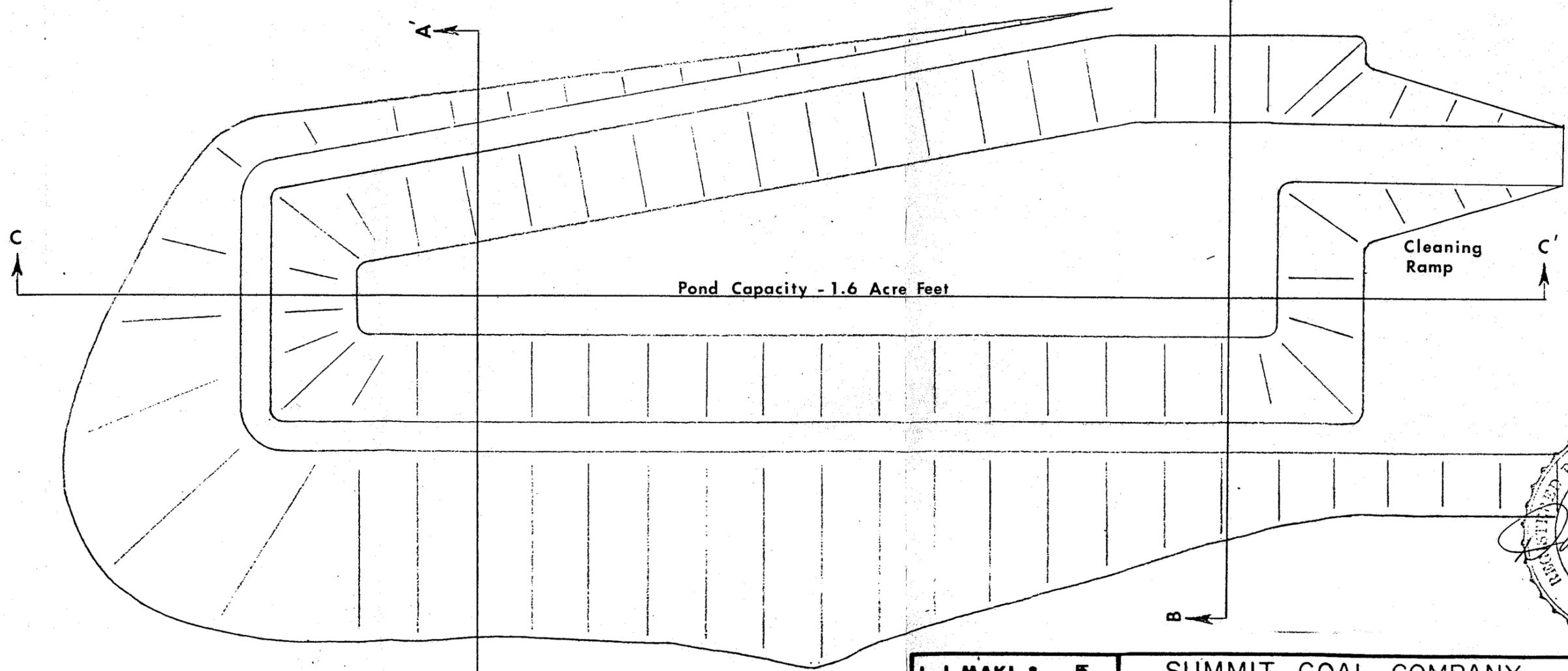
C = Common
U = Uncommon
S = Summer Only

APPENDIX 5

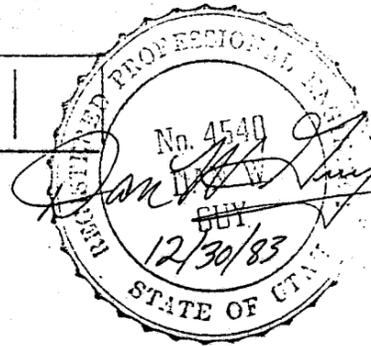
WATER TREATMENT FACILITY



SECTION



PLAN



SUMMIT COAL COMPANY
BOYER MINE
WATER TREATMENT FACILITY

APPENDIX 5
SCALE : 1" = 20'

APPENDIX 6A

UDWR CORRESPONDANCE



DIVISION OF WILDLIFE RESOURCES

DOUGLAS F. DAY
Director

1596 West North Temple/Salt Lake City, Utah 84116/801-533-9333

Reply To NORTHERN REGIONAL OFFICE
515 East 5300 South / Ogden, Utah 84403

March 7, 1983

Mr. Lynn M. Kunzler
Reclamation Biologist
Division of Oil, Gas and Mining
4241 State Office Building
Salt Lake City, Utah 84114

Dear Mr. Kunzler:

We have reviewed the Summit County coal mine site (T.2N, R.6E, portions of sections 25,36) proposed by Mr. Bill Bloomquist, Coalville, Utah and provide the following concerns and considerations to incorporate into the mining and mitigation plan.

The proposal presented will have an impact on resident wildlife; however, the magnitude and nature of impact will be minimal for many species. Since the project site is primarily big game winter range, the direct loss of browse and grass species from road construction, excavation and associated disturbance from mining activities will reduce available forage for big game. Although moose and elk occur within the general area, project impacts will affect primarily deer. This loss could be minimized and partially mitigated by (1) reclaiming disturbed sites with browse seedlings; (2) removing fall livestock grazing within a 20-30 acre fenced portion of the site to increase browse forage available; or (3) planting additional browse on other south or south-westerly slopes adjacent to the project.

We do not anticipate impacts to wintering bald eagles along Chalk Creek. No other threatened or endangered plant or animal species are known to occur within or adjacent to the project site.

Erosion control and on-site detention of run-off and mining wastes are needed to avoid discharge to Chalk Creek. Chalk Creek is a Class III fishery and tributary to Echo Reservoir (municipal-industrial water source).

The intermittent drainage east of the mining portal should be used to divert run-off away from the haul road and portal area. Sediment detention basins are needed to detain sediment before discharge to Chalk Creek.

Overall, the impacts of the proposal, as presented (size, extent of excavation, etc) will not significantly affect resident wildlife species or existing management activities or goals; however, a significant change in the magnitude of the project would require a re-evaluation of our position.

If I can provide additional information or suggestions, please contact George Wilson, Regional Resource Analyst, (801-479-5143).

Sincerely,

Jack A. Rensel
Regional Supervisor

JAR/GWW/jm

7.0 GEOLOGY OF THE PROJECT VICINITY

The Boyer Deposit is located at the east end of the Coalville Coal Field approximately eleven miles east of the town of Coalville, Utah. This deposit is situated on the north side of Chalk Creek, about one mile upstream from Upton, in Sections 25 and 36, Township 3 North, Range 6 East.

The Boyer Deposit is a bed of sub-bituminous coal dipping to the northwest at about 11 to 13 degrees. This bed is known as the Wasatch Bed (Coalville) and is six to seven feet thick in this area. Two parallel normal faults seem to bound this deposit on the east and west and form a block about two-thirds of a mile wide between them. The eastern fault has a reported displacement of more than 1,000 feet and the displacement of the Western fault is unknown and may be only minor. The northern extent of this block is not known but seems to extend at least as far north as Josh Hollow. Southward this block extends across Chalk Creek, where it has been recently mined by another company and probably extends all the way through the ridge into the South of Chalk Creek. Near the northeast corner of Section 36, this bed surfaces under a cover of talus, but is noticeable by the outcrop of the sandstone cap rock just above the coal bed. In this area, this bed was mined, about the turn of the century, by the Boyer Family. The full extent of these workings are not known. This is one of the reasons why it is important to proceed with an exploratory entry adjacent to the old works. On the south side of Chalk Creek this bed has been mined more extensively and has proved to be successful and produce a good quality coal.

7.1 STRATIGRAPHY

Cretaceous and Tertiary rocks made up of at least 18,000 feet of strata crop out in the Coalville area. Five or six formations are of Cretaceous age, two of which are coal bearing. The two thick coal-bearing members have been subdivided into 3 coal zones:

(1) Dry Hollow coal about 900 feet above the base of the Wanship Formation; (2) Wasatch coal about 1,100 feet below the top of the Frontier; and (3) the Spring Canyon zone, about 100 feet above the base of the Frontier Formation. A generalized section of the rock formation in the Coalville Coal Field is shown on Figure 6.3.1.

7.2 STRUCTURE

The beds of the Coalville Field have been folded into an overturned anticline which has a general northeast-southwest trend. This anticline dips from 15° to 30° on the northwest flank, then flattens to form a broad crest, and turns abruptly to an overturned nearly vertical southeast flank. The southeast flank then turns abruptly again to form a parallel syncline with the same trend as the anticline. The southeast flank of the syncline dips from 10° to 25° to the northwest. The coal beds were included in this folding. Most of this folding preceded the deposition of a thick cover of Eocene deposits which since have been eroded away in many places to expose the Cretaceous sediments.

A number of faults cut the Coalville Field, most of which trend across the anticline near Coalville and complicate the structure by breaking beds into blocks. The abandonment of the old works may have been directly influenced by these faults. The exploratory mine will to some degree delineate the extent of the nearest fault and aid in determining feasibility of an active mine. (See attached figure).

8.0 LAND USE AND CULTURAL RESOURCES

The principal land use of the 10 acres of private land to be covered by this exploration plan is that of grazing livestock by the owner of the surface. There is a limited use of the land by hunters during the deer season. The roads and pads for previous coal mines have done most of the disturbance of the property that will be needed in order to set up the planned mining of coal for testing purposes.

Figure 6.3.1

System	Series	Stratigraphic Unit	Thickness (feet)	Description	
TERTIARY	Eocene	Knight Formation	2,000+	Red to variegated clays, sands and conglomerates. —Unconformity—	
	Maestrichtian	Echo Canyon Conglomerate	3,000±	Gray, red weathering boulder and pebble conglomerate interbedded with gray and red shale and gray sandstone. —Unconformity—	
Campanian					
Santonian					
CRETACEOUS	Coniacian	Wasatch Formation	Henefer Member	2,450-2,500	Light brown to light yellowish gray, fine- to medium-grained sandstone and red, brown, yellow and tan claystone.
			Upton Sandstone	450	Light yellow to blue-gray, fine-grained, calcareous, well bedded sandstone.
			Judd Shale	350- 760	Gray marine shale, thickens eastward.
			Gram Creek Member	875-1,025	Tan thin-bedded sandstone, alternating with gray shale in upper third with lenticular coarse-grained sandstone and red clay shale in lower part, thickens westward.
			Dry Hollow Member COAL	1,000-1,220	Upper white sandstone hogback, Dry Hollow coal zone, and lower part divided into an upper shale and conglomerate, middle nonmarine shale and basal conglomerate. —Unconformity—
	Turonian	Frontier Formation	Oyster Ridge Sandstone	200- 28	Light yellow, orange to gray, massive, ridge-forming very fine-grained calcareous sandstone.
			Allan Hollow Shale	780	Gray marine calcareous shale.
			Coalville Member COAL	175- 223	Dark gray conglomeratic sandstone overlies Wasatch coal zone, yellow-gray ridge-forming fine-grained calcareous sandstone at base, thickens westward.
	Cenomanian	Frontier Formation	Chalk Creek Member	3,150	Nonmarine redbeds; pink to red claystone, coarse sandstone and conglomerate sandstone.
			Spring Canyon Member COAL	350+	Dark shales, carbonaceous shales, sandstone and thin coal beds.
	Albian	Frontier Formation	Longwall Sandstone	70- 100	Light gray ridge-forming, massive, fine-grained sandstone, thickens eastward.
			Aspen Shale	210	Dark gray shale and tan sandstone with interbedded light gray shale containing teleost fish scales.
			Kelvin Formation	2,500+	Nonmarine redbeds, shale and sandstone with lenses of conglomerate.
			?		
	?	Aptian			
	?	Neocomian			

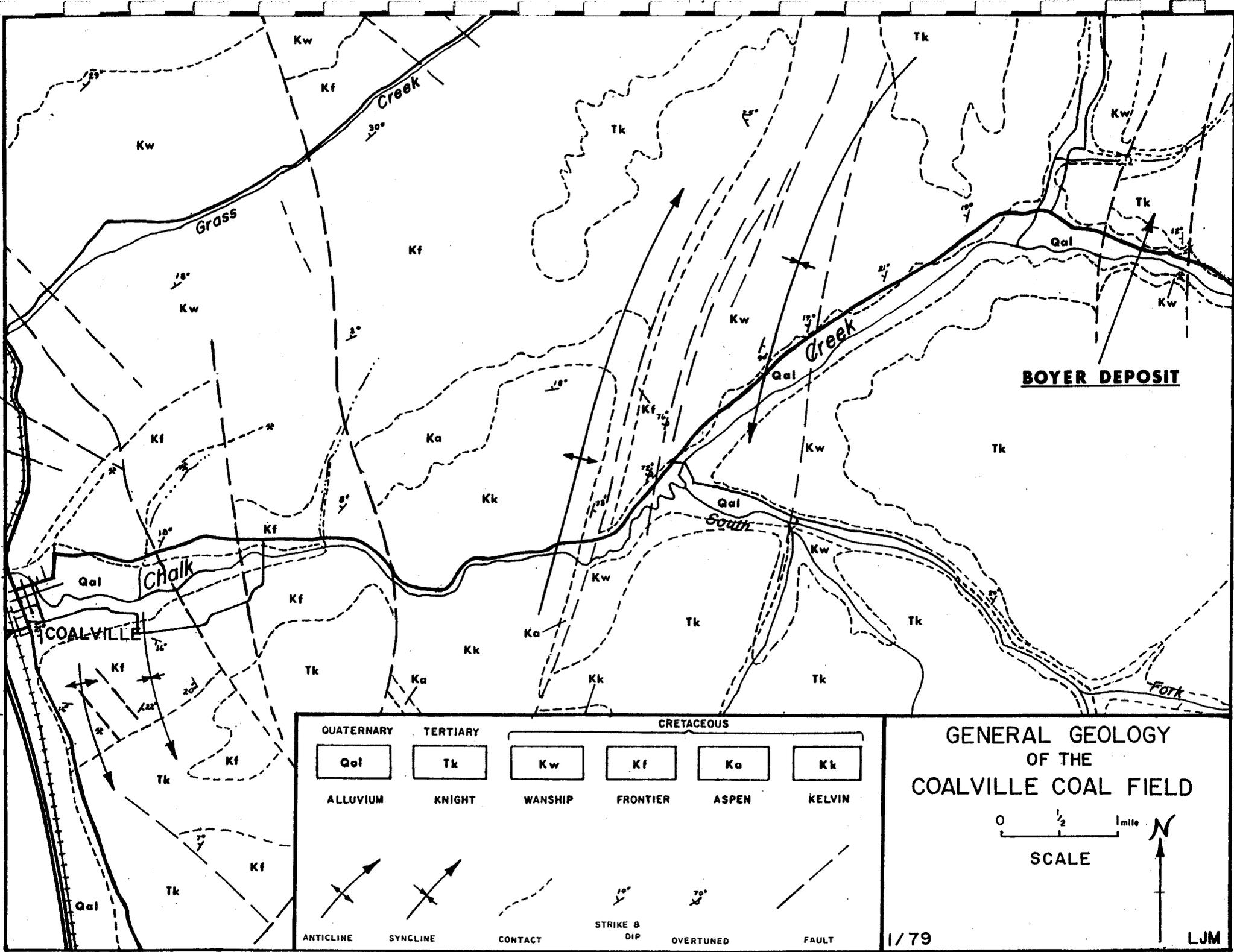


Figure 7-1

GENERAL GEOLOGY OF THE COALVILLE COAL FIELD

0 1/2 1 mile

SCALE

1/79

LJM

A paleo-archeological inventory was done on the entire area of potential disturbance and no site were observed. The balance of this report is available upon request.

Due to the fact that most of the surface roads and needed pad area has already been constructed, there would be little cultural significance.

9.0 PROPOSED EXPLORATION PLAN

The proposed exploration plan of the applicant on the Boyer Mine Project will require approximately 9 to 12 months of mining of the Wasatch Seam and opening up and mining the lower middle portion of this seam of coal. The portals of these proposed workings are shown on Plate 2-1. The total coal needed for exploration of these coal seams and to determine the degree of faulting and the extent of the old work is 50,000 tons of coal. The time to mine this amount of tonnage depends on permit approval, and the degree of difficulty in assessing the extent of the old works.

Timetable

March 1, 1984	Submit exploration plan to Utah Department of Oil, Gas, and Mining, U.S. B.L.M., Dept. of Health, and MSHA.
April 1, 1984	Approval by Utah Dept DOGM, Start earth moving operation, construction of sediment pond, and clear water diversion
May 1, 1984	Start pad and portal construction. Begin shaft for underground coal mine. Submit partial plan when available.
March 1, 1985	MRP approval or withdrawal and the onset of reclamation.

Equipment

Surface Equipment

- 1 3.5 yd. Frontend Loader
- 1 36" Ridgid Frame Conveyor
- 1 2½ ton Service Truck
- 1 1-ton Pickup Truck
- 2 Ventilation Fans

Underground Equipment

- 2 3.5 yd. LHD (Diesel SCH 31)
- 1 Face Drill (Diesel SCH 31)
- 1 Roof Bolt Drill (Diesel SCH 31)
- 1 Coal Saw (Electric)
- 36" Cable Frame Conveyor

Normal surface equipment: end loaders, shop building, change house, water storage tank with capacity of 50,000 gallons.

There will be no coal washing facility on the premises.

Access

There is presently a county road that extends through the south edge of the property. The road accessing the mine is existing but must be improved. A few modifications to the road system such as settling ponds for runoff water will be constructed.

The Summit County Commission was informed of the proposed mine, and a copy of their endorsement as well as a letter indicating access and road use is included as Appendix 9-2.

Archeological Survey

A survey was completed in the Fall of 1983 and there are no known archeological sites identified on the property.

Noise

The noise levels will be kept within the guidelines of the Federal regulatory agencies as pertain to coal mining.

Safety Features

People

Standard safety precautions will be followed to prevent accidents or injury to personnel.

Livestock and Wildlife

Precautions will be taken to keep hazardous material and conditions in a way so that they will not be injurious to either livestock or wildlife. Any opening or portal not needed will be sealed up to keep wildlife out of the mine.

Fire Protection

Standard procedures as required in and around coal mines will be adhered to.

General Health

Hazards to public health are not expected during operation or abandonment because of the isolation of this project from any residential, industrial or recreation activity centers. All rules and regulations as established by the State and Federal governmental agencies will be followed.

APPENDIX 9-2

ACCESS CORRESPONDANCE

Summit County

State of Utah

P.O. Box 128
COALVILLE, UTAH
84017

COMMISSIONERS
GERALD E. YOUNG
CLIFTON BLONQUIST
RON PERRY

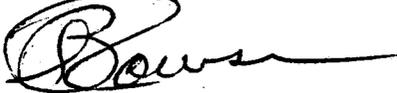
REED D. PACE, COUNTY CLERK
ROBERT H. WILLIAMS, TREASURER
ALAN SPRIGGS, RECORDER
ROBERT ADKINS, ATTORNEY
FRED ELEY, SHERIFF
LEO O. FRAZIER, ASSESSOR

TO: Bill Blonquist
FROM: Bruce Rowser, Summit County Road Superintendent
DATE: February 14, 1984
RE: Access onto County Road

Dear Bill,

This letter is to verify that you will be able to access onto the County Road for your coal mining operation above Upton under the provisions that we talked about earlier. This being, proper signing, proper culverts, and approach to County Road under our inspection and final approval.

Sincerely,



Bruce Rowser, Superintendent
Summit County Road Department

cc: Road Dept.
Jerry Smith, Planning

APPENDIX 9-3

RECLAMATION COSTS

ESTIMATE OF RECLAMATION COSTS

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

<u>TYPE OF ACTIVITY</u>	<u>COST PER ACRE</u>
<u>Hydromulching and Seeding:</u>	
Application of seed and tackifyer; equipment and labor only	\$ 175.00/acre
Application of mulch, fertilizer and tac; equipment and labor only	275.00/acre
<u>Mobilization [Utah Area]</u>	Job 500.00
Mulch	380.00/acre
Tac @ \$1.60/# 140#/acre	224.00/acre
Fertilizer @ \$23.00/100#	23.00/acre
<u>Drill Seeding</u>	240.00/acre
JD 450 Crawler @ \$45.00/hour estimating 8 hours/acre	360.00/acre
Case 580 Backhoe @ \$35.00/hour estimating 24 hours/acre	840.00/acre
<u>Seed</u>	
Variable - current quote	165.00/acre
Planting and Site Preparation	93.00/acre
Nursery Stock	.50/each

ESTIMATE OF TOTAL COST ON RECLAMATION

Approximately 2 Acres

5 Acres Hydroseeding	\$ 37.50
2 Acres Hydroculching and Fertilizing	1,301.00
Mobilization in Utah	500.00
Drill Seeding	360.00
Crawler Tractor	720.00
Backhoe 560 Case	1,680.00
Seed [current bid - Maple Leaf supply]	330.00
Planting and Site Preparation	186.00
Nursery Stock \$1,500/acre	<u>3,000.00</u>
TOTAL	\$ 8,667.50/2acres

Cost per acre = \$4,334.00 x 10 acres = \$43,340.00

Cost comparables received from:

U.S.F.S. Fishlake National Forest
Plateau Mining Company - Test Plot Data
Kaiser Mining Company - Slaughter Canyon Road
Getty Coal CV Ridge Reclamation
B&R Reclamation Company - Kenilworth, Utah

1. Soldier Creek Sewage Pond
2. Trail Mountain Reclamation
3. Plateau - Wildlife Enhancement Area
4. Mountain Resources - Drill Site Reclamation

Coal Analysis

Selected coal samples will be analyzed for:

Btu

Sulfur

Proximate Analysis (moisture, volatiles, ash, carbon)

Ultimate Analysis

Hardgrove Grindability

Major Ash Analysis (ten major elements)

Phosphorus

Calcium

Silica

Magnesium

Iron

Sulfur

Aluminum

Potassium

Titanium

Sodium

10.0 EXPLORATION MINE PLAN

The exploration plan for the mine is comprised of a systematic development from outcrop of a conventional room and pillar mine. A detailed outline of this plan is in the following sections.

