



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor

Ted Stewart
Executive Director

James W. Carter
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

December 28, 1993

Mr. Val Payne
Senior Environmental Engineer
PacifiCorp
P.O. Box 1005
Huntington, Utah 84528

Re: Appendix XVI and Approval of Test Plot Plan, Des-Bee-Dove Mine,
ACT/015/017, Folder #3, Emery County, Utah

Dear Mr. Payne:

Pursuant to your letter of September 10, 1993, this letter will clarify that the test plot plan is approved. It has been assumed by Division staff that the test plots were approved previously. I apologize for any confusion regarding this matter.

Please submit three copies of Appendix XVI, as requested in my letter of August 25, 1993, by January 18, 1994. If you have any questions, please call me.

Sincerely,


Pamela Grubaugh-Littig
Permit Supervisor

pgl



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801-538-5319 (TDD)

April 13, 1993

Mr. Val Payne
Senior Environmental Engineer
PacifiCorp
P.O. Box 1005
Huntington, Utah 84528

Dear Mr. Payne:

Re: Approval of As-Built Test Plots, Des-Bee-Dove Mine, PacifiCorp,
ACT/015/017, Folder #3, Emery County, Utah

A site visit was conducted by the technical staff on April 7, 1993 that validated the test-plot "as-built" information, which is now approved and can be inserted into the Mining and Reclamation Plan.

Sincerely,

A handwritten signature in cursive script, reading "Pamela Grubaugh-Littig".

Pamela Grubaugh-Littig
Permit Supervisor

pgl



APPENDIX XVI
DES BEE DOVE COAL MINE
HAUL ROAD RECLAMATION STUDY

APPENDIX XVI

SUMMARY

1. JULY 25, 1990 LETTER TO MR. DAVID SMALDONE FROM MS. PAMELA GRUBAUGH-LITTIG
2. JULY 12, 1990 MEMO FROM TOM MUNSON TO MS. PAMELA GRUBAUGH-LITTIG
3. TEST PLOTS - OUTLINE
4. JULY 31, 1990 LETTER TO MS. PAMELA GRUBAUGH-LITTIG FROM VAL PAYNE (WITH AERIAL PHOTOS)
5. HAUL ROAD RECLAMATION STUDY
6. DES BEE DOVE EROSION TASK FORCE AGENDA
7. NOVEMBER 13, 1991 MEMO TO TASK FORCE MEMBERS FROM GUY DAVIS
8. DES BEE DOVE HAUL ROAD RECLAMATION STUDY RUNOFF AND SEDIMENT YIELD MONITORING PROGRAM (WITH DRAWING)
9. JUNE 12, 1992 LETTER TO PAMELA GRUBAUGH-LITTIG FROM VAL PAYNE - DES BEE DOVE TEST PLOT PLAN
10. SEPTEMBER 25, 1992 LETTER TO MS. PAMELA GRUBAUGH-LITTIG FROM VAL PAYNE
11. FEBRUARY 4, 1993 LETTER TO MS. PAMELA GRUBAUGH-LITTIG FROM VAL PAYNE
12. MARCH 26, 1993 LETTER TO MS. PAMELA GRUBAUGH-LITTIG FROM VAL PAYNE
13. PURE LIVE SEED (PLS) DETERMINATION - NATIVE SEED
14. PURE SEED TESTING - NATIVE SEED
15. NATIVE SEED GERMINATION TEST REPORTS (STATE SEED LABORATORY #1814 - 1818)
16. NATIVE SEED SOURCE
17. NURSERY SEED SOURCE
18. SOIL ANALYSIS REPORTS (09/30/92)

APPENDIX XVI
REVISED 9/9/93



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340

RECEIVED

JUL 30 1990

Permitting & Compliance
UO&M - Mining Division

July 25, 1990

CC: T. Fauchoux
M. Moon

Mr. David R. Smaldone, Director
Permitting, Compliance & Services
Utah Power and Light Company
Mining Division
P. O. Box 26128
Salt Lake City, Utah 84126-0128

RECEIVED

SEP 14 1993

DIVISION OF
OIL, GAS & MINING

Dear Mr. Smaldone:

Re: Review of Des-Bee-Dove Haul Road, Utah Power and Light Company, Des-Bee-Dove Mine, ACT/015/017, Folder #2, Emery County, Utah

Attached is a Technical Memorandum that reviews the above-referenced reclaimability of the Des-Bee-Dove Haul Road. The operator must commit to a literature search and a study of reclamation options and initiation of test plots for this site.

A time frame for this project and a work outline must be submitted to the Division by August 3, 1990.

Sincerely,

Pamela Grubaugh-Littig
Permit Supervisor

djh

Attachment

cc: V. Payne, UP&L
"A" Team, DOGM

AT



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340

July 12, 1990

TO: Pamela Grubaugh-Littig, Permit Supervisor
FROM: Tom Munson, Sr. Reclamation Hydrologist *TM*
RE: Haul Road Reclamation Meeting, Des-Bee-Dove Mine, Utah Power and Light Company, ACT/015/017, Folder #2, Emery County, Utah

Synopsis

On July 12, 1990, Val Payne, Utah Power and Light Company's (UP&L) representative, met with Division personnel Susan White, Henry Sauer, Jesse Kelley, Jeff Emmons, and Tom Munson to discuss the reclamation of the Des-Bee-Dove Haul Road and the Initial Completeness Review for the Des-Bee-Dove Mine.

Analysis

The meeting involved a lot of discussion regarding the reclamation of the Haul Road in terms of regrading slopes, future erosion control, revegetation success, and ongoing erosion control test plots.

The Division staff presented the operator with a list of topics and ideas which were intended to help him formulate a reclamation strategy. It was the general consensus of all people involved that we do not have enough technical information at this point in time to make an informed finding regarding reclamation success.

To satisfy questions regarding reclamation options raised in the Initial Completeness Review, and decide what the operator would be required to do. The operator was requested to follow the following review framework.

1. Literature search,
2. Study feasibility of reclamation options and initiate test plots/consultant review.

In addition to a commitment and a time frame for completion of all commitments regarding a reclamation plan, the operator was requested to formulate ideas based on present knowledge of reclamation of Mancos Shale and present them along with the Initial Completeness Review Response.

Page 2
Memo to P. Grubaugh-Littig
ACT/015/017
July 12, 1990

Based on the complexity of this issue and the lack of knowledge regarding reclamation of Mancos Shale, it was decided that gathering all information available and assessing the feasibility of implementation of new reclamation methods and techniques will be paramount to merely choosing an immediate course of action based on present knowledge.

Recommendations

The operator be required to maintain a strict time frame for review of data, studying feasibility of reclamation options, and implementation of test plots.

Another meeting of all parties concerned be held to better define reclamation strategy and to maintain a diligent and responsible effort to obtain a feasible reclamation plan.

djh
cc: "A" Team
AT46/34-35

The following outline are ideas of treatments to test for reclaiming the Haul Road through the Mancos shale. We realize there may not be an area large enough to test all these variables. UP&L and consultants may wish to select some or none of these treatments along with there own treatments to incorporate in a test plot.

Test Plots

- I. Backfilling and Grading
 - A. Undulating, Conical Slopes
 - 1. shape
 - 2. distance
 - 3. orientation to aspect
 - 4. benching
 - B. Non-undulating topography

- II. Erosion control, mechanical
 - A. Matting, drainage or entire slope
 - 1. coconut matting
 - 2. excelsior
 - 3. geotextile
 - 1. check dams
 - B. Incorporating 4 to 5 tons/acre organic matter
 - C. Watering, developing crust
 - 1. number of applications
 - D. Rock Mulch
 - 1. ridge top
 - 2. entire slope
 - E. Compaction with pitting

- III. Vegetation Establishment
 - A. Seed
 - 1. native collections
 - B. Transplants
 - 1. grown from native collections
 - 2. transplanted from Waste Rock
 - C. Water

- IV. Determination of Success
 - A. Sediment Yield
 - B. Length and depth of gullies
 - C. Cover of vegetation

July 31, 1990

Ms. Pamela Grubaugh-Littig
Permit Supervisor
Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

RE: Des Bee Dove Haul Road Reclamation Study, Utah Power and
Light Company, Des Bee Dove Mine, ACT/015/017, Folder #2,
Emery County, Utah

Dear Ms. Grubaugh-Littig:

Submitted in response to your letter to Mr. Smaldone dated July 25, 1990, please find the proposed schedule for the above referenced project.

PROJECT PHASES/TASKS

COMPLETION DATE

DESIGN

Literature Review	9/30/90
Identify relevant factors and options	
Grading	
Drainage	
Erosion Control	
Revegetation	
Site/Area Characterization	10/31/90
Site vs literature info	
Topography	
Soils	
Vegetation	
Drainage/Erosion Patterns	
Precipitation	
Design Development	1/5/91
Consultation	
Engineering	
Hydrology/Hydraulics	
Vegetation	
Erosion/Sediment Control	
Monitoring	

Design Review/Modification/Approval
DOGM/OSM
Consultant

3/15/91

IMPLEMENTATION

10/15/91

Materials Procurement
Slope Stabilization
Erosion Control
Revegetation
Seed/Plants
Soil Amendments
Site Preparation
Materials Installation

MONITORING AND EVALUATION

8/15/95

Stability
Erosion
Sediment Production
Precipitation
Vegetation
Soils

The project involves several uncontrollable factors including the schedules of various personnel (including DOGM and OSM), laboratory time, availability of materials and seasonal consideration for implementation. Therefore, I feel the proposed schedule is realistic and reasonable.

If you have questions or comments regarding this matter, please call me at 687-9821.

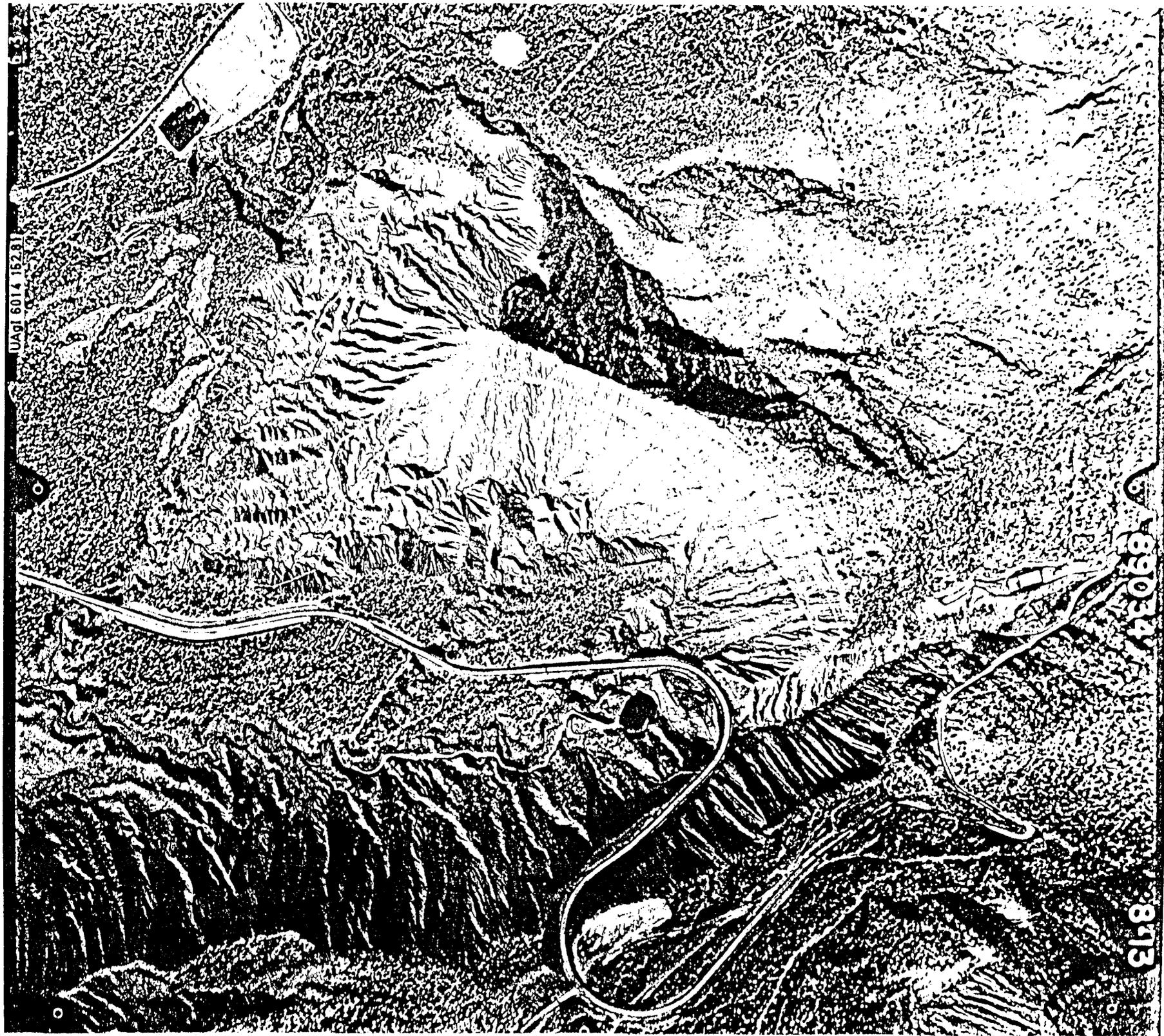
Sincerely,



Val Payne
Senior Environmental Engineer

VP/do

cc: D.W. Jense
S. Child
G. Davis
T. Faucheux
M. Moon



UAGI 6014 15281

89034

813

9-2-82 172001 EAST MOUNTAIN 9-09 8209



DES BEE DOVE HAUL ROAD RECLAMATION STUDY

INTRODUCTION

The focus of the Reclamation Study is primarily the Mancos shale. Therefore; the following information, regarding the first three phases of the study, addresses only the portion of the haul road which impacted the Mancos shale. Specifically, the major fill slope located between Stations 131+00 and 142+00.

PHASE I LITERATURE REVIEW/INFORMATION SEARCH

Because the primary issues are reclaimability and erosion of Mancos shale, the literature review focused on these issues. It should be noted that the gathering of information is a continuing process. The major literature sources are listed herein. These references provide useful information as well as valuable additional references for continuing research.

Bureau of Land Management, 1985; Gully erosion, Technical Note 366, US Dept. of Interior, 181 pages.

Bureau of Land Management, 1979; Reclaimability analysis of the Emery coal field, Emery County Utah, EMRIA Report No. US Dept of Interior, 413 pages.

Heede, Burchard H., 1976; Gully development and control: the status of our knowledge, USDA For. Serv. Res. Pap. RM-169, 42 p. Rocky Mt. For. and Range Exp. Sta., Fort Collins, Colo.

Williams, R.D. and Schuman, G.E. (Editors). 1987. Reclaiming mine soils and overburden in the western United States, analytic parameters and procedures. Soil Conservation Society of America, Akeny, Iowa.

As stated previously, only the major reference sources are listed here. Other references are cited within the text.

PHASE II SITE CHARACTERIZATION

Climate

The Des Bee Dove haul road is located near the base of the eastern slope of the Wasatch Plateau in western Emery County, Utah. At higher elevations of the plateau, 10,000 feet, annual precipitation averages more than 15 inches, primarily as winter snowfall. This precipitation depletes the moisture from the westerly airflow thus making the downslope flow significantly dryer.

Data from the PacifiCorp East Mountain weather station, 1.5 miles northwest of the haul road site, at an elevation of 9,000 feet, indicates a mean annual precipitation of approximately 14.5 inches. The mean annual precipitation at the Hunter Power Plant, 10 miles southeast of the haul road site at an elevation of 5,800 feet, is 7.5 inches. The mean annual precipitation at the haul road site, elevation 7,000 feet, is estimated to be approximately 11 or 12 inches.

A comparison of the seasonal distribution of annual precipitation at East Mountain (water years 1980-81 thru 1988-89) and Hunter Plant (water years 1975-76 thru 1988-89) indicates the following (see pages 4 and 5):

<u>LOCATION</u>	<u>SEASON</u>	<u>PRECIP. (IN)</u>	<u>% AN.PR.</u>
East Mountain	Summer (Apr-Oct)	62.13	47.6
	Winter (Oct-Apr)	68.46	52.4
Hunter Plant	Summer	55.94	53.4
	Winter	48.77	46.6

The seasonal distribution of annual precipitation at the haul road site is expected to be similar to that of Hunter Plant. Most of the precipitation is received in the "summer" season primarily in the form of thunder storms in July and August.

Estimated annual temperatures at the haul road site were also extrapolated from the East Mountain and Hunter Plant average annual temperature data (water years 1985-86 thru 1988-89, pages 6 thru 9).

East Mountain					
<u>YEAR</u>	<u>AV. ANN. TEMP. (°F)</u>	<u>HIGH AV. TEMP. (°F)</u>	<u>LOW AV. TEMP. (°F)</u>	<u>HOTTEST MONTH</u>	<u>COLDEST MONTH</u>
85-86	40.2	62.7	25.1	Aug	Nov
86-87	40.1	60.3	19.5	Jul	Jan
87-88	38.6	62.6	15.3	Jul	Dec
88-89	38.9	61.8	20.1	Jul	Jan
Hunter Plant					
85-86	49.4	70.8	26.9	Aug	Dec
86-87	47.5	71.9	21.5	Jul	Jan

87-88	49.3	75.7	17.0	Jul	Jan
88-89	50.0	76.5	16.3	Jul	Jan

The average annual temperature at the haul road site is expected to be approximately 43° F. The high average temperature is expected to be approximately 66° F, occurring in July. The low average temperature is expected to be approximately 20° F, occurring in January.

The slope aspect at the haul road site is generally southwestern.

Soils

The soils at the haul road site are classified by the Soil Conservation Service as Rockland (SCS Soil Survey, Carbon-Emery Area, Utah 1970). Discussion of this soil type is included on pages 10 thru 12.

Additional soil chemical information is included on page 13. These soil analyses were performed in conjunction with the existing vegetation test plots.

Vegetation

Vegetation cover at the haul road site is very sparse (estimated at less than 25% overall) and is dominated by Halogeton glomeratus.

Slope Stability

Soils engineering and physical properties are discussed in the stability analysis performed by Chen Northern, Inc. This information is found on pages 14 thru 20.

Slope erosion has been monitored since 1986. This information is presented on pages 21 thru 24.

TABLE 1: EAST MOUNTAIN PRECIPITATION

Elevation - 9,005 Feet

<u>Water Year</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEPT</u>	<u>TOTAL</u>
80-81	1.28	0.39	0.05	0.29	0.52	2.77	0.64	0.87	0.11	0.57	0.85	2.55	10.90
81-82	1.93	0.53	0.97	3.22	0.14	1.67	0.00	0.45	0.09	1.86	1.10	2.61	14.57
82-83	0.38	2.90	1.39	1.30	1.81	1.98	0.92	0.71	0.61	1.27	4.83	1.62	19.71
83-84	0.76	2.43	2.42	0.27	0.65	1.22	0.50	0.22	1.18	1.90	2.33	0.64	14.53
84-85	3.27	0.97	1.67	0.49	0.59	1.77	1.35	1.73	0.28	2.47	0.12	2.31	17.02
85-86	1.15	2.38	0.87	0.30	2.10	1.43	1.05	0.38	0.53	0.87	2.24	1.63	14.92
86-87	1.57	0.39	0.16	1.37	1.37	1.65	1.16	1.77	0.58	2.49	1.16	0.06	13.73
87-88	2.77	1.91	1.29	1.42	0.00	0.99	2.08	1.03	0.81	0.45	0.96	0.91	14.61
88-89	0.61	0.43	1.56	1.00	0.68	1.03	0.26	0.47	0.43	1.19	2.44	0.49	10.59
89-90	0.28	0.39	0.16	0.74	2.08								

TABLE 2 : HUNTER PLANT PRECIPITATION

Elevation - 5,800 Feet

<u>Water Year</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEPT</u>	<u>TOTAL</u>
75-76	0.13	0.25	0.19	0.02	0.40	0.00	0.89	0.84	0.03	0.31	0.08	0.70	3.84
76-77	0.00	0.02	0.00	0.37	0.07	0.00	0.03	1.28	0.07	1.35	0.41	0.50	4.10
77-78	0.01	0.18	0.00	1.28	1.05	1.74	0.34	1.21	0.00	0.69	1.14	0.14	7.78
78-79	0.03	2.22	0.22	1.43	0.53	2.43	0.24	0.47	0.00	0.00	0.79	0.00	8.36
79-80	0.00	0.00	0.41	1.70	1.70	0.67	0.75	1.11	0.00	0.02	0.51	2.06	8.93
80-81	0.66	0.06	0.02	0.00	0.07	1.48	0.16	0.45	0.14	0.20	0.70	2.43	6.37
81-82	0.58	0.27	0.45	0.94	0.45	0.54	0.00	0.02	0.00	0.15	1.06	1.23	5.69
82-83	0.20	1.25	0.45	0.54	0.41	0.84	0.37	0.51	0.00	2.18	1.58	0.88	9.21
83-84	0.53	0.66	1.07	0.03	0.35	0.34	0.34	0.05	1.09	1.80	1.89	2.35	10.50
84-85	1.6	0.06	1.24	0.20	0.95	1.01	0.67	0.64	0.26	1.50	0.03	0.86	9.11
85-86	0.92	1.40	0.42	0.10	0.97	0.40	0.31	0.00	0.31	0.55	1.01	0.57	7.05
86-87	0.92	0.08	0.10	0.32	0.45	0.90	0.12	1.38	1.25	1.65	1.27	0.11	8.55
87-88	1.91	1.02	0.66	0.55	0.00	0.66	1.64	0.59	0.20	0.69	0.44	0.78	9.14
88-89	0.69	0.04	0.48	1.23	0.02	0.23	0.00	0.37	0.14	1.01	1.70	0.35	6.26
89-90	0.20	0.00	0.03	0.31									

Table 3: TEMPERATURES IN EMERY COUNTY, UTAH (1986 WATER YEAR)

Month	<u>Hunter Plant</u>		<u>Huntington Plant</u>		<u>Electric Lake</u>		<u>East Mountain</u>	
	<u>Average Temp. (°F)</u>	<u>Departure From Normal</u>						
1985								
Oct.	49.6	+1.2	49.6	+0.2	37.3	-0.2	41.5	+5.1
Nov.	34.7	-0.5	33.1	-2.9	24.4	-1.3	25.1	-2.1
Dec.	26.9	+0.2	27.6	+-.2	14.7	-1.1	26.7	+4.0
1986								
Jan.	30.3	+6.2	30.1	+6.5	18.6	+4.0	28.8	+5.1
Feb.	36.3	+7.9	34.0	+3.8	19.9	+0.6	27.3	+3.1
Mar.	45.3	+9.5	43.6	+5.9	30.4	+9.6	35.8	+7.6
Apr.	47.6	+3.0	45.1	0.0	29.5	+0.8	36.0	+2.0
May	55.5	+3.4	54.8	-0.1	39.0	0.0	34.9	-5.6
June	69.1	+7.7	69.1	+3.3	54.1	+5.5	59.1	+5.0
July	70.2	-1.8	69.1	-2.6	54.5	-1.2	59.3	-2.6
Aug.	70.8	+4.4	70.6	+1.2	57.6	+3.8	62.7	+0.9
Sept	56.8	-1.9	56.5	-3.9	43.1	-4.4	45.7	-4.8
TOTALS	49.4	+3.3	48.6	+1.0	35.3	+1.4	40.2	+1.9

Table 4: TEMPERATURES IN EMERY COUNTY, UTAH (1987 WATER YEAR)

Month	<u>Hunter Plant</u>		<u>Huntington Plant</u>		<u>Electric Lake</u>		<u>East Mountain</u>	
	<u>Average Temp. (°F)</u>	<u>Departure From Normal</u>						
<u>1986</u>								
Oct.	30.6	-0.1	47.0	-2.4	36.5	-1.0	37.6	+1.2
Nov.	37.2	+2.0	37.8	+1.8	28.7	+3.0	36.4	+9.2
Dec.	28.9	+2.2	29.3	+1.9	17.1	+1.3	19.6	-3.1
<u>1987</u>								
Jan.	21.5	-2.6	24.4	+0.8	9.8	-4.8	19.5	-3.2
Feb.	31.4	+3.0	31.9	+1.7	13.0	-6.3	22.8	-0.9
Mar.	36.3	+0.5	34.6	-3.1	18.1	-2.7	26.0	+1.8
Apr.	50.8	+6.2	50.2	+5.1	34.2	+5.5	41.3	+13.1
May	56.5	+4.4	55.2	+0.3	42.6	+3.6	45.9	+5.4
June	69.1	+7.7	67.6	+1.8	50.6	+2.0	59.4	+5.3
July	71.9	+3.5	68.0	-3.7	N/A	---	60.3	-1.6
Aug.	71.1	+4.7	68.8	-0.6	55.0	+1.2	57.3	-4.5
Sept	65.1	+6.4	63.0	+2.6	49.6	+2.1	54.7	+4.2
TOTALS	47.5	+3.2	48.2	+0.6	32.3	-1.6	40.1	+1.3

TABLE 5: TEMPERATURES IN EMERY COUNTY, UTAH (1988 WATER YEAR)

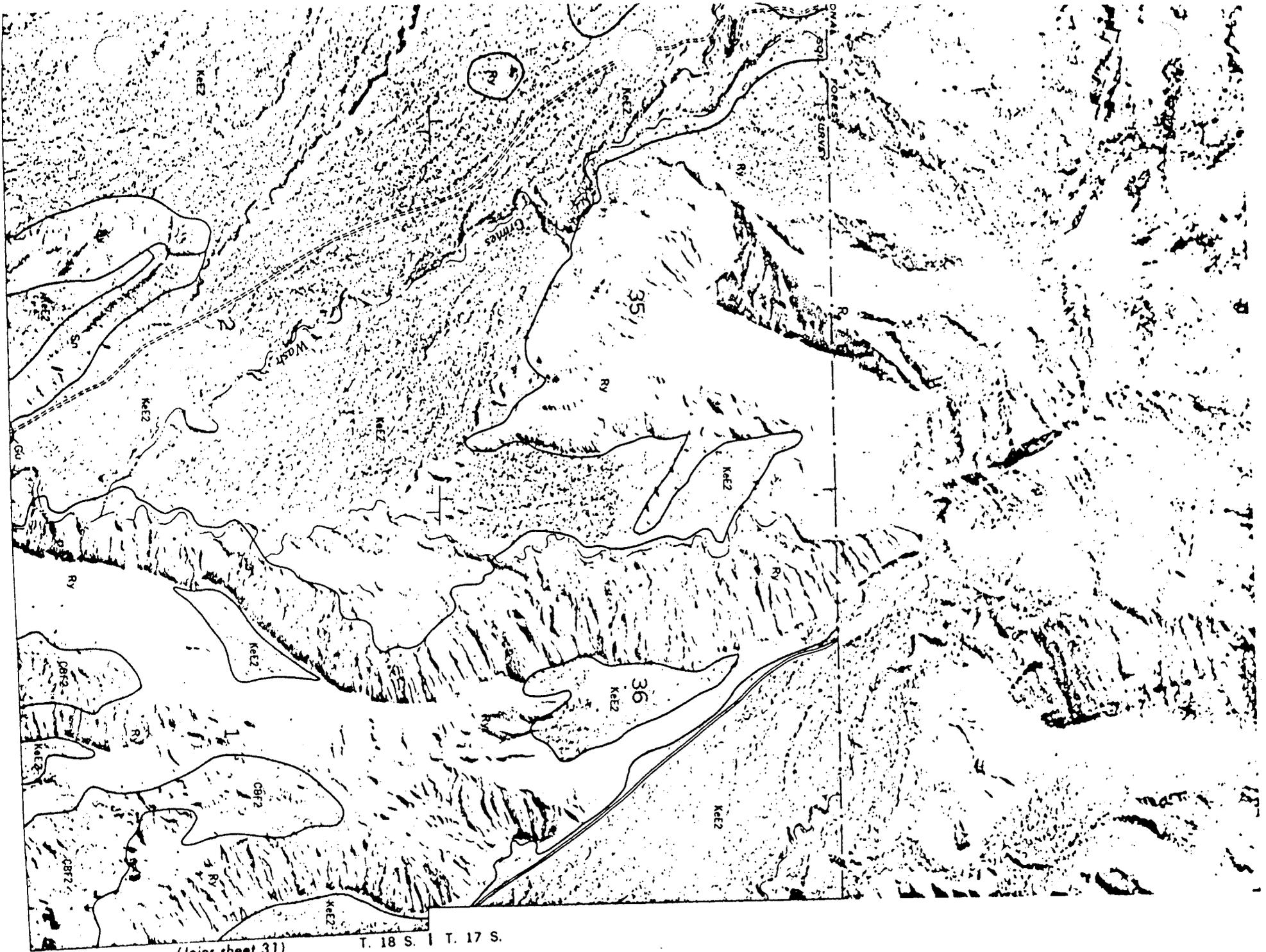
Month	<u>Hunter Plant</u>		<u>Huntington Plant</u>		<u>Electric Lake</u>		<u>East Mountain</u>	
	<u>Average Temp.*</u>	<u>Departure From Normal</u>	<u>Average Temp.*</u>	<u>Departure From Normal</u>	<u>Average Temp.*</u>	<u>Departure From Normal</u>	<u>Average Temp.*</u>	<u>Departure From Normal</u>
<u>1987</u>								
Oct.	55.1	+6.7	53.9	+4.5	41.4	+3.9	42.0	+4.8
Nov.	38.5	+3.3	35.8	-0.2	24.6	-1.1	25.8	-2.4
Dec.	25.0	-1.7	24.4	-3.0	11.2	-4.6	15.3	-6.1
<u>1988</u>								
Jan.	17.0	-7.1	20.5	-3.1	10.4	-4.2	17.7	-3.7
Feb.	31.4	+3.0	30.9	+0.7	16.3	-3.0	24.7	+0.7
Mar.	38.4	+2.6	36.2	-1.5	17.4	-3.4	25.9	-1.8
Apr.	49.1	+4.5	47.3	+2.2	32.8	+4.1	38.0	+2.6
May	57.0	+4.9	55.8	+0.9	40.2	+1.2	46.1	+4.2
June	71.0	+9.6	68.2	+2.4	53.1	+4.5	58.5	+3.2
July	75.7	+7.3	74.2	+2.5	58.4	+2.7	62.6	+0.9
Aug.	72.2	+5.8	70.1	+0.7	54.5	+0.7	60.0	-1.0
Sept	61.6	+2.9	60.8	+0.4	45.6	-1.9	47.0	-3.6
TOTALS	49.3	+3.5	48.2	+0.5	33.8	-0.1	38.6	-0.2

* Temperatures reported in degrees Fahrenheit.

TABLE 6 : TEMPERATURES IN EMERY COUNTY, UTAH (1989 Water Year)

Month	<u>Hunter Plant</u>		<u>Huntington Plant</u>		<u>Electric Lake</u>		<u>East Mountain</u>	
	<u>Average Temp.*</u>	<u>Departure From Normal</u>	<u>Average Temp.*</u>	<u>Departure From Normal</u>	<u>Average Temp.*</u>	<u>Departure From Normal</u>	<u>Average Temp.*</u>	<u>Departure From Normal</u>
<u>1988</u>								
October	57.4	+9.0	56.3	+6.9	45.3	+7.8	43.8	+5.9
November	38.4	+3.2	37.7	+1.7	23.6	-2.1	23.5	-4.2
December	26.8	+0.1	25.1	-2.3	10.9	-4.9	21.1	-0.3
<u>1989</u>								
January	16.3	-7.8	18.8	-4.8	10.3	-4.3	20.1	-2.1
February	27.0	-1.4	24.5	-5.7	12.7	-6.6	20.2	-3.5
March	45.3	+9.5	41.5	+3.8	28.9	+8.1	34.0	+5.7
April	54.1	+9.5	50.8	+5.7	35.6	+6.9	42.1	+6.0
May	58.9	+6.8	55.6	+0.7	43.0	+4.0	46.8	+4.4
June	66.4	+5.0	64.0	-1.8	42.2	-6.4	50.3	-4.5
July	76.5	+8.1	73.4	+1.7	57.9	+2.2	61.8	+0.1
August	69.7	+3.3	66.6	-2.8	50.5	-3.3	53.8	-6.4
September	62.8	+4.1	60.7	+0.3	45.2	-2.3	48.8	-1.6
TOTALS	50.0	+4.1	47.9	+0.3	33.8	-0.1	38.9	0.0

* Temperatures reported in degrees Fahrenheit.



(Joins sheet 31) T. 18 S. | T. 17 S.

persed with areas of the Ravola soil (fig. 13). Both soils are on flood plains and alluvial fans.

Included in mapping were small areas of Billings silty clay loam.

Runoff is rapid from the Bunderson soil, and most areas contain gullies 5 to 20 feet deep and 500 to 1,300 feet apart. Head cutting is common, and it is forming shallow gullies. In places windblown hummocks less than 2 feet high occur. Typically, these are on the east and north sides of greasewood and other plants.

The soils in this mapping unit are suited to the production of range forage. Controlling gully erosion and regulating the amount and season of range use are needed. Clearing the brush and reseeding grasses are not feasible, because of the small amount of rainfall. (Both soils are in Capability unit VIIe-D, nonirrigated; Ravola soil is in Desert Loam Bottom range site)

Riverwash (Rv) consists of streambeds or riverbeds, including oxbow-loops and other channels. These areas are exposed at low water and subject to shifting during periods of high water because of deposition and erosion. The deposited materials are extremely variable, ranging from boulders in the upper part of streams to silt and clay in the lower, more nearly level areas. Most areas are channeled and have little or no cover of vegetation. (Capability unit VIIIw-4, nonirrigated; not rated for other uses)

Rock land (Ry) is a miscellaneous land type having a surface 50 to 70 percent covered by stones, boulders, and outcrops of shale and sandstone. Most of this land type is moderately eroded, but many areas are severely eroded. Soil characteristics are almost obscured by the stones and boulders. The slopes are very steep to perpendicular, but typically they are between 50 and 80 percent.

Included in mapping were gently sloping, deep fine sandy loams. Intermingled with the sandstone outcrops



Figure 13.—An area of Ravola-Bunderson complex, 1 to 3 percent slopes, eroded. The nearly bare, light-colored slickspots are the Bunderson soil.

were inclusions of shallow fine sandy loams. Also included on some of the north-facing slopes in the mountains along the west side of the survey area were small areas of an unidentified soil.

This land type has almost no value for farming, although some areas have a sparse cover of grass, sagebrush, pinon, and juniper. This vegetation grows on all exposures but it is dominant on north and west exposures. Small areas are accessible to livestock and wildlife, but most of the land type is too steep and rocky for grazing. (Capability unit VIIIe-3, nonirrigated; not rated for other uses)

Saltair Series

Soils of the Saltair series are deep, poorly drained, very strongly saline, moderately fine textured, and nearly level to gently sloping. They occupy moderate to large areas on alluvial fans, on flood plains, and in narrow alluvial valleys. These soils have formed in alluvium derived from marine shale and sandstone. The vegetation is greasewood, saltgrass, and kochia, but bare surfaces are common. Elevations range from 4,000 to 6,500 feet. The annual rainfall is 6 to 11 inches, and the mean annual soil temperature is 47° to 54° F. The frost-free season is 110 to 160 days.

In a typical profile, the surface layer is light brownish gray, strongly calcareous, very strongly saline silty clay loam about 7 inches thick. The underlying material is light brownish-gray and light-gray heavy silt loam that is very strongly saline in the upper part. Platy crusts of salt on the surface, underlain by layers of soft, granular material, are common. The content of salt is 2 percent or more within 20 inches of the surface.

This soil is used for range, but the quality of the forage is poor.

Representative profile of Saltair silty clay loam in pasture, 1,200 feet north and 500 feet west of the SE corner of section 13, T. 17 S., R. 9 E. in Emery County Utah:

A11sa—0 to ½ inch, grayish-brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) when moist; weak, thin, platy structure breaking to moderate fine, granular structure; soft, firm, very sticky and plastic; plentiful large roots; many medium and fine vesicular pores; strongly calcareous; strongly alkaline (pH 8.9); thin salt crust; clear, smooth boundary.

A12sa—½ inch to 7 inches, light brownish-gray (2.5Y 6/1) silty clay loam, grayish brown (2.5Y 5/2) when moist; many, fine, distinct, yellowish-brown (10YR 5/6) mottles; weak to moderate, fine, angular blocky structure; very hard, very firm, very sticky and very plastic; plentiful medium and fine roots; common medium and fine pores; strongly calcareous; moderately alkaline (pH 8.3); very strongly saline; efflorescent salt on many ped surfaces and in pores; clear, smooth boundary.

C1gsa—7 to 14 inches, light brownish-gray (2.5Y 6/2) heavy silt loam, grayish brown (2.5Y 5/2) when moist; common, fine, distinct, yellowish-brown (10YR 5/6) mottles and common, fine, faint, gray (N 5/1) mottles; weak, fine, angular blocky structure; very hard, very firm, very sticky and very plastic; plentiful fine roots; common medium pores; strongly calcareous; very strongly saline; efflorescent salt on many ped surfaces and in pores; strongly alkaline (8.5); gradual, wavy boundary.

CAPABILITY UNIT VIII-4 (NONIRRIGATED)

This capability unit consists of the land type Riverwash, which is gravelly and cobbly. Areas of this land type are subject to damaging overflows and do not support the growth of plants. Their main use is for wildlife habitat.

CAPABILITY UNIT VIII-5 (NONIRRIGATED)

This capability unit consists of deep, poorly drained, very strongly saline, fine textured and moderately fine textured soils that generally have a crust of salt $\frac{1}{2}$ to 1 inch thick on the surface. These soils are in the Cache, Libbings, and Saltair series.

Because of their high content of salt, these soils have no known farm use. Plants cannot grow on them. Experience indicates that reclaiming these soils for use as salt meadow pasture is economically not feasible.

CAPABILITY UNIT VIII-6 (NONIRRIGATED)

This capability unit consists only of bare, steep ledges of Rock land on which plants do not grow. The only use is for wildlife habitat, water supply, and esthetic purposes.

CAPABILITY UNIT VIII-7 (NONIRRIGATED)

This capability unit consists of rough, broken, and nearly bare areas of Badland and of a Bunderson soil. These areas have little potential for the production of plants and are sources of silt carried by runoff.

Small areas are used for a limited amount of grazing. The areas are used mainly, however, as a habitat for wildlife, for water supply, and for esthetic purposes.

Estimated yields

Table 1 gives the estimated average acre yields of the principal crops and pasture grown on irrigated soils under two levels of management. These yields are estimated on the basis of records obtained from farmers for the specific soils, on field observations of soil scientists, and on data compiled by economists of the Colorado River Storage Project. If no information was available for a particular soil, the estimates were made on the basis of yields on a similar soil. Only soils that are suitable for the crops and pasture specified are listed in table 1. In a given year, yields may be considerably higher or lower than the estimated average.

Under both levels of management, yields are based on a generalized crop rotation consisting of 5 years of a legume, 2 years of row crops, and 2 years of small grain. This rotation or a variation of it is used in most of the survey area. The kinds of row crops to be grown depend on the expected supply of irrigation water. Oats or barley normally are grown as a nurse crop to new seedings of alfalfa.

The yields in columns A are those that can be expected under average, or common, management. Under common management, phosphorus fertilizer is applied sparingly or not at all; nitrogen is seldom used. Most of the available animal manure is spread. Sugar beets generally are fertilized with phosphorus and nitrogen.

Under common management, water-control structures generally are inadequate, and water is applied without enough regard to proper length of run or to the timely needs of crops. Pastures are not clipped, rotation graz-

ing is not practiced, and no commercial fertilizer is applied. In some instances droppings are scattered, but generally they are not.

The yields in columns B are those expected over a period of years under a moderately high level of management. This management provides that phosphorus fertilizer is applied when new seedings of alfalfa are being established and again after 2 or 3 years. Nitrogen fertilizer is used on row crops after the first year out of alfalfa and occasionally on small grains, unless animal manure is available. All available animal manure is spread. Tillage is reduced to essential, timely operations to avoid traffic pans or compacting the soil. In addition, operators use control structures for handling irrigation water, use proper lengths of runs that are adapted to soil conditions, and apply water in the quantity that satisfies crop requirements.

Under a moderately high level of management, irrigated pastures generally contain about 50 percent alfalfa and 50 percent grass. Regardless of the amount of alfalfa fewer animals die of bloat when rotation grazing is used than when it is not used. Alfalfa is allowed to mature to the hay stage before animals graze it, and then animals are concentrated so that all the forage is consumed within a few days.

Pastures that are rotated, and in which alfalfa is the primary source of forage, should be grazed about 6 days and then rested for 28 to 40 days to allow for the regrowth of plants. The length of the regrowth period is about the same as the interval between hay cuttings. Six paddocks, or grazing units, generally are well suited to rotation grazing. This is the minimum number of paddocks that can be used if irrigation water is applied about every 14 days. This number allows for an irrigation immediately after grazing is finished and again 6 to 8 days before the next grazing so that the soil is dry when grazed.

At the stocking rate of 20 cows per acre, 6 days are needed to harvest efficiently the forage in a 5-acre pasture. Pastures grazed at this rate seldom need to be mowed for weed control oftener than every other year. Droppings are spread each year.

From 40 to 50 pounds of available nitrogen fertilizer are applied before growth starts each spring. Phosphorus fertilizer is applied every 2 or 3 years.

The length and warmth of the growing season at Green River allows farmers to have a greater variety of crops and larger yields than are feasible in the other parts of the survey area. For this reason, the soils at Green River are designated "extended season" phases to separate them from their counterparts in Castle Valley. For example, at Green River three full crops of alfalfa are obtained, and corn matures and is harvested for grain. In Castle Valley, on the other hand, alfalfa produces only two full crops and part of a third, and corn does not mature for grain. The frost-free period in Green River is 140 to 160 days, and the average temperature in summer is 76° F. In Castle Valley, the frost-free season is 110 to 130 days, and the average temperature in summer is 66° F.

The amount of soluble salts or alkali in the soil determines the kinds of crops that can be grown, and affects crop yields.

FGL

FRUIT GROWERS LABORATORY, INC.

May 19, 1989

LAB NO: 15913 03

RE: LANDSCAPE SOIL ANALYSIS

RECEIVED
SEP 15 1999

Nature-Gro Corp.
P.O. Box 4135
Pacoima, CA 91381

DIVISION OF
OIL, GAS & MINING

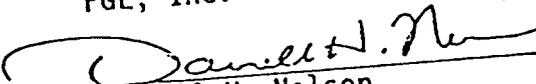
Location: Utah P & E, below road
Description: Preplant Landscape
Date Sampled: 05/04/89
Sampled by: Nature-Gro

Date Received: 04/27/89
Depth: 0-6"

TEST RESULTS	Your Analysis	Optimum Range	Comment
Moisture	1.00 %	1/2 Satn. %	Too Dry
Saturation	32.00 %	--	Loam
Nitrate-Nitrogen	6.00 PPM	10 - 40	Low
Phosphorus	2.00 PPM	13 - 40	Very Low
Exch. Potassium	270.00 PPM	81 - 300	Ample
Limestone	7.30 %	0	See Below*
pH	7.90	5.8 - 8.2	OK
Soil Salinity	20.70	0.3 - 2.0	Excessive
Gypsum Requirement	4.00 T/AF	0	Apply
Lime Requirement	0.00 T/AF	0	OK
Sulfate-Sulfur	95.80 meq/l	< 20	Excessive
Chloride	39.00 meq/l	< 3	Excessive
Boron	0.50 PPM	0.02 - 1.0	OK
Calcium	49.30 meq/l	> 2.0	Ample
Magnesium	16.30 meq/l	> 1.5	Ample
Sodium	175.80 meq/l	See SAR/ESP	--
SAR	30.70	< 7	Too High
ESP	30.30	< 10	Too High
Zinc	2.40 PPM	> 0.7	Ample
Manganese	1.60 PPM	> 1.4	Ample
Iron	16.90 PPM	> 8	Ample
Copper	0.80 PPM	> 0.2	Ample

Soil pH & Limestone levels are important to consider when making plant selections. Soils having pH levels above 7.0 should not be used for plants that require acid soil conditions. Soils containing free limestone should not be used for plants that require acid soil conditions or are sensitive to limestone.

FGL, Inc.


Darrell H. Nelson

1-800-366-1363
1-800-366-1363 Facsimile

August 29, 1990

APPENDIX III

Johansen & Tuttle
90 South 100 East
Castledale, Utah 84513

Des-Bee-Dove Mine
Sedimentation Pond & Road
Stability Analysis

Attention: Mr. Craig Johansen
Subject: Debris Basin Dike and
Road Fill Slope Stability Analysis
Project No. 5-462-90

Gentlemen:

At your request, we have performed a slope stability analysis for the two embankments referenced above. This letter presents the results of our analysis for these embankments which are located near Orangeville, Utah. The analysis was conducted for the purpose of estimating the factor of safety against slope failure for these embankments.

Site Conditions

A representative of our firm has not been at the site to review site conditions and consequently we have relied upon the information provided by your firm in order to understand site conditions. It is our understanding that the cross-sectional data for the both the dike and the road fill as provided by your firm represent typical cross-sections of the slopes to be analyzed. The cross section as analyzed for the Road Fill and the Debris Basin are shown on Figures 1 and 4, respectively. We further understand that there is no anticipated phreatic surface in the embankment of either project and that the foundation soils for both projects are essentially the same as the embankment material.

We understand that field density testing indicates that the soil at the road embankment has an in situ dry density which varies from 112.5 to 122.2 pounds per cubic foot and that the moisture content varies from 9.8 to 11.2 percent of the dry density. Similarly, the soil within the Debris Basin Dike has an in situ dry density which varies from 102.7 to 115 pounds per cubic foot with a moisture content in the range 11.6 to 19.9 percent. Soil samples representative of the embankment and foundation soils, at each of the embankment sites, were delivered to our laboratory.

Laboratory Testing

The samples delivered to our laboratory were observed and visually classified. Pertinent laboratory testing was conducted on each sample to determine the engineering and physical properties of the soils in general accordance with ASTM or other approved procedures.

<u>Tests Conducted:</u>	<u>To Determine:</u>
Grain-size Distribution Figures 2 and 5	Size and distribution of soil particles; that is, clay, silt, sand, and gravel.
Atterberg Limits Figure 2	A method of describing the affect of varying water content on the consistency of fine-grained soils.
Moisture-density Relationship Figures 2 and 5	The optimum moisture content for compacting soil and the maximum dry unit weight (density) for a given compactive effort.
Direct Shear Figure 3 and 6	General soil strength properties.

Results of the laboratory tests are summarized on the enclosed figures as indicated above. Based on the laboratory test results soil samples were classified in accordance with ASTM D-2487 which is based on the Unified Soil Classification System.

Soil Conditions

Road Fill

The embankment and foundation soils contained in the road fill consist of a clay with moderate plasticity. This clay is primarily fine-grained but contains chunks of claystone which accounts for the gradation as shown on Figure 2. The moisture density relationship indicates that the soil has a maximum dry density of 124 pounds per cubic foot and an optimum moisture content of 10.5 percent.

Based on the field density tests soil samples were reconstructed to a dry unit weight of 115 pounds per cubic foot at a moisture content of 10 percent for direct shear testing. Due to the lack of a phreatic surface through the embankment the direct shear testing was completed at the moisture density indicated above. Direct shear test results indicated a friction angle of 36 degrees and a cohesion intercept of 1,500 pounds per square foot. The direct shear results seem somewhat high for anticipated field conditions. As a result, for use in the slope stability analysis, the friction angle has been reduced to 30 degrees and the cohesion to 1,200 pounds per square foot. It should be noted that if a phreatic surface were to be established within the road fill that this could lead to a substantial softening of the soils as measured during this testing.

Debris Basin

The soil contained in the embankment and foundation of the Debris Basin Dike consists of silty sand with gravel. This soil is broadly graded and has low to no plasticity. The moisture density relationship indicates a maximum density of 125 pounds per cubic foot and a moisture content of 9.5 percent.

Based on results of the field density tests, samples were reconstructed for direct shear testing at a dry unit weight of 105 pounds per cubic foot and moisture content of 15 percent. Prior to the initiation of the direct shear testing these samples were allowed to saturate. Direct shear testing indicated a friction angle of 32 degrees with no cohesion. Due to the significant amounts of coarse rock removed from the soil in order to prepare samples which could be tested in the direct shear testing apparatus, it is felt that a slight increase in the test results for this sample would be appropriate for use in stability analysis. Soil strengths used in the stability analysis are a friction angle of 34 degrees and a cohesion intercept of zero.

Stability Analysis

A computer model of Bishop's Simplified Method was used to perform the actual stability calculations. The computer model used was Stabl5M, which was developed at Purdue University for the Federal Highway Administration.

The Bishop's Simplified Method of Analysis is a limiting equilibrium method which relates, through the use of a factor of safety, the available shearing strength and the shear stresses which develop within the soil mass. This relationship provides a limiting value of which the forces acting to cause failure are in balance with those acting to resist failure. The limiting value of the factor of safety is 1.0 at which the shearing stresses are equal to the maximum shearing strength and failure of a particular potential failure mass is eminent.

Analyzing the stability of a particular potential failure mass using the Bishop's method requires that the mass be divided into several slices. The analysis to determine slope stability then considers all the forces acting on each individual slice or body. In the Bishop's method the forces which act on each slice are resolved vertically. This yields an equation of equilibrium in which the unknowns are the normal and tangential forces acting on the failure surface and the difference between the vertical side forces. The tangential force on the failure surface is the shearing force acting to cause failure of the body. The normal force is used in the Mohr-Coulomb strength criteria of the soil.

In order to reduce the number of unknowns, Bishop applied the limit equilibrium condition that the shearing stress equals the available strength, divided by the factor of safety. Ultimately it is the factor of safety that is being solved for. In the Simplified Bishop's Method it is assumed that the difference in the vertical side forces is small enough to be neglected. Comparison of this method with more rigorous methods shows that this assumption results in a slightly lower or more conservative factor of safety. In general, however, the results of this method are very close to the more rigorous methods and the Bishop's Simplified Method is considered to be appropriate for use in slope stability analysis.

Both embankments were analyzed under static conditions. In addition the Debris Basin was also analyzed under earthquake conditions. For the conditions of this study, it is felt that the pseudo static method of analysis is appropriate for use in the dynamic analysis.

The pseudo static method of analysis assumes a constant horizontal acceleration of a given value. The site of the debris basin is located within Zone 2-B of the Uniform Building Code Seismic Zone Map of the United States. It is estimated that at the site there is a 90 percent probability that the site will experience a maximum horizontal acceleration of 0.10g in the next 50 years and 0.2g during the next 250

years. It has been estimated that for use in seismic Zone 2, that a pseudo static coefficient or constant acceleration of 0.10g is appropriate. This value is used under earthquake conditions in this study.

Analysis Results

	<u>Factor Safety</u>	<u>Required Safety Factor</u>
Road Fill	1.72	1.3
Debris Basin, Down Stream	1.65	1.5
Debris Basin, Down Stream with Earthquake	1.28	1.2
Debris Basin, Up Stream	2.20	1.5
Debris Basin, Up Stream with Earthquake	1.63	1.2

Conclusions

Based on the assumptions used in this analysis, as previously discussed, it is our opinion that the slopes under consideration have factors of safety against failure in excess of those which have been set as a required minimum. As such, we feel that these slopes should be considered stable.

It should be noted, however, that a change in field conditions could significantly alter the results of this analysis. One of the most common causes of slope failures is the presence of unaccounted for seepage water which can cause softening of cohesive soils and, in all types of slopes, result in pore pressures which reduce slope stability. As with all embankments, monitoring of field conditions is important to determine that field conditions do not change. Where field conditions do change, stability of slopes needs to be reconsidered.

