

# CO-OP MINING CO.

P.O. Box 15809  
Salt Lake City, Utah 84115  
Phone (801) 467-4003  
May 27, 1983

File  
ACT/015/025  
Folder No. 3  
MRP.  
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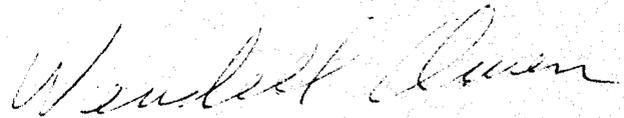
JWS  
6-6-83

## MODIFICATION SUBMITTAL

The following material is in answer to the deficiencies as stipulated by the Division in their letter of May 12, 1983, and also of February 3, 1983 regarding the modification to the Bear Creek Canyon Mine permitting.

The information contained herein is true and correct according to the best of my knowledge.

Wendell Owen



RECEIVED  
JUN 01 1983

DIVISION OF  
OIL, GAS & MINING

761.12 Procedures

(d) The applicant must submit information that indicates the applicant has fulfilled all the requirements set forth under this section:

Where the surface effects of the proposed underground coal mining activities are to be conducted within 100 feet measured horizontally of the outside right-of-way line of any public road (except where mine access roads or haulage roads join in such right-of-way line) or where the applicant proposes to relocate any public road, the Board shall-

(1) Require the applicant to obtain necessary approvals of the authority with jurisdiction over the public road.

Reply:

(1) There is no public road within 100 feet of the permit area except where the mine access and haulage road join in such right-of-way.

(a) A road becomes a public road by one or more of the following means:

(i) By purchase of right-of-way and construction of road by a government entity or its contractor.

(ii) By a court decree.

(iii) Use by the general public.

We have researched the history of the road in Bear Canyon leading to the minesite and have found none of the above took place. It was constructed, used, and maintained by the previous private operators of the mine in which we are currently mining. It dead-ends at the mine and has been used solely for the operation of this mine.

UMC 761.5 Definitions

Valid existing rights means:

(b) For haul roads, valid existing rights means:

(2) Any road in existence as of August 3, 1977;

Co-op Mining Company made legal and financial commitments to the property involved prior to August 3, 1977 (lease dated December 1, 1975) and has been using the road since that time for purposes incidental to mining.

UMC 782.13 Identification of Interests

(c) Names and addresses of all principles, officers and resident agents for COP Development Company.

Vern Brown, President 53 West Angelo Ave. S.L.C. Ut. 84115  
Joseph Kingston, Vice Pres. 765 N. 300 W. S.L.C., Ut. 84116  
Luana Kingston, Sec. Treas. 765 N. 300 W. S.L.C., Ut. 84116  
Carl Kingston, Res. Agent 53 West Angelo Ave., S.L.C., Ut. 84115

Schedule A, Paragraph 3 of the enclosed copy of the Title Insurance designates the property as listed in Schedule C as 'FEE SIMPLE'. This description is interpreted as all surface and sub-surface rights unless specific exception is made. In this case, coal has been excepted, but granting surface rights to the following:

T16S, R7E, SLBM

Section 26 E $\frac{1}{2}$  NW $\frac{1}{2}$ , and all that part of SE $\frac{1}{2}$ NE $\frac{1}{2}$  and the SE $\frac{1}{2}$  lying West of a Northeast-Southwest fault line.

All surface and sub-surface rights apply to the following:

T16S, R7E, SLBM

Section 14: S $\frac{1}{2}$   
22; E $\frac{1}{2}$ NE $\frac{1}{2}$ , NW $\frac{1}{2}$ SE $\frac{1}{2}$ , NE $\frac{1}{2}$ SE $\frac{1}{2}$   
23: All  
24: NW $\frac{1}{2}$ NW $\frac{1}{2}$  and all that part of the SW $\frac{1}{2}$ NW $\frac{1}{2}$  and the W $\frac{1}{2}$ NE $\frac{1}{2}$  lying West of a North-east- Southwest fault line.  
25: All that part of the NW $\frac{1}{2}$ NW $\frac{1}{2}$  lying West of a Southwest- Northeast faultline  
26: W $\frac{1}{2}$ NE $\frac{1}{2}$ , NW $\frac{1}{2}$ NW $\frac{1}{2}$ , and all that part of the NE $\frac{1}{2}$ NE $\frac{1}{2}$  lying West of a Northeast- Southwest fault line.

The portions in question then are as follows:

NE $\frac{1}{2}$ NE $\frac{1}{2}$ Sec. 26 -- Fee simple	NW $\frac{1}{2}$ NW $\frac{1}{2}$ Sec. 25 -- Fee simple
SE $\frac{1}{2}$ NE $\frac{1}{2}$ " " Surface	SW $\frac{1}{2}$ NW $\frac{1}{2}$ " " "
SE $\frac{1}{2}$ SE $\frac{1}{2}$ Sec. 23 -- Fee simple	NW $\frac{1}{2}$ SW $\frac{1}{2}$ " " "
SW $\frac{1}{2}$ SW $\frac{1}{2}$ Sec. 24 -- Fee simple	SW $\frac{1}{2}$ SW $\frac{1}{2}$ " " "

All real estate transactions are made according to title search by trained professionals such as South Eastern Utah Title Company rather than county records.

Form No. 1402 (1-70)  
AUSA Owner's Policy  
Form B - 1976  
(Amended 10-17-76)  
(Standard Coverage)

OWNER'S  
POLICY

## POLICY OF TITLE INSURANCE

ISSUED THROUGH THE OFFICE OF

**SOUTH EASTERN UTAH TITLE COMPANY**



PROFESSIONAL BUILDING • PRICE, UTAH 84501  
(801) 637-1245

SUBJECT TO THE EXCLUSIONS FROM COVERAGE, THE EXCEPTIONS CONTAINED IN SCHEDULE B AND THE PROVISIONS OF THE CONDITIONS AND STIPULATIONS HEREOF, FIRST AMERICAN TITLE INSURANCE COMPANY, a California corporation, herein called the Company, insures, as of Date of Policy shown in Schedule A, against loss or damage, not exceeding the amount of insurance stated in Schedule A, and costs, attorneys' fees and expenses which the Company may become obligated to pay hereunder, sustained or incurred by the insured by reason of:

1. title to the estate or interest described in Schedule A being vested otherwise than as stated therein,
2. any defect in or lien or encumbrance on such title,
3. lack of a right of access to and from the land, or
4. unmarketability of such title

IN WITNESS WHEREOF, First American Title Insurance Company has caused this policy to be signed and sealed by its duly authorized officers, as of Date of Policy shown in Schedule A

*First American Title Insurance Company*



BY

*[Signature]*  
PRESIDENT

ATTEST

*[Signature]*  
SECRETARY

COUNTERSIGNED

*[Signature]*  
ASSISTANT SECRETARY

### SCHEDULE A

Total Fee for Title Search, Examination  
and Title Insurance [REDACTED]

Order No. 8598-E

Amount of Insurance: [REDACTED]

Policy No. 10,530-9

Date of Policy: September 25, 1986 at 3:10 p.m.

1. Name of Insured:

C.O.P. COAL DEVELOPMENT COMPANY,  
a Utah corporation.

2. The estate or interest referred to herein is at Date of Policy vested in:

C.O.P. COAL DEVELOPMENT COMPANY,  
a Utah corporation.

