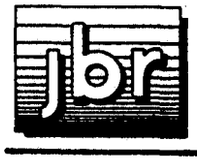
HIDDEN VALLEY COAL MINE
CALMAT

RECLAMATION PLAN



CONSULTANTS GROUP

CalMat
of Arizona

The CalMat Companies

September 24, 1991

FEDERAL EXPRESS

Mr. Lowell P. Braxton
Associate Director, Mining
Utah Division of Oil, Gas and Mining
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Re: Hidden Valley Mine, Permit Renewal

Dear Mr. Braxton:

The Mining and Reclamation Permit for Hidden Valley Coal Company, Hidden Valley Mine, ACT/015/007 expires January 29, 1992. This is our renewal application pursuant to R614-303-230, Coal Mining Rules.

Applicable rule compliance for renewal is as follows:

a) 614-303-232.220: Certificate of Insurance #6358, issued by Marsh & McLennan, Incorporated on 7/19/91 remains in effect until July 1, 1992 and will be renewed as needed, and in the form necessary, to comply with the Coal Mining Rules. This certificate is on file with the Division.

b) 614-303-232.230: Reclamation Bond 400HS8041 issued by St. Paul Fire and Marine Insurance Company, effective 10-5-87, in the penal sum of $68,606.00 remains enforceable. The original bond and endorsements are on file with the Division.

c) 614-303-232.240: A copy of the proposed newspaper notice is attached for review and approval.

This request is for a renewal term of five (5) years (R614-303-234). We are not requesting or proposing any other changes to the present permit with this application.

Respectfully submitted,
Hidden Valley Coal Company

Lee Edmonson
Assistant Secretary and Manager
Planning and Regulatory Affairs

LE/csb

Enclosure

cc: Mr. Joseph M. Jarvis, President
JBR Consultants Group

DRAFT PROPOSED
NOTICE

Hidden Valley Coal Company, 3200 San Fernando Road, Los Angeles, California 90065 hereby announces the filing of an application for Permit Renewal for Hidden Valley Coal Mine in Emery County, Utah with the Division of Oil, Gas and Mining and the Office of Surface Mining under laws of the State of Utah and the United States.

Approval of the renewal application would allow Hidden Valley Coal Company to continue reclamation activities, for an additional five years, as set forth in the Final Reclamation Plan for the Hidden Valley Coal Mine. The Final Reclamation Plan was approved in January, 1987. Copies of the plan are available for public inspection at the Utah Division of Oil, Gas and Mining, 3 Triad Center, Suite 350; Salt Lake City Utah 84180-1203 and the Emery County Courthouse, Recorders Office; Castle Dale, Utah 84513.

Written comments, objections or requests for an informal conference should be submitted to Mr. Lowell Braxton, Utah Division of Oil, Gas and Mining, 3 Triad Center, Suite 350; Salt Lake City, Utah 84180-1203. Said comments, objections or requests must be submitted within thirty (30) days from Month x, 1991.

The permit area is contained on the U.S.G.S. 7.5-minute "Walker Flat" quadrangle map.

The permit area is 960 acres. The surface is owned by Hidden Valley Coal Company and the coal is leased from Ivie Creek Coal Associates. The disturbed area that has been reclaimed is approximately 7 acres.

Description of the permit area:

Section 17, W1/2
Section 18: A11
Township 23 South, Range 6 East, Salt lake Meridian

Description of the disturbed area which has been reclaimed:

Section 17 NW1/4
Township 23 South, Range 6 East, Salt Lake Meridian

Published in the Emery County Progress Month x,x,x, and x, 1991.

NOTICE

FURTHER INFORMATION ON
THE HIDDEN VALLEY RECLAMATION PLAN AND PERMIT
MAY BE FOUND IN THE FOLLOWING LOCATIONS:

CalMat - Hidden Valley Coal Company
P.O. Box 52012
Phoenix, AZ 85072
(602)-254-8465

Utah Division of Oil, Gas and Mining
Price Field Office
College of Eastern Utah
451 East 400 North
Price, UT 8450-2699
(801)-637-5806

Utah Division of Oil, Gas and Mining
3 Triad Center, Suite 350
Salt Lake City, UT 84180-1203
Phone:(801)-538-5340

ACORD. CERTIFICATE OF INSURANCE

ISSUE DATE (MM/DD/YY): 07/05/94

PRODUCER

Alexander & Alexander of CA
55 South Lake Ave., Suite 500
(818) 683-5000
Pasadena, CA 91101-2602

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED

CalMat Co.
Hidden Valley Coal Company
Risk Management Department
P.O. Box 2950
Los Angeles, California 90051

COMPANIES AFFORDING COVERAGE

COMPANY LETTER A	United States Fire Insurance Co.
COMPANY LETTER B	
COMPANY LETTER C	
COMPANY LETTER D	
COMPANY LETTER E	

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A	GENERAL LIABILITY	547 000 105 5	07/01/94	07/01/95	GENERAL AGGREGATE	$2,000,000
	X COMMERCIAL GENERAL LIABILITY				PRODUCTS-COMP/OP AGG.	$1,000,000
	CLAIMS MADE [X] OCCUR.				PERSONAL & ADV. INJURY	$1,000,000
	OWNER'S & CONTRACTOR'S PROT.				EACH OCCURRENCE	$1,000,000
					FIRE DAMAGE (Any one fire)	$1,000,000
					MED. EXPENSE (Any one person)	$ 10,000
A	AUTOMOBILE LIABILITY	547 000 105 5	07/01/94	07/01/95	COMBINED SINGLE LIMIT	$1,000,000
	X ANY AUTO					
	X ALL OWNED AUTOS				BODILY INJURY (Per person)	$
	SCHEDULED AUTOS					
	X HIRED AUTOS				BODILY INJURY (Per accident)	$
	X NON-OWNED AUTOS					
	GARAGE LIABILITY				PROPERTY DAMAGE	$
	EXCESS LIABILITY				EACH OCCURRENCE	$
	UMBRELLA FORM				AGGREGATE	$
	OTHER THAN UMBRELLA FORM					
	WORKER'S COMPENSATION AND EMPLOYERS' LIABILITY				STATUTORY LIMITS	
					EACH ACCIDENT	$
					DISEASE–POLICY LIMIT	$
					DISEASE–EACH EMPLOYEE	$
	OTHER					

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

Evidence of Insurance.
Re: Inactive Coal Mine - Section 18 and the W Section 17, T23S, R6E, S.L. B&M
Acct. No. 015-007.

CERTIFICATE HOLDER

Division of Oil, Gas & Mining
State of Utah
355 W. North Temple
Triad Center, Ste. 350
Salt Lake City, UT. 84180-1203

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

@DS2047853

MR FORM 5

(Revised August 1985)
(Non-Federal)

Bond Number 400 HJ 8041
Permit Number INA/015/007

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
(801) 538-5340

THE MINED LANDS RECLAMATION ACT

BOND
****

The undersigned HIDDEN VALLEY COAL COMPANY as principal, and ST. PAUL FIRE AND MARINE INSURANCE COMPANY as surety, hereby jointly and severally bind ourselves, our heirs, administrators, executors, successors and assigns unto the State of Utah, Division of Oil, Gas and Mining in the penal sum of ONE HUNDRED SEVENTY ONE THOUSAND FIVE HUNDRED FIFTEEN AND NO/100THS dollars ($ 171,515.00).

The principal estimated in the Mining and Reclamation Plan filed with the Division of Oil, Gas and Mining on the 6th day of June, 19 86, that 6.7 acres of land will be disturbed by this mining operation in the State of Utah. A description of the disturbed land is attached hereto as Exhibit "A."

When the Division has determined that the principal has satisfactorily reclaimed the above-mentioned lands affected by mining in accordance with the approved Mining and Reclamation Plan and has faithfully performed all requirements of the Mined Land Reclamation Act, and complied with the Rules and Regulations adopted in accordance therewith, then this obligation shall be void; otherwise it shall remain in full force and effect until the reclamation is completed as outlined in the approved Mining and Reclamation Plan.

If the approved plan provides for reclamation of the land affected on a piecemeal or cyclic basis, and the land is reclaimed in accordance with such plan, then this bond may be reduced periodically.

In the converse, if the plan provides for a gradual increase in the area of the land affected or increased reclamation work, then this bond may accordingly be increased with the written approval of the surety company.

The Division shall only accept the bond of a surety company if the bond is noncancellable by the surety at any time for any reason including, but not limited to nonpayment of premium or bankruptcy of the permittee during the period of liability.

NOTE: Where one signs by virtue of Power of Attorney for a surety company, such Power of Attorney must be filed with this bond. If the principal is a corporation, the bond shall be executed by a duly authorized officer.

HIDDEN VALLEY COAL COMPANY
Principal (Company)

By _____
Company Officer - Position
Ronald E. Evans - Vice President

Date: 12/30/86

ST. PAUL FIRE AND MARINE INSURANCE COMPANY
Surety (Company)

By _____
Surety Company Officer - Position
ROBERT A. OPPELT, ATTORNEY-IN-FACT

DATE: DECEMBER 19, 1986

APPROVED AS TO FORM:

By _____
Assistant Attorney General

AFFIDAVIT OF QUALIFICATION

ROBERT A. OPPELT, being first duly sworn, on oath deposes and says that he/she is the (officer or agent) ATTORNEY-IN-FACT of said Surety Company, and that he/~~she~~ is duly authorized to execute and deliver the foregoing obligations; that said Surety Company is authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations.

(Signed) By _____
Surety Company Officer - Position
Attorney-in-Fact

Subscribed and sworn to before me this 19th day of December, 1986.

OFFICIAL SEAL
D LAWRENCE LANGLEY
NOTARY PUBLIC - CALIFORNIA
LOS ANGELES COUNTY
My comm. expires AUG 15, 1989

_____
Notary Public

My Commission Expires:

_____, 19____.

EXHIBIT " A"

DESCRIPTION OF THE DISTURBED LAND: HIDDEN VALLEY MINE-SECTION 18. AND THE W2 SECTION 17, T23S, B6E, S.L. B&M

STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

Norman H. Bangerter, Governor
Dee C. Hansen, Executive Director
Dianne R. Nielson, Ph.D., Division Director

355 W. North Temple • 3 Triad Center • Suite 350 • Salt Lake City, UT 84180-1203 • 801-538-5340

July 16, 1988

Mr. John Rains
Chief Mining Engineer
California Portland Cement Division
695 South Rancho Avenue
Colton, California 92324-0514

Dear Mr. Rains:

Re: Phase I Bond Release Approval, California Portland Cement, Hidden Valley Mine, INA/015/007, Folder #2 and #4, Emery County, Utah

The Phase I bond release application has been reviewed, determined complete and approved by the Division. A bond release inspection of the reclaimed site was conducted on May 24, 1988 (copy of inspection attached). As a result of this inspection, the backfilling, grading, topsoil placement, and drainage controls were determined complete. The Division concludes, therefore, that 60 percent of the bond may be released, or $102,909, effective June 1, 1988. Bond Number 400HJ8041(A) with St. Paul Fire and Insurance Company may be reduced by a rider to $68,606.

If you have any questions, please call Pamela Grubaugh-Littig.

Sincerely,

Lowell P. Braxton

Lowell P. Braxton
Administrator
Mineral Resource Development
and Reclamation Program

PGL/djh
cc: J. Whitehead
P. G.-Littig
9075R/50

A F F I D A V I T

County of Los Angeles)
) ss.
State of California)

I, JOHN L. FROGGE, do hereby certify and say that:

1. I am a duly elected, qualified and acting Assistant Secretary of California Portland Cement Company, a California corporation.

2. California Portland Cement Company owns 100 percent of the outstanding shares of stock of Soldier Creek Coal Company, a Utah corporation, and has owned 100 percent of said stock since Soldier Creek Coal Company was incorporated in 1976.

John L. Frogge
JOHN L. FROGGE

Subscribed and sworn before me this 16th day of August, 1986.

OFFICIAL SEAL
FAYE A BARNES
NOTARY PUBLIC - CALIFORNIA
LOS ANGELES COUNTY
My comm. expires APR 23, 1990

Faye A. Barnes
Notary Public, California

August 15, 1986

Lowell D. Braxton, Administrator
Mine Land Reclamation Program
Utah Division of Oil, Gas and Mining
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Dear Mr. Braxton:

Soldier Creek Coal Company, a Utah Corporation and a wholly owned subsidiary of CalMat Co. desires to submit a final reclamation plan on the Hidden Valley Coal Mine in Emery county, Utah.

To the best of my knowledge and belief, the information contained in the application and reclamation plan is true and correct.

We wish to express to you our appreciation for the cooperation of Mr. John Whitehead and his staff in developing this final reclamation plan. All written comments and telephone conversations should be directed to Mr. John W. Rains, Chief Mining Engineer. His address is CalMat Co., P.O. Box 947, Colton, California 92324, Telephone: (714) 825-4260.

Sincerely,

GENERAL ACKNOWLEDGMENT Letter to Lowell D. Braxton, Salt Lake City, Utah NO. 201

State of California } ss.
County of Los Angeles }

On this the 19th day of August 19 86, before me,

Faye A. Barnes,

the undersigned Notary Public, personally appeared

Ronald E. Evans,

XX personally known to me
☐ proved to me on the basis of satisfactory evidence
to be the person(s) whose name(s) is subscribed to the within instrument, and acknowledged that he executed it.
WITNESS my hand and official seal.

Faye A. Barnes
Notary's Signature

OFFICIAL SEAL
FAYE A BARNES
NOTARY PUBLIC - CALIFORNIA
LOS ANGELES COUNTY
My comm. expires APR 23, 1990

7110 122 NATIONAL NOTARY ASSOCIATION • 23012 Ventura Blvd. • P.O. Box 4625 • Woodland Hills, CA 91364

FILING FEE: $5.00

FILE NO.

RECEIVED

1986 OCT 10 PM 3:15

FILED

STATE OF UTAH

STATEMENT OF CHANGE OF REGISTERED OFFICE AND AGENT

NAME OF CORPORATION SOLDIER CREEK COAL COMPANY

OLD REGISTERED AGENT M. DONALD ROSS (V.P.)

NEW REGISTERED AGENT UNITED STATES CORPORATION COMPANY

OLD ADDRESS 90 WEST 1ST NORTH, PRICE, UT 84501

NEW ADDRESS 600 Deseret Plaza Building, 15 East First South Salt Lake City, Utah 84111

DATE September 24, 1986

THE FOLLOWING STATEMENTS MUST BE SIGNED BY AN AUTHORIZED OFFICER OF THE CORPORATION.

THE ABOVE CHANGES WERE AUTHORIZED BY RESOLUTION OF THE BOARD OF DIRECTORS.

UNDER PENALTY OF PERJURY, I DECLARE THAT THE ABOVE INFORMATION HAS BEEN EXAMINED BY ME AND IS, TO THE BEST OF MY KNOWLEDGE, TRUE, CORRECT AND COMPLETE.

BY Ronald C. Hadfield

TITLE Ronald C. Hadfield
Vice President

THE AGENT MUST SIGN DOCUMENT ACCEPTING APPOINTMENT AS AGENT.

REGISTERED AGENT UNITED STATES CORPORATION COMPANY

BY: Ted Lewis, agent

Affidavit of Publication

ADM-358

STATE OF UTAH,

ss.

County of Salt Lake

CHRIS ANDERSON

Being first duly sworn, deposes and says that he/she is legal advertising clerk of THE SALT LAKE TRIBUNE, a daily newspaper printed in the English language with general circulation in Utah, and published in Salt Lake City, Salt Lake County, in the State of Utah, and of the DESERET NEWS, a daily newspaper printed in the English language with general circulation in Utah, and published in Salt Lake City, Salt Lake County, in the State of Utah.

That the legal notice of which a copy is attached hereto

HIDDEN VALLEY COAL MINE

was published in said newspaper on

SEPT 24, OCT 1,8,15, 1986

Legal Advertising Clerk

NOTICE

Soldier Creek Coal Company, P.O. Box 2950 Los Angeles, California 90051 hereby announces the filing of a Final Reclamation Plan for the Hidden Valley Coal Mine in Emery County, Utah with the Division of Oil, Gas and Mining and the Office of Surface Mining under the laws of the State of Utah and the United States.

Copies of the Plan are available for public inspection at the Utah Division of Oil, Gas and Mining 3 Triad Center, Suite 350; Salt Lake City, Utah 84180-1203 and the Emery County Courthouse, Recorders Office; Castledale, Utah 84513.

This Reclamation Plan Completes the coal mining application tentatively approved February 4, 1980.

Written comments, objections or requests for an informal conference should be submitted to Mr. John L. Whitehead, Utah Division of Oil, Gas and Mining 3 Triad Center, Suite 350; Salt Lake City, Utah 84180-1203. Said comments, objections or requests must be submitted within thirty days (3) days from September 24, 1986.

The permit area is contained on the U.S.G.S. 7.5-minute "Walker Flat" quadrangle map.

The permit area is 960 acres. The surface is owned by Soldier Creek Coal Company and the coal is leased from Ivie Creek Coal Associates. The disturbed area to be reclaimed is approximately 7 acres.

Description of the permit area:
Section 17: W1/2
Section 18: All
Township 23 South, Range 6 East, Salt Lake Meridian

Description of the disturbed area to be reclaimed:
Section 17: NW1/4
Township 23 South, Range 6 East, Salt Lake Meridian

Published September 24, October 1, 8, and 15, 1986 in the Deseret News/Salt Lake Tribune.

B-78

Subscribed and sworn to before me this 27th day of

OCTOBER A.D. 19 86

B. T. Davis

Notary Public

My Commission Expires

MARCH 01,1988

NOTARY PUBLIC
B. T. DAVIS
STATE OF UTAH

AFFIDAVIT OF PUBLICATION

STATE OF UTAH }
County of Emery, } ss.

I, Dan Stockburger, on oath, say that I am the General Manager of The Emery County Progress, a weekly newspaper of general circulation, published at Castle Dale, State and County aforesaid, and that a certain notice, a true copy of which is hereto attached, was published in the full issue of such newspaper for Four (4) consecutive issues, and that the first publication was on the 24th day of September, 19 86 and that the last publication of such notice was in the issue of such newspaper dated the 15th day of October, 19 86

Dan Stockburger

Subscribed and sworn to before me this 15th day of October, 19 86

Holly Jo Baker
Notary Public.

My Commission expires My Commission Expires October 22, 1986 19 ____

Residing at Price, Utah

Publication fee, $ 105.60

NOTICE

Soldier Creek Coal Company, P.O. Box 2950 Los Angeles, California 90051 hereby announces the filing of a Final Reclamation Plan for the Hidden Valley Coal Mine in Emery County, Utah with the Division of Oil, Gas and Mining and the Office of Surface Mining under the laws of the State of Utah and the United States.

Copies of the Plan are available for public inspection at the Utah Division of Oil, Gas and Mining 3 Triad Center, Suite 350; Salt Lake City, Utah 84180-1203 and the Emery County Courthouse, Recorders Office; Castle Dale, Utah 84513.

This Reclamation Plan completes the coal mining application tentatively approved February 4, 1980.

Written comments, objections or requests for an informal conference should be submitted to Mr. John J. Whitehead, Utah Division of Oil, Gas and Mining 3 Triad Center, Suite 350; Salt Lake City, Utah 84180-1203. Said comments, objections or requests must be submitted within thirty days (30) days from September 24, 1986.

The permit area is contained on the U.S.G.S. 7.5-minute "Walker Flat" quadrangle map.

The permit area is 960 acres. The surface is owned by Soldier Creek Coal Company and the coal is leased from Ivie Creek Coal Associates. The disturbed area to be reclaimed is approximately 7 acres.

Description of the permit area:
Section 17: W½
Section 18. All
Township 23 South, Range 6 East, Salt Lake Meridian

Description of the disturbed area to be reclaimed:
Section 17: NW¼
Township 23 South, Range 6 East, Salt Lake Meridian

Published in the Emery County Progress September 24, October 1, 8, and 15, 1986.

HIDDEN VALLEY COAL MINE

RECLAMATION PLAN

CHAPTER III

Soldier Creek Coal Company

Submitted by

JBR Consultants Group

May, 1986

Executive Summary

The Hidden Valley Coal property, in the Emery Coal Field south of Emery Town, was to be developed by Soldier Creek Coal Company, a Utah corporation and wholly owned subsidiary of CalMat Company. The property is 960 acres and Soldier Creek Coal Company owns the surface and has the rights to the coal under a long term lease. A mining and reclamation plan, with two amendments, were submitted and approved under the OSM Interim Program. The access road, coal seam exploration, graded pads and drainage control were the only developments realized as economic changes forced curtailment of mine development. This document is a revised Reclamation Plan for the reclaiming of the small developed areas(approximately 6.7 acres of disturbed ground) within the permit area in 1986.

The culverts will be removed from the access road and from the two pad areas. The natural ephemeral drainage crossing the developed area will be restored to accept most of the flow from the reclaimed sites. Because the original drainage control pattern will be restored, the sediment pond will no longer function and can be opened to drain into Ivie creek.

The access road will be accessible to 4-wheel drive vehicles only and be waterbarred to control surface flows. The road surface will be scarified and seeded. The integrity of the road alignment will be maintained minimizing future development costs and

environmental impact when development becomes feasible.

The adits in the two coal seams will be sealed and the seams covered and graded. Topsoil materials stored onsite will be spread over a portion of the disturbed areas to provide a seedbed. Other materials on site will be used for seedbed material where topsoils are not available. All of the reclaimed areas will be mulched, fertilized and seeded in late fall as the final phase of reclamation. Drift fences will be installed to restrict cattle use of the seedings.

A ten year monitoring plan will sample the water quality and flows semi-annually in Ivie Creek and check on the progress of the revegetation efforts. Projected costs for reclaiming the site in 1986 are $ 148,716 and $ 23,000 for 10 years of monitoring .

Executive Summary

The Hidden Valley Coal property, in the Emery Coal Field south of Emery Town, was to be developed by Soldier Creek Coal Company, a Utah corporation and wholly owned subsidiary of CalMat Company. The property is 960 acres and Soldier Creek Coal Company owns the surface and has the rights to the coal under a long term lease. A mining and reclamation plan, with two amendments, were submitted and approved under the OSM Interim Program. The access road, coal seam exploration, graded pads and drainage control were the only developments realized as economic changes forced curtailment of mine development. This document is a revised Reclamation Plan for the reclaiming of the small developed areas (approximately 6.7 acres of disturbed ground) within the permit area in 1986.

The culverts will be removed from the access road and from the two pad areas. The natural ephemeral drainage crossing the developed area will be restored to accept most of the flow from the reclaimed sites. Because the original drainage control pattern will be restored, the sediment pond will no longer function and can be opened to drain into Ivie Creek.

The access road will be accessible to 4-wheel drive vehicles only and be waterbarred to control surface flows. The road surface will be scarified and seeded. The integrity of the road alignment will be maintained in support of the postmining land use of grazing by improving watershed values and providing a livestock trailway.

The adits in the two coal seams will be sealed and the seams covered and graded. Topsoil materials stored on site will be spread over a portion of the disturbed areas to provide a seedbed. Other materials on site will be used for seedbed material where topsoils are not available. All of the reclaimed areas will be mulched, fertilized and seeded in late fall as the final phase of

reclamation. Drift fences will be installed to restrict cattle use of the seedings.

A ten year monitoring plan will sample the water quality and flows semi-annually in Ivie Creek and check on the progress of the revegetation efforts. Projects cost for reclaiming the site in 1986 are $148,716 and $23,000 for 10 years of monitoring.

Table of Contents

* Revised, Modified or Added for Completeness and Technical Review

List of Tables

List of Figures

List of Plates

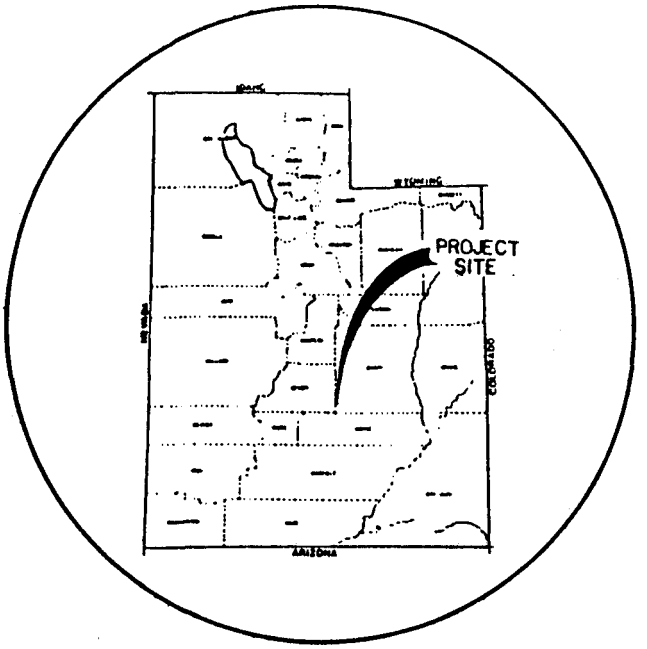
Reclamation Plan

Chapter III

Introduction

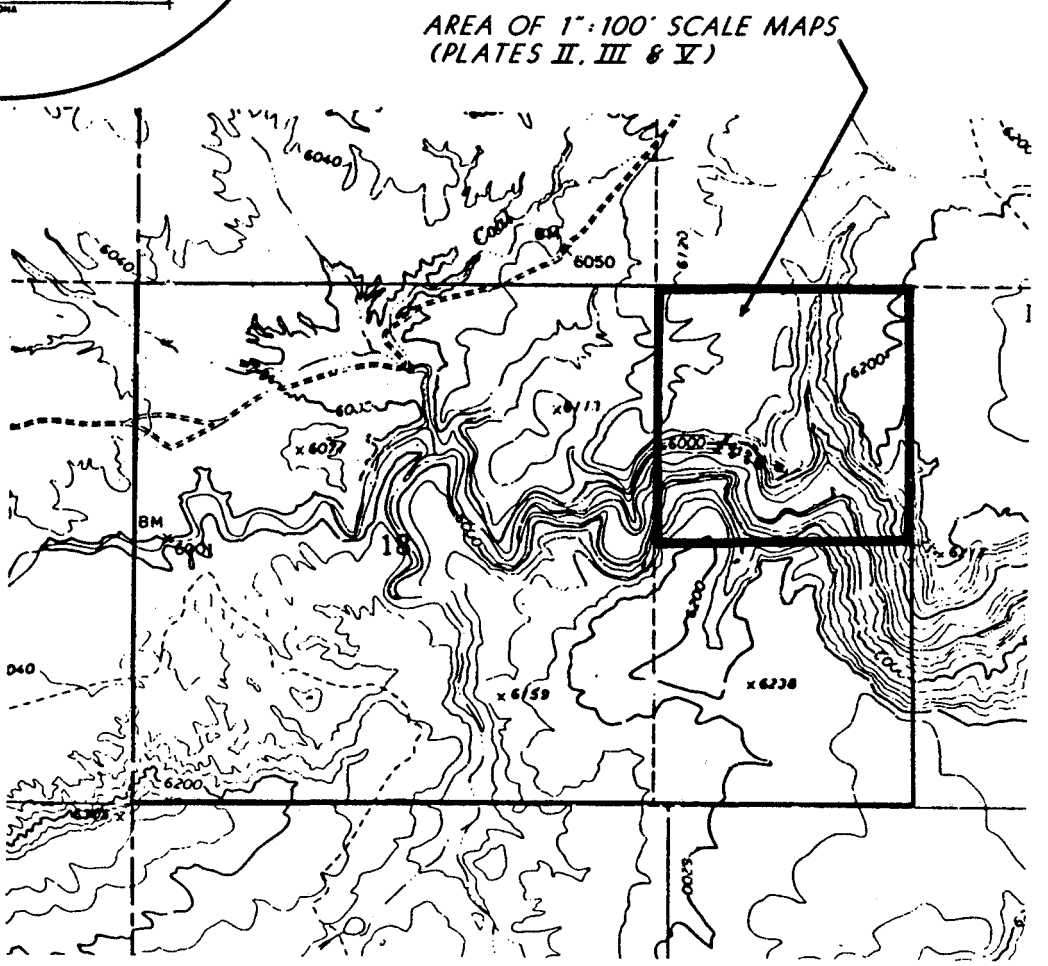
Soldier Creek Coal Company, a Utah Corporation and a wholly-owned subsidiary of CalMat Company, purchased this property and leased the right to mine coal from Ivie Creek Coal Company to develop the coal as a fuel source for their cement kilns (See Plate I for location, Plate 1a for ownership and Plate Ib for permit area). A mining and reclamation plan was submitted for this mine on September 7, 1979 under the OSM Interim Regulations. This mining and reclamation plan was granted conditional tentative approval on February 4, 1980 under the Interim Program by the Utah Division of Oil, Gas and Mining. Final approval under the Interim Program Regulations for Coal Mining and Reclamation Operations and the Utah Mined Land Reclamation Act was received April 14, 1980. A corporate guarantee of $152,500 was posted to cover projected reclamation costs under the Interim Plan. These plans, amendments and correspondence are on file at the Division's offices in Salt Lake City.

The mining plan for Hidden Valley proposed production to begin in



HIDDEN VALLEY MINE SITE

Township 23 South, Range 6 East
Salt Lake Base and Meridian
Section 18 & the West 1/2 of Section 17



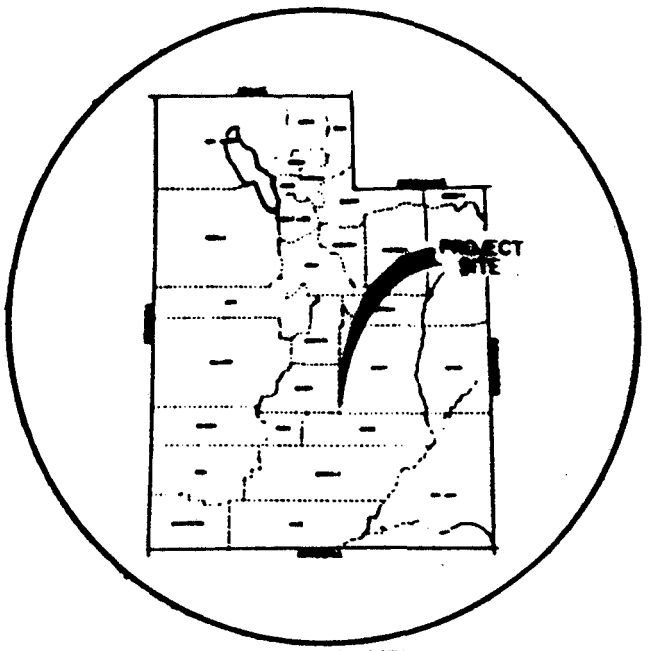
CONSULTANTS GROUP
SALT LAKE CITY, UTAH

SOLDIER CREEK COAL COMPANY
HIDDEN VALLEY MINE

HIDDEN VALLEY MINE LOCATION

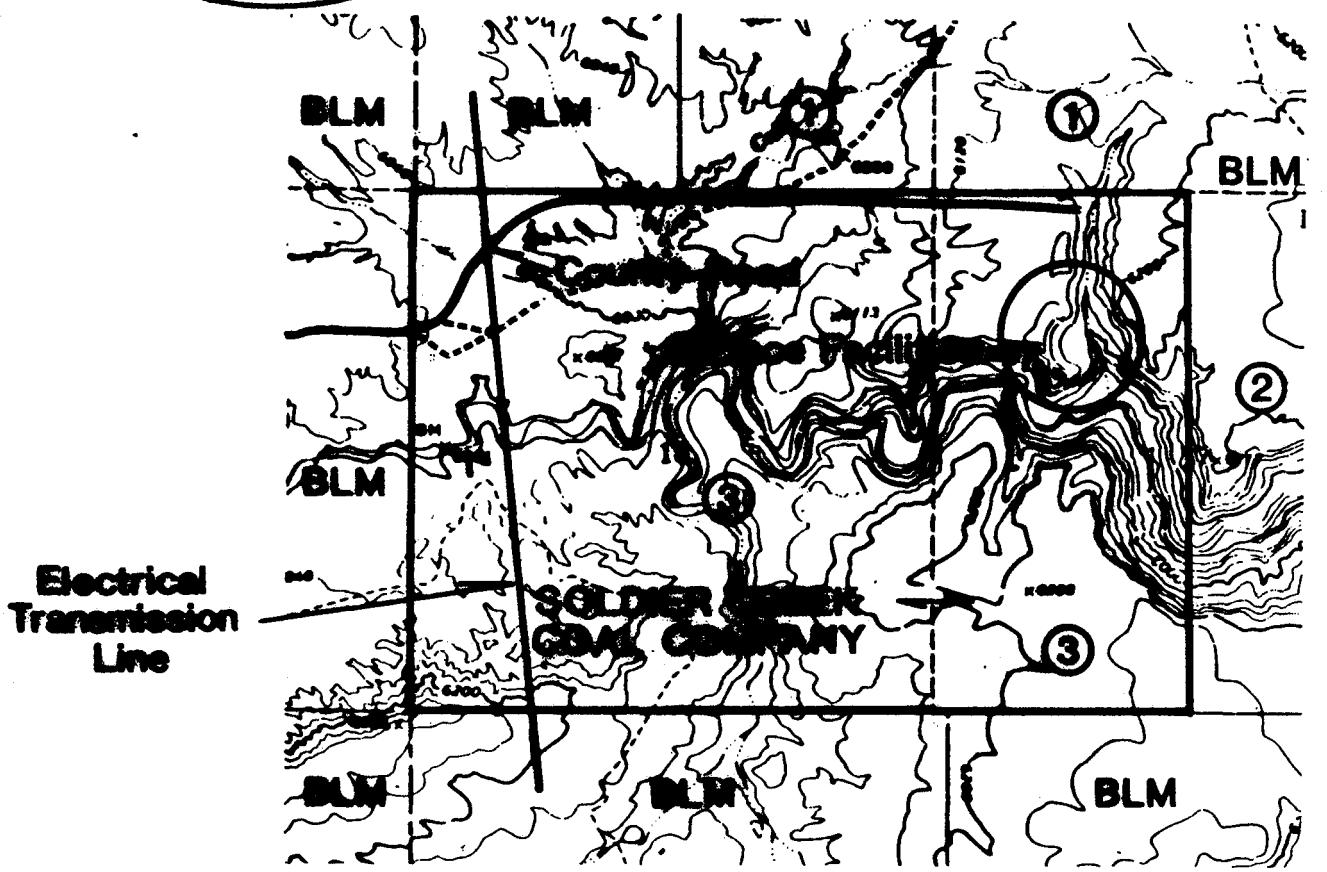
PLATE I

REVISIONS BY	DATE	BY	DATE	BY	DATE	DESIGNED BY: J.M.J	DRAFTER: C. Pixton
						SCALE	DATE: 5/3/86



HIDDEN VALLEY MINE SITE

Township 23 South, Range 6 East
Salt Lake Base and Meridian
Section 18 & the West 1/2 of Section 17



1. CONSOLIDATED COAL - 50% SURFACE AND MINERAL
   THE PITTSBURG MIDWAY - 50% SURFACE AND MINERAL
   GULF OIL CORP. - 50% COAL
2. BANK OF CALIFORNIA (LOVELLA COOK ROYALTY CONVEYANCE)
   JOHN E. LANSING
3. IVIE CREEK COAL ASSOCIATES - 100% MINERALS

CONSULTANTS GROUP
SALT LAKE CITY, UTAH

SOLDIER CREEK COAL COMPANY
HIDDEN VALLEY MINE

HIDDEN VALLEY MINE OWNERSHIP

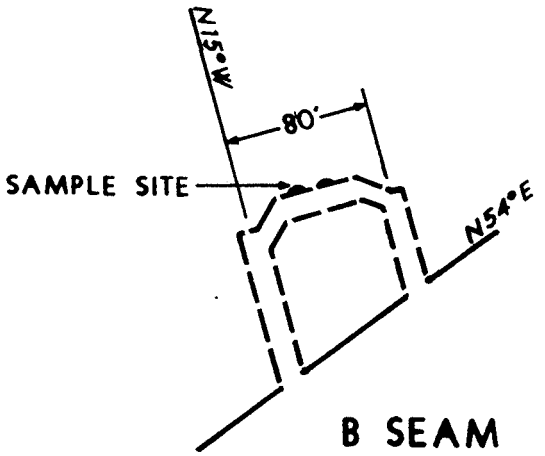
AML | C. Pierce
1" = 2000' | 8/3/86

PLATE IA

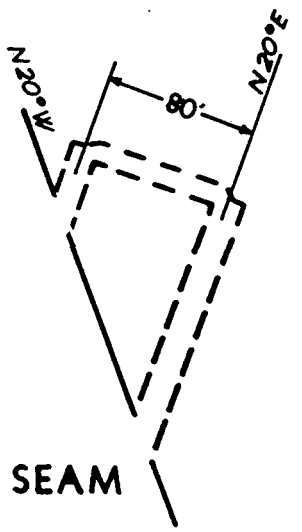
June, 1981. Maximum production was to be 500,000 tons annually with an expected mine life of 40 years. The initial development work commenced on April 17, 1980 with this goal in mind. However by August, 1980 it became evident that economic conditions had changed and it was decided by the company to cease development.

Within this short construction period a paved 2.75 mile access road from Highway 10 to the proposed coal processing site was completed with state funds and dedicated to Sevier and Emery Counties (See Appendix I, ROW documents). A 0.5 mile graveled Class II road was completed to gain access to the coal seams adjacent to Ivie Creek. The upper seam is designated the B coal seam and the lower seam is called the A seam. At the coal seams two pads were constructed for the future portal operations area. Culverts were installed in the graveled access road and in the benches for drainage control. A sediment pond was constructed on the lower pad to receive surface flows from the pads. Bulk coal samples were obtained from the existing exploratory adits in the two naturally exposed coal seams (See Figure I). These exposed coal seams were faced up and safety benches were constructed above the seams in anticipation of portal construction. Topsoil was stockpiled adjacent to the upper or "B" seam pad.

Because mine development did not proceed beyond this stage, no coal production was realized. Consequently, no other proposed facilities for mining and coal processing were constructed on the



B SEAM



A SEAM

CONSULTANTS GROUP
SALT LAKE CITY, UTAH

SOLDIER CREEK COAL COMPANY
HIDDEN VALLEY MINE

EXPLORATORY ADITS

BY	DATE	REVISIONS	BY	DATE
J.M.J.				

DESIGNED BY: J.M.J.
DRAFTER: C. Pixton
SCALE: 1" = 100'
DATE: 5/13/86

FIGURE I

property (Plate II). The disturbed area is approximately 6.7 acres consisting of an access road, pads and drainage control structures.

This reclamation plan will meet the regulations of the Permanent State OSM Program and supercedes the plan submitted under the Interim Program. The baseline data and mine plans are available in the Division of Oil, Gas and Mining files and will not be repeated in this plan. Many of the regulation sections usually required in a reclamation plan do not apply because facilities for coal production were never constructed. All sections of the required regulations are addressed in the plan but those not applicable are dismissed with a brief explanation. An Addendum is attached to this report to provide the information necessary to complete the original application.

I. Proposed Postmining Land Use Acreage to be Reclaimed and Timing and Sequence

UMC 784.15 Reclamation Plan. Post Mining Land Use

The adjacent BLM lands are permitted for cattle grazing in the winter and early spring. Most of the forage production is confined to the flats and benches in Castle Valley. Some grazing occurs on the upper benches of the permit area. The livestock use of the fee lands is presently unregulated. The declaration for postmining land use would be wildlife habitat and livestock grazing. This was the land use prior to the proposed mine development and this land use has continued to the present.

BLM Saleratus Allotment

409 cattle from Nov. 11th to March 31st, stocking rate is 1 AUM/10 Acres for total AUM's of 1843.

The disturbed acreage of the permit area is mostly sandstone talus slopes that provides very little livestock forage or wildlife habitat as is generally defined. The revegetation of these small disturbed areas will be in accordance with adjacent surveyed range reference sites. This revegetation will not provide either wildlife or livestock forage of any significance but will stabilize the site.

I. Proposed Postmining Land Use Acreage to be Reclaimed and Timing and Sequence

UMC 784.15 Reclamation Plan. Post Mining Land Use
The adjacent BLM lands are permitted for cattle grazing in the winter and early spring. Most of the forage production is confined to the flats and benches in Castle Valley. Some grazing occurs on the upper benches of the permit areas. The livestock use of the fee lands is presently unregulated. The declaration for postmining land use would be wildlife habitat and livestock grazing. This was the land use prior to the proposed mine development and this land use has continued to the present.

Because a variance to leave cut and fill slopes associated with the access road is being requested (see revised page 24 of this Plan), part of the disturbed area would involve an alternative postmining land use as defined by the Division. This is due to the fact that the cut and fill slopes, although still used for the postmining uses of livestock grazing and wildlife habitat, would allow a higher or better usage than occurred previous to the disturbance. This use would be compatible with the surrounding land uses. Emery County officials have indicated that their preference generally is not to close existing roads (Personal communication with Scott Johansen, Emery County Attorney, March 14, 1991).

BLM Saleratus Allotment
409 cattle from Nov. 11th to March 31st, stocking rate is 1 AUM/10 Acres for total AUM's of 1843.

The disturbed acreage of the permit area is mostly sandstone talus slopes that provides very little livestock forage or wildlife habitat as is generally defined. The revegetation of these small disturbed areas will be in accordance with adjacent surveyed range reference sites. This revegetation will not provide either

wildlife or livestock forage of any significance but will stabilize the site.

As with the surrounding BLM land, there is no crucial wildlife habitat in the area; wildlife species utilizing the site would most likely be small mammals and birds. Cattle would likely be the type of livestock using the area; they also graze adjacent federal land managed by the Bureau of Land Management. A grazing management plan for the site is detailed below, and is based upon livestock management in the adjacent BLM grazing allotment. In this way, the postmining land use and management at Hidden Valley will be compatible with management of the surrounding land. The BLM's proposed Resource Management Plan for the San Rafael Planning Area was utilized in preparation of the grazing plan.