Limitations

This analysis has been completed in accordance with general accepted soil engineering practices in this area. The results of this analysis and the conclusions contained in this letter are based upon the data provided from the client and the assumptions regarding field densities and phreatic surface. If actual conditions appear to be different from those described herein this office should be advised at once so that reevaluation and recommendations may be made.

CHEN-NORTHERN, INC.



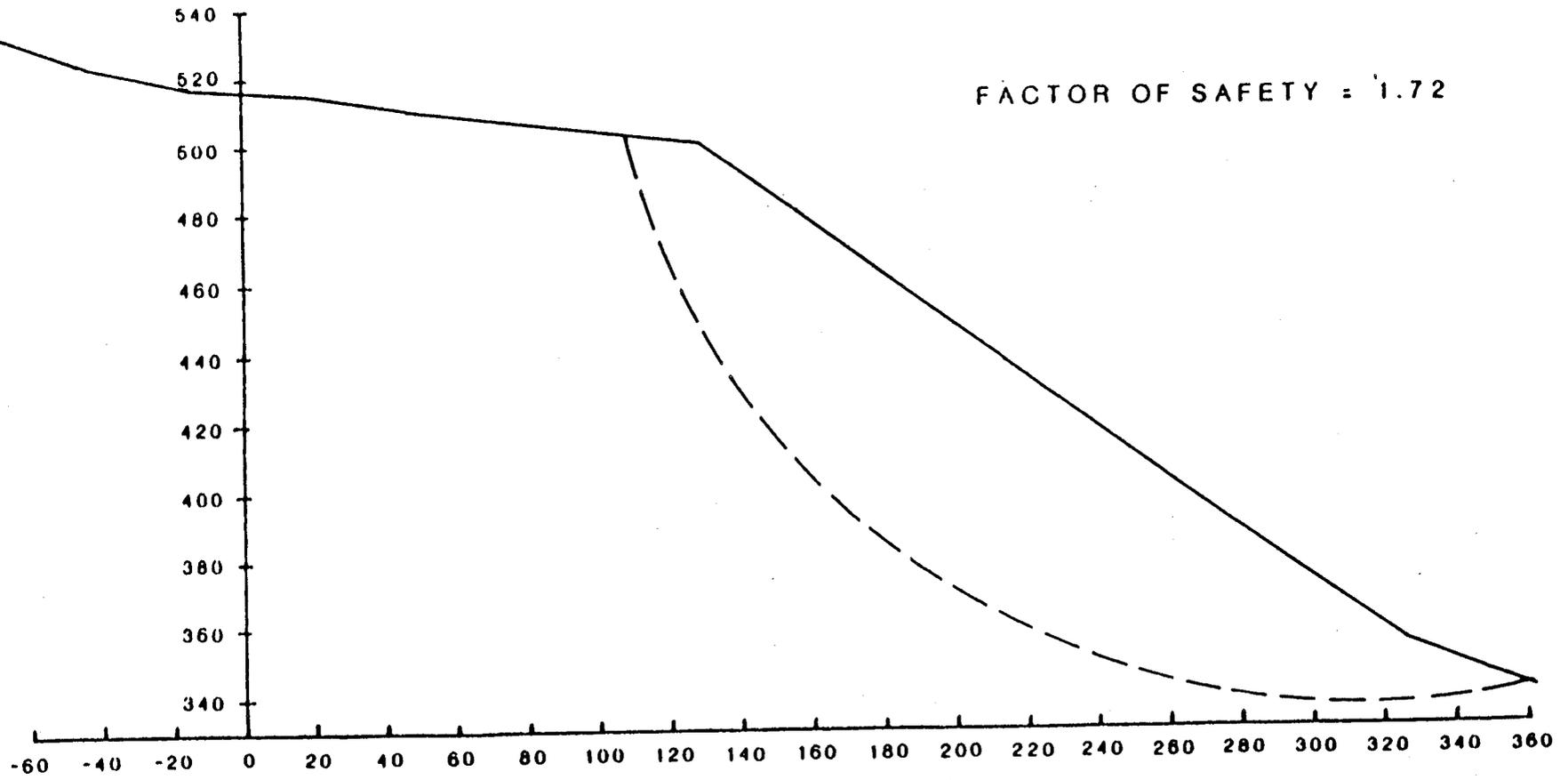
David K. Marble, P.E.

Rev. by WVJ, P.E.

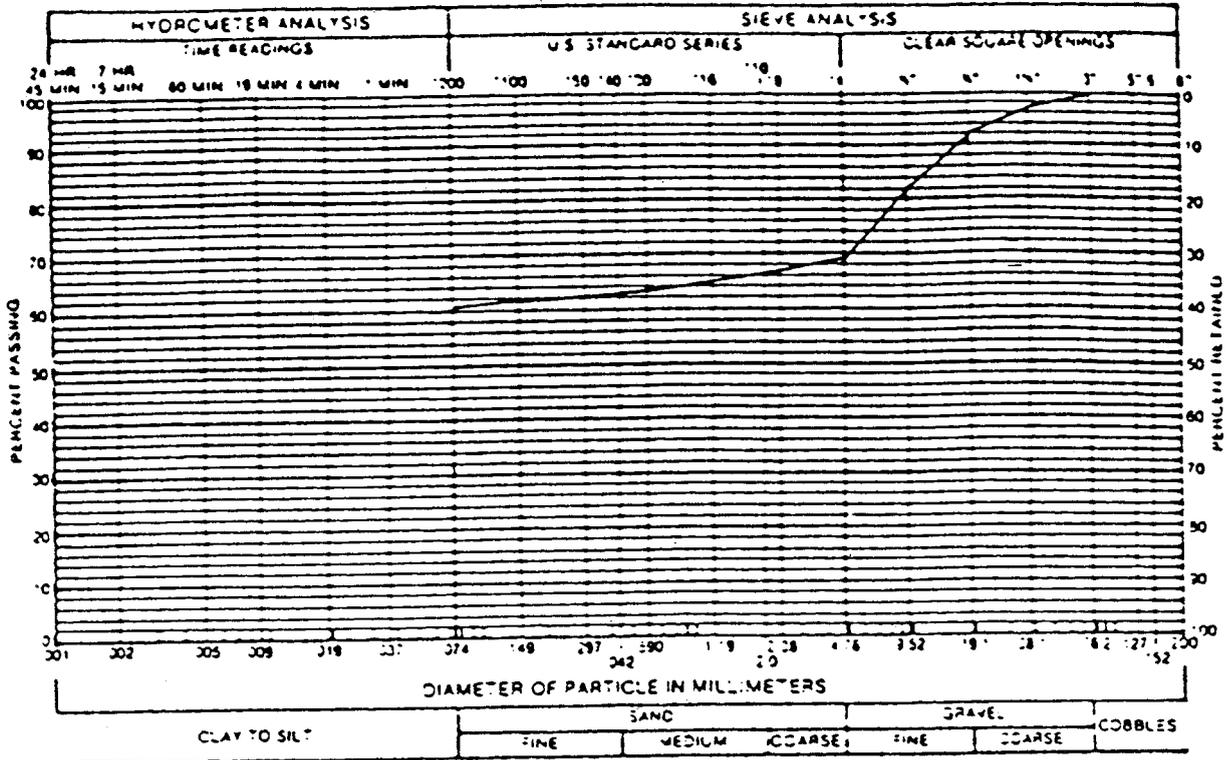
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Enclosures-6

FACTOR OF SAFETY = 1.72

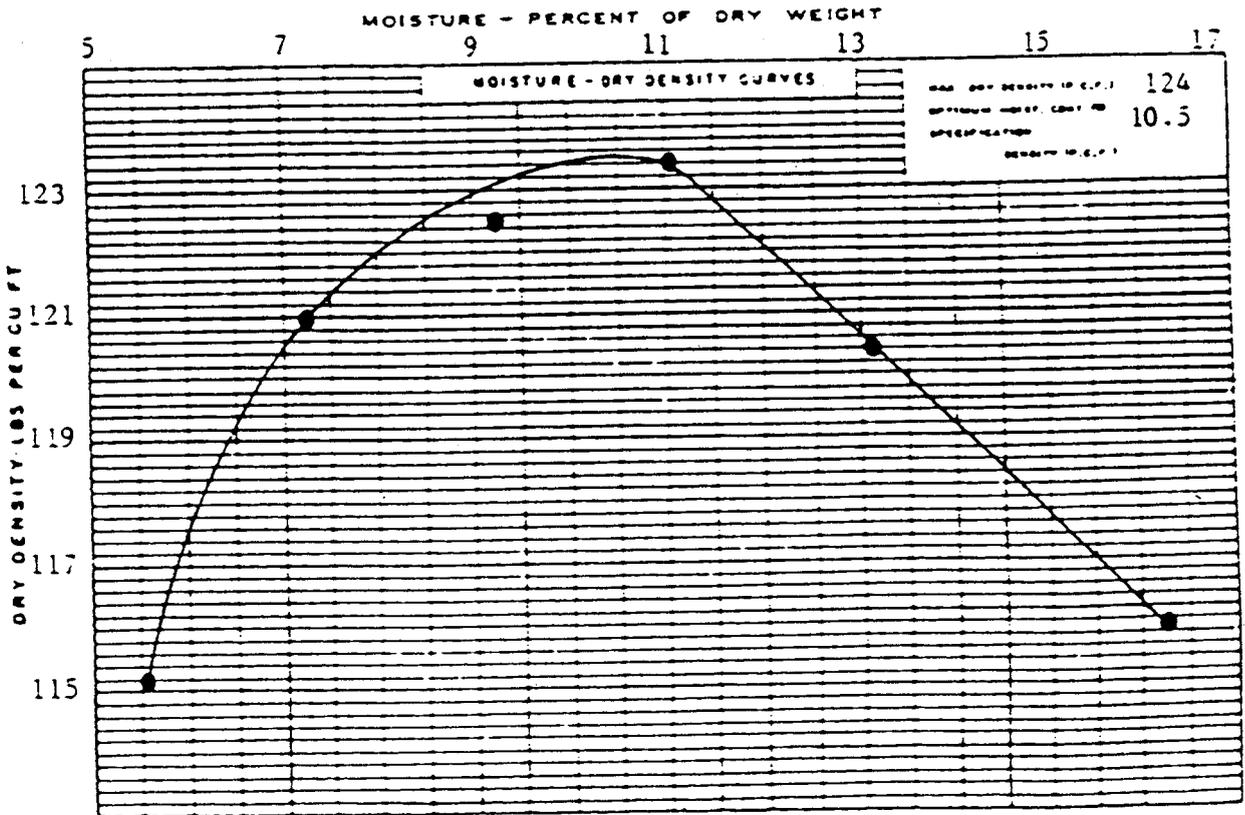


— — — CRITICAL FAILURE SURFACE



GRADATION TEST RESULTS

GRAVEL 32 % SAND 7 % SILT AND CLAY 61 %
 LIQUID LIMIT 31 PLASTICITY INDEX 15



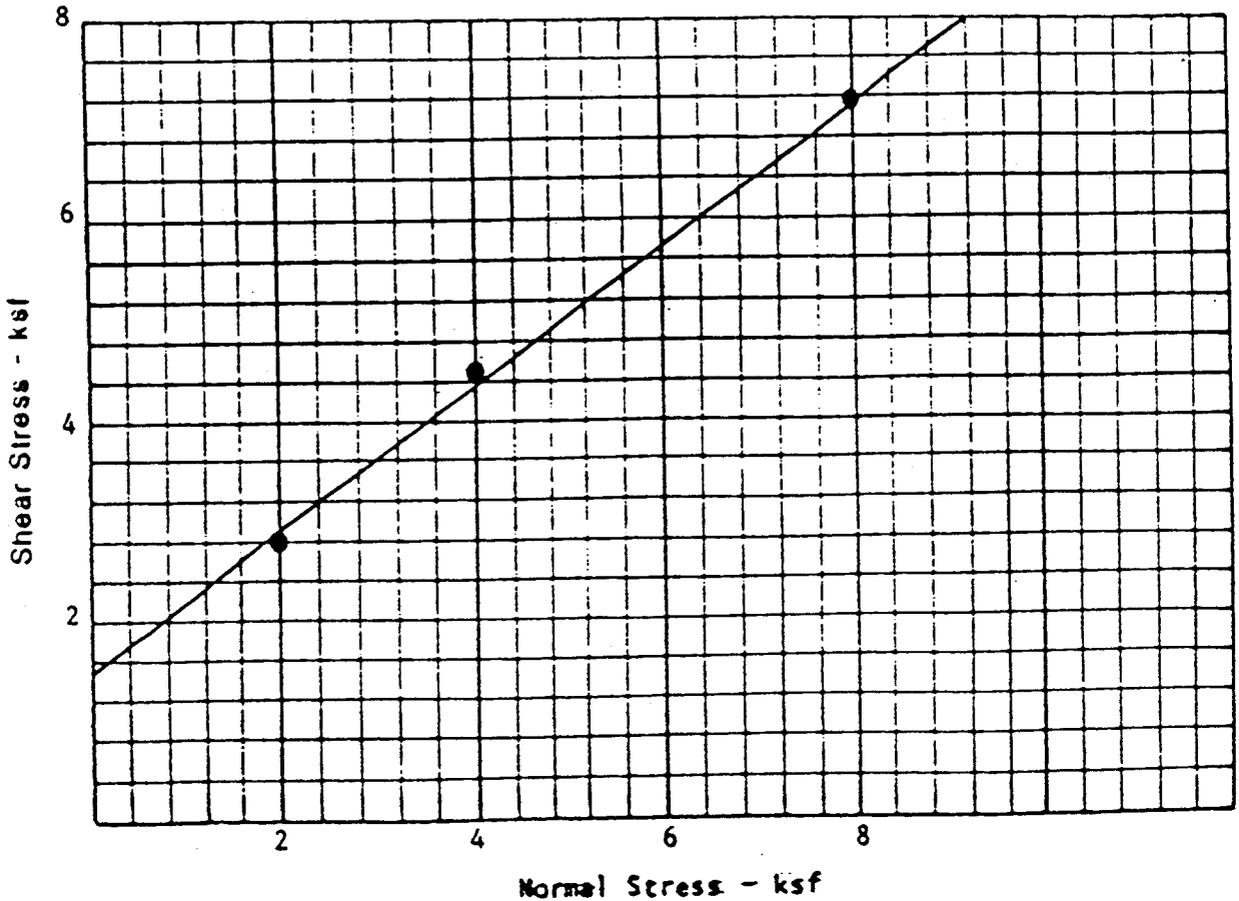
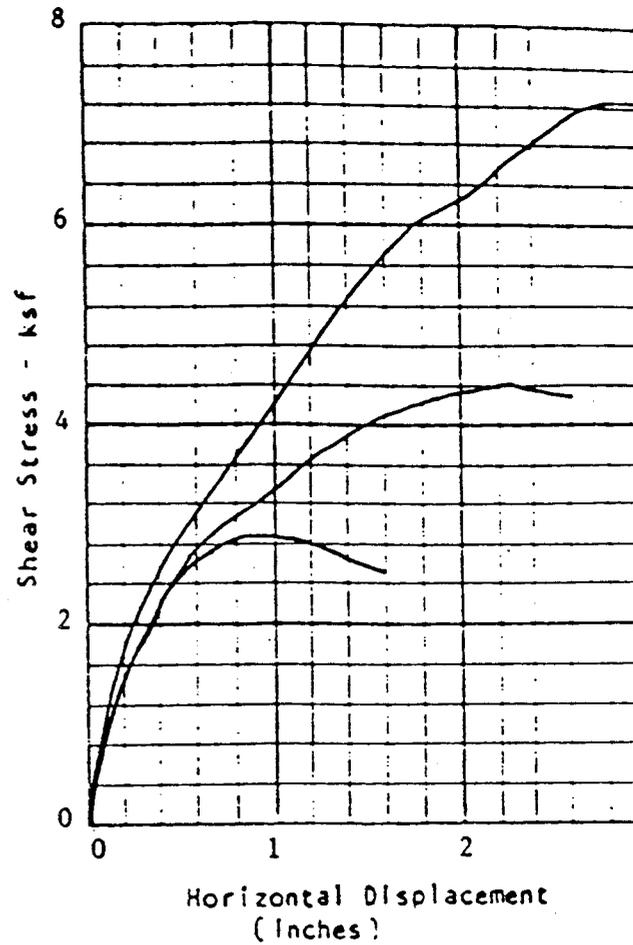
COMPACTION TEST RESULTS

COMPACTION TEST PROCEDURE
 SAMPLE OF (CL) Lean Clay

TEST NUMBER	1	2	3	4
LOCATION	ROAD-FILL	ROAD-FILL	ROAD-FILL	
HEIGHT-INCH	1"	1"	1"	
DIAMETER-INCH	2.4"	2.4"	2.4"	
WATER CONTENT - %	10	10	10	
DRY DENSITY - pcf	115	115	115	
CONSOL. LOAD - ksf	2	2	8	
NORMAL LOAD - ksf	2	4	8	
SHEAR STRESS - ksf	2.81	4.48	7.20	

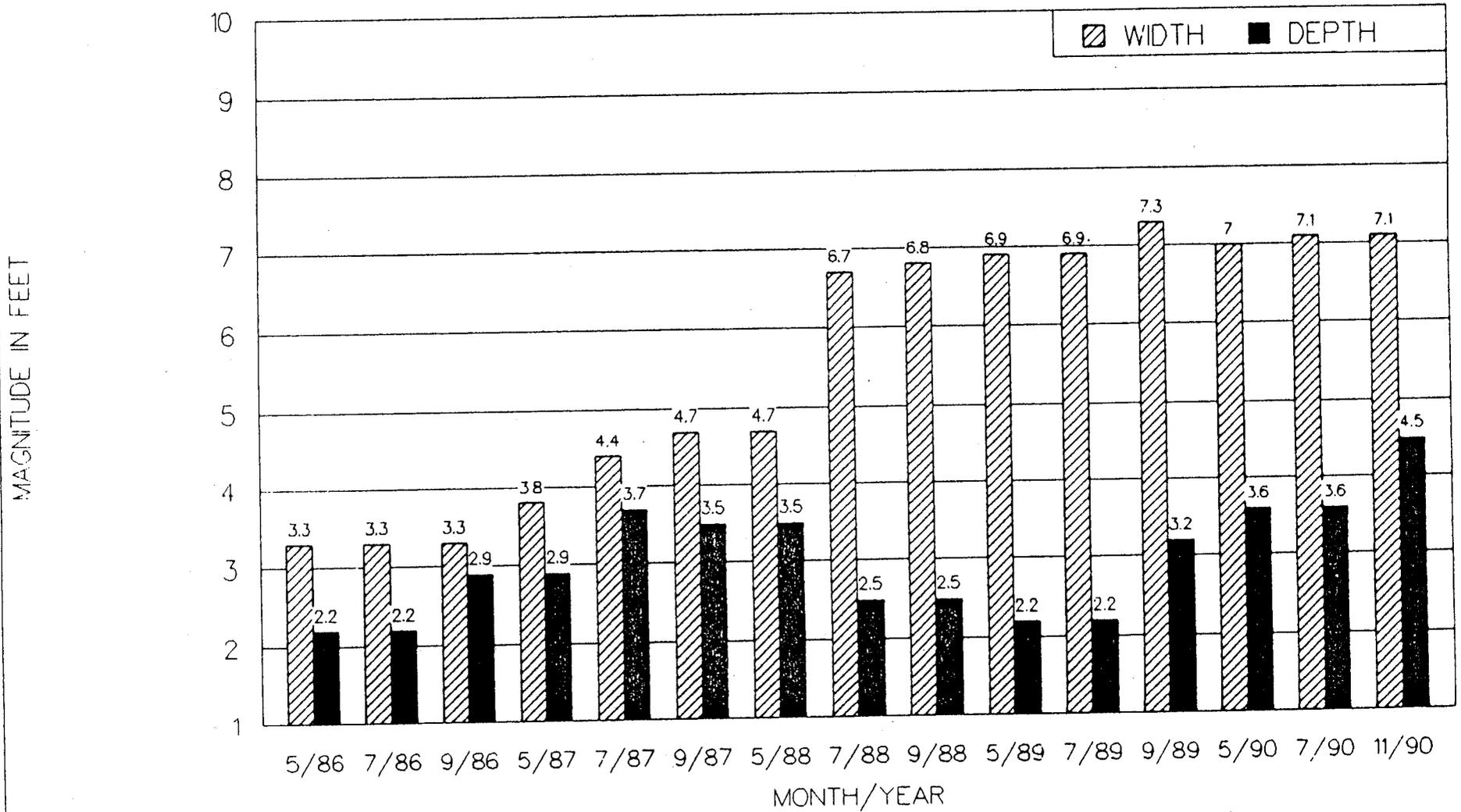
TYPE OF SPECIMEN Remolded
 SOIL DESCRIPTION (CL) Lean Clay
 TYPE OF TEST Unsaturated
Shear Rate 0.12 MM/MIN

Friction Angle = 36°
 Cohesion = 1.5 ksf



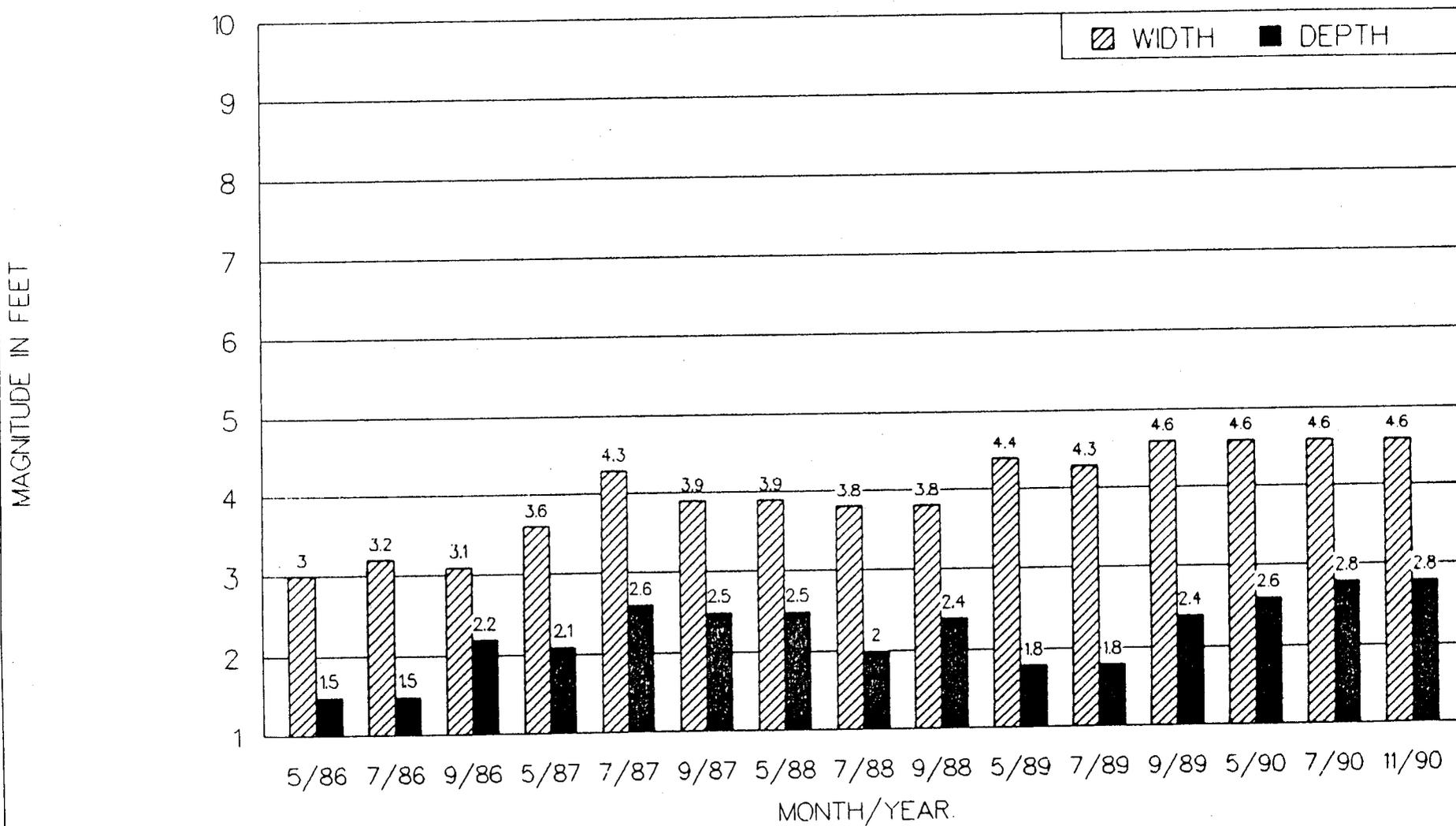
DES-BEE-DOVE HAUL ROAD EROSION
1986 THRU 1990

SITE 1



DES-BEE-DOVE HAUL ROAD EROSION
1986 THRU 1990

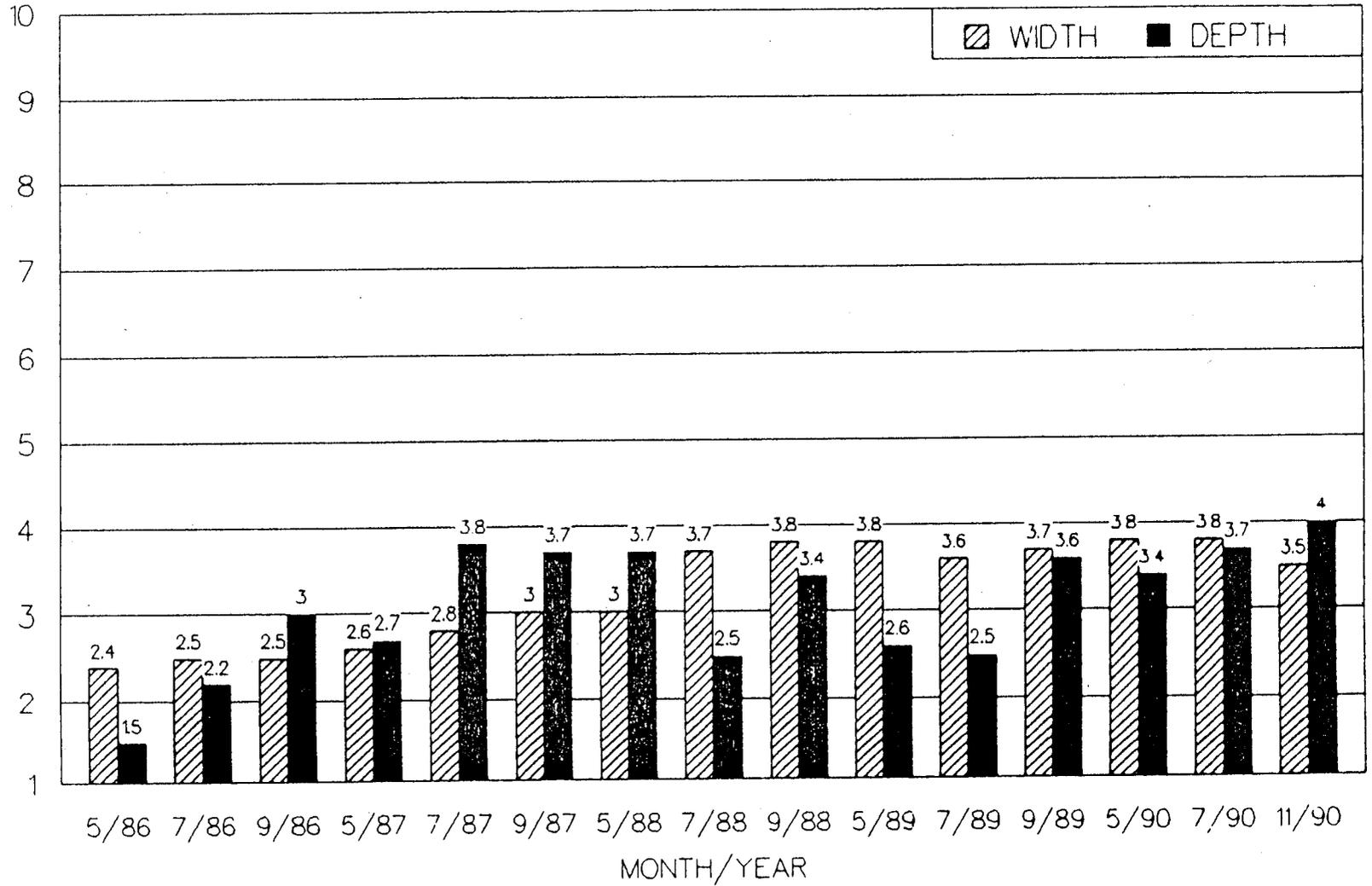
SITE 2



DES-BEE-DOVE HAUL ROAD EROSION
1986 THRU 1990

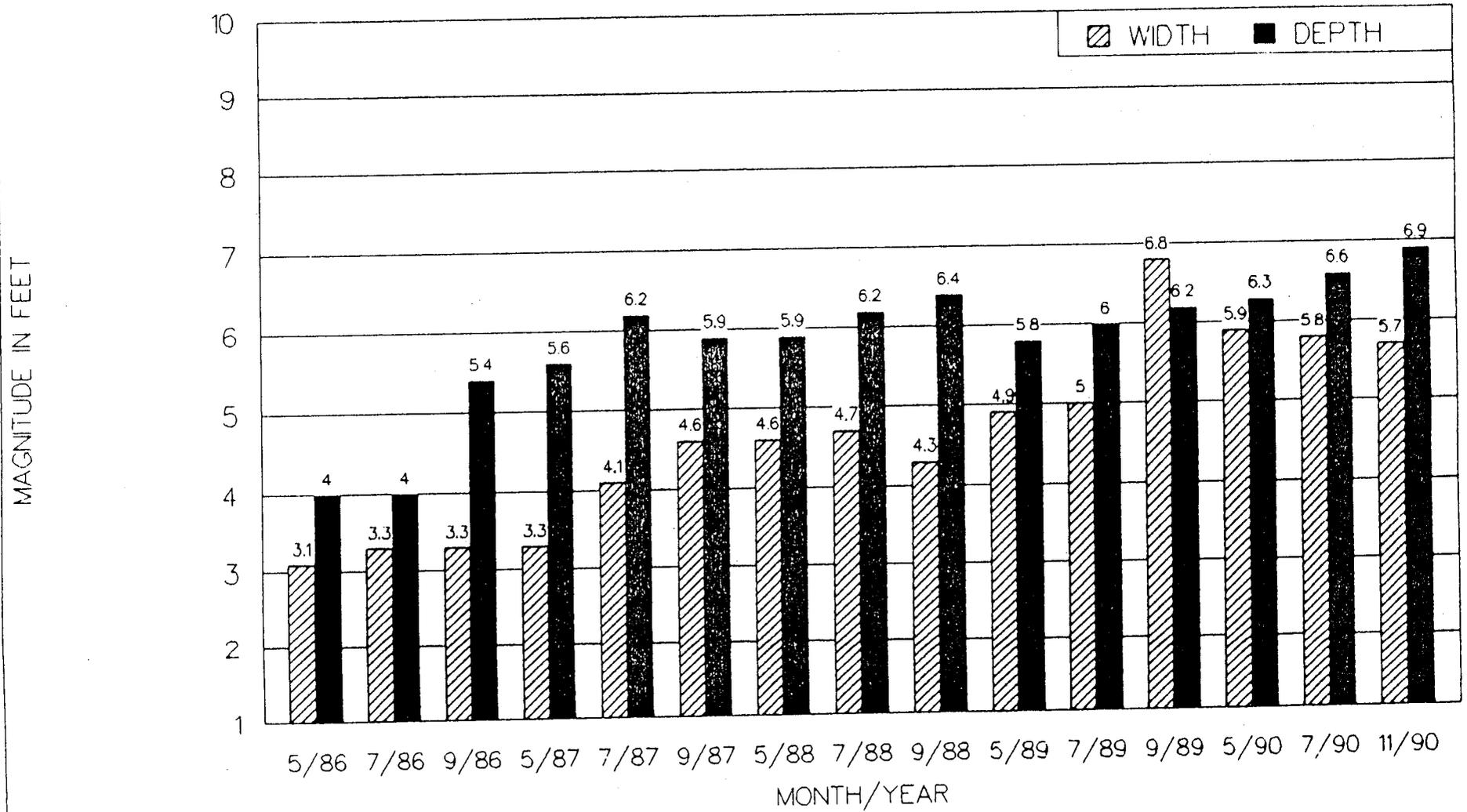
SITE 3

MAGNITUDE IN FEET



DES-BEE-DOVE HAUL ROAD EROSION
1986 THRU 1990

SITE 4



PHASE III DESIGN DEVELOPMENT

The primary objective of the reclamation study is to determine the reclaimability potential of the disturbed Mancos shale and to assess the effectiveness of the reclamation methodologies outlined in the Des Bee Dove Permit Application Package.

A secondary objective is the stabilization of erosion rills and gullies.

Effective reclamation will preferably include revegetation. Establishment of a vegetative cover will help to reduce and control erosion.

Existing site characteristics create marginal conditions for revegetation. These characteristics include; climatic factors (lack of precipitation and southwestern exposure, lack of topsoil, existing soil characteristics (low essential elements, high salinity, high sulfur and chloride, poor texture).

Similar characteristics existed at the Emery Coal Field (BLM EMRIA Report No. 16). Measures to address these factors included admixing of better soil materials or power plant fly ash with the existing soil. Proper admixing may dilute high soil elements and supplement low ones.

In addition to dilution, admixing with fly ash or other materials of less density than the Mancos, results in improved physical characteristics including increased pore volume, moisture availability and air capacity.

Admixtures proposed for the haul road test plots (See Map Cm-10602-DS Sheet 1 of 3) include better quality soil and coal spoil materials. Fly ash is not proposed because the elements which it would add to the Mancos (i.e. copper, zinc, calcium) are present in adequate concentrations. It is felt that the other admixtures are more suitable for improving the physical characteristics of the Mancos.

The potential for coal spoil materials to support vegetation has been observed at various abandoned mine refuse piles. Therefore, it appears that this material is a viable admixture.

Observations of natural conditions indicate that a mixture of soil and Mancos also supports vegetation.

The following procedures are proposed for admixing of materials at the haul road test plot site (refer to page 28):

- 1* Sample and analyze natural mancos/shale sites which support vegetation.
- 2* Sample and analyze coal spoil sites which support vegetation.

- 3* Sample and analyze coal waste material at the Cottonwood Waste Rock Site.
- 4* Sample and analyze the soil (Mancos) at the haul road site.

*Analyses will include the following parameters:

Texture (% sand, silt clay)
 SAR (meq/l)
 pH (standard units)
 Ec (mmhos/cm)
 Saturation Percentage (%)
 Organic Carbon (%)
 Total N (%)
 Available Phosphorus (mg/Kg)
 Available Potassium (mg/Kg)
 Water Extractable Boron (mg/Kg)
 Water Extractable Selenium (mg/Kg)
 Acid-Base Potential
 Available Water (%)
 1/3 and 15 atmospheres
 Soluble Ca, Mg and Na (meq/l)

- 5 Apply admixtures/or amendments to approximate conditions at natural vegetated mancos sites.
- 6 Incorporate adequate quantities of admixtures or amendments into top 12 to 18 inches of the mancos soil at the test plot sites to simulate soil conditions at natural vegetated mancos sites.
- 7 Sample and analyze test plot sites (per parameter list) to determine similarity with natural areas.

Following incorporation of admixtures and amendments at the test plots, contour ditches will be constructed across the entire test plot area. The ditches will be installed at 11 foot intervals from the top of the slope to the bottom. The ditches will completely retain the runoff at the test plot resulting from a 10 yr/6 hr storm event (see pages 31 and 32).

Following construction of the contour ditches the following seed mixture will be hand broadcast on the entire test plot. The seed will be covered by hand raking.

<u>Agropyron dasystachyum</u>	thickspike wheatgrass	3
<u>A. smithii</u>	western wheatgrass	4
<u>Oryzopsis hymenoides</u>	Indian ricegrass	3
<u>Elymus cinereus</u>	basin wildrye	4
<u>Sporobolus airoides</u>	alkali sakatoon	.25
<u>Melilotus officinalis</u>	yellow sweetclover	2

<u>Linum lewisii</u>	Lewis Flax	1
<u>Sphaeralcea</u>		
<u>grossularifolia</u>	globemallow	.5
<u>Atriplex canescens</u>	fourwing saltbush	2
<u>A. corrugata</u>	mat saltbush	2
<u>A. confertifolia</u>	shadscale	1
<u>Ceratoides lanata</u>	winterfat	2
<u>Kochia prostrata</u>	prostrata kochia	.5
	Total (PLS/Acre)	25.25

Following seeding, the various mulch treatments will be applied as indicated on page 28.

A standard 4 wire field fence will be installed to protect the test plots from disturbance by livestock.

A rip-rap lined ditch and dirt berm will be installed along the crest of the slope above the test plot area. The ditch is sized to adequately carry runoff from a 10 yr/6 hr storm event (see pages 33 thru 38).

The test plots will be monitored as described in the Des Bee Dove Permit Application Package.

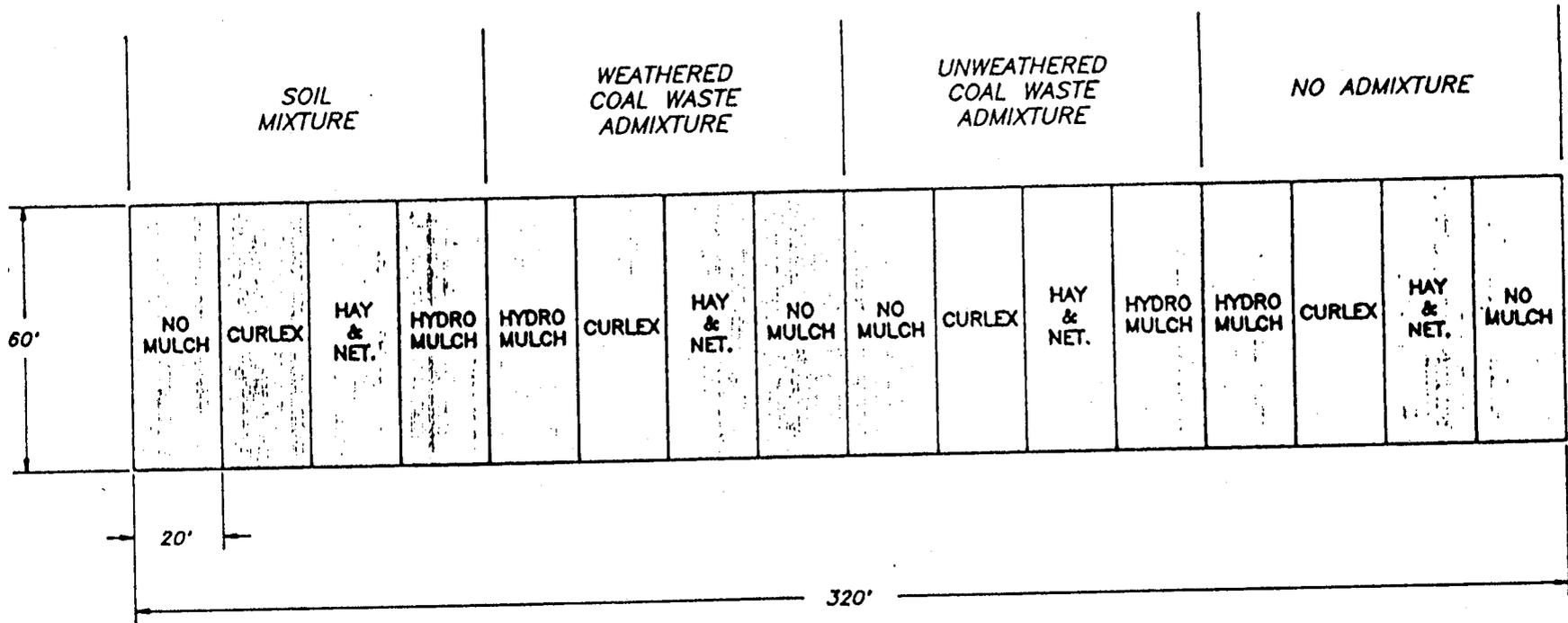
The present erosion monitoring program will continue at the four(4) established sites (see Map CM-10602-DS sheet 1 of 3). The current monitoring data seems to indicate gully development toward equilibrium at several sites similar to that discussed in BLM Technical Note 366. Data will be obtained from areas where naturally stable channels exist on slopes similar to the haul road slope. The geometric configuration of these natural channels will be determined and a comparison made between them and the erosion channels on the haul road slope.

The feasibility of constructing a simulated natural channel at the sites of haul road erosion will be determined. Construction of such a channel may include the various gully control structures as discussed in USFS Research Paper RM-169, pages 12 thru 31. If feasible, construction of the down slope channel would include attempts to establish vegetation as a means of channel stabilization.

Technical information will continue to be collected as well as site specific monitoring data. All information will be used to evaluate the effectiveness of reclamation measures installed and to identify possible alternatives, if necessary, for final reclamation of the haul road.

Additionally, as stated in the Des Bee Dove PAP, vegetation test plots will be established at several additional fill slope sites along the haul road. These sites will provide information on the suitability of the fill material for final reclamation of the haul road in soils other than the mancos.

DES-BEE-DOVE HAUL ROAD
RECLAMATION TEST PLOTS



CAD FILE NAME/DISK/: HAULRD KL7

PACIFICORP ELECTRIC OPERATIONS FUEL RESOURCES DEPARTMENT <small>P.O. BOX 26128 SALT LAKE CITY, UTAH 84128-0128</small>	
DES-BEE-DOVE HAUL ROAD RECLAMATION STUDY VEGETATION TEST PLOTS	
DRAWN BY: K. LARSEN	CS1284A
SCALE: 1" = 40'	DRAWING #:
DATE: MARCH 5, 1991	SHEET 1 OF 1

DES BEE DOVE HAUL ROAD

HYDROLOGICAL ANALYSIS

Rainfall depth for a 10 yr/6 hr storm event was determined from US Dept. of Commerce, NOAA Atlas 2, 1973.

The rainfall-runoff relation for the test plot slope was determined as discussed in SCS National Engineering Handbook, 1972, Section 4, Hydrology, Chapter 10.

The peak runoff values for the riprapped crest ditch were calculated by use of the "Storm Hydrograph Program" by Richard H. Hawkins and Kim A. Marshall, September 1979, Utah State University Foundation. The drainage area was determined based on final reclamation topography of the haul road from Station 121+00 to 142+00.

The design of the crest ditch is based on Manning's equation for open channels. The design channel is a trapezoid shape with 1:2 side slopes and a 2 feet bottom width. The value for Manning's N for the rip-rap channel lining was taken from A Compliance Manual, Methods for Meeting OSM Requirements, by Skelly and Loy, 1979, page 7-16.

The channel capacity was determined as outline in Utah State DOT Manual of Instructions, Part 4 - Road Drainage, 1984, pages 3-22 and 3-32.

The rip-rap ditch lining design was based on the procedure in Applied Hydrology and Sedimentology for Disturbed Areas, by B.J. Barfield, R.C. Warner and C.T. Haan, Oklahoma Technical Press, 1981.

DES BEE DOVE HAUL ROAD
STORM RUNOFF VALUES FOR 10 YEAR, 6 HOUR EVENT

RAINFALL DEPTH 1.3 INCHES

DISTRIBUTION: SOIL CONSERVATION SERVICE TYPE II

CN: 98

RAINFALL-RUNOFF RELATION, TEST PLOT SLOPE

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

WHERE: $P = 1.3''$
 $S = \frac{1000}{CN} - 10 = .204$

$$Q = \frac{(1.3 - 0.2 (.204))^2}{1.3 + 0.8 (.204)}$$

$$Q = 1.09 \text{ IN/FT}^2$$

TEST PLOT AREA = 320' X 60' = 19,200 FT²

TOTAL RUNOFF = 1744 CU.FT.

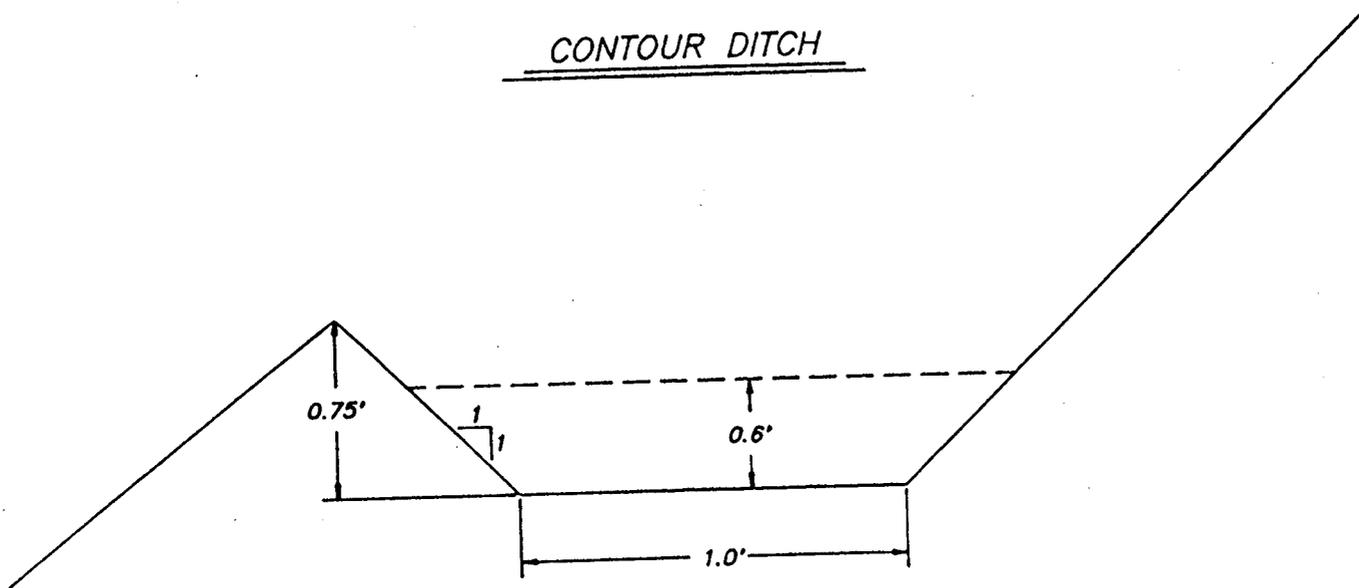
CONTOUR DITCHES CAPACITY = 1 CU.FT./ 1 FT. LENGTH

CAPACITY OF EACH DITCH = 320 CU.FT.

LENGTH OF SLOPE = 60 FT.

SPACING OF DITCHES = 11 FT.

CONTOUR DITCH



CAPACITY = 1 FT³ PER LINEAR FT

CAD FILE NAME/DISK#: HAULRD KL7

PACIFICORP ELECTRIC OPERATIONS
FUEL RESOURCES DEPARTMENT

P.O. BOX 28128 SALT LAKE CITY, UTAH 84128-0128

DES-BEE-DOVE
HAUL ROAD RECLAMATION STUDY
CONTOUR DITCH - TYP. CROSS SECTION

DRAWN BY: K. LARSEN

CS1286A

SCALE: NONE

DRAWING #

DATE: MARCH 5, 1991

SHEET 1 OF 1

REV.

TABLE

STORM RUNOFF DETERMINATION
FOR
DBD HAUL ROAD
CREST DITCH

INPUT SUMMARY:

```

=====
DISTRIBUTION = SCS TYPE II          RUNOFF AREA = .02 SQ. MILES
RAINFALL DEPTH = 1.3 INCHES        RUNOFF CURVE NO. = 98
STORM DURATION = 6 HOURS           TIME OF CONCENTRATION = .03 HRS.
=====
    
```

HYDROGRAPH ORDINATES:

TIME (HR)	PPT (IN)	CUM. FLOW (IN)	DEL. FLOW (IN)	FLOW RATE (IN/HR)	FLOW RATE (CFS)
0.00	0.00	0.0000	0.0000	0.0000	0.00
0.00	0.00	0.0000	0.0000	0.0000	0.00
0.01	0.00	0.0000	0.0000	0.0000	0.00
0.01	0.00	0.0000	0.0000	0.0000	0.00
0.02	0.00	0.0000	0.0000	0.0000	0.00
0.02	0.00	0.0000	0.0000	0.0000	0.00
2.98	0.84	0.6347	0.0048	1.1955	15.43
2.99	0.84	0.6395	0.0048	1.1961	15.44
2.99	0.85	0.6443	0.0048	1.1966	15.44
3.00	0.85	0.6491	0.0048	1.1972	15.45
3.00	0.86	0.6539	0.0016	1.1977	15.46
3.00	0.86	0.6555	0.0016	1.1744	15.16
3.01	0.86	0.6571	0.0016	1.1271	14.55
3.01	0.86	0.6587	0.0016	1.0558	13.63
3.02	0.86	0.6603	0.0016	0.9605	12.40
3.02	0.87	0.6619	0.0016	0.8412	10.86
6.04	1.30	1.0836	0.0000	0.0036	0.05
6.04	1.30	1.0836	0.0000	0.0015	0.02
6.05	1.30	1.0836	0.0000	0.0003	0.00
6.05	1.30	1.0836	0.0000	0.0000	0.00
6.06	1.30	1.0836	0.0000	0.0000	0.00
6.06	1.30	1.0836	0.0000	0.0000	0.00
6.06	0.00	0.0000	0.0000	0.0000	0.00

OUTPUT SUMMARY:

```

=====
TOTAL RUNOFF DEPTH = 1.084 IN.      TIME TO PEAK = 2.998 HOURS
INITIAL ABSTRACTION = .041 IN.     RUNOFF VOLUME CHECK = 1.086 IN.
PEAK FLOW = 15.503 CFS
=====
    
```

CREST DITCH CAPACITY CALCULATIONS

$$K' = \frac{Qn}{b^{2/3} s^{1/2}}$$

WHERE:

$$\begin{aligned} Q &= 15.503 \text{ CFS} \\ n &= 0.0395 \text{ (Manning's } n \text{ for rip-rap)} \\ s &= 0.08 \\ b &= 2' \end{aligned}$$

$$K' = 0.302$$

FROM CHART (PAGE 36) - CAPACITY OF TRAPEZOIDAL CHANNEL

$$\frac{d}{b} = .34$$

$$d = b(d/b)$$

$$d = .68 \text{ ft.}$$

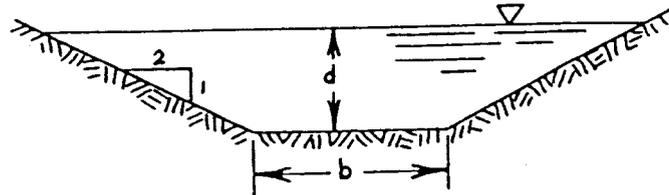
THEREFORE; CREST DITCH WILL CARRY THE PEAK RUNOFF OF 15.503 CFS WITH APPROXIMATELY 0.3' FREEBOARD.

A filter layer will be placed beneath the rip-rap channel lining materials. The filter will consist of 2 inch minus road base material and will be placed in a layer equal in thickness to the D_{50} size of the ditch.