10.1 Mining Plans

The overall mining plan for this mine consists of a system of main entries, sub-entries, and panels. Development of the mine is designed to maximize coal recovery with safety and efficiency, while at the same time determine:

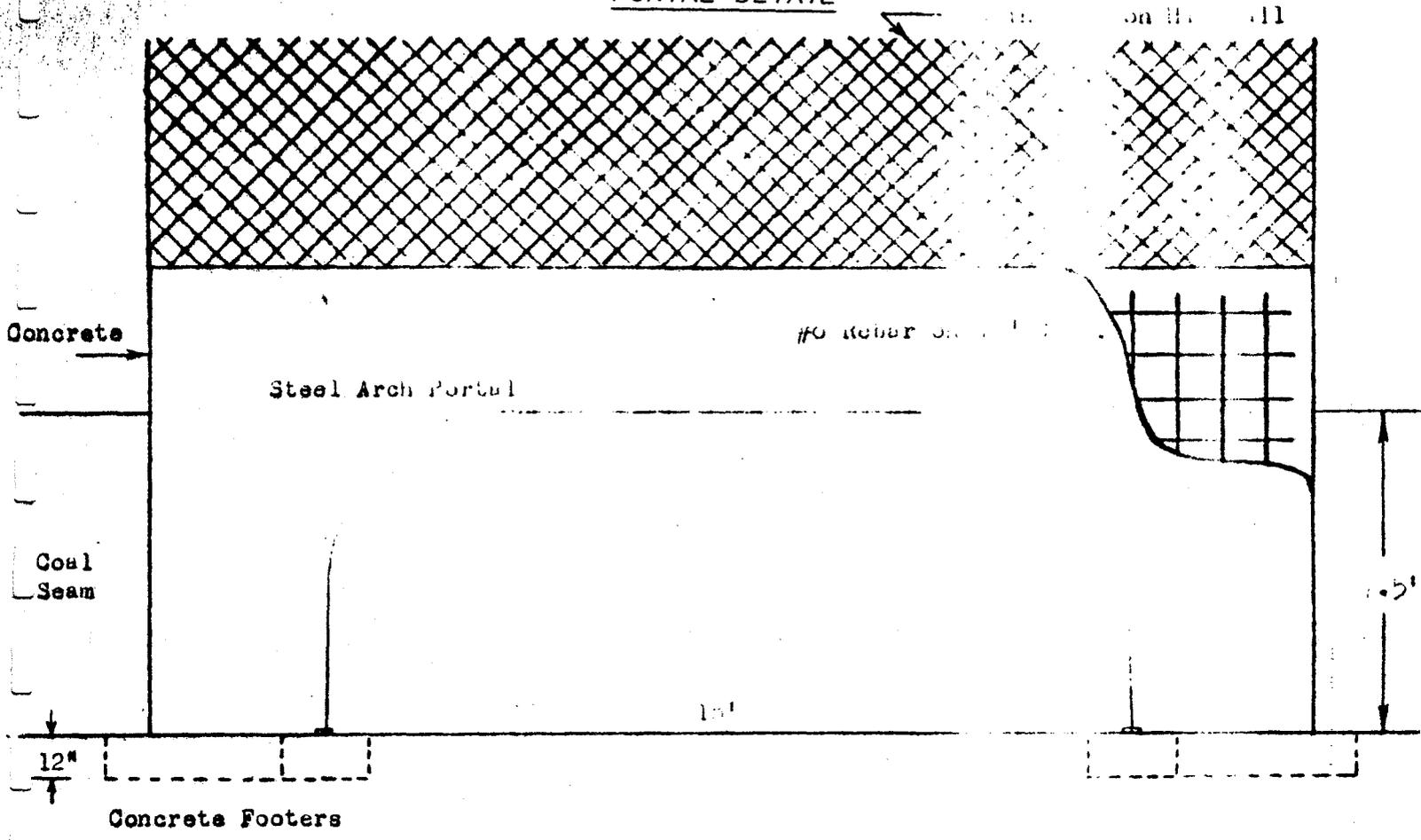
1. The extent of the old works.
2. The degree of faulting as well as roof and floor conditions.
3. To ascertain the feasibility of developing the old Boyer Mine as a working producing mine supplying the Wasatch Front.

10.2 PORTALS, SHAFTS, AND SLOPES

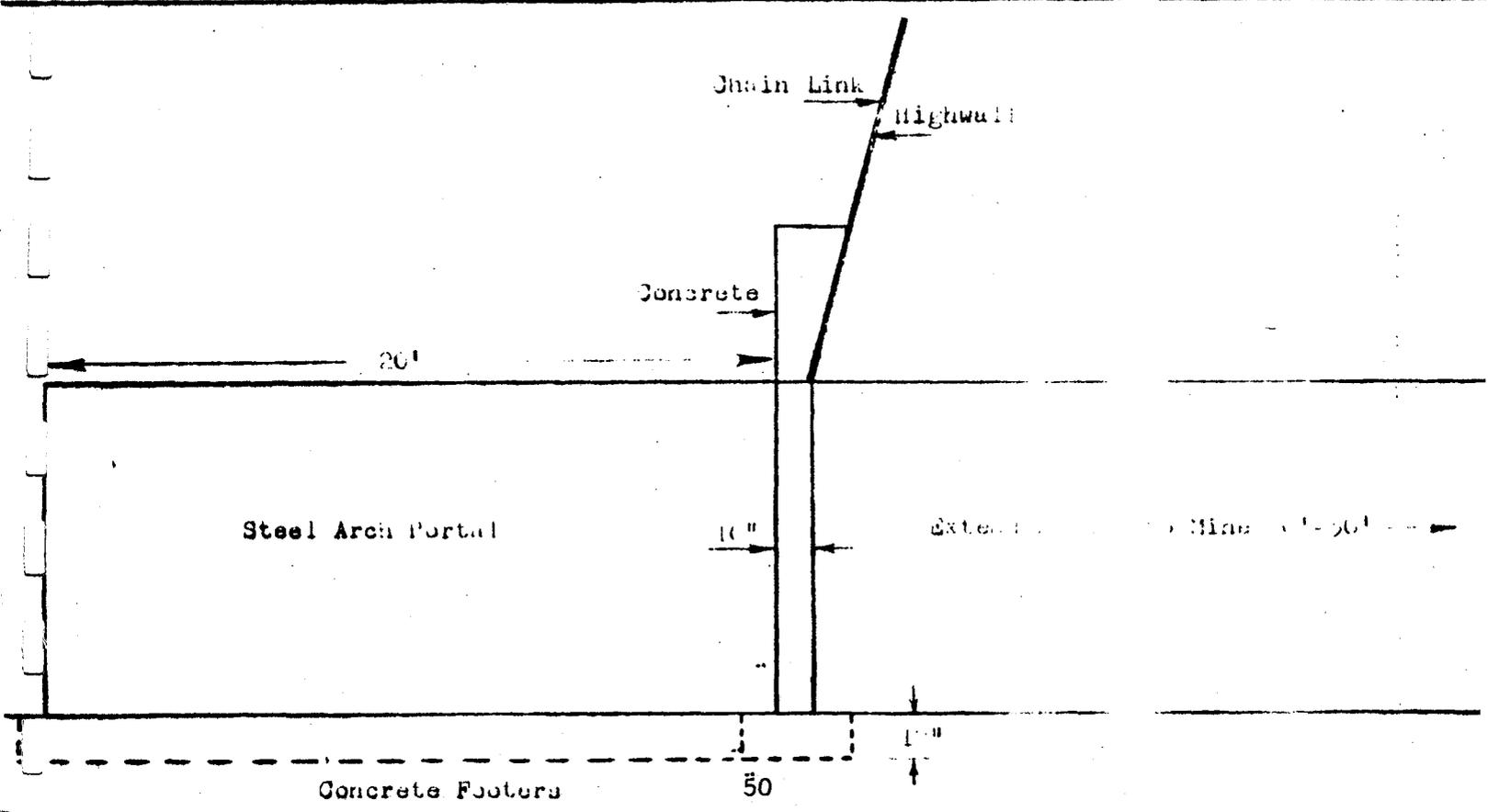
Entry to the mine will be made through three portals; details as shown on Figure 10-1. These portals will be connected to the main entries of the mine which will be excavated in an approximate N 45° W direction. This will develop the mine on a bias to the

Figure 10-1

PORTAL DETAIL



FRONT VIEW



slope on the entries of about 10 percent. The three entries will be developed into the mine a distance of approximately 150 to 200 feet and then will be expanded to five entries for safety and ventilation efficiency. Each entry will be excavated eighteen feet wide on 80 foot centers with interconnects between the entries each 160 feet, thus maintaining larger pillars on the main entries. All mine openings will be excavated at right angles to each other entry, forming a checker board pattern. Through this method the exact extent of the old works can be ascertained in a safe and productive manner.

10.3 MINING METHODS

The new Boyer Exploratory Mine is planned to utilize a conventional room and pillar advance retreat mining method. This plan is designed around the use of as much diesel equipment as possible in the mine. The basic mining cycle involves undercutting, drilling, blasting, scaling, loading out, and roof bolting. This cycle will vary somewhat according to the mining conditions. Conveyors are planned as the primary haulage out of the mine. The mining area will be divided into panels as shown on Plate 3-2, and each panel will be treated as an individual section of the mine. Mining in each panel is planned to use advance room and pillar method until the limits of the panel are reached. Then, the pillars will be mined by the retreat method.

10.4 PROJECTED MINE DEVELOPMENT

The project mine development is as shown on Plate 3-2. This is the proposed mine development for the exploration term.

10.5 ROOF CONTROL

Roof control is planned primarily around the use of roof bolts. Basically the mine roofs will be bolted on 5 foot centers with either split set, expansion shield or resin grouted bolts not less than 48 inches

long. Roof bolt plates and, if necessary, wooden head boards will be used. Wooden posts and head boards may also be installed if needed. This methodology will be upgraded or modified as the roof condition dictates in order to insure safe mining conditions.

Floor strata, based on a literature search, appear to be adequate and should create few problems. Some minor floor heaving may occur in the thin clay seam at the base of the coal bed. This seam is generally only a few inches thick.

10.6 VENTILATION

Fans with a combined capacity of 50,000 CFM supply air to the underground mining units.

Intake air is carried in the entries on one side of a set, while return air is carried through the entries on the other side. Air is directed through the mine by stoppings, doors, overcasts, regulators and brattice cloth. After sweeping the working faces of each section the air is directed into the return air courses and out of the mine. Historically, little or no methane gas is generated in the Wasatch seam.

10.7 DEWATERING, WATER SYSTEMS AND DUST SUPPRESSION

Water generated in the mine is collected in sumps and used at the mine for sprays on the machines at the working faces, on the coal at belt heads and transfer points. Water expected to be generated will be used or contained at the mine; there will be no discharge to surface waters. However, a National Pollution Discharge Elimination System (NPDES) permit will be obtained in case increased volumes are encountered.

10.8 ELECTRICAL

Electric power will be purchased from a public utility and distributed over the surface of the property through company-owned overhead and buried transmission lines. At the mine portals, a company sub-station will convert the power for underground distribution and for use on the surface.

Underground distribution voltages are transformed to 440/220/120 V at a power center for use by the machines. All circuits are isolated by switches and protected by adequate circuit breakers and overload devices as required by law.

10.9 BARRIER PILLARS

Pillars of coal generally are left underground to protect a surface or underground feature which must be maintained and protected for the life of the mine (main entries) or permanently (oil or gas wells). The size of some is specified by law; others are designed by the operator to provide the protection needed. Those along the outside property boundary will be 100 feet wide.

There are no active or abandoned oil or gas wells within the permit boundary.

11.0 ABANDONMENT AND REHABILITATION PROCEDURES

The area of surface disturbance that is done during this exploration project that will not be needed at a later date on the development of the privately owned property will be reclaimed and reseeded. (See Appendix 11-1 Letter from land owner).

Roads and Road Repairs

The road belonging to the county will be left in shape that is acceptable to the Summit County Road Department. The roads on the private property will be left so as not to create any runoff problem that might cause excessive erosion.

Revegetation

The disturbed area that has no further use to any future coal mining activity will be revegetated using the following methods:

Seed bed Preparation

The surface of the ground to be re-seeded will be prepared for planting by either harrowing or raking the area by hand to pulverize the surface dirt and clays.

Seeding

The seed will either be drilled where flat and a large enough area to warrant or to use a mechanical broadcast seeder such as a cyclone seeder or hydroseeder, then oversprayed with 1500 to 2000 lbs. of wood fiber mulch.

Seeding Dates

Late Fall seeding between October 1st and December 31st is planned.

Seed Mixture and Rate

A total of 11 species have been selected for reclamation of the disturbed areas. The mixture was selected by E.I.S.

personnel that are specialized in this field. The species recommended follow: (See Appendix 11-2).

12.0 SUMMARY

The Summit Coal Company leases the mineral rights under the NW $\frac{1}{4}$, NW $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 36, T3N, R6E Summit County, Utah. There have been coal mines operating in the Coalville area in the past and one small coal operation on the property.

Most all of the roads, pads, and other activities that would disturb the surface have historically been done. No major disturbance of the surface that has not been historically disturbed, is planned at this time.

The tonnage requested in this exploration plan will be necessary to remove in order to determine: (1) the extent of the old Boyer Mine, (2) the degree and amount of faulting, and (3) actual mine conditions, such as roof, floor, ground water, and the potential existence of gas or foul air.

The opening up the seam would check out the continuity and the physical qualities of coal. Summit Coal is committed to opening a mine at this location as represented by the MRP which was submitted to the Division on January, 1984. However, the actual decision to invest the large amounts of capital necessary to bring this mine on line, will depend largely on the outcome of this exploration endeavor.

APPENDIX 11-1

CORRESPONDANCE FROM LAND OWNER

February 13, 1984

To Whom It May Concern:

I, Thomas V Boyer, do

hereby authorize Summit Coal to

make a general clean up around

properties used for mining purposes

at the conclusion of their operations.

They are, however, to leave all major

excavation work and access to mine

entrance as they were during operation.

The area is to be posted, thereby

holding all parties free from any

liability.

Thomas V Boyer

APPENDIX 11-2

RECOMMENDED SEED MIX

Appendix 11-2

RECOMMENDED SEED MIX
INTERIM AND PERMANENT RECLAMATION

<u>SPECIES</u>	<u>RATE* PER ACRE</u>
<u>GRASSES</u>	
<u>Agropyron unilaterale</u>	3
Bearded wheatgrass	
<u>A. spicatum</u>	8
Bluebunch wheatgrass	
<u>Elymus cinereus</u>	1.5
Basin wildrye	
<u>Oryzopsis hymenoides</u>	3
Indian ricegrass	
<u>Poa secunda</u>	1
Sandberg bluegrass	
<u>FORBS</u>	
<u>Achillea millifolium</u>	.15
Western yarrow	
<u>Aster chilensis</u>	.15
Pacific aster	
<u>Hedysarum boreale</u>	9
Northern sweetvetch	
<u>Lupinus sericeus</u>	.5
Silky sweetvetch	
<u>Penstemon palmeri</u>	
Palmer penstemon	
or	
<u>P. strictus</u>	.5
Rocky Mountain penstemon	
	26.8

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

Appendix 11-2 cont.

ADDITION FOR PERMANENT RECLAMATION MIX

SHRUBS

<u>Amelanchier utahensis</u>	4
Utah serviceberry	
<u>Artemisia tridentata ssp. vaseyana</u>	.15
Big sagebrush	
<u>Cercocarpus montanus</u>	6
Birchleaf mountain mahogany	
<u>Purshia tridentata</u>	.5
Antelope bitterbrush	
<u>Symphoricarpos albus</u>	.8
Common snowberry	_____
For hydroseeding	38.25 #/acre
$\frac{1}{2}$ application for drill seeded areas	19.13 #/acre

SUMMIT COAL COMPANY REPLY TO
TECHNICAL DEFICIENCY REVIEW

OCTOBER 10, 1984

RECEIVED

NOV 14 1984

DIVISION OF OIL
GAS & MINING

UMC 776.12(b) Public Notice

A copy of the public notice which the applicant posted in the Summit County Courthouse must be submitted to the Division.

Summit Reply:

A notarized copy of the public notice is attached under document section end of reply.

UMC 805.13(b) Bonding

A 10 year maintenance program commitment and plan must be provided and indicated in the bond estimate.

Summit Reply:

See Appendix 1

UMC 805.14 Adjustment of Amount

The bond estimate does not detail quantities of work to be performed. The applicant must resubmit a reclamation cost estimate indicating estimated quantities of material (yd³, tons, etc.), equipment used, estimated productivity levels and sources used to obtain unit, labor and operating costs. The applicant must show mobilization/demobilization costs.

The Division shall then review and adjust the reclamation cost estimate for bonding under UMC 805.14. The bond must be submitted prior to the Division approving the exploration.

Summit Reply:

See Appendix 1

UMC 806.14 Liability Insurance

Proof of liability insurance as required by this section, must be submitted to the Division before exploration can be approved.

Summit Reply:

See Document Section end of Reply.

UMC 815.15(h) Underground Openings

Permanent closure of mine openings has not been addressed in the CEP deficiency response. The applicant must respond to sections UMC 817.13 - .15 as required. Temporary and permanent closures shall be equal or superior to those required under 30 CFR 75.1711.

Summit Reply:

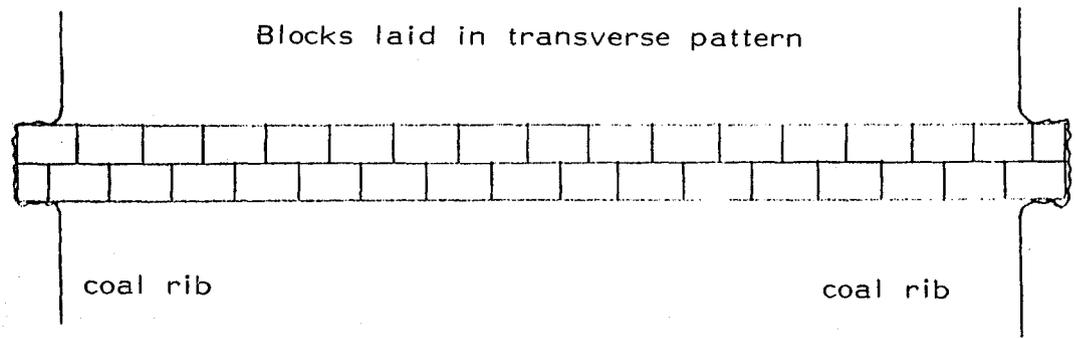
Sealing of Mine Openings

Permanent Seals

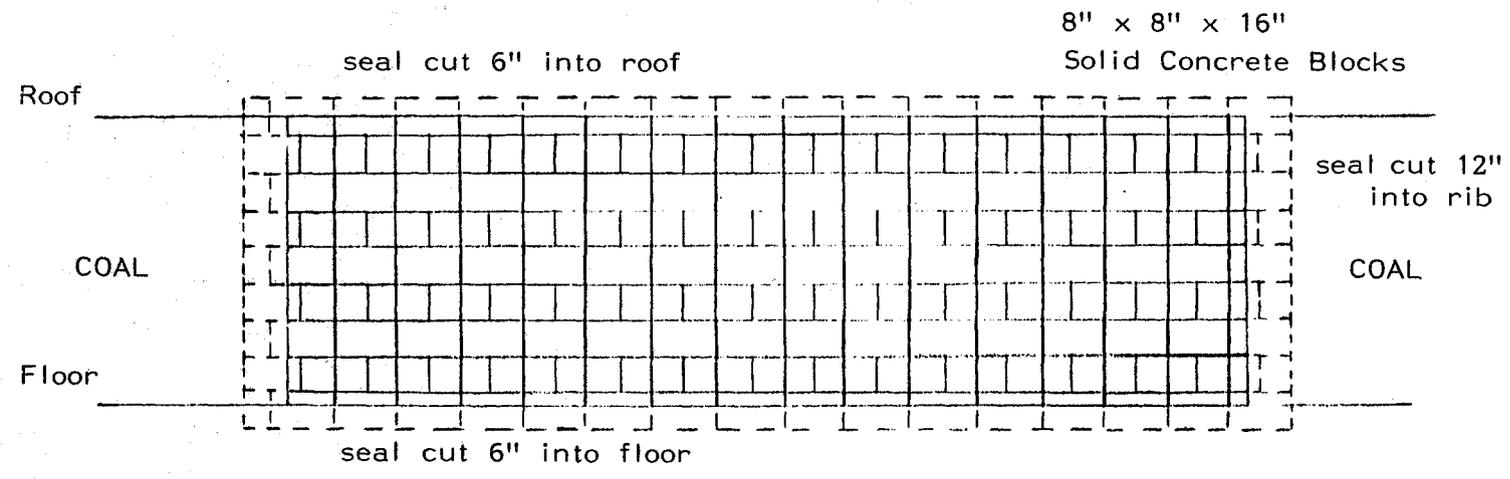
Upon completion of mining activities the portals will be permanently sealed as per 30 CFR 75.1711. The seals will consist of a double row of concrete blocks laid in a transverse pattern, placed 25' to 50' in by the portal. The area out by the portal will then be backfilled to minimize roof breakage in this area. Portal structures will then be removed and exposed coal seams, including portal areas, will be

covered with a minimum of 3' of incombustible material during reclamation of pad and highwall areas.

Based on hydraulic and geologic data from this area, mine drainage will not be a problem, and hydrologic seals are not required. Details of the seals are shown on the enclosed figures.