Critical soils are present at the Hidden Valley site, in the form of both saline and erodible soil. A grazing plan should ensure protection of these soils. Therefore, in line with both BLM policy for the adjacent lands and site specific conditions, emphasis on achievement of the postmining land use will be through protection of critical soils, and management of the site to increase vegetation. The revegetation seed mix, as described on page 58 was chosen with this in mind, rather than exclusively specifying native plants with high forage values.

Application of the grazing rate used on the Saleratus Allotment to the disturbed and reclaimed area would result in a forage production of less than one AUM, so livestock grazing will likely be minimal at the site, unless better forage production than provided by native vegetation is achieved. Cattle would be the preferred user. Period of use of the reclamation site will be the same as the adjacent federal land: November 16 through March 15. The access road will be used as the primary travelway for livestock, both to gain entry to the revegetated disturbed areas and to access Ivie Creek, the only nearby perennial water source.

(The access road has been left in place to aid in achievement of the postmining land uses, as described under the request for variance in this document).

The objective of the grazing plan would be to lease the 1.5 square-mile permit area to the adjacent BLM permittee. (This operator currently has access to much of the undisturbed permit acreage that is not fenced.) If that permittee did not wish to lease the property, then CalMat would open the lease to competitive bidding. The lessee would then need to insure that his livestock did not trespass to adjacent BLM land and that the BLM permittee no longer accessed the Hidden Valley property.

UMC 817.133 Postmining Land Use

The approximately 6.7 acres of disturbed land will be fully reclaimed. The work schedule calls for reclamation work to begin in the fall of 1986 with completion by December 31, 1986.

UMC 785.17 (b)(2,6,9); UMC 823.11 (c); UMC 823.14; UMC 823.15

Prime Farmland

Prime Farmland was not designated in the permit and does not exist within the permit area. All the lands in the permit area are undeveloped.

II. Structural Removal and Site Clean Up

UMC 784.11 (b) Operation Plan: General Requirements

There is a sediment pond with a small dam built into the pad at the "A" seam location. There are no other embankments or impoundments.

The sediment pond will be decommissioned at the time of reclamation of the disturbed area. The pond will lose it's function because the contributing drains will be removed and the natural drainages restored. This will cut off flows to the pond except for the immediate surface flows on the lower pad.

With the reestablishment of the ephemeral channel, waterbars in the access road, regrading of the A seam and B seam pads and the bench cut on the A seam face-up; the area draining to the sediment pond will be quite small, less than one half acre. As such, the pond will no longer serve a purpose. Therefore it is proposed that the discharge structures of the pond will be removed and the embankment facing Ivie Creek be breached. This will allow the discharges from the small drainage area to flow through the pond area. Peak flow from the area is only 0.35 cfs, based on a 10-year-24-hour precipitation and a curve number of 78 (Table 1 & 2). This minimal flow will not result in any significant accumulation in the area. The regraded surface of the pond is shown in Plate V and Figure II.

Table 1 - Peak Flows for Diversion Structures and Restored Channels

Structure ID	Curve Number	Time of Concentration (hr)	Drainage Area (ac)	Storm Duration (hr)	Precip. Depth (in)	Rainfall Distribution	Peak Flow (cfs)
Ephemeral Channel	78	0.54	124.89	24	2.60	SCS Type II	70.97
A-seam Terrace	85	0.03	1.9	24	1.67	SCS Type II	1.20
A-seam pad	80	0.22	0.78	24	1.67	SCS Type II	0.26
Sediment Pond	80	0.43	0.41	24	1.67	SCS Type II	0.10

Curve Number Documentation - Appendix III

Table 2 - Proposed Diversion and Channel Configuration

Reach	Q (cfs)	Slope (%)	Bottom width (ft)	m	"n"	Flow Depth (ft)	Flow Velocity (fps)	Permissible Velocity (fps)	Remarks
Ephemeral Channel	70.97	10.5	10	2	**	0.56	11.4		** Riprap w/ D_{50} of 0.75 ft
A-seam Terrace	1.2	3.0	0	5&.5	0.034	0.40	2.7	5.0-6.0*	Asymetric Channel
A-seam pad	0.26	110.0	0	2	0.028	0.12	8.2	2.5-4.0*	Alluvial Soils
Sediment Pond	0.10	90.0	0	2	0.028	0.09	6.0	2.5-4.0*	Alluvial Soils

* Values obtained from Table 6.1b in Simons and Li (1982)
** Channel design selected and evaluated using Steep Slope Diversion Design method (Simons and Li, 1982)

Table 3 - Riprap Gradation

D_{100}	2.5 * D_{50}	1.50 ft
D_{85}	1.8 * D_{50}	1.13 ft
D_{50}	1.0 * D_{50}	0.75 ft
D_{15}	0.1 * D_{50}	0.08 ft

The A-seam terrace diversion has been made functional by regrading the bench cut, and has been extended by creating a ditch across the road and down onto the flat area east of the ephemeral channel. The alignment of this channel is shown on the revised Plate III, and design details are given in the addendum to Appendix III. Information on peak flows and channel configuration for this diversion is updated from that given in Tables 1 and 2 as follows:

Table 1 - Peak Flows for Diversion Structures and Restored Channels

Structure ID	Curve Number	Time of Concent. (hr)	Drainage Area (ac)	Storm Duration (hr)	Precip. Depth (in)	Rainfall Dist.	Peak Flow (cfs)
A-seam Terrace	85	0.016	1.35	24	2.60	SCS B	1.83

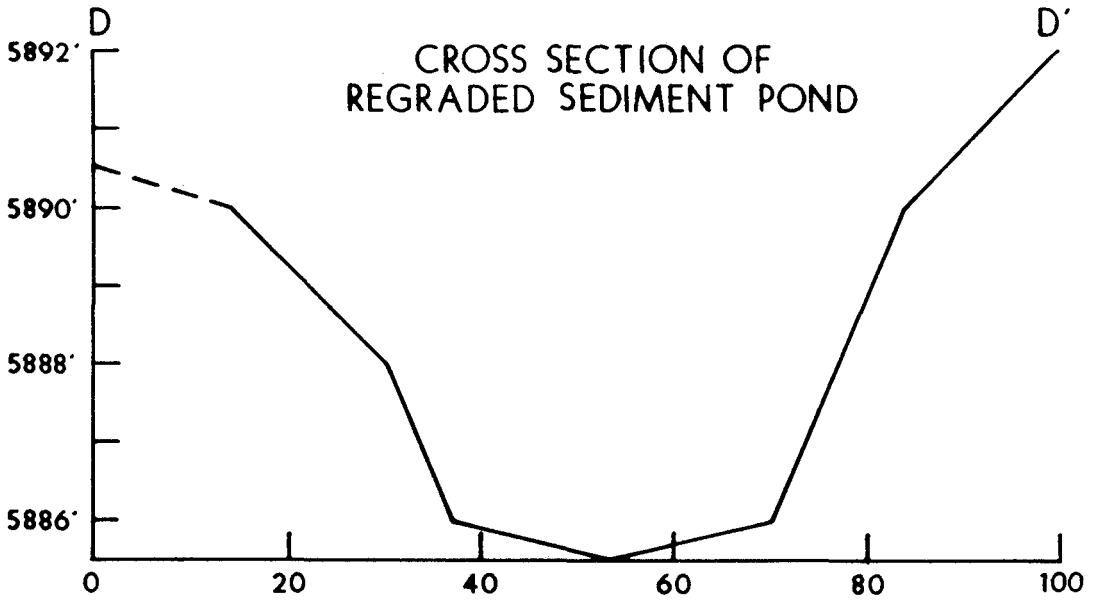
Table 2 - Proposed Diversion and Channel Configuration

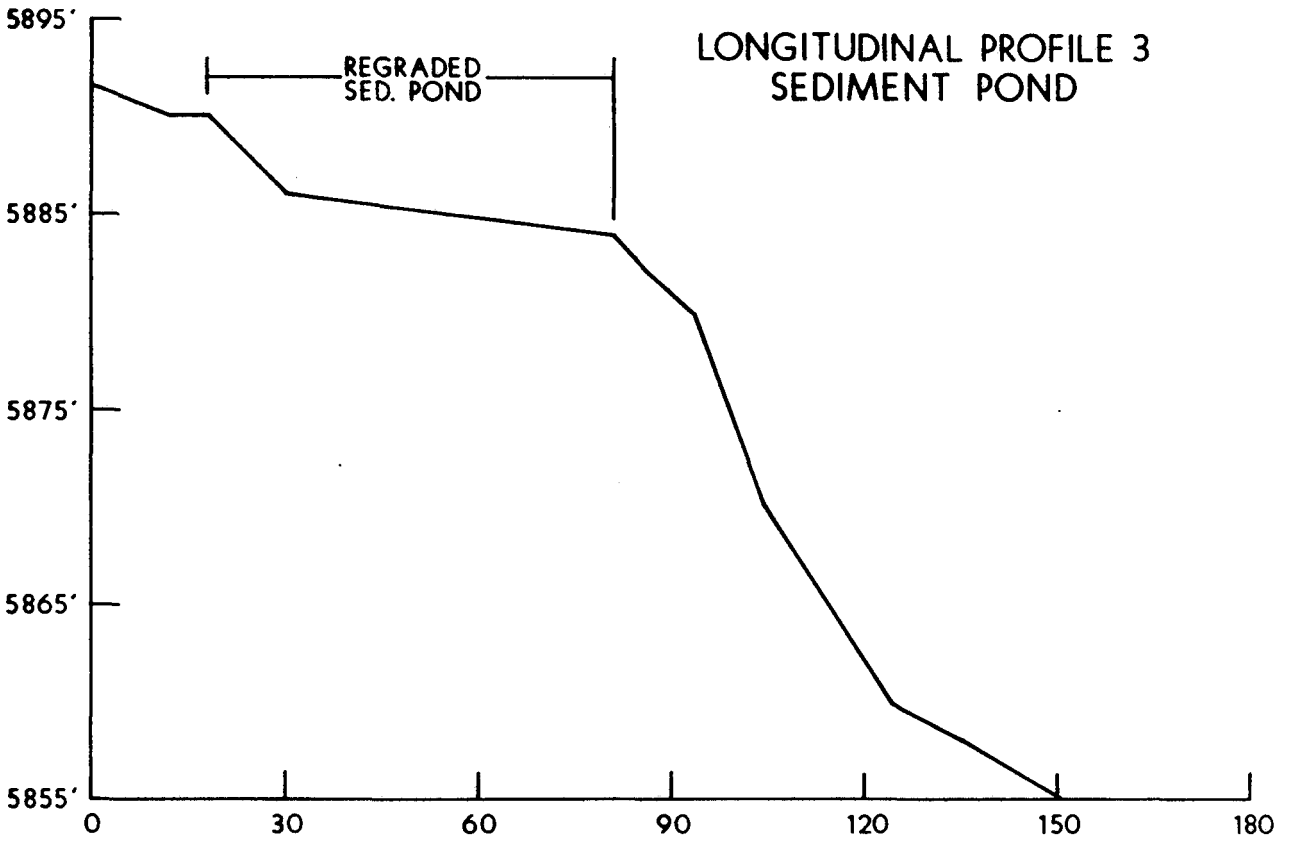
Reach	Q (cfs)	Slope (%)	Bottom width (ft)	m	"n"	Flow Depth (ft)	Flow Vel. (ft)	Permissible Velocity (fps)	Remar
A-seam Terrace:									
upper	1.83	8	0	1&3	.025	0.4	4.9	5.0-6.0	asymmetr
lower	1.83	17	0	3&3	.035	.3	5.2	11	.75'ripra

The A-seam pad diversion was never installed. All runoff from the pad is conveyed through the sediment pond diversion. Information in Table 2 has been updated to show flow characteristics of the combined flow from the A-seam pad and the sediment pond diversions:

Table 2 - Proposed Diversion and Channel Configuration

Reach	Q (cfs)	Slope (%)	Bottom width (ft)	m	"n"	Flow Depth (ft)	Flow Vel. (ft)	Permissible Velocity (fps)	Remar
Sed. Pond	0.36	90	0	2	.035	.16	7.0	8.8	.6'ripra





CONSULTANTS GROUP
SALT LAKE CITY, UTAH

SOLDIER CREEK COAL COMPANY
HIDDEN VALLEY MINE

SECTION AND PROFILE OF SEDIMENT POND

REVISIONS			DESIGNED BY: R. J. B.	DRAFTED: C. Pixton
			SCALE: AS SHOWN	DATE: 8/11/86

FIGURE II

A hydraulic evaluation of the reach from the sediment pond to Ivie Creek was conducted and it was determined that a trapezoidal channel with a 2h:1v sideslope and a six foot bottom would have a water velocity less than the maximum allowable. Slope protection with riprap is proposed for the sediment pond channel. The pond slopes will be seeded when the bench and coal seam slopes are revegetated. See Appendix III for hydrology methods.

UMC 784.11 (b)(2)(6) Operation Plan: General Requirements

Response: Not Applicable

UMC 784.13 (a) Reclamation Plan: General Requirements

Response: Refer to Interim Plan

UMC 784.13 (b)(1)(3-5) Reclamation Plan: General Requirements

Response:

(b)(1) See Section VIII, Schedule

(b)(2) See Section VIII, Schedule

(b)(3) See Section III, Backfilling and Grading

(b)(4) See Section V, Topsoil Redistribution

(b)(5) See Section VI, Revegetation

(b)(6) Not Applicable

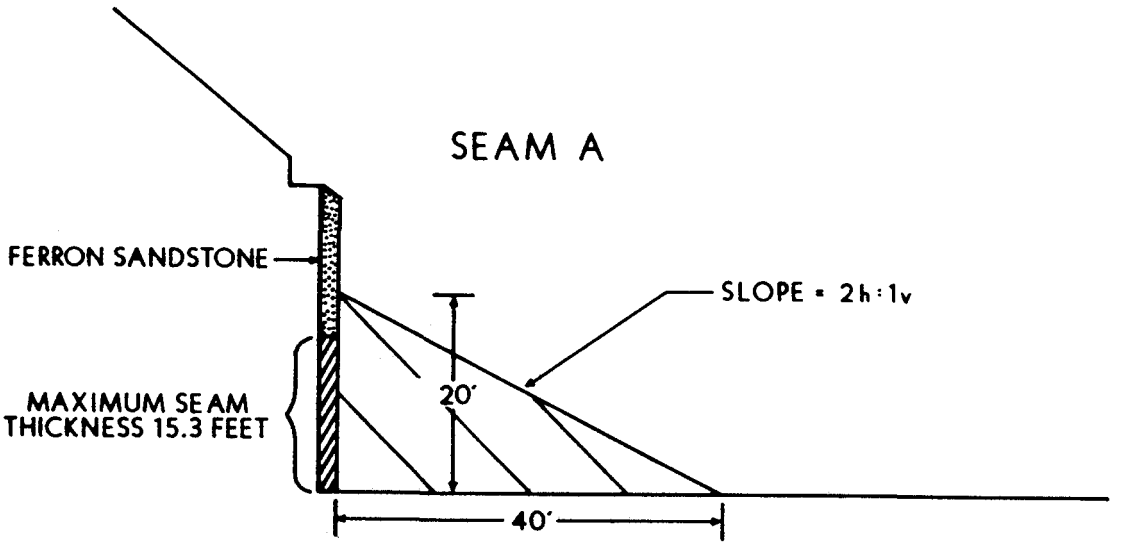
(b)(7) Not Applicable

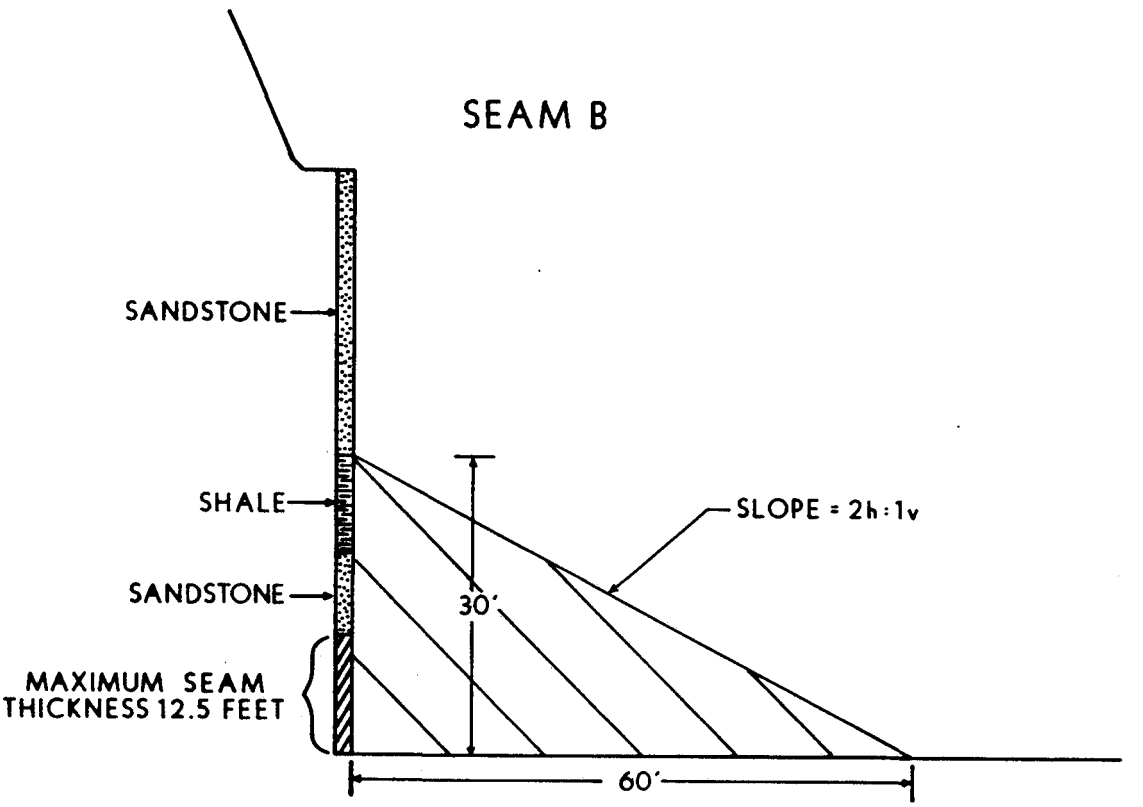
UMC 784.13 (b)(8) Reclamation Plan; General Requirements

Response: See Figure III

UMC 817.13-.15 Casing and Sealing Underground Openings: General Requirements

Response: The four shallow exploration adits are the only underground mine openings. The closure techniques for these openings are described in Section III. There have also been seven (7) exploration drill holes completed on the property. These holes were drilled both to evaluate the coal resource and to explore for groundwater for use as a mine water supply. The locations of these drill holes are shown on Plate IV. Drill holes 1, 2, #3, and 7 discovered artesian water. These holes are part of an approved and in-force Ø.25 CFS water right issued by the Utah Division of Water Rights. The other drill holes, 4, 5, and 6, found no water and were dry. Drill holes 1, 2, 3, and 7 were cased and completed as water wells. Valves were installed on each wellhead. The valves were in turn wrapped with fiberglass insulation, covered with an empty 55 gallon drum, and buried beneath a mound of soil.





CONSULTANTS GROUP
SALT LAKE CITY, UTAH

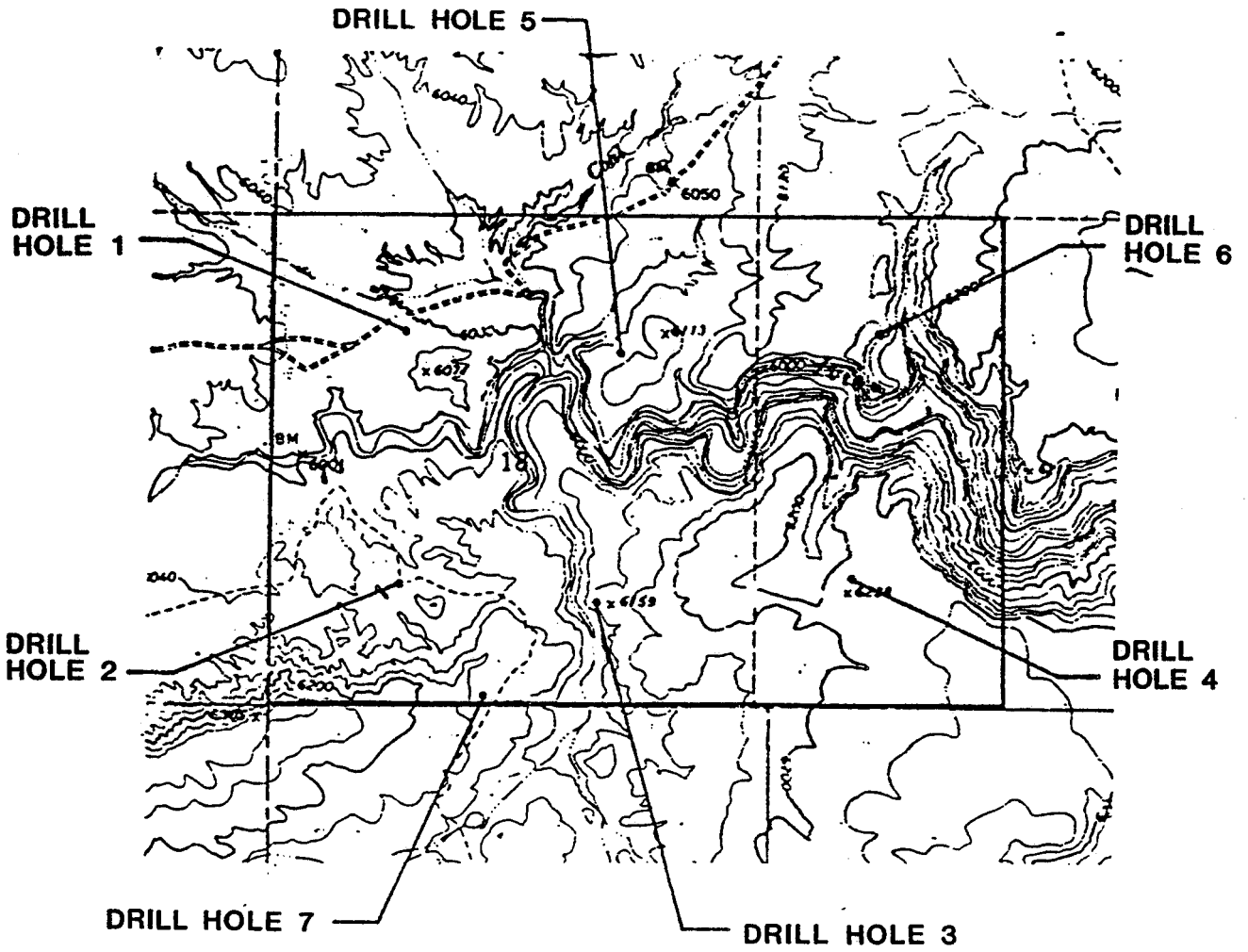
SOLDIER CREEK COAL COMPANY
HIDDEN VALLEY MINE

CROSS SECTIONS FOR COAL SEAM BACKFILLS

REVISIONS				DESIGNED BY J.M.J.	DRAFTER C. Pixton
				SCALE 1"=20'	DATE 8/11/86

FIGURE III

HIDDEN VALLEY MINE



jbr CONSULTANTS GROUP
SALT LAKE CITY, UTAH

SOLDIER CREEK COAL COMPANY
HIDDEN VALLEY MINE

HIDDEN VALLEY MINE
DRILL HOLE LOCATIONS

REVISIONS BY DATE	BY DATE	BY DATE	DESIGNED BY	DRAFTER C. Pixton
			SCALE 1"=2000'	DATE 8/11/86

PLATE IV

An inspection of all drill sites was carried out on July 31, 1986. This inspection revealed that drill holes 1, 2, 3, and 7 remain soil-covered as described above and that no leakage, evidenced by either wet soil or unusual plant growth, is taking place. The site of drill hole #4 was located, but the actual drill hole could not be found indicating that it has most likely been plugged and backfilled. Drill holes #5 and #6 were both located. Drill hole #5 was found to be open and covered with plastic sheeting beneath a large rock. Drill hole #6 was found to be cemented to the surface with a survey marker installed in the plug.

Drill hole #5 will be plugged with a five-foot surface plug during the reclamation work to be conducted during the Fall of 1986. Drill holes 1, 2, 3, and 7 will remain in there current condition since the water right for this property represents an asset that significantly enhances the potential for future development and also the property's value for resale. The Division of Water Rights has indicated that the water right is in force and that an extension through January 31, 1988 has been granted allowing the water right holder additional time to develop the water right. Given the potential for future coal development in this area, it is likely that further extensions (five years in term) will be granted. The Division of Water Rights has also indicated that the means of temporarily capping these wells that is described above is acceptable (Mr. Kent

The known location for drill hole #4 will again be searched with a shovel and probe at the time of reclamation to determine if the drill hole is plugged or open. The site is remote and the exploration road is not serviceable. Thus to use equipment on the site to search for this drill hole would require the re-opening of the exploration road, an additional disturbance. Should an open drill hole be discovered at this site it will be plugged with a five-foot surface plug during the reclamation construction period.

Drill holes 1,2,3 and 7 are part of Soldier Creek Coal Company's water right that has been extended to Jan. 31, 1988. Soldier Creek Coal Company through Calmat will notify the DOGM by March 1, 1988 of the action taken by the Utah Division of Water Rights regarding this water right. Should the water right be terminated, then abandonment procedures as required by the Utah Division of Water Rights', will be undertaken within 90 days of the date of final notice on the water right. Soldier Creek recognizes that this may require an extension of a portion of the surety bond to cover the additional costs of reclamation of the drill hole sites following abandonment action.

Should the water rights be transferred then Soldier Creek Coal Company will follow the procedures in UMC 817.53 for transfer of water rights.

Jones, Utah Division of Water Rights, Salt Lake City).

UMC 817.17-.74 Disposal of Excess Soil and Underground Development Waste: General Requirements

Response: There are no excess soils or underground wastes.

UMC 817.81-.88 Coal Processing Waste Banks: General Requirements

Response: Coal was not produced or processed under this permit.

UMC 817.91-.92 Coal Processing Waste: Dams and Embankments

Response: None exist on the property.

UMC 817.95 Air Resources Protection

Response: There was no underground mining or coal processing consequently there was no methane gases or emissions developed.

UMC 817.97 Protection of Fish, Wildlife and Related Environmental Values

Response: Refer to Interim Plan.

UMC 817.132 Cessation of Operations: Permanent

Response: There was no underground mining. Development ceased in August, 1980

UMC 817.95 Air Resources Protection

Response: There was no underground mining or coal processing consequently methane gases or emissions were not produced.

(a) (b)

Construction in this small area within a protected drainage will not produce copious amounts of fugitive dust. In this remote area no croplands or developments are contiguous to the permit area. During periods of strong winds large amounts of dust are transported naturally from the many barren and exposed soils in this area often exceeding Class II particulate levels.

During periods of extreme wind (50 mph+) construction will be delayed until winds abate. Water control of dust is not deemed necessary in this protected canyon. The only activity outside of the canyon is loading of the roadbase material which is a gravelly sandy material.

III Backfilling and Grading--including Portal Closure

UMC 817.100 Contemporaneous Reclamation

There have been only maintenance activities (drains, signs,etc.)on the property since August, 1980. The topsoil stockpile was hydroseeded in 1985 to stabilize and protect the soils material.

UMC 817.101 Backfilling and Grading: General Requirements

(b) Portals and Coal Seams

A dozer will be used to collapse the roof structures and push them into the exploratory adits. Soil and rock materials from the pads and culvert excavations will then be pushed into each adit for 25' to seal these openings. This is in accordance with MSHA Regulations 75.1711-2 (30 CFR Chapter I, 7-1-85 edition).

The exposed coal seams would then be covered and graded to a slope of approximately 2h:1v. The berm on the diversion above the "B" seam will be removed and cast down after backfilling. The slopes will then be covered with approximately 2" of topsoil and revegetated. Figure III shows the generalized backfill cross sections for the A and B seams. Actual cross sections showing pre- and post-reclamation configurations for the A seam and B

UMC 817.101 Backfilling and Grading (b)(4)(iii)

The static safety factor for the fill on the "A" seam pad is 1.354 and for the fill on the "B" seam pad is 1.353. The slope stability analysis is in Appendix VII.

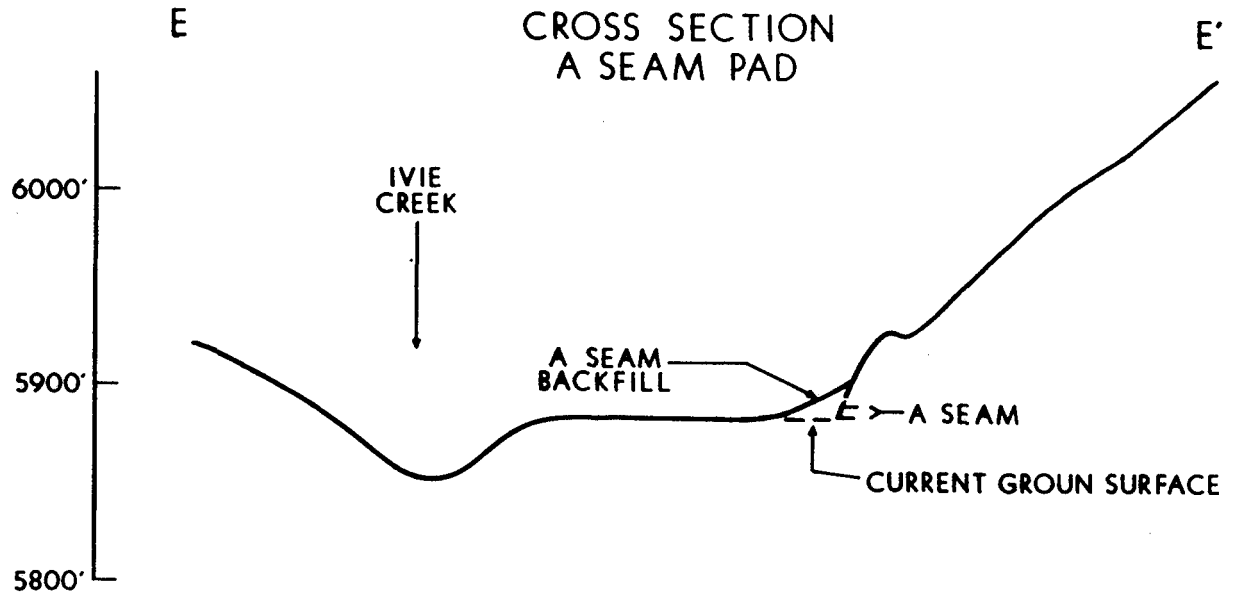
seam pads and highwalls are presented on Figure IV. Backfill volume required for the A seam is estimated to be 2500 cubic yards. This quantity plus the substantial existing talus bank that has naturally formed at the toe of the highwall will be adequate to achieve a 2h:1v fill slope. The volume of fill required to achieve a 2h:1v slope against the B seam is approximately 10,200 cubic yards. The source of fill for these backfills will be the estimated 11,000 cubic yards of material excavated from the channel to be cut through the B seam pad and the 1800 cubic yards of road base material stockpiled on the site. The road base material will be placed against the highwall on the B seam cut and covered with pad material.

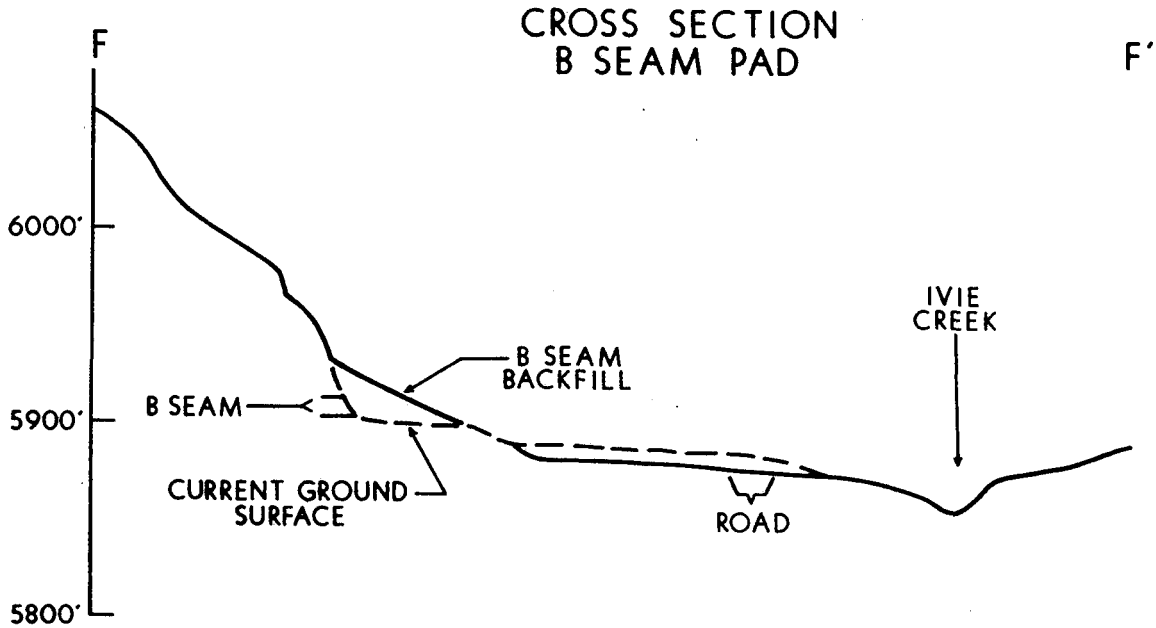
The removal of the berm on the highwall diversion will allow the surface flows to drain down the hillside in small rivulets. To prevent gully action on the sloped portion of the diversion the sidecast material will be placed on the terrace to restore the original slope gradient(Plate III). This will require about 84 cu. yds. of material on 300' of terrace.

(1) Road

The three culverts (80' of 48" diameter, 40' of 18" diameter and 70' of 18" diameter) located in the road will be removed. The 48" diameter culvert, located at the crossing of the ephemeral channel, will be removed to construct a channel to allow fording of the creek. Based on the reaches up and downstream of the

Three small, exposed coal seams along the road cut have been backfilled at a 2h:1v slope. Surfaces were prepared and revegetated according to the original revegetation plan.





CONSULTANTS GROUP
SALT LAKE CITY, UTAH

SOLDIER CREEK COAL COMPANY
HIDDEN VALLEY MINE

CROSS SECTION AND
POST RECLAMATION CONFIGURATION
A SEAM AND B SEAM PADS

REVISIONS			DESIGNED BY: R. J. B	DRAFTED: C. Pixton
			SCALE: 1" = 200'	DATE: 8/11/86

FIGURE IX

portion to be restored, it is expected that the channel bottom will rest on bedrock. The gradient of the channel will be the same as it was on the culvert (0.071 ft/ft) (Figure V). The channel will be riprapped to stabilize the disturbed section.

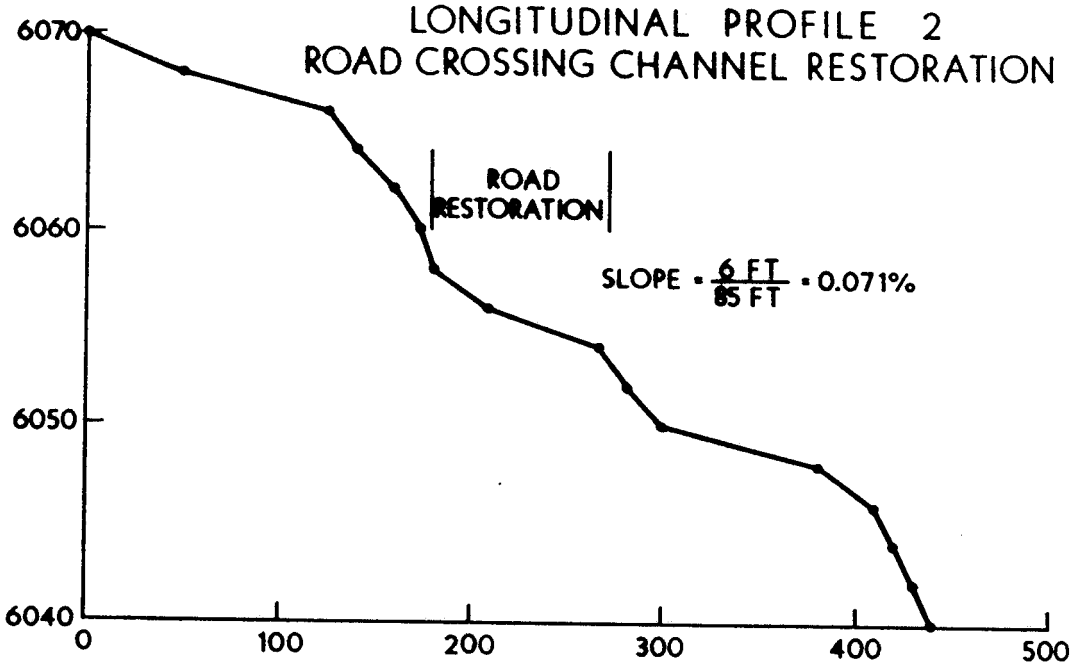
The other two 18" diameter culverts are road drainage culverts which were spaced to convey runoff under the road to prevent significant erosion. With the removal of these culverts waterbars will be installed according to spacing in Table 3b and Plate III at a 45^{o} angle to the direction of the roadbed. These waterbars will serve a similar purpose as the culverts, to control and collect surface runoff from the road and the hillsides above the road. The 11 waterbars will be approximately 18" high by 72" wide with a rounded crest extending across the road (Figure VI). The area just up hill from the bar will be excavated to a depth of 12" by a width of 48". The small flows diverted at each waterbar will be discharged to the west into the natural rockfill above the ephemeral drainage.

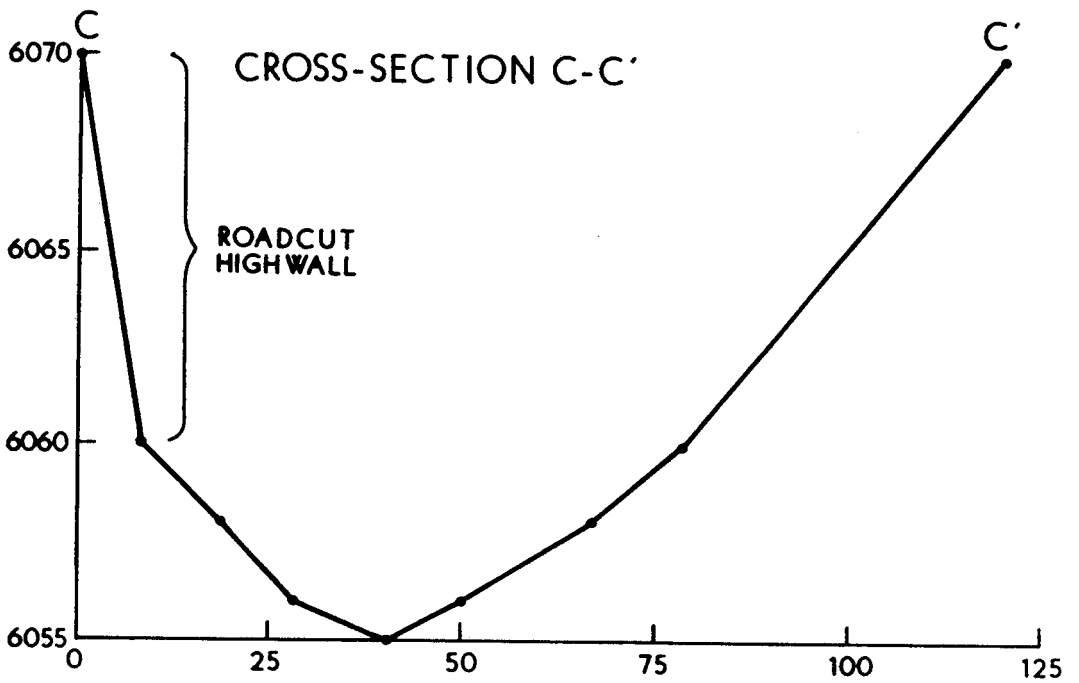
The roadbed will then be ripped to increase percolation and water-holding capacity. The entire road surface will be seeded. A gate with a lock will be installed near the top of the road to discourage trespass and prevent livestock drift onto the revegetated areas (Plate III).

This reclamation process on the road will restore the natural

Two additional waterbars have been added near the end of the road to prevent erosion of the toe of the small roadside coal seam backfill. They were installed according to the specifications in the original Plan. In addition, onsite rock has been placed in the waterbar outfalls to supplement existing rock fill where needed to control gullying. Small loose-rock check dams were installed at the downstream end of the waterbars to check the water before it spills over the crest of the outfall.

During the 1989 repair work, the road was not ripped and revegetated, for the reasons described on Amendment page 51. Erosion from the road surface appears to be adequately controlled through the installation and maintenance of water bars, and through the previous three years' of revegetation.