VALUES OF $b^{8/3}$

b	$b^{8/3}$	b	$b^{8/3}$
1	1.00	21	3360
2	6.35	22	3800
3	18.7	23	4280
4	40.3	24	4790
5	73.1	25	5340
6	119	26	5930
7	179	27	6560
8	256	28	7230
9	350	29	7940
10	464	30	8690
11	598	31	9480
12	755	32	10320
13	934	33	11200
14	1140	34	12130
15	1370	35	13110
16	1630	36	14160
17	1910	37	15176
18	2230	38	16320
19	2940	39	17466
20	2950	40	18732

Table 3-22: TRAPEZOIDAL CHANNEL
2:1 SIDE SLOPES

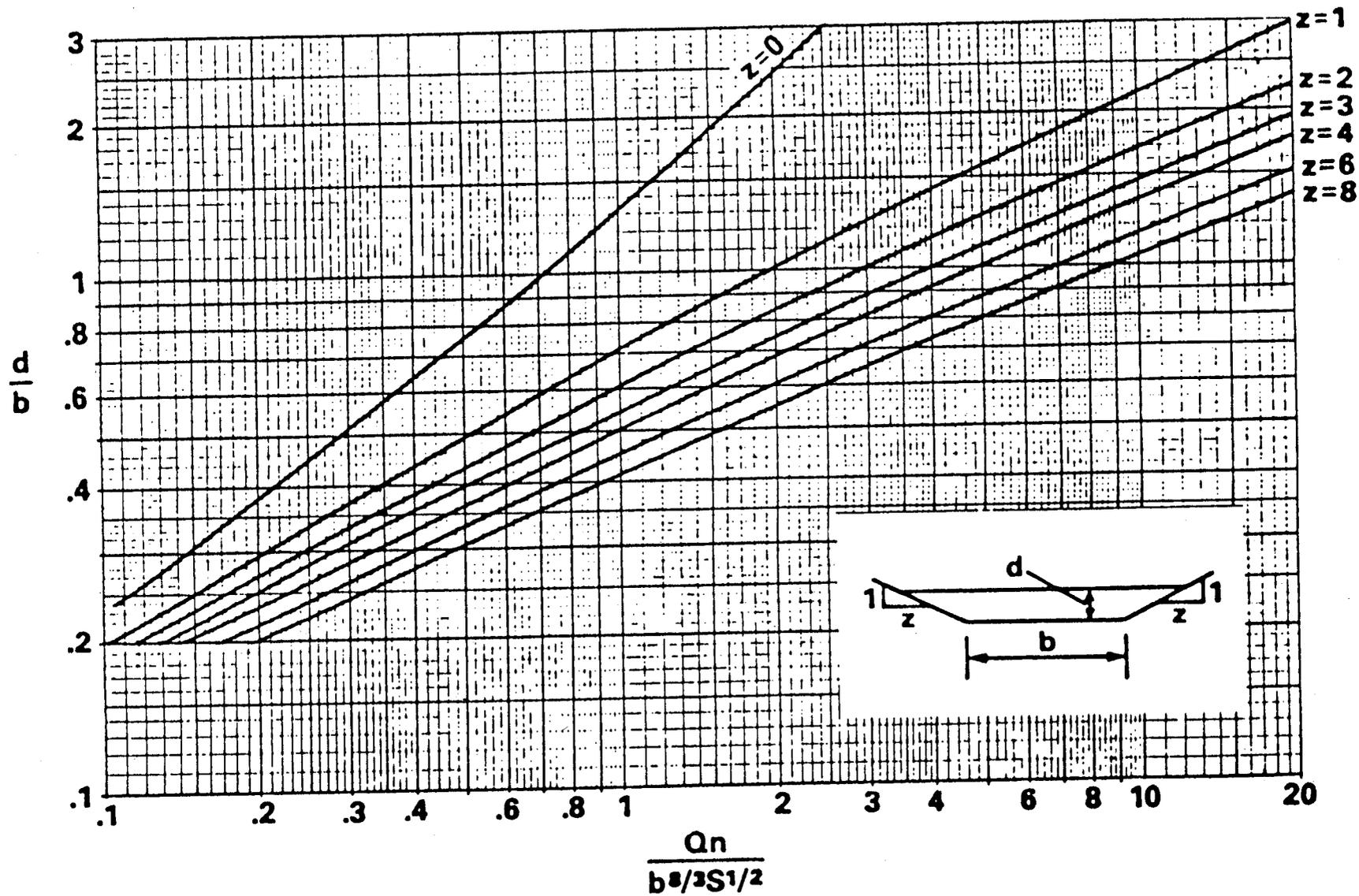


1. Calculate $K' = \frac{Qn}{b^{8/3} s^{1/2}}$
2. Enter the table below at K' and find the corresponding value of d/b .
3. Calculate $d = b(d/b)$.

Values of K' as a function of the ratio d/b .

d/b	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.20	.116	.127	.139	.150	.163	.176	.189	.203	.217	.232
0.30	.248	.264	.281	.298	.316	.334	.353	.372	.392	.413
0.40	.434	.456	.478	.501	.525	.549	.574	.599	.625	.652
0.50	.679	.707	.736	.765	.795	.826	.857	.889	.922	.956
0.60	.990	1.02	1.06	1.10	1.13	1.17	1.21	1.25	1.29	1.33
0.70	1.37	1.41	1.46	1.50	1.54	1.59	1.63	1.68	1.73	1.78
0.80	1.83	1.88	1.93	1.98	2.03	2.08	2.14	2.19	2.25	2.31
0.90	2.36	2.42	2.48	2.54	2.60	2.66	2.73	2.79	2.85	2.92
1.00	2.99	3.05	3.12	3.19	3.26	3.33	3.40	3.48	3.55	3.62
1.10	3.70	3.78	3.85	3.93	4.01	4.09	4.17	4.25	4.34	4.42
1.20	4.51	4.59	4.68	4.77	4.86	4.95	5.04	5.13	5.22	5.32
1.30	5.41	5.51	5.61	5.71	5.81	5.91	6.01	6.11	6.21	6.32
1.40	6.42	6.53	6.64	6.75	6.86	6.97	7.09	7.20	7.31	7.43
1.50	7.54	7.66	7.78	7.90	8.02	8.15	8.27	8.40	8.52	8.65
1.60	8.78	8.91	9.04	9.17	9.30	9.44	9.57	9.71	9.85	9.99
1.70	10.1	10.3	10.4	10.6	10.7	10.8	11.0	11.1	11.3	11.4
1.80	11.6	11.7	11.9	12.1	12.2	12.4	12.5	12.7	12.9	13.0
1.90	13.2	13.4	13.5	13.7	13.9	14.0	14.2	14.4	14.6	14.7
2.00	14.9	15.1	15.3	15.5	15.6	15.8	16.0	16.2	16.4	16.6
2.10	16.8	17.0	17.2	17.4	17.6	17.8	18.0	18.2	18.4	18.6

Capacity of Trapezoidal Channel



45

RIPRAP SIZING FOR
TRAPAZOIDAL DITCHES

ENTER LISTED PARAMETERS

1. FLOW RATE (CFS) 15.503
2. CHANNEL SLOPE .08
3. BOTTOM WIDTH (FT) 2
4. SIDE SLOPE .5
5. PHI ANGLE 42
6. SPECIFIC GRAVITY OF RIPRAP 2.65

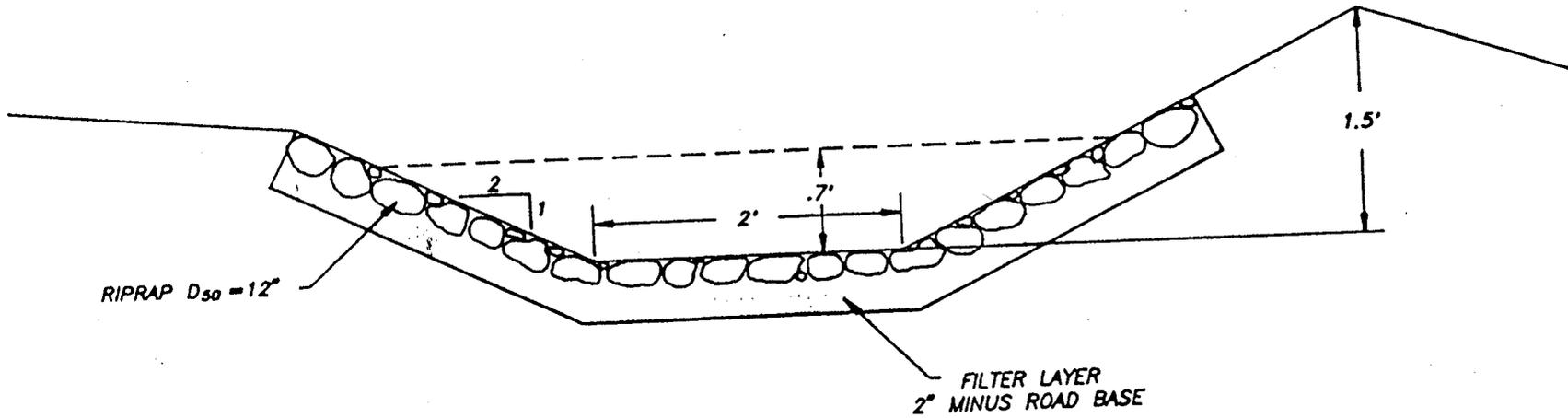
DESIRED SAFETY FACTOR FOR CHANNEL BOTTOM 1.0
DESIRED SAFETY FACTOR FOR CHANNEL BANKS 1.04

VELOCITY	DEPTH	D50	S.F. BTM	S.F. BANK
6.427	.707	.9985	1.232	1.04

RUN COMPLETE

Ok

CREST DITCH & BERM



CAD FILE NAME/DISK: HAULRD ML7

PACIFICORP ELECTRIC OPERATIONS
FUEL RESOURCES DEPARTMENT
P.O. BOX 28128 SALT LAKE CITY, UTAH 84128-0128

DES-BEE-DOVE
HAUL ROAD RECLAMATION STUDY
CREST DITCH & BERM

DRAWN BY: K. LARSEN

CS1285A

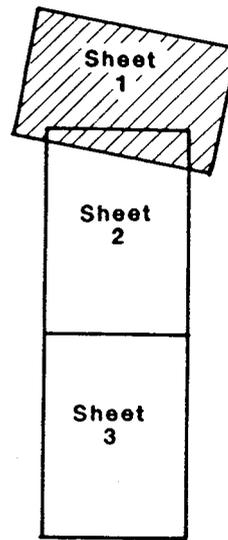
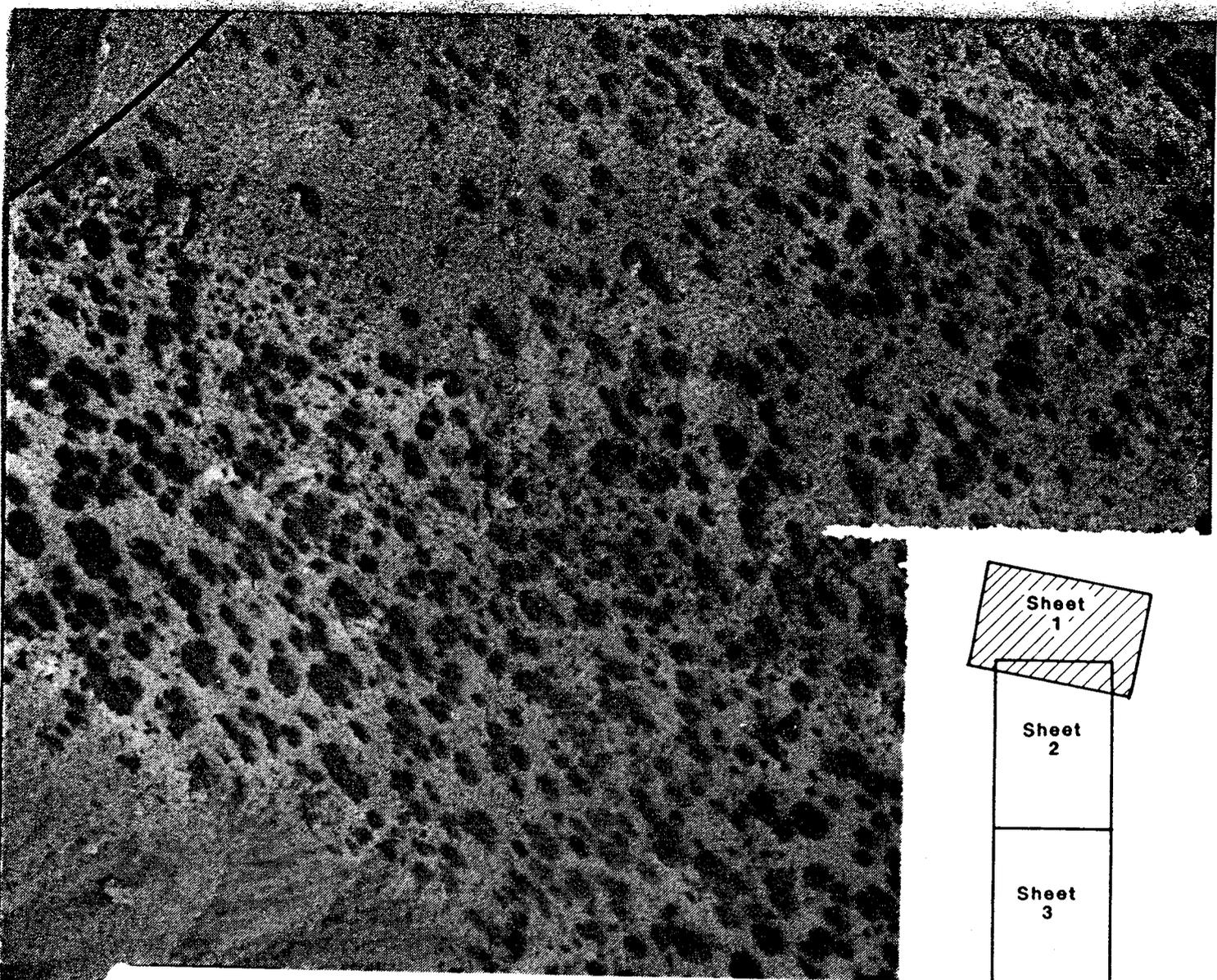
SCALE: NONE

DRAWN &

DATE: MARCH 5, 1991

SHEET 1 of 1

REV.



NOTE: UNCONTROLLED PHOTOGRAPHY

NOTE:

SEE DRAWING #CM-10601-DS SHEET 1 FOR CROSS-SECTION & PROFILE
(MAP PACKET 5-2)

DES-BEE-DOVE COAL MINES

EMERY COUNTY, UTAH

*AERIAL PHOTOGRAPH OF THE
DES-BEE-DOVE/WILBERG
JUNCTION ROAD*

UTAH POWER & LIGHT COMPANY
DEPARTMENT OF MINING & EXPLORATION

DRAWN BY: SMC

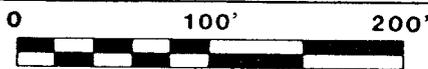
CHECKED BY:

DATE: OCTOBER 1, 1984

SCALE

SHEET NO.

DRAWING NUMBER



1 of 3

CM-10602-DS

DES BEE DOVE EROSION TASK FORCE

AGENDA

DATE: November 12th and 13th, 1991 (1 1/2 Days)

LOCATION: PacifiCorp Training Center
1/4 Mile South of Huntington Airport

OBJECTIVE: TO RECEIVE WRITTEN CONSENSUS RECOMMENDATIONS FROM THE TASK FORCE. PACIFICORP MANAGEMENT WILL DEVELOP A PLAN TO SUBMIT TO DOGM FOR APPROVAL AND IMPLEMENTATION

PART I: TRAINING CENTER - NOVEMBER 12th - 9:00 - 11:30 AM

Overview of Problem and Objective - Guy Davis

Slide Presentation of Site History - Guy Davis

Study Results:

Erosion Studies - Val Payne and Guy Davis

Vegetation/Erosion Study - DOGM

Reclamation Study Overview - Val Payne

Test Plots - Val Payne and DOGM

Application to Interim Problem Solution - Guy Davis

BREAK: LUNCH AND TRAVEL TO MINE SITE 11:30 AM - 1:00 PM
(Lunch Provided by PacifiCorp)

PART II: FIELD SITE 1:00 - 3:00 PM

Problem Analysis -

Tentative Solutions -

PART III: TRAINING CENTER 3:30 - 5:00 PM

Consensus Recommendations -

Written Recommendations -

Final Statement -

PART IV: TRAINING CENTER - NOVEMBER 13TH - 9:00 - 11:30 AM

**Time allocated if consensus and written recommendations are not met
on November 12th timeframe.**

DATE: November 7, 1991
TO: TASK FORCE MEMBER
FROM: Guy Davis - PacifiCorp *Guy*
SUBJECT: DES BEE DOVE EROSION TASK FORCE

Thank you for accepting this Task Force position. To help familiarize you with the area that the Task Force will be looking at, a brief history of what has occurred and future activities will be helpful.

A haul road was completed for the Des Bee Dove Mine in the Spring of 1983 which connected Highway 57 with the Danish Bench county road. The roadway was constructed for coal haulage from the mine to the Hunter Plant without going through the residential area of Orangeville.

Construction required the disturbance of the mancos shale to a large dugway which created cutslope and fillslope areas. This geologic formation (mancos shale) is very erodible with very limited revegetation capability.

Erosion in the fillslope areas has occurred in many locations. The larger erosion which is now present is the combination of 8 1/2 years of minor erosion and large > 10 yr/24 hr precipitation events. The first large event to this road area is recorded on 8-12-81 and caused erosion throughout the mine area particularly in this mancos location. Other violations were issued to the operator in following years concerning the erosion issue with abatement requirements met. The main abatement requirements were the establishment of the belt conveyor along the road guardrail, cut off ditches, installation of strawbale/silt fence filters on the pond access road and monitoring 4 locations at the crest of the main erosion site on May, July and September for width and depth measurements. Monitoring of the erosion sites are continuing. Seeding of the area was done in the fall of 1986 by the operator.

In the fall of 1989 a test plot area was located, on which a newly developed tackifier, soil additive and sulfur were applied along with seeding, in an attempt to reduce erosion and increase vegetation. The plots are still being monitored and conclusions are still pending.

In the recent past, another violation has been issued to PacifiCorp for not controlling erosion on the location. Part of the abatement of this violation is to establish interim erosion control on the mancos area. Berming and waterbarring of the pad area just above the largest erosion area is being done at this time. This action will capture the runoff from

the pad for containment of a 10 yr/24 hr event. Plans for runoff control of another smaller area has been submitted to the Division of Oil, Gas and Mining.

FUTURE PLOTS

Future test plots are planned adjacent to the 1989 test plot area to help determine final reclamation methods. These plots will test several soil additives including sulfuric acid. Results of these plots may aid in interim soil stabilization. Feasibility of the study and other amendments to the study are in the process. Additional information and discussion of the proposed plots will be presented in the November 12th meeting.

If there are any questions, please call me at 653-2312.

Des Bee Dove Meeting 11/12/91

Name	Agency
Bill Malencuk	DOGM
Terry Bauer	DOGM
George S. Cook	Soil Con. Service
Leland D. Stamer	Soil Con. Service
Susan White	DOGM
Ken Wyatt	DOGM
YAL PAYNE	PACIFICORP
DALE BRADBE	ENERGY WEST
DEANIS MORROW	EXTENSION SERVICE - NEV
Jess Kelley	DOGM
Guy Davis	PACIFICORP

DATE: November 13, 1991

TO: Task Force Member

FROM: Guy Davis

SUBJECT: CONSENSUS RECOMMENDATIONS FROM NOVEMBER 12, 1991 MEETING AND FIELD VISIT

I am enclosing the notes which were taken at the afternoon session of the task force during our 11-12-91 meeting. These notes are what I understand to be the group consensus recommendations. If there are any comments to the stated recommendations, please call me at 653-2312.

CONSENSUS RECOMMENDATIONS:

1. Interim erosion has been minimized at the site by the recent berm and waterbar installation. The operator will continue to monitor the 4 erosion study locations at the crest of the slope area in May, July and September. In addition, photos of the slope will be taken annually at the bottom of the area during the fall of the year.
2. Test plots on the pad's recently disturbed berm and waterbars will be initiated in the fall of '92. Plots will be monitored annually by visual observation and photos. Soil testing will be done at the commencement and end of the plot schedule. Vegetative monitoring for density, cover and diversity will be done during the 3rd growing season. Vegetative productivity will be monitored at the end of the test plot schedule. Proposed treatments to the plots will be discussed and agreed upon by the operator and DOGM.
3. Future test plots on the outslope area will be considered after reviewing results of the '92 test plots on the pad area.
4. The disturbed pad area will be seeded in the fall of '91 with 30 pounds/acre of Annual ryegrass for further interim erosion control. No mulch or fertilizer will be applied.
5. Transplants for the '92 test plots will be discussed by the operator and DOGM. Probable planting in spring of '93.

6. **Native seed planting is a proposed plot treatment. If this treatment is agreed upon, the seed collecting must start in the summer of '92.**

DES-BEE-DOVE HAULROAD RECLAMATION STUDY RUNOFF AND SEDIMENT YIELD MONITORING PROGRAM

The runoff and sediment yield monitoring program will consist of two phases. During the first phase, the development of the 1992 test plots (see map CM-10602-D5), staff gages will be installed in the trough areas within each type of application. Visual inspections will be made after precipitation events to document the effectiveness of the different types of applications. The second phase of the project will involve applying the applications based on the contoured ditched area to the proposed sloped test plot area. A total sediment collection will be installed to analyze the sediment yield from each type of application. Each type of application will be separated by a barrier of wood or metal to isolate each area. Runoff and sediment yield will be diverted to a collection system designed to accommodate a 10 year/24 hour precipitation event. Each collection system will consist of a container sized for a precipitation event of less than one inch and an overflow contained sized for a 10y/24h event. The following formulas will be utilized to determine the necessary volume once the size of the test plots has been determined.

Total Runoff Volume Calculation:

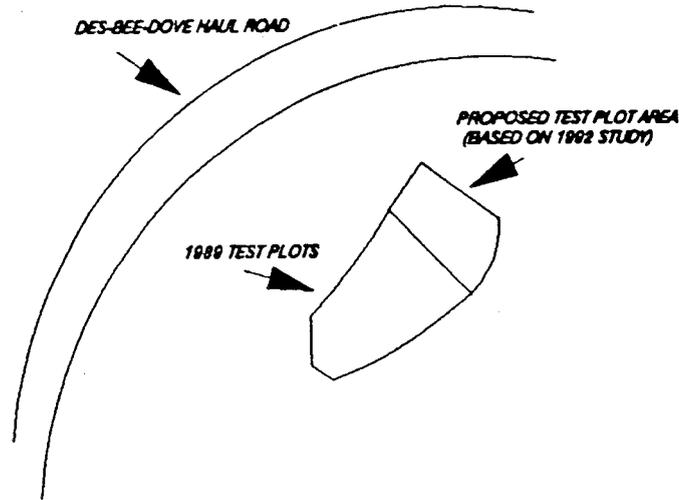
Area = dependent on the number of applications
Curve Number = 89, Range, Poor, Soil Group D
Precipitation Event = 10y/24h, 2.0 inches

$$S = (1000/CN) - 10$$
$$Q = (P - 0.2S)^2 / P + 0.8S$$

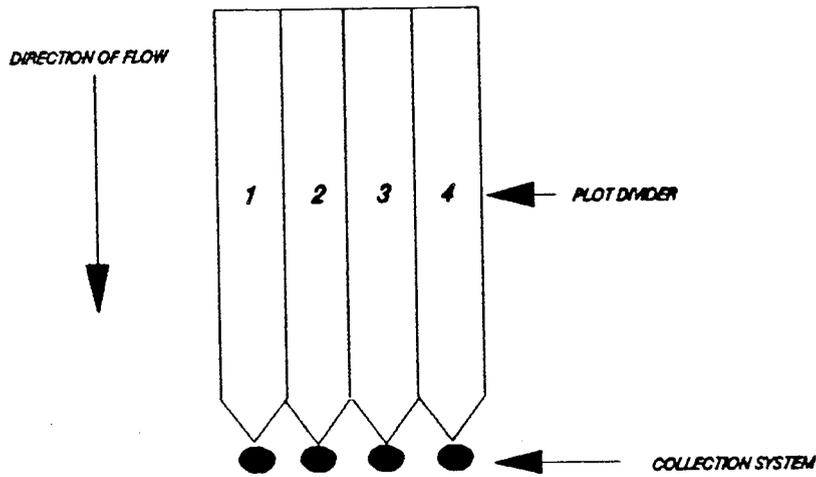
S = Infiltration Depth
CN = Curve Number
Q = Runoff in inches, ft²

Precipitation will be monitored utilizing a recording rain gage and compared to the sediment yield from each type of application. Sediment yield from the test plots will be determined from dried weighing of samples. Since each application will be similar in nature, i.e. type of soil, slope, length, and area, direct comparisons of the sediment yield from each type of application can then be made along with comparisons to the precipitation events.

**DES-BEE-DOVE HAULROAD RECLAMATION STUDY
RUNOFF AND SEDIMENT YIELD MONITORING PROGRAM
PROPOSED TEST PLOTS**



CONCEPTUAL TEST PLOT CONFIGURATION



Sediment Collection System

Test plot dimensions will be based on the number of applications selected from the 1992 test plot study. By modifying designs used by Jackson¹, each test plot will be approximately 10 feet wide and approximately 100 feet long (the length will be dependent on the final site construction). Each plot will be divided-bordered by installing either boards or corrugated metal along the existing slope, approximately 1.5:1. A total sediment collection system will be designed to collect all the sediment and precipitation from a 10 year/24 hour event. Sediment and precipitation will be funneled to the collection system which will consist of two containers. The first container will be sized for precipitation events of 1.0 inch or less, the second for a 10 year/24 hour event. If a significant amount of sediment is collected in the first container, the total amount of sediment will be determined and compared to the amount of precipitation. If the storm event exceeds the first container, the overflow will be collected in the second container and the amount of sediment will be determined calculating the total sediment solids in the runoff water.

¹ William L. Jackson, Karla Knoop, Joseph J. Szalona and Shirley Hudson, "A Runoff and Soil-loss Monitoring Technique Using Paried Plots," Technical Note 368, USDI Bureau of Land Management, Denver, CO, August, 1985

June 12, 1992

**Ms. Pamela Grubaugh-Littig
Permit Supervisor
Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203**

**RE: ADDITIONAL RESPONSE TO PERMIT CONDITIONS, DES BEE DOVE TEST
PLOT PLAN, PACIFICORP, DES BEE DOVE MINE, ACT/015/017**

Dear Ms. Grubaugh-Littig:

**In response to your letter dated May 5, 1992, the attached Des Bee Dove Test Plots Plan -
1992 is submitted.**

Upon approval this plan will be included at the end of Appendix XVI as an amendment.

If there are any questions, please call Guy Davis or me at 653-2312.

Sincerely,

Guy Davis

For **Val Payne
Sr. Environmental Engineer**

**GD/dw
Enclosure**

**cc: J. Blake Webster
File**

DES BEE DOVE TEST PLOT PLAN - 1992

INTRODUCTION

The focus of the 1992 Des Bee Dove Test Plots is primarily the Mancos shale. Specifically, to help develop reclamation procedures, plot treatments/soil admixtures will be tested to aid in the reclamation of the Mancos shale. Results from these 1992 test plots will determine the treatments to be tested on the "future" test plot planned in 3 to 5 years.

LOCATION

The individual plots will be approximately 10' x 14' each located in the raw Mancos material on top of the major fill slope between stations 131+00 to 142+00. The plots are part of the area redisturbed in the fall of 1991 as part of a violation abatement. (See attached Drawing CM-10874-DS.)

The location and size of the total plot area were based on the apparent universal soil and the availability of the test treatments. Each individual treatment will extend from the top of the waterbar slope to the top of the next waterbar slope (see Figure 1). All areas of the treatment, including the waterbars, will be observed and evaluated. The waterbar area is included because they are proposed in the final reclamation plan.

PLOT PREPARATION

All vegetation on the test plot area will be sprayed with two applications of Roundup two weeks prior to planting to kill any existing plant species. Applications will be spaced four (4) days apart.

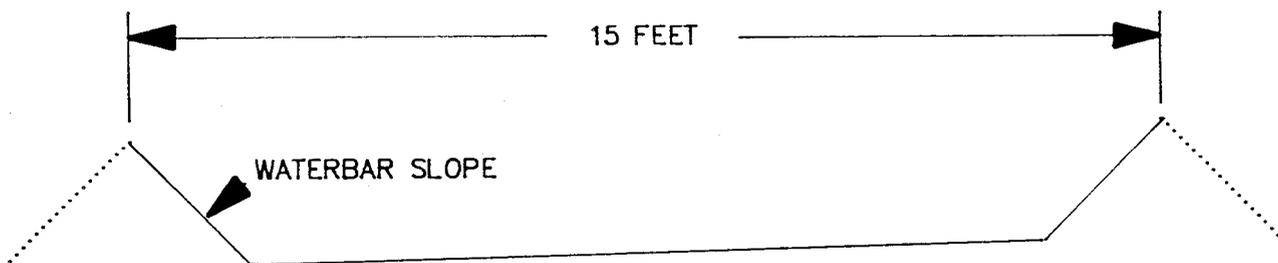
PLOT TREATMENTS/ADMIXTURES

As a result of the May 15, 1992 meeting with Division representatives, the following treatments were agreed upon. All treatments will be done randomly on the plot location in triplication.

- 1. Rocky Soil (Native Soil)**

This soil will be borrowed from near the site and will be placed on top of the Mancos soil. It is anticipated that one cubic yard of rocky soil will be used per individual plot. This will cover the Mancos surface with 2" or greater of soil. The treatment of rocky soil will be similar to the natural surrounding areas, so volume may vary following native soil sample results.

FIGURE 1
DES BEE DOVE TEST PLOTS — 1992
CROSS-SECTION



* NO SCALE

2. Coal Waste

Refuse waste <2" will be placed on top of the Mancos. On cubic yard of material will be required to cover one plot with 2" of refuse.

3. Live Earth

A soil admixture called "Live Earth" will be applied to the top of the Mancos material at 1200 lbs/acre. Application of this admixture will be done by Keith Littlefield, a supplier of the product. It is anticipated that addition will lower high pH and sulfate concentrations typical of the Mancos. The "Live Earth" will be applied in a dry form.

4. Combination Of Rocky Soil And "Live Earth"

This combination admixture will consist of 1 cubic yard of native rocky soil placed on top of 800 lbs/acre "Live Earth" product. The "Live Earth" may be applied in either the dry or liquid form per supplier preference. "Live Earth" representative will aide in the plot treatments application.

5. Combination Of Refuse Waste And "Live Earth"

This combination admixture will consist of 1 cubic yard/plot of less than 2" waste coal material placed on top of 800 lbs/acre "Live Earth" product. The "Live Earth" may be applied in either the dry or liquid form per the representative's preference. "Live Earth" representative will aide in the plot treatments application.

6. Sewage Treatment Plant Sludge

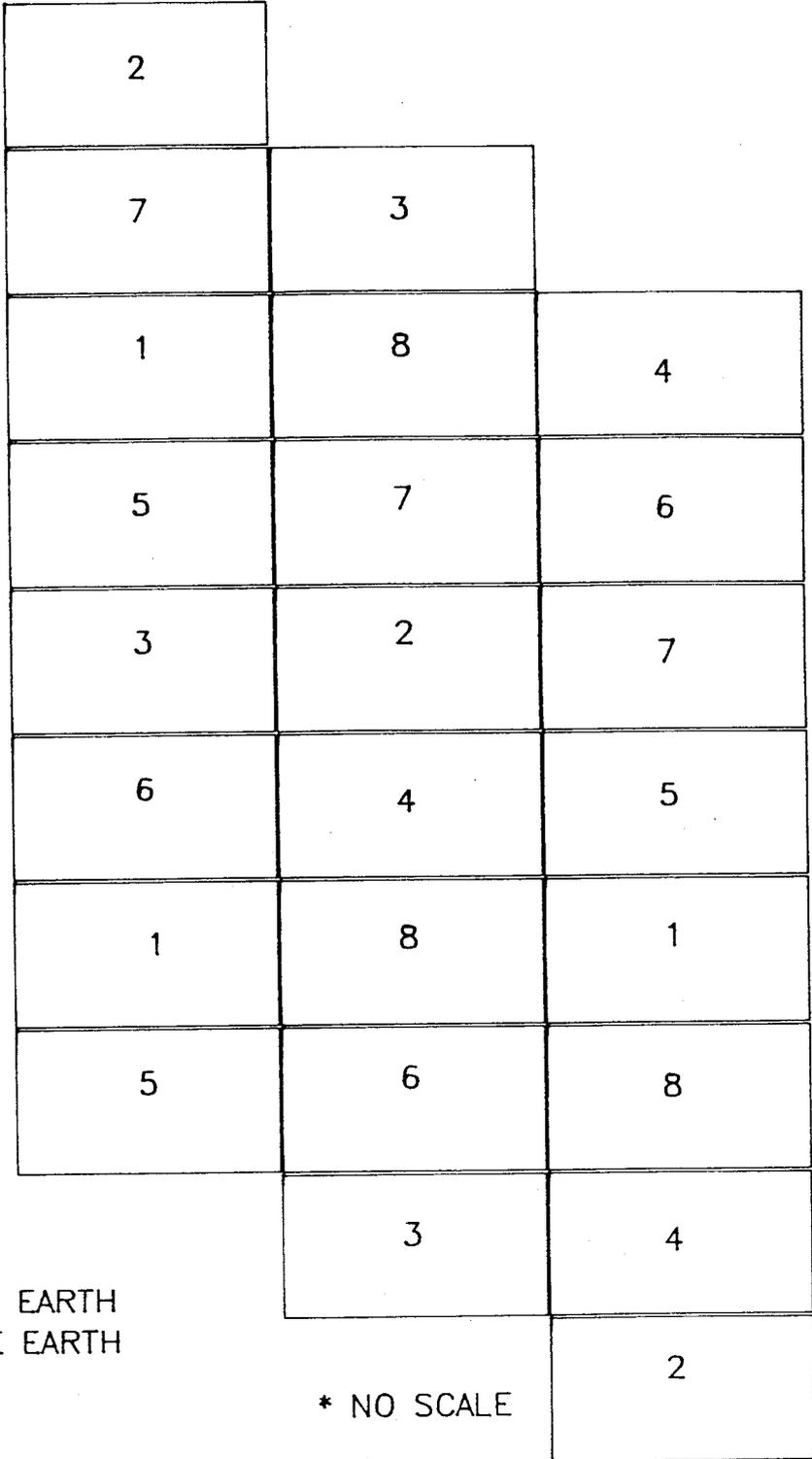
Sewage Treatment Plant sludge will be used as a treatment only if approved by the State Division of Water Pollution and Solid and Hazardous Waste. This approval will be obtained by Division personnel. Treatment volume will be determined after approval is received.

7. Native Seed

Native seed from the adjacent area will be collected and applied to 3 test plots. The seed mixture will be tested for viability prior to seeding. The quantity and variety of seed will be determined by availability at time of collection (see Figure 2).

It is anticipated that the following seed could be available at undetermined quantities:

FIGURE 2
DES BEE DOVE TEST PLOTS – 1992
PLOT TREATMENTS/ADMIXTURES



LEGEND

- 1. ROCKY SOIL
- 2. COAL WASTE
- 3. LIVE EARTH
- 4. ROCKY SOIL AND LIVE EARTH
- 5. COAL WASTE AND LIVE EARTH
- 6. SEWAGE SLUDGE
- 7. NATIVE SEED
- 8. NURSERY SEED

* NO SCALE

E:\DRAWINGS\1992\DEDPLOTS.DRW

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>COLLECTION</u>
Fourwing Saltbush	<u>Atriplex canescens</u>	Mid Oct.- Nov.
Shadscale	<u>A. confertifolia</u>	Mid Oct. - Nov.
Cuneate Saltbush	<u>A. cuneata</u>	Mid July - Aug.
Greasewood	<u>Sarcobatus vermiculatus</u>	October
Fat-hen Saltbush	<u>Atriplex patula</u>	June
Corymbed Eriogonum	<u>Eriogonum corymbosum</u>	Mid Aug - Sept.
Rock Goldenrod	<u>Petradoria pamila</u>	June
Salina Wildrye	<u>Elymus salinus</u>	Mid June
Squirreltail	<u>Sitanion hystrix</u>	June
Indian Ricegrass	<u>Oryzopsis hymenoides</u>	Late June
Mormon Tea	<u>Ephedra viridis</u>	Mid July
Prince's Plume	<u>Stanleya pinnate</u>	Mid June
Rabbit brush	<u>Chrysothamnus nauseosus</u>	Mid Oct. - Nov.

8. Nursery Seed

Nursery seed will be planted in 3 plots for comparison to the native seed plots. Nursery seed will also be seed source for all other treatments/admixtures. The seed mixture and planting amounts will be the approved final seedmix of the permit.

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>LBS/ACRE PLS</u>
Thickspike wheatgrass	<u>Agropyron dasystachyum</u>	3
Western wheatgrass	<u>A. smithii</u>	4
Indian ricegrass	<u>Oryzopsis hymenoides</u>	3
Basin wildrye	<u>Elymus cinereus</u>	4
Alkali sakatoon	<u>Sporobolus airoides</u>	.25
Yellow sweetclover	<u>Melilotus officinalis</u>	2
Lewis flax	<u>Linum lewisii</u>	1
Globemallow	<u>Sphaeralcea grossularifolia</u>	.5
Fourwing Saltbush	<u>Atriplex canescens</u>	2
Mat Saltbush	<u>A. corrugata</u>	2
Shadscale	<u>A. confertifolia</u>	1

Winterfat	<u>Ceratoides lanata</u>	2
Prostrate Kochia	<u>Kochia prostrata</u>	.5
TOTAL		25.25

Random treatment locations are shown on Figure 2. Each treatment will be staked and identified by a surveyor stake at each corner.

SOIL TESTING

Initially, the general test plot area will be sampled for the following parameters at 3 random locations. The sampling locations will be marked by a roofbolt for future identification.

- Texture (% sand, silt clay)
- SAR (meq/l)
- pH (standard units)
- Electrical Conductivity (mmhos/cm)
- Saturation (%)
- Organic Carbon (%)
- Total N (%)
- Available Phosphorus (mg/kg)
- Available Potassium (mg/kg)
- Water Extractable Boron (mg/kg)
- Water Extractable Selenium (mg/kg)
- Acid Base Potential
- Available Water (%)
 - 1/3 and 15 atmospheres
- Soluble Ca, Mg, Na (meq/l)

At the end of the test plot observation period (3 to 5 years) soil samples from each of the individual plots will be taken and analyzed for the same parameters. Three of these locations, will be the same locations as the initial soil sample locations.

SURFACE POCKING

The entire test plot area will be pocked by mechanical device or hand tools after the admixtures have been applied but prior to any seeding. The pocking will be randomly spaced over the entire area of each plot including the waterbar slopes.

SEEDING

All seeding will take place in the late fall, after the native seed collecting is complete. All plots will be seeded by hand broadcasting after the surface has been pocked. The seed will be lightly covered by dragging a chain between two workers.

MULCHING

All treatments/admixtures will be covered with curlex blanket. The blanket will be anchored as recommended by the manufacturer.

FERTILIZER

No fertilizer will be added initially because of the inherent high salt content of the Mancos. Fertilizer application may be considered in subsequent years.

MONITORING

Plots will be monitored annually by visual observation and photos. Vegetative monitoring for density, cover and diversity will be done during the 3rd growing season. Vegetative productivity will be monitored at the end of the test plot schedule.

Soil testing will be done at the commencement and end of the plots observation period. (See Soil Testing.)



POWER SUPPLY

September 25, 1992

Ms. Pamela Grubaugh-Littig
Permit Supervisor
Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, UT 84180-1203

RE: DES BEE DOVE TEST PLOT PLAN, ADDITIONAL COMMITMENTS,
PACIFICORP, DES BEE DOVE MINE, ACT/015/017

Dear Pamela:

In response to your letter of September 2, 1992, concerning two additional commitments required by the Division for submittal into Appendix XVI of the permit, PacificCorp submits the following:

COMMITMENT 1 A commitment to analyze "live earth" and the borrow soil.

PacificCorp commits to obtain the analytical results of the product "live earth" from the supplier if such information is not deemed proprietary by the supplier. The product has been tested extensively by the supplier in its use on farmlands.

The borrow soil will be sampled and analyzed for the listed parameters of Appendix XVI "Des Bee Dove Test Plot Plan - 1992"

COMMITMENT 2 A description of the soil borrow area, including locations.

The borrow soil will be from the existing Cell #7 of the old Waste Rock Facility. When the cell is covered for final reclamation this fall, a small amount for the Des Bee Dove Test Plot will be borrowed. The soil is similar to the Native Soil which blankets over the Mancos near the test plot area.

Please include this letter at the end of Appendix XVI and replace the Appendix XVI Summary with the enclosed revised Summary.

If there are any questions, please call.

Sincerely



Val Payne
Sr. Environmental Engineer

Enclosure

cc: J. Blake Webster
File

A:DBDTEST.PLT

 **PACIFICORP**
POWER SUPPLY

February 4, 1993

Ms. Pamela Grubaugh-Littig
Permit Supervisor
Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, UT 84180-1203

RE: SUBMITTAL OF TEST PLOT DRAWING AND PROCEDURES, PACIFICORP, DES
BEE DOVE MINE, ACT/015/017

Dear Pamela,

In response to your January 20, 1993 letter, we submit the following amendment.

The installation of the test plots was completed on November 9, 1992. The original Test Plot Plan - 1992, submitted to the Division on 6-12-92, was followed with the exception of the deletion of the sewage sludge admixture and the treatment of 1,000 lbs/acre to all "Live Earth" admixture plots instead of the varied 1,200 to 800 lbs/acre. These changes are reflected in the added Figure 2 "as-built" drawing and the Plot Installation 11-9-92.

Upon approval, please add this letter along with the above referenced pages to the end of Appendix XVI of the permit. Also, please replace the Summary at the beginning of Appendix XVI with the revised Summary reflecting this amendment addition.

If there are any questions, please call Guy Davis or me at 653-2312.

Sincerely,



Val E. Payne
Sr. Environmental Engineer

Enclosures

cc: Steve Kochevar
J. Blake Webster

A\BBDTPINS.AMD

DES BEE DOVE TEST PLOT - 1992

PLOT INSTALLATION 11-9-92

1. Soil Sampling

- The test plot area was sampled at 3 locations and analyzed for the approved parameters. The locations were marked for further reference by a roof bolt.
- The Rocky Soil was sampled and analyzed for the same parameters.
- All soil samples were taken on 9-30-92

2. Plot Preparation

- The plots were roughened by a backhoe the week of Nov. 2nd.
- The plots were left with pocking to enhance local water retention.
- Disturbance was thorough to remove perennial roots which might be still alive

3. Admixture Implementation

- Approximately 1 cubic yard of Coal Waste material was raked evenly over plots 2 and 5.
- Approximately 1 cubic yard of Rocky Soil was raked evenly over plots 1 and 4.
- 10 lbs. (1,000 lbs/acre) of "Live Earth" was placed on plots 3,4 and 5 by a broadcasting with a hurricane spreader.
- The Sewage Sludge was not applied to plot 6 because of no application approval from the Divisions within the Department of Environmental Quality.

4. Seeding

- The approved Nursery Seedmix was broadcast over all plots (including plot 6), with the exception of plot 7.
- The collected Native Seedmix was broadcast over plot 7. (PLS of the native seedmix/plot matched the nursery seedmix/plot)
- The entire plot area was hand raked to incorporate the seed into the soil.

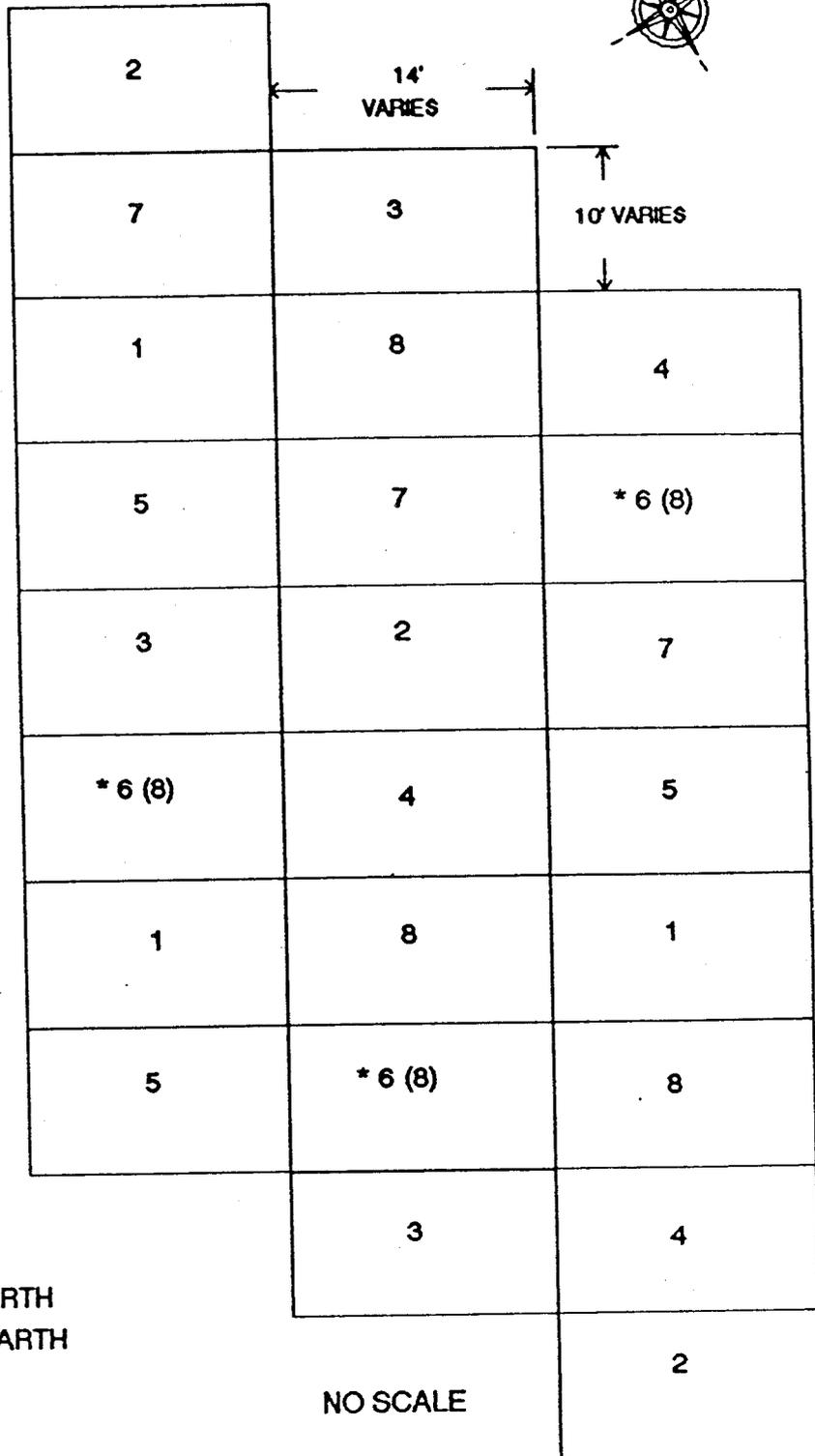
5. Mulching

- Curlex Blanket was placed on top to the surface of all plots. The blanket was installed according to manufacturer's recommendations.

FIGURE 2

DES BEE DOVE TEST PLOTS - 1992

PLOT TREATMENTS/ADMIXTURES AS - BUILT



* PLOT #6 WERE NOT APPROVED BY STATE AGENCIES. THESE PLOTS WERE TREATED WITH TREATMENT #8 ONLY

LEGEND

- 1. ROCKY SOIL
- 2. COAL WASTE
- 3. LIVE EARTH
- 4. ROCKY SOIL AND LIVE EARTH
- 5. COAL WASTE AND LIVE EARTH
- 6. SEWAGE SLUDGE *
- 7. NATIVE SEED
- 8. NURSERY SEED

NO SCALE

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March 26, 1993

Ms. Pamela Grubaugh-Littig
Permit Supervisor
Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, UT 84180-1203

RE: DEFICIENCIES FOR AS-BUILT TEST PLOT, APPENDIX XVI, DES-BEE-DOVE MINE, PACIFICORP, ACT/015/017

Dear Pamela,

In response to your letter of February 22, 1993 (copy attached), the following information is submitted to answer the four stated deficiencies. Upon approval, the following material should be added to Appendix XVI, located in Vol. 7 of the permit. Please replace the current Appendix XVI Summary with the revised 3/36/93 Summary.

Deficiency #2 of the 2/22/93 letter asked for seed source information of the Nursery Seedmix which was not included in the seed tag attached to the seed bag. In reviewing the attached pages 96 and 97 of the "Seed Act" the seed supplier is not required to supply all of the information requested by the Division. Included in this submittal is a copy of the seed tag which was attached to the nursery seedmix. It appears to be in accordance with the "Act".

PacificCorp commits to provide the Division with future test plot soil laboratory results. More sampling is committed to in 3 to 5 years per the "Test Plot Plan - 1992.

If you have any questions, please call Guy Davis or me at 653-2312.

Sincerely,

A handwritten signature in cursive script, appearing to read "Val Payne".

Val E. Payne
Sr. Environmental Engineer

cc. Steve Kochevar
J. Blake Webster

A\BBDTPDEF.AMD

PURE LIVE SEED (PLS) DETERMINATION

DES BEE DOVE MINE TEST PLOT - NATIVE SEED

NURSERY SEEDMIX PLS LBS/ACRE REQUIREMENT

Indian Ricegrass	3 lbs/acre
* Salina Wildrye	4 "
Fourwing Saltbush	2 "
Mat Saltbush	2 "
Shadscale	<u>1</u> "
Total	12 lbs/acre

Other species are included in the nursery seedmix but they were not collectable in the nearby mancos area.

* Salina Wildrye is not a species included in the nursery seedmix. The 4 lbs. was determined by matching the maximum grass species poundage of the nursery seedmix.

NATIVE SEED TEST PLOT ACREAGE

- 3 separate plots of 10' X 14' = .01 acres
- .12 lbs. PLS of the Native Seedmix is required

NATIVE SEED PURE LIVE SEED (PLS)

	<u>Purity Test</u>	<u>Germination Test</u>	<u>PLS</u>
Indian Ricegrass	90%	88%	79%
Salina Wildrye	60%	81%	49%
Fourwing Saltbush	95%	36%	34%
Mat Saltbush	84%	44%	37%
Shadscale	75%	29%	22%

PLS/ACRE (LBS REQUIRED/PLS%)

Indian Ricegrass	3.8 lbs/acre
Salina Wildrye	8.2 "
Fourwing Saltbush	5.9 "
Mat Saltbush	5.4 "
Shadscale	4.5 "

PLS LBS FOR 3 PLOTS (PLS/acre X .01 acres)

Indian Ricegrass	.04 lbs.	18.2 g.
Salina Wildrye	.08 lbs.	36.3 g.
Fourwing Saltbush	.06 lbs.	27.2 g.
Mat Saltbush	.05 lbs.	22.7 g.
Shadscale	.05 lbs.	22.7 g.

