WESTERN STATES MINERALS CORP.

J. B. KING MINE

Addendum

to

Data Submitted

9-1-83

RE: DETERMINATION of COMPLETENESS and TECHNICAL DEFICIENCIES

ACT/015/002

Folder No. 2

Emery County, Ut.

6-29-84

COAL SYSTEMS, Inc.

CONSULTING ENGINEERS

P.O. BOX 17117
SALT LAKE CITY, UTAH 84117

L. G. MANWARING, P.E.
PRESIDENT

AREA CODE 801
261-4500

June 29, 1984

Mr. Bruce Funk, County Clerk
Box 907
Castledale, Utah 84513

Dear Mr. Funk:

Accompanying this letter is a copy of the "Determination of Completeness" (DOC) for the J. B. King Mine requested by the Division of Oil, Gas and Mining in their letter of February 23, 1984.

Sincerely,

L. G. Manwaring, P.E.
President

blm

cc: D. W. Nelson, S. J. Groves & Sons Co.

COAL SYSTEMS, Inc.

CONSULTING ENGINEERS

P.O. BOX 17117
SALT LAKE CITY, UTAH 84117

L. G. MANWARING, P.E.
PRESIDENT

AREA CODE 801
261-4500

June 28, 1984

Mr. James W. Smith, Jr.
Coordinator of Mined Land Development
State of Utah - Natural Resources
4241 State Office Building
Salt Lake City, Utah 84114

Re: J. B. King Mine
ACT/015/002, Folder No. 2

Dear Mr. Smith:

Submitted herewith are 8 sets (1 volume each) of WESTERN STATES MINERALS CORPORATION'S response to your Determination of Completeness letter dated February 23, 1984, regarding the J. B. KING MINE.

This material was prepared by COAL SYSTEMS, Inc., Salt Lake City, Utah and includes relevant information by NATIVE PLANTS, INC. and FORD CHEMICAL LABORATORY.

Sincerely,

L. G. Manwaring, P.E.
President

LGM/blm

Submittals: 8

cc: A. B. Morrow - Western States Minerals Corporation, Denver
D. W. Nelson - S. J. Groves and Sons Company, Lexington

WESTERN STATES MINERALS CORP.

J. B. KING MINE

Addendum
To
Data Submitted
9-1-83

RE: DETERMINATION OF COMPLETENESS
and TECHNICAL DEFICIENCIES

ACT/015/002
Folder No. 2
Emery County, Ut.

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DETERMINATION OF COMPLETENESS

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LIST OF DRAWINGS

INTRODUCTION

The material submitted in this volume is in response to the Determination of Completeness and Technical Deficiencies letter dated February 23, 1984.

Note that a "coordinating index" is also provided for location of subjects and data provided in previous submittals, viz., The Original Submittal, Vol. 1 and 2 - 1981; the Apparent Completeness Review., Vol. 1 and 2 - 1983; and the Determination of Completeness, Vol. 1 and 2 - 1984. To assist further in locating various subjects, notations are included throughout this narrative which designate locations as follows:

(Original Submittal)	- located in the original submittal document
(ACR)	- located in the Apparent Completeness Review.
(DOC)	- located in the Determination of Completeness documents.

The information provided is for the purpose of review by The Division of Oil, Gas and Mining before proceeding to the technical analysis and final permitting of the J. B. King Mine.

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817.13	Casing and Sealing of Exposed Underground Openings: General Requirements	Vol. 1, Sec. 3, Pg. 37		X
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817.15	Casing and Sealing of Underground Openings: Permanent	Vol. 1, Sec. 3, Pg. 37	X	
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817.46	Hydrologic Balance: Sedimentation Ponds	Vol. 1, Sec. 3, Pg. 8	X	X
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817.82	Coal Processing Waste Banks: Site Inspection	Vol. 1, Sec. 3, Pg. 33		X
817.83	Coal Processing Waste Banks: Water Control Measures	Vol. 1, Sec. 3, Pg. 32	X	X
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817.86	Coal Processing Waste: Burning	Vol. 1, Sec. 3, Pgs. 21,22		X
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817.88	Coal Processing Waste: Return to Underground Workings			X
817.89	Disposal of Non-Coal Wastes	Vol. 1, Sec. 3, Pgs. 32,33	X	X
817.91	Coal Processing Waste: Dams and Embankments: General Requirements			
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817.95	Air Resources Protection	Vol. 1, Sec. 3, Pg. 20	X	X
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817.101	Backfilling and Grading: General Requirements	Vol. 1, Sec, 3, Pg. 40		
817.103	Backfilling and Grading: Covering Coal and Acid- and Toxic-Forming Materials	Vol. 1, Sec. 3, Pg. 33		X
817.106	Regrading or Stabilizing Rills and Gullies	Vol. 1, Sec. 3, Pgs. 40, 41		
817.111	Revegetation: General Requirements	Vol. 1, Sec. 3, Pg. 47	X	
817.112	Revegetation: Use of Introduced Species	Vol. 1, Sec. 3, Pg. 43	X	
817.113	Revegetation: Timing	Vol. 1, Sec. 3, Pgs. 47, 48	X	
817.114	Revegetation: Mulching and Other Soil Stabilizing Practices	Vol. 1, Sec. 3, Pg. 42	X	
817.115	Revegetation: Grazing		X	
817.116	Revegetation: Standards for Success	Vol. 1, Sec. 3, Pg. 47	X	
817.117	Revegetation: Tree and Shrub Stocking for Forest Land	Vol. 1, Sec. 3, Pg. 45		
817.121	Subsidence Control: General Requirements	Vol. 1, Sec. 3, Pg. 31		X
817.122	Subsidence Control: Public Notice			
817.124	Subsidence Control: Surface Owner Protection	Vol. 1, Sec. 3, Pg. 32		
817.126	Subsidence Control: Buffer Zones	Vol. 1, Sec. 3, Pg. 17		
817.131	Cessation of Operations: Temporary		X	
817.132	Cessation of Operations: Permament	Vol. 1, Sec. 3, Pg. 37		X
817.133	Postmining Land Use	Vol. 1, Sec. 4, Pg. 7		
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817.152	Roads: Class I: Design and Construction	Vol. 1, Sec. 3, Pg. 8		
817.153	Roads: Class I: Drainage	Vol. 1, Sec. 3, Pg. 8		X
817.154	Roads: Class I: Surfacing	Vol. 1, Sec. 3, Pg. 8		
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817.156	Roads: Class I: Restoration			
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817.161	Roads: Class II: Location			X
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817.171 Roads: Class III: Location.....			X
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817.180 Other Transportation Facilities.....	Vol. 1, Sec. 3, Pg. 8		
817.181 Support Facilities and Utility Installations.....	Vol. 1, Sec. 3, Pg. 6		

UMC 782.18 PERSONAL INJURY AND PROPERTY DAMAGE INSURANCE INFORMATION

In the ACR, the DOGM notified the applicant that a rider must be included requiring the insurance company to notify the Division if substantial changes are made to the policy and confirm that insurance will be kept in effect through completion of final reclamation. In compliance with this regulation Western States Minerals Corporation transferred the liability insurance from the Chandler Associates Agency, Policy Number TR-SLG-165T427-6-80, (original submittal) to the Johnson and Higgins Agency, American Insurance Company Policy Number KLA 321 55 83 (ACR).

The coverages under the new policy are in compliance with the provisions of UMC 806.14 which specify that a minimum insurance coverage for bodily injury shall be $300,000 for each occurance and $500,000 aggregate; and minimum insurance coverage for property damage shall be $300,000 for each occurance and $500,000 aggregate.

(COAL)

CERTIFICATE OF LIABILITY INSURANCE
Issued to: State of Utah
Department of Natural Resources
Division of Oil, Gas, and Mining

THIS IS TO CERTIFY, That the THE AMERICAN INSURANCE COMPANY
(Name of Insurance Company)
of 777 San Marin Drive, Novato, CA 94947
(Home Office Address of Company)
has issued to WESTERN STATES MINERALS CORPORATION of
(Name of Permit Applicant)
4975 Van Gordon, Wheat Ridge, CO 80033 Policy No. KLA 321 55 83
(Address of Permit Applicant)
effective from April 1, 19,83 and continuing until cancelled, nonrenewed, or changed as provided herein, which policy provides personal injury and property damage insurance covering the obligations imposed upon such permit applicant with regard to Permit No. ACT/015/002 according to provisions of the coal mining and reclamation program of Utah, (Utah Code Annotated 40-10-1 et seq.), specifically Section UMC/SMC 806.14.

Underwriting Agent: W. A. ERICKSON

Company Name: JOHNSON & HIGGINS Phone: (612) 338-0681

Address: 100 WASHINGTON SQUARE SUITE 2220, MINNEAPOLIS, MINNESOTA 55431

The above-named insurance company agrees to notify the Division in writing of any substantive change in the above coverage, including cancellation, failure to renew, or other material change. No change shall be effective until at least thirty (30) days after such notice is received by the Division.

The undersigned affirms that the above information is true and complete to the best of his or her knowledge and belief, and that he or she is an authorized representative of the above-named insurance company.

8/24/83 W. A. Erickson, Vice President
(Date, Signature, and Title of Authorized Representative of Insurance Company)

Signed and sworn to before me by W. A. Erickson this the 24 day of August, 1983.

SHARON A. ALDRECHT
NOTARY PUBLIC — MINNESOTA
HENNEPIN COUNTY
MY COMMISSION EXPIRES SEPT. 13, 1984

Sharon A. Aldrecht
(Notary)

My Commission Expires: 9-13-84

UMC 783.14 GEOLOGY DESCRIPTION

(a)(2)(iii)

Analysis of the pyritic content of the strata above and below the coal seam is represented by four samples taken by Coal Systems, Inc. Analysis for potential alkalinity from these samples is also included.

The samples are designated and the analysis is as follows:

No. 1-R Above Seam — Sulfur Analysis

SO_4	0.002-AR,	0.002-Dry
Pyritic	0.59 -AR,	0.59 -Dry
Organic	0.02 -AR,	0.02 -Dry

Water Soluble Alkalies

Na_2O	0.013-AR,	0.013-Dry
K_2O	0.018-AR,	0.018-Dry

No. 2-R Above Seam — Sulfur Analysis

SO_4	0.094-AR,	0.096-Dry
Pyritic	1.09 -AR,	1.12 -Dry
Organic	0.26 -AR,	0.27 -Dry

Water Soluble Alkalies

Na_2O	0.010-AR,	0.010-Dry
K_2O	0.012-AR,	0.012-Dry

No. 1-F Below Seam — Clay Content

Sand	30.8%
Silt	52.0%
Clay	17.2%

No. 2-F Below Seam — Sulfur Analysis

SO_4	0.06 -AR,	0.06 -Dry
Pyritic	0.02 -AR,	0.02 -Dry
Organic	0.02 -AR,	0.02 -Dry

Water Soluble Alkalies

Na_2O	0.019-AR,	0.019-Dry
K_2O	0.012-AR,	0.012-Dry

The location of these samples within the mine is shown on Dwg. 4050-5-5-R. Copies of the laboratory reports follow.

(a)(2)(iv)

The sulfur content of the coal seam is represented by the analysis of the sulfur forms from bore hole No. DVC-6C and from the Sample Numbers 91119-1 thru 4 conducted by Western States Minerals Corporation. Copies of the laboratory reports follow.

CORE LABORATORIES, INC.
ANALYTICAL REPORT

JULY 8 1983 PAGE 1 OF 3

COAL SYSTEMS INC.

P. O. BOX 17117
SALT LAKE CITY UTAH 84117
MR. IVAN L. LOTT

JOB: 6307-C83249
CHEMIST: DRH/LSN
LOCATION: AURORA CO.

FORMS OF SULFUR ANALYSIS OF SAMPLES 1-R AND 2-R

SMPL NO.	SAMPLE ID.	A.R. SO4	A.R. PYRITIC	A.R. ORGANIC	DRY SO4	DRY PYRITIC	DRY ORGANIC
1 1-R	ABOVE SEAM	0.002	0.59	0.02	0.002	0.59	0.02
2 2-R		0.094	1.09	0.26	0.096	1.12	0.27

UMC 783.14(a)(2)(iii

1
NOTE: A.R. DESIGNATES AS RUN BASIS
NOTE: ALL VALUES ARE IN WT%

CORE LABORATORIES, INC.
ANALYTICAL REPORT

COAL SYSTEMS INC.

P. O. BOX 17117
SALT LAKE CITY UTAH 84117
MR. IVAN L. LOTT

JOB: 6307-C83249
CHEMIST: DRH/LSN
LOCATION: AURORA CO.

WATER SOLUBLE ALKALI ANALYSIS OF 1-R AND 2-R

SMPL NO.	SAMPLE ID.	A.R. NA20 WT%	A.R. K20 WT%	DRY NA20 WT%	DRY K20 WT%
1 1-R	ABOVE SEAM	0.013	0.018	0.013	0.018
2 2-R		0.010	0.012	0.010	0.012

UMC 783.14(a)(2)(iii)

NOTE: A. R. DESIGNATES AS RUN BASIS

CORE LABORATORIES, INC.
ANALYTICAL REPORT

COAL SYSTEMS INC.

P. O. BOX 17117
SALT LAKE CITY UTAH 84117
MR. IVAN L. LOTT

JOB: 6307-C83249
CHEMIST: DRH/LSN
LOCATION: AURORA CO.

PERCENT CLAY CONTENT OF 1-F

SMPL NO.	SAMPLE ID.	SAND %	SILT %	CLAY %
1 1-F	BELOW SEAM	30.8	52.0	17.2

UMC 783.14(a)(2)(iii)

CORE LABORATORIES, INC.
COAL ANALYSIS RESULTS

MAY 4, 1984

COAL SYSTEMS INC.
FLOOR MATERIAL
NO. 2F
JOB 4050-5
BELOW SEAM

JOB NO.:6307-CB4105-
CHEMIST:DRH
LOCATION:AURORA CO.

PROXIMATE ANALYSIS (%)

ULTIMATE ANALYSIS (%)

MINERAL ANALYSIS OF ASH (%)

EQUILIBRIUM MOISTURE (%)

FORMS OF SULFUR (%)

	AS RECD	DRY
SULFATE	0.06	0.06
PYRITIC	0.02	0.02
ORGANIC	0.02	0.02
TOTAL	0.10	0.10

FUSION TEMPERATURE OF ASH (°F)

ADDITIONAL DATA

GRINDABILITY (HGI)

WATER SOLUBLE ALKALIES (%)

	AS RECD	DRY
SODIUM OXIDE	0.019	0.019
POTASSIUM OXIDE	0.012	0.012

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES 228 NORTH LA SALLE STREET, CHICAGO ILLINOIS 60601 AREA CODE 312 726 8434

WESTERN DIVISION MANAGER
LLOYD W. TAYLOR, JR

PLEASE ADDRESS ALL CORRESPONDENCE TO
10775 EAST 51st AVE., DENVER, COLO 80239
OFFICE TEL (303) 373-4772

WESTERN STATES COAL COMPANY
7475 West 5th Avenue
Suite 204
Lakewood, Colorado 80226

May 1, 1978

Sample Identification by

Western States Coal Co.

Kind of sample reported to us: Coal - I-Seam

Core Hole No. DVC-6C
112.5' - 124.5'

Sample taken at: Dog Valley

Sample taken by: Western States Coal Co.

Date Sampled: xxxxx

Date Received: 3-29-78

Analysis report no. 72-69342 Page 1

PROXIMATE ANALYSIS	As received	Dry basis
% Moisture	5.81	xxxxx
% Ash	15.02	15.95
% Volatile	37.58	39.90
% Fixed Carbon	41.59	44.15
	100.00	100.00
Btu	11067	11750
% Sulfur	2.66	2.82

ULTIMATE ANALYSIS	As received	Dry basis
% Moisture	5.81	xxxxx
% Carbon	61.96	65.78
% Hydrogen	4.37	4.64
% Nitrogen	1.13	1.20
% Chlorine	0.01	0.01
% Sulfur	2.66	2.82
% Ash	15.02	15.95
% Oxygen (diff)	9.04	9.60
	100.00	100.00

SULFUR FORMS	As received	Dry basis
% Pyritic Sulfur	1.66	1.76
% Sulfate Sulfur	0.07	0.07
% Organic Sulfur (Diff)	0.93	0.99
% Total Sulfur	2.66	2.82

FUSION TEMPERATURE OF ASH	Reducing	Oxidizing
Initial Deformation	xxxxx°F	xxxxx°F
Softening (H=W)	xxxxx°F	xxxxx°F
Softening (H=1/2W)	xxxxx°F	xxxxx°F
Fluid	xxxxx°F	xxxxx°F

HARDGROVE GRINDABILITY INDEX = xxxxx at xxxxx % Moisture

% EQUILIBRIUM MOISTURE = xxxxx

FREE SWELLING INDEX = xxxxx

GDP/md /bn

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

G. D. PALMER, Manager, Denver Laboratory

Charter Member

COALEX ENERGY CORPORATION

ANALYSIS REPORT

Sponsor:
Western States Minerals Corporation

Date: 12/4/79
Project No.: 612.0
Purchase Order:

Sample No.: 91119-1 thru 4
Sample Description: FORMS OF SULFUR

Date Sample Received: 11/19/79
I - Seam

SAMPLE	AS RECEIVED	DRY BASIS
11/14/79 RAW COAL		
% Pyritic	0.77	0.85
% Sulfate	0.00	0.00
% Organic	0.83	0.91
% Total	1.60	1.76
11/14/79 COARSE C/C		
% Pyritic	0.34	0.37
% Sulfate	0.00	0.00
% Organic	0.94	1.02
% Total	1.28	1.39
11/14/79 FINES C/C		
% Pyritic	0.43	0.53
% Sulfate	0.00	0.00
% Organic	0.82	1.01
% Total	1.25	1.54
11/14/79 REJECT		
% Pyritic	3.16	3.49
% Sulfate	0.00	0.00
% Organic	0.34	0.38
% Total	3.50	3.87

UMC 783.15 GROUND WATER INFORMATION

(b)

It is acknowledged that accurate measurements of ground water parameters in relationship to the existing water wells do not exist. It is the understanding of the applicant, that a complete test program for determining the discharge rate, recharge rate and storage capacity of the water source must be conducted. However, since the mine is currently in an inactive status, it was agreed in discussions with Division personnel April, 1984 this testing will be delayed until such time as renewed production is being considered. The timing of these tests (to be approved by the Division) will be such as to insure results and time for review well in advance of mining activities.

The test program will require complete renovation of the wells and reconditioning of the pumps. The well system will be placed under a constant discharge pumping test to determine ground water discharge, recharge, and storage capacity of the source. These parameters will be derived from tests to determine transmissivity ratio, hydraulic conductivity, specific capacity, storage coefficients and other aquifer properties. Water quality and operational monitoring is addressed in UMC 817.52 (DOC).

"Table of Water Well Depths", page 3, shows a comparison between completed depth, total depth, and cross-section depths; the latter is shown on Dwg. 4050-5-2 contained in UMC 783.13 (ACR).

Previous operations water was delivered from the existing wells. As shown by experience, these wells cannot be pumped continually at their listed rates without draw-down sufficient to cut off pump supply. This has resulted in emergency purchase of water, delivered by truck. The importance of water conservation, considering the area conditions, must be emphasized.

Water requirements for the projected production are estimated to be 43 Acre-Ft/Yr or a continual supply of 29 gpm. The existing wells are considered adequate to supply this volume if properly maintained and conservation practices are enforced. To this end, it is proposed to install a 100,000 gal. water tank, if production is resumed, to eliminate water loss and to serve as reservoir capacity for the distribution system. The calculations in support of the 29 gpm requirement are as follows and the distribution system is illustrated on Dwg. 4050-5-3-R, page 4.

- Required volume:

  58,150 gal/day x 5 days/wk = 290,750 gal/wk

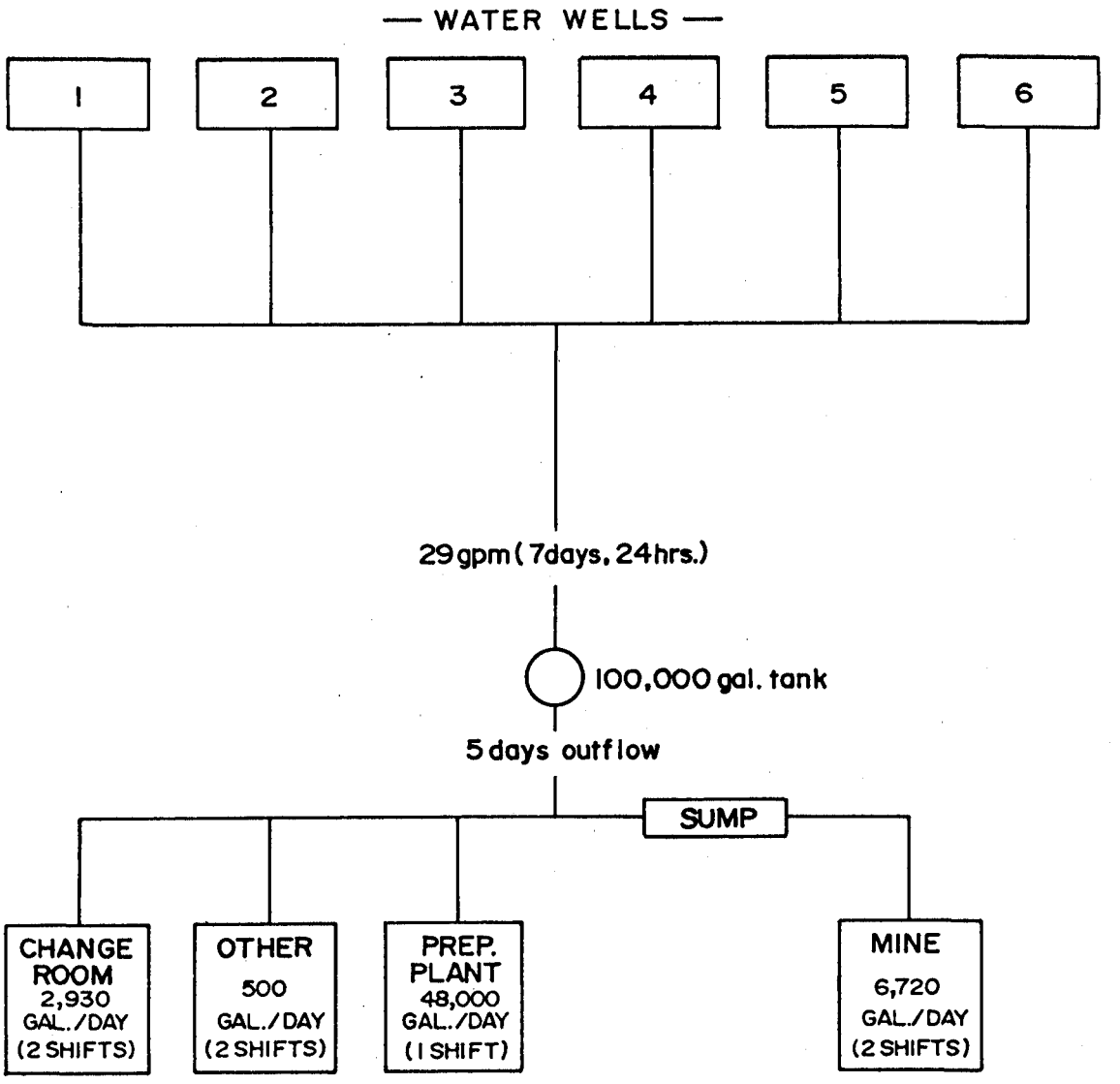
- To generate this amount of water

$$\frac{290{,}750 \text{ gal/wk}}{7 \text{ day/wk} \times 24 \text{ hrs/day} \times 60 \text{ min/hr}} = 29 \text{ gpm}$$

  Store short term excess in water tank.

TABLE OF WATER WELL DEPTHS

Well No.	Completed Depth	Total Depth	X-Section Depth UMC 783.13(ACR)
1	293	293	293
2	240	250	250
3	282	300	300
4	265	265	265
5	245	340	340
6	210	220	220



TOTAL DAILY VOLUME = 58,150 GAL.

UMC 783.13
UMC 783.15

WESTERN STATES MINERALS CORP.		
SCALE: NONE	APPROVED BY: L.G.M.	DRAWN BY I.L.
DATE: 7-6-83		REVISED 5-14-84
J.B. KING MINE — MINING HYDROLOGY		
COAL SYSTEMS, INC.- S.L.C., UTAH		DRAWING NUMBER 4050-5-3-R

UMC 783.19 VEGETATION INFORMATION

The original permit application encompassed permitting for the I & F Seams. Thus, application was for the entire 440 Acres of the coal lease. Since the current permitting activities are for the I-Seam coal only, the permit boundary is reduced to 300 Acres susceptible to disturbance by underground coal mining activities. This permit boundary is shown on Dwg. 4050-5-5-R and 4050-5-10 (ACR) and is correctly shown on Exhibits 1, 2, and 3 (ACR). Since the portion of the reference area shown outside the permit boundary is within the lease holdings of Western States Minerals Corporation, it can and will be protected and managed until bond release.

The reference area has been staked in the field for future identification. Three to four metal stakes on the side lines have been placed for ease of location.

UMC 783.25 CROSS SECTIONS, MAPS AND PLANS

The area affected by surface operations and facilities is restricted to the approximate 28 acres illustrated on the Disturbed Area-Surface Topography Map, Dwg. 4050-5-13-R (DOC). Since there are no previously mined areas, the cross section depicting the surface topography from above the coal outcrop (portals) and extending the entire distance of the disturbed area illustrates the slope measurements representing the existing land surface. See Dwg. 4050-5-15 (ACR).

Also, additional cross sections of the area are found on Dwgs. 4050-5-(29 to 32) (DOC) in connection with UMC 784.13

UMC 784.12 OPERATION PLAN: EXISTING STRUCTURES

The description and dates of construction of the underground mining support facilities are as described in Section 3.1 (Original Submittal); the locations are as shown on Dwg. 4050-5-13-R (DOC). There are no anticipated modifications or reconstruction plans at this time since the mine is in a standby, non-producing mode. Should the mine be re-activated, plans for any modification or other construction would be submitted to the Division for compliance approval.

The support facilities have been constructed and drainage collection ditches provided to prevent areal pollution to the extent possible. Suspended solids or run-off is contained within the permit area and no damage to fish, wildlife or related environmental values is foreseen. Monitoring of the area is continuous by Western States Minerals personnel and a security guard provision. Equipment and materials are available for repair and maintenance of the facilities.

The current condition of these facilities is that of a nearly new status due to the minimal past operation of the mine. Photographs of the structures, taken May 1, 1984, are submitted for ease of description.