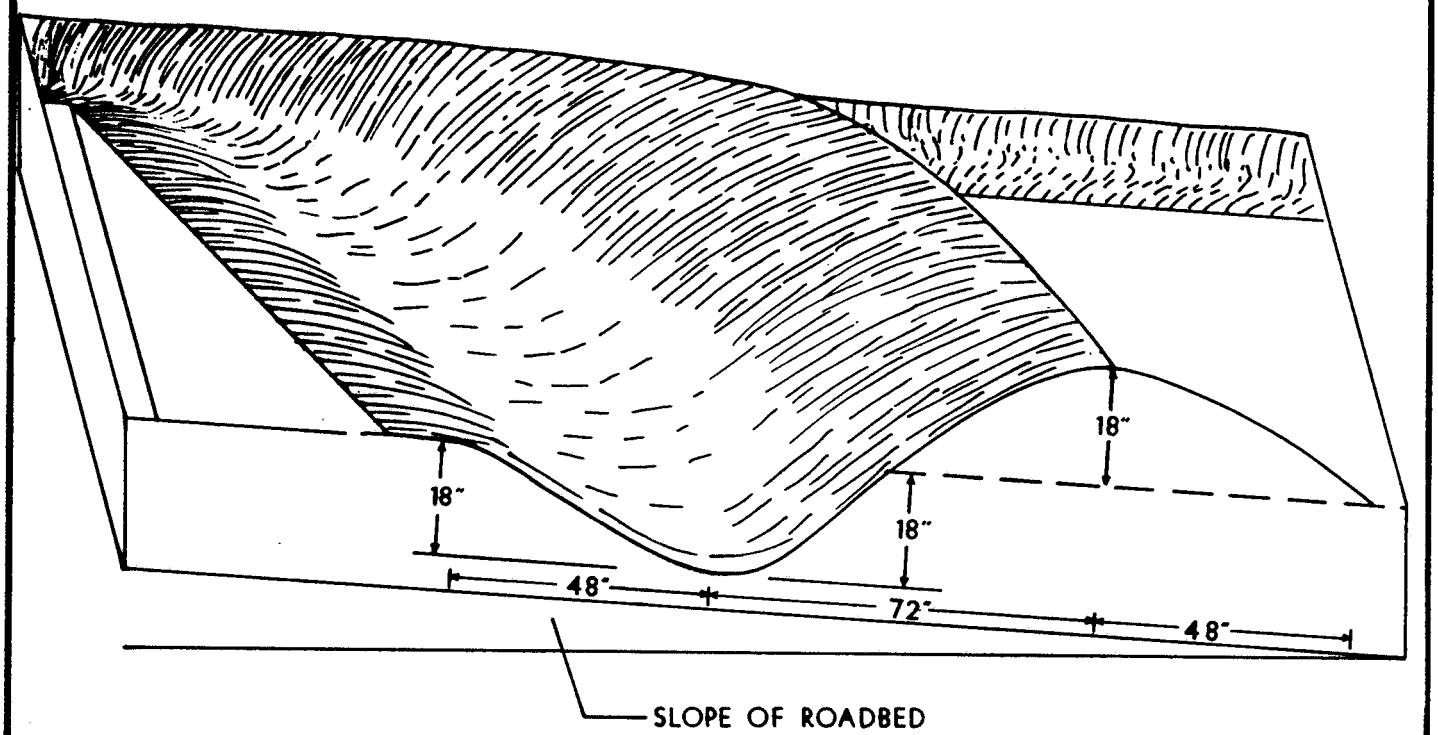
CONSULTANTS GROUP
SALT LAKE CITY, UTAH

SOLDIER CREEK COAL COMPANY
HIDDEN VALLEY MINE

SECTIONS AND PROFILE OF ROAD CHANNEL

		DESIGNED BY: T. J. S.	DRAFTED: C. Pixton
		SCALE: AS SHOWN	DATE: 7/25/86

FIGURE V



CONSULTANTS GROUP
SALT LAKE CITY, UTAH

SOLDIER CREEK COAL COMPANY
HIDDEN VALLEY MINE

BLOCK DIAGRAM OF ROAD WATERBARS

REVISIONS			DESIGNED BY: R.J.B.	DRAFTER: C. Pixton
			SCALE: 1" = 30"	DATE: 8/11/86

FIGURE VI

drainage patterns and control erosion. Because the cuts and fills remain the integrity of the road alignment is retained . Thus, the road could be restored for use in future coal resource development with minimal construction activity and environmental damage.

A variance is requested to allow these stabilized road fills and cuts to remain after reclamation and monitoring are completed.

Pads

The 250' of 48" diameter culvert in the "B" seam pad will be removed and the ephemeral channel restored to approximately original grade. The gradient will be uniform at 10.5% and the sidelsopes will be 4h:1v. The depth variation of the channel is shown in Figure VII and the cross-sections of the proposed and natural channels are shown in Figure VIII. It will then discharge into Ivie creek. This channel will be riprapped to stabilize the surface and prevent excessive headcutting. The excavated material from the channel will be used to cover the coal seam and to slope the adjacent pads to drain into the restored ephemeral channel. A silt fence will be installed on the channel banks to prevent sediments from reaching the channel prior to vegetation becoming established on the topsoiled areas.

The 160' of 18" diameter culvert in "A" seam pad will be removed and the excavated material replaced in the channel. With the

drainage patterns and control erosion.

A variance is requested to allow the access road and associated cut and fill terraces to remain upon reclamation. A description of the means by which this variance will allow the postmining land use to be achieved is described in the following paragraphs. The variance will simply enhance the premining land use capabilities, while allowing the use to remain the same. It will also enhance the ability to meet other requirements of the Division such as revegetation, erosion and runoff control. In addition, CalMat, the land owner, approves of the variance; the variance is also compatible with the operation of adjacent lands.

A stability analysis has been conducted on the slopes which would not be restored to natural contours and is described in this document. All coal wastes have been covered, so retention of the cuts and fills will not result in exposure of waste materials. As described below, greater benefits to the watershed will occur as a result of maintaining the cut and fill terraces than would occur if the natural contours were restored. High velocity runoff and consequent erosion will be minimized if the road bed is in place, and use of the road surface as a livestock trail will prevent impact to Ivie Creek and its adjacent riparian lands as a result of trampling.

Retention of the cut and fill terraces of the roadway will aid in the protection of critical soils and enhance the forage production at the site. According to the RMP for the adjacent San Rafael Planning Area, one of the main BLM means of protecting critical soils is to grade slopes such that they serve to collect water to aid in onsite revegetation. The roadway functions to provide this. In addition, the roadway is in line with other BLM goals of water-barring roads and protection of riparian areas as described later in this section.

During construction of the access road into the property, blasting was required along the uphill side of the road, resulting in a cut slope in bedrock, and excess materials were placed as fill along the downhill side of the road, resulting in a talus-like slope down to the ephemeral channel bottom. The natural terrain in the area is comprised of a series of cliffs, small benches and talus slopes due to the interbedded sedimentary bedrock, so the cut and fill terraces of the roadway complement the natural drainage patterns of much of the area.

During reclamation, the cut and fill slopes created during road construction were left in place. Water bars were installed along the road to control runoff from uphill areas and the roadbed itself. These water bars meet BLM criterion for construction in critical soil areas (road grade does not exceed 10 percent within a 1000-foot distance). The road surface was ripped to eliminate compaction, seeded, mulched and fertilized. The roughened condition of the road and barriers across the road prevent vehicular access.

In its current configuration, the road and associated cut and fill terraces aid achievement of the postmining land use in two ways. The first of these is site enhancement related to revegetation and erosion control.

A typical cross section of the roadway and adjacent slopes would show a steep slope comprised of bedrock outcrop interspersed with areas of colluvial material with sparse vegetation, below which occurs the road cut slope which is almost vertical sandstone bedrock with a height of approximately 10 - 15 feet. The road bed itself is approximately 20 feet wide and is in a roughened, hummocky condition with occasional large boulders. The road fill area down to the channel bottom is comprised of talus-like fill materials with some large boulders and natural bedrock outcrop

visible. The entire slope is steep, with little vegetative growth as is typical of the surrounding undisturbed areas.

The roadbed surface acts in several ways to enhance vegetation efforts. The flat bench serves to break up the otherwise very steep sideslope of the canyon, providing a terrace to capture runoff and sediments from the upper steep, bare slopes. This lessens the potential for erosion of the bottom slope adjacent to the channel by reducing both total runoff and flow velocities. In the absence of this terrace, the very high production of runoff from the upper slopes would result in severe erosion of the lower talus slopes adjacent to the channel, which would compromise the stability of the canyon side slopes. Additional benefits are incurred by storing of runoff and conserving soil moisture in the roadbed soils rather than conveying it all to the channel. Also, the trapping of fine sediments on the roadbed enhances the road surface as a growth medium. These all serve to enhance the potential for revegetation on the road bed. Neither the upper nor lower portions of the canyon sideslope are conducive for vegetation because of the lack of soil medium.

Contour terraces that are essentially equivalent to the roadbed are commonly constructed to provide water harvesting and erosion control in slope rehabilitation. They function to shorten the slope length, consequently reducing runoff velocities which in turn encourages infiltration and storage of runoff, and lessens the potential for erosion. Because the road bed has a significant gradient, a series of water bars were constructed across the surface to further control runoff and sediment production.

In the site environment, where climate and soil types limit vegetative growth, any means of enhancing growth potential can significantly increase the value of the site as a provider of habitat and producer of forage. In this way, the cut and fill

terraces left during reclamation are essential in allowing achievement of the post-mining land use of grazing and wildlife habitat.

The second way in which the cut and fill terraces serve to enhance the post-mining land use is for livestock trailing. Other than the road surface, there would be two avenues for livestock to gain entrance to the disturbed areas where revegetation would be most successful. The first of these would be along the Ivie Creek bottom. This is evidently the trail that was used historically, however given the already poor quality of Ivie Creek water, the desirable protection of riparian areas, and the risk to livestock along this route (high flows, ice, and precarious travelways), this route is less than ideal. The second possible trailway would be from the top of the disturbed area down through the ephemeral drainage at the base of the roadway. This route is steep, narrow and very rocky, which unnecessarily increases the risk to livestock. Use of the roadway for livestock trailing would be preferable from an environmental standpoint, from a livestock safety standpoint, and also from the standpoint of human access to inspect animals, provide salt licks, etc..

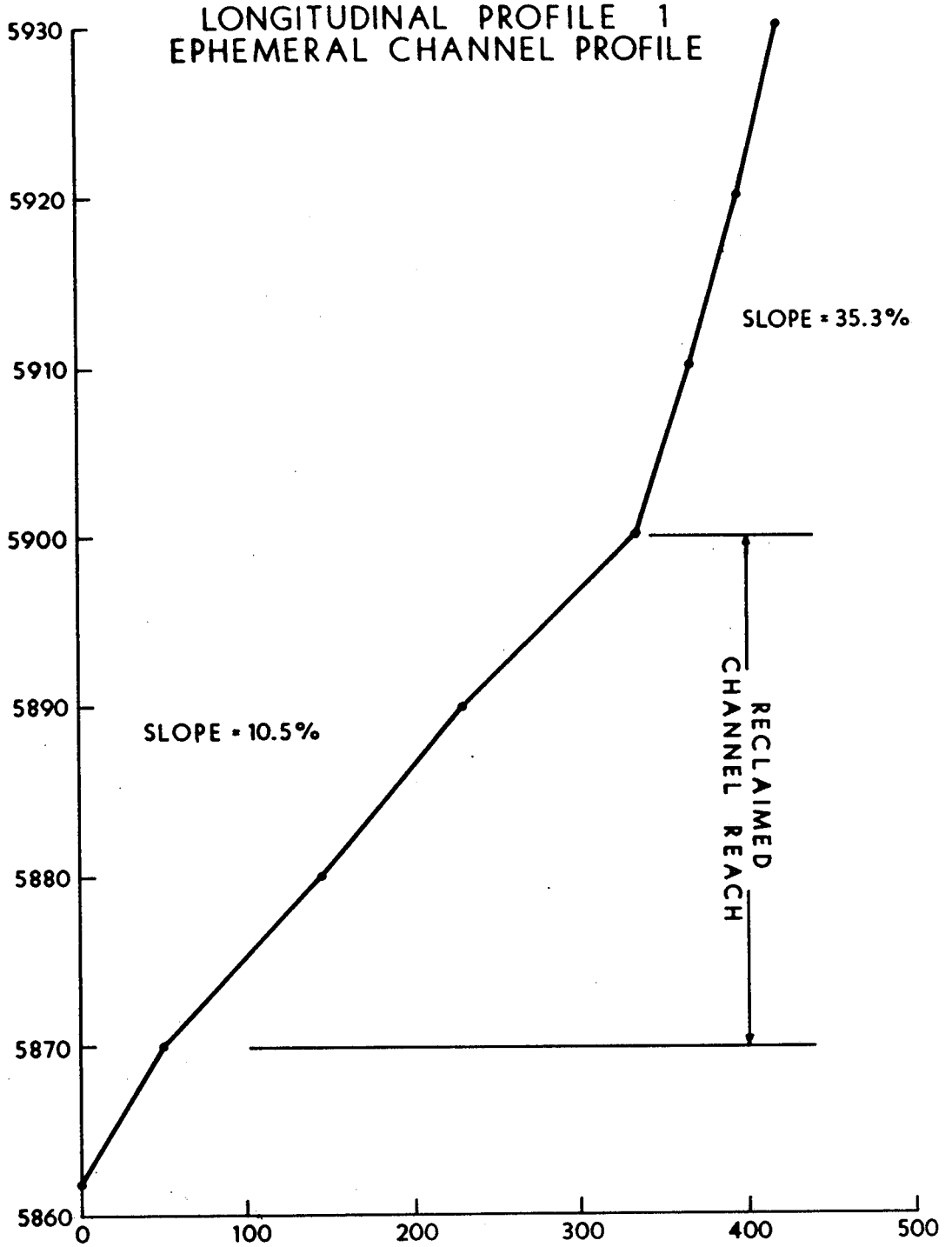
In summary, not regrading the cut and fill terraces associated with the road allows achievement of the post mining land uses. This is accomplished primarily by site enhancement through conserving soil moisture, ensuring slope stability, and controlling erosion. A secondary benefit of the road surface is to provide a livestock trailing route that is preferable to other available options.

Pads

The 250' of 48" diameter culvert in the "B" seam pad will be removed and the ephemeral channel restored to approximately original grade. The gradient will be uniform at 10.5% and the sideslopes will be 4h:1v. The depth variation of the channel is shown in Figure VII and the cross-sections of the proposed and

natural channels are shown in Figure VIII. It will then discharge into Ivie Creek. This channel will be riprapped to stabilized the surface and prevent excessive headcutting. The excavated material from the channel will be used to cover the coal seam and to slope the adjacent pads to drain into the restored ephemeral channel. A silt fence will be installed on the channel banks to prevent sediments from reaching the channel prior to vegetation becoming established on the topsoiled areas.

The 160' of 18" diameter culvert in "A" seam pad will be removed and the excavated material replaced in the channel. With the



Vertical Exaggeration: 10x

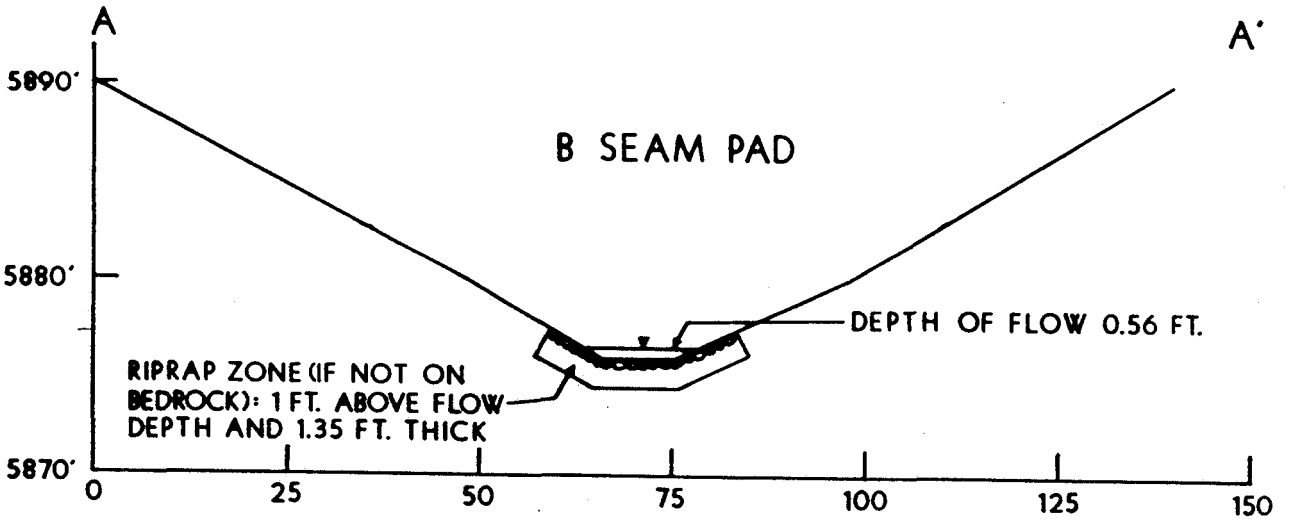
CONSULTANTS GROUP
SALT LAKE CITY, UTAH

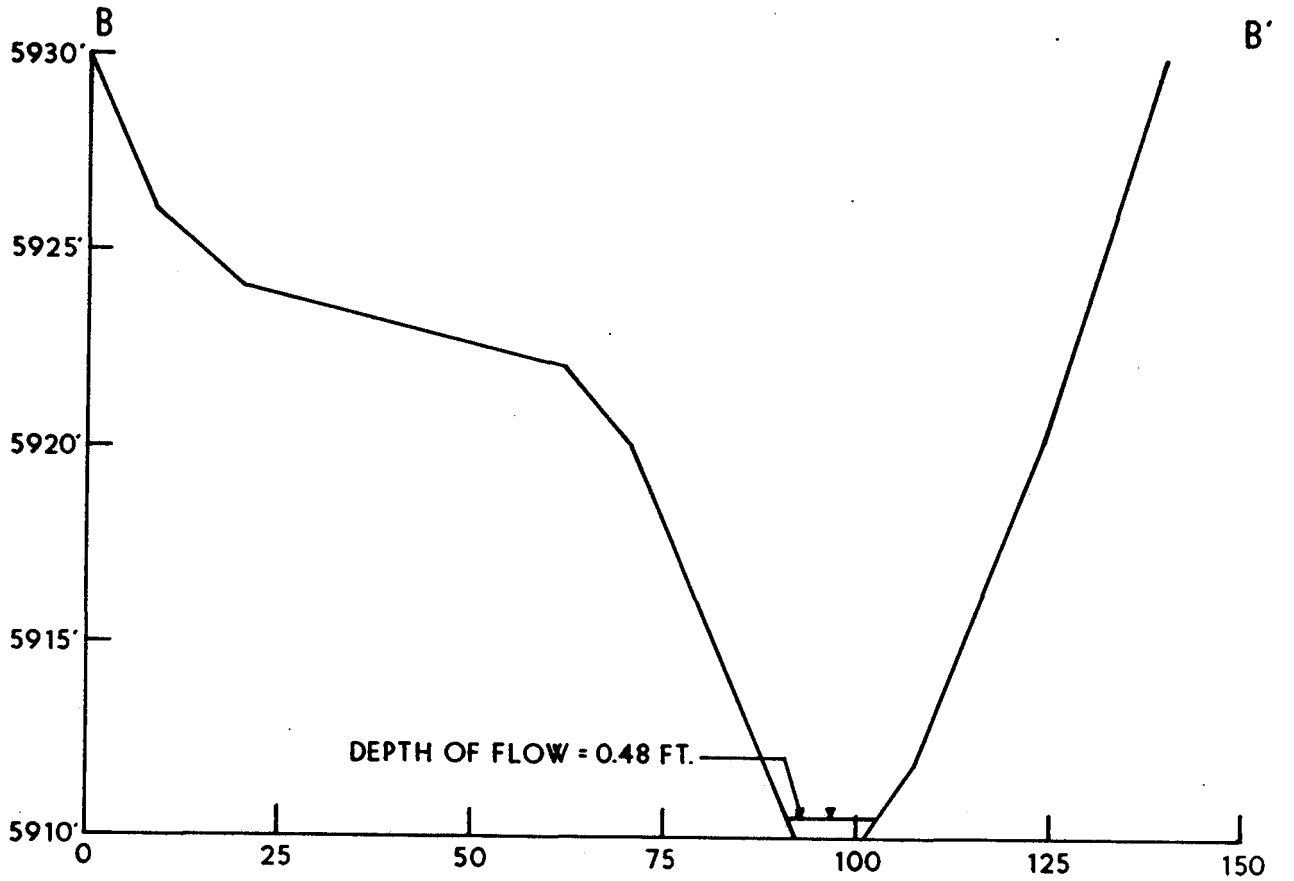
SOLDIER CREEK COAL COMPANY
HIDDEN VALLEY MINE

B-SEAM PAD
RESTORED CHANNEL
PROFILE

		DESIGNED BY: T.J.S.	DRAFTER: C. Pixton
		SCALE: AS SHOWN	DATE: 7/25/86

FIGURE VII





jbr CONSULTANTS GROUP
SALT LAKE CITY, UTAH

SOLDIER CREEK COAL COMPANY
HIDDEN VALLEY MINE

CROSS SECTIONS OF EPHEMERAL CHANNEL

REVISIONS			DESIGNED BY: T.J.S.	DRAFTER: C. Pixton
			SCALE: AS SHOWN	DATE: 8/11/86

FIGURE VIII

water-barring of the road and filling of the small roadside ditch the discharge into this culvert will be eliminated.

UMC 817.103 Backfilling and Grading: Covering Coal and Acid- and Toxic-Forming Materials

Coal or other associated materials are not readily evident on the site. Should any of these materials be discovered during excavation and backfilling they will be placed against the coal seams and covered with other non-toxic materials. There is no water drainage from the coal seams or adits. Therefore, acid mine drainage and related toxic elements would not be discharged from the site. See letter in Appendix Ia.

UMC 817.106 Regrading or Stabilizing Rills and Gullies

The existing rills in the road surface will be eliminated with water-barring and ripping of the road surface. The rills or gullies that may appear during post-reclamation monitoring will be stabilized by filling with soil and rocks. Chronic sites will be stabilized with small gabions or rock check dams.

IV Drainage Control - Including Sediment Control and Channel Restoration

UMC 784.14 (a)(1-4), (b)(1-2) Reclamation Plan: Protection of the Hydrologic Balance.

Response: The measures to be taken to protect the hydrologic balance during the present suspended operations are included in the Interim Plan, Runoff Control Plan.

Measures to be taken during the reclamation phase of the operation will include the following:

1) Reestablishment of the ephemeral drainage through the B-seam pad and at the present road crossing.

2) Removal of the road culverts and replacement with waterbar structures.

3) Removal of the A-seam culvert and regrading of the site to allow natural drainage of the site.

4) Removal of the discharge structures from the sediment pond and breaching of the embankment against Ivie Creek to provide a naturally draining structure.

5) Installation of a series of berms and silt fences prior to construction to allow control of erosion and to ensure that water quality of waters that are released from the site meet acceptable standards.

The 250 feet of 48 inch diameter culvert in the B-seam pad will be removed and the ephemeral channel restored to an approximately natural grade. The gradient will be uniform at 10.5%, the sideslopes will be at 4h:1v, and the bottom width will be 10 feet. The depth of the channel will vary depending on the exact location. The depth variation is shown on Plate V and the cross-sections of the natural and proposed channels are shown on Figure VIII. While little information is available as to the material underlying the 48 inch culvert, it is expected that much of the excavation for the restored channel will result with the channel bottom resting on bedrock. For any section of the channel where the bottom will rest on fill material, the fill will be riprapped to protect against erosion (see Figure VIII).

Evaluation of the restored channel for flow depth and for flow velocity to be capable of handling a peak flow of 71 cfs, indicates that the expected flow depth in the channel is 0.55 feet while the velocity is expected to be approximately 11 fps. As indicated above, a portion of the channel is expected to be bedded on bedrock and therefore will require riprap on the slopes, however several reaches of the channel are expected be

provide adequate protection, the riprap will be required to have a D_{50} of 0.75 feet. Table 3 shows design specification of the riprap gradation.

Table 3 Riprap Gradation

D 100	2.5 * D50	1.50 ft.
D 85	1.8 * D50	1.13 ft.
D 50	1.0 * D50	0.75 ft.
D 15	0.1 * D50	0.08 ft.

Design calculations for all diversions and hydrologic structures are presented in Appendix III.

No filter blanket is presently planned for the site. This is due to the coarse nature of the material in the channel area. No particle size distribution for the channel material is available, because the 48 inch culvert and fill material exists at the proposed location of the channel. It is expected however, that when the culvert is removed, much of the coarse bedding material will remain in those portions of the channel requiring riprap. This is expected to provide a more than adequate blanket layer for those portions of the channel requiring riprap. To ensure that the channel design is adequate, a sample of the material in the channel area will be taken (after the culvert has been removed) for particle size analysis. The data will be used to evaluate the need for a filter blanket in those areas to be riprapped.

The 48 inch culvert, located at the crossing of the ephemeral channel (see Plate V), will be removed and the channel excavated to construct a channel to allow fording of the creek (see Figure V). Based on the reaches up and downstream of the reach to be restored, it is expected that the channel bottom will rest on bedrock. The gradient on the channel will be the same as that on the culvert (0.071 ft/ft). Assuming a conservative approach, the peak flow determined for the restored ephemeral channel through the B-seam pad will be used in the evaluation of the road crossing channel restoration. Using a peak flow of 71 cfs, the flow depth through the channel is 0.93 feet. The velocity of flow through the restored reach is 7.4 fps. This is below the maximum allowable velocity for flows over bedrock so only the slopes one-foot above flow depths will be riprapped.

As the road and A-seam pad are regraded it becomes necessary to remove the 18 inch culvert through the pad. With the water barring of the road and the filling-in of the road side ditch, the normal drainage to the culvert will be diverted. Therefore, there is no reason for the culvert to remain.

Regrading of the A-seam pad, as shown on Plate V, will result in two drainage areas on the pad. First is the main portion of the pad and second is the sediment pond area. Due to the reestablishment of the ephemeral channel and the regrading of the road, the main portion of the A-seam pad will convey water from a

drainage area of 0.78 acres through a silt fence to Ivie Creek via a triangular ditch. The peak flow for the area is 0.26 cfs. This flow is based on the 10 year 24 hour precipitation event and a curve number of 80. The ditch will have 2h:1v side slopes, a depth of 1.5 feet, and an anticipated flow depth of 0.17 feet. Evaluation of the flow in the ditch at its steepest section shows that 6" D_{50} riprap protection is required to handle the maximum expected velocity of 4.3 feet per second (f/s). The riprap gradation is presented in Table 3a. No filter blanket is proposed due to the short stretch of channel and the gravelly nature of the soil.

With the reestablishment of the ephemeral channel, regrading of the access road and the A-seam pad, the area draining to the sediment pond will be quite small, less than one acre. As such the pond will no longer serve a purpose. Therefore, it is Proposed that the discharge structures of the pond be removed and the embankment facing Ivie Creek be breached allowing the small drainage area to follow through the pond area. The regraded surface of the pond is shown in Plate V with the cross-sections and longitudinal profile shown in Figure II.

The peak flow resulting from the small area above the pond is only 0.1 cubic feet per second (cfs). This value is based on the 10 year 24 hour precipitation event and a curve number of 80. This discharge for the regraded pond area will be past through a

Flow to the pond is 0.36 cubic feet/second (original pond diversion flow plus flow from the remainder of the A-seam pad). Flow velocity is 7.0 feet/second and flow depth is 0.16 feet, as shown on the updated Table 2 on Amendment page 10-a.

silt fence as shown on Plate III and conveyed to Ivie Creek via a triangular ditch. The ditch will have 2h:1v side slopes, a depth of 1.5 feet, and an anticipated flow depth of 0.11 feet. Elevation of the flow in the ditch at its steepest section shows that the maximum expected velocity of 3.8 feet per second (f/s) requires a riprap of 6" D_{50}. Table 3a shows the riprap gradation for the channel. As with the A-seam diversion channel no filter blanket is proposed.

Prior to the construction of the above described drainage structures, a series of berms and silt fences will be constructed, as shown on Plate V, to control erosion from the site and aid in meeting water quality standards for any runoff from the site during construction. The material specified for the filter fabric will be required to be capable of withstanding prolonged exposure to ultraviolet rays. The construction and installation of the silt fences will consist of the following:

1) Placement of "t" fence posts at eight foot spacing along the length of the proposed silt fence location.

2) Attach "chicken" wire fence material to the fence posts at top and bottom of the wire fence material along the ground surface.

3) Secure silt fence fabric to the chicken wire fence, on

Drainage from the entire A-seam pad, including the fill slope, the main pad area and the old sediment pond location, is all conveyed through a series of silt fences to the diversion at the location of the old sediment pond which empties into Ivie Creek. The channel constructed during the original Plan is sufficient to carry these flows, as indicated on the Amendment page 10-a.

Silt fences were constructed according to original specifications, but in some areas a heavy-gauge field fence was used instead of the chicken wire called for in the original Plan. The field fence will provide a stronger support for the fabric.

The A-seam terrace diversion has been made functional by regrading the bench cut, and has been extended by creating a ditch across the road and down onto the flat area east of the ephemeral channel. The alignment of this channel is shown on the revised Plate III, and design details are given in the addendum to Appendix III. Information on peak flows and channel configuration for this diversion is updated on Amended page 10-a.
A series of small retention berms was placed downslope of the outlet of the channel parallel to the slope on the flat bench east of the ephemeral channel. The alignment of these berms is shown on revised Plate III. They are approximately 2 feet high, with 2h:1v sideslopes, constructed with cut/fill techniques. They will serve to retain runoff and sediment and pass the overflow to the next, downstream berm, thus creating a longer flow path to the silt fence and the ephemeral channel.

the upstream side of the fence, at the top of the fence only. This protects the integrity of the silt fence fabric. The lower edge of the silt fence fabric is to be buried at the base of the fence to a depth of at least 6 inches.

4) The ends of the silt fence are to be enclosed in an adjacent berm to ensure that no runoff is allowed to bypass the silt fence.

UMC 784.14 c Reclamation Plan: Protection of Hydrologic Balance

Probable Hydrologic Consequences Assessment

for the

Hidden Valley Mine

1.0 Introduction

The purpose of this section is to address the requirement raised in the State of Utah, Department of Natural Resources, Division of Oil, Gas, and Mining (DOGM) regulations, UMC 784.14 (c), requiring that the operator of an underground coal mine address

Table 3a. Riprap Gradation for A-Seam and Sediment pond Diversions.

Size Percentage	Multiplier	Particle size
D_{100}	2.5 x D_{50}	1.25 ft
D_{85}	1.8 x D_{50}	0.90 ft
D_{50}	0.5 x D_{50}	0.50 ft
D_{15}	0.1 x D_{50}	0.05 ft

the probable hydrologic consequences of the proposed operation.

This section will present hydrologic and geologic information to allow the DOGM to review the impacts of the proposed operation. In the case of the Hidden Valley Mine, the proposed operation is the reclamation of a partially constructed underground mine.

2.0 Description of the Mining Operation

The Hidden Valley Mine is located in Emery County, Utah approximately seven miles south of the town of Emery. It was proposed to be a 500,000 ton per year underground coal mining operation. Due to poor market conditions, such development was not possible. Following several years of inactive status, the company has decided that the best course of action will be to reclaim the site.

Originally proposed as an underground mine to be developed in the A and B coal seams of the Ferron Sandstone Member of the Mancos Shale, the site was located adjacent to Ivie Creek in a small ephemeral drainage. The local geology is shown in Figure IX. Taken from Lines and Morrissey (1983), the figure shows that the Ferron Sandstone Member of the Mancos Shale is conformably overlain and underlain by the Blue Gate and Tununk Members, respectively, of the Mancos Shale. The sediments are of Cretaceous age and were deposited as part of a transgressive series of the shallow seas during middle Cretaceous time (Stokes

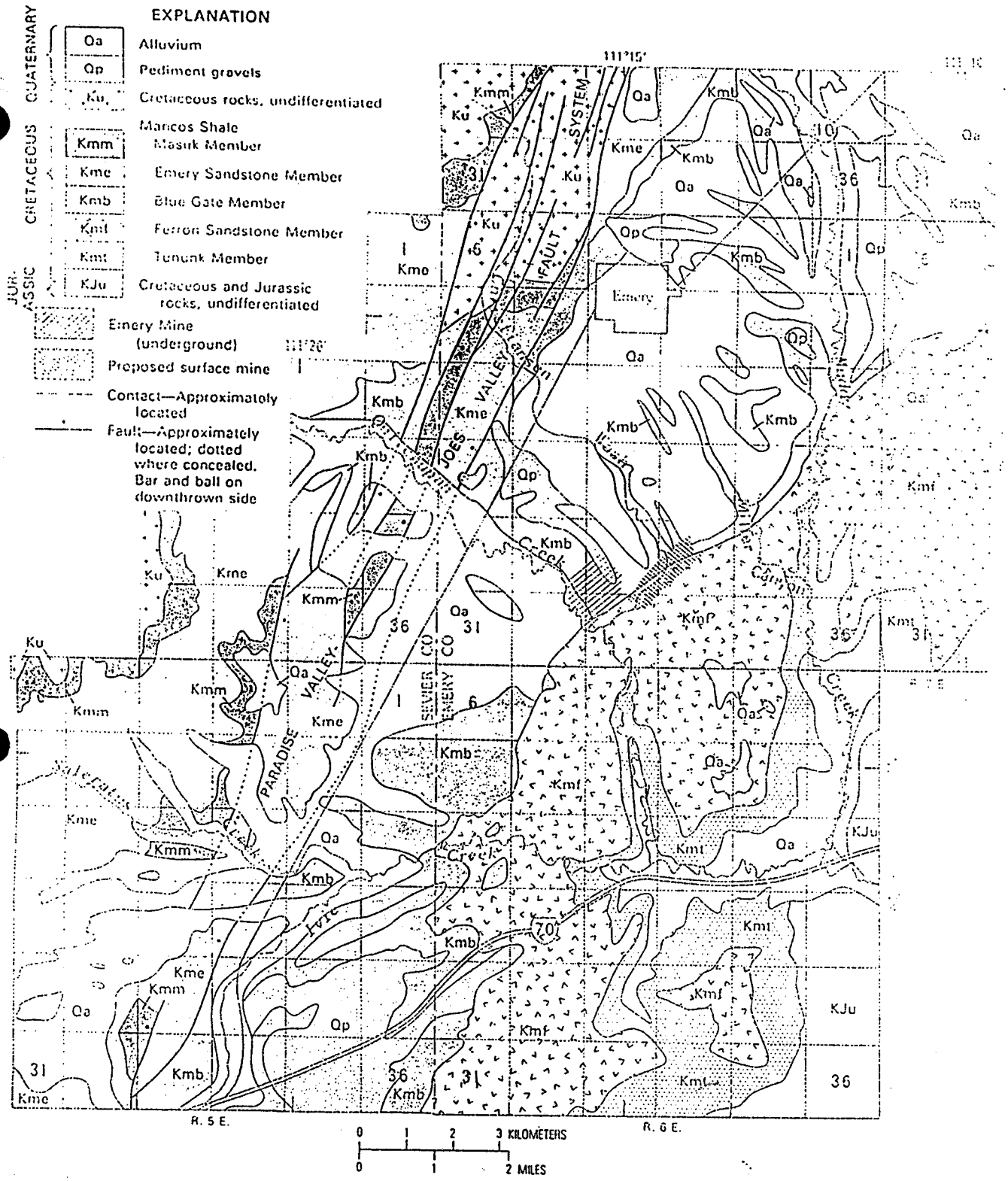


FIGURE IX

LOCAL GEOLOGY

and Cohenour, 1956).

Mine development was never undertaken. The extent of the workings, shown in Plate II and Figure I, were never expanded beyond the exploration adits. Samples were taken within the adits and from boreholes for coal quality data. No samples were taken of underburden or overburden quality. The coal quality data is presented in Appendix VI.

3.Ø Surface Water

Figure X shows the surface hydrology surrounding the Hidden Valley site. Located adjacent to Ivie Creek, a perennial stream, approximately two miles from the confluence with Quitchupah Creek, drainage from the mine site flows through the sediment pond to Ivie Creek.

The mine site is bisected by an ephemeral drainage which has been diverted through a 48" culvert through the mine site. Drainage from above the portals has also been diverted by bench cuts and 18" culverts to Ivie Creek. Flow at the site is generally limited to thunderstorm runoff. Some snow melt does occur during the spring, however generally water produced from snow melt is evaporated or it infiltrates.

Water use in the area is mainly for stock and some irrigation. The waters are generally high in Total Dissolved Solids (TDS),

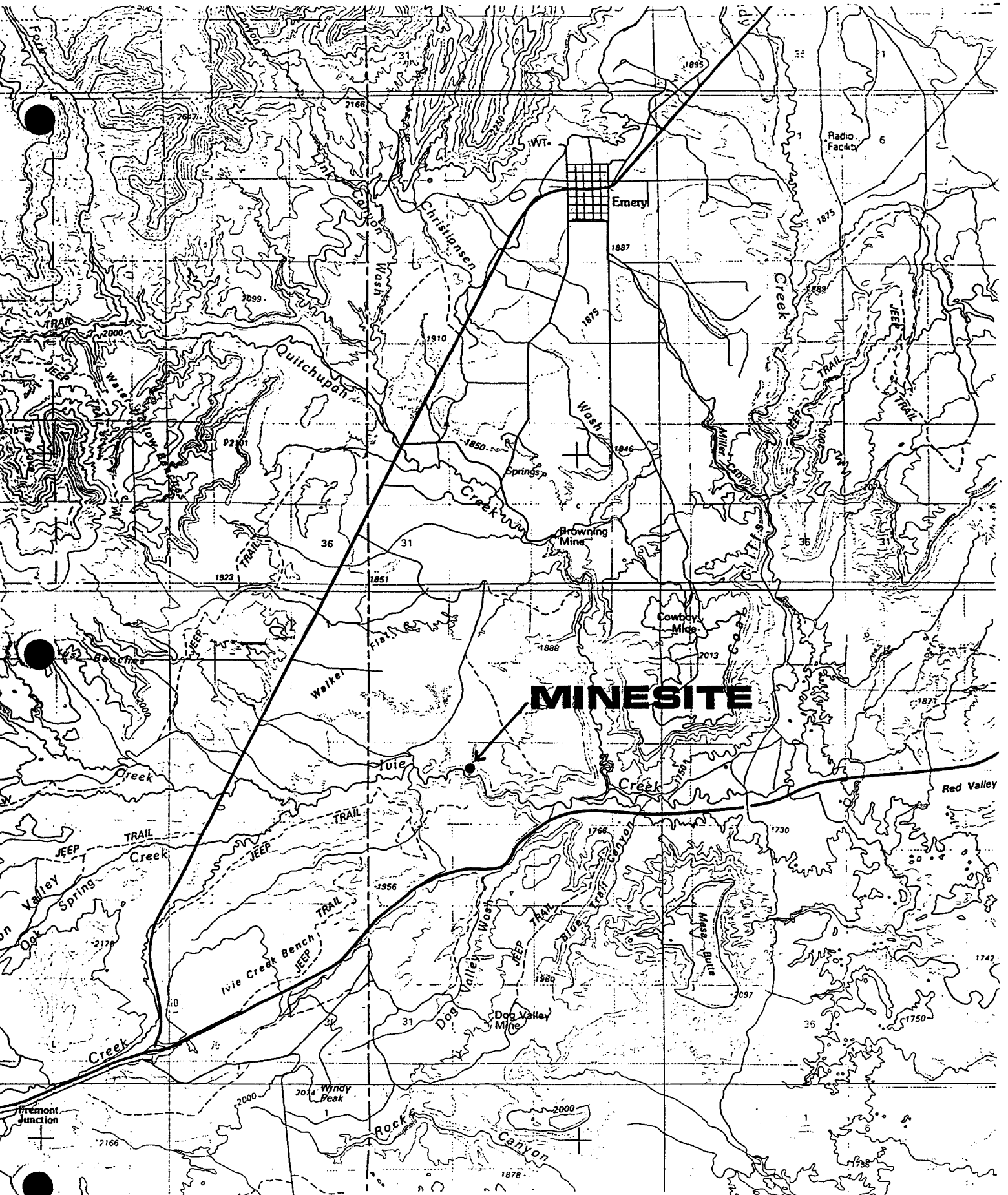


FIGURE X
SURFACE HYDROLOGY

averaging 3,050 mg/l, which limit the use of the waters. Seasonally, the TDS concentration varies from 700 mg/l in the spring to 3,000 to 5,000 mg/l in the fall. No significantly high metals were noted. The surface runoff is dominated by sodium and sulfate ions.

Average flow in Ivie Creek is less than 1 cfs. Minimum flows at the weir on Ivie Creek were less than 0.1 cfs. The maximum flows reported by the U.S.G.S. was 1,240 cfs. The maximum flows usually occur during either the spring as a result of snow melt runoff on the south end of the Wasatch Plateau or as thunderstorm runoff from summer storms.

4.0 Ground Water

Ground water in the area of the Hidden Valley site occurs in the Ferron Sandstone Member of the Mancos Shale. Recharge to the sandstone occurs from three areas. First and largest, is subsurface inflow, most likely from the Wasatch Plateau. Second is a moderate amount of recharge from infiltration of precipitation at the outcrop. Last is leakage from either the overlying Blue Gate Shale or the underlying Tununk Shale. This last area of recharge is quite small. Lines and Morrissey (1983) indicate that recharge values to the Ferron Sandstone are: 2.4 cubic feet per second (cfs) from subsurface inflow; >0.1 cfs from precipitation; and >0.1 cfs from leakage from both the Blue Gate

and Tununk Shales.

Discharge from the Ferron Sandstone occurs from six areas. In order of decreasing rate they are: leakage to the Blue Gate Shale, mine discharge, leakage along streams, leakage to the Tununk Shale, well discharge, phreatophyte transpiration, and spring and seep flows. Lines and Morrissey (1983) indicate flow rates for these discharge areas are as follows: Ø.8 cfs for leakage to the Blue Gate Shale; Ø.7 cfs from Browning mine discharge; Ø.4 cfs each for both stream leakage and leakage to the Tununk Shale; Ø.3 cfs for well discharges; and >Ø.1 cfs each to both phreatophyte transmission and spring and seep flows. The balance of these order of magnitude numbers for inflow to and discharges from the Ferron Sandstone is within Ø.1 cfs.

