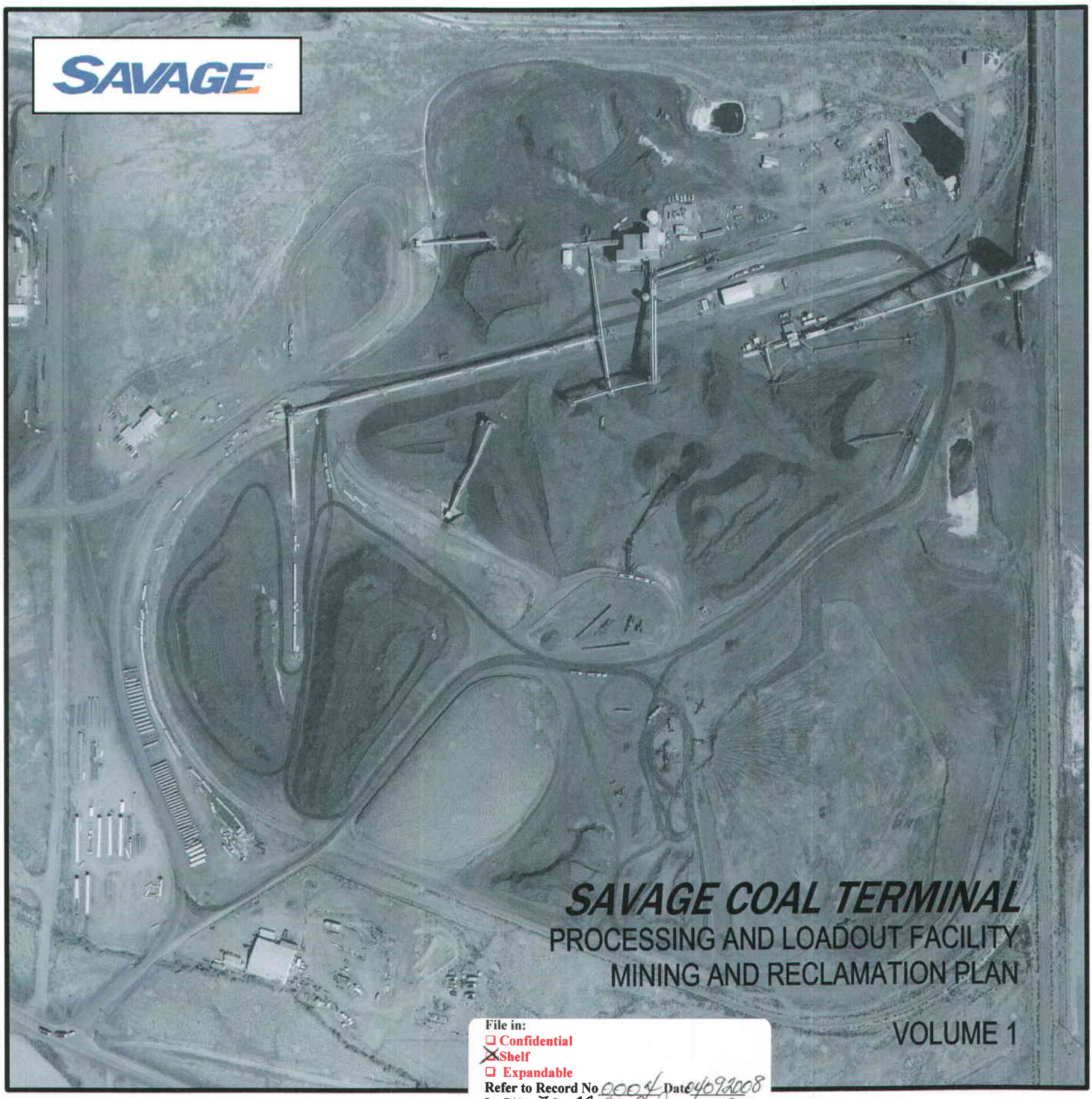

SAVAGE COAL TERMINAL

PROCESSING AND LOADOUT FACILITY
MINING AND RECLAMATION PLAN

VOLUME 1

File in:
- ❑ Confidential
- ☒ Shelf
- ❑ Expandable

Refer to Record No 0004 Date 04/09/2008
In C/D 070022, 2008, Incoming
For additional information

1 Chapter 1
General Contents

2 Chapter 2
Soils

3 Chapter 3
Biology

4 Chapter 4
Land Use

5 Chapter 5
Engineering

6 Chapter 6
Geology

7 Chapter 7
Hydrology

8 Chapter 8
Bonding and Insurance

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Table of Contents
Savage Coal Terminal
Chapter 1 - General Contents

R645-301-100. General Contents
R645-301-112. Identification of Interests
R645-301-113. Violation Information
R645-301-114. Right of Entry Information
R645-301-115. Status of Unsuitability Claims
R645-301-116. Permit Term
R645-301-117. Insurance, Proof of Publication and Facilities or Structures Used in Common
R645-301-118. Filing Fee
R645-301-120. Permit Application Format and Contents
R645-301-130. Reporting of Technical Data
R645-301-140. Maps and Plans
R645-301-150. Completeness

Table 1-1 Record Holders of Legal Interests

Appendix 1-1 Compliance History
Appendix 1-2 Other Licenses and Permits
Appendix 1-3 Public Notice - Permit Renewal Application
Appendix 1-4 Certification of Corporate Secretary
Appendix 1-5 Certification Statement
Appendix 1-6 Designation of Authorized Representatives

Plate 1-1 Surface & Mineral Ownership

File in:
❑ Confidential
☒ Shelf
❑ Expandable
Refer to Record No 0004 Date 04/9/2008
In C0070022 2008 Incoming
For additional information

Table of Contents
Savage Coal Terminal
Chapter 2 - Soils

R645-301-200. Soils
R645-301-220. Environmental Description
R645-301-230. Operation Plan
R645-301-231. General Requirements
R645-301-232. Topsoil and Subsoil Removal
R645-301-233. Topsoil Substitutes and Supplements
R645-301-234. Topsoil Storage
R645-301-240. Reclamation Plan
R645-301-241. General Requirements
R645-301-242. Soil Redistribution
R645-301-243. Soil Nutrients and Amendments
R645-301-244. Soil Stabilization
R645-301-250. Performance Standards

Table 2-1 Predicted Average Yields - Principal Irrigated Soils
Table 2-2 Estimated Potential Production - Forage
Table 2-3 Soil Suitability as Seedbed Quality Material
Table 2-4 Evaluation of Seedbed Quality Material
Table 2-5 Soil Chemical and Physical Analysis
Table 2-6 Seedbed Quality Material Volumes
Table 2-7 Soil Analysis of Savage Coal Terminal Refuse Material
Table 2-8 Depths of Suitable Topsoil Available for Seedbed Material
Table 2-9 Topsoil Mass Balance Table

Figure 2-1 SCS Letter

Appendix 2-1 Topsoil Stockpiles (As-Constructed)
Appendix 2-2 Topsoil Evaluation for New coal Stockpile Area
Appendix 2-3 Soils Evaluation for Settling Pond Area

Plate 2-1 Soils Map
Plate 2-2 As-Built Topsoil Map
Plate 2-3 Settling Pond Area

Table of Contents
Savage Coal Terminal
Chapter 3 - Biology

R645-301-300. Biology
R645-301-320. Environmental Description
R645-301-322. Fish and Wildlife Information
R645-301-323. Maps and Aerial Photographs
R645-301-330. Operation Plan
R645-301-333. Expected Impacts of Mining Operations on Fish and Wildlife
R645-301-340. Reclamation Plan
R645-301-350. Performance Standards

Table 3-1 Aerial Extent of Vegetation and Disturbed Areas
Table 3-2 Summary of Cover and Frequency Data in the Shadscale Community
Table 3-2A Shadscale Affected Transect 1
Table 3-2B Shadscale Affected Transect 2
Table 3-2C Shadscale Affected Transect 3
Table 3-2D Shadscale Affected Transect 4
Table 3-2E Shadscale Affected Transect 5
Table 3-3 Production Data (G/M^2), Affected Area - Shadscale Community Species 1 - 13
Table 3-3A Production Data (G/M^2), Affected Area - Shadscale Community Species 14 - 26
Table 3-3B Production Data (G/M^2), Affected Area - Shadscale Community Species 27 - 39
Table 3-3C Production Data (G/M^2), Affected Area - Shadscale Community Species 40 - 52
Table 3-3D Production Data (G/M^2), Affected Area - Shadscale Community Species 53 - 65

Table 3-4 Sample Adequacy: Shadscale Community, Affected and Reference Areas
Table 3-5 Plants Observed at Savage Coal Terminal
Table 3-6 Summary of Frequency and Cover Data, Reference Area Shadscale Community
Table 3-6A Shadscale Reference Transect 1
Table 3-6B Shadscale Reference Transect 2
Table 3-7 Production Data (G/M^2), Affected Area - Shadscale Community
Table 3-8 Reference Area, Frequency and Density Summaries for Shrub Species
Table 3-9 Evaluation of Shrub Density Sample Adequacy for the Reference Area
Table 3-10 Affected Area, Frequency and Density Summaries for Shrub Species
Table 3-11 Evaluation of Shrub Density Sample Adequacy for the Affected Area
Table 3-12 Potential Vertebrate Wildlife
Table 3-13 Status of White-Tailed Prairie Dog (Cynomys Leucurus) Burrows on the Savage Coal Terminal Study Area
Table 3-14 Construction of White-Tailed Prairie Dog (Cynomys Leucurus) Burrows on the Savage Coal Terminal Study Area

Table 3-15 Federally Listed T&E Species for Carbon County

Figure 3-1 NRCS Letter
Figure 3-2 SCS Letter

Appendix 3-1 Vegetation Test Plots
Appendix 3-2 Reclamation Test Plot
Appendix 3-3 Wetland Delineation - (Submitted to U.S. Army Corps of Engineers)

Plate 3-1 Vegetation Map

Table of Contents
Savage Coal Terminal
Chapter 4 - Land Use

R645-301-400.	Land Use and Air Quality
R645-301-410.	Land Use
R645-301-411.	Environmental Description
R645-301-412.	Reclamation Plan
R645-301-413.	Performance Standards
R645-301-420.	Air Quality
R645-301-422.	Air Quality Control Plan
Appendix 4-1	Property Agreement
Appendix 4-2	Utility Easements
Appendix 4-3	Division of Air Quality Approval Order
Plate 4-1	Archeological Map (In Confidential Binder)

Table of Contents
Savage Coal Terminal
Chapter 5 - Engineering

R645-301-500. Engineering
R645-301-510. Introduction
R645-301-511. General Requirements
R645-301-512. Certification
R645-301-513. Compliance With MSHA Regulations and MSHA Approvals
R645-301-514. Inspections
R645-301-515. Reporting and Emergency Procedures
R645-301-520. Operation Plan
R645-301-530. Operational Design Criteria and Plans
R645-301-537. Regraded Slopes
R645-301-540. Reclamation Plan
R645-301-541. Contemporaneous Reclamation
R645-301-542. Narratives, Maps and Plans
R645-301-550. Reclamation Design Criteria and Plans
R645-301-560. Performance Standards

Table 5-1 Temporary Reclamation Seed Mixture
Table 5-2 Seed Mix for the Shadscale (Upland Areas)
Table 5-3 Seed Mix for the Greasewood (Lowland Areas)
Table 5-4 Permanent Reclamation Seed Mixture - Price River System
Table 5-5 Projected Water Consumption

Figure 5-1 I.D. Sign and Refuse Pile Sign
Figure 5-2 Perimeter Marker and Topsoil Storage Marker
Figure 5-3 Typical Coal Analysis - No. 7 Mine Castle Gate "A" Seam
Figure 5-4 Refuse Pile Analysis
Figure 5-5 OSM Safety Factor Calculations for Refuse Pile
Figure 5-6 MSHA Letter for Refuse Piles
Figure 5-7 Centerline and Grade of Belts
Figure 5-8 Processing Flow Chart

Appendix 5-1 Proposed Removal of Main Refuse Pile
Appendix 5-2 BTU Resource Recovery Plan for Refuse Pile

Plate 5-1 Surface Disturbance Map
Plate 5-2 Facility Map
Plate 5-3 Refuse Pile As-Constructed
Plate 5-4 Road Map
Plate 5-5 Railroad Facilities
Plate 5-6 Post-Mining Topography
Plate 5-7 River Pump and Pipeline System (Existing)
Plate 5-8 River Pump and Pipeline System (Reclaimed)

Table of Contents
Savage Coal Terminal
Chapter 6 - Geology

R645-301-600.	Geology
R645-301-610.	Introduction
R645-301-620.	Environmental Description
R645-301-622.	Cross Sections, Maps and Plans
R645-301-623.	Geologic Information
R645-301-624.	Geologic Information for Mining
R645-301-630.	Operation Plan
R645-301-640.	Performance Standards
R645-301-630.	Operational Design Criteria and Plans

Figure 6-1	Log of Holmes-McGee Well No. 1 (From Public Records)
Figure 6-2	Test Boring and Core Sample Locations
Figure 6-3	Core Sample Logs

Plate 6-1	Geologic Map

Table of Contents
Savage Coal Terminal
Chapter 7 - Hydrology

R645-301-700. Hydrology
R645-301-710. Introduction
R645-301-720. Environmental Description
R645-301-722. Cross Sections and Maps
R645-301-723. Water Quality
R645-301-724. Baseline Information
R645-301-725. Baseline Cumulative Impact Area Information
R645-301-727. Alternative Water Source Information
R645-301-728. Probable Hydrologic Consequences (PHC) Determination
R645-301-729. Cumulative Hydrologic Impact Assessment (CHIA).
R645-301-730. Operation Plan
R645-301-732. Sediment Control Measures
R645-301-733. Impoundments
R645-301-740. Design Criteria and Plans
R645-301-741. Mine Plan Area Watersheds and Surface Runoff
R645-301-742. Sediment Control Measures
R645-301-743. Impoundments
R645-301-744 Discharge Structures

Table 7-1 Groundwater Observations
Table 7-1A Groundwater Monitoring Wells
Table 7-2 Pump Test Data
Table 7-3 Ground Water Chemical Analyses at two sites near the Savage Coal Terminal Loading Facility
Table 7-4 French Drain Water Quality
Table 7-4a French Drain Water Quality Summary
Table 7-5 Well CV2W Quality
Table 7-5a Well CV2W Quality Summary
Table 7-6 Well CV3W Quality
Table 7-6a Well CV3W Quality Summary
Table 7-7 Well CV4W Quality
Table 7-7a Well CV4W Quality Summary
Table 7-8 Well CV5W Quality
Table 7-8a Well CV5W Quality Summary
Table 7-9 Well CV6W Quality

Table 7-9a Well CV6W Quality Summary
Table 7-10 Well CV7W Quality
Table 7-10a Well CV7W Quality Summary
Table 7-11 Well CV8W Quality
Table 7-11a Well CV8W Quality Summary
Table 7-12 Well CV10W Quality
Table 7-12a Well CV10W Quality Summary
Table 7-13 Well CV11W Quality
Table 7-13a Well CV11W Quality Summary
Table 7-14 Well CV12W Quality
Table 7-14a Well CV12W Quality Summary
Table 7-14b Chemical Analyses of Storm runoff at three sites near the Savage Coal Terminal Loading Facility
Table 7-14c Chemical Analysis of Surface Water from Ditch North of Site
Table 7-15 Price Warehouses
Table 7-16 Mean Seasonal Wind Speeds in the Castle Valley Area
Table 7-17 Water Monitoring Report
Table 7-18 Weighted Curve Number Determination
Table 7-19 Runoff Volumes Estimates
Table 7-20 Diversion Design Calculations
Table 7-21 Sedimentation Pond Design Capacities
Table 7-22 Direct Precipitation to Sediment Ponds
Table 7-23 Erosion Rate Determination
Table 7-24 TR-20 Analysis of Pond Outlets for 25 Year-24 Hour Rainfall Event
Table 7-25 Culvert Design Specifications
Table 7-26 Refuse Pile Drainage

Figure 7-1 Monitoring Well Design
Figure 7-2 Chemical Analysis - Price River
Figure 7-3 Chemical Analysis - Carbon Canal
Figure 7-4 Drainage Areas
Figure 7-5 Area Subdrainages
Figure 7-6 Location of Irrigation Canals
Figure 7-7 AVF and Zoning Figure
Figure 7-8 Typical Silt Fence
Figure 7-9 Typical Straw Bale Installation
Figure 7-10 Typical Wire Gabion
Figure 7-11 Refuse Pile Drainage Channels
Figure 7-12 Jensen Property Berm
Figure 7-13 Typical Collection Ditches
Figure 7-14 Reclaimed Channel
Figure 7-15 Sediment Marker

Appendix 7-1	Small Area Exemption - River Pump/Pipeline
Appendix 7-2	Water Rights Documentation
Appendix 7-3	Probable Hydrologic Consequences Determination
Plate 7-1	Water Monitoring Location Map
Plate 7-2	Hydrology Map
Plate 7-3	Sediment Ponds 1, 2 and 3
Plate 7-4	Sediment Pond 5
Plate 7-5	Sediment Pond 6
Plate 7-6	Settling Ponds

Table of Contents
Savage Coal Terminal
Chapter 8 - Bonding and Insurance

R645-301-800.	Bonding and Insurance
R645-301-820.	Requirements to File a Bond
R645-301-830.	Determination of Bond Amount
R645-301-850.	Bonding Requirements
R645-301-860.	Form of Bond
R645-301-880.	Bond Release Application
R645-301-890.	Liability Insurance

Appendix 8-1	Reclamation Cost Estimate
Appendix 8-2	Reclamation Performance Bond
Appendix 8-3	Liability Insurance

Savage Services Corporation
Savage Coal Terminal
C/007/022

Chapter 1

General Contents

R645-301-100

Table of Contents
Savage Coal Terminal
Chapter 1 - General Contents

R645-301-100.	General Contents
R645-301-112.	Identification of Interests
R645-301-113.	Violation Information
R645-301-114.	Right of Entry Information
R645-301-115.	Status of Unsuitability Claims
R645-301-116.	Permit Term
R645-301-117.	Insurance, Proof of Publication and Facilities or Structures Used in Common
R645-301-118.	Filing Fee
R645-301-120.	Permit Application Format and Contents
R645-301-130.	Reporting of Technical Data
R645-301-140.	Maps and Plans
R645-301-150.	Completeness

Table 1-1 Record Holders of Legal Interests

Appendix 1-1	Compliance History
Appendix 1-2	Other Licenses and Permits
Appendix 1-3	Public Notice - Permit Renewal Application
Appendix 1-4	Certification of Corporate Secretary
Appendix 1-5	Certification Statement
Appendix 1-6	Designation of Authorized Representatives

Plate 1-1 Surface & Mineral Ownership

R645. Natural Resources; Oil, Gas and Mining; Coal.

R645-301. Coal Mine Permitting: Permit Application Requirements.

R645-301-100. General Contents.

112. Identification of Interests.

112.100. The applicant is a Utah Corporation.

112.210. The permit applicant name, address, telephone number and employer I. D. Number is:

Savage Services Corporation
6340 South 3000 East, Suite 600
Salt Lake City, Utah 84121
(801) 944-6600
Employer I.D. #87-0237425

112.220. The applicant's resident agent is:

C. T. Corporation Systems
50 West Broadway
Salt Lake City, Utah 84101
(801) 441-9820

112.230. The abandoned mine land reclamation fee will be paid by Savage Services Corporation as identified in 112.210 above.

112.300. All stock is owned by:

Savage Companies
6340 South 3000 East, Suite 600
Salt Lake City, Utah 84121
(A Utah Corporation)
Employer I.D. #87-0387049

112.310. Officers and Directors of the Applicant.

The names and addresses of every officer, partner, director, or other person performing a function similar to a director of the applicant:

SAVAGE SERVICES CORPORATION (Shareholder: Savage Companies)

Corporation:	Savage Services Corporation
Type of Entity:	Utah Corporation
Date of Formation:	June 22, 1959

Shareholder:	Savage Companies
Date of Formation:	October 2, 1970

Directors for Savage Services Corporation and Savage Companies:

Directors:		Hire Date:
Allen B. Alexander	Chairman	05/15/78
Neal Savage	Vice Chairman	06/22/59
H. Benson Lewis	Director	08/01/85
James T. Jensen	Director	07/01/90
David G. Wolach	Director	04/29/87
Todd L. Savage	Director	09/23/76
John K. Savage	Director	01/01/70
Howard F. Goodman	Director	05/01/94
Donald W. Alexander	Director	02/01/83
Nathan N. Savage	Director	06/02/86

Officers:		Hire Date:
Allen B. Alexander	President and CEO	05/15/78
H. Benson Lewis	Exec. VP and CFO	08/01/85
James T. Jensen	Exec. VP, General Counsel & Sec.	07/01/90
David G. Wolach	Exec. VP	04/29/87
Todd L. Savage	Exec. VP	09/23/76
Donald W. Alexander	Sr. Vice President	02/01/83
John K. Savage	Sr. Vice President	01/01/70
Kelly J. Flint	Sr. VP, Asst. Gen. Counsel,	01/01/03
Howard F. Goodman	Sr. Vice President	05/01/94
Curtis C. Dowd	Sr. Vice President	08/30/04
Nathan N. Savage	Sr. Vice President	06/02/86
Tad A. Koch	Vice President	09/16/86
David L. Harris	Vice President and Controller	08/04/99
C. Scott Smith	Vice President	08/01/05

112.320. All stock is owned by The Savage Companies (see Section 112.300).

112.330. See Section 112.310.

112.340. Names under which the applicant, partner, or principal shareholder previously operated underground or surface coal mining operations in the United States within the five years preceding the date of application:

Savage Industries, Inc.
Employer I.D. #87-0237425
Catale Oklahoma Loadout
Catale, Oklahoma
M.S.H.A. #34-01626, Issued 07/31/87.

112.350. N/A - There are no other coal mine operation permits in the name of Savage Services Corporation.

112.400. (See Section 112.340)

112.500. The owner of the surface and coal is:

Savage Services Corporation
6340 South 3000 East, Suite 600
Salt Lake City, Utah 84121

112.600. See Plate 1-1 for owners of record, and Tables 1-1 and 1-2 for details and addresses.

112.700. The MSHA numbers for all mine-associated structures are:

Mine Name: Savage Coal Terminal.
MSHA I.D. # 42-01444
(See also Appendix 1-2 for MSHA Refuse Pile Numbers).

112.800. N/A - None.

112.900. When notified the application is approved, but before the permit is issued, the applicant shall, as applicable, update, correct or indicate that no change has occurred in the information previously submitted under R645-301-112.100 through R645-301-112.800.

113. Violation Information

113.110. The applicant has not had a federal or state permit to conduct coal mining and reclamation operations suspended or revoked in the last 5 years.

113.120. The applicant has not forfeited a performance bond or similar security deposited in lieu of bond.

113.200. N/A

113.300. A list of all notices of violation received by the applicant in the past 3 years for violations pertaining to air or water environmental protection is included in Appendix 1-1.

113.310. See Appendix 1-1.

113.320. See Appendix 1-1.

113.330. See Appendix 1-1.

113.340. See Appendix 1-1.

113.350. See Appendix 1-1.

113.400. After the applicant is notified that the application is approved, but before the permit is issued, the applicant shall, as applicable, update, correct or indicate that no change has occurred in the information previously submitted under R645-301-113.

114. Right of Entry Information.

114.100. A description of the documents upon which the applicant bases its legal right to enter and begin underground coal activities in the permit area and whether the rights are the subject of pending litigation.

Documents Establishing Legal Right to Enter

Plate 1-1 shows the boundaries of lands within the proposed permit area upon which the applicant has the legal right to enter and conduct coal operations. The documents which give applicant the legal right to enter, commence and maintain coal preparation and load-out activities in the permit area are as follows:

1. Special Warranty Deed dated November 11, 1977 from Utah Power & Light Company, grantor, to Swisher Coal Company (later Beaver Creek Coal Company), grantee, covering all the surface and part of the minerals of the following described lands:

   Township 15 South, Range 10 East, SLBM

   Section 11: SW 1/4, expecting therefrom the most Easterly 100 feet thereof.

2. Lease, granted for the purposes of railroad trackage and coal loading facilities, dated January 15, 1981, from The Denver and Rio Grande Western Railroad Company, lessor, to Beaver Creek Coal Company, lessee, covering the surface of the following described lands:

   Township 15 South, Range 10 East, SLBM

   A rectangle tract of lessor's land near Price, Utah, being the Westerly 42.5 feet of lessor's right-of-way from Engr. Sta. 91 plus 70 to Engr. Sta. 132 plus 70 of lessor's Castle Valley Spur.

3. Trackage agreement, dated January 22, 1974, between The Denver and Rio Grande Western Railroad and Utah Power & Light Company providing for construction and operation of trackage between Station 90 + 20 and Station 134 + 20 off the main track of Castle Valley Spur. With the consent of The Denver and Rio Grande Western Railroad Company, said agreement was assigned to Swisher Coal Company (later Beaver Creek Coal Company) on February 27, 1978.

4. Letter agreement, dated January 17, 1978, between R. D. & Peggy Campbell and Swisher Coal Co. (later Beaver Creek Coal Company) wherein Campbells grant a 20-foot right-of-way for water pipelines over and across their land in Sections 2 and 11, Township 15 South, Range 10 East, between the Price River and Beaver Creek Coal Company's coal preparation and loadout facilities in the SW ¼ of Section 11, Township 15 South, Range 10 East.

5. Right-Of-Way Agreement, dated January 1, 1978, between David and Mildred Cave and Judson D. and Cherie Critchlow, grantors, and Swisher Coal Co. (later Beaver Creek Coal Company), grantee wherein Cave and Critchlow grant a 20-foot right-of-way for water pipelines over and across their property in Section 2, Township 15 South, Range 10 East, together with the right to build a pumphouse thereon.

6. Application for exchange of water, approved May 25, 1979, covering 157 acre-feet of water for industrial use in the coal preparation plant.

7. Lease Agreement with Option to Purchase between Mountain Coal Company and Savage Industries, Inc. September 9, 1994.

8. Name change from Savage Industries, Inc. to Savage Service Corporation, June 22, 2003.

Pending Litigation:
None.

Surface Mining Rights:
The surface operations associated with coal processing and loadout activities do not involve the surface mining of coal. No private coal mineral estate is to be severed from the property during the term of this permit.

114.200. N/A - This is a coal processing and loadout facility. There are no plans for mining of coal.

114.300. Nothing given under R645-301-114.100 through R645-301-114.200 will be construed to provide the Division with the authority to adjudicate property rights disputes.

115. Status of Unsuitability Claims.

115.100. Areas Designated Unsuitable for Mining

The proposed permit area is not within an area designated unsuitable for the surface effects of underground coal mine activities under the R645 regulations. Neither is the proposed permit area under study for designation in an administrative proceeding initiated under renewable resource lands and would not result in substantial losses of food fiber, or water supply. The permit area contains no prime farmland or merchandisable timber. Mining would not affect natural hazard lands and thereby endanger life and property. It contains no cemeteries, no national trails, no wild and scenic rivers, no wilderness or wilderness study areas, and no sufficient harvestable forest cover.

115.200. Exemption

The applicant does not claim exemption.

115.300. Dwellings

There are no occupied dwellings within ¼ mile of the proposed permit area.

The operations are within 100' of a public road which provides access to the site.

This has been approved under the existing permit.

116. Permit Term

116.100. Surface Acres Affected

The number of surface acres to be disturbed by the operation is 153.46 acres. There are no plans for additional surface disturbance for this operation at this time.

Horizontal Extent of Underground Workings - N/A

All 153.46 acres of the permit area may be affected by surface activities.

Vertical Extent of Workings - N/A

This permit will be for a period of 5 years. The permit is expected to be renewed at 5-year intervals throughout the life of the property.

116.200. N/A - The initial permit term is not requested for more than 5 years.

117. Insurance, Proof of Publication and Facilities or Structures Used in Common.

117.100. A Certificate of Liability Insurance is included in Chapter 8, Appendix 8-3.

117.200. A copy of the newspaper advertisement for renewal of this permit is included in Appendix 1-3.

117.300. N/A

118. Filing Fee.

A filing fee of $5.00 has been submitted to the Division with this application.

120. Permit Application Format and Contents.

121. The Permit Application:

121.100. The permit application contains current information.

121.200. The permit application is intended to be clear and concise.

121.300. This application is filed in the format required by the Division.

122. All reference materials used in this application have been provided in the permit, or are readily available to the division.

123. A notarized statement is included in Appendix 1-5.

130. Reporting of Technical Data

131. All technical data submitted in the permit application is accompanied by the names of persons or organizations that collected and analyzed the data, dates of collection and analysis of the data, and descriptions of the methodology used to collect and analyze the data.

132. Technical analyses will be planned by or under the direction of a professional qualified in the subject to be analyzed.

140. Maps and Plans

141. Maps have been submitted in a consolidated format and per regulation.

142. Maps are included to show both operation and reclamation phases. In addition, Plate 5-1 shows areas of the site disturbed prior to August 3, 1977, after August 3, 1977 and prior to May 3, 1978, after May 3, 1978 and prior to approval of the State Program and after issuance of the Permit.142.100 Prior to August 3, 1977;

142.200. See Plate 5-1.

142.210. See Plate 5-1.

142.220. N/A - There have been no small operator's exemptions.

142.300. See Plate 5-1.

142.400. See Plate 5-1.

150. Completeness

This is a reformatted permit application submitted for renewal of an existing approved permit. This application is intended to address each of the R645-301 regulations for completeness and technical adequacy.

TABLE 1-1
RECORD HOLDERS OF LEGAL INTERESTS

Surface Owner:	Address:
Savage Services Corporation	6340 South 3000 East, Suite 600 Salt Lake City, Utah 84121
Agnes K. Pierce	735 North 700 East Price, Utah 84501
UPC Inc.	53 West Angelo Avenue Salt Lake City, Utah 84115
John Brown	53 West Angelo Avenue Salt Lake City, Utah 84115
Circle K Ranch	P.O. Box 700 Price, Utah 84501
John L. & Christy L. Hanna	1830 East 5000 South Price, Utah 84501
Kevin Ray & Lois W. Jensen	P.O. Box 219 Cleveland, Utah 84518
David C. Swenson	2269 N. Hillcrest Drive Wellington, Utah 84542
High Country Forest Products	8243 Old Federal Road Montgomery, AL 36117
David R. Cave	1220 South 530 West Price, Utah 84501
Roy D. & Peggy L. Campbell	P.O. Box 269 Wellington, Ut 84542
Alan Walton	3212 South State Street Salt Lake City, Utah 84115
E. W. Stoddard	P.O. Box 65644 Salt Lake City, Utah 84165
E. W. Stoddard	53 West Angelo Ave Salt Lake City, Utah 84115
Denver & Rio Grande Western Union Pacific Railroad Company	1700 Farnam Street, 10th Floor South Omaha, NE 68102

Surface Owner:	Address:
John C. & Sophia Critchlow	Route 1, Box 331 Price, Utah 84501
Olga Downard	223 South 5th East Price, Utah 84501
Ervin & Violet Feichko	Route 1 Helper, Utah 84526
Mountain States Telephone & Telegraph Company	931 14th Street Denver, CO 80202
Geraldine Thomas c/o Glenn Thomas	6715 Lederer Street Canoga Park, California 91300
Rocky Mountain Power	P.O. Box 899 Salt Lake City, Utah 84110
Kent E. & Clara W. Peterson	Unknown Salt Lake City, Utah 84101
Price City	City Hall,185 East Main Street Price, Utah 84501
G.W. Waterman	Route 1 Box 113 Price, Utah 84501
State of Utah Division of State Lands	675 East 500 South, Suite 500 Salt Lake City, UT 84102
Jack & Frank World	760 North 5th East Price, Utah 84501

See Plate 1-1 for Surface & Mineral Ownership Map.

Appendix 1-1

Compliance History

Savage Services Corporation
Savage Coal Terminal

Appendix 1-1
Compliance History

N.O.V.#: 06-46-3-1	
Date:	07/14/06
Location:	Savage Coal Terminal
Agency:	Utah Division of Oil, Gas & Mining
Description:	Activities without Approval
Proceedings:	None
Status:	Terminated - 7/28/06
Abatement Action:	Salvage & Store Topsoil

Appendix 1-2

Other Licenses and Permits

Savage Services Corporation
Savage Coal Terminal

Appendix 1-2
Permits and Licenses Needed to Operate Savage Coal Terminal

Type of Permit/License	Permit License Issuing Authority	Application Number	Status
Construction Approval	Utah Division of Health 288 N. 1460 W. Salt Lake City, Utah 84116-0690	N/A	Approved 07/21/77
Building Permit	Carbon County County Courthouse Price, Utah 84501	No. 979	Issued 10/06/77
Refuse Fill Permit	State of Utah Division of Oil, Gas & Mining 355 W. North Temple Salt Lake City, Utah 84180-1203	N/A	Issued 10/02/79
Temporary Refuse Permit	MSHA P.O. Box 25367 Denver, Colorado 80225	1211-UT-9-0033	Issued 10/02/79
Permanent Refuse Permit	MSHA P.O. Box 25367 Denver, Colorado 80225	1211-UT-9-0034	Issued 10-02/79
UPDES Discharge Permit	Utah Dept. of Environmental Quality 288 North 1460 West Salt Lake City, Utah 84114-4870	UTG040005	Issued 05/01/03
Air Quality Approval Order	Utah Division of Health Bureau of Air Quality 150 North 1950 West Salt Lake City, Utah 84114-4820	DAQE-ANI793003-06	Issued 08/16/06
State Permit Approval	State of Utah Division of Oil, Gas & Mining 1594 West No. Temple Suite 1210 Salt Lake City, Utah 84114-5801	C/007/022	Issued 08/06/84 Renewal 08/06/04

Appendix 1-3

Public Notice
Permit Renewal Application

Savage Services Corporation
Savage Coal Terminal

PUBLIC NOTICE FOR PERMIT RENEWAL
SAVAGE COAL TERMINAL
SAVAGE SERVICES CORPORATION
6340 SO. 3000 E. #600
SALT LAKE CITY, UTAH 84121

Savage Services Corporation has filed with the Utah Division of Oil, Gas & Mining, an application for renewal of its Mining and Reclamation Plan Permit for the Savage Coal Terminal.

The permit for which renewal is being sought is Utah #C/007/022. This is a Mining and Reclamation Permit for the Savage Coal Terminal, which is located in the Miller Creek area of Carbon County, Utah in Sections 2 and 11, Township 15 South, Range 10 East, Salt Lake Base & Meridian.

The permit area is further described as follows:
Township 15 South, Range 10 East, Salt Lake Base & Meridian
Sec. 11: W ½ SW ¼ except 0.24 ac. in NW corner, E ½ SW ¼ except East 100' and 5.42 ac. in SW corner.

Also included in the permit area is a 20' Right-of-Way for a pipeline across the SE ¼ NW ¼ and NW ¼ NW ¼ of Section 11 (1.21 acres), and across the SW ¼ SW ¼, NW ¼ SW ¼, SW ¼ NW ¼ and NE ¼ NW ¼ of Section 2 (3.97 acres). This area is located on the "Price Quadrangle", U.S. Geological Survey 7.5 minute map.

The permit is available for inspection at the Utah Division of Oil, Gas & Mining office in Price, College of Eastern Utah, 451 E. 400 N., Price, Utah, and the Utah Division of Oil, Gas & Mining office, 1594 West North Temple, Suite 1210, Salt Lake City, Utah.

The application for renewal is available for inspection at the Utah Division of Oil, Gas and Mining Office in Price, College of Eastern Utah, 451 E. 400 N., Price, Utah, and the Utah Division of Oil, Gas & Mining office, 1594 West North Temple, Suite 1210, Salt Lake City, Utah.

Written comments, objections or requests for informal conferences on the application may be submitted to: State of Utah Department of Natural Resources, Division of Oil, Gas & Mining, 1594 West North Temple, Suite 1210, P.O. Box 145801, Salt Lake City, Utah 84114-5801.

Appendix 1-4

Certification
of
Corporate Secretary

Savage Services Corporation
Savage Coal Terminal

CERTIFICATE
OF
CORPORATE SECRETARY

James T. Jensen, the corporate secretary for Savage Services Corporation, a Utah corporation ("Savage"), hereby certifies that according to the business records of Savage, the attached document accurately reflects the hire dates, names and titles, as of the date of this certificate, of the directors and officers of Savage.

Dated this 15th day of September 2004.

Savage Services Corporation

By: James T. Jensen

James T. Jensen

Title: Secretary

2-3b

INCORPORATED

MAY 10 2005

DIV OF OIL GAS & MINING

Secretary's Certificate
Savage Services Corporation

I, James T. Jensen, Secretary of Savage Services Corporation, herby certify to the following:

1. The information currently on file with the Office Of Surface Mining concerning the following officers is outdated. Please remove this information concerning these former officers from the Applicant Violator System and any other data base in which it may be contained.

Connie Gragg	Vice President	Term Date: 6/30/2003
Alan Wilcox	Vice President	Term Date: 12/31/2003
Dean Rees	Vice President	Term Date: 3/1/2004
Ervin Myers	Vice President	Term Date: 8/30/2002
Rick Nelson	Vice President	Term Date: 9/30/2001

Witness my hand and seal of the Company this 13th day of April 2005

James T. Jensen
Secretary

State of Utah)
§
County of Salt Lake)

Sworn and Subscribed to before me this 13th day of April 2005.

KRISTINA L NICOL
Notary Public
State of Utah
My Commission Expires Jun. 2, 2008
6340 S 3000 E Ste. 500 SLC, UT 84121

Kristina L. Nicol
Notary Public

INCORPORATED

MAY 10 2005

Appendix 1-5

Certification Statement

Savage Services Corporation
Savage Coal Terminal

CERTIFICATION STATEMENT

I, as a responsible official of the applicant, do hereby certify that the information included in this application is true and correct to the best of my information and belief.

James T. Jensen
Executive Vice-President

Subscribed and sworn to before me this 29th day of August

DANA BALLARD
NOTARY PUBLIC - STATE of UTAH
865 EAST 2800 SOUTH
PRICE, UTAH 84501
COMM. EXP. 9-27-97

Dana Ballard
Notary Public

My Commission Expires: 9/27/97

Attest: State of: Utah

County of: Carbon

CHECK NO. 288750

VENDOR NO.

Savage INDUSTRIES INC.

GENERAL ACCOUNT
5250 South 300 West - Suite 200
Salt Lake City, Utah 84107
Phone: 263-9400

CHECK DATE 8-10-94

NUMBER 288750

PAY FIVE AND NO/100 **********

PAY EXACTLY $********5.00****

TO THE ORDER OF UTAH DIVISION OF OIL, GAS, & Mining

ZIONS FIRST NATIONAL BANK
310 SOUTH MAIN STREET
SALT LAKE CITY, UTAH 84101

SAVAGE INDUSTRIES, INC.

31-5
1240

BY _____

BY _____
Authorized Signatures

⑈288750⑈ ⑆124000054⑆ 02 18559 3⑈

CHECK NO. 288750 VENDOR NO. MO. 8 DAY 10 YR. 94

Savage INDUSTRIES INC.

INVOICE DATE	INVOICE / CONTRACT NUMBER	DESCRIPTION	GROSS AMOUNT	DISCOUNT	NET AMOUNT
		PERMIT TRANSFER APP. FEE			5 00
		TOTALS			

DETACH AND RETAIN THIS STATMENT
THE ATTACHED CHECK IS IN PAYMENT OF ITEMS DESCRIBED ABOVE.
IF NOT CORRECT PLEASE NOTIFY US PROMPTLY NO RECEIPT REQUIRED

Appendix 1-6

Designation of Authorized Representatives

Savage Services Corporation
Savage Coal Terminal

James T. Jensen
Executive Vice President
& General Counsel

Savage Industries Inc.
5250 South Commerce Drive
Suite 200
Salt Lake City, Utah 84107
(801) 263-9400
(801) 261-8766 Fax

January 25, 2000

Pamela Grubaugh-Littig
Permit Supervisor
Utah Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801

RECEIVED
JAN 27 2000
DIVISION OF
OIL, GAS AND MINING

RE: Designation of Authorized Representatives
Savage Coal Terminal
ACT/007/002
Carbon County, Utah

This letter is to inform your agency that the following people have been designated "Authorized Representatives" for Savage Industries Inc. for matters pertaining to the Savage Coal Terminal permit and environmental monitoring:

(1) James T. Jensen
Executive Vice President
and General Counsel
Savage Industries Inc.

(2) Boyd Rhodes
Manager
Savage Coal Terminal

(3) Dan W. Guy
President
Blackhawk Engineering, Inc.

Any of the above individuals are empowered to sign transmittal letters and C_1 Amendment forms to DOGM, and to submit required water monitoring data; however, since Dan Guy is not an employee of Savage Industries Inc., he may sign or submit such data only for Boyd Rhodes in the name of Savage Industries Inc.

INCORPORATED
EFFECTIVE:
FEB 08 2000
UTAH DIVISION OIL, GAS AND MINING

All correspondence from your agency concerning Savage Coal Terminal should continue to be sent to:

James T. Jensen
Executive Vice President
and General Counsel
Savage Industries Inc.
5250 South 300 West, Suite 200
Salt Lake City, Utah 84107

Sincerely,

James T. Jensen

James T. Jensen

cc: Boyd Rhodes
Dan Guy
File

INCORPORATED
EFFECTIVE:
FEB 08 2000
UTAH DIVISION OIL, GAS AND MINING

PRICE RIVER

5459

T14S R10E
T15S R10E

5538

5500

RIVER PUMP

SURFACE:
2 C'S PROPERTIES, LLC

MINERALS:
JOHN C. & SOPHIA CRITCHLOW

S.A.E. #1 PIPELINE 20' R/W

EXISTING FARM/ACCESS ROAD

SURFACE:
ROY D. CAMPBELL, ETUX

MINERALS:
OLGA DOWNARD

SURFACE:
2 C'S PROPERTIES, LLC

PRICE RIVER

3

2

1

S.A.E. #1 PIPELINE 20' R/W

SURFACE:
J.K. CRITCHLOW, ETUX

R.R. RIGHT OF WAY

SURFACE:
ROY D. CAMPBELL, ETUX

MINERALS:
PRICE CITY

5500

SURFACE:
ROY D. CAMPBELL, ETUX

MINERALS:
OLGA DOWNARD

SURFACE:
STATE LAND

S.A.E. #1 PIPELINE 20' R/W

SURFACE:
E.W. STODDARD

MINERALS:
PRICE CITY

EXISTING FARM/ACCESS ROAD

SURFACE:
ROYD & PEGGY L. CAMPBELL

SURFACE:
DANIEL R. CAMPBELL, ETUX

5600

SURFACE:
NICK PLATIS, ETAL

SURFACE:
AGNES K. PEIRCE, TR.

MINERALS:
ELDRED E. PIERCE, JR. & GERALDINE THOMAS

ALAN WALTON

SURFACE:
E.W. STODDARD

MINERALS:
OLGA DOWNARD

S.A.E. #1 PIPELINE 20' R/W

SURFACE:
D&RGW RAILROAD COMPANY

MINERALS:
OLGA DOWNARD

10

11

12

PUMPHOUSE

SURFACE:
JOHN BROWN

OIL & GAS:
USA

COAL & OTHER MIN:
KENT E. & CLARA W. PETERSON

SURFACE:
U.P.C., INC.

(COVOL)

SAVAGE COAL TERMINAL

5500

SURFACE:
SAVAGE INDUSTRIES, INC.

OIL & GAS:
USA

COAL & OTHER MIN:
MOUNTAIN COAL COMPANY

SURFACE:
SAVAGE INDUSTRIES, INC.

MINERALS:
ERVIN & VIOLET FEICHKO

SURFACE:
D&RGW RAILROAD COMPANY

OIL & GAS:
ERVIN & VIOLET FEICHKO

COAL & OTHER MIN:
D&RGW RAILROAD COMPANY

SURFACE:
ROYD & PEGGY L. CAMPBELL

SURFACE:
D&RGW RAILROAD COMPANY

OIL & GAS:
JACK & FRANK WORLD

COAL & OTHER MIN:
D&RGW RAILROAD COMPANY

SURFACE:
SAVAGE INDUSTRIES, INC.

OIL & GAS:
JACK & FRANK WORLD

COAL & OTHER MIN:
MOUNTAIN COAL COMPANY

KEVEN & LOIS JENSEN

R.R. RIGHT OF WAY

SURFACE:
SHANE R. & KRISTIN CAMPBELL

SURFACE:
JOHN L. & CHRISTY L. HANNA

MINERALS:
G.W. WATERMAN

SURFACE:
CIRCLE K RANCH

SURFACE:
DAVID C. SWENSON

MINERALS:
STATE OF UTAH

CIRCLE K RANCH

SURFACE:
D&RGW RAILROAD COMPANY

MINERALS:
STATE OF UTAH

SURFACE:
HIGH COUNTRY FOREST PRODUCTS

5500

5540

15

14

13

5531

5500

RECEIVED
APR 09 2008
DIV. OF OIL, GAS & MINING

REVISION #	DESCRIPTION

LEGEND:

PERMIT AREA:

UTAH REGISTERED
#154168
DAN W. GUY
4/5/08
PROFESSIONAL ENGINEER

N

SAVAGE

SAVAGE COAL TERMINAL
SURFACE & MINERAL OWNERSHIP

SCALE:	DRAWN BY:
1" = 1000'	BLACKHAWK ENGINEERING
DATE:	PLATE:
SEPTEMBER 2007	PLATE 1-1

Savage Services Corporation
Savage Coal Terminal
C/007/022

Chapter 2

Soils

R645-301-200

Table of Contents
Savage Coal Terminal
Chapter 2 - Soils

R645-301-200. Soils
R645-301-220. Environmental Description
R645-301-230. Operation Plan
R645-301-231. General Requirements
R645-301-232. Topsoil and Subsoil Removal
R645-301-233. Topsoil Substitutes and Supplements
R645-301-234. Topsoil Storage
R645-301-240. Reclamation Plan
R645-301-241. General Requirements
R645-301-242. Soil Redistribution
R645-301-243. Soil Nutrients and Amendments
R645-301-244. Soil Stabilization
R645-301-250. Performance Standards

Table 2-1 Predicted Average Yields - Principal Irrigated Soils
Table 2-2 Estimated Potential Production - Forage
Table 2-3 Soil Suitability as Seedbed Quality Material
Table 2-4 Evaluation of Seedbed Quality Material
Table 2-5 Soil Chemical and Physical Analysis
Table 2-6 Seedbed Quality Material Volumes
Table 2-7 Soil Analysis of Savage Coal Terminal Refuse Material
Table 2-8 Depths of Suitable Topsoil Available for Seedbed Material
Table 2-9 Topsoil Mass Balance Table

Figure 2-1 SCS Letter

Appendix 2-1 Topsoil Stockpiles (As-Constructed)
Appendix 2-2 Topsoil Evaluation for New coal Stockpile Area
Appendix 2-3 Soils Evaluation for Settling Pond Area

Plate 2-1 Soils Map
Plate 2-2 As-Built Topsoil Map
Plate 2-3 Settling Pond Area

R645. Natural Resources; Oil, Gas and Mining; Coal.