TOP VIEW



FRONT VIEW

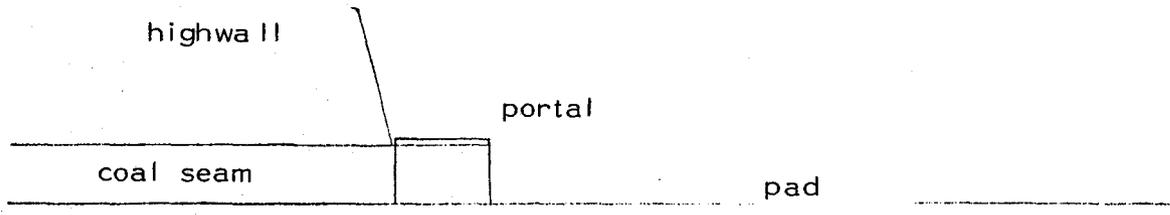
-4-

BY Dan Guy DATE 11/1/84
CHKD. BY DATE

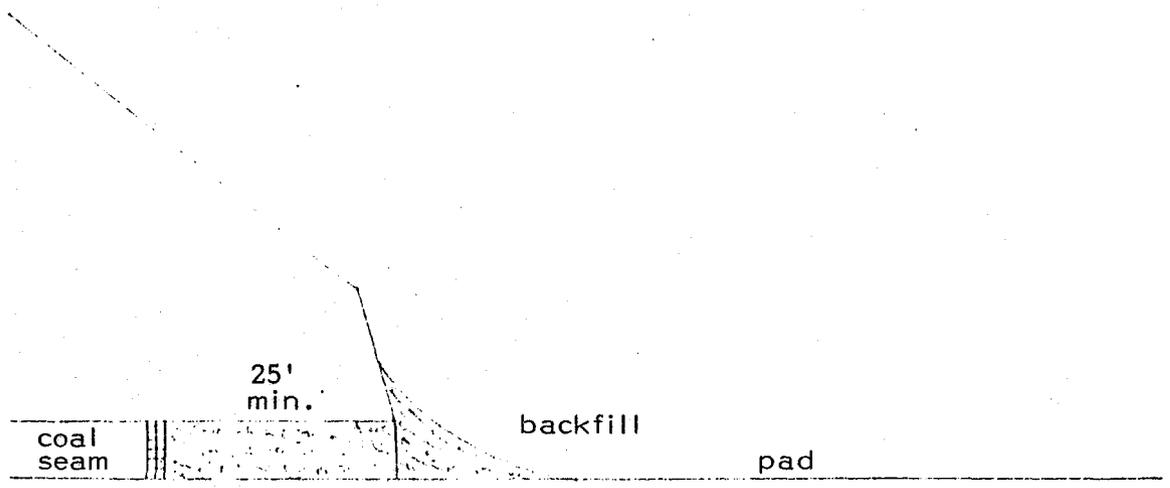
SUBJECT TYPICAL PORTAL SEALING

Scale - 1" = 20'

SHEET NO. OF
JOB NO.



TYPICAL CONSTRUCTION



TYPICAL RECLAMATION

UMC 815.15(j) Sediment Control Measures

Since the sediment pond has been sized to handle the flow from a 100 year-24 hour event, it is sized adequately to handle the flow and sediment produced during the 10 year-24 hour event.

However, the sediment pond must have a dewatering device, principal spillway, and emergency spillway. No plans or calculations have been submitted for these structures. Information for the dewatering device must demonstrate that the volume between the principal spillway and the dewatering device is capable of containing the 10 year-24 hour storage volume. This requires submission of the elevations of both the principal spillway and the dewatering device. The combined capacity of the principal spillway and the emergency spillway must be able to handle the 25 year-24 hour peak flow. The emergency spillway must be located at least one (1) foot higher than the principal spillway. (See UMC 817.46)

These plans must be submitted and approved before a permit for exploration can be granted.

Summit Reply:

See Appendix 2

UMC 817.22 Topsoil: Removal

The applicant must provide the exact acreage associated with Areas C and D.

The six-inch soil redistribution depth is not justified based on the soils data and descriptions provided and cannot be approved. Assuming a topsoil redistribution depth of 1 foot, a deficiency of 5,645 cubic yards exists; while for a 1.5 foot redistribution depth, an 11,290 cubic yard deficit exists (Figures based on those provided by the applicant in Appendix 8-5). Note: the soil volume in the existing stockpile, soil removal to a depth of 18 inches in the Moweba series (area F) and topsoil removal in areas D and E would appear to offset this deficit. It also, appears that a 1-foot topsoil redistribution depth coupled with a subsoil depth of at least 6 inches will be necessary for Division approval.

Please provide the volume of the existing topsoil stockpile.

A specific soil stripping map reflecting approved removal depths must be provided.

A map which includes the existing soil stockpile location must also be supplied. This stockpile is not shown on plate 3-1.

Summit Reply:

Plate 8-1a attached, indicates the volumes of usable soil associated with each area. Area "C" is less than .18 acres, area "D" is approximately .89 acres.

Summit is committed to reclaim all disturbed areas in a manner which will best ensure success. Since the Division feels that 12" of topsoil over 6" of subsoil is necessary, Summit will adhere to this recommendation. Plate 8-1a indicates the quantities of soil which are available on-site for reclamation. A large portion of the areas will not be disturbed until such time as reclamation commences. It is Summit's intent to protect these areas of soil reserves by maintaining the existing vegetation and safeguarding the integrity of the soils through corrective berming and posting as top soil storage areas.

The existing topsoil stock pile is in the process of being removed and redistributed as per the directive of Ms. Sandy Pruitt, July 2, 1984. (Certified Receipt # P492-430-084). Wherein this material is counted in the area of proposed disturbance, it's temporary location and quantity was considered irrelevant at this time.

UMC 817.23 Topsoil Protection

The specific seed mix to be utilized for topsoil stockpile protection must be provided. The interim seed mix referred to in the last submittal was not provided and must be submitted for review and approval.

The applicant must commit to a specific detailed plan for mulching; listing several options or possibilities is not acceptable. Mulching

should take place concurrently with seeding. The applicant must commit to seeding and mulching together on a daily basis. From the time table, it appears mulching will take place at least a week after seeding; this is unacceptable.

Summit Reply:

See Appendix 3

UMC 817.24 Topsoil: Redistribution

Specific methods to be performed by each piece of equipment described in the applicant's response to be employed in grading and soil redistribution must be provided. The applicant must demonstrate that grading will be done along the contour.

Summit Reply:

See Appendix 3 (Earth Moving)

UMC 817.25 Nutrients and Amendments

The applicant must commit to a sampling program following soil redistribution, to a depth of at least 18 inches with six inch increments. Subsoil must be sampled separately.

Please provide a listing of the trace elements to be sampled and describe why it is expected that this is necessary. How will fertilizer application rates be determined?

Any required fertilizer must be distributed uniformly in the root zone. It is not likely that this can be achieved using hydromulching

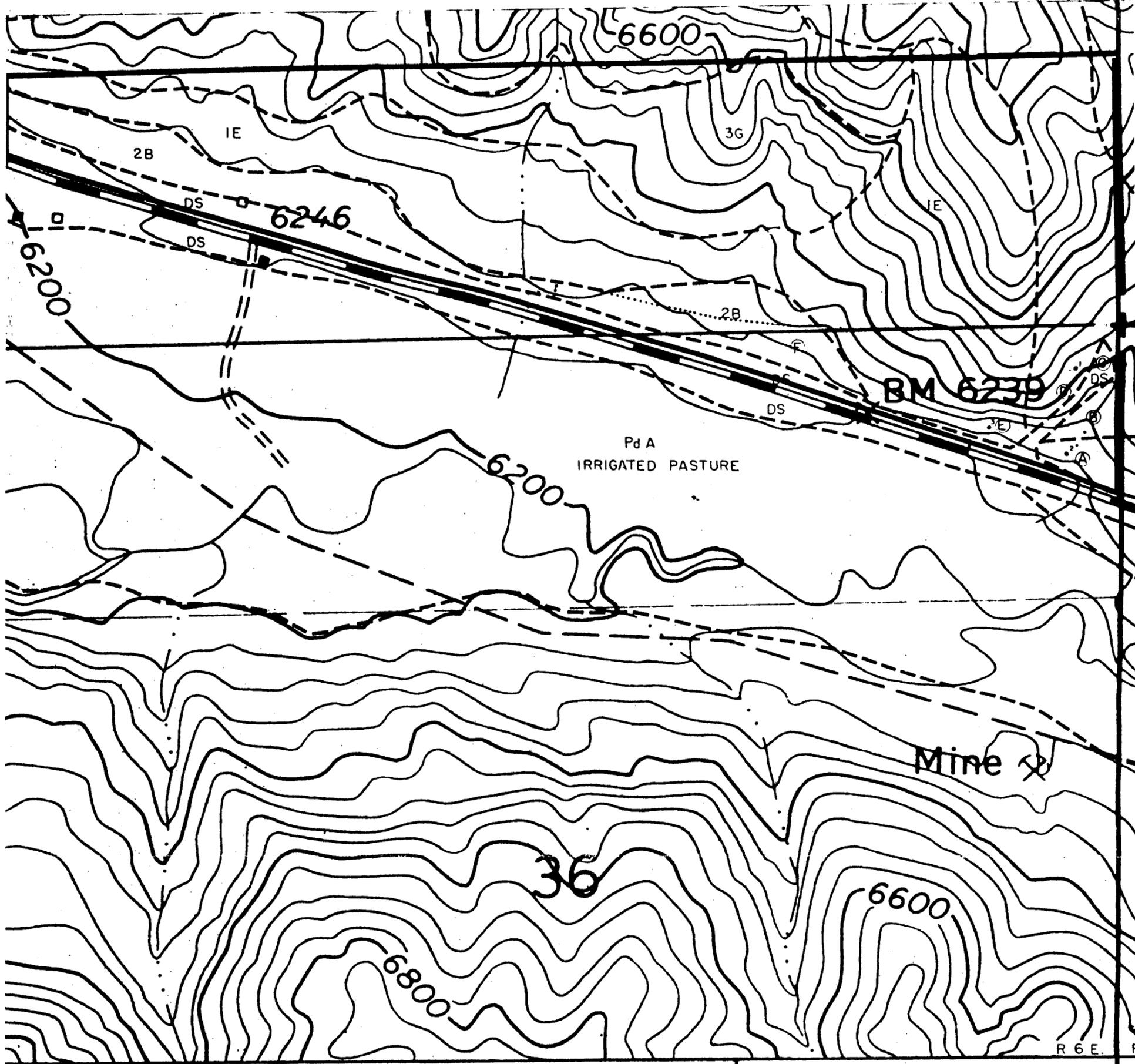
techniques. Please propose satisfactory methods which entail using equipment capable of incorporating the nutrients into the root zone.

Summit Reply:

Summit Coal will sample all in place subsoils prior to topsoil redistribution. The topsoil will be spread to the desired 12 inches in 6" lifts. Fertilizer will be applied on top of the first 6" lift at 3/4 the rate indicated by soil tests. The balance of the soil will be applied and the remaining $\frac{1}{4}$ application will be incorporated in the mulch application.

By ripping the soils prior to planting, the fertilizer should be dispersed through the root zone of the soil in such a manner as to enhance long term establishment. The surface application is a proven method to ensure rapid development of the germinating seed. A follow-up surface application the preceding fall ensures establishment of the emergent vegetation.

The rates and types of fertilizers used will be based on SCS recommendation pending soil tests upon redistribution. A sample soils test is included in Appendix 3.



LEGEND

SOIL TYPES

IE	BEZZANT GRAVELLY LOAM	-	25 TO 40% SLOPE
2B	MOWEBA GRAVELLY LOAM	-	2 TO 5% SLOPE
3G	RICHVILLA GRAVELLY LOAM	-	40 TO 70% SLOPE
DS	DISTURBED		
SOIL BOUNDARIES	-----		
SOIL SAMPLE SITE	.1 .2 .3		

AREA

DEPTH

VOLUME

Ⓐ	18"	4,330 Cu. Yds.
Ⓑ	6"	1,111 Cu. Yds.
Ⓒ	12"	278 Cu. Yds.
Ⓓ	12"	1,445 Cu. Yds.
Ⓔ	—	—
Ⓕ	18"	10,500 Cu. Yds.

SUMMIT COAL COMPANY
SUMMIT COUNTY, UTAH

SOIL STRIPPING MAP

SCALE:
1"=500'

DRAWN BY:
D. GUY

DATE:
11/1/84

BOYER MINE

PLATE 8-1a

APPENDIX 1

Detailed Timetable and Cost Estimate for
Reclamation of the Boyer Mine Exploration

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 Portals - 1 week	1 week
2. Remove Structures - 2 weeks	3 weeks
3. Soil Placement (backfilling and grading)	
a. Upper Pad - $\frac{1}{2}$ week	$3\frac{1}{2}$ weeks
b. Middle Pad - 2 weeks	$5\frac{1}{2}$ weeks
c. Lower Pad - $1\frac{1}{2}$ weeks	7 weeks
d. Parking Lot and Pond - 1 week	8 weeks
4. Seedbed Preparation - 1 week	9 weeks
5. Reseeding & Fertilization - 1 week	10 weeks
6. Mulching - 1 week	11 weeks
7. Protective Fence - 2 weeks	13 weeks

The above reclamation tasks are therefore proposed to be completed within 13 weeks following the start of reclamation activities.

Summary Cost Estimate

1. Seal Portals	\$ 1,350.00
2. Remove Structures	8,191.00
3. Soil Placement	16,100.00
4. Seedbed Preparation and Handling	7,376.00
5. Reseeding & Fertilizing	9,625.00
6. Mulching	2,450.00
7. Protective Fencing	4,600.00
	<hr/>
	\$49,692.00
Maintenance & Monitoring	2,500.00
Mobilization / Demobilization	2,500.00
Forman	7,800.00
	<hr/>
1984 Dollars	\$62,492.00

Detailed Cost Estimate

Equipment Costs

1. Loader - Cat 950B	\$75.50/hr
Operator	<u>15.00/hr</u>
	\$90.50/hr
2. Crane - Groves RT-580 (20 T)	\$62.50/hr
Operator	<u>15.00/hr</u>
	\$77.50/hr
3. Dozer - Cat D-6	\$60.00/hr
Operator	<u>15.00/hr</u>
	\$75.00/hr
4. Backhoe - Case 680	\$35.00/hr
Operator	<u>15.00/hr</u>
	\$50.00/hr
5. Truck - 10 yd	\$50.00/hr
Operator	<u>15.00/hr</u>
	\$65.00/hr

1. Seal Portals

Labor - 2 men X \$100/man day X 3 days	\$600.00
Materials - 200 blocks/seal X 3 seals X \$1.00/block	600.00
Mortar	<u>150.00</u>
	1,350.00

2: Remove Structures

Fan

Labor - 2 men X \$100./day X 1 day	\$200.00
Truck & Operator - 4 hrs X \$65/hr	260.00
Crane & Operator - 2 hrs X \$77.50/hr	<u>155.00</u>
	\$815.00

Shop

Labor - 3 men X \$100/day X 2 days	\$600.00
Truck & Operator - 16 hrs X \$65/hr	1,040.00
Crane & Operator - 16 hrs X \$ 77.50/hr	<u>1,240.00</u>
	\$2,880.00

Substation

Labor - 2 men X \$100/day X 1 day	200.00
Truck & Operator - 4 hrs X \$65/hr	260.00
Crane & Operator - 2 hrs X \$77.50/hr	<u>155.00</u>

\$615.00

Office & Bathhouse Trailers

Labor - 2 men X \$100/day X 1 day	\$ 200.00
Truck & Operator - 8 hrs X \$65/hr	<u>520.00</u>
	\$ 720.00

Water Tank & Water System

Labor - 2 men X \$100/day X 2 days	400.00
Truck & Operator - 16 hrs X \$65/hr	1,040.00
Crane & Operator - 8 hrs X \$77.50/hr	<u>620.00</u>
	\$2,060.00

Clean-up

Labor - 2 men X \$100/day X 2 days	400
Truck & Operator - 8 hrs X \$65/hr	520.00
Loader & Operator - 2 hrs X \$90.50/hr	<u>181.00</u>
	\$1,101.00

3. Soil Placement (Backfilling & Grading)

Upper Pad (C-172 cu. yds; F-200 cu. yds.)

Backhoe & Operator - 4 hrs X \$50/hr	200.00
Cat & Operator - 4 hrs X \$75/hr	<u>300.00</u>
	\$500.00

Middle Pad (C-5108 cu. yds.; F-3719 cu. yds)

Backhoe & Operator - 85 hrs X \$50/hr	4,250.00
Cat & Operator - 37 hrs X \$75/hr	2,775.00
Labor - 2 men X \$100/day X 3 days	<u>600.00</u>
	\$7,625.00

Lower Pad (C-3600 cu. yds; F-2593 cu. yds.)

Backhoe & Operator - 60 hrs X \$50/hr	3,000.00
Cat & Operator - 26 hrs X \$75/hr	1,950.00
Labor - 2 men X \$100/day X 3 days	<u>600.00</u>
	\$5,550.00

Parking Lot & Pond (C-500 cu. yds.; F-2738 cu. yds.)

Backhoe & Operator - 8 hrs X \$50/hr	400.00
Cat & Operator - 27 hrs X \$75/hr	<u>2,025.00</u>
	\$2,425.00

APPENDIX 2

Sediment Pond Specifications

- | | | |
|------|----------------------------------------------------------------------------------------------------------------|-----------------------|
| 1. | Drainage area to pond | 4.82 acres |
| * 2. | 100 yr./24 hour precipitation event | Use 3" |
| 3. | Required capacity for 100 yr./24 hour event | 1.205 ac. ft. |
| 4. | Pond capacity at overflow | 1.41 ac. ft. |
| 5. | Pond depth at overflow | 9.0 ft. |
| * 6. | 10 yr./24 hour precipitation event | Use 2" |
| 7. | Required capacity for 10 yr./24 event | 0.803 ac. ft. |
| 8. | Pond capacity at principal spillway | 1.10 ac. ft. |
| 9. | Pond depth at principal spillway | 8.0 ft. |
| 10. | Dam height 10 ft. Freeboard | 1.0 ft. |
| 11. | Excess capacity for 100 yr./24 hour event | 0.205 ac. ft. |
| 12. | Excess capacity for 10 yr./24 hour event | 0.607 ac. ft. |
| 13. | Planned sediment storage capacity | 0.117 ac. ft. |
| 14. | Overflow | (0.607 cfs) |
| | a. Required area | 0.122 ft ² |
| | b. Actual area | 3.0 ft ² |
| 15. | Principal Spillway | (0.356 cfs) |
| | a. Required area | 0.07 ft ² |
| | b. Actual area | 3.14 ft ² |
| 16. | Dewatering Device | |
| | a. 8 rows of $\frac{1}{4}$ " holes on 4" centers. | |
| | b. Drains to base of level for 10 yr./24 hour runoff storage. | |
| | c. Dewatering rate: | |
| ** | (1) $Q = 19.636 Kd^2 h$; $K = .61$; $d = .25"$, $h = 2'$, | |
| | (2) $Q = 1.6 \text{ gpm}/\frac{1}{4}" \text{ hole} \times 96 \text{ holes} = 101.6 \text{ gpm}$; Use 100 gpm. | |
| | (3) Inflow from 10 yr/24 hour event - 261,749 gal. | |

(4) Theoretical dewatering time

43.6 hrs.

17. Conclusions:

- a. Pond size is adequate to contain 100 yr/24 hour precipitation event.
- b. Pond size is adequate to contain 10 year/24 hour precipitation event between bottom of dewatering device and 1' below emergency spillway.
- c. Dewatering device will allow for theoretical 24 hour retention time.
- d. Pond sizing is adequate to allow for .117 ac. ft. of sediment storage (storage to 2.0' depth).
- e. Overflow and principal spillway are adequately sized to pass projected flows.

* N.O.A.A. - "Precipitation Frequency Atlas of Western U.S.", (1973).

** Cameron Hydraulic Data, 12th Edition, "Flow Through Orifices and Nozzles", p. 67.

APPENDIX 3

RECLAMATION PLAN

9.7 RECLAMATION PLAN

The following procedures are designed to revegetate and control erosion. They should, to a large degree, satisfy the commitments made by Summit Coal Company in their permit while also satisfying DOGM regulations as pertaining to interim reclamation and final reclamation for those areas which will be utilized after mining operations are concluded.

The areas in question are along and adjacent to the mine and powder storage access road and will be of an interim nature, to stabilize newly disturbed areas and a permanent nature upon abandonment.

The actual ground involved comprises approximately .7 acres of disturbed land primarily road and deck areas. The actual procedures involve a four phase program; (1) earthwork, (2) hydromulch the entire area to supplement revegetation and control run-off until stabilization is complete, (3) prepare a site which will be stable enough for a period of time to allow vegetation to become established, and (4) to plant seedlings to further stabilize the soil and to satisfy bond release requirements.

PHASE 1 - Earthwork - Original Contour

The roads and pads can be brought back to a reasonable configuration by implementation of a large backhoe unit in conjunction with a crawler tractor (JD450). The actual method will involve the pulling of material from approximately ten feet below the road cut up onto the road surface and spreading and compacting this material with the crawler tractor, at the same time pulling the leading edge of the high wall down to lessen the degree and angle of the high wall. All work done, both above and below the road, should take into consideration existing vegetation and all effort would be made to minimize disturbance where possible. When there is no alternative

other than disturbance, an effort can be made to relocate earth and maintain existing vegetation in place; attempting to relocate the vegetation in the proximity of the road disturbance. The material redistributed to regain original contour should be compacted to approximately 95% of the original or adjacent undisturbed soil. Upon completion of this step of spreading and compacting, the unconsolidated native material will approach the original configuration of the site prior to disturbance. The native topsoil which was removed from the area will be redistributed to a depth of 6 inches. Upon redistribution of the A horizon soil, all associated compaction resulting from spreading will be alleviated by ripping the entire area to a depth of 20 centimeters to enhance the revegetation effort.

PHASE 2 - Seeding and Mulching

The entire area of disturbance should be drilled and hydroseeded during the first Fall following the complete abandonment and earth work. (September thru November).