3. The estate or interest in the land described in Schedule C and which is covered by this policy is:

FEE SIMPLE

10,930-9

## SCHEDULE B

This policy does not insure against loss or damage by reason of the matters shown in parts one and two following:

### Part One:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

### Part Two:

1. Taxes for the year 1980, now a lien, not yet due.
2. The right of the United States of America or any persons authorized by it to prospect for, mine, and remove coal from the E $\frac{1}{2}$ NW $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$ , and SE $\frac{1}{4}$  of Section 26, T16S, R7E, SLBM, as contained in the Patents recorded March 23, 1925 in Book A-2 at pages 291 and 292.
3. A Pole Line Easement dated April 8, 1947, executed by Freed Coal & Coke Company in favor of Utah Power & Light Company, recorded August 7, 1947, in Book A-13 at page 291, granting a perpetual easement and right of way for the erection and continued maintenance and repair of electric transmission, distribution, and telephone circuits, along a line described as follows:  

Beginning at existing pole on Grantor's land at a point 925 feet South and 1890 feet West, more or less, from the E $\frac{1}{4}$  Corner of Section 22, T16S, R7E, SLBM, thence running N 47° 33' E 2173 feet on said land and being in the N $\frac{1}{2}$ SE $\frac{1}{4}$  and the SE $\frac{1}{4}$ NE $\frac{1}{4}$  of said Section 22.
4. A Pole Line Easement dated October 15, 1957, executed by Freed Coal and Coke Company and Huntington Corporation, in favor of Utah Power & Light Company, recorded November 1, 1957, in Book 28 at page 374, granting an easement and right of way for the erection and continued maintenance and repair of electric transmission, distribution, and telephone circuits, along a line described as follows:

SCHEDULE B - continued

10, 33-9

Beginning on West boundary line of Grantor's land at a point 1190 feet North, more or less, from the S $\frac{1}{4}$  Corner of Section 26, T16S, R7E, SLBM, thence running E 49°55' E 3570 feet, more or less; thence N 12°57' E 1692 feet on said land, and being in the SW $\frac{1}{4}$ SE $\frac{1}{4}$ , W $\frac{1}{2}$ SE $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$  of said Section 26, and the W $\frac{1}{2}$ NW $\frac{1}{4}$  of Section 25, T16S, R7E, SLBM.

5. A Right of Way Easement 20 feet in width, dated November 8, 1971, executed by Peabody Coal Company, a corporation, in favor of North Emery Water Users Association, a corporation, recorded February 21, 1973, in Book 72 at page 472, granting a perpetual easement with the right to erect, construct, install, operate, and maintain a buried culinary water pipe line over and across a portion of the NW $\frac{1}{4}$ SE $\frac{1}{4}$  of Section 22, T16S, R7E, SLBM, along with the right of ingress and egress over the adjacent lands owned by the Grantor's.

6. A Pole Line Easement dated March 6, 1974, executed by Peabody Coal Company in favor of Utah Power & Light Company, recorded May 8, 1974, in Book 77 at page 166, granting a perpetual easement and right of way for the erection, maintenance, and repair of electric transmission and distribution circuits, along with the necessary poles, guys, and other attachments, to cross a tract of land described as follows:

Beginning on the Grantor's land at a point 269.5 feet North and 1417.8 feet East from the S $\frac{1}{4}$  Corner of Section 26, T16S, R7E, SLBM, thence S 30°43' W 16.9 feet thence S 48°21' W 71.9 feet; thence S 41°39' E 40 feet; thence N 48°21' E 73.1 feet; thence E 30°43' E 23.1 feet; thence N 59°17' W 40 feet to the point of beginning, being in SE $\frac{1}{4}$ SE $\frac{1}{4}$  of Section 26.

7. A Pole Line Easement dated February 20, 1974, executed by Peabody Coal Company in favor of Utah Power & Light Company, recorded May 8, 1974, in Book 77 at page 167, granting a perpetual easement and right of way for the erection, maintenance, and repair of electric transmission and distribution circuits, along with the necessary poles, guys, and other attachments, to cross a tract of land described as follows:

Beginning on the West boundary line of the Grantor's land at a point 395 feet North, more or less, from the S $\frac{1}{4}$  Corner of Section 26, T16S, R7E, SLBM, thence S 79°48' E 785 feet, more or less, thence N 35°46' E 634 feet on said land and being in the S $\frac{1}{4}$ SE $\frac{1}{4}$  of said Section 26.

SCHEDULE B - continued

10,930-9

8. A Purchase Mortgage given to secure a note bearing even date thereof, with interest thereon, as therein provided:

Dated : August 22, 1980  
Amount : XXXXXXXXXX  
Mortgagor : C.O.P. Coal Development Company,  
a Utah Corporation  
Mortgagee : Peabody Coal Company, a  
Delaware Corporation  
Recorded : September 25, 1980 in Book 115 at page 575.

\* \* \*

SCHEDULE C

The land referred to in this policy is situated in the County of Emery, State of Utah, and is described as follows:

T16S, R7E, SLBM

Section 26: E $\frac{1}{2}$ NW $\frac{1}{4}$  and all that part of SE $\frac{1}{4}$ NE $\frac{1}{4}$  and the SE $\frac{1}{4}$  lying West of a Northeast-Southwest fault line.

EXCEPTING THEREFROM all coal.

- 14: S $\frac{1}{2}$   
22: E $\frac{1}{2}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$ , NE $\frac{1}{4}$ SE $\frac{1}{4}$   
23: All  
24: NW $\frac{1}{4}$ NW $\frac{1}{4}$  and all that part of the SW $\frac{1}{4}$ NW $\frac{1}{4}$  and the W $\frac{1}{2}$ SW $\frac{1}{4}$  lying West of a Northeast-Southwest fault line.  
25: All that part of the NW $\frac{1}{4}$ NW $\frac{1}{4}$  lying West of a Northeast-Southwest fault line.  
26: W $\frac{1}{2}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ NW $\frac{1}{4}$ , and all that part of the NE $\frac{1}{4}$ NE $\frac{1}{4}$  lying West of a Northeast-Southwest fault line.

\* \* \*

UMC 783.14 Geology Description

(a) (1) (ii) The scale area is located in the canyon floor area and does not require any major excavation or overburden removal. The scale building will have concrete footing which will be entirely contained in the alluvial material. The only material to be removed is the topsoil itself. There are no coal seams located beneath this area. It is located in the Starpoint formation, which lies beneath the lowest coal seam in the area.

The applicant submits that this section does not apply to this portion of the application for the above noted reasons.

UMC 783.24 Maps; General Requirements

Updated map prepared for Co-op Mining Company by Viking Engineering Services is included in thei submittal. This map supercedes previous maps and will be considered the correct version in the following noted changes. The road has been positioned on its original alignment, the additional area is designated as parking area. Drainage is shown to be separated from the drainage of the adjacent disturbed area. The septic and sewage dispersal system has been deleted. (From scale area only, retained in bath house area.) The applicant will use one of the options as suggested by the Board of Health, such as fully contained holding tank to be pumped out, or chemical toilet for the use of scale attendant with shower house facilities available for other employees. The length of the stream channel culvert has been changed.

The catch basin design and stream channel culvert design (included in submittal) has been prepared for the Co-op Mining Company by Viking Engineering Services.