R645-301. Coal Mine Permitting: Permit Application Requirements.

R645-301-200. Soils.

211. Premining Soil Resources.

The permit area was mapped by the USDA Soil Conservation Service (SCS) in 1970. The site was originally disturbed for industrial purposes in 1973-1974. The disturbance was expanded to accommodate most of the existing facilities in 1977-1978, with the majority of the disturbance occurring prior to S.M.C.R.A.; therefore, only limited areas had any topsoil/subsoil salvaged prior to disturbance.

Topsoil and subsoil have been removed and stored in separate piles for all areas disturbed since S.M.C.R.A. requirements were implemented on coal processing facilities.

212. Stockpiling and Redistribution.

Topsoil and subsoil have been removed from post-SMCRA disturbed areas and stockpiled as described under Section 230.

220. Environmental Description.

221. Prime Farmland Investigation and Determination.

In July 1980, Beaver Creek Coal Company (site owner at the time) requested that SCS personnel in Price, Utah review all the soils present within the Permit boundary to determine if any qualified as Prime Farmland. At that time, the SCS made a field reconnaissance to confirm soil types. The field information was then checked against a state listing of prime farmland soils. At this time the State Soil Scientist determined that there are no prime farmlands on CV Spur (Savage Coal Terminal) property. (See Figure 2-1).

222. Soil Survey.

A soil survey of the Savage Coal Terminal (C.V. Spur) was conducted to provide soil resource information to meet the requirements of the Utah Division of Oil, Gas and Mining and the Office of Surface Mining. The soil survey was performed by James P. Walsh & Associates based on a contract with Beaver Creek Coal Company, site owner at the time. Results of the survey are summarized in the following section.

An additional soils survey was conducted in March, 2002 on the area proposed for disturbance inside the railroad loop east of the office. This survey was conducted by Mr. Dan Larsen, Soils Scientist for E.I.S. Services, Co., Helper, Utah. The survey was conducted to determine topsoil stripping depths. Results of the survey are included in Appendix 2-2.

Another Order 1 Soils Survey was completed for the Settling Pond Area. This survey was conducted by Mr. Bruce Chesler, Soil Scientist, on August 21, 2006. Results of this survey are included in Appendix 2-3.

222.100. The permit area was mapped by the USDA Soil Conservation Service (SCS) in 1970. Plate 2-1, Soil Map of SAVAGE COAL TERMINAL permit area was originally made by James P. Walsh & Associates in July 1980 as a refinement of the SCS survey. At the time of mapping, a large part of the area was mapped as disturbed land.

Map unit descriptions are site specific. Six map units are mapped and described.

Soil series descriptions are adapted from the SCS to be site specific. Detailed pedon descriptions are presented for the three major soil series at the site. Pedons were described in backhoe pits to 60 inches or to bedrock, whichever was shallowest.

The six major soil series were sampled at the site. Samples were analyzed by Colorado Agricultural Consultants of Brighton, Colorado. Parameters tested were pH, electrical conductivity, saturation percent, soluble calcium, magnesium and sodium, available potassium, texture class from percent sand, silt, clay and very fine sand, organic matter percent, phosphorous, lime, boron, ammonia-nitrogen, and nitrate-nitrogen.

Present and potential uses of the soils of the site have been evaluated based on SCS Soil Survey Interpretation information. The soils have no potential as cropland or pasture land. The soils have not been evaluated by the SCS for their potential production as rangeland but their capability groups are given.

The soils are evaluated as seedbed quality material for drastically disturbed land. The evaluation method used is that of the SCS. Each horizon of each pedon is rated as seedbed quality material based on the field description and the analytical data. Recommended use for each soil is given.

Soil names given in this report are tentative. The soils in this report are named for similar soils that are presently being mapped by the SCS in the area. In some cases the described pedons are outside of the accepted range in characteristics for the series and those differences are noted in the test.

The soils in this report have not been correlated by the SCS. Classifications are based on morphology as described in the field, and to a lesser degree on the analytical data. Where analytical data do not support the field descriptions, the soils are classified according to the field descriptions.

222.200. Soil Identification. The soils at the site were initially examined by stereoscopic examinations of serial photographs by the Company. This allowed the consultant to determine slopes, land forms, and vegetative patterns. Soils were then examined in the field. The soil descriptions were compared with recorded characteristics of the soils in adjacent counties and in the official Soil Conservation Service (SCS) series descriptions. Map units are comprised of soil series and inclusions found with an area to make them site specific.

222.300. Soil Description.

Billings Series - Typical Pedon

The Billings series is a member of the fine-silty, mixed (calcareous) mesic family of Typic Torrifluvents. Annual precipitation is 7 to 11 inches. The mean annual soil temperature ranges from 47 to 57 Degrees Fahrenheit, and the frost free period is 110 to 160 days. A representative profile of Billings silty clay, gently sloping 300 feet east and 1900 feet north of the southwest corner of Section 11, T 15 S, R 10 E is:

A11p 0 to 2 inches; light brownish gray (2.5Y 6/2) silty clay; dark grayish brown (2.5Y 4/2) moist; moderate thin platy structure on surface, moderate very fine granular below; slightly hard; very friable; sticky and plastic; calcareous; some thin salt crusts on surface; few very fine roots, clear smooth boundary.

A12p 2 to 7 inches; light brownish gray (2.5Y 6/2) silty clay; dark gray brown (2.5Y 4/2) moist; strong coarse angular blocky structure; hard; friable; very sticky and plastic; calcareous, few very fine roots; abrupt smooth boundary.

C11cs 7 to 18 inches; light brownish gray (2.5Y 6/2) silty clay; gray brown (2.5Y 5/2) moist; massive; friable; very sticky and plastic; calcareous; few faint light yellowish brown (2.5Y 6/4) mottles; diffuse boundary.

C12cs 18 to 26 inches; light brownish gray (2.5Y 6/2) silty clay; gray brown (2.5Y 5/2) moist, massive; friable; very sticky and plastic; calcareous; many nodules and threads of gypsum; clear smooth boundary.

C13cs 26 to 45 inches; light brownish gray (2.5Y 6/2) silty clay; gray brown (2.5Y 5/2) moist; massive; friable; very sticky and plastic; calcareous; many nodules and threads of gypsum; few very fine roots, clear smooth boundary.

C2cs 45 to 60 inches; light brownish gray (2.5Y 6/2) silty clay; gray brown (2.5Y 5/2) moist; massive; friable; very sticky and plastic; calcareous; abundant nodules and threads of gypsum, few very fine roots.

The described pedon may have a higher percent clay than is allowed in the established series.

Chipeta Series - Typical Pedon

The Chipeta Series is a member of the clayey, mixed (calcareous) mesic, shallow family of Typic Torriorthents. These soils formed in residuum derived from alkaline marine shale with gypsum. Annual precipitation is 6 to 11 inches. The mean annual soil temperatures ranges from 47 to 52 Degrees Fahrenheit, and the frost free period is 110 to 160 days. A representative profile of Chipeta silty clay, gently sloping, 1200 feet east and 500 feet north of the southwest corner on Section 11, T 15 S, R 10 E is:

A1 0 to 3 inches; light brownish gray (2.5Y 6/2) silty clay; dark grayish brown (2.5Y 4/2) moist; moderate medium platy structure at surface, weak fine subangular blocky structure below; slightly hard, very friable, very sticky and very plastic; calcareous, few medium roots; 5% shale channers; clean smooth boundary.

C1 3 to 19 inches; light brownish gray (2.5Y 6/2) silty clay; gray brown (2.5Y 5/2) moist; weak fine subangular blocky; soft, very friable, very sticky and very plastic, calcareous, numerous gypsum crystals up to 20 mm in diameter; many fine roots to 10 inches; common fine roots from 10 to 19 inches; 28% shale channers.

Cr 19 inches; weathered shale.

Disturbed Land Soils - Typical Pedon

The available water capacity is high, and permeability is moderate to slow. These soils are used for mining activities. These soils formed in alluvium derived from marine shales with gypsum. Annual precipitation is 6 to 11 inches. The mean annual soil temperature ranges from 17 to 52 Degrees Fahrenheit, and the frost free period is 110 to 160 days. A representative profile of a disturbed soil 1100 feet east and 1000 feet north of the southwest corner of Section 11, T 15 S, R 10 E is:

0 to 12 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam fill; dark yellowish brown (10YR 4/4) moist; compacted at surface, loose below, very friable, nonsticky and nonplastic; calcareous, with numerous gypsum crystals and threads.

12 to 60 inches; light grayish brown (2.5Y 6/2) silty clay, gray brown (2.5Y 5/2) moist; massive, hard, very sticky and very plastic; calcareous, with numerous gypsum crystals and threads.

Killpack Series - Typical Pedon

The Killpack series is a member of the fine-silty mixed (calcareous) mesic family of Typic Torriorthents. These soils formed in alluvium derived from marine shale with gypsum. Annual precipitation is 7 to 11 inches. The mean annual soil temperature ranges from 47 to 48 Degrees Fahrenheit, and the frost free period is 110 to 130 days. A representative profile of Killpack silty clay loam, gently sloping, 1800 feet east and 500 feet north of the southwest corner of Section 11, T 15 S, R 10 E is:

A11 0 to 2 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium platy structure at surface about 5 mm thick; moderate fine granular below; slightly hard, friable, sticky and plastic; calcareous, common fine roots; clear smooth boundary.

A12 2 to 8 inches; light brownish gray (2.5Y 6/2) silty clay, moderate medium and coarse subangular blocky; slightly hard, friable, sticky and plastic; calcareous, common fine roots, clear wavy boundary.

C11 8 to 22 inches; light brownish gray (10YR 6/2) silty clay, gray brown (10YR 5/2) moist; moderate fine angular blocky structure; hard, friable, sticky and plastic; many gypsum nodules up to 10 mm in diameter; 10% shale channers, few fine roots, calcareous, diffuse boundary.

C12 22 to 29 inches; light brownish gray (10YR 6/2) silty clay; gray brown (10YR 5/2) moist; moderate fine angular blocky structure; hard friable, sticky and plastic; many gypsum nodules up to 10 mm in diameter; 10% shale channers, few fine roots, calcareous, clear wavy boundary.

Cr 39 inches; weathered shale and sand stone.

The described pedon may have a higher percentage of clay than is allowed in the established soil series.

Killpack Series, High Water Table Variant - Typical Pedon

The Killpack series High Water Table Variant is a member of the fine-silty, mixed (calcareous) mesic family of Typic Torriorthents. These soils formed in alluvium derived from marine shales with gypsum. Annual precipitation is 7 to 11 inches. The mean annual soil temperature ranges from 47 to 48 Degrees Fahrenheit, and the frost free period is 110 to 160 days. A representative profile of Killpack silt loam, high water table variant, gently sloping, 600 feet east and 1300 feet north of the southwest corner of Section 11, T 15 S, R 10 E is:

A11 0 to 4 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist, moderate coarse platy structure; soft' very friable; sticky and plastic; calcareous; slightly stratified; common fine distinct strong brown (7.5YR 5/6) mottles; few fine roots; clear smooth boundary.

A12 4 to 10 inches; pale brown (10YR 6/3) silty clay loam; dark brown (10Yr 3/3) moist; moderate course platy structure, slightly hard, very friable, sticky and plastic; common fine distinct strong brown (7.5YR 5/6) mottles; calcareous; common very fine roots; slightly stratified, clear smooth boundary.

Clcs 10 to 16 inches; light brownish gray (2.5YR 6/2) silty clay; dark gray brown (2.5YR 4/2) moist; strong medium and course angular blocky; hard; very friable; sticky and plastic; calcareous, few fine and medium roots; common fine white gypsum crystals; few fine faint olive yellow (2.5Y 6/6) mottles; some cracking; clear smooth boundary.

C2 16 to 31 inches; light brownish gray (2.5Y 6/2) silty clay; dark grayish brown (2.5Y 4/2) moist; massive, very hard, firm, very sticky and plastic, calcareous, many threads of gypsum; no roots; clear wavy boundary.

Cr 31 inches; weathered shale.

The described pedon may have more clay than is allowed in the established series.

Saltair Series - Typical Pedon

The Saltair series is a member of the fine-silty mixed mesic family of Typic Salorthids. These soils formed in alluvium derived from marine shale and sandstone. Annual precipitation is 6 to 11 inches. The mean annual soil temperature ranges from 47 to 54 Degrees Fahrenheit, and the frost free period is 110 to 160 days. A representative profile of Saltair silty clay loam, 1200 feet north and 500 feet west of the southeast corner of Section 13, T 17 S, R 9 E is:

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 crusts; clear smooth boundary.

A12sa ½ inch to 7 inches light brownish-gray (2.5Y 6/2) 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 (10Y 5/4) mottles and common, fine, faint, grey (N 5/0) mottles; weak, fine angular blocky structure; very hard, very firm, very sticky and very plastic; few 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.
C2gsa	14 to 32 inches, light brownish-gray (2.5Y 6/2) heavy silt loam, grayish brown (2.5Y 5/2) when moist; many, fine, distinct, yellowish-brown (10Yr 5/4) mottles and common, fine, faint, gray (N 5/0) mottles; massive; very hard, firm, sticky and plastic; few fine roots; common medium and fine pores; strongly calcareous; very strongly saline; efflorescent salt on the surfaces of many peds and in pores; strongly alkaline (pH 8.5); gradual, wavy boundary.
C3g	32 to 60 inches, light-grey (2.5Y 7/2) heavy silt loam, grayish brown (2.5Y 5/2) when moist; few, fine, distinct, yellowish-brown (10YR 5/4) mottles and medium, faint, gray (2.5 5/0) mottles; massive; hard, firm, sticky and plastic; few fine roots; common fine pores; strongly calcareous; strongly alkaline (pH 8.5).

The Saltair series was not sampled or described in the permit area as it is of limited occurrence and is unsuited for reclamation material.

Map Unit Descriptions

Map Unit: B1B - Billings Silty Clay, 1 to 3 Percent Slopes

This map unit is on alluvial fans and flood-plains. The slope is 1 to 3 percent. The native vegetation is mainly greasewood, shadscale, galleta grass and Indian rice grass.

This unit is 75 percent Billings silty clay and 1.5 percent Bunderson loam. The Bunderson loam occupies barren spots. Included in this map unit is about 10 percent Saltair silty clay loam on the lowest parts of the map units, where seepage waters from irrigation effect the soils. Included areas make up about 10 percent of the total acreage.

The Billings soil is deep and very deep and moderately well-drained. It is formed in alluvium derived from alkaline, gypsum bearing marine shale.

Typically, the surface layer is light brownish gray, calcareous, silty clay about 7 inches thick. The subsoil is a light brownish gray, massive gypsiferous silty clay about 38 inches thick. The sub-stratum to a depth of 60 inches or more is light brownish gray, strongly gypsiferous silty clay.

Permeability of the Billings soil is slow. Available water capacity is about 5 inches. Effective rooting depth is 60 inches. Runoff is rapid and the erosion hazard for water is moderately high.

The unit is mainly used for mining activities in the mapped area. It is also used for irrigated crops where it is not too saline in parts of Carbon County. The present plant community is mainly shadscale, galleta grass and greasewood.

Production potential is 400/150 pounds of air-dry vegetation in favorable and unfavorable years, respectively.

This map unit is in capability unit VIIe non-irrigated, Desert Loamy Shale site, and 6 to 11 inch precipitation zone.

Map Unit: ChC - Chipeta Silty Clay, 3 to 6 Percent Slopes

This map unit is on toeslopes of low shale hills. The slope is 3 to 6 percent. The native vegetation is mainly shadscale and Indian ricegrass.

This unit is 80 percent Chipeta silty clay. Included in this map unit is about 10 percent Killpack soils on the lower portions of the landscape. Also included are 10 percent other soils. Included areas make up about 20 percent of the total acreage.

The Chipeta soil is shallow and moderately well-drained. It is formed in residuum derived from alkaline, gypsiferous marine shale.

Typically, the surface layer is a light brownish gray silty clay about 3 inches thick. The subsoil is a light brownish gray gypsiferous silty clay about 16 inches thick. Slightly weathered marine shale bedrock is at a depth of 19 inches.

Permeability of the Chipeta soil is slow. Available water capacity is low. Effective rooting depth is less than 20 inches. Runoff is medium and the erosion hazard for water is moderate.

The unit is mainly used for range in Carbon County. It is also used for mining activities in the mapped area.

The present plant community is mainly a saltbush-grassland.

The potential productivity produces 200/100 pounds of air-dry vegetation in favorable/and unfavorable years, respectively.

This map unit is in capability unit VIIE, Desert Shallow Shale range site, and 6 to 11 inch precipitation zone.

Map Unit: ChE2 - Chipeta Silty Clay, 3 to 20 Percent Slopes, Eroded

This map unit is on shale hills. The slope is 3 to 20 percent. The native vegetation is mainly mat saltbrush and Castle Valley clover.

This unit is 75 percent Chipeta soils, 15 percent shale outcrop, 5 percent Persayo soils, and 5 percent other soils. The Chipeta soil is on the side-slopes and toeslopes. Shale outcrops consist of nearly bare, strongly sloping, actively eroding shale. Tiny channels of numerous intermittent drainages form a branching pattern in most places. Inclusions comprise 25 percent of the map unit.

The Chipeta soil is shallow and moderately well-drained. It is formed in residuum derived from alkaline, gypsiferous marine shale.

Typically, the surface layer is light brownish gray silty clay about 3 inches thick. The subsoil is a light brownish gray gypsiferous silty clay about 16 inches thick. Slightly weathered marine shale bedrock is at a depth of 19 inches.

Permeability of the Chipeta soil is slow. Available water capacity is low. Effective rooting depth is less than 20 inches. Runoff is medium and the erosion hazard for water is moderate.

The unit is mainly used for range. It is also used for mining activities in the mapped area.

The present plant community is mainly mat saltbrush and Castle Valley clover.

The potential productivity produces 200/100 pounds of air-dry vegetation in favorable/and unfavorable years, respectively.

The Chipeta soil is in capability unit VIIE nonirrigated, Desert Shallow Shale range site, and 6 to 11 inch precipitation zone. The shale outcrop is in capability unit VIIIs nonirrigated.

Map Unit: DL - Disturbed Land, 1 to 6 Percent Slopes

This map unit is throughout the mapped area. The slope is 1 to 6 percent. The native vegetation has been removed. In many places weeds have pioneered in disturbed areas.

The unit is 90 percent disturbed land. Included are small areas where removal of vegetation, heavy traffic or a thin layer of coal waste have obscured the pre-existing soils.

Based on soil mapping prior to disturbance (USDA, 1970) the disturbed soils are generally fine textured, deep and moderately well-drained. They are formed in alluvium derived from alkaline gypsiferous shale.

Typically, the surface layer has been removed. The subsoil is a calcareous, gypsiferous, silty clay, about 60 inches thick.

Permeability of the disturbed soils is slow. Available water capacity is high. Effective rooting depth is more than 60 inches. Runoff is moderate and the erosion hazard for water is high.

The unit is mainly used for mining activities.

The present plant community, where plants occur, is mainly weeds.

The map unit is in capability unit VIIE, and 6 to 11 inch precipitation zone.

Map Unit: K1B - Killpack Silty Clay Loam, 1 to 3 Percent Slopes

This map unit is on toeslopes, below the Chipeta soils. The slope is 1 to 3 percent. The native vegetation is mainly shadscale and Indian ricegrass.

This unit is 90 percent Killpack soils, and 10 percent soils similar to the Killpack but deeper than 40 inches to shale.

Killpack soil is moderately deep and moderately well drained. It is formed in alluvium derived from alkaline and gypsiferous shale.

Typically, the surface layer is a light grayish brown silty clay loam about 2 inches thick. The subsoil is a light grayish brown or light brownish gray silty clay about 31 inches thick. Weathered shale is at a depth of about 39 inches.

Permeability of the Killpack soil is slow. Available water capacity is low. Effective rooting depth is less than 40 inches. Runoff is medium and the erosion hazard for water is moderate.

The unit is mainly used for range, irrigated pasture, irrigated alfalfa and small grains. It is also used for mining activities in the mapped area.

The present plant community is mainly a saltbrush or grassland.

The potential productivity produces 400/150 pounds of air-dry vegetation in favorable/and unfavorable years, respectively.

The map unit is in capability unit I'VE irrigated and VIIE nonirrigated, Desert Loamy Shale range site, and 6 to 11 inch precipitation zone.

Map Unit: KmB - Killpack Silt Loam, High Water Table Variant 1 to 3 Percent Slopes

This map unit is on low areas that receive seepage water. The slope is 1 to 3 percent. The native vegetation is mainly greasewood.

This unit is 80 percent Killpack silt loam, High Water Table Variant and 10 percent soils more than 40 inches or less than 20 inches deep. Included in this map unit is about 10 percent other soils.

The Killpack silt loam, High Water Table Variant soil is moderately deep and somewhat poorly-drained. It is formed in alluvium derived from alkaline, gypsiferous shale.

Typically, the surface layer is a brown, silt loam about 4 inches thick. The subsoil is a pale brown silty clay loam about 6 inches thick. The substratum to a depth of 31 inches is light brownish gray saline silty clay.

Permeability of the Killpack silt loam, High Water Table Variant is slow. Available water capacity is low. Effective rooting depth is less than 40 inches. Runoff is slow and the erosion hazard for water is slight.

The unit is mainly used for range. It is also used for mining activities in the areas mapped. It is used for mining activities in the areas mapped.

The present plant community is mainly greasewood and saltgrass.

The potential productivity is not established.

This map unit is in capability unit VIw nonirrigated, Desert Loamy Shale range site, and 6 to 11 inch precipitation zone.

Map Unit: Sa-Saltair Silty Clay Loam, Barren 0 to 3 Percent Slopes

This map unit is on alluvial fans, on flood plains and narrow alluvial valleys. The slope is 0 to 3 percent. The soil is mainly without vegetation.

This unit is 90 percent Saltair silty clay loam, barren, and 10 percent other soils.

The Saltair soil is deep and poorly-drained. It is formed in fine textured alluvium derived from calcareous marine shale with gypsum.

Typically, the surface layer is light brownish gray, strongly calcareous, very strongly saline silty clay loam about 7 inches thick. The subsoil is a light brownish gray heavy silt loam to a depth of 60 inches.

Permeability of the Saltair soil is slow. Available water capacity is low. Effective rooting depth is 60 inches. Runoff is slow or ponded and the erosion hazard for water is low.

The Unit is mainly used for mining activities. It is also used for range and wildlife in Carbon County but is poor bor both uses.

The soil is mainly barren of vegetation.

The potential productivity data is not available but it is very low. This map unit is in capability unit VIII-w, not rated for range site.

222.400. Present and Potential Productivity of Existing Soils.

Present and potential uses of soils of the site have been evaluated based on SCS soil survey interpretation information. Potential production as irrigated crop land and pasture land and their key building groups are given. Potential production as range land, range site classification and their productivity groups are also given.

Crops and Pasturelands.

Table 2-1 lists the potential yields of a variety of crops for the Killpack and Billings soils under irrigation and other improved management practices in Carbon County. Predicted yields are based on information from the Carbon Emery Area Survey (USDA, 1970).

TABLE 2-1
PREDICTED AVERAGE YIELDS - PRINCIPAL IRRIGATED SOILS

Soil Series	Phase	NIRR	IRR	IRR Alfalfa Hay (tons)	IRR Corn Silage (tons)	IRR Pasture (AUM)	IRR Sugar Beets (tons)	IRR Barley (Bu)	IRR Wheat Spring (Bu)
		Capability							
Billings (a)	0 - 3%	VIIs	IIIE	6.0	2.0	11	20	100	80
Killpack (b)	0 - 3%	VIIE	I'VE	4.0	15	8	-	60	-
(a) - Billings soil on the site is too salty for cultivation.									
(b) - Killpack soil on the site has been cultivated in the past.									

The U. S. Department of Agriculture has the authority to identify farmlands of national, state, or local importance. These farmlands are referred to as prime farmlands, farmlands of statewide importance, and unique farmlands. The SCS has determined that there are no prime, important or unique farmlands at the Castle Valley Spur site (see Figure 2-1, SCS Prime Farmland Clearance).

Rangelands.

The soils of the site area have been used as rangeland in the past. Table 2-2 lists the predicted forage production for rangeland soils during favorable, normal, and unfavorable years for various sites. Table 2-2 is based on generalized SCS data. Capability classes for the rangeland soils are VI, VII, and VIII. The principal limitations are erosion, wetness, and shallowness. Capability units show, in a general way, the availability of soils to support cultivated crops. Soils in Class VI are generally unsuited for cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover. Soils in Class VII have very severe limitations that make them unsuited for cultivation and that restrict their use largely to grazing limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, water supply or aesthetic purposes.

TABLE 2-2
ESTIMATED POTENTIAL PRODUCTION - FORAGE

Soil Series	Potential Production Favorable/Normal/ Unfavorable Years (lbs/ac)*	Sites	Soil Capability Class
Billings	400/150	all	VIIs
Chipeta	200/100	all	VIIE
Killpack	400/-/150	all	VIIE
Killpack High Water Table	NA	NA	VIw
Saltair	NA	very strongly saline	VIIIw
NA - data not available			

223. Soil Characterization.

The survey discussed in Section 222. was conducted in 1980. This survey was conducted in accordance with standards applicable at that time.

224. Substitute Topsoil.

The criteria for evaluating if topsoil is seedbed quality material are given in Table 2-3. References to topsoil means only those soil horizons suitable for use as seedbed quality material. The criteria include sodium absorption ratio (SAR), electrical conductivity or salinity (EC), toxic materials, soil reaction (pH), available water holding capacity (AWHC), erosion factor (k), wind erosion group, texture, and percent coarse fragments.

Criteria are given for good, fair or poor sources of seedbed quality material (Table 2-4). "A good rating means vegetation can be relatively easy to establish and maintain, the surface is stable and resists erosion, and the topsoil has good potential productivity. Material rated fair can be vegetated and stabilized by modifying one or more properties. Top dressing with better material or application of soil amendments may be necessary for satisfactory performance. Material rated poor has such severe problems that revegetation and stabilization is very difficult and costly. Top dressing with better material may be necessary to establish and maintain vegetation," (USDA, 1978).

TABLE 2-3
SOIL SUITABILITY AS SEEDBED QUALITY MATERIAL

Property	Good	Limits/Fair	Poor	Restrictive Feature
1. Sodium Adsorption Ratio (SAR)	5	5-12	12	Excess Sodium
2. Salinity (MMHOS/CM)	8	8-16	16	Excess Salt
3. Toxic Materials	Low	Medium	High	Toxicity
4. Soil Reaction (pH)[a]	5.6-7.8	4.5-5.5	4.5	Too Acid
5. Soil Reaction (pH)	7.9	7.9-8.4	8.4	Excess Line
6. Available Water Capacity (IN/IN)	.10	.05-.10	.05	Droughty
7. Erosion Factor (K)	.37	.37	-	Erodes Easily
8. Wind Erod. Group	3	3	1,2	Soil Blowing
9. USDA Texture	-	SCL, CL, SICL	C[b],SIC[b],SC	Too Clayey
10. USDA Texture	-	LCOS, LS, LFS, LVFS	COS, S, FS, VFS	Too Sandy
11. Coarse Frag. (WT PCT) 3-10 in. (7.6-25.4 cm)	15	15-35	35	Large Stones
12. 10 in. (725.4 cm)	3	3-10	10	Large Stones

[a] Layers with high potential acidity should be rated poor.

[b] If in kaolinitic family, rate one class better if experience confirms.

From National Soils Handbook 1978, NSH - Part II (403.6(a))

TABLE 2-4
EVALUATION OF SEEDBED QUALITY MATERIAL

Series	Suitability Point[a]	Depth (in)	Rock	Salinity	Toxic Materials[b] (Boron)	Soil Reaction	Available Water Cap[c]	Erosion Factor	Wind Erodibility Group[d]	USDA Texture[e]	Coarse Frags[f]	Overall Rating
Billings	3	0-2	good	fair	good	good	good	fair	good	fair[e]	good	FAIR
		2-7	good	fair	good	good	good	fair	NA	fair[e]	good	FAIR
		7-18	fair	poor	good	good	good	fair	NA	poor	good	POOR
		18-26	fair	poor	good	good	good	fair	NA	poor	good	POOR
		45-60	fair	poor	good	good	good	fair	NA	poor	good	POOR
Chipeta	5	0-3	fair	good	good	good	good	fair	good	fair[e]	good	FAIR
		3-19	good	fair	good	good	good	fair	NA	fair	good	Fair-poor
Disturbed Land	6	0-12	fair	fair	good	good	fair	NA	NA	fair	poor[f]	POOR
		12-60	god	poor	good	good	good	NA	NA	poor	good	POOR
Killpack	4	0-2	good	good	good	good	good	fair	good	fair	good	FAIR
		2-8	fair	good	good	good	good	fair	NA	fair[e]	good	FAIR
		8-22	good	good	good	good	good	fair	NA	fair[e]	good	FAIR
		22-39	poor	poor	good	good	good	fair	NA	poor	good	POOR

Series	Sample Depth	Depth (in)	S-AR	Salinity	Toxic Materials[a] (Boron)	Soil Reaction	Available Water Cap[b]	Erosion Factor	Wind Erodibility Group[b]	USDA Texture[c]	Coarse Frags[d]	Overall Rating
Killpack, high water table	7	0-4	fair	fair	good	good	good	fair	good	good	good	FAIR
		4-10	good	good	good	good	good	fair	NA	fair	good	FAIR
		10-16	good	fair	good	good	good	fair	NA	poor	good	POOR
		16-31	fair	poor	good	good	good	fair	NA	poor	good	POOR
Saltair	not sampled	NA	NA	poor	NA	NA	fair-poor[b]	fair	good	NA	NA	POOR

[a] evaluation based on WDEQ Guideline No. 3 for boron limits
[b] from sol survey interpretation records, USDA SCS
[c] from field description of soil texture; not taken from lab analysis
[d] from field description of texture and coarse fragments (USDA, 1979)
[e] rated one category better due to satisfactory fifth as described in field description and adequate organic matter content
[f] rated one category lower due to excessive ravels
NA - data not available

Soil Chemistry and Physical Properties

Chemical and physical data for project area soils (Table 2-5) were collected to evaluate the soils as seedbed quality material for reclamation. Soil chemical and physical data are from analysis by Colorado Agricultural consultants. Other sources of information used to evaluate soils for reclamation are manuscript SCS soil survey information and soil survey interpretation records.

Soils were sampled by horizon and analyzed using standard agricultural techniques as specified in Table 2-3. The parameters tested were paste pH, electrical conductivity, moisture saturation percentage, SAR, organic matter, plant available phosphorus and potassium, particle size distribution, nitrate nitrogen, ammonia nitrogen, lime and boron. The techniques used were those of USDA Handbook 60 (1954), the American Society of Agronomy Monograph #9 (Black, 1965).

Suitability as Seedbed Quality Material for Reclamation of Disturbed Lands

Table 2-4 is an evaluation of topsoil for each horizon on each project area soil type. The evaluation is based on the soil chemical and physical data in Table 2-5 and the criteria of Table 2-3. The soils are rated good, fair, or poor sources of seedbed quality material. The overall rating given for each horizon is the rating for most limiting criteria.

"Vegetation is difficult to establish on soils with high SAR which indicates potential instability and water transmission problems (USDA, 1978)." SAR ranges from good to poor and high SAR is a potential restrictive feature for several of the soils tested.

TABLE 2-5
SOIL CHEMICAL AND PHYSICAL ANALYSIS

Sample Indent	PH	EC MMHO S/CM	SAT %	NA MEQ/L	CA MEQ/L	MG MEQ/L	SAR Ton 1000T	AK $CaCO_3$	TEXT USDA	SN %	SI %	CL %	VFS %	N %	OM %	P PPM	LM %	B PPM	NH3 %
Billing/Hole: 3																			
0-2	6.9	10.1	43.3	8.84	47.69	27.72	1.4	450	SILO	22	76	2	16	7	1.7	0	9.2	0.47	0.5
2-7	7.0	15.7	39.6	16.69	50.83	65.68	2.2	300	SILO	21	78	1	16	3	1.2	0	9.2	0.40	0.4
7-18	7.3	28.0	38.3	51.78	53.16	137.54	5.3	210	SILO	19	78	3	17	4	0.9	0	9.2	0.50	0.5
18-45	7.5	43.1	43.0	95.42	49.65	223.53	8.2	190	LO	37	48	15	14	7	0.7	4	9.2	0.73	0.3
45-60	7.5	28.0	53.8	72.46	35.45	136.40	7.8	290	CLLO	31	37	32	14	6	9.8	11	9.2	0.92	0.5
Chipeta/Hole: 5																			
0-3	7.7	4.8	45.4	19.91	15.50	5.87	6.1	790	CLLO	35	33	32	14	5	1.0	3	9.1	0.62	1.1
3-19	7.0	9.2	46.3	20.28	39.21	27.36	3.5	500	CLLO	39	31	30	12	4	0.8	0	9.0	0.65	0.5
Disturbed Land Material/Hole: 6																			
0-12	7.1	10.2	35.3	31.49	35.97	39.18	5.5	290	SNLO	61	34	5	12	39	1.1	0	9.2	0.79	0.4
12-60	7.6	47.9	37.1	194.21	56.81	157.13	18.8	320	SILO	38	52	10	14	72	0.7	5	9.0	0.98	2.9
Killpack/Hole: 4																			
0-2	7.3	5.3	37.8	11.04	19.79	12.34	2.8	580	LO	39	41	20	12	14	1.4	5	8.9	0.25	1.4
2-8	7.4	5.0	45.4	23.75	14.21	2.94	8.1	570	CLLO	33	29	38	14	9	1.7	4	9.2	0.25	1.2
8-22	7.2	4.9	69.9	8.46	26.71	6.67	2.1	810	CL	32	23	45	14	5	1.0	0	9.1	0.48	0.7
22-39	7.4	14.8	68.3	74.34	18.98	40.99	13.6	860	CL	41	15	44	12	10	0.7	0	9.1	1.40	0.6

Sample Depth																		
Killpack, High Water Table Variant/Hole: 7																		
0-4	7.2	9.6	39.4	33.52	23.35	18.60	7.3	1440	SILO	39	511	10	10	7	2.4	15	9.2	0.60	1.3
4-10	7.3	5.0	37.2	10.28	18.91	12.53	2.6	460	LO	36	48	16	12	3	1.3	2	9.2	0.43	0.9
10-16	7.1	11.4	50.4	27.60	35.93	52.91	4.1	430	CLLO	35	31	34	14	6	1.2	0	9.2	0.51	0.5
16-31	7.1	21.89	38.7	62.90	51.15	82.67	7.7	210	SILO	361	60	4	41	5	0.7	0	8.3	0.36	0.4

"Electrical conductivity is a measure of soil salinity. Excessive salts restrict plant growth, create problems in establishing vegetation and therefore also influence erosion and the stability of the surface, USDA, 1978." Electrical conductivity of the soils of the site ranges from good to poor and is a restrictive feature for a number of soils. Salt tends to be highest in the subsoils, but also accumulates in crusts at the surface in poorly drained soils.

"Toxic materials such as boron get into the food chain and are toxic to animals who eat the vegetation. Excessively high or low pH causes problems in establishing vegetation and as a result influence erosion and stability of the surface, USDA 1978." The soils of the site are rated good for boron and pH. "The available water holding capacity (AWHC) also is important in establishing vegetation. Soils with low available water capacity may require irrigation for establishment of vegetation, USDA, 1978." AWHC is estimated according to the U.S. Forest Service (USDA, 1979) based on field texture and coarse fragments, and is good for most of the soils of the site. It is fair for the fill material.

"The stability of the soils depends upon its erodibility by water and wind and its strength. Water erodibility is indicated by the K factor; wind erodibility is rated according to the wind erodibility group, USDA, 1978." K values for soils of the project area are from the best data available in the SCS Soil Survey Interpretation Records. The soils of the site are rated fair for erodibility by water. Wind erodibility data are available for only the surface soils of the site. The surface layers are rated good for wind erodibility.

USDA texture also influences available water capacity and erodibility by wind or water. Texture influences soil structure, consistence, water intake rate, runoff, fertility, workability, and trafficability. Potential slippage hazard is related to soil texture, and although other factors also contribute, the ratings of soil texture represent one important factor (USDA, 1978). Clay textures are a restrictive feature for most of the soils of the site.

Textures for soils of the site were described in the field and the evaluations are abased on the field determinations. Lab data on soil textures have been disregarded because it is thought that dispersion of silt and clay particles was not adequate, possibly because of high gypsum contents.

Coarse fragments influence the ease of excavation, stock piling and respreading, and suitability for the final use of the land. A certain amount of coarse fragments can be tolerated depending upon the size and intended use of the reclaimed area. If the size of rock fragments exceeds 10 inches (25cm) the problems are more severe (USDA, 1978). Coarse fragments are evaluated based on pedon descriptions for soils of project areas and are rated good for most of the project area.

Topsoil Replacement and Use of Selected Overburden Materials

Very little seedbed quality material exists for areas to be disturbed or previously disturbed and topsoil salvaged (see previous for physical and chemical analysis and Table 2-6 for topsoil available for reclamation). In addition, as a result of surface disturbance created prior to enactment of laws requiring salvaging of topsoil, areas mapped as Disturbed Land contain in-place soil material underlying coal waste and rock.

Since there is not sufficient topsoil to cover all pre and post-law disturbed areas to a minimum depth of six (6) inches, Savage Services Corporation proposes to alleviate and amend the poor features of the pre-law disturbed areas.

As shown by Table 2-4, the upper portion of the disturbed land material is rated as good or fair for all parameters except for the presence of coarse fragments. Many of these fragments are present in the upper portions of the road base. The subsoil material is clayey in areas and may contain high quantities of salt.

The disturbed land areas will have any large amounts of coal waste and excessive rocks removed and disposed of properly prior to reclamation. These areas will ten be graded to the appropriate contour, and scarified to reduce compacted zones. If cloddy surfaces exist they can be pulverized with a disc to crate a more desirable seedbed. Application of mulch will add organic matter to the soil and help recreate soil structure. Additional discussion of the redistribution and handling of the disturbed land fill conductive to successful establishment of vegetation during reclamation is given in Section 240.

The actual reclaimability of the substitute topsoil (in-place soils on Disturbed Lands) will be based on results from the test plots. The Mass Balance Table 2-9 is based on "worst case" conditions, wherein the refuse pile would be covered with a minimum of 6" of soil and any remaining soil would be placed over only a portion of pre-law disturbed lands. This would require that the upper 12" of the disturbed land areas be reconditioned as necessary to meet topsoil standards. The material below a depth of 12" on the disturbed land would not be used as a topsoil substitute.

If the test plots are successful, it may mean that less than 6" of topsoil cover would be adequate on the refuse area, and more material would be available for the pre-law disturbed areas.

Because of the lack of large volumes of suitable subsoil and topsoil on the site, as demonstrated in Tables 2-4 and 2-6, less than four feet of sub and topsoil will be available for utilization during revegetation of the processed waste disposal banks. An analysis of the waste disposal material demonstrates that this material is rated good utilizing soil suitability standards, (see Table 2-7 for chemical analysis of refuse material).

Based on the suitability analysis results for the refuse disposal area and the fact that baseline vegetation studies at Savage Coal Terminal indicates that vegetation is shallow-rooted due to the close proximity of Manco Shale to the soil surface, all disturbed area should be able to be adequately reclaimed to the established vegetation standards with an even redistribution of stockpiled material.

TABLE 2-6
SEEDBED QUALITY MATERIAL VOLUMES

(Including Acres Disturbed in 2006)

Mapping Unit	Suitable Stripping Depth	Acreage	Volume - Bank Cubic Yards BCY
*Killpack - KmB	12" Topsoil 12" Subsoil	1.77	5,490
*Billing - Blbm	12" Topsoil 12" Subsoil	2.43	7,538
**Topsoil Stockpile	NA	NA	49,286
Total Seedbed Quality Material Available (After 2006 Stripping)			62,314

* Actual Volumes Stripped in 2006.
** From Appendix 2-1.

TABLE 2-7
SOIL ANALYSIS OF SAVAGE COAL TERMINAL REFUSE MATERIAL

	Wet Refuse	Suitability*	Dry Refuse	Suitability*
pH	7.70	Good	7.62	Good
E.C. mmhos/cm	4.50	Good	4.80	Good
Saturation %	44.70	N/A	30.30	N/A
Soluble Ca (meq./l)	13.00	N/A	15.50	N/A
Soluble Mg (meq./l)	22.10	N/A	27.90	N/A
Soluble Na (meq./l)	10.70	N/A	10.20	N/A
SAR	2.55	Good	2.19	Good
ESP	2.44	N/A	1.93	N/A
Boron ppm**	0.30	Good	0.25	Good
*Based on National Soils Handbook 1978, NSH - Part II (403.6(a)).				
**Based on WDEQ Guideline No. 1 Table 1-3 for boron limits.				
If erosion is detected after revegetation which may result in the possibility of exposure of the covered waste material, remedial steps will be taken as described in R645-301-541.				

230. Operation Plan.

Future areas of disturbance have been identified to the extent possible and plans have been made to remove all suitable topsoil prior to disturbance (see Plate 5-2). Most of the plans for future disturbance consist of land needed for coal stockpile areas.

When additional storage area becomes necessary topsoil will be stripped using standard earth moving equipment and taken to the topsoil piles. (See Plate 5-2 for location of stockpiles). A qualified Soils Scientist will be on site during topsoil stripping to ensure adequate recovery of soils. The topography on Plate 5-2 represent the "as-built" or present configuration of the topsoil and subsoil piles.

231. General Requirements.

231.100 Removal Storage and Protection of Soils

The in-place depths of seedbed quality material available for reclamation of the project area is listed on Table 2-8 by map unit. The table includes the map unit, map unit components, depth of horizon, rating (from Table 2-4), percent of map unit, recommended depth of stripping and the restrictive features of the suitable material. Volumes of seedbed quality material in stockpile or in-place and to be disturbed in the future can be found in Table 2-6.

All of map unit ChC can be stripped to 6 inches. Included with the Chipeta are other soils that can be stripped to the same depth. The soils report in Appendix 2-2 indicates the Chipeta in the track loop area can be stripped from 2" to 7", with an average of approximately 6". This has been completed.

Based on a recent soils study for the settling pond area (Appendix 2-3), the Map Unit Blb (Billings) was subdivided into 2 units - BlBe and BlBm, as shown on Plate 2-1. Based on analyses, it was determined that the top 12" of BlBm (and KmB) could be salvaged as topsoil and the next 12" of both BlBm and KmB could be salvaged as subsoil. It was also determined that none of map unit BlBe should be salvaged due to poor quality.

Disturbed lands in the mapped area have variable surface materials. Gravelly road till does not have adverse chemical characteristics but may be too gravelly to be used as a reclamation material. Clayey subsoil in areas mapped as disturbed lands may be excessively salty. Much of the area mapped as disturbed land has surface contamination with coal.

Map unit KmB can be stripped to 9 inches, and as indicated above, up to 12" for topsoil and 12" for subsoil in the area of the settling ponds. See Table 2-6 for available volume of that soil unit. This is based on the soils report in Appendix 2-2.

Barren areas and salty spots should be avoided in stripping. This includes the Saltair Unit, for which a variance in topsoil stripping is requested due to poor quality. (See Plate 2-1 for locations.)

Prior to the Reclamation Act of 1977 and Utah Interim Program, 77.2 acres of C.V. Spur were disturbed and topsoil not salvaged.

Of the remaining 76.8 acres, 48.7 acres have had topsoil stripped as of April 2002, leaving approximately 28.1 acres within the permit area that will need to have available topsoil removed, if disturbed. An additional 4.20 acres were stripped in 2006. Although 6.61 acres were disturbed, only 4.20 acres were stripped to a total depth of 24" due to poor quality of the remaining acreage.

The topsoil and subsoil stripped from the settling pond was placed in separate storage piles. Organic debris existing on the surface of the newly stripped area was left in the soil when stockpiled to maintain the organic content.

Once the newly stripped soil was placed in new stockpiles, 2000 pounds per acre of weed free hay mulch was added to the surface. The surface was then roughened using a trackhoe. Once the site was prepared, the piles were hydroseeded using the Temporary Seed Mix described on Table 5-1. In addition to the seeding, a potassium fertilizer (manufactured by 3 Tier Tech) and 2 bio-stimulants (manufactured by P.B.I. Gordon) were applied to the topsoil & subsoil piles. The fertilizer was a liquid concentrate called "Establish" (5: 16: 12), applied at a rate of 48 ounces per acre. One of the bio-stimulants was called "Launch ® CF", consisting of 1 % K, 0.36% Fe, 74.3% Manure extract, 9% Humic and Folic Acid and 1.2% Kelp. The other bio-stimulant was "Huma-Cal Plus", consisting of 8% Ca, 4% Humic Acid and 27.5 billion microbes/gallon. Each bio-stimulant was applied at a rate of 4 gallons/acre. 2000 pounds per acre of wood fiber mulch and 60

pounds per acre of tacifier were then applied to the surface. Seeding took place during the week of October 23, 2006. It should be noted that the berm constructed with other excavated material from the ponds was also seeded at this time.

The topsoil piles are protected by a combination of efforts, including existing berms and revegetation as described above.

Plate 5-1 indicates disturbance created before and after May 1978. Topsoil material that has been stockpiled and in-place soil to be disturbed contain insufficient volumes of material to cover all of the projected disturbed area to a minimum of six (6) inches. Thus, as discussed in Sections 8.5 and 8.6, the Disturbed Land Map Unit will be revegetated in-place since no better topsoil material exists for reclamation.

All post-law disturbance and the entire refuse area (a total of 55.31 acres after the 2006 stripping) will receive a minimum cover of six inches of topsoil/subsoil. Table 2-6 provides the volumes of soil currently in storage.

Even distribution of six inches over 55.31 acres would require 44,617 cubic yards of material. Therefore, the 62,314 cubic yards of topsoil/subsoil currently in storage is enough to accommodate the proposed reclamation plan.

231.200 Nutrients and Soil Amendments

Soil tests will be taken in materials to be used for final reclamation in order to evaluate the need for soil amendments and nutrients. Soil testing will be performed by a qualified laboratory which uses accepted analytical procedures.