The largest portion of the recontoured site will facilitate drill seeding. In order to lessen compaction, a rangeland drill seeder pulled behind a small crawler tractor would be utilized. A tentative estimate of the area to drill seed is approximately 4.5 acres. The balance of the area would then be hydroseeded. The seed mix and rate of application is attached. [Appendix 9-1].

In combination with the seed, the following rates of tackifier should be utilized:

[Rates of Tac were developed with respect to velocity and erosive power of water which is proportional to the square root of the slope.]

An empirical factor was determined from laboratory and field studies to arrive at the minimum Tac fiber ratio. Thus, 60 pounds of Tac per ton of fiber is about minimum for slopes up to 20% and the empirical factor is determined as $60 - 25\% = 15$. A 25% slope is about

maximum for the minimum amount of Tac. For a 100% slope [1:1 or 45°] the ratio of Tac to Fiber is calculated as:

$$[100\%] [12] = 120 \text{ pounds}$$

SUGGESTED RATIOS OF TAC TO FIBER FOR HYDROSEEDING AND
HYDROMULCHING TO SERVE AS MULCH OR SOIL BINDER

<u>SLOPE ANGLE</u>	<u>SLOPE RATIO</u>	<u>PERCENT SLOPE</u>	<u>LBS. TAC PER TON FIBER</u>	<u>RATIO TAC TO FIBER</u>
	rise:run			
14	1 : 4	25%	60[minimum]*	1 : 30
26	1 : 2	50%	80	1 : 25
33	1 : 1½	66%	100	1 : 20
45	1 : 1	100%	120	1 : 16
57	1½ : 1	150%	140	1 : 14
64	2 : 1	200%	160[minimum]	1 : 12

* 60 pounds is suggested as a minimum to insure excellent stabilization; however, in many conditions 40 pounds of Tac per acre has given excellent results on a 1:4 or less slope.

Following the seeding effort the entire area of disturbance will be hydro-mulched and fertilized. The rate of application of the mulch is:

1,200 to 1,500 lbs/acre on 1:1 slopes
2,000 to 2,500 lbs/acre on 3:1 slopes

The mulch should also be fortified with Tac as previously indicated according to slope. Incorporated in the mulch slurry the following rate of fertilizer will be applied per acre:

80 lbs N/acre
100 lbs. P₂ O₅/acre
100 lbs. K₂ O₅/acre

Approximately 50% of the above application can be incorporated in the mulch and the balance be added as an over-spray the following Fall. Recommendation on fertilizer requirements is based on soils test.

PHASE 3 - Site Preparation

Site stability will be largely accomplished through the grading, compacting and the utilization of a tackifying agent. However, on those areas with slopes of more than 2:1, the following procedures will add an additional parameter of stability and enhance the revegetation efforts.

Site preparation is both general and specific in procedures. The sites and methods provide a multitude of purposes and to a large degree are residual for several years. First and foremost, they effectively decrease the angle of repose of the slope in question. In accomplishing this you effectively modify the site and change those conditions which preclude vegetation from becoming established. Second, you change the severity of erosion and, in fact, use those surface waters which heretofore were destructive in nature. This is accomplished by creating basins wherein the water has time to soak in and thus can be utilized by vegetation.

This, in turn, decreases the impact on adjacent watersheds and improves quality of surface waters. Those areas which are terraced provide a more favorable ecosystem than that of an equivalent slope. It facilitates better utilization of grasses and forage for grazing animals; to some degree it modifies climate in that severity of wind and weather is somewhat diminished. Also the cut face acts in much the same as a snow drift fence does in trapping and causing small areas of snow retention.

PHASE 4 - Planting

The planting of seedlings will be done within 2 years of the seeding effort 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.

The species and numbers of individual plants will be correlated to the Range Transects which were established during July of 1982.

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 should be compacted back around the roots being careful to leave no air pockets or loose dirt [which would constitute settling]. The tree should 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 - the use of a stick or foot is strictly forbidden.

At all times the trees will be protected from direct sun light and special care will be exhibited when lifting the seedling from the planting bag to the prepared hole.

Field Storage

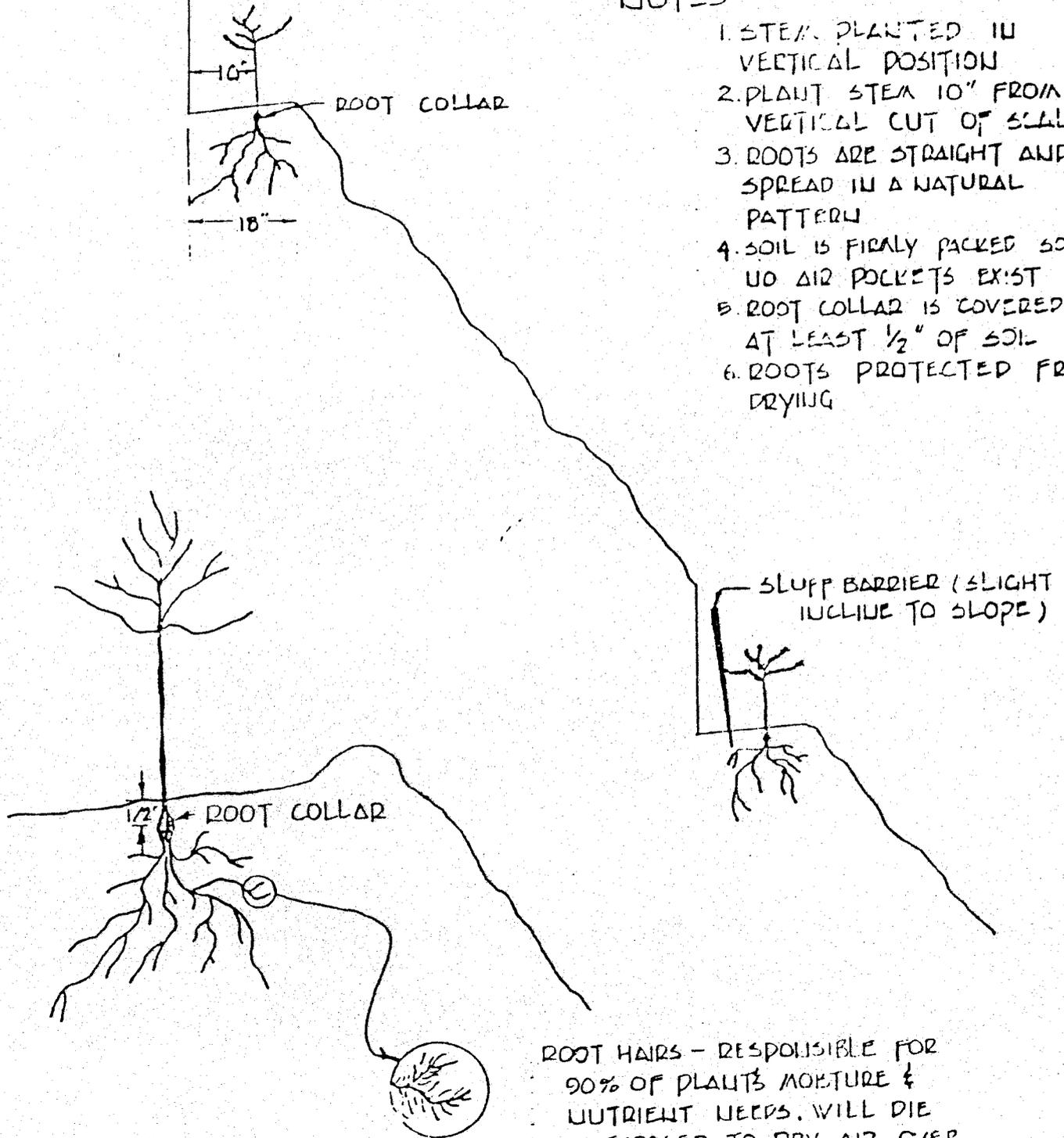
Field storage facilities are illustrated in (Fig. 9-2). In the event snow is not available, a similar cache can be constructed using wet burlap and damp straw.

PLANTING PROCEDURE

Figure 9-1

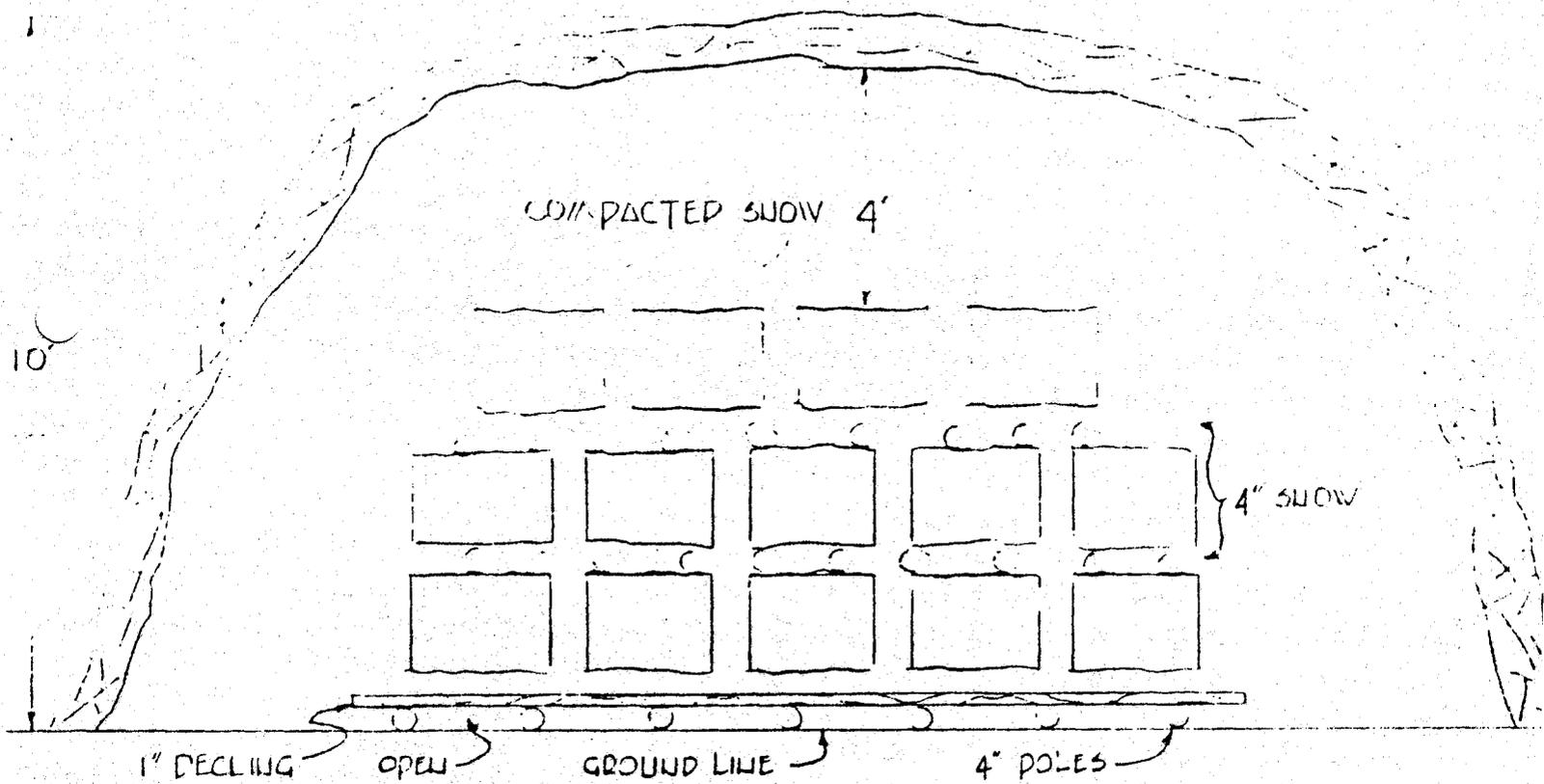
NOTES:

1. STEM PLANTED IN VERTICAL POSITION
2. PLANT STEM 10" FROM VERTICAL CUT OF SLOPE
3. ROOTS ARE STRAIGHT AND SPREAD IN A NATURAL PATTERN
4. SOIL IS FIRMLY PACKED SO NO AIR POCKETS EXIST
5. ROOT COLLAR IS COVERED BY AT LEAST $\frac{1}{2}$ " OF SOIL
6. ROOTS PROTECTED FROM DRYING



SEEDLING STORAGE

Figure 9-2



SNOW CACHE WILL MAINTAIN SEEDLINGS AT 32°F AND RELATIVE HUMIDITY OF 100%. SEEDLINGS SHOULD BE PLACED IN A COOL SHADED AREA 24 HOURS PRIOR TO PLANTING.

The mine will have to maintain a sorting, packaging and storing tent at the cache site. A sorting table will need to be set up in one tent. Each seedling must be examined and all that do not have a 2 to 1 crown to root relationship or are damaged must be discarded. The seedlings then need to be dipped in a vermiculite slurry and then rolled in wet burlap and placed in canvas planting bags.

The trees can only be left in the bags for twenty-four hour periods and then must be repacked following the same procedure.

The field handling of packed trees requires the crowns be kept moist and the bags covered with insulated tarps and stored in shaded areas.

During breaks, lunch, etc., the crews planting bags must be placed in shaded areas. At the end of each operational day all bags must be unpacked and the trees redipped in vermiculite and rerolled in wet burlap and repackaged to be used first the succeeding day.

9.8 MONITORING

Upon completion, the reclaimed area will be monitored to determine when bond release parameters are achieved. If the monitoring indicates inadequacies, the area will be supplemented with additional efforts.

The monitoring procedures will be the same sampling methodologies which were incorporated in establishment of the range site determinations.

Appendix 9-1

RECOMMENDED SEED MIX
INTERIM AND PERMANENT RECLAMATION

<u>SPECIES</u>	<u>RATE* PER ACRE</u>
<u>GRASSES</u>	
<u>Agropyron unilaterale</u>	3
Bearded wheatgrass	
<u>A. spicatum</u>	8
Bluebunch wheatgrass	
<u>Elymus cinereus</u>	1.5
Basin wildrye	
<u>Oryzopsis hymenoides</u>	3
Indian ricegrass	
<u>Poa secunda</u>	1
Sandberg bluegrass	
<u>FORBS</u>	
<u>Achillea millifolium</u>	.15
Western yarrow	
<u>Aster chilensis</u>	.15
Pacific aster	
<u>Hedysarum boreale</u>	9
Northern sweetvetch	
<u>Lupinus sericeus</u>	.5
Silky sweetvetch	
<u>Penstemon palmeri</u>	
Palmer penstemon	
or	
<u>P. strictus</u>	.5
Rocky Mountain penstemon	
	26.8

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

Appendix 9-1 cont.

ADDITION FOR PERMANENT RECLAMATION MIX

SHRUBS

<u>Amelanchier utahensis</u>	4
Utah serviceberry	
<u>Artemisia tridentata ssp. vaseyana</u>	.15
Big sagebrush	
<u>Cercocarpus montanus</u>	6
Birchleaf mountain mahogany	
<u>Purshia tridentata</u>	.5
Antelope bitterbrush	
<u>Symphoricarpos albus</u>	.8
Common snowberry	_____
For hydroseeding	38.25 #/acre
1/2 application for drill seeded areas	19.13 #/acre

SUMMIT COAL CO.
August 3, 1984

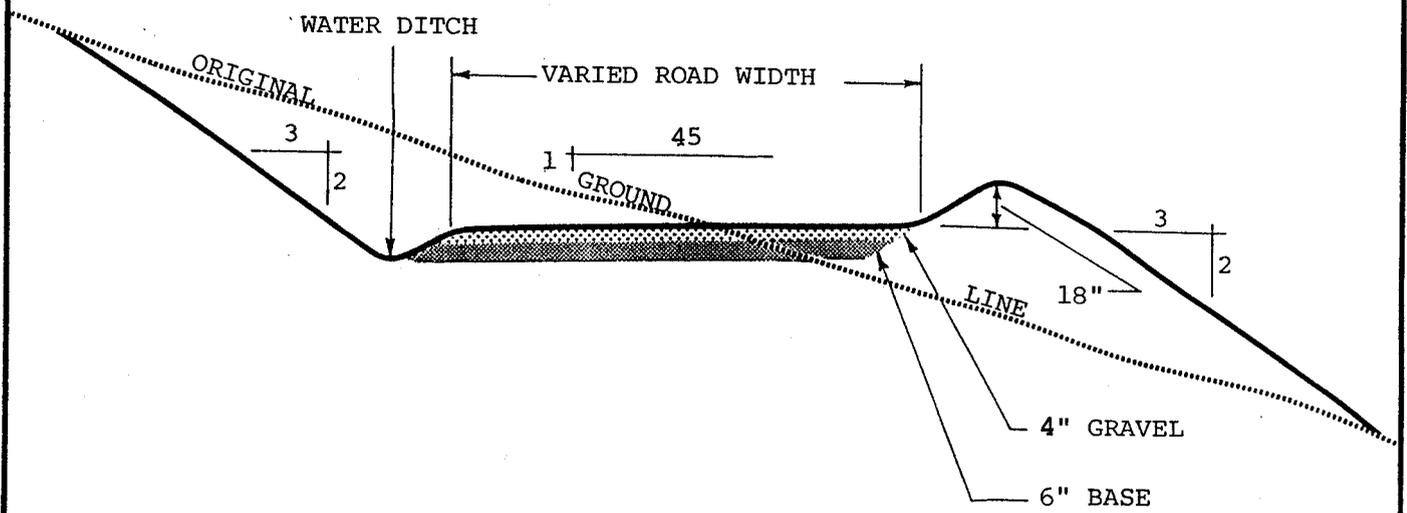
Sample #	Water Soluable Cations			SAR	pH ¹	EC ² (mmhos)
	Ca(meg/l)	Mg(meg/l)	Na(meg/l)			
1A	1.85	1.43	.49	1	7.27	0.28
1B	2.63	4.25	1.04	1	7.23	0.27
2A	2.95	.94	.57	1	7.50	0.43
2B	3.57	1.11	.61	1	7.62	0.48
3	2.57	1.16	.55	1	7.91	0.31

Sample #	Particle Size Analysis			Texture	Percent Organic Carbon ³	Saturation Percent
	% Sand	% Clay	% Silt			
1A	41.3	33.6	25.1	Clay	1.48	44.7
1B	42.6	33.6	23.8	Clay	1.08	44.5
2A	47.8	31.6	20.6	Sandy clay loam	1.62	45.0
2B	49.8	23.6	26.6	Sandy clay loam	2.44	47.0
3	73.8	13.6	12.6	Sandy loam	1.02	42.2

Sample #	Total Nitrogen (%)	Nitrate-Nitrogen ⁴ (ppm)	Phosphorus(ppm)	Alkalinity ⁵
1A	.13	1.60	5.6	Normal
1B	.13	1.20	2.0	Normal
2A	.10	2.60	15.6	Normal
2B	.18	3.65	18.8	Normal
3	.07	1.45	4.0	Normal

1. Saturated paste
2. Saturated extract
3. Organic matter
4. "Available" nitrogen
5. "Normal"; not "alkaline", not "saline" and not "alkaline-saline" (USDA Handbook 60 definitions)

DOCUMENTS



NOT TO SCALE



SUMMIT COAL COMPANY
 EXPLORATION MINE
 TYPICAL ROAD CROSS-SECTION

FIGURE 2

The cost and methodologies outlined in the reclamation portion of the permit were equally applied to all road areas.

UDOGM: UMC 776.12(3)(ii)

" (c) Waste rock storage and disposal have not been addressed."

Summit Reply:

Prior to any construction activities, topsoil will be removed. The rock material excavated during the portal construction will be utilized to form the pad (illustrated on Plate 3-1). Summit does not anticipate any rock being generated in the actual mining sequence, and in fact is anticipating purchasing additional fill rock for the parking, coal storage, and fan pads.

UDOGM: UMC 776.12(3)(ii)

" (d) Due to potential secondary effects of subsidence involving horizontal stresses on outcrop areas, substantiation of the 100-foot barrier pillars must be made including specific rock types of affected strata, thicknesses, proximity to the county road, etc.

Summit Reply:

Summit is committed to maintain a minimum of 100-foot barrier pillar to the outcrop. This, and the fact that the coal bed lies approximately 120 feet above the county road and over 200 feet horizontal distance at its closest point, minimizes the possibility that even related stresses could adversely impact the road in the course of mining.

The exploration mine will maintain a minimal distance of 200+ feet from the county road and will maintain the old Boyer works between

its entries and the road. Wherein the old works have had no adverse impacts in over 50 years, it would be a reasonable assumption that the exploratory operation would likewise be secure. The exploration mine will not pull pillars and thus further minimize the potential for subsidence. Appendix A Drill Logs, identifies the specific rock types. The known stratigraphy is as follows:

Cretaceous and Tertiary rocks made up of at least 18,000 feet of strata crop out in the Coalville area. Five of the six formations are of Cretaceous age, two of which are coal bearing. The two thick coal-bearing members have been sub-divided into 3 coal zones: (1) Dry Hollow coal about 900 feet above the base of the Wanship Formation; (2) Wasatch coal about 1,100 feet below the top of the Frontier; and (3) The Spring Canyon zone, about 100 feet above the base of the Frontier Formation. A generalized section of the rock formation in the Coalville Coal Field is shown on Figure 1.

UDOGM: UMC 776.12(3)(iii)

"Reclamation of the proposed construction and facilities should be discussed in light of the operator's ability to determine from the exploration whether or not additional activity will continue. If the possibility of a negative determination may be reached at the termination of the project, a total cost summary should be included in the proposal, discussing various aspects of the reclamation timetable. This timetable should be further defined should the applicant determine that mining will not ensue after completion of the exploration program."