The applicant notes a difference in the design calculations for the catch basin by Dave Darby of the Division and by Viking Engineering. The difference in construction time and costs of the two designs would not be great enough to be worthwhile to the applicant to have approval delayed on this account. We will construct the larger size if needed for Division approval.

UMC 784.13 Reclamation Plan: General requirements

See appendix A, prepared for Co-op Mining Company by Environmental Industrial Supply.

UMC 784.16 Reclamation Plan: Ponds etc.

4.

D.

(3) See appendix A, prepared for Co-op Mining Company by Environmental Industrial Supply.

SCALE AREA MODIFICATION RESPONSE  
BY  
CO-OP MING COMPANY  
BEAR CANYON MINE

RESPONSE TO MR. DAVID DARBY'S LETTER OF MAY 5, 1983.

Septic System

After discussing the cost benefits with relocation of the scale house sewage system with Public Health Officials. Co-Op Mining is not going to install the septic tank in its current location. The detail will be made known to the Division after agreement is made with Public Health. The jurisdiction of N83-5-2-2 is still under consideration.

Catch Basin

Please review the enclosed 2ND SUBMITTAL for the catch basin design, it has all the details you have requested.

Stream Channel Culvert

The septic tank is no longer a concern, and the length of the culverts has been reduced to 200ft.

Mr. Darby's concerns have also be addressed in the Divisions Modification Review.



R: from the figure 1 of the "Universal Soil Loss Equation", SCS, Jan. 1976 indicates a R factor of 20 for the Bear Canyon. Copy of figure 1 enclosed. Mr. Darby of the Division of Oil, Gas and Mining suggests a R factor of 27. If the Division submits copies of the methodology and references Mr. Darby used to Co-Op Mining, Viking Engineering Service, and SCS the suggestion will be considered.

$$R = 20$$

K: Soil erodibility factor was determined by using an SCS approved Soil Erodibility Nomograph, (developed by Dr. W.H. Wischmeier, ARS-SWC-Prudue University) This method is accepted by both the U.S. Forest Service and O.S.M. The soil Nomograph is enclosed.  
57% silt and fine sand (.10 to 2mm)  
39% sand  
4% Organic matter  
Moderate fine gradular (2)  
Permeability - moderate (3)

$$K = .29$$

LS: from the slope length - slope gradient characteristics depicted on Drawing 1, Slope length 2000 ft. and gradient 1%, and using Table 1 of "Universal Soil Loss Equation" SCS, Jan. 1976 indicates

$$LS = .32$$

C: the Runoff coefficient values published by E.P.A. - Erosion and Sediment Control (1976) lists Roads - gravel min. .25 with max. .70  
Earth surface - gravel min. .25 with max. .65  
Due to the relative strength of the local gravel and/or slag a value of .80 will be recommended: this exceeds E.P.A.'s max value.

$$C = .80$$

P: is assigned the value 1; therefore having no effect on the final

Soil Density = 90 lbs/ft<sup>3</sup>

Therefore:  $A = RKLSCP$   $A = (20)(.29)(.32)(.80)(1)$

$A = 1.48$  Tons of sediment per year per acre

Total tons per year =  $1.82 \times 1.48 = 2.69$  tons

Three years of sediment =  $3 \times 2.69 = 8.07$  tons

Required volume for sediment =  $8.07 \text{ tons} \times 2000 \text{ lbs/ton} \times 90 \text{ lbs/ft}^3 = 179.33 \text{ ft}^3$

Sediment volume = 179.33 ft<sup>3</sup>

Runoff Storage Volume

For a 10year - 24 hour storm for Bear Canyon, the precipitation data was taken from "Estimating Return Periods for Short Duration Precipitation in Utah" by E.A. Richardson. From the listed material from Clear Creek Summit and Hiawatha was taken, and then adjusted based on elevation. 10 year - 24 hour event will = 2.25 inches

Distributed drainage from 1.82 acres

Using the Division<sub>2</sub> recommended Curve Number of 85 and the "Solution of Runoff"  $Q = \frac{(P - 0.2s)^2}{P + 0.8s}$  from the Soil conservation Service Graph (No. ES 1001)

$Q = .98$

Runoff volume = (1.82 acres) (43,560 ft<sup>2</sup>/acres) (0.98 in) (1/12 in/ft) = 6474.47 ft<sup>3</sup>

TOTAL VOLUME REQUIRED: 6,654 ft<sup>3</sup>

The pond will be a completely excavated. With all slopes at 2:1 as required. All slopes and bed will be compacted. From the bottom of the basin to the top of the slopes the vertical difference will be 5ft. 1 foot is to be considered as the free board. Along the top of the slopes the pond measures 55ft by 65ft. The pond emergency overflow will be a 4ft. wide rip-raped (lined) channel in the south west of the pond. The lining will be brattice cloth with heavy rip-rap. The channel will begin at a 4ft elevation above the pond base floor. After leaving the basin the overflow channel will descend to the creek on slopes no greater than 2:1, and heavy with rip-rap. A six inch decant pipe will be placed through the embankment, below the emergency spillway. The pipe level will begin a 2ft. above the pond base. Rip-rapping will take place along all inlets. Brattice line will be placed on the critical areas for seepage problems. The enclosed drawing will help insure understanding.



TABLE 1

SLOPE-EFFECT TABLE (TOPOGRAPHIC FACTOR, LS)

Percent Slope	Slope Length in Feet													
	10	20	40	60	80	100	110	120	130	140	150	160	180	200
0.2	0.04	0.05	0.06	0.07	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.10	0.10
0.3	0.04	0.05	0.07	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.11
0.4	0.05	0.06	0.07	0.08	0.09	0.09	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11
0.5	0.05	0.06	0.08	0.08	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.12	0.12
1.0	0.06	0.08	0.10	0.11	0.12	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.15	0.16
2.0	0.10	0.12	0.15	0.17	0.19	0.20	0.21	0.21	0.22	0.22	0.23	0.23	0.24	0.25
3.0	0.14	0.18	0.22	0.25	0.27	0.29	0.30	0.30	0.31	0.32	0.32	0.33	0.34	0.35
4.0	0.16	0.21	0.28	0.33	0.37	0.40	0.42	0.43	0.44	0.46	0.47	0.48	0.51	0.53
5.0	0.17	0.24	0.34	0.41	0.48	0.54	0.56	0.59	0.61	0.63	0.66	0.68	0.72	0.76
6.0	0.21	0.30	0.43	0.52	0.60	0.67	0.71	0.74	0.77	0.80	0.82	0.85	0.90	0.95
8.0	0.31	0.44	0.63	0.77	0.89	0.99	1.04	1.09	1.13	1.17	1.21	1.25	1.33	1.40
10.0	0.43	0.61	0.87	1.06	1.23	1.37	1.44	1.50	1.56	1.62	1.68	1.73	1.84	1.94
12.0	0.57	0.81	1.14	1.40	1.61	1.80	1.89	1.98	2.06	2.14	2.21	2.28	2.42	2.55
14.0	0.73	1.03	1.45	1.78	2.05	2.29	2.41	2.51	2.62	2.72	2.81	2.90	3.08	3.25
16.0	0.90	1.27	1.80	2.20	2.54	2.84	2.98	3.11	3.24	3.36	3.48	3.59	3.81	4.01
18.0	1.09	1.54	2.17	2.66	3.07	3.43	3.60	3.76	3.92	4.06	4.21	4.34	4.61	4.86
20.0	1.29	1.82	2.58	3.16	3.65	4.08	4.28	4.47	4.65	4.83	5.00	5.16	5.47	5.77
25.0	1.86	2.63	3.73	4.56	5.27	5.89	6.18	6.45	6.72	6.97	7.22	7.45	7.90	8.33
30.0	2.52	3.56	5.03	6.16	7.11	7.95	8.34	8.71	9.07	9.41	9.74	10.06	10.67	11.25
40.0	4.00	5.66	8.00	9.80	11.32	12.65	13.27	13.86	14.43	14.97	15.50	16.01	16.98	17.90
50.0	5.64	7.97	11.27	13.81	15.94	17.82	18.69	19.53	20.32	21.09	21.83	22.55	23.91	25.21
60.0	7.32	10.35	14.64	17.93	20.71	23.15	24.28	25.36	26.40	27.39	28.36	29.29	31.06	32.74