TABLE 2-8
DEPTHS OF SUITABLE TOPSOIL AVAILABLE FOR SEEDBED MATERIAL
(By Map Unit)

Mapping Unit	Component	Depth (in.)	Rating	Percent of Map Unit	Available Depth Suitable Material (restrictive feature of recommended material)
Chc	Chipeta	0-3	fair	80	6 inches (sodic and clayey)
		3-19	fair/poor		
	Killpack	0-8	fair	10	6 to 9 inches
	Other Soils	var	var	10	6 inches
DL	Disturbed Land	0-12	poor	NA	0 inches (various restrictive features)
		12-60	poor		
KmB	Killpack-high water table	0-10	fair	80	6 inches (clayey and sodic)
	Other	var	var	20	0 inches
Blb	Billings	0-7	Fair	100	7 inches

NA = data not available Var = variable

231.300 Effects of Mining Operations on Soils, Nutrients and Soil Amendments to be Used

The Disturbed Landfill which has been impacted by mining operations has some inherit problems that will be addressed prior to reclamation. These include gravelly road fill, clayey subsoil, and surface contamination with coal fines. The coal fines and gravelly road fill will be removed by standard earth moving equipment. The clayey subsoil will be deep chiseled to eliminate compacted zones.

The disturbed soils samples show it to be of a quality similar to the stockpiled soil on site. This material can be upgraded as needed to provide a plant growth medium; therefore, no soil substitute is necessary for reclamation of the disturbed soil areas.

Additional soil testing will be performed on the disturbed soils prior to regrading and final reclamation.

Location and number of soil tests will be determined in consultation with the Division at least 60 days prior to final reclamation.

All soils will be properly fertilized to bring them up to the level necessary for vegetation establishment. Fertilizer application will be based on soil test analysis as discussed in Section 231.200.

231.400 Mitigation and Control Plans

All suitable seedbed quality material (topsoil) will be stripped and stockpiled prior to disturbance. Topsoil stockpiles will be placed on a stable surface in an attempt to limit wind and water erosion and other factors which would lessen the capability of the material to support vegetation. Every effort will be made to minimize the area of disturbance to only that area needed immediately. A quick-growing cover of annual and perennial plants will be seeded or planted during the first desirable planting period after disturbance. Topsoil stockpiles will remain in-place and undisturbed until the material is to be redistributed on disturbed areas.

An as-built survey was performed on the soil stockpiles, as required. Results of the survey show a total of 49,286 cubic yards of material presently in storage, as indicated on Table 2-6. The survey is summarized in Appendix 2-1, and the as-built map of the piles is shown on Plate 2-2.

In April 2002, an additional 12,140 cubic yards of topsoil were stripped and added to the Topsoil Stockpile. The topsoil and subsoil piles were blended together into one pile, roughened, mulched and seeded. This increased the volume of the Topsoil Stockpile to 49,286 cubic yards. In 2006, an additional 13,028 cubic yards of topsoil/sub-soil were stripped and placed in separate storage piles located north of the office building, bringing the total storage volume to approximately 62,314 cubic yards.

TABLE 2-9
TOPSOIL MASS BALANCE TABLE

Topsoil Available	62,314 cu. yds.
Disturbed Area	132.5 ac.
Pre-law Disturbance	77.2 ac.
Post-law Disturbance	55.3 ac.
Topsoil Required (Post-law)	44,617 cu. yds.
*Topsoil Required (All Disturbance)	106,883 cu. yds.
Max. Area for 6" Redistribution	77.25 ac.
* As discussed in Section 220, pre-law disturbed areas will utilize in-place soils, since no better topsoil exists for reclamation.	

232. Topsoil and Subsoil removal.

Topsoil and subsoil removal are described in Section 231.100 above.

231.100. As indicated in Section 231.100, the topsoil will be removed as a separate layer from the area to be disturbed, and segregated.

232.200. As described in Section 231.100, barren areas and salty spots (Saltair Unit) will not be stripped per a variance requested due to poor quality.

232.300. Based on soil tests described in Section 231.100, soils will be stripped to the in-place depths of seedbed quality as shown on Table 2-8.

232.410. There are no plans to strip topsoil for minor disturbances such as power poles, signs or fence lines.

232.420. Topsoil will not be stripped on minor disturbances which will not destroy the existing vegetation and will not cause erosion.

232.500. Subsoil has been combined with the refuse area topsoil stripping. This was done to allow adequate material to cover the refuse pile to meet DOGM and MSHA regulations. In other areas, the removal plan is to take all of the soil of seedbed quality for use as topsoil replacement.

232.600. For all areas not disturbed prior to SMCRA, soil removal has been, and will continue to be, prior to disturbance. Only large trees would be typically removed prior to soil stripping, since small vegetation will enhance organics in the soil.

232.700. N/A - There have been no adverse conditions to date at this site to prevent removal of topsoil or subsoil.

233. Topsoil substitutes and supplements.

Topsoil substitutes and supplements are discussed under Section 231.200.

233.100. See Sections 231.200 and 231.300.

233.200. See Section 231.200.

233.300. See Sections 224 and 231.200.

233.310. See Section 224.

233.320. See Section 224.

233.330. N/A

233.340. See Sections 224 and 231.200.

233.400. See Section 224.

234. Topsoil Storage.

Topsoil storage is described in Section 231.100.

234.100. Soil materials are segregated and stockpiled on site, since the entire disturbed area is being utilized and final regrading is not practical.

234.200. Stockpiling criteria are discussed in Section 231.100.

234.210. As described in Section 231.100, stockpiled materials are selectively placed on a stable site within the permit area;

234.220. Stockpiled materials are protected from contaminants and compaction by their isolated location and prevention of vehicle access.

234.230. Topsoil piles have been reseeded on 5 separate occasions. Although vegetative success has been minimal, some cover is established; however, the main protection against erosion has been the roughening of the pile sides to maximize water retention.

234.240. Stockpiled materials are not planned to be moved until final reclamation as approved by the Division.

234.300. N/A - There are no plans to temporarily distribute soil materials on this site.

240. Reclamation Plan

Detailed reclamation plans for this site are presented in Section 540. Soils redistribution plans are also described in Section 224. of this chapter.

241. General Requirements.

Plans for redistribution of soils, use of nutrients and stabilization are discussed in Section 224.

242. Soil Redistribution.

See Section 224 for redistribution plans.

242.100. Soils will be redistributed according to the plan presented in Section 224.

242.110. Per discussion in Section 224, soils will be redistributed in a manner to achieve an approximately uniform, stable thickness consistent with the approved post-mining land use, contours, and surface water drainage system.

242.120. Redistributed topsoil will not be compacted.

242.130. As discussed in Section 224, topsoil and subsoil piles have been reseeded and roughened for erosion protection. As discussed in Chapter 5 under Section 540, redistributed topsoil will be seeded and mulched as soon as practical after preparation.

242.200. See Sections 224 and 540 for redistribution and reclamation details.

242.300. N/A - There are no permanent impoundments or roads proposed for this site.

242.310. N/A

242.320. N/A

243. Soil Nutrients and Amendments.

As described in Section 540 nutrients and soil amendments will be applied to the initially redistributed material when necessary to establish the vegetative cover.

244. Soil Stabilization.

See Sections 224 and 540 for reclamation and treatment details.

244.100. See Section 540 for reclamation details.

244.200. See Section 540.

244.300. See Section 540.

244.310. See Section 540.

244.320. See Section 540.

250. Performance Standards.

251. All topsoil, subsoil and topsoil substitutes or supplements will be removed, maintained and redistributed according to the plan (R645-301-540) given under R645-301-230 and R645-301-240 and 252. All stockpiled topsoil, subsoil and topsoil substitutes or supplements will be located, maintained and redistributed according to plans given under R645-301-230 and R645-301-240, (also R645-301-540).

References.

Black, C.A., 1965, Methods of Soil Analysis. American Society of Agronomy Mono. No. 9 Parts 1 and 2. Madison, Wisconsin. 1572 pgs.

USDA, Soil Conservation Service. Soil Survey Staff, 1975. Soil Taxonomy - a basic system of soil classification for making and interpreting soil surveys, USDA Agricultural handbook No. 436.

USDA, 1978 Soil Conservation Service, National Soils Handbook (Compedium of SCS in-house memos) Part II (403.6(a)).

USDA, Soil Survey Staff, 1951, Soil Survey Manual, USDA Agricultural Handbook No. 18.

USDA, Soil Conservation Services, 1979, Soil Survey Carbon Emery Area, Utah.

USDA, 1974, Guidelines to Making Soil Interpretations, Branch of Soils, Division of Watershed Management, Rocky Mountain Region.

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

4012 Federal Building
125 South State Street
Salt Lake City, Ut 84138

June 16, 1980

Mr. David Chenoweth
ARCO Coal Company
555 17th Street
P.O. Box 5300
Denver, CO 80217

Dear Mr. Chenoweth:

After site investigation the Soil Conservation Service has determined that no prime farmland occurs on Beaver Creek Coal property known as Castle Valley Spur in Section 11, T.15 S., R. 10 E., SLBM.

Further detailed information may be obtained through the Price Field Office.

Sincerely,

T. B. Hutchings
State Soil Scientist

cc:
Ed Burton, AC, Orem
Gary Moreau, DC, Price

FIGURE 2-1

Appendix 2-1

Topsoil Stockpiles
(As-Constructed)

August 2006

Savage Services Corporation
Savage Coal Terminal

Appendix 2-1
Topsoil Stockpile
As-Constructed

Station	Area (sq.ft.)	Volume (cu.yds)	Acc. Volume (cu.yds)
0+00	0.00		
		1271.65	4709.80
1+00	2543.29		
		3169.26	11738.00
2+00	3795.23		
		4018.34	14882.72
3+00	4241.44		
		3293.62	12198.57
4+00	2345.79		
		1363.62	5050.44
5+00	381.45		
		190.73	706.39
6+00	0.00		
			49285.93

*Based on Aerial Survey and Cross Sections from Plate 2-2.

Appendix 2-2

Topsoil Evaluation
for
New Coal Stockpile Area

Savage Services Corporation
Savage Coal Terminal

April 3, 2002

Dan Guy
Blackhawk Engineering
1056 West 2060 North
Helper, Utah 84526

On March 27 and 29, 2002 I made a field evaluation of the available topsoil at the new coal stockpile area at the Savage Coal Terminal near Wellington, Utah as requested.

The existing soils map shows three soil types: ChC (Chipeta), KmB (Kilpack), and Sa (Saltair). These soils have developed mostly from parent materials of the Mancos shale under and arid environment. Representative vegetation includes shadscale, greasewood, tamarisk, and saltgrass. The area mapped as Sa supports mostly saltgrass and has been identified as a possible wetland site.

A topsoil layer about six inches thick was initially considered for salvage. Based on my field inspection, I found a range from about two to nine inches. The average is about six inches, however I have identified areas with seven to nine inches, four to seven inches, three to six inches, and two to three inches.

Thickness of suitable surface soil was determined by field observations of soil characteristics and root distribution. A tiling spade and bucket auger were used to excavate and expose soil materials. Restricting features were subsoils with very high salt content (crystals observed), very high carbonates (white patches predominant), shaly material (bedrock influence), and predominant mottling of colors (water table influence). Suitable surface soils have a dark grayish-brown to brown color and typically have higher organic matter and a more friable (looser and softer) consistency than the subsoils.

The soil-vegetation relationships are a key to identifying sites with different topsoil thickness. The sites with greasewood (KmB) have an average of about 8 inches of salvageable topsoil. Included in the area mapped as Kilpack soil is a patch of tamarisk. The soils are more of a brown to yellowish-brown color, but still average about 8 inches of suitable soil material. On the more sloping upland the soils are shallow over shale and support mostly shadscale and associated species. These sites are representatives of the Chipeta soil series and commonly have 3 to 6 inches of salvageable soil over a subsoil that is very high in carbonates and shaly material. Some spots that are nearly bare of vegetation have less than 3 inches of suitable soil material. The area in the northwest corner of the stockpile project site that is mapped as the Chipeta soil has suitable topsoil up to seven inches thick, but there are spots with as little as three inches. In the area with saltgrass there is about eight inches of suitable topsoil.

The site supporting saltgrass in the northeast corner of the project area was mapped as the Saltair soil series and was evaluated for wetness and drainage characteristics to aide in wetland determination. Most of this site was dry at the time of inspection. One small spot, about 25 feet long and six feet wide, was moist. The

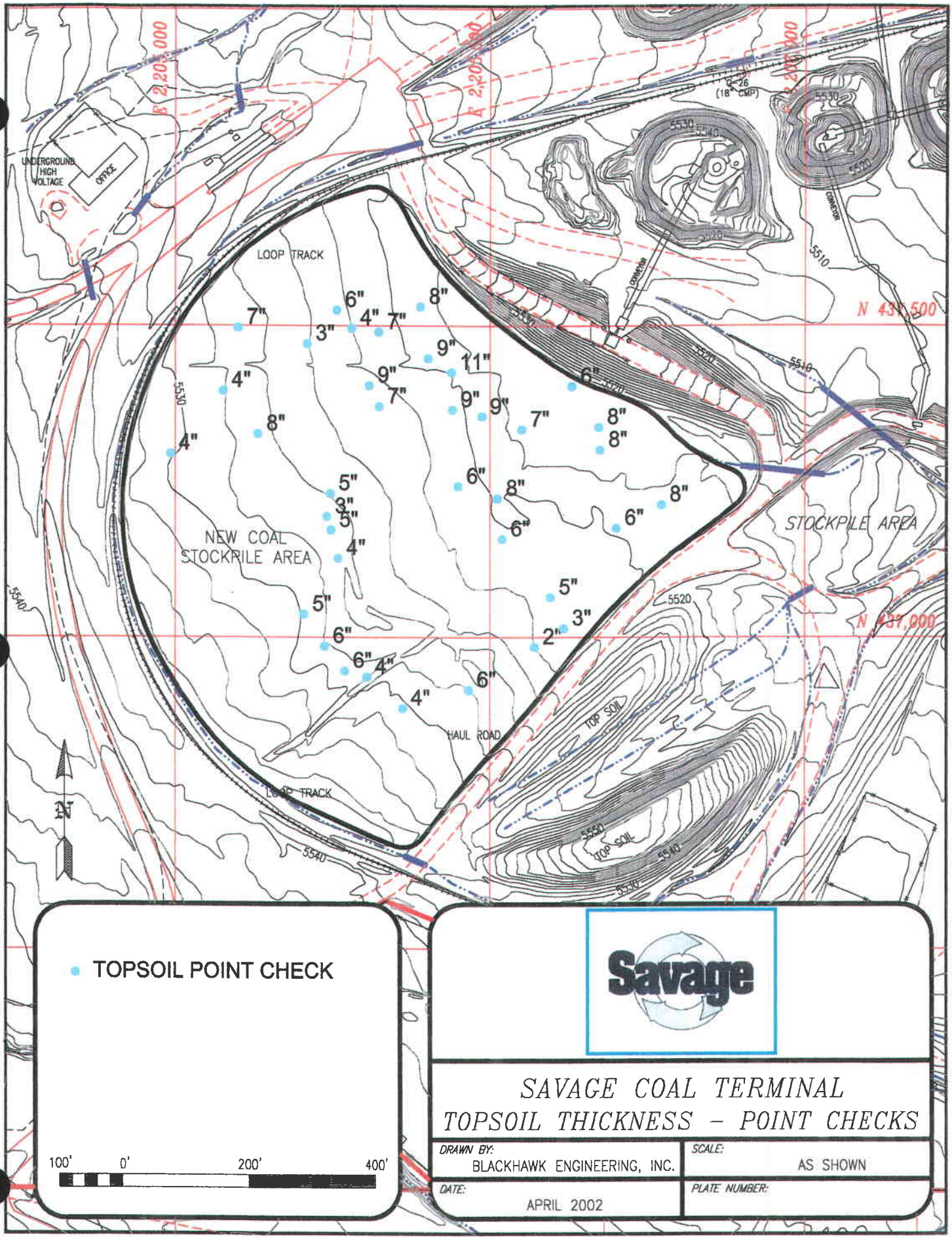
surface six to eight inches of soil at this spot has a very dark grayish-brown color and a silty clay loam texture. At about eight inches the soil has prominent mottling of gray and strong brown (rusty) colors. Weathered shaly material is present at about 24 inches. The soil appears to be more like the Libbings soil series, which is moderately deep over shale, different than Saltair, which is very deep.

Within the project area are two old irrigation ditches that were once used but are now dry and not used any more. At one time the soils supporting saltgrass, greasewood, and tamarisk were apparently wetter than under the present drainage situation, due to the influence of irrigation water.

This information on topsoil thickness is intended to supplement the soil inventory information presented by James P. Walsh and Associates, July 1980. Topsoil thickness has been staked at about 20 locations within the project area, and a map showing topsoil thickness has been prepared. If you need further assistance or have any questions, please contact me.

Sincerely,

Daniel M. Larsen
Soil Scientist, EIS



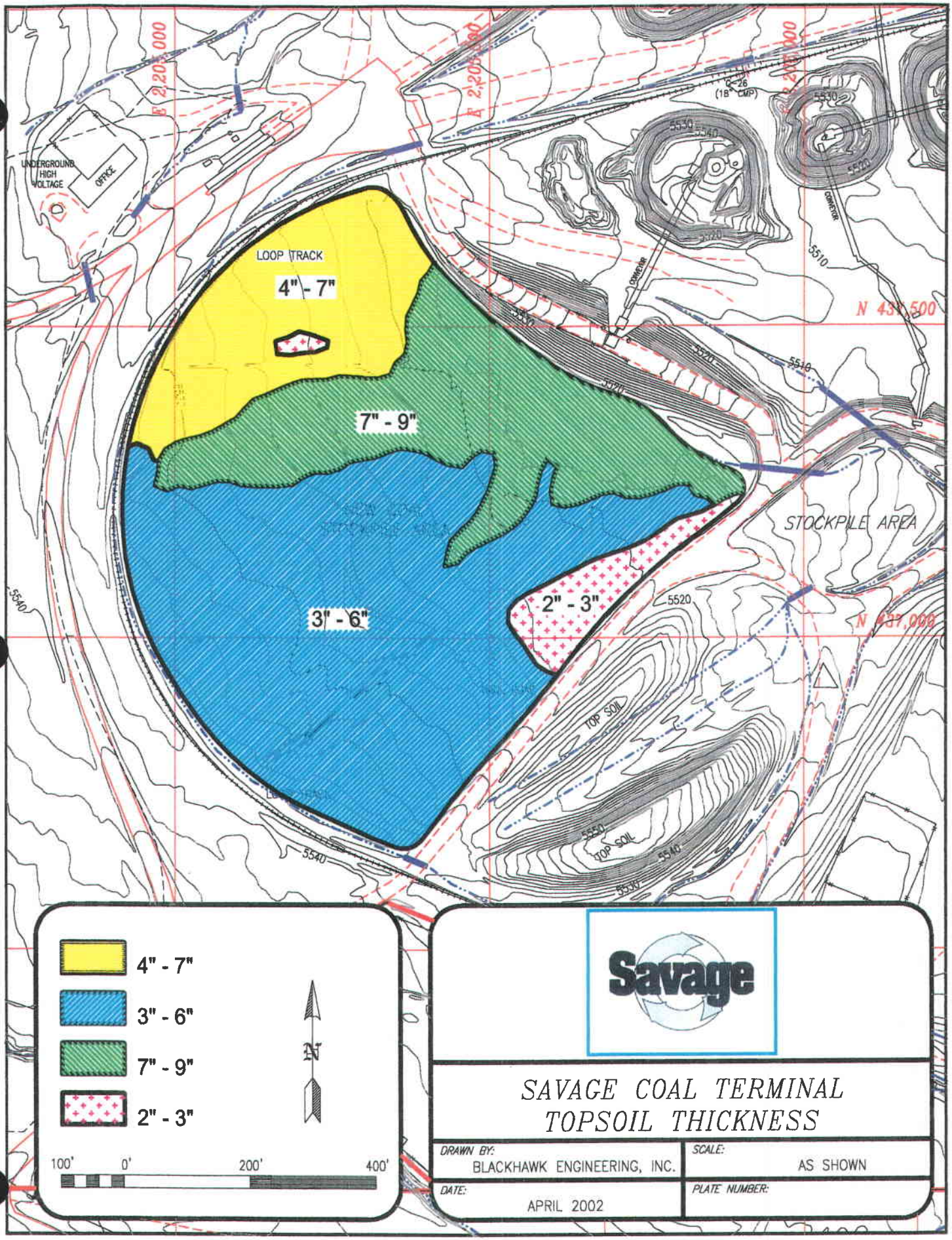
TOPSOIL POINT CHECK

100' 0' 200' 400'

Savage

SAVAGE COAL TERMINAL
TOPSOIL THICKNESS – POINT CHECKS

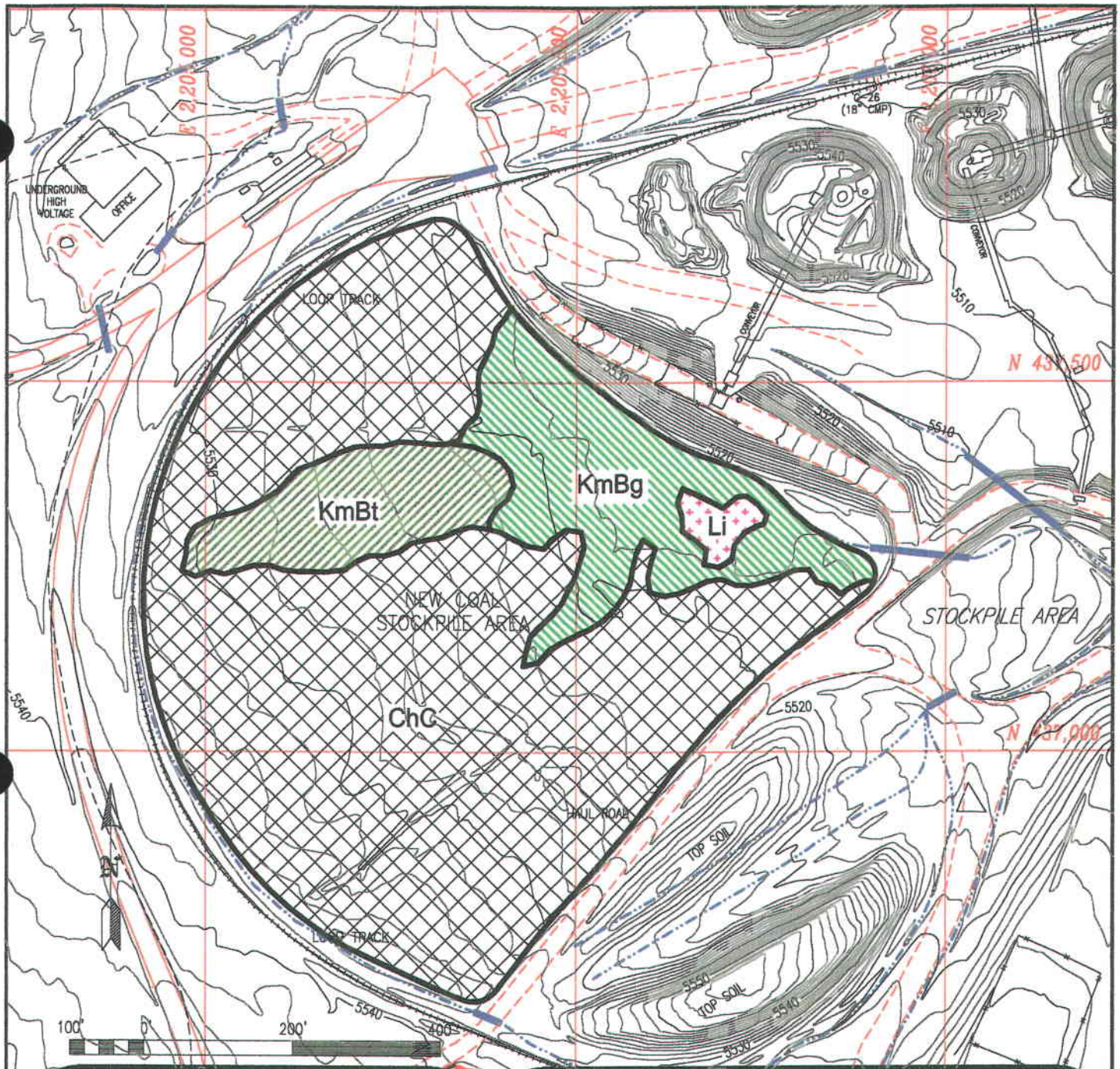
DRAWN BY: BLACKHAWK ENGINEERING, INC.	SCALE: AS SHOWN
DATE: APRIL 2002	PLATE NUMBER:



Savage

SAVAGE COAL TERMINAL
TOPSOIL THICKNESS

DRAWN BY: BLACKHAWK ENGINEERING, INC.	SCALE: AS SHOWN
DATE: APRIL 2002	PLATE NUMBER:



ChC – Chipeta

KmBt – Killpack, High Water Table* Variant, Tamarisk

KmBg – Killpack, High Water Table* Variant, Greasewood

Li – Libbings*

* Drainage has been altered by changes in water supply. Presently drier than in the past.

Savage

SAVAGE COAL TERMINAL
SOIL TYPE MAP

DRAWN BY:	SCALE:
BLACKHAWK ENGINEERING, INC.	AS SHOWN
DATE:	PLATE NUMBER:
APRIL 2002	

Li

61—Libbings silty clay loam. This moderately deep, poorly drained, strongly saline soil is on foot slopes of shale hills. It is adjacent to the Price, Carbon, and Wellington Canals. It formed in residuum derived dominantly from shale. Slope is 0 to 3 percent. Slopes are 200 to 400 feet long and are convex. The present vegetation in most areas is mainly greasewood and saltgrass. Elevation is 5,400 to 5,500 feet. The average annual precipitation is 6 to 8 inches, the average annual air temperature is 47 to 49 degrees F, and the average freeze-free period is 115 to 140 days.

Typically, the surface layer is grayish brown silty clay loam 9 inches thick. Below this to a depth of 34 inches is light brownish gray and gray silty clay loam and silty clay over soft shale. The content of salt above a depth of 20 inches is 2 to 5 percent.

Included in this unit are about 10 percent Saltair silty clay loam in narrow alluvial valleys and 5 percent Hunting loam.

Permeability of this Libbings soil is slow. Available water capacity is about 1 to 2 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate. A water table is at a depth of 10 to 30 inches in January through December, but it is highest early in summer.

This unit is used for grazing.

The potential plant community on the Libbings soil is 85 percent grasses, 10 percent forbs, and 5 percent shrubs. Among the important plants are inland saltgrass, alkali sacaton, sedge, and Baltic rush.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. The suitability of this unit for grazing is good.

The suitability of this unit for rangeland seeding is poor. The main limitations are the high water table and salinity. Plants suitable for seeding include alkali sacaton and tall wheatgrass.

This map unit is in capability subclass VIIw, nonirrigated, and in Salt Meadow range site.

Appendix 2-3

Soils Evaluation for Settling Pond Area

Savage Services Corporation
Savage Coal Terminal

FINAL REPORT

for

ORDER 1 SOIL SURVEY including

SOIL TOPSOIL CHARACTERIZATION

Prepared for

PROPOSED SETTLING POND AREA
SAVAGE COAL TERMINAL
SAVAGE SERVICES CORPORATION
2025 East 5000 South
Price, Utah 84501

Prepared By

Mt. Nebo Scientific, Inc.
330 East 400 South, Suite 6
Springville , Utah 84663
(801) 489-6937

Bruce Chesler, Soil Scientist

August 21, 2006

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Introduction

An Order 1 soil survey was conducted on approximately 6.6 acres of Savage Coal Terminal Loadout area, on a previously non-disturbed area owned by Savage Services Corporation, Inc. The active loadout facility is currently under permit by the State of Utah, and comprises 154 total acres, most of which currently has coal loading and processing activities present. The 6.6 acre area study site lies to the northwest of Savage Services offices, and is characterized by gently-sloping Mancos shale fanslopes with a salt desert shrub vegetation type. Two settling ponds with a total area of approximately 2 acres are proposed for this site for coal wash water clarification, along with an undisturbed diversion and an area proposed for topsoil salvage storage along the southwest perimeter of the study site (see Savage Coal Terminal Soils Map, September 2005, Blackhawk Engineering, Inc).

Objectives

Provide a detailed Order 1 Soil Survey is provided on the 6.6 acre site to determine soil conditions and variability in accordance with National Cooperative Soil Survey standards.

Physical and chemical properties of both topsoil and subsoils were tested to determine suitability of topsoil for reclamation purposes according to R645-301-200 Soil Guidelines for Management of Topsoil and Overburden (OGM Price Field Office, October 2005).

Calculate topsoil salvage depths and provide a map showing areas of topsoil salvage and make recommendations to amend the quality of available topsoil materials, based on the above analytical studies and the Order 1 soil survey.

Make recommendations for the salvage operations with suggestions to reclamation specialists when using the topsoil materials to reclaim this site area to UDOGM standards.

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Methods

Prior to initiating fieldwork, Order 3 soil survey data from the area was reviewed (Sheet 19 of Soil Survey of Carbon Area, Jensen and Borchert, 1988.) A second, more detailed soil survey reconnaissance in this area was made at the Order 1 level of detail (James Walsh Associates, July 1980). This information was also reviewed and given consideration in my map unit design for the 6.6 area study site. Telephone discussions with Leland Sasser, NRCS Soil Scientist at the Price Field Office, were useful in the correlation and soil taxonomic classifications of these soils types. The current field survey of the study area was accomplished by Bruce Chesler on July 20 and 21, 2006. A telephone discussion between Bruce Chesler, soil surveyor, and Priscilla Burton, Soil Scientist at UDGOM Price Field office on July 18, 2006 was crucial for me, in detailing the scope of the projected soil survey and the type of soil analysis required for laboratory topsoil characterization at this site. Special considerations were made toward observing the extent of, and characterizing any high water table in the area.

An introduction to the proposed disturbed area was given to me by Dan Guy of Blackhawk Engineering, Inc. and the survey stakes representing ditch location and settling pond corners were noted. Spade and auger reconnaissance was made initially to determine soil surface variability, and to choose locations for backhoe soil description and sampling sites. Three soil profiles were chosen to represent map unit variability, then were sampled and bagged by horizon (or depth increment) and sent to BYU Soil and Plant Analysis Laboratory for characterization according to state standards (Table 3, OGM Topsoil Guidelines, 2003).

Soil and Landscape Description

Mancos Shale badlands comprise the geologic parent materials for soil development in the area. These Cretaceous age marine sediments are known from previous research to contain both strongly saline and sodic soil conditions in soils under these climatic conditions (USDA Soil Characterization Data, viewed on NSSC website). High dissolved salt contents, high Sodium Adsorption Ratios and Electrical Conductivities, and greater than 40 % clay content in both the soil epipedons and subsoils are evident in Mancos shale derived materials in general.

The landscape of the study area is characterized by flat to gently-sloping (less than 5 %), fanslopes derived from colluvial and alluvial materials comprised of marine sedimentary rock. These sediments appear in profile as olive to gray colored poorly defined horizons. Due to an arid climatic and the lack of mechanical weathering in a low precipitation area, combined with Mancos shale mineralogy, soil development is weak and difficult to define in the field. Soil moisture regime is Ustic, and soil temperature is mesic at this

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site. Soil Classifications at these sites fall within the Entisol Soil Order. Vegetation in the study area ranges from barren land to matted saltbrush and greasewood plant communities, with a shadscale component.

Results and Discussion

Three soil profiles were described in the area between the water diversion ditch and settling pond areas, chosen to represent the soil depth variability at the site. These pedon description sites were based upon previous soil surveys in the area and following a walk across the landscape. Appendix 1 includes the three soil profile descriptions identified as SP-1, 2, and 3. SP-1 is correlated to the Killpack Series, a Fine-silty, mixed, active, calcareous, mesic, Typic Torriorthent (OSD 7/2003), with weathered shale bedrock occurring at a depth of less than forty inches. Profiles SP-2 and SP-3 resemble the Billings Series, Fine-silty, mixed, active, calcareous, Typic Torrifluvent (OSD 7/2003) in that the Mancos shale bedrock is not evident in any depth greater than sixty inches. All three soil profiles were free of apparent mottling or other redoximorphic features which may indicate high water tables in the area. All of the soil profiles contained some concentrations of dissolved salts (crystallization), resulting from their transport and deposition in the profile. These salt concentrations were observed without magnification. Soils were generally moist at the time of sampling (7-21-06) at depths below 36 inches, on account of their dense, massive structure and slow permeability. Pedon SP-2 had the most apparent water content of the three sites. Surface cracks were apparent near SP-2, indicative of the high clay contents in these surface soils.

The clay mineralogy of the Mancos shales include both illite and kaolinite, which may have been a factor in the difficulties in accurately dispersing clays in samples for particle size laboratory analysis. In conversations with soil chemists (Henry Sauer in Denver, Colorado and Bruce Webb, Provo, Utah) the presence of certain clay minerals in these samples may have influenced a complete dispersion of clay. Thus, only surface soil data for mechanical particle sizes were analysed by the lab, and my field estimates of these soil samples were generally underestimated for clays by 20-25% in the field.

One other feature of the soil landscape which pertain to topsoil suitability and reseeding potential of this area are certain land use practices on adjacent properties which have, at times in the past, contributed coal dust and coal waste by-products onto the surfaces of these soils. I noticed that less than 1 inch of coal fines were present, but erratically distributed, on western portions of the study area. Some of the coal waste products (fines) may have already been incorporated into soil profiles in this area.

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Soil Chemical and textural properties are presented in Table 1. The chemical analyses concur with projected high salt, sodium, and clay contents generally recognized on Mancos shale derived soils, and referred to in the above discussion. Electrical conductivities in SP-1 were in the good range to 13 inch depths, then fair to poorly rated to 35 inches (bedrock contact). In SP-2, the EC were fair to 24 inch depth, then poor to unacceptable ratings. SP-3 has EC rated only poor to unacceptable.

Sodium Adsorption Ratios at soil SP-1 is fair to good to 13 inches, then poor in the subsoil. SP-2 has fairly rated SAR in the depth increments 0-12 inches and 24-48 inches, otherwise poor to unacceptable rated. SP-3 are all greater than 14 SAR, unacceptable by UDOGM Guidelines (Table 4, Topsoil Suitability Evaluations).

These data indicate to me the presence of both strongly saline conditions and sodic (high SAR) in these soils. Native topsoil (0-12 inches) in the study area were found to be suitable materials for seed and plant media, except for their clayey textures. Subsoils in this area are poorly suited as substitute topsoil material due to their high salt accumulations and clay content over 40% (field estimate). This could be anticipated due to the arid climate and the marine shale mineralogy of the geologic parent material.

Figure 1. shows my recommended depths of topsoil salvage at the three soil map units. The upper 26 inches of SP-1 (Killpack, clayey surface) and upper 24 inches SP-2 (Billings, moist) provide the best choice for topsoil materials with regard to salt content management. Only the upper 6 inches of SP-3 (Billings, eroded) should be considered for replacement topsoil due to high SAR values throughout the subsoils here.

Irrigation with less saline water with the intent of leaching the salts into the lower soil profile is a means whereby beneficial change in chemical composition could occur. Leaching with irrigation water found in the Price River nearby would not appreciably affect the salt movement, because of its inherently high salt contents.

Clay contents are all higher than 40 % in the all topsoils at the sampling sites. My field textural estimates for epipedons were generally 25% less than values derived by mechanical laboratory analysis. Thus, I can assume that a minimum of 40-50% clay particles comprise the lower soil profiles for each site. The management of clays in topsoil suitability poses another serious challenge for plant seed viability and plant growth at this site. Along with very slow permeability, lack of pore space, and their massive structural aggregates, certain types of clay minerals may repel vital plant nutrients. Recommendations I have to improve the physical properties of these high clay content materials include adding some of the waste rock from the coal wash process (sandier material) and using sewage sludge or other organic amendments to the topsoil stockpile to increase soil permeability, porosity, and decrease structural aggregations.

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Conclusions

A soil survey of the Order 1 magnitude and soil characterizations for three soils representing the soil landscape variability were made at the Savage property proposed for settling ponds and coal wash water clarification. High dissolved salt contents, high sodium, and high clay contents are three of the more limiting properties of these soils with respect to topsoil salvage and plant regrowth. The results of this soil survey and laboratory analyses make recommendations for the salvage of as much as 26 inches of the topsoil at this site (less in certain areas) to be used as topsoil, and if possible amended in some way to improve aggregation of soil, and water and air movement properties. The use of sewage sludge, organic matter, and fine materials derived from coal wash waste rock are some possibilities suggestions by this contractor to improve topsoil conditions and perhaps allow for additional substitute soil borrowed from the site (up to 3 feet depth) to be used in future reclamation.

I recommend that a qualified soil scientist with soil identification experience be monitoring soil recovery in the field at time of topsoil removal/stockpile operations.

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APPENDIX 1. Soil Pedon Descriptions from SP-1, SP-2, SP-3

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SP-1

SOIL DESCRIPTION

Soil Type KILLPACK, CLAYEY SURFACE | File No.

Area SAVAGE COAL TERMINAL | Date 7/20/06 | Stop No.

Classification FINE SILTY USTIC TORRIORTHENT, MIXED, ACTIVE, CALCAREOUS, MESIC

Location: Section T R

N. Veg. SHADSCALE W/ GREASEWOOD

Parent Material ALLUVIUM OVER RESIDUUM | Climate (Precip.) USTIC

Physiography FANSLOPES | Surface Rock Fragments Gravel 0->T

Relief SLIGHTLY CONVEX | Drainage SPD | Surface Rock Fragments Cobble 0

Elevation | Gr.water NONE | Surface Rock Fragments Stones 0

Slope 2 | Range 1-3% | Moisture — | Surface Rock Fragments Other 0

Aspect/Degrees 40° | Root Distr. | % Clay *PSCS >35 (Est)

Erosion NONE → SLIGHT | % Coarse fragments *PSCS 0 | % Coarser than V.F.S. *PSCS <20

Permeability SLOW | Range Site

GPS Latitude N 12S 0519190 | Microbiotic Crust Class NONE

GPS Longitude W UTM 4375819 | Rock Formation/Type MANCOS SHALE

GPS Elevation 1666 M. | Topo Quad Name

Soil Temp at 20" F NOT MEASURED | Photo Number

Additional Notes SECONDARY DEPOSITS OF GYPSUM AND CALCIUM CARBONATES COMMON

COAL DUST FINES ERRATICALLY OCCUR ON SURFACES < 1 INCH DEPTH

PHOTOS 1 & 2 PEDON AND LANDSCAPE

BRUCE CHESLER DESCRIBER

BACKHOE PIT 4½ FEET DEEP

FIELD / LAB

*Control Section Average

Horizon	Depth (Inches)	Color Dry	Color Moist	Texture Clay	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction Effer.	Boundary	Rock Frags	Root	Pore	Ped Surface Features
A	0-4	10YR 6/2	2.5Y 4/3	CLAY / SI	2CPL → MGR	SH	FI	S P	VE	CS	TR COAL FINE +SS	2VF	2VF FTU 2F	
C1	4-12	2.5Y 6/2	2.5Y 4/3	SICL / 30	2C-M SBK	SH	FI	S P	VE	CW	/	INF	2VF 1	GYSUM & CACO3 FILAMENTS
C2	12-26	2.5Y 7/1	2.5Y 4/2	SICL / 31	3C SBK	MA	VFI	S P	VE	GW	/	INF	INF. 1FTU	GYPSUM XTAL CACO3 NODES AND FILAMENTS
CY	26-35	5Y 7/2	5Y 5/3	SICL / 33	3C-M SBK	VH	VFI	S P	VE	G.S	10 SHALE FRAGS	/	/	GYPSUM CRYSTALS SHALE FRAGS
Cr	35+	35-50% WEATHERED OLIVE COLORED SHALE BEDROCK												

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SP-2

SOIL DESCRIPTION

Soil Type BILLINGS, MOIST PHASE | File No.

a SAVAGE COAL TERMINAL | Date 7/20/06 | Stop No.

Classification FINE-SILTY TYPIC TORRIFLUVENT, MIXED ACTIVE, CALCAREOUS MESIC

Location: Section T R

N. Veg. GREASEWOOD

Parent Material ALLUVIUM | Climate (Precip.) USTIC

Physiography TOESLOPE | Surface Rock Fragments Gravel 0

Relief PLANAR | Drainage POORLY DRAINED | Surface Rock Fragments Cobble 0

Elevation | Gr.water NONE APPARENT | Surface Rock Fragments Stones 0

Slope 1 | Range 1-2% | Moisture YES, BELOW 48" | Surface Rock Fragments Other 0

Aspect/Degrees 50° | Root Distr. | % Clay *PSCS >40% (EST)

Erosion NONE | % Coarse fragments *PSCS 0 | % Coarser than V.F.S. *PSCS <20%

Permeability SLOW | Range Site

GPS Latitude N 0519259 | Microbiotic Crust Class NONE

GPS Longitude W 4375852 | Rock Formation/Type MANCOS

GPS Elevation 1676 M | Topo Quad Name PRICE

Soil Temp at 20" F | Photo Number

Additional Notes BACKHOE PIT 8 FEET DEEP OBSERVED. BRUCE CHESLER DESCRIBED

SOIL MOIST FROM 48-96 INCHES

SECONDARY GYPSUM AND CALCIUM CARBONATES COMMON IN SOIL

*Control Section Average

Zon	Depth (inches)	Color Dry	Color Moist	Texture Clay	Struc-ture	Consistence Dry	Consistence Moist	Consistence Wet	Reaction Effer.	Bound-ary	Rock Frags	Root	Pore	Ped Surface Features
A1	0-6	2.5Y 5/1	2.5Y 3/2	sicl / 29*	3M,C → MGR	HA	FI	S P	VE	CS	/	VF IF IM	2VF i 2F tu	PLATY STRUCTURES
A2	6-12	2.5Y 6/3	2.5Y 4/3	sicl / 29	3C-M SBK	VH	FI	S P	VE	CS	/	VF IF IM	VF i IF tu	
C1	12-24	2.5Y 6/2	2.5Y 4/2	sicl / 33	3 C SBK	VH	VFI	S P	VE	GW	/	VF	VF tu,i	FEW VFAINT MOTTLES, ROOT CHANN
Cy1	24-48	2.5Y 6/3	2.5Y 5/2	sicl / 32	3C SBK	VH	VFI	S P	VE	GW	/	/	VF i	GYSUM & CALCS FILAMENTS
Cy2	48-72	5Y 5/2	5Y 4/1	sicl / 30	MASSIVE	EH	EFI	S P	VE	DW	/	/	VF T	GYSUM CRYSTALS
Cy3	72-96	5Y 6/2	5Y 5/3	sic / 47	MASSIVE	EH	EFI	VS VP	SE		/	/	/	GYPSUM CRYSTALS
		* LAB ANALYSIS		54% CLAY		0-6" DEPTH								

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SP-3

SOIL DESCRIPTION

Soil Type BILLINGS, ERODED PHASE | File No.

Area SAVAGE COAL TEMINAL | Date 7-21-06 | Stop No.