Summit Reply:

The exploration should be completed in May, 1985, 12 months from its onset. The feasibility of continued mining will be completed by

Figure 1

System	Series	Stratigraphic Unit	Thickness (feet)	Description		
CRETACEOUS	Eocene	Knight Formation	2,000+	Red to variegated clays, sands and conglomerates.		
	— Unconformity —					
	Maestrichtian	Echo Canyon Conglomerate	3,000±	Gray, red weathering boulder and pebble conglomerate interbedded with gray and red shale and gray sandstone.		
	Campanian					
	Santonian					
	— Unconformity —					
	Cretaceous	Coniacian	Wanship Formation	Henefer Member	2,450-2,500	Light brown to light yellowish gray, fine- to medium-grained sandstone and red, brown, yellow and tan claystone.
				Upton Sandstone	450	Light yellow to blue-gray, fine-grained, calcareous, well bedded sandstone.
				Judd Shale	350- 760	Gray marine shale, thickens eastward.
				Grass Creek Member	875-1,025	Tan thin-bedded sandstone, alternating with gray shale in upper third with lenticular coarse-grained sandstone and red clay shale in lower part, thickens westward.
				Dry Hollow Member COAL	1,000-1,220	Upper white sandstone hogback, <u>Dry Hollow coal zone</u> , and lower part divided into an upper shale and conglomerate, middle nonmarine shale and basal conglomerate.
	— Unconformity —					
	Turonian	Frontier Formation	Oyster Ridge Sandstone	200- 28	Light yellow, orange to gray, massive, ridge-forming very fine-grained calcareous sandstone.	
			Allan Hollow Shale	780	Gray marine calcareous shale.	
			Coalville Member COAL	175- 223	Dark gray conglomeratic sandstone overlies <u>Wasatch coal zone</u> , yellow-gray ridge-forming fine-grained calcareous sandstone at base, thickens westward.	
	Cenomanian	Frontier Formation	Chalk Creek Member	3,150	Nonmarine redbeds; pink to red claystone, coarse sandstone and conglomerate sandstone.	
			Spring Canyon Member COAL	350+	Dark shales, carbonaceous shales, sandstone and thin coal beds.	
	Albian	Frontier Formation	Longwall Sandstone	70- 100	Light gray ridge-forming, massive, fine-grained sandstone, thickens eastward.	
			Aspen Shale	210	Dark gray shale and tan sandstone with interbedded light gray shale containing teleost fish scales.	
			Kelvin Formation	2,500+	Nonmarine redbeds, shale and sandstone with lenses of conglomerate.	
?	Aptian					
?						
Neocomian						

June 30th, 1985. In the event mining will not ensue, all structures will be removed by August 30th, 1985; Earthwork, recontouring, and topsoil redistribution will be completed by September 30th, 1985 with seeding and mulching to be implemented within 2 weeks of topsoil distribution in order to minimize erosion potential and surface compaction.

Total Cost of Reclamation

Structure removal and portal seals:

160 man hours @ \$10.00/hr.	\$ 1,600.00
18 man hours @ \$35.00/hr. (680 case backhoe)	630.00
12 hours @ \$45.00/hr. (10 yd. end dump & operator)	540.00
	<hr/>
	\$ 2,770.00

Reclamation & TopSoil Distribution:

235 Caterpillar Excavator @ 480 cu. yds./hour 6 hours @ \$190.00/hr.	\$ 1,140.00
D4E Caterpillar Bulldozer 20 hours @ \$90.00/hr.	1,800.00
104 man hours @ \$10.00/hr.	1,040.00
650 Case backhoe 48 hours @ \$35.00/hr.	1,680.00
	<hr/>
	\$ 5,660.00

Seeding & Mulching (see P-47 EPA)	<hr/> 12,420.00
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Total Cost Estimate to reclaim all road, pads, and portals	\$ 20,850.00
---------------------------------------------------------------	--------------

UDOGM: UMC 776.12(3)(iv)

" Coal storage capacity at the site or elsewhere, as well as proposed methods for distribution and testing, should be discussed with reference to UMC 815.17."

Summit Reply:

The proposed exploratory mine has a storage capacity of approximately 1,000 tons of coal on site. The mine has had a number of inquiries from firms which would like varying amounts of coal to run tests on. An example of the correspondence relative to needs are attached in Appendix B. It appears that the demand for coal for test purposes would more than adequately address the disposal of all coal in excess of 1,000 tons.

APPENDIX A

DRILL LOG

HOLE No. BC-1

PROJECT BOYER MINE

DRILLER BOYLES

LOCATION NE 1/4 SEC 36 T3N R6E

COLLAR ELEVATION 6270

TOTAL DEPTH 232

DATE STARTED 7-27-82

DATE FINISHED 8-3-82

ANGLE FROM HORIZONTAL 90°

DIRECTION _____

ELEV.	DEPTH	LOG	DESCRIPTION
	0		SURFACE
		0-8	ALLUVIUM
		8-10	KNIGHTS CONGL.
	10		START MOIST, MED. BROWN SAND IN KNIGHTS CONGL.
		10-15	ANOTHER SAND LAYER IN KNIGHTS.
	20		LT. TAN, SANDY KNIGHTS CONGL.
	30		MUCH SANDIER TEXTURE, MED BROWN SAND. HEAVY GR. MED. STEEL CHIPS IN CUTTINGS, BUT NO DRILLING DIFFICULTY.
	40		LEAVE THIS HOLE & MOVE 10' DUE TO CAVING. OUT OF TA CONGL. & INTO STICKY GREEN BLUE CLAY (SHALE)
	50		
	60		PALE YELLOW, LT. TAN & WHITE SS. (FINE GR.)
	70		WHITE SS. TURNING TO MED. GREY SS.

ELEV.	DEPTH	LOG	DESCRIPTION
	70		
	80		MED. GRAY. FINE TO V.F. SS.
	90		MED GRAY CARBONACEOUS SS.
	100		MED TO DK. GRAY CARBONACEOUS SS.
	110		WHITE SS.
	120		WHITE, V.F. SS. WITH SOME BROWN CLAY BALLS.
	130		MED. GRAY, V.F. SS.
	140		WHITE SS. GREY SHALE W/ SMALL CHIDS OF COAL (1/4" LONG)
	150		COAL CHIDS, JUPIDE (PY?) & BLUE-GREY SHALE.
	160		SAND W/ DARK GRAY LAYERS 29' 4" CORE CORE BRASSING Δ \approx 12° → SHALE → FOSSILIFEROUS SAND → SAND

ELEV.	DEPTH ↓	LOG	DESCRIPTION
	170		
	180		TRANSITIONARY PY CARBONACEOUS SHALE STONED. (BLACK) GREY SHALE
	190		GREY S.S. GREY SHALE, CARBONACEOUS SHALE WITH SANDY LAYERS.
	200		
	210		
	216		COAL
	220		SANDSTONE
	230		LT. GRAY S.S. BLACK SH. WITH LT. GRAY S.S. LENSES TD 232'
			CURE BOX #3 3. - MART. PROP. BOYCE 4. - S.S. INTERVAL 224' TO 232' 6' RECOVERED.

DRILL LOG

HOLE No. BC-2

PROJECT BOYER MINE DRILLER ROY
 LOCATION SE 1/4 SEC 25 T3N R6E
 COLLAR ELEVATION 6258 TOTAL DEPTH 396'
 DATE STARTED 8-4-82 DATE FINISHED 8-9-82
 ANGLE FROM HORIZONTAL 90° DIRECTION _____

ELEV.	DEPTH	LOG	DESCRIPTION
	0	○	<p>GRAY SANDY SILTSTONE</p> <p>YELLOW SANDY & QUARTZ CONGL.</p>
	10		
	20		
	30		BLUE-GRAY SHALE
	40		BROWN SHALE (OR CLAY?)
	50		<p>QUARTZ CONGL.</p> <p>PREPARED UP DUE TO SK. AROUND BIT OR COLLAR</p>
	60		<p>LARGE QUARTZ BOULDER</p> <p>BLUE GRAY SHALE</p>
	70		

ELEV.	DEPTH	LOG	DESCRIPTION
	70		
	80		
	90		
	100		SANDY GRAY SHALE
	110		SANDY GRAY CARBONACEOUS SHALE
	120		GRAY SILT & CLAY SAND
	130		
	140		GRAY CARBONACEOUS SHALE
	150		HARDER, GRAY TO LT. GRAY SS.
	160		

ELEV.	DEPTH	LOG	DESCRIPTION
	160		
	170		
	180		
	190		GRAY & BROWN SHALE DK. GRAY CARBONACEOUS SHALE.
	200		
	210		DK. GRAY SANDY SH. LT. GRAY, GRAY & DK. GRAY SANDY SH. BROWN & CARBONACEOUS SANDY SH.
	220		GRAY, HIGHLY CARBONACEOUS SH. GRAY, CARBONACEOUS SH. WITH LENSES OF CARBON
	230		GRAY & LT. GRAY SANDSTONE GRAY & WHITE S.S.
	240		CARBONACEOUS, BROWNISH-GRAY SS.
	250		GRAY TO LT GRAY HARD SS.

ELEV.	DEPTH	LOG	DESCRIPTION
			GRAY TO BROWNISH-GRAY SH.
			GRAY SS
	260		POST TERCIARY, GRAY TO LT. GRAY CARBONACEOUS S.S. GRAY TO LT. GRAY ^{MED} CARBONACEOUS S.S.
	270		PURPLE GRAY POST TERCIARY SAND - SH. GRAY TO LT. GRAY (H-25) CARBONACEOUS S.S.
	280		BROWNISH-GRAY, CARBONACEOUS SH.
	290		GRAY S.S. GRAY TO LT. GRAY CARBONACEOUS S.S.
	297		
	300		WHITE CARBONACEOUS SANDSTONE BROWNISH-GREY SANDY SHALE BROWNISH-GREY SHALES
	310		MED GRAY F. GRAY S.S. (MIXED CARBONACEOUS)
	320		GRAY TO DK. GRAY & BROWN SOFT SHALE (CARBONACEOUS) DK. GRAY SHALE BROWN SANDY SHALE GRAY TO GRAY-BROWN CARBONACEOUS SH WHITE S.S.
	330		GRAY-BROWN SHALE BROWN TO GRAY CARBONACEOUS SHALE
	340		LT GRAY SANDSTONE GR. - BROWN SANDY SHALE GRAY TO DK. GRAY SANDSTONE BROWN SHALY S.S. GRAY S.S. CARBONACEOUS SILTCLAY

FAST DRILLING

ELEV.	DEPTH	LOG	DESCRIPTION
			GRAY SAND WITH BROWN SHALE LAYERS
			LT. TO MED GRAY CARBONACEOUS SS
			GRAY SS. WITH CARBONACEOUS LAYERS
	350		GRAY, FINE, MEDIUM
			DL. GRAY F. FERTILE SHALE (3" LAYER OF PY W/ PY FOSSILS)
			LT. GRAY F. GRAY SANDY SHALE
	300		DL. GRAY, FERTILE SH SOME LAYERS EXTREMELY FERTILE
			DL. GRAY FERTILE, SANDY SHALE.
	270		DL. GRAY, SANDY, FERTILE SS.
	300		CORE 10'
			COAL @ 384'
	390		W/TE PEBBLES IN GRAY CLAY DL. GRAY SANDY SH. HARD GRAY CARBONACEOUS S.S.
			MED. TO DL. GRAY SANDY SHALE.
			<u>END OF HOLE</u>
	400		

DRILL LOG

HOLE No. BC-3

PROJECT BOYER MINE DRILLER BOYLES

LOCATION SE 1/4 SEC 25 T3N R6E

COLLAR ELEVATION 6379 TOTAL DEPTH 427

DATE STARTED 8-10-82 DATE FINISHED 8-11-82

ANGLE FROM HORIZONTAL 90° DIRECTION _____

ELEV.	DEPTH	LOG	DESCRIPTION
	0		<u>Y.P.V.C.</u> FIRM REDDISH CLAY SOIL
	10		
	20		
	30		
	40		
	50		GRAY TO DK GRAY SHALE
	60		
	70		

ELEV.	DEPTH	LOG	DESCRIPTION
			GRAY TO DK GRAY SHALE
	80		
	90		
	100		
	110		
	120		
	130		
	140		GRAY SHALY S.S.
	150		GRAY CARBONACEOUS S.S.
	160		

ELEV.	DEPTH	LOG	DESCRIPTION
	170		GRAY SHALE
	180		
	190		
	200		
	210		
	220		GRAY SHALE
	230		
	240		ROCKY GRAY SHALE
	250		

ELEV.	DEPTH	LOG	DESCRIPTION
	260		
	270		
	280		ALTERNATING LAYERS OF REDDISH-BROWN SHALY SHALES GRAY SS
	290		HARD LI GRAY SS. W/ SOME REDDISH-GRAY SH LAYERS. REDDISH-GRAY S.S.
	300		HARD GRAY SS. GRAYISH-BROWN CARBONACEOUS SHALY S.S.
	310		
	320		GRAY & REDDISH GRAY SOFT S.S.
	330		
	340		BROWNISH-GRAY SOFT SS

ELEV.	DEPTH	LOG	DESCRIPTION
			LT GRAY SOFT SS.
	320		LT TO MED GRAY SS.
	350		BROWNISH-GRAY SOFT SS.
	370		LT GRAY TO MED GRAY CARBONACEOUS SS.
	380		LT GRAY TO MED GRAY
	390		BROWNISH-GRAY SHALE
	390		GRAY TO BROWNISH-GRAY S.S.
			BROWNISH-GRAY SHALE.
	400		BROWNISH-GRAY TO DK. GRAY CARBONACEOUS SS.
	410		DK BROWN CARBONACEOUS SHALE
	420		QUAL 414
			END OF HOLE

DRILL LOG

HOLE No. BC-4

PROJECT BOYER MINE

DRILLER ROYLES

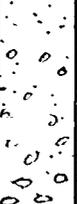
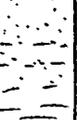
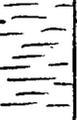
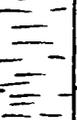
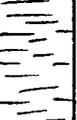
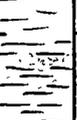
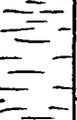
LOCATION SE 14 SEC 25 T3N R6E

COLLAR ELEVATION _____ TOTAL DEPTH 400

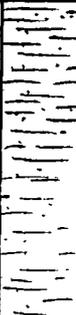
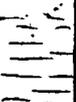
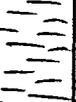
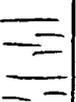
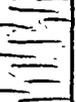
DATE STARTED 8-12-82 DATE FINISHED 8-17-84

ANGLE FROM HORIZONTAL 90° DIRECTION _____

ELEV.	DEPTH	LOG	DESCRIPTION
	0	0.00	SOIL WITH SOME WHITE PEBBLES & COBBLES
	15	15.00	HARD GRAY S.S. SOFT TAN S.S.
	20	20.00	HARD RED S.S. GRAY SHALE
	30	30.00	GRAY SANDSTONE ALTERNATING GRAY TO TAN S.S.
	40	40.00	GRAY SHALE TAN S.S. ALTERNATING TAN S.S. & GRAY SH.
	50	50.00	BROWNISH-GRAY TO GRAY SHALE RED S.S. YELLOW S.S. TAN S.S. HARD TAN S.S. WHITE S.S. LT. TAN S.S. HARD, LT. GRAY PEBBLY S.S. WHITE S.S. (PEBBLY)
	60	60.00	HARD, LT. TAN S.S. HARD WHITE S.S.
	70	70.00	HARD LT TAN PEBBLY S.S.

ELEV.	DEPTH	LOG	DESCRIPTION
	70		SOFTER, LT. TAN TO WHITE SS.
	80		VERY HARD PEBBLY SS.; WHITE IN GEN'L APPEARANCE BUT WITH VARIOUS COLORED QUARTZ CHIPS
	90		VERY HARD QUARTZ COBBLES & BOULDERS
	100		YELLOWISH-BROWN CLAY IN QUARTZ.
	110		GRAY CLAY IN QUARTZ DK GRAY SHALE
	120		MED GRAY SHALE
	130		GRAY TO BROWN SHALE
	140		
	150		
	160		

ELEV.	DEPTH	LOG	DESCRIPTION
			BROWN & GRAY S.S.
	170		
			GRAY S.S.
	180		
	190		GRAY MEDIUM COAR. SILTY S.S.
	200		
	210		
	220		
	230		
	240		TAN S.S.
	250		GRAY SANDY SILTY M. / CLAY

ELEV.	DEPTH	LOG	DESCRIPTION
	250		
	270		HIGHLY CARBONACEOUS GRAY LT. GRAY S.S.
	290		
	310		
	330		GRAY TO DK. GRAY SHALE.
	350		
	370		DK. GRAY & BROWN SHALE
	390		
	410		WHITE S.S.
	430		

ELEV.	DEPTH	LOG	DESCRIPTION
	350		
	360		
	370		DK GRAY FOSSILIFEROUS SH
	380		DK GRAY FOSSILIFEROUS SH w/ MINOR PY
	390		
			CORING AT 394.7
	400		END OF HOLE



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(801) 375-9100

ENVIRONMENTAL SERVICES • ANALYTICAL & AGRICULTURE CHEMISTS

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

BC-1	217-219 (6806)	BC-3	415-417 (6812)
	219-221 (6807)		417-419 (6813)
	221-223 (6808)		419-421.5 (6814)
	223.4-224.4 (6809)	BC-4	395-396 (6815)
BC-2	384-386 (6810)		396-397 (6816)
	386-388 (6811)		

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LEONARD MAKI & ASSOC., INC.
8347 South Mesa Drive
Sandy, UT 84092

SAMPLE DESCRIPTION: Coal Samples
BC-1, -2, -3, -4
AC&R SAMPLE NUMBERS 6806-6816

TTN: Leonard Maki

CHEMIST: STEVE GETZ



American
Chemical
& Research
Laboratories

1780 WEST 2300 SOUTH • SALT LAKE CITY, UTAH 84119
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CERTIFICATE OF ANALYSIS
ENVIRONMENTAL SERVICES • ANALYTICAL & AGRICULTURE CHEMISTS

ANALYSIS

<u>SAMPLE #</u>	<u>WATER</u>	<u>ASH</u>	<u>VOLATILE MATTER</u>	<u>FIXED CARBON</u>	<u>BTU (BTU/lb)</u>	<u>%SULFUR</u>
6806	10.2	9.0	34.4	46.4	10,818	1.19
6807	10.6	14.9	34.7	40.0	11,229	0.66
6808*	10.7	7.4	33.3	48.6	10,548	1.06
6809*	7.6	26.0	28.5	37.9	8,451	4.20
6810	10.4	18.5	36.1	35.0	9,773	1.54
6811	6.4	25.8	27.7	40.1	8,314	2.10
6812*	9.8	7.8	34.6	47.8	10,957	1.55
6813	8.65	21.0	34.7	35.75	10,299	0.98
6814	9.6	13.1	32.9	44.4	10,336	1.82
6815*	10.7	4.7	35.7	51.1	10,801	0.48
6816	10.0	8.5	33.5	48.0	10,937	0.17

*Average of triplicate analysis

CHEMIST: STEVE GETZ

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APPENDIX B



April 6, 1984

SUMMIT COAL COMPANY, INC.
P.O. BOX 294
COALVILLE, UT 84017

Gentlemen:

It is our understanding that your organization is thinking of opening a coal mine located near Coalville, Ut. We would like to take this opportunity to inform you that in the event that that your mine goes into operation we would be interested in testing your coal for use at our plant. Because of the location of your mine compared to the mines we are currently purchasing coal from we feel that there may be substantial cost savings for us. For test purposes we would like to obtain from 100 to 10,000 tons of coal.

We would like for you to call us as soon as you have some test coal available.

Respectfully,

A handwritten signature in cursive script that reads "Kip Bigelow".

Kip Bigelow
Utelite Corp.



Bayer

American & Research Chemical Laboratories

1401 WEST 820 NORTH • PROVO, UTAH 84601
(801) 375-9100

ENVIRONMENTAL SERVICES ● ANALYTICAL & AGRICULTURE CHEMISTS

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

BC-1	217-219 (6806)	BC-3	415-417 (6812)
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	386-388 (6811)		

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LEONARD MAKI & ASSOC., INC.
8347 South Mesa Drive
Sandy, UT 84092

SAMPLE DESCRIPTION: Coal Samples
BC-1, -2, -3, -4
AC&R SAMPLE NUMBERS 6806-6816

ATTN: Leonard Maki

CHEMIST: STEVE GETZ

ANALYSIS

SAMPLE #	WATER	ASH	VOLATILE MATTER	FIXED CARBON	BTU (BTU/lb)	%SULFUR
6806	10.2	9.0	34.4	46.4	10,818	1.19
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*Average of triplicate analysis

CHEMIST: STEVE GETZ

Steve Getz



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ENVIRONMENTAL SERVICES • ANALYTICAL & AGRICULTURE CHEMISTS

Boyer

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TECHNICAL ANALYSIS

SUMMIT COAL COMPANY

BOYER MINE

UMC 776.15-DD

The applicant shall supply the Division with an analysis of the expected (average) density of coal to be mined.

Summit Reply

Upon commencing of mine development, Summit will provide the Division with sequential samples of coal density as per their request. Also attached under "Appendix A" is a copy of core drilling analysis.

UMC 783.14-DD

The applicant shall submit analyses of the roof rock, floor rock and coal seam to be mined depicting the pyritic content and alkalinity of the stratum above and below the coal seam, the clay content immediately below the coal seam and the pyrite, marcasite and sulfur content of the coal seam. All sample locations should be indicated on a map.

Summit Reply:

Upon exposing of the coal seam during portal development, Summit will provide all information requested.

UMC 815.15(j)-TJS

As specified, the applicant must comply with the requirements of 817.46 to minimize disturbance to the prevailing hydrologic balance. As such, the following concerns are raised:

Under 817.46(e) the applicant is required to design the sediment pond to prevent short circuiting. As shown on figures "Sediment Pond Design Details" (Submitted November 13, 1984) and "Surface Facilities Exploration Mine" (Submitted September 7, 1984) the spillway and dewatering structure is located at the same end of the pond as the inflow structures. This allows short circuiting to occur and thereby does not ensure ability to meet effluent limitations. Therefore the applicant must move the spillway and dewatering structure to the far end of the pond from the inflow structures.

As presently designed, the proposed dewatering device cannot be shown to be nonclogging and will also be unable to prevent discharge of oil and grease. The applicant must modify design of dewatering structure to prevent clogging and to prevent discharge of oil and grease.