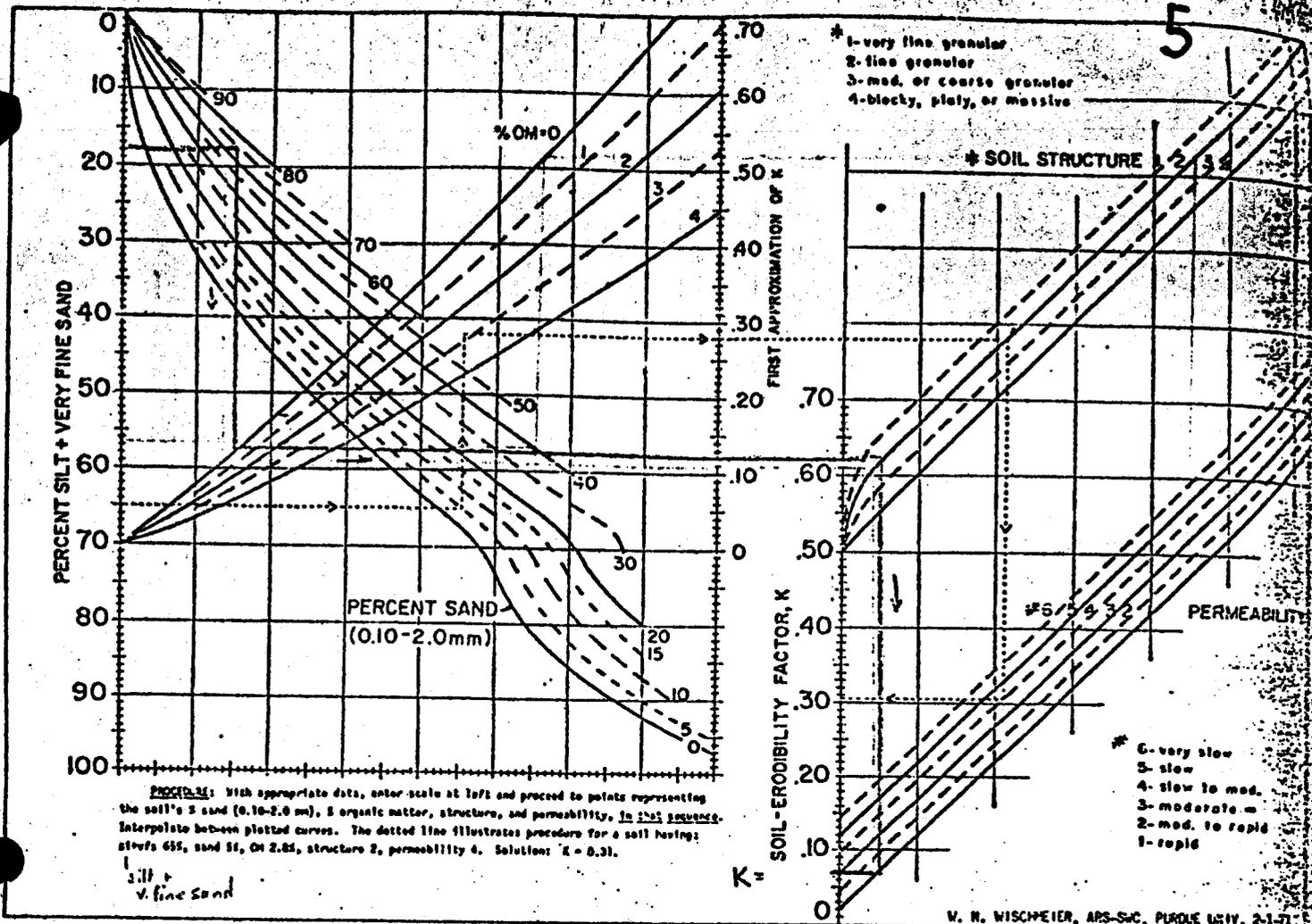


Figure 1. Soil erodibility nomograph.

line between sand and silt classifications and a new particle-size distribution parameter.

Analyses of the rainulator and natural-rain soil-erodibility data showed conclusively that particles in the very fine sand classification (0.05-0.10 mm) behave more like silt than like larger sand. When we redefined silt to include very fine sand and defined sand as particles from 0.10 to 2.0 mm, the prediction values of the two parameters improved appreciably.

This revised classification concept is not entirely new. Family groupings in the U. S. Department of Agriculture's Soil Classification System, Seventh Approximation, recognize very fine sand as having silt properties. The American Association of State Highway Officials, in a 1961 report (1), used the midpoint of the very fine sand category as the dividing line between their granular and silt-clay classifications.

Even with the improved classification criteria, however, the relation of erodibility to a given percent silt or

percent clay depends considerably on the particle-size distribution in the remainder of the soil mass. The erodibility of a 60-percent-silt soil relative to that of a 40-percent-silt soil, for example, depends on the associated sand-to-clay ratios and the levels at which other properties are combined in the soil. The number and complexity of these interrelations account for the large number of terms in the previously published multiple regression equation for soil erodibility (6). Discovery of a parameter that adequately describes the whole particle-size distribution for a given soil sample made it possible to drop many of the previously significant terms from the equation without appreciable loss in accuracy.

The new particle-size parameter, which we have designated as  $M$ , is the product of percent silt and percent sand-and-silt. When the very fine sand component was included in the percent silt, the  $M$  accounted for 85 percent of the variance in observed  $K$  values for the 55 rainulator-tested

soils. Its relationship to erodibility was curvilinear.

Close consideration of the parameter  $M$  showed that it is quite descriptive. For soils with a low or medium silt fraction, the  $M$  increases for each additional percent silt depends very much on the soil's sand-to-clay ratio. As sand content becomes high, silt content decreases and  $M$  declines in value, but it remains a function of the silt-to-clay ratio. When clay content is high,  $M$  assumes a low value which is a function of the sand-to-silt ratio.