Seven boreholes were drilled on and adjacent to the mine plan area. Four of these boreholes encountered water and were completed as water monitoring wells. Two of the dry holes were plugged and reclaimed. The last borehole was not plugged and will be plugged as part of the mine reclamation activities. Plate IV, Page 14, shows the locations of the boreholes. Sites DH-1, DH-2, DH-3, and DH-7 encountered water and were completed as monitoring wells.

The depth of the various boreholes is shown in Table 4. As mentioned above, only four of the holes were completed as

Table 4 Completion Details and Approximate Water Elevations For Boreholes

Drill Hole Number	Collar* Elevation	Depth of Hole	Depth Cased	Perforated or Open Zone	Water Level	Approximate Water Elevation	Comments
DH-1	6020	439	165	165-439	+196	6216	hole uncased thru and beneath water production zone
DH-2	6058	545	155	155-545	-12	6046	"
DH-3	6140	484	155	155-484	+157	6297	"
DH-4	6232	464	0	0	0	0	Dry hole
DH-5	6060	414	0	0	0	0	Dry hole
DH-6	6148	464	0	0	0	0	Dry hole
DH-7	6152	600	600	300-600	>gs**	>6152	Water flowing at the surface - No pressure recorded

* not surveyed - taken from U.S.G.S. Topographic map, Walker Flat Quadrangle, 40 Foot contour interval.

** Ground surface.

monitoring wells. The completion details of these holes are also shown in Table 4.

DH-1, 2, 3, and 7 have water levels which are above the ground surface, representing an artesian condition in the Ferron sandstone. DH-1 has a shut-in pressure of approximately 85 psi, representing 196 feet of water. DH-2 has a water level within the casing at 6Ø46 feet. The ground surface for DH-2 is 6Ø58 feet. The pressure head in DH-3 is 68 psi. This represents 157 feet of water. The shut-in pressure of DH-7 was not recorded, however it has a sustained flow of approximately 5 gallons per minute (gpm) from a casing above the ground surface.

Lines and Morrissey (1983) estimate, based on a computer simulation of the Ferron Sandstone Aquifer (Morrissey, et al., 198Ø), that potentiometric surface in the area of the mine is between 6ØØØ to 6Ø5Ø feet and moves toward Ivie Creek and to the east. Comparison of these estimated potentiometric surface elevations with the approximate elevation values presented in Table 4, shows only one close value. The remaining three water levels are 1ØØ to 25Ø feet higher. This variation is most likely due to the semiquantitative nature of the computer simulation data. Lines and Morrissey (1983) indicate that the computer model predictions are semiquantitative due to: the lack of historical data verification; the nonsteady state conditions during data collection period; and the inability of the model

used to account for the fractures in the Ferron Sandstone which act as major groundwater flow conduits.

The computer model was based on actual data inputs of transmissivity, hydraulic conductivity, and storage. As part of the Lines and Morrissey study (1983) values for each parameter were determined. Aquifer tests were conducted to determine transmissivity values. Transmissivities ranged from 200 to 700 square feet per day downdip from the outcrop area to less than 200 square feet per day in the outcrop area. Hydraulic conductivity values were evaluated for the sandstones and shales. The sandstones were found to average 1.5×10^{-1} feet per day in the horizontal direction and 9.1×10^{-2} feet per day in the vertical. Conductivity values for the shales were found to average 3.8×10^{-4} feet per day horizontally and 1.3×10^{-3} feet per day in the vertical. It is felt that the reduction of the transmissivity value toward the outcrop is a result of the thinning of the formation and a reduction in the saturated thickness rather than a change in the hydraulic conductivity.

The storage coefficient, for the confined portion of the aquifer, ranges from 3.0×10^{-6} to 2.0×10^{-3}. For the unconfined zone, the storage coefficient is estimated to average about 0.05.

Quality of the regional ground water is generally quite good, with municipal and industrial uses farther up gradient (toward

Emery). In and adjacent to the mine, four water wells were completed by Soldier Creek Coal Company for industrial use. Water rights were filed and approved for these wells (App # 47409). Water analyses from these wells shows the water quality to be good. TDS concentrations ranged from 610 to 850 mg/l with no elevated metals concentrations. The ground waters, like the surface waters, are dominated by sodium and sulfate ions.

5.0 Consequences of Reclamation Activities

This sub-section provides a general description of the reclamation activities and their consequences and impacts.

5.1 Description of Reclamation Plan

The reclamation plans for the Hidden Valley mine call for reclamation of the portal pad area and restoration of the portal access road. The proposed plans are:

1. Removal of the 48" culvert for the ephemeral drainage under the pad and at the road crossing and the 18" culverts from the portal bench terraces above the A and B seams to Ivie Creek, regrading of the site, and restoration of the ephemeral channel to convey water to Ivie Creek.
2. Removal of the sediment pond discharge structures and regrading of the pond embankments and A-seam pad to establish and ensure adequate drainage for the site.

3. Installation of a combination of berms and silt fences along the edge of the regraded slopes and the ephemeral channel to serve as temporary sediment control measures.

4. Removal of the road culverts, regrading of the road surface to slope to the ephemeral drainage, and installation of water bars at a 45 degree angle to ensure drainage is conveyed off of the road to the ephemeral channel.

5. Revegetation of the site with an acceptable seed mix and erosion protection with hay mulch applied at a rate of 4,000 pounds per acre.

Further details of the channel restoration plan can be found in the Hydrology Section of the reclamation plan for the Hidden Valley mine.

5.2 Impacts and Consequences of the Reclamation Plan

5.2.1 Ground Water

Based on the fact that no ground water has been encountered at the site or in the underground workings and that the ground water is confined and isolated from the surface so no surface activities can or will affect the ground waters, no ground water impacts are expected.

The fill slopes at the A- and B-seams have been covered with an erosion-control matting in place of the hay mulch.

5.2.2 Surface Water

Surface water impacts at the site are expected to be minimal. Construction and reclamation activities will result in suspended and settleable solids in the runoff water from the disturbed and reclaimed areas. This sediment laden runoff will be minimized by the installation of berms and silt fences adjacent to the ephemeral drainage and to Ivie Creek during all reclamation activities.

Also, some settleable solids contributions are expected from within the restored ephemeral channel during the first few runoff events. This flushing will not be a significant problem, due to the bedrock channel bottom or to riprap protection for fill sections. Also during and for a short period following channel restoration, a silt fence will be installed across the ephemeral channel, at the confluence with Ivie Creek, to aid in controlling erosion and sediment contribution.

6.Ø Conclusion

No significant long term impacts are expected to either ground or surface waters. Some minor short term affects are expected to the surface water system from the reclamation activities; however, these will be minimized by the actions of the company during the reclamation and by nature once the reclamation is established.

References

Lines, G.C. and D.J.Morrissey, 1983. Hydrology of the Ferron Sandstone Aquifer and Effects of Proposed Surface-Coal Mining in Castle Valley, Utah, U.S.G.S. Water Supply Paper 2195. Washington, D.C.

Morrissey,D.J., G.C.Lines, and S.D.Bartholoma, 1980. Three-Dimensional Digital-Computer Model of the Ferron Sandstone Aquifer near Emery, Utah. U.S.G.S., Water-Resources Investigation 80-62. Salt Lake City, Utah.

Stokes, W.L. and R.E.Cohenour, 1956. Geologic Atlas of Utah-Emery County, Bulletin 52, Utah Geological and Mineral Survey. Salt Lake City, Utah.

UMC 784.16 (a)(1)(i-iii) Reclamation Plan: Ponds, Impoundments, Banks, Dams and Embankments

Response: See Section II, Pages 9 & 11

UMC 784.16(a)(2)(iv) Timetable

Response: Refer to Section VIII, Schedule

UMC 784.16 (a)(3)(iv)

Response: The sediment pond shall be removed concurrently with reclamation of the area.

UMC 784.16 (b)(1)

Response: Refer to Interim Plan, Runoff Control Plan

UMC 784.16 (b)(2)

Response: Refer to Interim Plan, Runoff Control Plan

UMC 784.16 (c)

Response: Refer to Interim Plan, Runoff Control Plan

UMC 784.16 (d) (e)

Response: Not Applicable

UMC 784.22

Response: See Figures IV,V,VII & VIII

UMC 817.150-.156 Roads: Class I

The Class I road was constructed with public funds and is dedicated to Sevier and Emery Counties. See ROW documents in Appendix I.

UMC 817.160-.165 Roads: Class II

Response: Refer to Interim Plan, Mine Plan Section, Figure 6.1: Appendix D

UMC 817.166 Roads: Class II: Restoration

(a) Request variance for retention of road alignment only. A variance will be required to retain the road surface materials (mostly native fill materials) and the rock cuts and fills.

(1) A sign "Road Closed" will be placed at the terminus of the paved road. A 3-wire, 42" high barbed wire fence, tied to rock

UMC 817.89 Disposal of Non-Coal Wastes

A waste bin will be located onsite during reclamation construction for disposal of solid and liquid wastes. The bin wastes and culverts or drainages structures removed will be hauled offsite to the appropriate landfill for disposal.

UMC 817.166 Roads: Class II: Restoration

(a) Request variance for retention of road alignment only. A variance will be required to retain the road surface (mostly native fill materials) and the rock cuts and fills.

ledges, will be constructed across the upper portion of the road to prevent access. This fence will be checked at each site visit during the monitoring period and maintenance completed as required to retain the integrity of the fence.

(2) The 48" diameter culvert will be removed and the natural ephemeral drainage restored and stabilized. This will require the excavation of approximately 213 cu. yds. of fill. The channel design will adhere to the standards proposed in Table I except the sideslope gradient will be less to accommodate the passage of 4WD vehicles.

(3) The 48" and two 18" diameter culverts will be removed and the excavations backfilled.

(4) The roadbed shall be ripped and scarified prior to revegetating.

(5) Fill slopes are stable and similar to natural rock slopes in the area both in materials and grades.

(6) Cut slopes are rock and shall remain. They are similar to the ledges and cliffs in the area.

(7) The eleven water bars shall be spaced according to Table 3b and located on the ripped roadbed according to Plate III at a 45

After the initial revegetation attempt on the road, two additional attempts were made to establish vegetation on the road. In the fall of 1987, and again in the fall of 1988, the road surface was ripped, seeded, fertilized and mulched according to the original Revegetation Plan. As part of the 1988 revegetation work, a photo-degradable netting was also placed to help hold the mulch.

During the 1989 work, it was decided not to do further revegetation work on the road surface, for the following reasons:

1) Each successive year of ripping the road surface to prepare the seedbed has had the negative effect of bringing large rock to the surface, while the desirable soil material has fallen into the voids. In localized areas, ripping the road continues to expose the coal bedrock just under the road surface. These consequences of ripping have substantially decreased the suitability of the road surface as an adequate medium for plant growth. Ripping has also prevented the road from being suitable as a four-wheel drive road, as was permitted during the initial Reclamation Plan. It was felt that re-ripping the road would simply worsen these problems.

2) Observations of growth patterns on the road surface over three consecutive years indicates that salinity of the soil may also be worsened by excessive disturbances such as ripping. It is thought that exposing new material to the surface, as well as creating conditions for excessive evaporation of soil moisture, has increased salinity of the already-saline soil material. It was felt prolonged exposure of the ripped soils to precipitation may leach some of the salts from the surfaces, as the ripping has provided adequate internal drainage. Also, the residue from successive seeding over the last few years has provided adequate seed when future conditions allow for germination. For the above reasons, it was felt that minimizing the disturbance on the road would be the best alternative at this time.

3) It appears that erosion from the road surface is adequately controlled, so additional ripping and reseeding is not necessary from a water quality standpoint.

Table 3b Water Bar Spacing for the Calmat Access Road.

Section	Length	Slope	Spacing	Number of Bars
1	200 ft	5.8%	800 ft	1
2	450 ft	9.7%	500 ft	1
3	450 ft	3.0%	800 ft	1
4	300 ft	0.8%	1000 ft	1
5	850 ft	11.8%	200 ft	4
6	250 ft	15.0%	160 ft	2
7	200 ft	17.0%	150 ft	1
8	200 ft	1.2%	1000 ft	0
	2900 ft			11

Slopes were taken from Plate VI, Class II Road Vertical Alignment and Plate V, Final Configuration.

degree angle to discharge into the stable rock fills. The 11 water bars will average 18" in height and 60' in length (Fig. VI). These will be checked during each site visit of the monitoring period and cleaned and repaired as necessary.

(8) No terraces are necessary.

(9) No topsoil is available to cover the road surface. The native fill is suitable growing medium if properly prepared by mulching and fertilizing.

(b) The road surface materials are suitable for revegetation as noted in (a)(9)

UMC 817.170-.176 Roads: Class III

There are no Class III roads in the permit area.

Two additional waterbars have been added near the end of the road to prevent erosion of the toe of the small roadside coal seam backfill. They were installed according to the specifications in the original Plan. Where needed to control gullying, onsite rock has been placed in the waterbar outfalls to supplement existing rock fill. Small loose-rock check dams were installed at the downstream end of the waterbars to check the water before it spills over the crest of the outfall. These checkdams were constructed with small, notched spillways to control overflow.

V Topsoil Redistribution and Surface Preparation Including Testing and Amendments

UMC 817.21 Topsoil: General Requirements

One topsoil pile of approximately 770 cu. yds. is located on the "B" seam pad.

UMC 817.24 Topsoil: Redistribution

The single topsoil stockpile will be redistributed on the "B" seam pad.

The soil stockpile on the B seam pad is approximately 770 cu. yds. of fine sand, silt loam salvaged from the alluvial benches during initial development. This will be used to topsoil the 2.1 acres of covered B seam and the regraded pad. This topsoil will be spread to a thickness of approximately 2.5 inches.

The pad at the "A" seam and the sediment pond were constructed of alluvial silt loams, rocky sandy loams and coal seam overburden. There is no topsoil available for this pad so the existing mixture of materials will be used for the seedbed. During construction an attempt will be made to salvage the better soil materials as they are exposed.

UMC 817.25 Nutrients and Soil Amendments

Composite soil samples were taken from the topsoil storage pile and from each pad in March and July, 1986. See Appendix II for the complete lab reports.

The soil materials are low in fertility. They lack sufficient cation sites and organic matter to provide the basic nutrients for plant growth. Phosphorus and nitrogen are at especially low levels. Sulfates and sodium are at high levels and very mobile in these soils. The soil textures are sandy loams. Some fines are probably contributed by coal and overburden debris. Saturation percent indicates adequate water holding capacity.

To partially overcome the poor fertility structure of these soils 4,000 lbs/acre of green alfalfa hay mulch will be applied to the seedbeds to increase organic matter and also nitrogen and potassium. Diammonium phosphate fertilizer pellets will be spread in the fall at the rate of 242 lbs/acre to increase phosphorus and nitrogen. The dragging operation on the seeded soils will cover the mulch and fertilizer. A spring application of 100 lbs/acre of liquid urea will supply additional nitrogen to the plants to compensate for the increased soil microbial action. This program will provide 140 lbs of phosphorus, 84 lbs of potassium and 187 lbs of nitrogen per acre in the seedbeds.

On areas which were reseeded during the 1989 repair work (A- and B-seam fills, and pad areas adjacent to the ephemeral channel) fertilizer was spread with a cyclone spreader. The fertilizer used during the original revegetation work was not readily available, so 16-20-0-13(S) was used in its place after onsite approval was given by Henry Sauer and Lynn Kunzler of DOGM. It was applied at the rate of 100 pounds per acre, and was supplemented with additional urea (approximately 10 pounds per acre).

Table 5 Soil Fertility Summary

Parameter	Range
pH	6.79 - 7.83
Saturation %	29.2 - 33.4
CEC meg/100	4.17 - 6.84
Alkalinity as $CaCO_3$ mg/l	45.9 - 56.3
N %	0.025 - 0.032
P mg/kg	1.50 - 3.81
K mg/kg	91 - 95
Ca mg/kg	365 - 440
Mg mg/kg	138 - 515
SO_4 mg/kg	5,490 - 10,600
Na mg/kg	120 - 425

817.25 Nutrients and Soil Amendments

The correct conductivity reading is Umhos/cm as stated in the lab reports in Appendix II.

The metals copper, iron and zinc were determined from a DPTA extract.

A lab analysis was run on a sample of native soil obtained from a adjacent undisturbed area to provide baseline fertility information. These results are located in Appendix II under sample S-5.

VI Revegetation - Including Seeding, Mulching, Planting, Irrigation, Etc.

UMC 817.111 Revegetation: General Requirements

The entire 6.7 acres of disturbed ground will be properly scarified, seeded, fertilized, mulched and covered to provide the best possible opportunity for plant growth. The road fill slopes and some small sites will require hand application of seed, mulch and fertilizer. The reclamation work is scheduled for late fall, 1986.

The proposed fertilization rate is based upon lab analysis of composite soil samples secured in March, 1986. Additional soil samples will be taken after topsoil materials are spread on the "B" seam pad and from mixed materials on "A" seam pad. These later analyses will be used to determine the actual fertilization rates.

Irrigation is not planned.

It is not contemplated that there will be a pest or disease control problem.

Cattle grazing during the revegetation process will be limited by

During the 1989 repair work, revegetation was done on the A- and B-seam fill slopes, and on pad areas adjacent to the ephemeral channel.

On the fill slopes, the seedbed was prepared by first loosening the soil and repairing the gullys by bulldozing fill materials upslope. Then a series of small depressions/catches were made by using the dozer blade to create small furrows the width of the blade (furrows were approximately 6 inches deep, 8 inches wide, spaced at 1.5-foot intervals down the slope). These were placed across the entire fill slopes. Due to the very soft, powdery nature of the recently disturbed soils, some definition of these was lost during additional disturbance by seeding and placing the erosion control matting, but they still maintained their function as a surface roughening mechanism.

Since the prepared soil surface was very loose and did not easily settle, it was not necessary to rake in the seed and fertilizer. The fertilizer was of sufficient weight to sink slightly under the soil surface, and the seed was adequately worked into the soil by the act of walking on it and applying the erosion control matting. Care was taken to apply seed during periods of no wind, and netting was done immediately afterward to prevent wind loss.

On the flatter pad areas where revegetation was done, the soil surface was prepared by ripping the soil to a depth of 6- to 8 inches. Seeding and fertilizing was done during periods of no wind and covered by the action of dozer tracks on the loose soil.

The fertilizer and seed were applied with cyclone type spreaders at the rate prescribed on previous pages.

installation of 3-wire 42" barbed wire drift fences across Ivie Creek and on the road alignment (Plate III).

UMC 817.112 Revegetation: Use of Introduced Species.

A mixture of native and commonly used introduced species will be seeded on the disturbed areas. The introduced species are legumes that provide nitrogen-fixing capabilities. Two grasses, crested wheatgrass and Russian wildrye, are used to provide erosion control and food for wildlife.

(a) Both species are now established on the site from past undocumented seedings. These two species also did well on test plots located just north of the permit area. They became quickly established as seedlings and maintained themselves during the 5 year test of revegetation success on the Emery Coal fields. See page 9 & 10 of Reclamation on Utah's Emery and Alton Coal Fields: Techniques and Plant Materials; R.B. Ferguson and Frischknecht, N.C.; Research Paper INT-335; Intermountain Forest and Range Experiment Station Ogden, Utah.

(b) Indian ricegrass and sand dropseed will be slow to germinate and establish groundcover on the reclaimed sites. Quick cover species are needed to provide erosion control in the first two-three years.

(c) The species provide food and cover for small animals. Both produce high yields of seed for birds and rodents.

(d) The two species are not poisonous or noxious and meet State and Federal seed standards.

The following seed mixture and rates will be used:

Common Name	Scientific Name	PLS lbs/acre
crested wheatgrass	Agropyron cristatum	1.Ø
sand dropseed	Sporobolus cryptandrus	Ø.5
Indian ricegrass	Oryzopsis hymenoides	3.Ø
Salina wildrye	Elymus salinus	3.Ø
Russian wildrye	Elymus junceus	1.Ø
yellow sweetclover	Melilotus officinalis	3.Ø
fourwing saltbush	Atriplex canescens	3.Ø
shadscale	Atriplex confertifolia	2.Ø
mat saltbush	Atriplex corrugata	2.Ø
winterfat	Ceratoides lanata	2.Ø
	Total	2Ø.5

This mixture varies from that listed in the Interim Plan. The mixture is designed to be salt tolerant and survive in the dry

Planting was redone on the A- and B-seam fillslopes and the pad areas adjacent to the ephemeral channel. The original revegetation mix was adjusted based upon experience gained with three seasons of planting since the original reclamation work was done in 1986. The revised seed mix is:

Common Name	Scientific Name	PLS in lb/ac
Hycrest hybrid	Agropyron cristatum	4
Indian ricegrass	Oryzopsis hymenoides	2
Russian wildrye	Elymus junceus	3
Yellow sweetclover	Melilotus officinalis	1
Fourwing saltbush	Atriplex canescens	1

All of these species were in the original mix, except that crested wheatgrass was replaced with a new, drought-tolerant hybrid of crested and Ephraim wheatgrasses. Species that were not hearty enough to withstand the drought conditions (i.e. winterfat) and species that did not germinate at all (i.e. sand dropseed) in past seedings were not utilized in the latest seeding attempt.

conditions of the talus slopes.

UMC 817.113 Revegetation: Timing

The seedbed will be prepared by ripping all compacted surfaces and scarifying the soil materials. The areas will be broadcast seeded in late fall (Oct-Nov) as the final reclamation phase. The species are all cool-season types except sand dropseed which actually germinates as late cool-season or early warm-season grass. The seed, mulch and fertilizer will be covered by dragging the loose soil surface.

UMC 817.114 Revegetation: Mulching and other stabilizing practices.

Alfalfa hay at 4000 lbs/acre will be spread on all the seeded areas. The mulch will be anchored with soil dragged over the hay. The graded slopes on the coal seams will require erosion control netting to hold the mulch and seed in place.

UMC 817.115 Revegetation: Grazing

The postmining land use is wildlife and livestock grazing. The location of the revegetated area precludes any significant value or use by livestock. Cattle use is restricted to a few head drifting along Ivie Creek. Wildlife use is restricted to small

The graded slopes on the A- and B-seams were stabilized with erosion control matting. This matting is North American Green SC-150, which is designed for use on steep slopes. It is comprised of straw and coconut fibers held together by a cotton netting and degradable, plastic netting. It was installed according to manufacturer's specifications for 2h:1v slopes, including trench-key-in, overlapping requirements, and a staple pattern of 2/sq. yd.

mammals, birds and raptors.

UMC 817.116 Revegetation: Standards for Success

A reference site is located on the talus slopes with a south aspect adjacent to the coal seams for the seedings on the pads, backfills and roadbed (Appendix IV). This corresponds to study site #3, steep rocky slopes, in the Interim Plan. The Ø.14 acre roadbase storage site in study site #4, pinyon-juniper upper benches, is a very small area. To simplify the monitoring and bond release, the standard for success for this site will be the reference site established on the talus slope in the steep rocky slope vegetative type.

The seeded area will be checked monthly (April - Sept.) during the first two growing seasons. A site check will include inspection of fences, erosion control structures, seeding condition and wildlife or pest damage. The seeded areas will be carefully scrutinized to determine the need for reseeding. Line intercept transects will be utilized in year 3 to determine the need for reseeding. However, should the initial seeding obviously be a failure reseeding could be initiated earlier.

In years 3-1Ø, the site will be visited annually during the growing season.

Reseeding of portions of the reclaimed area was accomplished in years 1, 2 and 3, and as such, no transects will be done until year 6. Monthly monitoring during the growing season will continue in years 4-6.

The cover, density and productivity of the seeded sites will be sampled in years 9 & 10 in preparation for bond release. The reference sites will be measured again with the methods used for the original measurements (See Appendix IV). The fences protecting the seedings will be removed once the plant cover goals are achieved.

UMC 817.117 Revegetation: Trees and Shrubs

No trees will be planted. A variety of shrub species are included in the seed mixture.

VII Monitoring and Maintenance

UMC 817.41-.5Ø Hydrologic Balance: General Requirements

UMC 817.52 Hydrologic Balance: Surface and Ground Water Monitoring

The surface flows in Ivie creek, a perennial stream, are and will be sampled and measured semi-annually, during the months of May and September. The water analysis includes:

Field Measurements

Specific Conductivity (umhos/cm)

pH

Water Temperature (Degrees Centigrade)

Dissolved Oxygen

Flows (cfs)

Laboratory Analyses (mg/l)

Total Dissolved Solids

Total Suspended Solids

Total Settleable Solids

Total Hardness (as $CaCo_3$)

Acidity ($HC\emptyset_3^-$)

Carbonate (Co_{3-2})

Bicarbonate ($HC\emptyset_3-$)

Calcium

Chloride

UMC 817.52 Hydrologic Balance: Surface and Ground Water Monitoring

1. The upstream surface water sampling point is 1400 feet upstream from the confluence of the ephemeral channel in the development area and Ivie Creek in section 17. See Plate Ib. The site is on a curve of Ivie Creek below cliffs.

2. The downstream surface water sampling point is 400 feet downstream of the natural channel discharge below the disturbed area in section 17. This site is on the east shore north of the large curve in Ivie Creek. See Plate Ib.

Iron (Dissolved)

Magnesium

Manganese (Total)

Potassium

Sodium

Sulfates

Oil & Grease

Cation-Anion Balance

This monitoring program will be continued until bond release is obtained.

There is no ground water monitoring planned since there was no underground development and mine-water discharge.

Water quality samples will also be secured at the discharge points from the reclaimed area to Ivie Creek during each runoff event encountered during scheduled monitoring visits (water quality and revegetation checks).

UMC 817.56 Hydrologic Balance: Postmining Rehabilitation of Sedimentation Ponds, Diversions, Impoundments and Treatment Facilities

The sediment pond will be decommissioned concurrent with reclamation as stated in UMC 784.11(b) & 784.14(a & b).

UMC 817.57 Hydrologic Balance: Stream Buffer Zones

The ephemeral stream channels disturbed during reclamation will be stabilized in a 2h:1v or 4h:1v sideslope configuration. Silt fences as shown in Plate V will aid in control of sediments from surface flows until revegetation adequately stabilizes the ground surface. The small berm and silt fences adjacent to Ivie Creek will remain throughout monitoring. No reclamation activities will be conducted in the buffer zone except for the removal of culverts that empty into the creek and the subsequent restoration of channel discharges.

Schedule Sequence of Reclamation Components

1. Haul stockpiled roadbase material (1800 cu. yds.) to "B" seam pad. 3 days*

2. Remove culverts in pads. 5 days

250' of 48" culvert, est. 10,924 cu. yds excavated

160' of 18" culvert, est. 480 cu. yds. excavated and refilled

70' of 18" culvert under the road between the pads, est. 21 cu. yds. excavated and refilled.

3. Remove pipe drains and open sediment pond dam to drain into Ivie Creek. 1 day

40' of 18" pipe, est. 178 cu. yds excavated

4. Collapse roof structures into adits and backfill (compacted) 25' into adits to seal. 2 days

74 cu. yds. of compacted fill/adit(4) = 296 cu. yds. total

5. Backfill and grade coal seams and regrade pads to drain into riprapped channels ("B" seam pad) or into channel in breached sediment pond dam ("A" seam pad). 5 days

A seam = 2,500 cu. yds.

B seam = 10,250 cu. yds.

Slopes = 1,800 cu. yds.

6. Riprap channel in "B" seam pad and install drains for "A" seam pad. 3 days

250' of channel = 458 cu. yds.

7. Spread topsoil on "B" seam bench. 1 day

770 cu. yds of topsoil

8. Prepare seedbed on 4.2 acres. 3 days

Scarify = 4 acres

Fertilize = 1016 lbs of diammonium phosphate

420 lbs of urea

Mulch = 16,800 lbs of hay

Seed = 86 lbs of seed

Broadcast and cover seed = 4.2 acres

9. Install silt fences, drift fences and erosion netting. 4 days

silt fences = 700'

drift fences= 240'

erosion netting = 2025'

* These days for each component may run concurrent or sequential. Project is estimated to take 15-20 working days to complete.

10. Remove culverts from road. 1 day

    80' of 48" diameter culvert and riprap, 213 cu. yds. of excavation

    60' of 18" diameter culvert and refill, 20 cu. yds. of excavation

11. Water bar road and rip surface for seeding. 1 day

    11 waterbars

    2.4 acres of ripping and scarifying

12. Seed road and roadbase storage site. 2 days

    2.5 acres of seeding

    51 lbs of seed

    10,000 lbs of hay

    605 lbs of diammonium phosphate

    250 lbs of urea

13. Install fence and gate on road. 1 day

    60' of fence

14. Monitor, 10 year period

    20 water sampling trips

    20 revegetation checks

IX Costs
Means Site Work Cost Data, 1986, 5th Edition
Hours represent total equipment time.

	Unit Cost	Total Cost
1. Hauling roadbase 1800 cu yds, 25 hrs.	$ 2.30	$ 4,140
spreading topsoil 770 cu yds,11 hrs.	$ 1.61	$ 1,240
Subtotal		$ 5,380
2. Removing culverts, 89 hrs.		
road 80' of 48", 213 cu yds excavation	$ 1.36	$ 290
60' of 18", 20 cu yds excavation	$ 3.85	$ 77
pads 250' of 48", 10,924 cu yds excavation	$ 1.36	$ 14,857
230' of 18", 501 cu yds excavation	$ 3.85	$ 1,945
sed pond 40' of 18", 178 cu yds excavation	$ 3.32	$ 591
remove pipe and concrete pads		$ 200
sampling for particle analysis		$ 250
Subtotal		$ 18,210
3. Covering coal seams and grading, 179 hrs.		
Collapse structures in 4 adits		$ 480
Fill 4 adits 296 cu yds	$ 3.39	$ 1003
"A" seam cover 2500 cu yds	$ 3.39	$ 8,475
"B" seam cover 10250 cu yds	$ 3.39	$ 34,748
Slope grading 1800 cu yds	$ 3.39	$ 6,102
General grading 500 cu yds	$ 3.39	$ 1,695
Subtotal		$ 52,503
4. Riprap channels, 44 hrs.		
80' in road 67 cu yds	$ 21.13	$ 1,416
250' in pad 930 cu yds	$ 21.00	$ 19,530
100' in A pad 15 cu yds	$ 21.00	$ 315
Hauling rock all sites	$ 1.78	$ 2,422
Subtotal		$ 23,683

5.	Waterbars in road and ripping, 10 hrs.		
	11 waterbars		$ 650
	rip, 2.4 acres	$ 314.58	$ 755
		Subtotal	$ 1,405
6.	Seedbed preparation and seeding, 50 hrs.		
	benches, 4.2 acres	$ 1,800	$ 7,560
	road and roadbase site, 2.5 acres	$ 1,800	$ 4,500
		Subtotal	$ 12,060
7.	Fences, gates and erosion netting, 55 hrs.		
	fences, 180'	$ 4.60	$ 843
	gate, 1 ea.		$ 200
	silt fences, 700'	$ 5.85	$ 4,095
	erosion netting, 2250 sy	$ 0.55	$ 1,238
		Subtotal	$ 6,376
8.	Drill Hole plugging, 2 holes	$ 500	$ 1,000
9.	Miscellaneous, 64 hrs.		
	Equipment mobilization		$ 5,000
	Equipment rental		$ 2,500
	Materials disposal		$ 2,500
		Subtotal	$ 10,000
		Reclamation Total	$130,617
10.	Monitoring, 10 years		
	Water sampling, 20 trips		$ 16,000
	Revegetation checks, 20		$ 7,000
		Total	$ 23,000
10.	Contigency 10%		$ 15,362
	Escalation 1.62% for 1 yr.		$ 2,737
		Subtotal	$ 18,099
		Grand Total	$171,716

ADDENDUM

This Section contains the regulatory sections normally listed in the PAP. These additional sections have been requested by the DOGM in the Completeness Review to provide other information and data for evaluation of the Reclamation Plan.

771.25 Permit Fees

The $5.00 fee will be filed with the application.

771.27 Verification of Application

The copy of verification is located at the front of the application.

782.13 Identification of Interests

(a)(1)
Permit Applicant: Soldier Creek Coal Company
subsidiary of CalMat Co.
3200 San Fernando Road
Los Angeles, California 90065

Mailing Address:
P.O. Box 2950
Los Angeles, California 90051
(213) 258-2777

(2)(3)
Surface Owners: Soldier Creek Coal Company

Mineral Owners: Soldier Creek Coal Company, lessee; see attached

owners:

B.G. Raybould	0.23530%
Sigler and Co.	2.94134%
Barbara D. Williams	1.61774%
A.W. Walker & Lovejoy Prosser	2.94134%
Helen G. Paul	2.43543%
Katherine Paul Littlefield	2.43543%
Dale W. Ahern, as personal representative of the Dorothy R. Ward Estate	2.42955%
Winifred W. Fehr	2.18052%
Zions First National Bank, as personal representative of the Samuel Walker Estate	1.09026%
Smith and Co.	4.85910%
Bank of America, as personal representative of Francis Lewis Noonan Estate	5.31501%
Forrest Kelly Eccles	4.48555%
William Walker Eccles	4.49144%
Samuel Franklin Eccles	4.49144%
Eugene K. Walker	3.77669%
Helen Kennedy Rogers	0.27060%
Paul D. Augsburg	0.27060%
June E. Kimball	0.54120%
Roger Walker Daynes	0.81181%
Sarah Daft Home	4.08553%
Nicholas W. Kuryla	1.08929%
Michale A. Kuryla	1.08929%
Charles Kuryla	1.08929%
Virginia Godnick	5.28266%
Robert von Khrum	2.22366%
M. Walker Wallace	11.76539%
Glen Walker Wallace	11.76539%
Karen Bertagnole	2.22366%
First Interstate Bank of Utah, as personal representative of John M. Wallace Jr. Estate	11.76539%

(4)
No purchasers of record under a real estate contract.

(5)
Operator: Soldier Creek Coal Company

(6)
Resident Agent:

(b)(1)(2)
Corporation: Soldier Creek Coal Company

Officers: See attached list of officers

Shareholders: See attached list of shareholders

(3)
Previous Coal Mining Permits: Permit No. ACT-007-018
Soldier Creek Coal Company Price, Utah

(3)(e)
Contiguous Owners: See Plate 1a

SW 1/4 of Section 7
SE 1/4 of section 8
Sections 19 & 20
T. 23 S., R. 6 E.
Bureau of Land Management
Price, Utah

Sections 12, 13, & 24
T. 23 S., R. 5 E.
Bureau of Land Management
Richfield, Utah

E 1/2 of Section 17
T. 23 S., R. 6 E.
Bank of California
John E. Lansing
Lovella Clark royalty conveyance

SW 1/4 of Section 8
T. 23 S., R. 6 E.
Consolidated Coal, 50% surface & mineral

SW 1/4 of Section 8
T. 23 S., R. 6 E.
The Pittsburg Midway, 50% surface & mineral

SW 1/4 of Section 8
T. 23 S., R. 6 E.
Gulf Oil Corp., 50% coal

(3)(f)
MSHA ID No. 42-01407, Hidden Valley

(3)(g)
Soldier Creek Coal Company does not have any interest or pending application for contiguous lands or minerals.

782.14 Compliance Information

(a)
No permit suspended or revoked

(b)
No bond or security forfeiture

(c)
Violations:

Date	Agency	Regulation	Action	Termination
1/30/85	DOGM	UMC 817.131 no water monitoring	resume monitoring	3/20/85
3/21/85	DOGM	UMC 817.23 topsoil stockpile not protected	seed stockpile	4/25/85
3/21/85	DOGM	UMC 817.42 no signs	signed road and area	5/24/85
1/27/86	DOGM	UMC 817.52 no water monitoring	resume monitoring	1/27/86

UMC 782.15 Right of Entry and Operation Information

(a)
Soldier Creek Coal Company is the surface owner.
Warranty Deed is attached.

(b)
Soldier Creek Coal Company has a long term coal lease to 2022
Lease is attached.

782.16 Relationship to Areas Designated Unsuitable for Mining

No areas designated unsuitable for mining are located on or near the permit area.

782.17 Permit Term Information

Coal mining is not or will not be conducted under this permit.

782.18 Personal Injury and Property Damage Insurance Information

Certificate included with Application.

782.19 Identification of Other Licenses and Permits

N.P.D.E.S. Permit # UT-ØØ237Ø with E.P.A. Denver, Colorado
no record of approval or termination

782.2Ø Identification of Public Office for Filing Information

The Emery County Recorder's Office; Castledale, Utah 84513

782.21 Newspaper Advertisement and Proof of Publication

To be filed in the Carbon County and Salt Lake City metropolitan newspapers.

783.18 Climatological Information

The closest official weather station is located at Emery, Utah about 8 miles north-northwest of the mine site. The information is taken from the Utah State by the National Oceanic and Atmospheric Administration.

(a)
The average annual precipitation is 7.55 inches. The prevailing strong winds are from the south. The daily winds shift from southeast A.M. winds to northwest P.M. winds.

Precipitation and Temperatures by Month

J	F	M	A	M	J	J	A	S	O	N	D	Total
.47	.41	.45	.42	.62	.69	.71	1.17	.79	.85	.4Ø	.57	7.55
23.9	28.9	36.5	44.6	53.3	61.4	67.8	66.Ø	58.2	47.9	35.Ø	26.8	45.9

783.19 Vegetation Information

(a)

Vegetation Type	Disturbed Acres
Rocky Slopes	6.67
Pinyon-Juniper Woodland	Ø.14
Total	6.71

783.20 Fish and Wildlife Resources Information

See 784.21 Fish and Wildlife Plan

783.24 Maps: General Requirements

See Plate 1a

784.13 General Reclamation Requirements - Revegetation

See 817.111 - 817.116 and Section VIII & IX

784.14 Protection of the Hydrologic Balance

See revised Section IV, Drainage Control

784.16 Reclamation Plan; Pond, Impoundments, Banks, Dam and Embankments

See revised Section IV, Drainage Control

784.17 Protection of Public Parks and Historic Places

There are no public parks or historic places on the disturbed area or on the Permit Area.

784.21 Fish and Wildlife Plan

The resident wildlife populations consist of small mammals, small birds, a few carnivorous mammals and raptors. The small mammals populations and the fluctuating seasonal small bird populations provide the prey base for the carnivores and raptors. Reptiles, especially lizards, are part of the prey base during the summer.

The plant cover is generally sparse and consequently forage production is low. The cliffs and rock slopes provide ample cover and security for the animals. Ivie Creek has a sparse narrow band of riparian vegetation.

The only specific wildlife reports (USFWS, 1980) for the area mentioned a owl's nest in one of the adits. This site was visited in March, April and May of 1986 with no reports of owl observations. An active prairie falcon nest was noted on a cliff face south of Ivie Creek about 900 feet from the portal pads. The nesting was completed by late April.

The fall construction period will not impact falcon nesting in the vicinity. The restoration of vegetation will provide some

habitat on otherwise barren sites. The use of legumes and grasses will provide a small amount of additional forage for small mammals and birds. The new shrubs will provide sparse cover for these small animals. Probably the major beneficiary of this small amount of forage from the increased cover and food will be the migratory flocks of small birds and mourning doves.

The closing of the road will reduce harassment of wildlife and particularly the nesting prairie falcons.

784.22 Diversions

See revised Section IV, Drainage Control.

784.26 Air Pollution Control Plan

(a)(b)
Construction in this small area within a protected drainage will not produce copious amounts of fugitive dust. In this remote area no croplands or developments are contiguous to the permit area. During periods of strong winds large amounts of dust are transported naturally from the many barren and exposed soils in this area often exceeding Class II particulate levels.

During periods of extreme wind (50 mph+) construction will be delayed until winds abate. Water control of dust is not deemed necessary in this protected canyon. The only activity outside of the canyon is loading of the roadbase material which is a gravelly sandy material.

817.99 Slides and Other Damage

Soldier Creek Coal Company will mitigate any slide damage on the permit area for the period of their obligations under the Reclamation Plan.

GENERAL OFFICES: 3200 SAN FERNANDO ROAD
LOS ANGELES, CA 90065
TEL: 213-258-2777

CALMAT CO.
3200 San Fernando Road
Los Angeles, California 90065

PROXY STATEMENT

This statement is furnished in connection with the solicitation of proxies to be mailed on or about March 19, 1986, for use at the Annual Meeting of Shareholders of CALMAT CO. (the "Company"), to be held on Wednesday, April 16, 1986. This solicitation is made by the Board of Directors of the Company, and the costs thereof, which will be borne by the Company, are expected to be nominal. In addition to solicitation of proxies by mail, the Company may utilize the services of directors, officers and regular employees of the Company (who will receive no additional compensation therefor) to solicit proxies personally and by telephone and telegraph.

Brokerage houses, custodians, nominees, and others who hold stock in their names will be reimbursed for expenses incurred by them in sending proxy material to their principals.

The shareholders of record at the close of business on March 14, 1986, are entitled to one vote for each share of stock held by them. Each shareholder entitled to vote at any election for directors has the right to cumulate his votes and give one candidate a number of votes equal to the number of directors to be elected multiplied by the number of votes to which his shares are entitled, or to distribute his votes on the same principle among as many candidates as he thinks fit. The proxy solicited by the Board of Directors confers discretionary authority on the proxies to cumulate votes so as to elect the maximum number of nominees. Proxies cannot be voted for a greater number of persons than the number of nominees named.