A:DBDNSPLS.CAL

APPENDIX XVI
ADDED 3/26/93

**PURE SEED TESTING
DES BEE DOVE TEST PLOT NATIVE SEED
10/10/92**

1. Indian Ricegrass	<u><i>Oryzopsis hymenoides</i></u>
SAMPLE:	7 gm
SEED/LITTER, ETC:	6.3 gm/.7 gm (No Foreign Seed Found)
PURE SEED:	90%
2. Salina Wildrye	<u><i>Elymus salinus</i></u>
SAMPLE:	7 gm
SEED/LITTER, ETC:	4.2 gm/2.8 gm (No Foreign Seed Found)
PURE SEED:	60%
3. Fourwing Saltbush	<u><i>Atriplex canescens</i></u>
SAMPLE:	19 gm
SEED/LITTER, ETC:	18.1 gm/.9 gm (No Foreign Seed Found)
PURE SEED:	95%
4. Mat Saltbush	<u><i>Atriplex corrugata</i></u>
SAMPLE:	8 gm
SEED/LITTER, ETC:	6.7 gm/1.3 gm (No Foreign Seed Found)
PURE SEED:	84%
5. Shadscale	<u><i>A. confertifolia</i></u>
SAMPLE:	20 gm
SEED/LITTER, ETC:	14.9 gm/5.1 gm (No Foreign Seed Found)
PURE SEED:	75%

**APPENDIX XVI
ADDED 3/26/93**



SEED ANALYSIS REPORT
UTAH STATE DEPARTMENT OF AGRICULTURE
 DIVISION OF PLANT INDUSTRY
 SEED LABORATORY, 350 NORTH REDWOOD ROAD
 SALT LAKE CITY, UTAH 84116

1818
 GERMINATION FEE _____
 OTHER FEE \$ 20.00
 TOTAL FEE \$ 20.00

Nov. 9, 19 92

SAMPLE SUBMITTED BY:

NAME Energy West Mining Guy Davis ADDRESS Box 1005 Huntington, UT 84520

WEIGHT POUNDS CERTIFICATION NO

KIND AND VARIETY *	LOT NO.	PURE SEED %	OTHER CROP %	INERT MATTER %	WEED SEED %	Germination %	HARD** SEED %	Germ & Hard Seeds%	GRADE
Indian Ricegrass						88.00	viable by TX		

PURE SEED INCLUDES ALL SEED OF THE KIND BEING EXAMINED. CROP SEED CONTAINS SEEDS OF OTHER CULTIVATED PLANTS. INERT MATERIAL INCLUDES BROKEN SEED, DIRT, STICKS, CHAFF, CHALCID-FLY INFESTED SEED, AND SIMILAR MATERIAL.

*VARIETY DESIGNATIONS NOT CONFIRMED BY LABORATORY.

**RE: HARD SEEDS: ACTUAL PERCENT OF HARD SEED AND THE ACTUAL PERCENT OF GERMINATION MUST BE LISTED. IT IS NOT PERMISSIBLE TO COMBINE THESE PERCENTAGES UNDER GERMINATION.

FOREIGN SEED INCLUDES THE FOLLOWING

NOXIOUS WEED SEEDS	NO. PER POUND	OTHER WEED SEEDS	NO. PER POUND	OTHER CROP SEEDS	NO. PER POUND

REMARKS:

APPENDIX XVI
 ADDED 3/26/93

DATE SAMPLE RECEIVED BY LABORATORY
10-28-92

SAMPLE TREATED
 YES NO

Terry Sue Freeman *STJ*
 STATE SEED ANALYST

THIS SEED TEST REPORT APPLIES ONLY TO THE SAMPLES SUBMITTED. SAMPLES SHOULD BE REPRESENTATIVE OF THE LOTS FROM WHICH THEY ARE TAKEN. THE SEED LABORATORY DISCLAIMS ANY RESPONSIBILITY FOR THE ACCURACY OF THE SAMPLING, UNLESS THE SAMPLE IS TAKEN BY AN AUTHORIZED EMPLOYEE OF THE UTAH STATE DEPARTMENT OF AGRICULTURE. IN REFERRING TO SAMPLES PLEASE GIVE LABORATORY TEST NUMBER.



SEED ANALYSIS REPORT
UTAH STATE DEPARTMENT OF AGRICULTURE
 DIVISION OF PLANT INDUSTRY
 SEED LABORATORY, 350 NORTH REDWOOD ROAD
 SALT LAKE CITY, UTAH 84116

1817
 FORTY FIVE
 GERMINATION FEE \$ 20.00
 OTHER \$ 0.00
 TOTAL FEE \$ 20.00

Nov. 9, 19 92

SAMPLE SUBMITTED BY:

NAME Energy West Mining Guy Davis ADDRESS Box 1005 Huntington, UT 84528

BAGS _____ POUNDS _____ CERTIFICATION NO _____

KIND AND VARIETY *	LOT NO.	PURE SEED %	OTHER CROP %	INERT MATTER %	WEED SEED %	Germination %	HARD** SEED %	Germ & Hard Seed%	GRADE
Salina Wildrye						81.00	viable by TX		

PURE SEED INCLUDES ALL SEED OF THE KIND BEING EXAMINED. CROP SEED CONTAINS SEEDS OF OTHER CULTIVATED PLANTS. INERT MATERIAL INCLUDES BROKEN SEED, DIRT, STICKS, CHAFF, CHALCID-FLY INFESTED SEED, AND SIMILAR MATERIAL.

*VARIETY DESIGNATIONS NOT CONFIRMED BY LABORATORY.
 **RE: HARD SEEDS: ACTUAL PERCENT OF HARD SEED AND THE ACTUAL PERCENT OF GERMINATION MUST BE LISTED. IT IS NOT PERMISSIBLE TO COMBINE THESE PERCENTAGES UNDER GERMINATION.

FOREIGN SEED INCLUDES THE FOLLOWING

NOXIOUS WEED SEEDS	NO. PER POUND	OTHER WEED SEEDS	NO. PER POUND	OTHER CROP SEEDS	NO. PER POUND

REMARKS:

USI: CARL BOIT

APPENDIX XVI
 ADDED 3/26/93

DATE SAMPLE RECEIVED BY LABORATORY
 10-28-92

SAMPLE TREATED
 YES NO

Terry Sue Freeman *STG*
 STATE SEED ANALYST

THIS SEED TEST REPORT APPLIES ONLY TO THE SAMPLES SUBMITTED. SAMPLES SHOULD BE REPRESENTATIVE OF THE LOTS FROM WHICH THEY ARE TAKEN. THE SEED LABORATORY DISCLAIMS ANY RESPONSIBILITY FOR THE ACCURACY OF THE SAMPLING, UNLESS THE SAMPLE IS TAKEN BY AN AUTHORIZED EMPLOYEE OF THE UTAH STATE DEPARTMENT OF AGRICULTURE. IN REFERRING TO SAMPLES PLEASE GIVE LABORATORY TEST NUMBER.



SEED ANALYSIS REPORT
UTAH STATE DEPARTMENT OF AGRICULTURE
 DIVISION OF PLANT INDUSTRY
 SEED LABORATORY, 350 NORTH REDWOOD ROAD
 SALT LAKE CITY, UTAH 84116

1814

PURITY FEE _____
 GERMINATION FEE _____
 OTHER **20.00**
 TOTAL FEE \$ **20.00**

Nov. 9 19 92

SAMPLE SUBMITTED BY:

NAME Energy West Mining ADDRESS Box 1005 Huntington, UT 84528

BAGS _____ POUNDS _____ CERTIFICATION NO _____

KIND AND VARIETY *	LOT NO.	PURE SEED %	OTHER CROP %	INERT MATTER %	WEED SEED %	Germination %	HARD** SEED %	Germ & Hard Seed%	GRADE
Fourwing Saltbush						36.00	viable by TZ		

PURE SEED INCLUDES ALL SEED OF THE KIND BEING EXAMINED. CROP SEED CONTAINS SEEDS OF OTHER CULTIVATED PLANTS. INERT MATERIAL INCLUDES BROKEN SEED, DIRT, STICKS, CHAFF, CHALCID-FLY INFESTED SEED, AND SIMILAR MATERIAL.

*VARIETY DESIGNATIONS NOT CONFIRMED BY LABORATORY.
 **RE: HARD SEEDS: ACTUAL PERCENT OF HARD SEED AND THE ACTUAL PERCENT OF GERMINATION MUST BE LISTED. IT IS NOT PERMISSIBLE TO COMBINE THESE PERCENTAGES UNDER GERMINATION.

FOREIGN SEED INCLUDES THE FOLLOWING:

NOXIOUS WEED SEEDS	NO. PER POUND	OTHER WEED SEEDS	NO. PER POUND	OTHER CROP SEEDS	NO. PER POUND

REMARKS:

APPENDIX XVI
 ADDED 3/26/93

USI: CARL BOIT
 DATE SAMPLE RECEIVED BY LABORATORY
10-28-92

SAMPLE TREATED
 YES NO

Terry Sue Freeman *TSF*
 STATE SEED ANALYST

THIS SEED TEST REPORT APPLIES ONLY TO THE SAMPLES SUBMITTED. SAMPLES SHOULD BE REPRESENTATIVE OF THE LOTS FROM WHICH THEY ARE TAKEN. THE SEED LABORATORY DISCLAIMS ANY RESPONSIBILITY FOR THE ACCURACY OF THE SAMPLING, UNLESS THE SAMPLE IS TAKEN BY AN AUTHORIZED EMPLOYEE OF THE UTAH STATE DEPARTMENT OF AGRICULTURE. IN REFERRING TO SAMPLES PLEASE GIVE LABORATORY TEST NUMBER.



SEED ANALYSIS REPORT
UTAH STATE DEPARTMENT OF AGRICULTURE
 DIVISION OF PLANT INDUSTRY
 SEED LABORATORY, 350 NORTH REDWOOD ROAD
 SALT LAKE CITY, UTAH 84116

1815

PURITY FEE _____
 GERMINATION FEE _____
 OTHER **TX** 20.00
 TOTAL FEE \$ 20.00

Nov. 9, 19 92

SAMPLE SUBMITTED BY:

NAME Energy West Mining Guy Davis ADDRESS Box 1005 Huntington, UT 84528

BAGS _____ POUNDS _____ CERTIFICATION NO _____

KIND AND VARIETY *	LOT NO.	PURE SEED %	OTHER CROP %	INERT MATTER %	WEED SEED %	Germination %	HARD** SEED %	Germ & Hard Seed%	GRADE
Mat Salbush						44.00	viable by TX		

PURE SEED INCLUDES ALL SEED OF THE KIND BEING EXAMINED. CROP SEED CONTAINS SEEDS OF OTHER CULTIVATED PLANTS. INERT MATERIAL INCLUDES BROKEN SEED, DIRT, STICKS, CHAFF, CHALCID-FLY INFESTED SEED, AND SIMILAR MATERIAL.

*VARIETY DESIGNATIONS NOT CONFIRMED BY LABORATORY.

**RE: HARD SEEDS: ACTUAL PERCENT OF HARD SEED AND THE ACTUAL PERCENT OF GERMINATION MUST BE LISTED. IT IS NOT PERMISSIBLE TO COMBINE THESE PERCENTAGES UNDER GERMINATION.

FOREIGN SEED INCLUDES THE FOLLOWING

NOXIOUS WEED SEEDS	NO. PER POUND	OTHER WEED SEEDS	NO. PER POUND	OTHER CROP SEEDS	NO. PER POUND

REMARKS:

APPENDIX XVI
 ADDED 3/26/93

USI: CARL BOYT
 DATE SAMPLE RECEIVED BY LABORATORY
 10-28-92

SAMPLE TREATED	
YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>

Terry Sue Freeman *STA*
 STATE SEED ANALYST

THIS SEED TEST REPORT APPLIES ONLY TO THE SAMPLES SUBMITTED. SAMPLES SHOULD BE REPRESENTATIVE OF THE LOTS FROM WHICH THEY ARE TAKEN. THE SEED LABORATORY DISCLAIMS ANY RESPONSIBILITY FOR THE ACCURACY OF THE SAMPLING, UNLESS THE SAMPLE IS TAKEN BY AN AUTHORIZED EMPLOYEE OF THE UTAH STATE DEPARTMENT OF AGRICULTURE. IN REFERRING TO SAMPLES PLEASE GIVE LABORATORY TEST NUMBER.

1816

SEED ANALYSIS REPORT

UTAH STATE DEPARTMENT OF AGRICULTURE

DIVISION OF PLANT INDUSTRY

SEED LABORATORY, 350 NORTH REDWOOD ROAD
SALT LAKE CITY, UTAH 84116

PURITY FEE _____
GERMINATION FEE _____
OTHER **20.00**
TOTAL FEE \$ **20.00**

Nov. 9, 19 92



SAMPLE SUBMITTED BY:

NAME **Energy Heart Mining Coy Davis** ADDRESS **Box 1005 Huntington, UT 84528**

BAGS _____ POUNDS _____ CERTIFICATION NO _____

KIND AND VARIETY *	LOT NO.	PURE SEED %	OTHER CROP %	INERT MATTER %	WEED SEED %	Germination %	HARD** SEED %	Germ & Hard Seed%	GRADE
Shadscale						29.00	viable by TX		

PURE SEED INCLUDES ALL SEED OF THE KIND BEING EXAMINED. CROP SEED CONTAINS SEEDS OF OTHER CULTIVATED PLANTS. INERT MATERIAL INCLUDES BROKEN SEED, DIRT, STICKS, CHAFF, CHALCID-FLY INFESTED SEED, AND SIMILAR MATERIAL.

*VARIETY DESIGNATIONS NOT CONFIRMED BY LABORATORY.

**RE: HARD SEEDS: ACTUAL PERCENT OF HARD SEED AND THE ACTUAL PERCENT OF GERMINATION MUST BE LISTED. IT IS NOT PERMISSIBLE TO COMBINE THESE PERCENTAGES UNDER GERMINATION.

FOREIGN SEED INCLUDES THE FOLLOWING

NOXIOUS WEED SEEDS	NO. PER POUND	OTHER WEED SEEDS	NO. PER POUND	OTHER CROP SEEDS	NO. PER POUND

REMARKS:

APPENDIX XVI
ADDED 3/26/93

ISI: CARL BOFF

DATE SAMPLE RECEIVED BY LABORATORY
10-28-92

SAMPLE TREATED
YES NO

Terry Sue Freeman
STATE SEED ANALYST

TSF

THIS SEED TEST REPORT APPLIES ONLY TO THE SAMPLES SUBMITTED. SAMPLES SHOULD BE REPRESENTATIVE OF THE LOTS FROM WHICH THEY ARE TAKEN. THE SEED LABORATORY DISCLAIMS ANY RESPONSIBILITY FOR THE ACCURACY OF THE SAMPLING, UNLESS THE SAMPLE IS TAKEN BY AN AUTHORIZED EMPLOYEE OF THE UTAH STATE DEPARTMENT OF AGRICULTURE. IN REFERRING TO SAMPLES PLEASE GIVE LABORATORY TEST NUMBER.

NATIVE SEED SOURCE

LOCATION - Near the Des-Bee-Dove Test Plot Area, Emery County, UT

All seed used for the Native Seedmix were collected within a 1/4 mile radius of the test plot location.

ELEVATION - Between 6750 to 7150 feet.

All collected areas were within 200 feet elevation of the test plot elevation or 6950 feet.

NURSERY SEED SOURCE



Stevenson Intermountain Seed

Box 8
Ephraim, Utah 84607
(801) 253-8828



Variety/Species	% Pure Seed	% Germs	% Dorm	% Germs & Dorm	Origin	Test Date
Rosana Western Wheatgrass	11.44	91			ID	9/92
Magnar Great Basin Wildrye	11.42	91			WA	3/92
Fourwing Saltbrush	10.35	51TZ			UT	2/92
Mat Saltbrush	10.01	39CT			UT	8/92
Winterfat	9.81	46TZ			UT	2/92
Indian Ricegrass	8.73	95TZ			WA	3/92
Critana Thickspike	8.72	93			ID	4/92
Yellow Sweetclover	5.72	92			CAN	7/92
Shadscale	5.46	49CT			UT	2/92
Appar Lewis Flax	3.13	86			CO	12/9
Kochia Prostrata	2.64	63TZ			UT	2/92
Gooseberryleaf Globemallow	1.58	85TZ			UT	8/92
Alkali Sackaton	.78	80			NM	1/92

% Inert 10.00 % Crop .09 % Weed .12 % Nox. Weed none
 Net Wt. 3.97 Seed Mixture Lot No. M-92-513 Customer Order No. JS330781

GUARANTEED: Stevenson Intermountain Seed guarantees the seed to be of processed quality and true to name as specified, within recognized tolerances, but expressly or imply no further guarantee. Liability shall be limited to replacement or refund of purchase price.

2.525 PLS lbs.

Client : Energy West Mining Co.
Address : P.O. Box 310
Huntington, UT
Attn : Guy Davis, cc: J. Demzak
Project : JS330660
Sample Matrix: Soil
Sample ID: Soil Sample #1
Sample Date Time: 09/30/92

DES-BEE-DING TEST PLOT
SOIL SAMPLE #1

Lab No. : 92-SI/01388
Date Received: 10/15/92

Parameters

Saturation %	36.	%	
pH, saturated paste	8.4	units	1
Conductivity, sat. paste	9.86	mmhos/cm	1
Calcium, soluble	16.57	meq/l	1
Magnesium, soluble	10.53	meq/l	1
Sodium, soluble	106.14	meq/l	1
Sodium Absorption Ratio	28.8		
Nitrogen, total kjeldahl	0.06	%	
Potassium, extractable	189.	mg/kg	3
Phosphorus, extractable	-1.	mg/kg	3
Boron, soluble	1.52	mg/kg	2
Selenium, soluble	0.080	mg/kg	2
Sulfur, total	0.44	%	
Neutralization Potential	10.	% as CaCO3	
Acid-Base Potent. (CaCO3)	86	Tons/1000T	
Organic Matter	1.7	%	
Sand 2.00 - .062 mm	19.	%	
Silt .062 - .002 mm	51.	%	
Clay -.002 mm	30.	%	
Texture			

- 1 Saturated Paste Extraction
- 2 Hot Water Extraction
- 3 AB-DTPA Extraction

Remarks:

Note: Negative sign "-" denotes that the value is less than "<"

Scott Habermehl, Quality Assurance Officer *SH*

Frank E. Polniak, Inorganic Laboratory Supervisor *For FR AH*

Client : Energy West Mining Co.
 Address : P.O. Box 310
 Huntington, UT
 Attn. : Guy Davis, cc: J. Demzak
 Project : JS330660
 Sample Matrix: Soil
 Sample ID: Soil Sample #2
 Sample Date Time: 09/30/92

DES-BEE-ONE TEST PLAT
SS #2

Lab No. : 92-SI/01387
 Date Received: 10/15/92

Parameters

Saturation %	40.	%	
pH, saturated paste	8.3	units	1
Conductivity, sat. paste	8.43	mmhos/cm	1
Calcium, soluble	16.77	meq/l	1
Magnesium, soluble	11.27	meq/l	1
Sodium, soluble	83.52	meq/l	1
Sodium Absorption Ratio	22.3		
Nitrogen, total kjeldahl	0.05	%	
Potassium, extractable	195.	mg/kg	3
Phosphorus, extractable	-1.	mg/kg	3
Boron, soluble	1.62	mg/kg	2
Selenium, soluble	0.035	mg/kg	2
Sulfur, total	0.42	%	
Neutralization Potential	10.	% as CaCO3	
Acid-Base Potent.(CaCO3)	87	Tons/1000T	
Organic Matter	2.	%	
Sand 2.00 - .062 mm	13.	%	
Silt .062 - .002 mm	56.	%	
Clay -.002 mm	31.	%	
Texture	SiCL		

- 1 Saturated Paste Extraction
- 2 Hot Water Extraction
- 3 AB-DTPA Extraction

Remarks:

Note: Negative sign "-" denotes that the value is less than "<"

Scott Habermehl, Quality Assurance Officer */S.H.*

Frank E. Polniak, Inorganic Laboratory Supervisor *for FP AH*

Client : Energy West Mining Co.
 Address : P.O. Box 310
 Huntington, UT
 Attn. : Guy Davis, cc: J. Demzak
 Project : JS330660
 Sample Matrix: Soil
 Sample ID: Soil Sample #3
 Sample Date Time: 09/30/92

Des-Bee-Dows Test Prot
SS #3

Lab No. : 92-SI/01389
 Date Received: 10/15/92

Parameters

Saturation %	36.	%	
pH, saturated paste	7.9	units	1
Conductivity, sat. paste	3.99	mmhos/cm	1
Calcium, soluble	18.81	meq/l	1
Magnesium, soluble	11.02	meq/l	1
Sodium, soluble	23.49	meq/l	1
Sodium Absorption Ratio	6.1		
Nitrogen, total kjeldahl	0.05	%	
Potassium, extractable	192.	mg/kg	3
Phosphorus, extractable	-1.	mg/kg	3
Boron, soluble	1.51	mg/kg	2
Selenium, soluble	0.010	mg/kg	2
Sulfur, total	0.30	%	
Neutralization Potential	10.1	% as CaCO ₃	
Acid-Base Potent. (CaCO ₃)	92	Tons/1000T	
Organic Matter	1.9	%	
Sand	2.00 - .062 mm	%	
Silt	.062 - .002 mm	%	
Clay	-.002 mm	%	
Texture	SiCL		

- 1 Saturated Paste Extraction
- 2 Hot Water Extraction
- 3 AB-DTPA Extraction

Remarks:

Note: Negative sign "-" denotes that the value is less than "<"

Scott Habermehl, Quality Assurance Officer *K.H.*

Frank E. Polniak, Inorganic Laboratory Supervisor *for FP*
KH

Client : Energy West Mining Co.
 Address : P.O. Box 310
 Huntington, UT
 Contact : Guy Davis, cc: J. Demzak
 Project : JS330660
 Sample Matrix: Soil
 Sample ID: Soil Sample #4
 Sample Date Time: 09/30/92

*DES-DEE-DOVE TEST PLOT
 ROCKY SOIL ADMIXTURE
 FROM WRS CELL #7 RECLAMATION*

Lab No. : 92-SI/01390
 Date Received: 10/15/92

Parameters

Saturation %	25.	%	
pH, saturated paste	8.5	units	1
Conductivity, sat. paste	1.49	mmhos/cm	1
Calcium, soluble	3.09	meq/l	1
Magnesium, soluble	5.35	meq/l	1
Sodium, soluble	6.70	meq/l	1
Sodium Absorption Ratio	3.3		
Nitrogen, total kjeldahl	0.01	%	
Potassium, extractable	243.	mg/kg	3
Phosphorus, extractable	-1.	mg/kg	3
Boron, soluble	0.43	mg/kg	2
Selenium, soluble	0.005	mg/kg	2
Sulfur, total	0.01	%	
Neutralization Potential	10.9	% as CaCO ₃	
Acid-Base Potent. (CaCO ₃)	109	Tons/1000T	
Organic Matter	0.8	%	
Sand 2.00 - .062 mm	74.	%	
Silt .062 - .002 mm	13.	%	
Clay - .002 mm	13.	%	
Texture	SL		

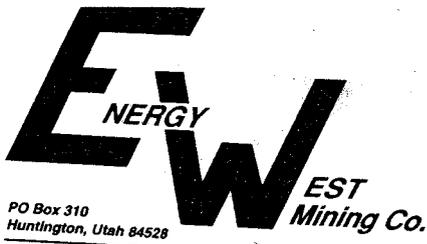
- 1 Saturated Paste Extraction
- 2 Hot Water Extraction
- 3 AB-DTPA Extraction

Remarks:

Note: Negative sign "-" denotes that the value is less than "<"

Scott Habermehl, Quality Assurance Officer *SH*

Frank E. Polniak, Inorganic Laboratory Supervisor *FP*
SH



RECEIVED

APR 09 1997

DEPT. OF OIL, GAS & MINING

April 7, 1997

To: Task Force Member

From: Richard Northrup-PacifiCorp/Energy West

Subject: PacifiCorp, "Energy West", Des-Bee-Dove
 Pre-scheduled Tentative Task Force Meeting (15/017.
 Plots) Love Haul Road Test

[Handwritten signature]
 #2

Dear Task Force member,

Due to unforeseen circumstances, that have now surfaced, the meeting of this group scheduled for April 23, 1997 will be postponed until the fall of some time in September. A pre-determined date and time during September will be selected by Energy West and each member will be contacted and made aware, well in advance of the meeting.

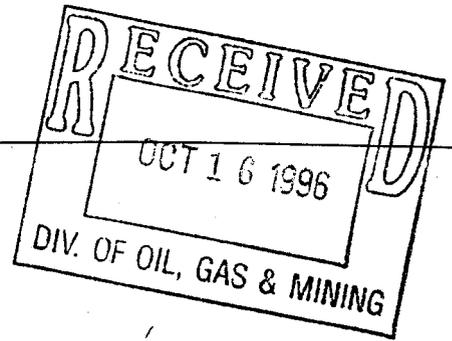
Thank you for your continued support and assistance in dealing with the Mancos Shale issue and efforts to determine the best techniques and reclaiming capabilities to produce a suitable and lasting reclamation project.

Sincerely,
[Handwritten signature: Richard Northrup]
 Richard Northrup
 Env. Eng.

Huntington Office:
 (801) 687-9821
 Fax (801) 687-2695
 Purchasing Fax (801) 687-9092

Deer Creek Mine:
 (801) 381-2317
 Fax (801) 381-2285

Cottonwood Mine:
 (801) 748-2319
 Fax (801) 748-2380



Date: October 08, 1996
To: Task Force Member
From: Richard Northrup - PacifiCorp/Energy West
Subject: Consensus of the notes taken at the September 11, 1996 Task Force meeting and field test plot evaluation.

CONSENSUS:

*ACT/10/15/017 #2
Copy FAM*

1. Interim erosion has been minimized at the test plot site, monitoring study indicates some changing in the width, more so than the depth. The operator will continue to monitor the four erosion study sites as previously committed.
2. Test plot evaluation by visual observation, vegetation cover test plot study and soil analysis comparison, all indicate best test plots to be:
 1. # 2 plot, coal waste
 2. # 4 plot, rocky soil and live earth
 3. # 5 plot, coal waste and live earth

The accumulated vegetation, cover and density, as summarized from Dr. Collins report, as outlined during the field inspection, clearly indicate a growth trend for the good, on all plots as outlined above.

3. Future test plots, if required, will consist of three treatments: (in triplicate) # 2 coal waste; # 4 rocky soil and live earth; a combination blend of # 2 coal waste, # 4 rocky soil and live earth; and a control plot, native soil. Location of plots will be randomized.
4. Use of berming, terraces, waterbars and pocking are positive measures and should be utilized during final reclamation and future test plots, in areas where feasible.
5. Design criteria of the waterbar lengths, width and size to be determined before construction. Determine, if possible, failure criteria (how much water containment before failure.) Standard height of berm determined along the crest of the outslope.

7. Evaluate slopes above pond for possibility of future test plots. Determine area availability, slope gradient and size of plots that could be established.
8. Seeding would be according to the previous plan parameters, except, only the nursery seed will be used on the future test plots. Parameters will include curlex blanketing, live seed analysis and soil sampling (3 locations.) Same parameters of soil preparation could be used.
9. Determine Live Earth availability, cost and supplier location.
10. Questions concerning plans for Des-Bee-Dove mine as to final reclamation, including haul road, to be answered if possible.
11. Concerns about others requiring use of the haul road, such as Texaco.
12. Task Force to reconvene on April 23, 1997.

This listing is what I perceive to be the group consensus of what took place in the meeting held September 11, 1996 in Huntington Ut. If there is anything I missed, please feel free to call and discuss with me, at 687-4822.

Thank you for your participation and co-operation in this matter, a reminder letter will follow as the above given date approaches.

Sincerely,



Richard Northrup
Env. Eng.



FAX TRANSMITTAL

of pages >

To	PAM GRUBAUGH-LITTLE	From	R. SINGH
Dept./Agency		Phone #	303-844-1489
Fax #	801-354-3940	Fax #	303-844-1538
NSN 7540 01 317 7368	5099-101	GENERAL SERVICES ADMINISTRATION	

DATE: August 14, 1996
 TO: Task Force Member
 FROM: Richard Northrup-PacifiCorp

SUBJECT: DES BEE DOVE HAUL ROAD, EROSION MONITORING TASK FORCE

Task force member:

PacifiCorp is planning an onsite meeting at the Des-Bee-Dove haul road slope monitoring and test plot areas. We request your presence at this meeting on September 11, 1996 at 10:00 am.

The purpose of this meeting is to evaluate the erosion conditions and vegetation coverage of the various test plots, and determine the effectiveness of current erosion control, and decide which test plots should be used for further testing. The findings and recommendations from this meeting will be used to develop final reclamation procedures.

A copy of the test plot plan is attached. A drawing of the test plot areas is enclosed for your review.

Please find the attached letter distributed to each task force member in November of 1991. This letter is a brief synopsis and sequence of events leading up to the necessity of the erosion study and test plot areas. Since this time, the Office of Surface Mining issued a violation on December 2, 1993. This violation was issued for failure to eliminate erosion conditions on the slope and included a cessation order preventing use of the haul road. This resulted in a hearing and eventually a judgement terminated the cessation order.

Continued monitoring along the outslope area indicates runoff has been checked significantly since the installation of berms, waterbars and other measures employed at this location.

Please find enclosed a copy of the monitoring chart and graphs depicting the erosion results for the last 10 years.

Huntington Office:
 (801) 687-9821
 Fax (801) 687-2695
 Purchasing Fax (801) 687-9092

Deer Creek Mine:
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 Fax (801) 381-2285

Cottonwood Mine:
 (801) 748-2319
 Fax (801) 748-2380

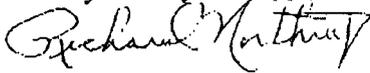
96-08-19-07

File ACT/015/017 Copy Bill M. (FAX) Bob
 #2 Susan, Ken, Joel, Aaron, Pam

We feel that the enclosed information should be helpful and beneficial in reminding everyone of the circumstances related to forming the Task Force. It is hopeful that this meeting will provide adequate and comprehensive conclusions regarding what can and will be done during final reclamation of the slope area.

If you have any questions or concerns please call Richard Northrup at 687-4822 or Val Payne at 687-4722.

Thank you for your support



Richard Northrup
Env. Eng.



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
James W. Carter
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

DIVISION OF OIL GAS & MINING
FIELD VISIT FORM
TECHNICAL

Date : September 11, 1996

Time: 10:00 a.m. to 3:00 p.m.

Mine: Des Bee Dove Haul Road

File Number: ACT/007/011

DOG M Staff: Robert Davidson, Joe Helfrich, Pamela Grubaugh-Littig, Ken Wyatt, Susan White and Bill Malencik

OSM Staff: Ron Singh

Other Attendees: Richard Northrup and Guy Davis, EWest, and Patrick Collins, Mt. Nebo

Purpose:

Des Bee Dove Haul Road Task Force meeting to discuss current test-plots and future test plots and reclamation direction.

Observations:

Based on the past three years, including this years survey, the best treatment for revegetation success are as follows: Best - Coal waste, next - Rocky soil and live earth, next - coal waste and live earth, next - rocky soil, and last - native soil. Soil analysis data show that the coal treatments lowered the soil pH to around 7.0 in the top 6 inches. Other relative benefits from the coal were lower SAR values, lower EC values, and higher percent carbon and Sulfur. The acid-base potential for coal treatments was much lower when compared to the other treatments. Based on these facts, it appears that the coal modified the manchos soil by lowering the pH with secondary effects of reduced alkalinity and total salts. It was quite apparent at the plots that the coal treatments were superior to the other treatments with greater cover, greater density and wider variety of plants. Other apparent benefits from the coal and rocky-soil cover was reduced erosion on the surface. Rain drop impact damage is would be much reduced with greater infiltration and retention of moisture within the surface treatment.

Recommendations/Conclusions:

It was decided that future plots would be designed using engineering and hydrology aspects to help control erosion in addition to the surface treatment and seed mix. The best two performers, mix of the two, and a control will be used as treatments. With three replications, this will require 12 plots. Curlex blanket will be used on all plots with the same seed mix. The plots will be located at the toe of the slope where the slope and aspect will be similar to those at reclamation. The plots will be laid out to maximize slope length and plot width. The task force will reconvene in April 1997 with the goal to mobilize the test plots by fall of 1997.

Signature: _____ on September 12, 1996

Robert A. Davidson, Reclamation Specialist II (Soils)
B:COAL\TRAVEL\FIELD911.RAD



9/11/96
Sigs

Reference Area by Sed Pond
Salt Desert / Shrub

Coordination meeting
Sopris
December 1996
Cashed Methane

FIGURE 2

DES BEE DOVE TEST PLOTS - 1992

PLOT TREATMENTS/ADMIXTURES AS-BUILT

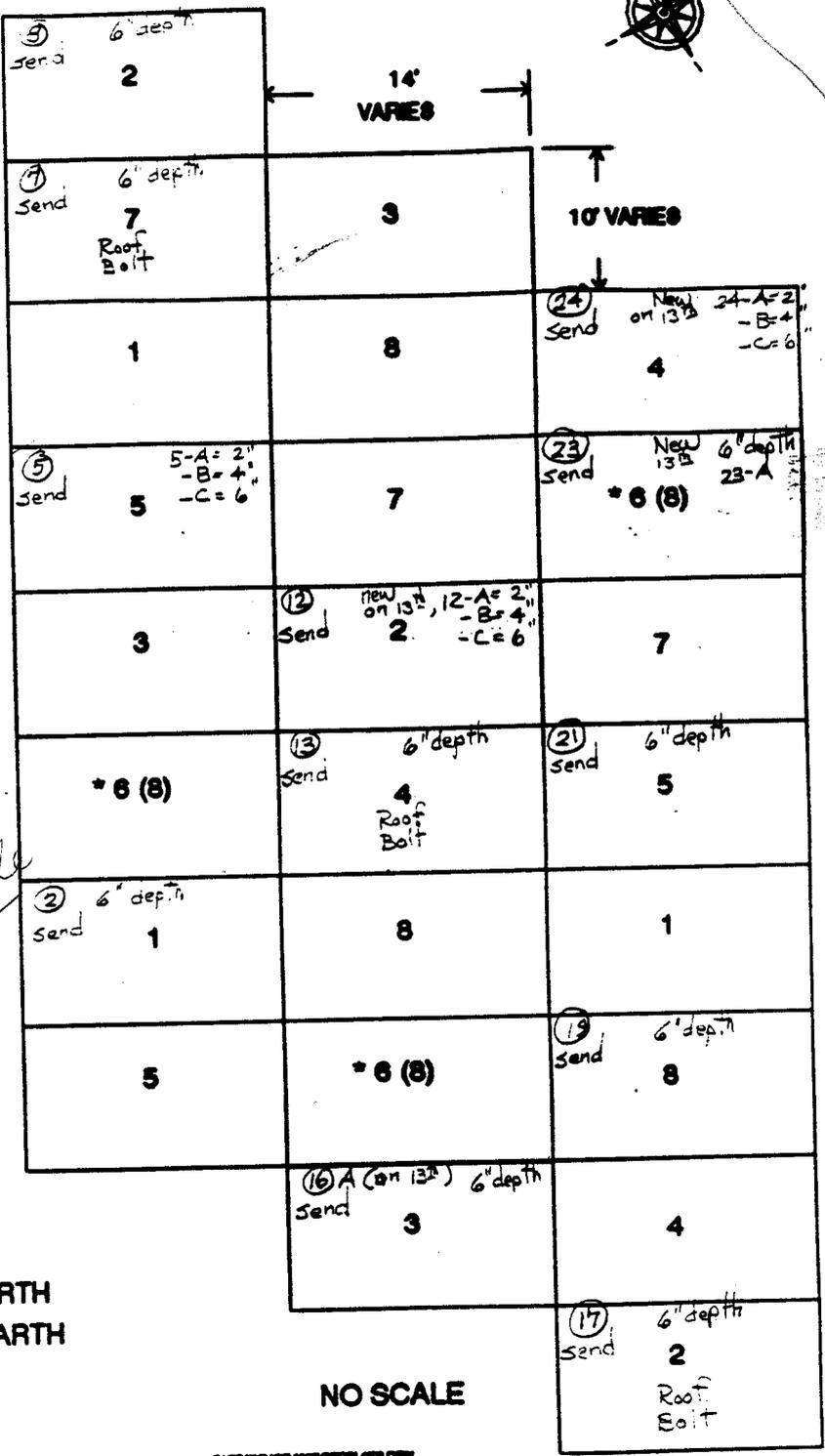
SEND SAMPLES TO LAB



ROAD

Reclamation
Stability on
Oils
Should be
Who's responsible

* PLOT #6 WERE NOT APPROVED BY STATE AGENCIES. THESE PLOTS WERE TREATED WITH TREATMENT #8 ONLY



LEGEND

- 1. ROCKY SOIL
- 2. COAL WASTE
- 3. LIVE EARTH
- 4. ROCKY SOIL AND LIVE EARTH
- 5. COAL WASTE AND LIVE EARTH
- 6. SEWAGE SLUDGE *
- 7. NATIVE SEED
- 8. NURSERY SEED

NO SCALE

© 1992 DES BEE DOVE TEST PLOTS

Analysis
E.g. Solution + Hydrology
1) How improve permeability
2) How improve impact problem
no concentration of H₂S → possible a precip.
no Veg. Solution
Court Case → add to file

* Potential for Road Retention. no need for reclamation single use vs. Multiple Use
Cashed Methane Road
Bim-Pacifilo non-exclusive Relief if some else take up.
Life of methane well - 30 years. Seeded

Write Up of 9/9/96 Miller Creek Field Trip

- Cracks
- Breakout
- Anti Degradation
- Tree Jack
- Areas of rock (boulder) falls
- Disappearance
- Length of Hike
- Map of hike
- Attendees
-

Future

1. Conclusions to Date
2. Where to Go
from Here?
3. Forelate
4. Formulas

Future mtgs. 12/96

- Coalbed Methane/Coal
- Discuss
- Exploration

Traco Road

Multiple Use

Pre-Meeting

November
w/ Brian

Bad Release

Books

Ash, Ray, Belle/Brad's
identif. slides

Put Together Des-Bee-Dave
Decision + Inst Force

Soil Sample taken 9/30/92.

SUMMARY OF DES-BEE-DOVE

11/12/91 - Test Face

10th live ants (1000⁺/ac)

TEST PLOTS (1992)

Fall of 1992

9/11/96

Curlex placed on all surface.

Installed 11/9/92

Plot No.	1994		1995		1996	
	Cover %	Density **	Cover	Density	Cover	Density
1	28.89 (G+S) (12.34) (5) Grass = Shrub	1764 (2)	20.56 (15.23) (4)	1659 (3)	22.22 (19.46) (9)	9245 (3)
2	28.33 (15.56) (5)	3630 (1)	28.33 (25.02) (5)	3630 (1)	29.44 (29.12) (1)	4252 (1)
3	22.78 (13.12) (1)	207 (5)	25.44 (14.22) (5)	415 (1)	26.00 (17.33) (5)	622 (5)
4	33.89 (18.24) (1)	1245 (1)	33.89 (25.90) (5)	2484 (2)	26.67 (26.68) (2)	3215 (2)
5	28.89 (13.34) (1)	830 (1)	27.78 (26.99) (1)	1037 (4)	26.11 (26.11) (1)	933 (1)
6 (8)	16.11 (8.23) (1)	207 (6)	23.89 (13.56) (3)	622 (5)	17.78 (16.61) (3)	622 (6)
7	20.56 (3.89) (8)	0 (7)	18.33 (8) (9.23)	0 (7)	15.00 (10.56) (7)	104 (7)
8	23.33 (8.34) (6)	104 (6)	22.22 (13.12) (6)	415 (7)	20.00 (16.66) (6)	726 (5)

Good & Herbaceous
Density
Improved w/ Plant Species
Sampled ~ August

- 1 FIRST
- 2 SECOND
- 3 THIRD
- (8) LAST

26% Cover -
ref. area

RECOMMENDATIONS

- Best = #2 Coal Waste
- Next = #4 Rocky soil & Live Earth*
- Next = #5 Coal Waste & Live Earth
- Next = #1 Rocky soil
- LAST = #7 Native Seed

- 1 - Rocky Soil
- 2 - Coal Waste
- 3 - Live Earth
- 4 - Rocky Soil / Live Earth
- 5 - Coal Waste / Live Earth
- 6 - Sewage Sludge
(NOT APPROVED
→ Heavy feed)
- 7 - NATIVE SEED
- 8 - NURSERY SEED

Improving Every Year
26000 shrub/ac.

Cover % = From above
look

Density = Plants/Acre

* G+S = Grass + Shrub cover & density needs

9/11/96 M.L.G.

Ravin Singh, DSM
Joe Helmer, DSM
Bob Davidson
Susan White
Ken Wryatt
Bill Malenik
Pam

Guy Davis
Dick Anthony } Energy Dept
Pat Collins

① Reconnect in ~~February~~ April 1997

② Work with County about status
Dick responsible

③ Eng + Hydro → Slope area
Contractors Ref. area } Test Plots Area ←

④ Veg Replication + 2:1 + mix + control
As long & wide as possible
(212 plots)
⑤ Slope levels 2:1 Final Slopes (?)

Utah Power
Cottonwood Preparation Facility } Situated in Conf. Room
Energy Conty, Utah

Client : Energy West Mining Co.
 Address : P.O. Box 310
 Huntington, UT
 At : Guy Davis, cc: J. Demzak
 Project : JS330660
 Sample Matrix: Soil
 Sample ID: Soil Sample #1
 Sample Date Time: 09/30/92

DES-BEE-DONE TEST PROT
SOIL SAMPLE #1

Lab No. : 92-SI/01388
 Date Received: 10/15/92

Parameters

Saturation %	36.	%	
pH, saturated paste	8.4	units	1
Conductivity, sat. paste	9.86	mmhos/cm	1
Calcium, soluble	16.57	meq/l	1
Magnesium, soluble	10.53	meq/l	1
Sodium, soluble	106.14	meq/l	1
Sodium Absorption Ratio	28.8		
Nitrogen, total kjeldahl	0.06	%	
Potassium, extractable	189.	mg/kg	3
Phosphorus, extractable	-1.	mg/kg	3
Boron, soluble	1.52	mg/kg	2
Selenium, soluble	0.080	mg/kg	2
Sulfur, total	0.44	%	
Neutralization Potential	10.	% as CaCO ₃	
Acid-Base Potent. (CaCO ₃)	86	Tons/1000T	
Organic Matter	1.7	%	
Sand 2.00 - .062 mm	19.	%	
Silt .062 - .002 mm	51.	%	
Clay -.002 mm	30.	%	
Texture	SiCL		

- 1 Saturated Paste Extraction
- 2 Hot Water Extraction
- 3 AB-DTPA Extraction

Remarks:

Note: Negative sign "-" denotes that the value is less than "<"

Scott Habermehl, Quality Assurance Officer/SN.

Frank E. Polniak, Inorganic Laboratory Supervisor *for PP*
AK

Client : Energy West Mining Co.
 Address : P.O. Box 310
 Huntington, UT
 : Guy Davis, cc:J. Demzak
 Subject : JS330660
 Sample Matrix: Soil
 Sample ID: Soil Sample #2
 Sample Date Time: 09/30/92

DES-BOE-UNO TEST PLAT
SS #2

Lab No. : 92-SI/01387
 Date Received: 10/15/92

Parameters

Saturation %	40.	%	
pH, saturated paste	8.3	units	1
Conductivity, sat. paste	8.43	mmhos/cm	1
Calcium, soluble	16.77	meq/l	1
Magnesium, soluble	11.27	meq/l	1
Sodium, soluble	83.52	meq/l	1
Sodium Absorption Ratio	22.3		
Nitrogen, total kjeldahl	0.05	%	
Potassium, extractable	195.	mg/kg	3
Phosphorus, extractable	-1.	mg/kg	3
Boron, soluble	1.62	mg/kg	2
Selenium, soluble	0.035	mg/kg	2
Sulfur, total	0.42	%	
Neutralization Potential	10.	% as CaCO3	
Acid-Base Potent. (CaCO3)	87	Tons/1000T	
Organic Matter	2.	%	
Sand 2.00 - .062 mm	13.	%	
Silt .062 - .002 mm	56.	%	
Clay -.002 mm	31.	%	
Texture	SiCL		

- 1 Saturated Paste Extraction
- 2 Hot Water Extraction
- 3 AB-DTPA Extraction

Remarks:

Note: Negative sign "-" denotes that the value is less than "<"

Scott Habermehl, Quality Assurance Officer */S.H.*

Frank E. Polniak, Inorganic Laboratory Supervisor *for PP AH*

Client : Energy West Mining Co.
 Address : P.O. Box 310
 Huntington, UT
 : Guy Davis, cc: J. Demzak
 Subject : JS330660
 Sample Matrix: Soil
 Sample ID: Soil Sample #3
 Sample Date Time: 09/30/92

DES-BEE-DOVE TEST PROT
SS #3

Lab No. : 92-SI/01389
 Date Received: 10/15/92

Parameters

Saturation %	36.	%	
pH, saturated paste	7.9	units	1
Conductivity, sat. paste	3.99	mmhos/cm	1
Calcium, soluble	18.81	meq/l	1
Magnesium, soluble	11.02	meq/l	1
Sodium, soluble	23.49	meq/l	1
Sodium Absorption Ratio	6.1		
Nitrogen, total kjeldahl	0.05	%	
Potassium, extractable	192.	mg/kg	3
Phosphorus, extractable	-1.	mg/kg	3
Boron, soluble	1.51	mg/kg	2
Selenium, soluble	0.010	mg/kg	2
Sulfur, total	0.30	%	
Neutralization Potential	10.1	% as CaCO ₃	
Acid-Base Potent.(CaCO ₃)	92	Tons/1000T	
Organic Matter	1.9	%	
Sand	2.00 - .062 mm	%	
Silt	.062 - .002 mm	%	
Clay	-.002 mm	%	
Texture	SiCL		

- 1 Saturated Paste Extraction
- 2 Hot Water Extraction
- 3 AB-DTPA Extraction

Remarks:

Note: Negative sign "-" denotes that the value is less than "<"

Scott Habermehl, Quality Assurance Officer *K.H.*

Frank E. Polniak, Inorganic Laboratory Supervisor *for FP*
AT

Client : Energy West Mining Co.
 Address : P.O. Box 310
 Huntington, UT
 Contact : Guy Davis, cc: J. Demzak
 Project : JS330660
 Sample Matrix: Soil
 Sample ID: Soil Sample #4
 Sample Date Time: 09/30/92

*DES-BEE-DOVE TEST PLOT
 ROCKY SOIL ADMIXTURE
 FROM WRS CELL #7 RECLAMATION*

Lab No. : 92-SI/01390
 Date Received: 10/15/92

Parameters

Saturation %	25.	%	
pH, saturated paste	8.5	units	1
Conductivity, sat. paste	1.49	mmhos/cm	1
Calcium, soluble	3.09	meq/l	1
Magnesium, soluble	5.35	meq/l	1
Sodium, soluble	6.70	meq/l	1
Sodium Absorption Ratio	3.3		
Nitrogen, total kjeldahl	0.01	%	
Potassium, extractable	243.	mg/kg	3
Phosphorus, extractable	-1.	mg/kg	3
Boron, soluble	0.43	mg/kg	2
Selenium, soluble	0.005	mg/kg	2
Sulfur, total	0.01	%	
Neutralization Potential	10.9	% as CaCO3	
Acid-Base Potent. (CaCO3)	109	Tons/1000T	
Organic Matter	0.8	%	
Sand 2.00 - .062 mm	74.	%	
Silt .062 - .002 mm	13.	%	
Clay -.002 mm	13.	%	
Texture	SL		

- 1 Saturated Paste Extraction
- 2 Hot Water Extraction
- 3 AB-DTPA Extraction

Remarks:
 Note: Negative sign "-" denotes that the value is less than "<"

Scott Habermehl, Quality Assurance Officer *SH*

Frank E. Polniak, Inorganic Laboratory Supervisor *FP*



1633 Terra Avenue
Sheridan, WY 82801

Date 9/6
Number of pages including cover sheet 2

To: Richard W.

From: JP

Phone _____
Fax Phone _____
CC: _____

Phone 1-307-872-8945
Fax Phone 1-307-872-8063

REMARKS:

- Urgent
- For your review
- Reply ASAP
- Please comment



**Environmental
Chemistry at its Best!**



Inter-Mountain Laboratories, Inc.
Sheridan, Wyoming 82801

Tel. (307) 672-8945

1633 Terra Avenue

ENERGY WEST MINING COMPANY
ORANGEVILLE, UTAH

SITE: DES BEE DOWE TEST PLOTS

September 6, 1996

Page 1 of 3

Lab No.	Location	Depths feet	pH	EC mahos/cm @ 25°C	Satur- ation %	Calcium meq/l	Magnesium meq/l	Sodium meq/l	SAR	Sand %	Silt %	Clay %	Texture
135819	TEST PLOT 1- #2	0.0-6.0	7.5	3.46	32.8	15.0	8.06	21.4	6.29	22.0	49.0	29.0	CLAY LOAM
135820	TEST PLOT 2- #3	0.0-6.0	7.5	1.99	32.1	4.68	2.53	13.9	7.34	38.0	38.0	24.0	LOAM
135821	#12A	0.0-2.0	7.0	1.66	44.4	9.68	3.16	5.93	2.34	80.0	10.0	10.0	LOAMY SAND
135822	#12B	0.0-4.0	7.1	3.04	34.3	14.7	6.48	16.5	5.05	30.0	43.0	27.0	CLAY LOAM
135823	#12C	0.0-6.0	7.2	3.39	35.1	17.0	7.72	18.3	5.21	20.0	54.0	26.0	SILT LOAM
135824	#17	0.0-6.0	7.6	1.64	33.1	3.23	1.81	11.6	7.33	28.0	46.0	26.0	LOAM
135825	T. PLOT 3- #16A	0.0-6.0	7.6	1.70	31.7	3.62	1.75	12.3	7.54	12.0	62.0	26.0	SILT LOAM
135826	TEST PLOT 4- #4	0.0-6.0	7.3	1.14	40.5	5.32	2.70	4.04	2.02	16.0	52.0	32.0	SILTY CLAY LOAM
135827	#13	0.0-6.0	7.3	2.40	35.5	6.73	3.44	16.8	7.46	14.0	58.0	28.0	SILTY CLAY LOAM
135828	#24A	0.0-6.0	7.2	1.10	35.4	4.65	2.38	4.33	2.31	29.0	41.0	30.0	CLAY LOAM
135829	#24B	0.0-4.0	7.4	2.42	40.1	16.9	7.71	6.71	1.91	17.0	51.0	32.0	SILTY CLAY LOAM
135830	T. PLOT 5- #5A	0.0-2.0	7.0	1.24	43.7	7.87	2.19	3.63	1.62	80.0	12.0	8.0	LOAMY SAND
135831	#5B	0.0-4.0	7.2	1.58	35.1	5.49	2.90	8.82	4.31	38.0	44.0	18.0	LOAM
135832	#5C	0.0-6.0	7.8	1.37	32.3	2.39	1.55	10.4	7.38	20.0	52.0	28.0	CLAY LOAM
135833	#21	0.0-6.0	7.2	1.70	35.9	4.02	3.04	10.4	5.56	66.0	17.0	17.0	SANDY LOAM
135834	T. PLOT 6- #23A	0.0-6.0	7.3	2.68	37.3	18.1	8.01	7.88	2.18	10.0	61.0	29.0	SILTY CLAY LOAM
135835	TEST PLOT 7- #7	0.0-6.0	7.9	4.55	37.0	8.90	4.47	37.8	14.6	10.0	61.0	29.0	SILTY CLAY LOAM
135836	T. PLOT 8- #19	0.0-6.0	7.9	4.67	37.8	6.03	4.09	42.0	18.7	8.0	64.0	28.0	SILTY CLAY LOAM

Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage, Exch= Exchangeable, Avail= Available

3:59PM P.02

SEP 6, 1996

B016872695

TO:

FROM: KONICA FAX

P.03

4:00PM

SEP 6, 1996

SEP

0016872695

TO:

FROM: KONICA FAX



Inter-Mountain Laboratories, Inc.