Classification FINE-SILTY, USTIC TORRIFLUVENT, MIXED, ACTIVE, CALCAREOUS, MESIC

Location: Section T R

N. Veg. MATTED SALTBRUSH, WEEDS, GREASEWOOD

Parent Material ALLUVIUM, RESIDUUM FROM SHALE | Climate (Precip.) USTIC

Physiography FANSLOPE | Surface Rock Fragments Gravel 0

Relief SL. CONCAVE → UNDULATING | Drainage PD | Surface Rock Fragments Cobble 0

Elevation | Gr.water NONE | Surface Rock Fragments Stones 0

Slope 2% | Range 1-2 | Moisture BELOW 36" | Surface Rock Fragments Other 0

Aspect/Degrees 60 | Root Distr. 0-12" | % Clay *PSCS > 40%

Erosion SLIGHT - MODERATE | % Coarse fragments*PSCS 0 | % Coarser than V.F.S.*PSCS < 20%

Permeability SLW RILL EROSION | Range Site

GPS Latitude N 0519252 | Microbiotic Crust Class NONE

GPS Longitude W 4375912 | Rock Formation/Type MANCOS SHALE

GPS Elevation | Topo Quad Name

Soil Temp at 20" F | Photo Number

Additional Notes BACKHOE PIT 5+ FEET DEEP DESCRIBED BY BRUCE CHESLEY

POSSIBLY CLASSIFIED SAGERS SERIES IF TINE SITE IS UPLAND

SOIL SURFACE CRACKS + SUBSIDENCE APPARENT W/ CHEMICAL SOIL CRUSTS

SMALL 1/2-1' ARROYOS DISSECT LANDSCAPE W → E DIRECTION

*Control Section Average

Hori-zon	Inches Depth	Color Dry	Color Moist	Texture Clay	Struc-ture	Consistence Dry	Consistence Moist	Consistence Wet	Reaction Effer.	Bound-ary	Rock Frags	Root	Pore	Ped Surface Features
A	0-6	2.5Y 5/3	2.5Y 4/2	SiL / 27	3M-C SBK → MGR	SH	FR	SS PS	VE	CS	/	VF IF	2VF IF IN	SOME PLATY STRUCTURE, CHEMICAL CRUST, SFC CARBS
A	6-12	2.5Y 5/2	2.5Y 4/3	SiCL /	3M-C ABK	HA	FI	S P	VE	CW	/	VF	1FT 1VF IN	CACO3 FILAMENTS + DISSEMINATED
C1	12-24	2.5Y 6/3	2.5Y 4/2	SiCL / 32	3MC SBK	HA	VFI	S P	VE	CW	/	/	1VF-F IN	GYPSUM CRYSTALS, CACO3 NODULES & FILAMENTS
C2	24-48	5Y 5/2	5Y 4/2	SiC / 42	MASSIVE	VH	EFI	VS VP	VE	GW	/	/	/	CACO3 FILAMENTS, MOIST
CY	48-60+	5Y 6/2	5Y 5/3	SiC / 49	MASSIVE	EH	EFI	VS VP	SE		/	/	/	GYPSUM CRYSTALS, MOIST-WET
		* LAB MECHANICAL ANALYSIS (48% CLAY)												

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BYU Soil Sample Site Laboratory Analysis SAVAGE LOADOUT SITE

													Cations (mg/kg)					
Sample Site	Soil Depth (in.)	Lab #	Sand (%)	Clay (%)	Silt (%)	vfsand %	USDA tex	Saturation %	pH	EC (mmhos/cm)[1]	$CaCO_3$	Total Organic Carbon %	Soluble meq/L Ca	Soluble meg/L Mg	Soluble meg/L K	Soluble meg/L Na	mg/Kg P	mg/Kg NO3-N
A SP-1	0-4	975.00	21.00	51.28	27.72	14.80	clay	46.51	7.77	3.30	24.25	1.80	21.94	4.69	0.62	24.15	5.35	8.77
C1 SP-1	13-Apr	976	16.92	53.28	29.80	11.68	silty clay	44.04	7.69	3.60	24.47	0.70	140.09	7.47	0.47	15.03	6.43	9.11
SP-1	13-26	977	no data	no data	ND	ND		46.52	8.01	8.50	21.90	0.40	25.16	28.59	0.16	63.44	2.45	14.28
SP-1	26-35	978	ND	ND	ND	ND		50.38	8.22	9.50	17.89	0.30	25.93	44.59	0.17	130.43	0.36	12.00
CR SP-1	35 plus	979	ND	ND	ND	ND		53.02	7.99	10.00	9.36	0.01	22.56	45.23	0.23	83.48	0.25	18.43
SP-2	0-6	980	17.28	54.28	28.44	12.56	silty clay	43.96	7.67	4.60	23.77	1.70	28.80	7.04	0.01	22.04	6.43	17.16
SP-2	6--12	981	no data	no data	no data	no data		55.95	7.70	4.60	21.24	0.70	30.17	10.03	0.23	22.59	3.13	7.42
SP-2	12--24	982	ND	ND	ND	ND		49.03	7.91	8.00	22.92	0.20	27.65	33.49	0.20	58.10	3.48	8.39
SP-2	24-48	983	ND	ND	ND	ND		58.82	8.55	9.50	16.56	0.02	17.96	146.56	0.24	73.46	0.03	8.69
SP-2	48-72	984	ND	ND	ND	ND		60.80	8.55	10.10	17.05	0.06	17.15	142.93	0.42	172.52	2.79	1.03
SP-2	72-96	985	ND	ND	ND	ND		59.09	8.53	5.10	17.32	0.02	17.03	138.88	0.58	278.26	4.99	4.62
SP-3	0-6	986	14.28	48.56	37.16	10.12	silty clay	50.85	8.30	14.00	20.71	1.00	25.85	6.83	1.01	161.74	7.78	28.32
SP-3	6 to 12	987	no data	no data	no data	no data		62.89	8.63	20.00	19.91	0.40	20.94	10.24	0.40	461.22	9.94	1.03
SP-3	12 to 24	988	ND	ND	ND	ND		63.79	8.68	30.00	17.95	0.07	17.82	33.92	0.33	439.65	1.34	20.61
SP-3	24-48	989	ND	ND	ND	ND		66.82	8.76	30.00	20.70	0.03	16.83	172.80	0.74	745.74	1.23	10.42
SP-3	48-72	990	ND	ND	ND	ND		69.06	8.67	30.50	22.51	0.02	16.50	160.21	0.56	617.74	2.68	3.36

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Table 1 - Soil Chemical and Textural Properties at SAVAGE LOADOUT SITE

																Cations (mg/kg)					
Sample Site	Soil Depth (in.)	Lab #	Sand (%)	Clay (%)	Silt (%)	vfsand %	USDA tex	Saturation %	pH	EC (mmhos/cm)[1]	$CaCO_3$	Total Organic Carbon %	SAR	Est. K Factor	AWC %	Soluble meq/L Ca	Soluble meq/L Mg	Soluble meq/L K	Soluble meq/L Na	mg/Kg P	mg/Kg NO3-N
SP-1	0-4	975	21.00	51.28	27.72	14.80	clay	46.51	7.77	3.30	24.25	1.80	6.62	0.32	12.00	21.94	4.69	0.62	24.15	5.35	8.77
SP-1	4 to 13	976	16.92	53.28	29.80	11.68	silty clay	44.04	7.69	3.60	24.47	0.70	1.75	0.28	14.00	140.09	7.47	0.47	15.03	6.43	9.11
SP-1	13-26	977	no data	no data	ND	ND		46.52	8.01	8.50	21.90	0.40	12.25	0.28	14.00	25.16	28.59	0.16	93.44	2.45	14.28
SP-1	26-35	978	ND	ND	ND	ND		50.38	8.22	9.50	17.89	0.30	21.29	0.28	14.00	25.93	44.59	0.17	130.43	0.36	12.00
SP-1	35 +	979	ND	ND	ND	ND		53.02	7.99	10.00	9.36	0.01	14.34	0.28	14.00	22.56	45.23	0.23	83.48	0.25	18.43
SP-2	0-6	980	17.28	54.28	28.44	12.56	silty clay	43.96	7.67	4.60	23.77	1.70	5.21	0.32	14.00	28.80	7.04	0.01	22.04	6.43	17.16
SP-2	6--12	981	no data	no data	no data	no data		55.95	7.70	4.60	21.24	0.70	5.04	0.28	14.00	30.17	10.03	0.23	22.59	3.13	7.42
SP-2	12--24	982	ND	ND	ND	ND		49.03	7.91	8.00	22.92	0.20	10.51	0.28	14.00	27.65	33.49	0.20	58.10	3.48	8.39
SP-2	24-48	983	ND	ND	ND	ND		58.82	8.55	9.50	16.56	0.02	8.10	0.28	14.00	17.96	146.56	0.24	73.46	0.03	8.89
SP-2	48-72	984	ND	ND	ND	ND		60.80	8.55	10.10	17.05	0.06	19.28	0.28	14.00	17.15	142.93	0.42	172.52	2.79	1.03
SP-2	72-96	985	ND	ND	ND	ND		59.09	8.53	5.10	17.32	0.02	31.52	0.28	14.00	17.03	138.88	0.58	278.26	4.99	4.62
SP-3	0-6	986	14.28	48.56	37.16	10.12	silty clay	50.85	8.30	14.00	20.71	1.00	40.02	0.32	14.00	25.85	6.83	1.01	161.74	7.78	28.32
SP-3	6 to 12	987	no data	no data	no data	no data		62.89	8.63	20.00	19.91	0.40	116.55	0.28	14.00	20.94	10.24	0.40	461.22	9.94	1.03
SP-3	12 to 24	988	ND	ND	ND	ND		63.79	8.68	30.00	17.95	0.07	88.44	0.28	14.00	17.82	33.92	0.33	439.65	1.34	20.61
SP-3	24-48	989	ND	ND	ND	ND		66.82	8.76	30.00	20.70	0.03	79.59	0.28	14.00	16.83	172.60	0.74	745.74	1.23	10.42
SP-3	48-72	990	ND	ND	ND	ND		69.06	8.67	30.50	22.51	0.02	65.72	0.28	14.00	16.50	160.21	0.56	617.74	2.66	3.36

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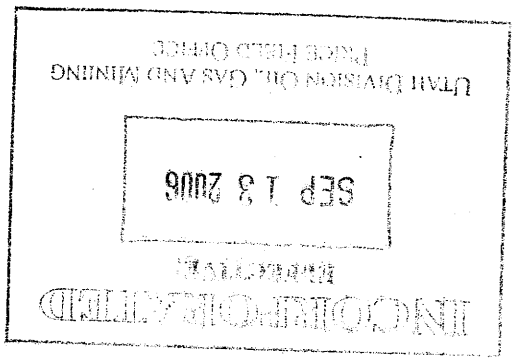
PO Box 355
Escalante, UT 84726

8/8/06

SOIL ID:

Customer Sample ID	Lab #	mg/Kg P	mg/Kg NO3-N	Extractable meq/100g K	%OM
A 0-4 SP-1	r6 975	5.35	8.77	5.91	2.68
C1 4-13 SP-1	976	6.43	9.11	2.38	0.97
SP-1 13-26"	977	2.45	14.28	0.57	0.58
SP-1 26-35"	978	0.36	12.00	0.57	0.44
SP-1 35" Cr weathered mancos	979	0.25	18.43	0.57	0.01
SP-2 0-6"	980	6.43	17.16	3.45	2.39
SP-2 6-12"	981	3.13	7.42	1.48	0.99
SP-2 12-24"	982	3.48	8.39	0.98	0.31
SP-2 24-48"	983	0.03	8.69	0.98	0.02
SP-2 48-72"	984	2.79	1.03	1.39	0.06
SP-2 72-96"	985	4.99	4.62	3.77	0.02
SP-3 0-6"	986	7.78	28.32	5.01	1.44
SP-3 6-12"	987	9.94	1.03	3.69	0.50
SP-3 12-24"	988	1.34	20.61	1.23	0.07
SP-3 24-48"	989	1.23	10.42	1.07	0.03
SP-3 48-72"	990	2.68	3.36	2.38	0.02



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8/8/06

SOIL ID:

Customer Sample ID	Lab #	Soluble meq/L K	Soluble meq/L Na	SAR	% Moisture Sat.	%CaCO3
A 0-4 SP-1	r6 975	0.62	24.15	6.6	46.51	24.25
C1 4-13 SP-1	976	0.47	15.03	1.8	44.04	24.47
SP-1 13-26"	977	0.16	63.44	12.2	46.52	21.90
SP-1 26-35"	978	0.17	130.43	21.3	50.38	17.89
SP-1 35" Cr weathered mancos	979	0.23	83.48	14.3	53.02	9.36
SP-2 0-6"	980	0.01	22.04	5.2	43.96	23.77
SP-2 6-12"	981	0.23	22.59	5.0	55.95	21.24
SP-2 12-24"	982	0.20	58.10	10.5	49.03	22.92
SP-2 24-48"	983	0.24	73.46	8.1	58.82	16.56
SP-2 48-72"	984	0.42	172.52	19.3	60.80	17.05
SP-2 72-96"	985	0.58	278.26	31.5	59.09	17.32
SP-3 0-6"	986	1.01	161.74	40.0	50.85	20.71
SP-3 6-12"	987	0.40	461.22	116.0	62.89	19.91
SP-3 12-24"	988	0.33	439.65	86.4	63.79	17.95
SP-3 24-48"	989	0.74	745.74	79.6	66.82	20.70
[redacted]P-3 48-72"	990	0.56	617.74	65.7	69.06	22.51

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Soil and Plant Analysis Lab
255 WIDB
Brigham Young University
Provo, Utah 84602
801-422-2147

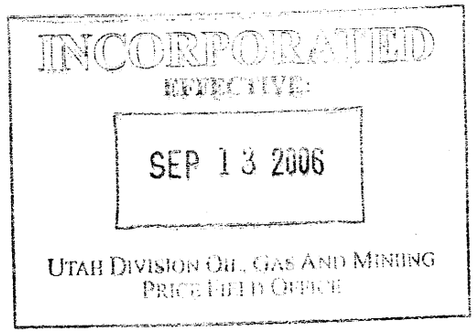
2 3

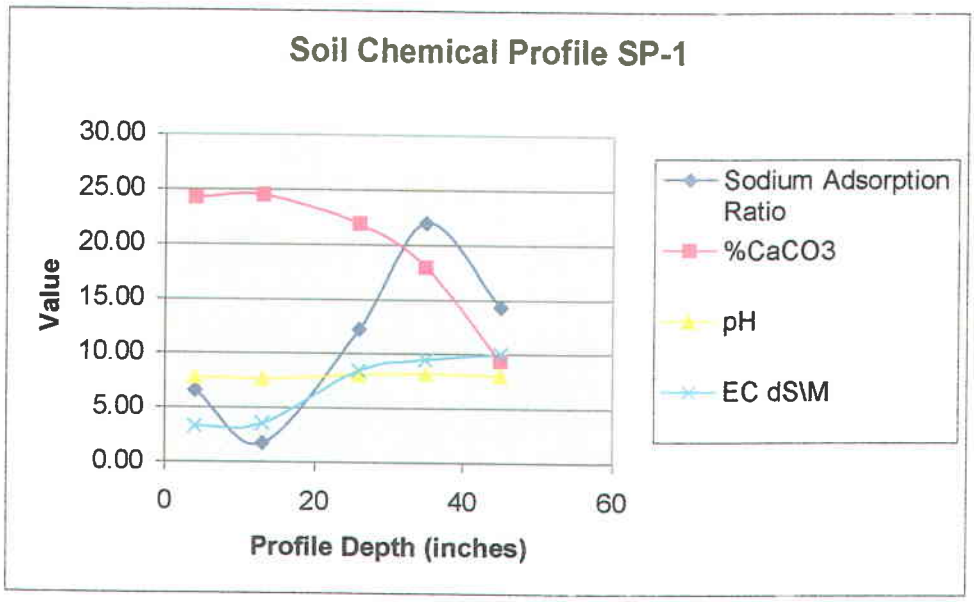
Azar Excavations/Expeditions Bruce Chesler
PO Box 355
Escalante, UT 84726

8/8/06

SOIL ID:

Customer Sample ID	Lab #	% Organic Carbon (LOI ORGANIC CARBON)	pH	EC dS\M	%Sand	%Clay	%Silt	USDA TEXTURE	% VF Sand	Soluble meq/L Ca	Soluble meq/L Mg
A 0-4 SP-1 r6	975	1.55	7.77	3.30	21.00	51.28	27.72	clay	14.80	21.94	4.69
C1 4-13 SP-1	976	0.56	7.69	3.60	16.92	53.28	29.80	s i c	11.68	140.09	7.47
SP-1 13-26"	977	0.34	8.01	8.50						25.16	28.59
SP-1 26-35"	978	0.25	8.22	9.50						25.93	44.59
SP-1 35" Cr weathered mancos	979	0.00	7.99	10.00						22.56	45.23
SP-2 0-6"	980	1.39	7.67	4.60	17.28	54.28	28.44	s i c	12.56	28.80	7.04
SP-2 6-12"	981	0.57	7.70	4.60						30.17	10.03
SP-2 12-24"	982	0.18	7.91	8.00						27.65	33.49
SP-2 24-48"	983	0.01	8.55	9.50						17.96	146.56
SP-2 48-72"	984	0.03	8.55	10.10						17.15	142.93
SP-2 72-96"	985	0.01	8.53	5.10						17.03	138.88
SP-3 0-6"	986	0.84	8.30	14.00	14.28	48.56	37.16	s i c	10.12	25.85	6.83
SP-3 6-12"	987	0.29	8.63	20.00						20.94	10.24
SP-3 12-24"	988	0.04	8.68	30.00						17.82	33.92
SP-3 24-48"	989	0.02	8.76	30.00						16.83	172.80
SP-3 48-72"	990	0.01	8.67	30.50						16.50	160.21





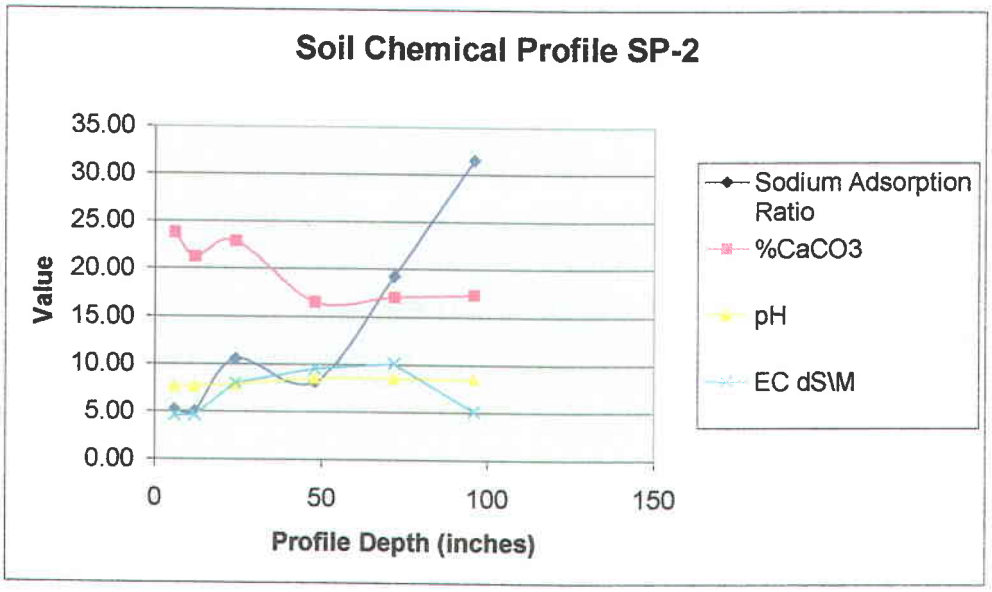


Figure 1

Soil Chemical Profiles, At Savage Loadout sites SP-1, SP-2

courtesy of Henry Sauer, Soil Scientist, Walsh and Associates, Inc.

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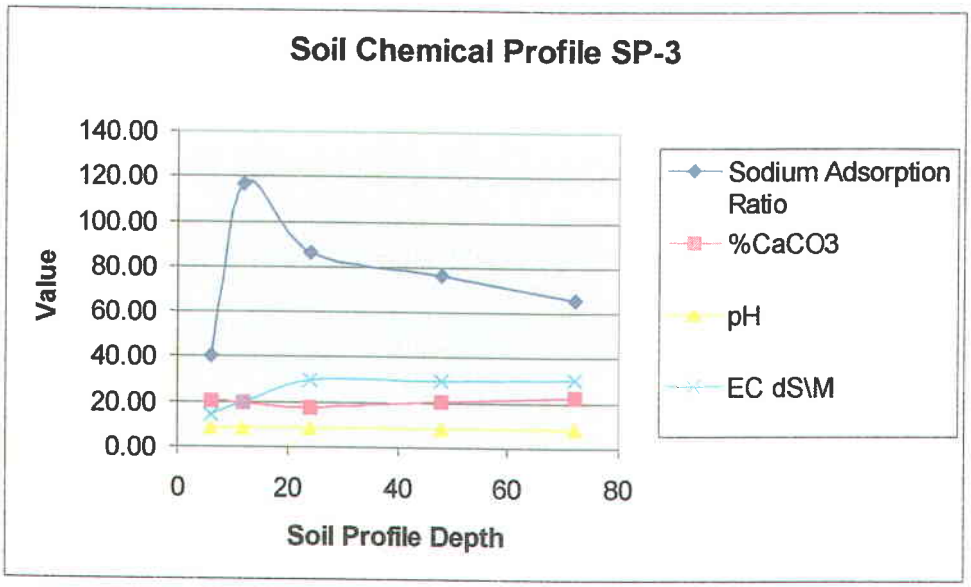
FIGURE 2. Soil Chemical Profile for SP-3, Savage Loadout Site



Graph courtesy of Henry Sauer, Soil Scientist, Walsh and Associates, Inc.

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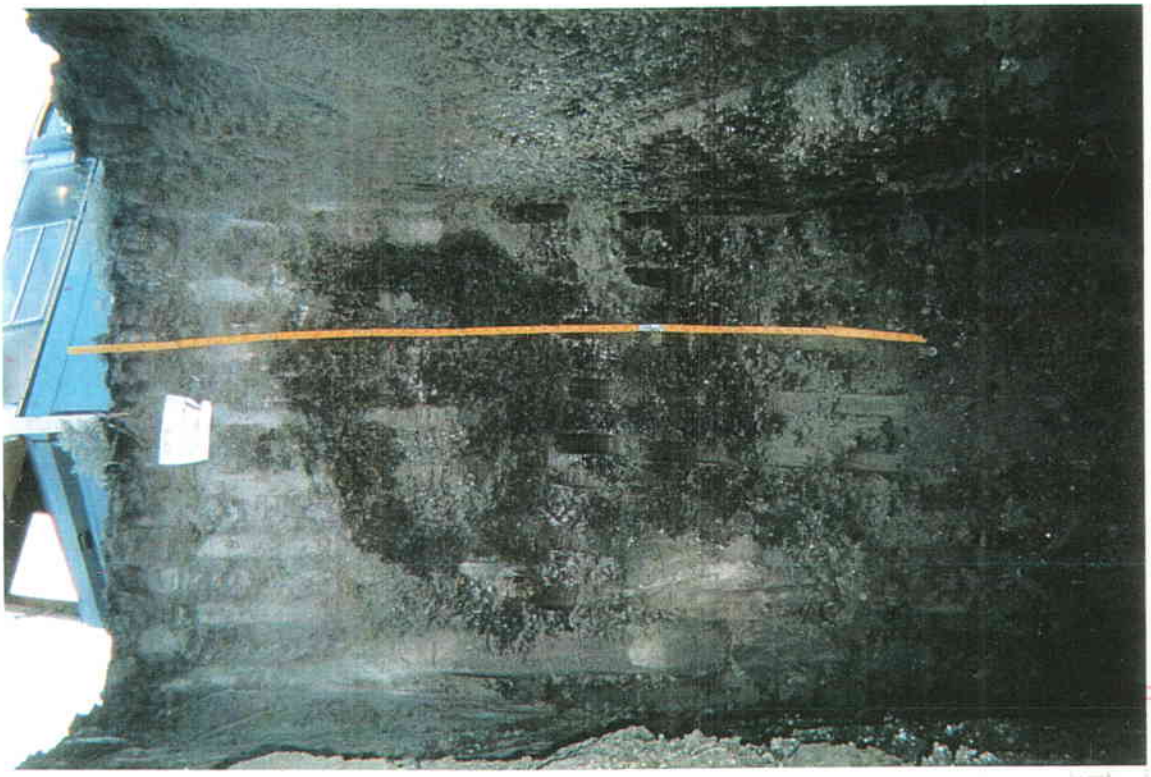
APPENDIX 1
PEDON SP-3 PHOTOGRAPHS including landscape position



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APPENDIX 1
PHOTOGRAPHS OF SP-2, with geographic setting

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APPENDIX 1
PHOTOGRAPHS of PEDON SP-1, with landscape position

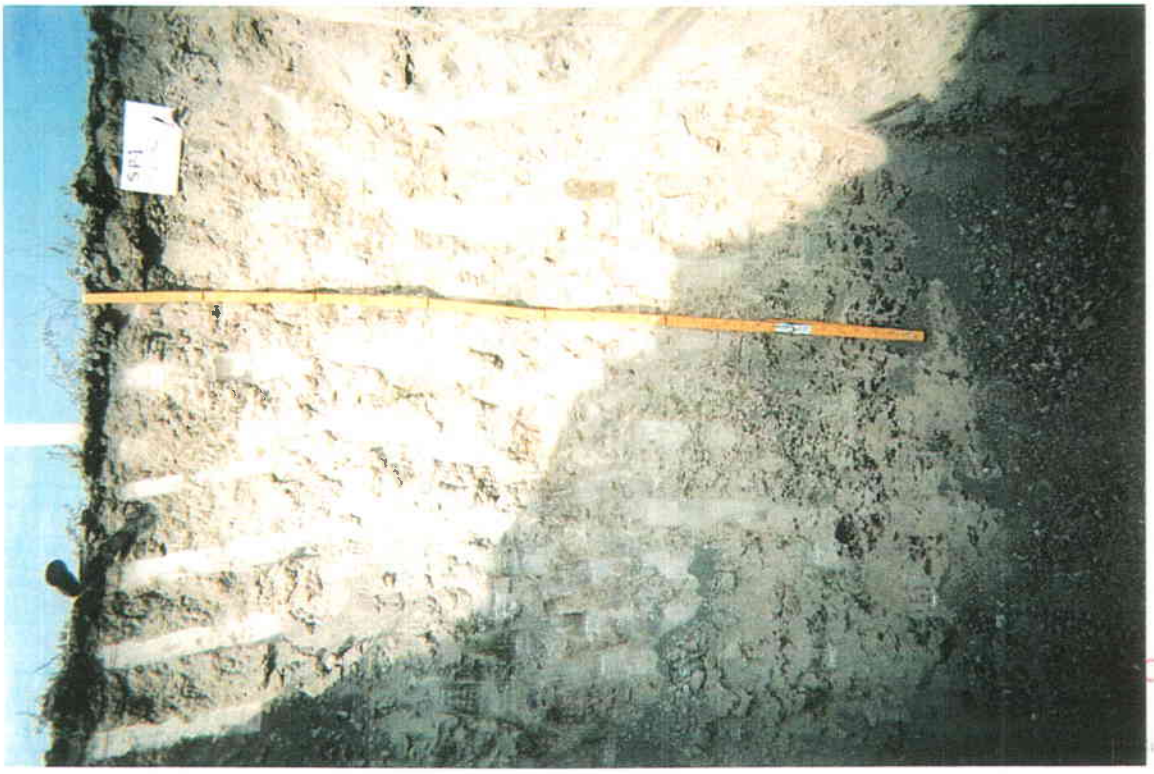

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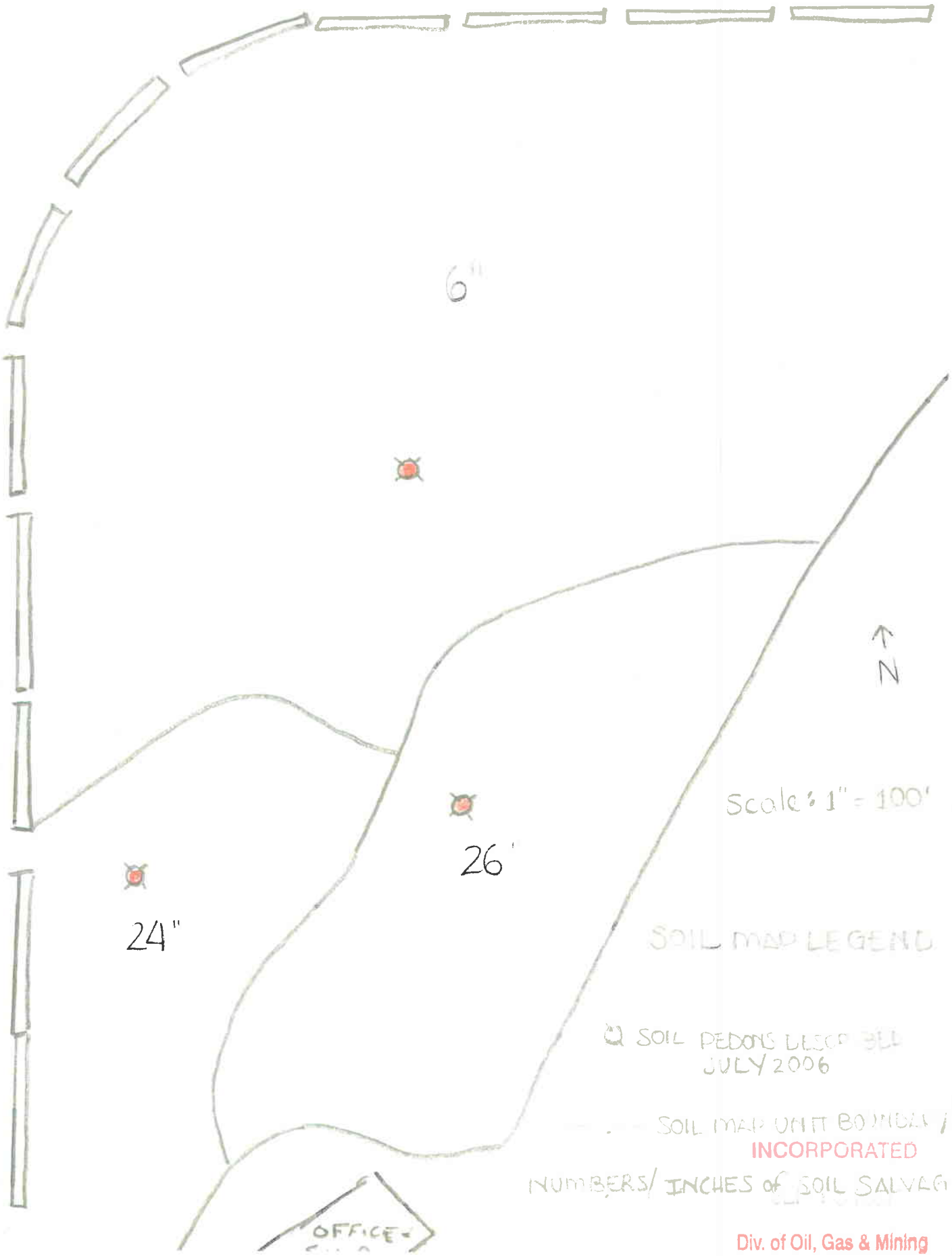
FIGURE 1. SOIL SALVAGE MAP



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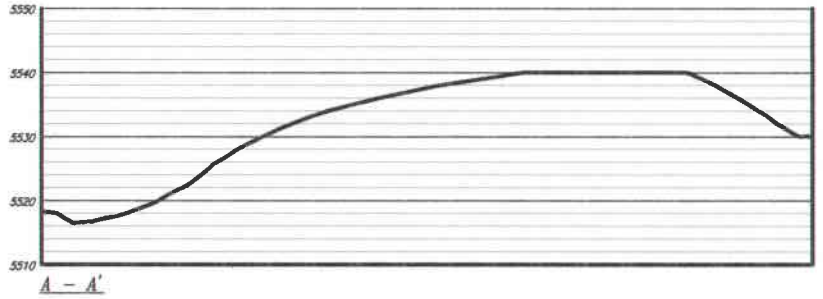

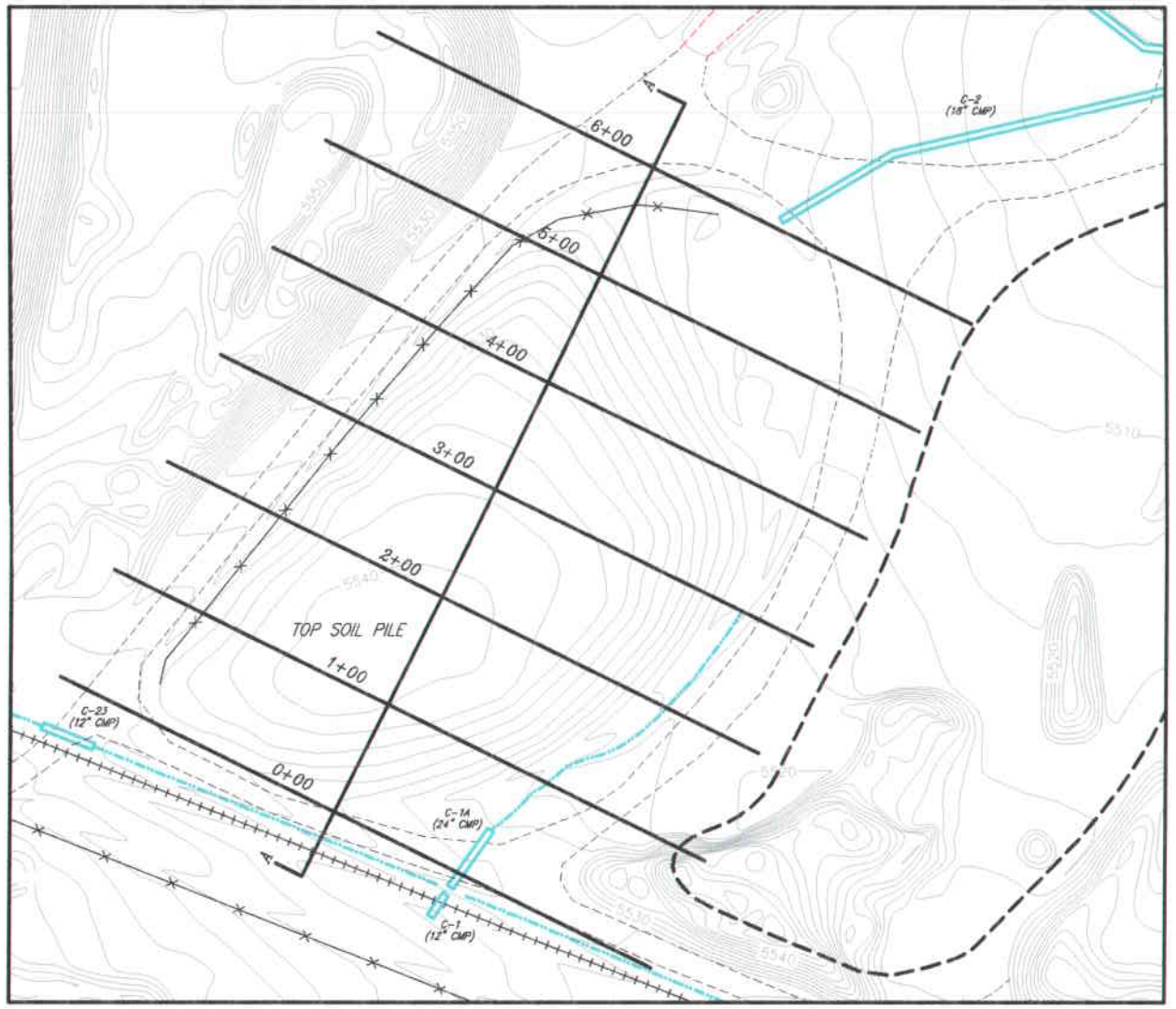

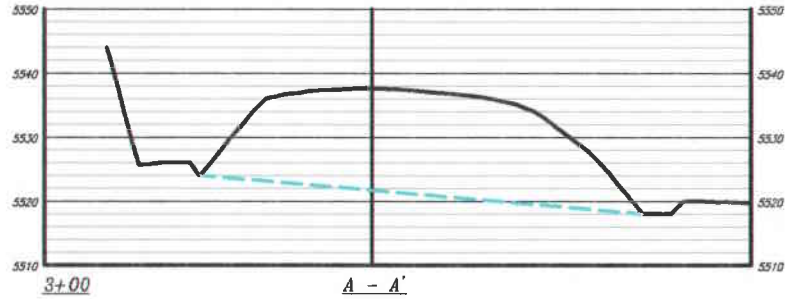

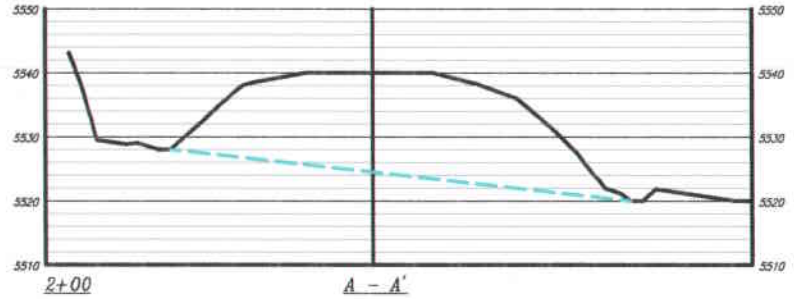

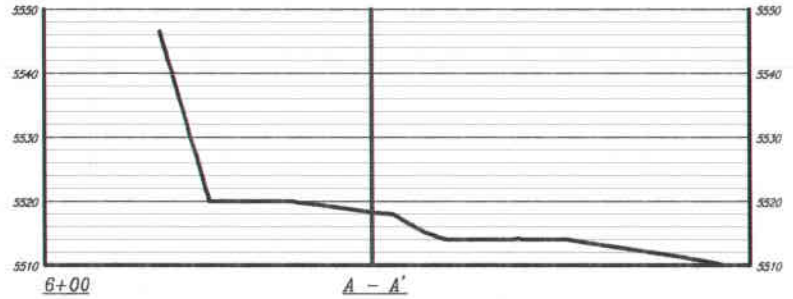

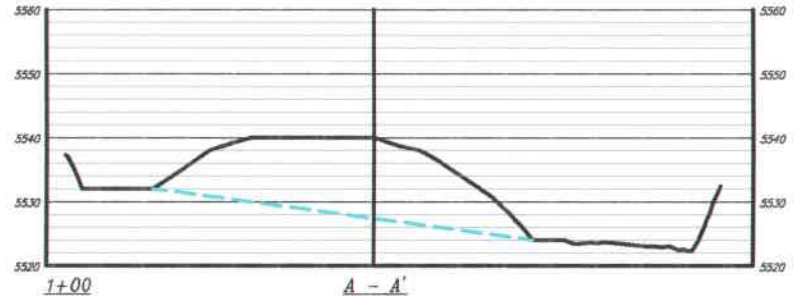

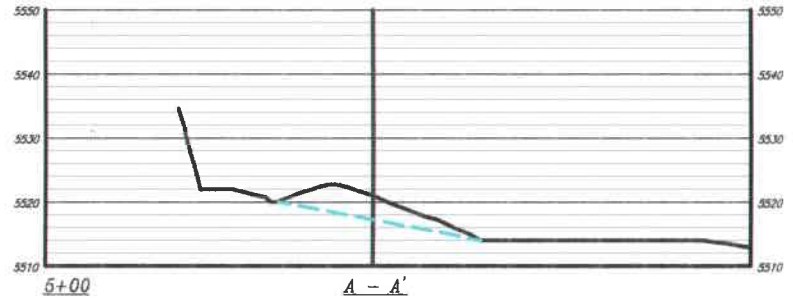

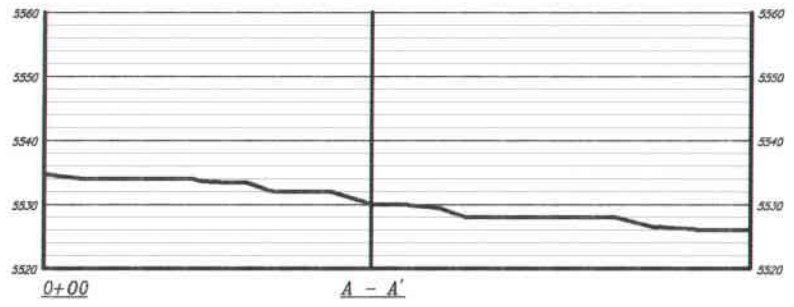

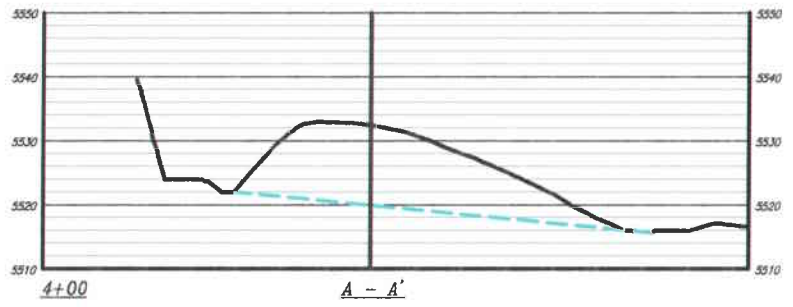

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VERTICAL SCALE: 1:5
HORIZONTAL SCALE: 1:1

LEGEND:
EXISTING GROUND LINE: – – –
CROSS-SECTION LINE: ———

REVISION #	DESCRIPTION

File in:
☐ Confidential
☒ Shelf
☐ Expandable
Refer to Record No 0004 Date 04/9/2008
In C/007/0022, 2008, Incoming
For additional information

UTAH REGISTERED #154168 DAN W. GUY 21564 PROFESSIONAL ENGINEER

N

SAVAGE

SAVAGE COAL TERMINAL
AS-BUILT TOPSOIL MAP

SCALE:	DRAWN BY:
1" = 150'	BLACKHAWK ENGINEERING
DATE:	PLATE:
AUGUST 2006	PLATE 2-2

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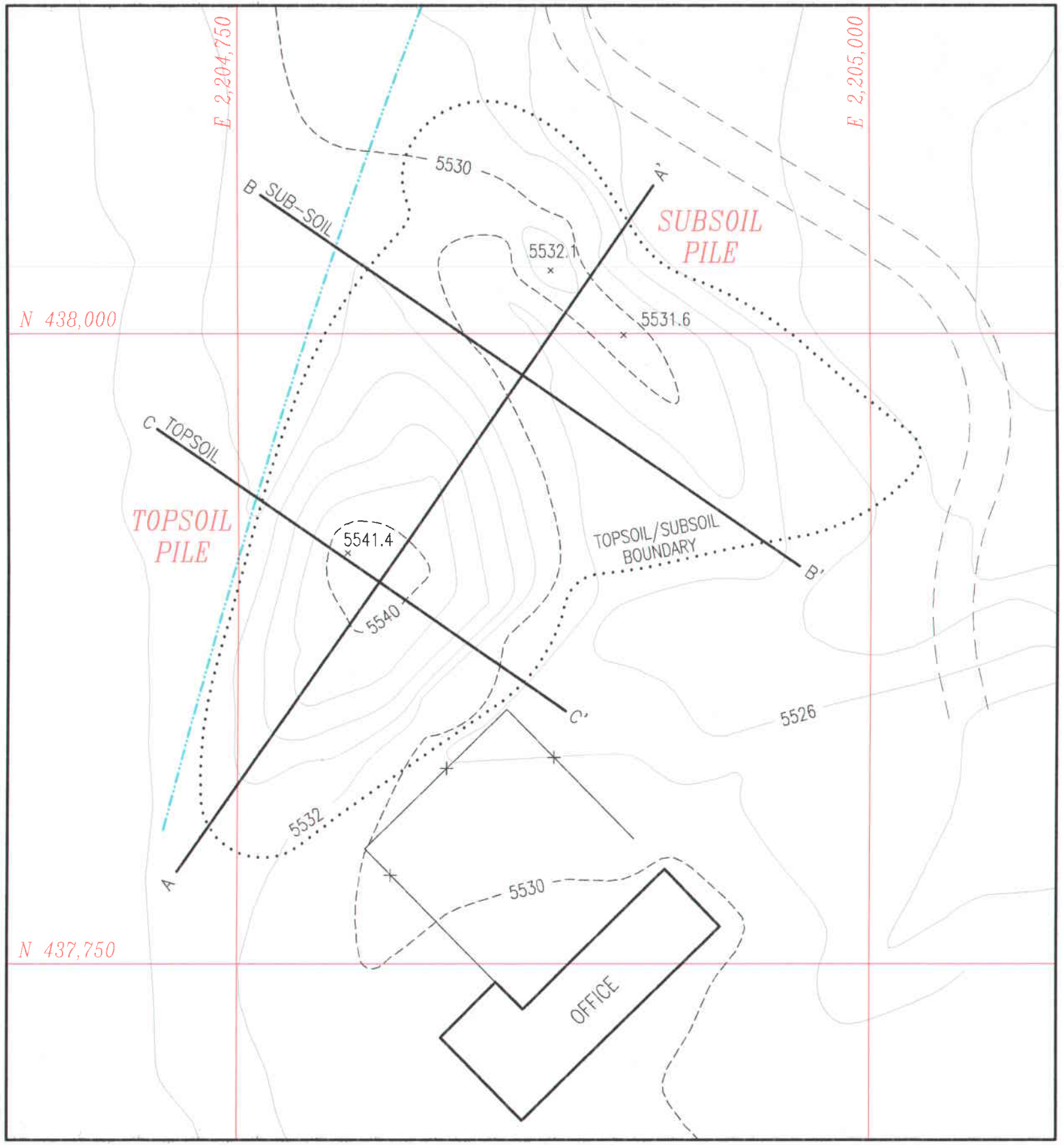
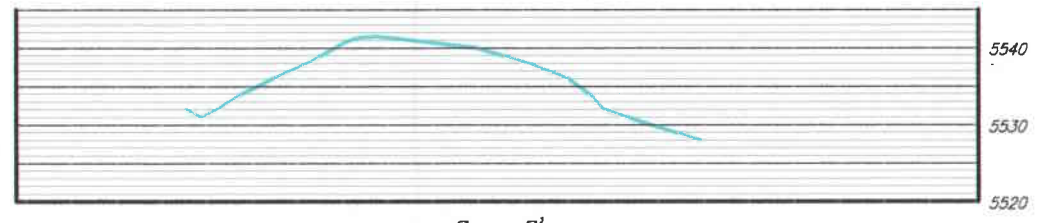
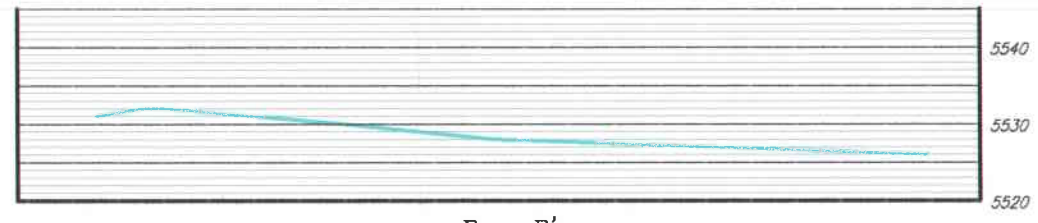
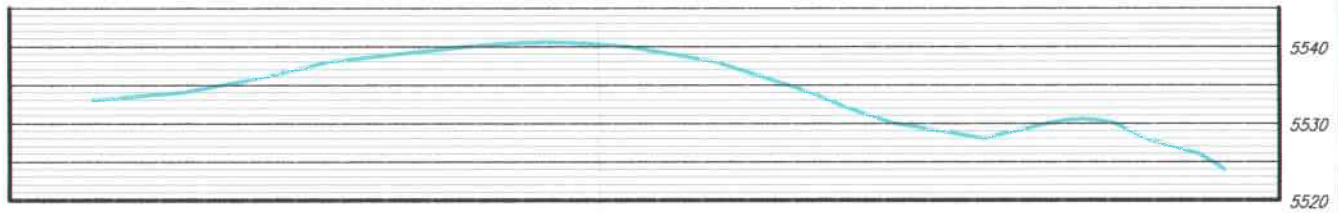




C – C'



B – B'



A – A'

NOTE:

TOPSOIL STORED = 6514 c.y.

SUB-SOIL STORED = 6514 c.y.

TOTAL AVAILABLE = AT THIS LOCATION. 13,028 c.y.