Even though the parameter is not identified in the nomograph (Figure 1), the left-hand section of the graph is based on the relation of  $M$  to  $K$ . The scale on the horizontal axis is the  $M$  scale, with values from 0 to 8,000. The  $K$ -approximation curves for five levels of organic matter were plotted against this scale. The curve marked "%OM = 2" shows the relationship that accounted for 85 percent of the variance in observed  $K$  values. To eliminate manual computation of  $M$  for

Table III-4.—Values of runoff coefficient <sup>18</sup>

Values of $C = \frac{\text{Runoff}}{\text{Rainfall}}$			Value proposed		Value by other authority	
Surfaces			Min.	Max.	Min.	Max.
Roofs, slag to metal			0.90	1.00	0.70	0.99
Pavements	Concrete or asphalt		0.90	1.00	0.95	1.00
	Bituminous macadam, open and closed type		0.70	0.90	0.70	0.90
	Gravel, from clean and loose to clayey and compact		0.25	0.70	0.15	0.30
R.R. yards			0.10	0.30	0.10	0.30
Earth Surfaces	Sand, from uniform grain size, no fines, to well graded, some clay or silt	Bare	0.15	0.50	0.01	0.55
		Light Vegetation	0.10	0.40	0.01	0.55
		Dense Vegetation	0.05	0.30	0.01	0.55
	Loam, from sandy or gravelly to clayey.	Bare	0.20	0.60		
		Light Vegetation	0.10	0.45		
		Dense Vegetation	0.05	0.35		
	Gravel, from clean gravel and gravel sand mixtures, no silt or clay to high clay or silt content	Bare	0.25	0.65		
		Light vegetation	0.15	0.50		
		Dense vegetation	0.10	0.40		
	Clay, from coarse sandy or silty to pure colloidal clays	Bare	0.30	0.75	0.10	0.70
		Light vegetation	0.20	0.60	0.10	0.70
		Dense vegetation	0.15	0.50	0.10	0.70
Composite areas	City, business areas		0.60	0.75	0.60	0.95
	City, dense residential areas, vary as to soil and vegetation		0.50	0.65	0.30	0.60
	Suburban residential areas, vary as to soil and vegetation		0.35	0.55	0.25	0.40
	Rural districts, vary as to soil and vegetation		0.10	0.25	0.10	0.30
	Parks, golf courses, etc. vary as to soil and vegetation		0.10	0.35	0.05	0.35

NOTE: Values of  $C$  for earth surfaces are further varied by degree of saturation, compaction, surface irregularity and slope, by character of subsoil, and by presence of frost or glazed snow or ice.

HYDROLOGY: SOLUTION OF RUNOFF EQUATION  $Q = \frac{(P-0.2S)^2}{P+0.8S}$

P=0 to 12 inches  
Q=0 to 8 inches

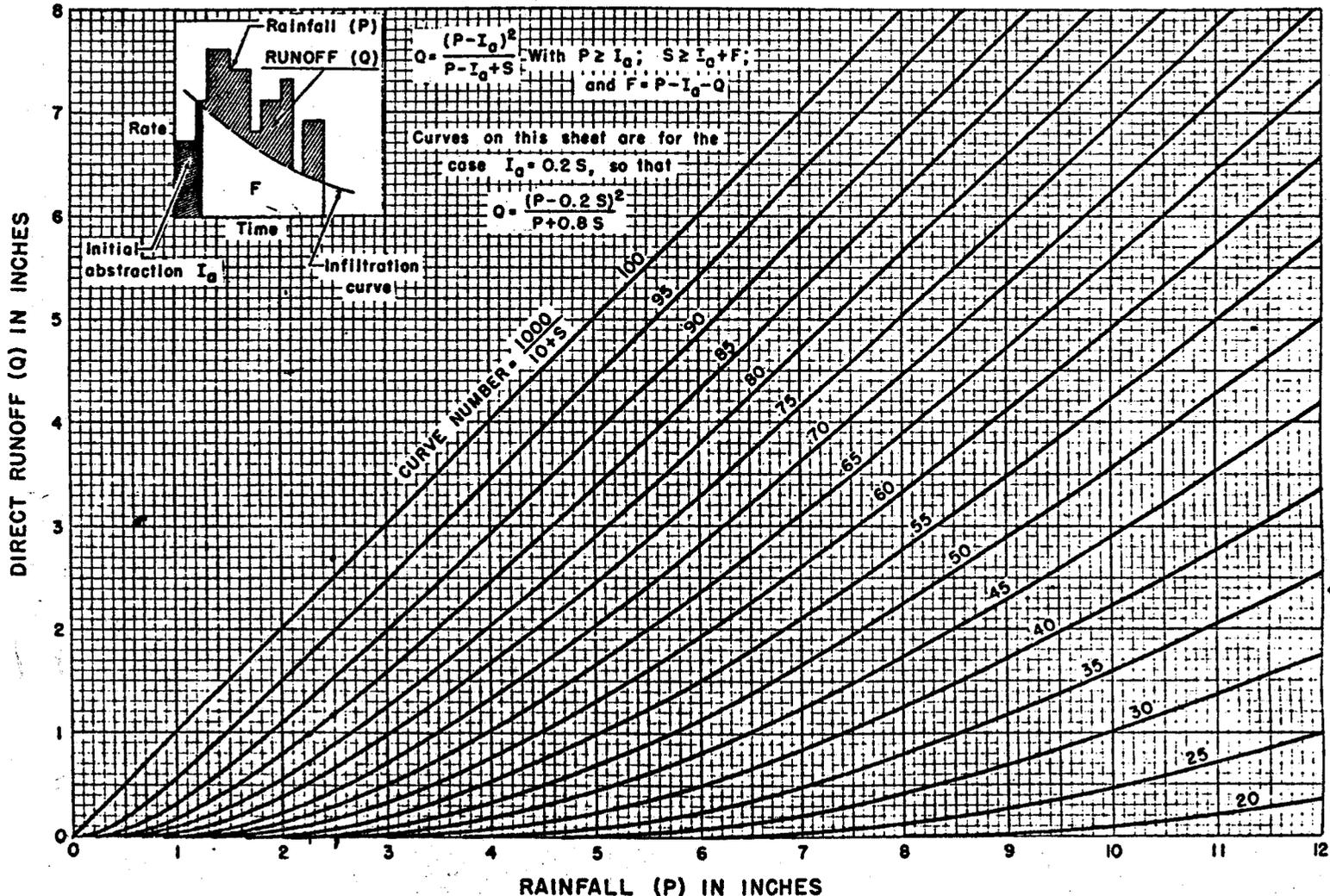


Figure - 10.1 (1 of 2)

REFERENCE  
Mockus, Victor; Estimating direct runoff amounts from storm rainfall:  
Central Technical Unit, October 1955.

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
ENGINEERING DIVISION - HYDROLOGY BRANCH