On February 1, 1986, there were outstanding 15,080,814 shares of common stock, $1 par value, all of which are of one class. The following shows information with respect to the only persons known to the Company to be the beneficial owners of more than 5% of the Company's outstanding stock as of February 1, 1986. For the purpose of this proxy statement, beneficial ownership of securities is defined in accordance with the rules of the Securities and Exchange Commission and means generally the power to vote or dispose of the securities, regardless of any economic interest therein. Unless noted otherwise, beneficial owners listed have sole voting and investment power with respect to the shares reported.

Name and Address of Beneficial Owner	Amount and Nature of Beneficial Ownership	Percent of Class
The Dan Murphy Foundation Post Office Box 76026 Los Angeles, CA 90010	2,108,001 shares	14.0
Richard D. Colburn 1120 La Collina Dr. Beverly Hills, CA 90210	895,605 shares(a)	5.9
Directors and officers as a group	1,848,135 shares(b)	12.3

(a) Shareholder has shared voting and investment power with respect to these shares.

(b) Includes presently exercisable options to purchase 131,127 shares.

PART III

Identification of Executive Officers:

Name	Age	Position	Served in Such Office Since(a)
William Jenkins	66	Chairman of the Board and Chief Executive Officer	June, 1984
A. Fredrick Gerstell	48	President and Chief Operating Officer	June, 1984
Ronald E. Evans	47	Executive Vice President and General Manager, California Portland Cement Co.	June, 1984
Michael J. Kerstetter	49	Executive Vice President and General Manager, Conrock Div.	June, 1984
Thomas M. Linden	42	Executive Vice President and General Manager, Properties Division	April, 1985
Ronald J. Hadfield	45	Senior Vice President, Chief Financial Officer	April 1985
Scott J Wilcott	48	Senior Vice President, Legal Counsel and Secretary	June, 1984
Gene R. Block	48	Vice President, Properties	June, 1984
David S. Cahn	47	Vice President, Regulatory Matters	June, 1984
John L. Frogge	39	Vice President, Administration	June, 1984
Wilbur B. Jager	56	Vice President, Marketing	April, 1985
John G. S. Mills	34	Vice President, Chief Accounting Officer	December, 1984
Anthony E. Sarris	48	Vice President, Technical Services	October, 1985
David C. Lauritzen	43	Treasurer and Assistant Secretary	June, 1984
Vaughn S. Corley	51	Senior Vice President, Arizona Portland Cement Co.	June, 1984
George W. Cosby	51	Vice President and General Manager, Valley Reclamation Co.	June, 1984
Bruce A. Dyer	35	Vice President and General Manager, CalMat Co. of Arizona	June, 1984
Gerald H. Weber	56	Vice President and General Manager, CalMat Properties Co.	June, 1984

(a) with the exception of Messrs Linden, Hadfield, Mills and Sarris each executive officer has served in office since the date of the merger of Conrock Co. and California Portland Cement Co. which occured on June 27, 1984

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

CalMat Co.

By /s/ William Jenkins
William Jenkins, Chairman of the Board and Chief Executive Officer

By /s/ A. Frederick Gerstell
A. Frederick Gerstell, President and Chief Operating Officer

March 26, 1986

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

Signature	Capacity	Date
/s/ William Jenkins William Jenkins	Chairman of the Board and Chief Executive Officer	March 25, 1986
/s/ A. Frederick Gerstell A. Frederick Gerstell	President and Chief Operating Officer and Director	March 25, 1986
/s/ Ronald C. Hadfield Ronald C. Hadfield	Principal Financial Officer	March 25, 1986
/s/ John G. S. Mills John G. S. Mills	Principal Accounting Officer	March 25, 1986
/s/ Thomas F. Call Thomas F. Call	Director	March 25, 1986
/s/ Keith W. Colburn Keith W. Colburn	Director	March 25, 1986
/s/ Harry M. Conger Harry M. Conger	Director	March 25, 1986

Signature	Capacity	Date
/s/ Richard A. Grant, Jr. Richard A. Grant, Jr.	Director	March 25, 1986
/s/ Grover R. Heyler Grover R. Heyler	Director	March 25, 1986
/s/ Albert J. Hicks Albert J. Hicks	Director	March 25, 1986
/s/ William T. Huston William T. Huston	Director	March 25, 1986
/s/ Oscar T. Lawler Oscar T. Lawler	Director	March 25, 1986
/s/ Thomas M. Linden Thomas M. Linden	Director	March 25, 1986
Thomas L. Lowe	Director	March , 1986
/s/ Stuart T. Peeler Stuart T. Peeler	Director	March 25, 1986
/s/ Harold H. Short Harold H. Short	Director	March 25, 1986

EXHIBIT 22.1

CALMAT CO.

SUBSIDIARIES OF REGISTRANT

December 31, 1985

Name of Company	Organized Under the Laws of	Percentage of Stock or Interest Owned by Registrant
Arizona Portland Cement Company..... (a division of California Portland Cement Company)	Arizona	100 %
Bakersfield Ready Mix Company	California	100 %
California Portland Cement Company...	California	100 %
CalMat Co. of Arizona.....	Arizona	100 %
CalMat Properties Co.	California	100 %
Carroll Canyon Centre Co.	California	100 %*
Colton Lime and Stone Co. ..... (a division of California Portland Cement Company)	California	100 %
Conrock Co.	California	100 %
Industrial Asphalt, a Joint Venture..	California	50 %
Huntmix, Inc.	California	100 %
Palomar Transit Mix, Inc.	California	66.7%
Reliance Transport Co.	California	100 %
Sloan Canyon Sand Co.	California	100 %
Valley Reclamation Co.	California	100 %

*Through ownership of CalMat Properties Co.

WHEN RECORDED, MAIL TO:

J. Randolph Elliott, Esq.
Vice President & General Counsel
California Portland Cement Co.
800 Wilshire Boulevard
Los Angeles, California 90017

92

Recorded at Request of:

Soldier Creek Coal Company
90 West First North
Professional Building
Price, Utah 84501

Assignment of Coal Lease

Pursuant to a Coal Lease dated August 20, 1976 (the "Lease"), between Ivie Creek Coal Company, a Utah corporation ("ICCC"), as lessor, and Clifford Minerals Corporation, a Utah corporation ("Clifford"), and Peter L. Shea ("Shea") as lessees, ICCC leased to Clifford and Shea certain rights, as more fully set forth in the Lease, with respect to the following described real property located in Emery County, Utah:

> The West half of Section 17 and all of Section 18, Township 23 South, Range 6 East, S.L. Mer.

A Memorandum of the Lease was recorded on August 25, 1976, Entry No. 252949, Book 87, page 698, in the records of the Recorder of Emery County, Utah. The Lease was assigned on September 22, 1976, by Clifford and Shea to Ivie Creek Coal Associates, a Utah limited partnership ("Ivie Creek"), and such assignment was recorded on November 17, 1976, Entry No. 257680, Book 89, page 185, in the records of the Recorder of Emery County, Utah. Ivie Creek wishes to assign all its right, title and interest in and to the Lease to Soldier Creek Coal Company, a Utah corporation ("Soldier Creek");

STATE OF UTAH
COUNTY OF EMERY
FILED AND RECORDED
JAN 12 9 13 AM 1978
IN BOOK 96 PAGE 92
EMERY COUNTY RECORDER
Estella H. Hayman

257593

93

NOW, THEREFORE, for $10 and other good and valuable consideration, receipt of which is hereby acknowledged, Ivie Creek, by its two General Partners, does hereby:

Assign, sell, transfer and set over to Soldier Creek Coal Company, 90 West First North, Professional Building, Price, Utah 84501, all of Ivie Creek's right, title and interest in and to the Lease and the real property described therein.

This Assignment may be executed in counterparts and all the counterparts thereof shall be construed together as one instrument.

IN WITNESS WHEREOF, Ivie Creek has executed and delivered this Assignment as of the 12th day of January, 1978.

IVIE CREEK COAL ASSOCIATES

By _____
Peter Shea
A General Partner

By: CLIFFORD MINERALS CORPORATION
A General Partner

By _____
Joseph C. Bennett
President

[Corporate Seal]

Attest:

_____
Secretary

Acknowledgment By
General Partners

State of New York)
: ss.:
County of New York)

January 10, 1978

On January 10, 1978, before me, the undersigned Notary Public, personally appeared Peter L. Shea, who being first duly sworn declared (1) that he is the person whose name is subscribed; (2) that he subscribed the within instrument and acknowledged that he executed the same.

WITNESS MY HAND AND SEAL.

LEANDER T. BROWN
No. 41-4517590
Qualified in Queens County
Certificate filed in New York County
Commission Expires March 30, 1978

Leander T. Brown
Notary Public

My term of office expires on the day of , 19 .

State of Utah)
: ss.:
County of Salt Lake)

On the 10th day of January, 1978, personally appeared before me Joseph C. Bennett, who being by me duly sworn did say that he is the President of Clifford Minerals Corporation, and that the foregoing Assignment was signed on behalf of said corporation by authority of a resolution of its Board of Directors, and he further duly acknowledged to me that the corporation executed the same.

Karen L Matthews
Notary Public
Residing at Salt Lake City, Utah

NOTARY PUBLIC — STATE OF UTAH

My Commission Expires:

10/9/78

259391

STATE OF UTAH
COUNTY OF EMERY } SS
FILED AND RECORDED FOR
Joe Hammond
JAN 20 9 21 AM '77
BK 90 PG 47-49
Estella L. Sargent
COUNTY RECORDER

COAL LEASE
(Short Form)

This Coal Lease made as of August 20, 1976, by and between Ivie Creek Coal Company, a Utah corportion having its principal office at 518 Walker Bank Building, Salt Lake City, Utah ("Lessor") and Ivie Creek Coal Associates, a Utah limited partnership having an office at 1720 Beneficial Life Tower, Salt Lake City, Utah ("Lessee"), witnesseth that:

Whereas, the Lessor, as lessor, and Peter L. Shea and Clifford Minerals Company, a Utah corporation, as lessee, said lessee having an office at 1720 Beneficial Life Tower, Salt Lake City, Utah, entered into a Coal Lease dated August 20, 1976, covering the coal and coal mining rights in property situated in Emery County, Utah and more particularly described therein and hereinbelow, and a Memorandum thereof was recorded in the office of the County Recorder of Emery County on August 25, 1976 in Book 87 at page 698; and

Whereas, the leasehold interest under said Coal Lease was thereafter assigned by Clifford Minerals Corporation and Peter L. Shea (joined by Nancy Shea, his wife) to Ivie Creek Coal Associates, the present Lessee, by counterpart instruments executed and delivered as of September 22, 1976, and such instruments were recorded in the office of the County Recorder of Emery County in Book 89 at pages 185-187; and

Whereas, such Coal Lease has not been recorded and the parties now, in consideration of the premises and to make an instrument for recordation, do hereby agree as follows:

1. Lessor has leased and does hereby lease to and Lessee has leased and hereby leases from Lessor the coal rights and interests in real property in Emery County, State of Utah

described as :

The West half of Section 17 and all of Section 18 of Township 23 South, Range 6 East, Salt Lake Meridian.

During the life of this lease, Lessee may freely drill, explore, prospect, develop, mine, strip, extract and sell such coal therefrom as it may elect, and use the surface and underground thereof for all lawful purposes.

2. The term hereof commences August 20, 1976 and ends the 31st day of January, 2007, except that Lessee may extend such term for an additional 30 years thereafter (or until January 31,2037) on certain conditions. Such term is subject to surrender, or to termination, on certain conditions.

3. Further rights and obligations of the parties under such lease are set out in full in the Coal Lease covering the subject property and dated August 20, 1976.

In witness whereof, Lessor has caused the execution hereof by its officers thereunto duly authorized, and the Lessee has caused the execution hereof by Clifford Minerals Corporation, a general partner therein, said general partner being authorized so to do and the officers of such general partner being authorized to act on its behalf. This Memorandum is made as of the date first above written and is actually signed this 30 day of December, 1976.

SIGNATURE NOT LEGIBLE FOR MICRO-FILM

Ivie Creek Coal Company

ATTEST:

By _____

Its _____

Ivie Creek Coal Associates, a Utah limited partnership, by Clifford Minerals Corporation, a general partner thereof

ATTEST:

By _____

Its President

Portia C. Williams

STATE OF UTAH)
: ss.
COUNTY OF SALT LAKE)

On the 30th day of December, 1976, personally appeared before me M. Walker Wallace and Edward G. Richards, who being by me duly sworn did say, each for himself, that he the said M. Walker Wallace is the President, and he the said Edward G. Richards is the Secretary of Ivie Creek Coal Company, and that the within and foregoing instrument was signed in behalf of said corporation by authority of a resolution of its Board of Directors, and said M. Walker Wallace and Edward G. Richards each duly acknowledged to me that said corporation executed the same.

Notary Public
Residing in: Salt Lake City, Utah

My Commission expires:
My Commission Expires March 31, ..

STATE OF UTAH)
: ss.
COUNTY OF SALT LAKE)

On the 10th day of ~~December, 1976~~ January, 1977, personally appeared before me Joseph Bennett and Portia C. Williams who being by me duly sworn did say, each for himself, that he the said Joseph Bennett is the President, andshe the said Portia C. Williams is the Secretary of Clifford Minerals Corporation, and that the within and foregoing instrument was signed in behalf of said corporation by authority of a resolution of its Board of Directors, and said Joseph Bennett and Portia C. Williams each duly acknowledged to me that said corporation executed the same.

Notary Public
Residing in: Salt Lake City, Utah

My Commission expires:
10/9/78

WHEN RECORDED, MAIL TO:

J. Randolph Elliott, Esq.
Vice President and General Counsel
California Portland Cement Company
800 Wilshire Boulevard
Los Angeles, California 90017

95 C

Space Above for Recorder's Use

WARRANTY DEED

IVIE CREEK COAL ASSOCIATES, a limited partnership organized and existing under the laws of the State of Utah, with its principal office at 1720 Beneficial Life Tower, County of Salt Lake, State of Utah, Grantor, hereby conveys and warrants to SOLDIER CREEK COAL COMPANY, a Utah corporation, of Salt Lake City, Utah, Grantee, for the sum of TEN AND NO/100 ($10.00) DOLLARS the following described tract of land in Emery County, State of Utah:

The West half of Section 17 and all of Section 18 of Township 23 South, Range 6 East, Salt Lake Meridian.

INCLUDING ALL WATER RIGHTS APPURTENANT TO SAID LAND.

UTAH) ss
OF EMERY)
Creek Coal
9 11 78
96 95
96
Y

BUT SUBJECT TO the certain reservation and easement contained in and more particularly described in the Warranty Deed with respect to said land from Ivie Creek Coal Company to Ivie Creek Coal Associates dated October 29, 1976, recorded under Entry No. 258784, in Book 89 at page 483, Emery County Records.

AND ALSO SUBJECT TO general taxes accruing after December 31, 1977.

IN WITNESS WHEREOF, the Grantor has executed this Warranty Deed by all of its General Partners as of the 12th day of January, 1978.

IVIE CREEK COAL ASSOCIATES

By: Peter L. Shea
Peter L. Shea
A General Partner

By: CLIFFORD MINERALS CORPORATION
A General Partner

By J. C. Bennett
Joseph C. Bennett
President

[Corporate Seal]

ATTEST:

Portia C. Williams
Secretary

Acknowledgment By
General Partners

State of New York)
: ss.:
County of New York)

January 10, 1978

On January 10, 1978, before me, the undersigned Notary Public, personally appeared Peter L. Shea, who being first duly sworn declared (1) that he is the person whose name is subscribed; (2) that he subscribed the within instrument and acknowledged that he executed the same.

WITNESS MY HAND AND SEAL.

LEANDER T. BROWN
No. 41-4517590
Qualified in Queens County
Certificate filed in New York County
Commission Expires March 30, 1978

Leander T. Brown
Notary Public

My term of office expires on the day of , 19 .

State of Utah)
: ss.:
County of Salt Lake)

On the 10th day of January, 1978, personally appeared before me Joseph C. Bennett, who being by me duly sworn did say that he is the President of Clifford Minerals Corporation, and that the foregoing Warranty Deed was signed on behalf of said corporation by authority of a resolution of its Board of Directors, and he further duly acknowledged to me that the corporation executed the same.

Karen S. Matthews
Notary Public
Residing at Salt Lake City, Utah

My Commission Expires:

10/9/78

RONNY L. CUTSHALL, of
Jones, Waldo, Holbrook & McDonough
800 Walker Bank Building
Salt Lake City, Utah 84111

Space Above for Recorder's Use

483

STATE OF UTAH } ss
COUNTY OF EMERY }
FILED AND RECORDED FOR
Penny Cutshall
DEC 15 9 07 AM '76
BOOK 89 PAGE 483
Estella M. Hansen
COUNTY RECORDER

2587784

Warranty Deed
(Corporate Form)

IVIE CREEK COAL COMPANY, a corporation organized and existing under the laws of the State of Utah, with its principal office at 518 Walker Bank Building, of County of Salt Lake, State of Utah, grantor, hereby conveys and warrants to

IVIE CREEK COAL ASSOCIATES, a limited partnership

Grantee
of Salt Lake City, Utah
for the sum of
TEN AND NO/100----------($10.00)----------DOLLARS,
the following described tract of land in Emery County,
State of Utah:

The West half of Section 17 and all of Section 18 of Township 23 South, Range 6 East, Salt Lake Meridian.

INCLUDING ALL WATER RIGHTS APPURTENANT TO SAID LAND.

BUT RESERVING TO GRANTOR, its successors and assigns, all coal, mineral, oil and gas rights on, in and to said land; and solely for purposes thereof, the right of reasonable access, ingress and egress in and to said land.

Entry No. 258784
Book 89 page 483
Emery Co. Records
recorded Oct 29, 1976

The officers who sign this deed hereby certify that this deed and the transfer represented thereby was duly authorized under a resolution duly adopted by the board of directors of the grantor at a lawful meeting duly held and attended by a quorum.

In witness whereof, the grantor has caused its corporate name and seal to be hereunto affixed by its duly authorized officers this 29th day of October A. D., 1976,

Attest:
Edward G. Richards Secretary.
(Corporate Seal)

IVIE CREEK COAL Company
By
M. Walker Wallace President.

STATE OF UTAH,
County of SALT LAKE } ss.

On the 29th day of October, A.D. 1976 personally appeared before me M. Walker Wallace and Edward G. Richards who being by me duly sworn did say, each for himself, that he, the said M. Walker Wallace is the president, and he, the said Edward G. Richards is the secretary of Ivie Creek Coal Company, and that the within and foregoing instrument was signed in behalf of said corporation by authority of a resolution of its board of directors and said M. Walker Wallace and Edward G. Richards each duly acknowledged to me that said corporation executed the same and that the seal affixed is the seal of said corporation.

Notary Public.

My Commission expires 11-13-77 My residence is S. Salt Lake City, Utah

FORM 101C—WARRANTY DEED, CORP. FORM—KELLY CO., 55 W. NINTH SOUTH, S.L.C., UTAH

Appendix I

ROW Documents

BLM ROW

County ROW

United States Department of the Interior

IN REPLY REFER

2800
U-43522
(U-942)

BUREAU OF LAND MANAGEMENT
UTAH STATE OFFICE
University Club Building
136 East South Temple
Salt Lake City, Utah 84111

DECISION

Right-of-Way Granted

Details of Grant

Serial number of grant:	Utah 43522
Name of Grantee:	Sevier County 250 North Main Richfield, UT 84701
Map showing the location and dimensions of grant	Sevier County Collector Road (R-514(1) BLM
Map designations:	Right-of-way Easement
Date filed:	8/9/79
Permitted use by grantee:	County Collector Road 100 feet wide
Authority for grant:	Title V of the Federal Land Policy and Management Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1781)
Date of grant:	SEP 7 1979
Expiration date of grant:	September 6, 2009
Rental	
Amount:	None (County Government)
When payable by grantee:	

Terms and conditions of the grant are set forth on the following pages.

BUREAU OF LAND MANAGEMENT
UTAH STATE OFFICE

Serial No. U-43522

PROOF OF CONSTRUCTION

DEC 29 1980

SEVIER RESOURCE AREA

Rex W. Friant (name of engineer) states that he is the chief engineer or was employed to ~~supervise or~~ check the construction of the County Road (type of right-of-way) for the Emery County (company); that said County Road (type of right-of-way) has been constructed under his supervision; that construction was commenced on the 10th day of January, 1980, and completed on the 18th day of December, 1980; that the constructed right-of-way as aforesaid conforms to the map which received the approval of the Department of the Interior on the 22nd day of August, 1979.

Rex W. Friant
(Signature of engineer)

I, Elmo Herring (company officer) certify that I am ~~the~~ County Commission Chairman (title) of ~~the~~ Sevier County (~~company~~); that the County Road (type of right-of-way) was actually constructed as set forth in the above statement of Rex W. Friant (name), chief engineer, and on the exact location represented on the map approved by the Department of the Interior on the 22nd day of August, 1979; and that the county has in all things complied with the requirements of the Act of October 21, 1976 granting rights-of-way for County Roads (type of right-of-way) through public lands of the United States.

(SEAL)

Elmo Herring
(Signature of applicant)

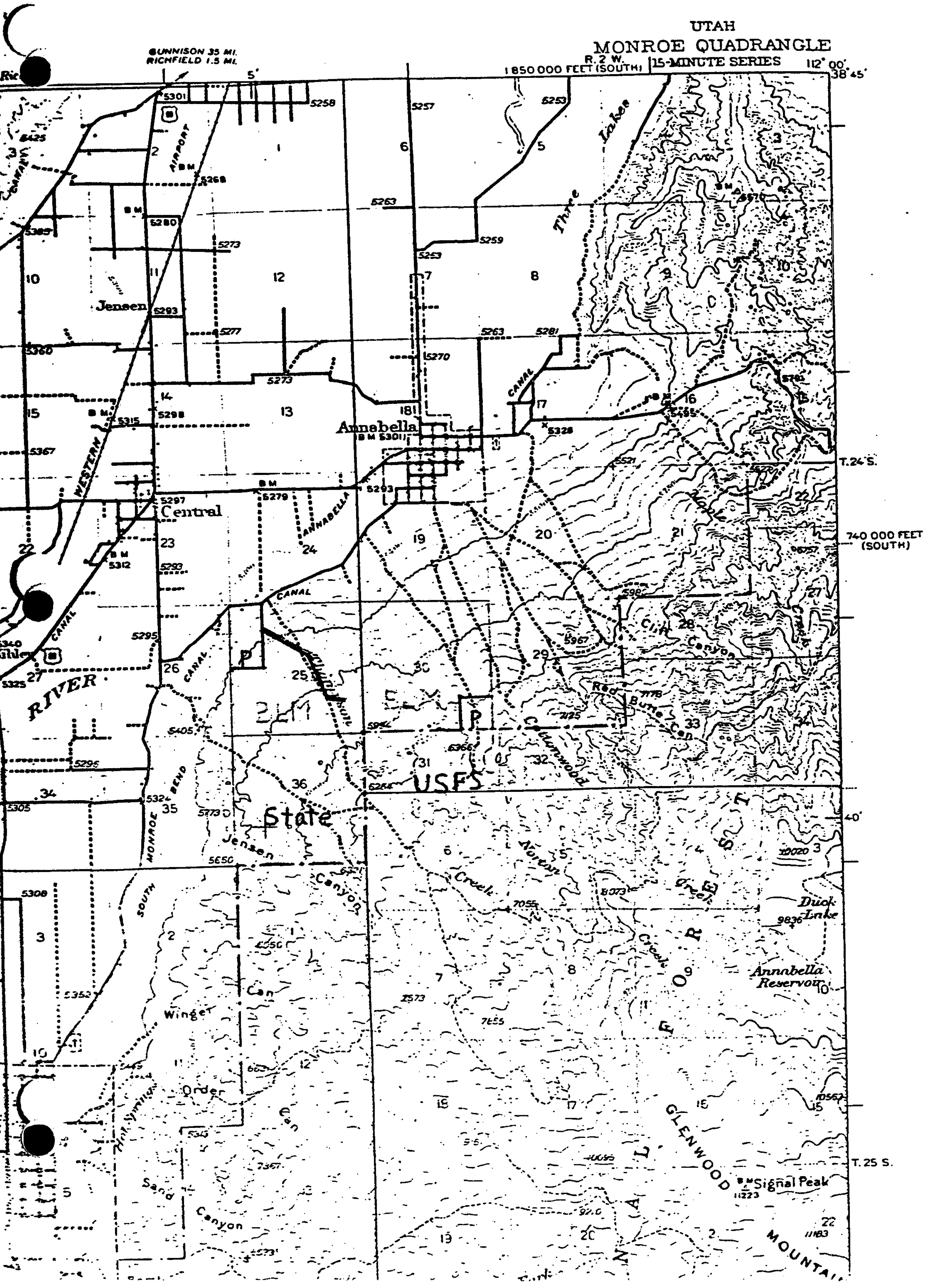
County Commissioner
(Title)

Sevier County
(Company)

Attest:

Lee Carlson

USO 2800-7 (March 1976)


UTAH
MONROE QUADRANGLE
15-MINUTE SERIES
R. 2 W.
1 850 000 FEET (SOUTH)
112° 00'
38° 45'
GUNNISON 35 MI.
RICHFIELD 1.5 MI.
AIRPORT
Jensen
Annabella
B M 5301
Central
WESTERN
CANAL
ANNABELLA
RIVER
Three Lakes
Maple
Cliff Canyon
Red Butte Can
Cottonwood
T. 24 S.
740 000 FEET (SOUTH)
BLM
USFS
State
Jensen Canyon
MONROE BEND
SOUTH
Norton Creek
Creek
Duck Lake
Annabella Reservoir
Winger Can
Order Can
Sand Canyon
40'
T. 25 S.
Signal Peak
GLENWOOD MOUNTAIN
FOREST

IN REPLY REFER TO

2800
U-43522
(U-942)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Utah State Office
University Club Building
136 East South Temple
Salt Lake City, Utah 84111

ACCEPTANCE
NOTICE OF STIPULATIONS

I hereby certify that I am an authorized officer for _____

Sevier County,

and that I have reviewed the above terms and conditions of right-of-way grant U-43522

Glenn R. Herring
Signature

Chairman.
Title

8-30-1979
Date

EASEMENT

WE, THE UNDERSIGNED owners of real property situated and located in Emery County, State of Utah, do hereby convey, grant, and release to Emery County, State of Utah, an easement and right-of-way for the construction, operation and maintenance of a portion of Collector Road Project CR 514 (1), over and through the following described real property situated in said Emery County, and more particularly described as follows:

STATE OF UTAH) SS
COUNTY OF EMERY)
FILED AND RECORDED FOR
DEC 31 9 33 AM 79
IN BOOK 111 PAGE 482-486
COUNTY RECORDER

288304

See Exhibit 'A'

THE CONSIDERATION to be paid for this easement is the sum of One Dollar ($ 1.00), said sum to be paid to the grantors upon execution of this agreement. Grantors hereby agree that Emery County shall have the right of ingress to and egress from the property above described for the purpose of constructing, maintaining, and repairing that portion of Collector Road Project CR 514 (1) and its related facilities, to be located on the above described property.

The easement herein granted by the undersigned is a perpetual easement.

DATED this 21st day of November, 19 79.

M. D. Rose

Vice President & General Manager

SUBSCRIBED AND SWORN to before me, a Notary Public, in and for the State of Utah, on this day and year above written.

Notary Public Jean Whipple

Residing at: Price, Utah

Commission Expires: April 1, 1980

Right-of-Way Description for

Collector Road Project CR 514 (1) in

Emery County

Parcel 1 being a tract of property in Section 18, Township 23 South, Range 6 East, Salt Lake Base and Meridian.

The boundaries of said parcel of land are described as follows:

Beginning at a pt. S. 0°03'26" E. along the Section line 1183.01 ft. from the NW cor. of Section 18, T.23S., R 6E., S.L.B. & M., which pt. is Engineers Centerline Station 90 + 36.40; thence N. 0°03'26" W. along the Section line 71.85. to a pt.; thence NE'ly 225.61 ft. along the arc of a 798.83 ft. radius curve to the left, (the chord of said curve bears N. 34°07'21" E. 224.85'), to a pt. 50.00 ft. radially distant NW'ly from Engineers Centerline Station 93 + 29.33; thence N. 23°55'01" E. 270.86 ft. to a pt.; thence N. 9°20'01" E. 52.20 ft. to a pt.; thence N. 26°01'58" E. 100.00 ft. to a pt.; thence N. 52°07'04" E. 34.11 ft. to a pt. 60 ft. perpendicularly distant NW'ly from Engineers Centerline Station 97 + 80.64; thence 1006.71 ft. NE'ly along the arc of a 908.83 ft. radius curve to the right, (the chord of said curve bears N. 57°45'58" E. 956.03'), to a pt. 60.00 ft. radially distant N'ly from Engineer Centerline Station 107 + 20.89; thence N. 89°29'58" E. 729.46 ft. to a pt. 60.00 ft. perpendicularly distant N'ly from Engineer station 114 + 50.35; thence 334.87 ft. SE'ly along the arc of a 2606.48 ft. radius curve to the right, (the chord of said curve bears S. 86°49'11" E. 334.65 ft.), to a pt. 60.00 ft. radially distant N'ly from

Engineer Centerline Station 117 + 77.51; thence N. 89°52'44" E. 123.41 ft. to a pt.; thence S. 83°08'22" E. 395.12 ft. to a pt. 75.00 ft. perpendicularly distant N'ly from Engineer Centerline Station 122 + 95.12; thence 567.40 ft. E'ly along the arc of a 2471.48 ft. radius curve to the left, (the chord of said curve bears S 89°42'59" E. 566.15), to a pt. 75.00 radially distant N'ly from Engineer Centerline Station 128 + 79.74; thence S. 89°10'59" E. 121.19 ft. to a pt.; thence N. 83°42'24" E. 439.03 ft. to a pt. 60.00 ft. perpendicularly distant N'ly from Engineer Centerline Station 134 + 39.03; thence 302.90 E'ly along the arc of 2606.48 ft. radius curve to the right, (the chord of said curve bears N. 87°02'09" E. 320.73 ft.), to a pt. 60.00 ft. radially distant N'ly from Engineer Centerline Station 137 + 34.96; thence S. 89°38'06" E. 265.04 ft. to a pt.; thence N. 80°09'41" E. 101.61 ft. to a pt.; thence S. 89°38'06" E. 300.00 ft. to a pt.; thence S. 79°25'53" E. 101.61 ft. to a pt.; thence S. 89°38'06" E. 425.93 ft. to a pt. in the East Section line of said Section 18; thence S. 0°29'05" E. along the Section line 60.01 ft. to Engineer Centerline Station 149 + 26.80, which pt. is S. 0°29'05" E. along the Section line 78.86 ft. from the NE corner of Sec. 18, T.23S., R.6E., S.L.B. & M.; thence S. 0°29'05" E. along the Section line 60.01 ft. to a pt.; thence N. 89°38'06" W. 427.71 ft. to a pt.; thence S. 80°09'41" W. 101.61 ft. to a pt.; thence N. 89°38'06" W. 300.00 ft. to a pt.; thence N. 79°25'53" W. 101.61 ft. to a pt.; thence N. 89°38'06" W. 265.04 ft. to a pt. 60.00 ft. perpendicularly distant S'ly from Engineer Center-

line Station 137 + 34.96; thence 288.95 ft. SW'ly along the arc of a 2486.48 ft. radius curve to the left, (the chord of said curve bears S. 87°02'09" W. 288.79 ft.), to a pt. 60.00 ft. radially distant S'ly from Engineer Centerline Station 134 + 39.03; thence S. 83°42'24" W. 439.03 ft. to a pt.; thence S. 76°35'49" W. 121.19 ft. to a pt. 75.00 ft. perpendicularly distant S'ly from Engineer Centerline Station 128 + 79.74; thence 601.84 ft. W'ly along the arc of a 2621.48 ft. radius curve to the right, (the chord of said curve bears N. 89°42'59" W. 600.52 ft.), to a pt. 75.00 ft. radially distant S'ly from Engineer Centerline Station 122 + 95.12; thence N. 83°08'22" W. 395.12 ft. to a pt.; thence N. 76°09'27" W. 123.41 ft. to a pt. 60.00 ft. perpendicularly distant S'ly from Engineer Centerline Station 117 + 77.51; thence 319.45 ft. W'ly along the arc of a 2486.48 ft. radius curve to the left, (the chord of said curve bears N. 86° 49'11" W. 319.24 ft.), to a pt. 60.00 ft. radially distant S'ly from Engineer Centerline Station 114 + 50.35; thence S. 89°29'58" W. 729.46 ft. to a pt. 60.00 ft. perpendicularly distant S'ly from Engineer Centerline Station 107 + 20.89; thence 873.79 ft. SW'ly along the arc of a 788.83 ft. radius curve to the left, (the chord of said curve bears S. 57°45'58" W. 829.79 ft.), to a pt. 60.00 ft. radially distant SE'ly from Engineer Centerline Station 97 + 80.64; thence S. 0°03'01" E. 34.11 ft. to a pt.; thence S. 26°01'58" W. 100.00 ft. to a pt. thence S. 42°43'54" W. 52.20 ft. to a pt.; thence S. 28°08'57" W. 270.86 ft. to a pt. 50.00 ft. perpendicularly distant SE'ly from Engineer Centerline Station 93 + 29.33; thence 353.12 ft. along the arc of an 898.83 ft. radius curve to the right, (the chord of said curve bears S. 38°05'24" W. 349.90 ft.), to a pt. in the West Sectionline of

said Section 18; thence N. 0°03'26" W. along the Section line 61.28 ft. to the pt. of beginning.

As shown on the drawings of said project on file with Emery County. The above described parcel of land contains 17.33± Acres.

EASEMENT

WE, THE UNDERSIGNED owners of real property situated and located in Emery County, State of Utah, do hereby convey, grant, and release to Emery County, State of Utah, an easement and right-of-way for the construction, operation and maintenance of a portion of Collector Road Project CR 514 (1), over and through the following described real property situated in said Emery County, and more particularly described as follows:

See Exhibit 'A'

STATE OF UTAH
COUNTY OF EMERY } ss
FILED AND RECORDED FOR
DEC 31 9 33 AM '79
IN BOOK 111 PAGE 482-484
COUNTY RECORDER

THE CONSIDERATION to be paid for this easement is the sum of One Dollar ($ 1.00), said sum to be paid to the grantors upon execution of this agreement. Grantors hereby agree that Emery County shall have the right of ingress to and egress from the property above described for the purpose of constructing, maintaining, and repairing that portion of Collector Road Project CR 514 (1) and its related facilities, to be located on the above described property.

The easement herein granted by the undersigned is a perpetual easement.

DATED this 21st day of November, 19 79.

M. D. Pon

Vice President & General Manager

SUBSCRIBED AND SWORN to before me, a Notary Public, in and for the State of Utah, on this day and year above written.

Notary Public

Residing at: Price, Utah

Commission Expires: April 1, 1980

Right-of-Way Description

For Collector Road Project CR 514 (1)

In Emery County

Parcel 2 being a tract of property in Section 17, T. 23S., R. 6 East, Salt Lake Base and Meridian.

The boundaries of said parcel of land are described as follows:

Beginning at a pt. S. 0°29'05" E. along the Section Line 78.86 ft. from the NW cor. of Sec. 17, T. 23S., R. 6E., Salt Lake Base and Meridian, which point is Engineer Centerline Station 149 + 26.80; thence N. 0°29'05" W. along the Section Line 60.01 ft. to a point; thence S. 89°38'06" E. 790.89 ft. to a point; thence S. 0°21'54" W. 60.00 ft. to Engineer Centerline Station 157 + 16.82; thence S. 0°21'54" W. 60.00 ft. to a point; thence N. 89°38'06" W. 789.1 ft. to a point in the West Section Line of said Sec. 17; thence N. 0°29'05" W. along the Section Line 60.01 ft. to the point of beginning

As shown on the drawings of said project on file with Emery County. The above described parcel of land contains 2.1763 acres.

Appendix 1a

SOLDIER CREEK COAL CO.

Telephone (801) 637-6360

P.O. Box I
Price, Utah 84501

April 25, 1986

Mr. Severo Chavez
California Portland Cement Company
P.O. Box 947
Colton, CA 92324-0514

Re: Hidden Valley Mine
Adit Condition

Mr. Severo Chavez:

On April 26, 1979, I entered the A and B seam portals at Hidden Valley Mine for a routine inspection. During this inspection no evidence of water was encountered. Refer to the enclosed Exhibit A for a description of the two adits.

If I can be of further help please let me know.

Sincerely,

SOLDIER CREEK COAL COMPANY

J.T. Paluso

J.T. Paluso
Chief Engineer

JTP:pp
Enclosure

Appendix II

Sample S-1	"A" Seam Pad
Sample S-2	Lower "B" Seam Pad
Sample S-3	Upper "B" Seam Pad
Sample S-4	Topsoil Stockpile
Sample S-5	Native Soil

Sample HVD-1	Lower "B" Seam Pad
Sample HVD-2	Upper "B" Seam Pad
Sample HVD-3	Sediment Pond

CHEMTECH

CHEMICAL AND BACTERIOLOGICAL ANALYSES

67 SOUTH COMMERCE LOOP
OREM, UTAH 84057
(801) 226-8822

2875 MAIN
SUITE #101
SALT LAKE CITY, UTAH 84115
(801) 483-1163

Aug. 12, 1986

TO: JBR Consultants
1841 E. Fort Union Blvd.
Salt Lake City, UT 84121

SAMPLE ID: Lab #U014090 - Soil, HVD-1
Lab #U014091 - Soil, HVD-2
Lab #U014092 - Soil, HVD-3

CERTIFICATE OF ANALYSIS

PARAMETER	U014090	U014091	U014092
Saturation, %	29.2	33.4	32.2
Soil Texture: Gravel, %	7.0	19.4	13.5
Sand, %	54.3	37.4	40.9
Silt/Clay, %	38.7	43.2	45.6
Alkalinity as $CaCO_3$, mg/Kg	45.6	49.9	56.3
Alkalinity as $CaCO_3$, mg/l	45.9	50.2	56.3

NOTE: Alkalinity tests were run on a water extract sample

Rex Henderson

CHEMTECH

CHEMICAL AND BACTERIOLOGICAL ANALYSES

28 EAST 1500 NORTH
OREM, UTAH 84057
(801) 226-8822

2875 S. MAIN
SUITE #101
SALT LAKE CITY, UTAH 84115
(801) 483-1162

April 17, 1986

CLIENT: JBR Consultants
2556 East Oak Creek Circle
Sandy, UT 84092

LAB NO.: U011184

LOCATION: S-2, Hidden Valley Soil

CERTIFICATE OF ANALYSIS

PARAMETER	LEVEL
pH Units	6.79
CEC Meg/100	4.17
Chloride as Cl, mg/kg	29.6
Organic Matter, %	0.32
Organic N, %	0.028
Nitrate as NO_3-N, mg/kg	78
Phosphorus as PO_4-P, mg/kg	1.50
Potassium as K, mg/kg	91.0
Calcium as Ca, mg/kg	365
Magnesium as Mg, mg/kg	335
Zinc as Zn, mg/kg	1.60
Copper as Cu, mg/kg	1.15
Sulfate as SO_4, mg/kg	5,940
Sodium as Na, mg/kg	265
Iron as Fe, mg/kg	45.4
Conductivity, umhos/cm	38

(NOTE: Metals determined on DPTA extract)

CHEMTECH

CHEMTECH

CHEMICAL AND BACTERIOLOGICAL ANALYSES

28 EAST 1500 NORTH
OREM, UTAH 84057
(801) 226-8822

2875 S. MAIN
SUITE #101
SALT LAKE CITY, UTAH 84115
(801) 483-1162

April 17, 1986

CLIENT: JBR Consultants
2556 East Oak Creek Circle
Sandy, UT 84092

LAB NO.: U011185

LOCATION: S-3, Hidden Valley Soil

CERTIFICATE OF ANALYSIS

PARAMETER	LEVEL
pH Units	7.31
CEC Meg/100	5.89
Chloride as Cl, mg/kg	34.7
Organic Matter, %	0.29
Organic N, %	0.019
Nitrate as NO_3-N, mg/kg	172
Phosphorus as PO_4-P, mg/kg	3.81
Potassium as K, mg/kg	95.5
Calcium as Ca, mg/kg	390
Magnesium as Mg, mg/kg	515
Zinc as Zn, mg/kg	1.70
Copper as Cu, mg/kg	1.40
Sulfate as SO_4, mg/kg	10,600
Sodium as Na, mg/kg	210
Iron as Fe, mg/kg	33.4
Conductivity, umhos/cm	48

(NOTE: Metals determined on DPTA extract)

CHEMTECH

CHEMTECH

CHEMICAL AND BACTERIOLOGICAL ANALYSES

28 EAST 1500 NORTH
OREM, UTAH 84057
(801) 226-8822

2875 S. MAIN
SUITE #101
SALT LAKE CITY, UTAH 84115
(801) 483-1162

April 17, 1986

CLIENT: JBR Consultants
2556 East Oak Creek Circle
Sandy, UT 84092

LAB NO.: U011186

LOCATION: S-4, Hidden Valley Soil

CERTIFICATE OF ANALYSIS

PARAMETER	LEVEL
pH Units	7.15
CEC Meg/100	6.24
Chloride as Cl, mg/kg	36.6
Organic Matter, %	0.25
Organic N, %	0.020
Nitrate as NO_3-N, mg/kg	88
Phosphorus as PO_4-P, mg/kg	2.84
Potassium as K, mg/kg	94.5
Calcium as Ca, mg/kg	440
Magnesium as Mg, mg/kg	138
Zinc as Zn, mg/kg	0.70
Copper as Cu, mg/kg	0.65
Sulfate as SO_4, mg/kg	5,490
Sodium as Na, mg/kg	120
Iron as Fe, mg/kg	16.2
Conductivity, umhos/cm	38

(NOTE: Metals determined on DPTA extract)

CHEMTECH

CHEMTECH

CHEMICAL AND BACTERIOLOGICAL ANALYSES

28 EAST 1500 NORTH
OREM. UTAH 84057
(801) 226-3822

2875 S. MAIN
SUITE #101
SALT LAKE CITY. UTAH 84115
(801) 483-1162

April 17, 1986

CLIENT: JBR Consultants
2556 East Oak Creek Circle
Sandy, UT 84092

LAB NO.: U011183

LOCATION: S-1, Hidden Valley Soil

CERTIFICATE OF ANALYSIS

PARAMETER	LEVEL
pH Units	7.83
CEC Meg/100	6.84
Chloride as Cl, mg/kg	36.6
Organic Matter, %	0.26
Organic N, %	0.021
Nitrate as NO_3-N, mg/kg	190
Phosphorus as PO_4-P, mg/kg	2.37
Potassium as K, mg/kg	94.5
Calcium as Ca, mg/kg	375
Magnesium as Mg, mg/kg	275
Zinc as Zn, mg/kg	2.40
Copper as Cu, mg/kg	1.75
Sulfate as SO_4, mg/kg	10,600
Sodium as Na, mg/kg	425
Iron as Fe, mg/kg	89.3
Conductivity, umhos/cm	46

(NOTE: Metals determined on DPTA extract)

CHEMTECH

Appendix III

Hydrologic Methods and Calculations

APPENDIX III

HYDROLOGY
DESIGN CALCULATIONS.