File in:
☐ Confidential
☒ Shelf
☐ Expandable
Refer to Record No 0004 Date 04/09/2008
In C/CO 7003 2008 Incoming
For additional information

REVISION #	DESCRIPTION

UTAH REGISTERED #154168 DAN W. GUY 7/5/08 PROFESSIONAL ENGINEER

N

SAVAGE

SAVAGE COAL TERMINAL
SETTLING POND AREA

SCALE:	1" = 50'	DRAWN BY:	BLACKHAWK ENGINEERING
DATE:	JANUARY 2007	PLATE:	PLATE 2-3

Savage Services Corporation
Savage Coal Terminal
C/007/022

Chapter 3

Biology

R645-301-300

Table of Contents
Savage Coal Terminal
Chapter 3 - Biology

R645-301-300. Biology
R645-301-320. Environmental Description
R645-301-322. Fish and Wildlife Information
R645-301-323. Maps and Aerial Photographs
R645-301-330. Operation Plan
R645-301-333. Expected Impacts of Mining Operations on Fish and Wildlife
R645-301-340. Reclamation Plan
R645-301-350. Performance Standards

Table 3-1 Aerial Extent of Vegetation and Disturbed Areas
Table 3-2 Summary of Cover and Frequency Data in the Shadscale Community
Table 3-2A Shadscale Affected Transect 1
Table 3-2B Shadscale Affected Transect 2
Table 3-2C Shadscale Affected Transect 3
Table 3-2D Shadscale Affected Transect 4
Table 3-2E Shadscale Affected Transect 5
Table 3-3 Production Data (G/M^2), Affected Area - Shadscale Community Species 1 - 13
Table 3-3A Production Data (G/M^2), Affected Area - Shadscale Community Species 14 - 26
Table 3-3B Production Data (G/M^2), Affected Area - Shadscale Community Species 27 - 39
Table 3-3C Production Data (G/M^2), Affected Area - Shadscale Community Species 40 - 52
Table 3-3D Production Data (G/M^2), Affected Area - Shadscale Community Species 53 - 65

Table 3-4 Sample Adequacy: Shadscale Community, Affected and Reference Areas
Table 3-5 Plants Observed at Savage Coal Terminal
Table 3-6 Summary of Frequency and Cover Data, Reference Area Shadscale Community
Table 3-6A Shadscale Reference Transect 1
Table 3-6B Shadscale Reference Transect 2
Table 3-7 Production Data (G/M^2), Affected Area - Shadscale Community
Table 3-8 Reference Area, Frequency and Density Summaries for Shrub Species
Table 3-9 Evaluation of Shrub Density Sample Adequacy for the Reference Area
Table 3-10 Affected Area, Frequency and Density Summaries for Shrub Species
Table 3-11 Evaluation of Shrub Density Sample Adequacy for the Affected Area
Table 3-12 Potential Vertebrate Wildlife
Table 3-13 Status of White-Tailed Prairie Dog (Cynomys Leucurus) Burrows on the Savage Coal Terminal Study Area
Table 3-14 Construction of White-Tailed Prairie Dog (Cynomys Leucurus) Burrows on the Savage Coal Terminal Study Area

Table 3-15 Federally Listed T&E Species for Carbon County

Figure 3-1 NRCS Letter
Figure 3-2 SCS Letter

Appendix 3-1 Vegetation Test Plots
Appendix 3-2 Reclamation Test Plot
Appendix 3-3 Wetland Delineation - (Submitted to U.S. Army Corps of Engineers)

Plate 3-1 Vegetation Map

R645. Natural Resources; Oil, Gas and Mining; Coal.

R645-301. Coal Mine Permitting: Permit Application Requirements.

R645-301-300. Biology.

310. Introduction. Each permit application will include descriptions of the:

311. Vegetative, fish, and wildlife resources of the permit area and adjacent areas as described under R645-301-320;

311. See Section R645-301-320.

312. Potential impacts to vegetative, fish and wildlife resources and methods proposed to minimize these impacts during coal mining and reclamation operations as described under R645-301-330 and R645-301-340; and

312. See Sections R645-301-330 and R645-301-340.

313. Proposed reclamation designed to restore or enhance vegetative, fish, and wildlife resources to a condition suitable for the designated postmining land use as described under R645-301-340.

313. See Section R645-301-340.

320. Environmental Description.

321. Vegetation Information.

321.100. Scope

Vegetation studies at Savage Coal Terminal were originally executed in June and August, 1980 by Espey, Huston and Associates, Inc. of Denver, Colorado. The study included initial vegetation mapping, a floristic survey to identify any threatened or endangered species, the vegetation communities, and quantitative estimations of vegetation production, cover, and frequency. Vegetation information was included in the original August 1980 submittal and in the updated November 1980 supplement.

Shrub density information within the reference area was collected in July 1981 by ARCO Coal Company staff. Due to problems with shrub identification in this earlier study, shrub density was re-sampled in September 1982 by Stoecker-Keammerer & Associates Ecological Consultants of Boulder, Colorado.

Methodology

Vegetation Map

The original vegetation map compiled in June 1980 showed three mapping units within the permit area: Shadscale Community, Weed Community and Disturbed Area. This earlier map was expanded in March 1982 to better qualitatively describe the existing vegetation, specifically the Salt Desert type (formerly the Shadscale Community).

Plate 3-1, Vegetation Map of the Savage Coal Terminal was prepared from black and white aerial photos. Visually distinct areas on the photos were inspected on the ground and the vegetation characterized by community type. Only the shadscale phase of the salt desert community was of sufficient extent (Table 3-1) to warrant quantitative analysis. The other phases as well as the remaining mapping units, have been described qualitatively.

During the original mapping, a Weed Community was mapped. That is comparable to the currently mapped Disturbed, Agricultural area.

A Sedge Meadow type was mapped during the original study (June 1980), adjacent to the current western permit boundary. Although no such type was actually mapped within the permit area, a low area does exist within the currently mapped Disturbed, Agricultural area, now drained by a French drain.

Qualitative Analysis

Each vegetation mapping unit at S.C.T. has been qualitatively described in terms of its dominant and conspicuous species. An estimate of maturity, persistence, and degree of disturbance within each unit is also provided.

Quantitative Analysis

Sample locations were chosen by random from a grid originating in the southwest corner of the study area with its extending north-south and east-west. Grid spacing on the ground was approximately 1 x 1 meter. Coordinate points were obtained from a random numbers table.

Line transects, 50 meters in length with 20 x 50 cm ($0.1m^2$), quadrants placed at 1 meter intervals, were used to collect cover information (Daubenmire 1959). The location and orientation of the line transects were randomly determined. The percentage of ground covered by a vertical projection of the foliage or stems of each species onto the ground was estimated by visual inspection in each plot (Oosting 1956).

Standing crop biomass measurements were obtained from randomly located $0.25m^2$ circular plots. The species within the plots were harvested by clipping the standing vegetation at ground level. The clipped material was placed in paper bags, taken to a laboratory, and oven dried for 24 hours at 105 degrees Celsius. The material was weighed on a triple beam balance to the nearest 0.1 gram.

Data reduction for the $0.1m^2$ quadrants and line transects was carried out as follows:

$$\% \text{ Cover} = \frac{\text{aerial coverage value}}{\text{area sampled}}$$

$$\text{Frequency} = \frac{\text{number of plots in which a species occurs}}{\text{total number of plots sampled}}$$

Sample adequacy for cover was evaluated using the formula outlines in Utah DOGM guideline for vegetation information. Adequacy for randomly placed production samples was evaluated utilizing the adequate sample size formula, outlined in the Wyoming DEQ Guideline 2 (March 1979).

Shrub density data (September 1982) were collected using a line strip transect approach. Sixteen line strip transects 20 meters ling and 2 meters wide were randomly located within the existing reference area. All shrubs within the 20m area were counted on the basis of height classes (0.10m - 0.25m and 0.26m - 0.75m). None of the individual shrubs were more than 0.75m tall. The data were summarized by calculating mean density for each species as well as a mean density for all species combine.

Existing Resources

General Site Description

The Savage Coal Terminal is located on relatively level Mancos shale in very typical salt desert vegetation. The dominant plants are shadscale (Atriplex confertifolia) and matbush (Atriplex corruagata). The primary land uses are small wildlife habitat and, to a limited extent, grazing. The climate is arid to semi -arid continental with peaks of precipitation in the spring and early fall.

Vegetation Types

Salt Desert Community

The salt desert community is the only vegetation type at Savage Coal Terminal that has not been greatly modified by man. For purposes of mapping and general qualitative description, it has been divided into four phases: Shadscale, Matbush, Greasewood (Sarcobatus vermiculatus), and Saltgrass (Distichlis stricta). The Shadscale Phase is the dominant phase in the salt desert community at Savage Coal Terminal.

The Shadscale Phase comprises 5.1% of the Savage Coal Terminal property (Table 3-1). This phase was dominated by low, widely-spaced shrubs. Relief was relatively level, with a slight slope to the northeast. The elevation was approximately 5500 feet. The major soil types included the Killpack loam, Persayo loam, Chipeta silty clay, and Billings silty clay. Based on cover data, the vegetation was represented by 22 known species of plants, nine shrubs, nine orbs, and four grasses. Shrubs were the dominant life form, contributing approximately 71.3%. The average total percent vegetation cover was 18.8%. Litter, rock, and moss cover were nearly nonexistent. All figures listed are absolute values for vegetation only.

The dominant shrubs were shadscale (Atriplex confertifolia), with cover of 5.2% (Table 3-2), and rubber rabbitbrush (Chrysothamnus nauseosus), with a cover of 4.8%. The most common grass, galleta (Hilaria jamesii) had a cover of 1.9%. Important forbs included marsh alder (Iva acillaris) and globe mallow (Sphaeralcea sp.,), with cover values of 0.7% and 0.3%, respectively.

The estimated Annual Net Production (ANP) of clipped plots within the Shadscale Phase ranged from 2.8 g/m^2 with a mean of 110.9 g/m^2 (Table 3-3). Shrubs are the major producers of biomass with an average 90.7 g/m^2 or 81.8% of the average total production.

Sample adequacy calculations for the Shadscale phase are presented in Table 3-4.

The other phases of the Salt Desert were not quantitatively sampled separately because of their small area and intergradation with the shadscale phase. Qualitative descriptions of these phases are given below.

The Matbush Phase of the salt desert community was sparsely vegetated and dominated by Matbush. It occurred on dry alkaline surfaces. As the alkalinity increased and salts accumulated at the surface, the vegetation cover decreased. Scattered throughout the Matbush phase were Saltbush (Atriplex cuneata) and Indian Ricegrass. The Matbush phase accounted for 0.2% of the Savage Coal Terminal area (Table 3-1).

The Greasewood Phase was represented at the Savage Coal Terminal by isolated strands of Greasewood (Sarcobatus vermiculatus) accompanied by a limited number of Tamarisk (Tamarix pentandra). The understory was dominated by Halogeton (Halogeton glometatus). An annual Atriplex (Atriplex powellii) was also common. This phase was eliminated through new disturbance (and topsoil stripping) in 2002.

The Saltgrass Phase consisted of a small but densely covered meadow of Saltgrass (Distichlis stricta). This meadow was found where the soil is alkaline and moist throughout much of the growing season.

Disturbed Community

This community includes industrial, refuse processing and disposal areas, as well as an area of land which had been farmed and/or grazed in the past. The disturbed community accounts for 94.6% of the area at the Savage Coal Terminal.

The industrial areas consisted primarily of weeds interspersed with native perennials: the most conspicuous annuals and longer lived adventives in this area were:

Russian Thistle	Salsola kali
Halogeton	Halogeton glomeratus
Sunflower	Helianthus annuus
Goosefoot	Chenopodium sp.
Burning-Bush	Kochia scoparia
Tansy Mustard	Descurainia sp.
Squirrel-tail	Sitanion hystrix
Field Bindweed	Convolvulus arvensis

The actual refuse processing and disposal areas had no vegetation cover.

The abandoned agricultural community was originally salt desert that had been disturbed in the past by cultivation and grazing. Historically, 40 acres of this property was in cultivation during the 1930's, but was abandoned because it was not economical (R.D. Campbell, personal communication). This mapping unit is comparable to the Weed community outlined on pervious vegetation maps (June 1980).

This region appears some what different than industrial disturbed areas because it supports a greater amount of native vegetation. The native perennials most conspicuous throughout include:

Shadscale	Atriplex confertifolia
Matbush	Atriplex corrugata
Indian Ricegrass	Oryzopsis hymenoides
Stemless Evening Primrose	Oenothera caespitosa
Saltbush	Atriplex cuneata

In the northeast portion of this area some small areas now exist which are dominated by matbush or saltgrass.

Plant Species List

Table 3-5 presents the plant species observed at Savage Coal Terminal. Within that table, plants observed or sampled within the reference area and affected areas are marked. Identification was through the use of Cronquist et al. (1972) and Welsh and Moore (1973).

Total Acres in Plan Area

There are currently 132.5 acres disturbed in the Mine Plan area, plus an additional 5.28 acres for the river pump and pipeline. There are no plans for additional disturbance at this time.

Reference Area

Two areas have been chosen to represent standards for final revegetation success. One area represents a shadscale (or upland) community. Savage Industries' permit required this reference area to be reassessed by the Natural Resource Conservation Service (NRCS) or other qualified biologists in 2002 for condition and biomass production. This task was accomplished. The reference area was rated in "good" condition. In a letter-report, the biologist from the NRCS also stated that *the potential production ranged from 350 to 400 lbs per acre on a favorable year and 100 to 150 lbs. per acre on an unfavorable year. This year the site will produce about 240 lbs. per acre* (see NRCS letter dated August 8, 2002, Figure 3-1).

A second reference area has been approved to represent final revegetation success standards for the lowland areas that have been disturbed by the loadout facilities. The disturbed lowland areas were once greasewood communities. Although this area had low species diversity, it does represent the site prior to disturbance. This reference area was also investigated by the NRCS in 2002 for range condition and productivity. In the aforementioned letter-report the biologist from the NRCS stated that this site was in "high fair" condition. Also, *the potential*

production ranges from 950 to 1000 lbs. per acre on a favorable year to 500 to 550 lbs. per acre on a unfavorable year. This year the site will produce about 560 lbs. per acre.

A reference area in the Shadscale Phase of the salt desert community was selected to represent the vegetation of the Savage Coal Terminal. The reference area is located within the extreme southwest corner of the property. It is bordered on the south primarily by a paved road, on the north and east by an irrigation canal, and on the west by the entrance road to the coal terminal.

Two randomly located cover transects were run during the 1980 study just south of the fenced portion of the current reference area. The dominant shrub was shadscale, with a cover of 6.4%. The most common grass was galleta, with a cover of 4.1% (Table 3-6). The average total cover of vegetation was 17.6%, of which 63% was contributed by shrubs. Refer to Tables 3-6A and 3-6B for cover summaries by individual transect.

The estimated annual net production of clipped plants ranged from 0.8 gm/m^2 to 313.6 gm/m^2 (Table 3-7). Shrubs produced the most biomass with an average of 61.4 gm/m^2 or 71.6% of the average total.

Calculations of sample adequacy for cover and production in the reference area transects are given in Table 3-4. The minimum number of samples for production were met, based on the Wyoming DEQ Guideline 2 in place at the time of sampling. Also, refer to the SCS statement on condition of the reference area (Figure 3-1).

Based on quantitative sampling, a total of 24 species were found within the reference area and a total of 22 species were located within the affected area (Shadscale Community or Salt Desert mapping unit). Refer to Table 3-5. In addition, 16 species were common to both. By incorporating these figures into the Sorensen's similarity Index:

$$I.S. = \frac{2C}{A+B} \times 100 = \frac{2(16)}{24+22} \times 100 = 70\%$$

Where: A = Total number of species in community A.
B = Total number of species in community B.
C = Total number of species common to both communities.

Shrub Area - Reference Area

The original shrub density survey information submitted in the May 1983 permit submittal was deleted. Information from an updated study completed September 1982 has been included in the current permit submittal.

The results of the 1982 shrub density measurements are presented in Table 3-8. The most abundant shrub species is shadscale (Atriplex confertifolia) followed by winter fat (Ceratoides lanata). Five other shrub species occur in the reference area, however, they occur only in limited numbers.

In order to satisfy the requirements of the Utah Division of Oil, Gas and Mining, enough samples were taken to obtain sample adequacy based on the requirements of their vegetation studies guideline. Sample adequacy was attained for total shrub density (Table 3-9).

Shrub Density of the Affected Area

Shrub density information within the 4.45 acre affected area was collected in November 1983 by NPI of Salt Lake City, Utah. The shrub density sampling methods used on the reference area were also used on the affected area. The locations of each of the 18 line-strip transects used to sample the affected area is shown on Vegetation Map (Plate 3-1).

The results of this survey are presented in Table 3-10. The most abundant shrub species on this area is low rabbitbrush (Chryothamnus viscidiflorus) followed by shadscale (Atriplex confertifilia) and Gardner's saltbush (Atriplex gardneri). Six other shrub species occur in the affected area; however, these species are more limited in number.

Sample adequacy was attained for total shrub density (see Table 3-11). No significant difference in shrub density was found to exist between the reference and affected areas ($t=1.1$, $p=0.29$). Shrub species composition was also similar between these two areas (Sorensen's Index of Similarity = 87.5%), although the relative contribution of each species to each area's overall shrub density differed.

The greasewood phase of the salt desert (shadscale) community type (see 1c on the Vegetation Map, Plate 3-1) appears to have been altered by some recent environmental changes. Shrub density and diversity is atypically low for this community type. Many dead and dying shrubs are also in evidence here. Because of the dramatic reduction in the size of the shrub populations which appeared to formerly characterize this phase and the small area this phase occupies on the site, the decision was made to exclude this phase from the density analysis for the affected area sampled.

Threatened and Endangered Species

No plants or animals cited by the U.S. Fish and Wildlife Service (USFWS) as threatened or endangered as shown on Table 3-15, were found at the Savage Coal Terminal.

321.200. See Section 321.100 and Figure 3-1.

322. Fish and Wildlife Information.

Each application will include fish and wildlife resource information for the permit area and adjacent areas.

322.100. Scope

Studies have been completed to ensure that fish and wildlife resources that might exist in the vicinity of the Savage Coal Terminal would not be irretrievably affected by proposed operations. Literature and field surveys were conducted to determine the presence and/or significance of wildlife resources.

Methodology

Company officials consulted with Utah Division of Wildlife Resources to determine the extent of existing information. Adequate data was supplied by this agency to answer questions relative to wildlife resource presence, status, relative abundance, and population trend. Vegetation information was correlated to wildlife habitat to answer remaining questions. Additional studies were carried out by consultants to evaluate the presence or significance of a Black-footed Ferret population on the Savage Coal Terminal area.

Existing Wildlife Resources

Wildlife Habitats

The company has analyzed wildlife resources at the Savage Coal Terminal both prior to the disturbance and at the present time. Conversations with the prior landowner indicate that the land contained with Savage Coal Terminal once provided a more diverse habitat than at present. Riparian and wetland communities appear to have been more abundant several years ago; however, due to the increasing alkaline conditions of the soils, a very limited acreage of these communities remains.

It should be noted that a wetland delineation was completed on an area of approximately 0.05 acres in 2002. This area was subsequently approved by the U.S. Army Corp of Engineers to be disturbed. All related information on this wetland area is included in Appendix 3-3.

Vegetation studies indicate that the project area is currently classified as a saltbush vegetation community with limited value as wildlife habitat. This community provides good cover and food availability for relatively few wildlife species when compared to other, more diverse vegetation types found in Utah.

Ground cover in the saltbush vegetation type averages about 18%. The large amount of ground, coupled with low shrub life, provides little cover and food. Lizards, lagomorphs, burrowing rodents, and those species which prey upon them, are the most abundant permanent residents of the saltbush area.

Because of the proximity of the project site to surrounding crop land and the Price River, the area could serve as a stopover and resting site for several species of migratory birds. However, because of the vast amount of saltbush vegetation in this portion of Utah, the value of the project site for migratory birds is minimal.

Wildlife

Two species of game birds are known to inhabit and nest on crop lands and wetlands surrounding the project area. They are the Ring-neck Pheasant and Morning Dove. These birds may cross the project area at various times but it is unlikely that any desirable habitat exists on the area (personal communication, Larry Dalton, Utah Division of Wildlife Resources).

Mammals observed on the study area during the Black-footed Ferret survey included black-tailed jackrabbit (Lepus californicus), white-tailed jackrabbit (L. townsendi), and desert cottontail (Sylvilagus audoboni). The latter two species were observed most frequently. Jackrabbits were seen in native desert shrub vegetation within and around the Savage Coal Terminal property. Cottontail were observed in both disturbed and undisturbed vegetation communities. Whereas, jackrabbits do not dig or normally occupy burrows, cottontail may utilize existing burrows in the ground. The latter species may use prairie dog burrows on the property, as cottontail fecal droppings were seen near the openings of several burrows.

Though no predators were actually observed, some evidence was found which indicates possible use of the area by badger (Taxidea taxus) and coyote (Canis latrans). Two burrows in the active mound had been excavated to a width greater than twenty centimeters and appeared elipitcal shape, suggesting badger activity. Coyote tracks were seen in the desert shrub community west of the property, outside the boundary.

Table 3-12 provides information on upland game birds and federally listed threatened or endangered species of wildlife, as well as other vertebrates-amphibians, reptiles, birds, and mammals which could inhabit the area.

322.200. Site-specific resource information necessary to address the respective species or habitats will be required when the permit area or adjacent area is likely to include:

322.210. Threatened and Endangered Species

Three federally listed threatened or endangered species of wildlife are of concern to the Utah Division of Wildlife Resources. They are the Bald Eagle, Peregrine Falcon, and Black-footed Ferret. The habitat surrounding the Savage Coal Terminal is ranked with substantial value for Bald Eagles and Peregrine Falcons. However, due to present disturbance, it is highly unlikely these raptors utilize this site. There are no conformed sightings of Black-footed Ferrets on or near Savage Coal Terminal; however, this area is classified as historic range for the Ferret (personal communications, Larry Dalton, Utah Division of Wildlife Resources).

Black-footed Ferret Survey

A small number of prairie dogs inhabited Savage Coal Terminal at the time of the original permit. Therefore, a qualified consultant was hired to determine the potential occurrence of Black-footed Ferrets.

The Black-footed Ferret (Mustela nigripes), an endangered species, is a member of the weasel family whose original range was closely correlated to that of the prairie dog (Cynomys spp.). This range extended over the Great Plains area from southern Canada to west Texas, and from east of the one hundredth meridian to Utah and Arizona (Fortenbery 1972). The current distribution of this species is not known but is believed to be considerably reduced from its original range (Linder et al. 1978). Black-footed ferrets have a close relationship with prairie dogs (Henderson et al. 1969), the latter being a major dietary component of ferrets. Due to decades of prairie dog reduction and eradication programs throughout the west and mid-west, habitat loss is the likely cause for the Black-footed ferret's decline (Clark 1978).

The status of the Black-footed ferret in Utah is unknown at the present time. A dead animal was found in 1952 approximately two miles south of Blanding, in San Juan County (Hinckley 1970) and there have since been numerous unconfirmed sightings reported in Carbon County, the most recent off which was an observation by a Utah State Division of Wildlife Resources conservation officer in February, 1980 (Dalton 1980).

The nocturnal habits of the ferret, along with its penchant for living underground, render this animal an extremely difficult one to observe or study.

As previously stated, ferrets exist in close association with prairie dogs. The white-tailed prairie dog (C. leucurus) is a colonial animal and the sole prairie dog species inhabiting the Carbon County, Utah, area (Sparks 1973).

Survey Methods

Upon initial inspection, the area was divided into nine workable units and thoroughly searched on foot for evidence of prairie dog activity and black-footed ferret sign. Transects approximately fifteen yards apart were walked within each unit while visually surveying areas in between. When a burrow greater than five centimeters (two inches) in diameter was encountered it was inspected to determine its current activity status and the presence or absence of black-footed ferret sign. Such sign includes:

> Trenches or stringers of soil, characteristically fifteen to twenty centimeters wide, five to weight centimeters deep and thirty centimeters to three and one-half meters in length, with a groove in the center.
>
> Burrows plugged with soil, particularly fresh plugged burrows in active prairie dogs areas.
>
> Skeletal material, either of black-footed ferret or of prairie dogs, the latter displaying chewing marks at the base.
>
> Fecal droppings from mustelids, usually marked by segmentation and twisting when composed of hair, varying form dark brown to black in color, approximately six millimeters in diameter and twenty five to one hundred millimeters in length.

A burrow was defined as active if evidence of fresh digging was seen. (A heavy rain had occurred about one week prior to the survey and aided in recent activity determinations).

In addition to the property itself, all surrounding areas within one-sixteenth to one-eighth mile of the property boundary were surveyed, excepting agricultural field currently under cultivation. Areas of extensive disturbance, such as coal and waste storage piles, were not surveyed. Areas of active prairie dog evidence were scanned regularly with binoculars in order to observe prairie dog behavior. The survey was conducted primarily during daylight hours in the third week of September, 1980, and comprised twenty five man hours on site.

Prairie Dog Status

A total of twenty nine active burrows and one active mound with multiple burrows was encountered during the survey (Table 3-13). Sixty five currently inactive open burrows and two inactive mounds with multiple burrows were also surveyed.

The majority of both active and inactive burrows consisted of a single entrance, usually surrounded by a slightly raised area of dirt (Table 3-14). Two active and ten inactive burrows were in flat ground with no apparent mounding. Two active and eight inactive burrows were constructed in man-made disturbance, such as in a trench, and therefore were not classified as to the appearance of mounding. Average diameter of all open burrows, active and inactive, was 11.2 centimeters (4.4 inches).

The most active prairie dog area appeared to be on the east side of the property, as evidenced by the majority of active burrows, signs of fresh digging (not necessarily connected with excavation of burrow sites) and numerous prairie dog tracks. One inactive burrow on the eastern portion of the property was constructed entirely (on the surface) in coal waste while another burrow, currently active was constructed in soil immediately underneath a thin layer coal waste. Vegetation throughout active areas showed signs of having been utilized by prairie digs, such as the stripping of most green matter from rubber rabbitbrush and the cropping of grasses.

Widespread evidence of past prairie dog activity was seen in the form of numerous old plugged burrows within the surrounding currently active areas. White-tailed prairie dogs are known to plug their own burrows, for example before hibernating (Clark 1978) or when predators such as rattlesnakes, badgers, coyotes and ferrets use their burrows (Fortenbery 1972).

Observations of prairie dogs during the survey were extremely limited. Five animals were observed displaying the upright or upright extended alert positions (Clark 1973) during the morning of September 17 on or around the single active mound in the western part of the property. Another prairie dog was observed in the evening of the same day displaying an upright alert posture in the same vicinity. No alarm chattering calls were heard during the course of the survey. Sex and age of the individual animals observed was not determined.

The paucity of prairie dog observations may be due to a variety of contributing factors, such as industrial and/or human disturbance, presence of the observer or onset of inactive periods, i.e. hibernation. Prairie dogs on the Savage Coal Terminal property exist among a wide array of potentially disturbing activities associated with a coal preparation facility which may modify their behavior patterns.

Also, "target practicing" on prairie dogs is a common local practice, through it can not be stated with any certainty that the animals are the objects of such practice on the property itself. Smith (1958) reported that two weeks were needed before prairie dogs acclimated to the observer during a study in Kansas and, prior to that time, the animals would quickly disappear at the approach of a vehicle or person on foot. In addition, many animals may not have been active above ground during the time the survey was conducted. Clark (1973) reported that, in Wyoming, some prairie dogs disappeared for several days consecutively during September and the activity of juveniles was sporadic. Adult prairie dogs of both sexes usually become inactive by late August and juveniles remained active, though sporadically, through late October-early November during that study. It is likely that many of the prairie dogs on the Savage Coal Terminal were already inactive at the time this survey was conducted. Therefore, no attempts were made to determined prairie dog densities.

Black-footed Ferret Status

No definitive evidence, current or recent, of black-footed ferret use of the Savage Coal Terminal prairie dog community was found during the course of this study.

A single trench was encountered in an active prairie dog area on the west side of the property, but this phenomenon was undoubtedly caused by erosion and was not the result of past ferret activity. Trenching caused by ferrets is characterized by tailings of loose dirt on top of the ground and such trenches or stringers of soil are usually fifteen to twenty centimeters wide, five to eight centimeters deep and thirty centimeters to thee and one half meters long, with a groove in the center. The aforementioned trench did not have such an appearance, being about fifty centimeters deep, one and one quarter meters long and having no loose soil. The trench was associated with a large inactive burrow.

As was previously mentioned, many old plugged holes were seen throughout active and inactive prairie dog areas. Prairie dogs will plug their own holes for various reasons other than use of their burrows by ferrets. Several freshly covered holes in a small "dog" town, especially where something has dug out from the inside and left an opening the size of a silver dollar, are an indication that ferrets may be active in the area (Fortenbery 1972). No freshly plugged burrows, with or without small openings dug from inside out, were encountered during the survey.

The only skeletal material found was the skull of a white-tailed prairie dog at the opening of an active burrow on the southeast portion of the property. This skull did not display chewing marks at the base. Prairie digs clean their burrows in the spring, removing material collected over winter to the outside of the burrow (Tileston and Lechleitner 1966) and this was the probable origin of the skull found on the property. Several small vertebrae were seen scattered around active prairie dog areas. These bones were probably those of white-tailed prairie dogs

that were removed from burrows during spring maintenance.

No black-footed ferret or mustelid-like tracks were seen in the Savage Coal Terminal area during this survey.

Summary and Conclusions

Due to the lack of evidence found during this study, it is extremely improbable that black-footed ferrets are or have recently been active in the Savage Coal Terminal vicinity. If more conclusive data are sought to substantiate the absence of black-footed ferrets, further research could be undertaken during spring, when prairie dogs emerge from hibernation, and/or during August, when black-footed ferrets are most likely to be seen above ground.

Raptors

Routine observations for raptors at the Savage Coal Terminal by company environmental personnel have not indicated occurrences of raptors on the site. Due to the amount of activity at the Savage Coal Terminal it is highly unlikely that any raptors would use the site. Occasional raptors have been seen on the Mancos Shale bluffs to the west and south of the property.

A raptor powerline hazard survey was conducted by wildlife consultants in May, 1981. At that time it was discovered the poles at the site were armless types which are relatively safe. However, some of the poles closer to the coal preparation plant may have phase wires too close to the poles to be raptor proof. Based on the location of the site, the wildlife consultants do not feel that the powerline poles present any raptor hazards. A letter from USFW to DOGM confirmed these findings on 11/10/82.

In 1984 some additional poles were added to facilitate lighting in the preparation plant yard. Do to their close proximity to the plant no raptor use has ever been observed. In July of 1989 Mr. Larry Dalton of the UDWR was requested to evaluate all poles on the property and make recommendations to up-grade or further safeguard use by raptors. Mr. Dalton concurred in part with the 1981 findings, however, he did recommend that raptor protection would be advantages on the property. These poles could be hazardous in the event they were utilized by raptors. Those safeguards were implemented by the company in 1989.

Safeguards were triangular perch guards with cross-arms to prevent birds from landing.

Summary and Conclusions

Due to the lack of evidence found during this study, it is extremely improbable that black-footed ferrets are or have recently been active in the Savage Coal Terminal vicinity. If more conclusive data are sought to substantiate the absence of black-footed ferrets, further research could be undertaken during spring, when prairie dogs emerge from hibernation, and/or during August, when black-footed ferrets are most likely to be seen above ground.

322.220. As indicated in Section 322.210, there are no habitats of unusually high value for fish and wildlife at the Savage Coal Terminal.

322.230. See Section 322.210 for discussions of protected species.

322.300. Fish and Wildlife Service review.

Upon request, the Division will provide the resource information required under R645-301-322 and the protection and enhancement plan required under R645-301-333 to the U.S. Fish and Wildlife Service Regional or Field Office for their review. This information will be provided within 10 days of receipt of the request from the Service.

323. Maps and Aerial Photographs.

Maps or aerial photographs of the permit area and adjacent areas will be provided which delineate:

323.100. Vegetation reference areas are shown on Plate 3-1.

323.200. See Section 322.210 for information relative to wildlife studies.

323.300. Raptor protection is discussed under Section 322.210.

323.400. See Plate 3-1.

330. Operation Plan

331. As discussed under Section 321.100, the disturbed area at the Savage Coal Terminal is approximately 137.79 acres (including the river pumps and pipeline). It is the intent of the operator to minimize disturbance and perform contemporaneous reclamation where possible; however, the existing disturbance is necessary to provide adequate facility space, coal storage area, sediment control and refuse area.

Surface erosion of the topsoil stockpile areas is controlled by vegetation and roughening to reduce runoff.

The reclamation plan discussed under Section 340 will provide details on revegetation at this site.

322. N/A - This is a surface operation only.

333. Expected Impacts of Mining Operations on Fish and Wildlife

The wildlife species that do occur on the site consist mainly of small mammals and some songbirds. These species appear to be capable of existing on the site in spite of on-going mining operations unlike larger mammals and raptors. Therefore, little if any impact to wildlife is expected on the Savage Coal Terminal site.

Mitigation and Management Plans

Even though the Savage Coal Terminal site provides minimal habitat for wildlife, every effort is being made to temporarily reclaim areas the have been disturbed but are no longer needed for operations at the site. In this manner, the company is capable of restoring the limited habitat that does exist for small mammals and songbirds.

The company also has made the employees aware that harassment or hunting of wildlife on the site is not permitted. Sensitive periods (e.g. nesting seasons, snake dens, etc.) have also been discussed with company personnel.

The long-term management plan for the Savage Coal Terminal site is to continue the above mitigation measures throughout the life of operations. Upon cessation of operations, the company will direct its efforts towards reclaiming the site compatible with the post-mining land use which is small mammal and songbird habitat.

333.100. See Sections 322 and 333.

333.200. See Sections 322 and 333.

333.300. See Sections 322 and 333.

340. Reclamation Plan.

Complete reclamation plans for the Savage Coal Terminal are presented in Section 540 of this permit application. (Sections 341. through 342.400 are addressed in that section.)

341. Revegetation.

See Section 540.

342. Fish and Wildlife.

See Section 540.

350. Performance Standards

351. General Requirements.

All coal mining and reclamation operations will be carried out according to plans provided under R645-301-330 through R645-301-340.

352. Contemporaneous Reclamation.

As previously discussed, the vast majority of presently disturbed areas at Savage Coal Terminal are necessary to maintain adequate space for facilities, coal stockpiles, sediment controls and refuse areas. Disturbed areas that are no longer necessary have been, and will continue to be, reclaimed and/or reseeded with an approved temporary seed mix. (See Section 540).

353. Revegetaion: General Requirements.

Revegetation is discussed in detail under Section 540.

354. Revegetation: Timing.

See Section 540.

355. Revegetation: Mulching and Other Soil Stabilizing Practices.

See Section 540.

356. Revegetation: Standards for Success.

See Section 540.

357. Revegetation: Extended Responsibility Period.

See Section 540.

358. Protection of Fish, Wildlife, and Related Environmental Values.

Protection of Fish, Wildlife and Related Environmental Values is discussed under Section 333 of this permit.

TABLE 3-1
AREAL EXTENT OF VEGETATION AND DISTURBED AREAS

Area	Acres	Percent
Salt Desert		
Shadscale Phase	7.8	5.1%
Greasewood Phase	0.0*	0.0%
Matbush Phase	0.3	0.2%
Saltgrass Phase	0.2	0.1%
Sub-Total	8.3	5.4%
Abandoned Agricultural and Grazing Land	13.2*	8.6%
Industrial, Refuse and Processing Areas	132.5	86.0%
Totals	154.5	100.0%

* Disturbed in 2002/2006.

TABLE 3-2
SUMMARY OF COVER AND FREQUENCY DATA IN THE SHADSCALE COMMUNITY

Species	% Frequency	% Cover
Grasses		
Hilaria jamesii	23.6	1.9
Oryzopis hymenoides	8.8	0.4
Sitanion hystrix	8.8	0.4
Sporobolus airodes	5.2	0.4
Total % Grasses		
Shrubs		
Atriplex cuneata	4.8	1.5
Atriplex confertifolia	19.2	5.2
Atriplex corrugata	2.4	0.3
Atriplex graciliflora[b]	0.4	0.2
Chrysothamnus nauseosus	16.8	4.8
Ceratoides lanata	1.2	0.2
Gutierrezia sarothrae	3.6	0.3
Sarcobatus vermiculatus	2.0	0.5
Eriogonum umbellatum	0.8	0.1
Leptodacactylon pungens	5.6	0.4
Unknown shrub 3	0.4	0.1
Total % Shrubs		13.4[a]
Forbs		
Chenopodium sp.	0.4	0.4
Descurainia pinnata	1.2	0.1
Eriogonum inflatum	0.4	0.1

Species	% Frequency	% Cover
Iva axillaris	16.4	0.7
Oenothera caespitosa	0.8	0.1
Penstemon sp.	0.8	0.1
Phlox hoodii	2.0	0.1
Sphaeralcea sp.	5.6	0.3
Unknown Compositae	10.8	0.3
Unknown forb 1	0.8	0.1
Unknown forb 2	0.4	0.2
Unknown forb 3	1.6	0.1
Total % forbs		2.3[a]
Total % Vegetation		18.8[a]

[a] Based on individual transect summaries.
[b] Probable herb included under shrub designation.

TABLE 3-2A SHADSCALE AFFECTED TRANSECT 1		
	% Frequency	% Cover
Grasses		
Hilaria jamesii	46	3.2
Oryzopsis hymenoides	10	0.3
Sitanion hystrix	12	0.3
Total % Grasses		
Shrubs		
Atriplex confertifolia	28	7.1
Atriplex corrugata	4	0.2
Atriplex cuneata	22	6.7
Atriplex graciliflora[a]	2	1.0
Eriogonum umbellatum	4	0.2
Ceratoides lunata	4	1.0
Gutierrezia sarthrae	6	0.4
Leptadactylon pungens	10	0.7
Total % Shrubs		
Forbs		
Chenopodium sp.	2	1.3
Phlox hoodii	4	0.1
Sphaeralcea sp.	10	0.6
Unknown Compositae	30	0.6
Unknown forb 1	2	0.1
Total % Forbs		2.6
Total % Vegetation		23.7

[a] Probable herb included under shrub designation.

TABLE 3-28 SHADSCALE AFFECTED TRANSECT 2		
	% Frequency	% Cover
Grasses		
Hilaria jamesii	48	4.7
Oryzopsis hymenoides	14	0.6
Sitanion hystrix	8	0.2
Total % Grasses		5.5
Shrubs		
Atriplex confertifolia	36	14.0
Atriplex cuneata	2	0.7
Ceratoides lunata	2	0.1
Leptadactylon pungens	18	0.2
Unknown shrub 3	2	
Total % Shrubs		16.9
Forbs		
Oenothera caespitosa	4	0.4
Penstemon sp.	4	0.1
Phlox hoodi	6	0.2
Sphaeralcea sp.	2	0.1
Unknown Compositae	24	1.1
Unknown forb 1	2	0.1
Unknown forb 2	2	0.9
Total % Forbs		2.8[a]
Total % Vegetation		25.2

[a] Added 0.1 to Total % Forbs since column contained two less than 0.1 figures.

TABLE 4-2C
SHADSCALE AFFECTED TRANSECT 2

	% Frequency	% Cover
Grasses		
Hilaria jamesii	2	0.3
Sitanion hystrix	4	0.1
Sporobolus airoides	2	0.1
Total % Grasses		0.4
Shrubs		
Atriplex confertifolia	2	0.5
Chrysothanmus nauseosus	34	14.3
Sarcobatus vermiculatus	2	0.7
Total % Shrubs		15.5
Forbs		
Chenopodium sp.	2	0.1
Descurainia pinnata	6	0.1
Iva axillaris	36	1.0
Sphaeralcea sp.	2	0.1
Total % Forbs		1.2
Total % Vegetation		17.2[a]

[a] Added 0.1 to Total % Vegetation since column contained two less than 0.1 figures.

TABLE 3.20 SHADSCALE AFFECTED TRANSECT		
	% Frequency	% Cover
Grasses		
Hilaria jamesii	22	1.2
Oryzopsis hymenoides	10	0.5
Sitanion hystrix	4	0.3
Sporobolus airoides	22	1.8
Total % Grasses		3.8
Shrubs		
Atriplex confertifolia	20	2.3
Atriplex corrugata	2	0.1
Chrysothamnus nauseosus	10	1.2
Gutierrezia sarothrai	2	0.1
Sarcobatus vermiculatus	8	1.9
Total % Shrubs		5.6
Forbs		
Chenopodium sp.	8	0.5
Iva axillaris	38	2.3
Unknown forb 3	8	0.3
Total % Forbs		3.1
Total % Vegetation		12.5

TABLE 3-2E SHADSCALE AFFECTED TRANSECT 6		
	% Frequency	% Cover
Grasses		
Oryzopsis hymenoides	10	0.7
Sitanion hystrix	16	1.2
Sporobolus airoides	2	0.1
Total % Grasses		1.9
Shrubs		
Atriplex confertifolia	10	2.0
Atriplex corrugata	6	1.1
Chrysothamnus nauseosus	40	8.3
Gutierrezia sarothrae	2	0.5
Total % Shrubs		11.9
Forbs		
Chenopodium sp.	2	0.1
Eriogonum inflatum	2	0.5
Iva axillaris	8	0.1
Sphaeralcea sp.	14	0.8
Total % Forbs		1.4
Total % Vegetation		15.3[a]

[a] Added 0.1 to Total % Vegetation since column contained two less than 0.1 figures.

TABLE 3-3
PRODUCTION DATA (G/M^2), AFFECTED AREA - SHADSCALE, COMMUNITY

Grasses													
Hilaria jamesii		38.4	4.4	3.6	20.8		44.8	6.0					
Oryzopsis hymneoides	3.2									62.4			
Sitanion hystrix							1.2		20.4	6.0	5.6		
Sporobolus airoides													
Total Grass Production	3.2	38.4	4.4	3.6	20.8		46.0	6.0	20.4	68.4	5.6		
Shrubs													
Atriplex confertifolia	71.6		11.2	58.4	84.0		131.6				725.6	39.6	
Atriplex corrugata													
Atriplex graciliflora													
Chrysothamnus nauseosus						284.8				77.2			
Eriogonum umbellatum										5.6			
Ceratoides lunata					32.8								
Gutierrezia sarothrae								39.2				149.2	
Leptodactylon pungens	34.4												
Sarcobatus vermiculatus													
Tetradymia spinosa													
Unknown Compositae													
Total Shrub Production	106.0		11.2	58.4	116.8	284.8	131.6	39.2		82.8	725.6	188.8	

TABLE 3-3
PRODUCTION DATA (G/M^2), AFFECTED AREA - SHADSCALE, COMMUNITY

Forbs													
Aster leucelene													
Eriogonum inflatum	13.2								16.8				11.2
Iva axillaris													
Penstemon sp.													
Phlox hoodii													
Sphaeralcea sp.													
Total Forb Production	13.2								16.8				11.2
Total Production	122.4	38.4	15.6	62.0	137.6	284.8	45.2	151.1	37.2	151.1	731.2	188.8	11.2

TABLE 3-3A
PRODUCTION DATA (G/M^2), AFFECTED AREA - SHADSCALE, COMMUNITY

Grasses													
Hilaria jamesii	2.3		4.6		166.8								
Oryzopsis hymneoides													
Sitanion hystrix										6.4		2.0	
Sporobolus airoides									67.7	360.4			
Total Grass Production	2.3		4.6		166.8				67.7	366.8		2.0	
Shrubs													
Atriplex confertifolia	3.6	25.6	2.4	25.6									42.0
Atriplex corrugata												292.4	
Atriplex graciliflora													
Chrysothamnus nauseosus				206.0				152.0					
Eriogonum umbellatum						26.0							
Ceratoides lunata													
Gutierrezia sarothrae												91.6	
Leptodactylon pungens													
Sarcobatus vermiculatus											703.2		
Tetradymia spinosa													
Unknown Compositae													
Total Shrub Production	3.6	25.6	2.4	231.6		26.0		152.0			703.2	384.0	42.0

TABLE 3-3A
PRODUCTION DATA (G/M^2), AFFECTED AREA - SHADSCALE, COMMUNITY

Forbs													
Aster leucelene													
Eriogonum inflatum													
Iva axillaris								6.0		5.2			
Penstemon sp.													
Phlox hoodii													17.2
Sphaeralcea sp.							31.2			4.4		8.4	
Total Forb Production							31.2	6.0		9.6		8.4	17.2
Total Production	5.9	25.6	7.0	231.6	166.8	26.0	31.2	158.0	67.6	376.4	703.2	394.4	59.2

TABLE 3-3B
PRODUCTION DATA (G/M^2), AFFECTED AREA - SHADSCALE, COMMUNITY

Grasses													
Hilaria jamesii	7.2		0.4	4.0	2.4			8.4	2.8	7.6		10.0	21.6
Oryzopsis hymneoides											13.6		
Sitanion hystrix													
Sporobolus airoides													
Total Grass Production	7.2		0.4	4.0	2.4			8.4	2.8	7.6	13.6	10.0	21.6
Shrubs													
Atriplex confertifolia							4.8						
Atriplex corrugata													
Atriplex graciliflora													
Chrysothamnus nauseosus						231.2							
Eriogonum umbellatum													
Ceratoides lunata											115.6		
Gutierrezia sarothrae													
Leptodactylon pungens													
Sarcobatus vermiculatus	388.8												
Tetradymia spinosa													
Unknown Compositae													
Total Shrub Production	388.8					231.2	4.8				115.6		

TABLE 3-3B
PRODUCTION DATA (G/M^2), AFFECTED AREA - SHADSCALE, COMMUNITY

Forbs													
Aster leucelene													
Eriogonum inflatum													
Iva axillaris													
Penstemon sp.													
Phlox hoodii			10.0	0.8	2.4					30.4	0.8		
Sphaeralcea sp.												3.5	
Total Forb Production			10.0	0.8	2.4					30.4	0.8	3.5	
Total Production	7.2	388.8	10.4	4.8	4.8	231.2	4.8	8.4	2.8	38.0	130.0	13.5	21.6

TABLE 3-3C
PRODUCTION DATA (G/M^2), AFFECTED AREA - SHADSCALE, COMMUNITY

Grasses													
Hilaria jamesii		4.8	11.6	18.8		9.2	29.2		27.6				
Oryzopsis hymneoides													
Sitanion hystrix						0.4							
Sporobolus airoides													
Total Grass Production		4.8	11.6	18.8		9.6	29.2		27.6				
Shrubs													
Atriplex confertifolia	198.4					127.2				259.2	115.2		
Atriplex corrugata													
Atriplex graciliflora			30.4										
Chrysothamnus nauseosus													
Eriogonum umbellatum													
Ceratoides lunata		3.2	15.6										
Gutierrezia sarothrae					52.8								
Leptodactylon pungens													
Sarcobatus vermiculatus								368.8					26.4
Tetradymia spinosa													
Unknown Compositae						8.4							
Total Shrub Production	198.4	3.2	46.0		52.8	135.6		368.8		259.2	115.2		26.4

TABLE 3-3C
PRODUCTION DATA (G/M^2), AFFECTED AREA - SHADSCALE, COMMUNITY

Forbs													
Aster leucelene		4.0											
Eriogonum inflatum													
Iva axillaris													
Penstemon sp.							0.4						
Phlox hoodii													
Sphaeralcea sp.												8.8	
Total Forb Production		4.0					0.4					8.8	
Total Production	198.4	12.0	57.6	18.8	52.8	145.2	29.6	368.8	27.6	259.2	115.2	8.8	26.4

TABLE 3-3D
PRODUCTION DATA (G/M^2), AFFECTED AREA - SHADSCALE, COMMUNITY

Grasses														
Hilaria jamesii	3.2				30.8	22.4	2.8		23.2		2.0		20.4	8.6
Oryzopsis hymneoides		16.4	7.2				2.8							1.6
Sitanion hystrix														0.6
Sporobolus airoides														6.6
Total Grass Production	3.2	16.4	7.2		30.8	22.4	5.6		23.2		2.0		20.4	17.4
Shrubs														
Atriplex confertifolia1	94.8		12.8	35.2	127.6	63.2		81.6		6.8				36.1
Atriplex corrugata														4.5
Atriplex graciliflora														0.5
Chrysothamnus nauseosus														14.6
Eriogonum umbellatum														
Ceratoides lunata											104.8		95.6	5.7
Gutierrezia sarothrae														5.1
Leptodactylon pungens														0.5
Sarcobatus vermiculatus														22.5
Tetradymia spinosa														0.4
Unknown Compositae	1.6				0.4							6.8	0.4	0.3
Total Shrub Production	96.4		12.8	35.2	128.0	63.2		81.6		6.8	104.8	6.8	96.0	90.7

TABLE 3-3D
PRODUCTION DATA (G/M^2), AFFECTED AREA - SHADSCALE, COMMUNITY

Forbs														
Aster leucelene														0.1
Eriogonum inflatum														0.2
Iva axillaris														0.6
Penstemon sp.	2.8											1.6		0.1
Phlox hoodii														0.9
Sphaeralcea sp.					0.8									0.8
Total Forb Production	2.8				0.8							1.6		2.8
Total Production	102.4	16.4	20.0	35.2	159.6	85.6	81.6	23.2	6.8	106.8	8.4	106.8	116.4	110.9

TABLE 3-4
SAMPLE ADEQUACY: SHADSCALE COMMUNITY AFFECTED AND REFERENCE AREAS

	Production (g/m²)					Cover (%)				
	(z,d)[1]	x	S.D.	N	^{n}min	(t,d,)[2]	x	S.D.	n	^{n}min
Affected	(0.84, 0.2)	110.9	150.4	65	65	(1.282, 0.1)	18.8	5.51	5	15
Reference	(0.84, 0.2)	85.8	76.7	35	28	(1.282, 0.1)	17.5	3.18	2	6

n = number of quadrants (production) or transects (cover) sampled

x = mean value

d = amount of difference desired to detect

z = value of the z-statistics

t = value of the t-statistics

[1] Sample adequacy equation and specific values derived from Wyoming DEQ guideline 2 (March 1979).
[2] Sample adequacy and specific values derived from Utah DOGM guideline for vegetation.