The figure submitted on September 7, 1984 "Surface Facilities Exploration Mine" shows a drop drain located adjacent to culvert A. This drain appears to convey drainage under the lower parking and storage areas to the sediment pond. In checking elevations of the pond and drop structure, it is difficult to ascertain whether or not water will flow in the required direction. The Division therefore requires that the applicant provide sufficient grade on the drain pipe so that the water will flow to the sediment pond.

Summit Reply:

See revised Plate 7-1a and Plate 7-1b, Appendix B

UMC 815.17 Requirement for a Permit-SL

The applicant must supply proof that the coal mined under the Exploration Permit is being used to test for coal properties as defined by this regulation. This can be done by submittal of letters detailing who is getting the coal, how much they need, and the uses they are testing for.

Summit Reply:

Summit agrees to provide the above documentation.

UMC 817.22 Topsoil: Removal-TLP

How will the information contained in the "Soil Stripping Map" be communicated to equipment operators?

What is meant by the statement on page 7 of the November 13, 1984 response ... "A large portion of the areas will not be disturbed until such time as reclamation commences."? Is the applicant by this statement alluding to the generalization of a borrow area? If so, it puts the application in a new light.

The existing topsoil stockpile will be moved. Its volume as well as its new storage location shall be depicted on a map. This course parallels plans put forth in the original MRP in Chapter 8. Further, Ms. Pruitt did not direct that this soil be redistributed in the letter cited nor did she intend that it should (personal communication). Again, since it is "counted in the area or proposed disturbance" it must be relocated. Please provide plans including soil volume and maps to do so.

Summit Reply:

Summit is committed to hire an expert soil scientist to be onsite during the soil removal operation. This will ensure that all of the desired soil available will be removed with a minimal amount of foreign material.

Relative to the small temporary pile of material that was stockpiled during preliminary exploration activities; this soil was redistributed and reclaimed. However, the land owner allowed some additional disturbance to occur on the site during a flood crisis situation spring of 1984. This disturbance has resulted in a small stockpile of approximately 80 cubic yards. This material will be transported to the primary pile as depicted on Plate 3-1 at the onset of construction.

UMC 817.23 Topsoil: Storage-TLP

Please see comments which pertain to topsoil storage and protection under 817.111-.117 since this is the review of Appendix 3 (where responses to all DOGM comments on 817.23 were referred to).

Summit Reply:

Summit Coal is committed to ensure both stability and integrity of the top soil stockpile and will adhere to all safeguards as outlined in 817.111-.117.

UMC 817.24 Topsoil: Redistribution-TLP

Nothing is found in Appendix 3 to indicate that grading will be done along the contour. This must be shown to be the case. The depth of topsoil and subsoil respectively has not been revised.

Summit Reply:

All soil grading will be done along the contour. A grouzer equipped tractor will be run up and down the contour as a final grooming aid to create grouzer indentation parallel to the contour. This method has proved effective in creating a favorable micro-site to aid in seed establishment. The depth of the topsoil and subsoil are further discussed under Appendix 3.

UMC 817.25 Nutrients and Amendments-TLP

The subsoil will probably need to be fertilized separately. Ripping to the depth proposed in Appendix 3 would not result in mixing of either the subsoil or the greater part of the 6-12 inch topsoil zone. Please revise.

If SCS fertilizer guidelines are to be used to make recommendations they must be included in the application. Alternatively, the applicant may wish to commit to fertilization accordance with Division guidelines in effect at the time of reclamation.

Summit Reply:

Summit Coal will sample all in place subsoils prior to topsoil redistribution. The subsoil will be spread to the desired 6 inches in a 6 inch lift. Fertilizer will be applied on top of this first 6 inch lift at 3/4 the rate indicated by soil tests. The balance of the topsoil (4") will be applied and the remaining $\frac{1}{4}$ application will be incorporated on the surface.

By ripping the soils prior to planting, the fertilizer should be dispersed through the root zone of the soil in such a manner as to enhance long term establishment. The surface application is a proven method to ensure rapid development of the germinating seed. A followup

surface application the preceeding fall ensures establishment of the emergent vegetation.

The rates and types of fertilizers used will be based on UDOGM recommendation pending soil tests upon redistribution.

UMC 817.111-.117 Revegetation-LK

The following comments are specific to Appendix 3 of the November 14, 1984 reply to Technical Deficiency Review.

Summit Reply:

See revised Appendix 3

APPENDIX A

APPENDIX B

REVISED
APPENDIX 3

RECLAMATION PLAN

RECLAMATION PLAN

The following procedures are designed to revegetate and control erosion. They will satisfy the commitments made by Summit Coal Company in their permit while also satisfying DOGM regulations as pertaining to interim reclamation and final reclamation for those areas which will be utilized after mining operations are concluded.

The areas in question are along and adjacent to the mine and powder storage access road and will be of an interim nature, to stabilize newly disturbed areas and a permanent nature upon abandonment.

The actual ground involved comprises approximately 7 acres of disturbed land primarily road and deck area. The actual procedures involve a four phase program: (1) earthwork, (2) hydromulch the entire area to supplement revegetation and control runoff until stabilization is complete, (3) prepare a site which will be stable enough for a period of time to allow vegetation to become established, and (4) to plant seedlings to further stabilize the soil and to satisfy bond release requirements.

PHASE 1 - Earthwork - Original Contour

The roads and pads will be brought back to a reasonable configuration by implementation of a large backhoe unit in conjunction with a crawler tractor (JD450). The actual method will involve the pulling of material from approximately ten feet below the road cut up onto the road surface and spreading and compacting this material with the crawler tractor parallel to the contour, at the same time pulling the leading edge of the high wall down to lessen the degree and angle of the high wall. All work done, both above and below the road, will take into consideration existing vegetation and all effort will be made to minimize disturbance where possible. When there is no alternative other than disturbance, an effort will be made

to relocate earth and maintain existing vegetation in place; attempting to relocate the vegetation in the proximity of the road disturbance. The material redistributed to regain original contour will be compacted to approximately 95% of the original or adjacent undisturbed soil. Upon completion of this step of spreading and compacting, the unconsolidated native material will approach the original configuration of the site prior to disturbance. The native topsoil which was removed from the area will be redistributed to a depth of 6 inches. Upon redistribution of the A horizon soil, all associated compaction resulting from spreading will be alleviated by ripping the entire area to a depth of 20 centimeters to enhance the revegetation effort.

PHASE 2 - Seeding and Mulching

The entire area of disturbance will be drilled and hydroseeded during the first fall following the complete abandonment and earth work. (September thru November).

The largest portion of the recontoured site will facilitate drill seeding. In order to lessen compaction, a rangeland drill seeder pulled behind a small crawler tractor will be utilized. A tentative estimate of the area to drill seed is approximately 4.5 acres. The balance of the area will then be hydroseeded. The seed mix and rate of application is attached. (Appendix 9-1).

In combination with the seed, the following rates of tackifier will be utilized:

(Rates of Tac were developed with respect to velocity and erosive power of water which is proportional to the square root of the slope.) An empirical factor was determined from laboratory and field studies to arrive at the minimum Tac fiber ratio. Thus, 60 pounds of Tac per ton of fiber is about minimum for slopes up to 20% and the empirical factor is determined as $60 - 25\% = 15$. A 25% slope is about

maximum for the minimum amount of Tac. For a 100% slope [1:1 or 45°] the ratio of Tac to Fiber is calculated as:

$$[100\%] [12] = 120 \text{ pounds}$$

SUGGESTED RATIOS OF TAC TO FIBER FOR HYDROSEEDING AND
HYDROMULCHING TO SERVE AS MULCH OR SOIL BINDER

<u>SLOPE ANGLE</u>	<u>SLOPE RATIO</u>	<u>PERCENT SLOPE</u>	<u>LBS. TAC PER TON FIBER</u>	<u>RATIO TAC TO FIBER</u>
	rise:run			
14	1 : 4	25%	60[minimum]*	1 : 30
26	1 : 2	50%	80	1 : 25
33	1 : 1½	66%	100	1 : 20
45	1 : 1	100%	120	1 : 16
57	1½ : 1	150%	140	1 : 14
64	2 : 1	200%	160[minimum]	1 : 12

* 60 pounds is suggested as a minimum to insure excellent stabilization; however, in many conditions 40 pounds of Tac per acre has given excellent results on a 1:4 or less slope.

Following the seeding effort the entire area of disturbance will be hydro-mulched and fertilized. The rate of application of the mulch is:

2,000 lbs/acre on 1:1 slopes
2,000 to 2,500 lbs/acre on 3:1 slopes

The mulch will also be fortified with Tac as previously indicated according to slope. Incorporated in the mulch slurry the following rate of fertilizer will be applied per acre:

80 lbs. N/acre
100 lbs. P₂ O₅/acre
100 lbs. K₂ O₅/acre

Approximately 50% of the above application will be incorporated in the mulch and the balance be added as an over-spray the following fall. Recommendation on fertilizer requirements is based on soils test.

PHASE 3 - Site Preparation

Site stability will be largely accomplished through the grading, compacting and the utilization of a tackifying agent. However, on those areas with slopes of more than 2:1, the following procedures will add an additional parameter of stability and enhance the revegetation efforts. (1) Utilize a crawler tractor with 1½" grousers to run up and down the slope to create small indentations parrallel to the contour, (2) Plant seedlings as pictured on fig. 9-1.

Site preparation is both general and specific in procedures. The sites and methods provide a multitude of purposes and to a large degree are residual for several years. First and foremost, they effectively decrease the angle of repose of the slope in question. In accomplishing this you effectively modify the site and change those conditions which preclude vegetation from becoming established. Second, you change the severity of erosion and, in fact, use those surface waters which heretofore were destructive in nature. This is accomplished by creating basins wherein the water has time to soak in and thus can be utilized by vegetation. This, in turn, decreases the impact on adjacent watersheds and improves quality of surface waters. Those areas which are track rolled provide a more favorable ecosystem than that of an equivalent slope. It facilitates better utilization of grasses and forage for grazing animals; to some degree it modifies climate in that severity of wind and weather is somewhat diminished. Also, the cut face acts in much the same as a snow drift fence does in trapping and causing small areas of snow retention.

PHASE 4 - Planting

The planting of seedlings will be done within 2 years of the seeding effort in order to evaluate the number and species of seedlings necessary to ensure both composition and stocking of woody species to maximize utilization by wildlife and domestic grazing.

The species and numbers of individual plants will be correlated to the reference areas which will be established during July of 1985. In order to determine a bond estimate, 1,000 seedlings per acre will be planted. The following species will be utilized at the rate of:

Birchleaf Mt. Mahogany	50
Gambel Oak	10
Snowberry	40

Planting Procedure:

Planting will be done in the spring using a powered auger with a capability of drilling a 3"+ 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 will be used to pack soil around the tree - the use of a stick or foot is strictly forbidden.

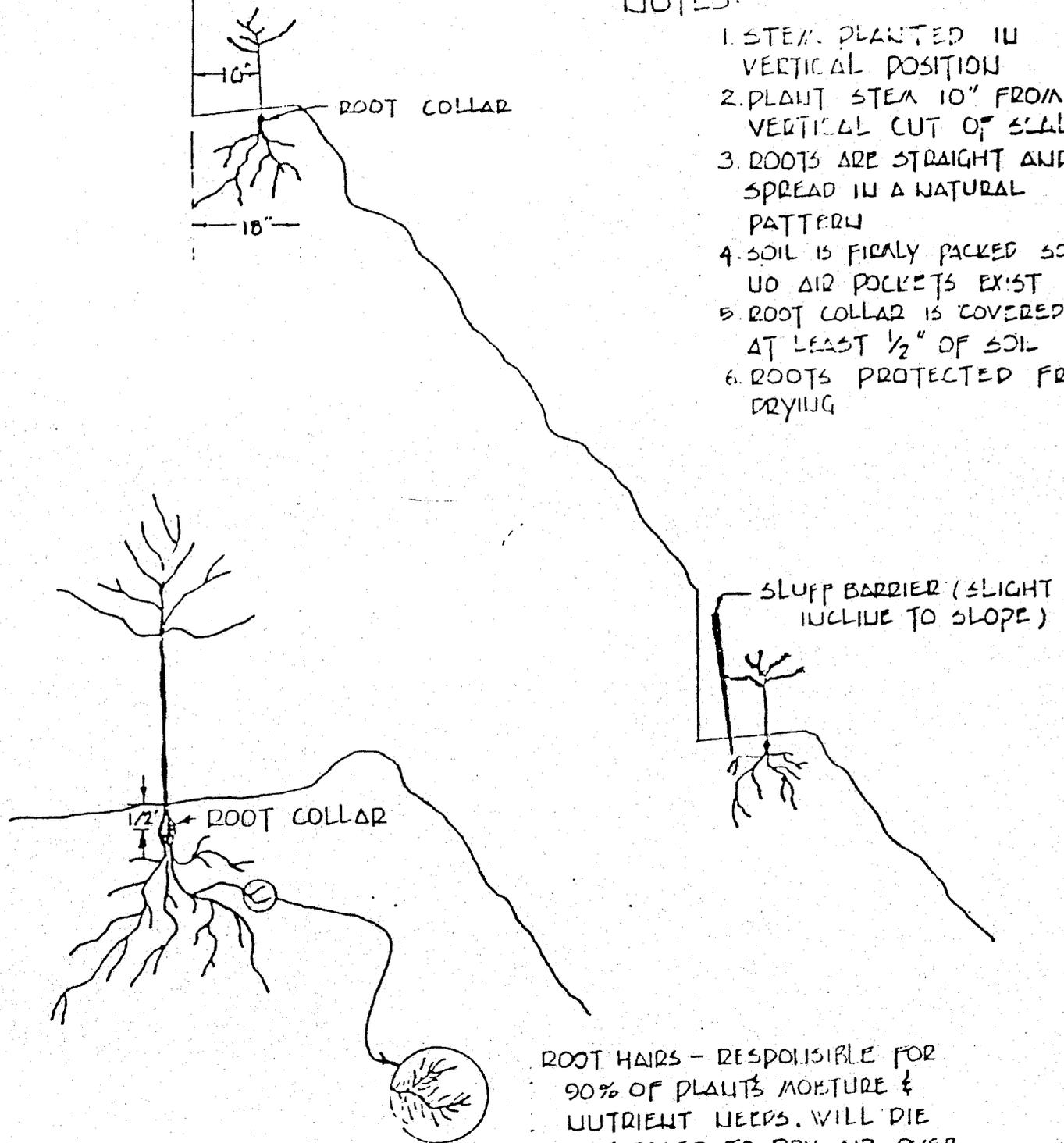
At all times the trees will be protected from direct sun light and special care will be exhibited when lifting the seedling from the planting bag to the prepared hole.

PLANTING PROCEDURE

Figure 9-1

NOTES:

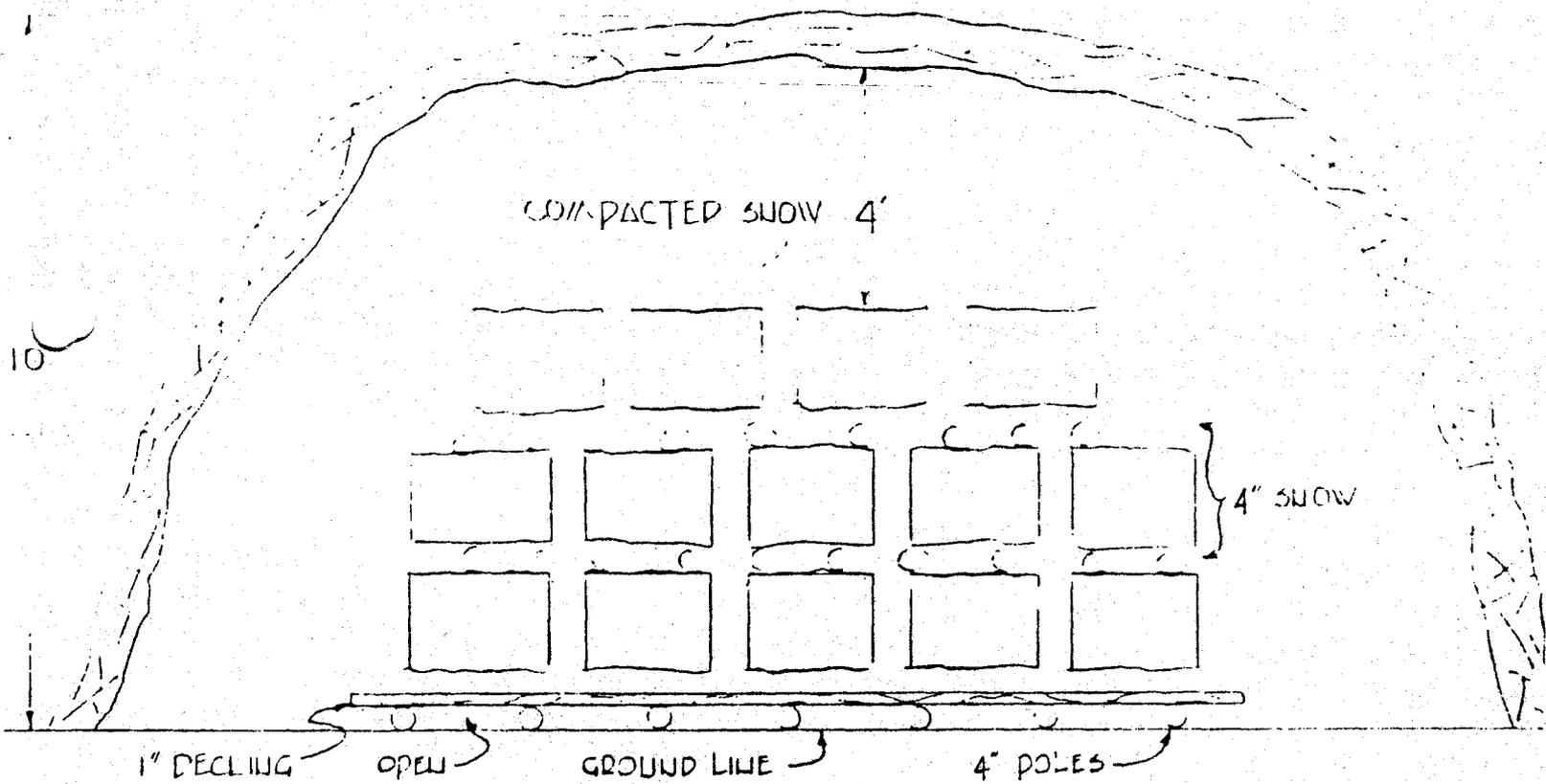
1. STEM PLANTED IN VERTICAL POSITION
2. PLANT STEM 10" FROM VERTICAL CUT OF SCARP
3. ROOTS ARE STRAIGHT AND SPREAD IN A NATURAL PATTERN
4. SOIL IS FIRMLY PACKED SO NO AIR POCKETS EXIST
5. ROOT COLLAR IS COVERED BY AT LEAST 1/2" OF SOIL
6. ROOTS PROTECTED FROM DRYING



ROOT HAIRS - RESPONSIBLE FOR 90% OF PLANT'S MOISTURE & NUTRIENT NEEDS. WILL DIE IF EXPOSED TO DRY AIR OVER 15 SECONDS

SEEDLING STORAGE

Figure 9-2



SNOW CACHE WILL MAINTAIN SEEDLINGS AT 32°F AND RELATIVE HUMIDITY OF 100%. SEEDLINGS SHOULD BE PLACED IN A COOL SHADED AREA 24 HOURS PRIOR TO PLANTING.

Field Storage

Field storage facilities are illustrated in Fig. 9-2. In the event snow is not available, a similar cache can be constructed using wet burlap and damp straw.

The mine will maintain a sorting, packaging and storing tent at the cache site. A sorting table will be set up in one tent. Each seedling must be examined and all that do not have a 2 to 1 crown to root relationship or are damaged must be discarded. The seedlings then will be dipped in a vermiculite slurry and rolled in wet burlap and placed in canvas planting bags.

The trees will only be left in the bags for twenty-four hour periods and ten must be repacked following the same procedures.

The field handling of packed trees requires the crowns be kept moist and the bags covered with insulated tarps and stored in shaded areas.

During breaks, lunch, etc., the crews planting bags will be placed in shaded areas. At the end of each operational day all bags will be unpacked and the trees redipped in vermiculite and rerolled in wet burlap and repackaged to be used first the succeeding day.

Monitoring

Upon completion, the reclaimed area will be monitored to determine when bond release parameters are achieved. If the monitoring indicates inadequacies, the area will be supplemented with additional efforts.

The monitoring procedures will be the same sampling methodologies which will be incorporated in establishment of the reference area determinations.

Appendix 9-1

RECOMMENDED SEED MIX
INTERIM AND PERMANENT RECLAMATION

<u>SPECIES</u>	<u>RATE* PER ACRE</u>
<u>GRASSES</u>	
<u>Agropyron trachycaulum</u> slender wheatgrass	3
<u>A. spicatum</u> Bluebunch wheatgrass	8
<u>Elymus cinereus</u> Basin wildrye	3
<u>Oryzopsis hymenoides</u> Indian ricegrass	3
<u>Poa secunda</u> Sandberg bluegrass	1
<u>FORBS</u>	
<u>Achillea millifolium</u> Western yarrow	.15
<u>Aster chilensis</u> Pacific aster	.15
<u>Hedysarum boreale</u> Northern sweetvetch	.30
<u>Lupinus sericeus</u> Silky sweetvetch	1.
<u>Penstemon palmeri</u> Palmer penstemon	.5
<u>Melilotus officinalis</u> yellow sweet clover	2.
<u>P. strictus</u> Rocky Mountain penstemon	.5
	22.6

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

Appendix 9-1 cont.