STANDARD DWG. NO.  
ES-1001  
SHEET 1 OF 2  
DATE 4-22-56  
REVISED 10-1-64

10.21  
4

SCALE AREA MODIFCATION RESPONSE

BY

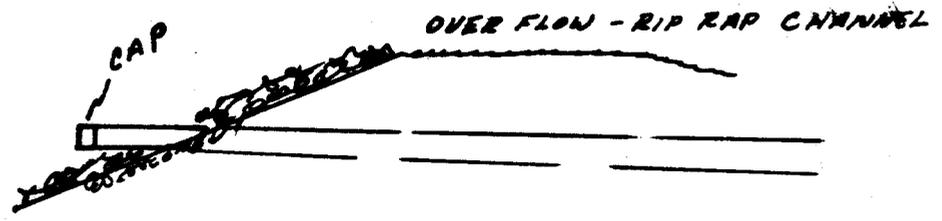
CO-OP MINING COMPANY  
BEAR CANYON MINE

UMC 784.16 Reclamation Plan: Ponds, Impoundments, Banks, Dams and Embankments

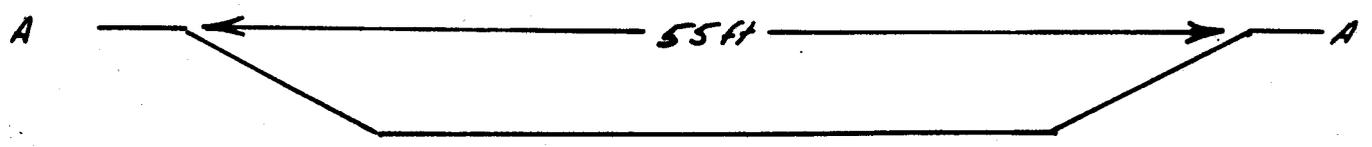
- 1 and 2 were addressed in the 2ND SUBMITTAL for the Catch Basin.
3. Violation 3 of 3 for NOV 83-5-3-3 was not concerned with the catch basin. Seepage protection in the basin will be accomplished by compaction and brattice - rip-rapped lining of key areas.
4. Desin detail for the 60 in. culvert
- A. The culvert will only extent 200ft. Note drawings
  - B. The culvert is to be a 60 inch concrete pipe. The slope relationship can be determind by crossection and headwall drawings.
  - C. Rip-rap of  $D_{50}$  of 6 inch will effect the needed erosion protection and energy disapator. Thus reducing the possiblity of scouring the banks.
  - D. Construction details for culvert installation
    - 1. During construction the creek flow will be dammed north of the first 60 inch culvert. Water will by-pass the construction through gravity feed pipe lines.
    - 2. Sediment control during construction will have problems during percipitation events. A construction varance is being requested from the Division and the State Public Health.
    - 3. Because the culverts add increased value to the land, by increasing access to the west, C.O.P. Development Company requests the culverts remain inplace.
    - 4. The Division Staff is requested to make an on site determination as to the justification to topsoil stripping in a creek bed. After the Staff member reviews the site, a plan will be coordinated between the Division and Co-OP.
    - 5. Estimated construction time is two weeks.

- E. The operator will maintain the trash racks.
  - F. These agencies will be contacted by Co-Op Mining Company.
  - G. Note the submitted crosssections.
  - H. Co-Op Mining has some concern as to this statement, but that concern will be addressed an an other time.
5. The lining will installed in the catch basin.
  6. A. Organic matter should be 4%.  
B. Please refer to the modified pond calculations.
  7. Please refer to the modified pond calculations.

MOVED  
DECANT



SCALE  
1" = 5'



CROSS SECTION  
SCALE 1" = 10ft

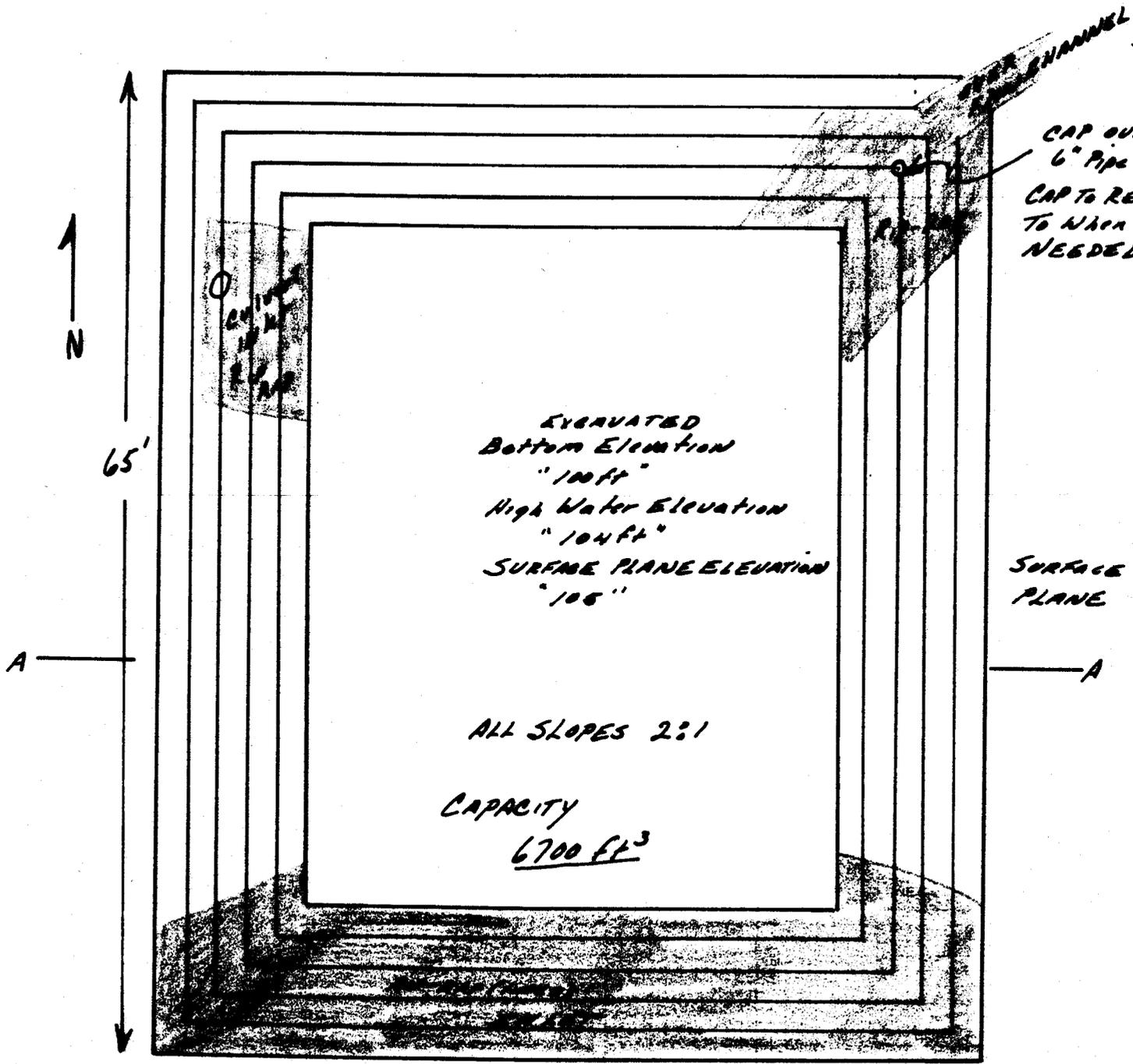
SUBMITTAL - 2

SCALE AREA CATCH BASIN

BY .....DATE .....  
CHKD. BY .....DATE .....

SUBJECT .....

SHEET NO. .... OF .....  
JOB NO. ....