TABLE 3-5
PLANTS OBSERVED AT SAVAGE COAL TERMINAL

Family	Scientific Name	Common Name	Growth Form
Chenopodiaceae	Chenopodium sp.[2]	Lambsquarter	herb
	Atriplex gardneri[1]	Gardner's Saltbush	shrub
	Atriplex confertifolia [1,2]	Shadscale	shrub
	Atriplex corrugata [1,2]	Matbush	shrub
	Atriplex cuneata [1,2]	Saltbush	shrub
	Atriplex graciliflora [1,2]	-	herb
	Atriplex powellii	-	herb
	Ceratoides lanata [1,2]	Winterfat	shrub
	Halogeton glomeratus [1]	Halogeton	herb
	Kochia americana [1]	Burning Bush	herb
	Kochia scoparia	Summer Cypress	herb
	Salsola Kali	Russian Thistle	herb
	Sarcobatus vermiculatus [2]	Greasewood	shrub
	Grindelia sp.	Gumweed	shrub
Compositae	Chrysothamnus viscidiflorus [1]	Rabbitbush	shrub
	Artemisia spinescens [1]	Bud Sagewood	shrub
	Chrysothamnus nauseosus [1,2]	Rabbitbush	shrub
	Gutierrezia sarothrae [1,2]	Snakeweed	shrub
	Helianthus annuus [1]	Sunflower	herb
	Iva Axillaris	Poverty Sumpweed	herb
	Tetradymia spinosa [1]	Spiny Horsebrush	shrub
Convolvulaceae	Convolulus arvensis	Field Bindweed	herb
Cruciferae	Descurainia pinnata [2]	Tansy Mustard	herb
Cyperaceae	Scirpus maritimus	Bulrush	grass-like
Gramineae	Agropyron trachyculum	Slender Wheatgrass	grass
	Distichlis stricta	Inland Saltgrass	grass
	Hilaria jamesii [1,2]	Galleta	grass
	Hordeum jubatum	Foxtail Barley	grass

TABLE 3-5
PLANTS OBSERVED AT SAVAGE COAL TERMINAL

Family	Scientific Name	Common Name	Growth Form
	Oryzopsis hymenoides [1,2]	Indian Ricegrass	grass
	Polypogon monspeliensis	Rabbitfoot	grass
	Puccinellia airoides	Alkali Grass	grass
	Sitanion hystrix [1,2]	Squirrel-tail	grass
	Sporobolus airoides [1]	Alkali Sacaton	grass
Juncaginaceae	Triglochin maritimum	Arrowgrass	grass-like
Leguminosae	Medicago sativa	Alfalfa	herb
	Melilotus alba	White Sweet Clover	herb
	Melilotus officinalis	Yellow Sweet Clover	herb
Liliaceae	Asparagus officinalis	Asparagus	herb
Malvaceae	Sphaeralcea sp. [1,2]	Globemallow	herb
Onagraceae	Oenothera caespitosa [1,2]	Stemless Evening Primrose	herb
Polemoniaceae	Leptodactylon pungens [1,2]	Granite gilia	herb
	Phlox hoodii [1,2]	Phlox	herb
	Eriogonum bicolor	-	shrub
	Eriogonum gordonii	-	herb
	Eriogonum inflatum [1,2]	Desert Trumpet	herb
	Eriogonum umbellatum [2]	-	shrub
Salicaceae	Salixi sp.	Willow	shrub
Scrophulariaceae	Penstemon sp. [1,2]	Beardstongue	herb
Tamaricaceae	Tamarix pentandra	Tamarisk	shrub
Ulmaceae	Ulmus pumila	Siberian Elm	tree

Total Observed	
tree	45
shrub	1
herb	32

[1] Observed or sampled within reference area.
[2] Sampled within affected area.

TABLE 3-6
SUMMARY OF FREQUENCY AND COVER DATA, REFERENCE AREA, SHADSCALE COMMUNITY

	% Frequency	% Cover
Grasses		
Hilaria jamesii	44.0	4.1
Oryzopsis hymenoides	29.0	2.2
Sitanion hystrix	4.0	0.1
Total % Grasses		6.4 [a]
Shrubs		
Atriplex confertifolia	28.0	6.4
Atriplex corrugata	7.0	1.3
Atriplex graciliflora [b]	1.0	0.2
Ceratoides lanata	10.0	1.5
Gutierrezia sarothrae	-	-
Chrysothamnus nauseosus	2.0	0.1
Unknown Composite shrub	10.0	1.0
Tetradymia spinosa	5.0	0.8
Grindelia sp.	1.0	-
Total % Shrubs		11.1 [a]
Forbs		
Penstemon sp.	3.0	0.1
Sphaeralcea sp.	1.0	-
Total % Forbs		0.1 [a]
Total % Vegetation		17.6 [a]

[a] Based on individual transect summaries.
[b] Probable herb included under shrub designation.

TABLE 3-6A
SHADSCALE REFERENCE TRANSECT 1

	% Frequency	% Cover
Grasses		
Hilaria jamesii	46	3.7
Oryzopsis hymenoides	34	3.2
Sitanion hystrix	4	0.1
Total % Grasses		7.0
Shrubs		
Atriplex confertifolia	20	3.5
Atriplex corrugata	8	1.1
Atriplex graciliflora	-	-
Ceratoides lanata	12	2.5
Gutierrezia sarothrae	2	0.1
Chrysothamnus nauseosus	4	0.2
Unknown Composite shrub	6	0.8
Tetradymia spinosa	2	0.1
Total % Shrubs		8.2
Forbs		
Penstemon sp.	4	0.1
Total % Forbs		0.1
Total % Vegetation		15.3

TABLE 3-6B
SHADSCALE REFERENCE TRANSECT 2

	% Frequency	% Cover
Grasses		
Hilaria jamesii	42	4.5
Oryzopsis hymenoides	24	1.1
Sitanion hystrix	4	0.1
Total % Grasses		5.7
Shrubs		
Atriplex confertifolia	36	9.2
Atriplex corrugata	6	1.4
Atriplex graciliflora	2	0.3
Ceratoides lanata	8	0.4
Tetradymia spinosa	8	1.6
Grindelia sp.	2	0.1
Unknown Composite Shrub	14	1.1
Total % Shrubs		14.0
Forbs		
Sphaeralcea coccinea	2	0.1
Penstemon sp.	2	0.1
Total % Forbs		0.1 [a]
Total % Vegetation		19.8

[a] Added 0.1 to Total % Forbes since column contained two less than 0.1 figures.

TABLE 3-7
PRODUCTION DATA (G/M^2), AFFECTED AREA, SHADSCALE COMMUNITY

Grasses													
Hilaria jamesii	18.0		28.4	13.6		14.8	47.2		35.6			15.6	50.8
Oryzopsis hymenoides						29.2		0.4		3.2	1.2		
Sitanion hystrix											1.2		
Total Grass Production	18.0		28.4	13.6		44.0	47.2	0.4	35.6	3.2	2.4	15.6	50.8
Shrubs													
Atriplex confertifolia						232.4		69.6		17.6	26.8	134.8	
Atriplex corrugata							17.6	9.6					
Tetradymia spinosa													
Unknown Composite Shrub													
Unknown shrub											4.0		
Total Shrub Production						232.4	17.6	79.2		17.6	30.8	134.8	6.8
Forbs													
Oenothera caespitose		21.6											
Penstemon sp.	1.6		0.8								5.6		
Phlox hoodii													
Sphaeralcea sp.					3.6						5.2		
Total Forb Production	1.6	21.6	0.8		3.6						10.8		
Total Production	19.6	21.6	29.2	13.6	3.6	276.4	64.8	79.6	35.6	20.8	44.0	150.4	57.6

TABLE 3-7 (Continued)
PRODUCTION DATA (G/M^2), AFFECTED AREA, SHADSCALE COMMUNITY

Grasses													
Hilaria jamesii			27.2		36.8	63.2				43.2	24.4	48.4	17.2
Oryzopsis hymenoides	81.2	4.4		8.4			7.6	2.0	35.6				
Sitanion hystrix													7.2
Total Grass Production	81.2	4.4	27.2	8.4	36.8	63.2	7.6	2.0	35.6	43.2	24.4	48.4	24.4
Shrubs													
Atriplex confertifolia	64.4	11.6	106.0	65.6	82.8		190.0		6.0		0.8		289.2
Atriplex corrugata													
Tetradymia spinosa													
Unknown Composite Shrub	6.8					23.6						0.4	
Unknown shrub									68.0				
Total Shrub Production	71.2	11.6	106.0	65.6	82.8	23.6	190.0		74.0		0.8	0.4	289.2
Forbs													
Oenothera caespitose													
Penstemon sp.					2.8								
Phlox hoodii						12.8							
Sphaeralcea sp.													
Total Forb Production					2.8	12.8							
Total Production	152.4	16.0	133.2	74.0	122.4	99.6	197.6	2.0	109.6	43.2	25.2	48.8	313.6

TABLE 3-7 (Continued)
PRODUCTION DATA (G/M^2), AFFECTED AREA, SHADSCALE COMMUNITY

Grasses										
Hilaria jamesii	6.4		0.8			39.2		29.2		16.0
Oryzopsis hymenoides							57.2			6.6
Sitanion hystrix		0.4								0.2
Total Grass Production	6.4	0.4	0.8			39.2	57.2	29.2		22.8
Shrubs										
Atriplex confertifolia	19.2	161.2		39.2	38.0		21.6		206.4	50.9
Atriplex corrugata					12.0	17.6				0.8
Tetradymia spinosa					26.0			86.0		4.0
Unknown Composite Shrub				82.8	4.8					3.2
Unknown shrub										2.2
Total Shrub Production	19.2	161.2		122.0	80.8	17.6	21.6	86.0	206.4	61.4
Forbs										
Oenothera caespitose										0.6
Penstemon sp.										0.3
Phlox hoodii										0.4
Sphaeralcea sp.										0.2
Total Forb Production										1.5
Total Production	25.6	161.6	0.8	122.0	80.8	56.8	78.8	115.2	206.4	85.8

TABLE 3-8
REFERENCE AREA
FREQUENCY AND DENSITY SUMMARIES FOR SHRUB SPECIES

Species	Height Class	Frequency (%)	Density (No. per hectare)	
Artemisia Spinosa	Total	50.0		625
	I		125	
	II		500	
Atriplex Confertifolia	Total	100.0		10,828
	I		7,563	
	II		3,266	
Atriplex Gardneri	Total	25.0		156
	I		156	
Ceratoides Lanata	Total	81.3		3,063
	I		391	
	II		2,672	
Chrysothamnus Nauseosus	Total	43.6		156
	I		141	
	II		16	
Chrysothamnus Viscidiflorus	Total	18.8		219
	I		47	
	II		172	
Tetradymia Spinosa	Total	68.8		469
	I		31	
	II		438	
Total				15,516 +/- 3,513

Based on data from 16 2m x 20m line-strip transects. (1982 data)

TABLE 3-9
EVALUATION OF SHRUB DENSITY SAMPLE ADEQUACY FOR THE REFERENCE AREA

	Sample Size	Mean +/- Standard Deviation	Degrees of Freedom (n-1)	Alpha	Value of t (two-tailed)	Computed Adequate Sample Size (Tabs)
Shrub Density (No. Ind./ha)	16	15,516 +/- 3,513	15	0.2	1.341	10

[a] Based on Utah DOGM guideline formula for adequate samples.

TABLE 3-10
AFFECTED AREA, FREQUENCY AND DENSITY SUMMARIES FOR SHRUB SPECIES.

Species	Height Class*	Frequency (%)	Density - STD (No. per hectare)	
Artemisia Spinosa	Total	27.8		417
	I		306	
	II		111	
Atriplex Confertifolia	Total	94.4		4,806
	I		3,056	
	II		1,750	
Atriplex Gardneri	Total	44.4		1,598
	I		1,528	
	II		70	
Atriplex Cuneata	Total	5.6		14
	I		14	
	II		0	
Ceratoides Lanata	Total	72.2		736
	I		514	
	II		222	
Chrysothamnus Nauseosus	Total	61.1		820
	I		542	
	II		273	
Chrysothamnus Viscidiflorus	Total	94.4		5,403
	I		3,820	
	II		1,583	
Sarcobatus Vermiculatus	Total	5.6		14
	I		0	
	II		14	
Tetradymia Spinosa	Total	33.3		181
	I		56	
	II		125	

TABLE 3-11
EVALUATION OF SHRUB DENSITY SAMPLE ADEQUACY FOR THE AFFECTED AREA

	Sample Size	Mean +/- Standard Deviation	Degrees of Freedom (n-1)	Alpha (α)	Value of t (two-tailed)	Computed Adequate Sample Size (Nadeq)
Shrub Density (No. Ind./ha)	18	13,986 +/- 4,485	17	0.2	1.282	17

Based on data from 18 2m x 20m line-strip transects. (1983 data).

TABLE 3-12
POTENTIAL VERTEBRATE WILDLIFE

Family Cyprinidae Carp (Cyprinus carpio)	C-P		Lakes-littoral areas; quiet water areas in rivers, ponds, sloughs, creeks, and irrigation ditches.
Family Ambystomatidae Tiger Salamander (Ambystoma tigrinum)	C-P	Unknown	Quiet water of ponds, reservoirs, lakes, temporary rain pools and streams from arid sagebrush plains to rolling grasslands, mountain meadows and forests.
Family Pelobatidae Great Basin Spadefoot Toad (Scaphiopus intermontanus)	C-N	Unknown	Sagebrush flats, pinion-juniper woodlands to high elevations in spruce-fir communities.
Family Bufonidae Woodhouse's Toad (Bufo woodhouse)	C-N	Unknown	Grassland, sagebrush flats, woods, desert streams, valleys, flood plains, farms, and city backyards.
Great Plains Toad	C-N	Unknown	Prairies, deserts, quiet water of streams, grasslands, and sagebrush plains.
Family Iguanidae Collared Lizard (Crotaphytus collaris)	C-N	Unknown	Arid and semi-arid plains with bunchgrass, sagebrush or other low desert shrub communities; avoids dense vegetation.
Desert Spiny Lizard (Sceloporus magister)	C-N	Unknown	Shadscale deserts, pinion-juniper woodland, willows and cottonwoods.
Sagebrush Lizard	C-N	Unknown	Variety of habitat types; sagebrush, pinion-juniper, low desert shrub and rocklands.
Side-blotched Lizard (Uta stansburiana)	C-N	Unknown	Inhabits a variety of habitat types, sandy washes with scattered rocks ad low growing sagebrush.

TABLE 3-12
POTENTIAL VERTEBRATE WILDLIFE

Short-horned Lizard (Phrynosoma douglassi)	C-N	Unknown	Desert grassland, sagebrush, pinion-juniper, pine-spruce and spruce-fir associations, extending from desert shrub to mountain habitats.
Family Teiidae Western Whiptail (Cnemidophorus velox)	C-N	Unknown	Desert shrub communities where plants are sparse and there are open areas for running.
Family Colubridae Striped Whipsnake (Masticophis taeniatus)	C-N	Unknown	Brushlands, grasslands, sagebrush flats, pinion-juniper woodlands and open pine forests.
Night Snake (Hypsiglena torquata)	C-N	Unknown	Plains, sagebrush flats, desert and woodlands; often found under rocks and surface litter.
Order Ciconiiformes Family Ardeidae Great Blue Heron (Ardea herodias)	C-P resident	STABLE	Marshes, shallow reservations, rivers, streams, shores and irrigation ditches.
Order Falconiformes Family Cathartidae Turkey Vulture (Cathartes aura)	C-P summer resident	STABLE	Usually seen in sky or perched on dead trees, posts, carrion or on ground.
Family Accipitridae Red-tailed Hawk (Buteo jamaicensis)	U-P summer resident	STABLE	Open country, woodlands, mountains and deserts.
Swainson's Hawk (Buteo swainsoni)	U-P summer resident	STABLE	Dry plains and rangeland with hills; open forest or alpine meadows with sparse trees.

TABLE 3-12
POTENTIAL VERTEBRATE WILDLIFE

Rough-legged Hawk (Buteo lagopus)	C-P winter resident	STABLE	Open country, woodlands, deserts and marshes.
Ferruginous Hawk (Buteo regalis)	U-P summer resident	STABLE	Open desert; infrequently marshes and farmlands are utilized.
Golden Eagle (Aquila chrysaetos)	C-P resident	STABLE	Open mountains, foothills, canyons and desert.
Marsh Hawk (Circus cyaneus)	C-P resident	STABLE	Marshes, fields and prairies.
Family Falconidae Prairie Falcon (Falco mexicanus)	C-P resident	STABLE	Canyons, open habitat in mountains, plains and deserts.
Peregrine Falcon (Falco peregrinus)	E-P resident	Unknown	Canyons, high cliffs, rivers, marshlands and deserts.
American Kestrel (Falco sparverius)	C-P summer resident	STABLE	Open country, prairies, deserts, wooded streams, farmland and cities.
Order Gallifonmes Family Phasianidae Ring-necked Pheasant (Phasianus colchicus)	C-P resident	Decreasing	Irrigated cropland, pastureland, wetlands and desert washes.
Order Charadriiformes Family Charadriidae Snowy Plover (Charadrius alexandrinus)	U-P transient	STABLE	Alkali and sand flats.

TABLE 3-12
POTENTIAL VERTEBRATE WILDLIFE

Killdeer (Charadrius vociferus)	C-P summer resident and transient	STABLE	Fields and pastures, lawns, riverbanks, irrigated land, shores, plowed fields, alkali flats and gravel roads.
Family Scolopacidae Least Sandpipe (Calidris minutilla)	C-P transient	STABLE	Grassy marshes, rain pools, shores and alkali mudflats.
Order Columbiformes Family Columbidae Mourning Dove (Zenaida macroura)	C-P summer resident and transient	STABLE	Farmlands, towns, open woods, grassland deserts.
Order Strigiformes Family Strigidae Screech Owl (Otus asio)	U-P resident	STABLE	Riparian communities and wooded canyons.
Great Horned Owl (Bubo viginianus)	C-P resident	STABLE	Ubiquitous
Burrowing Owl (Speotyto cunicularia)	L-P resident	Declining	Open grassland, prairies, dikes, desert, farms and prairie dog colonies.
Short Eared Owl (Asio flammeus)	C-P resident	STABLE	Marshes, prairies, irrigated land and open country with short vegetation.
Order Caprimulgiformes Family Caprimulgidae Poor-will (Phalaenoptilus nuttallii)	C-P summer resident	STABLE	Arid uplands with open pinion-juniper and sparse brush; riparian areas.

TABLE 3-12
POTENTIAL VERTEBRATE WILDLIFE

Family Corvidae Black-billed Magpie (Pica pica)	C-P resident	Unknown	Foothills, ranches, sagebrush, river thickets, shelterbelts and prairie brush.
Common Raven (Corvus corax)	C-P resident	Unknown	Mountains, deserts, canyons and cliffs.
Common Crow (Corvus corax)	C-P resident	Unknown	Deciduous, mixed and open coniferous woodlands, farmlands and river grove.
Pinion Jay (Gymnorhinus cyanocephala)	C-P resident	Unknown	Pinion-juniper woodlands, but ranges into sagebrush.
Family Troglodytidae Rock Wren (Salpinctes obsoletus)	C-P resident	Unknown	Desert to high mountain areas with talus slopes and cliffs.
Family Mimidae Mockingbird (Mimus polyglottos)	U-P transient and summer resident	Unknown	Towns, farms, ranches, roadsides, brush and desert streamsides.
Bendire's Thrasher (Toxostoma bendirei)	R-P resident	Unknown	Desert scrub and farmlands.
Sage Thrasher (Oreoscoptes montanus)	C-P	Unknown	Sagebrush, rabbitbrush, brushy slopes and mesas.
Order Apodiformes Family Trochilidae Broad-tailed Hummingbird (Selasphorus platycercus)	C-P	Unknown	Ubiquitous

TABLE 3-12
POTENTIAL VERTEBRATE WILDLIFE

Order Passeriformes Family Tyrannidae Eastern Kingbird (Tyrannus tyrannus)	C-P summer resident	Unknown	Wood edges, parklands, riparian areas, farms, shelter birds, orchards and roadsides.
Ash-throated Flycatcher (Myriarchus cinerascens)	C-P summer resident	STABLE	Semi-arid country, deserts, brush, pinion-juniper and open woods.
Says Phoebe (Sayornis saya)	C-P resident	Unknown	Open arid country, deserts, bushy plains, prairie farms, canyon mouths and buttes.
Gray Flycatcher (Empidonax wrightii)	K-P summer resident	Unknown	Breeds in sagebrush and pinion-juniper woodlands.
Family Alaudidae Horned Lark (Eremophila alpestris)	C-P resident	Unknown	Plains, desert, prairies, fields, sparse sagebrush flats, dirt roads, shores, alpine meadows, alkali flats and areas of sparse vegetation.
Family Hirundinidae Cliff Swallow (Petrochedidon pyrrhonota)	C-P summer resident	Unknown	Open to semi-wooded country, neat farms, cliffs, canyons, rivers or lakes.
Family Laniidae Logger Shrike (Lanius ludovicianus)	C-P resident	Unknown	Deserts and other open country with lookout posts, wires, scattered trees and low scrub.
Family Sturnidae Starling (Sturnus vulgaris)	C-P resident	Unknown	Cities, fields, orchards and woodlands.
Family Ploceidae House Sparrow (Passer domesticus)	C-P resident	Unknown	Cities, farms and houses.

TABLE 3-12
POTENTIAL VERTEBRATE WILDLIFE

Family Icteridae Western Meadowlark (Sturnella neglecta)	C-P resident	Unknown	Open fields, meadows and plains.
Yellow-headed Blackbird (Xanthocephalus xanthocephalus)	C-P summer resident	Unknown	Marshes with cattail and bulrushes; forages in fields and open country.
Brewer's Blackbird (Euphagus cyanocephalus)	C-P resident	Unknown	Varied open country, lakeshores, irrigated pastures, feed lots, parks and cities.
Family Icteridae Common Grackie (Quiscalus quiscula)	A-P transient	Unknown	Farms, fields, streamsides and wet woodlands.
Brown-headed Cowbird (Molothrus ater)	C-P resident	Unknown	Farms, fields, barnyards wood edges riparian woodlands.
Family Emberizidae Black-headed Grosbeak (Pheucticus melanocephalus)	C-P summer resident	Unknown	Edges of second growth deciduous woods, pinion, riparian areas, orchards and parks.
Blue Grosbeak (Guiraca caerulea)	C-P summer resident	Unknown	Brushy and weedy places, willows and river thicket and other riparian areas.
Lapland Longspur (Calcarius lapponicus)	R-P winter resident	Unknown	Fields, grasslands, saline flats, desert shrub; often seen with horned larks.
Lark Bunting (Calamospiza melancorys)	O-P transient	Unknown	Plains, prairies, desert shrub and sagebrush.
Savannah Sparrow (Passercules sandwichensis)	C-P summer resident	Unknown	Grasslands, fields, saltgrass meadows and open country.

TABLE 3-12
POTENTIAL VERTEBRATE WILDLIFE

Vesper Sparrow (Pooecetes gramineus)	C-P summer resident	Unknown	Alfalfa and grain fields, meadows, sagebrush and desert shrub.
Family Emberizidae Lark Sparrow (Chondestes grammacus)	C-P summer resident	Unknown	Open country in sagebrush and desert shrub with available perch sites.
Sage Sparrow (Ammphispiza belli)	U-P summer resident	Unknown	Sagebrush, greasewood and other desert desert shrubs.
Dark-eyed Junco (Junco hyemalis	C-P resident	Unknown	In summer openings and edges of coniferous and mixed woodlands; in winter greasewood and undergrowth.
Tree Sparrow (Spizella arborea)	U-P winter resident	Unknown	Willow thickets and brushy areas.
Brewer's Sparrow	C-P summer resident	Unknown	Sagebrush, greasewood and other desert shrubs or brushy areas.
White-crowned Sparrow (Zonotrichia leucophrys)	C-P resident	Unknown	In summer forest edges and clearings, low brush and mountain thickets; in winter widespread in the valleys, along fence row willows, brushy areas, corn and greasewood.
Song Sparrow (Zonotrichia melodia)	C-P resident	Unknown	Woodland edges, grasslands, cattail marshes, thickets and brushy fence rows.
Black-throated Sparrow (Ammphispiza bilineata)	U-P summer resident	Unknown	Pinion-juniper, mountain brush and sagebrush.
Family Fringillidae House Finch (Carpodacus mexicanus)	C-P resident	Unknown	Varied habitats; towns, ranches, open woods, mountain scrub, canyons, deserts and riparian area.

TABLE 3-12
POTENTIAL VERTEBRATE WILDLIFE

American Goldfinch (Carduelis tristis)	C-P resident	Unknown	Riparian woodlands, willows, cottonwoods, orchards, roadsides, and sunflowers.
Order Insectivora Family Soricidae Merriam Shrew (Sorex merriami)	U-N	Unknown	Arid sagebrush or grassland areas, mountain mahogany, coniferous forests, aspen and cottonwoods.
Order Chiroptera Family Vespertilionidae Little Brown Myotis (Myotis lucifugus)	C-N	Unknown	Caves, mine tunnels, hollow trees or buildings usually near water.
Fringed Myotis (Myotis thysanodes)	U-N	Unknown	Caves, old buildings, rock crevices, pinion-juniper and desert shrub.
Yuma Myotis (Myotis yumanensis)	U-N	Unknown	Caves, tunnels, and buildings in arid areas.
California Myotis (Myotis californicus)	C-N	Unknown	Mine tunnels, hollow trees, loose rocks, buildings, bridges; chiefly a crevice dweller (up to 6,000 feet in elevation).
Small-footed Myotis (Myotis leibii)	U-N	Unknown	Caves, mine tunnels, crevices in rocks and in buildings.
Western Pipistrelle (Pipistrellus hesperus)	C-N	Unknown	Caves, under loose rocks, crevices, in cliffs, buildings; arid areas near water courses.
Western Big-eared Bat (Plecotus townsendii)	C-N	Unknown	Caves, mine tunnels and buildings utilized for roosting; inhabits arid western desert shrub, pinion-juniper and pine forests.

TABLE 3-12
POTENTIAL VERTEBRATE WILDLIFE

Order Lagomorpha Family Leporidae White-tailed Jackrabbit (Lepus townsendii)	C-N	STABLE	Open, grassy or sagebrush areas at medium elevation.
Black-tailed Jackrabbit (Lepus californicus)	C-N	STABLE	Open grassland, sagebrush and desert shrub areas at low to medium elevations.
Desert Cottontail (Sylvilagus audubonii)	C-P	STABLE	Open plains, foothills and low valleys with grass, sagebrush or scattered pinion-juniper.
Order Rodentia Family Sciuridae White-tailed Prairie Dog (Cynomys leucurus)	C-N	STABLE	Valleys and flatlands where vegetation is sparse.
Whitetail Antelope Squirrel (Ammosperhmophilus leucurus)	C-N	STABLE	Arid areas of low desert and foothills with sparse vegetation.
Least Chipmunk (Eutaniums minimus)	C-N	STABLE	Variety of habitat types including sagebrush, desert shrub, mountain bush, coniferous and mixed forest areas.
Family Geomyidae Ord Kangaroo Rat (Dipodomys ordii)	C-N	Unknown	Desert shrub, pinion-juniper and tamarisk communities; sandy soils preferred but found on hard soils.
Great Basin Pocket Mouse	C-N	Unknown	Sagebrush or greasewood and other desert (Perognathus parvus) shrub communities and pinion-juniper.
Family Cricetidae Western Harvest Mouse (Reithrodontomys megalotis)	C-N	Unknown	Grasslands, open desert, wetlands, irrigated farmland of dense vegetation near water.

TABLE 3-12
POTENTIAL VERTEBRATE WILDLIFE

Deer Mouse (Peromyscus maniculatus)	C-N	Unknown	All dry-land habitat and irrigated farmland within its range.
Brush Mouse (Peromyscus boylei)	C-N	Unknown	Brushy areas of arid and semi-arid regions; prefers rocky sites.
Desert Wood Rat (Neotoma lepida)	C-N	Unknown	Desert floors and rocky slopes with low desert vegetation or arid mountain brush.
Mountain Vole (Microtus montanus)	C-N	Unknown	Dense vegetation in sagebrush-grass communities.
Family Muridae Black Rat (Rattus rattus)	C-N	Unknown	Buildings and dumps.
Norway Rat (Rattus norvegicus)	C-N	Unknown	Burrows along building foundations and beneath rubbish piles.
House Mouse (Mus musculus)	C-N	Unknown	Buildings and occasionally in fields.
Order Carnivora Family Canidae Coyote (Canis latrans)	C-N	STABLE	Ubiquitous.
Family Mustelidae Black-footed Ferret (Mustela nigripes)	E-P	Unknown	Prairie dog towns.
Striped Skunk (Mephitis mephitis)	C-P	Increasing	Semi-open country of prairie, brushlands or mixed woodlands within two miles of water.

TABLE 3-12
POTENTIAL VERTEBRATE WILDLIFE

Order Artiodactyla Family Cervidae Mule Deer (Odocoileus hemionus)	C-P	Increasing	Coniferous forests, desert shrub, mountain brush, grassland with shrubs and other habitats where browse species are present.
Family Antilocapridae Pronghorn Antelope (Antilocapra americana)	L-P	STABLE	Open prairies and sagebrush or desert shrub plains.

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

TABLE 3-13
STATUS OF WHITE-TAILED PRAIRIE DOG (CYNOMYS LEUCURUS) BURROWS ON THE SAVAGE COAL TERMINAL STUDY AREA

	Single Burrows	Multiple Burrows (true mound)	
Active	29	(1) 5	34
Inactive	65	(2) 8	73

TABLE 3-14
CONSTRUCTION OF WHITE-TAILED PRAIRIE DOG (CYNOMYS LEUCURUS) BURROWS ON THE SAVAGE COAL TERMINAL STUDY AREA

	Active Burrows	Inactive Burrows
Flat Ground	2	10
Slightly Mounded	25	47
True Mound (Multiple Burrows)	1 (5)	2 (8)
Unclassified*	2	8

* Unclassified due to construction in man-caused disturbance, for example, in a man-made trench.

TABLE 3-15
FEDERALLY LISTED
Threatened (T), Endangered (E), and Candidate (C)
FOR CARBON COUNTY UTAH

Common Name	Scientific Name	Status
Uinta Basin Hookless Cactus	*Sclerocactus glaucus*	T
Graham Beardtongue	*Penstemon grahamii*	T Proposed
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker	*Xyrauchen texanus*	E
Bald Eagle	*Haliaeetus leucocephalus*	T
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Mexican Spotted Owl - Possibly	*Strix occidentalis lucida*	T
Black-footed Ferret - Unconfirmed	*Mustela nigripes*	E Extirpated

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United States Department of Agriculture

NRCS
Natural Resources Conservation Service
P.O. Box 2890
Washington, D.C. 20013

August 8, 2002

Mt. Nebo Scientific
Patrick D.Collins, Ph.D.
330 E. 400 S., Suite 6
Springville, UT 84663

Dear Patrick,

The vegetative reference site located just east of the Savage Load out turnoff is a desert loamy clay D-34 site. It is in high good condition. The potential production ranges from 350 to 400 lb. per acre on a favorable year 100 to 150 lbs. per acre on an unfavorable year. This year the site will produce about 240 lbs. per acre.

The reference site located west of the coal pile is an alkali flat D-34 site. This site is in high fair condition. The potential production ranges from 950 to 1000 lbs. per acre on a favorable year to 500 to 550 lbs. per acre on an unfavorable year. This year the site will produce about 560 lbs. per acre.

Attached is the data collection sheet for the latter range site. There was a mistake on my part on the last data sheet I sent for the second site. Therefore I am sending a corrected data sheet for the site. Please let me know if you have any questions.

Kari Christman
Soil Conservationist
Natural Resource Conservation Service

FIGURE 3-1

United States Department of Agriculture
Soil Conservation Service
350 North 4th East
Price, Utah 84501

September 29, 1983

Mr. Dan Guy
Beaver Creek Coal Company
P. O. Box AU
Price, Utah 84501

Dear Dan,

This letter is in reference to the inspection we made at the Castle Valley Spur on September 29, 1983. We visited one reference area that was identified as a desert loam range site.

The method used in obtaining herbage production and site condition was an ocular estimate.

The production and condition for this site is as follows:

> The desert loam vegetation site is producing about 450 lbs. per acre air dry. The site is in good condition.

The production figures are based on air dry herbage per acre.

Don M. Andrews

Don M. Andrews
Range Conservationist

FIGURE 3-2

Appendix 3-1

Vegetation Test Plots

Savage Services Corporation
Savage Coal Terminal

FINAL RESULTS
OF THE C.V. SPUR NO.1
REVEGETATION TEST PLOTS

Prepared by

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for

BLACKHAWK ENGINEERING
Route 1, Box 146-H5
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by

Patrick Collins, Ph.D.

March 2001

TABLE OF CONTENTS

SUMMARY 1

INTRODUCTION 1

Objectives 1
Location 2
Design 2

RESULTS & DISCUSSION 3

Cover 3
Composition 4
Density 5

FINAL RESULTS OF THE C.V. SPUR NO. 1 REVEGETATION TEST PLOTS

SUMMARY

A test plot was constructed in 1987 that compared revegetation techniques including soil cover, coal refuse cover, wood fiber mulch, straw mulch and strip planting methods. Living cover data suggests the subplots that had more coal refuse performed better. Although the trend is not as evident for woody species density, data also suggests that density was greater in those plots with more coal refuse.

INTRODUCTION

Objectives

The purpose of this report is to summarize the final results of the Revegetation Test Plots at the C.V. Spur. No. 1 site. Although the plots have been monitored since their construction in 1987, the information herein was based on the most recent intensive quantitative vegetation sampling which was conducted in 1997.

Because this report is intended to be a 'summary' of the final results, all data tables, sampling methodologies, color photographs, and raw data *have not been included in the report*. A more complete set of this information can be found in the report called: VEGETATION MONITORING OF THE C.V. SPUR TEST PLOTS: 1997.

Location

The C.V. Spur area is located approximately 4 miles southeast of the city of Price, Utah. The area is comprised of nearly 120 acres of disturbed land associated with coal cleaning and loading activities. The disturbed area lies within a salt desert community on soils derived from Mancos Shale.

Design

Revegetation test plots investigating different treatments were established in the fall of 1987 by the former owner, Beaver Creek Coal Company. The entire research plot size is approximately 120 ft by 140 ft. This area was divided into sixteen 25 ft by 25 ft plots or "subplots" to test and compare different reclamation treatments. The treatments consisted of controls, topsoil depths, coarse refuse mixtures and mulches. More specifically, the treatments investigated with their respective subplot numbers are listed below on Table 1.

TABLE 1: CV SPUR NO. 1 TEST PLOT DESIGN

SUBPLOT NUMBERS	TREATMENT
1, 9	6 in. soil, seed, (control)
2, 6	6 in. soil, seed, wood fiber mulch
3, 7	4 in. soil, 2 in. coal refuse, seed, wood fiber mulch
4, 8	3 in. soil, 3 in. coal refuse, seed, wood fiber mulch
5	6 in. soil, wood fiber mulch, (strip planting)
10, 14	6 in. soil, seed, hay mulch
11, 15	4 in. soil, 2 in. coal refuse, seed, hay mulch
12, 16	3 in. soil, 3 in. coal refuse, seed, hay mulch
13	6 in. soil, hay mulch, (strip planting)

RESULTS & DISCUSSION

Rather than providing all data summary tables with their respective data sets, graphs have been included in this report that facilitates comparisons of the final results. The graphs provided show results of all subplots for living cover, composition and woody species density.

Cover

The living cover for each subplot has been illustrated in two ways. First, the data were summarized and comprised all species, including the exotic annuals or "weedy" species. However, because weeds are not considered to be desirable species for final revegetation success, the data also were summarized by means that excluded these species.

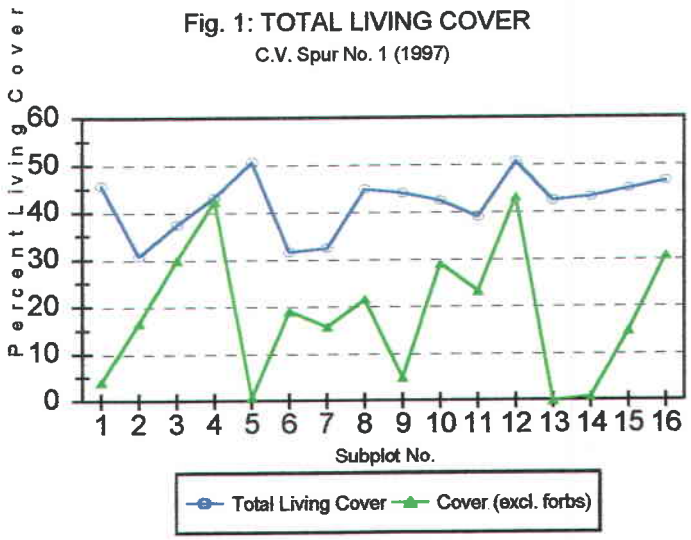


Figure 1 graphically illustrates the total cover – with and without the weedy species.

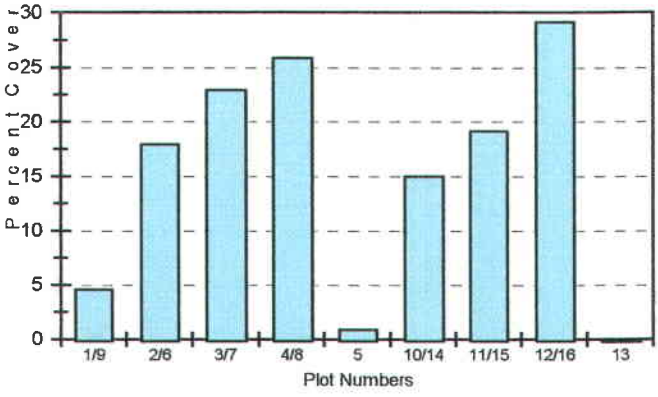
Another way to represent and simplify the data was to combine the subplots that had identical treatments. This was done by averaging their values, thus deriving one value for each treatment instead of two (each treatment was replicated two times). For example, Subplot numbers 2 and 6

were the same treatment (6" in. soil, seed, wood fiber). Their cover values excluding weeds were 16.67% and 19.17%, respectively. The mean cover for this treatment would then be 17.92%. The mean cover values of each treatment is shown on Figure 2.

Interestingly, the two highest cover values (Subplots 12/16 & 4/8) had the same seedbed medium (3" soil, 3" coal refuse). The next highest cover also had similar growth medium (4" soil, 2" coal refuse). Conversely, the subplots that performed with the least success for living cover were the subplots that had 6 inches of soil with no coal refuse added (Subplots 1/9, 5 & 13).

Fig. 2: MEAN COVER OF EACH TREATMENT

C.V. Spur No 1 (1997)

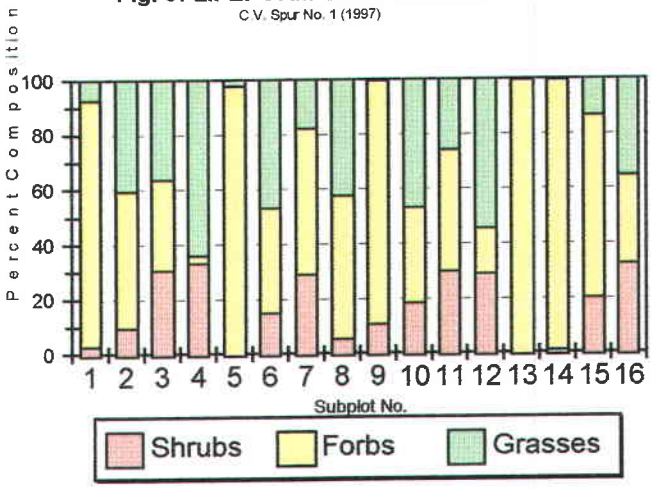


Composition

Lifeform or species composition has also been graphically shown for each subplot for comparison. This provides the reviewer with information about the relative

Fig. 3: LIFEFORM COMPOSITION

C.V. Spur No. 1 (1997)

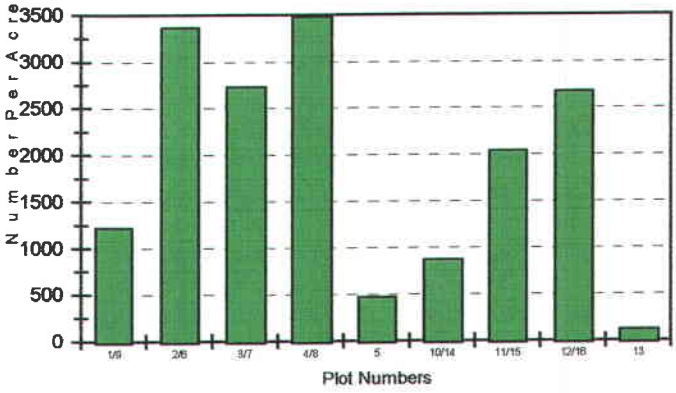


cover proportion of shrubs, forbs and grasses. The graph is shown on Figure 3, but weedy species were included with the forbs.

Density

Like the cover data described above, woody species density was also combined by treatments and shown on Figure 4. Woody species density also revealed interesting results and patterns. If one considers the subplots with the wood fiber mulch, for example, most subplots had high density values, especially those that also had coal refuse cover (Subplots 2/6, 3/7, & 4/8). The trend for the hay mulch is that density increased as coal refuse cover increased (Subplots 10/14, 11/15 & 12/16).

Fig. 4: MEAN DENSITY OF EACH TREATMENT
C.V. Spur No. 1 (1997)



Like the cover data, the subplots that performed poorest were those with the most soil cover (Subplots 5, 13, & 1/9).

VEGETATION TEST PLOTS

C.V. SPUR

Scope:

Beaver Creek C.V. Spur is located approximately 4 miles southeast of Price, Utah in Carbon County. The area comprises approximately 120 acres of potential disturbance associated with the washing, cleaning and loading of coal. The land lies in an agricultural region but is not classified a prime farm ground due to the rolling topography with saline soils derived from mancos shale. The predominant vegetative cover prior to disturbance is outlined in the C.V. Spur MRP. Total vegetative cover is less than 18% comprised predominantly of species which are of marginal importance to wildlife or domestic grazing. This, in combination with very low productivity, less than 300# per acre renders this area ideal to attempt to enhance the region in its ability to support a more diversified population of wildlife while providing increased forage and cover over what existed prior to disturbance.

Attempts to perform contemporaneous revegetation at the site in the past have met with little success. The purpose of the test plots is to evaluate different soil treatment and planting medium. In addition, a standard control test plot will be used to allow evaluation of individual plant species within the seed mix. The test plots will be placed on the west end of the refuse pile and will remain undisturbed throughout the life of the study.

The following report outlines the design and implementation of the test plots.

C.V. Spur Test Plots

Scope:

On October 18, 1988, the vegetation test plots located in Carbon County, Utah at Beaver Creek Coal Company, CV Spur site were examined to determine success of revegetation methodologies. The plots were implemented in the fall of 1987 under the direction of Mr. Dan Guy of Beaver Creek Coal Company.

Three soil treatments and two mulches were tested as to their effectiveness in facilitating the establishment of 17 species of vegetation (see Attachment 1 - Species List). The test plot was established approximately in the south central portion of the property (Plate 3-1) on an existing coal refuse pile. An area of approximately 140' by 120' was dedicated to the test plots. Soil was hauled from an adjacent top soil pile and placed in 25' strips, 120' in length at a rate of 6", 6", 4", and 3". After the soil was in place, 2" refuse was overlaid on the 4" soil strip, and 3" of coal refuse was overlaid on the 3" soil strip. A John Deere 750 Farm tractor was then utilized to thoroughly tile (mix) the refuse and soil areas into a uniform consistency of 33% coal soil and 50% coal soil respectively. The 6" soil area was also tilled in order to minimize surface compaction associated with the transport and spreading of materials. Soil analysis was conducted and is attached as Attachment 2. Two control blocks 25' by 25' were then marked off on the 6" soil area and the balance of the site was drill seeded utilizing a John Deere grain drill set at 3/8" depth. The two control plots were hand seeded with each species separated in stripe approximately 10' by 18" and hand raked in order to partially cover the seed (see Exhibit 1).