ADDITION FOR PERMANENT RECLAMATION MIX

SHRUBS

<u>Amelanchier alnifolia</u>	4
serviceberry	
<u>Artemisia tridentata ssp. vaseyana</u>	.15
Big sagebrush	
<u>Cercocarpus montanus</u>	6
Birchleaf mountain mahogany	
<u>Purshia tridentata</u>	1.
Antelope bitterbrush	
<u>Symphoricarpos albus</u>	1.
Common snowberry	_____
For hydroseeding	34.75 #/acre
$\frac{1}{2}$ application for drill seeded areas	17.5 #/acre



BLACKHAWK ENGINEERING, CO.

Rt. 1, Box 146-H5 - Helper, Utah 84526 - Telephone (801) 637-2422

December 9, 1984

Mr. Leonard J. Maki
Summit Coal Co.
8347 South Mesa Drive
Sandy, Utah 84092

Re: Boyer Mine - Sediment Pond

Dear Mr. Maki:

At your request, I have examined the feasibility of moving the outlet of the sedimentation pond to the opposite end of the present proposed inlet and cleaning ramp. I do not recommend moving the outlet for the following reasons:

- (1) The present outlet location is in the widest part of the pond. This lessens the possibility of sediment build-up around the outlet pipe, which could result in eventual plugging of the decant system and outlet;
- (2) The opposite end of the pond is the narrowest part of the pond bottom. My experience with sediment ponds has been that fine sediment tends to migrate to the outlet structure where it will accumulate. This could be particularly hazardous in the confined space at the opposite end of the pond;
- (3) The present overflow location was chosen because it allows the outlet culvert to pass through the least amount of dam embankment. To move it to the other end would result in the culvert passing through approximately 100' of fill with 6 seepage collars, instead of passing through only 60' with 3 seepage collars. From an engineering standpoint, I recommend that such culverts pass through as little dam embankment as possible;
- (4) The pond is designed to provide for a theoretical 24-hour detention time for a 10-year, 24-hour event; therefore, it is unlikely that the proximity of the inlet to the outlet structure will have a significant impact on the quality of the discharge - particularly with the installation of the oil-skimmer, which will also act as a baffle.



BLACKHAWK ENGINEERING, CO.

Rt. 1, Box 146-H5 - Helper, Utah 84526 - Telephone (801) 637-2422

(2)

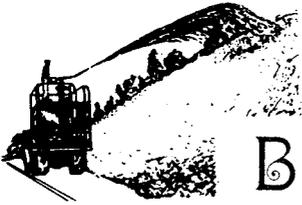
I therefore recommend that the outlet structure be left in its present proposed location. If necessary, the inlet could be moved to the opposite end as shown on Plate 7-1a. In the event this is still unacceptable to the agency, an alternate outlet location has also been shown on Plate 7-1a.

If you have any questions or need any further information, please let me know.

Respectfully,


Dan W. Guy,
President





B & R Reclamation Specialists

BILL O'BRIEN

'Hydro-Seeding ★ Hydro-Mulching'

P. O. Box 360
Helper, Utah 84526
(801) 472-5186

December 6, 1984

E.I.S.
Melvin A. Coonrod
P.O. Box 358
Elmo, Utah 84521

Re: Reclamation Costs

Dear Mel:

As you requested, I have compiled a list of contracts excluding seed that our firm completed in 1984. I have broken down materials as Conwed mulch, and have listed only those jobs where 2,000 lbs. of mulch were oversprayed on a drill or hydro seeded site.

1. Exxon, Gold Basin Rd. Project - 125 acre site
2,500 # mulch, 120 TerraTac AR \$ 980.00 /acre
less \$150.00/acre seed
2. Beaver Creek #4 Mine Reclamation
2,000 # mulch, 100 # TerraTac NF 850.00/acre
3. Beaver Creek, Wild Horse Ridge Rd. reclamation (app. 10 acres)
Application same as 2 850.00/acre
4. Scofield State Park
Drill seeding only 86.00/acre
5. Marathon Oil, Drill Pads (2 acres)
Drill seed, 2,000# mulch, 100# Tac,
200# fertilizer \$1,000.00/acre

The following prices are labor only:

Hydro seeding (No hose work)	\$120.00/acre
Hydro mulching (no hose work)	240.00/acre
Drill seeding	90.00/acre
Hydro fertilizing	50.00/acre
Planting seedlings 0 to 20% slope	.50/seedling
20 to 40% slope	.70/seedling
40%+ slope	1.00/seedling

Needless to say, these prices are flexible and must take into consideration the size of the job, accessibility, and distance from Carbon and Emery counties.

I hope this is what you need and we would appreciate an opportunity to bid on any work your client may have coming up.

Sincerely,



William O'Brien
General Partner, B & R Reclamation

SUMMIT COAL COMPANY REPLY TO
TECHNICAL DEFICIENCY REVIEW

OCTOBER 10, 1984

RECEIVED

NOV 14 1984

DIVISION OF OIL
GAS & MINING

Summit Reply:

See Appendix 1

UMC 806.14 Liability Insurance

Proof of liability insurance as required by this section, must be submitted to the Division before exploration can be approved.

Summit Reply:

See Document Section end of Reply.

UMC 815.15(h) Underground Openings

Permanent closure of mine openings has not been addressed in the CEP deficiency response. The applicant must respond to sections UMC 817.13 - .15 as required. Temporary and permanent closures shall be equal or superior to those required under 30 CFR 75.1711.

Summit Reply:

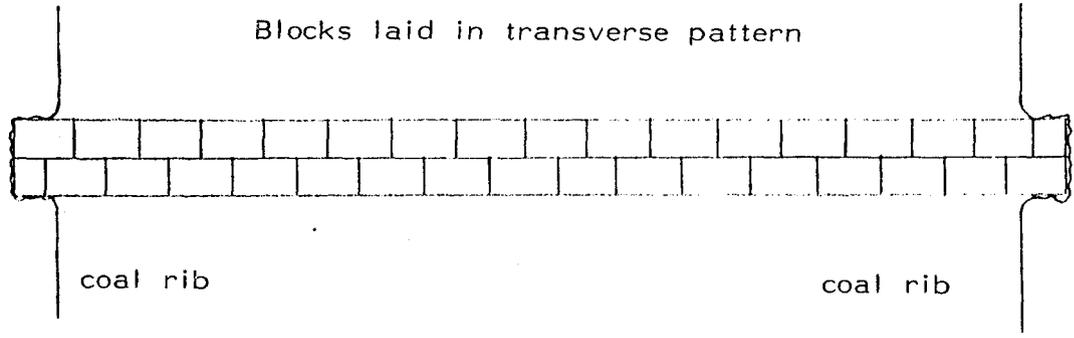
Sealing of Mine Openings

Permanent Seals

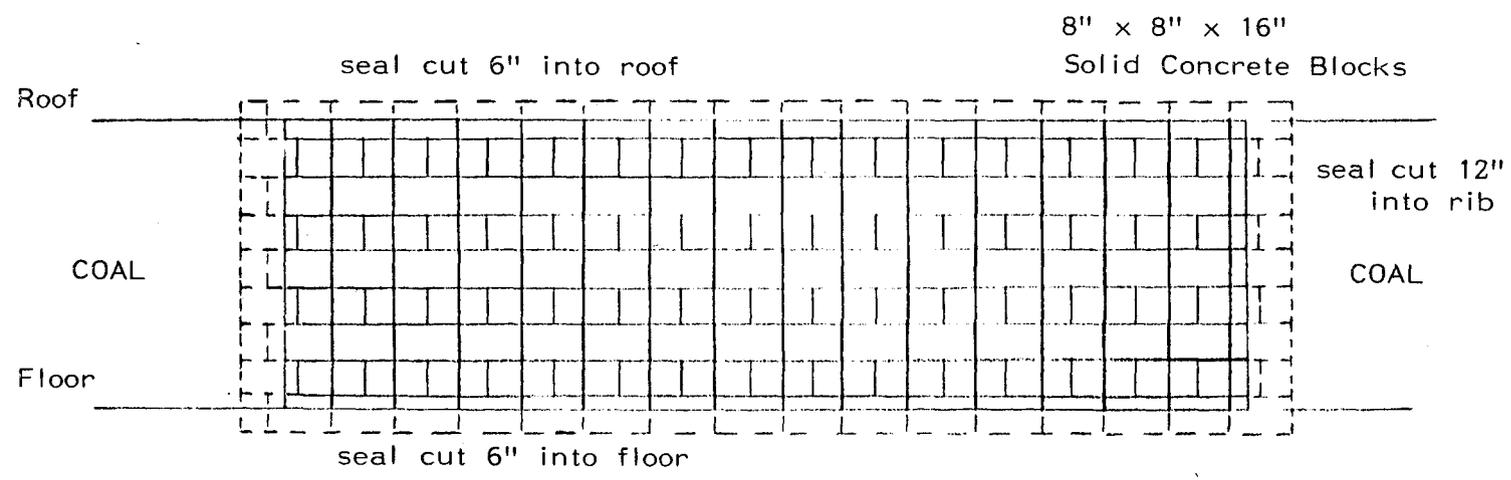
Upon completion of mining activities the portals will be permanently sealed as per 30 CFR 75.1711. The seals will consist of a double row of concrete blocks laid in a transverse pattern, placed 25' to 50' inby the portal. The area outby the portal will then be backfilled to minimize roof breakage in this area. Portal structures will then be removed and exposed coal seams, including portal areas, will be

covered with a minimum of 3' of incombustible material during reclamation of pad and highwall areas.

Based on hydraulic and geologic data from this area, mine drainage will not be a problem, and hydrologic seals are not required. Details of the seals are shown on the enclosed figures.



TOP VIEW

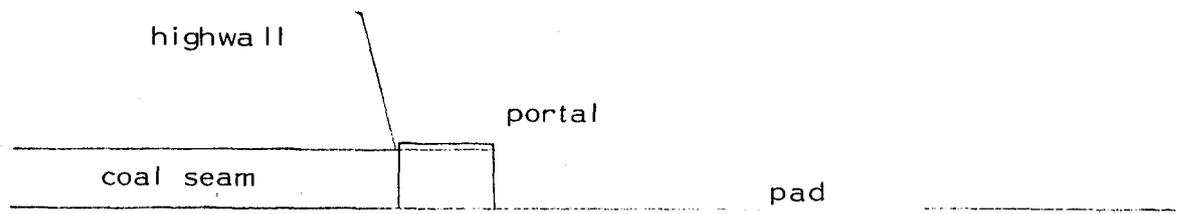


FRONT VIEW

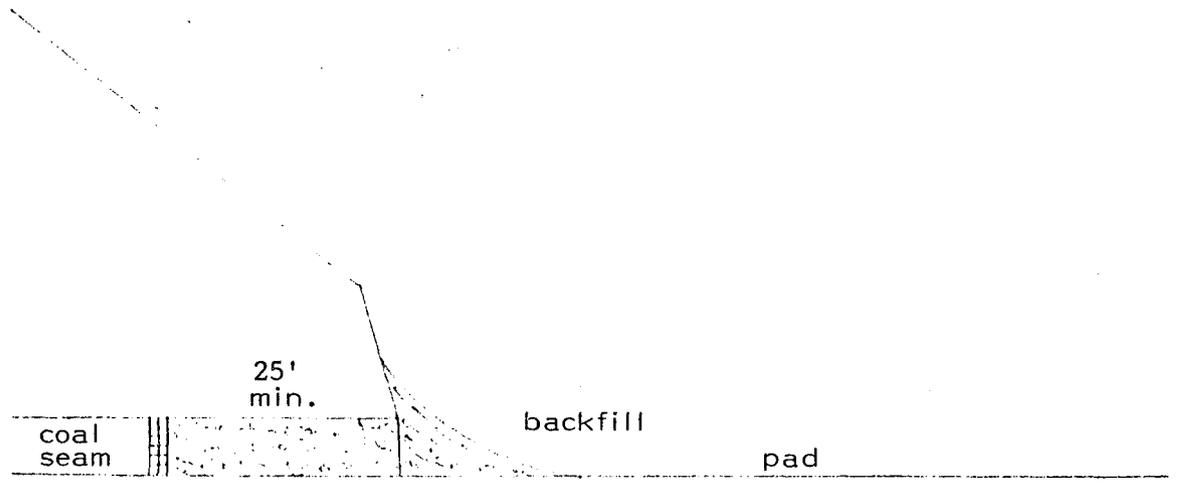
BY Dan GUY DATE 11/1/84
CHKD. BY DATE

SUBJECT TYPICAL PORTAL SEALING
Scale - 1" = 20'

SHEET NO. OF
JOB NO.



TYPICAL CONSTRUCTION



TYPICAL RECLAMATION

UMC 815.15(j) Sediment Control Measures

Since the sediment pond has been sized to handle the flow from a 100 year-24 hour event, it is sized adequately to handle the flow and sediment produced during the 10 year-24 hour event.

However, the sediment pond must have a dewatering device, principal spillway, and emergency spillway. No plans or calculations have been submitted for these structures. Information for the dewatering device must demonstrate that the volume between the principal spillway and the dewatering device is capable of containing the 10 year-24 hour storage volume. This requires submission of the elevations of both the principal spillway and the dewatering device. The combined capacity of the principal spillway and the emergency spillway must be able to handle the 25 year-24 hour peak flow. The emergency spillway must be located at least one (1) foot higher than the principal spillway. (See UMC 817.46)

These plans must be submitted and approved before a permit for exploration can be granted.

Summit Reply:

See Appendix 2

UMC 817.22 Topsoil: Removal

The applicant must provide the exact acreage associated with Areas C and D.

The six-inch soil redistribution depth is not justified based on the soils data and descriptions provided and cannot be approved. Assuming a topsoil redistribution depth of 1 foot, a deficiency of 5,645 cubic yards exists; while for a 1.5 foot redistribution depth, an 11,290 cubic yard deficit exists (Figures based on those provided by the applicant in Appendix 8-5). Note: the soil volume in the existing stockpile, soil removal to a depth of 18 inches in the Moweba series (area F) and topsoil removal in areas D and E would appear to offset this deficit. It also, appears that a 1-foot topsoil redistribution depth coupled with a subsoil depth of at least 6 inches will be necessary for Division approval.

Please provide the volume of the existing topsoil stockpile.

A specific soil stripping map reflecting approved removal depths must be provided.

A map which includes the existing soil stockpile location must also be supplied. This stockpile is not shown on plate 3-1.

Summit Reply:

Plate 8-1a attached, indicates the volumes of usable soil associated with each area. Area "C" is less than .18 acres, area "D" is approximately .89 acres.

Summit is committed to reclaim all disturbed areas in a manner which will best ensure success. Since the Division feels that 12" of topsoil over 6" of subsoil is necessary, Summit will adhere to this recommendation. Plate 8-1a indicates the quantities of soil which are available on-site for reclamation. A large portion of the areas will not be disturbed until such time as reclamation commences. It is Summit's intent to protect these areas of soil reserves by maintaining the existing vegetation and safeguarding the integrity of the soils through corrective berming and posting as top soil storage areas.

The existing topsoil stock pile is in the process of being removed and redistributed as per the directive of Ms. Sandy Pruitt, July 2, 1984. (Certified Receipt # P492-430-084). Wherein this material is counted in the area of proposed disturbance, it's temporary location and quantity was considered irrelevant at this time.

UMC 817.23 Topsoil Protection

The specific seed mix to be utilized for topsoil stockpile protection must be provided. The interim seed mix referred to in the last submittal was not provided and must be submitted for review and approval.

The applicant must commit to a specific detailed plan for mulching; listing several options or possibilities is not acceptable. Mulching

should take place concurrently with seeding. The applicant must commit to seeding and mulching together on a daily basis. From the time table, it appears mulching will take place at least a week after seeding; this is unacceptable.

Summit Reply:

See Appendix 3

UMC 817.24 Topsoil: Redistribution

Specific methods to be performed by each piece of equipment described in the applicant's response to be employed in grading and soil redistribution must be provided. The applicant must demonstrate that grading will be done along the contour.

Summit Reply:

See Appendix 3 (Earth Moving)

UMC 817.25 Nutrients and Amendments

The applicant must commit to a sampling program following soil redistribution, to a depth of at least 18 inches with six inch increments. Subsoil must be sampled separately.

Please provide a listing of the trace elements to be sampled and describe why it is expected that this is necessary. How will fertilizer application rates be determined?

Any required fertilizer must be distributed uniformly in the root zone. It is not likely that this can be achieved using hydromulching

techniques. Please propose satisfactory methods which entail using equipment capable of incorporating the nutrients into the root zone.

Summit Reply:

Summit Coal will sample all in place subsoils prior to topsoil redistribution. The topsoil will be spread to the desired 12 inches in 6" lifts. Fertilizer will be applied on top of the first 6" lift at $\frac{3}{4}$ the rate indicated by soil tests. The balance of the soil will be applied and the remaining $\frac{1}{4}$ application will be incorporated in the mulch application.

By ripping the soils prior to planting, the fertilizer should be dispersed through the root zone of the soil in such a manner as to enhance long term establishment. The surface application is a proven method to ensure rapid development of the germinating seed. A follow-up surface application the preceeding fall ensures establishment of the emergent vegetation.

The rates and types of fertilizers used will be based on SCS recommendation pending soil tests upon redistribution. A sample soils test is included in Appendix 3.

LEONARD MAKI & ASSOC., INC.
8347 South Mesa Drive
Sandy, UT 84092

SAMPLE DESCRIPTION: Coal Samples
BC-1, -2, -3, -4
AC&R SAMPLE NUMBERS 6806-6816

CHEMIST: STEVE GETZ

ATTN: Leonard Maki



American
Chemical
& Research
Laboratories

ENVIRONMENTAL SERVICES • ANALYTICAL & AGRICULTURE CHEMISTS
1780 WEST 2300 SOUTH • SALT LAKE CITY, UTAH 84119
(801) 974-0900

CERTIFICATE OF ANALYSIS

ANALYSIS

SAMPLE #	WATER	ASH	VOLATILE MATTER	FIXED CARBON	BTU (BTU/lb)	%SULFUR
6806	10.2	9.0	34.4	46.4	10,818	1.19
6807	10.6	14.9	34.7	40.0	11,229	0.66
6808*	10.7	7.4	33.3	48.6	10,548	1.06
6809*	7.6	26.0	28.5	37.9	8,451	4.20
6810	10.4	18.5	36.1	35.0	9,773	1.54
6811	6.4	25.8	27.7	40.1	8,314	2.10
6812*	9.8	7.8	34.6	47.8	10,957	1.55
6813	8.65	21.0	34.7	35.75	10,299	0.98
6814	9.6	13.1	32.9	44.4	10,336	1.82
6815*	10.7	4.7	35.7	51.1	10,801	0.48
6816	10.0	8.5	33.5	48.0	10,937	0.17

*Average of triplicate analysis

CHEMIST: STEVE GETZ

Steve Getz

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American & Research Chemical Laboratories

1401 WEST 820 NORTH • PROVO, UTAH 84601
(801) 375-9100

ENVIRONMENTAL SERVICES ● ANALYTICAL & AGRICULTURE CHEMISTS

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

BC-1	217-219 (6806)	BC-3	415-417 (6812)
	219-221 (6807)		417-419 (6813)
	221-223 (6808)		419-421.5 (6814)
	223.4-224.4 (6809)	BC-4	395-396 (6815)
BC-2	384-386 (6810)		396-397 (6816)
	386-388 (6811)		

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APPENDIX 1

Detailed Timetable and Cost Estimate for
Reclamation of the Boyer Mine Exploration

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 Portals - 1 week	1 week
2. Remove Structures - 2 weeks	3 weeks
3. Soil Placement (backfilling and grading)	
a. Upper Pad - $\frac{1}{2}$ week	$3\frac{1}{2}$ weeks
b. Middle Pad - 2 weeks	$5\frac{1}{2}$ weeks
c. Lower Pad - $1\frac{1}{2}$ weeks	7 weeks
d. Parking Lot and Pond - 1 week	8 weeks
4. Seedbed Preparation - 1 week	9 weeks
5. Reseeding & Fertilization - 1 week	10 weeks
6. Mulching - 1 week	11 weeks
7. Protective Fence - 2 weeks	13 weeks

The above reclamation tasks are therefore proposed to be completed within 13 weeks following the start of reclamation activities.

Summary Cost Estimate

1. Seal Portals	\$ 1,350.00
2. Remove Structures	8,191.00
3. Soil Placement	16,100.00
4. Seedbed Preparation and Handling	7,376.00
5. Reseeding & Fertilizing	9,625.00
6. Mulching	2,450.00
7. Protective Fencing	4,600.00
	<hr/>
	\$49,692.00
Maintenance & Monitoring	2,500.00
Mobilization / Demobilization	2,500.00
Forman	7,800.00
	<hr/>
1984 Dollars	\$62,492.00

Detailed Cost Estimate

Equipment Costs

1. Loader - Cat 950B	\$75.50/hr
Operator	<u>15.00/hr</u>
	\$90.50/hr
2. Crane - Groves RT-580 (20 T)	\$62.50/hr
Operator	<u>15.00/hr</u>
	\$77.50/hr
3. Dozer - Cat D-6	\$60.00/hr
Operator	<u>15.00/hr</u>
	\$75.00/hr
4. Backhoe - Case 680	\$35.00/hr
Operator	<u>15.00/hr</u>
	\$50.00/hr
5. Truck - 10 yd	\$50.00/hr
Operator	<u>15.00/hr</u>
	\$65.00/hr

1. Seal Portals

Labor - 2 men X \$100/man day X 3 days	\$600.00
Materials - 200 blocks/seal X 3 seals X \$1.00/block	600.00
Mortar	<u>150.00</u>
	1,350.00

2. Remove Structures

Fan

Labor - 2 men X \$100./day X 1 day	\$200.00
Truck & Operator - 4 hrs X \$65/hr	260.00
Crane & Operator - 2 hrs X \$77.50/hr	<u>155.00</u>
	\$815.00

Shop

Labor - 3 men X \$100/day X 2 days	\$600.00
Truck & Operator - 16 hrs X \$65/hr	1,040.00
Crane & Operator - 16 hrs X \$77.50/hr	<u>1,240.00</u>
	\$2,880.00

Substation

Labor - 2 men X \$100/day X 1 day	200.00
Truck & Operator - 4 hrs X \$65/hr	260.00
Crane & Operator - 2 hrs X \$77.50/hr	<u>155.00</u>
	\$615.00

Office & Bathhouse Trailers

Labor - 2 men X \$100/day X 1 day	\$ 200.00
Truck & Operator - 8 hrs X \$65/hr	<u>520.00</u>
	\$ 720.00

Water Tank & Water System

Labor - 2 men X \$100/day X 2 days	400.00
Truck & Operator - 16 hrs X \$65/hr	1,040.00
Crane & Operator - 8 hrs X \$77.50/hr	<u>620.00</u>
	\$2,060.00

Clean-up

Labor - 2 men X \$100/day X 2 days	400
Truck & Operator - 8 hrs X \$65/hr	520.00
Loader & Operator - 2 hrs X \$90.50/hr	<u>181.00</u>
	\$1,101.00

3. Soil Placement (Backfilling & Grading)

Upper Pad (C-172 cu. yds; F-200 cu. yds.)