Ventilation Fan

Sub-Station

Fuel Pumps

Raw Coal Storage

Coal Cleaning Plant

Truck Loading & Scales

Office-Utility Trailers

Plant Yard - Looking North

Maintenance Shop

UMC 784.13 RECLAMATION PLAN: GENERAL REQUIREMENTS

(b)(2)

Backfill material and substitute topsoil for the reclamation of the disturbed area will be obtained from the areas designated and outlined on Dwg. 4050-5-13-R.

The fill material developed from the "Portal Bench Borrow Area", calculated to be 20,000 cubic yards, will be bulldozed into place as backfill and portal seal plugging as shown on Dwg. 4050-5-21 (ACR) Vol. 2.

The sedimentation pond embankment (1500 cubic yards) will be bulldozed onto the slurry pond floors as partial fill for the four foot depth requirement of this area.

The refuse pile containment dike will be bulldozed onto the existing mine refuse adjacent to the dike as partial fill for the four foot requirement of the area. None of the calculated 7000 cubic yards will be hauled from the immediate site.

Backfill material will be hauled from the designated "Backfill Borrow Pit" to the refuse pile and contaminated surface areas requiring a minimum four foot of cover. A detailed cost estimate of the proposed reclamation scheme follows:

PHASE I - DISMANTLING

A. Remove from underground to outside:

- o Conveyors
- o Stamler Feeder
- o Continuous Miner
- o Wagner Scoops and Bolting Machine
- o Cable, power centers and other electrical
- o Water lines and pumps
- o Miscellaneous

B. Disassemble:

- o Preparation Plant
- o Conveyors
- o ROM handling and Stacking Tube
- o Clean coal handling and Stacking Tubes
- o Truck scales
- o Shop Building
- o Fuel tanks and pumps
- o Office trailers
- o Pull water wells
- o Substation, power lines, and light poles
- o Miscellaneous

C. Drill and shoot concrete pads

D. Remove all hardware from property.

TOTAL PHASE I COSTS = $116,700

PHASE II - COSTS

RELOCATION OF CONTAMINATED MATERIALS TO DESIGNATED DISPOSAL SITES

A. Contaminated Area:

$$\frac{(5.52 \text{ Acres Contaminated})(43{,}560 \text{ sq.ft.})(1 \text{ ft. depth})}{27 \text{ cu ft/cy}} = 9{,}000 \text{ cy}$$

B. Equipment Requirements:

1. 1 D10 dozer: (Ref. 1)

   a. Capacity = 500 cy/hr

   b. Conditions

   - 75 ft. avg. dozing distance (max.= 1250 cy/hr)
   - Average operator (factor = .75)
   - Hard, dry material (factor = 0.8)
   - Efficiency @ 40 min/hr (factor = 0.67)

C. Labor Costs:

1. 1 equipment operator (Ref. 2)

   $28.45/Hr x 8 Hrs/Da x 2.25 Days = $512.00

2. 0.5 Building Laborer (Ref. 2)

   $21.95/Hr x 4 Hrs/Da x 2.25 Days = $197.50

D. Equipment Costs:

1. 1 Dozer: (Ref. 2)

   $976.80/Da. x 2.25 Days = $2,197.80

Sub Total	=	$2,907.30
10% Contingency	=	290.83
TOTAL PHASE II COSTS	=	$3,198.00

PHASE IIA - COSTS

PORTAL BENCH AREA
BACKFILL DOZING AND PORTAL SEALING

A. Effected Area:

Portal bench area - 20,000 cy

B. Equipment Specifications:

1. 1 D10 Dozer: (Ref. 1)

- o Capacity = 450 cy/hr
- o Conditions:
  - 75 ft. aug. dozing distance (max. = 1250 cy/hr)
  - Average operator (factor = 0.75)
  - Hard, dry material (factor = 0.8)
  - +10% grade (factor = 0.9)
  - Efficiency @ 40 min./hr. (factor = 0.67)

C. Labor Costs:

1. 1 Equipment Operator (Ref. 2)

$28.45/Hr x 8 Hrs/Da x 5.6 Days. = $1,274.56

2. 0.5 Building Laborer (Ref. 2)

$21.95/Hr x 4 Hrs/Da x 5.6 Days = 491.68

D. Equipment Costs:

1. Dozer (Ref. 2)

$976.80/Da x 5.6 Days = $5,470.00

E. Portal Seals:

- Reinforced concrete, in place, steel included.

  @ $200/cy (Ref. 3)

  160 cy x $200/cy = $32,000.00

*Note: Cost factor for concrete compared well with itemized estimate by Coal Systems, Inc.

Sub-Total	=	$39,236.24
10% Contingenty	=	3,923.62
TOTAL PHASE IIA COSTS	=	$43,160.00

PHASE III - COSTS

CONTAMINATED SURFACES

Excavation and Haulage of Backfill Borrow Pit Material to Contaminated Surfaces Accompanied With Dozing

A. VOLUMETRICS:

1. Volume Required:

   - o For 4 ft cover of contaminated area = 64,000 cy

2. Volume available:

   - o From sedimentation pond embankment = 1,500 cy
   - o From refuse pile dike = 7,000 cy

     Note: To be dozed into place

   - o From Borrow Pit area (avg. depth @ 5 ft) = 59,000 cy

     Note: To be moved with self-loading scrapers.

     Total Available = 67,500 cy

B. Equipment Requirements:

1. 1 D-10 Dozer (Ref. 1)

   - o Capacity = 360 cy/hr
   - o Conditions:
     - Average of 75 ft haul (1250 cy max.)
     - Average operator (factor = 0.75)
     - Hard, compacted material (factor = 0.7)
     - Average grade, +15% (factor = 0.83)
     - Job efficiency @ 40 min/hr (factor = 0.67)

2. 1 Self-Propelled Scraper (Ref. 4)

   - Capacity = 2400 cy/day
   - Conditions:
     - Common earth material
     - 1500 ft haul (avg., both ways)
     - 1/4 assistance by dozer

3. 1 2-Wheel Drive Pick-up

C. Labor Costs:

1. Dozer Crew: (Ref. 2)

   8500 cy x 1 hr/360 cy x 1 day/8 hrs = 3.0 days

   - 1 Equipment Operator/Day = $227.60
   - 0.5 Building Laborer/Day = $ 87.80

   Total/Day = $315.40

   Total For Dozing Crew ($315.40 x 3 Days) = $946.20

2. Scraper Crew: (Ref. 5)

   59,000 cy x 1 Day/2400 cy ≈ 25 days.

   - 1 Equipment Operator/Day = $227.60
   - 0.5 Building Laborer/Day = 87.80
   - 0.25 Equipment Operator/Day = 56.90

   Total/Day = $372.30

   Total for Scraper Crew ($372.30 x 25 Days) = $9,307.50

   Total Labor Costs = $10,253.70

D. Equipment Costs:

1. 1 Dozer: @ $976.80/Day

   o For close dozing work on dikes

   $976.80/Day x 3 Days = $2,930.40

   o For work with scraper

   $244.20/Day x 25 Days = 6,105.00

2. Scraper: @ $1,217.70/Day

   $1,217.70/Day x 25 Days = $30,442.50

3. Pickup Truck: @ $75/Day

   $75.00/Day x 30 Days = 2,250.00

Total Equipment Costs = $41,728.00

Sub-Total = $51,982.00

10% Contingency = 5,198.00

TOTAL PHASE III COSTS = $57,180.00

PHASE IV - COSTS

GRADING, SCARIFICATION AND CONTOURING RECLAIMED AREA

A. Effected Area:

1. Areas to be graded (not including refuse pile area)

   =18 Acres

2. Area to be smoothed by dozer (refuse pile area)

   =11 Acres

B. Equipment Requirements:

1. Motor Grader (30,000 lbs) (Ref. 6)

   Capacity = 6,400 sy/day

2. 1 Dozer (Ref. 6)

   Capacity = 7,340 sy/day

C. Labor Costs:

1. 1 Equip. Opr. for Grader (Ref. 7)

$$\frac{\$227.60}{\text{Day}} \times \frac{1\ \text{Day}}{6400\ \text{sy}} \times 18\ \text{Acres} \times \frac{4840\ \text{sy}}{\text{Acre}} = \$3,098.21$$

2. 1 Building Laborer (Ref. 7)

$$\frac{\$175.60}{\text{Day}} \times \frac{1\ \text{Day}}{6400\ \text{sy}} \times 18\ \text{Acres} \times \frac{4840\ \text{sy}}{\text{Acre}} = \$2,390.36$$

3. 1 Equip. Opr. for Dozer (Ref. 2)

$$\frac{\$227.60}{\text{Day}} \times \frac{1\ \text{Day}}{7340\ \text{sy}} \times 11\ \text{Acres} \times \frac{4840\ \text{sy}}{\text{Acre}} = \$1,650.88$$

4. 0.5 Building Laborer (Ref. 2)

$$\frac{\$87.80}{\text{Day}} \times \frac{1\ \text{Day}}{7340\ \text{sy}} \times 11\ \text{Acres} \times \frac{4840\ \text{sy}}{\text{Acre}} = \$\ 636.85$$

Total Labor Costs = $7,776.30

D. Equipment Costs:

1. Grader (Ref. 7)

$\frac{\$460.70}{\text{Day}}$ x 13.61 Days = $6,271.28

2. Dozer (Ref. 2)

$\frac{\$976.80}{\text{Day}}$ x 7.25 Days = $7,085.13

Total Equipment Costs = $13,356.41

Sub-Total = $21,132.71

10% Contingency = $ 2,113.27

TOTAL PHASE IV COSTS = $23,246.00

PHASE V - COSTS

FERTILIZING, RESEEDING, AND SHRUB PLANTING

A. Fertilizing and/or Neutralizing		
29 Acres @ $386.00/Acre	=	$11,194.00
B. Reseeding:		
29 Acres @ $450.00/Acre	=	13,050.00
C. Shrub Planting:		
18 Acres @ $192.00/Acre	=	3,456.00
Sub-Total	=	$27,700.00
10% Contingency	=	2,770.00
TOTAL PHASE V COSTS	=	$30,470.00

COST SUMMARY

PHASE	
I	$116,700.00
II	3,200.00
IIA	43,200.00
III	57,200.00
IV	23,200.00
V	30,500.00
TOTAL	$274,000.00

References

1. Anonymous, Caterpillar Performance Handbook, ed. 14, Peoria, pp. 42, 44, October, 1983.

2. Anonymous, Site Work Cost Data, 3rd ed., Crew B10-M, Kingston: Robert Snow Means, p. xiv, 1984

3. Anonymous, Building Construction Cost Data, 42nd ed., circle reference 44, Kingston: Robert Snow Means, p. 357, 1984

4. Anonymous, Site Work Construction Data, 3rd. ed, 2.3-164-2300, Kingston: Robert Snow Means, p. 357, 1984.

5. Anonymous, Site Work Construction Data, 3rd ed., Crew B-33E, Kingston: Robert Snow Means, p. xix, 1984

6. Anonymous, Site Work Construction Data, 3rd Ed., 2.3-220-1800, Kingston: Robert Snow Means, p. 37, 1984

7. Anonymous, Site Work Construction Data, 3rd Ed., Crew B11-L, Kingston: Robert Snow Means, p. xv., 1984.

(b)(3, 4, 7)

Sources of the fill material are those outlined and designated as 1) Portal Bench Borrow Area, 2) Sedimentation Pond Embankment, 3) Refuse Pile Containment Dike and 4) Backfill Borrow Pit on Dwg. 4050-5-13-R. The volumetrics are shown and are incorporated in the preceding cost estimate.

The 84,000 cubic yards of backfill material required for the four foot minimum cover of the possible toxic areas is available from the borrow pit area of approximately 7.4 acres by excavating to an average five foot depth. The area has been sampled and deemed suitable as a substitute topsoil and will therefore be used as inert fill as well as topsoil material (See the following "Soil Sample Logs", Dwg. 4050-5-28; and "Soil Analysis and Interpretation" by Native Plants).

Samples of the site facilities area show that removal of the coal dust contaminated surface to depths of up to one foot and relocation of this material to the refuse pile area will leave a clean surface which can then be scarified and prepared for planting.

A "worst case" toxic analysis of the refuse material has been assumed. According to UMC 817.85 (d), this then dictates the placement of a minimum of four feet of inert material cover. The refuse material will first be compacted in the pile to attain a

90% maximum dry density according to AASHTO T99-74. The four feet of cover will be placed in two foot lifts and compacted to at least 90% Standard Proctor Density as recommended by Chen and Associates in UMC 784.10 (ACR). See Dwgs. 4050-5-13-R, and 4050-5-29-R to 32-R for location and reclaimed surface details. Also see UMC 817.22 DOC-Topsoil Removal.

SOIL ANALYSIS AND INTERPRETATION

J. B. KING MINE

Submitted to

L. G. Manwaring
COAL SYSTEMS, Inc.
Salt Lake City, Utah

By

David Anderson, PhD
Senior Scientist
Native Plants, Inc.
Salt Lake City, Utah

June 6, 1984

NPI

417 Wakara Way
Salt Lake City, Utah 84108
(801) 582-0144
TWX 910 925 5284

June 6, 1984

Mr. L.G. Manwarring, P.E.
Coal Systems, Inc.
PO Box 17117
Salt Lake City, UT 84117

Dear Mr. Manwarring:

Please find enclosed the results of the analysis of 34 soil samples for pH, EC, texture and water soluble Ca, Mg and Na. An interpretation of the data is also provided as requested in your letter received on the 21st of May, 1984.

If we can be of further assistance, feel free to contact us.

Sincerely,

David Anderson

David Anderson, Ph.D.
Senior Scientist

DA:brg

Enclosure

SOIL ANALYSIS AND INTERPRETATION

J.B. King Mine

Coal Systems, Inc.

The following report includes the analysis of 34 soil samples delivered to NPI laboratories on the 21st of May (Table 1). Each soil sample was analyzed for water soluble Ca, Mg, and Na; electrical conductivity (EC), pH, and texture, from which saturation percentage (SP), and sodium adsorption ratio (SAR) were determined. The parameters sampled are as outlined in UMC 817.22(e)(1)(i) and required by the Division of Oil, Gas and Mining (Attachment A). Phosphorus and potassium analyses were not conducted since the purpose of these analyses is to determine soil fertility with respect to revegetation procedures. These analyses are to be conducted at the time of revegetation to determine fertilizer requirements.

The pH of a saturated paste, electrical conductivity of saturation extracts, and the SAR as derived from the soluble cations, calcium, magnesium, and sodium, are all parameters which define saline and alkali soils. Agriculturally, saline and alkaline soils are generally problematic in that they require special remedial measures and management practices. For reclamation purposes, remedial measures, certain management practices, and the use of specialized species may be indicated.

Soil Salinity

The SAR is related to exchangeable-sodium-percentage (ESP) as per Figure 27, "Diagnosis and Improvements of Saline and Alkali Soils" (USDA Agriculture Handbook No. 60, p. 103, Attachment B). The ESP is a parameter defining alkali soils.

Saline soil. A soil that has an EC greater than 4 mmhos/cm at 25^{o} C and an ESP less than 15. Usually the pH is less than 8.5 (Handbook 60, p. 5). All "A" samples, all "C" samples, except C-1, and K-11 fall into this category.

Saline-Alkali Soil. A soil that has an EC greater than 4 mmhos/cm at 25° C and an ESP greater than 15. The pH is less than 8.5. Sample No. E-10 falls into this category.

Non Saline-Alkali Soil. Are soils that have an EC less than 4 mmhos/cm at 25° C but with an ESP value greater than 15. The pH is between 8.5 and 10. None of the samples fall into this category.

Normal Soils. By inference, these are soils with an EC value less than 4 mmhos/cm and an ESP value less than 15. They are not problematic. All "J" samples, "H" samples, and C-1 fall into this category.

Soil Suitability

The suitability of the soils sampled as a substitute topsoil is based on criteria outlined by the Wyoming Department of Environmental Quality, Land Quality Division, Guideline No. 1, Topsoil and Overburden Draft, p. 18 (Attachment C). The parameters measured of those listed include pH, EC, texture, sodium adsorption ratio (SAR), and saturation percentage (SP). Table 2 lists each soil sample as to its suitability based on those criteria.

The results show that all soils would be suitable with the exception of E-10 based on SAR values. Based on texture, soils C-2, C-3, C-4 and E-10 are only marginally suitable and based on EC, C-3, C-4 and E-10 are again marginally suitable. The pH values and saturation percentages (SP) were all within the good-fair range and suitable for a topsoil substitute. There appears to be a layer of soil in the sample area C heavy in clays with unsuitable EC values that should not qualify as a substitute topsoil. The only other problem area is at the 10-foot depth of sample area E which has a high SAR, EC and over 40% clay. The suitability of soils at area E is undetermined since only a 10 foot deep sample was taken.

Based on the results of those analyses the soils sample are not suspected to be toxic or combustible. However, specific heavy metal concentrations were not determined nor required of the Division of Oil, Gas and Mining (DOGM).

Summary

Based on the comparison of the results of these soil analyses to criteria established by the Wyoming DEQ soils sampled at areas A, H, and J & K are suitable substitutes for topsoil. Area E soils taken at a depth of 10 feet are not a suitable topsoil substitute. Area C soils could be used if caution is taken to locate and avoid the use of clay layers found from approximately 2-5 feet.

Table 1. Soil Analysis Results

RESULTS
Coal Systems Inc./J.B. King, May 1984

Drill Hole-Depth Sample No.	pH-EC pH*	EC** (mmhos)
A-1	6.08	5.68
A-2	6.12	6.80
A-3	5.92	7.22
A-4	5.92	7.44
A-5	6.32	6.50
A-6	6.93	6.87
A-7	6.97	7.17
C-1	6.49	3.67
C-2	7.56	7.19
C-3	7.81	10.30
C-4	7.87	9.99
C-5	7.27	4.98
C-6	7.55	4.18
C-7	7.87	5.17
C-8	7.81	5.94
C-9	7.79	6.04
C-10	7.64	4.68
C-11	7.56	4.43
C-12	7.72	4.39
E-10	8.05	16.00
H-1	7.95	2.18
H-2	8.11	0.75
H-3	7.94	1.29
J-1	7.96	0.53
J-2	8.05	0.74
J-3	8.07	0.57
J-4	7.96	0.64
J-5	8.08	0.57
J-6	8.17	0.85
J-7	8.11	0.50
J-8	8.18	0.21
J-9	7.95	0.66
J-10	8.03	1.17
K-11	7.83	7.52

*Method: Saturated Paste
**Method: Saturated Extract

Particle Size Analysis*

Drill Hole-Depth Sample No.	% Sand	% Clay	% Silt	Texture
A-1	67.2	16.6	16.2	Loam
A-2	61.6	22.6	15.8	Loam
A-3	45.4	25.4	29.2	Silt-loam
A-4	50.4	22.6	27.0	Sandy-clay-loam
A-5	53.0	20.8	26.2	Loam
A-6	51.4	20.6	28.0	Loam
A-7	49.6	24.0	26.4	Silt-loam
C-1	80.8	11.4	7.8	Sandy-loam
C-2	35.0	40.6	24.4	Clay
C-3	32.4	44.6	23.0	Clay
C-4	28.8	44.6	26.6	Clay
C-5	76.0	14.0	10.0	Sandy-loam
C-6	54.0	18.6	27.4	Loam
C-7	58.0	21.4	20.6	Loam
C-8	59.0	20.2	20.8	Loam
C-9	59.6	18.6	21.8	Loam
C-10	66.4	20.6	13.0	Loam
C-11	73.4	14.0	12.6	Sandy-loam
C-12	68.4	20.0	11.6	Loam
E-10	28.0	43.4	28.6	Clay
H-1	45.6	20.6	33.8	Silt-loam
H-2	48.4	24.6	27.0	Silt-loam
H-3	44.4	23.4	32.2	Silt-loam
J-1	80.8	11.4	7.8	Sandy-loam
J-2	81.6	10.6	7.8	Sandy-loam
J-3	91.6	6.6	1.8	Loamy-sand
J-4	87.2	8.4	4.4	Loamy-sand
J-5	89.6	6.6	3.8	Loamy-sand
J-6	86.0	9.4	4.6	Sandy-loam
J-7	88.0	8.0	4.0	Loamy-sand
J-8	90.6	6.6	2.8	Loamy-sand
J-9	88.8	9.4	1.8	Loamy-sand
J-10	90.8	7.4	1.8	Loamy-sand
K-11	63.0	18.6	18.4	Loam

*Method: Hydrometer method bouyoucos.

Soluable Cations*/SAR

Drill Hole-Depth Sample No.	Ca (ppm)	Ca (meq/l)	Mg (ppm)	Mg (meq/l)	Na (ppm)	Na (meq/l)	SAR	Sat.%**
A-1	889.9	44.4	638	52.5	257.4	11.2	1.6	38
A-2	767.8	38.3	961.4	79.1	336.6	14.6	1.9	43
A-3	671.0	33.5	1120.0	92.2	397.0	17.3	2.2	42
A-4	638.0	31.8	1091.2	89.8	454.3	19.8	2.5	43
A-5	676.5	33.7	926.2	76.2	355.3	15.4	2.1	37
A-6	724.9	36.2	896.9	73.8	407.0	17.7	2.4	38
A-7	753.5	37.6	968.4	79.7	429.0	18.7	2.4	37
C-1	717.2	35.8	561.3	46.2	220.0	9.6	1.5	44
C-2	623.7	31.1	764.7	62.9	862.4	37.5	5.5	54
C-3	621.5	31.0	1122.0	92.3	1287.0	56.0	7.1	51
C-4	581.9	29.0	1035.1	85.2	954.8	41.5	5.5	58
C-5	719.4	35.9	638.0	52.5	257.4	11.2	1.7	45
C-6	607.2	30.3	266.4	21.9	412.5	17.9	3.5	38
C-7	652.3	32.5	319.5	26.3	632.5	27.5	5.1	44
C-8	696.3	34.7	399.3	32.9	744.7	32.4	5.6	38
C-9	683.1	34.1	407.0	33.5	776.6	33.8	5.8	44
C-10	807.4	40.3	334.2	27.5	291.5	12.7	2.2	38
C-11	789.8	39.4	304.3	25.0	266.2	11.6	2.0	39
C-12	877.8	43.8	264.5	21.8	185.9	8.1	1.4	43
E-10	534.6	26.7	1606.0	132.2	3421.0	148.7	16.7	47
H-1	155.1	7.7	132.0	10.9	249.7	10.9	3.6	58
H-2	85.8	4.3	27.4	2.3	100.9	4.4	2.4	38
H-3	104.5	5.2	65.9	5.4	143.0	6.2	2.7	44
J-1	104.5	5.2	16.3	1.3	25.3	1.1	0.6	32
J-2	122.1	6.1	46.4	3.8	28.4	1.2	0.5	28
J-3	95.7	4.8	19.3	1.6	26.2	1.1	0.6	30
J-4	127.6	6.4	22.9	1.9	20.9	0.9	0.4	34
J-5	64.9	3.2	31.5	2.6	33.0	1.4	1.2	31
J-6	100.1	5.0	53.5	4.4	361.9	15.7	7.2	32
J-7	74.8	3.7	27.2	2.2	53.9	2.3	1.4	29
J-8	100.1	5.0	32.0	2.6	52.0	2.3	1.2	40
J-9	97.9	4.9	26.6	2.2	45.8	2.0	1.1	31
J-10	121.0	6.0	66.3	5.5	105.6	4.6	1.9	30
K-11	597.3	29.8	756.8	62.2	974.6	42.4	6.3	42

*Water Soluable Ca, Mg, and Na:

A saturated paste was prepared from air-dried sample material and deionized water as per method 3a, p.84, handbook 60. USDA. Saturation percentage* was recorded and an extract was obtained as outlined in the handbook. Concentrations of Ca^{2+}, Mg^{2+} and Na^{+} were measured using standard atomic asorption spectrophotometry methods. SAR is a calculated value as follows:

$$SAR = \frac{Na^{+}}{\sqrt{Ca^{2+} + Mg^{2+}/2}}$$

**Saturation percent: $= \frac{\text{Wt. of D.I. } H_2O}{\text{Wt. of air-dried soil}} \times 100$

10% QA/QC for:

pH
Range 0.03 - 0.06, $\bar{x}$ = 0.04

EC
Range 0.02 - 0.24 (from lower to higher EC values), $\bar{x}$ = 0.16

Texture
Sand - Range 0-8%, $\bar{x}$ = 3.2%
Silt - Range 1.4-2%, $\bar{x}$ = 1.8%
Clay - Range 2-6%, $\bar{x}$ = 3.7%

Soluable cations
Ca range 1.1-11.0 ppm (from lower to higher values), $\bar{x}$ = 6.2
Meq/l range .1-.6 (from lower to higher values), $\bar{x}$ = .37

Mg range 2.3-17.6 ppm (from lower to higher values), $\bar{x}$ = 8.9
Meq/l range .2-1.5 (from lower to higher values), $\bar{x}$ = .57

Na range 2.2-15.4 ppm (from lower to higher values), $\bar{x}$ = 9.5
Meq/l range .1-.7 (from lower to higher values), $\bar{x}$ = .43

SAR 0-.1 range, x = .03

Table 2. Soil Suitability

Drill Hole - Depth	pH	EC (mmhos)	Texture	SAR	SP
A-1	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
A-2	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
A-3	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
A-4	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
A-5	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
A-6	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
A-7	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
C-1	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
C-2	Good (Suitable)	Fair (Suitable)	Poor (Marginally Suitable)	Good (Suitable)	Good-Fair (Suitable)
C-3	Good (Suitable)	Poor (Marginally Suitable)	Poor (Marginally Suitable)	Fair (Suitable)	Good-Fair (Suitable)
C-4	Good (Suitable)	Poor (Marginally Suitable)	Poor (Marginally Suitable)	Good (Suitable)	Good-Fair (Suitable)
C-5	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
C-6	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
C-7	Good (suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
C-8	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
C-9	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
C-10	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
C-11	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
C-12	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
E-10	Good (Suitable)	Unsuitable	Poor (Marginally Suitable)	Unsuitable	Good-Fair (Suitable)
H-1	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
H-2	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)

Drill Hole - Depth	pH	EC (mmhos)	Texture	SAR	SP
H-3	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
J-1	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
J-2	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
J-3	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
J-4	Good (Suitable)	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good-Fair (Suitable)
J-5	Good (Suitable)	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good-Fair (Suitable)
J-6	Good (Suitable)	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good-Fair (Suitable)
J-7	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
J-8	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good (Suitable)	Good-Fair (Suitable)
J-9	Good (Suitable)	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good-Fair (Suitable)
J-10	Good (Suitable)	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Good-Fair (Suitable)
K-11	Good (Suitable)	Fair (Suitable)	Good (Suitable)	Fair (Suitable)	Good-Fair (Suitable)

ATTACHMENT A

TELEPHONE COMMUNICATIONS REPORT TI-5387

DATE: 5/15/84 | TIME: A.M. / P.M.