Sheridan, Wyoming 82801

Tel. (307) 672-8945

1633 Terra Avenue

ENERGY WEST MINING COMPANY
ORANGEVILLE, UTAH

SITE: DES BEE DOVE TEST PLOTS

September 6, 1996

Page 2 of 3

Lab No.	Location	Depths feet	Total Organic Carbon %	Total Sulfur %	T.S. AB t/1000t	Neut. Pot. t/1000t	T.S. ABP t/1000t	Sulfate Sulfur %	Pyritic Sulfur %	Organic Sulfur %	PyrS AB t/1000t	PyrS ABP t/1000t
135819	TEST PLOT 1- #12	0.0-6.0	4.0	0.15	4.69	179.	175.					
135820	TEST PLOT 2- #13	0.0-6.0	17.0	0.17	5.31	216.	210.					
135821	#12A	0.0-2.0	71.3	0.44	13.7	60.2	46.5					
135822	#12B	0.0-4.0	20.2	0.26	8.12	148.	140.					
135823	#12C	0.0-6.0	12.4	0.35	10.9	189.	97.7					
135824	#17	0.0-6.0	24.4	0.31	9.68	108.	98.7					
135825	T. PLOT 3- #16A	0.0-6.0	4.7	0.26	8.12	117.	108.					
135826	TEST PLOT 4- #14	0.0-6.0	4.7	0.03	0.94	165.	164.					
135827	#13	0.0-6.0	4.8	0.24	7.50	137.	130.					
135828	#24A	0.0-6.0	4.4	0.04	1.25	213.	211.					
135829	#24B	0.0-4.0	5.0	0.17	5.31	149.	144.					
135830	T. PLOT 5- #15A	0.0-2.0	67.7	0.47	14.7	84.2	69.5					
135831	#58	0.0-4.0	50.1	0.50	15.6	108.	92.3					
135832	#5C	0.0-6.0	11.9	0.31	9.68	111.	102.					
135833	#21	0.0-6.0	53.0	0.56	17.5	71.0	53.5					
135834	T. PLOT 6- #23A	0.0-6.0	4.9	0.28	8.75	124.	115.					
135835	TEST PLOT 7- #17	0.0-6.0	4.5	0.32	10.0	122.	112.					
135836	T. PLOT 8- #19	0.0-6.0	4.6	0.36	11.2	118.	107.					

Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur,
Neut. Pot.= Neutralization Potential

P.04

4:00PM

SEP 6, 1996

SEP

September 6, 1996

0016872695

TO:

FROM: KONICA FAX



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Sheridan, Wyoming 82801

Tel. (307) 672-8945

1633 Terra Avenue

ENERGY WEST MINING COMPANY
ORANGEVILLE, UTAH

SITE: DES BEE DOWE TEST PLOTS

Page 3 of 3

Lab No.	Location	Depths feet	P ppm	K ppm	Nitrate- Nitrogen ppm	Boron ppm	Selenium ppm	Total Kjeldahl Nitrogen %	1/3 bar	15 bar
135819	TEST PLOT 1- #2	0.0-6.0	1.07	192.	4.58	0.62	<0.02	0.09	18.0	7.3
135820	TEST PLOT 2- #3	0.0-6.0	1.69	156.	<0.01	0.99	<0.02	0.26	18.1	6.3
135821	#12A	0.0-2.0	1.14	82.0	0.60	1.25	0.02	0.85	16.4	6.0
135822	#12B	0.0-4.0	1.51	161.	0.04	1.35	0.02	0.33	20.0	6.7
135823	#12C	0.0-6.0	1.27	183.	<0.01	0.98	0.02	0.21	19.0	7.3
135824	#17	0.0-6.0	1.38	192.	<0.01	0.98	<0.02	0.33	19.4	7.2
135825	T. PLOT 3- #16A	0.0-6.0	0.88	211.	0.46	1.00	0.02	0.16	19.1	8.5
135826	TEST PLOT 4- #4	0.0-6.0	1.80	193.	<0.01	0.56	<0.02	0.15	20.0	10.0
135827	#13	0.0-6.0	1.33	225.	3.18	1.02	0.02	0.17	19.1	8.7
135828	#24A	0.0-6.0	2.42	233.	0.06	0.53	0.02	0.15	19.2	7.0
135829	#24B	0.0-4.0	1.72	205.	<0.01	0.89	<0.02	0.10	21.0	9.1
135830	T. PLOT 5- #5A	0.0-2.0	0.91	57.0	0.02	1.13	<0.02	0.56	15.0	5.3
135831	#5B	0.0-4.0	0.94	108.	<0.01	1.34	0.02	0.50	19.1	6.2
135832	#5C	0.0-6.0	1.01	189.	0.02	1.06	0.02	0.15	20.4	9.0
135833	#21	0.0-6.0	1.20	102.	0.02	1.09	0.02	0.55	18.0	6.5
135834	T. PLOT 6- #23A	0.0-6.0	1.30	231.	1.66	0.98	<0.02	0.08	22.0	10.4
135835	TEST PLOT 7- #7	0.0-6.0	0.86	246.	1.04	1.19	0.04	0.10	22.0	11.1
135836	T. PLOT 8- #19	0.0-6.0	1.07	262.	4.42	1.18	0.04	0.13	23.0	12.2

P.05

4:00PM

SEP 6, 1996

SEP

0016872695

TO:

FROM: KONICA FAX



Inter-Mountain Laboratories, Inc.
Sheridan, Wyoming 82801

1633 Terra Avenue

Tel. (307) 672-8945

ENERGY WEST MINING COMPANY
ORANGEVILLE, UTAH

SITE: DES BEE DOVE TEST PLOTS

September 6, 1996

Page 1 of 3

Lab No.	Location	Depths feet	pH	EC mahos/cm @ 25°C	Satur- ation %	Calcium meq/l	Magnesium meq/l	Sodium meq/l	SAR	Sand %	Silt %	Clay %	Texture
135836	T. PLOT 8- #19	0.0-6.0	7.9	4.67	37.8	6.03	4.09	42.0	18.7	8.0	64.0	28.0	SILTY CLAY LOAM
135838	135836(DUP)	0.0-6.0	8.0	4.54	37.7	5.84	4.09	42.1	18.9	8.0	64.0	28.0	SILTY CLAY LOAM
135829	#248	0.0-4.0	7.4	2.42	40.1	16.9	7.71	6.71	1.91	17.0	51.0	32.0	SILTY CLAY LOAM
135839	135829(DUP)	0.0-4.0	7.4	2.50	37.6	16.6	7.65	6.75	1.94	16.0	52.0	32.0	SILTY CLAY LOAM

Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage, Exch= Exchangeable, Avail= Available

P.06

4:01PM

SEP 6, 1996

8016872695

TO:

FROM: KONICA FAX



Inter-Mountain Laboratories, Inc.

Sheridan, Wyoming 82801

Tel. (307) 672-8945

1633 Terra Avenue

ENERGY WEST MINING COMPANY
ORANGEVILLE, UTAH

SITE: DES BEE DOVE TEST PLOTS

September 6, 1996

Page 2 of 3

Lab No.	Location	Depths feet	Total Organic Carbon %	Total Sulfur %	T.S. AB t/1000t	Neut. Pot. t/1000t	T.S. ABP t/1000t	Sulfate Sulfur %	Pyritic Sulfur %	Organic Sulfur %	PyrS AB t/1000t	PyrS ABP t/1000t
135836	T. PLOT 8- #19	0.0-6.0	4.6	0.36	11.2	118.	107.					
135838	135836(DUP)	0.0-6.0	4.5	0.36	11.2	118.	107.					
135829	#248	0.0-4.0	5.0	0.17	5.31	149.	144.					
135839	135829(DUP)	0.0-4.0	5.1	0.14	4.37	153.	148.					

Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr*Org= Pyritic Sulfur + Organic Sulfur, Neut. Pot.= Neutralization Potential

P.07

4:01PM

SEP 6, 1996

B016872695

TO:

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Tel. (307) 672-8945

ENERGY WEST MINING COMPANY
ORANGEVILLE, UTAH

SITE: DES BEE DOVE TEST PLOTS

September 6, 1996

Page 3 of 3

Lab No.	Location	Depths feet	P ppm	K ppm	Nitrate- Nitrogen ppm	Boron ppm	Selenium ppm	Total Kjeldahl Nitrogen %	1/3 bar	15 bar
135836	1. PLOT 8- #19	0.0-6.0	1.07	262.	4.42	1.18	0.04	0.13	23.0	12.2
135838	135836(DUP)	0.0-6.0	1.35	270.	3.96	1.09	0.04	0.13	23.0	11.4
135829	#248	0.0-4.0	1.72	205.	<0.01	0.89	<0.02	0.10	21.0	9.1
135839	135829(DUP)	0.0-4.0	1.59	203.	<0.01	0.93	<0.02	0.10	21.1	9.1

435-687-4825

**Application for Postmining Land Use Change
PacifiCorp, Des-Bee-Dove Mine
ACT/015/017
Energy West Mining Company
P.O. Box 310
Huntington, Utah 84528**

*Told him
Bond Released
on 5/5/98.*

PacifiCorp, by and through its wholly-owned subsidiary, Energy West Mining Company ("Energy West") as mine operator, is filing with the Division of Oil, Gas and Mining an application for Postmining Land Use change for the Des-Bee-Dove Mine, specifically, the presently designated Des-Bee-Dove Haul Road, from Highway 57 to an area close to the County Road referred to as Danish Bench. The Construction of this portion of haul road was designated by roadway stationing, starting at 96+00 center of road, located a few hundred feet above the Danish Bench connection in the direction of the mine site, and ending at Highway 57, stationing 243+18 center of roads.

PacifiCorp, "Energy West" filed notification to reclaim the Des-Bee-Dove Mine and associated Rights-of-Ways (R/W) as permitted (February 26, 1997). Since that time the County has expressed interest in acquiring the Haul Road and incorporating the road into the county road system.

Negotiations for land Rights-of-Way transfer between PacifiCorp, the County and those government agencies as listed below have been completed. This means that the haul road and associated Rights-of-Way would remain in place and become part of the " County Road System". The State Division of Oil, Gas and Mining would no longer have permitting control within these areas as listed.

The road and associated Rights-of-Way, wherein the road lies is listed below within the closest 1/4 section.

State of Utah Road Right-of-Way No. 2470 (49.34 acres) utilized for the location of the Junction Haul Road located within Section 36, T17S, R7E, SLM and Section 2, T18S, R7E, SLM.

- State of Utah-The NE 1/4 NE 1/4 Section 2, T18S, R7E, SLM.
- State of Utah-The NW 1/4 NE 1/4 Section 2, T18S, R7E, SLM.
- State of Utah-The SW 1/4 NE 1/4 Section 2, T18S, R7E, SLM.
- State of Utah-The NW 1/4 SE 1/4 Section 2, T18S, R7E, SLM.
- State of Utah-The NE 1/4 SW 1/4 Section 2, T18S, R7E, SLM.
- State of Utah-The NE 1/4 NW 1/4 Section 36, T17S, R7E, SLM.
- State of Utah-The SE 1/4 NW 1/4 Section 36, T17S, R7E, SLM.
- State of Utah-The NW 1/4 NW 1/4 Section 36, T17S, R7E, SLM.

BLM Right-of-Way Grant U-50148 (28.29 acres) utilized for the location of the Junction

Haul Road within the E 1/2 E 1/2 Section 35, T17S, R7E, SLM.

BLM-The NE 1/4 NE 1/4 Section 35, T17S, R7E, SLM.

BLM-The SE 1/4 NE 1/4 Section 35, T17S, R7E, SLM.

BLM-The NE 1/4 SE 1/4 Section 35, T17S, R7E, SLM.

BLM-The SE 1/4 SE 1/4 Section 35, T17S, R7E, SLM.

United States Forest & Special Use Permit utilized for the location of the Junction Haul Road located within the SW 1/4 SW 1/4 Section 25, SE 1/4 SW 1/4 Section 25 and the SE 1/4 SE 1/4 Section 26, T17S, R7E, SLM.

POSTMINING LAND USE

The current Des-Bee-Dove permit states that the postmining land use for the area of the mine will be grazing and wildlife. The postmining land use would be expanded to reflect current public uses of the area which include the following land use categories:

Access for Industrial/Commercial (coal bed methane extraction) and recreation.

This notice is being published to comply with the Surface Mining Control and Reclamation Act of 1997 and the State and Federal regulations promulgated pursuant to said Act. The application for Postmining Land Use Change is on file at the Castle Dale, County Court House in the Public Records Office and at the State Department of Natural Resources as listed below.

Written comments may be submitted to: State of Utah Department of Natural Resources, Division of Oil, Gas and Mining, 1594 West North Temple, Suite 1210, Box 145801, Salt Lake City, Utah 84114-5801. Comments must be in within 30 days from the date of last publication of this notice.

Published in the Emery County Progress on the following dates:



BR
Paul Wayne

April 30, 1998

Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801

Appendix A

Call Dennis

Re: Amendment to complete the Division Order regarding The Disposition of the Des-Bee-Dove Haul Road, and Postmining Land Use, PacifiCorp, Des-Bee-Dove Mine, ACT/015/017-D097A, Folders #2 and #5, Emery County, Utah.

Attention: Mr. Daron R. Haddock

Copy Haddock, Paul

"Energy West" received the Division's letter dated December 31, 1997, which was a response from the Division to a request for additional time to complete the above amendment (previously submitted in Draft form). The Division granted an extension to April 30, 1998.

At this time "Energy West" submits seven (7) copies of the amendment that covers the requirements necessary to comply with State Regulations. As requested, please find attached, documents that comply with the following items as addressed by the Division in your file letter dated December 12, 1997.

1. **Postmining land use change, documentation to verify publication of premining land use in the local newspaper. (Refer to Land Use Section)**
 - ◆ Energy West submitted a publication draft for review in February (Refer to R645-301-400 Land Use Section). The Division notified Energy West that publication of the Post Land Use Change notification will commence on the date this amendment is submitted to the Division. Energy West will submit notice to the Emery County Progress on the week of May 6, 1998. Publication dates are tentatively May 12, 19, 26 and June 2, 1998.

2. **Documentation from the various land owners providing proof of acceptance of the land transfer and post mining land use change, which includes the following agencies: (Refer to R645-301 -400: Land Use Section)**
 - ◆ School and Institutional Trust Lands Administration
 - ◆ Bureau of Land Management
 - ◆ Forest Service

Huntington Office:
(801) 687-9821
Fax (801) 687-2695
Purchasing Fax (801) 687-9092

Deer Creek Mine:
(801) 381-2317
Fax (801) 381-2285

Cottonwood Mine:
(801) 748-2319
Fax (801) 748-2380

3. **Documentation from the Emery County Road Department accepting the road transfer and all Rights-of-Ways associated therein. (Refer to R645-301-500: Engineering Section)**
4. **Documentation of funds transferred to the Emery County Road Department from PacifiCorp for upgrading and bringing said road to County Standards as stipulated by the County. (Refer to R645-301-500: Engineering Section)**
5. **PacifiCorp, "Energy West" to show that road runoff will not cause diminution of water quality in the area including erosion control. (Refer to R645-301-700: Hydrology Section)**

As previously stated in Energy West's letter dated December 30, 1997, several measures have been provided by Energy West in an effort to maintain and control surface runoff from causing damage or any diminution of the area. These measures have been accepted and approved by the Division and have been monitored during Division inspections for several years. Upon R/W transfer the Emery County Road Department will have full responsibility to maintain and prevent any possibilities of this nature from occurring. The provisions provided have been (1) a guard rail belting along the inside of the roadway and (2) Rip-rap ditches, water bars and berm protection along the outslope of the steep slope areas. These areas have been monitored and found beneficial and successful in providing the means of erosion control sought by Energy West and the Division. In view of the existing natural surrounding steep slopes, in comparison to those in question the conditions of erosion control are in compliance and well maintained to date.

6. **The reclamation items and bonding review have been revised and are included as part of this amendment to reflect the changes with respect to the removal of all items attached to the haul road transfer. (Items deleted and recalculated, Refer to Bonding Section, Volume 2, Part 4, Reclamation Cost and Reclamation Cost: Calculations & Method).**

After reviewing the MRP and evaluating the changes required within the text and drawings, the following items are determined necessary to realign the permit to comply with those actions taken toward transferring the haul road R/Ws from the Energy West permit to the Emery County Road Department. These items will be revised, removed, deleted or otherwise altered to comply with the regulations that govern the plan.

Volume 1, Introduction:

**Page 2,
Page 3,
Page 4**

**Revision of Fig. 1, Energy West Permitted area.
Revise address location, application by PacifiCorp.
Revise acres of disturbance, added cessation 1987.**

Volume 1, Table of Contents:

Replace Table of Contents

Volume 1, Part 1,

Replace the entire section. To facilitate future revisions to Part 1, Notice of Violation tables were removed from the text section and included as Part 1, Appendix I.

Volume 1, Part 2,

Pages 2-134 to 2-142

Remove resource survey concerning haul road.

Volume 2, Part 3

Replace the entire section. To facilitate future revisions to Part 3, all of the figures, tables and reference data were removed from the text section and included as Part 3 Appendices I through V.

Volume 2, Part 4

Replace the entire section. To facilitate future revisions to Part 4, all of the figures, tables and reference data were removed from the text section and included as Part 4 Appendices I through VII.

Volume 3, Maps:

- Plate 1-1, CM-10536-DS: Revised, remove haul road.**
- Plate 1-2, CM-10568-DS: Revised, remove haul road.**
- Plate 1-3, CM-10368-BH: Revised, remove haul road.**
- Plate 1-4, CM-10371-DS: Revised, remove haul road.**
- Plate 1-5, CM-10864-DS: Revised, remove haul road, pond description, County road description.**

- Plate 1-6, CS1740D: Added to revise sediment pond and access road permit areas.**

- Plate 2-12, CE-10490-DS: Revised, remove haul road.**
- Plate 2-14, CE-10502-DS: Revised, remove haul road, soils**
- Plate 2-16, CE-10865-DS: Remove haul road,**
(3 of 3)
- Plate 2-17A, CM-10596-DS: Revised, remove haul road,**
- Plate 2-17B, CM-10586-DS: Revised, remove haul road, Raptor version new**
- Plate 2-18, CM-10544-DS: Remove (Refer to 2-18A, 2-18B)**
- Plate 2-18A, CM-10544DS: Replaces 2-18**
- Plate 2-18B, CM-10903DS: Additional Drawing, Elk Habitat**
- Plate 3-6, CM-10333-DS: Remove: Superceded by CM-10388-DS (3 of 3).**
(2 of 2)
- Plate 3-7, CM-10388-DS: Revised, remove haul road.**
(3 of 3)
- Plate 3-8, CM-10421-DS: Revised, pond area.**
(2 of 2)

Volume 4, Maps:

- Plate 4-1, CM-10393-DS: Revised, remove haul road items.**
(3 of 5)

Volume 5, Appendix: No changes

Volume 6, Appendix XIV: Remove appendix from permit, all construction drawings in Plate 5-1 (Transfer to County)

Volume 7, Appendix XIV Continued:

- Plate 5-2, CM-10601-DS: Remove: (Transfer to County).**
- Plate 5-3, CM-1130-D: Remove: (Transfer to County).**
- Plate 5-3A, CS-1129C: Remove: (Transfer to County).**
- Plate 5-3B, KS-1190C: Remove: (Transfer to County).**
- Plate 5-4, CM-10607-DS: Remove: (Transfer to County).**
- Plate 5-5, CM-10609-DS: Remove: (Transfer to County).**
- Plate 5-6, CM-10613-DS: Remove: (Transfer to County).**

Volume 7, Appendix XV :

**Figure 1, Revise drawing, remove haul road related items.
Plate 5-7, CM-10658-DS: Remove: Superseded by CM-10658-
DS, Plate 1-5**

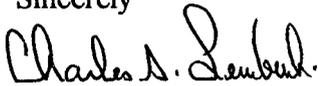
Appendix XVI:

Remove appendix XVI, (Transfer to County).

All sections are listed with intent to satisfy the changes required within the permit to delete the existing haul road from the original Des-Bee-Dove permit. Based on extensive research conducted by Energy West, all parameters to this amendment have been covered and are included in the preceding text (Refer to Appendix B of the Introduction Section for revised permit information).

Energy West is appreciative of the help and assistance received from the Division's staff in completing the amendment as now submitted. If there are any further questions or concerns related to the amendment please call Dennis Oakley at 687-4825.

Sincerely



Charles Semborski
Geology/Permitting Supervisor

cc: Carl Pollastro
Blake Webster
Charles Semborski
Barbara Adams (File)

Application for Permit Processing Detailed Schedule of Changes to the MRP

Title of Application: Amendment to Satisfy Division Order (DO97A)

Permit Number: ACT/015/017

Disposition of the Des-Bee-Dove Haul Road

Mine: DES-BEE-DOVE

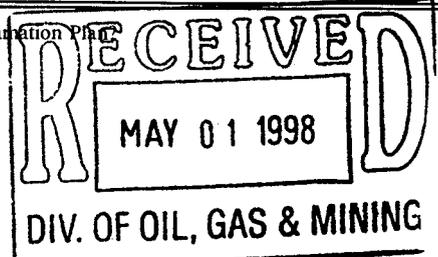
Permittee: PACIFICORP

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit application. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the existing mining and reclamation plan. **Include page, section and drawing numbers as part of the description.**

DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED

<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	DESCRIPTION
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Volume 3, Plate 3-6, CM-10333-DS (2 of 2), superseded by Volume 2, CM-10388-DS, Plate 3-7 (3 of 3)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Volume 3, Plate 3-7, CM-10388-DS (3 of 3), Remove Haul Road
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Volume 3, Plate 3-8, CM-10421-DS (2 of 2), Revised, pond area
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Volume 4, Plate 4-1, CM-10393-DS (3 of 5), Revised, remove Haul Road items
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Volume 6, Appendix XIV
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Volume 7, Appendix XIV, Plate 5-2, CM-10601-DS
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Volume 7, Appendix XIV, Plate 5-3, CM-1130-D, Revised, remove haul road items
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Volume 7, Appendix XIV, Plate 5-3A, CS-1129-C
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Volume 7, Appendix XIV, Plate 5-3B, KS-1190-C, Revised, remove haul road items
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Volume 7, Appendix XIV, Plate 5-4, CM-10607-DS, Revised, remove haul road items
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Volume 7, Appendix XIV, Plate 5-5, CM-10609-DS, Revised, remove drainages areas to haul road
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Volume 7, Appendix XIV, Plate 5-6, CM-10613-DS
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Volume 7, Appendix XV, Figure 1, Revised, remove haul road items
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Volume 7, Appendix XV, Plate 5-7, CM-10658-DS, superseded by CM-10658-DS, Plate 1-5
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Volume 7, Appendix XVI
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan:



Application for Permit Processing Detailed Schedule of Changes to the MRP

Title of Application: Amendment to Satisfy Division Order (DO97A)

Permit Number: ACT/015/017

Disposition of the Des-Bee-Dove Haul Road

Mine: DES-BEE-DOVE

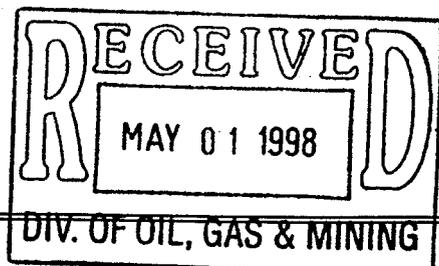
Permittee: PACIFICORP

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit application. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the existing mining and reclamation plan. **Include page, section and drawing numbers as part of the description.**

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 1, Introduction, page 2, Figure 1
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 1, Introduction, pages 3-4
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 1, Table of Contents
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 1, Part 1, (includes Part 1, Appendix I)
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Volume 1, Part 2, remove pages 2-134 through 2-142
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 2, Part 3, (includes Part 3 Appendices I-V)
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 2, Part 4, (includes Part 4 Appendices I-VII)
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 3, Plate 1-1, CM-10536-DS, Revised to remove Haul Road
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 3, Plate 1-2, CM-10568-DS, Revised to remove Haul Road
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 3, Plate 1-3, CM-10368-BH, Revised to remove Haul Road
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 3, Plate 1-4, CM-10371-DS, Revised to remove Haul Road
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 3, Plate 1-5, CM-10864-DS, Revised to remove Haul Road and to reflect disturbed boundary. Drawing CM-10864-DS is superseded by CM-10658-DS.
<input checked="" type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 3, Plate 1-6, CS1740D
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 3, Plate 2-12, CE-10490-DS, Revised to remove Haul Road
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 3, Plate 2-14, CE-10502-DS, Revised to remove Haul Road, soils
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 3, Plate 2-16, CS1749D supersedes map CE-10865-DS (sheets 3 of 3)
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 3, Plate 2-17A, CM-10596-DS, Revised to remove Haul Road
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 3, Plate 2-17B, CM-10586-DS, Remove Haul Road, Raptor ver.new
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Volume 3, Plate 2-18, CM-10544-DS, Remove (Refer to 2-18A and 2-18B)
<input checked="" type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 3, Plate 2-18A, CM-10544-DS, Replaces 2-18
<input checked="" type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Volume 3, Plate 2-18B, CM-10903-DS, Additional drawing, Elk Habitat

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

C2 form continued on next page.



APPLICATION FOR PERMIT CHANGE

Title of Change: Amendment to Satisfy Division Order (DO97A)

Permit Number: ACT/015/017

Disposition of the Des-Bee-Dove Haul Road

Mine: Des-Bee-Dove

Permittee: PacifiCorp

Description, include reason for change and timing required to implement: Relinquishment of Des-Bee-Dove Haul Road, all right-of-ways associated with road, involves transfer of the right-of-ways. Includes removal from permit all items related to the haul road within the permit boundary.

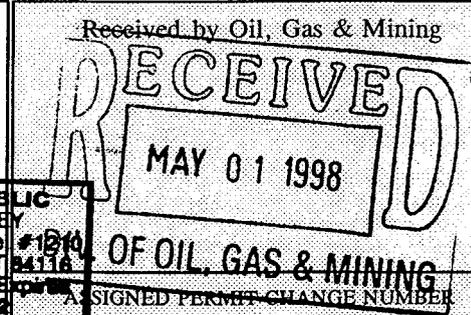
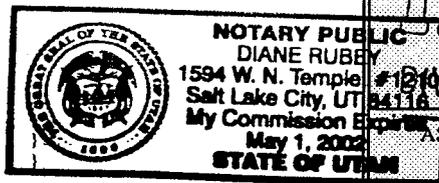
- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 1. Change in the size of the Permit Area? 93.18 acres <input type="checkbox"/> increase <input checked="" type="checkbox"/> decrease |
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 2. Change in the size of the Disturbed Area? 93.18 acres <input type="checkbox"/> increase <input checked="" type="checkbox"/> decrease |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 3. Will permit change include operations outside the Cumulative Hydrologic Impact Area? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 4. Will permit change include operations in hydrologic basins other than currently approved? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 5. Does permit change result from cancellation, reduction or increase of insurance or reclamation bond? |
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 6. Does permit change require or include public notice publication? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 7. Permit change as a result of a Violation? Violation # _____ |
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 8. Permit change as a result of a Division Order? D.O. # _____ |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 9. Permit change as a result of other laws or regulations? Explain: _____ |
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 10. Does permit change require or include ownership, control, right-of-entry, or compliance information? |
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 11. Does the permit change affect the surface landowner or change the post mining land use? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 12. Does permit change require or include collection and reporting of any baseline information? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 13. Could the permit change have any effect on wildlife or vegetation outside the current disturbed area? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 14. Does permit change require or include soil removal, storage or placement? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 15. Does permit change require or include vegetation monitoring, removal or revegetation activities? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 16. Does permit change require or include construction, modification, or removal of surface facilities? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 17. Does permit change require or include water monitoring, sediment or drainage control measures? |
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 18. Does permit change require or include certified designs, maps, or calculations? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 19. Does permit change require or include underground design or mine sequence and timing? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 20. Does permit change require or include subsidence control or monitoring? |
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 21. Have reclamation costs for bonding been provided or revised for any change in the reclamation plan? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 22. Is permit change within 100 feet of a public road or perennial stream or 500 feet of an occupied dwelling? |
| <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 23. Is this permit change coal exploration activity <input type="checkbox"/> inside <input type="checkbox"/> outside of the permit area? |

Attach 7 complete copies of proposed permit change as it would be incorporated into the Mining and Reclamation Plan.

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

Charles A. Semborski
 Charles A. Semborski - Geology/Permitting Supervisor 5/1/98
 Signed - Name - Position - Date

Subscribed and sworn to before me this 1 day of May, 1998.
Diane Rubey
 Notary Public
 My Commission Expires: May 1, 192002
 Attest: STATE OF Utah
 COUNTY OF Salt Lake





State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

1594 West North Temple, Suite 1210

PO Box 145801

Salt Lake City, Utah 84114-5801

801-538-5340

801-359-3940 (Fax)

801-538-7223 (TDD)

Michael O. Leavitt
Governor

Lowell P. Braxton
Division Director

October 1, 1998

Chuck Semborski, Environmental Supervisor
Energy West Mining Company
P. O. Box 310
Hurricane, Utah 84528

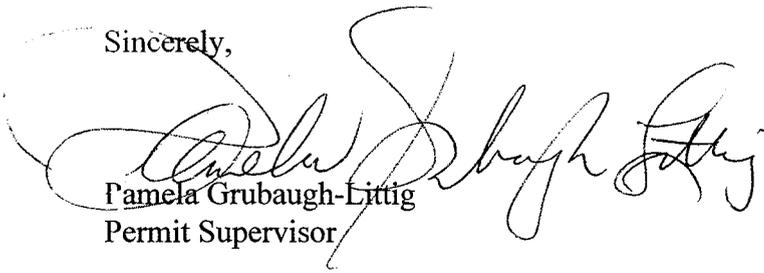
Re: Des-Bee-Dove Haul Road Bond Release, PacifiCorp, Des-Bee-Dove Mine,
ACT/015/017-98BR, File #2, Emery County, Utah

Dear Mr. Semborski:

The above referenced amendment was approved on September 1, 1998. Clean copies were received at our office on September 23, 1998. Enclosed are the approved pages for incorporation into your Mining and Reclamation Plan.

If you have further questions, please feel free to call me.

Sincerely,



Pamela Grubaugh-Littig
Permit Supervisor

tam

Enclosure

cc: Ranvir Singh, OSM, w/o
Richard Manus, BLM, w/o
Janette Kaiser, USFS, w/o
Mark Page, Water Rights, w/o
Dave Ariotti, DEQ, w/o
Bill Bates, DWR, w/o
Price Field Office

O:\015017.DBD\FINAL\APPROVAL.BR

URCES
NG

PO Box 140001
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

Michael O. Leavitt
Governor

Lowell P. Braxton
Division Director

Suite 1210

August 24, 1998

James Fulton, Chief
Office of Surface Mining
Reclamation and Enforcement
1999 Broadway, Suite 3320
Denver, Colorado 80202

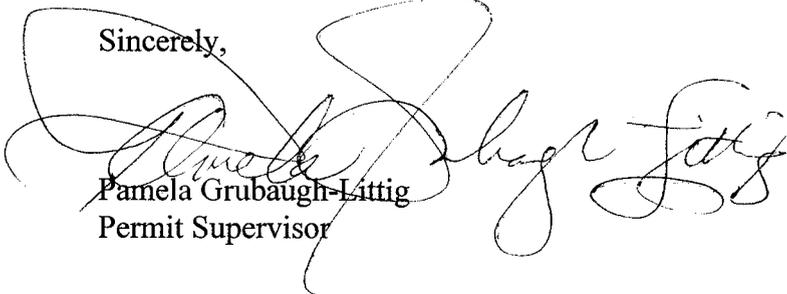
Re: Decision Document for Des-Bee-Dove Bond Release - Concurrence Requested,
PacifiCorp, Des-Bee-Dove Mine, ACT/015/017-98BR, Folder #3, Emery County, Utah

Dear Mr. Fulton:

Enclosed please find the Decision Document for the bond release for the Des-Bee-Dove haul road. This bond release represents 93.18 acres that will be removed from the Des-Bee-Dove Mine permit area due to the achievement of the alternative postmining land use of that road. There is no change in the bond amount due to this final bond release.

OSM concurrence is requested on the Division recommendation for bond release. If you have any questions, please call me.

Sincerely,


Pamela Grubaugh-Littig
Permit Supervisor

tam
Enclosure
cc: Chuck Semborski, PacifiCorp
O:\015017.DBD\FINAL\OSMDDLTR.WPD

From: Paul Baker
To: PGrubaug
Date: 8/21/98 3:37pm
Subject: Des Bee Bond Release

I'm going to be gone Monday, but I've prepared a memo as if Dennis did the changes I suggested. It's in o:\015017.db\draft\dbbr3.pbb. If he submits something and a response absolutely has to go out Monday, it's ready.

What he should submit is a page talking about the dominant species in the test plots. Basically it's winterfat, thickspike wheatgrass, and western wheatgrass. See ya Tuesday.

August 17, 1998

TO: File

THRU: Daron Haddock, Permit Supervisor

FROM: Paul Baker, Reclamation Biologist

RE: Haul Road Bond Release, PacifiCorp, Des Bee Dove Mine, ACT/015/017-BR98, Folder #2, Emery County, Utah

SUMMARY:

PacifiCorp has submitted a proposal to delete the Des Bee Dove haul road from the permit area. Numerous maps have been revised to accommodate this deletion, and much of the text has also been changed. Some of the text changes are not directly associated with the haul road; many simply update the plan to show current conditions at the site. A few are substantive, however.

This review does not consider every change made to the plan, and some problems may be found when the Division and operator begin to insert this proposal into the mining and reclamation plan.

TECHNICAL ANALYSIS:

ADMINISTRATIVE INFORMATION

RIGHT OF ENTRY

Regulatory Reference: R645-301-114

Analysis:

Right of entry information has been updated and now includes metes and bounds descriptions for the sediment pond access road area. Portions of the road right of way would still be in the permit area near the sediment pond.

It appears the applicant has taken the necessary steps to transfer and modify rights of way, and the application contains letters to this effect from the Bureau of Land Management, the

Page 2
Haul Road Bond Release
ACT/015/017-BR98
August 17, 1998

School and Institutional Trust Lands Administration, and the Forest Service. Plate 1-5 has been revised to clearly show an area where the road right of way overlaps with the permit area that will exist after bond release. The text of the plan refers to Plate 1-6 instead of 1-5. This appears to be a typographical error that should be corrected.

Findings:

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

RECLAMATION PLAN

REVEGETATION

Regulatory Reference: R645-301-341

Analysis:

Revegetation test plots were established near the haul road in 1992. The existing plan contains information about methods used, and the application has an executive summary with some methods and results. Results presented include dominant species, total cover, and soil analyses.

The information provided in the summary together with the design information in the appendices will be valuable for future reclamation efforts at this and other mines.

The application includes changes to the reclamation plan. Primarily, tree and shrub seedlings are being deleted from both interim and final revegetation planting mixes, and shrubs would be established from seed. No methods for establishing trees are included in the plan, but they are not needed. The proposed changes are acceptable.

The regulations do not specifically address revegetation of road cut and fill slopes. While the postmining land uses for the road are considered the same as for adjacent areas, revegetation requirements should not necessarily be the same. For example, wildlife management agencies intentionally seed less palatable species near roads to help reduce wildlife collisions with vehicles, and it is best not to have wildlife cover next to a road. Therefore, the traditional standards for density of woody species, cover, production, and diversity are not applicable.

The areas near the road are, for the most part, adequately vegetated or otherwise protected that there are no serious erosion problems. However, a few areas in the cuts and fills east of the sediment pond are not well vegetated and have had some erosion problems. In an

Page 3

Haul Road Bond Release

ACT/015/017-BR98

August 17, 1998

attempt to control erosion, the applicant has diverted water away from the longer slopes adjacent to the road. The applicant has had an ongoing erosion monitoring program in this area. Recent results indicate rills and gullies are tending to become wider but that the depths are either stable or becoming shallower. This is a typical pattern for healing erosional features and indicates increasing stability.

Findings:

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

POSTMINING LAND USE

Regulatory Reference: R645-301-412

Analysis:

Together with the bond release, the applicant is proposing a change in the postmining land use from wildlife and grazing to wildlife, grazing, recreation, and industrial.

The application includes comment letters from the involved government agencies supporting retention of the road, and it gives justification for changing the postmining land use in accordance with the requirements of R645-301-413.300. The applicant has shown the uses proposed are higher or better uses as defined in R645-100. The road will be used for coalbed methane development in the area and for recreation purposes.

Findings:

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

RECOMMENDATIONS:

The applicant has provided required information to justify the postmining land use change and to delete the haul road from the permit area.

Pam -
Pam and I
reviewed this on Wed.
Looks like you are mostly
here.

8/20

DECISION DOCUMENT

DES-BEE-DOVE HAUL ROAD
(AKA DES-BEE-DOVE/WILBERG JUNCTION ROAD)
ALTERNATIVE POSTMINING LAND USE
FINAL BOND RELEASE
DES-BEE-DOVE MINE
ACT/015/017-98BR

WynAnn -
When we
get the info,
here's the
document I

Background

The Des-Bee-Dove haul road was constructed in 1983, in response to public concern for safety in the previous route that went through the residential streets of Orangeville, Utah. Utah Power and Light Company (now PacifiCorp) represented the road as a public road and did not obtain a permit from the regulatory authority to construct the haul road. The Division of Oil, Gas, and Mining ("Division") issued a notice of violation to Utah Power and Light Company on July 18, 1984 that required this haul road be included in the PAP for a permanent program permit. On July 31, 1984, the Division issued a cessation order preventing Utah Power and Light Company from using this road. This cessation order was terminated on October 1, 1984. The Utah Board of Oil, Gas, and Mining reopened the haul road under an emergency order pursuant to the approved Utah State Program, to allow Utah Power and Light Company to resume production and delivery of coal to the Hunter Power Plant without routing truck through the town of Orangeville.

prepared.
Would
you
please
read
and
reviewed

Chronology and Summary

This haul road was included in the Des-Bee-Dove Mine permit issued by the Division on August 28, 1985. The Des-Bee-Dove Mine went into temporary cessation on February 6, 1987. By letter, dated February 26, 1997, PacifiCorp submitted to the Division a Notice of Intent to reclaim the Des-Bee-Dove Mine, including the portion of the haul road within the permit area. On February 27, 1997, the Division issued violation N97-41-3-1- to PacifiCorp at the Des-Bee-Dove Mine for failure to have adequate drainage controlfailure to maintain a road to control or prevent additional contributions of suspended solids to streamflow or runoff outside the permit area", which was associated with construction of a coalbed methane pipeline by Texaco in the drainage ditch of the Des-Bee-Dove Haul Road. The On April 4, 1997, Energy West (operator of the Des-Bee-Dove Mine) received a letter from Rex Funk, Road Supervisor for Emery County that stated there may be a public interest in the Des-Bee-Dove Haul Road.

etc.
as
noted
by,

Violation N97-41-3-1 was vacated on June 10, 1997, and an Order issued that stated: "Within 60 days of receipt of this Order, the permittee shall submit plan to the Division that discuss the disposition of the roadside ditch containing the pipeline that is subject of the NOV upon reclamation of the Des-Bee-Dove haul road." On June 18, 1997 Energy West submitted a letter to the Emery County Commission concerning the assumption of the Des-Bee-Dove Haul road. On July 29, 1997, Energy West requested and received Division approval for a 90-day

extension to resolve the disposition of the Des-Bee-Dove Haul Road until October 29, 1997.

A Public Notice was published by Emery County in the Emery County Progress on September 2 and September 9, 1997 which stated: "The purpose of the Public Hearing, is to receive public comment on whether the Emery County Commission should accept and add the following road (i.e. the Des-Bee-Dove Haul Road) to the County Road System in order to provide access." On September 17, 1997 the Emery County Board of County Commissioners held this public hearing. As a result of this public hearing, Commissioner Bevan Wilson made a motion to pursue negotiations with Energy West to work on a plan to bring the road to an agreeable standard and to coordinate with the county attorney to prepare the documents to transfer the haul road to the county system.

On October 23, 1997, Energy West and Emery County met to discuss the disposition of the Des-Bee-dove road. As a result of the meeting a draft agreement was prepared incorporating the following provisions:

- * After the road has been conveyed to Emery County, it will have sole responsibility for maintenance of the road.
- * While the Des-Bee-Dove haul road was designed by the Utah Department of Transportation and constructed in 1983 to meet UDOT specifications which are similar to, or exceed the standards for the county road system additional action will be taken by Emery County at the expense of PacifiCorp, to insure that the road meets all construction standards applicable to other public roads in the State of Utah of this classification.
- * Current and past uses of the Des-Bee-Dove road will be acknowledged which include diverse public uses such as: industrial//commercial)coalbed methane exploration and development work conducted by Texaco Corporation), recreation (hunting and wildlife viewing), grazing (access to separate grazing allotments).

A meeting was held at the Division on October 30, 1997 with PacifiCorp about this issue. A draft amendment was submitted on November 5, 1997 and an extension was granted until December 2, 1997 to submit an amendment to formally address this issue which was done, but was still identified as "draft". The Division responded by letter dated December 16, 1997 about the postmining land use deficiencies. On December 30, 1997, PacifiCorp requested an additional 90 days to resolve this issue due to the land transfer process with Rights of Way with State Institutional Trust Lands Administration (SITLA), Bureau of Land Management and the Manti LaSal National Forest as well as finalizing the transfer with Emery County.

On February 27, 1998, the midterm review was sent to PacifiCorp for the Des-Bee-Dove Mine, which included resolution of the Division Order associated with this haul road. On March

18, 1998 the Emery County Commissioners approved of the transaction and signed the land transfer agreement. On March 23, 1998, PacifiCorp requested 30 more days to submit the land use changes to meet the requirements of the Division Order, which was granted until April 30, 1998.

In the meantime, the Forest Service (letter dated April 15, 1998), Bureau of Land Management (letter dated March 26, 1998), and State Institutional Trust Lands Administration (letter dated March 24, 1998) all concurred with the postmining land use change, i.e. transfer of use from PacifiCorp to Emery County, contingent upon the Division approval of the removal of this haul road from the Des-Bee-Dove Mine permit area.

PacifiCorp submitted the postmining land use changes for the haul road which would remove the haul road from the permit area on April 30, 1998. The Division decided that this "removal from the permit area" would be considered a "final bond release" for this area and notified PacifiCorp on May 5, 1998.

Findings for Alternative Postmining Land Use

PacifiCorp has met all of the requirements of R645-301-413.300 through R645-301-414.300 (Alternative Postmining Land use), for this haul road. The current postmining land use for the area is grazing and wildlife. The alternative postmining land use has been expanded to recreation and industrial/commercial access. There is likelihood for achievement of the use of this road for recreation and access for industrial/commercial (coalbed methane) because these uses are already occurring.

These uses do not pose any actual or probable hazard to public safety, health, or threat of water diminution or pollution. These uses are practical and reasonable, consistent with applicable land-use policies or plans, are currently being implemented and do not contribute to violation of federal, Utah or local law.

Emery County has agreed to transfer this road to the Emery County Road system by agreement dated March 18, 1998, contingent upon removal of this road from jurisdiction by the Utah Coal Regulatory Program, i.e. through bond release.

The alternative postmining land use for this haul road was submitted as a significant revision to the plan, published this significant alteration from the original permit for four consecutive weeks in the Emery County Progress (May 12, 19, 26 and June 2, 1998), and at the end of the comment period, no comments were received.

PacifiCorp has met the requirements for the alternative postmining land use.

*Paragraph
reflecting
Paul B's
findings.*

Findings for Bond Release

Administrative

The application for final bond release for the Des-Bee-Dove haul road included removal of this road from the Des-Bee-Dove Mine permit area (decrease the permit area by 93.18 acres) but no change in the reclamation bond amount.

The advertisement of the postmining land use and bond release for this haul road was published in the Emery County Progress on May 12, 19, 26, and June 2, 1998. The comment period ended and there were no adverse comments.

Letters were sent to the landowners by PacifiCorp advising them of this bond release action. Invitations to the bond release inspection were sent to Emery County Planning, OSM-WRCC, Manti-LaSal FS, BLM (PFO), BLM (State Office) and SITLA on July 6, 1998. The bond release inspection was conducted on July 20, 1998. In attendance were:

OSM:	Henry Austin
Division:	Paul Baker, Daron Haddock, Mary Ann Wright, Wayne Wester, Bill Malencik, and Pamela Grubaugh-Littig
Emery County:	Ray Petersen (Emery County Road Department)
PacifiCorp:	Dennis Oakley, Chuck Semborski, Scott Child, Blake Webster, and John Kirkham

There were no problems identified during the inspection.

The Forest Service (letter dated April 15, 1998), Bureau of Land Management (letter dated March 26, 1998), and State Institutional Trust Lands Administration (letter dated March 24, 1998) all concurred with the postmining land use change, i.e. transfer of use from PacifiCorp to Emery County, contingent upon the Division approval of the removal of this haul road from the Des-Bee-Dove Mine permit area. The concurrence for the change in postmining land use gave concurrence to remove from the permit area because there was no longer any mining use for this road and therefore, no longer required for the permit area for the Des-Bee-Dove Mine.

PacifiCorp has met the requirements of the Act and the permit and therefore, final bond release for the Des-Bee-Dove Haul Road should be granted.

Vegetation Test Plots/Erosion Study Along Haul Road

Evidence of erosion on the outslope of the mine haul road had been in existence since 1987 (see Decision by Administrative Law Judge, Harvey Sweitzer dated February 28, 1995 for federal violation No.93-020-190-05). Between August and November 1991, PacifiCorp implemented the sedimentation control plan which effectively prevented most of the road runoff from flowing onto the road slope. Concurrently, PacifiCorp and the Division organized a task force to determine what other measures might be taken to control or prevent erosion on the road outslope. Members of the task force included representatives of the Division, USNRCS (formerly SCS), Utah State University Extension Service, PacifiCorp and its subsidiary, Energy West Mining Company. OSM was invited to take part in the task force, but OSM did not participate.

The task force met on November 12, 1991 and concluded that the outslope rills and gullies are caused by water erosion and that the erosion control measures implemented by PacifiCorp should curtail and/or control this erosion. The task force also concluded that further erosional control and rehabilitation measures should be deferred pending completion of a study to evaluate erosion control measures and reclamation alternatives. Pursuant to the task force's recommendation, PacifiCorp in 1992 with Division oversight, launched a three-year study to evaluate various erosion control methods.

The reasoning behind the task force's conclusions were that the road outslope is composed of Mancos shale and is very steep. By all accounts, Mancos shale is highly susceptible to erosion. Nevertheless, the outslope was considered stable, showing no evidence of tension cracks or mass movement and having naturally settled since the road's construction in 1983.

Implementation of additional erosion control or rehabilitation measures would require the use of heavy equipment and disturbance of the slope, loosening the soil surface and destabilizing the steep slope. The task force feared that if such measures failed, their implementation would only exacerbate the outslope erosion.

In addition to being extremely erosive, Mancos shale is very resistant to revegetation because of its high salt content and tendency to form a hard surface crust. In light of these conditions, it was unclear whether implementation of additional measures, such as mulching, netting, tackifiers, and revegetation would be effective.

The conclusions of this task force and the results of the three-year study are included in the plan.

*May
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Decision Document
Final Bond Release
Des-Bee-Dove Haul Road
Page 6

Conclusions and Recommendation

Based on the Division findings the PacifiCorp has met the requirements for approval of the alternative postmining land use for the Des-Bee-Dove Haul Road, it is recommended that this final bond release be approved.

DECISION DOCUMENT

DES-BEE-DOVE HAUL ROAD
(AKA DES-BEE-DOVE/WILBERG JUNCTION ROAD)
ALTERNATIVE POSTMINING LAND USE
FINAL BOND RELEASE
DES-BEE-DOVE MINE
ACT/015/017-98BR

BACKGROUND

The Des-Bee-Dove haul road was constructed in 1983, in response to public concern for safety in the previous route that went through the residential streets of Orangeville, Utah. Utah Power and Light Company (now PacifiCorp) represented the road as a public road and did not obtain a permit from the regulatory authority to construct the haul road. The Division of Oil, Gas, and Mining ("Division") issued a notice of violation to Utah Power and Light Company on July 18, 1984 that required this haul road be included in the PAP for a permanent program permit.

On July 31, 1984, the Division issued a cessation order preventing Utah Power and Light Company from using this road. This cessation order was terminated on October 1, 1984. The Utah Board of Oil, Gas, and Mining reopened the haul road under an emergency order pursuant to the approved Utah State Program, to allow Utah Power and Light Company to resume production and delivery of coal to the Hunter Power Plant without routing trucks through the town of Orangeville.

CHRONOLOGY AND SUMMARY

Temporary Cessation/Notice to Reclaim

This haul road was included in the Des-Bee-Dove Mine permit issued by the Division on August 28, 1985. The Des-Bee-Dove Mine went into temporary cessation on February 6, 1987. By letter, dated February 26, 1997, PacifiCorp submitted to the Division a Notice of Intent to reclaim the Des-Bee-Dove Mine, including the portion of the haul road within the permit area.

Violation Issued/THird Party Interference

On February 27, 1997, the Division issued violation N97-41-3-1- to PacifiCorp at the Des-Bee-Dove Mine for "failure to have adequate drainage controlfailure to maintain a road to control or prevent additional contributions of suspended solids to streamflow or runoff outside the permit area", which was associated with construction of a coalbed methane pipeline by Texaco in the drainage ditch of the Des-Bee-Dove Haul Road. On April 4, 1997, Energy West Mining Company ("Energy West") (operator of the Des-Bee-Dove Mine) received a letter from Rex Funk, Road Supervisor for Emery County that stated there may be a public interest in the Des-Bee-Dove Haul Road.

Division Order Issued

Violation N97-41-3-1 was vacated on June 10, 1997, and an Order issued that stated: "Within 60 days of receipt of this Order, the permittee shall submit plan to the Division that discuss the disposition of the roadside ditch containing the pipeline that is subject of the NOV upon reclamation of the Des-Bee-Dove haul road." On June 18, 1997, Energy West submitted a letter to the Emery County Commission concerning the assumption of the Des-Bee-Dove Haul road. On July 29, 1997, Energy West requested and received Division approval for a 90-day extension to resolve the disposition of the Des-Bee-Dove Haul Road until October 29, 1997.

Process of Conveyance of Haul Road to County Road System

A Public Notice was published by Emery County in the Emery County Progress on September 2 and September 9, 1997, which stated: "The purpose of the Public Hearing, is to receive public comment on whether the Emery County Commission should accept and add the following road (i.e. the Des-Bee-Dove Haul Road) to the County Road System in order to provide access." On September 17, 1997, the Emery County Board of County Commissioners held this public hearing. As a result of this public hearing, Commissioner Bevan Wilson made a motion to pursue negotiations with Energy West to work on a plan to bring the road to an agreeable standard and to coordinate with the county attorney to prepare the documents to transfer the haul road to the county system.

On October 23, 1997, Energy West and Emery County met to discuss the disposition of the Des-Bee-dove road. As a result of the meeting a draft agreement was prepared incorporating the following provisions:

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- * Current and past uses of the Des-Bee-Dove road will be acknowledged which include diverse public uses such as: industrial/commercial (coalbed methane exploration and development work conducted by Texaco Corporation), recreation (hunting and wildlife viewing), grazing (access to separate grazing allotments).