Hydrology Calculations for Hidden Valley Reclamation Project.

Areas Considered:

- Portal Area Bench Telle above A Seam Portal
- Ephemeral Channel thru Portal Area and Fan to Sed. Pond
- Limited Drainage thru Sediment Pond.
- A-Seam Pad Area.

Portal Area Diversion

- A-Seam
  - Area - 1.9 Ac
  - AWS - 1.05
  - Hydraulic Length - 800 ft
  - Curve Number - Based on Sandstone outcrops and Colluvium.

    - 85
  - Time of Concentration - 0.037 hrs.
  - Rainfall - 10yr-24Hr Storm - 1.67 in
  - Dist. - SCS Type II
  - Peak Flow - 1.2 CFS

HYDROLOGY CALCULATIONS FOR HIDDEN VALLEY

- EPHEMERAL CHANNEL
  - AREA - 124.89 AC
  - AWS - 0.151
  - LENGTH - 5,200 FT
  - CN - 78 - BASED ON COMBINED AREAS OF SANDSTONE AND SEMI-ARID RANGELAND (PROFESSIONAL JUDGEMENT)
  - TIME OF CONCENTRATION - 0.54 HRS
  - RAINFALL - 2.6 IN - 100YR-24 HR STORM
  - DIST. - SCS TYPE II
  - PEAK FLOW - 70.97 CFS

- SEDIMENT POND
  - AREA - 0.41 AC
  - A.W.S. = 0.22
  - HYDRAULIC LENGTH = 300'
  - CURVE NUMBER - 80 - BASED ON SANDSTONE OUTCROP & REGRADED PORTAL BENCH.
  - TIME OF CONCENTRATION - 0.43 HR
  - RAINFALL - 1.67 - 10YR 24-HR STORM
  - DIST. - SCS TYPE II
  - PEAK - 0.1 CFS

- A - SEDM. POND
  - AREA - 0.78 AC
  - TIME OF CONC - 0.[illegible] HR
  - AWS - 0.43 FT/FT
  - RAINFALL - 1.67 IN
  - HYDRAULIC LENGTH = 200 FT
  - DIST. - SCS TYPE II
  - CN-80 - BASED ON SANDSTONE OUTCROP & REGRADED PORTAL [illegible]
  - PEAK - 0.26 CFS

EVALUATION OF CHANNEL REQUIREMENTS

- PORTAL DIVERSION
  - A-SEAM - UPPER SECTION
    - PEAK FLOW 1.2 CFS
    - EXISTING CHANNEL - TRIANGULAR SHAPE
      - CUT IN BED ROCK

- $M_1 = 5$ $n = 0.032$
- $M_2 = .5$ $S = 0.034$ (FROM 6/19/80 LETTER ALLRESS PROFILE)

ASSUME DEPTH OF 0.4 FT

AREA = 0.44 FT²

WP = 2.487 FT

R = 0.177 FT

Q = 1.191 FT LOW

ASSUME DEPTH OF 0.42 FT

A = 0.485

WP = 2.611

R = 0.186

Q = 1.356 TOO HIGH

ASSUME DEPTH OF 0.402 FT

A = 0.444

WP = 2.499

R = 0.178

Q = 1.207 ok!

- VELOCITY DETERMINATION

$$Q/A = V = 1.2/0.444 = 2.7 \text{ FPS}$$

- MAXIMUM ALLOWABLE VELOCITY - 5-6 FPS

BASED ON TABLE 6.1a, OSM SURFACE MINING WATER DIVERSION DESIGN MANUAL 1982

- EPHEMERAL CHANNEL - PORTAL LEVEL

PEAK FLOW - = 1 CFS

CHANNEL SHAPE - TRAPEZOIDAL

$Z = 4$

$b = 10$

SLOPE = 0.105 (FROM PROFILE = 1)

RIPRAP & FLOW DEPTH DETERMINED BY SIMPLIFIED METHOD (OSM GUIDELINES MANUAL, 1982, FIG. C.5 (ATTACHED)

$D_{50} = 0.675$ FT - USE 0.75FT

$d = 0.55$ FT

RIPRAP GRADATION

$D_{100} = D_{50} * 2 = 0.75 * 2 = 1.5$ FT.

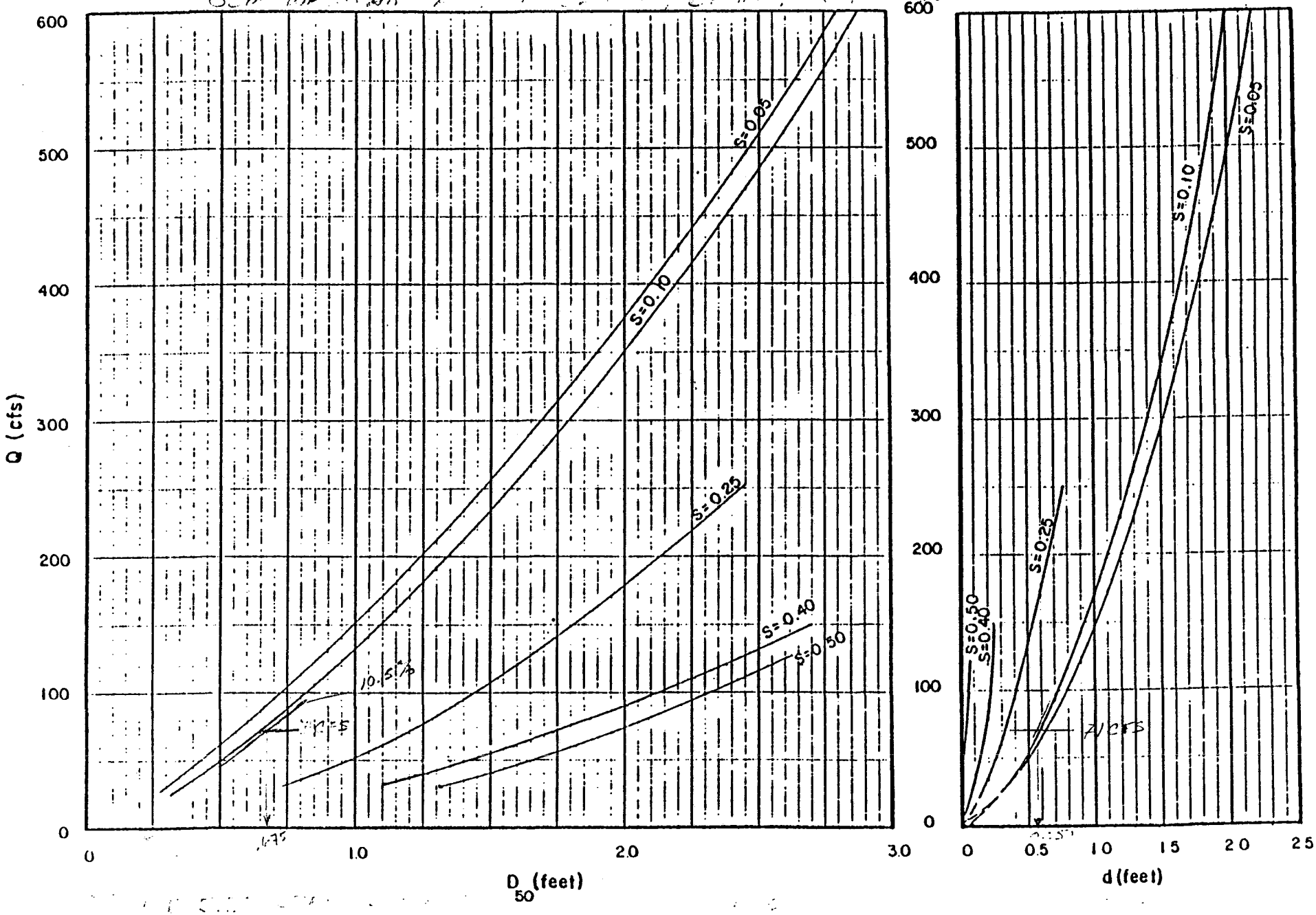
$D_{85} = D_{50} * 1.5$ 0.75 * 1.5 = 1.13 FT

$D_{50} = D_{50} * 1.0$ 0.75 * 1.0 = 0.75 FT

$D_{15} = D_{50} - D.$ 0.75 * 0.1 = 0.075 FT

Table 6.1a. Maximum Permissible Velocities Tables by Fortier and Scobey (1926).

Original Material Excavated For Canals	n	Mean velocity of canals after aging (d≤3 ft) Clear water, no detritus ft/sec	m/sec	Water transporting colloidal silt ft/sec	m/sec	Water transporting noncolloidal silts, sands gravels or rock fragments ft/sec	m/sec
1. Fine sand (colloidal)	0.02	1.5	0.46	2.50	0.76	1.50	0.46
2. Sandy loam (noncqlloidal)	0.02	1.45	0.53	2.50	0.76	2.00	0.61
3. Silt loam (noncolloidal)	0.02	2.00	0.61	3.00	0.91	2.00	0.61
4. Alluvial silt when noncolloidal	0.02	2.00	0.61	3.50	1.07	2.00	0.61
5. Ordinary firm loam	0.02	2.50	0.76	3.50	1.07	2.25	0.69
6. Volcanic ash	0.02	2.50	0.76	3.50	1.07	2.00	0.61
7. Fine gravel	0.02	2.50	0.76	5.00	1.52	3.75	1.14
8. Stiff clay (very colloidal)	0.025	3.75	1.14	5.00	1.52	3.00	0.91
9. Graded, loam to cobbles, when noncolloidal	0.03	3.75	1.14	5.00	1.52	5.00	1.52
10. Alluvial silt when colloidal	0.025	3.75	1.14	5.00	1.52	3.00	0.91
11. Graded, silt to cobbles, when colloidal	0.03	4.00	1.22	5.50	1.68	5.00	1.52
12. Coarse gravel (noncolloidal)	0.025	4.00	1.22	6.00	1.83	6.50	1.98
13. Cobbles and shingles	0.035	5.00	1.52	5.50	1.68	6.50	1.98
14. Shales and hard pans	0.025	6.00	1.83	6.00	1.83	5.00	1.52


Q (cfs)
600
500
400
300
200
100
0
0
1.0
2.0
3.0
D_{50} (feet)
S=0.05
S=0.10
S=0.25
S=0.40
S=0.50
10.5 1/3
Y=5
.675
d (feet)
0
0.5
1.0
1.5
2.0
2.5
S=0.10
S=0.05
S=0.25
S=0.50
S=0.40
Y=5
.675

5.18

→ CHANNEL STABILIZATION

- IDIENELL [illegible] WILL BE [illegible] WITH 4:1 SIDESLOPES [illegible] [illegible] [illegible] [illegible] [illegible]
- THIS ALLUVIAL FILLS OVER [illegible]. TO ALLOW REQUIRED PROTECTION OF [illegible] FILL AREAS, THE CHECK [illegible] BE ENFORCED AT THESE LOCATIONS TO PREVENT EROSION.

- NO FILTER BLANKET WILL BE USED [illegible] THE SITE. THIS IS DUE TO THE COARSE NATURE OF THE MATERIAL IN THE CHANNEL AREA. WHILE NO PARTICAL SIZE [illegible] FOR THE CHANNEL MATERIAL IS AVAILABLE, IT IS EXPECTED THAT WHEN THE [illegible] IS REMOVED MUCH OF THE COARSE [illegible] MATERIAL WILL REMAIN PROVIDING A [illegible] BLANKET [illegible]. ALSO THE [illegible] THE [illegible] AND THE SMALL [illegible] WITH A [illegible] WILL RESULT IN [illegible] EROSION.

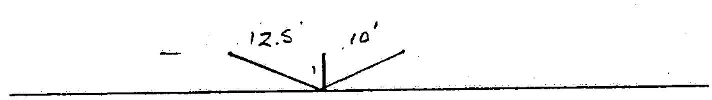
- POOL CROSSING

PEAK FLOW - 71 CFS

SHAPE OF CHANNEL - ASYMETRIC TRIANGLE

MANNINGS $n = 0.032$

SLOPE = 0.071 (FROM LONGITUDINAL PROFILE 2)



ASSUME DEPTH OF 1 FOOT

$$AREA = (1/2\, b_1 h_1) + (1/2\, b_2 h_2)$$

$$= (1/2\; 12.5(1)) + (1/2\; 10(1)) = 11.25\ FT^2$$

$$W.P. = hy_1 + hy_2 = \sqrt{b_1^2 + h_1^2} + \sqrt{b_2^2 + h_2^2}$$

$$= \sqrt{12.5^2 + 1^2} + \sqrt{10^2 + 1^2} = 22.59\ FT$$

HYDRAULIC RADIUS = $R = \frac{A}{WP} = \frac{11.25}{22.59} = 0.4$

$Q = A \frac{1.486}{n} R^{2/3} S^{1/2}$

$= (11.25) \frac{1.486}{0.032} (0.498)^{2/3} (0.071)^{1/2}$

$= 87.45$ CFS TOO HIGH

ASSUME DEPTH OF 0.75 FT

AREA $= \frac{1}{2} b_1 h_1 + \frac{1}{2} b_2 h_2 = \frac{1}{2} 9.375 0.75 + \frac{1}{2} 7.5$ [illegible]

W.P. $= 9.40 + 7.54 = 16.94$

$R = 0.37$

$Q = 40.66$ CFS TOO LOW

ASSUME DEPTH OF 0.9 FT

$b_1 = 11.25 h_1 = 0.9$ $b_2 = 9$ $h_2 = 0.9$

$A = 5.06 + 4.05 = 9.11$ FT^2

$WP = 11.28 + 9.04 = 20.33$

$R = 0.448$

$Q = 65.99$ CFS TOO LOW

ASSUME DEPTH OF 0.92 FT

$h_1 = 0.92$ $b_1 = 11.54$ $b_2 = 9.2$

$A = 5.29 + 4.23 = 9.52$

$WP = 11.54 + 9.25 = 20.78$

$R = 0.458$

$Q = 69.99$ CFS LOW

ASSUME DEPTH OF 0.93 FT

$h_1 = 0.93$ $b_1 = 11.63$ $b_2 = 9.3$

$A = 5.41 + 4.32 = 9.73$ FT^2

$WP = 11.67 + 9.35 = 21.01$

$R = 0.463$

$Q = 72.06$ CFS HIGH

ASSUME FLOW DEPTH 0.925 FT

VELOCITY DETERMINATION AT ROAD CROSSING/CHANNEL RESTORATION.

PEAK FLOW = 71 CFS

DEPTH OF FLOW = 0.925 FT

AREA = 9.63 FT²

VELOCITY = Q/A = 71/9.63

= 7.4 F/S GOOD!

LESS THAN MAXIMUM ALLOWABLE FOR SED ROCK 10 F/S.

- A-SEAM PAD - TRIANGULAR

PEAK FLOW = 0.26CFS

MANNING'S N = 0.028 (ASSUMES NO VEGETATION ESTABLISHED)

SLOPE = 1.1 FT/FT

Z = 2:1

d = 0.12 FT

V = 8.2 F/S

DETERMINATION ASSUMES NO SILT FENCE IN PLACE. FLOW THRU SILT FENCE FABRIC WILL REDUCE THE PEAK - THE EXACT AMOUNT OF FLOW REDUCTION DUE TO THE FABRIC ON CONDITION OF THE FABRIC.

- SEDIMENT POND - TRIANGULAR

PEAK FLOW = 0.1 CFS

MANNING'S N = 0.028 (ASSUMING NO VEGETATION YET ESTABLISHED)

SLOPE = 0.9 FT/FT

Z = 2:1

d = 0.09 FT

V = 6.0 FT/S

DETERMINATION ALSO MADE NO SILT FENCE. FLOW WILL BE REDUCED.

Soldier Creek Coal Company
HIDDEN VALLEY MINE
Telephone 801 - 637-4429
P.O. Box AS
Price, Utah 84501

June 19, 1980

Mr. Tom Suchoski
Division of Oil, Gas, and Mining
1588 West North Temple
Salt Lake City, Utah 84111

Re: B-Seam Bench Cut
Soldier Creek Coal Company
Hidden Valley Mine
ACT/015/022

Dear Mr. Suchoski:

As per your telephone conversation with Dave Spillman on June 6, 1980, a description of the techniques to be used for reclamation of the portal area highwalls is as follows:

Please refer to figure 12, page 27, of the "Runoff Control Plan, Sedimentation Pond Design," submitted on May 5, 1980, for an illustration of the area in question.

Highwalls within the portal area are the necessary result of portal and bench cut development. The existing highwalls were constructed during the summer of 1977. Final reclamation of these disturbed areas will require permanent portal seals, back-filling, grading, and stabilization.

The cut and fill terrace method of backfilling described in 30 CFR 817.102 is believed to be the most compatible with the desired reclamation of the portal area. There is sufficient material in this area to facilitate such reclamation. It is speculated that the material to be used for highwall reclamation will come

from the immediate vicinity. The initial source of material would be centered around the removal of the 48 inch culvert, which bisects the portal area. As additional material is removed and pushed towards the highwall area, a dished out effect will result.

All backfilling and grading will be in accordance with 30 CFR 817.101 and 817.102. All stabilization will follow an approved revegetation plan.

I would like to remind you that the bench cut proposed above the B-Seam portals will not initially be used as a runoff diversion. Runoff from this area will be contained in the sedimentation pond. If the bench cut is going to be used as a diversion, the necessary diversion requirements will be submitted to the Division for approval at a later date.

Questions regarding the A-Seam diversion have been asked by the Division in a letter dated June 2, 1980. In response to these questions, a longitudinal profile of the drainage ditch is attached. Conveyance of runoff water from the diversion to Ivie Creek is by culvert as shown on page 27 of the "Runoff Control Plan, Sedimentation Pond Design." A typical portal reclamation profile is also enclosed.

Approval as quickly as possible of the B-Seam bench cut would be appreciated.

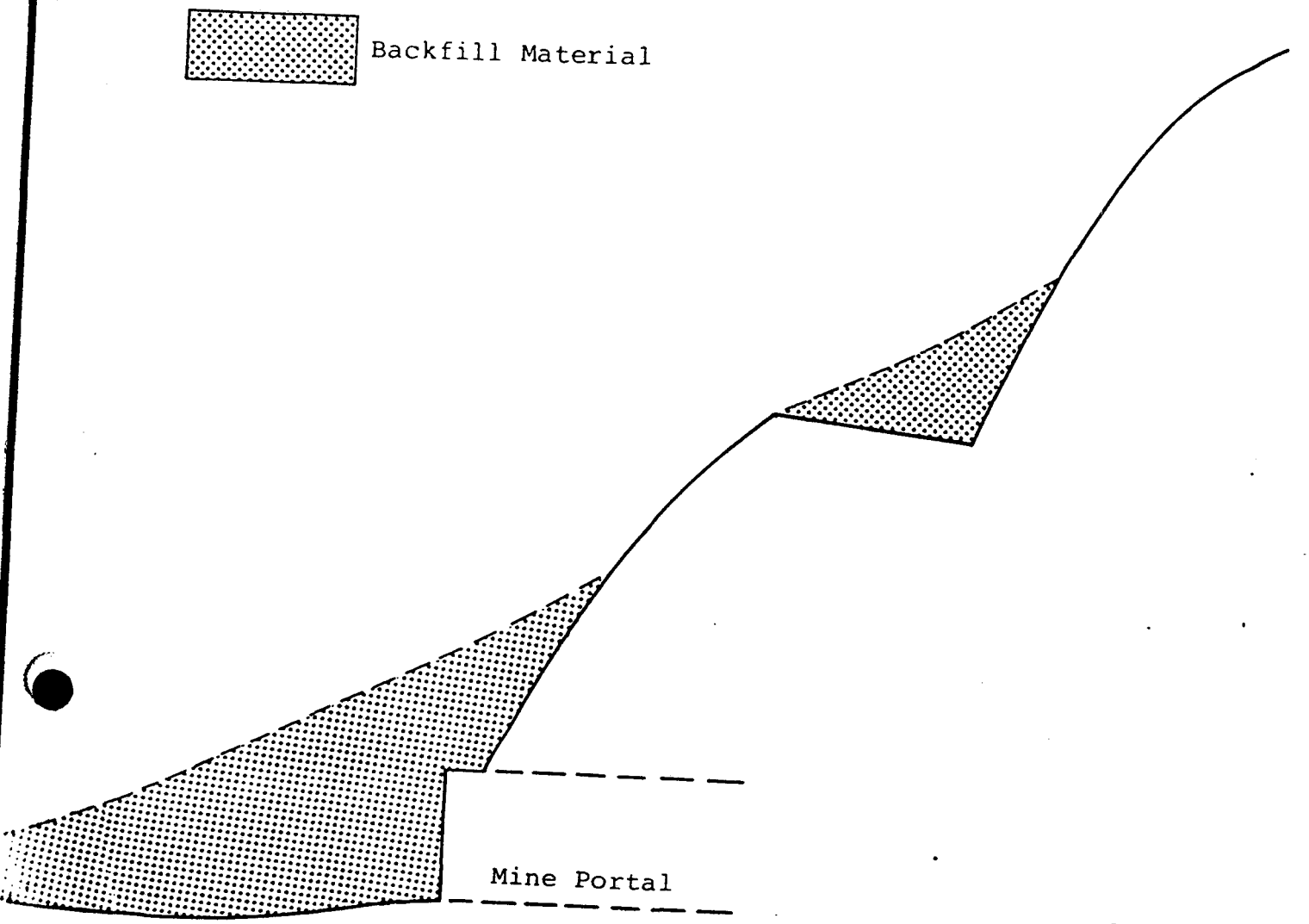
Sincerely,

SOLDIER CREEK COAL COMPANY
Hidden Valley Mine

J. T. Paluso

J. T. Paluso
Project Engineer

JTP:tp
Enclosures



Note: Cut-and-fill terraces may be utilized to ensure stability and control erosion. This is in accordance to 30 CFR 817.102.

REVISIONS					
MARK		BY			

1" = 10'

DATE 6-19-80

Soldier Creek Coal Company

HIDDEN VALLEY MINE

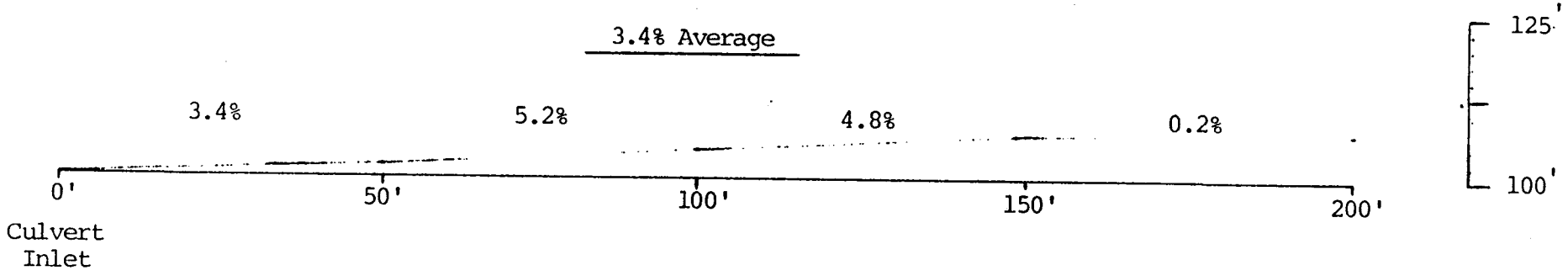
TITLE: Typical Portal Reclamation Profile

DRAWING NO. A-010

CHECKED | DATE | APPROVED | DATE

Existing A-Seam Bench-Cut Profile

Proposed Runoff Diversion



— To Lee:
Please look at E-CFO.
[illegible] Info. Thanks
[illegible]

Comments

7/[illegible]/80

[illegible] Division -
[illegible]
[illegible]

$V = \frac{1.49}{n} R^{2/3} S^{1/2}$ $R_H = \frac{A}{P} = \frac{[illegible]}{105} = .1247$

$= \frac{1.49}{0.040}(0.125)^{2/3}(0.034)^{1/2}$

$= 1.72$ F/S

on a bed rock surface so no
erosion or scour should occur.

[illegible]

ADDENDUM

TO

APPENDIX III - HYDROLOGY CALCULATIONS

To prevent gullying of A-seam fill, construct diversion at contact between cliff face + fill slope along existing bench at grade. Divert across road ↓ to retention berms on flat area east of main, riprapped channel.

Drainage area above A-seam fill:

$5.9\ in^2 = 1.35\ ac$ (100' = 1" map scale)

Curve Number = 85*

*Taken from info contained in Rec Plan

Time of Concentration:

$$T_c = C' \left(\frac{11.9\ (L)^3}{H} \right)^{.385}$$

where C' = based on CN, for CN=85, $C' = .8$
L = hydraulic length in miles
H = Elevation change of watershed in ft

$$T_c = 0.8 \left(\frac{11.9\ (.095)^3}{260} \right)^{.385}$$

$T_c = 0.016$ hr

Precipitation for 100-yr, 24-hr storm:

2.6 in (from Reclamation Plan)

Using Hawkins - SCS CN program for Rainfall - RO — peak flow is:

1.83 cfs

Hidden Valley Coal Mine - Amendment 1 - Nov. 15, 1989

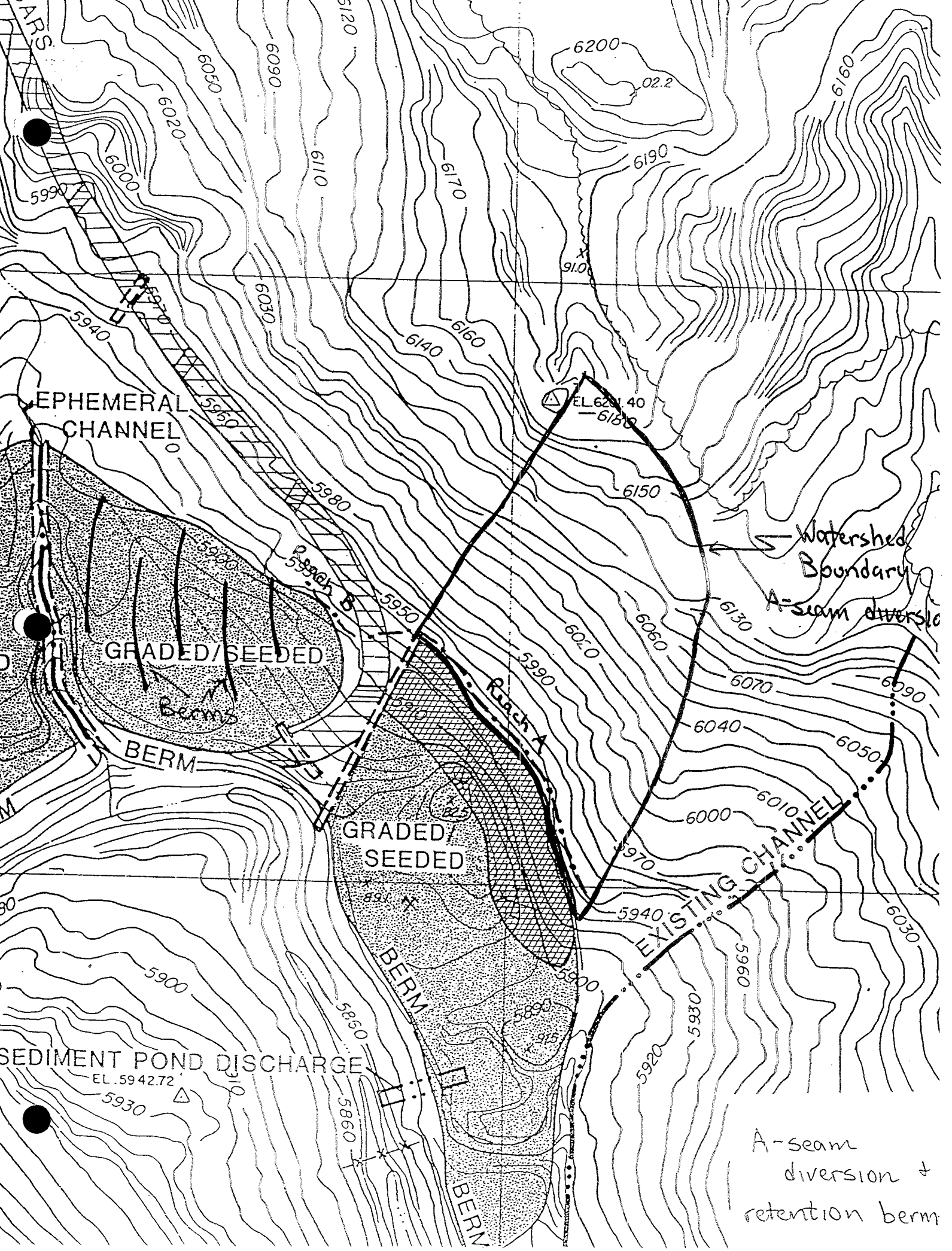
"UTPUT FROM SCS STORM HYDROGRAPH PROGRAM

INPUT FOR: Above A seam - 100yr

STORM :		WATERSHED :		
dist =	SCS Type II - 24 Hr	area =	1.35	acres
depth =	2.60 inches	cn =	85.00	
duration =	24.00 hrs	time conc =	0.016	hrs

OUTPUT SUMMARY

runoff depth	1.25862	inches	
initial abstr	0.35294	inches	
peak flow=	1.83	cfs	(1.34149 idh)
at time	12.000	hrs	


EPHEMERAL CHANNEL
GRADED/SEEDED
Berms
BERM
Reach B
Reach A
GRADED/ SEEDED
BERM
BERM
EXISTING CHANNEL
SEDIMENT POND DISCHARGE
EL. 5942.72
EL. 6201.40
Watershed Boundary
A-seam diversio
A-seam diversion + retention berm

Hidden Valley Coal Mine - Amendment 1 - Nov. 15, 1989

R A P N O R M

Find the Normal Depth of a Trapezoidal Channel

*** September 22, 1986. Uintex Corp. SLC. Utah ********

wton's Iteration Scheme is used.

Reach 1 - A-seam Diversion - Across fillslope

E N T E R D A T A below:

Bottom width, ft	: .01	n value	: .025
Left bank, slope (mH:1V)	: 3	n value	: .025
Right bank, slope (mH:1V)	: 2	n value	: .03
Discharge, cfs	: 1.83	Channel Slope	: .075

Here are the normal depth and velocity:

Yn = .3853701 feet
Vn = 4.878323 fps

R A P N O R M

Find the Normal Depth of a Trapezoidal Channel

*** September 22, 1986. Uintex Corp. SLC. Utah ********

wton's Iteration Scheme is used.

Reach 2 - A-seam diversion - Down road fill

E N T E R D A T A below:

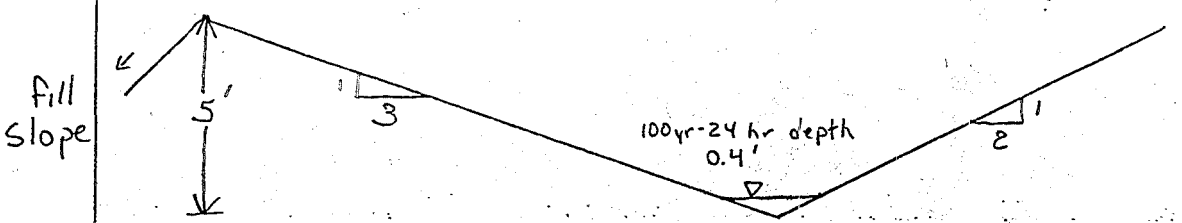
Bottom width, ft	: .01	n value	: .0354
Left bank, slope (mH:1V)	: 3	n value	: .0354
ight bank, slope (mH:1V)	: 3	n value	: .0354
Discharge, cfs	: 1.83	Channel Slope	: .17

Here are the normal depth and velocity:

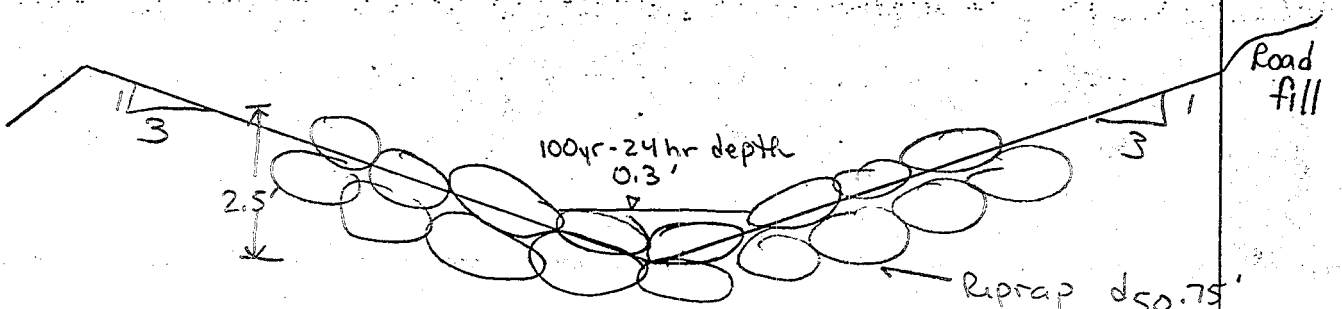
Yn = .3412769 feet
Vn = 5.186744 fps

1) Channel Cross sections for A-seam diversion

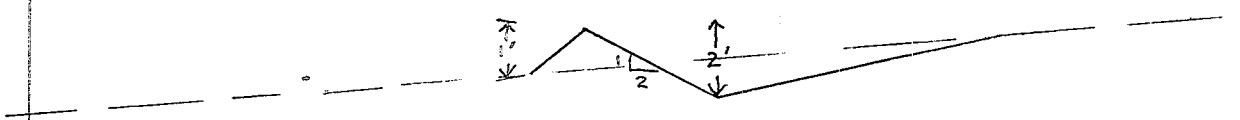
Reach 1 (Across top of fill)



Reach 2 (Down Road fill)



2) Cross - section of retention berms:



Appendix IV

Range Site Data

HIDDEN VALLEY MINE

REFERENCE AREA

May 8, 1986

Scope

The entire area around the Hidden Valley Mine was examined to find a reference area that would closely match the disturbed area of the mine. It was decided that the hillside immediately northwest of the topsoil stockpile was the area that corresponded closely with the disturbed area. Therefore, it was chosen as the reference area.

The photos and studies were taken on May 1, 1986, on what is considered a normal precipitation spring.

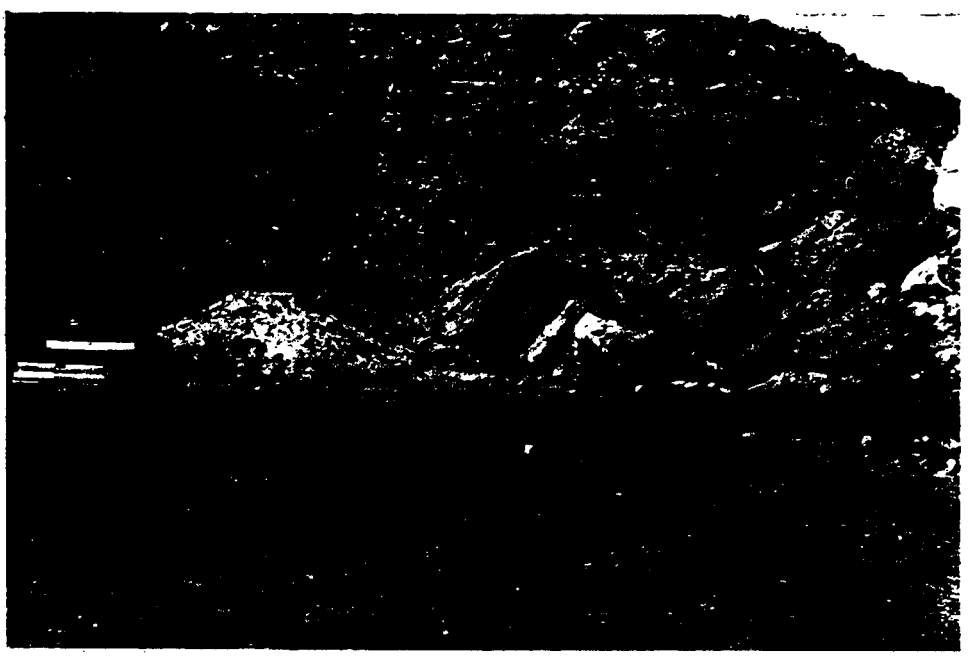


Photo No. 1. Hidden Valley Mine working area and topsoil stockpile.

Photo No. 2. Reference area hillside. This is a south facing slope, very rocky, and arid with sparse vegetation. It is at the 5960 ft. elevation, has the same slope and has the same aspect as the major disturbed area; therefore, it was chosen as the reference area. Major vegetation is black sagebrush, broom snakeweed, Mormon tea, Indian rice grass and galleta.

Sampling Method

The Division of Oil, Gas and Mining document Vegetation Information Guidelines and Permanent Program Submission for Coal Mines was used as the reference text for selecting the sampling procedure.

All of the methods were considered. The occular method described on Page 10 of the guidelines was chosen as the best method for this site. It was also decided to take 40 samples, which is the maximum recommended by the guide. The quadrat size was 36" x 36", one square yard.

Marking The Transect

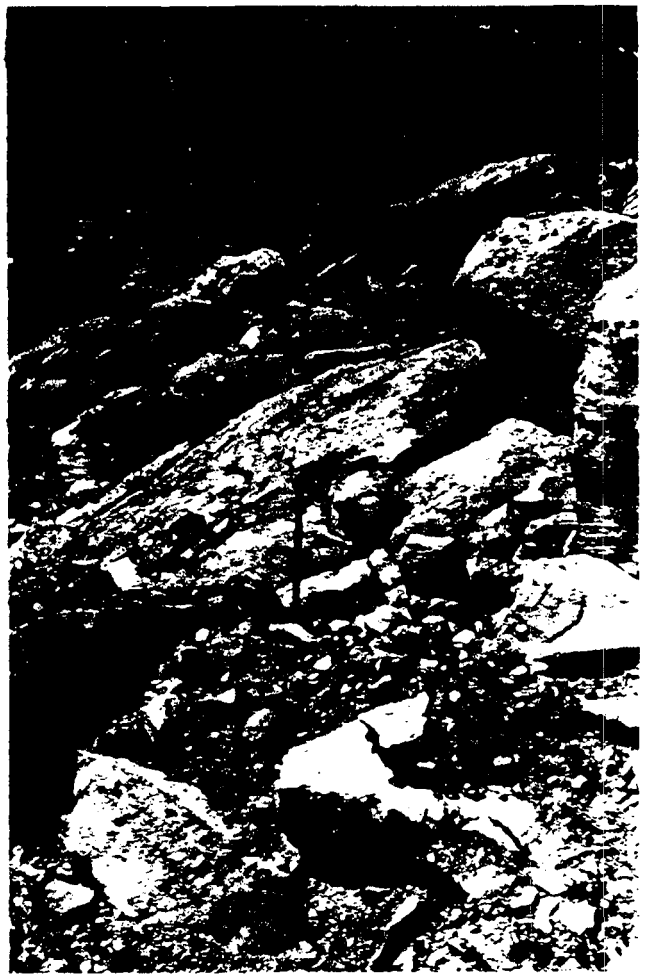


Photo No. 3. This is the start of the transect immediately northwest of the topsoil stockpile. A 3' piece of re-bar marks the start of the transect. The transect more or less contours the hillside going in a northwesterly direction. It is approximately 100 yards long.