COMMUNICATION WITH - NAME	COMPANY	ADDRESS
Euert Hooper	DOGM	

TITLE	PHONE NO.	ORIGINATOR OF CALL		
Soil Sci.	533-5771	D. Anderson	☐ CONTRACT ☒ INQUIRY	☐ QUOTE ☐ SCHEDULES

SUBJECT

Soil Analysis Required by Division for J.B. King Mine

DISCUSSION

Soil Parameters to be measured: EC
pH
Water Sol. Ca, Mg, Na

Texture

Phosphorus, Potassium & Nitrogen to be Analyzed for at time of Reclamation.

ACTION REQUIRED

ACTION ASSIGNED TO

SIGNED David T. Cooke

COPIES TO

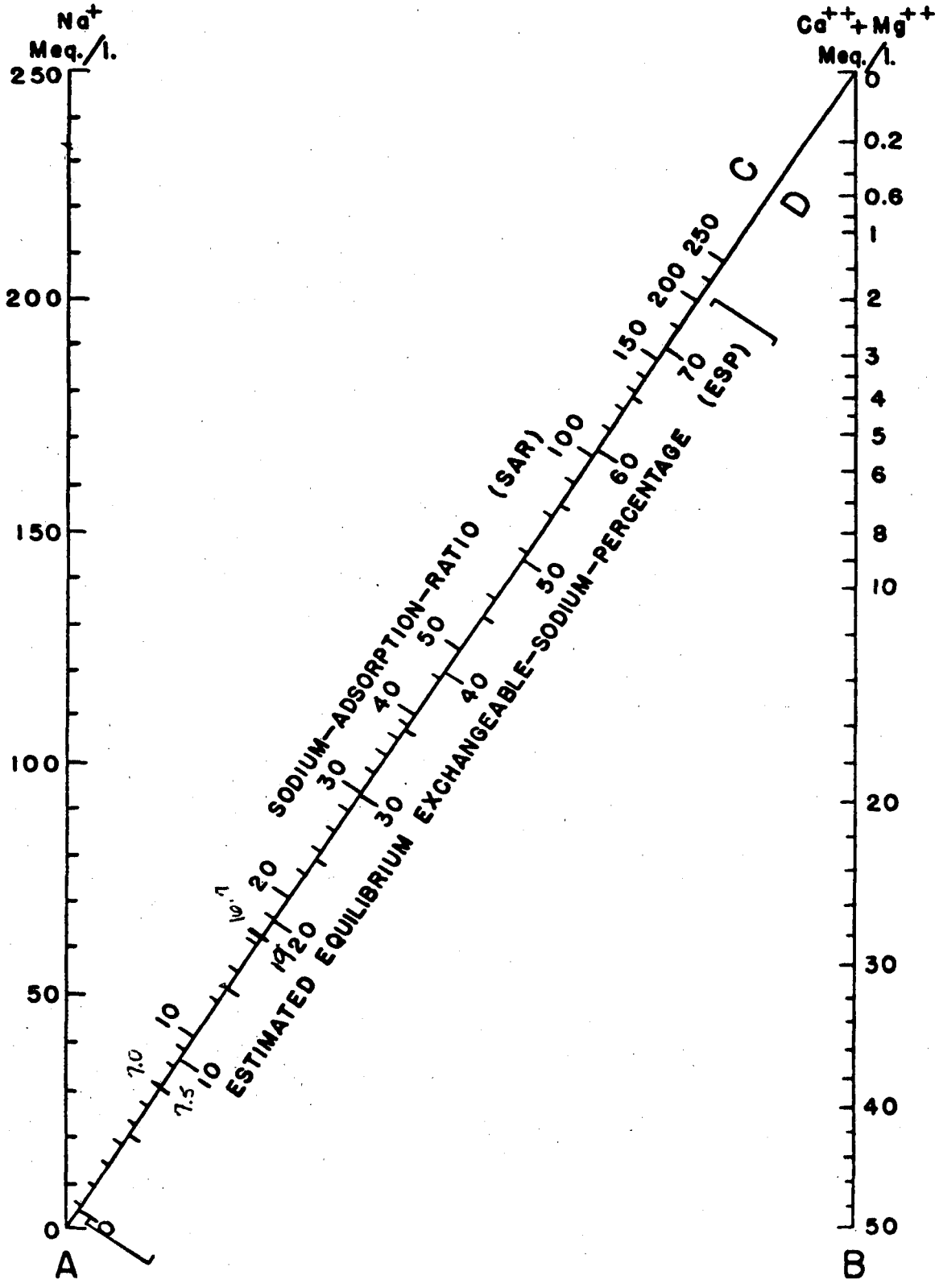


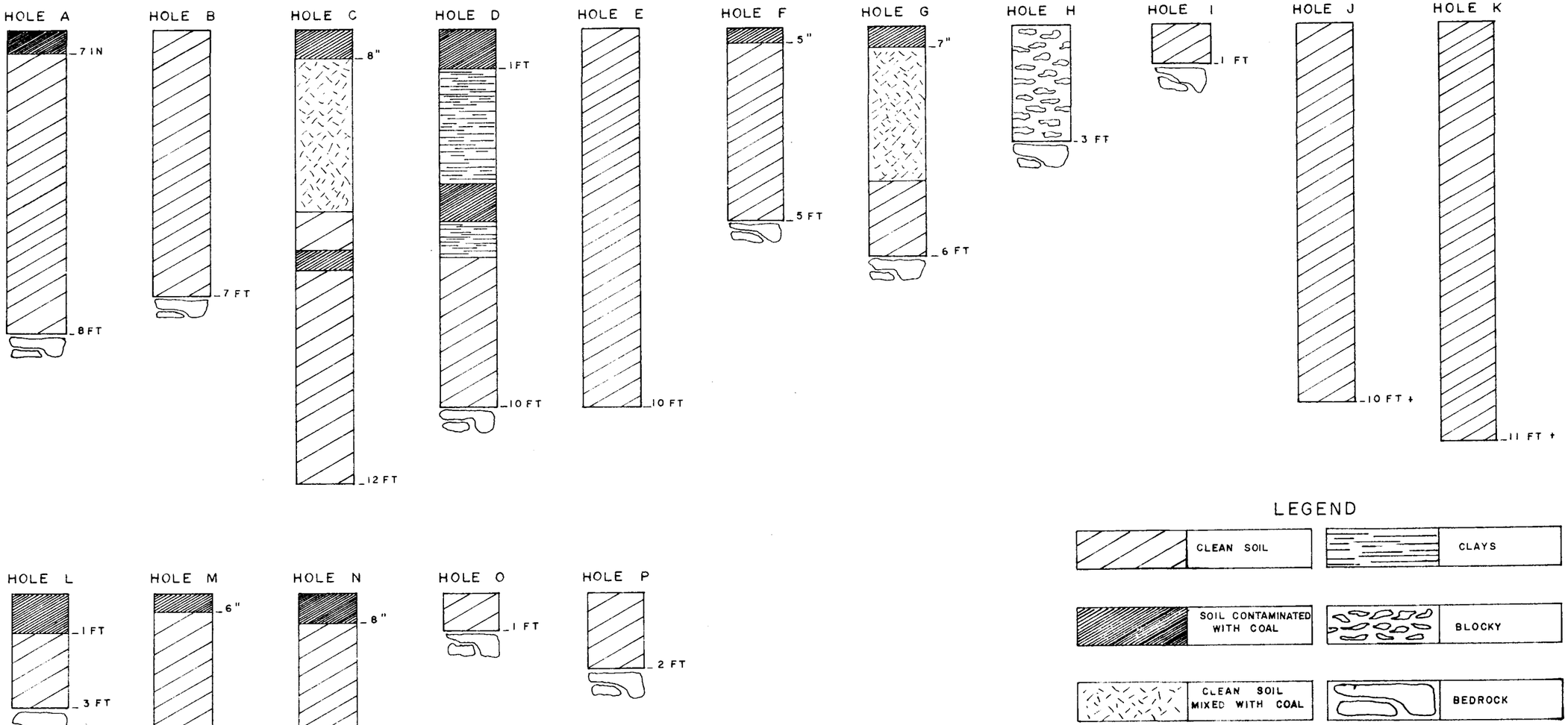
FIGURE 27.—Nomogram for determining the *SAR* value of a saturation extract and for estimating the corresponding *ESP* value of soil at equilibrium with the extract.

Table I-2:Criteria to establish suitability of topsoil (or topsoil substitutes).

Parameter	Suitable			Unsuitable
	Good	Fair	Poor	
pH	6.0 - 8.4	5.5 - 6.0 8.4 - 8.8	5.0 - 5.5 8.8 - 9.0	< 5.0 > 9.0
EC (Conductivity) mmhos/cm	0-4	4-8	8-16 > 8 may prove difficult to revegetate	> 16
Saturation Percentage	25-80		> 80 < 25	
Texture 1/	sl, l, sil, scl, vfsl, fsl	cl, sicl, sc ls, lfs	c, sic, s	
SAR	< 6	6-10	10 - 15 10 - 12 2/	> 15 > 12 2/
Selenium	< 2.0 ppm			> 2.0 ppm
Boron	< 5.0 ppm			> 5.0 ppm
Calcium Carbonate	0-15%	15-30%	over 30%	
Coarse Frag 3-10 in. (% vol) > 10 in.	0 - 15 0 - 3	15 - 25 3 - 7	25 - 35 7 - 10	> 35 > 10
Moist Consistency Dry Consistency	vfr, fr lo, so	lo, fi sh, h	vfi, exfi vh	

1/ SCS. 1978. National Soils Handbook, Notice 24.

2/ For fine textured soils (Clay >40%)(Gee et al., 1978).



Registered Professional Engineer
No. 4212
LEWIS G. MANWARING
State of Utah

UMC 784.13

WESTERN STATES MINERALS CORP

SCALE: 1" v = 3'	APPROVED BY: L.G.M.	DRAWN BY B.D.H.
DATE: 5-23-1984		REVISED

SOIL SAMPLE LOGS

COAL SYSTEMS, INC. – S.L.C., UTAH

DRAWING NUMBER 4050-5-28

UMC 784.17 PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES

In consultation with Mr. Jim Dykaman, State Historic Preservation Office, May 5, 1984, the following correction is made to page 29, para. 3 (ACR) - Determination of Effect.

"Final determination of effect on sites eligible to the NRHP should be sought by the Company from the Division of State History, State Historic Preservation Office, Utah State Historical Society."

UMC 784.20 SUBSIDENCE CONTROL PLAN

A. Renewable Resource Lands

Renewable resource lands that exist within the permit and adjacent areas are limited to grazing lands and wildlife habitat. Potential resource lands such as aquifers or areas for the recharge of aquifers and other underground water systems are not known to exist within the permit area. Further, no significant agricultural or silvicultural activities are being planned, or currently taking place in the permit area. Little material damage or diminution of renewable resource lands, caused by subsidence, is foreseen.

1. Grazing Lands: Field surveys conducted by Native Plants, under contract with Coal Systems, Inc., concluded: "The land uses prior to any mining were the same as the present land uses; cattle grazing and wildlife habitat", (Ref. 4). Mr. Thomas Guobis of Native Plants indicates that no significant impact on the grazing vegetation has taken place, due to subsidence. Therefore, it is felt that ground movement from subsidence should have a negligible effect on cattle grazing or wildlife habitat.
2. Underground Water Systems: No aquifers, areas for the recharge of aquifers, or other underground waters are known to exist in the permit area. (Note: The permit area depth extends to the I-Seam. See Dwgs. 4050-5-25 (ACR) and 4050-5-2 (ACR). Drill-hole data, combined

with on-site inspections, confirm that the permit area is dry from the surface to the I-Seam, (about 120 ft). The static water level is below the I-Seam. Since no aquifers or underground waters are known to exist in the permit area, subsidence should not effect these water systems.

3. Agricultural and Silvicultural Areas: There are no known agricultural or silvicultural activities planned for in the future, or currently taking place in the permit area. Subsidence in the area should not effect agricultural or silvicultural production for food and fiber.

B. Extent of Subsidence

The main objective of this section is to delineate the extent to which controlled subsidence is expected, and its method of calculation.

1. Significant Data:

   - A 75 ft barrier pillar will be maintained between the permit area and the adjacent property line. This situation exists along the southern boundary of the permit area.
   - A 100 ft barrier pillar will be maintained between the mined out area and the outcrop of the I-Seam. This situation exists around the entire mining area, with the exception of the southern boundary.

* Note: The barrier pillar dimensions given above differ from those previously stated in UMC 784.20 (b), (2), (iii), (ACR). An increase in the barrier pillar size is felt to be necessary to insure that subsidence will be limited to the permit area, and cause minimal damage to surface terrain.

2. General Equation:

$S_{EXT} = h \tan \alpha$ (Ref. 2)

Where: S_{EXT} = expected extent of subsidence

h = depth of overburden

α = angle of draw (30 degrees, Ref. 3)

3. Calculated values, Area by Area:

- Southeast corner:

  $S_{EXT} = 100' \tan 30^{\circ} = 58'$

- Eastern boundary:

  $S_{EXT} = 120' \tan 30^{\circ} = 69'$

- Northern boundary:

  $S_{EXT} = 60' \tan 30^{\circ} = 35'$

- Northwest boundary:

  $S_{EXT} = 80' \tan 30^{\circ} = 46'$

- Western boundary:

  $S_{EXT} = 100' \tan 30^{\circ} = 58'$

- Southwest boundary:

  $S_{EXT} = 80' \tan 30^{\circ} = 46'$

- Southern boundary:

  $S_{EXT} = 100' \tan 30^{\circ} = 58'$

4. Comments:

Subsidence is not expected to extend beyond the permit area during any phase of mining activity. The maximum extent of controlled subsidence is expected to be about 70 ft. A buffer zone should insure that subsidence is limited to the permit area. A subsidence profile, showing the angle of draw (α), and the actual subsidence that has occurred is shown in Dwg. 4050-5-34.

C. Surface Effects

The main objective of this section is to project the maximum surface effect based on overburden depth and thickness of coal extraction, and show the method of calculation.

1. General Equation:

$S_m = km$ (Ref. 2)

Where: S_m = maximum subsidence expected

k = subsidence factor, allows for depth of overburden, lithology, and extraction ratio (0.6, Ref. 1)

m = thickness of seam

2. Calculated value:

$S_m = 0.6 \times 12 \text{ ft} = 7 \text{ ft}$

3. Comments:

The maximum subsidence is calculated to be about 7 ft. A study, conducted by Grand River Institute, wherein they state that, "the surface will be lowered 5-to-8 feet", supports the calculated value. The actual subsidence, as measured between survey point S-1 to cap, Dwg. 4050-5-5-R, shows a maximum subsidence of about 7 ft.

D. Material Damage

This section describes the measures to be taken to define the effects of any material damage or diminution as required by UMC 784.20 (c).

There are no plans currently for the restoration or rehabilitation of structures and features, including approximate land-surface contours, to pre-mining conditions. No structures exist on the potential subsidence surface, therefore no material damage is expected. It is unlikely that structures of any significance will be built in the subsidence area, making the land capable of supporting the structures which may be built, and any other foreseeable land uses.

The operator has taken measures to determine the degree of material damage or diminution of value or foreseeable use of the surface by establishing a monitoring system. The monitoring system consists of surveyed points which reflect the depth and

extent of the actual subsidence. These survey points have been established over the pillared area of the mine. More survey points will be put in place as mining progresses (See Dwg. 4050-5-5-R). A cross-sectional profile, between points S-1 and Cap is shown in Dwg. 4050-5-34. These survey stations will be resurveyed annually, and the resulting data supplied to the Division, to insure that controlled subsidence is limited to the area shown in Dwg. 4050-5-5-R.

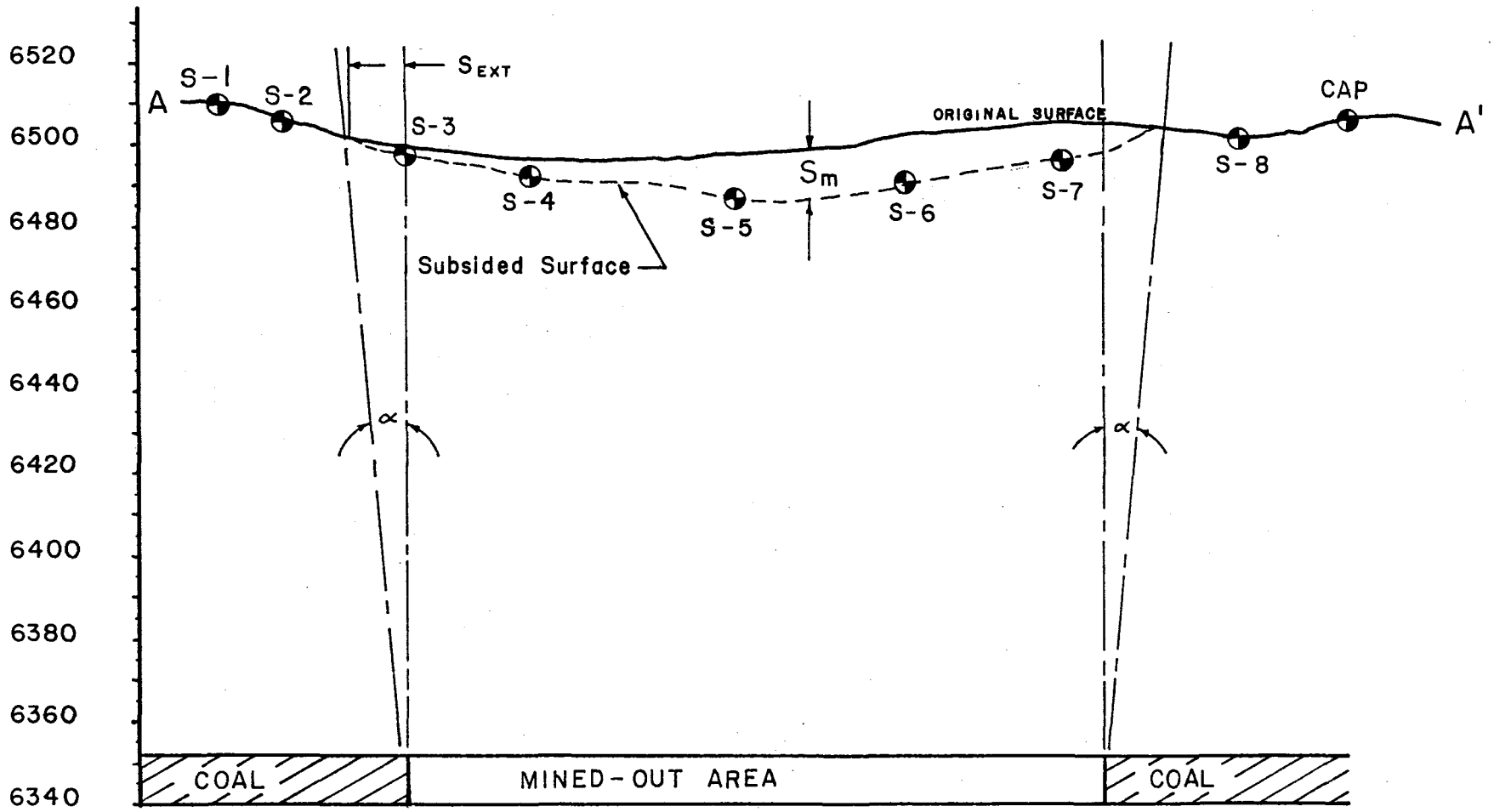
References

1. Adel, J. F., and Lee, F. T., Lithologic Controls on Subsidence., Pre-print 8-314, Minnesota: SME-AIME Fall Meeting, October 22-24, 1980.

2. Anonymous, Subsidence Engineers Handbook., National Coal Board Mining Department, 1975

3. Dunrud, R. D., Some Engineering Geologic Factors Controlling Coal Mine Subsidence in Utah and Colorado, Geological Survey Professional Paper 969, Washington: United States Government Printing Office, 1976.

4. Guobis, Thomas, J. B. King Mine Soil and Vegetation Data., Salt Lake City: Native Plants, August, 1983.



UMC 784.20

Registered Professional Engineer
No. 4212
LEWIS G. MARMARINO
State of Utah

WESTERN STATES MINERALS CORP.		
SCALE: 1" = 240'	APPROVED BY: LGM	DRAWN BY BDH
DATE: 5-29-84		REVISED
SURFACE SUBSIDENCE PROFILE		
COAL SYSTEMS, INC., SLC, UT.		DRAWING NUMBER 4050-5-34

UMC 784.22 DIVERSIONS

Southwest Boundary Diversion Ditch

An intercept ditch has been designed and constructed for the purpose of collecting and diverting surface runoff from the undisturbed area as well as a portion of the disturbed area. See Dwg. 4050-5-19. The ditch design complies with UMC 817.43 (a)(c)(f). Design criteria for a permanent diversion is used, although during reclamation, part of the diversion will be altered. Design details are as follows:

1. General Conditions
   - o A limited amount of poor quality watershed soil and vegetation in undisturbed watershed area
   - o High topographic relief between the head and toe of the undisturbed watershed area
   - o Low annual precipitation
2. Watershed Details
   - o Length (L) = 2200 ft (0.42 miles)(See Dwg. 4050-5-19-R)
   - o Difference in elevation (H) = 6600 - 6280 = 320 ft
   - o Delay time (t_c) (Ref. 1)

$$t_c(\text{hrs}) = \left[\frac{11.9\ L^3}{H}\right]^{0.385}$$

$$t_c = \left[\frac{11.9 \times 0.42^3}{320}\right]^{0.385}$$

$$t_c \approx 6 \text{ min}$$

- o Rainfall intensity (i)

  (for 10-year, 24-hour precipitation event)

  using t_c = 6 min.

  i = 0.23 in. (Ref. 2)

- o Runoff coefficient C (Ref. 1)

  C = 0.7

- o Area (A) sum of areas II and III (See Dwg. 4050-5-19-R)

  A = 9 + 34.2

  A = 43.2 acres

3. Peak runoff for ditch design (Ref. 1)

   o Rational method to find peak flow rates

   Q = CiA (cfs)

   Q = (0.7)(.23)(43.2)

   Q = 7.0 cfs

4. Ditch Profile and Data

   Detailed profiles of the diversion are illustrated in Dwgs. 4050-5-3K through 4050-5-30. The 0+00 station is taken to be a profile of the diversion ditch south of the 25 in. culvert.

   Table 1 at the end of this section, illustrates the maximum capacity, the depth of flow and velocity for the required capacity flow of each section of the ditch for the given ditch geometry and runoff conditions.

5. General Comments

   Between station 0+00 and 1+00 the diversion ditch handles the watershed from the undisturbed area and a portion of the disturbed area, as well as the inflow from the diver-

sion ditch below the refuse pile. This quantity is discharged through a 25 in. culvert to the large sedimentation pond. Sizing calculations for this culvert are found in UMC 817.43 (DOC).

The critical section, with respect to carrying capacity, is 6+00 - 7+00. The maximum quantity of flow that this section will accommodate is 30.7 cfs. The peak flow during a 10-year, 24-hour precipitation event is calculated to be 7 cfs. Therefore, the diversion can safely accommodate the required volume. The maximum velocity at the required flow is 4.8 fps. A velocity of 6.2 fps is expected in the natural drainage above the diversion.

Diversion Ditch Below Refuse Pile

An intercept ditch has been designed and constructed for the purpose of collecting and diverting surface runoff from the refuse pile. See Dwg. 4050-5-19. The ditch design complies with UMC 817.43 (a)(c)(f). Design criteria as applied to a permanent diversion is used, although during reclamation, the diversion will be altered. Design details are as follows:

1. General Conditions

   - o Gently sloping refuse pile
   - o Low annual precipitation

2. Watershed Details

- Length (L) = 600 ft (0.11 miles) (See Dwg. 4050-5-19-R)
- Difference in elevation (H) = 6340 - 6270 = 70 ft
- Delay time (t_c) (Ref. 1)

$$t_c \text{ (hrs)} = \left[\frac{11.9\ L^3}{H}\right]^{0.385}$$

$$t_c = \left[\frac{11.9 \times 0.11^3}{70}\right]^{0.385}$$

$$t_c \approx 2.5 \text{ min (use 5 min)}$$

- Rainfall intensity (i) (Ref. 2)

  using t_c = 5 min, 10-year, 24-hour precipitation event

  i = 0.23 in.

- Area (A) (See Dwg. 4050-5-19-R)

  Area is the area of the refuse pile

  A = 10.8 acres

Runoff coefficient (C) (Ref. 1)

C = 0.6

3. Peak Runoff (Ref. 1)

- Rational method to find peak flow rates

  Q = CiA (cfs)

  Q = (0.6)(0.23)(10.8)

  Q = 1.5 cfs

4. Ditch Profile and Data

A typical cross-sectional profile of the diversion is shown in Dwg. 4050-5-35. Table 2 at the end of this section, illustrates the maximum capacity and the required capacity of each section of the ditch for the given geometry and runoff conditions. Station 0+00 is taken to be at the head of the diversion ditch.

5. General Comments

This diversion should accommodate the runoff from the refuse pile and channel this runoff into the main sedimentation pond. Some energy dissipators (bales of hay) have been placed in the lower sections of the diversion as shown in Dwg. 4050-5-13-R.

The critical section, with respect to carrying capacity, is 1+00 - 2+00. The maximum quantity of flow that this section will accommodate is 7.7 cfs. The peak flow during a 10-year, 24-hour precipitation event is calculated to be 1.5 cfs. The diversion is of adequate size to handle the required flow. The maximum velocity expected during a 10-year, 24-hour precipitation event is 5.7 fps.

References

1. D'Appolonia, E., Engineering and Design Manual, Coal Refuse Disposal Facilities, Washington: United States Government Printing Office.