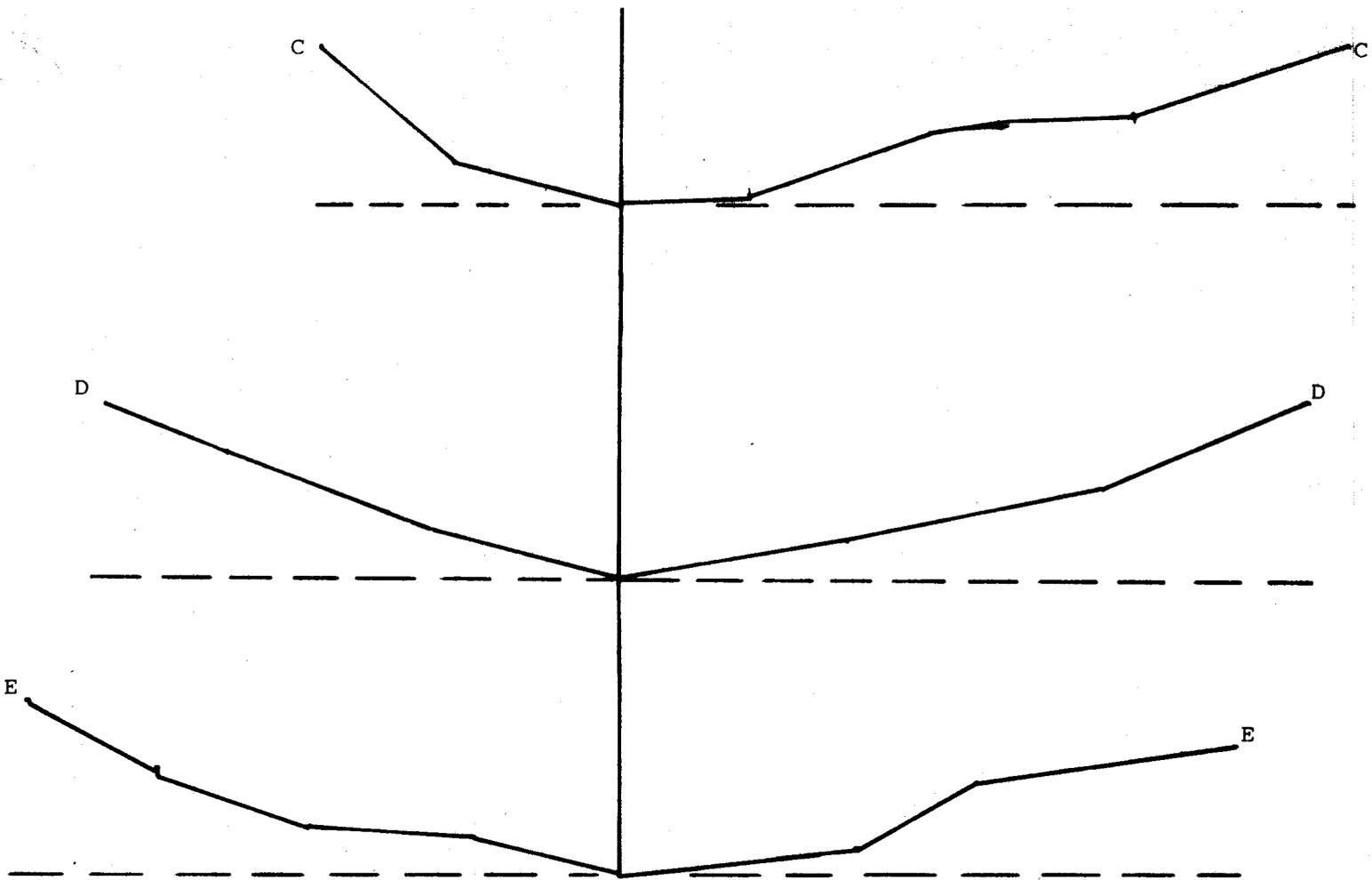


SCALE 1" TO 10'

SHEET NO. .... OF .....  
JOB NO. ....

SUBJECT .....

BY ..... DATE .....  
CHKD. BY ..... DATE .....



SOUTH END ELEVATION (COMPARATIVE)

93.09 ft.

3.4% DROP in 100 ft.

SCALE IN BOTH PLANES: 1 in. to 10 ft.

PRE-CULVERT INSTALLATION CROSS SECTION

BEAR CREEK

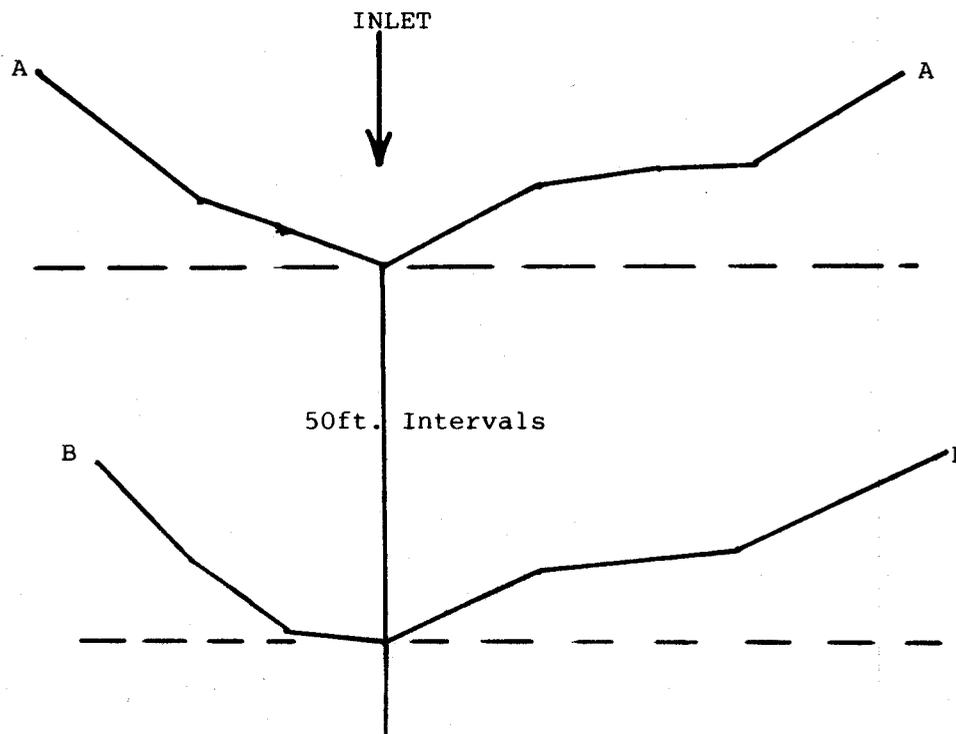
CO-OP MINING COMPANY

MAY 31, 1983



NORTH END ELEVATION (COMPARITIVE)