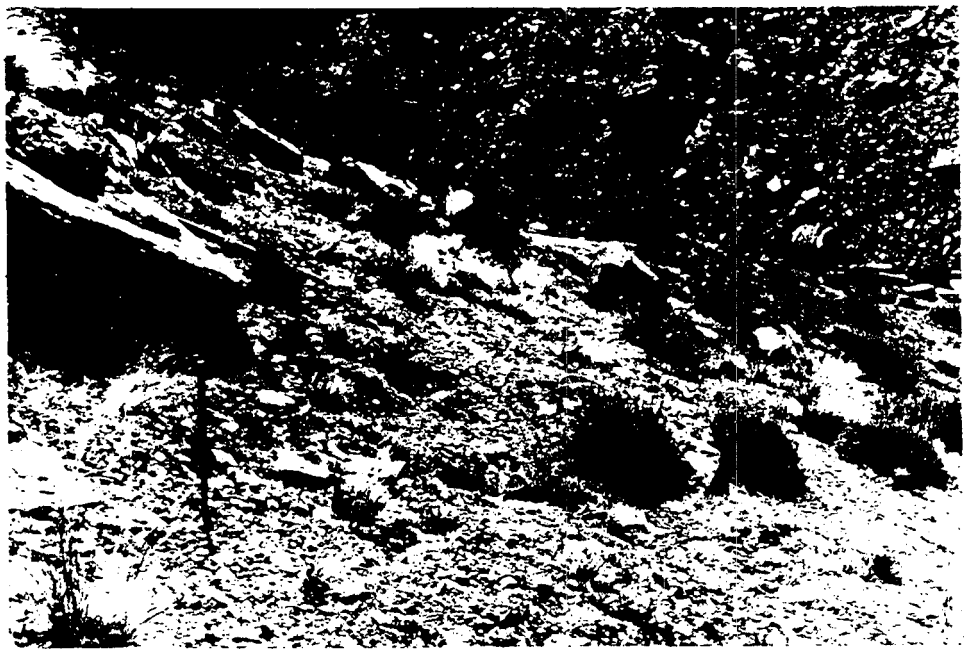


Photo No. 4. End of transect. This photo is from the end of the transect looking back into the sampled area.

Location of Quadrats

The 40 quadrats were randomly placed between the staked ends of the transect.

Typical Quadrats:

Following are three photographs showing typical conditions in the 40 quadrats.

Photo No. 5

Photo No. 6

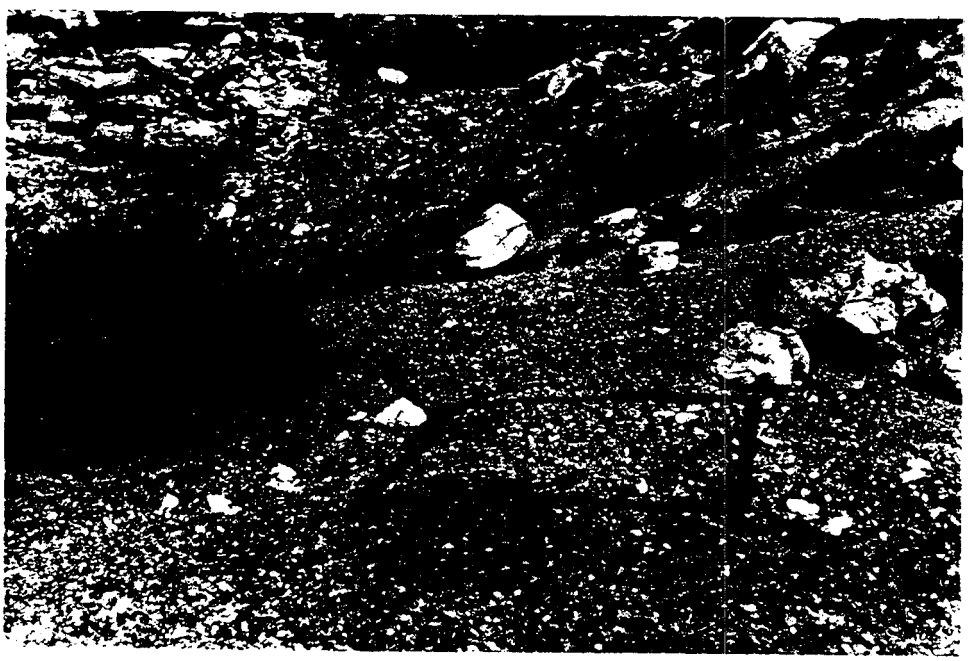


Photo No. 7

Hidden Valley Mine

Reference Area

36" x 36" Quadrats

Quadrat	% Vegetation	Plant Species %	Litter	Rock	Pavement and Bare Ground	Total %
1	14	Atco - 9 Orhy - 5	18	35	33	100
2	___	_____	___	100	___	100
3	7	Gusa - 2 Hija - 5	2	30	61	100
4	12	Arno - 10 Gusa - 2	3	27	58	100
5	15	Epvi - 14 Hija - 1	4	22	59	100
6	10	Arno - 8 Hija - 2	1	43	46	100
7	4	Orhy - 2 Gusa - 2	1	72	23	100
8	5	Hija - 3 Arno - 2	2	21	72	100
9	___	_____	___	42	58	100
10	10	Gusa - 6 Hija - 3	1	15	74	100
11	7	Atco - 7	1	12	80	100
12	8	Orhy - 2 Hija - 2 Arno - 4	1	23	68	100
13	___	_____	___	100	___	100

irat	% Vegetation	Plant Species %	Litter	Rock	Pavement and Bare Ground	
14	15	Arno - 12 Epvi - 3	1	27	57	100
15	2	Orhy - 2	2	12	84	100
16	3	Hija - 3	2	22	73	100
17	4	Gusa - 4	1	11	84	100
18	—	———	—	15	85	100
19	5	Gusa - 4 Hija - 1	—	15	80	100
20	7	Orhy - 7	1	22	70	100
21	9	Epvi - 9	2	10	79	100
22	5	Arno - 4 Gusa - 1	1	10	83	100
23	—	———	—	7	93	100
24	—	———	—	—	100	100
25	—	———	—	—	100	100
26	12	Atco - 12	2	12	74	100
27	5	Gusa - 3 Hija - 2	1	9	85	100
28	10	Orhy - 7 Hija - 3	2	5	83	100
29	3	Hija - 3	1	21	75	100
30	5	Orhy - 2 Gusa - 3	2	10	83	100
31	6	Epvi - 3 Orhy - 3	2	17	75	100

Quadrat	% Vegetation	Plant Species %	Litter	Rock	Pavement and Bare Ground	Total %
32	5	Orhy - 4 Arno - 1	1	10	84	100
33	17	Arno - 17	2	7	74	100
34	12	Epvi - 9 Hija - 3	2	5	81	100
35	3	Gusa - 3	1	14	82	100
36	7	Gusa - 4 Orhy - 3	1	7	85	100
37	4	Gusa - 4	2	1	93	100
38	6	Epvi - 6	2	12	80	100
39	14	Atco - 7 Orhy - 4 Gusa - 3	1	8	77	100
	8	Arno - 8	2	12	78	100
Total	259		69	843	2829	
Average	6.5		1.7	21.1	70.7	100

Plants in Quadrats

Shrubs

Atco - Atriplex confertifolia - Shadscale saltbush

Arno - Artemisia nova - Black sagebrush

Epvi - Ephedra viridis - Mormon tea

Gusa - Gutierrezia sarothrae - Broom snakeweed

Grasses

Orhy - Oryzopsis hymenoides - Indian rice grass

Hija - Hilaria jamesii - Galleta

Other Plants On Area Not Picked Up In Quadrats

Save - Sarcobatus vermiculatus - Greasewood

Chna - Chrysothamnus nauseosus - Rubber rabbit brush

Atca - Atriplex canescens - Fourwing saltbrush

Phlo - Phlox spp. - Phlox

Opnu - Opuntia spp. - Prickley pear

Summary of Data

The 40 quadrats show there is only 6.5% vegetation ground cover on the area. Of this, 27% is grasses and 73% is shrubs.

Litter covers 1.7% of the ground, rock 21.1% and pavement and bare ground 70.7%.

Shrub Density

There were 32 shrubs in the 40 quadrats, which is .8 shrubs per yard^2 or 3872 shrubs per acre.

Production

The production on this arid site is very low. There is only approximately 100 lbs. of air dry matter produced from the sparse grasses and shrubs per acre per year.

Goal

The goal is to have a 6.5% vegetative ground cover on the reclaimed area through revegetation work.

Frank R. Jensen

Frank R. Jensen
Reclamation Specialist

Appendix V

Climatological Data

EXHIBIT 4

ENVIRONMENTAL DATA SERVICE
IN COOPERATION WITH EMPLOYMENT DEVELOPMENT DIVISION
UTAH DEPARTMENT OF EMPLOYMENT SECURITY
CLIMATOGRAPHY OF THE UNITED STATES NO. 20-42

LATITUDE 38° 55'
LONGITUDE 111° 15
ELEV (GROUND) 6210 FT.

CLIMATOLOGICAL SUMMARY

STATION

EMERY, UTAH

MEANS AND EXTREMES FOR PERIOD 1941-1970

Month	Temperature (°F) Means: Daily maximum	Daily minimum	Monthly	Extremes: Record highest	Year	Record lowest	Year	Mean degree days **	Precipitation Totals (Inches): Mean	Greatest daily	Year	Snow, Sleet: Mean	Maximum monthly	Year	Greatest daily	Year	Mean number of days: Precip. .10 inch or more	Temperatures Max. 90° and above	Max. 32° and below	Min. 32° and below	Min. 0° and below	Month
(a)	30	30	30	30		30		#	30	30		30	30		30		30	30	30	30	30	
Jan.	37.4	11.3	24.1	59	1970•	-20	1963•	1265	.47	.65	1949	5.6	21.7	1957	7.0	1967	2	0	9	31	4	Jan.
Feb.	41.1	16.0	28.5	63	1954	-12	1951	1022	.42	.72	1955	5.3	15.5	1960	9.0	1955	1	0	5	28	2	Feb.
Mar.	48.7	21.9	35.3	70	1960	0	1948	880	.46	.64	1961	4.5	14.5	1952	6.0	1943	1	0	1	20	·	Mar.
Apr.	59.3	30.2	44.7	80	1943	10	1945	585	.43	1.00	1941	.9	5.0	1945	4.0	1943	2	0	·	16	0	Apr.
May	68.8	38.0	53.4	88	1947	12	1967	357	.62	1.00	1965	.2	5.8	1946	5.8	1946	2	0	0	6	0	May
June	76.9	45.3	61.1	98	1970	28	1968	153	.71	1.40	1947	0	0	--	0	--	2	1	0	·	0	June
July	84.0	52.3	68.1	98	1969•	28	1968	22	.73	2.13	1969	0	0	--	0	--	2	4	0	•	0	July
Aug.	81.5	50.6	66.0	98	1961	30	1968	34	1.17	2.16	1947	0	T	1953	0	--	3	3	0	•	0	Aug.
Sept.	74.7	42.4	58.5	89	1959•	23	1968	186	.79	1.08	1958	.2	5.0	1965	5.0	1965	2	•	0	2	0	Sept.
Oct.	64.0	32.9	48.4	85	1963	13	1970	508	.86	1.38	1960	.6	7.0	1970	4.0	1970	2	0	0	14	0	Oct.
Nov.	49.3	21.9	35.1	73	1941	- 1	1952	888	.41	1.02	1957	2.4	13.1	1957	10.0	1957	1	0	2	27	:	Nov.
Dec.	39.1	14.0	26.5	63	1958	-12	1962	1166	.57	.68	1949	5.2	27.0	1967	9.0	1967	2	0	8	31	2	Dec.
Year	60.4	31.3	45.8	98•	Aug. 1961	-20	Jan. 1963	7056	7.64	2.16	Aug. 1947	23.9	27.0	Dec. 1957	10.0	Nov. 1957	22	T	25	185	8	Year

(a) Average length of record, years.

T Trace, an amount too small to measure.

** Base 65°F

• Also on earlier dates, months, or years.

Less than one half.

CLIMATE OF EMERY, UTAH

Emery is located in southeastern Utah on the western edge of Castle Valley. This broad valley is oriented northeast to southwest and extends 20 to 25 miles east of the city, ending abruptly at the San Rafael Knob, which rises above 7900 feet MSL.

Emery is nearly surrounded by mountains. The Wasatch Plateau, (about 10 miles to the northwest), has several peaks rising to more than 11,000 feet above sea level and extends from west to north of Emery. To the southwest is the Sevier Plateau and to the south lies the Aquarius Plateau. About 60 miles to the northeast is the West Tavaputs Plateau, which has several peaks extending to above 10,000 feet MSL. Thus, these mountain ranges provide a protecting influence from storms approaching from every direction except the southeast.

The climate is of the semi-arid (steppe) type, the most striking features being abundant sunshine, meager precipitation, dry air, and relatively light winds. There are four well-defined seasons. Winters are characterized by cold and dry weather. Temperatures below zero occur in nearly every winter season and in about one of every 3 years temperatures 10 degrees below zero, or colder, can be expected. The annual snowfall is light, averaging only 24 inches and rarely does the yearly snowfall exceed 40 inches. Less than 5 inches of snow was recorded in 1934 and again in 1950.

Primarily because of the elevation of Emery, summers are delightfully cool. Maxima during the hottest summer months, July and August, are usually in the low 80's, with night-time minima generally in the low 50 s. Since the beginning of record in 1901, the temperature has never reached 100° at Emery.

The principal rainfall season is in summer, when moisture-laden air masses occasionally move into the area from the Gulf of Mexico. Precipitation during this season is usually associated with thunderstorms, and the mountain ranges to the east and north are a contributing factor to the development of these storms. August is the only month of the year that has an average precipitation greater than 1 inch.

Winds are generally light to moderate in all seasons, although relatively strong southerly winds may blow for several days at a time during the spring season, when low pressure storms occasionally move through the region. The extremely strong winds that rarely occur are usually associated with thunderstorms.

The freeze-free period, or growing season, averages about 4-1/2 months, usually extending from mid-May to late September. Livestock and livestock products account for most of the farm income in the area. Wheat and hay are the most important agricultural crops grown.

Following are the tables of miscellaneous phenomena, not included in the climatological summary table:

Average Dates of Occurrences of Various Temperature Values:

Temperature Equal to or Lower than:	Average Dates of Occurrence: Last in Spring	First in Fall	Period, Days
32°	May 21	September 30	132
28°	April 30	October 13	166
24°	April 21	October 25	187
20°	April 6	November 4	212
16°	March 22	November 13	236

Extremes of Temperature and Precipitation which have occurred prior to 1941 and exceed those appearing in the table include:

Maximum Temperatures
- 60° in January 1918
- 67° in February 1904
- 72° in March 1908
- 89° in April 1910
- 89° in May 1920
- 91° in September 1920
- 75° in November 1916

Minimum Temperatures
- -20 in February 1905
- 5 in March 1922
- 9 in April 1917
- 22 in September 1907
- 8 in October 1935
- - 2 in November 1931
- -19 in December 1924

Greatest Daily Precipitation
- .83 in January 1906
- 1.22 in March 1918
- 1.25 in April 1917
- 2.60 in May 1923
- 1.69 in September 1940
- 2.07 in October 1916
- 1.03 in November 1915
- .70 in December 1921

Greatest and least monthly precipitation totals for the full period of record, 1901-1955, are as follows:

Month	Greatest	Year	Least	Year
January	2.49	1916	0	1919
February	3.01	1905	0	1954•
March	1.97	1918	0	1955•
April	2.60	1917	0	1955•
May	4.00	1928	0	1932•
June	3.34	1969	0	1950•
July	4.26	1969	0	1928
August	5.47	1947	T	1903
September	3.48	1909	0	1953•
October	3.87	1916	0	1955•
November	2.00	1916	0	1944•
December	1.80	1913	0	1942•
Annual	16.84	1941	0.94	1902

Average Temperature (°F)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Ann'l
941	25.0	31.0	36.6	40.2	54.4	57.8	65.8	64.8	54.0	44.5	36.6	27.5	44.8
942	23.7	23.1	34.1	45.8	50.5	60.2	67.2	65.4	56.8	49.0	36.8	31.8	45.4
943	28.6	32.9	36.9	50.2	52.0	58.7	66.9	65.2	59.8	45.0	35.4	26.6	46.3
944	21.0	24.0	33.5	40.8	51.8	57.2	65.4	65.0	58.6	49.0	33.4	29.4	44.1
945	28.5	31.3	33.2	38.0	53.8	55.6	66.1	64.8	55.6	48.4	34.3	23.2	44.4
946	22.4	29.6	38.8	51.4	51.1	63.5	68.6	66.6	58.5	42.8	31.6	31.2	46.3
947	25.1	33.9	40.0	44.0	56.8	57.0	67.0	64.1	61.2	49.8	30.0	25.6	46.2
948	26.0	25.6	29.5	45.1	54.0	60.6	66.6	65.4	61.2	47.7	31.1	25.3	44.8
949	15.8	18.4	36.5	48.8	52.6	60.0	67.5	65.8	60.3	45.7	43.8	23.5	44.9
950	20.6	31.7	37.5	47.4	52.0	61.6	66.3	65.4	57.4	54.5	40.1	34.4	47.4
951	27.2	29.8	36.2	47.3	53.6	59.1	70.3	64.7	59.4	46.1	31.7	21.8	45.6
952	21.9	26.3	30.5	46.2	55.5	62.5	63.1	67.1	60.6	54.0	32.1	24.8	45.8
953	30.5	30.9	39.2	43.7	48.9	63.2	70.2	64.4	61.4	48.5	38.5	25.8	47.1
954	28.0	39.3	36.3	50.3	57.4	60.9	70.8	65.8	60.3	51.0	40.7	24.3	48.8
955	20.9	18.9	34.4	42.9	53.7	60.7	68.9	67.8	61.3	50.6	34.2	30.4	45.4
956	31.2	25.4	39.9	46.1	55.8	65.5	66.2	64.5	62.0	49.1	--	--	--
957	20.9	32.6	38.7	43.4	50.0	62.1	67.8	65.2	57.8	46.4	31.8	29.7	45.5
958	27.7	14.8	33.3	42.3	58.0	64.5	68.3	69.3	59.7	50.0	37.1	35.3	48.4
959	27.6	30.8	37.5	46.5	52.2	66.6	70.4	67.0				28.0	47.5
960	18.9	23.8	38.7	46.4	52.9	64.2	70.0	67.8	61.3	47.7	35.4	27.4	46.2
961	26.1	32.0	36.0	44.4	53.6	66.6	69.8	67.7	52.8	47.2	33.2	21.9	45.9
62	25.0	32.7	31.9	48.6	52.0	61.1	67.3	66.1	58.4	49.1	38.9	28.4	46.6
63	17.6		32.9	40.5	56.4	59.0	68.8	65.2	59.4	51.6	34.2	24.1	45.4
64	21.5	25.6	31.1	43.7	52.1	60.1	71.5	66.2	57.7	51.0	32.1	25.5	
65	30.4	28.7	33.6	44.1	50.3	58.2	67.7	65.1	53.5	51.8	39.6	25.5	
66	21.2	23.3						68.1				24.4	
67	24.5				51.9	58.0	70.5	68.4	59.6	52.0	38.7	18.4	
68	18.3	31.8	39.1	40.5	50.5	62.9	65.7	61.0	56.1	49.1	35.0	21.0	44.3
69	27.8	24.0	30.4	45.9	58.5	59.6	69.4	70.2	61.4	42.4	34.7	30.5	46.2
70	26.5		34.8	40.0	54.3	62.2	69.5	69.8	56.0	42.8	34.3	25.6	

Total Precipitation (Inches)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Oct.	Nov	Dec
1941	0.92	0.70	0.92	2.10	1.78	1.40	0.49	2.63	1.44	3.56	T	0.55
1942	0.11	0.30	0.24	0.36	0.03	0.00	0.74	0.33	0.67	1.23	T	0.00
1943	0.46	T	0.92	0.49	0.20	0.70	0.35	0.90	0.53	0.50	0.69	0.21
1944	1.01	0.32	0.55	0.62	T	1.30	0.20	0.12	0.00	0.37	0.03	T
1945	0.30	0.30	1.00	0.61	0.03	0.62	0.55	0.78	0.35	1.32	0.17	0.20
1946	0.37	0.00	0.63	0.17	0.81	0.00	0.13	0.74	T	0.90	1.48	0.20
1947	T	0.10	T	0.46	0.97	1.90	0.58	5.47	0.00	0.79	0.50	1.14
1948	T	0.85	0.50	T	T	0.42	0.29	0.80	0.07	1.47	T	0.80
1949	1.70	0.96	0.55	0.11	0.36	1.03	1.03	0.79	0.47	0.71	T	1.38
1950	0.20	0.03	T	T	0.21	0.00	1.94	0.78	0.30	0.00	0.59	0.52
1951	0.22	0.17	0.34	0.16	1.95	0.14	0.10	2.54	0.36	0.97	1.04	1.06
1952	0.78	0.05	1.37	0.16	0.05	1.25	0.20	0.62	1.41	0.00	0.48	0.74
1953	0.22	0.06	0.35	0.27	0.14	0.46	0.87	1.49	0.00	1.29	0.47	0.18
1954	0.47	0.00	0.65	0.59	1.03	0.83	0.45	0.51	1.91	0.14	0.15	0.17
1955	0.61	1.12	0.00	0.00	0.20	0.47	0.31	2.18	0.47	0.00	0.16	0.61
1956	1.11	0.21	0.00	0.53	0.21	0.03	0.20	0.12	0.39	0.10	0.00	0.62
1957	1.47	0.27	0.11	1.56	2.56	0.47	0.83	1.31	0.00	3.17	1.50	0.28
1958	0.25	0.45	0.93	0.31	0.57	0.08	0.47	0.42	1.43	0.16	0.77	0.00
1959	0.10	1.22	0.00	0.26	0.15	0.25	0.30	1.41	0.78	0.46	0.59	0.58
1960	0.67	1.11	0.70	0.18	0.28	0.11	0.33	0.05	1.52	2.64	0.58	0.00
1961	0.14	0.09	1.50	0.66	0.33	0.00	0.37	1.97	2.81	1.16	0.09	0.54
1962	0.18	1.42	0.12	0.00	0.81	0.12	0.20	0.04	0.78	1.02	0.09	0.07
1963	0.50	0.00	0.34	0.54	0.16	0.47	0.27	2.47	2.06	0.23	0.20	0.00
1964	0.00	0.00	0.40	0.65	1.37	0.36	0.68	0.53	0.00	0.00	0.25	1.04
1965	0.06	0.49	0.51	0.65	1.37	0.36	0.68	1.17	1.15	0.03	1.10	0.68
1966		0.79										
1967	0.38	0.05	0.19	0.24	0.82	1.45	0.20	0.90	0.50	0.01	0.34	0.86
1968	0.29	0.60	0.24	0.48	0.78	0.74	2.07	1.91	0.18	0.68	0.00	1.59
1969	1.19	0.36	0.28	0.16	1.02	3.34	4.26	0.91	2.25	0.68	0.21	0.56
1970	0.47	0.11	0.62	0.41		0.72	2.10	0.46	0.56	1.36	0.26	0.04

STATION HISTORY - EMERY, UTAH

Observations of precipitation and maximum and minimum temperatures date back to 1901 Emery. The station has been moved only four times during its history, and data from the various locations appear compatible. From January 1901 to June 1921, the station was located four ocks NE of the Post Office, with H. C. Wickman as the observer. In November 1921, after a ort break in the record, the instruments were moved to the Joseph J. Jensen residence located ree blocks NW of the Post Office, and Mr. and Mrs. Jensen began recording the weather data. r. Jensen died in 1951, but Mrs. Jensen continued as the observer until 1959.

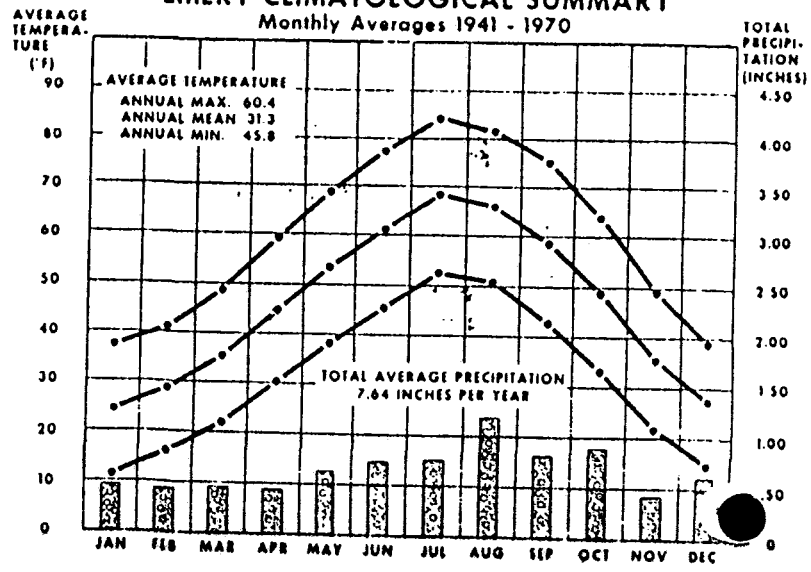
During the time the station was located at the Jensen residence, a total of about 38 years, ere were only two minor moves involving the station instruments. In May 1931 the equipment s moved 100 yards east of the former location; and in July 1952 the rain gage was again relo- ted a short distance to the east.

In May 1959 the station was moved to a location 0.3 mile SSW of the Post Office, and R. Crook became the official observer. In January 1960 Mr. Crook was forced to give up the ation because of illness and the equipment was moved 0.2 mile SE to the residence of Merlin Christensen. Mr. Christensen with the help of his family is continuing the excellent clima- logical records for the community.

E. Arlo Richardson, Climatologist
Logan, Utah

EMERY CLIMATOLOGICAL SUMMARY

Monthly Averages 1941 - 1970



Station: Emery, Utah

Longitude: 111° 15'

Elevation: 6200

Latitude: 38° 55'

1901-1970

Temp. 1901-1975

Month	TEMPERATURE							PRECIPITATION					
	MEANS			EXTREMES									
	Daily Maximum	Daily Minimum	Monthly	Record Highest	Year	Record Lowest	Year						
Jan.	37.0	10.8	23.9	60	1918	-20	1963	.48	.83	1906	5.6	29.0	1930
Feb.	41.7	16.0	28.9	67	1904	-20	1905	.52	.72	1955	5.6	27.0	1905
Mar.	50.1	22.9	36.5	72	1908	-5	1922	.44	1.22	1918	3.2	14.5	1952
Apr.	59.3	30.0	44.6	82	1910	9	1917	.39	1.25	1917	.7	10.0	1917
May	68.8	37.9	53.3	89	1920	12	1967	.58	2.60	1928	.6	16.0	1922
Jun.	77.5	45.4	61.4	98	1970	28	1968	.53	1.40	1947	.0		
Jul.	83.3	52.2	67.8	98	1969	28	1968	.85	2.13	1969	.0		
Aug.	81.3	50.6	66.0	98	1961	30	1968	1.19	2.16	1947	T	T	1953
Sep.	74.3	42.0	58.2	91	1920	22	1908	.91	1.69	1940	.1	5.0	1965
Oct.	63.5	32.4	47.9	85	1963	8	1935	.80	2.07	1916	.7	7.0	1970
Nov.	50.2	21.8	35.0	75	1916	-2	1931	.35	1.03	1915	1.9	20.0	1906
Dec.	39.4	13.7	26.8	63	1958	-19	1924	.51	.70	1921	3.9	27.0	1967
Annual	60.5	31.3	45.9	98	June 1970	-28	Jan. 1963	7.55	2.60	May 1928	22.3	29.0	1930

Appendix VI

Coal Quality Data

COMMERCIAL TESTING & ENGINEERING CO.

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

W[illegible]RN DIVISION MANAGER
LL[illegible] W. TAYLOR, JR.

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

SOLDIER CREEK COAL COMPANY
P.O. Box AS
Price, Utah 84501

August 3, 1979

Sample Identification

	Coal
	Hidden Valley Mine
Sam[illegible]	Soldier Creek Coal Co.
	xxxxx
	Instr. 7-5-79

Soldier Creek Coal Co.

Reject Composite of 72-82395
Core Hole No. DH-7
Seam - B
Req. No. 467
P. O. No. 11347

72-84211

SHORT PROXIMATE ANALYSIS
Dry Basis

% Moisture	xxxxx
% Ash	71.03
Btu/lb.	2692
% Sulfur	0.40

SULFUR FORMS
Dry Basis

% Pyritic Sulfur	0.21
% Sulfate Sulfur	0.00
% Organic Sulfur (Diff)	0.19
% Total Sulfur	0.40

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

G. D. PALMER, Manager, Denver Laboratory

GDP/vf

Charter Member

COMMERCIAL TESTING & ENGINEERING CO.

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

W[illegible]RN DIVISION MANAGER
LL[illegible] W. TAYLOR, JR.

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

SOLDIER CREEK COAL COMPANY
P.O. Box AS
Price, Utah 84501

August 10, 1979

Coal

Hidden Valley Mine

Soldier Creek Coal Co.

xxxxx

Instr. 7-5-79

Soldier Creek Coal Co.

Reject Composite of 72-82395
Core Hole No. DH-7
Seam - B
Req. No. 467
P.O. No. 11347

SOIL TEST REPORT

Paste Ph	8.6	Exchangeable Potassium, Meq/100g	0.6
Electric Cond mm/cc	6.1	Carbonate, Meq/L	1.42
Water Holding Capacity at Saturation	30.4	Bicarbonate, Meq/L	10.56
Calcium, Meq/L	6.38	Sulfate, Meq/L	77.16
Magnesium, Meq/L	2.19	Chloride, Meq/L	0.19
Sodium, Meq/L	95.47	Nitrate, Meq/L	4.36
Potassium, Meq/L	3.70	Texture Class	CARB
Sodium Adsorption Ratio	45.6	Sand %	*
Cation Exchange Capacity, Meq/100g	17.5	Silt %	*
Exchangeable Calcium, Meq/100g	10.5	Clay %	*
Exchangeable Magnesium, Meq/100g	3.4	Selenium (Soluble), PPM	0.06
Exchangeable Sodium, Meq/100g	5.4		
		Boron (Soluble), PPM	1.1

*Carbolithic

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

G. D. PALMER, Manager, Denver Laboratory

GDP/vt

COMMERCIAL TESTING & ENGINEERING CO.

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

EST[illegible] DIVISION MANAGER
OYD[illegible] TAYLOR, JR.

PLEASE ADDRESS ALL CORRESPONDENCE TO:
10[illegible]5 EAST 51st AVE., DENVER, COLO. 80239
OFFICE TEL. (303) 373-4772

SOLDIER CREEK COAL COMPANY
P.O. Box AS
Price, Utah 84501

August 10, 1979

Sample identification by

Kind of sample reported to us	Coal	Soldier Creek Coal Co.
ample taken at	Hidden Valley Mine	Reject Composite of 72-82396
mple taken by	Soldier Creek Coal Co.	Core Hole No. DH-7
Date sampled	xxxxx	Seam - C
Date received	Instr. 7-5-79	Req. No. 467
		P.O. No. 11347

Analyss report no. 72-84212 Page 2

SOIL TEST REPORT

Paste Ph	6.4	Exchangeable Potassium, Meq/100g	0.4
Electric Cond mm/cc	8.2	Carbonate, Meq/L	0.00
Water Holding Capacity at Saturation	32.6	Bicarbonate, Meq/L	2.37
Calcium, Meq/L	25.47	Sulfate, Meq/L	75.26
Magnesium, Meq/L	17.90	Chloride, Meq/L	0.11
Sodium, Meq/L	30.41	Nitrate, Meq/L	2.86
Potassium, Meq/L	6.83	Texture Class	CARB
Sodium Adsorption Ratio	6.2	Sand %	*
Cation Exchange Capacity, Meq/100g	18.2	Silt %	*
Exchangeable Calcium, Meq/100g	9.6	Clay %	*
Exchangeable Magnesium, Meq/100g	5.2	Selenium (Soluble), PPM	0.04
Exchangeable Sodium, Meq/100g	1.5		
		Boron (Soluble), PPM	0.9

*Carbolithic

Respectfully submitted
COMMERCIAL TESTING & ENGINEERING CO.

G. D. PALMER, Manager Denver Laboratory

Charter Member

'vt

COMMERCIAL TESTING & ENGINEERING CO.

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

[W]ESTERN DIVISION MANAGER
[LL]OYD W. TAYLOR, JR.

PLEASE ADDRESS ALL CORRESPONDENCE TO:
6775 EAST 51st AVE., DENVER, COLO. 80239
OFFICE TEL. (303) 373-4772

SOLDIER CREEK COAL COMPANY
P. O. Box AS
Price, Utah 8451

August 3, 1979

Sample identification by

Kind of sample reported to us	Coal	Soldier Creek Coal Co.
Sample taken at	Hidden Valley Mine	Reject Composite of 72-82396 Core Hole No. DH-7 Seam - C Rec. No. 467 P. O. No. 11347
Sample taken by	Soldier Creek Coal Co.	
Date sampled	xxxxx	
Date received	Instr. 7-5-79	

Analysis report no. 72-84212

SHORT PROXIMATE ANALYSIS	Dry Basis
% Moisture	xxxxx
% Ash	81.00
Btu/lb.	1328
% Sulfur	1.19

SULFUR FORMS	Dry Basis
% Pyritic Sulfur	1.05
% Sulfate Sulfur	0.02
% Organic Sulfur (Diff)	0.12
% Total Sulfur	1.19

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

G. D. PALMER, Manager, Denver Laboratory

GDP/vt

COMMERCIAL TESTING & ENGINEERING CO.

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

ERN DIVISION MANAGER
W. TAYLOR, JR.

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

SOLDIER CREEK COAL COMPANY
P. O. Box AS
Price, Utah 84501

August 3, 1979

Sample identification by

Kind of sample reported to us	Coal	Soldier Creek Coal Co.
Sample taken at	Hidden Valley Mine	Reject Composite of 72-82808
Sample taken by	Soldier Creek Coal Co.	Core Hole No. DH-7
Date sampled	xxxxx	Seam - A
		463.0' - 475.0'
Date received	Instr. 7-5-79	Req. No. 467
		P. O. No. 11347

Analysis report no. 72-84237

SHORT PROXIMATE ANALYSIS

	Dry Basis
% Moisture	xxxxx
% Ash	66.53
Btu/lb.	3753
% Sulfur	3.94

SULFUR FORMS

	Dry Basis
% Pyritic Sulfur	3.00
% Sulfate Sulfur	0.00
% Organic Sulfur (Diff)	0.94
% Total Sulfur	3.94

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

G. D. PALMER, Manager, Denver Laboratory

GDP/vt

inal Copy Watermarked
For Your Protection

Charter Member

COMMERCIAL TESTING & ENGINEERING CO.

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

W[illegible]IN DIVISION MANAGER
LL[illegible]W. TAYLOR, JR.

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

SOLDIER CREEK COAL COMPANY
P.O. Box AS
Price, Utah 84501

August 10, 1979

		Sample identification by
Kind of sample reported to us	Coal	Soldier Creek Coal Co.
Sample taken at	Hidden Valley Mine	Reject Composite of 72-82808
Sample taken by	Soldier Creek Coal Co.	Core Hole No. DH-7
Date sampled	xxxxx	Seam - A 463.0' - 475.0'
Date received	Instr. 7-5-79	Req. No. 467 P.O. No. 11347

Analysis report no. 72-84237 Page 2

SOIL TEST REPORT

Paste Ph	5.6	Exchangeable Potassium, Meq/100g	0.2
Electric Cond mm/cc	10.9	Carbonate, Meq/L	0.00
Water Holding Capacity at Saturation	29.6	Bicarbonate, Meq/L	1.42
Calcium, Meq/L	29.58	Sulfate, Meq/L	106.3
Magnesium, Meq/L	43.91	Chloride, Meq/L	0.08
Sodium, Meq/L	29.37	Nitrate, Meq/L	1.86
Potassium, Meq/L	6.82	Texture Class	CARB
Sodium Adsorption Ratio	4.8	Sand %	*
Cation Exchange Capacity, Meq/100g	19.4	Silt %	*
Exchangeable Calcium, Meq/100g	8.3	Clay %	*
Exchangeable Magnesium, Meq/100g	3.0	Selenium (Soluble), PPM	0.01
Exchangeable Sodium, Meq/100g	0.2	Boron (Soluble), PPM	0.8

*Carbolithic

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

G. D. PALMER, Manager, Denver Laboratory

GDP/vt
[illegible]nal Copy Watermarked
[illegible]or Your Protection

Charter Member

Appendix VII

Slope Stability Analysis

COAL SEAM BACKFILL SLOPE STABILITY ANALYSIS

SOLDIER CREEK COAL COMPANY

HIDDEN VALLEY MINE

Prepared for

CalMat Co
Los Angeles, California

November 7, 1986

Prepared by

JBR Consultants Group
1841 East Fort Union Blvd
Salt Lake City, Utah

TABLE OF CONTENTS

LIST OF FIGURES

1.Ø INTRODUCTION

1.1 PURPOSE OF DOCUMENT

The purpose of this report is to present the results of slope stability analysis for the post-reclamation configuration of the coal seam backfills at the Hidden Valley Coal Mine, Emery County, Utah.

1.2 SCOPE OF WORK

This project consisted of evaluating the slope stability of the coal seam backfills proposed in the Hidden Valley Coal Mine Reclamation Plan submitted to the Division of Oil Gas and Mining on May 28, 1986. The DOGM has requested that a slope stability analysis be conducted of these slopes to demonstrate a static factor of safety of at least 1.3. The principal components of this project were:

1. Preparation of coal seam backfill cross sections.
2. Compilation of material properties.
3. Evaluation of slope stability.

In this report we summarize the methodology used to evaluate the slope stability and present the results of our analysis. Computer printouts from the stability analysis are presented in Appendix A.

2.Ø STABILITY ANALYSIS

2.1 METHODOLOGY

The slope stability has been evaluated using the simplified Janbu method of slices (Janbu and others, 1956). A computer program has been used to generate potential failure surfaces and calculate the factor of safety for each surface (Geoslope, 1985). One hundred potential failure surfaces have been considered for each coal seam pad. Included in Appendix A are descriptions of the surfaces with the ten lowest factors of safety. Figures 1 and 2 show the coal seam backfills in cross section, and the potential failure surface with the lowest factor of safety.

Only static conditions were considered in the stability analysis.

2.2 COAL SEAM PAD GEOMETRY

The location of the coal seam backfills are identified on topographic maps showing post-reclamation topography as currently envisioned by CalMat personnel. Typical cross sections for each seam have also been prepared and were utilized for this study. Each coal seam backfill will be approximately similar to a right

triangle; Seam A having a base of 40 feet and a height of 20 feet, Seam B having a base of 60 feet and a height of 30 feet. The final slope configuration for both seam backfills will be 2h:1v. The base for the backfills is assumed to be competent materials. A similar assumption has been made for the bedrock at the back of the backfills.

2.3 MATERIAL PROPERTIES

The stability of the coal seam backfills is dependent upon parameters such as geometry, locations of piezometric surfaces, and strengths of the materials. In as much as the materials comprising the backfills will be coarse grained with only minor amounts of fines, we assumed the materials will be in drained conditions. Therefore, we have assumed one piezometric surface to exist at the contact of the fill material and the naturally occuring ground.

The fill material for the backfills will be excavated from the existing pads. This material is coarse grained sand and gravel with minor amounts of fines coresponding to a GW or GP (depending on grading) in the Unified Soil Classification System (USCS). We have used data from available references to assign the material properties necessary to perform the stability an alysis.

The dry density of the material has been assigned a value of 110 pcf. This represents the average of the values for dry sand and for gravel according to Spangler and Handy (1973). Furthermore, 110 pcf is the dry density for GP as reported by both USBR (1977), and E. D'Appolonia (1976). We have chosen to use the value for GP rather than for GW because it is the lower of the two values and thus yields the lower factor of safety. In this manner, we have used the 'worst case scenario'.

The angle of internal friction has been assigned a value of 34 degrees for this study. This represents the average of the values listed in the literature assuming the material is similar to 'dry sand' from Spangler and Handy (1973); 'GP' from USBR (1977); 'granular soils' from E. D'Appolonia (1976); and 'sub-rounded sand' from Brunsden and Prior (1984). The value selected is considered to be conservatively low as the values reported in the literature range up to 40 degrees.

Because the material is assumed to be coarse-grained, the cohesion is equal to 0 psi.

3.0 RESULTS

Stability analysis reveal factors of safety of 1.354 for the A Seam backfill, and 1.353 for the B Seam backfill. These factors of safety are for the potential failure surface with the

lowest factor of safety. These failure surfaces are shown in figures 1 and 2.

4.Ø CONCLUSION

Based on the available data and assumptions made, we conclude the coal seam backfills will have a factor of safety of at least 1.3.

5.Ø REFERENCES

Brunsden, D., and Prior, D. B., 1984, Slope Instability, John Wiley & Sons, New York, 62Ø pp.

E. D'Appolonia Consulting Engineers, Inc., 1976, Engineering and Design Manual Coal Refuse Disposal Facilities, U.S. Department of the Interior, Mining Enforcement and Safety Administration, Washington, D.C.