2. Richardson, E. A., Estimated Return Periods For Short Duration Precipitation in Utah, Logan: Utah State University.

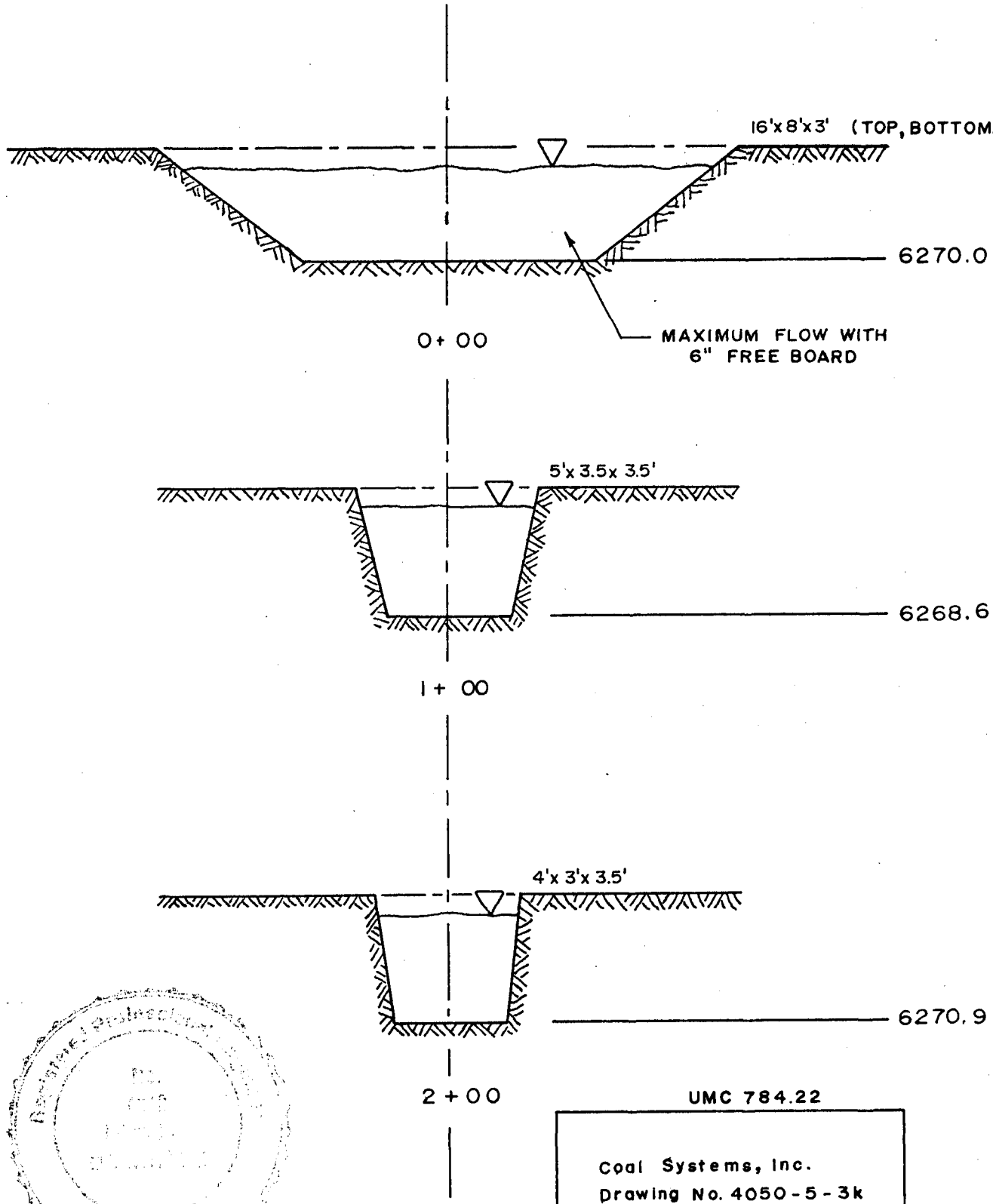
STATION		SPECIFLOW AT REQUIRED CAPACITY Q_{req} = 7 cfs			
Beginning at 30 in. culvert		Dist. (ft)	Δ El (f	Velocity (fps) n=0.04	Depth (in.)
0+00	1+00	100	-1.	2.2	5
1+00	2+00	100	2.	3.3	7
2+00	3+00	100	5.	4.5	6
3+00	4+00	100	4.	3.8	5
4+00	4+00	100	4.	4.2	6
5+00	6+00	100	3.	3.9	7
6+00	7+00	100	0.	1.4	12
7+00	8+00	100	1	2.7	7
8+00	9+00	100	0.	1.6	6
9+00	10+00	100	3	3.7	5
10+00	11+00	100	-1.	3.0	8
11+00	12+00	100	5	4.8	7
12+00	12+	300	50	6.2	4

STATION		SPECIFILOW AT REQUIRED CAPACITY Q_{req} = 1.5 cfs		
Beginning at crest	Dist. (ft)	ΔEle (ft	Velocity (fps) n=0.04	Depth (in.)
0+00 - 1+00	100	26.9	5.7	2.6
1+00 - 2+00	100	12.0	1.9	6.2
2+00 - 3+00	100	5.3	3.2	4.0
3+00 - 4+00	100	6.0	3.4	4.1
4+00 - 5+00	100	3.4	2.8	4.7
5+00 - 6+00	100	2.3	2.4	5.2
6+00 - 7+00	100	3.2	2.7	4.8
7+00 - 8+00	100	4.3	3.0	4.3
8+00 - 9+00	100	4.5	3.1	4.3

BY B.H. DATE 5/10/84 SUBJECT CROSS - SECTION SHEET NO. 1 OF 5

CHKD. BY L.G.M DATE 5/10/84 STA. 00+00 TO STA. 2+00 JOB NO. 4050 - 5

WESTERN - SOUTHERN DIVERSION DITCH DRAWING 4050-5-3K



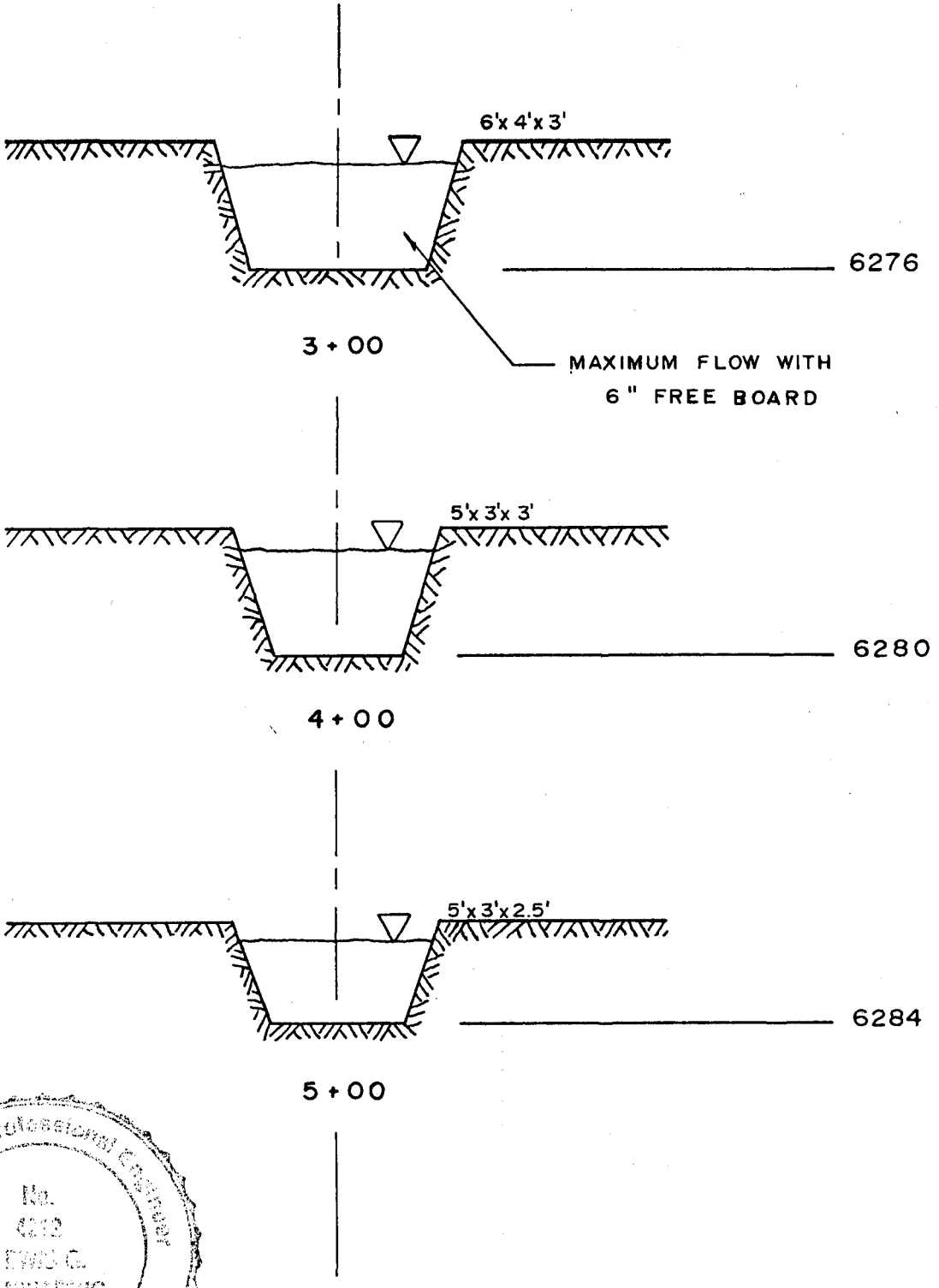
UMC 784.22

Coal Systems, Inc.
Drawing No. 4050-5-3k
SCALE 1/2" = 2ft.

BY BH DATE 5/11/84 SUBJECT CROSS - SECTIONS SHEET NO. 2 OF 5

CHKD. BY LGM DATE 5/11/84 STA 3+00 TO STA 5+00 JOB NO. 4050-5

SOUTHERN DITCH DRAWING 4050-5-3L

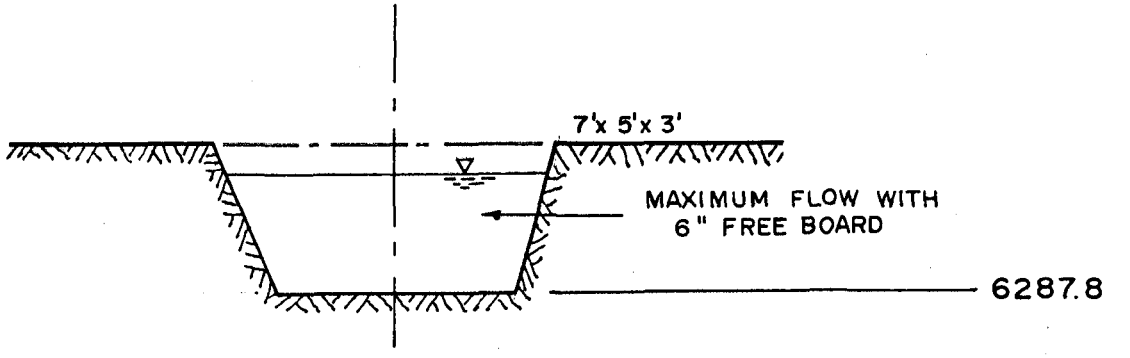


COAL SYSTEMS, Inc.
DRAWING 4050-5-3L
SCALE 1/2" = 2 FT.

BY BH DATE 5/11/84 SUBJECT CROSS-SECTION SHEET NO. 3 OF 5

CHKD. BY LGM DATE 5/11/84 STA 6+00 TO STA 8+00 JOB NO. 4050-5

SOUTHERN DITCH DRAWING 4050-5-3M



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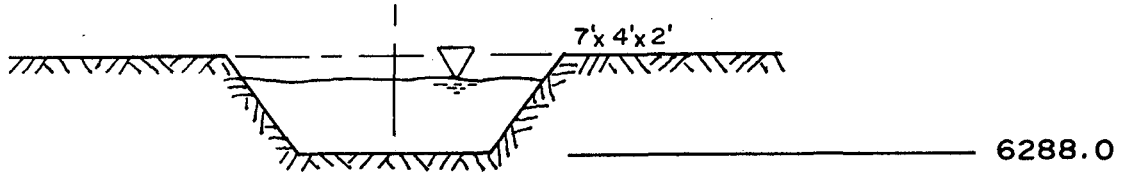
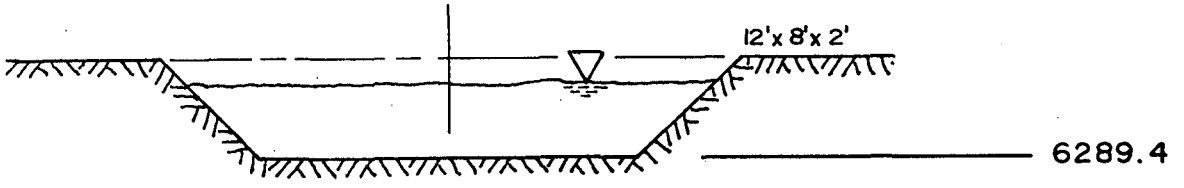
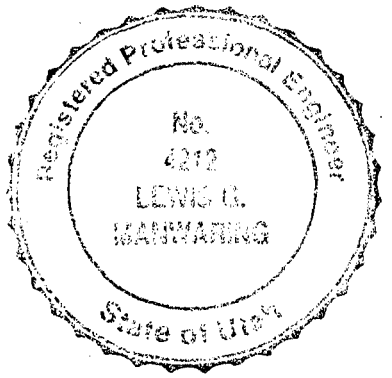


7+00



8+00

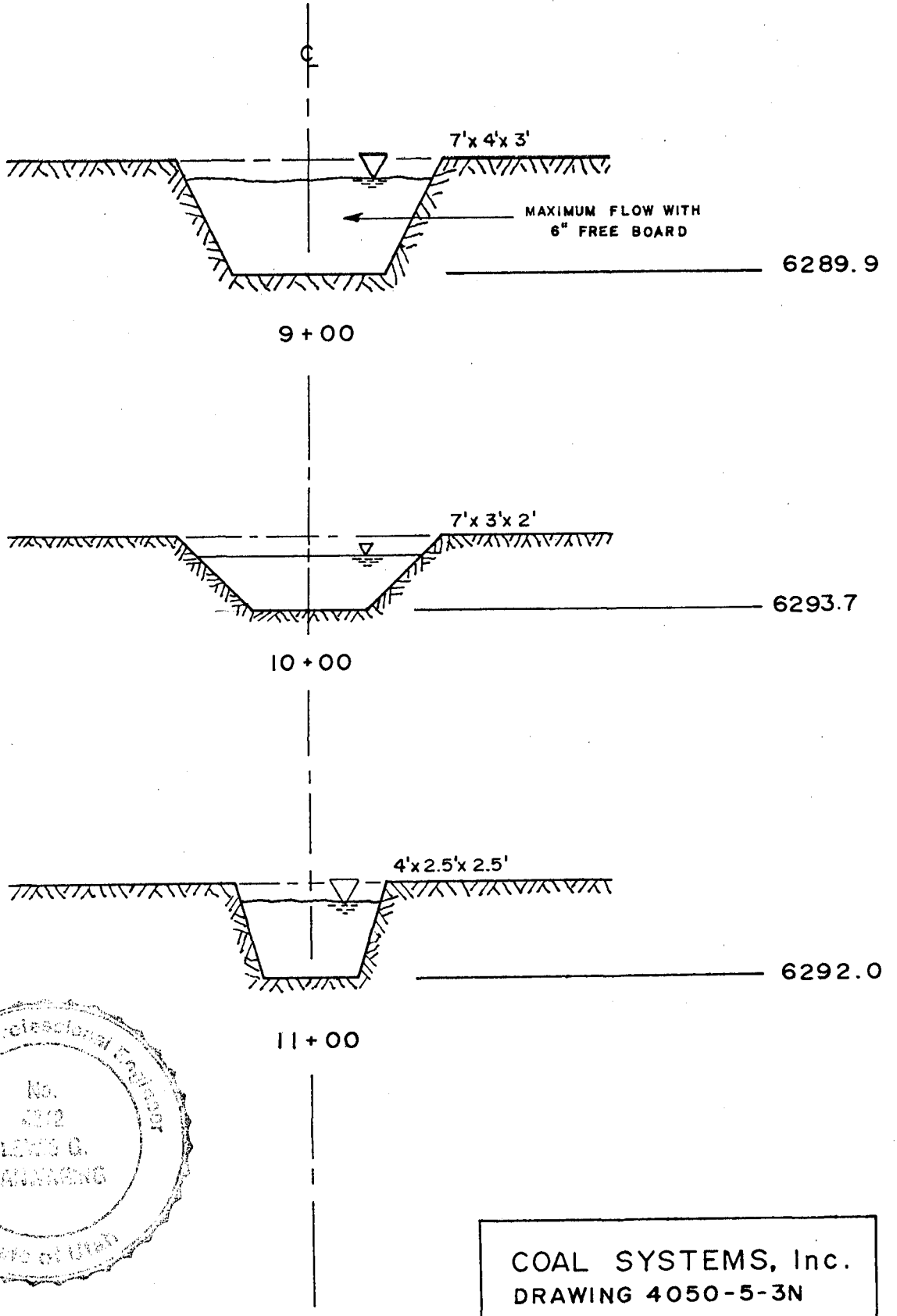


COAL SYSTEMS, Inc.
DRAWING 4050-5-3M
SCALE 1" = 4 FT

BY BDH DATE 5/14/84 SUBJECT CROSS-SECTIONS SHEET NO. 4 OF 5

CHKD. BY LGM DATE 5/14/84 STA 9+00 TO STA 11+00 JOB NO. 4050-5

SOUTHERN DITCH DRAWING 4050-5-3N

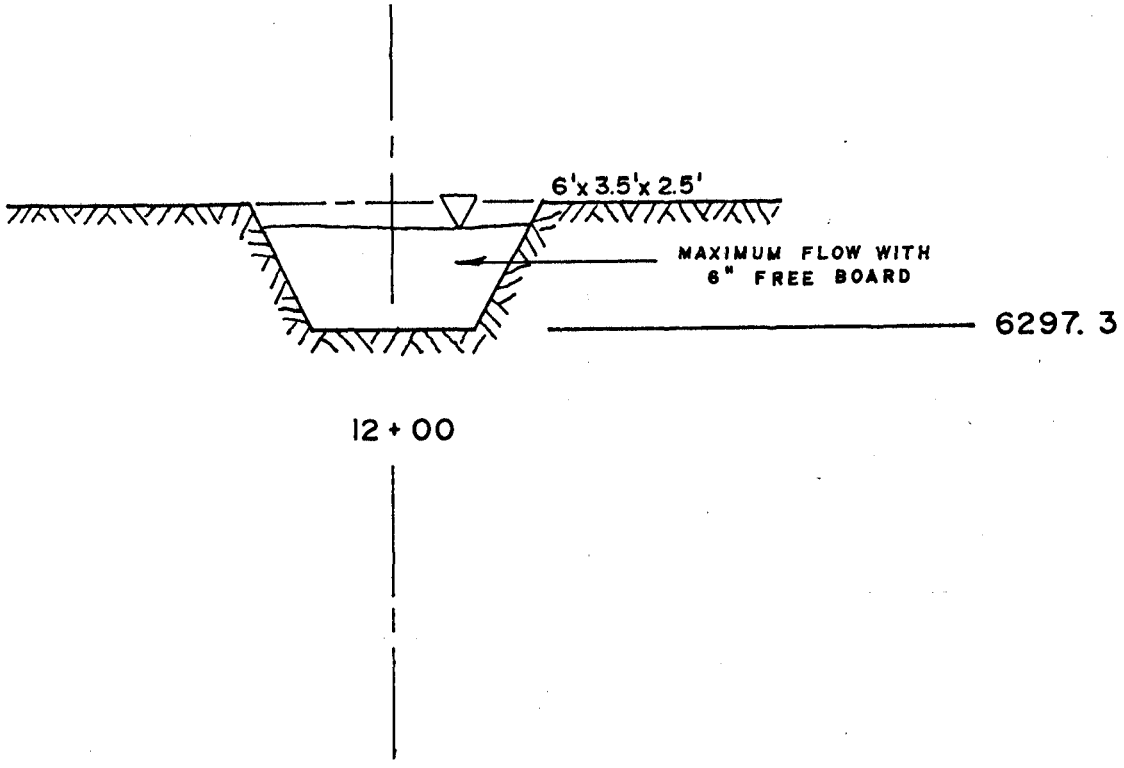


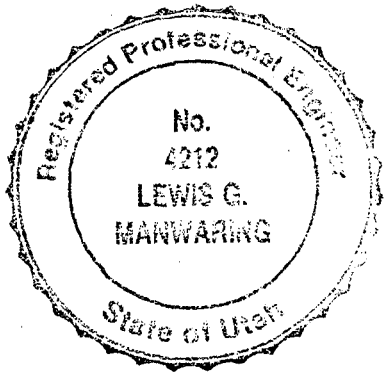
COAL SYSTEMS, Inc.
DRAWING 4050-5-3N
SCALE 1" = 4FT

BY BDH DATE 5/14/84 SUBJECT CROSS - SECTIONS SHEET NO. 5 OF 5

CHKD. BY LGM DATE 5/14/84 STATION 12 + 00 JOB NO. 4050-5

SOUTHERN DITCH DRAWING 4050-5-30

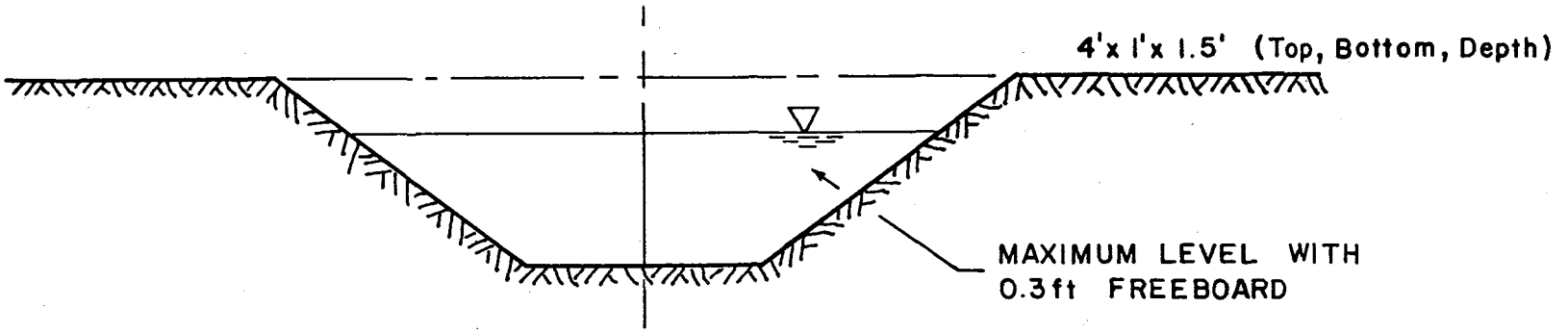




COAL SYSTEMS, Inc.
DRAWING 4050-5-30
SCALE 1" = 4 FT

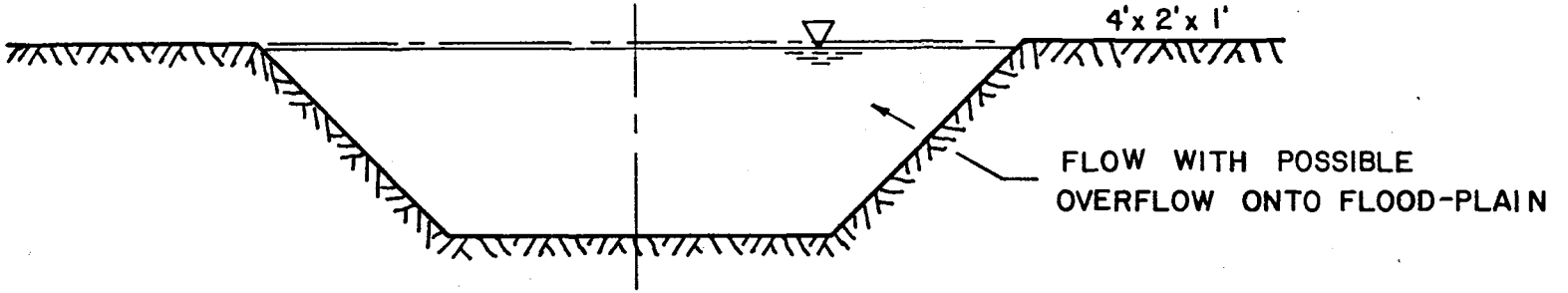
DIVERSION BELOW REFUSE PILE

UMC 784.22



PERMANENT DIVERSION FOR RECLAIMED YARD AREA

UMC 817.56



WESTERN STATES MINERALS CORP.		
SCALE: 1"= 1'	APPROVED BY: L.G.M.	DRAWN BY B.D.H.
DATE: 6/7/84		REVISED
TYPICAL CROSS SECTIONS		
COAL SYSTEMS, INC. SLC, UT.		DRAWING NUMBER 4050-5-35

UMC 784.23 OPERATION PLAN: MAPS AND PLANS

(b)(3)

The areas of land covered under Performance Bond No. 202E4265 which serves as a general performance bond for reclamation of all types of mining performed by Western States Minerals Corporation on the state leases and surface lease are delineated on Dwg. 4050-5-5-R as the areas encompassed within the "Coal Lease Property Line" and the "Surface Lease". The area involved is also described as the "J. B. King Mine - Lease Outline" and the specific leases illustrated on Dwg. 4050-5-9 (ACR).

STATE OF UTAH
NATURAL RESOURCES
State Lands & Forestry

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Ralph A. Miles, Division Director

3100 State Office Building • Salt Lake City, UT 84114 • 801-533-5381

Copy to Gus and Sandy Pruett
8/11/83

August 11, 1983

Western States Minerals Corporation
4975 Van Gordon Street
Wheat Ridge, CO
80033

Gentlemen:

RE: ML 1003, ML 17687, ML 18783, ML 19231, SL 062712, and SULA 365

The Director, on May 16, 1983, accepted Surety Bond No. 3481118 in the amount of $150,000 with you as principal and American Insurance Company as surety to cover lease performance and reclamation of mining and surface disturbances conducted under all of the above-listed leases. This bond is held jointly with the Division of Oil, Gas, and Mining and will not be released without their consent.

With acceptance of this new bond, Bond No. 202 E 6209 in the amount of $25,000 and Bond No. 202 E 4265 in the amount of $100,000 both with The Travelers Insurance Company as surety, are released.

I trust this information will be sufficient for your needs.

Yours very truly,

John T. Blake

JOHN T. BLAKE
MINERAL RESOURCES SPECIALIST

bp

CC The Travelers Insurance Company
500 IDS Center
Minneapolis, MN 55401

American Insurance Company
3333 California Street
San Francisco, CA 94118

UMC 817.13 CASINGS AND SEALING

Re: 784.13 (G)(8) ACR-1983, Vol.1

In late summer of 1983 measures were initiated to assure compliance and completion of this requirement. Since no ground water has been intercepted in the drilling program or subsequent mining activities, a surface plug technique consisting of cementing the upper three feet of the hole was used. The surface plug is made up of a mixture of cement with cuttings or soil and brought up to the casing top or ground level. This practice is in compliance with "Guidelines for Plugging Mineral Test Holes", Department of Oil, Gas and Mining. The bore hole locations can be found on Dwg. 4050-5-5-R. The sealing program is complete and deemed to be in compliance.

UMC 817.22 TOPSOIL: REMOVAL

It is submitted that it is far more favorable in terms of environmental damage, to use material located within the present disturbed area as a source for inert and substitute topsoil backfill in the mine reclamation plan.