After seeding, the south half of the test area was hydromulched utilizing a Bowie Hydromulcher. "Spraya Mulch", a wood fiber mulch was oversprayed at a rate of 2,000 lbs. per acre and 60 lbs. per acre Terra Tac AR on all but 1 control plot. Incorporated into the mulch slurry was 100 lbs. per acre of 16-16-8 fertilizer (see Exhibit 2 - Test Plot Layout). A 20' buffer zone between the hydromulched area was established to preclude overspray onto the hay mulch area.

The north half of the area was then mulched utilizing a "Finn" 2000 straw blower. Third cut alfalfa hay was applied at a rate of 2,000 lbs. per acre and crimped in on all but 1 control plot. Incorporated with the hay was 100 lbs. per acre of 16-16-8 fertilizer (see Exhibit 2 - Test Plot Layout). One hundred, (100) lbs. per acre of 16-16-8 fertilizer was then hand broadcast over the two control plots. The entire site was then fenced to preclude equipment or livestock trespass.

In May of 1988, the plots were examined to determine general condition. It was noted that the area was being heavily utilized by the indigenous wild hare or rabbit population in the area. This was noted by the number of scat sites as well as employee observation and tracks. Mr. Guy had the site re-fenced utilizing 48" x 1" x 1" chicken wire buried to a depth of 10" to 12" and tied to the top strain of barbed wire, approximately 36" above ground line. This appears to have actively precluded rabbit use since. The site was monitored for success in October of 1988.

Monitoring Methodology:

On October 11, 1988, the plots were monitored utilizing a 1.6% sample randomly located in each of the test plots. Ocular estimates of percent vegetative cover was made based on canopy coverage of the actual area. Where feasible, each species was identified (due to the emergent nature of the grass species, positive identification was almost impossible), each sprig within the monitoring plot was counted and apparent vigor was indicated of the overall plot. On a number of plots, large Russian thistles dominated the site. In order to gain an accurate count of sprigs, these thistle plants ere removed. The monitoring plots wee laid out north to south with the southwest corner located as the origination point. This corner was located on the ground and its approximate position is indicated with an "X" on Exhibit 2. No estimates of productivity were made due to the nature (emergent) of the vegetative cover.

It is important to note that the viability of a number of the species was in question due to the extreme drought experienced during the 1988 growing season. The 1989 monitoring should be more indicative of actual establishment.

The results of the survey are as follows:

	Plot Description	% Veg. Cover	Vigor
1.	Control - 6" soil	8%	Poor
2.	6" soil, wood mulch, fertilizer	22%	Average
3.	4" soil, 2" refuse, wood mulch, fert.	15%	Average
4.	3" soil, 3" refuse, wood mulch, fert.	21%	Good
5.	6" soil, hay mulch, fertilizer	7%	Poor
6.	4" soil, 2" refuse, hay mulch, fert.	10%	Poor
7.	3" soil, 3" refuse, hay mulch, fert.	<3%	Poor

Species	% Ground Cover %	Vigor Wood Mulch V	% Ground Cover %	Vigor Hay Mulch V
Atriplex currugata	0		0	
Agropyron trichophorum	25	G	30	A
Atriplex confertifolia	0		0	
Atriplex canescens	5	G	25	A
Agropyron dasystachyum	50	A	25	G
Oryzopsis hymenoides	30	A	75	G
Hilaria jamesii	0		0	
Melilotus officinalis	5	P	5	P
Agropyron cristatum ephraim	80	VG	50	P
Sporobolus airoides	5	P	0	
Penstemen palmeri	0		0	
Helianthus annuus	15	A	5	P
Agropyron cristatum fairway	80	P	20	P
Sphaeralcea graossulariae folia	<2	P	0	
Eurotia lanta	40	G	15	G
Chrysothamnus nauseosus	0	P	<2	P
Agropyron smithii	<2	P	<2	P

VG = Very Good Vigor (seed heads present)

G = Good Vigor

A = Average Vigor

P = Poor Vigor

Average Number of Plants Per Plot (1.6% of area)

Plot Description	Halogeton	Russian Thistle	Winterf at	Yellow Clover	Rabbit Brush	Rag Weed	Sun Flower	Grasses
Wood Mulch								
6" soil Wood Mulch Fertilizer	5	3	12	2	2	0	0	23
4" soil Wood mulch Fertilizer	5	7	1	0	0	0	0	135
3" soil 3" refuse Wood Mulch Fertilizer	5	30	1	0	0	8	0	68
Hay Mulch								
6" soil Hay Mulch Fertilizer	19	3	1	2	0	3	2	60
4" soil 2" refuse Hay Mulch Fertilizer	7	21	1	1	0	15	0	52
3" soil 3" refuse Hay Mulch Fertilizer	11	9	0	2	0	6	0	0

Conclusions and Recommendations:

Based on the first year monitoring results, it appears that:

1. Wood fiber mulch offers a 50% increase in vegetation establishment over both hay mulch or no mulch.

2. Coal refuse (up to 50%) is not a significant deterent to vegetation establishment.

3. Crested wheatgrasses and Indian rice grass offer the greatest potential for vegetation establishment in combination with Winter fat.

4. Third cut alfalfa hay may be an attractant to indigenous wildlife (rabbits) and as such, be detrimental to vegetation establishment.

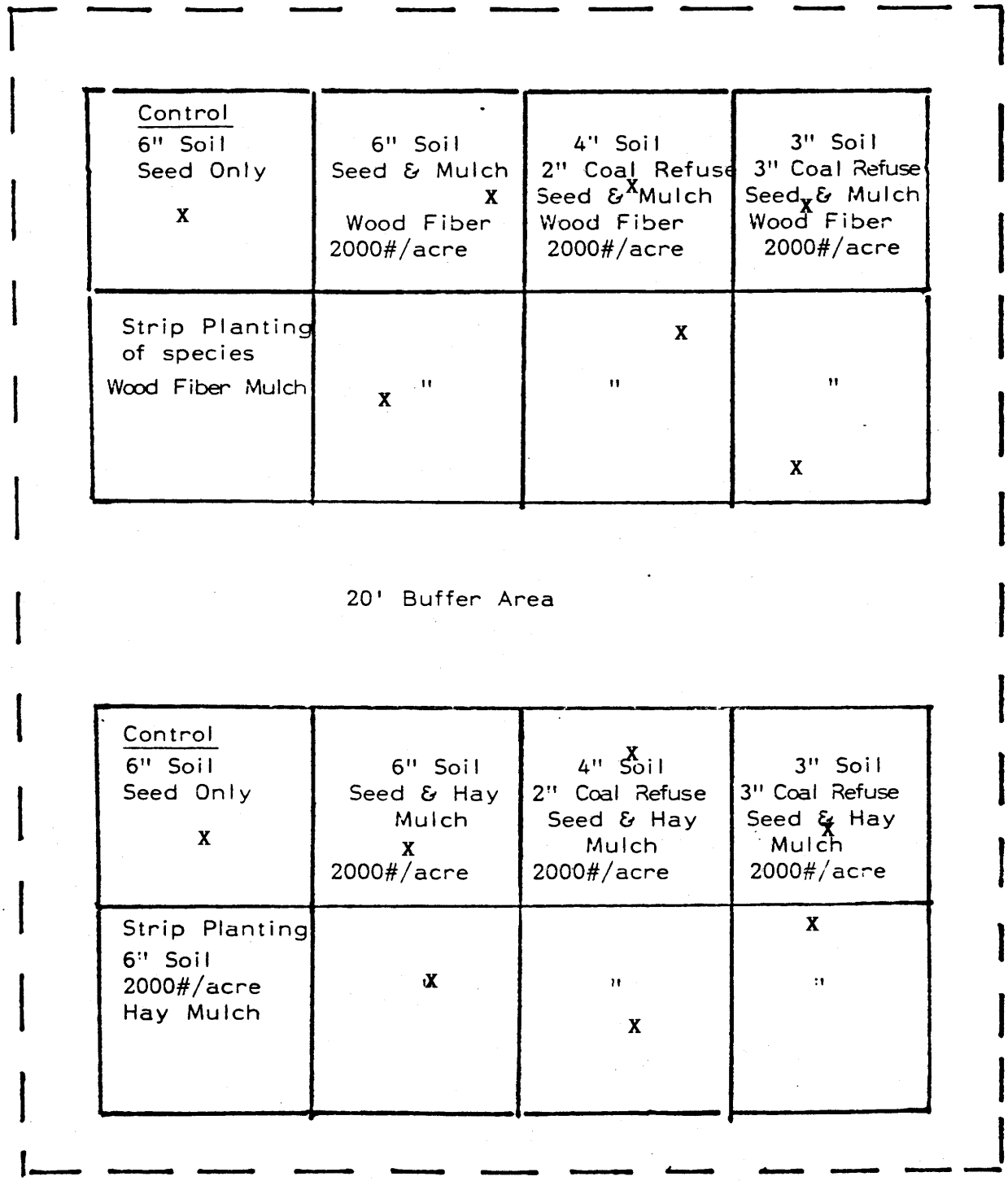
A general observation of the site indicates that the test plot was severely impacted by the 1988 drought experienced in Carbon County. In conducting the monitoring, all emergent vegetation was inventoried at the time monitoring was conducted (October). It was impossible to determine whether the individual plats ere dormant or dead. The 1989 monitoring should yield more significant data as to long term establishment.

It was interesting to note that the wood fiber mulch was largely in place with 90% + ground cover while the hay mulch was sparce and accounted for less than 50% ground cover. It was impossible to determine whether the loss of hay mulch was due to rodent activity or wind dispersal.

Continued monitoring appears to be essential to substantiate the above referenced conclusions.

Beaver Creek - CV Spur

Vegetation Test Plot

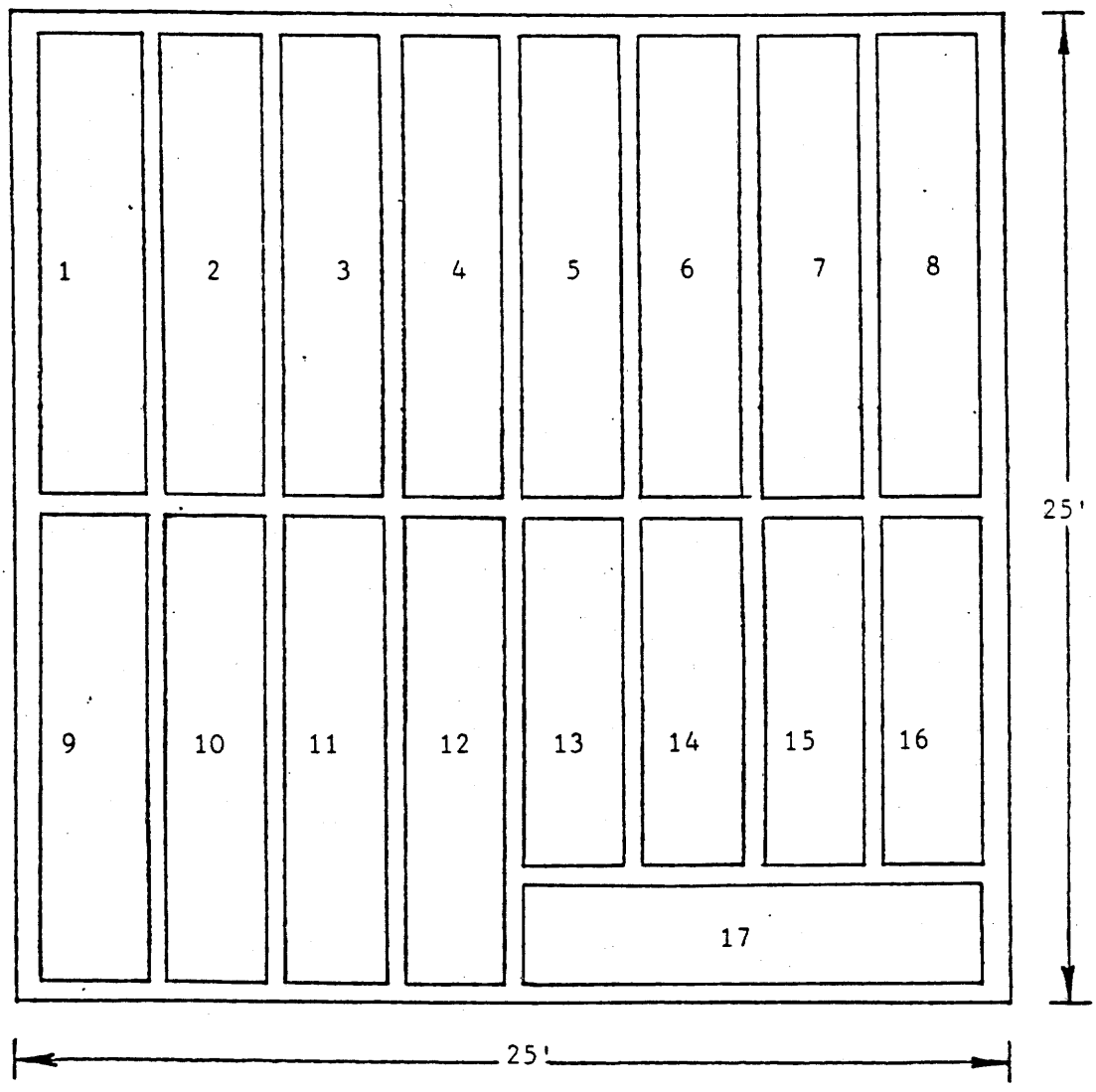


C.V. SPUR
TEST PLOTS

STRIP PLANTING
CONTROL PLOT

1- Atriplex corrugata
2- Agro trichophorum
3- Atriplex confertifolia
4- Atriplex canescens
5- Agro dasystachyum
6- Oryzopsis hymenoides
7- Hilaria jamesii
8- Melilotus officinalis
9- Agro Cristatum ephraim
10- Sporobolus airoides
11- Penstemen palmeri
12- Helianthus annuus
13- Agro cristatum fairway
14- Sphaeralcea grossulariae folia
15- Eurotia lanta
16- Chrysothamnus nauseosus
17- Agro Smithii

Scale: 1" = 5'



Attachment 1

PERMANENT RECLAMATION SEED MIXTURE

Name	Rate (Pounds PLS/AC)	Price Per Pound	Total
Grasses			
Galleta (Hilaria jamesii)	2	$26.25	$52.50
Thickspike wheatgrass (Agropyron dasystachyum)	4	$3.90	$15.60
Indian Ricegrass (Oryzopsis hymenoides)	3	$8.15	$24.45
Alkali scaton (Sporobolus airoides)	.75	$3.30	$2.48
Indian saltgrass (Distichlis spicata)	1	NA	NA
			$95.03
Forbs			
Globemallow (Sphaeralcea grossulariaefolia)	.5	$45.00	$27.50
Sunflower (Helianthus annuus)	4	$8.95	$35.80
Palmer Penstemon (Penstemon palmeri)	.5	$35.00	$17.50
Yellow sweetclover (Melilotus officinalis)	2	$0.68	$1.36
			$82.16

Shrubs			
Winterfat (Ceratoides lanata)	3	$18.50	$55.50
Shadscale (Atriplex confertifolia)	4	$8.00	$32.00
Matbush (Atriplex corrugata)	4	$15.00	$60.00
Whitestem rubber rabbitbrush (Chrysothamnus nauseosus var. albicanlis)	1.5	$68.00	$102.00
Four-wing saltbrush (Atriplex canescens)	3	$6.00	$18.00
			$267.50
Total (for broadcast or hydrosseding	33.25		$444.69

(½ Rate for drill seeding.)

ATTACHMENT II

SOILS TEST

"Interm" Wildlife Enhancement Revegetation - C.V. Spur

Over the preceding 5 years, Beaver Creek Coal Co. in cooperation with the U.D.W.R. have attempted to enhance two small areas in an effort to increase upland game habitat.

Area "A" Plate 3.1-A, Northeast Perimeter of Property - was drill seeded in the spring of 1987. The area was deeded utilizing a JD 9 ft. grain drill pulled by a JD 750 wheeled tractor. The seed mix was a combination of:

50# Hard Barley/acre
25# Adt. Oats/acre
35# Millet/acre

The planting was implemented in late May - good germination was recorded after 4 days of moderate rain in mid June. Unfortunately the majority of the cerial crop species failed to mature and produce viable seed heads by fall. While some enhancement was accomplished, it was temporary in nature with no natural reseeding occurring the following year.

The conclusion reached was that the area would not support a viable grain species without annual re-application of seed and that the area would need to be irrigated most years to produce a mature head prior to fall freezing.

The second area "B" Plate 3.1-A is a small area of reclaimed refuse South of the Silo and adjacent to the rail line and Pond #6. This area was drill seeded in October of 1987. A small portion of seed utilized on the test plots was drilled in combination with 50#/oats/acre utilizing the same equipment as in area "A". Good germination was in evidence spring of 1988. Unfortunately, a prolonged drought during the 1988 and 1989 growing season has all but eliminated establishment. A small area, inslope of Pond #6, was also hydro-mulched at a rate of approximately 1500@/acre. This application was to use the balance of the material left over from the test plot implementation.

Conclusion:

Both areas "A" and "B" were in large failures, relative to establishment of enhanced wildlife habitat. The reasons for the lack of success is most likely to do (in part) to abnormally dry summers following each application. It is important to note that in each case the goal was a short term increase in forage for upland game in combination with a proposed pheasant stocking program; and not the long term establishment of a diverse vegetation cover.

Inter-Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

March 28, 1988

Mr. Dan Guy
Beaver Creek Coal Company
P.O. Box 1378
Price, Utah 84501

Dear Dan:

On March 07, 1988, our laboratory received two (2) soil samples for analysis. These samples were analyzed for the parameters requested by the State of Utah, Dept. of Oil, Gas & Mining.

Enclosed are the results of the analysis performed. If you have any questions or if we can be of further service, please call.

Sincerely,

Ron R. Richardson

Ron R. Richardson
Lab Director

Enclosures

Inter-Mountain Laboratories, Inc.
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

BEAVER CREEK COAL Co.
PRICE, UTAH
Mine:
CV-SPUR TEST PLOT

te Reported: March 25, 1988

.b No.	Location	Depths	pH	EC mmhos/cm @ 25C	Satur-ation %	Calcium meq/l	Magnesium meq/l	Sodium meq/l	SAR
:45	COMP-SOIL	0.0-0.0	7.6	1.96	53.8	9.49	2.72	11.1	4.49
146	COMP-REFUSE	0.0-0.0	7.3	2.71	43.3	23.1	5.99	7.78	2.04

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

Inter-Mountain Laboratories, Inc.
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

BEAVER CREEK COAL Co.
PRICE, UTAH
Mine:
CV-SPUR TEST PLOT

te Reported: March 25, 1988

: No.	Location	Depths	Sand %	Silt %	Clay %	Texture	Organic Matter %	T.S. ABP t/1000t	Pyritic Sulfur %	Organic Sulfur %	Boron ppm	Selenium ppm	H2O Sol Selenium ppm
945	COMP-SOIL	0.0-0.0	22.7	42.8	34.5	CLAY LOAM	7.1	127.	0.01	0.04	0.30	<0.02	<0.01
946	COMP-RUFUSE	0.0-0.0	80.0	12.7	7.3	LOAMY SAND	14.3	10.3	0.10	0.39	0.98	<0.02	<0.01

A9-1-18

obreviations for extractants: PE= Saturated Paste Extract, H2OSol= water soluble,ABPTA= Ammonium Bicarbonate-DPTA, AAO= Acid Ammonium Oxalate
obreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, PyrOrg= Pyritic Sulfur + Organic Sulfur, Neut. Pot.= Neutralization Potential

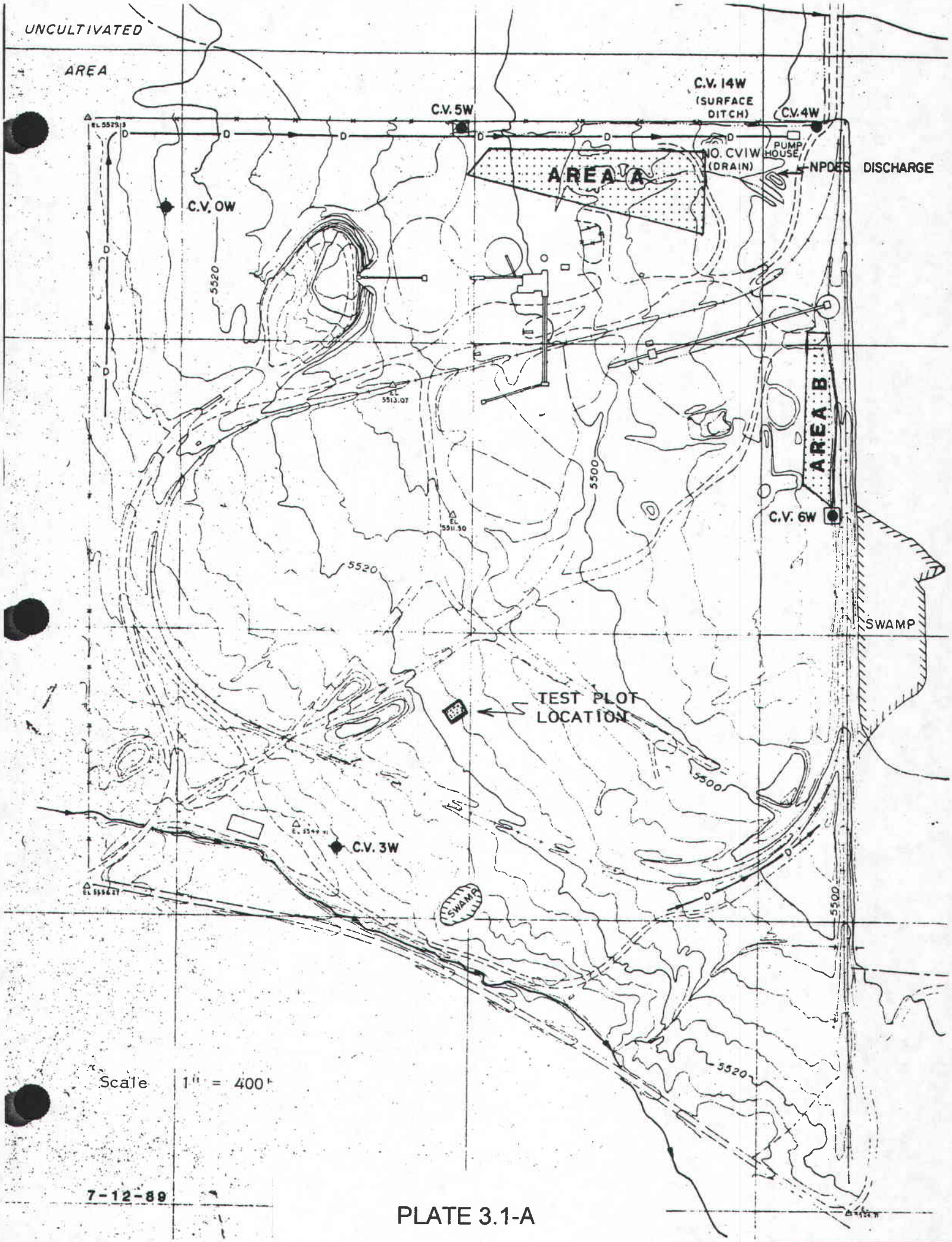

UNCULTIVATED
AREA
C.V. 14W
(SURFACE
DITCH)
C.V. 5W
C.V. 4W
PUMP
HOUSE
NO. CVIW
(DRAIN)
NPDES DISCHARGE
AREA A
C.V. OW
AREA B
C.V. 6W
SWAMP
TEST PLOT
LOCATION
C.V. 3W
SWAMP
5520
5500
5500
5520
5520
Scale 1" = 400'
7-12-89

PLATE 3.1-A

Appendix 3-2

Reclamation Test Plot

Savage Services Corporation
Savage Coal Terminal

C. V. SPUR

VEGETATIVE TEST PLOT NO. 2

VEGETATIVE TEST PLOT #2

CV Spur

SCOPE:

Beaver Creek CV Spur is located approximately 4 miles Southeast of Price, Utah in Carbon County. The area comprises approximately 120 acres of potential disturbance associated with the washing, cleaning and loading of coal. The land lies in an agricultural region but is not classified a prime farm ground due to the rolling topography with saline soils derived from mancos shale. The predominant vegetative cover prior to disturbance is outlined in CV Spur MRP, Chapter 9. Total vegetative cover is less than 18% comprised predominantly of species which are of marginal importance to wildlife or domestic grazing. This in combination with very low productivity, less than 300# per acre renders this area ideal to attempt to enhance the region in its ability to support a more diversified population of wildlife while providing increased forage and cover over what existed prior to disturbance.

In 1987 Beaver Creek Coal implemented a test plot in cooperation with the Utah Division of Wildlife Resources. It is proposed to reclaim the area to enhance upland game habitat. To facilitate this end, Dr. J. Jurnack, Utah State University, was consulted to offer suggestions relative to soil treatments; Richard Stevenson, UDWR Experimental Station, was requested to recommend a seed mix suited for upland game habitat which was

adaptable to the site specific conditions relative to soil and climate; Mr. Larry Dalton, Resource Analyst UDWR, was consulted in regard to methodologies to establish vegetation which have been successfully utilized in similar areas. This test plot experienced two consecutive draught growing seasons, and the results of monitoring indicated a success ratio of less than desired.

In 1989, a second test plot was designed on a pre-law disturbed site adjacent to the existing pump house. (See exhibit #1 Location Map). This test plot was designed in cooperation with UDOGM utilizing the methodologies that appeared to be most successful on the original test plot with additional soil treatment and minor modification in the seed mix and fertilizer application.

METHODOLOGIES

On September 24, 1989, a JD450 Crawler in combination with a crimper disk was utilized to scarify an area of approximately 200' X 40'. A slurry of Super Phosphate was applied in conjunction with the seed bed preparation to incorporate the phosphate into the top 6" of the soil. On approximately one half of the area, 100' X 40', green alfalfa hay was tilled into the upper 6" of soil. The entire area was then fenced, utilizing 39" field fence and 2 strains of barbed wire (see Attachment #2 Plot Design).

On October 16, 1989, the entire area was hand broadcast utilizing the approved seed mix at twice the drill seed rate (see Attachment 3 Seed Mix). In the center of the plot encompassing approximately half hay treated soil and half non-hay treated soil, strip planting was implemented. Each strip utilized a separate species (thirteen in all). The strips were approximately 2 meters X 1 meter. Seed was hand broadcast and lightly raked in. The entire area was then hydromulched at a rate of 2,000 lbs. per acre. Incorporated in the mulch was Agro Tac at a rate of 100 lbs. per acre.

In early spring of 1990, Urea fertilizer will be sprayed over the area at a rate of 100 lbs. per acre. Monitoring of the plot will begin in 1990 as outlined in Appendix 9-2 and in Chapter 3 Section 3.5.5.2 page 3-62b.

EXHIBIT 1

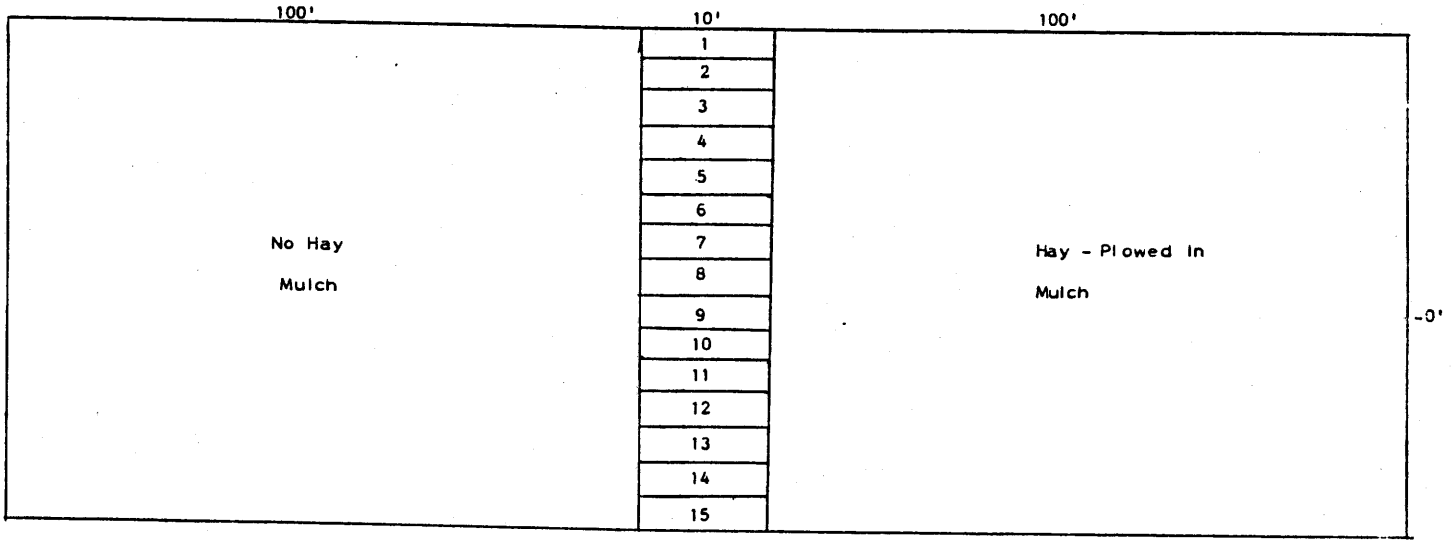
LOCATION MAP
1" =100'

ATTACHMENT #2

VEGETATIVE TEST PLOT #2

CV SPUR

(AS CONSTRUCTED)



1. Open
2. Open
3. Clover
4. Winterfat
5. Globemallow
6. Shadscale
7. Sun flower
8. Kochia sp. (Prostrata
9. Russian wildrye
10. Crested wheat (Fairway
11. Squirreltail
12. Tnickspike
13. Crested wheat (Ephraim
14. Palmer penstemon
15. Indian ricegrass

ATTACHMENT #3

C.V. SPUR TEST PLOT NO. 2

SEED MIX

Table 3-2
PERMANENT RECLAMATION SEED MIXTURE

(117 Acres)

Name	Rate/#/Acre PLS	# Seeds/Pound	Cost Per Pound	Total
Grasses				
*Crested Wheat Grass (Agro pyron cristatum ephraim)	2	319,660	1.20	2.40
Thickspike wheatgrass (Agropyron dasystachyum)	2	137,000	3.50	7.00
Indian ricegrass (Oryzopsis hymenoides)	4	188,295	4.50	18.00
Fairway crested wheatgrass *(Agro pyron cristatum fairway)	2	319,000	1.20	2.40
Squirreltail grass (Sithanyn hystrics)	.5	191,585	14.00	7.00
*Russian wildrye (Elymus juncus)	1	210,000	3.50	3.50
Forbs				
Globemallow (Sphaeralcea grossulariaefolia)	.25	500,660	35.00	8.75
Sunflower (Helianthus annuus)	3		2.50	7.50
Palmer Penstemon (Penstemon palmeri)	.5	609,675	.11	5.50
Yellow sweetclover (Melitoltus officinalis)	1	258,560	.40	.40
*Kochia (Kochia prostrate)	1	520,000	20.00	20.00
Shrubs				
Winterfat (Eurotia) Lanata	1	112,275	11.00	11.00
Shadscale (Atriplex confertifolia)	2	64,920	5.00	10.00

KIND: Indian Ricegrass

ORIGIN: Nevada

LOT NO: IRG-2-DX

PURITY:	93.11%
INERT:	1.85%
CROP:	0.00%
WEEDS:	0.04%
NOXIOUS:	NONE

TOTAL GERMINATION: 84%

TEST DATE: 9/88

NET WEIGHT: ~~2.42~~ 4.5 LBS.

2

KIND: PENSTEMON
VARIETY: PALMER

LOT NO: 1026
ORIGIN: UT

PURITY:	96.00%
INERT:	3.92%
CROP:	0.05%
WEEDS:	0.03%
NOXIOUS:	NONE FOUND

TOTAL GERMINATION: 75%

TEST DATE: 08/88

NET WEIGHT 0.70 LBS.

3

KIND: CRESTED WHEATGRASS
VARIETY: EPHRAIM (CERT)

LOT NO: 0486
ORIGIN: UTAH

PURITY:	95.71%
INERT:	4.27%
CROP:	0.02%
WEEDS:	0.00%
NOXIOUS:	NONE FOUND

TOTAL GERMINATION: 88%

TEST DATE: 11/88

NET WEIGHT 2.40 LBS.

KIND: THICKSPIKE
VARIETY: CRITANA

PURITY:	99.17%
INERT:	3.01%
CROP:	0.13%
WEEDS:	1.69%
NOXIOUS:	NONE FOUND

LOT NO: 704
ORIGIN: WYOMING

TOTAL GERMINATION: 96%

TEST DATE: 11/88

NET WEIGHT 2.10 LBS.

5

KIND: SQUIRRELTAIL,
VARIETY: BOTTLEBRUSH

PURITY:	83.21%
INERT:	15.02%
CROP:	0.07%
WEEDS:	1.70%
NOXIOUS:	NONE FOUND

LOT NO: 118
ORIGIN: NE

TOTAL GERMINATION: 91%

TEST DATE: 08/88

NET WEIGHT 0.66 LBS.

6

KIND: CRESTED WHEATGRASS
VARIETY: FAIRWAY

PURITY:	93.00%
INERT:	5.34%
CROP:	0.00%
WEEDS:	0.00%
NOXIOUS:	NONE FOUND

LOT NO: 7-624-8
ORIGIN: UTAH

TOTAL GERMINATION: 87%

TEST DATE: 01/88

NET WEIGHT 2.50 LBS.

7

KIND: RUSSIAN WILD RYE
VARIETY:

PURITY: 94.11%
INERT: 5.73%
CROP: 0.16%
WEEDS: 0.00%
NOXIOUS: NONE FOUND

LOT NO: CH-15-14
ORIGIN: MONTANA

TOTAL GERMINATION: 87%

TEST DATE: 08/89

NET WEIGHT 1.22 LBS.

8

KIND: KOCHIA PROSTRATA

PURITY: 50.00%
INERT: 47.50%
CROP: 2.00%
WEEDS: 0.50%
NOXIOUS: NONE FOUND

LOT NO: 1024
ORIGIN: UTAH

TOTAL GERMINATION: 50%

TEST DATE: 10/89

NET WEIGHT 4.0 LBS.

9

KIND: SUNFLOWER
VARIETY: WILD

PURITY: 92.00%
INERT: 7.83%
CROP: 0.15%
WEEDS: 0.02%
NOXIOUS: NONE FOUND

LOT NO: JB-88
ORIGIN: UTAH

TOTAL GERMINATION: 80%

TEST DATE: 12/88

NET WEIGHT 4.10 LBS.

KIND: SHADSCALE

PURITY: 95.00%
INERT: 4.00%
CROP: 0.70%
WEEDS: 0.30%
NOXIOUS: NONE FOUND

LOT NO: 1038
ORIGIN: UT

TOTAL GERMINATION: 55%

TEST DATE: 02/89

NET WEIGHT 3.80 LBS.

11

KIND: GLOBE MALLOW
VARIETY:

PURITY: 96.00%
INERT: 3.85%
CROP: 0.10%
WEEDS: 0.05%
NOXIOUS: NONE FOUND

LOT NO: GM1010
ORIGIN: IDAHO

TOTAL GERMINATION: 85%

TEST DATE: 10/88

NET WEIGHT 0.31 LBS.

12

KIND: WINTERFAT

PURITY: 92.00%
INERT: 7.50%
CROP: 0.20%
WEEDS: 0.30%
NOXIOUS: NONE FOUND

LOT NO: 1062
ORIGIN: UTAH

TOTAL GERMINATION: 56%

TEST DATE: 10/88

NET WEIGHT 2.00 LBS.

KIND: Yelow Sweet Clover

ORIGIN: Canada

LOT NO: 2

PURITY:	99.56%
INERT:	.44%
CROP:	.00%
WEEDS:	0.00%
NOXIOUS:	NONE

TOTAL GERMINATION: 93%

TEST DATE: 8/88

NET WEIGHT: 1.10 LBS.

Appendix 3-3

Wetland Delineation
(Submitted to U.S. Army Corps of Engineers)

Savage Services Corporation
Savage Coal Terminal

COMPLIANCE CERTIFICATION

Verification Number: 200350060

Nationwide Permit Number: 21

Name of Permittee: James Jensen
6340 South 3000 East, Suite 600
Salt Lake City, UT 84121-

Date of Issuance: April 18, 2003

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

Utah Regulatory Office
533 West 2600 South, Suite 150
Bountiful, Utah 84010

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with the terms and conditions of the permit your authorization may be suspended, modified, or revoked.

* * * * * * * * *

I hereby certify that the work authorized by the above-referenced permit, including all the required mitigation, was completed in accordance with the terms and conditions of the permit verification.

Savage Services Corp.
James T. Jensen 5/3/03
Signature of Permittee EX VP Date

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

April 18, 2003

Regulatory Branch (200350060)

James Jensen
Savage Services Corporation
6340 South 3000 East, Suite 600
Salt Lake City, Utah 84121

Dear Mr. Jensen:

I am responding to your request for a Department of the Army permit for the Savage Coal Stockpile project. This project is located in Section 11, Township 15 South, Range 10 East, Carbon County, Utah.

Based on the information you have provided, the proposed discharge of dredged or fill material into 0.05 acres of wetlands is authorized by Nationwide Permit Number 21. However, the work must meet the terms and conditions listed on the enclosed nationwide permit information sheets. **Upon completion of the work authorized by this permit, the permittee must sign and return the enclosed compliance certification as required by General Condition 14.**

This verification is valid for a period of two years from the date of this letter or until the nationwide permit is modified or expires, whichever comes first. This nationwide permit is currently scheduled to expire on March 18, 2007.

We have issued identification number 200350060 to this action. Please refer to this number in any further correspondence concerning this project. If you have any questions, please contact me at our Utah Regulatory Office, 533 West 2600 South, Suite 150, Bountiful, Utah 84010, or email Amy.Defreese@usace.army.mil, or telephone 801-295-8380, extension 13.

Sincerely,

Amy S Defreese

Amy Defreese
Biologist, Utah Regulatory Office

Enclosures

Copies furnished without enclosures:

Dan Guy, Blackhawk Engineering, 1056 W. 2060 N., Helper, Utah 84526
Melvin Coonrod, Environmental Industrial Services, 31 North Main Street, Helper, Utah 84526
Pam Grubaugh-Littig, Utah Division of Oil, Gas and Mining, P.O. Box 145801, Salt Lake City, Utah 84114

SAVAGE SERVICES CORPORATION
6340 SOUTH 3000 EAST, SUITE 600
SALT LAKE CITY, UT 84121
PHONE (801) 944-6600 FAX (801) 944-6554

FACSIMILE TRANSMITTAL SHEET

TO: Dan Guy
FROM: Jo Sanders
DATE: 4-22-03
TIME: 10:45 Am.
COMPANY: Blackhawk Eng.
TOTAL NUMBER OF PAGES: (INCLUDING COVER) 13
FAX NUMBER: 435-637-2431
PHONE NUMBER:

NOTES & COMMENTS:
Dan: Attached please find enclosure to April 18, 2003 letter to Jim Jensen from the Dept. of the Army.

CONFIDENTIALITY NOTICE: The information contained in this fax transmittal is privileged and confidential. It is intended for the addressee only. If you are neither the intended recipient nor the employee or agent responsible for delivering this to the intended recipient, any disclosure of this information in any way or taking of any action in reliance on this information is strictly prohibited. If you have received this fax transmittal in error, please notify the party transmitting the information immediately.

SAVAGE

COMPLIANCE CERTIFICATION

Verification Number: 200350060

Nationwide Permit Number: 21

Name of Permittee: James Jensen
6340 South 3000 East, Suite 600
Salt Lake City, UT 84121-

Date of Issuance: April 18, 2003

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

Utah Regulatory Office
533 West 2600 South, Suite 150
Bountiful, Utah 84010

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with the terms and conditions of the permit your authorization may be suspended, modified, or revoked.

* * * * * * * * *

I hereby certify that the work authorized by the above-referenced permit, including all the required mitigation, was completed in accordance with the terms and conditions of the permit verification.

Signature of Permittee Date

U S Army Corps of Engineers
Sacramento District

Nationwide Permit Summary

33 CFR Part 330; Issuance of Nationwide Permits – January 15, 2002, including Correction – February 13, 2002

21. **Surface Coal Mining Activities**. Discharges of dredged or fill material into waters of the US associated with surface coal mining and reclamation operations provided the coal mining activities are authorized by the DOI, Office of Surface Mining (OSM), or by states with approved programs under Title V of the Surface Mining Control and Reclamation Act of 1977 and provided the permittee notifies the District Engineer in accordance with the "*Notification*" General Condition. In addition, to be authorized by this NWP, the District Engineer must determine that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are minimal both individually and cumulatively and must notify the project sponsor of this determination in writing. The Corps, at the discretion of the District Engineer, may require a bond to ensure success of the mitigation, if no other Federal or state agency has required one. For discharges in special aquatic sites, including wetlands, and stream riffle and pool complexes, the *notification* must also include a delineation of affected special aquatic sites, including wetlands. (also, see 33 CFR 330.1(e))

Mitigation: In determining the need for as well as the level and type of mitigation, the District Engineer will ensure no more than minimal adverse effects to the aquatic environment occur. As such, District Engineers will determine on a case-by-case basis the requirement for adequate mitigation to ensure the effects to aquatic systems are minimal. In cases where OSM or the state has required mitigation for the loss of aquatic habitat, the Corps may consider this in determining appropriate mitigation under Section 404. (Sections 10 and 404)

A. <u>General Conditions</u>. The following general conditions must be followed in order for any authorization by an NWP to be valid:

☐ 1. **Navigation**. No activity may cause more than a minimal adverse effect on navigation.

☐ 2. **Proper Maintenance**. Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.

☐ 3. **Soil Erosion and Sediment Controls**. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

☐ 4. **Aquatic Life Movements**. No activity may substantially disrupt the necessary life-cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

☐ 5. **Equipment**. Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

☐ 6. **Regional and Case-By-Case Conditions**. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state or tribe in its Section 401 Water Quality Certification and Coastal Zone Management Act consistency determination.

☐ 7. **Wild and Scenic Rivers**. No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

☐ 8. **Tribal Rights**. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

☐ 9. **Water Quality**.

☐ (a) In certain states and tribal lands an individual 401 Water Quality Certification must be obtained or waived (See 33 CFR 330.4(c)).

☐ (b) For NWPs 12, 14, 17, 18, 32, 39, 40, 42, 43, and 44, where the state or tribal 401 certification (either generically or individually) does not require or approve water quality management measures, the permittee must provide water quality management measures that will ensure that the authorized work does not result in more than minimal degradation of water quality (or the Corps determines that compliance with state or local standards, where applicable, will ensure no more than minimal adverse effect on water quality). An important component of water quality management includes stormwater management that minimizes degradation of the downstream aquatic system,

including water quality (refer to General Condition 21 for stormwater management requirements). Another important component of water quality management is the establishment and maintenance of vegetated buffers next to open waters, including streams (refer to General Condition 19 for vegetated buffer requirements for the NWPs).

This condition is only applicable to projects that have the potential to affect water quality. While appropriate measures must be taken, in most cases it is not necessary to conduct detailed studies to identify such measures or to require monitoring.

☐ **10. Coastal Zone Management.** In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived (see 33 CFR 330.4(d)).

☐ **11. Endangered Species.**

☐ (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or is located in the designated critical habitat and shall not begin work on the activity until notified by the District Engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that may affect Federally-listed endangered or threatened species or designated critical habitat, the notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. As a result of formal or informal consultation with the FWS or NMFS the District Engineer may add species-specific regional endangered species conditions to the NWPs.

☐ (b) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the USFWS or the NMFS, both lethal and non-lethal "takes" of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS and NMFS or their world wide web pages at http://www.fws.gov/r9endspp/endspp.html and http://www.nfms.noaa.gov/prot_res/overview/es.html respectively.