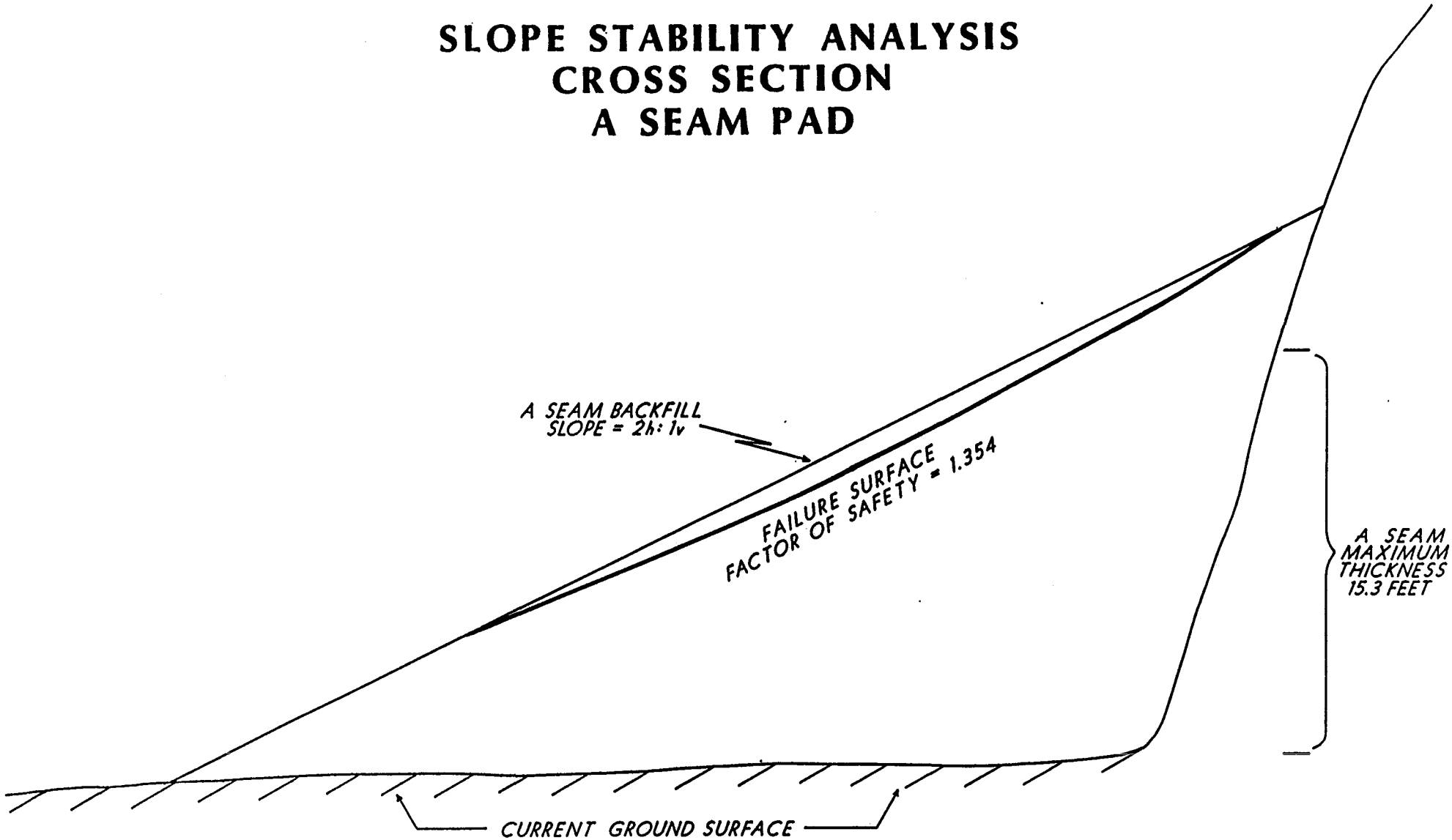
Geocomp Corp., 1985, Geoslope Version 3, Geocomp Corp., Concord, Massachusetts.

Janbu, N., Bjerrum, L., and Kjaernsli, B., 1956, Soil Mechanics Applied to Some Engineering Problems, Norwegian Geotechnical Institute, Publ. No. 16.

Spangler, M. G., and Handy, R. L., 1973, Soil Engineering, Intext Educational Publishers, New York, 748 pp.

U.S. Department of the Interior, Bureau of Reclamation, 1977, Design of Small Dams, A Water Resources Technical Publication, Washington, D.C.

SLOPE STABILITY ANALYSIS
CROSS SECTION
A SEAM PAD

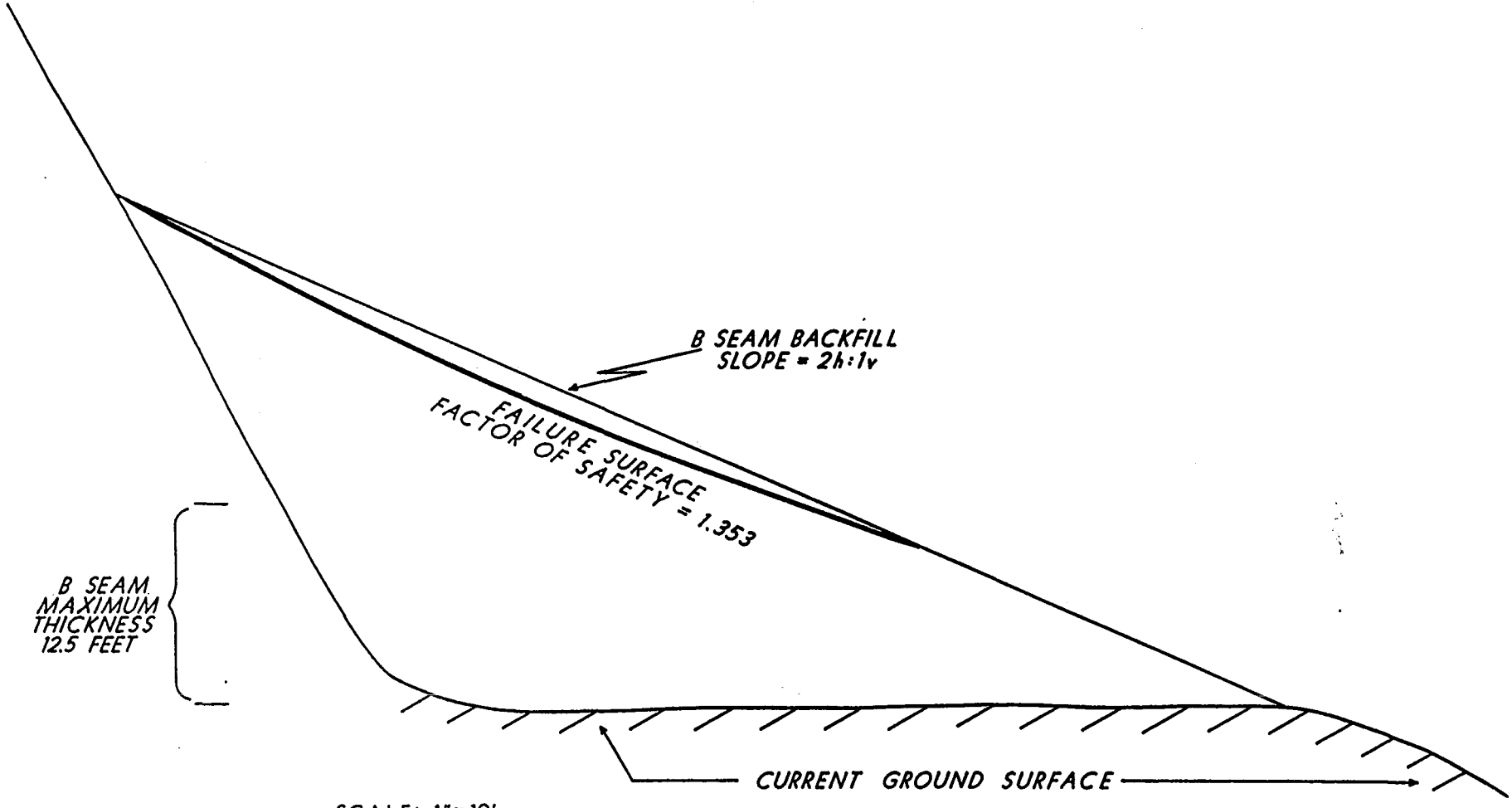


SCALE: 1" = 5'

CONSULTANTS GROUP
SALT LAKE CITY, UTAH

FIGURE

SLOPE STABILITY ANALYSIS
CROSS SECTION
B SEAM PAD



SCALE: 1"=10'

jbr CONSULTANTS GROUP
SALT LAKE CITY, UTAH

FIGURE 2

APPENDIX A

Version 3.1

Supplied by GEOCOMP Corp.
342 Sudbury Rd., Concord, MA. 01742
(617) 369-8304

GEOSLOPE V3.1 is based on the program, STABL3, developed at Purdue University under sponsorship of the Federal Highway Administration.

GEOCOMP Corp. has modified the program to run on various microcomputers and plotting devices.

GEOCOMP Corp. makes no warranties as to the fitness of this software. The user bears all responsibility for accuracy and correctness of results produced by this software. See the users manual for further warranty information.

Supplied under exclusive license to :
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CALMAT SECTION A - A'

BOUNDARY COORDINATES

2 TOP BOUNDARIES
2 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	.00	5.00	.00	1
2	5.00	.00	45.00	20.00	1

ISOTROPIC SOIL PARAMETERS

1 TYPE(S) OF SOIL

SOIL	TOTAL	SATURATED	COHESION	FRICTION	PORE	PRESSURE	PIEZOMETRIC

NO.				(DEG)	PARAMETER		NO.
1	110.0	110.0	.0	34.0	.00	.0	1

PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	.00
2	5.00	.00
3	38.00	.00
4	45.00	20.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 3 BOUNDARIES
OF WHICH THE FIRST 3 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	.00	5.00	.00
2	5.00	.00	38.00	.00
3	38.00	.00	45.00	20.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

100 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 10 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 10.00
AND X = 20.00

EACH SURFACE TERMINATES BETWEEN X = 35.00
AND X = 45.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = .00

2.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

* * SAFETY FACTORS ARE CALCULATED BY THE MODIFIED JANBU METHOD * *

JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 1 SPECIFIED BY 17 COORDINATE POINTS

SAFETY FACTOR = 1.354

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	15.56	5.28	21.10
2	17.42	6.00	21.83
3	19.28	6.74	22.56
4	21.13	7.51	23.30
5	22.96	8.30	24.03
6	24.79	9.11	24.76
7	26.61	9.95	25.50
8	28.41	10.81	26.23
9	30.20	11.70	26.96
10	31.99	12.60	27.70
11	33.76	13.53	28.43
12	35.52	14.49	29.16
13	37.26	15.46	29.90
14	39.00	16.46	30.63
15	40.72	17.48	31.36
16	42.43	18.52	32.09
17	43.97	19.49	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	16.49	1.87	21.87	.00	.00	19.66	9.80
2	18.35	1.86	62.37	.00	.00	56.01	27.91
3	20.20	1.85	96.65	.00	.00	86.70	43.21
4	22.04	1.84	124.77	.00	.00	111.85	55.74
5	23.88	1.83	146.82	.00	.00	131.53	65.54
6	25.70	1.82	162.88	.00	.00	145.85	72.68
7	27.51	1.81	173.03	.00	.00	154.89	77.18
8	29.31	1.79	177.37	.00	.00	158.75	79.11
9	31.10	1.78	176.00	.00	.00	157.54	78.50
10	32.87	1.77	169.04	.00	.00	151.33	75.41
11	34.64	1.76	156.59	.00	.00	140.23	69.88
12	36.39	1.75	138.77	.00	.00	124.34	61.96
13	38.13	1.73	115.72	.00	.00	103.76	51.70
14	39.86	1.72	87.57	.00	.00	78.58	39.16
15	41.57	1.71	54.46	.00	.00	48.92	24.38
16	43.20	1.54	16.68	.00	.00	15.00	7.48

CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 2 SPECIFIED BY 17 COORDINATE POINTS

SAFETY FACTOR = 1.354

POINT NO.			ALPHA (DEG)
1	16.67	5.83	20.94
2	18.54	6.55	21.69
3	20.39	7.29	22.45
4	22.24	8.05	23.21
5	24.08	8.84	23.97
6	25.91	9.65	24.72
7	27.72	10.49	25.48
8	29.53	11.35	26.24
9	31.32	12.23	26.99
10	33.11	13.14	27.75
11	34.88	14.07	28.51
12	36.63	15.03	29.27
13	38.38	16.00	30.02
14	40.11	17.01	30.78
15	41.83	18.03	31.54
16	43.53	19.07	32.29
17	44.98	19.99	

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 3 SPECIFIED BY 16 COORDINATE POINTS

SAFETY FACTOR = 1.355

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	18.89	6.94	20.18
2	20.77	7.63	21.13
3	22.63	8.36	22.09
4	24.49	9.11	23.04
5	26.33	9.89	23.99
6	28.15	10.70	24.95
7	29.97	11.55	25.90
8	31.77	12.42	26.86
9	33.55	13.32	27.81
10	35.32	14.26	28.77
11	37.07	15.22	29.72
12	38.81	16.21	30.67
13	40.53	17.23	31.63
14	42.23	18.28	32.58
15	43.92	19.36	33.54
16	44.54	19.77	

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 4 SPECIFIED BY 17 COORDINATE POINTS

SAFETY FACTOR = 1.357

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	17.78	6.39	19.03
2	19.67	7.04	20.09
3	21.55	7.73	21.15
4	23.41	8.45	22.21
5	25.26	9.21	23.27
6	27.10	10.00	24.32
7	28.92	10.82	25.38

10	34.30	13.49	28.56
11	36.05	14.45	29.61
12	37.79	15.44	30.67
13	39.51	16.46	31.73
14	41.21	17.51	32.79
15	42.89	18.59	33.85
16	44.55	19.70	34.90
17	44.93	19.96	

1

JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 5 SPECIFIED BY 18 COORDINATE POINTS

SAFETY FACTOR = 1.358

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	12.22	3.61	18.19
2	14.12	4.24	19.25
3	16.01	4.89	20.30
4	17.89	5.59	21.36
5	19.75	6.32	22.41
6	21.60	7.08	23.47
7	23.43	7.88	24.52
8	25.25	8.71	25.58
9	27.06	9.57	26.63
10	28.84	10.47	27.69
11	30.62	11.40	28.74
12	32.37	12.36	29.80
13	34.10	13.35	30.85
14	35.82	14.38	31.91
15	37.52	15.43	32.96
16	39.20	16.52	34.02
17	40.86	17.64	35.07
18	42.27	18.64	

1

JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 6 SPECIFIED BY 16 COORDINATE POINTS

SAFETY FACTOR = 1.361

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	18.89	6.94	17.16
2	20.80	7.53	18.59
3	22.70	8.17	20.01
4	24.58	8.86	21.43
5	26.44	9.59	22.85
6	28.28	10.36	24.28
7	30.10	11.19	25.70
8	31.91	12.05	27.12
9	33.69	12.97	28.54
10	35.44	13.92	29.97
11	37.18	14.92	31.39
12	38.88	15.96	32.81
13	40.56	17.05	34.23
14	42.22	18.17	35.65
15	43.84	19.34	37.08
16	44.17	19.59	

1

Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 7 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.362

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	12.22	3.61	16.30
2	14.14	4.17	17.56
3	16.05	4.78	18.81
4	17.94	5.42	20.06
5	19.82	6.11	21.31
6	21.68	6.83	22.57
7	23.53	7.60	23.82
8	25.36	8.41	25.07
9	27.17	9.26	26.32
10	28.96	10.14	27.57
11	30.74	11.07	28.83
12	32.49	12.03	30.08
13	34.22	13.04	31.33
14	35.93	14.08	32.58
15	37.61	15.15	33.83
16	39.28	16.27	35.09
17	40.91	17.42	36.34
18	42.52	18.60	37.59
19	43.12	19.06	

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 8 SPECIFIED BY 13 COORDINATE POINTS

SAFETY FACTOR = 1.363

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	20.00	7.50	16.43
2	21.92	8.07	18.45
3	23.82	8.70	20.46
4	25.69	9.40	22.48
5	27.54	10.16	24.50
6	29.36	10.99	26.52
7	31.15	11.89	28.54
8	32.90	12.84	30.56
9	34.63	13.86	32.58
10	36.31	14.93	34.59
11	37.96	16.07	36.61
12	39.56	17.26	38.63
13	39.63	17.31	

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 9 SPECIFIED BY 14 COORDINATE POINTS

SAFETY FACTOR = 1.364

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	13.33	4.17	15.87
2	15.26	4.71	17.66

4	19.05	5.99	21.24
5	20.91	6.71	23.03
6	22.75	7.49	24.82
7	24.57	8.33	26.61
8	26.36	9.23	28.40
9	28.12	10.18	30.19
10	29.85	11.19	31.97
11	31.54	12.24	33.76
12	33.20	13.36	35.55
13	34.83	14.52	37.34
14	36.34	15.67	

1

JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

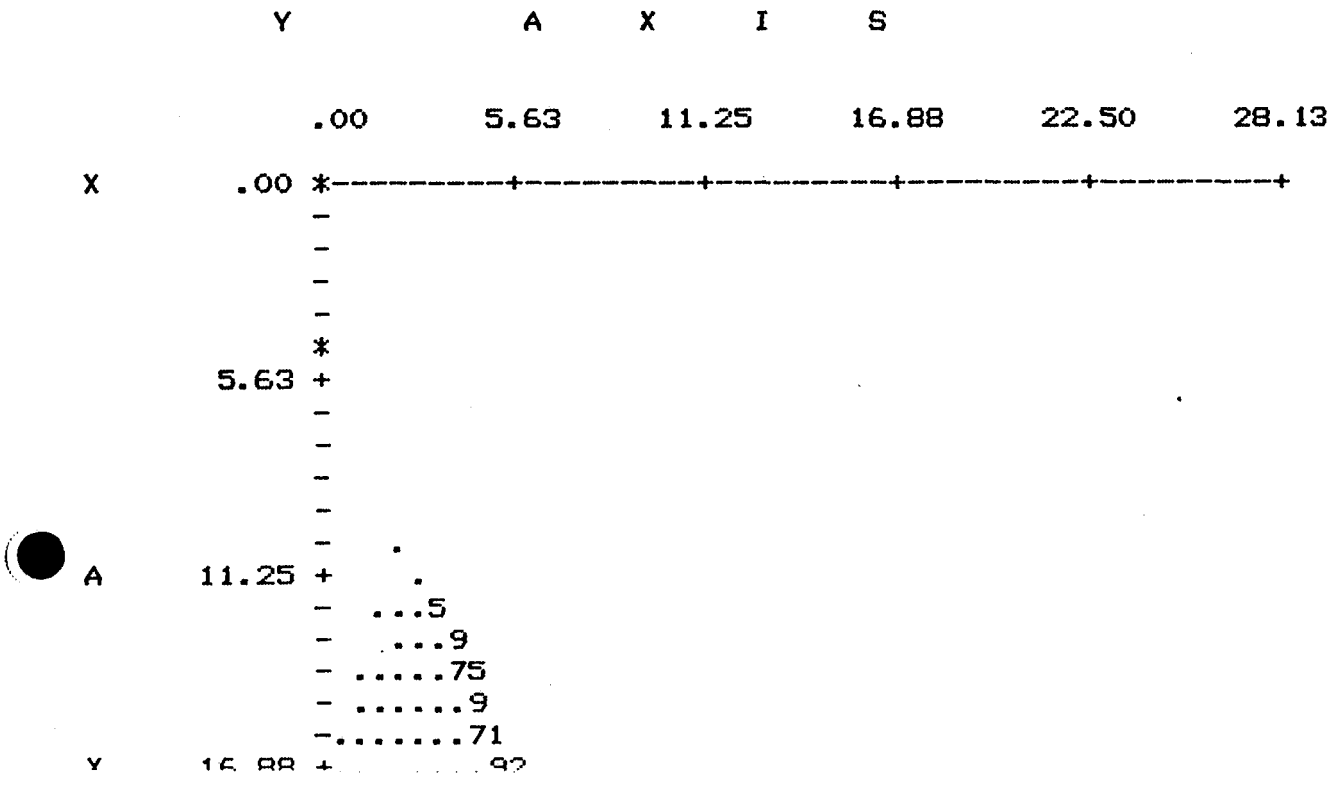
FAILURE SURFACE #10 SPECIFIED BY 14 COORDINATE POINTS

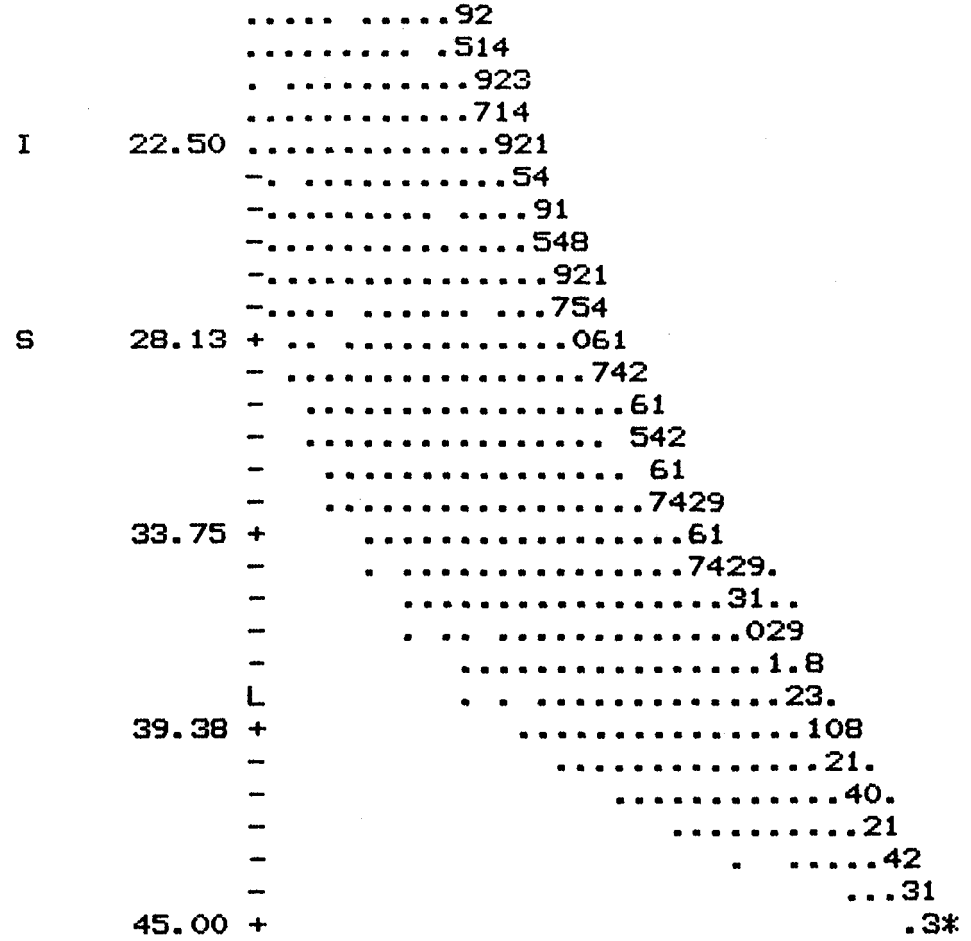
SAFETY FACTOR = 1.376

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	20.00	7.50	12.15
2	21.96	7.92	14.75
3	23.89	8.43	17.34
4	25.80	9.03	19.94
5	27.68	9.71	22.53
6	29.53	10.47	25.13
7	31.34	11.32	27.73
8	33.11	12.25	30.32
9	34.83	13.26	32.92
10	36.51	14.35	35.52
11	38.14	15.51	38.11
12	39.71	16.75	40.71
13	41.23	18.05	43.30
14	41.37	18.19	

1

JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)




22.50
28.13
33.75
39.38
45.00

GEOSLOPE
Version 3.1

Supplied by GEOCOMP Corp.
342 Sudbury Rd., Concord, MA. 01742
(617) 369-8304

GEOSLOPE V3.1 is based on the program, STABL3, developed at Purdue University under sponsorship of the Federal Highway Administration.

GEOCOMP Corp. has modified the program to run on various microcomputers and plotting devices.

GEOCOMP Corp. makes no warranties as to the fitness of this software. The user bears all responsibility for accuracy and correctness of results produced by this software. See the users manual for further warranty information.

Supplied under exclusive license to :
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CALMAT SECTION B - B'

BOUNDARY COORDINATES

1 TOP BOUNDARIES
1 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	.00	70.00	35.00	1

ISOTROPIC SOIL PARAMETERS

1 TYPE(S) OF SOIL

SOIL	TOTAL	SATURATED	COHESION	FRICTION	PORE	PRESSURE	PIEZOMETR
			INTERCEPT	ANGLE	PRESSURE	CONSTANT	SURFACE

NO.				(DEG)	PARAMETER		NO.
1	110.0	110.0	.0	34.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 3 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	.00
2	55.00	5.00
3	70.00	35.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 2 BOUNDARIES OF WHICH THE FIRST 2 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	.00	55.00	5.00
2	55.00	5.00	70.00	35.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

100 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 10 POINTS EQUALLY SPACED ALONG THE GROUND SURFACE BETWEEN X = 10.00
AND X = 30.00

EACH SURFACE TERMINATES BETWEEN X = 50.00
AND X = 70.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION AT WHICH A SURFACE EXTENDS IS Y = .00

2.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL

* * SAFETY FACTORS ARE CALCULATED BY THE MODIFIED JANBU METHOD * *

1

JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 1 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.353

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	21.11	10.56	21.10
2	22.98	11.28	21.53
3	24.84	12.01	21.97
4	26.69	12.76	22.40
5	28.54	13.52	22.84
6	30.39	14.30	23.27
7	32.22	15.09	23.71
8	34.05	15.89	24.14
9	35.88	16.71	24.58
10	37.70	17.54	25.02
11	39.51	18.39	25.45
12	41.32	19.25	25.89
13	43.11	20.12	26.32
14	44.91	21.01	26.76
15	46.69	21.91	27.19
16	48.47	22.82	27.63
17	50.24	23.75	28.06
18	52.01	24.69	28.50
19	53.77	25.64	28.93
20	55.52	26.61	29.37
21	57.26	27.59	29.80
22	59.00	28.59	30.24
23	60.72	29.59	30.68
24	62.44	30.61	31.11
25	64.16	31.65	31.55
26	65.86	32.69	31.98
27	67.56	33.75	32.42
28	67.75	33.88	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	22.04	1.87	21.87	.00	.00	19.66	9.80
2	23.91	1.86	63.68	.00	.00	57.21	28.51
3	25.77	1.85	101.79	.00	.00	91.38	45.54
4	27.62	1.85	136.20	.00	.00	122.21	60.91
5	29.46	1.84	166.96	.00	.00	149.74	74.63
6	31.30	1.84	194.08	.00	.00	173.98	86.71
7	33.14	1.83	217.60	.00	.00	194.98	97.17
8	34.97	1.83	237.53	.00	.00	212.77	106.04
9	36.79	1.82	253.91	.00	.00	227.38	113.32
10	38.60	1.81	266.77	.00	.00	238.84	119.03
11	40.41	1.81	276.14	.00	.00	247.19	123.19
12	42.22	1.80	282.06	.00	.00	252.46	125.82
13	44.01	1.79	284.57	.00	.00	254.69	126.93
14	45.80	1.79	283.69	.00	.00	253.91	126.54
15	47.58	1.78	279.47	.00	.00	250.15	124.67

17	51.13	1.76	261.16	.00	.00	233.83	116.53
18	52.89	1.76	247.15	.00	.00	221.34	110.31
19	54.64	1.75	229.97	.00	.00	206.01	102.67
20	56.39	1.74	209.65	.00	.00	187.88	93.63
21	58.13	1.74	186.25	.00	.00	166.97	83.22
22	59.86	1.73	159.81	.00	.00	143.33	71.43
23	61.58	1.72	130.37	.00	.00	117.00	58.31
24	63.30	1.71	98.00	.00	.00	88.00	43.86
25	65.01	1.70	62.74	.00	.00	56.37	28.09
26	66.71	1.70	24.63	.00	.00	22.15	11.04
27	67.65	.20	.29	.00	.00	.26	.13

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 2 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.354

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	23.33	11.67	20.92
2	25.20	12.38	21.37
3	27.06	13.11	21.82
4	28.92	13.85	22.27
5	30.77	14.61	22.72
6	32.62	15.38	23.17
7	34.46	16.17	23.62
8	36.29	16.97	24.07
9	38.11	17.79	24.52
10	39.93	18.62	24.96
11	41.75	19.46	25.41
12	43.55	20.32	25.86
13	45.35	21.19	26.31
14	47.15	22.08	26.76
15	48.93	22.98	27.21
16	50.71	23.89	27.66
17	52.48	24.82	28.11
18	54.25	25.76	28.56
19	56.00	26.72	29.01
20	57.75	27.69	29.45
21	59.49	28.67	29.90
22	61.23	29.67	30.35
23	62.95	30.68	30.80
24	64.67	31.71	31.25
25	66.38	32.74	31.70
26	68.08	33.79	32.15
27	69.78	34.86	32.60
28	69.98	34.99	

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 3 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.356

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	25.56	12.78	19.03
2	27.45	13.43	19.66
3	29.33	14.10	20.30
4	31.21	14.80	20.93

6	34.93	16.25	22.19
7	36.79	17.00	22.82
8	38.63	17.78	23.45
9	40.46	18.57	24.08
10	42.29	19.39	24.72
11	44.11	20.23	25.35
12	45.91	21.08	25.98
13	47.71	21.96	26.61
14	49.50	22.85	27.24
15	51.28	23.77	27.87
16	53.05	24.70	28.51
17	54.80	25.66	29.14
18	56.55	26.63	29.77
19	58.29	27.63	30.40
20	60.01	28.64	31.03
21	61.73	29.67	31.66
22	63.43	30.72	32.30
23	65.12	31.79	32.93
24	66.80	32.87	33.56
25	68.46	33.98	34.19
26	69.87	34.93	

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 4 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.357

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	16.67	8.33	18.51
2	18.56	8.97	19.13
3	20.45	9.62	19.76
4	22.34	10.30	20.39
5	24.21	11.00	21.02
6	26.08	11.71	21.65
7	27.94	12.45	22.28
8	29.79	13.21	22.91
9	31.63	13.99	23.53
10	33.46	14.79	24.16
11	35.29	15.61	24.79
12	37.10	16.44	25.42
13	38.91	17.30	26.05
14	40.71	18.18	26.68
15	42.49	19.08	27.30
16	44.27	20.00	27.93
17	46.04	20.93	28.56
18	47.79	21.89	29.19
19	49.54	22.87	29.82
20	51.28	23.86	30.45
21	53.00	24.87	31.08
22	54.71	25.91	31.70
23	56.41	26.96	32.33
24	58.10	28.03	32.96
25	59.78	29.11	33.59
26	61.45	30.22	34.22
27	63.10	31.35	34.85
28	64.15	32.07	

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 5 SPECIFIED BY 24 COORDINATE POINTS

SAFETY FACTOR = 1.360

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	27.78	13.89	17.16
2	29.69	14.48	18.03
3	31.59	15.10	18.90
4	33.48	15.75	19.77
5	35.37	16.42	20.63
6	37.24	17.13	21.50
7	39.10	17.86	22.37
8	40.95	18.62	23.24
9	42.79	19.41	24.10
10	44.61	20.23	24.97
11	46.42	21.07	25.84
12	48.22	21.94	26.71
13	50.01	22.84	27.57
14	51.78	23.77	28.44
15	53.54	24.72	29.31
16	55.29	25.70	30.17
17	57.02	26.70	31.04
18	58.73	27.74	31.91
19	60.43	28.79	32.78
20	62.11	29.88	33.64
21	63.77	30.98	34.51
22	65.42	32.12	35.38
23	67.05	33.27	36.25
24	68.13	34.06	

1

JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 6 SPECIFIED BY 29 COORDINATE POINTS

SAFETY FACTOR = 1.361

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	16.67	8.33	16.79
2	18.58	8.91	17.53
3	20.49	9.51	18.26
4	22.39	10.14	18.99
5	24.28	10.79	19.72
6	26.16	11.47	20.45
7	28.04	12.16	21.19
8	29.90	12.89	21.92
9	31.76	13.63	22.65
10	33.60	14.40	23.38
11	35.44	15.20	24.11
12	37.26	16.02	24.84
13	39.08	16.86	25.58
14	40.88	17.72	26.31
15	42.68	18.61	27.04
16	44.46	19.51	27.77
17	46.23	20.45	28.50
18	47.98	21.40	29.23
19	49.73	22.38	29.97
20	51.46	23.38	30.70
21	53.18	24.40	31.43
22	54.89	25.44	32.16
23	56.58	26.51	32.89
24	58.26	27.59	33.63

27	63.21	30.98	35.82
28	64.84	32.15	36.55
29	65.95	32.98	

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 7 SPECIFIED BY 17 COORDINATE POINTS

SAFETY FACTOR = 1.362

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	30.00	15.00	16.30
2	31.92	15.56	17.67
3	33.83	16.17	19.04
4	35.72	16.82	20.41
5	37.59	17.52	21.78
6	39.45	18.26	23.16
7	41.29	19.05	24.53
8	43.11	19.88	25.90
9	44.91	20.75	27.27
10	46.68	21.67	28.64
11	48.44	22.63	30.02
12	50.17	23.63	31.39
13	51.88	24.67	32.76
14	53.56	25.75	34.13
15	55.21	26.87	35.50
16	56.84	28.03	36.88
17	58.39	29.19	

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 8 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.365

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	21.11	10.56	15.05
2	23.04	11.08	16.03
3	24.97	11.63	17.01
4	26.88	12.21	17.99
5	28.78	12.83	18.97
6	30.67	13.48	19.94
7	32.55	14.16	20.92
8	34.42	14.88	21.90
9	36.28	15.62	22.88
10	38.12	16.40	23.86
11	39.95	17.21	24.83
12	41.76	18.05	25.81
13	43.56	18.92	26.79
14	45.35	19.82	27.77
15	47.12	20.75	28.75
16	48.87	21.71	29.72
17	50.61	22.71	30.70
18	52.33	23.73	31.68
19	54.03	24.78	32.66
20	55.71	25.86	33.63
21	57.38	26.96	34.61
22	59.02	28.10	35.59
23	60.65	29.26	36.57

25	63.84	31.68	38.52
26	64.67	32.34	

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

FAILURE SURFACE # 9 SPECIFIED BY 34 COORDINATE POINTS

SAFETY FACTOR = 1.373

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	10.00	5.00	12.25
2	11.95	5.42	13.16
3	13.90	5.88	14.07
4	15.84	6.37	14.98
5	17.77	6.88	15.89
6	19.70	7.43	16.81
7	21.61	8.01	17.72
8	23.52	8.62	18.63
9	25.41	9.26	19.54
10	27.30	9.93	20.45
11	29.17	10.62	21.36
12	31.03	11.35	22.27
13	32.88	12.11	23.19
14	34.72	12.90	24.10
15	36.55	13.72	25.01
16	38.36	14.56	25.92
17	40.16	15.44	26.83
18	41.95	16.34	27.74
19	43.72	17.27	28.65
20	45.47	18.23	29.56
21	47.21	19.21	30.48
22	48.93	20.23	31.39
23	50.64	21.27	32.30
24	52.33	22.34	33.21
25	54.00	23.43	34.12
26	55.66	24.56	35.03
27	57.30	25.70	35.94
28	58.92	26.88	36.86
29	60.52	28.08	37.77
30	62.10	29.30	38.68
31	63.66	30.55	39.59
32	65.20	31.83	40.50
33	66.72	33.13	41.41
34	67.34	33.67	

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)

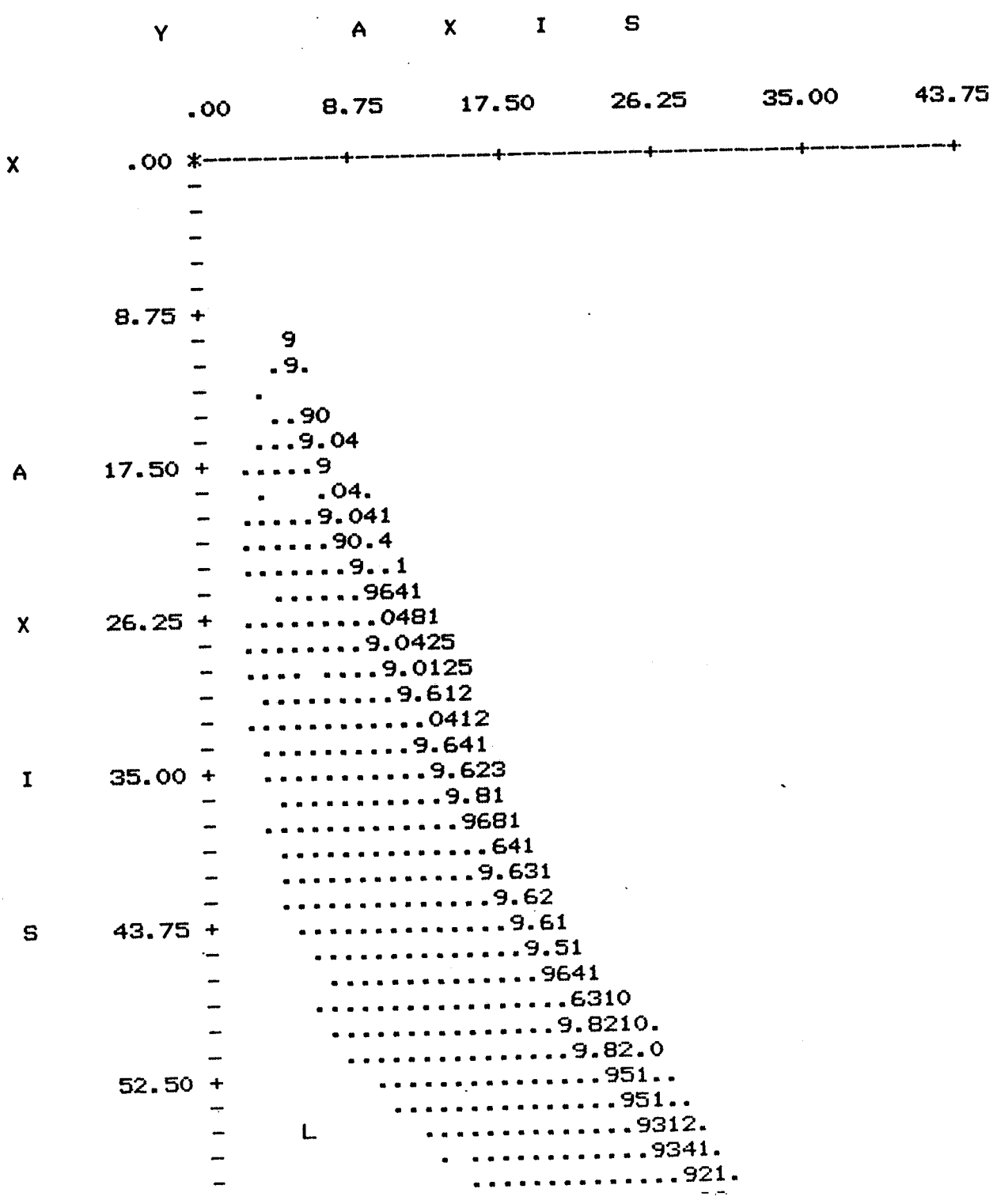
FAILURE SURFACE #10 SPECIFIED BY 22 COORDINATE POINTS

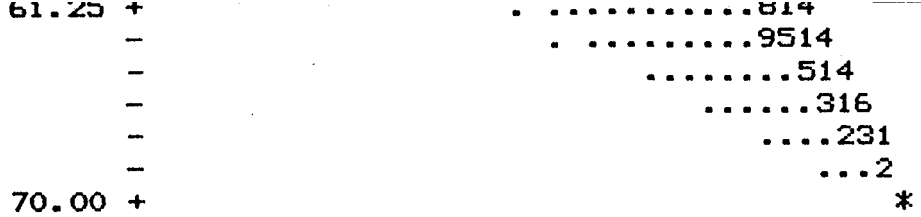
SAFETY FACTOR = 1.374

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	14.44	7.22	11.97
2	16.40	7.64	13.46
3	18.35	8.10	14.95
4	20.28	8.62	16.44
5	22.20	9.18	17.93
6	24.10	9.80	19.41
7	25.99	10.47	20.90

9	29.70	11.94	23.88
10	31.53	12.75	25.36
11	33.34	13.61	26.85
12	35.12	14.51	28.34
13	36.88	15.46	29.83
14	38.62	16.45	31.32
15	40.33	17.49	32.80
16	42.01	18.58	34.29
17	43.66	19.70	35.78
18	45.28	20.87	37.27
19	46.88	22.08	38.76
20	48.44	23.34	40.24
21	49.96	24.63	41.73
22	50.86	25.43	

1
JBR CONSULTANTS GROUP
Salt Lake City, UT (S/N 5076)




61.25 +
70.00 +
. ...814
. ...9514
.........514
.......316
....231
...2
*

jbr CONSULTANTS GROUP
SALT LAKE CITY, UTAH

SOLDIER CREEK COAL COMPANY
HIDDEN VALLEY MINE

FINAL RECLAMATION

REVISIONS						DESIGNED BY: J. W. J.	DRAFTER: C. Pixton
BY	DATE	BY	DATE	BY	DATE		
EWL	5/10/86	K.K	11/14/89			SCALE: 1" = 100'	DATE: 5/12/86
JMJ	11/18/86	K.K	12/18/90				

PLATE III

EXPLANATION

- Culverts Removed
- Range Reference Site
- Road Regraded with Waterbars
- Graded/Seeded Benches and Disturbed Areas
- Coal Seam Backfill
- Channels, Existing or Restored
- Fence

EPHEMERAL CHANNEL

EROSION CONTROL MATTING

RANGE REFERENCE SITE

SLOPE RESTORED

BERM

GRADED/ SEEDED

TEMPORARY RETENTION BERMS

SEDIMENT POND DISCHARGE
EL. 5942.72

EROSION CONTROL MATTING

EXISTING CHANNEL

SILT FENCE

CONSULTANTS GROUP
SALT LAKE CITY, UTAH

SOLDIER CREEK COAL COMPANY
HIDDEN VALLEY MINE

FINAL CONFIGURATION

REVISIONS BY	DATE	BY	DATE	BY	DATE	DESIGNED BY:	DRAFTER:
E.W.L.	5.10.86	K.K.	11/14/89			J. W. J.	C. Pixton
J.M.J.	11/8/86					SCALE: 1" = 100'	DATE: 5/12/86

EXPLANATION

- Culverts Removed
- Range Reference Site
- Road Regraded with Waterbars
- Graded/Seeded Benches and Disturbed Areas
- Coal Seam Backfill
- Channels, Existing or Restored
- Fence

LONGITUDINAL PROFILE 1

SAMPLING LOCATIONS

LONGITUDINAL PROFILE 3

EL. 5942.72

PLATE V