Native Plants, Inc., having been contracted to supply the soil and vegetation data, sampled and determined that the area designated R1C2, Exhibit 2 (ACR), was suitable as a topsoil substitute in keeping with UMC 817.22 (b). Coal Systems, Inc. has re-sampled this area and further extended sampling into the mine yard and facilities location site. Results of these tests confirm that the material available is suitable as a topsoil substitute. See Dwg. 4050-5-13-R and Soil Sample Logs, Dwg. 4050-5-28. See UMC 784.13 (DOC) for Native Plants' report of soil suitability.

A first step in the reclamation plan would be the removal of the coal dust "contaminated surface". After removal, the material remaining can then be utilized as backfill for the balance of the reclamation plan. Thus, the source of the soil material used as inert fill and topsoil substitute will be that of the area outlined and designated "backfill borrow pit" as shown on Dwg. 4050-5-13-R and cross sections Dwgs. 4050-5-29, 30, 31, 32.

UMC 817.41 HYDROLOGICAL BALANCE: GENERAL REQUIREMENTS

Prior to the current inactive status of the J. B. King Mine, potable water was supplied by purchase and all waste water from lavatory and shower facilities was disposed of through a septic tank absorption field system. In anticipation of resumed mining activities, and prior to start-up, plans and specifications for improving the potable water and waste water facilities will be submitted for approval by the Division of Environmental Health (Bureaus of Public Water Supplies and Water Pollution Control).

UMC 817.43 HYDROLOGIC BALANCE: DIVERSIONS AND CONVEYANCE OF OVERLAND FLOW, SHALLOW GROUND WATER FLOW, AND EPHERMAL STREAMS.

Supporting calculations which show that all the diversions and culverts found on-site have been designed and constructed in a manner which prevents additional contributions of suspended solids, are found in UMC 784.22 (DOC). On June 1, 1984, after meeting with Tom Munson and John Whitehead, Hydrology Specialists for the DOGM, it was suggested that calculated velocities below 5 fps should insure that additional contributions of suspended solids to the stream flow would be prevented. Tables 1 and 2 show that velocities do not exceed this value for most sections of diversions in the permit area. See UMC 784.22 (DOC).

Design calculations which show that diversions have been designed to handle peak flows from a 10-year, 24-hour precipitation event are shown in UMC 784.22 (DOC).

This section gives supporting calculations to show that the 30 in. culvert between the lower refuse pile ditch and the south-west boundary ditch will accommodate peak flows from a 10-year, 24-hour precipitation event.

A. Data:

- o 30 in. diameter (D)
- o 70 ft length
- o Relatively flat lying
- o HW = 0.5 ft

B. Method: (Ref. 1)

- o Using nomograph
- o Assuming inlet conditions

$$\frac{HW}{D} = \frac{0.5}{2.5} = 0.2$$

gives Q ≈ 6 cfs

The required capacity to safely accommodate the peak flow from a 10-year, 24-hour precipitation event is 1.5 cfs (UMC 784.22 (DOC)). Therefore, the culvert has adequate capacity to pass these peak flows.

This section gives supporting calculations to show that the 25 in. culvert between the southwest boundry ditch and the sedimentation pond will handle peak flows from a 10-year, 24-hour precipitation event.

A. Data

- o 25 in. diameter (D)
- o 30 ft length
- o Relatively flat lying
- o H = 0.5 ft

B. Method: (Ref. 1)

- o Using nomograph
- o Assuming outlet conditions

Discharge Q ≈ 10 cfs

The required capacity to accommodate peak flows from a 10-year, 24-hour precipitation event is 8.5 cfs (See UMC 784.22 (DOC), 7 cfs + 1.5 cfs). Therefore, the culvert has adequate capacity to pass these peak flows.

Reference

1. Anonymous, Design of Small Dams, Figs. 6.20, 6.26, Bureau of Reclamation: Bureau of Public Roads, January 1963, Revised 1977.

UMC 817.46 HYDROLOGIC BALANCE: SEDIMENTATION PONDS

(i)

The purpose of this section is to provide calculations which show that an appropriate combination of principal and emergency spillways will safely discharge the runoff from a 25-year, 24-hour precipitation event, plus any inflow from the underground mine, in accordance to UMC 817.46.

A. Principal and Emergency Spillway Between Slurry Ponds A and B (See Dwgs. 4050-5-27, 4050-5-13-R)

1. Primary Drainage - 9 in. culvert

a. Data:

- o 9 in. diameter
- o 5 ft length
- o Relatively flat lying

b. Determined Capacity:

- o Assuming inlet conditions (Ref. 1)

  HW = 2.5 ft

  Q ≈ 3 cfs

2. Emergency Spillway (See Dwg. 4050-5-27)

a. Data:

- o Cross-sectional area = 4.125 ft^2
- o R_H = 0.7704
- o Length = 17 ft
- o Inlet elevation = 6286
- o Outlet elevation = 6285.5
- o Slope = 0.0294
- o n = 0.04

b. Equation:

$$Q = \frac{1.49}{n} AR_H^{2/3} S^{1/2}$$

c. Calculated Value:

$$Q = \frac{1.49}{0.04} (4.125)(0.7704)^{2/3} (0.0294)^{1/2}$$

$$Q = 22 \text{ cfs}$$

3. Combined Capacity

The combined flow capacity of the primary and emergency drainage system is:

3 + 22 = 25 cfs

B. Drainage From Slurry Pond B

1. Data:

- 9 in diameter
- Length = 150 ft
- Inlet elevation = 6284
- Outlet elevation = 6268

2. Determined Capacity:

- Assuming inlet conditions (Ref. 1)

  HW = 2.5 ft

  Q ≈ 3 cfs

C. Emergency Spillway Capacity for Sedimentation Pond (See Dwg. 4050-5-17-R)

1. Data:

- Cross-sectional area = 30.0 ft^2
- R_H = 1.5789
- Length = 24 ft
- Inlet elevation = 6267.8
- Outlet elevation = 6266.3
- Slope = 0.0625
- n = 0.05 (lined with large boulders)

2. Equation:

$$Q = \frac{1.49}{n} A R_H^{2/3} S^{1/2}$$

3. Calculated Value:

$$Q = \frac{1.49}{0.05} (30.0)(1.5789)^{2/3} (.0625)^{1/2}$$

Q = 302 cfs

V = 10 fps

D. Calculated peak runoff for a 25-year, 24-hour. precipitation event, for slurry ponds A and B, (Ref. 2)

1. Data:

   - o A = 1 acre, 10% of Area II, this is an assumed maximum
   - o i = 0.25 (25-year event, t_c= 5 min)
   - o C = 0.70

2. Equation:

   Q = CiA (cfs)

3. Calculated Value:

   Q = (0.7)(0.25)(1)

   Q = 0.2 cfs

E. Calculated Peak Runoff for a 25-year, 24-hour. precipitation event, for sedimentation pond (Ref. 2)

1. Data:

   - o A = Areas I, II, III, IV, V, VI
   - o A = 8.4 + 9.0 + 34.2 + 10.8 + 4 + 4.8
   - o A = 71.2 Acres
   - o i = 0.28 (25-year event, t_c = 6 min)
   - o C = 0.7

2. Equation:

   Q = CiA (cfs)

3. Calculated Value:

   Q = (0.7)(0.28)(71.2)

   Q = 14 cfs

F. Conclusion

The combined capacity of the principal and emergency discharge systems between slurry ponds A and B is 25 cfs. The capacity of the culvert which exits slurry pond B is 3 cfs. The calculated peak runoff for the area surrounding the ponds, which is estimated to be no more than one acre, is 0.2 cfs. Therefore, the discharge systems for either slurry pond is capable of handling the peak runoff.

The capacity of the emergency spillway from the sedimentation pond is calculated to be 302 cfs. The peak runoff effecting the sedimentation pond is calculated to be 14 cfs. In a worst case event: the sedimentation pond being full, and the area experiences a 25-year, 24-hour. percipitation event, the spillway could easily pass the required volume.

There is no known inflow from the underground mine to any of the hydrologic collecting systems on the mine site.

(i) cont.

The elevation of the crest of the emergency spillway between slurry ponds A and B is 1.0 foot above the crest of the principal spillway. There is only one drainage system existing the main sedimentation pond, that being the emergency spillway. The base of the spillway entrance is 3 feet below the crest of the sedimentation pond embankment.

(j)

The minimum elevation of the top of the settled embankment is a minimum of 1.0 foot above the water surface with the emergency spillway flowing at maximum depth (See Dwg. 4050-5-17-R).

(k)

Original design calculations are not available to determine an increase in embankment height to allow for settlement. However, the embankment as it now exists complies with UMC 817.46(j), with respect to embankment height. It is felt that any settlement that might have been designed for has taken place, and that the height is still sufficient to comply with regulations.

(l)

As shown in Dwg. 4050-5-17-R, the minimum width of the embankment is 15 ft. The required width is (10 + 35)/5 = 9 ft. Therefore, the minimum width of the embankment is adequate to satisfy the regulations.

The minimum embankment width between the two slurry ponds is 20 ft (See Dwg. 4050-5-27). This too, is sufficient to satisfy the required width of (10 + 35)/5 = 9 ft.

(m)

The combined upstream and downstream side slopes of the settled embankment of the sedimentation pond is not less than 1v:5h, or steeper than 1v:2h (See Dwg. 4050-5-17-R). The slopes were inspected on May 19, 1984 by Coal Systems, Inc. and determined to be stable.

Dwg. 4050-5-17-R indicates where the clean out level of 60 percent of the sediment volume will be located in the sedimentation pond.

References

1. Anonymous, Design of Small Dams, Fig. 6.20, Bureau of Reclamation: Bureau of Public Roads, January 1963, Revised 1977.

2. D'Appolonia, E., Engineering and Design Manual, Coal Refuse Disposal Facilities, United States Department of the Interior: Mining Enforcement and Safety Administration, Washington: United States Government Printing Office.

PILE – AREA IV
(10.8 ACRES)

AREA VI – 4.8 ACRES

TO SEDIMENT POND

(8.4 ACRES)

AREA I

DISTURBED SURFACE

AREA II
(9 ACRES)

DITCH

PERMIT BOUNDARY

AREA III (34.2 ACRES)

AREA V (4 ACRES)

UNDISTURBED SURFACE

6265
6285
6300
6320
6350
6400
6450
6500
6550
6600
6650
6800
6430
6415
6542

N

UMC 817.46, 49

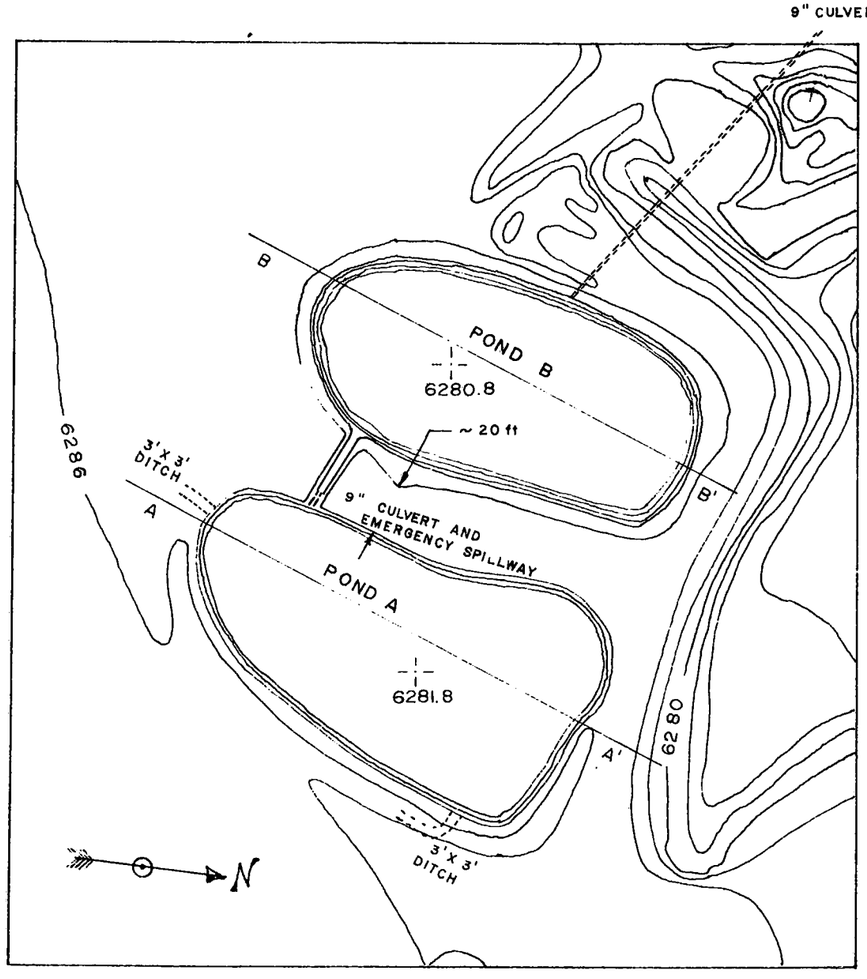
WESTERN STATES MINERALS CORP.

SCALE: 1"=200'	APPROVED BY: L.G.M.	DRAWN BY I.L.
DATE: 7-2-83		REVISED 5-25-84

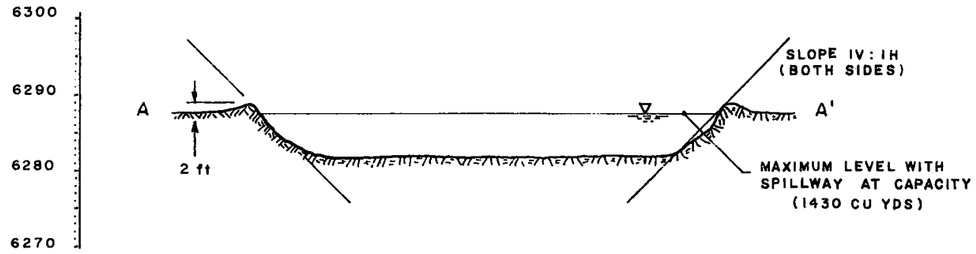
PERMIT AREA WATERSHED

COAL SYSTEMS, INC. - S.L.C., UTAH	DRAWING NUMBER 4050-5-19-R

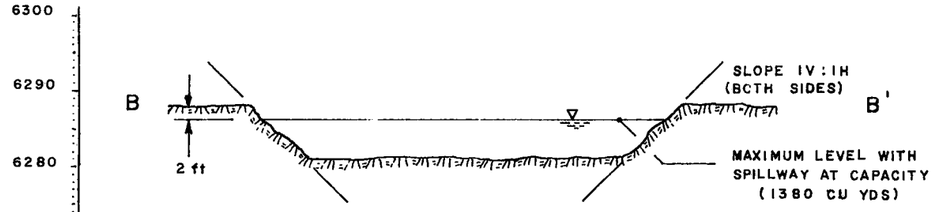
11 X 17 PRINTED ON NO. 1000H CLEARPRINT



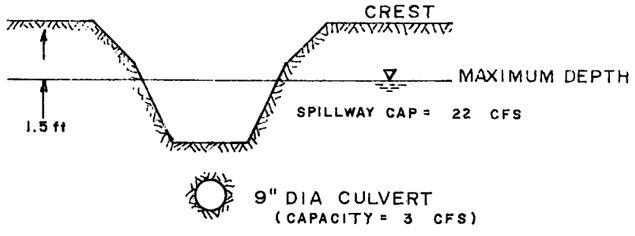
SLURRY POND A - PROFILE



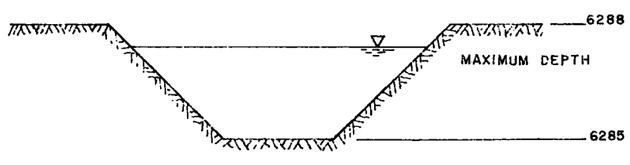
SLURRY POND B - PROFILE

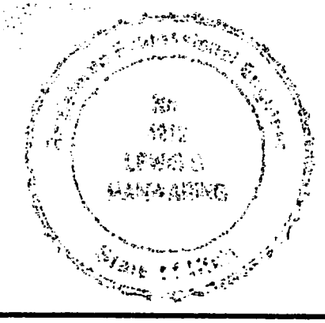


EMERGENCY SPILLWAY PROFILE



TWO ENTRANCE DITCH PROFILES





UMC 817.46, 49

WESTERN STATES MINERALS CORP.

SCALE: 1" = 50FT	APPROVED BY: L.G.M.	DRAWN BY B.D.H.
DATE: 5 - 25 - 84		REVISED

HYDROLOGIC STRUCTURES

COAL SYSTEMS, INC. - SLC, UTAH	DRAWING NUMBER 4050-5-27

UMC 817.49 HYDROLOGY BALANCE: PERMANENT AND TEMPORARY IMPOUNDMENTS

The following discussion describes calculations which show that a combination of the two small slurry ponds, (See Dwg. 4050-5-13-R), are of adequate size to accommodate a 25-year, 24-hour precipitation event, plus the sediment volume and freeboard, and are designed such that the top of the embankment is 1 foot plus 5% above the water surface with the spillway flowing at design depth. This amount of freeboard will satisfy design requirements as specified in UMC 817.46 (j).

A. Runoff Volume Determination

- See Dwg. 4050-5-13-R for watershed area (disturbed area around ponds)
- 25-year, 24-hour precipitation event
- P = 2.04" (Ref. 2)
- Area is a maximum of 1 Acre (estimated)
- Runoff depth (Ref. 1)

$$CN = 90$$

$$S = \frac{1000}{CN} - 10 = 1.11$$

$$Q = \frac{(P - 0.2\,S)^2}{(P + 0.8\,S)}$$

$$Q = \frac{(2.04 - (0.2)(1.11))^2}{(2.04 + (0.8)(1.11))}$$

$$Q = 1.13 \text{ in.}$$

- Runoff Volume

$$1.13 \text{ in.} \times \frac{1 \text{ ft}}{12 \text{ in.}} \times \frac{43{,}560 \text{ ft}^2}{\text{Acre}} \times 1 \text{ Acre} \times \frac{1 \text{ yd}^3}{27 \text{ ft}^3} = 152 \text{ yd}^3$$

- Sediment Volume

  Regulations allow 0.1 Ac-Ft of sediment volume per acre of disturbed land (UMC 817.46 (2)).

$$0.1 \text{ Ac-ft} \times \frac{43{,}560 \text{ ft}^2}{\text{Acres}} \times \frac{1 \text{ yd}^3}{27 \text{ ft}^3} = 161 \text{ yd}^3$$

- Conclusion

  Required Volume = Runoff + Sediment

  = 152 + 161

  Volume = 313 yd^3

B. Volume of Ponds

Assuming a semicircular shape and 1v:1h slope-

- Volume Pond A

$$\left(\frac{\pi \times 129 \times 59}{4}\right)6 + \left[\left(\frac{\pi \times 135 \times 65}{4}\right)6 - \left(\frac{\pi \times 129 \times 59}{4}\right)6\right] \div 2$$

Volume Pond A = 1430 yd^3

- Volume Pond B

$$\left(\frac{\pi \times 124 \times 59}{4}\right)6 + \left[\left(\frac{\pi \times 130 \times 65}{4}\right)6 - \left(\frac{\pi \times 124 \times 59}{4}\right)6\right] \div 2$$

Volume Pond B = 1380 yd^3

- Total Volume of Ponds A + B

Total Volume = 1430 yd^3 + 1380 yd^3

= 2810 yd^3

C. Conclusion

- Required Volume = Runoff + Sediment

  = 313 yd^3

- Total Volume Available = 2810 yd^3

The combination of the two ponds is more than adequate to handle the volume from a 25-year, 24-hour precipitation event. Further, the pond volumes are calculated using a 2 foot freeboard. This amount of freeboard more than satisfies the regulations (UMC 817.46 (j)(k)).

D. Slurry Pond Cross Sections

Cross sections of the two slurry ponds are shown in Dwg. 4050-5-27 in compliance with UMC 784.16 (a)(i)(ii).

E. Surface Drainage Map

The surface drainage is depicted in both Dwgs. 4050-5-19-R and 4050-5-13-R. Dwg. 4050-5-19-R shows the area watershed that effects the disturbed area. Drawing 4050-5-13-R shows the disturbed area and the direction of flow in the diversions on the permit area.

F. Spillway Profiles (UMC 817.46 (g))

The primary and emergency spillway between slurry ponds A and B is shown in Dwg. 4050-5-27. Capacity calculations are shown in UMC 817.46 (DOC).

G. UMC 817.49 (e)

The slurry pond embankments have been graded, fertilized, seeded and mulched. Vegetation has done reasonably well on the upstream slopes surrounding the ponds.

H. UMC 817.46 (t) Inspection Program

Although these ponds do not meet the size criteria of 30 CFR 77.216(2), they are examined for structural weakness, erosion or other potential hazard by mine personnel on a daily use basis during operations.

Under the current inactive status of the mine, the condition of the ponds is constantly monitored by the company employee stationed at the property.

References

1. D'Appolonia, E., Engineering and Design Manual, Coal Refuse Disposal Facilities, United States Department of the Interior: Mining Enforcement and Safety Administration, Washington: United States Government Printing Office.

2. Richardson, E. A., Estimated Return Periods for Short Duration Precipitation in Utah, Logan: Utah State University, March, 1971.

UMC 817.52 SURFACE AND GROUND WATER MONITORING

A. Ground Water:

Due to the paucity of prior baseline water quality data and in keeping with DOGM requirements, the applicant implemented a monitoring program (May 19, 1984) designed to provide depth of water and water quality data on at least a quarterly basis for a period of one year. The data gathering program consists of depth monitoring and sampling of Water Well No. 1. See Dwg. 4050-5-2, UMC 783.13 (ACR). Because testing of the other wells is currently hampered due to their having been out of service for over three years, it was agreed in discussions with the DOGM hydrologist that monitoring of these wells may be delayed. However, testing will be conducted after work-over prior to resuming coal production. Continued monitoring during production for water depths and quality parameters will be done on a bi-annual basis as a minimum.

Ground water quality characteristics will be determined in accordance with the parameters shown on the attached listing entitled "Baseline Water Quality Parameter List".

A copy of the laboratory report showing analysis of the May 19, 1984 sample from Water Well No. 1 is attached. Also, an example of water quality from prior testing of the Western States Minerals' wells is submitted in UMC 783.13 (ACR). Other information is presented in UMC 784.14 (ACR).

B. Surface Water:

The natural ephemeral drainage from the permit area which might contribute to the receiving drainage pattern of the area, i.e., Dog Valley, is that of the wash adjacent to the north section of the refuse pile containment dike. This wash collects drainage from the refuse pile intercept ditch and from the surrounding area to the east as well as any possible overflow from disturbed mine surface area. The only other major drainage pattern from the permit area into the Dog Valley pattern is south of the disturbed surface of the mine site and is not subject to contamination from the mining activity. See Dwgs. 4050-5-4 and 4050-5-13.

Monitoring of the intermittent flow of water in the drainage pattern north of the containment dike will consist of taking a grab sample during the event, conducting the qualitative analyses required to characterize water quality, and reporting as required. This monitoring shall continue after reclamation activities in order to establish compliance with minimum disturbance to the hydrologic balance of the area.

Surface water flow within the disturbed portion of the permit area consists of rainstorm runoff and snow melt only, from an area of approximately 40 acres. See Dwg. 4050-5-19. This water is collected into drainage control ditches which divert all runoff into the sedimentation pond which is of such a volume as to contain more than the 10-year, 24-hour precipitation event required of design calculations. See Dwgs. 4050-5-13 and 4050-5-17. The drainage control from the disturbed area insures that

possible runoff will be minimal and without any disturbance to the prevailing hydrological balance. In the event of overflow from the sedimentation pond, the spillway can be used as a weir for quantity measurements. Water quality can be monitored periodically from the pond water.

In the event of overflow from the pond, permission to discharge into the Dog Valley drainage is granted under NPDES Discharge Permit, UT-0023515.

Since the mine is currently in a standby, non-producing mode, the applicant requests that surface water monitoring be delayed until operations are resumed or the mine is abandoned. If abandoned, the surface water drainage and monitoring will be in conformation with the mine reclamation plan as approved by the Division.

Table 1. Baseline Water Quality Parameter List

		Units	Required(3)	
Field:(2)	Water Levels or Flow		X	
	pH		X	
	Dissolved Oxygen(1)	mg/L		
	Conductivity at 25° c	umhos/cm	X	
	Temperature at 25° c	C°	X	
Turbidity		JTU		
Total Suspended Solids(1)		mg/L	X	
Total Combustable Solids(1)		mg/L	X	only if visible coal fines, oil or grease
Total Dissolved Solids		mg/L	X	
Total Hardness (as $CaCO_3$)		mg/L	X	
Chemical Oxygen Demand		mg/L O_2		
Aluminum (Al)		mg/L	X	
Arsenic (As)		mg/L	X	
Barium (Ba)		mg/L	X	
Boron (B)		mg/L	X	
Carbonate (CO_3^{-2})		mg/L	X	
Bicarbonate (HCO_3^{-1})		mg/L	X	
Cadmium (Cd)		mg/L	X	
Calcium (Ca)		mg/L	X	
Chloride (Cl^{-1})		mg/L	X	
Chromium (Cr)		mg/L	X	
Copper (Cu)		mg/L	X	
Fluoride (F^{-1})		mg/L	X	
Iron - Total (Fe)		mg/L	X	
	Dissolved (Fe)	mg/L		
Lead (Pb)		mg/L	X	
Magnesium (mg)		mg/L	X	
Manganese (mn)		mg/L	X	
Mercury (hg)		mg/L	X	
Molybdenum (Mo)		mg/L	X	
Nickel (Ni)		mg/L	X	
Nitrogen: Ammonia (NH_3)		mg/L	X	
Nitrate $(NO_3)^{-1}$, Nitrite (NO_2)		mg/L	X	
Potassium (K)		mg/L	X	
Phosphate:	Total (PO_4^{-3}) (1)	mg/L	X	Surface Water
	Dissolved	mg/L	X	Ground Water
Selenium (Se)		mg/L	X	
Sodium (Na)		mg/L	X	
Sulfate (SO_4^{-2})		mg/L	X	
Sulfide (S^{-1})		mg/L	X	
Zinc (Zn)		mg/L	X	
Other:	Gross Alpha	pic/L	Optional	
	Gross Beta	pic/L	Optional	

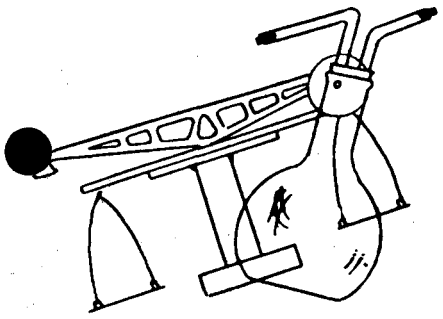
Table 1. (continued)

These are the parameter requirements for surface and ground water. Total ionic constituent for surface water. Dissolved ionic constituent for ground water. Other parameters as deemed relevant by the Division (i.e., Be, Bi, Ag, Sr, etc.).