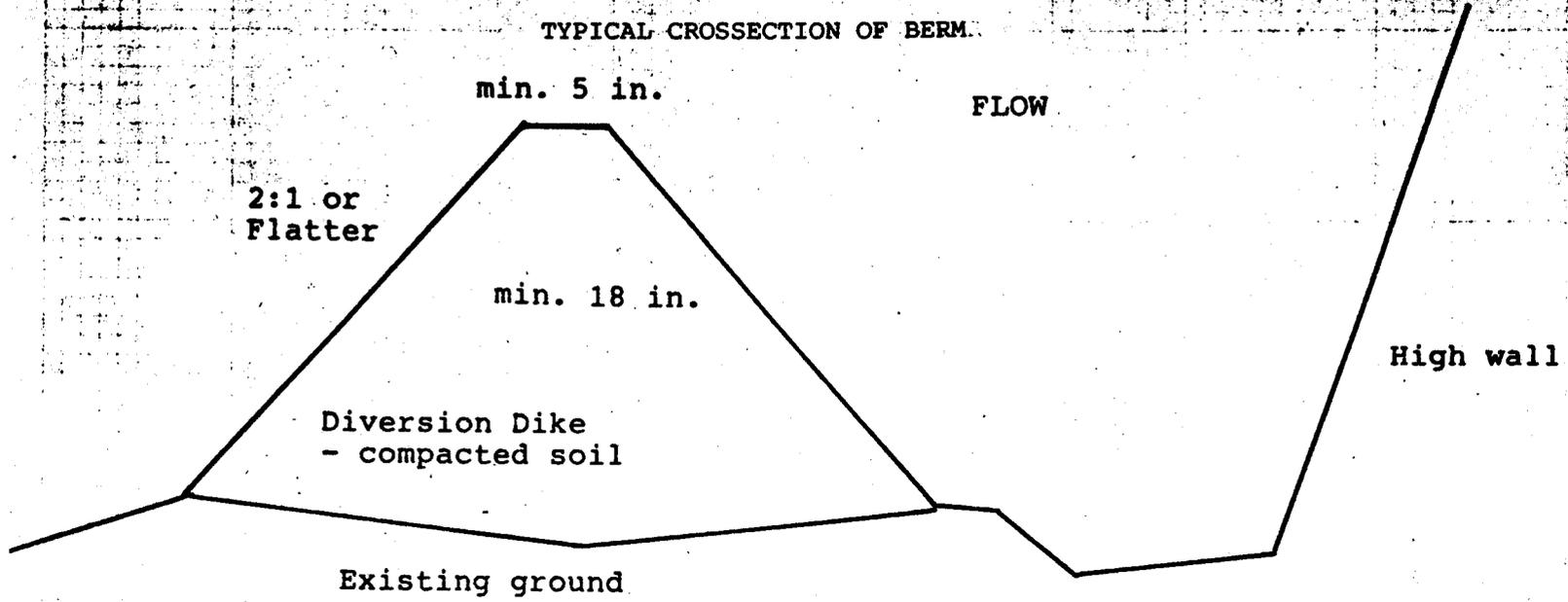
100.00 ft.



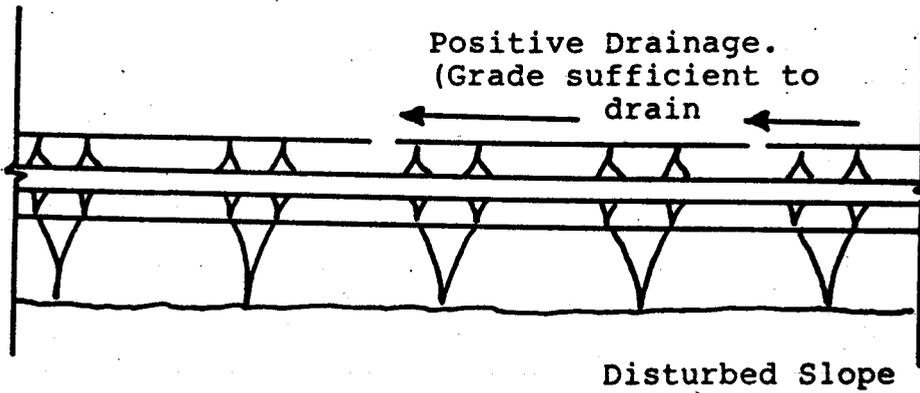
CHKD. BY .....DATE .....

JOB NO. ....

TYPICAL CROSSSECTION OF BERM.



Typical Cross Section



Plan View

UMC 817.21-25 Topsoil

See appendix A, prepared for the Co-op Mining Company by Environmental Industrial Supply.

UMC 817.103 Covering Coal and Acid- and Toxis-forming Materials

See appendix A, prepared for the Co-op Mining Company by Environmental Industrial Supply.

UMC - 784.13

- Item 1. The drill seed rate is  $\frac{1}{2}$  the rate indicated for Hydroseeding.
- Item 2. The supplemental planting, both rate and species, will need to be correlated to:
  - (1) Success of seeding effort - (density of woody species)
  - (2) Tied to the reference areas which will be established July 1983.
- Item 3. A meeting with DOGM and EIS to establish reference area will be tentatively set up for the last week in June.

UMC 784.16 [4-D (3)]

The channel left after the culvert has been removed will be seeded and lined with an excelsior netting and rip-raped with rock to minimize the potential for erosion until stabilization is complete.

UMC 817.21-25

The Division should disregard the November 26, 1982 submittal relative to topsoil and only consider the current (May 7th, 1983) material, which is correct to the best of our knowledge.

#### RELATIVE TO SAWDUST AND SEWAGE SLUDGE:

Reference is made to its use, only in the event that there is not a sufficient amount of usable growth media available upon recontouring. In the event that additional material is needed, the sawdust would be treated with adequate amounts of Amonia Sulfate to insure rapid decomposition while providing ample Nitrogen for vegetative establishment. The sewage sludge would be used only on those areas which are too steep and inaccessible to domestic grazing.

The concept and methodology was taken from "Mining Congress Journal, June 1983", Reclamation - Topsoil Use by Larry F. Brown.

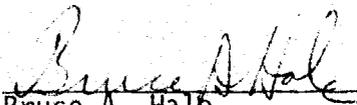
UMC 817.103

Please find attached, a Laboratory Analysis which substantiates the Non Toxic nature of the coal and or refuse material. This same material on other mine sites has been successfully revegetated, using as little as 6" of soil covering and in an abandoned mine situation such as the "Morland Area" has naturally revegetated over a span of 30 years.

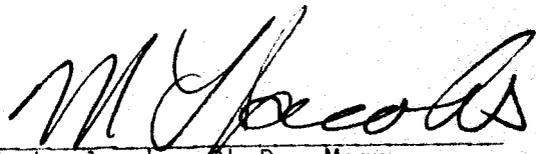
Table No. I  
(mg/L)  
EP Toxicity

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

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

  
Bruce A. Hale  
Section Supervisor

BAH/cl

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



NOV NUMBER	ISSUE DATE	DEADLINE FOR ABATEMENT	NATURE OF NOV	EXTENSION DAYS POSSIBLE	
83-5-2-2 (1)	2-04-83	7-08-83	Permitting on septic system <sup>INTO</sup>	3	Complete and adequate plans
<i>yellow Rick</i> (2)	2-04-83	7-08-83	Drainage ditch adjacent to crusher pad	3	Complete and adequate plans
83-5-5-3 (1)	3-10-83	7-13-83	<i>MOVE PILE, But send</i> Topsoil protection	35	Complete and adequate plans
<i>Dave</i> (2)	3-10-83	7-13-83	Drainage on scale area	35	Complete and adequate plans
<i>Dave</i> (3)	3-10-83	7-13-83	Rocks and soil in creek above scales	35	Plans to mitigate or remove
<i>draft letter</i> <i>yellow plans</i> 83-5-7-1 (1)	<i>roads</i> 5-02-83	7-15-83	Permit on scale area	26 24	Obtain permit (FTA 7-15-83)
83-5-8-3 (1)	5-16-83	7-20-83	Mod to interim <i>MRP</i>	30	Obtain approved mod
(2)	5-16-83	7-20-83	Sediment pond	30	Bring pond into compliance
<i>no on yellow Rick</i> (3)	5-16-83	7-20-83	Drainage, portal, substation fan	30	Obtain mod for drainage and implement plans
<i>Dave</i> (1)	7-08-83	<i>EP</i>	Safety on road intersection	81	
(2)	7-08-83		Operating without a permit	81	
(3)	7-08-83		Class I stds on haul road	81	