Division Order/Midterm (Postmining Land Use Change)

A meeting was held at the Division on October 30, 1997 with PacifiCorp about this issue. A draft amendment was submitted on November 5, 1997 and an extension was granted until December 2, 1997 to submit an amendment to formally address this issue which was done, but was still identified as "draft". The Division responded by letter dated December 16, 1997 about the postmining land use deficiencies. On December 30, 1997, PacifiCorp requested an additional 90 days to resolve this issue due to the land transfer process with Rights of Way with State Institutional Trust Lands Administration (SITLA), Bureau of Land Management and the Manti LaSal National Forest as well as finalizing the transfer with Emery County.

On February 27, 1998, the midterm review was sent to PacifiCorp for the Des-Bee-Dove Mine, which included resolution of the Division Order associated with this haul road. On March 18, 1998 the Emery County Commissioners approved of the transaction and signed the land transfer agreement. On March 23, 1998, PacifiCorp requested 30 more days to submit the land use changes to meet the requirements of the Division Order, which was granted until April 30, 1998.

Transfer of Rights of Way

In the meantime, the Forest Service (letter dated April 15, 1998), Bureau of Land Management (letter dated March 26, 1998), and State Institutional Trust Lands Administration (letter dated March 24, 1998) all concurred with the postmining land use change, i.e. transfer of use from PacifiCorp to Emery County, contingent upon the Division approval of the removal of this haul road from the Des-Bee-Dove Mine permit area.

Bond Release

PacifiCorp submitted the postmining land use changes for the haul road which would remove the haul road from the permit area on April 30, 1998. The Division decided that this "removal from the permit area" would be considered a "final bond release" for this area and notified PacifiCorp on May 5, 1998.

Vegetation Test Plots/Erosion Study Along Haul Road

Evidence of erosion on the outslope of the mine haul road had been in existence since 1987 (see Decision by Administrative Law Judge, Harvey Sweitzer dated February 28, 1995 for federal violation No.93-020-190-05). Between August and November 1991, PacifiCorp implemented the sedimentation control plan which effectively prevented most of the road runoff from flowing onto the road slope. Concurrently, PacifiCorp and the Division organized a task

force to determine what other measures might be taken to control or prevent erosion on the road outslope. Members of the task force included representatives of the Division, USNRCS (formerly SCS), Utah State University Extension Service, PacifiCorp and its subsidiary, Energy West Mining Company. OSM was invited to take part in the task force, but OSM did not participate.

The task force met on November 12, 1991 and concluded that the outslope rills and gullies are caused by water erosion and that the erosion control measures implemented by PacifiCorp should curtail and/or control this erosion. The task force also concluded that further erosional control and rehabilitation measures should be deferred pending completion of a study to evaluate erosion control measures and reclamation alternatives. Pursuant to the task force's recommendation, PacifiCorp in 1992 with Division oversight, launched a three-year study to evaluate various erosion control methods.

The reasoning behind the task force's conclusions were that the road outslope is composed of Mancos shale and is very steep. By all accounts, Mancos shale is highly susceptible to erosion. Nevertheless, the outslope was considered stable, showing no evidence of tension cracks or mass movement and having naturally settled since the road's construction in 1983.

Implementation of additional erosion control or rehabilitation measures would require the use of heavy equipment and disturbance of the slope, loosening the soil surface and destabilizing the steep slope. The task force feared that if such measures failed, their implementation would only exacerbate the outslope erosion.

In addition to being extremely erosive, Mancos shale is very resistant to revegetation because of its high salt content and tendency to form a hard surface crust. In light of these conditions, it was unclear whether implementation of additional measures, such as mulching, netting, tackifiers, and revegetation would be effective.

The conclusions of this task force and the results of the three-year study are included in the plan.

FINDINGS FOR ALTERNATIVE POSTMINING LAND USE

PacifiCorp has met all of the requirements of R645-301-413.300 through R645-301-414.300 (Alternative Postmining Land use), for this haul road. The current postmining land use for the area is grazing and wildlife. The alternative postmining land use has been expanded to recreation and industrial/commercial access. There is likelihood for achievement of the use of this road for recreation and access for industrial/commercial (coalbed methane) because these uses are already occurring.

These uses do not pose any actual or probable hazard to public safety, health, or threat of water diminution or pollution. These uses are practical and reasonable, consistent with applicable land-use policies or plans, are currently being implemented and do not contribute to violation of federal, Utah or local law.

Emery County has agreed to transfer this road to the Emery County Road system by agreement dated March 18, 1998, contingent upon removal of this road from jurisdiction by the Utah Coal Regulatory Program, i.e. through bond release.

The alternative postmining land use for this haul road was submitted as a significant revision to the plan, published this significant alteration from the original permit for four consecutive weeks in the Emery County Progress (May 12, 19, 26 and June 2, 1998), and at the end of the comment period, no comments were received.

PacifiCorp has met the requirements for the alternative postmining land use.

FINDINGS FOR BOND RELEASE

Administrative

The application for final bond release for the Des-Bee-Dove haul road included removal of this road from the Des-Bee-Dove Mine permit area (decrease the permit area by 93.18 acres) but no change in the reclamation bond amount.

The advertisement of the postmining land use and bond release for this haul road was published in the Emery County Progress on May 12, 19, 26, and June 2, 1998. The comment period ended and there were no adverse comments.

Letters were sent to the landowners by PacifiCorp advising them of this bond release action. Invitations to the bond release inspection were sent to Emery County Planning, OSM-WRCC, Manti-LaSal FS, BLM (PFO), BLM (State Office) and SITLA on July 6, 1998. The bond release inspection was conducted on July 20, 1998. In attendance were:

OSM:	Henry Austin
Division:	Paul Baker, Daron Haddock, Mary Ann Wright, Wayne Western, Bill Malencik, and Pamela Grubaugh-Littig
Emery County:	Ray Petersen (Emery County Road Department)
PacifiCorp:	Dennis Oakley, Chuck Semborski, Scott Child, Blake Webster, and John Kirkham

There were no problems identified about the transfer of this road to the county road system during the inspection. A midterm inspection at the Des-Bee-Dove mine site was also conducted with no problems identified.

The Forest Service (letter dated April 15, 1998), Bureau of Land Management (letter dated March 26, 1998), and State Institutional Trust Lands Administration (letter dated March 24, 1998) all concurred with the postmining land use change, i.e. transfer of use from PacifiCorp to Emery County, contingent upon the Division approval of the removal of this haul road from the Des-Bee-Dove Mine permit area. The concurrence for the change in postmining land use gave concurrence to remove from the permit area because there was no longer any mining use for this road and therefore, no longer required for the permit area for the Des-Bee-Dove Mine.

PacifiCorp has met the requirements of the Act, the R645 rules, and the permit. The alternative postmining land use has been met and therefore, final bond release for the Des-Bee-Dove Haul Road should be granted.

CONCLUSIONS AND RECOMMENDATION

Based on the Division findings the PacifiCorp has met the requirements for approval of the alternative postmining land use for the Des-Bee-Dove Haul Road, it is recommended that this final bond release be approved which removes 93.18 acres from the Des-Bee-Dove Mine permit area. There is no change in the bond amount.

Decision Document
Final Bond Release
Des-Bee-Dove Haul Road
Page 7

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PERMIT TRACKING FORM

- Permit Amendment (INS)
 Exploration Permit (INS)
 N.O.V. (INS)
 D.O.
 Permit Transfer
 Incidental Boundary Change (IBC)
 Permit Midterm (MT)
 Permit Renewal (PR)
 New Permit
 Significant Revision (SR)
 Bond Release (BR)

Date Received: <u>5/1/98</u>	By: <u>tat</u>	PERMIT NUMBER	ACT/015/017
Title of Proposal: <u>Bond Release</u>		PERMIT CHANGE #	<u>98-BR</u>
Description:		PERMITTEE	PACIFICORP
# of Copies Required: <u>7</u>	# of Copies Received: <u>7</u>	MINE NAME	DES-BEE-DOVE

PERMIT CHANGE APPLICATION SENT TO SLC DATE: _____ LETTER TO PERMITTEE: _____

<input type="checkbox"/> 15 DAY INITIAL RESPONSE TO PERMIT CHANGE APPLICATION OR INITIAL COMPLETENESS REVIEW	Date Due:	Date Done:	Letter to Permittee:
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<input type="checkbox"/> Notice of Affidavit of Publication. (If change is a Significant Revision, New Permit, or Permit Transfer)	Date Due:	Date Done:	Letter to Permittee:
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PFO REVIEW TRACKING	1ST ROUND		2ND ROUND		SLC REVIEW TRACKING	1ST ROUND		2ND ROUND	
<input type="checkbox"/> Lead <input type="checkbox"/> Generalist					<input type="checkbox"/> Lead				
<input type="checkbox"/> Administrative _____					<input type="checkbox"/> Administrative _____				
<input type="checkbox"/> Land Use/ AQ _____					<input type="checkbox"/> Land Use/ AQ _____				
<input type="checkbox"/> Biology _____					<input type="checkbox"/> Biology _____				
<input type="checkbox"/> Engineering _____					<input type="checkbox"/> Engineering _____				
<input type="checkbox"/> Geology _____					<input type="checkbox"/> Geology _____				
<input type="checkbox"/> Soils _____					<input type="checkbox"/> Soils _____				
<input type="checkbox"/> Hydrology _____					<input type="checkbox"/> Hydrology _____				

TA Review Done:	Date:	Permittee Response Due <input type="checkbox"/> Stipulation <input type="checkbox"/> Condition <input type="checkbox"/> No Requirements	Date:	DIVISION DECISION LETTER <input type="checkbox"/> APPROVE <input type="checkbox"/> DENY
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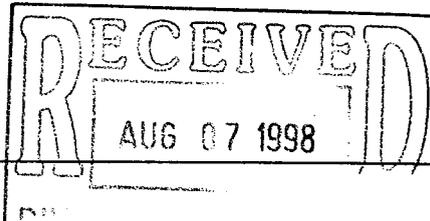
TA Review Done:	Date:	RESPONSE RECEIVED:	Date:	Date:
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COORDINATED REVIEWS	Phone Contact	1ST ROUND		2ND ROUND		RECEIVED	ADDITIONAL TRACKING:	DATE
		Sent	Due	Sent	Due			
<input type="checkbox"/> OSM- Copy							Public Hearing	
<input type="checkbox"/> BLM- Copy							Letter From Compliance Supervisor	
<input type="checkbox"/> USFS- 2 Copies							AVS Completed	
<input type="checkbox"/> Water Rights- ltr							Approval Effective Date	
<input type="checkbox"/> DEQ- Letter							Approved Copy to File	
<input type="checkbox"/> DWR- Letter							Approved Copy to Permittee	
							Approved Copy to PFO/SLC	
							Approved Copy to Agencies	
							CHIA Modified	
							Update Master TA Done/Needed	

Comments:



PO Box 310
Huntington, Utah 84528



HAND DELIVERED

August 7, 1998

Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801

*Copy Daron, Paul,
BAM*

Re: Revisions to the Des-Bee-Dove Haul Road, and Postmining Land Use amendment, PacifiCorp, Des-Bee-Dove Mine, ACT/015/017-D097A, Folders #2 and #5, Emery County, Utah.

#2

Attention: Mr. Daron R. Haddock

PacifiCorp, by and through its wholly-owned subsidiary, Energy West Mining Company ("Energy West") as mine operator, hereby submits the following information to clarify several issues raised during the Des-Bee-Dove Haul Road final bond closeout meeting conducted on July 20, 1998. The following is a list of concerns:

- ◆ BLM Right-of-Way U-53809 (sediment storage area adjacent to the sediment pond) was not listed in the "ADDITIONAL LANDS TO BE AFFECTED BY MINING" section Volume 1, Part 1, page 1-20. During the technical review, concerns were raised in reference to overlapping rights-of-way with Emery County. To clarify the ADDITIONAL LANDS TO BE AFFECTED BY MINING section and overlapping rights-of-way situation, page 1-20 has been revised to include a description of the U-53809 right-of-way documenting the acreage of overlap with Emery County, Plate 1-6 has been revised to include a detailed layout of the rights-of-way overlap area.
- ◆ During the July 20 inspection, soil stabilization/vegetation test plots established along the haul road were reviewed. General observations were made concerning the types of applications and the success of vegetative cover and diversity. It was recommended by the Division that a description and executive summary of the test plots be retained in the permit along with a chronological history of the Haul Road test plots. Volume 2, Part 4, pages 4-7 and 4-8 have been revised referencing the Haul Road test plot information. As part of the revision, a new appendix has been added to Volume 2, Part 4, Appendix VIII - Executive Summary of the 1990-1995 Test Plots and Appendix XVI of the MRP will be retained (originally designated in April 30, 1998 amendment to be deleted).

was this changed?

Huntington Office:
(435) 687-9821
Fax (435) 687-2695
Purchasing Fax (435) 687-9092

Deer Creek Mine:
(435) 687-2317
Fax (435) 687-2285

Trail Mountain Mine:
(435) 748-2140
Fax (435) 748-5125

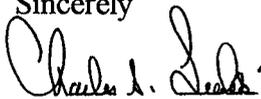
Department of Oil, Gas and Mining
August 7, 1998
Page Two

Attached is seven copies of the following revisions to the April 30, 1998 Haul Road amendment:

- | | |
|--|---|
| Volume 1, Part 1
Page 1-20 | Replace, revised to include BLM Right-of-Way U-53809 reference. |
| Volume 2, Part 4
Pages 4-7 and 4-8 | Replace, revised to include Haul Road test plot information. |
| Volume 2, Part 4
Appendix VIII | Insert new Appendix VIII, 1990-1995 Test Plot Executive Summary. |
| Volume 3, Maps:
Plate 1-5, CM-10658-DS: | Replace, revised to include Rights-of-Way overlap detail. |
| Volume 7, Appendix XVI: | Retain, chronological history of the Haul Road test plots (Originally deleted from MRP in the April 30, 1998 amendment). |

Energy West is appreciative of the help and assistance received from the Division's staff in completing the amendment as now submitted. If there are any further questions or concerns related to the amendment please call Dennis Oakley at 687-4825.

Sincerely



Charles Semborski
Geology/Permitting Supervisor

cc: Carl Pollastro
Blake Webster
Charles Semborski
Barbara Adams (File)



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

Michael O. Leavitt
Governor
Lowell P. Braxton
Division Director

August 18, 1998

Charles Semborski, Environmental Supervisor
Energy West Mining Company
P. O. Box 310
Huntington, Utah 84528

Re: Haul Road Bond Release, PacifiCorp, Des Bee Dove Mine, ACT/015/017-DO97A,
Folder #3, Emery County, Utah

Dear Mr. Semborski:

The Division has reviewed the information which was submitted on August 7, 1998 in regard to the above referenced action. There are still a few remaining deficiencies in the application which preclude us from approving the bond release. The two enclosed technical memos (Paul Baker and Priscilla Burton) describe the deficiencies and discuss those things that need to be completed prior to our approving your application for bond release. Please review the memos carefully and provide a response that addresses the deficiencies. We will expect your response by no later than September 18, 1998.

If you have questions, please don't hesitate to call me or the appropriate technical staff person.

Sincerely,


Daron R. Haddock
Permit Supervisor

tam
Enclosures: Technical Memos (2)
cc: P. Baker
P. Burton
J. Helfrich
P. Grubaugh-Littig
O:\015017.DBD\FINAL\ROADDEFI.BR



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor

Ted Stewart
Executive Director

James W. Carter
Division Director

1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801
(801) 538-5340
(801) 359-3940 (Fax)

August 13, 1998

Chuck Semborski
PacifiCorp
PO Box 310
Huntington, Utah 84528

RE: Three Study Areas, PacifiCorp, Des Bee Dove, ACT/015/017, Folder #2, Emery County, Utah

Dear Mr. Semborski:

I am writing you with copies of the letter to others, whose efforts made the test plot project a success. The test plot project was first driven by an oversight inspection and alleged road out slope erosion problem. The preliminary data assisted in adjudicating repetitive oversight conflicts. The single question, what will happen to the three studies? Sub-question, are they needed for future reclamation? If affirmative, should they, in whole or in part, be converted to demonstration areas? If the response is no, does this mean nothing should be done which is tantamount to abandonment?

Discussion

The Des Bee Dove DOGM permitted haul road is being transferred to Emery County. When these transactions are completed, this road will become part of the Emery County Road system. The test plot, the erosion study area, and the fenced vegetal study lie within the area to be transferred to Emery County. Further, the area is being deleted from the Des Bee Dove DOGM permit, and therefore, when this is accomplished the area will not be subject to the Utah Coal Law and Rules. Therefore, PacifiCorp no longer has any further commitments as related to the road and study areas. The key question again is, what should and what will happen to the three study areas listed below?

The three test plots include the following:

- Item 1: Erosion study area contiguous to item 3, road outslope (1½:1).
- Item 2: Vegetal fenced study area. The results are not as encouraging as item 3. However, even though expectations were not met, it is also important to know what didn't work.
- Item 3: Vegetal replicated test plots with eight different treatments. Copy of the executive summary attached for those noted on the last page for their use and review.
- Item 4: All three study projects lie on State Lands, Sec. 36, TWP 17S, R7E, SLPM (SULA 436).

The erosion study and the test plots made my job easier. PacifiCorp officials and I appeared and testified at a USDI/OSM cessation order hearing. The erosion and test plot data was especially meaningful when questioned by the solicitor and the USDI hearing examiner. The bottom line, the preliminary data from the two studies when entered into the record, together with other testimony and the erosion and water control treatments installed by PacifiCorp, resulted in the hearing examiner vacating OSM's cessation order.



The way things are now postured, perhaps the most propitious benefits can be realized if positive results are considered and utilized on future reclamation. These positive results may be considered on a mine reclamation project with similar site characteristics.

It is important to note that coal waste as a soil amendment was one of the more successful treatments. The resultant manifestation was favorable vegetal establishment. Some attitude adjustments and coal rule consideration will undoubtedly be necessary if coal waste will be utilized in the future as a mancos shale soil amendment on mine reclamation projects. Many will hang on to the premiss that successful reclamation can only take place when coal waste is not visible, covered with four feet of suitable material, and when material is covered with adequate soil medium. The gravel plots also showed favorable result. The key question, should the favorable treatments derived from the test plot results, including the sagacious use of coal waste, be taken to the next level?

Interagency Task Force

As a change of pace, but most importantly since this may, in essence, be a close out, must not forget to say thanks to you and others, including several Division personnel for assisting in formulating the test plot study plan (item 3). Significant outside contributions were made by:

PacifiCorp:

Chuck Semborski, Guy Davis, Dick Northrup, Karl Houskeeper, and Val Payne

USU Extension:

Dennis Worwood

Natural Resources Conservation Service:

George S. Cook and Leland D. Sasser

Mt. Nebo Scientific:

Dr. Collins who conducted annual vegetal surveys and recently assembled a final and illuminating report for PacifiCorp.

Proposal and Recommendations

PacifiCorp, as the past project manager and faced with future mancos shale reclamation at the other sites may wish to, with involvement of others, decide what should be done with the sites: (1) abandon the study areas all or part of them, (2) convert the three study areas to demonstration areas with the cooperation of the SITLA and Emery County, or (3) do nothing.

In my opinion, the three study areas, if converted to demonstration areas, would:

- meet a future need.
- not require costly and/or time consuming maintenance, if any.
- not require new protection. The three areas are protected from vehicle encroachment, IE., item 1 by topography and a guard rail; item 2 by a barb wire fence; and item 3 by a road guard rail.

Three Study Areas
ACT/015/017
August 13, 1998
Page 3

- not require additional runoff/erosion protection, current safeguards are in place.
- remain as is since the areas are not needed for other immediate land uses.
- not require formal annual data gathering and reports.

While the existing data can stand alone, converting the study areas to a demonstration areas will provide another visual tool and options for consideration in formulating a reclamation plan on mancos shale.

In conclusion, since your organization played the key organization and leadership role on all three projects, I hope you can see your way clear to take this matter to it's final conclusion. Personally, I would like to see the three areas converted and kept as demonstration sites. Perhaps, if you are so inclined, informal arrangements can be made through coordination with the land owners (SITLA) and Emery County Road Department. I would be willing to assist you if this will be taken to the next level. Also, Pam, as the interagency contact person, perhaps would be a logical choice as the person to contact SITLA. Give me your usual good thinking on what should happen next.

Again, thanks to those who made the test plot's item 3 a success. Chuck, thanks for your commitment to replace the test plot (item 3) survey stakes with more permanent and legible markers as we discussed at our session after the Des Bee Dove bond tour.

Sincerely,



Wm. J. Malencik
Reclamation Specialist

sd

enclosure: test plot executive summary

cc: Blake Webster, Interwest Mining, SLC
Guy Davis, PacifiCorp, Huntington
Val Payne, Public Lands, Castle Dale
Karl Houskeeper, PacifiCorp, Huntington
George S. Cook, NRCS, Price
Leland D. Sasser, NRCS, Price
Dennis Worwood, USU Extension Service, Price
Rex Funk, ECRD, Castle Dale
BLM, Price
USFS, Price
SITLA, SLC
Ranvir Singh, OSM, Denver
Joe Helfrich, DOGM, SLC, w/o enc
Pam Grubaugh-Littig, DOGM, SLC, w/o enc
Patrick Collins, Mt. Nebo Scientific, Springville, w/o enc

Aaron Howe:

The record shows your agency was invited to project formulation meeting, but unfortunately your commitment were of such a nature that you could not attend. However, though you might be interested in the test plot results, item 3. Enclosed is Dr. Collin's final report.

Dick Manus:

The record shows your agency was invited to project formulation meeting, but unfortunately your commitment were of such a nature that you could not attend. However, though you might be interested in the test plot results, item 3. Enclosed is Dr. Collin's final report.

APPENDIX XVI

SUMMARY OF DOCUMENTS

1. 01/19/94 LTR Division to OSM: cc of Appendix XVI encl.
2. 01/18/94 RPT Haul Road Reclamation Study: Appendix XVI
3. 12/28/93 LTR Division to PacifiCorp: submittal of 3 cc's of Appendix XVI by 1/18/94
4. 04/13/93 MEM S. White to P. Grubaugh-Littig re As-Built Test Plot
5. 04/13/93 LTR Division to Pacificorp: "As-built" info approved, can be inserted into MRP
6. 03/26/93 LTR Pacificorp to Division addressing 4 deficiencies of As-Built Test Plot, App. XVI
7. 02/22/93 LTR Division to Pacificorp: 4 deficiencies in As-Built Test Plot
8. 02/04/93 LTR Pacificorp to Division: add Fig 2 "as-built" drawing and Plot Installation 11-9-92 to App. XVI
9. 01/20/93 LTR As-builts of test plots must be submitted by 2/5/93
10. 09/02/93 FAX Des-Bee-Dove Test Plot Plan - 1992
11. 12/12/91 LTR Division to Pacificorp: review of permit conditions for Des-Bee-Dove five-year permit renewal
12. 12/04/91 MEM Outline of Meeting/Field Visit for Des-Bee-Dove Haul Road Reclamation Study
13. 11/04/91 MEM Task force for reclamation of haul road
14. 08/15/91 LTR Pacificorp to Division: Permit conditions for the five-year renewal
15. 11/12/91 DOC Des-Bee-Dove Meeting 11/12/91: Attendees
16. 11/06/91 LTR Request for S. Fisher's attendance at task force meeting

APPENDIX XVI

SUMMARY

*Sally -
Would you
help or be with
chronology of this
look up up info
write a bill
ask I'll
enter in A*

1. JULY 25, 1990 LETTER TO MR. DAVID SMA... GRUBAUGH-LITTIG
2. JULY 12, 1990 MEMO FROM TOM MUNSON TO MS. PAMELA GRUBAUGH-LITTIG
3. TEST PLOTS - OUTLINE
4. JULY 31, 1990 LETTER TO MS. PAMELA GRUBAUGH-LITTIG FROM VAL PAYNE (WITH AERIAL PHOTOS)
5. HAUL ROAD RECLAMATION STUDY -
6. DES BEE DOVE EROSION TASK FORCE AGENDA
July 17, 1991 - Need for task force, letter to Pacificorp from Division
7. NOVEMBER 13, 1991 MEMO TO TASK FORCE MEMBERS FROM GUY DAVIS -
8. DES BEE DOVE HAUL ROAD RECLAMATION STUDY RUNOFF AND SEDIMENT YIELD MONITORING PROGRAM (WITH DRAWING) -
9. JUNE 12, 1992 LETTER TO PAMELA GRUBAUGH-LITTIG FROM VAL PAYNE - DES BEE DOVE TEST PLOT PLAN
10. SEPTEMBER 25, 1992 LETTER TO MS. PAMELA GRUBAUGH-LITTIG FROM VAL PAYNE *re: Study*
11. FEBRUARY 4, 1993 LETTER TO MS. PAMELA GRUBAUGH-LITTIG FROM VAL PAYNE *re: Study*
12. MARCH 26, 1993 LETTER TO MS. PAMELA GRUBAUGH-LITTIG FROM VAL PAYNE
13. PURE LIVE SEED (PLS) DETERMINATION - NATIVE SEED
14. PURE SEED TESTING - NATIVE SEED
15. NATIVE SEED GERMINATION TEST REPORTS (STATE SEED LABORATORY #1814 - 1818)
16. NATIVE SEED SOURCE
17. NURSERY SEED SOURCE
18. SOIL ANALYSIS REPORTS (09/30/92)
19. Letter from Division to Pacificorp, April 13, 1993 "test plot" as-built approval.
20. Letter from Division to Pacificorp, August 25, 1993, 3 copies of Appendix XVI
APPENDIX XVI
REVISED 9/9/93
21. Letter to Division from Pacificorp, Sept 10, 1993 stating need Test Plot approval
22. ~~Dec~~ December 28, 1993, approval (stating "already approved") please
23. ~~Jan~~ January 19, 1994, 3 copies sent and transmitted of appendix XVI

APPENDIX XVI

SUMMARY

1. JULY 25, 1990 LETTER TO MR. DAVID SMALDONE FROM MS. PAMELA GRUBAUGH-LITTIG
2. JULY 12, 1990 MEMO FROM TOM MUNSON TO MS. PAMELA GRUBAUGH-LITTIG
3. TEST PLOTS - OUTLINE
4. JULY 31, 1990 LETTER TO MS. PAMELA GRUBAUGH-LITTIG FROM VAL PAYNE (WITH AERIAL PHOTOS)
5. HAUL ROAD RECLAMATION STUDY -
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State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
James W. Carter
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

January 19, 1994

Mr. Robert Hagen, Director
Office of Surface Mining
Reclamation and Enforcement
505 Marquette N.W., Suite 1200
Albuquerque, New Mexico 87102

Re: Appendix XVI, Haul Road Reclamation Study, Des-Bee-Dove Mine,
PacifiCorp, ACT/015/017, Folder #2, Emery County, Utah

Dear Mr. Hagen:

Enclosed please find a copy of Appendix XVI, Haul Road Reclamation Study,
for the Des-Bee-Dove Mine. If you have any questions, please call me.

Sincerely,

A handwritten signature in cursive script, reading "Pamela Grubaugh-Littig".

Pamela Grubaugh-Littig
Permit Supervisor

pgl
Enclosure
cc/enc: Bill Malencik, PFO



APPENDIX XVI
DES BEE DOVE COAL MINE
HAUL ROAD RECLAMATION STUDY



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Norman H. Bangertter
Governor

Dee C. Hansen
Executive Director

Dianne R. Nielson, Ph.D.
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340

RECEIVED

JUL 30 1990

Permitting & Compliance
- UO&M - Mining Division

July 25, 1990

CC: T. Fauchoux
M. Moon

Mr. David R. Smaldone, Director
Permitting, Compliance & Services
Utah Power and Light Company
Mining Division
P. O. Box 26128
Salt Lake City, Utah 84126-0128

RECEIVED

SEP 14 1993

DIVISION OF
OIL, GAS & MINING

Dear Mr. Smaldone:

Re: Review of Des-Bee-Dove Haul Road, Utah Power and Light Company, Des-Bee-Dove Mine, ACT/015/017, Folder #2, Emery County, Utah

Attached is a Technical Memorandum that reviews the above-referenced reclaimability of the Des-Bee-Dove Haul Road. The operator must commit to a literature search and a study of reclamation options and initiation of test plots for this site.

A time frame for this project and a work outline must be submitted to the Division by August 3, 1990.

Sincerely,

Pamela Grubaugh-Littig
Permit Supervisor

djh

Attachment

cc: V. Payne, UP&L
"A" Team, DOGM

AT



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340

July 12, 1990

TO: Pamela Grubaugh-Littig, Permit Supervisor
FROM: Tom Munson, Sr. Reclamation Hydrologist *TM*
RE: Haul Road Reclamation Meeting, Des-Bee-Dove Mine, Utah Power and Light Company, ACT/015/017, Folder #2, Emery County, Utah

Synopsis

On July 12, 1990, Val Payne, Utah Power and Light Company's (UP&L) representative, met with Division personnel Susan White, Henry Sauer, Jesse Kelley, Jeff Emmons, and Tom Munson to discuss the reclamation of the Des-Bee-Dove Haul Road and the Initial Completeness Review for the Des-Bee-Dove Mine.

Analysis

The meeting involved a lot of discussion regarding the reclamation of the Haul Road in terms of regrading slopes, future erosion control, revegetation success, and ongoing erosion control test plots.

The Division staff presented the operator with a list of topics and ideas which were intended to help him formulate a reclamation strategy. It was the general consensus of all people involved that we do not have enough technical information at this point in time to make an informed finding regarding reclamation success.

To satisfy questions regarding reclamation options raised in the Initial Completeness Review, and decide what the operator would be required to do. The operator was requested to follow the following review framework.

1. Literature search,
2. Study feasibility of reclamation options and initiate test plots/consultant review.

In addition to a commitment and a time frame for completion of all commitments regarding a reclamation plan, the operator was requested to formulate ideas based on present knowledge of reclamation of Mancos Shale and present them along with the Initial Completeness Review Response.

Page 2
Memo to P. Grubaugh-Littig
ACT/015/017
July 12, 1990

Based on the complexity of this issue and the lack of knowledge regarding reclamation of Mancos Shale, it was decided that gathering all information available and assessing the feasibility of implementation of new reclamation methods and techniques will be paramount to merely choosing an immediate course of action based on present knowledge.

Recommendations

The operator be required to maintain a strict time frame for review of data, studying feasibility of reclamation options, and implementation of test plots.

Another meeting of all parties concerned be held to better define reclamation strategy and to maintain a diligent and responsible effort to obtain a feasible reclamation plan.

djh
cc: "A" Team
AT46/34-35

The following outline are ideas of treatments to test for reclaiming the Haul Road through the Mancos shale. We realize there may not be an area large enough to test all these variables. UP&L and consultants may wish to select some or none of these treatments along with there own treatments to incorporate in a test plot.

Test Plots

- I. Backfilling and Grading
 - A. Undulating, Conical Slopes
 - 1. shape
 - 2. distance
 - 3. orientation to aspect
 - 4. benching
 - B. Non-undulating topography
- II. Erosion control, mechanical
 - A. Matting, drainage or entire slope
 - 1. coconut matting
 - 2. excelsior
 - 3. geotextile
 - 1. check dams
 - B. Incorporating 4 to 5 tons/acre organic matter
 - C. Watering, developing crust
 - 1. number of applications
 - D. Rock Mulch
 - 1. ridge top
 - 2. entire slope
 - E. Compaction with pitting
- III. Vegetation Establishment
 - A. Seed
 - 1. native collections
 - B. Transplants
 - 1. grown from native collections
 - 2. transplanted from Waste Rock
 - C. Water
- IV. Determination of Success
 - A. Sediment Yield
 - B. Length and depth of gullies
 - C. Cover of vegetation

July 31, 1990

Ms. Pamela Grubaugh-Littig
Permit Supervisor
Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

RE: Des Bee Dove Haul Road Reclamation Study, Utah Power and
Light Company, Des Bee Dove Mine, ACT/015/017, Folder #2,
Emery County, Utah

Dear Ms. Grubaugh-Littig:

Submitted in response to your letter to Mr. Smaldone dated July 25, 1990, please find the proposed schedule for the above referenced project.

PROJECT PHASES/TASKS

COMPLETION DATE

DESIGN

Literature Review	9/30/90
Identify relevant factors and options	
Grading	
Drainage	
Erosion Control	
Revegetation	
Site/Area Characterization	10/31/90
Site vs literature info	
Topography	
Soils	
Vegetation	
Drainage/Erosion Patterns	
Precipitation	
Design Development	1/5/91
Consultation	
Engineering	
Hydrology/Hydraulics	
Vegetation	
Erosion/Sediment Control	
Monitoring	

Design Review/Modification/Approval
DOGM/OSM
Consultant

3/15/91

IMPLEMENTATION

10/15/91

Materials Procurement
Slope Stabilization
Erosion Control
Revegetation
Seed/Plants
Soil Amendments
Site Preparation
Materials Installation

MONITORING AND EVALUATION

8/15/95

Stability
Erosion
Sediment Production
Precipitation
Vegetation
Soils

The project involves several uncontrollable factors including the schedules of various personnel (including DOGM and OSM), laboratory time, availability of materials and seasonal consideration for implementation. Therefore, I feel the proposed schedule is realistic and reasonable.

If you have questions or comments regarding this matter, please call me at 687-9821.

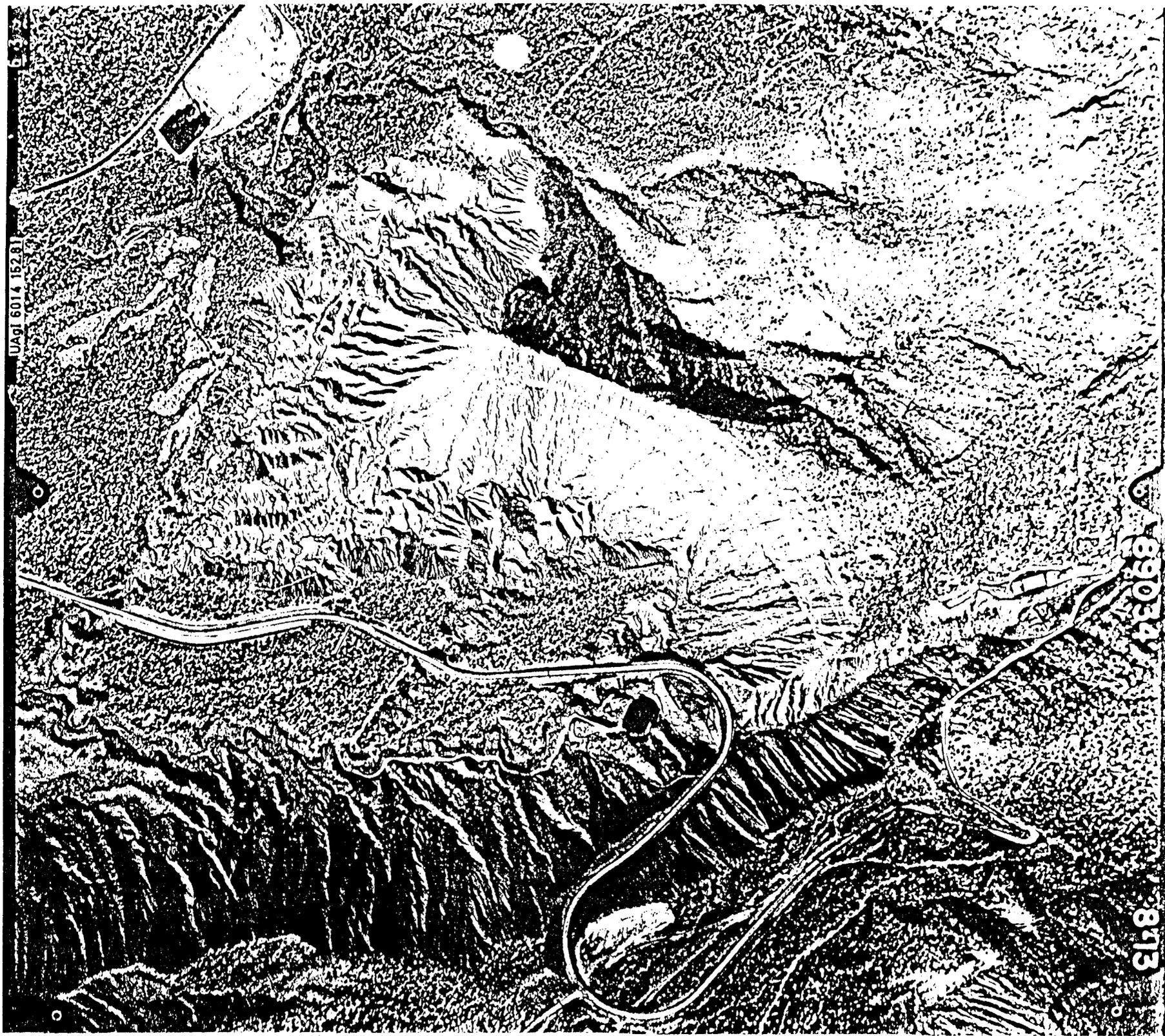
Sincerely,



Val Payne
Senior Environmental Engineer

VP/do

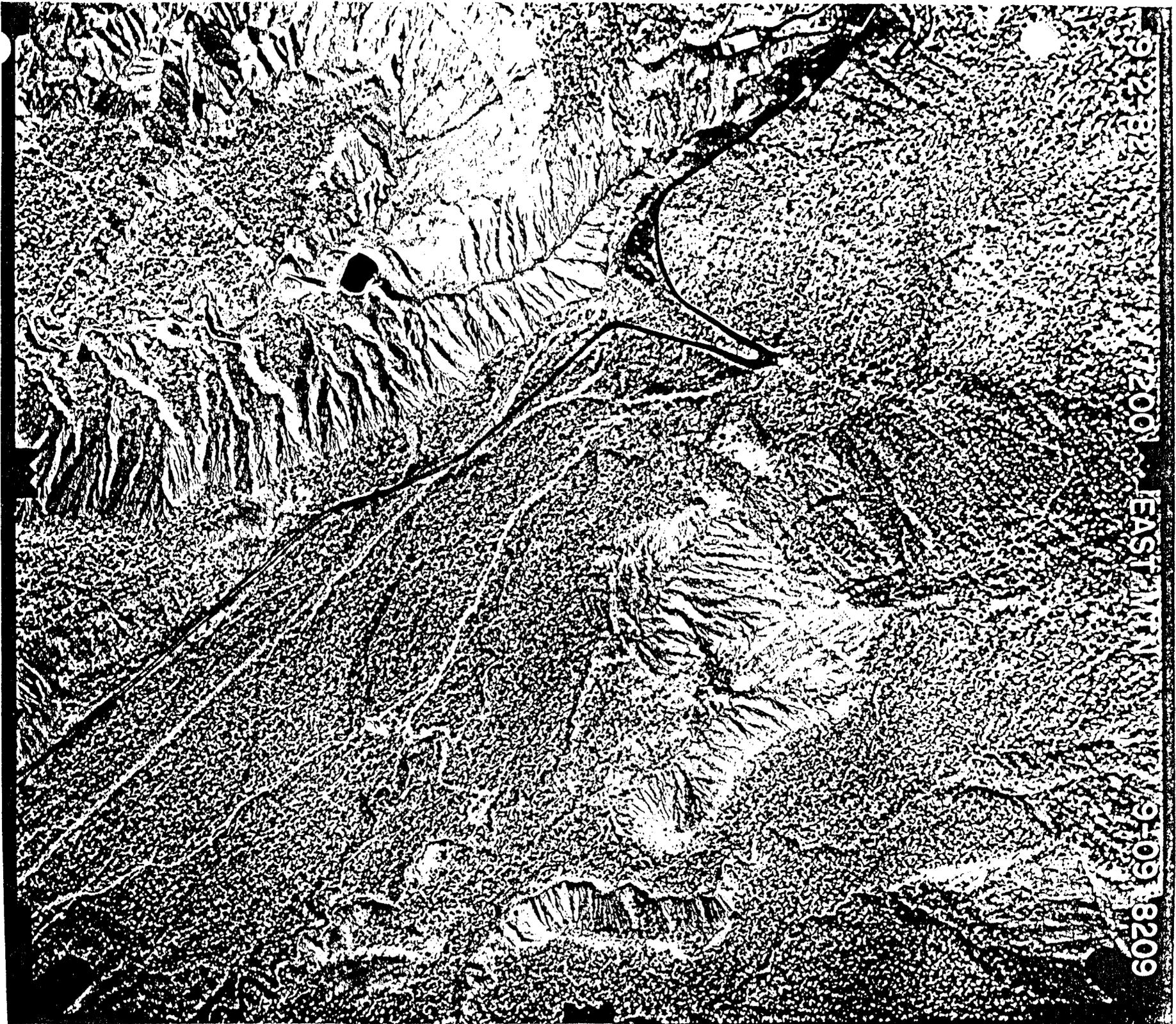
cc: D.W. Jense
S. Child
G. Davis
T. Faucheux
M. Moon



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9-25-82

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DES BEE DOVE HAUL ROAD RECLAMATION STUDY

INTRODUCTION

The focus of the Reclamation Study is primarily the Mancos shale. Therefore; the following information, regarding the first three phases of the study, addresses only the portion of the haul road which impacted the Mancos shale. Specifically, the major fill slope located between Stations 131+00 and 142+00.

PHASE I LITERATURE REVIEW/INFORMATION SEARCH

Because the primary issues are reclaimability and erosion of Mancos shale, the literature review focused on these issues. It should be noted that the gathering of information is a continuing process. The major literature sources are listed herein. These references provide useful information as well as valuable additional references for continuing research.

Bureau of Land Management, 1985; Gully erosion, Technical Note 366, US Dept. of Interior, 181 pages.

Bureau of Land Management, 1979; Reclaimability analysis of the Emery coal field, Emery County Utah, EMRIA Report No. US Dept of Interior, 413 pages.

Heede, Burchard H., 1976; Gully development and control: the status of our knowledge, USDA For. Serv. Res. Pap. RM-169, 42 p. Rocky Mt. For. and Range Exp. Sta., Fort Collins, Colo.

Williams, R.D. and Schuman, G.E. (Editors). 1987. Reclaiming mine soils and overburden in the western United States, analytic parameters and procedures. Soil Conservation Society of America, Akeny, Iowa.

As stated previously, only the major reference sources are listed here. Other references are cited within the text.

PHASE II SITE CHARACTERIZATION

Climate

The Des Bee Dove haul road is located near the base of the eastern slope of the Wasatch Plateau in western Emery County, Utah. At higher elevations of the plateau, 10,000 feet, annual precipitation averages more than 15 inches, primarily as winter snowfall. This precipitation depletes the moisture from the westerly airflow thus making the downslope flow significantly dryer.

Data from the PacifiCorp East Mountain weather station, 1.5 miles northwest of the haul road site, at an elevation of 9,000 feet, indicates a mean annual precipitation of approximately 14.5 inches. The mean annual precipitation at the Hunter Power Plant, 10 miles southeast of the haul road site at an elevation of 5,800 feet, is 7.5 inches. The mean annual precipitation at the haul road site, elevation 7,000 feet, is estimated to be approximately 11 or 12 inches.

A comparison of the seasonal distribution of annual precipitation at East Mountain (water years 1980-81 thru 1988-89) and Hunter Plant (water years 1975-76 thru 1988-89) indicates the following (see pages 4 and 5):

<u>LOCATION</u>	<u>SEASON</u>	<u>PRECIP. (IN)</u>	<u>% AN.PR.</u>
East Mountain	Summer (Apr-Oct)	62.13	47.6
	Winter (Oct-Apr)	68.46	52.4
Hunter Plant	Summer	55.94	53.4
	Winter	48.77	46.6

The seasonal distribution of annual precipitation at the haul road site is expected to be similar to that of Hunter Plant. Most of the precipitation is received in the "summer" season primarily in the form of thunder storms in July and August.

Estimated annual temperatures at the haul road site were also extrapolated from the East Mountain and Hunter Plant average annual temperature data (water years 1985-86 thru 1988-89, pages 6 thru 9).

East Mountain					
<u>YEAR</u>	<u>AV. ANN. TEMP. (°F)</u>	<u>HIGH AV. TEMP. (°F)</u>	<u>LOW AV. TEMP. (°F)</u>	<u>HOTTEST MONTH</u>	<u>COLDEST MONTH</u>
85-86	40.2	62.7	25.1	Aug	Nov
86-87	40.1	60.3	19.5	Jul	Jan
87-88	38.6	62.6	15.3	Jul	Dec
88-89	38.9	61.8	20.1	Jul	Jan
Hunter Plant					
85-86	49.4	70.8	26.9	Aug	Dec
86-87	47.5	71.9	21.5	Jul	Jan

87-88	49.3	75.7	17.0	Jul	Jan
88-89	50.0	76.5	16.3	Jul	Jan

The average annual temperature at the haul road site is expected to be approximately 43° F. The high average temperature is expected to be approximately 66° F, occurring in July. The low average temperature is expected to be approximately 20° F, occurring in January.

The slope aspect at the haul road site is generally southwestern.

Soils

The soils at the haul road site are classified by the Soil Conservation Service as Rockland (SCS Soil Survey, Carbon-Emery Area, Utah 1970). Discussion of this soil type is included on pages 10 thru 12.

Additional soil chemical information is included on page 13. These soil analyses were performed in conjunction with the existing vegetation test plots.

Vegetation

Vegetation cover at the haul road site is very sparse (estimated at less than 25% overall) and is dominated by Halogeton glomeratus.

Slope Stability

Soils engineering and physical properties are discussed in the stability analysis performed by Chen Northern, Inc. This information is found on pages 14 thru 20.

Slope erosion has been monitored since 1986. This information is presented on pages 21 thru 24.

TABLE 1: EAST MOUNTAIN PRECIPITATION

Elevation - 9,005 Feet

<u>Water Year</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEPT</u>	<u>TOTAL</u>
80-81	1.28	0.39	0.05	0.29	0.52	2.77	0.64	0.87	0.11	0.57	0.85	2.55	10.90
81-82	1.93	0.53	0.97	3.22	0.14	1.67	0.00	0.45	0.09	1.86	1.10	2.61	14.57
82-83	0.38	2.90	1.39	1.30	1.81	1.98	0.92	0.71	0.61	1.27	4.83	1.62	19.71
83-84	0.76	2.43	2.42	0.27	0.65	1.22	0.50	0.22	1.18	1.90	2.33	0.64	14.53
84-85	3.27	0.97	1.67	0.49	0.59	1.77	1.35	1.73	0.28	2.47	0.12	2.31	17.02
85-86	1.15	2.38	0.87	0.30	2.10	1.43	1.05	0.38	0.53	0.87	2.24	1.63	14.92
86-87	1.57	0.39	0.16	1.37	1.37	1.65	1.16	1.77	0.58	2.49	1.16	0.06	13.73
87-88	2.77	1.91	1.29	1.42	0.00	0.99	2.08	1.03	0.81	0.45	0.96	0.91	14.61
88-89	0.61	0.43	1.56	1.00	0.68	1.03	0.26	0.47	0.43	1.19	2.44	0.49	10.59
89-90	0.28	0.39	0.16	0.74	2.08								

TABLE 2 : HUNTER PLANT PRECIPITATION

Elevation - 5,800 Feet

<u>Water Year</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEPT</u>	<u>TOTAL</u>
75-76	0.13	0.25	0.19	0.02	0.40	0.00	0.89	0.84	0.03	0.31	0.08	0.70	3.84
76-77	0.00	0.02	0.00	0.37	0.07	0.00	0.03	1.28	0.07	1.35	0.41	0.50	4.10
77-78	0.01	0.18	0.00	1.28	1.05	1.74	0.34	1.21	0.00	0.69	1.14	0.14	7.78
78-79	0.03	2.22	0.22	1.43	0.53	2.43	0.24	0.47	0.00	0.00	0.79	0.00	8.36
79-80	0.00	0.00	0.41	1.70	1.70	0.67	0.75	1.11	0.00	0.02	0.51	2.06	8.93
80-81	0.66	0.06	0.02	0.00	0.07	1.48	0.16	0.45	0.14	0.20	0.70	2.43	6.37
81-82	0.58	0.27	0.45	0.94	0.45	0.54	0.00	0.02	0.00	0.15	1.06	1.23	5.69
82-83	0.20	1.25	0.45	0.54	0.41	0.84	0.37	0.51	0.00	2.18	1.58	0.88	9.21
83-84	0.53	0.66	1.07	0.03	0.35	0.34	0.34	0.05	1.09	1.80	1.89	2.35	10.50
84-85	1.6	0.06	1.24	0.20	0.95	1.01	0.67	0.64	0.26	1.50	0.03	0.86	9.11
85-86	0.92	1.40	0.42	0.10	0.97	0.40	0.31	0.00	0.31	0.55	1.01	0.57	7.05
86-87	0.92	0.08	0.10	0.32	0.45	0.90	0.12	1.38	1.25	1.65	1.27	0.11	8.55
87-88	1.91	1.02	0.66	0.55	0.00	0.66	1.64	0.59	0.20	0.69	0.44	0.78	9.14
88-89	0.69	0.04	0.48	1.23	0.02	0.23	0.00	0.37	0.14	1.01	1.70	0.35	6.26
89-90	0.20	0.00	0.03	0.31									

Table 3: TEMPERATURES IN EMERY COUNTY, UTAH (1986 WATER YEAR)

Month	<u>Hunter Plant</u>		<u>Huntington Plant</u>		<u>Electric Lake</u>		<u>East Mountain</u>	
	<u>Average Temp. (°F)</u>	<u>Departure From Normal</u>						
1985								
Oct.	49.6	+1.2	49.6	+0.2	37.3	-0.2	41.5	+5.1
Nov.	34.7	-0.5	33.1	-2.9	24.4	-1.3	25.1	-2.1
Dec.	26.9	+0.2	27.6	+-.2	14.7	-1.1	26.7	+4.0
1986								
Jan.	30.3	+6.2	30.1	+6.5	18.6	+4.0	28.8	+5.1
Feb.	36.3	+7.9	34.0	+3.8	19.9	+0.6	27.3	+3.1
Mar.	45.3	+9.5	43.6	+5.9	30.4	+9.6	35.8	+7.6
Apr.	47.6	+3.0	45.1	0.0	29.5	+0.8	36.0	+2.0
May	55.5	+3.4	54.8	-0.1	39.0	0.0	34.9	-5.6
June	69.1	+7.7	69.1	+3.3	54.1	+5.5	59.1	+5.0
July	70.2	-1.8	69.1	-2.6	54.5	-1.2	59.3	-2.6
Aug.	70.8	+4.4	70.6	+1.2	57.6	+3.8	62.7	+0.9
Sept	56.8	-1.9	56.5	-3.9	43.1	-4.4	45.7	-4.8
TOTALS	49.4	+3.3	48.6	+1.0	35.3	+1.4	40.2	+1.9

Table 4: TEMPERATURES IN EMERY COUNTY, UTAH (1987 WATER YEAR)

Month	<u>Hunter Plant</u>		<u>Huntington Plant</u>		<u>Electric Lake</u>		<u>East Mountain</u>	
	<u>Average Temp. (°F)</u>	<u>Departure From Normal</u>						
<u>1986</u>								
Oct.	30.6	-0.1	47.0	-2.4	36.5	-1.0	37.6	+1.2
Nov.	37.2	+2.0	37.8	+1.8	28.7	+3.0	36.4	+9.2
Dec.	28.9	+2.2	29.3	+1.9	17.1	+1.3	19.6	-3.1
<u>1987</u>								
Jan.	21.5	-2.6	24.4	+0.8	9.8	-4.8	19.5	-3.2
Feb.	31.4	+3.0	31.9	+1.7	13.0	-6.3	22.8	-0.9
Mar.	36.3	+0.5	34.6	-3.1	18.1	-2.7	26.0	+1.8
Apr.	50.8	+6.2	50.2	+5.1	34.2	+5.5	41.3	+13.1
May	56.5	+4.4	55.2	+0.3	42.6	+3.6	45.9	+5.4
June	69.1	+7.7	67.6	+1.8	50.6	+2.0	59.4	+5.3
July	71.9	+3.5	68.0	-3.7	N/A	---	60.3	-1.6
Aug.	71.1	+4.7	68.8	-0.6	55.0	+1.2	57.3	-4.5
Sept	65.1	+6.4	63.0	+2.6	49.6	+2.1	54.7	+4.2
TOTALS	47.5	+3.2	48.2	+0.6	32.3	-1.6	40.1	+1.3

TABLE 5: TEMPERATURES IN EMERY COUNTY, UTAH (1988 WATER YEAR)

Month	<u>Hunter Plant</u>		<u>Huntington Plant</u>		<u>Electric Lake</u>		<u>East Mountain</u>	
	<u>Average Temp.*</u>	<u>Departure From Normal</u>	<u>Average Temp.*</u>	<u>Departure From Normal</u>	<u>Average Temp.*</u>	<u>Departure From Normal</u>	<u>Average Temp.*</u>	<u>Departure From Normal</u>
<u>1987</u>								
Oct.	55.1	+6.7	53.9	+4.5	41.4	+3.9	42.0	+4.8
Nov.	38.5	+3.3	35.8	-0.2	24.6	-1.1	25.8	-2.4
Dec.	25.0	-1.7	24.4	-3.0	11.2	-4.6	15.3	-6.1
<u>1988</u>								
Jan.	17.0	-7.1	20.5	-3.1	10.4	-4.2	17.7	-3.7
Feb.	31.4	+3.0	30.9	+0.7	16.3	-3.0	24.7	+0.7
Mar.	38.4	+2.6	36.2	-1.5	17.4	-3.4	25.9	-1.8
Apr.	49.1	+4.5	47.3	+2.2	32.8	+4.1	38.0	+2.6
May	57.0	+4.9	55.8	+0.9	40.2	+1.2	46.1	+4.2
June	71.0	+9.6	68.2	+2.4	53.1	+4.5	58.5	+3.2
July	75.7	+7.3	74.2	+2.5	58.4	+2.7	62.6	+0.9
Aug.	72.2	+5.8	70.1	+0.7	54.5	+0.7	60.0	-1.0
Sept	61.6	+2.9	60.8	+0.4	45.6	-1.9	47.0	-3.6
TOTALS	49.3	+3.5	48.2	+0.5	33.8	-0.1	38.6	-0.2

* Temperatures reported in degrees Fahrenheit.