(1) Only for surface water samples.

(2) At the time of sampling.

(3) Those with (X) are required for baseline monitoring, those blank may be required. Some of the required parameters may be deleted after a review of a year's baseline by the Division.



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 466-8761

DATE: 06/12/84

CERTIFICATE OF ANALYSIS

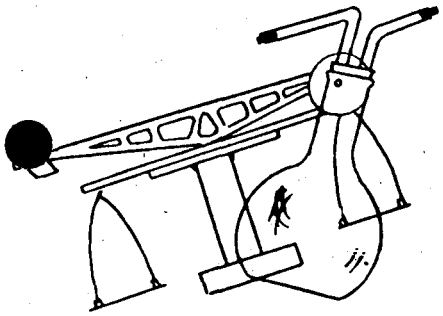
COAL SYSTEMS
P.O. BOX 17117
SALT LAKE CITY, UT
84117

84-009852

SAMPLE: J.B. KING MINE WELL #1 WATER SAMPLE COLLECTED 5-19-84
RECEIVED 5-22-84 FOR ANALYSIS.

RESULTS

Aluminum,Al (Tot) mg/l SM306A	<.001
Ammonia, NH3-N mg/l SM417C	<.01
Arsenic, As (Tot) mg/l SM304	<.001
Barium, Ba (Tot) mg/l SM303A	.52
Bicarbonate,HCO3 mg/l SM403	439.20
Boron as B Total mg/l	.040
Cadmium,Cd (Tot) mg/l SM304	<.001
Calcium, Ca mg/l SM303A	27.45
Carbonate as CO3 mg/l SM403	<.10
Chloride, Cl mg/l SM407A	50.0
Chromium,Cr (Tot) mg/l SM303A	<.001
Conductivity umhos/cm SM205	1,350
Copper, Cu (Tot) mg/l SM303A	<.001

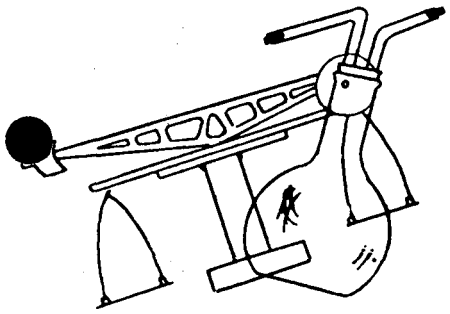


Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 466-8761

CERTIFICATE OF ANALYSIS
83-009852

	RESULTS
Fluoride, F mg/l SM413B	.74
Hardness,CaCO3 mg/l SM309R	141
Iron, Fe (Tot) mg/l SM303A	.27
Lead, Pb (Tot) mg/l SM303A	.002
Magnesium, Mg mg/l SM303A	18.11
Manganese,Mn (Tot) mgl SM303A	<.01
Mercury, Hg mg/l SM320A	<.0002
Molybdenum as Mo (Tot) mg/l	<.001
Nickel, Ni (Tot) mg/l SM249.2	.03
Nitrate, NO3-N mg/l SM418C	.02
Nitrite as NO2-N mg/l	.06
Potassium, K mg/l SM303A	1.1
Selenium, Se Tot. mg/l SM304	<.001
Sodium, Na mg/l SM303A	276.00
Sulfate, SO4 mg/l SM426D	294
Sulfide as S mg/l EPA 9030	<.10
Suspended Solids mg/l SM 209D	4.0



Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 466-8761

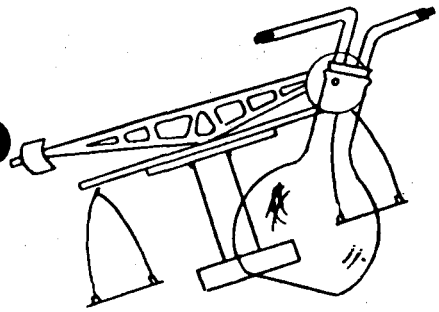
CERTIFICATE OF ANALYSIS

83-009852

RESULTS

Total Dis. Solids mg/l SM209B	885
Zinc, Zn (Tot) mg/l SM303A	.042
pH Units SM423	8.20

FORD CHEMICAL LABORATORY, INC.



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 466-8761

DATE: 06/12/84

CERTIFICATE OF ANALYSIS

83-009852-01

FORD CHEMICAL LABORATORIES

BALANCE SHEET FOR SAMPLE: (1) RESULTS

C A T I O N S	mg/l	meq/l
Calcium, Ca mg/l SM303A	27.450	1.370
Magnesium, Mg mg/l SM303A	18.110	1.490
Sodium, Na mg/l SM303A	276.000	12.006
Potassium, K mg/l SM303A	1.100	.028

A N I O N S	mg/l	meq/l
Carbonate as CO3 mg/l SM403	.000	.000
Bicarbonate,HCO3 mg/l SM403	439.200	7.203
Sulfate, SO4 mg/l SM426D	294.000	6.121
Chloride, Cl mg/l SM407A	50.000	1.411
Nitrate, NO3-N mg/l SM418C	.020	.000

B A L A N C E I N F O R M A T I O N

CATIONS:	14.894
ANIONS:	14.735
TOTAL:	29.629
DIFFERENCE:	.159
SIGMA:	.005

UMC 817.55 DISCHARGE OF WATER INTO AN UNDERGROUND MINE

Since no water has been encountered in the underground mining activities or the core drilling program, no water will be discharged from the mine, nor can any be diverted or discharged into other underground working. Surface water run-off will not enter the existing mine portals due to the slope of the surface away from the mouth of the portals. See Dwgs. 4050-5-13-R., 4050-5-29 to 32, and Permit Area Watershed Dwg. 4050-5-19-R.

UMC 817.56 POST-MINING REHABILITATION OF SEDIMENTATION PONDS DIVERSIONS, IMPOUNDMENTS AND TREATMENT FACILITIES

Post-mining drainage for the reclaimed minesite disturbed area will be achieved by utilizing the existing mine refuse pile intercept ditch and the applicable portion of the south drainage ditch. See Dwg. 4050-5-13-R. These two drainage systems will remain in place and the south drainage ditch will be renovated to comply with UMC 781.22 Diversions.

In addition, a third drainage system will be constructed in the reclaimed backfill borrow pit. This ditch will collect the flow, if any, from rainfall or snowmelt on the reclaimed area which is not captured and controlled by the intercept and south drainage ditches. The south drainage ditch and the borrow pit ditch will be combined to carry this ephemeral drainage into the natural drainage pattern to the north.

It is submitted that the existing drainage and collecting ditch system will divert and control ephemeral flows from entering the reclaimed area. The addition of the borrow pit ditch in combination with the others, should prevent, to the extent possible, any damage from erosion to the reclaimed disturbed area.

Continued monitoring of surface water flows from the disturbed area after reclamation in accordance with UMC 817.52(B)(2) will determine the effectiveness of the post-mining drainage plan. See Dwgs. 4050-5-13-R, 4050-5-35 (UMC 817.56), and Table 1 for arrangement and details of the system. Table 1 shows the maximum capacity, the depth of flow and velocity for the required

capacity flow for each section of the borrow pit ditch, given the ditch geometry and runoff conditions. Dwg. 4050-5-13-R shows the location of the diversions, and Dwg. 4050-5-35 (UMC 817.56) shows a typical cross-section through the proposed borrow pit diversion.

UMC 817.56 (DOC)

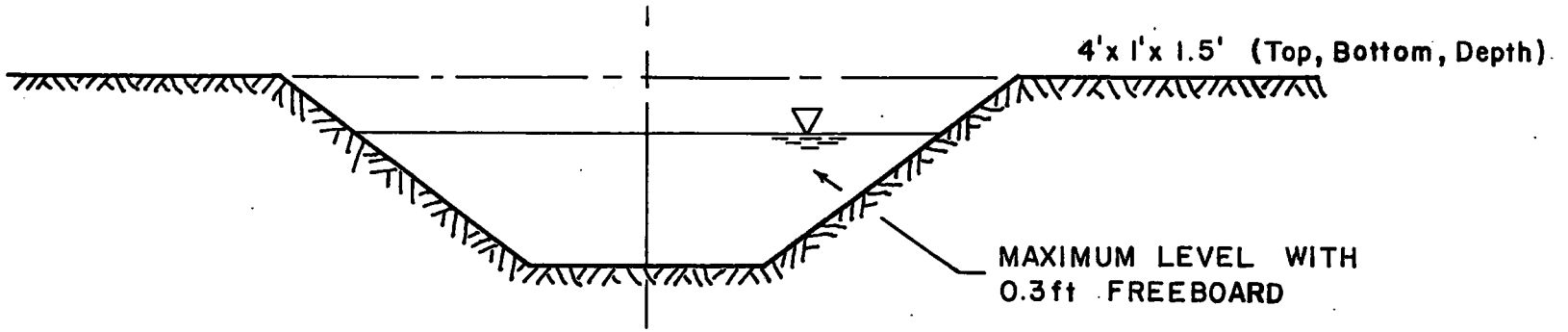
TABLE 1
RECLAIMED YARD DIVERSION DITCH

COAL SYSTEMS, Inc.
4050-5

STATION	SPECIFICATIONS			FLOW AT MAXIMUM CAPACITY				FLOW AT REQUIRED CAPACITY Q_{req} = 8.5 cfs	
Beginning at crest See Dwg. 4050-5-13-R	Dist. (ft)	ΔElev. (ft)	Slope (ΔEI/Dist)	Area (ft^2)	R_H	Quantity (cfs) n=0.04	Velocity (fps) n=0.04	Velocity (fps) n=0.04	Depth (in.)
0+00 - Section 6 Profile line	70	5	0.071	3.0	0.62	21.7	7.2	5.5	6.3
Sec. 6 - Sec. 7 Profile lines	320	8	0.025	3.0	0.62	12.9	4.3	3.8	9.5
Sec. 7 - Sec. 8 Profile lines	300	11	0.037	3.0	0.62	15.6	5.2	4.4	8.5
Sec. 8 - Sec. 9 Profile lines	370	16	0.043	3.0	0.62	16.0	5.6	4.6	8.2
Sec. 9 - Sec.10 Profile lines	320	9	0.028	3.0	0.62	13.6	4.5	4.0	9.2
Sec. 10 - Sec. 11 Profile lines	320	10	0.031	3.0	0.62	14.3	4.8	4.0	8.4
Sec. 11 - Collector Ditch Prof. line	30	2	0.067	3.0	0.62	21.0	7.0	5.4	7.2

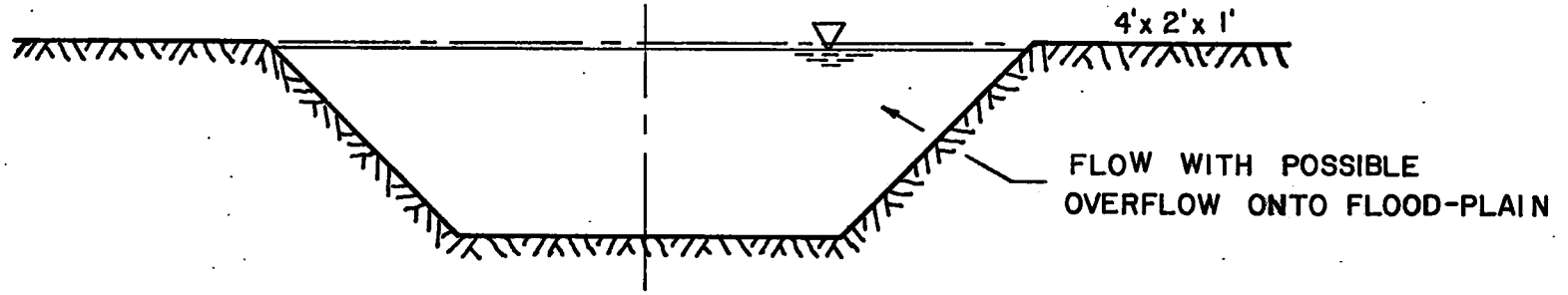
DIVERSION BELOW REFUSE PILE

UMC 784.22



PERMANENT DIVERSION FOR RECLAIMED YARD AREA

UMC 817.56



WESTERN STATES MINERALS CORP.		
SCALE: 1"= 1'	APPROVED BY: L.G.M.	DRAWN BY B.D.H.
DATE: 6/7/84		REVISED
TYPICAL CROSS SECTIONS		
COAL SYSTEMS, INC. SLC, UT.		DRAWING NUMBER 4050-5-35

UMC 817.81-.88 COAL PROCESSING WASTE BANKS: GENERAL REQUIREMENTS

Western States Minerals Corporation shall be committed to a quarterly inspection of the site by a qualified registered engineer. The inspections will be conducted to determine by observation or testing the potential for hazard to human life and property or detrimental effects to the environment. Copies of the inspection findings will be maintained at the site and the regulatory authority promptly notified of potential hazards and the remedial action taken.

Since the Mine is currently in the inactive status, coal processing waste fires must be handled by personnel other than employees of the operating company. A company representative, Mr. F. C. Peterson, Forman - MSHA No. 5266, has been retained to oversee activities on the property and is responsible for reporting fire or other hazards if they occur.

In April, 1983 a "hot spot" in the refuse pile was discovered. The action taken in compliance with UMC 817.86 and CFR 30,77.215(j) serves to illustrate how waste fires will be handled.

The plan, as submitted to the Engineering Coordinator - Coal Mine Safety & Health, Mine Safety and Health Administration is as follows:

DESCRIPTION AND GENERAL INFORMATION

Type of Facility:

The J. B. King Mine is an underground coal mine that utilizes a coal preparation plant for the removal of sandstone and shale materials from the coal.

Location:

The J. B. King Mine is located in Emery County, Utah approximately 45 miles east of Salina, Utah in Section 32, Township 23 South, Range 6 West of the Salt Lake Meridian.

Identification;

The J. B. King Mine was operating under approved numbers:

State: ACT/015/002

Federal: 42-00085

Status of Operation:

The operation has been in standby status with no underground production since January, 1981 and will remain in the same mode once this plan has been implemented and completed.

Owner:

The J. B. King Mine is owned and operated by Western States Minerals Corporation, which is a subsidiary of S. J. Groves and Sons Company. Coal Systems, Inc. is acting as consultant to both the above parties.

Address and Telephone:

Western States Minerals Corporation
P.O. Box F
Salina, Utah 84654
Telephone: 801-186-2311

Type of Plan:

As required by Code of Federal Regulations, Title 30, 77.215-(j). Plan for extinguishing fire in refuse pile No. 1211-UT-9-0020.

PLAN

The situation calls for the contracting of heavy equipment and operators from:

Castle Valley Construction Company
P.O. Box 781
Price, Utah 84501
MSHA Identification No. 4200403

Required Employees of Castle Valley Construction Company:

1. Ted Pappas - dozer operator
2. Bud Henrie - fire truck operator
3. Mark Olsen - helper

Special Note: Required training completed on April 15, 1983; certification will be available on-site.

In addition to the above, on-site engineering will be provided by:

Coal Systems, Inc.
5320 South, 9th East, Suite 150
Salt Lake City, Ut. 84117

Required employees of Coal Systems, Inc.:

1. L. G. Manwaring, P.E. Utah 04212-0958-0, Mining Engineer
2. David A. Skidmore - Mining Engineer

Special Note: Recent training completed August, 1982; certification will be available on site.

Western States Minerals Corporation will also have a company representative on hand:

F. C. Peterson - Foreman, MSHA No. 5266, front-end loader operator.

REQUIRED EQUIPMENT

1. D-8 dozer properly equipped with roll over-protection device, backup alarms, and fan reversed to blowing position.
2. 6000 gallon water truck with a minimum of 50 feet of fire hose and sufficient pump pressure with a nozzle to reach an additional 50 feet.
3. Front-end loader properly equipped with roll-over protection device, backup alarms, etc.

The dozer will remove the coal refuse above the hot spot. The highwall will be cut at a slope not to exceed 1 foot vertical to 1-1/2 foot horizontal. Access to the area will be at a grade of 1 foot vertical to 3 feet horizontal to allow safe access by the front-end loader into the work area.

Approximately 25 feet of overburden will be stripped from above the suspected hot zone and approximately 1 to 2 feet of suspect material will be moved to a designated area in the parking lot area where it will be extinguished by compaction and water. The material will remain in this location until cold and tested in 30 days for further combustion. The operation will move approximately 28,000 bank cubic yards of material.

Once it has been determined that the material has been extinguished, it will be replaced into the refuse pile and properly compacted.

ADDITIONAL SAFETY MEASURES FOR ALL PERSONNEL

1. A two foot high dirt berm will be constructed along the top of the temporary high wall in order to prevent other vehicles from driving into the working area.
2. The excavated area will be flagged and temporary safety boundaries will be established.
3. The 6000 gallon water truck with operator will be stationed above the work area for good visibility of the working area and a qualified operator will be stationed with the unit at all times when the dozer or loader operator is in the excavation removing the overburden or suspect material.
4. A qualified emergency medical technician will be on duty to perform emergency treatment.
5. A berm of axle height to the loader will be placed on the outside of the excavation and access road.
6. A person acting as a "spotter" will help the operator of both the loader and dozer to determine stability of the excavation.
7. The spotter will also watch all personnel for the possible affects of those fumes dangerous enough to cause an individual to pass out.
8. Only those individuals named above will be considered as authorized persons.

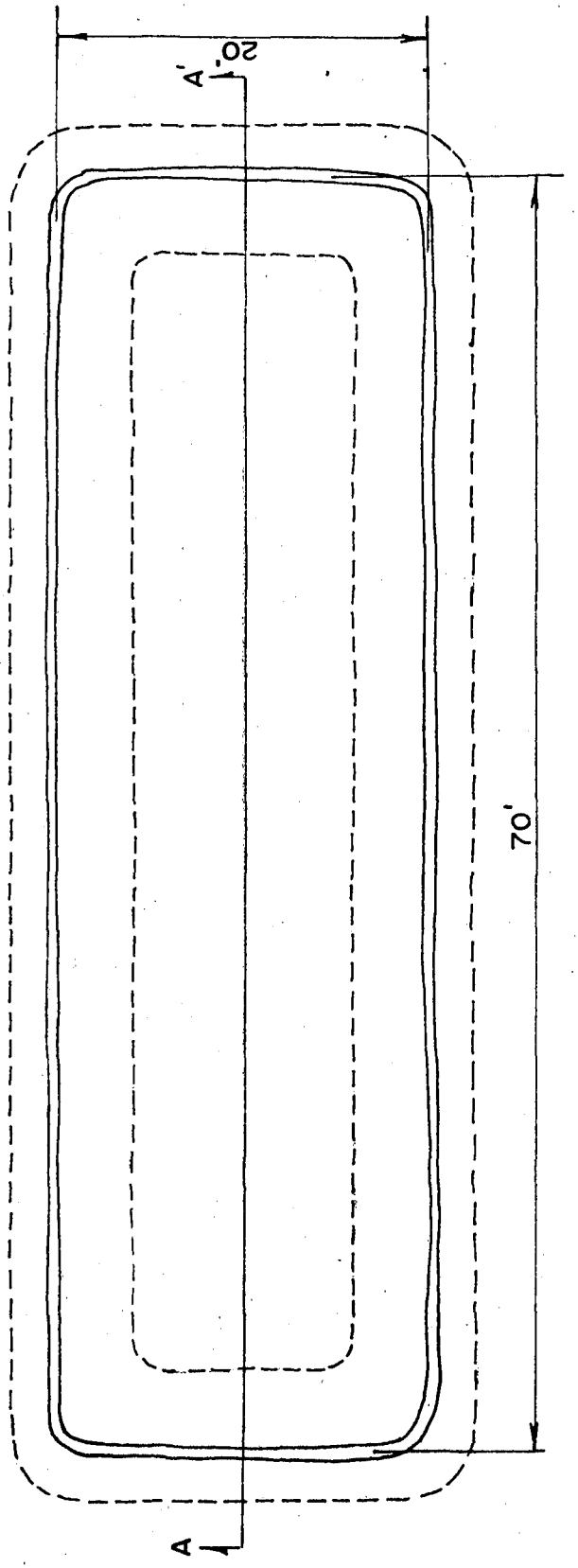
9. Only authorized persons will be allowed on the refuse pile or near the operation; all others will be warned away.

10. A safety session will be held immediately before each operating shift by F. C. Peterson. Discussions concerning the immediate condition of the work area will be held, along with additional update concerning the progress of the operation. Each individual will be given this plan and a map will be posted where progress can be noted at each meeting.

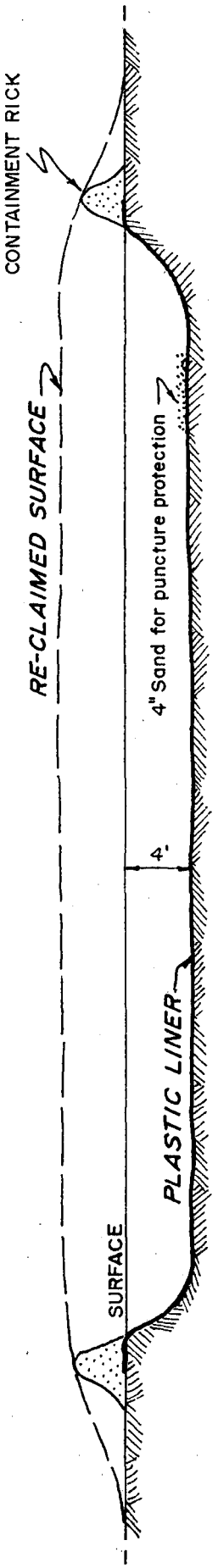
UMC 817.89 DISPOSAL OF NON-COAL WASTE

An area designated on Dwg. 4050-5-14 (ACR) will be excavated to an approximate depth of four feet, lined with impervious plastic sheeting to prevent leachate percolation; surface runoff will be prevented by suitable side ricks. Periodic compaction to ensure stability of the contents and monitoring by mine management will be conducted to assure conformance with local, state and federal requirements. In the event of excess material beyond the pit capacity, materials will be transported by truck to an approved sanitary landfill. Design of the waste pit is shown on the next page.

During the reclamation phase of the disturbed area, the disposal site will be covered with four feet of soil cover and the area stabilized in accordance with the approved reclamation plan.



— PLAN VIEW —



— SECTION A-A' —

817.95 AIR RESOURCES PROTECTION

After communicating with Mr. Steve McNeal (March 18, 1984) of the Division of Environmental Health, Bureau of Water Pollution Control, $MgCl_2$ spray will not be used for dust suppression. This is contrary to the dust control plan previously detailed in UMC 817.95 (ACR).

Upon resumption of mine production, the yard area and access road within the permit boundaries will be sprayed with water (pumped from wells or from preparation plant), to suppress dust. Spraying to control dust will be done as often as is necessary. See drawing 4050-5-13-R for extent of area concerned.

UMC 817.97 PROTECTION OF FISH, WILDLIFE AND RELATED ENVIRONMENTAL VALUES

As an addendum to the submitted information in the ACR, Vol. 1, 1983, the following list of wildlife resources in the immediate area of the J. B. King Mine is provided. This listing is from the Utah State Division of Wildlife Resources publication: Vertebrate Species of Southeastern Utah, L. B. Dalton et.al., herewith included.

The biographic area which contains the J. B. King Mine is of such size (Area D) that it includes aquatic communities containing fishes, amphibians, etc., which are not applicable to the immediate vicinity of the permit area. Therefore, care must be exercised in specification of exact members of a species to be found in residence or migrating through the area.

Since no springs, streams, lakes or other wetlands exist in the immediate vicinity which may be effected by the mining activities, the only areas which may be classified as high value to wildlife in the area of disturbance would possibly be the existing cliffs bounding the mine yard and facilities area. These cliffs as possible nesting sites for birds are not disturbed during mining activities, nor are there any proposals for alterations in the future. However, protection to perching raptors has been installed on power line poles leading into the mine site.

Contact with Mr. Wes Shields, Resource Analyst for the Southern Region has resulted in a letter from Mr. Clair Jensen, Regional Supervisor concluding that most wildlife values occur outside of the mine site and that activities at the site will create only a minimal disturbance; copies are enclosed.

STATE OF UTAH
NATURAL RESOURCES
Wildlife Resources

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Douglas F. Day, Division Director

Southern Region • 622 No. Main Street • P.O. Box 606 • Cedar City, UT 84720 • 801-586-2455

May 24, 1984

Ivan Lott
Coal Systems, Inc.
P.O. Box 17117
Salt Lake City, Utah 84117

Dear Mr. Lott:

I have enclosed the letter stating our agreement with the wildlife information discussed in the J.B. King Mine Plan. Most wildlife values occur outside of the mine site.

Our greatest concern for this mine, and as an additional concern for other mines, is the deaths of big game animals caused by coal transportation vehicles on highways. Their consistant 24 hour travel and incapacity to avoid animals is a significant threat to deer and elk beyond that of normal highway traffic. I feel that mine plans should outline appropriate measures to mitigate big game highway mortality resulting from the mine operation. Please inform me if additional comment is necessary.

Sincerely,

F. Clair Jensen
Regional Supervisor

FCJ/WCS/ksk

cc: Fred Pannunzio
Norman Bowden

STATE OF UTAH
NATURAL RESOURCES & ENERGY
Wildlife Resources

1596 West North Temple • Salt Lake City, UT 84116 • 801-533-9333

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Douglas F. Day, Division Director

March 13, 1984

Mr. James W. Smith, Jr.
Coordinator of Mined Land Development
Utah Division of Oil, Gas & Mining
4241 State Office Building
Salt Lake City, Utah 84114

Dear Mr. Smith,

We have reviewed the J.B. King Mine plan and are in agreement with their discussion relating to wildlife resources on the site. It appears that activities at the site will create only a minimal disturbance.

Thank you for your consideration of wildlife. We will be appreciative of future involvement with your Division.

Sincerely,

F. Clair Jensen
Regional Supervisor

FCJ/WCS/ksk

APPENDIX A

SPECIES LIST OF VERTEBRATE WILDLIFE THAT INHABIT SOUTHEASTERN UTAH

Compiled by

Larry B. Dalton
C. Brent Farnsworth
Randall B. Smith
R. Craig Wallace
Roger B. Wilson
Samuel C. Winegardner

PUBLICATION NO. 78-16

UTAH STATE DIVISION OF WILDLIFE RESOURCES

Douglas F. Day, Director

SPECIES LIST OF VERTEBRATE WILDLIFE THAT INHABIT SOUTHEASTERN UTAH

Utah is believed to be inhabited by 734 species of vertebrate wildlife. Four hundred forty-five of these species are protected: 2 amphibians, 2 reptiles, 26 mammals, 58 fish and 357 birds. One hundred of the protected species are game species: 10 species of big game; 20, fish; 10, furbearers; 43, migratory game birds; 5, small game mammals; and 12, upland, small game birds. Table 1 provides a comparison of inhabitation by game species between Utah Division of Wildlife Resource's five regions.