Backhoe & Operator - 4 hrs X \$50/hr	200.00
Cat & Operator - 4 hrs X \$75/hr	<u>300.00</u>
	\$500.00

Middle Pad (C-5108 cu. yds.; F-3719 cu. yds)

Backhoe & Operator - 85 hrs X \$50/hr	4,250.00
Cat & Operator - 37 hrs X \$75/hr	2,775.00
Labor - 2 men X \$100/day X 3 days	<u>600.00</u>
	\$7,625.00

Lower Pad (C-3600 cu. yds; F-2593 cu. yds.)

Backhoe & Operator - 60 hrs X \$50/hr	3,000.00
Cat & Operator - 26 hrs X \$75/hr	1,950.00
Labor - 2 men X \$100/day X 3 days	<u>600.00</u>
	\$5,550.00

Parking Lot & Pond (C-500 cu. yds.; F-2738 cu. yds.)

Backhoe & Operator - 8 hrs X \$50/hr	400.00
Cat & Operator - 27 hrs X \$75/hr	<u>2,025.00</u>
	\$2,425.00

APPENDIX 2

Sediment Pond Specifications

- | | | |
|------|----------------------------------------------------------------------------------------------------------------|-----------------------|
| 1. | Drainage area to pond | 4.82 acres |
| * 2. | 100 yr/24 hour precipitation event | Use 3" |
| 3. | Required capacity for 100 yr./24 hour event | 1.205 ac. ft. |
| 4. | Pond capacity at overflow | 1.41 ac. ft. |
| 5. | Pond depth at overflow | 9.0 ft. |
| * 6. | 10 yr./24 hour precipitation event | Use 2" |
| 7. | Required capacity for 10 yr./24 event | 0.803 ac. ft. |
| 8. | Pond capacity at principal spillway | 1.10 ac. ft. |
| 9. | Pond depth at principal spillway | 8.0 ft. |
| 10. | Dam height 10 ft. Freeboard | 1.0 ft. |
| 11. | Excess capacity for 100 yr./24 hour event | 0.205 ac. ft. |
| 12. | Excess capacity for 10 yr./24 hour event | 0.607 ac. ft. |
| 13. | Planned sediment storage capacity | 0.117 ac. ft. |
| 14. | Overflow | (0.607 cfs) |
| | a. Required area | 0.122 ft ² |
| | b. Actual area | 3.0 ft ² |
| 15. | Principal Spillway | (0.356 cfs) |
| | a. Required area | 0.07 ft ² |
| | b. Actual area | 3.14 ft ² |
| 16. | Dewatering Device | |
| | a. 8 rows of $\frac{1}{4}$ " holes on 4" centers. | |
| | b. Drains to base of level for 10 yr./24 hour runoff storage. | |
| | c. Dewatering rate: | |
| ** | (1) $Q = 19.636 K d^2 h$; $K = .61$; $d = .25"$, $h = 2'$. | |
| | (2) $Q = 1.6 \text{ gpm}/\frac{1}{4}" \text{ hole} \times 96 \text{ holes} = 101.6 \text{ gpm}$; Use 100 gpm. | |
| | (3) Inflow from 10 yr/24 hour event - 261,749 gal. | |

(4) Theoretical dewatering time

43.6 hrs.

17. Conclusions:

- a. Pond size is adequate to contain 100 yr/24 hour precipitation event.
- b. Pond size is adequate to contain 10 year/24 hour precipitation event between bottom of dewatering device and 1' below emergency spillway.
- c. Dewatering device will allow for theoretical 24 hour retention time.
- d. Pond sizing is adequate to allow for .117 ac. ft. of sediment storage (storage to 2.0' depth).
- e. Overflow and principal spillway are adequately sized to pass projected flows.

* N.O.A.A. - "Precipitation Frequency Atlas of Western U.S.", (1973).

** Cameron Hydraulic Data, 12th Edition, "Flow Through Orifices and Nozzles", p. 67.

APPENDIX 3

RECLAMATION PLAN

9.7 RECLAMATION PLAN

The following procedures are designed to revegetate and control erosion. They should, to a large degree, satisfy the commitments made by Summit Coal Company in their permit while also satisfying DOGM regulations as pertaining to interim reclamation and final reclamation for those areas which will be utilized after mining operations are concluded.

The areas in question are along and adjacent to the mine and powder storage access road and will be of an interim nature, to stabilize newly disturbed areas and a permanent nature upon abandonment.

The actual ground involved comprises approximately 7 acres of disturbed land primarily road and deck areas. The actual procedures involve a four phase program; (1) earthwork, (2) hydromulch the entire area to supplement revegetation and control run-off until stabilization is complete, (3) prepare a site which will be stable enough for a period of time to allow vegetation to become established, and (4) to plant seedlings to further stabilize the soil and to satisfy bond release requirements.

PHASE 1 - Earthwork - Original Contour

The roads and pads can be brought back to a reasonable configuration by implementation of a large backhoe unit in conjunction with a crawler tractor (JD450). The actual method will involve the pulling of material from approximately ten feet below the road cut up onto the road surface and spreading and compacting this material with the crawler tractor, at the same time pulling the leading edge of the high wall down to lessen the degree and angle of the high wall. All work done, both above and below the road, should take into consideration existing vegetation and all effort should be made to minimize disturbance where possible. When there is no alternative

other than disturbance, an effort can be made to relocate earth and maintain existing vegetation in place; attempting to relocate the vegetation in the proximity of the road disturbance. The material redistributed to regain original contour should be compacted to approximately 95% of the original or adjacent undisturbed soil. Upon completion of this step of spreading and compacting, the unconsolidated native material will approach the original configuration of the site prior to disturbance. The native topsoil which was removed from the area will be redistributed to a depth of 6 inches. Upon redistribution of the A horizon soil, all associated compaction resulting from spreading will be alleviated by ripping the entire area to a depth of 20 centimeters to enhance the revegetation effort.

PHASE 2 - Seeding and Mulching

The entire area of disturbance should be drilled and hydroseeded during the first Fall following the complete abandonment and earth work. (September thru November).

The largest portion of the recontoured site will facilitate drill seeding. In order to lessen compaction, a rangeland drill seeder pulled behind a small crawler tractor would be utilized. A tentative estimate of the area to drill seed is approximately 4.5 acres. The balance of the area would then be hydroseeded. The seed mix and rate of application is attached. [Appendix 9-1].

In combination with the seed, the following rates of tackifier should be utilized:

[Rates of Tac were developed with respect to velocity and erosive power of water which is proportional to the square root of the slope.] An empirical factor was determined from laboratory and field studies to arrive at the minimum Tac fiber ratio. Thus, 60 pounds of Tac per ton of fiber is about minimum for slopes up to 20% and the empirical factor is determined as $60 - 25\% = 15$. A 25% slope is about

maximum for the minimum amount of Tac. For a 100% slope [1:1 or 45°] the ratio of Tac to Fiber is calculated as:

$$[100\%] [12] = 120 \text{ pounds}$$

SUGGESTED RATIOS OF TAC TO FIBER FOR HYDROSEEDING AND
HYDROMULCHING TO SERVE AS MULCH OR SOIL BINDER

<u>SLOPE ANGLE</u>	<u>SLOPE RATIO</u>	<u>PERCENT SLOPE</u>	<u>LBS. TAC PER TON FIBER</u>	<u>RATIO TAC TO FIBER</u>
	rise:run			
14	1 : 4	25%	60[minimum]*	1 : 30
26	1 : 2	50%	80	1 : 25
33	1 : 1½	66%	100	1 : 20
45	1 : 1	100%	120	1 : 16
57	1½ : 1	150%	140	1 : 14
64	2 : 1	200%	160[minimum]	1 : 12

* 60 pounds is suggested as a minimum to insure excellent stabilization; however, in many conditions 40 pounds of Tac per acre has given excellent results on a 1:4 or less slope.

Following the seeding effort the entire area of disturbance will be hydro-mulched and fertilized. The rate of application of the mulch is:

1,200 to 1,500 lbs/acre on 1:1 slopes

2,000 to 2,500 lbs/acre on 3:1 slopes

The mulch should also be fortified with Tac as previously indicated according to slope. Incorporated in the mulch slurry the following rate of fertilizer will be applied per acre:

80 lbs N/acre
100 lbs. P₂ O₅/acre
100 lbs. K₂ O₅/acre

Approximately 50% of the above application can be incorporated in the mulch and the balance be added as an over-spray the following Fall. Recommendation on fertilizer requirements is based on soils test.

PHASE 3 - Site Preparation

Site stability will be largely accomplished through the grading, compacting and the utilization of a tackifying agent. However, on those areas with slopes of more than 2:1, the following procedures will add an additional parameter of stability and enhance the revegetation efforts.

Site preparation is both general and specific in procedures. The sites and methods provide a multitude of purposes and to a large degree are residual for several years. First and foremost, they effectively decrease the angle of repose of the slope in question. In accomplishing this you effectively modify the site and change those conditions which preclude vegetation from becoming established. Second, you change the severity of erosion and, in fact, use those surface waters which heretofore were destructive in nature. This is accomplished by creating basins wherein the water has time to soak in and thus can be utilized by vegetation.

This, in turn, decreases the impact on adjacent watersheds and improves quality of surface waters. Those areas which are terraced provide a more favorable ecosystem than that of an equivalent slope. It facilitates better utilization of grasses and forage for grazing animals; to some degree it modifies climate in that severity of wind and weather is somewhat diminished. Also the cut face acts in much the same as a snow drift fence does in trapping and causing small areas of snow retention.

PHASE 4 - Planting

The planting of seedlings will be done within 2 years of the seeding effort 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.

The species and numbers of individual plants will be correlated to the Range Transects which were established during July of 1982.

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 should be compacted back around the roots being careful to leave no air pockets or loose dirt [which would constitute settling]. The tree should 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 - the use of a stick or foot is strictly forbidden.

At all times the trees will be protected from direct sun light and special care will be exhibited when lifting the seedling from the planting bag to the prepared hole.

Field Storage

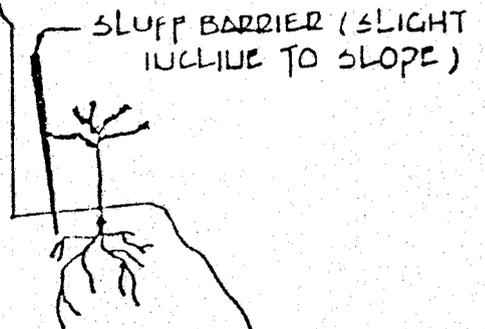
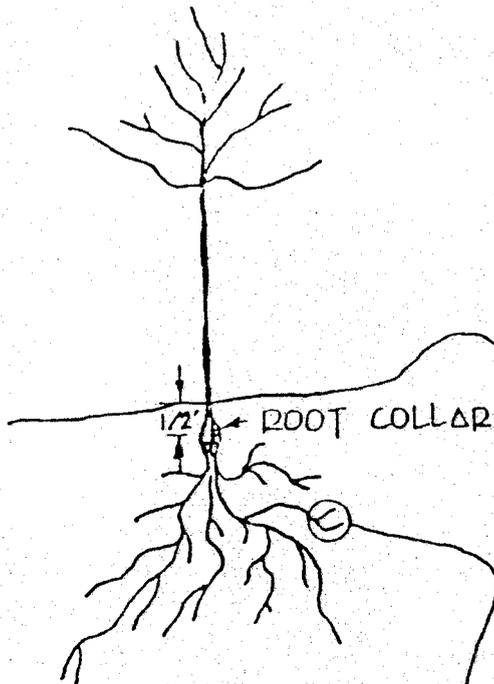
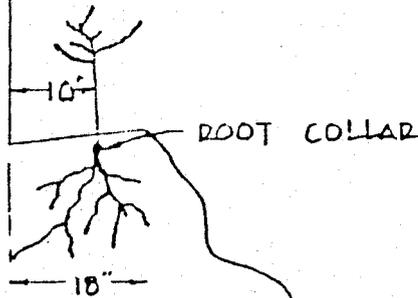
Field storage facilities are illustrated in (Fig. 9-2). In the event snow is not available, a similar cache can be constructed using wet burlap and damp straw.

PLANTING PROCEDURE

Figure 9-1

NOTES:

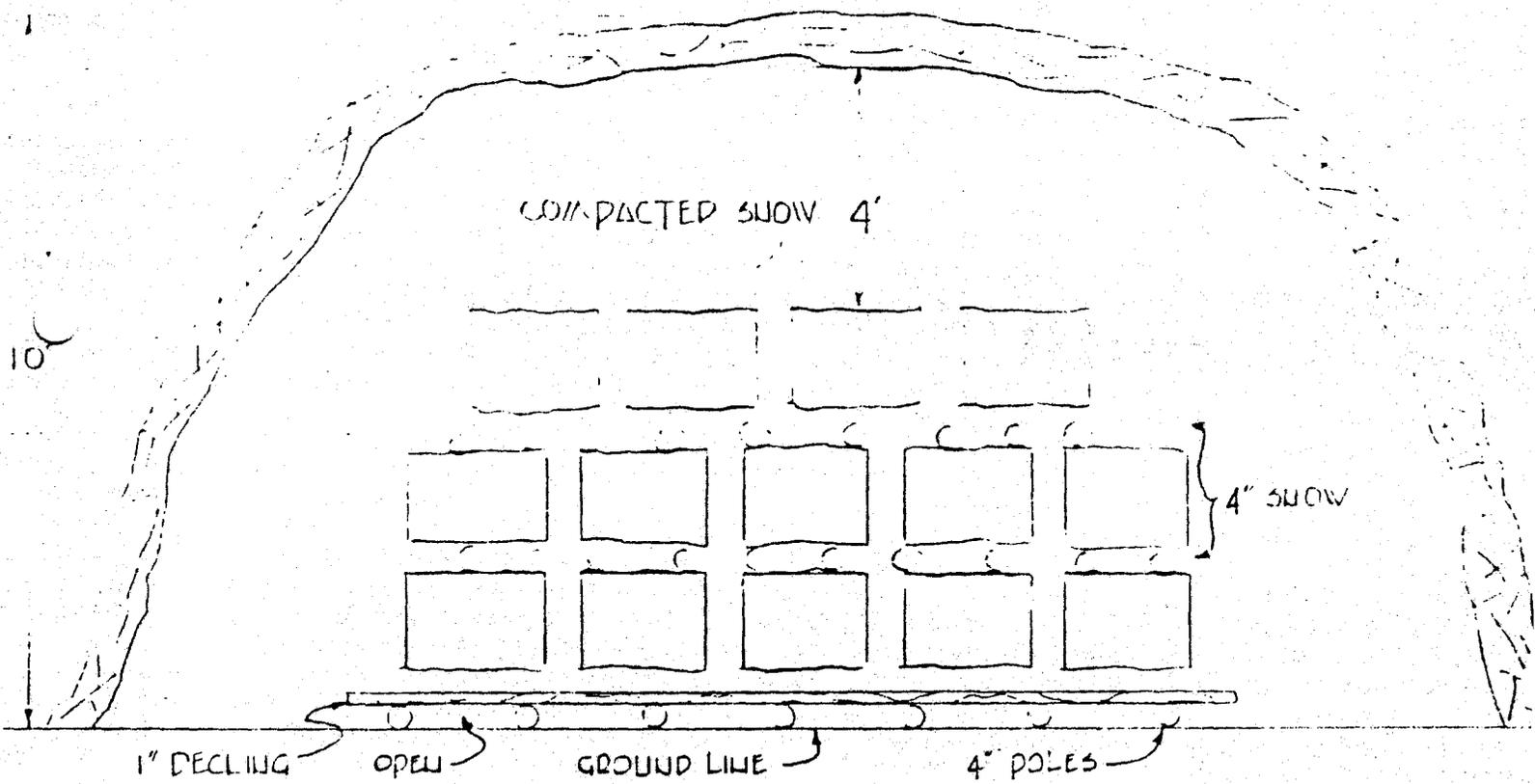
1. STEM PLANTED IN VERTICAL POSITION
2. PLANT STEM 10" FROM VERTICAL CUT OF SCARP
3. ROOTS ARE STRAIGHT AND SPREAD IN A NATURAL PATTERN
4. SOIL IS FIRMLY PACKED SO NO AIR POCKETS EXIST
5. ROOT COLLAR IS COVERED BY AT LEAST 1/2" OF SOIL
6. ROOTS PROTECTED FROM DRYING



ROOT HAIRS - RESPONSIBLE FOR 90% OF PLANT'S MOISTURE & NUTRIENT NEEDS. WILL DIE IF EXPOSED TO DRY AIR OVER 15 SECONDS

SEEDLING STORAGE

Figure 9-2



SNOW CACHE WILL MAINTAIN SEEDLINGS AT 32°F AND RELATIVE HUMIDITY OF 100%. SEEDLINGS SHOULD BE PLACED IN A COOL SHADED AREA 24 HOURS PRIOR TO PLANTING.

The mine will have to maintain a sorting, packaging and storing tent at the cache site. A sorting table will need to be set up in one tent. Each seedling must be examined and all that do not have a 2 to 1 crown to root relationship or are damaged must be discarded. The seedlings then need to be dipped in a vermiculite slurry and then rolled in wet burlap and placed in canvas planting bags.

The trees can only be left in the bags for twenty-four hour periods and then must be repacked following the same procedure.

The field handling of packed trees requires the crowns be kept moist and the bags covered with insulated tarps and stored in shaded areas.

During breaks, lunch, etc., the crews planting bags must be placed in shaded areas. At the end of each operational day all bags must be unpacked and the trees redipped in vermiculite and rerolled in wet burlap and repackaged to be used first the succeeding day.

9.8 MONITORING

Upon completion, the reclaimed area will be monitored to determine when bond release parameters are achieved. If the monitoring indicates inadequacies, the area will be supplemented with additional efforts.

The monitoring procedures will be the same sampling methodologies which were incorporated in establishment of the range site determinations.

Appendix 9-1

RECOMMENDED SEED MIX
INTERIM AND PERMANENT RECLAMATION

<u>SPECIES</u>	<u>RATE* PER ACRE</u>
<u>GRASSES</u>	
<u>Agropyron unilaterale</u> Bearded wheatgrass	3
<u>A. spicatum</u> Bluebunch wheatgrass	8
<u>Elymus cinereus</u> Basin wildrye	1.5
<u>Oryzopsis hymenoides</u> Indian ricegrass	3
<u>Poa secunda</u> Sandberg bluegrass	1
<u>FORBS</u>	
<u>Achillea millifolium</u> Western yarrow	.15
<u>Aster chilensis</u> Pacific aster	.15
<u>Hedysarum boreale</u> Northern sweetvetch	9
<u>Lupinus sericeus</u> Silky sweetvetch	.5
<u>Penstemon palmeri</u> Palmer penstemon or	
<u>P. strictus</u> Rocky Mountain penstemon	.5
	26.8

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

ADDITION FOR PERMANENT RECLAMATION MIXSHRUBS

<u>Amelanchier utahensis</u>	4
Utah serviceberry	
<u>Artemisia tridentata ssp. vaseyana</u>	.15
Big sagebrush	
<u>Cercocarpus montanus</u>	6
Birchleaf mountain mahogany	
<u>Purshia tridentata</u>	.5
Antelope bitterbrush	
<u>Symphoricarpos albus</u>	.8
Common snowberry	_____
For hydroseeding	38.25 #/acre
$\frac{1}{2}$ application for drill seeded areas	19.13 #/acre

SUMMIT COAL CO.

August 3, 1984

Sample #	Water Soluble Cations			SAR	pH ¹	EC ² (mmhos)
	Ca(meg/l)	Mg(meg/l)	Na(meg/l)			
1A	1.85	1.43	.49	1 0.38	7.27	0.28
1B	2.63	4.25	1.04	1 0.56	1.23	0.27
2A	2.95	.94	.57	1 0.41	1.50	0.43
2B	3.57	1.11	.61	1 0.40	7.62	0.48
3	2.57	1.16	.55	1 0.41	7.91	0.31

Sample #	Particle Size Analysis			Texture	Percent Organic Carbon ³	Saturation Percent
	% Sand	% Clay	% Silt			
1A	41.3	33.6	25.1	Clay loam	1.48	44.7
1B	42.6	33.6	23.8	Clay loam	1.08	44.5
2A	47.8	31.6	20.6	Sandy clay loam	1.62	45.0
2B	49.8	23.6	26.6	Sandy clay loam	2.44	47.0
3	73.8	13.6	12.6	Sandy loam	1.02	42.2

Sample #	Total Nitrogen (%)	Nitrate-Nitrogen ⁴ (ppm)	Phosphorus(ppm)	Alkalinity ⁵
1A	.13	1.60	5.6	Normal
1B	.13	1.20	2.0	Normal
2A	.10	2.60	15.6	Normal
2B	.18	3.65	18.8	Normal
3	.07	1.45	4.0	Normal

1. Saturated paste

2. Saturated extract

3. Organic matter

4. "Available" nitrogen

5. "Normal"; not "alkaline", not "saline" and not "alkaline-saline" (USDA Handbook 60 definitions)

DOCUMENTS