TABLE 6 : TEMPERATURES IN EMERY COUNTY, UTAH (1989 Water Year)

Month	<u>Hunter Plant</u>		<u>Huntington Plant</u>		<u>Electric Lake</u>		<u>East Mountain</u>	
	<u>Average Temp.*</u>	<u>Departure From Normal</u>	<u>Average Temp.*</u>	<u>Departure From Normal</u>	<u>Average Temp.*</u>	<u>Departure From Normal</u>	<u>Average Temp.*</u>	<u>Departure From Normal</u>
<u>1988</u>								
October	57.4	+9.0	56.3	+6.9	45.3	+7.8	43.8	+5.9
November	38.4	+3.2	37.7	+1.7	23.6	-2.1	23.5	-4.2
December	26.8	+0.1	25.1	-2.3	10.9	-4.9	21.1	-0.3
<u>1989</u>								
January	16.3	-7.8	18.8	-4.8	10.3	-4.3	20.1	-2.1
February	27.0	-1.4	24.5	-5.7	12.7	-6.6	20.2	-3.5
March	45.3	+9.5	41.5	+3.8	28.9	+8.1	34.0	+5.7
April	54.1	+9.5	50.8	+5.7	35.6	+6.9	42.1	+6.0
May	58.9	+6.8	55.6	+0.7	43.0	+4.0	46.8	+4.4
June	66.4	+5.0	64.0	-1.8	42.2	-6.4	50.3	-4.5
July	76.5	+8.1	73.4	+1.7	57.9	+2.2	61.8	+0.1
August	69.7	+3.3	66.6	-2.8	50.5	-3.3	53.8	-6.4
September	62.8	+4.1	60.7	+0.3	45.2	-2.3	48.8	-1.6
TOTALS	50.0	+4.1	47.9	+0.3	33.8	-0.1	38.9	0.0

* Temperatures reported in degrees Fahrenheit.



T. 18 S. | T. 17 S.

(Joins sheet 31)

persed with areas of the Ravola soil (fig. 13). Both soils are on flood plains and alluvial fans.

Included in mapping were small areas of Billings silty clay loam.

Runoff is rapid from the Bunderson soil, and most areas contain gullies 5 to 20 feet deep and 500 to 1,300 feet apart. Head cutting is common, and it is forming shallow gullies. In places windblown hummocks less than 2 feet high occur. Typically, these are on the east and north sides of greasewood and other plants.

The soils in this mapping unit are suited to the production of range forage. Controlling gully erosion and regulating the amount and season of range use are needed. Clearing the brush and reseeding grasses are not feasible, because of the small amount of rainfall. (Both soils are in Capability unit VIIe-D, nonirrigated; Ravola soil is in Desert Loam Bottom range site)

Riverwash (Rv) consists of streambeds or riverbeds, including oxbow-loops and other channels. These areas are exposed at low water and subject to shifting during periods of high water because of deposition and erosion. The deposited materials are extremely variable, ranging from boulders in the upper part of streams to silt and clay in the lower, more nearly level areas. Most areas are channeled and have little or no cover of vegetation. (Capability unit VIIIw-4, nonirrigated; not rated for other uses)

Rock land (Ry) is a miscellaneous land type having a surface 50 to 70 percent covered by stones, boulders, and outcrops of shale and sandstone. Most of this land type is moderately eroded, but many areas are severely eroded. Soil characteristics are almost obscured by the stones and boulders. The slopes are very steep to perpendicular, but typically they are between 50 and 80 percent.

Included in mapping were gently sloping, deep fine sandy loams. Intermingled with the sandstone outcrops



Figure 13.—An area of Ravola-Bunderson complex, 1 to 3 percent slopes, eroded. The nearly bare, light-colored slickspots are the Bunderson soil.

were inclusions of shallow fine sandy loams. Also included on some of the north-facing slopes in the mountains along the west side of the survey area were small areas of an unidentified soil.

This land type has almost no value for farming, although some areas have a sparse cover of grass, sagebrush, pinon, and juniper. This vegetation grows on all exposures but it is dominant on north and west exposures. Small areas are accessible to livestock and wildlife, but most of the land type is too steep and rocky for grazing. (Capability unit VIIIs-3, nonirrigated; not rated for other uses)

Saltair Series

Soils of the Saltair series are deep, poorly drained, very strongly saline, moderately fine textured, and nearly level to gently sloping. They occupy moderate to large areas on alluvial fans, on flood plains, and in narrow alluvial valleys. These soils have formed in alluvium derived from marine shale and sandstone. The vegetation is greasewood, saltgrass, and kochia, but bare surfaces are common. Elevations range from 4,000 to 6,500 feet. The annual rainfall is 6 to 11 inches, and the mean annual soil temperature is 47° to 54° F. The frost-free season is 110 to 160 days.

In a typical profile, the surface layer is light brownish gray, strongly calcareous, very strongly saline silty clay loam about 7 inches thick. The underlying material is light brownish-gray and light-gray heavy silt loam that is very strongly saline in the upper part. Platy crusts of salt on the surface, underlain by layers of soft, granular material, are common. The content of salt is 2 percent or more within 20 inches of the surface.

This soil is used for range, but the quality of the forage is poor.

Representative profile of Saltair silty clay loam in pasture, 1,200 feet north and 500 feet west of the SE corner of section 13, T. 17 S., R. 9 E. in Emery County Utah:

A11sa—0 to ½ inch, grayish-brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) when moist; weak, thin, platy structure breaking to moderate; fine, granular structure; soft, firm, very sticky and plastic; plentiful large roots; many medium and fine vesicular pores; strongly calcareous; strongly alkaline (pH 8.9); thin salt crust; clear, smooth boundary.

A12sa—½ inch to 7 inches, light brownish-gray (2.5Y 6/1) silty clay loam, grayish brown (2.5Y 5/2) when moist; many, fine, distinct, yellowish-brown (10YR 5/6) mottles; weak to moderate, fine, angular blocky structure; very hard, very firm, very sticky and very plastic; plentiful medium and fine roots; common medium and fine pores; strongly calcareous; moderately alkaline (pH 8.3); very strongly saline; efflorescent salt on many ped surfaces and in pores; clear, smooth boundary.

C1gsa—7 to 14 inches, light brownish-gray (2.5Y 6/2) heavy silt loam, grayish brown (2.5Y 5/2) when moist; common, fine, distinct, yellowish-brown (10YR 5/6) mottles and common, fine, faint, gray (N 5/1) mottles; weak, fine, angular blocky structure; very hard, very firm, very sticky and very plastic; plentiful fine roots; common medium pores; strongly calcareous; very strongly saline; efflorescent salt on many ped surfaces and in pores; strongly alkaline (8.5); gradual, wavy boundary.

CAPABILITY UNIT VIII-4 (NONIRRIGATED)

This capability unit consists of the land type Riverwash, which is gravelly and cobbly. Areas of this land type are subject to damaging overflows and do not support the growth of plants. Their main use is for wildlife habitat.

CAPABILITY UNIT VIII-5 (NONIRRIGATED)

This capability unit consists of deep, poorly drained, very strongly saline, fine textured and moderately fine textured soils that generally have a crust of salt $\frac{1}{2}$ to 1 inch thick on the surface. These soils are in the Cache, Libbings, and Saltair series.

Because of their high content of salt, these soils have no known farm use. Plants cannot grow on them. Experience indicates that reclaiming these soils for use as salt meadow pasture is economically not feasible.

CAPABILITY UNIT VIII-6 (NONIRRIGATED)

This capability unit consists only of bare, steep ledges of Rock land on which plants do not grow. The only use is for wildlife habitat, water supply, and esthetic purposes.

CAPABILITY UNIT VIII-7 (NONIRRIGATED)

This capability unit consists of rough, broken, and nearly bare areas of Badland and of a Bunderson soil. These areas have little potential for the production of plants and are sources of silt carried by runoff.

Small areas are used for a limited amount of grazing. The areas are used mainly, however, as a habitat for wildlife, for water supply, and for esthetic purposes.

Estimated yields

Table 1 gives the estimated average acre yields of the principal crops and pasture grown on irrigated soils under two levels of management. These yields are estimated on the basis of records obtained from farmers for the specific soils, on field observations of soil scientists, and on data compiled by economists of the Colorado River Storage Project. If no information was available for a particular soil, the estimates were made on the basis of yields on a similar soil. Only soils that are suitable for the crops and pasture specified are listed in table 1. In a given year, yields may be considerably higher or lower than the estimated average.

Under both levels of management, yields are based on a generalized crop rotation consisting of 5 years of a legume, 2 years of row crops, and 2 years of small grain. This rotation or a variation of it is used in most of the survey area. The kinds of row crops to be grown depend on the expected supply of irrigation water. Oats or barley normally are grown as a nurse crop to new seedings of alfalfa.

The yields in columns A are those that can be expected under average, or common, management. Under common management, phosphorus fertilizer is applied sparingly or not at all; nitrogen is seldom used. Most of the available animal manure is spread. Sugar beets generally are fertilized with phosphorus and nitrogen.

Under common management, water-control structures generally are inadequate, and water is applied without enough regard to proper length of run or to the timely needs of crops. Pastures are not clipped, rotation graz-

ing is not practiced, and no commercial fertilizer is applied. In some instances droppings are scattered, but generally they are not.

The yields in columns B are those expected over a period of years under a moderately high level of management. This management provides that phosphorus fertilizer is applied when new seedings of alfalfa are being established and again after 2 or 3 years. Nitrogen fertilizer is used on row crops after the first year out of alfalfa and occasionally on small grains, unless animal manure is available. All available animal manure is spread. Tillage is reduced to essential, timely operations to avoid traffic pans or compacting the soil. In addition operators use control structures for handling irrigation water, use proper lengths of runs that are adapted to soil conditions, and apply water in the quantity that satisfies crop requirements.

Under a moderately high level of management, irrigated pastures generally contain about 50 percent alfalfa and 50 percent grass. Regardless of the amount of alfalfa fewer animals die of bloat when rotation grazing is used than when it is not used. Alfalfa is allowed to mature to the hay stage before animals graze it, and then animals are concentrated so that all the forage is consumed within a few days.

Pastures that are rotated, and in which alfalfa is the primary source of forage, should be grazed about 6 days and then rested for 28 to 40 days to allow for the regrowth of plants. The length of the regrowth period is about the same as the interval between hay cutting. Six paddocks, or grazing units, generally are well suited to rotation grazing. This is the minimum number of paddocks that can be used if irrigation water is applied about every 14 days. This number allows for an irrigation immediately after grazing is finished and again 6 to 8 days before the next grazing so that the soil is dry when grazed.

At the stocking rate of 20 cows per acre, 6 days are needed to harvest efficiently the forage in a 5-acre pasture. Pastures grazed at this rate seldom need to be mowed for weed control oftener than every other year. Droppings are spread each year.

From 40 to 50 pounds of available nitrogen fertilizer are applied before growth starts each spring. Phosphorus fertilizer is applied every 2 or 3 years.

The length and warmth of the growing season at Green River allows farmers to have a greater variety of crops and larger yields than are feasible in the other parts of the survey area. For this reason, the soils at Green River are designated "extended season" phases to separate them from their counterparts in Castle Valley. For example, at Green River three full crops of alfalfa are obtained, and corn matures and is harvested for grain. In Castle Valley, on the other hand, alfalfa produces only two full crops and part of a third, and corn does not mature for grain. The frost-free period in Green River is 140 to 160 days, and the average temperature in summer is 76° F. In Castle Valley, the frost-free season is 110 to 130 days, and the average temperature in summer is 66° F.

The amount of soluble salts or alkali in the soil determines the kinds of crops that can be grown, and affects crop yields.

FGL

FRUIT GROWERS LABORATORY, INC.

May 19, 1989

LAB NO: 15913 03

RE: LANDSCAPE SOIL ANALYSIS

RECEIVED
SEP 15 1989

Nature-Gro Corp.
P.O. Box 4135
Pacoima, CA 91381

DIVISION OF
OIL, GAS & MINING

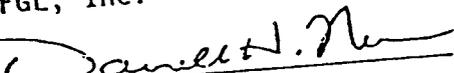
Location: Utah P & E, below road
Description: Preplant Landscape
Date Sampled: 05/04/89
Sampled by: Nature-Gro

Date Received: 04/27/89
Depth: 0-6"

TEST RESULTS	Your Analysis	Optimum Range	Comment
Moisture	1.00 %	1/2 Satn. %	Too Dry
Saturation	32.00 %	--	Loam
Nitrate-Nitrogen	6.00 PPM	10 - 40	Low
Phosphorus	2.00 PPM	13 - 40	Very Low
Exch. Potassium	270.00 PPM	81 - 300	Ample
Limestone	7.30 %	0	See Below*
pH	7.90	5.8 - 8.2	OK
Soil Salinity	20.70	0.3 - 2.0	Excessive
Gypsum Requirement	4.00 T/AF	0	Apply
Lime Requirement	0.00 T/AF	0	OK
Sulfate-Sulfur	95.80 meq/l	< 20	Excessive
Chloride	39.00 meq/l	< 3	Excessive
Boron	0.50 PPM	0.02 - 1.0	OK
Calcium	49.30 meq/l	> 2.0	Ample
Magnesium	16.30 meq/l	> 1.5	Ample
Sodium	175.80 meq/l	See SAR/ESP	--
SAR	30.70	< 7	Too High
ESP	30.30	< 10	Too High
Zinc	2.40 PPM	> 0.7	Ample
Manganese	1.60 PPM	> 1.4	Ample
Iron	16.90 PPM	> 8	Ample
Copper	0.80 PPM	> 0.2	Ample

Soil pH & Limestone levels are important to consider when making plant selections. Soils having pH levels above 7.0 should not be used for plants that require acid soil conditions. Soils containing free limestone should not be used for plants that require acid soil conditions or are sensitive to limestone.

FGL, Inc.


Darrell H. Nelson

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CHEN & NORTHERN, INC.
1000 East 1000 North
Salt Lake City, Utah 84143
Tel: 801-462-1661
Tel: 801-462-1363 Facsimile

August 29, 1990

APPENDIX III

Johansen & Tuttle
90 South 100 East
Castledale, Utah 84513

Des-Bee-Dove Mine
Sedimentation Pond & Road
Stability Analysis

Attention: Mr. Craig Johansen
Subject: Debris Basin Dike and
Road Fill Slope Stability Analysis
Project No. 5-462-90

Gentlemen:

At your request, we have performed a slope stability analysis for the two embankments referenced above. This letter presents the results of our analysis for these embankments which are located near Orangeville, Utah. The analysis was conducted for the purpose of estimating the factor of safety against slope failure for these embankments.

Site Conditions

A representative of our firm has not been at the site to review site conditions and consequently we have relied upon the information provided by your firm in order to understand site conditions. It is our understanding that the cross-sectional data for the both the dike and the road fill as provided by your firm represent typical cross-sections of the slopes to be analyzed. The cross section as analyzed for the Road Fill and the Debris Basin are shown on Figures 1 and 4, respectively. We further understand that there is no anticipated phreatic surface in the embankment of either project and that the foundation soils for both projects are essentially the same as the embankment material.

We understand that field density testing indicates that the soil at the road embankment has an in situ dry density which varies from 112.5 to 122.2 pounds per cubic foot and that the moisture content varies from 9.8 to 11.2 percent of the dry density. Similarly, the soil within the Debris Basin Dike has an in situ dry density which varies from 102.7 to 115 pounds per cubic foot with a moisture content in the range 11.6 to 19.9 percent. Soil samples representative of the embankment and foundation soils, at each of the embankment sites, were delivered to our laboratory.

Laboratory Testing

The samples delivered to our laboratory were observed and visually classified. Pertinent laboratory testing was conducted on each sample to determine the engineering and physical properties of the soils in general accordance with ASTM or other approved procedures.

<u>Tests Conducted:</u>	<u>To Determine:</u>
Grain-size Distribution Figures 2 and 5	Size and distribution of soil particles; that is, clay, silt, sand, and gravel.
Atterberg Limits Figure 2	A method of describing the affect of varying water content on the consistency of fine-grained soils.
Moisture-density Relationship Figures 2 and 5	The optimum moisture content for compacting soil and the maximum dry unit weight (density) for a given compactive effort.
Direct Shear Figure 3 and 6	General soil strength properties.

Results of the laboratory tests are summarized on the enclosed figures as indicated above. Based on the laboratory test results soil samples were classified in accordance with ASTM D-2487 which is based on the Unified Soil Classification System.

Soil Conditions

Road Fill

The embankment and foundation soils contained in the road fill consist of a clay with moderate plasticity. This clay is primarily fine-grained but contains chunks of claystone which accounts for the gradation as shown on Figure 2. The moisture density relationship indicates that the soil has a maximum dry density of 124 pounds per cubic foot and an optimum moisture content of 10.5 percent.

Based on the field density tests soil samples were reconstructed to a dry unit weight of 115 pounds per cubic foot at a moisture content of 10 percent for direct shear testing. Due to the lack of a phreatic surface through the embankment the direct shear testing was completed at the moisture density indicated above. Direct shear test results indicated a friction angle of 36 degrees and a cohesion intercept of 1,500 pounds per square foot. The direct shear results seem somewhat high for anticipated field conditions. As a result, for use in the slope stability analysis, the friction angle has been reduced to 30 degrees and the cohesion to 1,200 pounds per square foot. It should be noted that if a phreatic surface were to be established within the road fill that this could lead to a substantial softening of the soils as measured during this testing.

Debris Basin

The soil contained in the embankment and foundation of the Debris Basin Dike consists of silty sand with gravel. This soil is broadly graded and has low to no plasticity. The moisture density relationship indicates a maximum density of 125 pounds per cubic foot and a moisture content of 9.5 percent.

Based on results of the field density tests, samples were reconstructed for direct shear testing at a dry unit weight of 105 pounds per cubic foot and moisture content of 15 percent. Prior to the initiation of the direct shear testing these samples were allowed to saturate. Direct shear testing indicated a friction angle of 32 degrees with no cohesion. Due to the significant amounts of coarse rock removed from the soil in order to prepare samples which could be tested in the direct shear testing apparatus, it is felt that a slight increase in the test results for this sample would be appropriate for use in stability analysis. Soil strengths used in the stability analysis are a friction angle of 34 degrees and a cohesion intercept of zero.

Stability Analysis

A computer model of Bishop's Simplified Method was used to perform the actual stability calculations. The computer model used was Stabl5M, which was developed at Purdue University for the Federal Highway Administration.

The Bishop's Simplified Method of Analysis is a limiting equilibrium method which relates, through the use of a factor of safety, the available shearing strength and the shear stresses which develop within the soil mass. This relationship provides a limiting value of which the forces acting to cause failure are in balance with those acting to resist failure. The limiting value of the factor of safety is 1.0 at which the shearing stresses are equal to the maximum shearing strength and failure of a particular potential failure mass is eminent.

Analyzing the stability of a particular potential failure mass using the Bishop's method requires that the mass be divided into several slices. The analysis to determine slope stability then considers all the forces acting on each individual slice or body. In the Bishop's method the forces which act on each slice are resolved vertically. This yields an equation of equilibrium in which the unknowns are the normal and tangential forces acting on the failure surface and the difference between the vertical side forces. The tangential force on the failure surface is the shearing force acting to cause failure of the body. The normal force is used in the Mohr-Coulomb strength criteria of the soil.

In order to reduce the number of unknowns, Bishop applied the limit equilibrium condition that the shearing stress equals the available strength, divided by the factor of safety. Ultimately it is the factor of safety that is being solved for. In the Simplified Bishop's Method it is assumed that the difference in the vertical side forces is small enough to be neglected. Comparison of this method with more rigorous methods shows that this assumption results in a slightly lower or more conservative factor of safety. In general, however, the results of this method are very close to the more rigorous methods and the Bishop's Simplified Method is considered to be appropriate for use in slope stability analysis.

Both embankments were analyzed under static conditions. In addition the Debris Basin was also analyzed under earthquake conditions. For the conditions of this study, it is felt that the pseudo static method of analysis is appropriate for use in the dynamic analysis.

The pseudo static method of analysis assumes a constant horizontal acceleration of a given value. The site of the debris basin is located within Zone 2-B of the Uniform Building Code Seismic Zone Map of the United States. It is estimated that at the site there is a 90 percent probability that the site will experience a maximum horizontal acceleration of 0.10g in the next 50 years and 0.2g during the next 250

years. It has been estimated that for use in seismic Zone 2 that a pseudo static coefficient or constant acceleration of 0.10g is appropriate. This value is used under earthquake conditions in this study.

Analysis Results

	<u>Factor Safety</u>	<u>Required Safety Factor</u>
Road Fill	1.72	1.3
Debris Basin, Down Stream	1.65	1.5
Debris Basin, Down Stream with Earthquake	1.28	1.2
Debris Basin, Up Stream	2.20	1.5
Debris Basin, Up Stream with Earthquake	1.63	1.2

Conclusions

Based on the assumptions used in this analysis, as previously discussed, it is our opinion that the slopes under consideration have factors of safety against failure in excess of those which have been set as a required minimum. As such, we feel that these slopes should be considered stable.

It should be noted, however, that a change in field conditions could significantly alter the results of this analysis. One of the most common causes of slope failures is the presence of unaccounted for seepage water which can cause softening of cohesive soils and, in all types of slopes, result in pore pressures which reduce slope stability. As with all embankments, monitoring of field conditions is important to determine that field conditions do not change. Where field conditions do change, stability of slopes needs to be reconsidered.

Limitations

This analysis has been completed in accordance with general accepted soil engineering practices in this area. The results of this analysis and the conclusions contained in this letter are based upon the data provided from the client and the assumptions regarding field densities and phreatic surface. If actual conditions appear to be different from those described herein this office should be advised at once so that reevaluation and recommendations may be made.

CHEN-NORTHERN, INC.

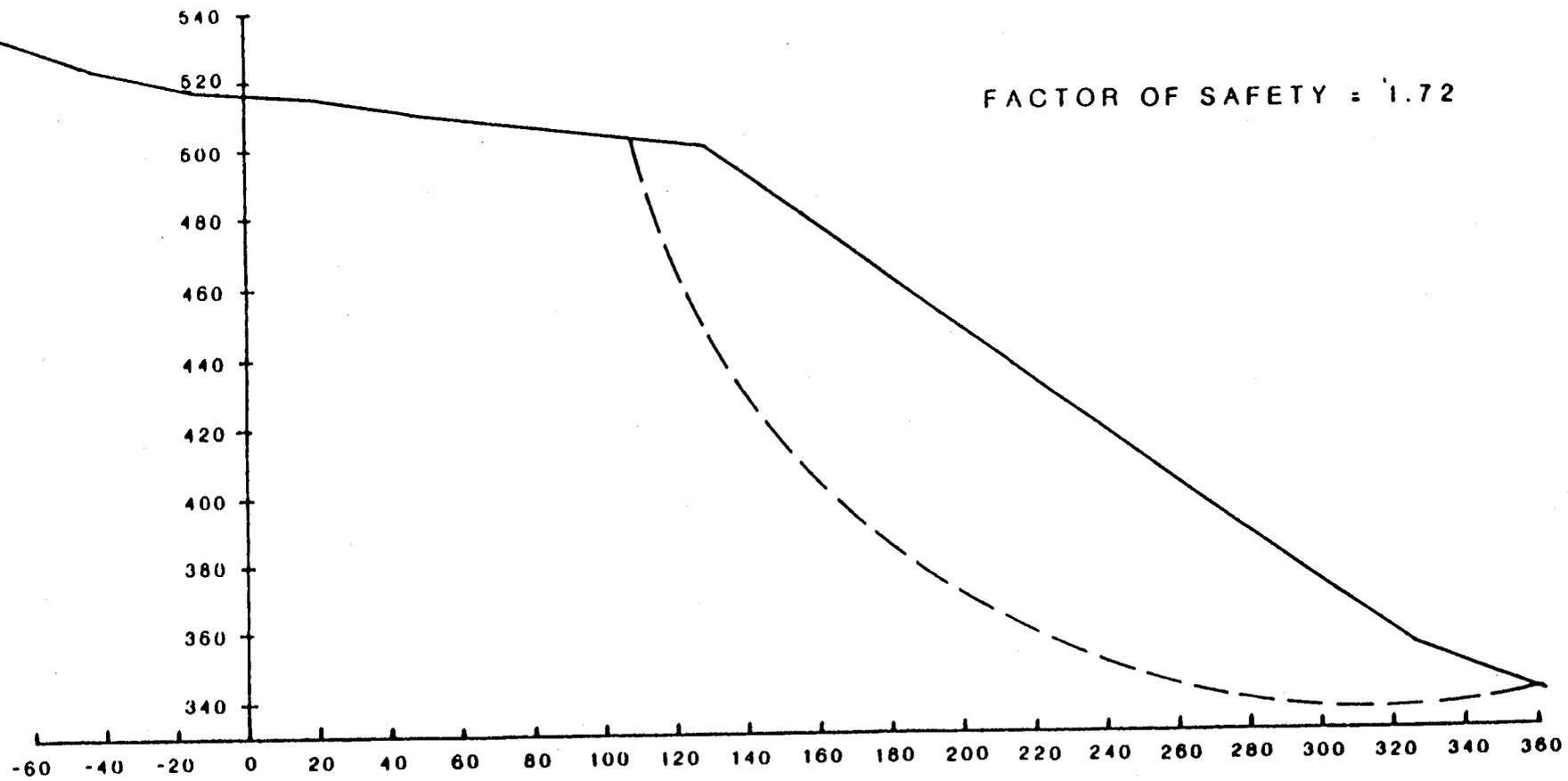


David K. Marble, P.E.

Rev. by WWJ, P.E.

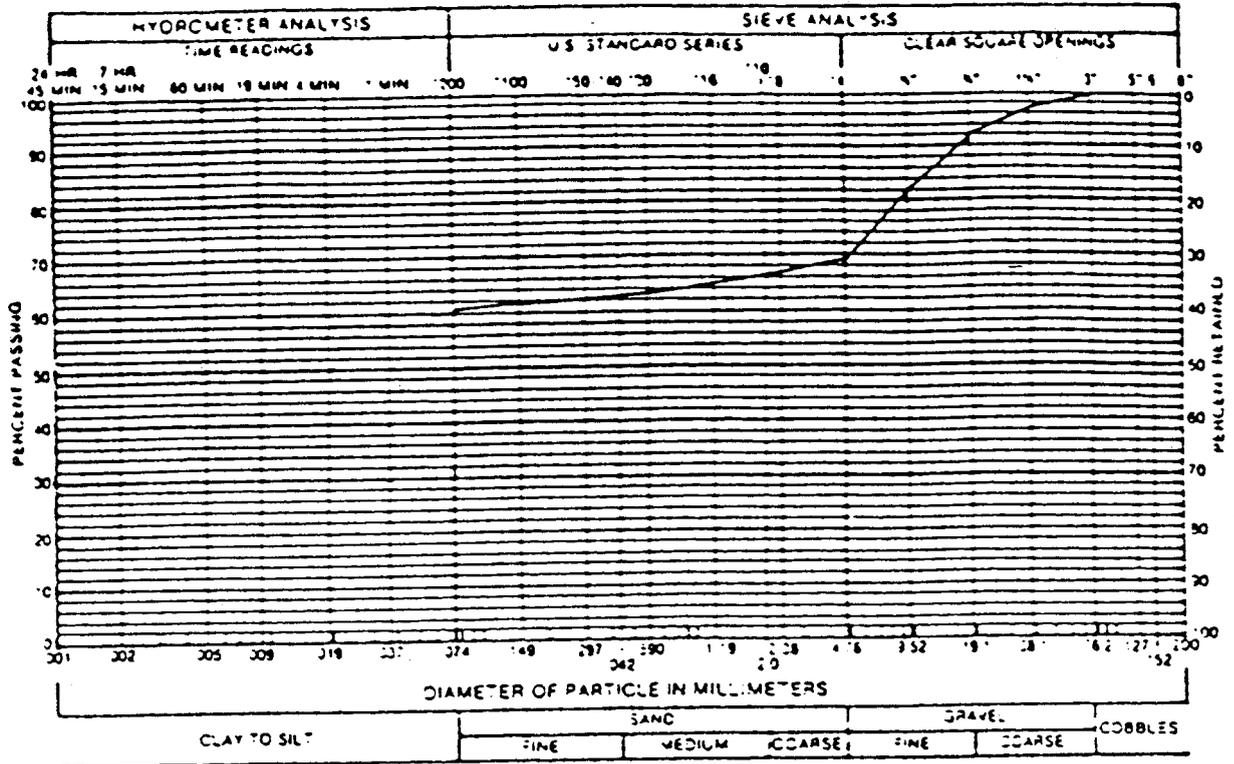
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Enclosures-6



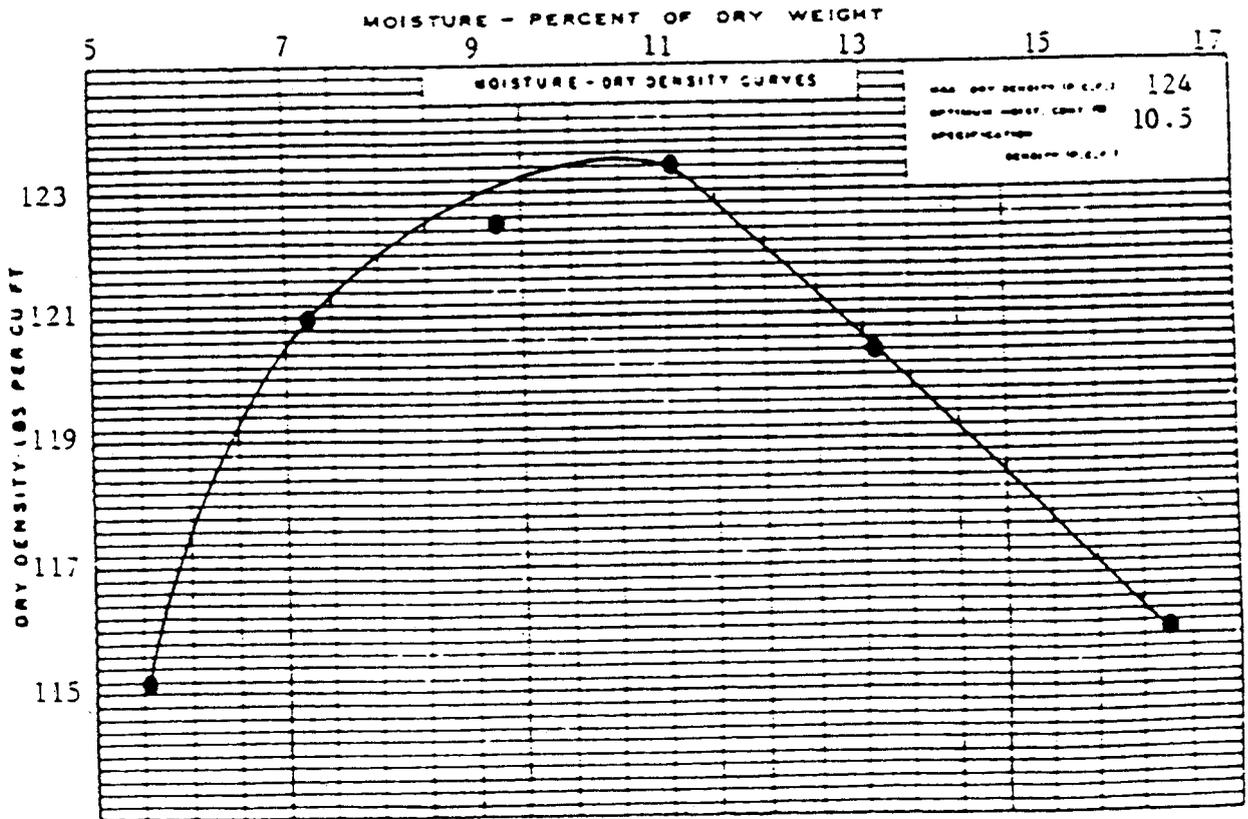
— — — CRITICAL FAILURE SURFACE

Chen Northern, Inc.



GRADATION TEST RESULTS

GRAVEL 32 % SAND 7 % SILT AND CLAY 61 %
 LIQUID LIMIT 31 PLASTICITY INDEX 15



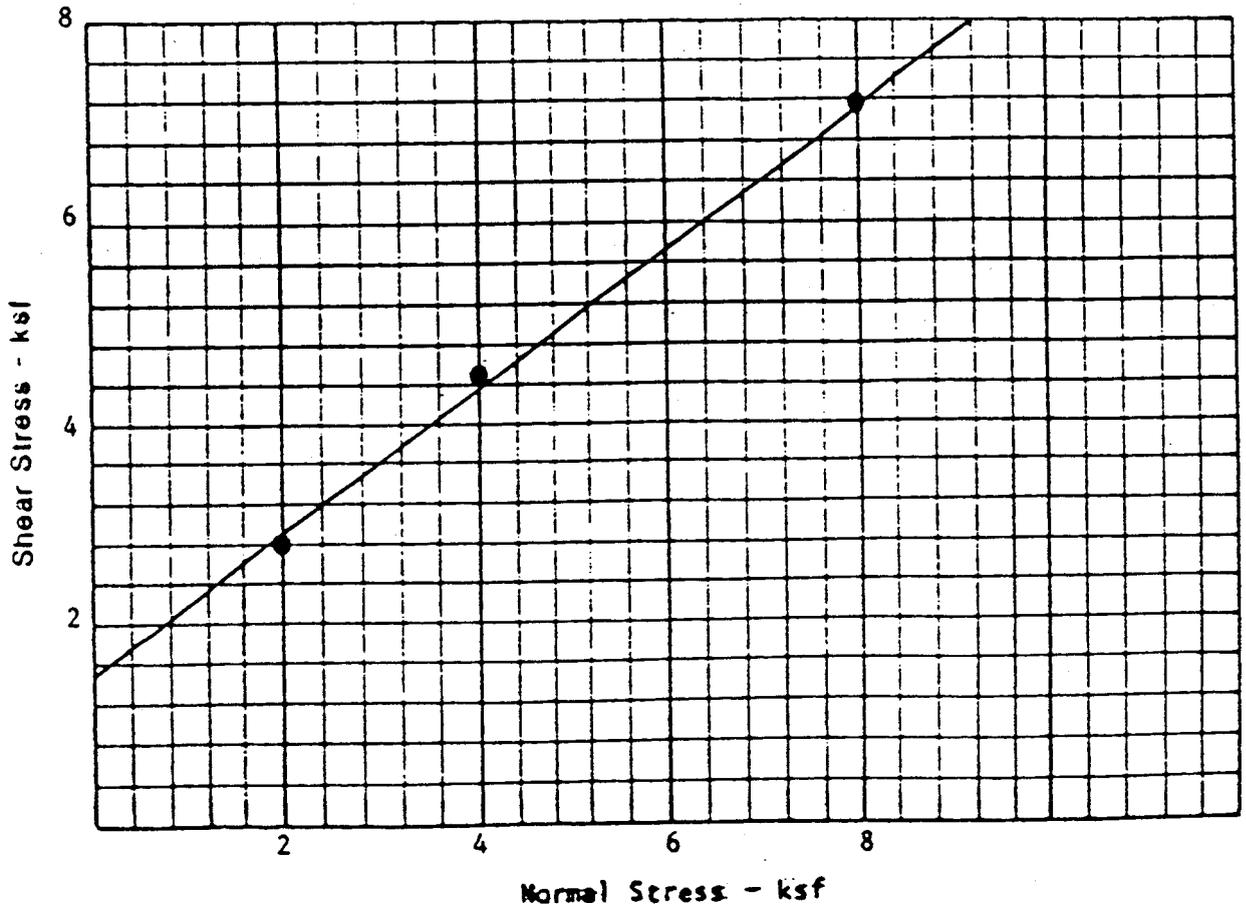
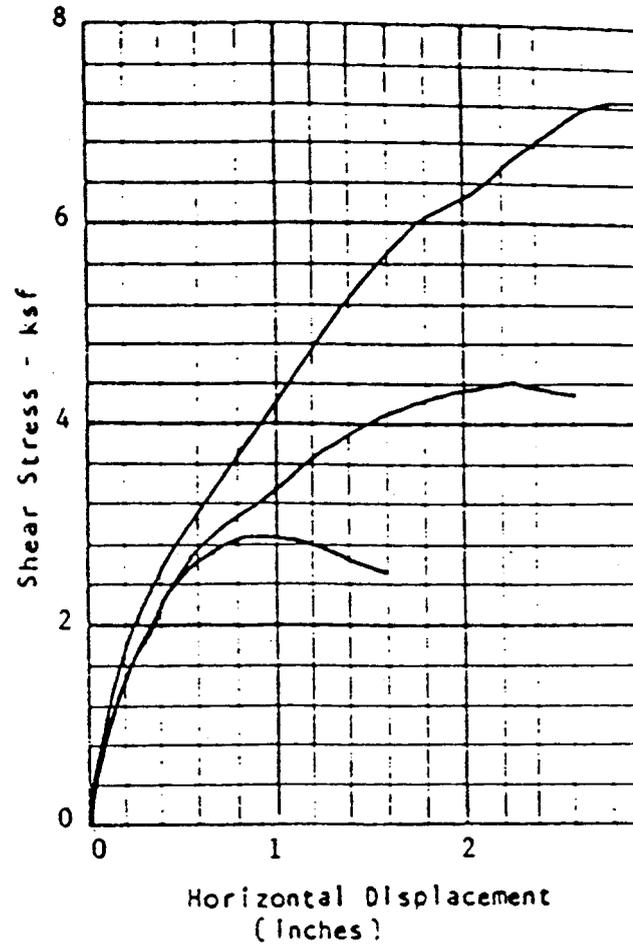
COMPACTION TEST RESULTS

COMPACTION TEST PROCEDURE
 SAMPLE OF (CL) Lean Clay

TEST NUMBER	1	2	3	4
LOCATION	ROAD-FILL	ROAD-FILL	ROAD-FILL	
HEIGHT-INCH	1"	1"	1"	
DIAMETER-INCH	2.4"	2.4"	2.4"	
WATER CONTENT - %	10	10	10	
DRY DENSITY - ocf	115	115	115	
CONSOL. LOAD - ksf	2	2	8	
NORMAL LOAD - ksf	2	4	8	
SHEAR STRESS - ksf	2.81	4.48	7.20	

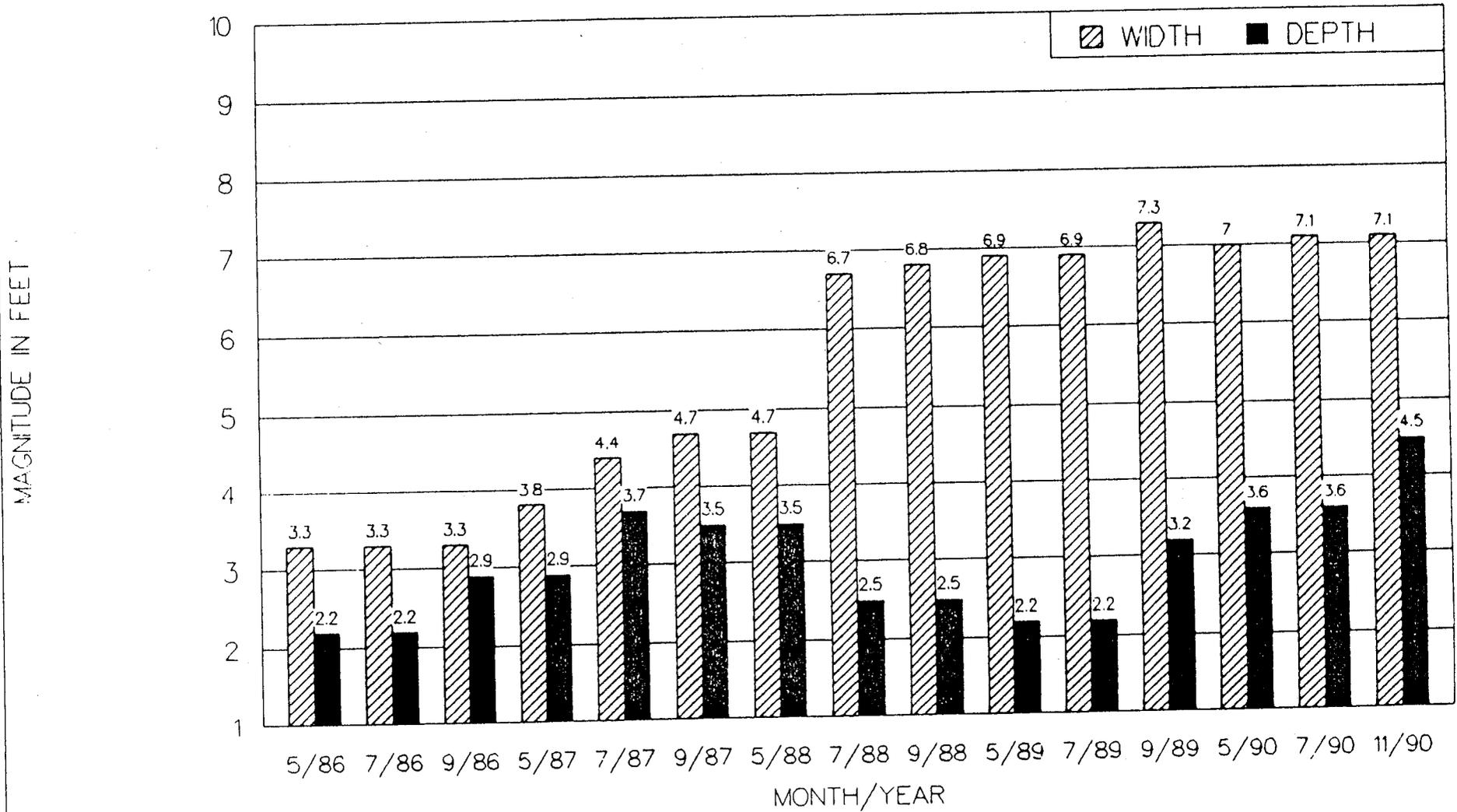
TYPE OF SPECIMEN Remolded
 SOIL DESCRIPTION (CL) Lean Clay
 TYPE OF TEST Unsaturated
Shear Rate 0.12 MM/MIN

Friction Angle = 36°
 Cohesion = 1.5 ksf



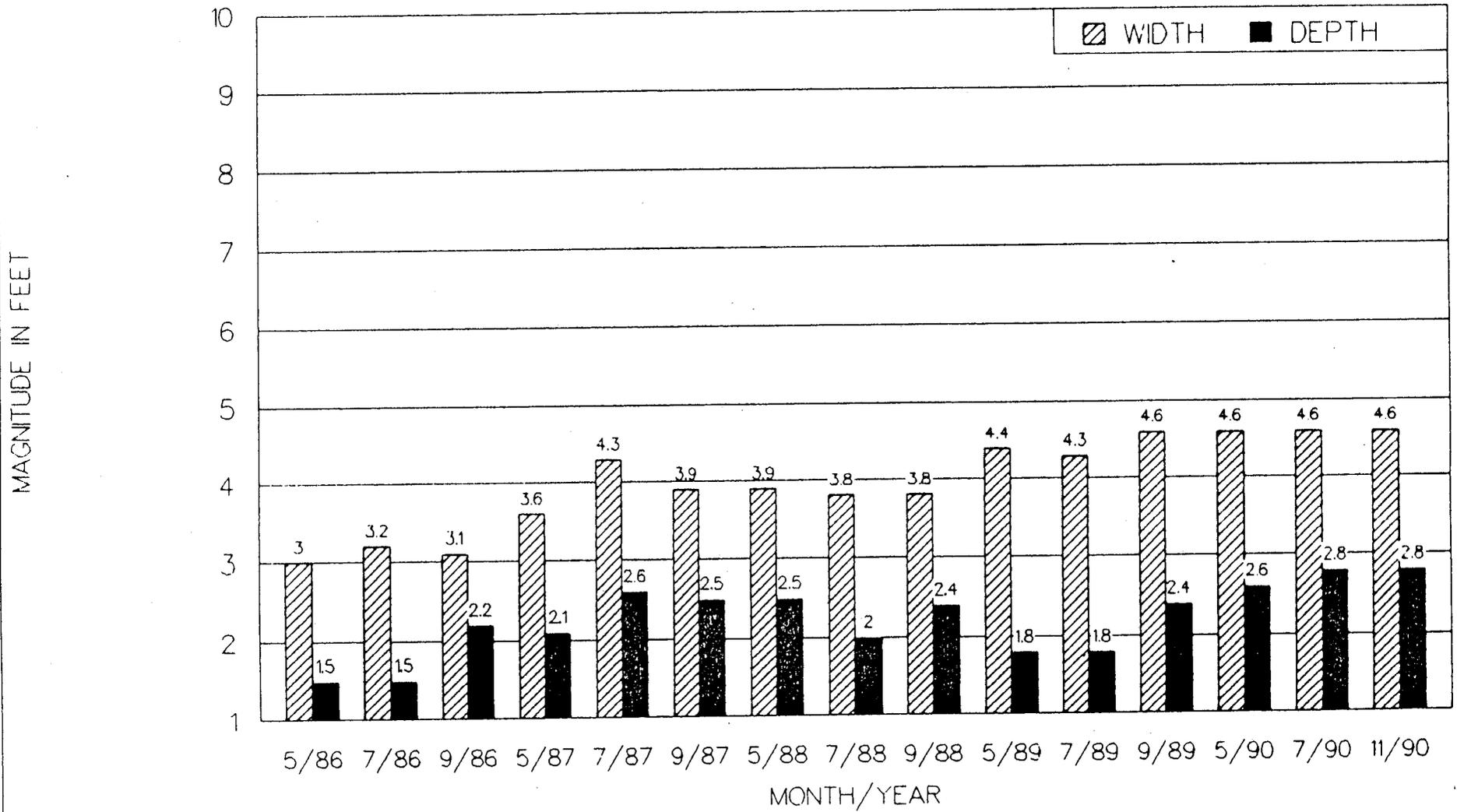
DES-BEE-DOVE HAUL ROAD EROSION
1986 THRU 1990

SITE 1



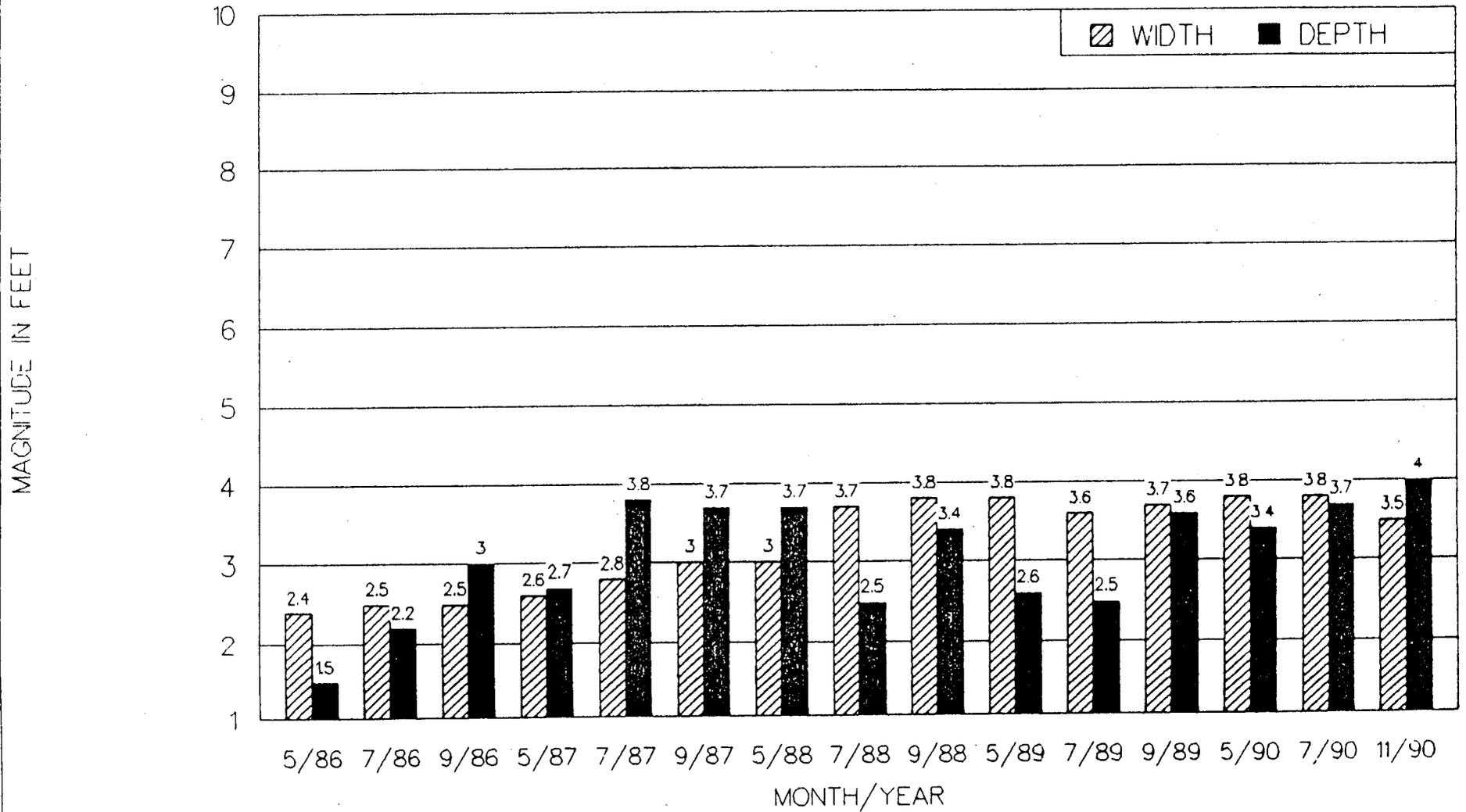
DES-BEE-DOVE HAUL ROAD EROSION
1986 THRU 1990

SITE 2



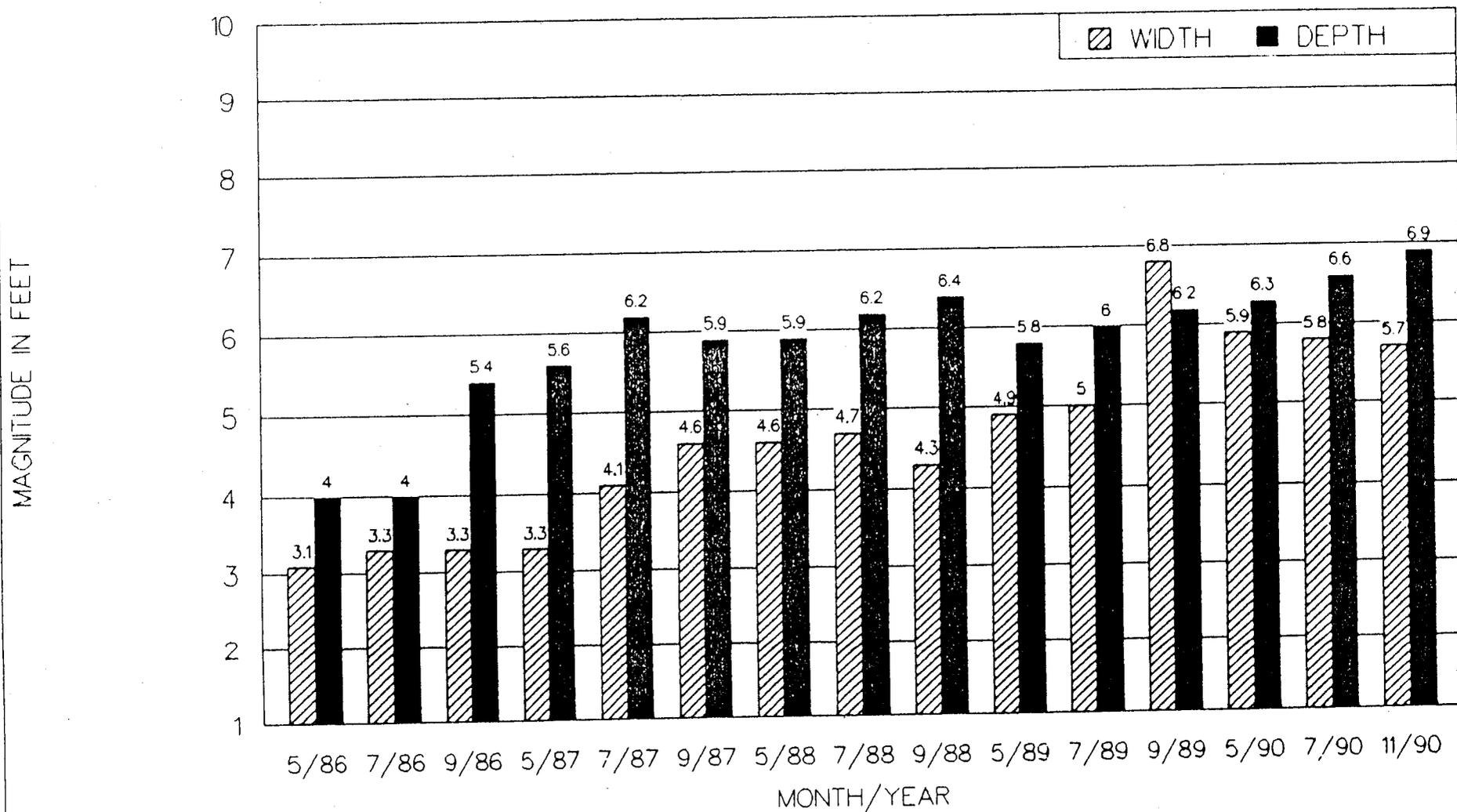
DES-BEE-DOVE HAUL ROAD EROSION
1986 THRU 1990

SITE 3



DES-BEE-DOVE HAUL ROAD EROSION
1986 THRU 1990

SITE 4



PHASE III DESIGN DEVELOPMENT

The primary objective of the reclamation study is to determine the reclaimability potential of the disturbed Mancos shale and to assess the effectiveness of the reclamation methodologies outlined in the Des Bee Dove Permit Application Package.