Southeastern Utah is inhabited by 466 species of vertebrate wildlife in six biogeographic areas (Table 2). Three hundred forty-three of these species are protected: 2 amphibians, 26 mammals, 38 fish and 277 birds. Seventy-nine of the protected species that inhabit southeastern Utah are game species: 9 species of big game; 13, game fish; 9, furbearers, 35, migratory game birds; 4, small game mammals; and 9, upland, small game birds.

Southeastern Utah has been divided into six biogeographic areas. Each area allows an overlap of wildlife species that inhabit contiguous low and high elevation areas. This procedure was utilized to reduce any controversy that would normally arise from a "sharp line" drawn on a map.

A- Wasatch Plateau extending east from Skyline Drive to Highway 10 and bounded on the north by Highway 6 and on the south by Interstate 70.

B- West Tavaputs Plateau including all drainages into the Price River drainage from Soldier's Summit east along Reservation Ridge and including the drainages into Argyle, Nine Mile and Minnie Maud creeks; bounded on the east by the Green River and south and west by Highway 6.

C- East Tavaputs Plateau bounded on the east by the Colorado-Utah state line; on the south by Interstate 70; on the west by the Green River and on the north by Uintah-Ouray Indian Reservation and the Uintah-Grand county line.

D- San Rafael Swell and San Rafael Desert bounded by Highway 6 on the north; Highway 10 on the west; the Green River on the east and the Emery-Wayne county line on the south. (LOCATION OF J.B.KING MINE)

E- Henry Mountains and Burr Desert bounded on the north by Emery-Wayne county line; the Green and Colorado rivers on the east; Lake Powell on the south and Capitol Reef National Park and the Waterpocket Fold on the west.

F- Mountains and deserts of Grand and San Juan counties south of Interstate Highway 70 and north of the San Juan River bounded on the east by the Utah-Colorado border and on the west by the Green and Colorado rivers and Lake Powell.

Each species is listed by common name followed by the generic and specific nomenclature. The status for each species was determined by the authors after evaluation and consultation from several sources. The listing for mammals was developed from Sparks (1974), Burt and Grossenheider (1976) and Durrant (1952). The primary sources consulted in compiling the bird list were Behle and Perry (1975) and Hayward et al. (1976) although, Peterson (1969), Robbins et al. (1966) and Udvardy and Rayfield (1977) were also used.

Holden (1973), Bailey et al. (1970), Eddy (1969) and Sigler and Miller (1963) were consulted for preparation of the list of fishes.

The status of reptiles and amphibians was determined through discussion with local herpetologists. The phylogenetic listing is after Stebbins (1966). Tanner (1975) was consulted for species inhabiting Utah.

The following code letters are given for each species to describe its status.

K Status unknown - It is believed that these species are present, but little is known of their population dynamics.
C Common - These species are widespread and abundant.
U Uncommon - These species are widespread, but not abundant.
R Rare - These species are seldom identified during any one year.
O Occasional - These species are periodically identified during a long term period--10-50 years.
A Accidental - Distribution for these species does not normally include this area. Sightings are as far between as 50 to 100 years.
E Endangered - These species are endangered with extinction or extirpation from wildland in Utah.
T Threatened - These species are threatened with becoming endangered in Utah.
L Limited - These species are common but restricted to a particular use area or habitat type in Utah.
X Extirpated - These species have disappeared from wildland habitats in Utah.
P Protected - These species are protected by state or federal laws in Utah.
N Nonprotected - These species are not protected by any laws in Utah.

The following terminology is used to describe the seasonal status for avian species.

Transient - These species pass through southeastern Utah twice a year during their migratory travels.

Resident - These species occur yearlong in southeastern Utah.

Summer Resident - These species breed in southeastern Utah and migrate elsewhere for the winter.

Winter Resident - These species breed elsewhere but winter in southeastern Utah.

Note, the species marked with an asteric (*) are of high interest to the State and those marked with an exclamation mark(!) have potential to inhabit the environs of the project area. *(High interest species are those defined as being of economic importance from either a consumptive or non-consumptive perspective, or having special aesthetic; scientific; educational or ecological significance.)*

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Reptiles -- 36 species in southeastern Utah				
Family Iguanidae				
*Chuckwalla (Sauromalus obesus)	E,F	L-P	Unknown	Rocky hillsides
Collared Lizard (Crotaphytus collaris)	A,B,C,D,E,F	C-P	Unknown	Canyons, rocky gullies, mountain slopes and boulder strewn alluvial fans where vegetation is sparse
Leopard Lizard (Crotaphytus wislizenii)	A,B,C,D,E,F	C-P	Unknown	Arid and semi-arid plains with bunchgrass, sagebrush or other low desert shrub communities; avoids dense vegetation
Lesser Earless Lizard (Holbrookia maculata)	F	K-P	Unknown	Washes, sandy stream banks and sand dunes on shortgrass prairi and farmlands

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Eastern Fence Lizard (Sceloporus undulatus)	A,B,C,D,E,F	C-P	Unknown	Forest, woodlands, prairie, brushy flatlands, sand dunes, rocky hillsides and farmlands
Desert Spiny Lizard (Sceloporus magister)	D,E,F	C-P	Unknown	Shadscale deserts, pinion-juniper woodland, willows and cottonwoods.
Sagebrush Lizard (Sceloporus graciosus)	A,B,C,D,E,F	C-P	Unknown	Variety of habitat types; sagebrush, pinion-juniper, low desert shrub and rocklands
Tree Lizard (Urosaurus ornatus)	A,B,C,D,E,F	C-P	Unknown	Trees and rocks
Side-blotched Lizard (Uta stansburiana)	A,B,C,D,E,F	C-P	Unknown	Inhabits a variety of habitat types; sandy washes with scattered rocks and low growing shrubs
Desert Horned Lizard (Phrynosoma platyrhinos)	E	K-P	Unknown	Along washes at the edge of dunes in saltbrush and sagebrush areas
Short-horned Lizard (Phrynosoma douglassi)	A,B,C,D,E,F	C-P	Unknown	Desert grassland, sagebrush, pinion-juniper, pine-spruce and spruce-fir associations, extending from desert shrub to mountain habitats

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Family Colubridae				
Smooth Green Snake (Opheodrys vernalis)	F	K-P	Unknown	Damp grassy environment
Striped Whipsnake (Masticophis taeniatus)	A,B,C,D,E,F	C-P	Unknown	Brushlands, grasslands, sagebrush flats, pinion-juniper woodlands and open pine forests
Coachwhip (Masticophis flagellum)	E,F	K-P	Unknown	Utilizes a variety of habitats but avoids dense vegetation; rodent burrows, rocks and branches are used
Racer (Coluber constrictor)	A,B,C,D,E,F	C-P	Unknown	Meadows, sparse brush and forest openings with semi-arid and moist areas; grassy places near rocks and logs are preferred
Corn Snake (Elaphe guttata)	F	K-P	Unknown	Stream and river bottoms, rocky wooded hillsides, coniferous forests, and farmland with rodent burrows, rocks and logs
Ringneck Snake (Diadophis punctatus)	A	K-P	Unknown	Moist habitats usually in the mountains or along stream and river bottoms

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Black-necked Garter Snake (Thamnophis cyrtopsis)	F	K-P	Unknown	Desert and grasslands
Western Black-headed Snake (Tantilla planiceps)	E,F	K-P	Unknown	Grasslands, woodlands and deserts; often found under rocks and logs
Night Snake (Hypsiglena torquata)	A,B,C,D,E,F	C-P	Unknown	Plains, sagebrush flats, desert and woodlands; often found under rocks and surface litter
Family Crotalidae				
Hopi Rattlesnake (Crotalus viridis nuntius)	E	U-P	Unknown	Prefers rock piles and rodent burrows on grasslands, brushlands, woodlands and forests; avoids sparsely vegetated deserts
Prairie Rattlesnake (Crotalus viridis viridis)	F	U-P	Unknown	Prefers rock piles and rodent burrows on grasslands, woodlands and forests; avoids sparsely vegetated deserts
Midget Faded Rattlesnake (Crotalus viridis concolor)	A,B,C,D,E,F	C-P	Unknown	Prefers rock piles and rodent burrows on grasslands, brushlands, woodlands and forests; avoids sparsely vegetated deserts

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Order Falconiformes				
Family Cathartidae				
*Turkey Vulture (Cathartes aura)	A,B,C,D,E,F	C-P summer resident	Stable	Usually seen in sky or perched on dead trees, posts, carrion or on groun
California Condor (Gymnogyps californianus)	A,B,C,D,E,F	X-P	Extirpated	Usually seen in sky or perched on dead trees, posts, carrion or on groun
Family Accipitridae				
*Goshawk (Accipiter gentilis)	A,B,C,D,E,F	U-P resident	Stable	Mountain woodlands
*Sharp-shinned Hawk (Accipiter striatus)	A,B,C,D,E,F	U-P resident and transient	Stable	Forests, thickets, scruboak, desert riparian, mountain woodlands and aspen
*Cooper's Hawk (Accipiter cooperii)	A,B,C,D,E,F	C-P summer resident and transient R-P winter resident	Stable	Broken woodlands, dry wooded canyons, riparian areas, pinion-juniper and conifers
*Red-tailed Hawk (Buteo jamaicensis)	A,B,C,D,E,F	C-P resident	Stable	Open country, woodlands, mountains and deserts
*Red-shouldered Hawk (Buteo lineatus)	C,F	A-P transient	Unknown	Broken woodlands, primarily along lowland rivers and often close to cultivated fields
* Swainson's Hawk (Buteo swainsoni)	A,B,C,D,E,F	U-P summer resident	Stable	Dry plains and rangeland with hills; open forest or alpine meadows with sparse trees

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
* American Kestrel (Falco sparverius)	A,B,C,D,E,F	C-P summer resident U-P winter resident	Stable	Open country, prairies, deserts, wooded streams, farmland and cities
Order Galliformes				
Family Tetraonidae				
* Blue Grouse (Dendragapus obscurus)	A,B,C,D,E,F	C-P resident	Stable	Coniferous forests, aspen, mountain brush, open slash and burns
* Ruffed Grouse (Bonasa umbellus)	A,B	C-P resident	Stable	Aspen and coniferous forests near stream courses
* Sage Grouse (Centrocercus urophasianus)	A,B,C,F	C-P resident	Stable	Sagebrush plains associated with pasture lands; sagebrush parks associated with wet meadows
Family Phasianidae				
* California Quail (Lophortyx californicus)	A,B,D,E,F	C-P resident	Stable	Mountain brush, woodland edges and farmlands near river bottoms
* Gambels Quail (Lophortyx gambelii)	D,E,F	C-P resident	Stable	Desert thickets, usually near water
* Chukar (Alectoris chukar)	A,B,C,D,E,F	C-P resident	Stable	Rocky, grassy or brushy slopes in arid mountains and canyons
* Ring-necked Pheasant (Phasianus colchicus)	A,B,C,D,E,F	C-P resident	Decreasing	Irrigated cropland, pastureland, wetlands and desert washes

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Order Columbiformes Family Columbidae				
* Band-tailed pigeon (Columba fasciata)	A,E,F	U-P summer resident and transient	Stable	Forests, canyons and foothills near mountain brush (acorns) and agricultural lands
Rock Dove (Columba lavia)	A,B,C,D,E,F	C-N resident	Stable	Cities, farms and cliffs
* Mourning Dove (Zenaida macroura)	A,B,C,D,E,F	C-P summer resident and transient	Stable	Farmlands, towns, open woods, grassland and deserts
White-winged Dove (Zenaidura asiatica)	E,F	A-P summer resident and transient	Unknown	Open woods and river bottoms

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Order Cuculiformes				
Family Cuculidae				
*Yellow-billed Cuckoo (Coccyzus americanus)	A,B,C,D,E,F	K-P summer resident	Unknown	River thickets and willows
Order Strigiformes				
Family Tytonidae				
*Barn Owl (Tyto alba)	A,B,C,D,E,F	K-P resident	Unknown	Woodlands, fields, farms, towns, canyons, cliffs and dirt banks
Family Strigidae				
*Screech Owl (Otus asio)	A,B,C,D,E,F	U-P resident	Stable	Riparian communities and wooded canyons
*Flammulated Owl (Otus flammeolus)	A,B,C,D,E,F	K-P summer resident	Unknown	Open pine and fir forests in mountains
*Great Horned Owl (Bubo virginianus)	A,B,C,D,E,F	C-P resident	Stable	Ubiquitous
*Pygmy Owl (Glaucidium gnoma)	A,B,C,D,E,F	K-P resident	Unknown	Wooded canyons in open coniferous, mixed woodlands and pinion-juniper forests
*Burrowing Owl (Speotyto cunicularia)	A,B,C,D,E,F	L-P resident	Declining	Open grassland, prairies, dikes, desert, farms and prairie dog colonies

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Order Apodiformes				
Family Apodidae				
*Black Swift (Cypseloides niger)	A,B,C,D,E,F	U-P summer resident	Unknown	Open areas in mountain country
White-throated Swift (Aeronautes saxatalis)	A,B,C,D,F	C-P summer resident	Unknown	Open areas; wide ranging and breeds mainly in dry mountain canyons
Family Trochilidae				
Black-chinned Hummingbird (Archilochus alexandri)	A,B,C,D,E,F	C-P summer resident	Unknown	Semi-arid country near water; semi-wooded canyons and slopes, mountain brush and riparian woodlands
Broad-tailed Hummingbird (Selasphorus platycercus)	A,B,C,D,E,F	C-P summer resident	Unknown	Ubiquitous
Rufous Hummingbird (Selasphorus rufus)	A,B,C,D,E,F	C-P summer resident and transient	Unknown	Forest edges, thickets in coniferous and deciduous forests, mountain brush and alpine meadows
Calliope Hummingbird (Stellula calliope)	A,B,C,D,E,F	C-P summer resident	Unknown	High mountains, canyons and forest openings
Rivoli's Hummingbird (Eugenes fulgens)	E,F	U-P summer resident	Unknown	High mountain forest openings, pine-oak forests and canyons

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Order Columbiformes Family Columbidae				
* Band-tailed pigeon (Columba fasciata)	A,E,F	U-P summer resident and transient	Stable	Forests, canyons and foothills near mountain brush (acorns) and agricultural lands
Rock Dove (Columba lavia)	A,B,C,D,E,F	C-N resident	Stable	Cities, farms and cliffs
* Mourning Dove (Zenaida macroura)	A,B,C,D,E,F	C-P summer resident and transient	Stable	Farmlands, towns, open woods, grassland and deserts
White-winged Dove (Zenaidura asiatica)	E,F	A-P summer resident and transient	Unknown	Open woods and river bottoms

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Order Cuculiformes				
Family Cuculidae				
*Yellow-billed Cuckoo (Coccyzus americanus)	A,B,C,D,E,F	K-P summer resident	Unknown	River thickets and willows
Order Strigiformes				
Family Tytonidae				
*Barn Owl (Tyto alba)	A,B,C,D,E,F	K-P resident	Unknown	Woodlands, fields, farms, towns, canyons, cliffs and dirt banks
Family Strigidae				
*Screech Owl (Otus asio)	A,B,C,D,E,F	U-P resident	Stable	Riparian communities and wooded canyons
*Flammulated Owl (Otus flammeolus)	A,B,C,D,E,F	K-P summer resident	Unknown	Open pine and fir forests in mountains
*Great Horned Owl (Bubo virginianus)	A,B,C,D,E,F	C-P resident	Stable	Ubiquitous
*Pygmy Owl (Glaucidium gnoma)	A,B,C,D,E,F	K-P resident	Unknown	Wooded canyons in open coniferous, mixed woodlands and pinion-juniper forests
*Burrowing Owl (Speotyto cunicularia)	A,B,C,D,E,F	L-P resident	Declining	Open grassland, prairies, dikes, desert, farms and prairie dog colonies

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*Black Swift (Cypseloides niger)	A,B,C,D,E,F	U-P summer resident	Unknown	Open areas in mountain country
White-throated Swift (Aeronautes saxatalis)	A,B,C,D,F	C-P summer resident	Unknown	Open areas; wide ranging and breeds mainly in dry mountain canyons
Family Trochilidae				
Black-chinned Hummingbird (Archilochus alexandri)	A,B,C,D,E,F	C-P summer resident	Unknown	Semi-arid country near water; semi-wooded canyons and slopes, mountain brush and riparian woodlands
Broad-tailed Hummingbird (Selasphorus platycercus)	A,B,C,D,E,F	C-P summer resident	Unknown	Ubiquitous
Rufous Hummingbird (Selasphorus rufus)	A,B,C,D,E,F	C-P summer resident and transient	Unknown	Forest edges, thickets in coniferous and deciduous forests, mountain brush and alpine meadows
Calliope Hummingbird (Stellula calliope)	A,B,C,D,E,F	C-P summer resident	Unknown	High mountains, canyons and forest openings
Rivoli's Hummingbird (Eugenes fulgens)	E,F	U-P summer resident	Unknown	High mountain forest openings, pine-oak forests and canyons

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Downy Woodpecker (Dendrocopos pubescens)	A,B,C,D,E,F	C-P resident	Unknown	Broken or mixed forest, willows, poplars, riparian woodlands, orchards and shade trees
Northern Three-toed Woodpecker (Picoides tridactylus)	A,B,C,E,F	U-P resident	Unknown	Coniferous forests
Order Passeriformes				
Family Tyrannidae				
Western Kingbird (Tyrannus verticalis)	A,B,C,D,E,F	C-P summer resident	Stable	Open country with scattered trees, farms and roadsides
Cassin's Kingbird (Tyrannus vociferans)	A,B,C,D,E,F	U-P summer resident	Unknown	Semi-open high country, scattered trees, pine-oak mountains and ranch groves
Eastern Kingbird (Tyrannus tyrannus)	A,B,C,D,E,F	C-P summer resident	Unknown	Wood edges, parklands, riparian areas, farms, shelter belts, orchards and roadsides
Ash-throated Flycatcher (Myiarchus cinerascens)	A,B,C,D,E,F	C-P summer resident	Stable	Semi-arid country, deserts, brush, pinion-juniper and open woods
Black Phoebe (Sayornis nigricans)	F	C-P resident	Unknown	Streamside woodlands, farmyards and towns with cliffs near water
Says Phoebe (Sayornis saya)	A,B,C,D,E,F	C-P resident	Unknown	Open arid country, deserts, bushy plains, prairie farms, canyon mouths and buttes

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Northern Three-toed Woodpecker (Picoides tridactylus)	A,B,C,E,F	U-P resident	Unknown	Coniferous forests
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Eastern Kingbird (Tyrannus tyrannus)	A,B,C,D,E,F	C-P summer resident	Unknown	Wood edges, parklands, riparian areas, farms, shelter belts, orchards and roadsides
Ash-throated Flycatcher (Myiarchus cinerascens)	A,B,C,D,E,F	C-P summer resident	Stable	Semi-arid country, deserts, brush, pinion-juniper and open woods
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Eastern Kingbird (Tyrannus tyrannus)	A,B,C,D,E,F	C-P summer resident	Unknown	Wood edges, parklands, riparian areas, farms, shelter belts, orchards and roadsides
Ash-throated Flycatcher (Myiarchus cinerascens)	A,B,C,D,E,F	C-P summer resident	Stable	Semi-arid country, deserts, brush, pinion-juniper and open woods
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Says Phoebe (Sayornis saya)	A,B,C,D,E,F	C-P resident	Unknown	Open arid country, deserts, bushy plains, prairie farms, canyon mouths and buttes

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Family Alaudidae				
Horned Lark (Eremophila alpestris)	A,B,C,D,E,F	C-P resident	Unknown	Plains, desert, prairies, fields, sparse sagebrush flats, dirt roads, shores, alpine meadows, alkali flats and areas of sparse vegetation
Family Hirundinidae				
Violet-green Swallow (Tachycineta thalasssina)	A,B,C,D,E,F	C-P summer resident	Unknown	Widespread when foraging; when nesting, open forests foothill woods, mountains, canyons, cliffs and towns
Tree Swallow (Iridoprocne bicolor)	A,B,C,D,E,F	C-P summer resident	Unknown	Open country near water, marshes, mountain meadows, streams, lakes and wires; when nesting requires dead trees and snags, preferabl; near water
Bank Swallow (Riparia riparia)	A,B,C,D,E,F	C-P summer resident	Unknown	Usually near water; over fields, marshes, streams and lakes
Rough-winged Swallow (Stelgidopteryx ruficollis)	A,B,C,D,E,F	C-P summer resident	Unknown	Near streams, lakes and washes
Barn Swallow (Hirundo rustica)	A,B,C,D,E,F	C-P summer resident	Unknown	Open or semi-wooded country, farms, ranches, fields, marshes and lakes; usually near man's habitation

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Family Paridae				
Black-capped Chickadee (Parus atricapillus)	A,B,C,D,E,F	C-P resident	Unknown	In summer aspen-conifer, mixed woodlands and forest edges; in winter woodlands along valley streams and tree rows
Mountain Chickadee (Parus gambeli)	A,B,C,D,E,F	C-P resident	Unknown	In summer mountain forests and conifers; in winter riparian woodlands at lower elevations
Plain Titmouse (Parus inornatus)	A,B,C,D,E,F	K-P resident	Unknown	Pinion-juniper woodlands
Bushtit (Psaltriparus minimus)	A,B,C,D,E,F	C-P resident	Unknown	Oak woodlands, mountain brush, broad-leafed and mixed woods and pinion-juniper forest
Family Sittidae				
White-breasted Nuthatch (Sitta carolinensis)	A,B,C,D,E,F	C-P resident	Unknown	Coniferous forests, pinion-juniper woodlands, oak brush, and riparian woodlands
Red-breasted Nuthatch (Sitta canadensis)	A,B,C,E,F	C-P resident	Unknown	Coniferous forests
Pygmy Nuthatch (Sitta pusilla)	A,B,C,D,E,F	C-P resident	Unknown	Ponderosa pines and Douglas fir

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Brown Thrasher (Toxostoma rufum)	D,E,F	R-P resident	Unknown	Brushy places and thorny thickets
Bendire's Thrasher (Toxostoma bendirei)	F	R-P resident	Unknown	Desert scrub and farmlands
Sage Thrasher (Oreoscoptes montanus)	A,B,C,D,E,F	C-P resident	Unknown	Sagebrush, rabbitbrush, brushy slopes and mesas
Family Muscicapidae				
American Robin (Turdus migratorius)	A,B,C,D,E,F	C-P resident	Unknown	In summer towns, lawns, farmland, open forests, streamsides and any wooded habitat; in winter berry-bearing trees
Varied Thrush (Ixoreus naevius)	E,F	O-P winter resident	Unknown	Deciduous and coniferous forests usually near water
Hermit Thrush (Catharus guttatus)	A,B,C,D,E,F	C-P summer resident and transient	Unknown	In summer mixed woodlands and open coniferous forest in winter woods, thickets and parks
Swainson's Thrush (Catharus ustulatus)	A,B,D	C-P summer resident	Unknown	Willow thickets, river woodlands, aspens, forest undergrowth and conifers
Veery (Catharus fuscescens)	A,B	U-P summer resident	Unknown	Streamside woodlands

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Family Motacillidae				
Water Pipet (Anthus spinoletta)	A,B,C,D,E,F	C-P resident	Unknown	In summer alpine zone; in migration and winter plains, bare fields, shores and irrigated field
Family Bombycillidae				
Bohemian Waxwing (Bombycilla garrulus)	A,B,C,D,E,F	U-P winter resident	Unknown	Widespread and feeds on berries
Cedar Waxwing (Bombycilla cedrorum)	A,B,C,D,E,F	C-P winter resident	Unknown	Open woodlands, Russian olive and other fruiting trees or orchards
Family Laniidae				
Northern Shrike (Lanius excubitor)	A,B,C,D,E,F	U-P winter resident	Unknown	Semi-open country or open country with look-out posts
Loggerhead Shrike (Lanius ludovicianus)	A,B,C,D,E,F	C-P resident	Unknown	Deserts and other open country with lookout posts, wires, scattered trees and low scrub
Family Sturnidae				
Starling (Stuirnus vulgaris)	A,B,C,D,E,F	C-P resident	Unknown	Cities, fields, orchards and woodlands
Family Vireonidae				
Gray Vireo (Vireo vicinior)	D,E,F	U-P summer resident	Unknown	Brushy mountain slopes, scrub oak and junipers
Solitary Vireo (Vireo solitarius)	A,B,C,D,E,F	U-P summer resident	Unknown	Streamside woodlands, pinion-juniper and Ponderosa pine forests

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Hermit Warbler (Dendroica occidentalis)	E,F	U-P summer resident and transient	Unknown	Coniferous forests; in migration other trees
Yellow-rumped Warbler (Dendroica coronata)	A,B,C,D,E,F	C-P summer resident	Unknown	In summer coniferous and mixed forests; in winter varied woods, river thickets, brush and gardens
Black-throated Gray Warbler (Dendroica nigrescens)	A,B,C,D,E,F	K-P summer resident	Unknown	In summer dry oak slopes, pinion-juniper woodlands, open mixed woods; in migration varied trees and brush
Townsend's Warbler (Dendroica townsendi)	A,B,C,D,E,F	U-P transient	Unknown	Coniferous forests
Northern Waterthrush (Seiurus noveboracensis)	B,C,D,E,F	U-P transient	Unknown	Swampy or wet woods, streamsides and lakeshores; in migration thickets
MacGillivray's Warbler (Oporornis tolmiei)	A,B,C,D,E,F	C-P summer resident	Unknown	Low dense undergrowth and shady, damp thickets
Yellowthroat (Geothylpis trichas)	A,B,C,D,E,F	L-P summer resident	Unknown	Cattail and bulrush marshes, willow thickets and streamsides
Yellow-breasted Chat (Icteria virens)	A,B,C,D,E,F	C-P summer resident	Unknown	Dense brush along water courses, willow thickets and moist canyons

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
* Scotts Oriole (Icterus parisorum)	C,D,E,F	U-P summer resident	Unknown	Pinion-juniper woodlands of desert mountains, oak slopes and cottonwood trees in canyons
Rusty Blackbird (Euphagus carolinus)	A	O-P transient	Unknown	Wooded marshes and riparian woodlands
Brewer's Blackbird (Euphagus cyanocephalus)	A,B,C,D,E,F	C-P resident	Unknown	Varied open country, lakeshores, irrigated pastures, feed lots, parks and cities
Common Grackle (Quiscalus quiscula)	A,B,D	A-P transient	Unknown	Farms, fields, streamsides and wet woodlands
Brown-headed Cowbird (Molothrus ater)	A,B,C,D,E,F	C-P resident	Unknown	Farms, fields, barnyards wood edges and riparian woodlands
Family Thraupidae				
Western Tanager (Piranga ludoviciana)	A,B,C,D,E,F	C-P summer resident	Unknown	Open coniferous, aspen or mixed forests; widespread in migration
Family Embarizidae				
Rose-breasted Grosbeak (Pheucticus ludovicianus)	F	O-P summer resident	Unknown	Broadleaf riparian areas and aspens
Black-headed Grosbeak (Pheucticus melanocephalus)	A,B,C,D,E,F	C-P summer resident	Unknown	Edges of second growth deciduous woods, pinion, riparian areas, orchards and parks

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Vesper Sparrow (Pooecetes gramineus)	A,B,C,D,E,F	C-P summer resident	Unknown	Alfalfa and grain fields, meadows, sagebrush and desert shrub
Lark Sparrow (Chondestes grammacus)	A,B,C,D,E,F	C-P summer resident	Unknown	Open country in sagebrush and desert shrub with available perch sites
Sage Sparrow (Amphispiza belli)	A,B,C,D,E,F	U-P summer resident	Unknown	Sagebrush, greasewood and other desert shrubs
Dark-eyed Junco (Junco hyemalis)	A,B,C,D,E,F	C-P resident	Unknown	In summer openings and edges of coniferous and mixed woodlands; in winte greasewood and undergrowt
Gray-headed Junco (Junco caniceps)	A,B,C,D,E,F	C-P summer resident	Unknown	Coniferous, mixed forests and mountain brush
Tree Sparrow (Spizella arborea)	A,B,C,D,E,F	U-P winter resident	Unknown	Willow thickets and brushy areas
Chipping Sparrow (Spizella passerina)	A,B,C,D,E,F	C-P summer resident	Unknown	Mountain coniferous and deciduous woodlands, valley woodlands, farms, orchards, parks and brushlands
Brewer's Sparrow (Spizella breweri)	A,B,C,D,E,F	C-P summer resident	Unknown	Sagebrush, greasewood and other desert shrubs or brushy areas
Harris Sparrow (Zonotrichia querula)	A,B,C,D,E,F	U-P winter resident	Unknown	Brushy edges of open woodlands, Russian olives and willows

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Black-throated Sparrow (Amphispiza bilineata)	A,B,C,D,E,F	U-P summer resident	Unknown	Pinion-juniper, mountain brush and sagebrush
Family Fringillidae				
Evening Grosbeak (Coccothraustes vespertinus)	A,B,C,D,E,F	C-P winter resident	Unknown	Boxelders, Russian olive trees and fruiting shrubs
Cassin's Finch (Carpodacus cassinii)	A,B,C,D,E,F	C-P summer resident U-P winter resident	Unknown	In summer, open conifer forests of high mountains in winter valleys
House Finch (Carpodacus mexicanus)	A,B,C,D,E,F	C-P resident	Unknown	Varied habitats; towns, ranches, open woods, mountain scrub, canyons, deserts and riparian area
Pine Grosbeak (Pinicola enucleator)	A,B,C,E,F	U-P resident	Unknown	In summer coniferous forests; in winter mixed woods and fruiting trees
Rosy Finch (Leucosticte arctoa)	A,B,C,D,E,F	C-P resident	Unknown	In summer alpine tundra, meadows and snowfields; winters in lowlands
Pine Siskin (Carduelis pinus)	A,B,C,D,E,F	C-P resident	Unknown	Coniferous forests, along edges of second growth deciduous forests; in migration seen in large flocks in the lower valle

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Masked Shrew (Sorex cinereus)	A,B,D,E	C-N	Unknown	Moist sites in forests, open country and brushlan
Dusky Shrew (Sorex obscurus)	A,B,C,F	C-N	Unknown	Marshes, coniferous forests and dry hillsides
* Gray (Desert) Shrew (Notiosorex crawfordi)	E,F	C-N	Unknown	Arid alluvial fans, brushy slopes, sagebrush and other low desert shrub communities
Order Chiroptera Family Vespertilionidae Little Brown Myotis (Myotis lucifugus)	A,B,C,D,E,F	C-N	Unknown	Caves, mine tunnels, hollow trees or buildings usually near water
Fringed Myotis (Myotis thysanodes)	A,B,C,D,E,F	U-N	Unknown	Caves, old buildings, roc crevices, pinion-juniper and desert shrub
Long-eared Myotis (Myotis evotis)	A,B,C,D,E,F	C-N	Unknown	Coniferous forests in hig mountains, around buildin or trees and occasionally caves
Long-legged Myotis (Myotis volans)	A,B,C,D,E,F	C-N	Unknown	Buildings, small pockets, crevices in rock ledges and trees

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Mexican Big-eared Bat (Plectus phyllotis)	F	L-N	Unknown	Caves in pine-oak forests between 5,000 to 8,500 feet elevation
*Spotted Bat (Euderma maculata)	Unknown	L-N	Unknown	Arid country; it occasionally enters buildings and caves
Pallid Bat (Antrozous pallidus)	A,B,C,D,E,F	C-N	Unknown	Caves, mine tunnels, crevices in rocks, buildings and trees are utilized for roosts; inhabits scattered desert shrub and pine-oak forests below 6,500 feet elevation
Family Molossidae				
Mexican Free-tailed Bat (Tadarida brasiliensis)	A,B,C,D,E,F	C-N	Unknown	Caves and buildings are utilized for roosts; inhabits lower and upper Sonoran Life Zones
Order Lagomorpha				
Family Ochotonidae				
Pika (Ochontona princeps)	A,B,C,E,F	C-N	Unknown	Talus slopes and rock-slides above 8,000 feet elevation
Family Leporidae				
White-tailed Jackrabbit (Lepus townsendii)	A,B,C,D	C-N	Stable	Open, grassy or sage-brush areas at medium elevation
*Snowshoe Hare (Lepus americanus)	A,B,C	L-P	Cyclic	Coniferous forests and aspen, riparian and brush types near conifers

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
*Spotted Ground Squirrel (Spermophilus spilosoma)	F	L-N	Unknown	Open forests, scattered brush and grassy areas with sandy soil is preferred
Rock Squirrel (Spermophilus variegatus)	A,B,C,D,E,F	C-N	Stable	Rocky canyons with boulder strewn slopes, riparian woodlands, and ditchbanks
Uintah Ground Squirrel (Spermophilus armatus)	A,B	C-N	Stable	Meadows and edges of fields near green vegetation up to 8,000 feet elevation
Golden-mantled Ground Squirrel (Spermophilus lateralis)	A,B,C	C-N	Stable	Mountain brush, open pine and spruce-fir forests to above timberline
Whitetail Antelope Squirrel (Ammospermophilus leucurus)	A,B,C,D,E,F	C-N	Stable	Arid areas of low desert and foothills with sparse vegetation
Yellow-billied Marmot (Marmota flaviventris)	A,B,C,E,F	C-N	Stable	Rocky sites or talus slopes along valleys or in foothills 5,000 to 9,000 feet elevation
*Northern Flying Squirrel (Glaucomys sabrinus)	A,B,C,F	K-N	Unknown	Coniferous and mixed forests in high mountains

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Ord Kangaroo Rat (Dipodomys ordii)	A,B,C,D,E,F	C-N	Unknown	Desert shrub, pinion-juniper and tamarisk communities; sandy soils preferred but found on hard soils
Baird Pocket Mouse (Perognathus flavus)	F	C-N	Unknown	Prefers short grass areas with sandy or rocky soils
Great Basin Pocket Mouse (Perognathus parvus)	A,D	C-N	Unknown	Sagebrush or greasewood and other desert shrub communities and pinion-juniper
Apache Pocket Mouse (Perognathus apache)	C,D,F	C-N	Unknown	Sparse brushlands and scattered pinion-juniper, usually 5,000-7,200 feet elevation
Family Castoridae				
* Beaver (Castor canadensis)	A,B,C,D,E,F	C-P	Increasing	Streams, lakes and irrigation systems with poplars, birch or willows on the bank
Family Cricetidae				
Western Harvest Mouse (Reithrodontomys megalotis)	A,B,C,D,E,F	C-N	Unknown	Grasslands, open desert, wetlands, irrigated farmland of dense vegetation near water
Canyon Mouse (Peromyscus crinitus)	A,B,C,D,E,F	C-N	Unknown	Rocky canyons and slopes with mountain brush

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
Meadow Vole (Microtus pennsylvanious)	A,D	C-N	Unknown	Moist areas with dense growth of grasses
Mountain Vole (Microtus montanus)	A,B,D,E	C-N	Unknown	Dense vegetation in sagebrush-grass communities
Richardson's Vole (Microtus richardsoni)	A	C-N	Unknown	Creekbanks and marshes in mountains to above timberline
Longtail Vole (Microtus longicaudus)	A,B,C,D,E,F	C-N	Unknown	In summer streambanks, mountain meadows with dry sites; in winter brushy areas
Sagebrush Vole (Lagurus curtatus)	C,F	C-N	Unknown	Scattered sagebrush with loose soil and arid conditions
Family Muridae				
Black Rat (Rattus rattus)	A,B,C,D,E,F	C-N	Unknown	Buildings and dumps
Norway Rat (Rattus norvegicus)	A,B,C,D,E,F	C-N	Unknown	Burrows along building foundations and beneath rubbish piles
House Mouse (Mus musculus)	A,B,C,D,E,F	C-N	Unknown	Buildings and occasionally in fields

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
*Gray Wolf (Canis lupus)	A,B,C,D,E,F	E-P	Decreasing	Wilderness forests
Family Ursidae				
*Black Bear (Ursus americanus)	A,B,C,E,F	C-P	Increasing	Mountainous areas
*Grizzly Bear (Ursus horribilis)	A,B,C,E,F	X-P	Extirpated	Remote mountainous regions
Family Procyonidae				
Ring-tailed Cat (Bassariscus astutus)	A,B,C,D,E,F	C-N	Stable	Near water on slopes with mountain brush, rocky ridges and cliffs
*Raccoon (Procyon lotor)	A,B,C,D,E,F	K-N	Unknown	Along streams, lake borders and near wooded areas or rock cliffs
Family Mustelidae				
*Short-tailed Weasel (Mustela erminea)	A,B,C,F	K-P	Unknown	Brushy or wooded areas not far from water
*Long-tailed Weasel (Mustela frenata)	A,B,C,D,E,F	C-P	Stable	All land habitat types near water
*Mink (Mustela vison)	A,B,C,F	L-P	Unknown	Along streams and lakes
*Wolverine (Gulo luscus)	A,B	L-P	Unknown	Remote mountain regions
*Black-footed Ferret (Mustela nigripes)	A,B,C,D,F	E-P	Unknown	Prairie dog towns
*Marten (Martes caurina)	A,B,C,F	R-P	Unknown	Coniferous forests at high elevations

Species	Biogeographic Area Inhabited	Status	Population Trend	Habitat Use Area
* Moose (Alces alces)	A	L-P	Increasing	Mountainous areas, forests, mountain brush and willow bottoms
*Rocky Mountain Elk (Cervus canadensis)	A,B,C,E,F	C-P	Increasing	Semi-open forests, mountain meadows (in summer), foothills, plains and valleys
Family Antilocapridae * Pronghorn Antelope (Antilocapra americana)	B,C,D,E,F	L-P	Stable	Open prairies and sagebrush or desert shrub plains
Family Bovidae * Desert Bighorn Sheep (Ovis canadensis nelsoni)	D,E,F	L-P	Increasing	Precipitous terrain on mountain and canyon slopes and rims with sparse growth of trees
* Rocky Mountain Bighorn Sheep (Ovis canadensis canadensis)	B,C	L-P	Increasing	Precipitous terrain on mountain and canyon slopes and rims with sparse growth of trees
*Bison (Bison bison)	E	L-P	Stable	Desert shrub plains of the Burr Desert and mountain brush forest habitats associated with steep mountain slopes of the Henry Mountains

Table 2. Classification of the 466 species of vertebrate wildlife that inhabit six biogeographic areas within Southeastern Utah.

	Biogeographic Areas[1]					
	A	B	C	D	E	F
FISH	14	20	15	15	24	31
Protected-Threatened	(0)	(1)	(1)	(1)	(1)	(1)
Protected-Endangered	(0)	(3)	(2)	(1)	(1)	(2)
Protected-Nongame	(10)	(11)	(9)	(10)	(12)	(16)
Protected-Game	(4)	(5)	(3)	(3)	(10)	(12)
AMPHIBIANS	6	5	6	7	7	10
Protected-Nongame	(1)	(1)	(1)	(1)	(1)	(2)
Unprotected-Nongame	(5)	(4)	(5)	(6)	(6)	(8)
REPTILES	18	14	15	14	21	28
Unprotected-Nongame	(18)	(14)	(15)	(14)	(21)	(28)
BIRDS	242	244	242	235	251	262
Protected-Extirpated	(1)	(1)	(1)	(1)	(1)	(1)
Protected-Threatened	(0)	(0)	(0)	(0)	(0)	(0)
Protected-Endangered	(2)	(2)	(2)	(2)	(2)	(2)
Protected-Nongame	(199)	(202)	(202)	(193)	(208)	(217)
Protected-Game	(39)	(38)	(36)	(38)	(39)	(41)
Unprotected-Nongame	(1)	(1)	(1)	(1)	(1)	(1)
MAMMALS	84	80	80	65	66	90
Protected-Threatened	(0)	(0)	(0)	(0)	(0)	(0)
Protected-Endangered	(1)	(1)	(1)	(1)	(0)	(1)
Protected-Extirpated	(2)	(2)	(2)	(0)	(2)	(2)
Protected-Game	(18)	(19)	(19)	(12)	(16)	(19)
Unprotected-Extirpated	(0)	(0)	(0)	(0)	(0)	(0)
Unprotected-Nongame	(63)	(58)	(58)	(52)	(53)	(62)
Total Protected Species	277	286	279	263	293	317
TOTAL:	364	363	358	336	369	421

[1] Biogeographic areas of southeastern Utah
A- Wasatch Plateau east of Skyline Drive
B- West Tavaputs Plateau
C- East Tavaputs Plateau
D- San Rafael Swell and Desert
E- Henry Mountains and Burr Desert
F- Mountains and Deserts south of I-70 in Grand and San Juan counties

UMC 817.99 SLIDES AND OTHER DAMAGE

It shall be the responsibility of operations management to notify the DOGM, by the fastest means available, of any slides or other damage which may have potential adverse effects on public property, health, safety, or the environment.

During the current standby status of the mine, it shall be the responsibility of the Western States Minerals' personnel and security guard at the site for this reporting.

UMC 817.100 CONTEMPORANEOUS RECLAMATION

The seed mixture and application rates proposed and applied as stated in the original MRP submittal have been superceded by those recommended by Native Plants, Inc., Salt Lake City, Utah. The seed mixture and application rates listed in Tables 11 and 12, UMC 783.19 (ACR) are those recommended after site-specific studies of the area, and are to take precedence for future reclamation.

Continuous contemporaneous reclamation will proceed, as mining practice allows, with the intent of completing as much of the final reclamation program as possible before cessation of operations.

UMC 817.150-.156 ROADS: CLASS I

The applicant submits that the access road from Federal Highway I-70 to the J. B. King Mine meets the prescribed test criteria for determination of a public road. (See attached letter B. Roberts and R. Daniels to Board, January 27, 1984 regarding Public Roads Criteria.) The twofold test for a public road is 1) there must be significant public use of the road and 2) the road must be maintained with public funds. If the test can be met, it will not be necessary to permit the road.

In support of our determination that the road is a public road, note the following:

A. Re: Significant public use

From Uinta-Southwestern Utah Final Environmental Impact Statement, Coal. B.L.M.:

Land use is classified as "Concentrated Use". Visitor days are estimated at 600 days/year, occuring primarily on Easter, Labor Day, and Memorial Day weekends; most activities involve picnics, off-road vehicles, and rock hounds.

Also, a 1586 AUM/year cattle allotment is in effect from December through April.

B. Re: Maintenance with public funds

The road to the J. B. King Mine is listed in Emery County as No. 9-19 and consists of 1.9 miles from the county line to the mine: the balance of the distance to its junction with I-70 lies within Sevier County jurisdiction. The state of Utah distributes monies to the counties for maintenance of the road and therefore it is classified as a Class B (County) public road. Emery County, under a reciprocal agreement with Sevier County, maintains the road from I-70 to the mine guard shack. See Dwg. 4050-5-9 (ACR).

Based on the belief that the access road to the mine (I-70 to mine guard house) will meet the criteria for a public road, the only road that could be considered to be a Class I road within the permit area would be the approximately 600 feet of road from the property line (guard house) to the mine yard area. This road is located and described on Dwg. 4050-5-22, UMC 817.150 (ACR).

STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

4241 State Office Building • Salt Lake City, UT 84114 • 801-533-5771

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Dr. G. A. (Jim) Shirazi, Division Director

January 27, 1984

TO: Board of Oil, Gas and Mining

FROM: Barbara W. Roberts & Ronald W. Daniels

RE: Public Roads Criteria for Coal Haulage and Access Roads (Revised)

The following criteria are presently in use by the Division in defining this category of public roads. We seek your concurrence with these criteria.

A public road is one which:

1. is classified as a public use road by the subject public body;

2. is constructed similarly to similarly classified roads;

3. is publicly funded, with public funding determined by the following criteria:

   a. constructed and/or maintained by the public body; or,

   b. an agreement, at the public body's insistence, provides for the construction and maintenance by the operator wherein the public body retains control over the construction and/or maintenance and some public funds are expended through the exercise of that control.

4. has substantial (more than incidental) public use; i.e., the road:

   a. is used by the public for access, and

   b. provides access to sites other than the permit area, and

   c. the operator does not have the authority to deny public access at any time.

mll
cc: Joe Helfrich
Jim Smith

UMC 817.160-.166 ROADS: CLASS II

Not applicable for any roads at this facility.

UMC 817.170-.176 ROADS: CLASS III

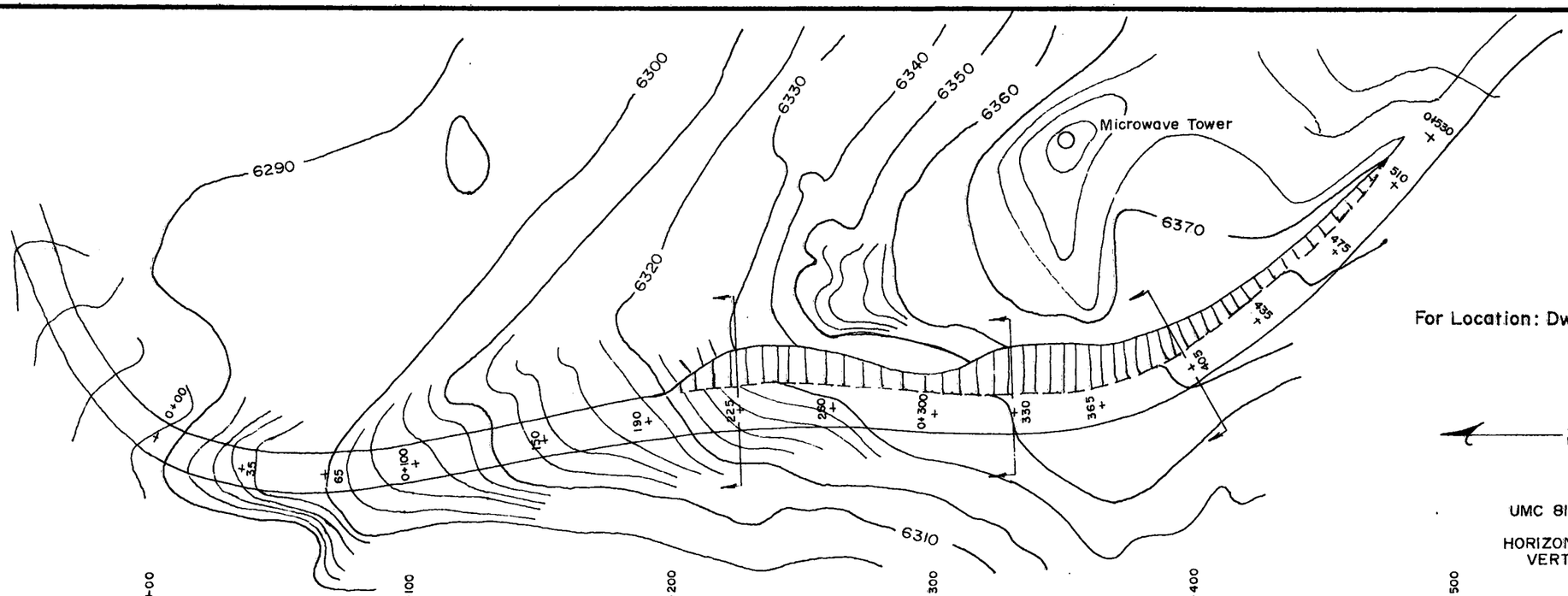
Prior to coal mining activity in the area, a Class III road (jeep access road) entered the lease area from the southwest. It can only be assumed that this road evolved as access for cattlemen in connection with the grazing permits effective in this area. Since access to the area cannot be denied and in effect the road falls under the classification of a public road, permitting of this road is not required. (See Dwg. 4050-5-4 (ACR).

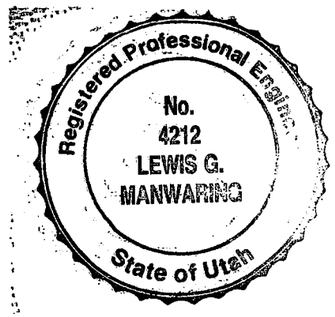
However, a connecting road from the mine yard area to the above described public road was constructed to service the microwave communications tower and to allow access to the surface above the coal seam for core hole drilling. The drilling program has been completed and the road will now be used for subsidence control monitoring and access to the vegetation study reference area on a very limited basis. The road is described in the following.

Beginning at a point approximately 30 feet northwest of the refuse pile drainage ditch culvert, the road extends southwest some 700 feet across the mine yard area before climbing to the microwave tower above (See Dwg. 4050-5-13-R). This portion will be reclaimed under the disturbed area reclamation plan described in UMC 784.13 (DOC). From 700 feet to 1,115 feet, the road is cut into the slope of the existing hill or follows the natural surface.

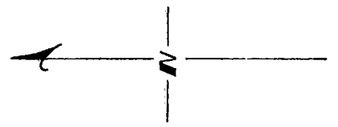
Beyond this point the road is merely bladed across the existing surface, following the tops of ridges or draws as they exist with no cut or fill for approximately 2,200 feet to its junction with the Class III public road described above.

After the road is no longer needed for operations, it will be closed to traffic and where blading has created ricks of sand along the sides, these ricks will be spread and, if appropriate, re-seeded. The cuts described above will be reshaped to blend with the natural contours of the site as shown in the profile. Dwg. 4050-5-33.



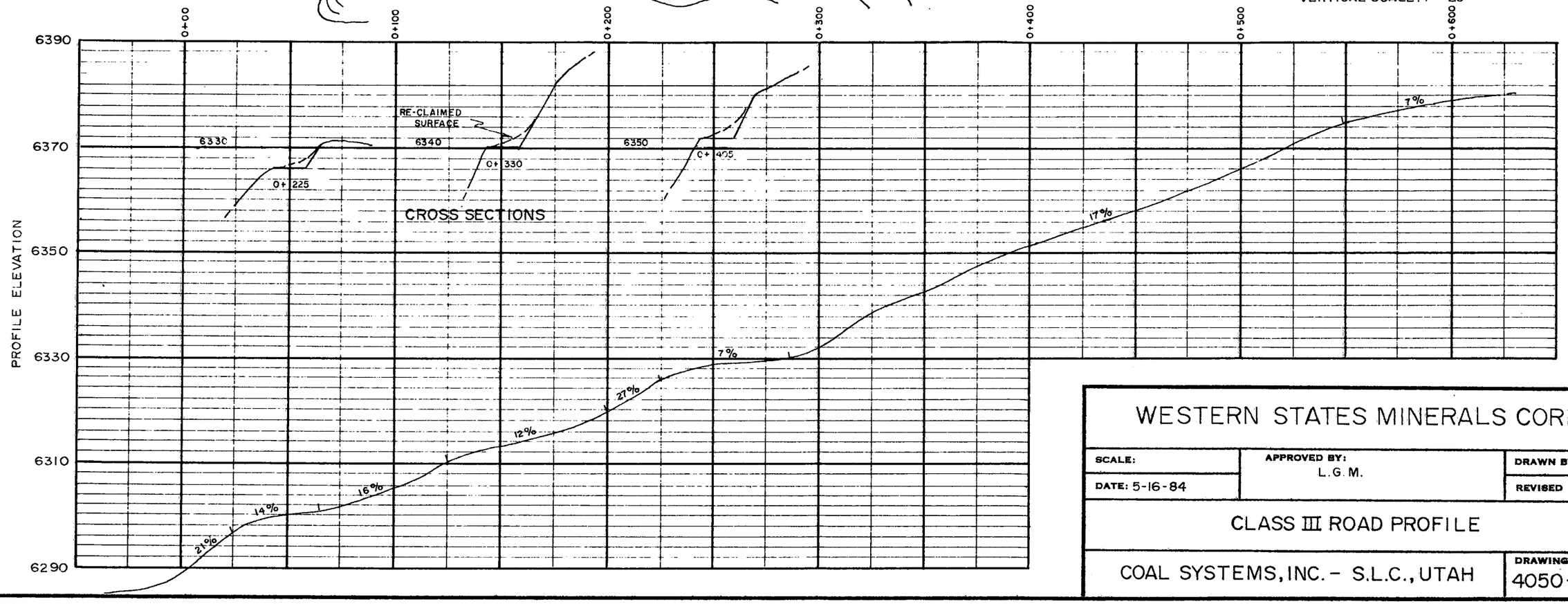


For Location: Dwg. 4050-5-13



UMC 817.170-.176

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 20'



WESTERN STATES MINERALS CORP.		
SCALE:	APPROVED BY: L.G.M.	DRAWN BY I.L.
DATE: 5-16-84		REVISED
CLASS III ROAD PROFILE		
COAL SYSTEMS, INC. - S.L.C., UTAH		DRAWING NUMBER 4050-5-33

11 X 17 PRINTED ON NO. 1000H CLEARPRINT

UMC 817.153, 817.163, 817.173 ROADS: CLASS I, II, III; DRAINAGE

As submitted, the only portion of road classified as Class I exists within the permit area: however, provision for drainage control for this road does not exist. The road has merely been bladed on natural surface with occasional light fill through low areas and the occasional ephemeral drainage is alongside with no culverts or drainage control devices employed. See Dwg. 4050-5-22 (ACR).

The existing Class III road as described in UMC 817.50-.176 has no drainage control.