A secondary objective is the stabilization of erosion rills and gullies.

Effective reclamation will preferably include revegetation. Establishment of a vegetative cover will help to reduce and control erosion.

Existing site characteristics create marginal conditions for revegetation. These characteristics include; climatic factors (lack of precipitation and southwestern exposure, lack of topsoil, existing soil characteristics (low essential elements, high salinity, high sulfur and chloride, poor texture).

Similar characteristics existed at the Emery Coal Field (BLM EMRIA Report No. 16). Measures to address these factors included admixing of better soil materials or power plant fly ash with the existing soil. Proper admixing may dilute high soil elements and supplement low ones.

In addition to dilution, admixing with fly ash or other materials of less density than the Mancos, results in improved physical characteristics including increased pore volume, moisture availability and air capacity.

Admixtures proposed for the haul road test plots (See Map Cm-10602-DS Sheet 1 of 3) include better quality soil and coal spoil materials. Fly ash is not proposed because the elements which it would add to the Mancos (i.e. copper, zinc, calcium) are present in adequate concentrations. It is felt that the other admixtures are more suitable for improving the physical characteristics of the Mancos.

The potential for coal spoil materials to support vegetation has been observed at various abandoned mine refuse piles. Therefore, it appears that this material is a viable admixture.

Observations of natural conditions indicate that a mixture of soil and Mancos also supports vegetation.

The following procedures are proposed for admixing of materials at the haul road test plot site (refer to page 28):

- 1* Sample and analyze natural mancos/shale sites which support vegetation.
- 2* Sample and analyze coal spoil sites which support vegetation.

- 3* Sample and analyze coal waste material at the Cottonwood Waste Rock Site.
- 4* Sample and analyze the soil (Mancos) at the haul road site.

*Analyses will include the following parameters:

Texture (% sand, silt clay)
 SAR (meq/l)
 pH (standard units)
 Ec (mmhos/cm)
 Saturation Percentage (%)
 Organic Carbon (%)
 Total N (%)
 Available Phosphorus (mg/Kg)
 Available Potassium (mg/Kg)
 Water Extractable Boron (mg/Kg)
 Water Extractable Selenium (mg/Kg)
 Acid-Base Potential
 Available Water (%)
 1/3 and 15 atmospheres
 Soluble Ca, Mg and Na (meq/l)

- 5 Apply admixtures/or amendments to approximate conditions at natural vegetated mancos sites.
- 6 Incorporate adequate quantities of admixtures or amendments into top 12 to 18 inches of the mancos soil at the test plot sites to simulate soil conditions at natural vegetated mancos sites.
- 7 Sample and analyze test plot sites (per parameter list) to determine similarity with natural areas.

Following incorporation of admixtures and amendments at the test plots, contour ditches will be constructed across the entire test plot area. The ditches will be installed at 11 foot intervals from the top of the slope to the bottom. The ditches will completely retain the runoff at the test plot resulting from a 10 yr/6 hr storm event (see pages 31 and 32).

Following construction of the contour ditches the following seed mixture will be hand broadcast on the entire test plot. The seed will be covered by hand raking.

<u>Agropyron dasystachyum</u>	thickspike wheatgrass	3
<u>A. smithii</u>	western wheatgrass	4
<u>Oryzopsis hymenoides</u>	Indian ricegrass	3
<u>Elymus cinereus</u>	basin wildrye	4
<u>Sporobolus airoides</u>	alkali sakatoon	.25
<u>Melilotus officinalis</u>	yellow sweetclover	2

<u>Linum lewisii</u>	Lewis Flax	1
<u>Sphaeralcea</u>		
<u>grossularifolia</u>	globemallow	.5
<u>Atriplex canescens</u>	fourwing saltbush	2
<u>A. corrugata</u>	mat saltbush	2
<u>A. confertifolia</u>	shadscale	1
<u>Ceratoides lanata</u>	winterfat	2
<u>Kochia prostrata</u>	prostrata kochia	.5
	Total (PLS/Acre)	25.25

Following seeding, the various mulch treatments will be applied as indicated on page 28.

A standard 4 wire field fence will be installed to protect the test plots from disturbance by livestock.

A rip-rap lined ditch and dirt berm will be installed along the crest of the slope above the test plot area. The ditch is sized to adequately carry runoff from a 10 yr/6 hr storm event (see pages 33 thru 38).

The test plots will be monitored as described in the Des Bee Dove Permit Application Package.

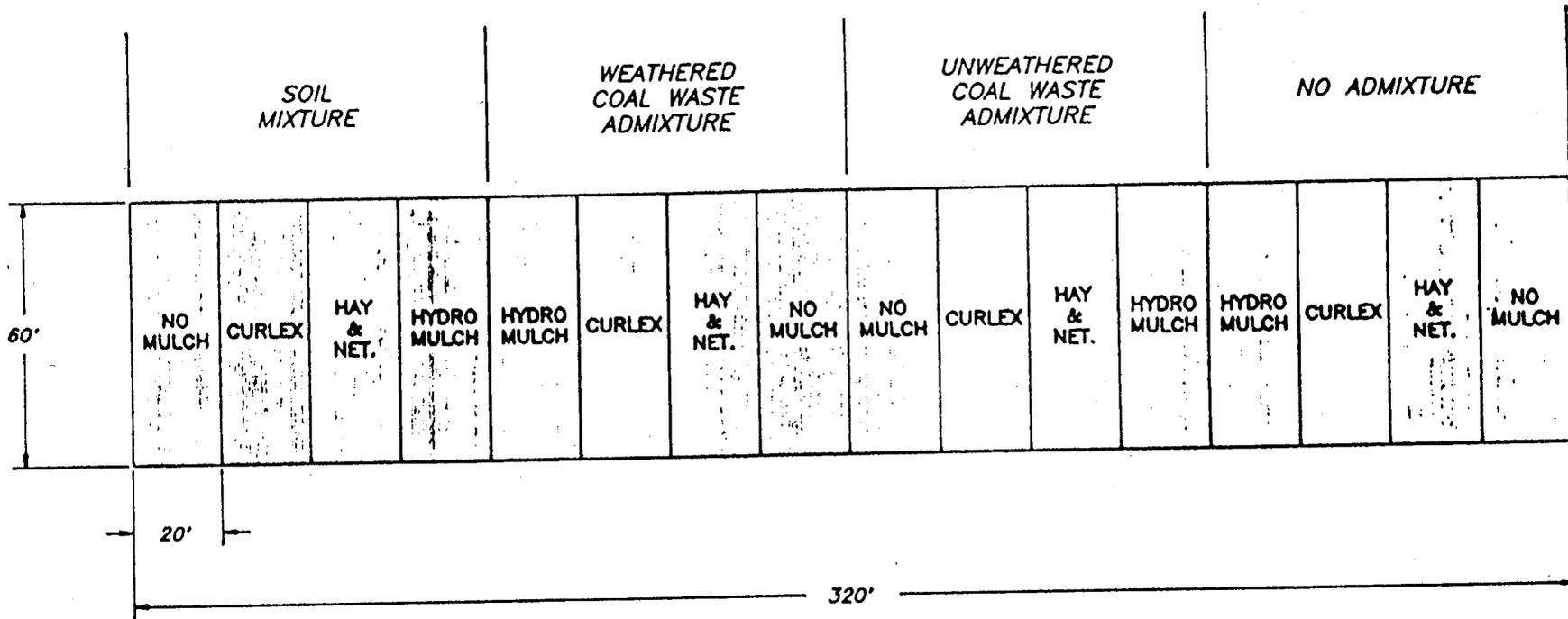
The present erosion monitoring program will continue at the four(4) established sites (see Map CM-10602-DS sheet 1 of 3). The current monitoring data seems to indicate gully development toward equilibrium at several sites similar to that discussed in BLM Technical Note 366. Data will be obtained from areas where naturally stable channels exist on slopes similar to the haul road slope. The geometric configuration of these natural channels will be determined and a comparison made between them and the erosion channels on the haul road slope.

The feasibility of constructing a simulated natural channel at the sites of haul road erosion will be determined. Construction of such a channel may include the various gully control structures as discussed in USFS Research Paper RM-169, pages 12 thru 31. If feasible, construction of the down slope channel would include attempts to establish vegetation as a means of channel stabilization.

Technical information will continue to be collected as well as site specific monitoring data. All information will be used to evaluate the effectiveness of reclamation measures installed and to identify possible alternatives, if necessary, for final reclamation of the haul road.

Additionally, as stated in the Des Bee Dove PAP, vegetation test plots will be established at several additional fill slope sites along the haul road. These sites will provide information on the suitability of the fill material for final reclamation of the haul road in soils other than the mancos.

DES-BEE-DOVE HAUL ROAD
RECLAMATION TEST PLOTS



CAD FILE NAME/DISK: HAULRD R1.7

PACIFICORP ELECTRIC OPERATIONS
FUEL RESOURCES DEPARTMENT
P.O. BOX 28128 SALT LAKE CITY, UTAH 84128-0128

DES-BEE-DOVE
HAUL ROAD RECLAMATION STUDY
VEGETATION TEST PLOTS

DRAWN BY: **K. LARSEN**

CS1284A

SCALE: **1" = 40'**

DRAWING #:

DATE: **MARCH 5, 1991**

SHEET **1** OF **1**

REV.

DES BEE DOVE HAUL ROAD

HYDROLOGICAL ANALYSIS

Rainfall depth for a 10 yr/6 hr storm event was determined from US Dept. of Commerce, NOAA Atlas 2, 1973.

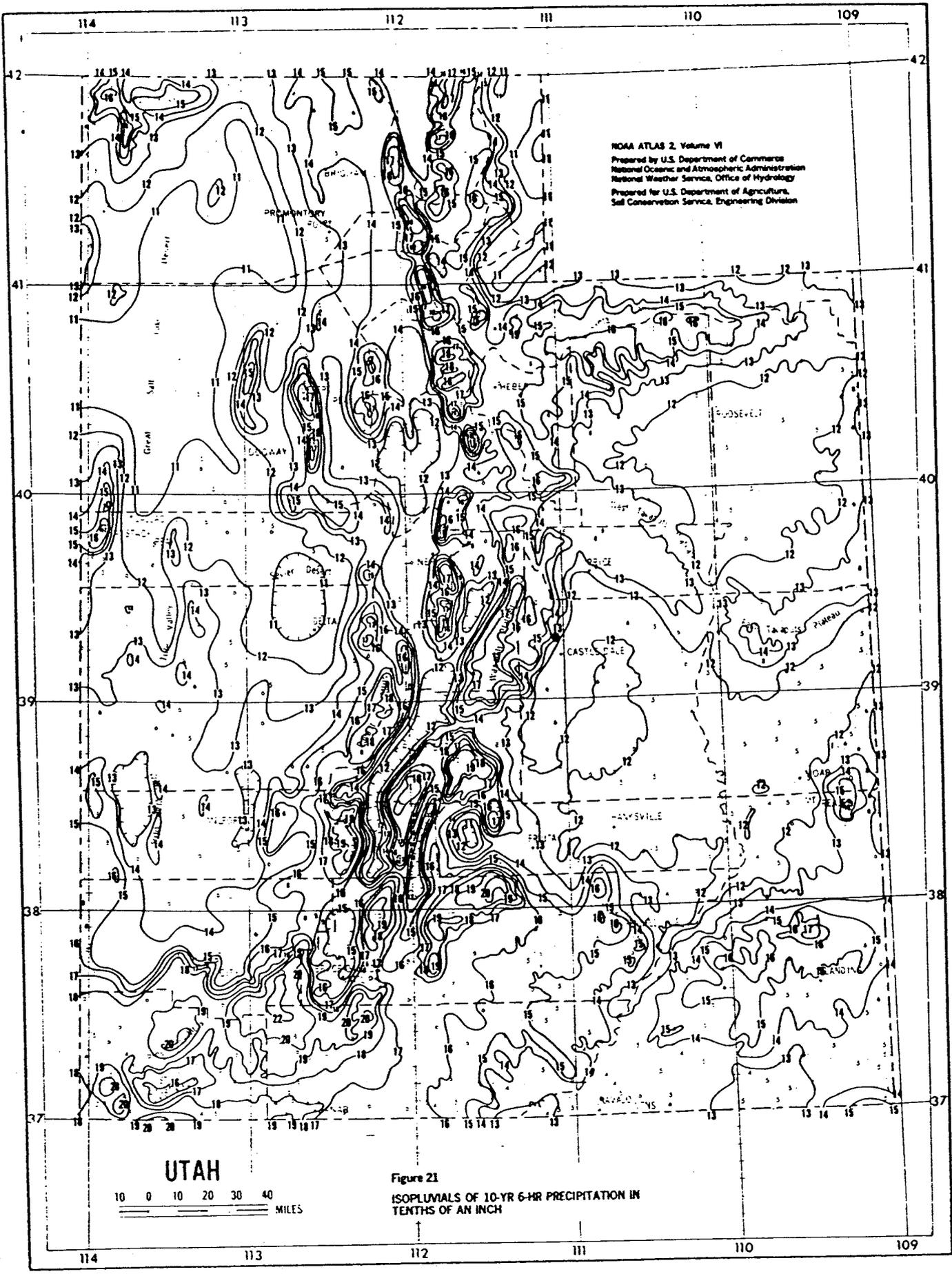
The rainfall-runoff relation for the test plot slope was determined as discussed in SCS National Engineering Handbook, 1972, Section 4, Hydrology, Chapter 10.

The peak runoff values for the riprapped crest ditch were calculated by use of the "Storm Hydrograph Program" by Richard H. Hawkins and Kim A. Marshall, September 1979, Utah State University Foundation. The drainage area was determined based on final reclamation topography of the haul road from Station 121+00 to 142+00.

The design of the crest ditch is based on Manning's equation for open channels. The design channel is a trapezoid shape with 1:2 side slopes and a 2 feet bottom width. The value for Manning's N for the rip-rap channel lining was taken from A Compliance Manual, Methods for Meeting OSM Requirements, by Skelly and Loy, 1979, page 7-16.

The channel capacity was determined as outline in Utah State DOT Manual of Instructions, Part 4 - Road Drainage, 1984, pages 3-22 and 3-32.

The rip-rap ditch lining design was based on the procedure in Applied Hydrology and Sedimentology for Disturbed Areas, by B.J. Barfield, R.C. Warner and C.T. Haan, Oklahoma Technical Press, 1981.



DES BEE DOVE HAUL ROAD
STORM RUNOFF VALUES FOR 10 YEAR, 6 HOUR EVENT

RAINFALL DEPTH 1.3 INCHES

DISTRIBUTION: SOIL CONSERVATION SERVICE TYPE II

CN: 98

RAINFALL-RUNOFF RELATION, TEST PLOT SLOPE

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

WHERE: $P = 1.3''$
 $S = \frac{1000}{CN} - 10 = .204$

$$Q = \frac{(1.3 - 0.2 (.204))^2}{1.3 + 0.8 (.204)}$$

$$Q = 1.09 \text{ IN/FT}^2$$

TEST PLOT AREA = 320' X 60' = 19,200 FT²

TOTAL RUNOFF = 1744 CU.FT.

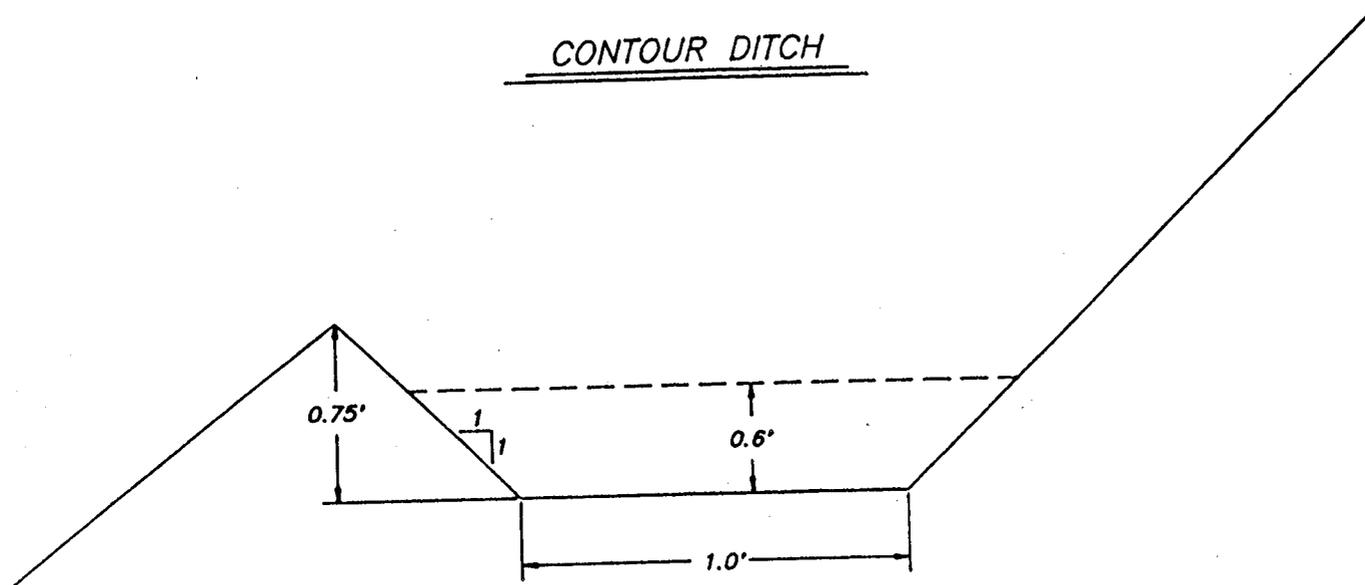
CONTOUR DITCHES CAPACITY = 1 CU.FT./ 1 FT. LENGTH

CAPACITY OF EACH DITCH = 320 CU.FT.

LENGTH OF SLOPE = 60 FT.

SPACING OF DITCHES = 11 FT.

CONTOUR DITCH



CAPACITY = 1 FT³ PER LINEAR FT

CAD FILE NAME/DISK #: HAULRD KL7

PACIFICORP ELECTRIC OPERATIONS
FUEL RESOURCES DEPARTMENT

P.O. BOX 28128 SALT LAKE CITY, UTAH 84128-0128

DES-BEE-DOVE
HAUL ROAD RECLAMATION STUDY
CONTOUR DITCH - TYP. CROSS SECTION

DRAWN BY: K. LARSEN

CS1286A

SCALE: NONE

DRAWING #

DATE: MARCH 5, 1991

SHEET 1 OF 1

REV.

TABLE

STORM RUNOFF DETERMINATION
FOR
DBD HAUL ROAD
CREST DITCH

INPUT SUMMARY:

```

=====
DISTRIBUTION = SCS TYPE II          RUNOFF AREA = .02 SQ. MILES
RAINFALL DEPTH = 1.3 INCHES        RUNOFF CURVE NO. = 98
STORM DURATION = 6 HOURS           TIME OF CONCENTRATION = .03 HRS.
=====
    
```

HYDROGRAPH ORDINATES:

TIME (HR)	PPT (IN)	CUM. FLOW (IN)	DEL. FLOW (IN)	FLOW RATE (IN/HR)	FLOW RATE (CFS)
0.00	0.00	0.0000	0.0000	0.0000	0.00
0.00	0.00	0.0000	0.0000	0.0000	0.00
0.01	0.00	0.0000	0.0000	0.0000	0.00
0.01	0.00	0.0000	0.0000	0.0000	0.00
0.02	0.00	0.0000	0.0000	0.0000	0.00
0.02	0.00	0.0000	0.0000	0.0000	0.00
2.98	0.84	0.6347	0.0048	1.1955	15.43
2.99	0.84	0.6395	0.0048	1.1961	15.44
2.99	0.85	0.6443	0.0048	1.1966	15.44
3.00	0.85	0.6491	0.0048	1.1972	15.45
3.00	0.86	0.6539	0.0016	1.1977	15.46
3.00	0.86	0.6555	0.0016	1.1744	15.16
3.01	0.86	0.6571	0.0016	1.1271	14.55
3.01	0.86	0.6587	0.0016	1.0558	13.63
3.02	0.86	0.6603	0.0016	0.9605	12.40
3.02	0.87	0.6619	0.0016	0.8412	10.86
6.04	1.30	1.0836	0.0000	0.0036	0.05
6.04	1.30	1.0836	0.0000	0.0015	0.02
6.05	1.30	1.0836	0.0000	0.0003	0.00
6.05	1.30	1.0836	0.0000	0.0000	0.00
6.06	1.30	1.0836	0.0000	0.0000	0.00
6.06	1.30	1.0836	0.0000	0.0000	0.00
6.06	0.00	0.0000	0.0000	0.0000	0.00

OUTPUT SUMMARY:

```

=====
TOTAL RUNOFF DEPTH = 1.084 IN.      TIME TO PEAK = 2.998 HOURS
INITIAL ABSTRACTION = .041 IN.     RUNOFF VOLUME CHECK = 1.086 IN.
PEAK FLOW = 15.503 CFS
=====
    
```

CREST DITCH CAPACITY CALCULATIONS

$$K' = \frac{Qn}{b^{2/3} s^{1/2}}$$

WHERE:

$$Q = 15.503 \text{ CFS}$$

$$n = 0.0395 \text{ (Manning's } n \text{ for rip-rap)}$$

$$s = 0.08$$

$$b = 2'$$

$$K' = 0.302$$

FROM CHART (PAGE 36) - CAPACITY OF TRAPEZOIDAL CHANNEL

$$\frac{d}{b} = .34$$

$$d = b(d/b)$$

$$d = .68 \text{ ft.}$$

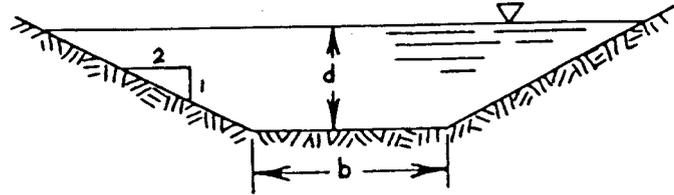
THEREFORE; CREST DITCH WILL CARRY THE PEAK RUNOFF OF 15.503 CFS WITH APPROXIMATELY 0.3' FREEBOARD.

A filter layer will be placed beneath the rip-rap channel lining materials. The filter will consist of 2 inch minus road base material and will be placed in a layer equal in thickness to the D_{50} size of the ditch.

VALUES OF $b^{8/3}$

b	$b^{8/3}$	b	$b^{8/3}$
1	1.00	21	3360
2	6.35	22	3800
3	18.7	23	4280
4	40.3	24	4790
5	73.1	25	5340
6	119	26	5930
7	179	27	6560
8	256	28	7230
9	350	29	7940
10	464	30	8690
11	598	31	9480
12	755	32	10320
13	934	33	11200
14	1140	34	12130
15	1370	35	13110
16	1630	36	14160
17	1910	37	15176
18	2230	38	16320
19	2940	39	17466
20	2950	40	18732

Table 3-22: TRAPEZOIDAL CHANNEL
2:1 SIDE SLOPES

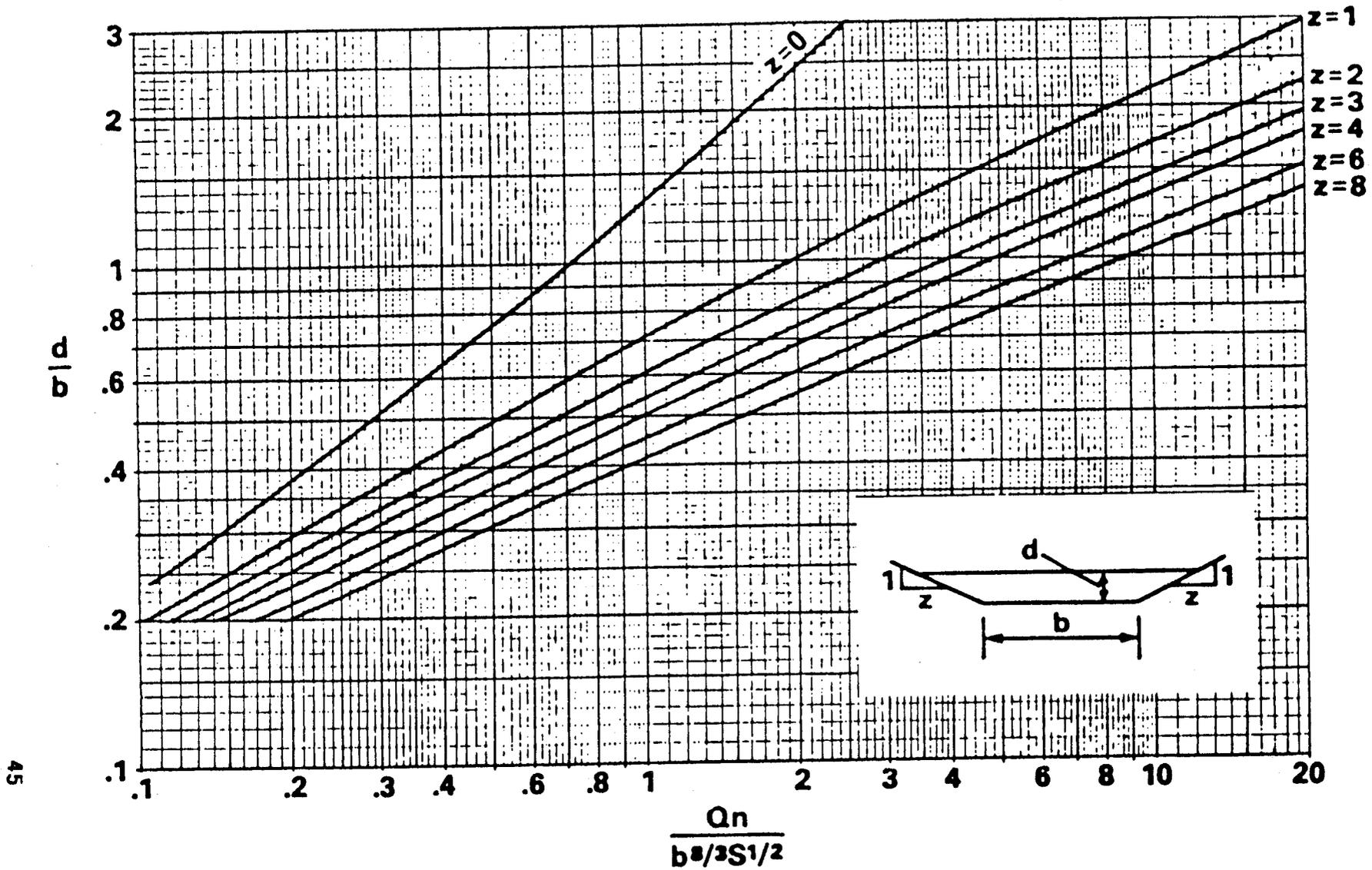


1. Calculate $K' = \frac{Qn}{b^{8/3} s^{1/2}}$
2. Enter the table below at K' and find the corresponding value of d/b .
3. Calculate $d = b(d/b)$.

Values of K' as a function of the ratio d/b .

d/b	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.20	.116	.127	.139	.150	.163	.176	.189	.203	.217	.232
0.30	.248	.264	.281	.298	.316	.334	.353	.372	.392	.413
0.40	.434	.456	.478	.501	.525	.549	.574	.599	.625	.652
0.50	.679	.707	.736	.765	.795	.826	.857	.889	.922	.956
0.60	.990	1.02	1.06	1.10	1.13	1.17	1.21	1.25	1.29	1.33
0.70	1.37	1.41	1.46	1.50	1.54	1.59	1.63	1.68	1.73	1.78
0.80	1.83	1.88	1.93	1.98	2.03	2.08	2.14	2.19	2.25	2.31
0.90	2.36	2.42	2.48	2.54	2.60	2.66	2.73	2.79	2.85	2.92
1.00	2.99	3.05	3.12	3.19	3.26	3.33	3.40	3.48	3.55	3.62
1.10	3.70	3.78	3.85	3.93	4.01	4.09	4.17	4.25	4.34	4.42
1.20	4.51	4.59	4.68	4.77	4.86	4.95	5.04	5.13	5.22	5.32
1.30	5.41	5.51	5.61	5.71	5.81	5.91	6.01	6.11	6.21	6.32
1.40	6.42	6.53	6.64	6.75	6.86	6.97	7.09	7.20	7.31	7.43
1.50	7.54	7.66	7.78	7.90	8.02	8.15	8.27	8.40	8.52	8.65
1.60	8.78	8.91	9.04	9.17	9.30	9.44	9.57	9.71	9.85	9.99
1.70	10.1	10.3	10.4	10.6	10.7	10.8	11.0	11.1	11.3	11.4
1.80	11.6	11.7	11.9	12.1	12.2	12.4	12.5	12.7	12.9	13.0
1.90	13.2	13.4	13.5	13.7	13.9	14.0	14.2	14.4	14.6	14.7
2.00	14.9	15.1	15.3	15.5	15.6	15.8	16.0	16.2	16.4	16.6
2.10	16.8	17.0	17.2	17.4	17.6	17.8	18.0	18.2	18.4	18.6

Capacity of Trapezoidal Channel



45

RIPRAP SIZING FOR
TRAPAZOIDAL DITCHES

ENTER LISTED PARAMETERS

1. FLOW RATE (CFS) 15.503
2. CHANNEL SLOPE .08
3. BOTTOM WIDTH (FT) 2
4. SIDE SLOPE .5
5. PHI ANGLE 42
6. SPECIFIC GRAVITY OF RIPRAP 2.65

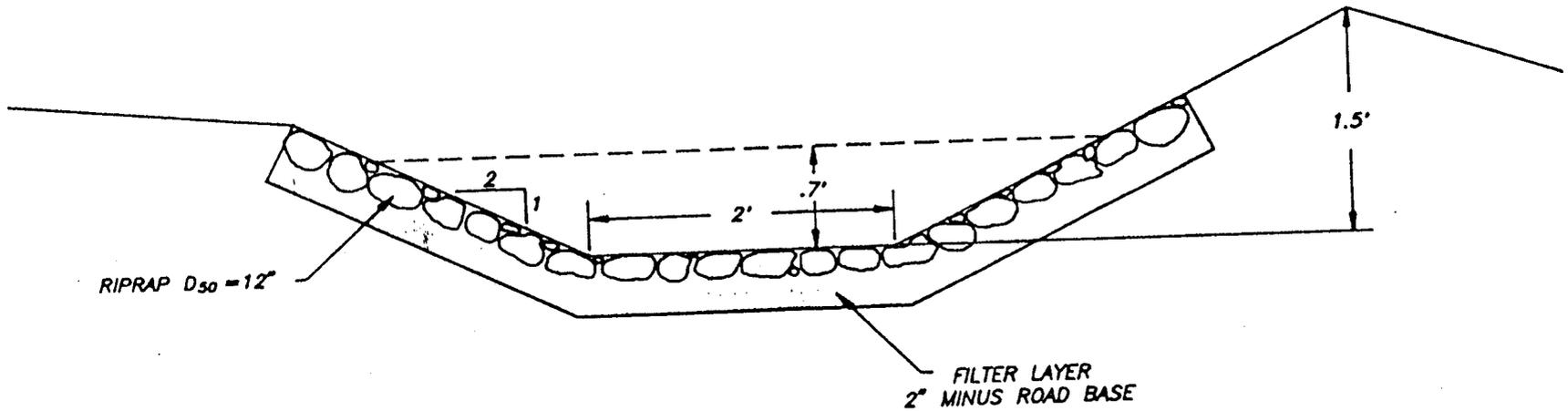
DESIRED SAFETY FACTOR FOR CHANNEL BOTTOM 1.0
DESIRED SAFETY FACTOR FOR CHANNEL BANKS 1.04

VELOCITY	DEPTH	D50	S.F. BTM	S.F. BANK
6.427	.707	.9985	1.232	1.04

RUN COMPLETE

Ok

CREST DITCH & BERM

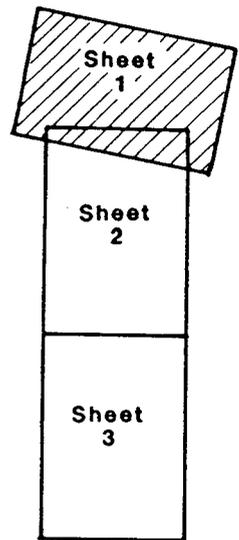
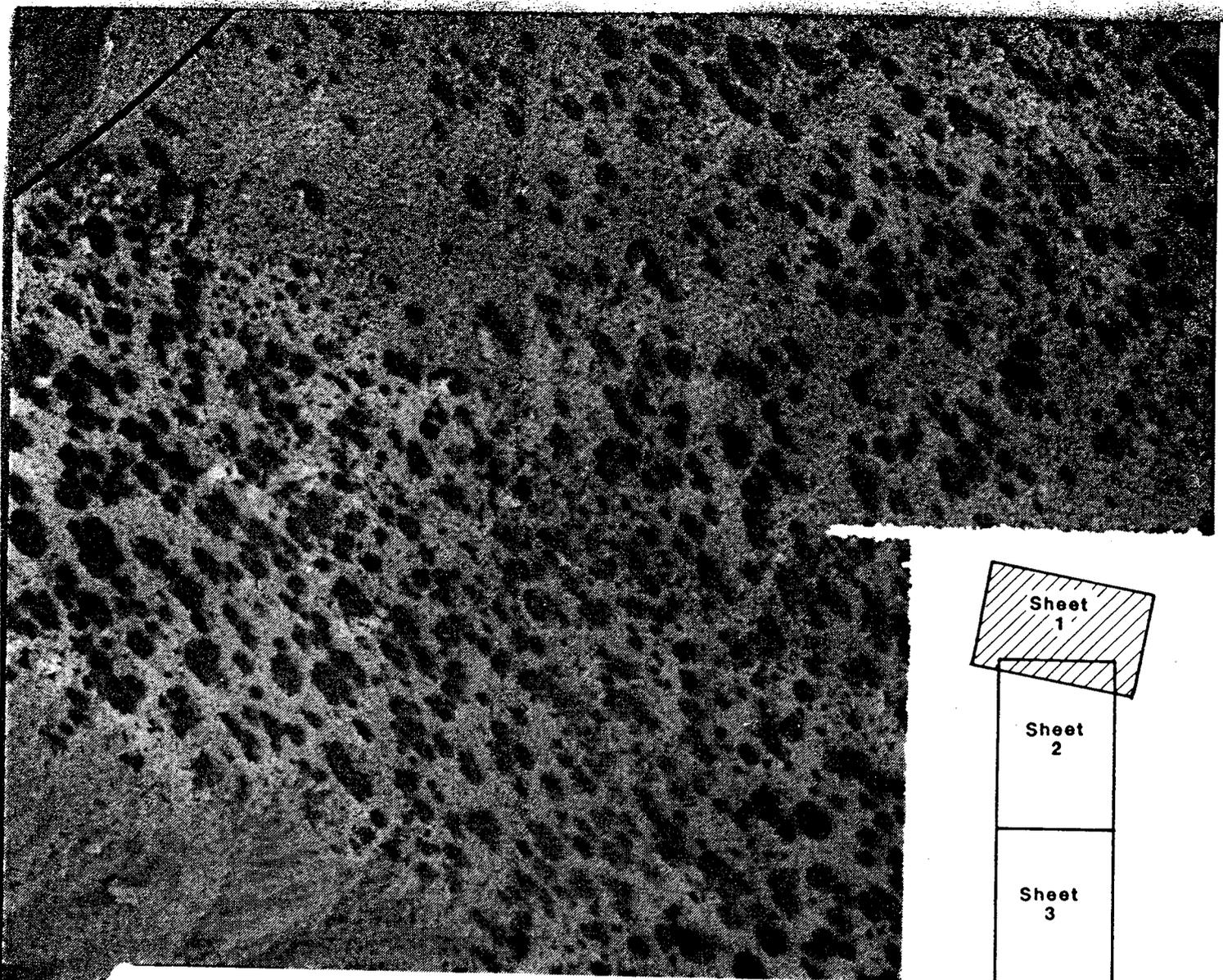


CAD FILE NAME/DISK#: HAULRD KL7

PACIFICORP ELECTRIC OPERATIONS
FUEL RESOURCES DEPARTMENT
P.O. BOX 28128 SALT LAKE CITY, UTAH 84128-0128

DES-BEE-DOVE
HAUL ROAD RECLAMATION STUDY
CREST DITCH & BERM

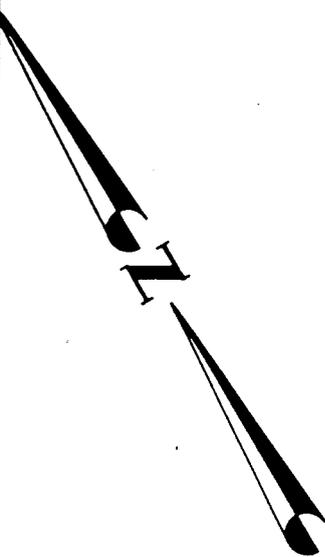
DRAWN BY:	K. LARSEN	CS1285A
SCALE:	NONE	
DATE:	MARCH 5, 1991	SHEET 1 of 1



NOTE: UNCONTROLLED PHOTOGRAPHY

NOTE:

SEE DRAWING #CM-10601-DS SHEET 1 FOR CROSS-SECTION & PROFILE
(MAP PACKET 5-2)



DES-BEE-DOVE COAL MINES

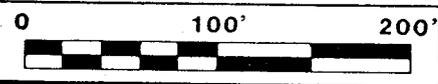
EMERY COUNTY, UTAH

*AERIAL PHOTOGRAPH OF THE
DES-BEE-DOVE/WILBERG
JUNCTION ROAD*

UTAH POWER & LIGHT COMPANY
DEPARTMENT OF MINING & EXPLORATION

DRAWN BY: SMC CHECKED BY: DATE: OCTOBER 1, 1984

SCALE SHEET NO. DRAWING NUMBER



1 of 3

CM-10602-DS

DES BEE DOVE EROSION TASK FORCE

AGENDA

DATE: November 12th and 13th, 1991 (1 1/2 Days)

LOCATION: PacifiCorp Training Center
1/4 Mile South of Huntington Airport

OBJECTIVE: TO RECEIVE WRITTEN CONSENSUS RECOMMENDATIONS FROM THE TASK FORCE. PACIFICORP MANAGEMENT WILL DEVELOP A PLAN TO SUBMIT TO DOGM FOR APPROVAL AND IMPLEMENTATION

PART I: TRAINING CENTER - NOVEMBER 12th - 9:00 - 11:30 AM

Overview of Problem and Objective - Guy Davis

Slide Presentation of Site History - Guy Davis

Study Results:

Erosion Studies - Val Payne and Guy Davis

Vegetation/Erosion Study - DOGM

Reclamation Study Overview - Val Payne

Test Plots - Val Payne and DOGM

Application to Interim Problem Solution - Guy Davis

BREAK: LUNCH AND TRAVEL TO MINE SITE 11:30 AM - 1:00 PM
(Lunch Provided by PacifiCorp)

PART II: FIELD SITE 1:00 - 3:00 PM

Problem Analysis -

Tentative Solutions -

PART III: TRAINING CENTER 3:30 - 5:00 PM

Consensus Recommendations -

Written Recommendations -

Final Statement -

PART IV: TRAINING CENTER - NOVEMBER 13TH - 9:00 - 11:30 AM

**Time allocated if consensus and written recommendations are not met
on November 12th timeframe.**

DATE: November 7, 1991
TO: TASK FORCE MEMBER
FROM: Guy Davis - PacifiCorp *Guy*
SUBJECT: DES BEE DOVE EROSION TASK FORCE

Thank you for accepting this Task Force position. To help familiarize you with the area that the Task Force will be looking at, a brief history of what has occurred and future activities will be helpful.

A haul road was completed for the Des Bee Dove Mine in the Spring of 1983 which connected Highway 57 with the Danish Bench county road. The roadway was constructed for coal haulage from the mine to the Hunter Plant without going through the residential area of Orangeville.

Construction required the disturbance of the mancos shale to a large dugway which created outslope and fillslope areas. This geologic formation (mancos shale) is very erodible with very limited revegetation capability.

Erosion in the fillslope areas has occurred in many locations. The larger erosion which is now present is the combination of 8 1/2 years of minor erosion and large > 10 yr/24 hr precipitation events. The first large event to this road area is recorded on 8-12-81 and caused erosion throughout the mine area particularly in this mancos location. Other violations were issued to the operator in following years concerning the erosion issue with abatement requirements met. The main abatement requirements were the establishment of the belt conveyor along the road guardrail, cut off ditches, installation of strawbale/silt fence filters on the pond access road and monitoring 4 locations at the crest of the main erosion site on May, July and September for width and depth measurements. Monitoring of the erosion sites are continuing. Seeding of the area was done in the fall of 1986 by the operator.

In the fall of 1989 a test plot area was located, on which a newly developed tackifier, soil additive and sulfur were applied along with seeding, in an attempt to reduce erosion and increase vegetation. The plots are still being monitored and conclusions are still pending.

In the recent past, another violation has been issued to PacifiCorp for not controlling erosion on the location. Part of the abatement of this violation is to establish interim erosion control on the mancos area. Berming and waterbarring of the pad area just above the largest erosion area is being done at this time. This action will capture the runoff from

the pad for containment of a 10 yr/24 hr event. Plans for runoff control of another smaller area has been submitted to the Division of Oil, Gas and Mining.

FUTURE PLOTS

Future test plots are planned adjacent to the 1989 test plot area to help determine final reclamation methods. These plots will test several soil additives including sulfuric acid. Results of these plots may aid in interim soil stabilization. Feasibility of the study and other amendments to the study are in the process. Additional information and discussion of the proposed plots will be presented in the November 12th meeting.

If there are any questions, please call me at 653-2312.



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor

Ted Stewart
Executive Director

James W. Carter
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

December 28, 1993

Mr. Val Payne
Senior Environmental Engineer
PacifiCorp
P.O. Box 1005
Huntington, Utah 84528

Re: Appendix XVI and Approval of Test Plot Plan, Des-Bee-Dove Mine,
ACT/015/017, Folder #3, Emery County, Utah

Dear Mr. Payne:

Pursuant to your letter of September 10, 1993, this letter will clarify that the test plot plan is approved. It has been assumed by Division staff that the test plots were approved previously. I apologize for any confusion regarding this matter.

Please submit three copies of Appendix XVI, as requested in my letter of August 25, 1993, by January 18, 1994. If you have any questions, please call me.

Sincerely,

A handwritten signature in cursive script, reading "Pamela Grubaugh-Littig".
Pamela Grubaugh-Littig
Permit Supervisor

pgl



One Utah Center
201 South Main, Suite 2100
Salt Lake City, Utah 84140-0021
(801) 220-2000



September 10, 1993

RECEIVED

SEP 14 1993

DIVISION OF
OIL, GAS & MINING

Pamela Grubaugh-Littig
Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

#2

RE: **APPENDIX XVI, PACIFICORP, DES BEE DOVE MINE, ACT/015/017, EMERY COUNTY, UTAH**

Dear Ms. Grubaugh-Littig:

Enclosed is the copy of the Des Bee Dove PAP Appendix XVI that you requested. Note that Page 1, Appendix XVI Summary, revised 9/9/93 reflects the addition of the June 12th letter and Test Plot Plan Amendment which is still pending written approval. Upon written approval of the Test Plot Plan, the three (3) copies you requested in your August 25, 1993 letter will be submitted. Also please note that the pages have been number per your request.

If you have any question feel free to contact me at 653-2312.

Sincerely,

A handwritten signature in cursive script that reads "Val Payne".

Val Payne
Sr. Environmental Engineer

cc: Steve Kochevar
File



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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355 West North Temple
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Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

April 13, 1993

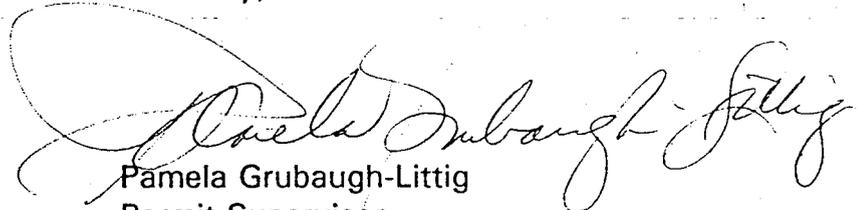
Mr. Val Payne
Senior Environmental Engineer
PacifiCorp
P.O. Box 1005
Huntington, Utah 84528

Dear Mr. Payne:

Re: Approval of As-Built Test Plots, Des-Bee-Dove Mine, PacifiCorp,
ACT/015/017, Folder #3, Emery County, Utah

A site visit was conducted by the technical staff on April 7, 1993 that validated the test-plot "as-built" information, which is now approved and can be inserted into the Mining and Reclamation Plan.

Sincerely,



Pamela Grubaugh-Littig
Permit Supervisor

pgl





State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

April 13, 1993

TO: Pamela Grubaugh-Littig, Permit Supervisor ✓
FROM: Susan M. White, Senior Reclamation Biologist *SMW*
RE: As-Built Test Plot, Des-Bee-Dove Mine, PacifiCorp,
ACT/015/017, Folder #2, Emery County, Utah

Synopsis and Analysis

A site visit was conducted on April 7, 1993 by the Division to verify the test-plot "as built" information. The information submitted for Appendix XVI appeared to accurately depict that which was on the ground.

Recommendation

The test-plot "as-built" information should be accepted for inclusion into the permit.





March 26, 1993

Ms. Pamela Grubaugh-Littig
Permit Supervisor
Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, UT 84180-1203

RE: DEFICIENCIES FOR AS-BUILT TEST PLOT, APPENDIX XVI, DES-BEE-DOVE MINE, PACIFICORP, ACT/015/017

Dear Pamela,

2

In response to your letter of February 22, 1993 (copy attached), the following information is submitted to answer the four stated deficiencies. Upon approval, the following material should be added to Appendix XVI, located in Vol. 7 of the permit. Please replace the current Appendix XVI Summary with the revised 3/36/93 Summary.

Deficiency #2 of the 2/22/93 letter asked for seed source information of the Nursery Seedmix which was not included in the seed tag attached to the seed bag. In reviewing the attached pages 96 and 97 of the "Seed Act" the seed supplier is not required to supply all of the information requested by the Division. Included in this submittal is a copy of the seed tag which was attached to the nursery seedmix. It appears to be in accordance with the "Act".

PacificCorp commits to provide the Division with future test plot soil laboratory results. More sampling is committed to in 3 to 5 years per the "Test Plot Plan - 1992.

If you have any questions, please call Guy Davis or me at 653-2312.

Sincerely,

A handwritten signature in cursive script that reads "Val Payne".

Val E. Payne
Sr. Environmental Engineer

cc. Steve Kochevar
J. Blake Webster

A\BDBTPDEF.AMD

RECEIVED

MAR 29 1993

DIVISION OF
OIL GAS & MINING