☐ **12. Historic Properties.** No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the District Engineer has complied with the provisions of 33 CFR Part 325, Appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)). For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the notification must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

☐ **13. Notification.**

☐ (a) Timing; where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a preconstruction notification (PCN) as early as possible. The District Engineer must determine if the notification is complete within 30 days of the date of receipt and can request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the District Engineer will notify the prospective permittee that the notification is still incomplete and the PCN review process will not commence until all of the requested information has been received by the District Engineer. The prospective permittee shall not begin the activity:

☐ (1) Until notified in writing by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or

☐ (2) If notified in writing by the District or Division Engineer that an Individual Permit is required; or

☐ (3) Unless 45 days have passed from the District Engineer's receipt of the complete notification and the prospective permittee has not received written notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

☐ (b) Contents of Notification: The notification must be in writing and include the following information:

☐ (1) Name, address and telephone numbers of the prospective permittee;

☐ (2) Location of the proposed project;

☐ (3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), Regional General Permit(s), or Individual Permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP (Sketches usually clarify the project and when provided result in a quicker decision.);

☐ (4) For NWPs 7, 12, 14, 18, 21, 34, 38, 39, 40, 41, 42, and 43, the PCN must also include a delineation of affected special aquatic sites, including wetlands, vegetated shallows (e.g., submerged aquatic vegetation, seagrass beds), and riffle and pool complexes (see paragraph 13(f));

☐ (5) For NWP 7 (Outfall Structures and Maintenance), the PCN must include information regarding the original design capacities and configurations of those areas of the facility where maintenance dredging or excavation is proposed;

☐ (6) For NWP 14 (Linear Transportation Projects), The PCN must include a compensatory mitigation proposal to offset permanent losses of waters of the US and a statement describing how temporary losses of waters of the US will be minimized to the maximum extent practicable;

☐ (7) For NWP 21 (Surface Coal Mining Activities), the PCN must include an Office of Surface Mining (OSM) or state-approved mitigation plan, if applicable. To be authorized by this NWP, the District Engineer must determine that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are minimal both individually and cumulatively and must notify the project sponsor of this determination in writing;

☐ (8) For NWP 27 (Stream and Wetland Restoration Activities), the PCN must include documentation of the prior condition of the site that will be reverted by the permittee;

☐ (9) For NWP 29 (Single-Family Housing), the PCN must also include:

☐ (i) Any past use of this NWP by the Individual Permittee and/or the permittee's spouse;

☐ (ii) A statement that the single-family housing activity is for a personal residence of the permittee;

☐ (iii) A description of the entire parcel, including its size, and a delineation of wetlands. For the purpose of this NWP, parcels of land measuring ¼-acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands are and the amount of wetlands that exists on the property. For parcels greater than ¼-acre in size, formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f));

☐ (iv) A written description of all land (including, if available, legal descriptions) owned by the prospective permittee and/or the prospective permittee's spouse, within a one mile radius of the parcel, in any form of ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the-entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

☐ (10) For NWP 31 (Maintenance of Existing Flood Control Facilities), the prospective permittee must either notify the District Engineer with a PCN prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

☐ (i) Sufficient baseline information identifying the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided the approved flood control protection or drainage is not increased;

☐ (ii) A delineation of any affected special aquatic sites, including wetlands; and,

☐ (iii) Location of the dredged material disposal site;

☐ (11) For NWP 33 (Temporary Construction, Access, and Dewatering), the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources;

☐ (12) For NWPs 39, 43 and 44, the PCN must also include a written statement to the District Engineer explaining how avoidance and minimization for losses of waters of the US were achieved on the project site;

☐ (13) For NWP 39 and NWP 42, the PCN must include a compensatory mitigation proposal to offset losses of waters of the US or justification explaining why compensatory mitigation should not be required. For discharges that cause the loss of greater than 300 linear feet of an intermittent stream bed, to be authorized, the District Engineer must determine that the activity complies with the other terms and conditions of the NWP, determine adverse environmental effects are minimal both individually and cumulatively, and waive the limitation on stream impacts in writing before the permittee may proceed;

☐ (14) For NWP 40 (Agricultural Activities), the PCN must include a compensatory mitigation proposal to offset losses of waters of the US. This NWP does not authorize the relocation of greater than 300 linear-feet of existing serviceable drainage ditches constructed in non-tidal streams unless, for drainage ditches constructed in intermittent non-tidal streams, the District Engineer waives this criterion in writing, and the District Engineer has determined that the project complies with all terms and conditions of this NWP, and that any adverse impacts of the project on the aquatic environment are minimal, both individually and cumulatively;

☐ (15) For NWP 43 (Stormwater Management Facilities), the PCN must include, for the construction of new stormwater management facilities, a maintenance plan (in accordance with state and local requirements, if applicable) and a compensatory mitigation proposal to offset losses of waters of the US. For discharges that cause the loss of greater than 300 linear feet of an intermittent stream bed, to be authorized, the District Engineer must determine that the activity complies with the other terms and conditions of the NWP, determine adverse environmental effects are minimal both individually and cumulatively, and waive the limitation on stream impacts in writing before the permittee may proceed;

☐ (16) For NWP 44 (Mining Activities), the PCN must include a description of all waters of the US adversely affected by the project, a description of measures taken to minimize adverse effects to waters of the US, a description of measures taken to comply with the criteria of the NWP, and a reclamation plan (for all aggregate mining activities in isolated waters and non-tidal wetlands adjacent to headwaters and any hard rock/mineral mining activities);

☐ (17) For activities that may adversely affect Federally-listed endangered or threatened species, the PCN must include the name(s) of those endangered or threatened species that may be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work; and

☐ (18) For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

☐ (c) Form of Notification: The standard Individual Permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(18) of General Condition 13. A letter containing the requisite information may also be used.

☐ (d) District Engineer's Decision: In reviewing the PCN for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may submit a proposed mitigation plan with the PCN to expedite the process. The District Engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the District Engineer will notify the permittee and include any conditions the District Engineer deems necessary. The District Engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee is required to submit a compensatory mitigation proposal with the PCN, the proposal may be either conceptual or detailed. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the District Engineer will expeditiously review the proposed compensatory mitigation plan. The District Engineer must review the plan within 45 days of receiving a complete PCN and determine whether the conceptual or specific proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP.

☐ If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then the District Engineer will notify the applicant either:

☐ (1) that the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an Individual Permit;

☐ (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level; or

☐ (3) that the project is authorized under the NWP with specific modifications or conditions. Where the District Engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level. When conceptual mitigation is included, or a mitigation plan is required under item (2) above, no work in waters of the US will occur until the District Engineer has approved a specific mitigation plan.

☐ (e) Agency Coordination: The District Engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

☐ For activities requiring notification to the District Engineer that result in the loss of greater than ½-acre of waters of the US, the District Engineer will provide immediately (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy to the appropriate Federal or state offices (USFWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the District Engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 15 calendar days before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. As required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act, the District Engineer will provide a response to NMFS within 30 days of receipt of any Essential Fish Habitat conservation recommendations. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification.

☐ (f) Wetland Delineations: Wetland delineations must be prepared in accordance with the current method required by the Corps (For NWP 29 see paragraph (b)(9)(iii) for parcels less than ¼-acre in size). The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 45-day period will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.

☐ **14. Compliance Certification.** Every permittee who has received NWP verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include:

☐ (a) A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions;

☐ (b) A statement that any required mitigation was completed in accordance with the permit conditions; and (c) The signature of the permittee certifying the completion of the work and mitigation.

☐ **15. Use of Multiple Nationwide Permits.** The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the US authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit (e.g. if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the US for the total project cannot exceed 1/3-acre).

☐ **16. Water Supply Intakes.** No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may occur in the proximity of a public water supply intake except where the activity is for repair of the public water supply intake structures or adjacent bank stabilization.

☐ **17. Shellfish Beds.** No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWP 4.

☐ **18. Suitable Material.** No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may consist of unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.) and material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the CWA).

☐ **19. Mitigation.** The District Engineer will consider the factors discussed below when determining the acceptability of appropriate and practicable mitigation necessary to offset adverse effects on the aquatic environment that are more than minimal.

☐ (a) The project must be designed and constructed to avoid and minimize adverse effects to waters of the US to the maximum extent practicable at the project site (i.e., on site).

☐ (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

☐ (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland impacts requiring a PCN, unless the District Engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. Consistent with National policy, the District Engineer will establish a preference for restoration of wetlands as compensatory mitigation, with preservation used only in exceptional circumstances.

☐ (d) Compensatory mitigation (i.e., replacement or substitution of aquatic resources for those impacted) will not be used to increase the acreage losses allowed by the acreage limits of some of the NWPs. For example, ¼-acre of wetlands cannot be created to change a ¾-acre loss of wetlands to a ½-acre loss associated with NWP 39 verification. However, ½-acre of created wetlands can be used to reduce the impacts of a ½-acre loss of wetlands to the minimum impact level in order to meet the minimal impact requirement associated with NWPs.

☐ (e) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferably in the same watershed.

☐ (f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., easements, deed restrictions) of vegetated buffers to open waters. In many cases, vegetated buffers will be the only compensatory mitigation required. Vegetated buffers should consist of native species. The width of the vegetated buffers required will address documented water quality or aquatic habitat loss concerns. Normally, the vegetated buffer will be 25 to 50 feet wide on each side of the stream, but the District Engineers may require slightly wider vegetated buffers to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the Corps will determine the appropriate compensatory mitigation (e.g., stream buffers or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where vegetated buffers are determined to be the most appropriate form of compensatory mitigation, the District Engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland impacts.

☐ (g) Compensatory mitigation proposals submitted with the "notification" may be either conceptual or detailed. If conceptual plans are approved under the verification, then the Corps will condition the verification to require detailed plans be submitted and approved by the Corps prior to construction of the authorized activity in waters of the US.

☐ (h) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases that require compensatory mitigation, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.

☐ **20. Spawning Areas.** Activities, including structures and work in navigable waters of the US or discharges of dredged or fill material, in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., excavate, fill, or smother downstream by substantial turbidity) of an important spawning area are not authorized.

☐ **21. Management of Water Flows.** To the maximum extent practicable, the activity must be designed to maintain preconstruction downstream flow conditions (e.g., location, capacity, and flow rates). Furthermore, the activity must not permanently restrict or impede the passage of normal or expected high flows (unless the primary purpose of the fill is to impound waters) and the structure or discharge of dredged or fill material must withstand expected high flows. The activity must, to the maximum extent practicable, provide for retaining excess flows from the site, provide for maintaining surface flow rates from the site similar to preconstruction conditions, and provide for not increasing water flows from the project site, relocating water, or redirecting water flow beyond preconstruction conditions. Stream channelizing will be reduced to the minimal amount necessary, and the activity must, to the maximum extent practicable, reduce adverse effects such as flooding or erosion downstream and upstream of the project site, unless the activity is part of a larger system designed to manage water flows. In most cases, it will not be a requirement to conduct detailed studies and monitoring of water flow.

This condition is only applicable to projects that have the potential to affect waterflows. While appropriate measures must be taken, it is not necessary to conduct detailed studies to identify such measures or require monitoring to ensure their effectiveness. Normally, the Corps will defer to state and local authorities regarding management of water flow.

☐ **22 Adverse Effects From Impoundments.** If the activity creates an impoundment of water, adverse effects to the aquatic system due to the acceleration of the passage of water, and/or the restricting its flow shall be minimized to the maximum extent practicable. This includes structures and work in navigable waters of the US, or discharges of dredged or fill material.

☐ **23. Waterfowl Breeding Areas.** Activities, including structures and work in navigable waters of the US or discharges of dredged or fill material, into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

☐ **24. Removal of Temporary Fills.** Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

☐ **25. Designated Critical Resource Waters.** Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, National Wild and Scenic Rivers, critical habitat for Federally listed threatened and endangered species, coral reefs, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the District Engineer after notice and opportunity for public comment. The District Engineer may also designate additional critical resource waters after notice and opportunity for comment.

☐ (a) Except as noted below, discharges of dredged or fill material into waters of the US are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, and 44 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. Discharges of dredged or fill materials into waters of the US may be authorized by the above NWPs in National Wild and Scenic Rivers if the activity complies with General Condition 7. Further, such discharges may be authorized in designated critical habitat for Federally listed threatened or endangered species if the activity complies with General Condition 11 and the USFWS or the NMFS has concurred in a determination of compliance with this condition.

☐ (b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with General Condition 13, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The District Engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

☐ **26 Fills Within 100-Year Floodplains.** For purposes of this General Condition, 100-year floodplains will be identified through the existing Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps or FEMA-approved local floodplain maps.

☐ (a) Discharges in Floodplain; Below Headwaters. Discharges of dredged or fill material into waters of the US within the mapped 100-year floodplain, below headwaters (i.e. five cfs), resulting in permanent above-grade fills, are not authorized by NWPs 39, 40, 42, 43, and 44.

☐ (b) Discharges in Floodway; Above Headwaters. Discharges of dredged or fill material into waters of the US within the FEMA or locally mapped floodway, resulting in permanent above-grade fills, are not authorized by NWPs 39, 40, 42, and 44.

☐ (c) The permittee must comply with any applicable FEMA-approved state or local floodplain management requirements.

☐ **27. Construction Period.** For activities that have not been verified by the Corps and the project was commenced or under contract to commence by the expiration date of the NWP (or modification or revocation date), the work must be completed within 12-months after such date (including any modification that affects the project).

☐ For activities that have been verified and the project was commenced or under contract to commence within the verification period, the work must be completed by the date determined by the Corps.

☐ For projects that have been verified by the Corps, an extension of a Corps approved completion date may requested. This request must be submitted at least one month before the previously approved completion date.

B. Further Information

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other Federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project.

C. Regional Conditions for Nationwide Permits – Sacramento District

1. Regional Conditions to be applied across the entire Sacramento District:

☐ **1.** Nationwide Permits 14, 29, 39, 40, 41, 42, and 44 are withdrawn from used in histosols, including fens. For the used of all other nationwide permits in fens, project proponents are required to notify the Corps using the notification or PCN procedures of the nationwide permit program (General Condition 13). This will be a "Corps only" notification.

☐ **2.** For all activities using any existing and proposed nationwide permits, mitigation that is required by special condition must be completed before or concurrent with project construction. Where project mitigation involves the use of a mitigation bank or in-lieu fee, payment must be made to the bank or fee-in-lieu program before commencing construction of the permitted activity.

☐ 3. For all nationwide permits requiring notification, except 27, the applicant must provide a written statement to the district engineer explaining how avoidance and minimization of loses of waters of the United States were achieved on the project site.

II. Regional conditions to be applied in California and Nevada.

☐ All existing and proposed nationwide permits are suspended in the Lake Tahoe basin in favor of using General Permit 16.

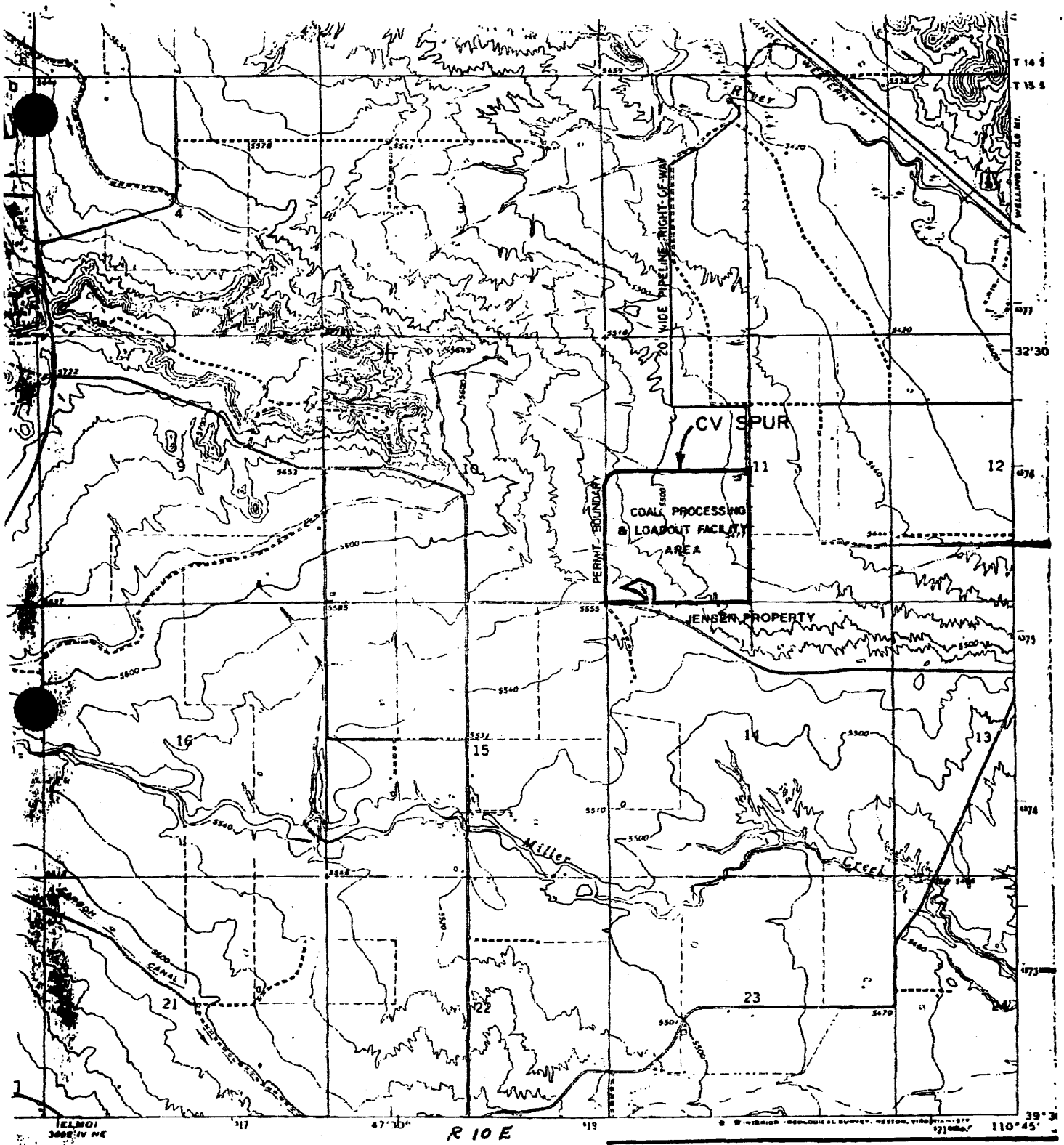
III. Regional conditions to be applied in Utah

☐ For use of any nationwide permit with the following attributes, notification of the Corps of Engineers' Utah Regulatory Office, using the "Notification" procedures of the Nationwide Permit Program (General Condition 13), is required, except where certain nationwide permits are restricted and can not be used as indicated in each category. This will be a "Corps only" notification.

☐ 1. All activities that will affect waters of the U.S. below the elevation 4217 feet msl adjacent to the Great Salt Lake and below 4500 feet msl adjacent to Utah Lake.

☐ 2. Bank stabilization in a perennial stream that would affect more than 100 feet of stream length as measured from the upstream portion of the affected bank to the downstream section, narrow the cross-section of the stream, substantially reduce the riparian vegetation, or increase velocities.

☐ 3. All activities that will affect springs. A spring is an aquatic feature caused by ground water being discharged to the surface, creating wetland and/or stream characteristics. Nationwide Permits 14, 16, 18, 29, 33, 36, 40, 42, 43, and 44 can not be used in spring areas.

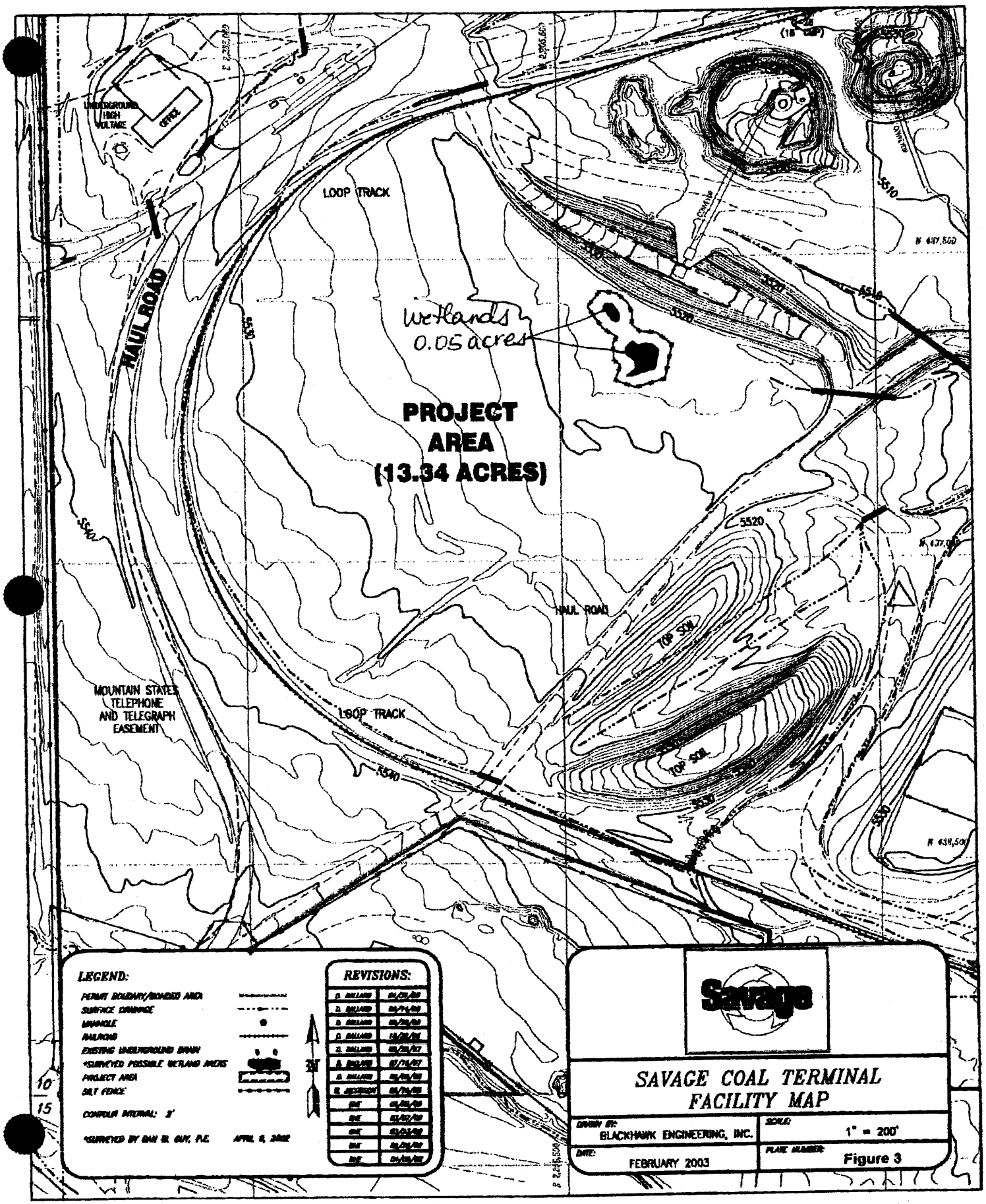


Beaver Creek Coal Company

PERMIT AREA MAP
C.V. SPUR
(U.S.G.S. TOPO)

Prepared by: D GUY	Scale: 1" = 2000'
Department: ENGINEERING	Date: JULY, 1980
Drawn by: D GILMORE	REV. 01-17-03

FIGURE 1


UNDERGROUND HIGH VOLTAGE
OFFICE
LOOP TRACK
HAUL ROAD
Wetlands
0.05 acres
PROJECT AREA
(13.34 ACRES)
MOUNTAIN STATES TELEPHONE AND TELEGRAPH EASEMENT
LOOP TRACK
HAUL ROAD
TOP SOIL
TOP SOIL
5510
5520
5530
5540
N 437,500
N 438,500
LEGEND:
PERMIT BOUNDARY/BONDED AREA
SURFACE DRAINAGE
MANHOLE
RAILROAD
EXISTING UNDERGROUND DRAIN
*SURVEYED POSSIBLE WETLAND AREAS
PROJECT AREA
SILT FENCE
CONTOUR INTERVAL: 5'
*SURVEYED BY RAY B. BUK, P.E. APRIL 8, 2002
REVISIONS:
Savage
SAVAGE COAL TERMINAL
FACILITY MAP
DRAWN BY: BLACKHAWK ENGINEERING, INC.
SCALE: 1" = 200'
DATE: FEBRUARY 2003
PLATE NUMBER: Figure 3

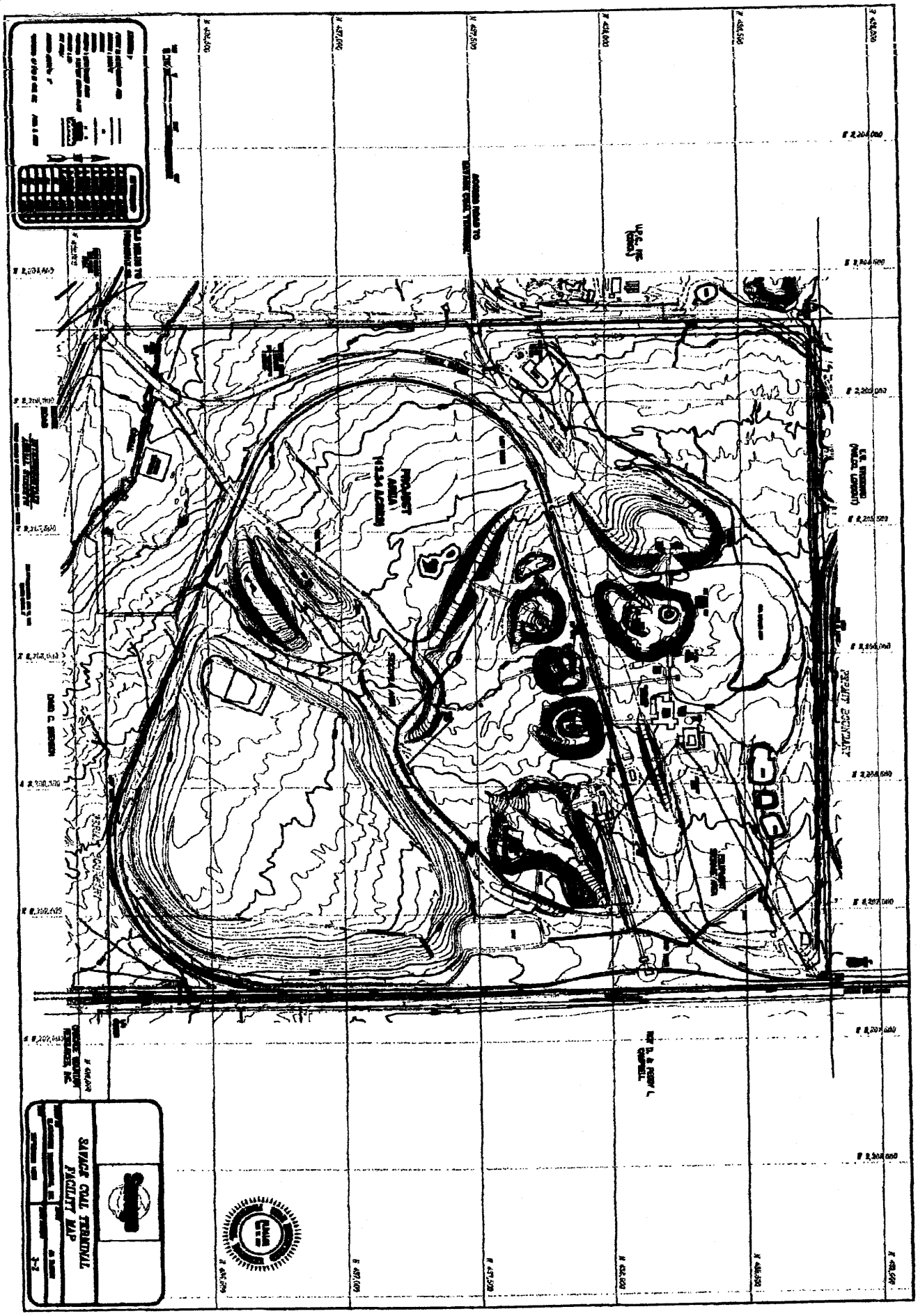


FIGURE 2

ENVIRONMENTAL INDUSTRIAL SERVICES
435-472-3814 • 800-641-2927 • FAX 435-472-8780 • eisec@sisna.com • 31 NORTH MAIN STREET HELPER, UTAH 84526

November 27, 2002

Amy Defreese, Project Manager
U.S. Army Corp of Engineers
Utah Regulatory Office
533 West 2600 South, Suite 150
Bountiful, Utah 84010

RE: Amendment to Wetland Delineation – CV Spur Savage Industries Coal Loadout Area

Dear Ms. Defreese:

Please find attached a copy of the amended wetland delineation our firm performed for the CV Spur Coal Loadout (Submitted 4/11/02, resubmitted with changes 9/17/02). As previously shown, we have delineated 0.05 acres of potential jurisdictional salt flat/wet meadow wetland within the 13.34 acres slated for disturbance using the atypical situation methodology for a man-made induced issue. This amendment includes discussion in atypical methodology, and a better description as to groundwater hydrology present.

If you have any questions regarding this report, or the references to geology, soils and hydrology from the MFP please contact Mel Coonrod of our firm. A site visit will answer your questions to the degree of delineation accuracy, wetland size, and would facilitate the UDOGM permit process (currently on hold due to this issue). Also, please contact Mr. Dan Guy at (435) 637-2431 for questions regarding the actions to be taken, UDOGM concerns, and the company involved.

Sincerely,

David Steed
Project Manager

WETLAND DELINEATION
FOR THE
SAVAGE INDUSTRIES
CV SPUR COAL PROCESSING FACILITY
WELLINGTON, UTAH
CARBON COUNTY

Conducted By

DAVID STEED
EIS ENVIRONMENTAL & ENGINEERING CONSULTING
31 NORTH MAIN
HELPER, UTAH
(435) 472-3814

Introduction

Proposed Action Savage Industries (Savage) is proposing to expand their existing CV Spur Coal Loading Facility near Wellington, Utah in Carbon County (Plate I). Access to the site is via U.S. Highway 10 to Ridge Road approximately nine miles south of Price, Utah. Approximately 13.34 acres currently maintained as an undisturbed area would be incorporated into the existing surface facility to allow for the expansion of coal processing, storage and unit train coal loading.

Background The 13.34 acre undisturbed area identified for expansion is located within the Utah Division of Oil, Gas and Mining (UDOGM) permitted CV Spur Facility. Vegetation at the site was described in 1980 prior to the development of the CV Spur to facilitate the UDOGM permitting process. This area is generally made up of salt desert shrub species (*Atriplex confertifolia*, *Atriplex cuneta*, *Sarcobatus vermiculatus*) on moderately deep Mancos Shale clay derived soil types. Small, shallow runoff channels transect the site from the west to the east.

To the immediate west of the disturbed area boundary of the CV Spur Facility, an area within one of these shallow channels is briefly described in the 1980 report within the CV Spur Mine Reclamation Plan (MRP) as a sedge meadow. This site, though unsupported with any data (no vegetation species list, description of hydrologic function, or hydric soil identification), is identified on current MRP maps as a wetland. Since the original permit was written and the CV Spur Facility developed, the operators of the facility have maintained the area designated as sedge meadow/wetland as part of the undisturbed area. No surface activities have occurred within the site since this designation by the operator and UDOGM in the early 1980's.

As shown on Plate I, a historic open seasonal irrigation canal runs along the western edge of this site

(to be piped in 2003-2005), as does a county highway (referred to as Ridge Road), and a portion of railroad track developed for the CV Spur Facility in early 1980's. A paved entrance road parallels the tracks to allow coal haul trucks access to the facility. To the immediate east of the site is the edge of the disturbed coal loading facility and the raised terrace of the coal pile storage site. Also located within the immediate area are indications of past agricultural actions (i.e. ditches and terracing). These disturbances are shown clearly within the MRP aerial photomaps (See Attached). A historical review of the site indicated that farming actions were attempted within the site in the early and mid-1900's, but were abandoned by the farm owner at the time due to lack of production resulting from the high clay and salt content of the Mancos Shale soil substrate. At some time prior to development of the site facility, fill material (road base) was added to the northern end of the area (along and adjacent to the terraced coal stacking facility).

Need for Delineation Since the area was 1) identified as sedge meadow within the 1980 vegetation survey for the original UDOGM permit and 2) is currently shown on aerial photomaps within the MRP as a wetland, UDOGM has required that Savage, as the current operator of the CV Spur Facility, determine if the sedge meadow/wetland identified in the 1980 report and MRP maps is present, and if so, prepare a wetland delineation of the site prior to their approval of the facility expansion. EIS Environmental & Engineering Consulting (EIS) of Helper, Utah, a U.S. Army Corp Of Engineers (COE) approved wetland delineator, was contacted in April 2002 by Dan Guy, Environmental Coordinator for Savage to evaluate and inventory the 13.34 acre area proposed for facility expansion to determine if any area within it meets current wetland delineation standards.

Methodology

Atypical Situation Determination Utilizing procedures and protocol from the 1987 Corp of Engineers (COE) Wetland Delineation Manual (As amended), an atypical situation determination for man-induced wetlands was conducted. A routine site determination was ruled out due to the degree of pre-law development within the project area. A comprehensive determination was ruled out due to the size of the site and lack of complex functional values within the site (hydrological conditions, vegetation communities, etc.). The site was inventoried in April using the routine site forms. Atypical situation site forms were later prepared using the data from the routine site data sheets.

Data Review Review of data resources conducted prior to on-site analysis revealed the past use of the site for the activities previously described. The construction of the access road and rail line in the early 1980's was conducted prior to development of the COE 1987 manual (as amended). These transportation corridors were constructed across a wet area (as shown on the MRP aerial photomaps) located immediately below the existing irrigation canal that parallels the Ridge Road. The fill previously described was most likely added to the site during the pre-facility use as farmland and agriculture. Discussions with staff associated with the Savage facility indicated that these previous action were completed prior to their association with the site and ownership of the parcel in question.

Groundwater hydrology within the area was monitored through a series of monitoring wells between 1980 and 1988. This discussion is included within the resource discussion of the UDOGM MFP. Geological and hydrological evaluations conducted during the operation of this facility indicate that no regional groundwater table is present, though a perched water table exists at some locations

within the site. The perched, highly saline water table is located above the impermeable Bluegate Shale within alluvium, weathered shale, and gravelly pods. The nearest springs or wells are located near Wellington, Utah on the other side of the Price River; some 2.5 miles down gradient and to the east of the site in a separate drainage. During the period of monitoring, seasonal fluctuations in water levels within some of the monitoring wells near the project site was observed. This seasonal fluctuation in water levels corresponded to the seasonal use of the adjacent canal, upland from the wells. When in full use in mid to late summer, water levels within nearby wells rose as much as a foot. In low to no use periods in the fall and winter, water levels dropped or were non-existent. Seepage from the adjacent canal, moving downslope was determined to be the factor in the rise and fall of the subsurface aquifer present. The canal is scheduled for piping sometime in 2003 to 2005.

Dan Larsen, Soil Scientist with EIS conducted a review of available soils information and an on-site inventory of the 13.34 acre site in March of 2002. Information included that presented by James P. Walsh and Associates, July 1980, in the MRP; information given by the Natural Resources Conservation Service (NRCS) in the Soil Survey of the Carbon County Area, Utah, 1988; and direct communication with Leland Sasser, soil scientist, NRCS. A small area identified as a possible wetland was mapped as having soils of the Saltair series (poorly drained). Another area was mapped as having Killpack, high water table variant soils, and was included in field evaluation of wetlands. All of the soils in the project area have formed from materials of the Mancos shale and range from shallow to moderately deep. Soil drainage characteristics were noted as being influenced by irrigation water.

On-Site Inventory Following the protocol within the 1987 Corp of Engineers (COE) Wetland Delineation Manual, David Steed, Biologist and Dan Larsen, Soil Scientist for EIS conducted an on-site inventory of the 13.34 acre site on April 8, 2002. Four observation points were selected within the parcel. A dominant woody overstory is not present, though a woody understory of salt desert shrub species is predominant within the site. The herbaceous understory was characterized and noted as to their indicator status (upland vs. wetland). The relative community structure was noted, photographed (Exhibit 1 - 4) and mapped (PLATE I). Where dominant wetland species community cover was in excess of 50 percent, the presence of hydrophytic vegetation was noted. Likewise, hydrological function and presence was noted at each of these points. Presence of flooding, saturated soils, drainage patterns and historic actions (fill and grading) was noted. A soil pit was excavated for each site and soil profile examined. Where hydrophytic vegetation was dominant and hydrological function was present (indications of previous inundated surface condition) soils were evaluated for hydric qualities. Using a Munsell soil guide, color, chroma, and contrast were noted on soils thought to potentially exhibit hydric properties.

Attachment A contains the routine site and atypical field sheets for the four sites reviewed for wetland characteristics. Plate I includes the location of each of these sites.

Results

Site Findings The following table summarizes the wetland character results of the on-site inventory of the 13.34 acre parcel.

Site	Vegetation*	Hydrology	Soils	Community
1	No (5%)	No	No	Salt Desert Shrub
2	No (0%)	No	No	Salt Desert Shrub
3	Yes (60%)	Yes	Yes	Salt Flat-Wet Meadow
4	Yes (90%)	Yes	Yes	Salt Flat-Wet Meadow

* Included is percent of dominant hydrophytic vegetation present at each site

Areas that were obviously identifiable as upland or fill were noted and eliminated from wetland consideration. Overall, vegetation within these areas consists of salt desert shrub species, including *Atriplex confertifolia* , *Atriplex cuneta*, *Sarcobatus vermiculatus*, and *Chrysothamnus nauseosus*. Wetland hydrology on these sites is absent and the predominant clay loam soils lack hydric characteristics.

The observation points selected for the delineation and described on the field sheets in Attachment A, were chosen due to the questionable wetland characteristics inherent to each of their locations. Points 1 and 2 (Exhibit 1 and Exhibit 2), are located with the area previously described as a sedge meadow/wetland within the MRP. This area did contain some hydrophytic vegetation (*Tamarix pentandra*) and indication of hydric conditions present at one time within the soils (presence of weak reducing and oxidation condition). However, since these sites 1) did not display the sedge meadow identified in 1980 (no sedge species were identified anywhere within the 13.34 acre area), 2) lacked dominance of hydrophytic vegetation (< 50 percent), 3) lacked supportive hydrological conditions (past hydrologic source eliminated due to rail line and road construction) and 4) contained minimal hydric soil characteristics, this area was eliminated from consideration as a jurisdictional wetland for this delineation. This area was considered as now to be part of the upland-salt desert shrub community. Point 3 (Exhibit 3), located along the northern edge of the site and adjacent to the terraced coal facility and along the area of road base fill, included a mix of hydrophytic vegetation (*Distichlis stricta*) and facultative upland shrub species, noticeable hydrological conditions associated with drainage and ponding, and exhibited slightly stronger reducing conditions-hydric soil characteristics within the shallow clay loam Libbings-Killpack transition present. This 0.01 acre portion of the parcel along the northern boundary and adjacent to the disturbed area was determined to be a salt flat-wet meadow wetland. Point 4 (Exhibit 4) contained predominant hydrophytic vegetation (*Distichlis stricta*), exhibited saturated and reducing soils and noticeable hydric characteristics (drift lines on vegetation and drainage patterns) and was determined to be part a salt flat-wet meadow wetland. This 0.04 acre site, though separated by a portion of upland and by pre-law fill is interconnected, thus forming a 0.05 acre jurisdictional site. This area is most likely the remnant of the pre-transportation corridor disturbed drainage channel associated with shallow sub-surface flows from the historic irrigation canal approximately 0.33 miles from the site.

Wetland-Nonwetland Boundary Approximately 0.05 acres of the 13.34 acre parcel would be considered a wetland as defined by the COE. A wetland-nonwetland (upland/fill) boundary was determined using the qualitative on-site observations of the overall site and presence of hydric conditions surrounding the identified jurisdictional wetlands. Though salt grass was located outside of the 0.05 acre site, lack of hydrologic condition or hydric soils eliminated these areas from consideration. This separation was determined by the location and drainage from the upland areas discussed, presence of historic fill, and proximity to the adjacent disturbed area terrace (which acts to

impound water draining towards the identified wetland).

Hydric flow to the site from its historic source is limited due to the development of the transportation corridors. Terracing from the disturbed area, past pre-law fill, and any surface flow on the heavy clay resulting from precipitation are all the appear to be currently creating and supporting this 0.05 acre site. Subsurface water most likely does not support the site due to the shallow depth to weathered shale and heavy clay constituents of the substrate. The site appears to be reducing in size and appears to be non-functional. At Points 3 and 4, the soils show evidence of periodic saturated conditions. Field interpretation suggests that most of these soil features developed under a wetter environment that what is currently present. It was noted that the soils did not fit the Saltair soil series concept and are more like the Libbings soils as described by the NRCS. The soils are moderately deep over shale bedrock rather than being deep and they are not as wet as the Saltair soils. The weak indication of past hydric action within soil surrounding the site identified in 1980 as a sedge meadow indicates that the potential for a wetland in the past was possible, with the site most likely being supported by seepage from the irrigation canal to the south. Field inspection of the site indicates a changed condition over the previous soils mapping. Although there is some local accumulation of runoff water, the main supply of water from irrigation canals is no longer present.

References

EIS. 2002. Soil Survey of CV Spur Undisturbed Area

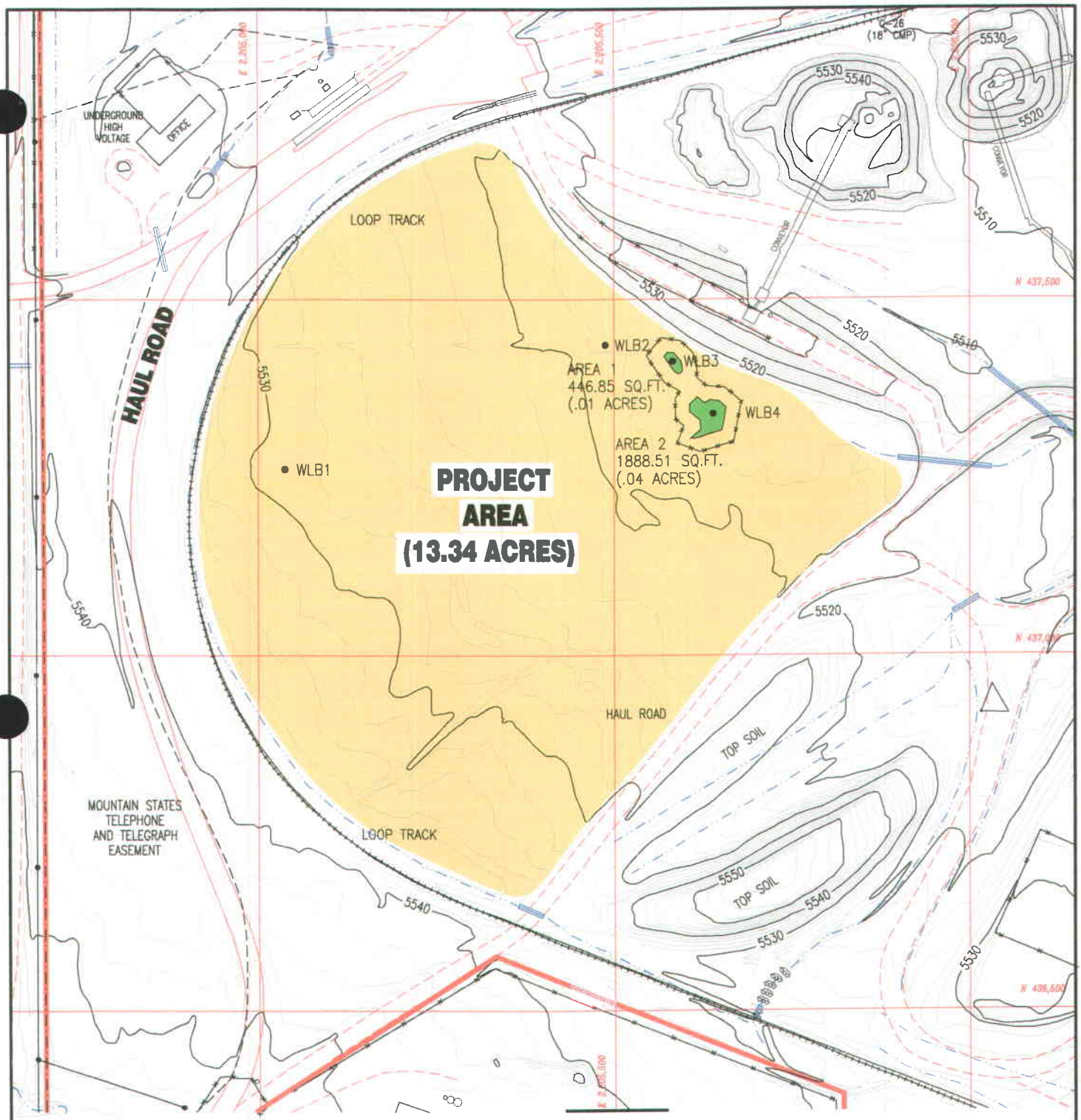
Environmental Laboratory. 1987, (As amended). Corp of Engineers Wetland Delineation Manual, Technical Report Y-87-1m U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

UDOGM and Savage Industries. 2002 Mine and Reclamation Plan Permit for the CV Spur Loadout.

U.S. Department of the Interior. 1988. National List of Plant Species that Occur in Wetlands: Utah, U.S. Fish and Wildlife Service Biological Report, St. Petersburg, Florida.

PLATE I

LOCATION MAP WITH IDENTIFIED WETLANDS



LEGEND:

- PERMIT BOUNDARY/BONDED AREA
- SURFACE DRAINAGE
- MANHOLE
- RAILROAD
- EXISTING UNDERGROUND DRAIN
- *SURVEYED POSSIBLE WETLAND AREAS
- PROJECT AREA
- SILT FENCE

CONTOUR INTERVAL: 2'

*SURVEYED BY DAN W. GUY, P.E. APRIL 9, 2002

UTAH REGISTERED PROFESSIONAL ENGINEER #154168 DAN W. GUY

N

Savage

SAVAGE COAL TERMINAL FACILITY MAP

SCALE:	DRAWN BY:
1" = 200'	BLACKHAWK ENGINEERING
DATE:	PLATE:
FEBRUARY 2003	PLATE 1

EXHIBITS

EXHIBITS

Exhibit 1
Within old drainage area

Exhibit 2
At base of old drainage

Exhibit 3
Near coal storage terrace.

Exhibit 4
View looking towards identified wetlands.

COE DELINEATION FIELD SHEETS

ATYPICAL SITUATION DETERMINATION – SITES 1-4
ROUTINE, SMALL AREA DETERMINATION – SITES 1-4

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: CV Spur - Savage Lowmont
Applicant/Owner: Savage Industries
Investigator: D. Steed w/ O. Lorsen

Date: 4/8/02
County: Cache
State: Utah

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: #1
Transect ID: _____
Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Sarcobatus vermiculatus	WS	FACU
2. Chrysothamnus nauseosus	WS	FACU
3. Sisymbrium altissimum	HF	FACU-
4. Rosa americana	HF	FACU
5. Tamarix	WS	FACW
6. Halogeton glomeratus	HF	FACU
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 5-10%

Remarks: No Carex species evident
- plants still dormant - no greening yet

HYDROLOGY

X Recorded Data (Describe in Remarks):
__ Stream, Lake, or Tide Gauge
X Aerial Photographs
__ Other
__ No Recorded Data Available

Field Observations:
Depth of Surface Water: 0 (in.)
Depth to Free Water in Pit: 0 (in.)
Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
__ Inundated
__ Saturated in Upper 12 Inches
__ Water Marks
__ Drift Lines
__ Sediment Deposits
WEAK X Drainage Patterns ~~in Wetlands~~
Secondary Indicators (2 or more required):
__ Oxidized Root Channels in Upper 12 Inches
__ Water-Stained Leaves
__ Local Soil Survey Data
__ FAC-Neutral Test
__ Other (Explain in Remarks)

Remarks: - Weak drainage pattern - old and not consistent

SOILS

Map Unit Name (Series and Phase): Kim B, (Kilpatrick, High Water Table Variant) Drainage Class: Somewhat poor to well drained

Taxonomy (Subgroup): Typic Fragiaquept Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4	A	2.5Y 3/2	—	—	SICL, WK GR, WTNPL
4-8	B_2	2.5Y 4/2	7.5YR 4/6	FEW, FINE DISTINCT	SICL, MASSIVE, WTNPL
8-22	C_{2y}	2.5Y 4/2	white pockets 2.5Y 7/2	—	SICL-SIL, MASSIVE, very hard breaks to MASSIVE

Profile is dry

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- X Reducing Conditions and Oxidizing
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: 4-8" layer has some light spots (carbonates, silt), strong effervescence w/ 10% HCl, some evidence of past wet condition, but now dry environment, no apparent water source indicated

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ~~Yes~~ No (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

Is this Sampling Point Within a Wetland? (Circle) Yes (No)

Remarks:

Area mapped as sedge meadow in 1980

⇒ Not apparent now, area is drying out, w/ receeding hydrophytic vegetation (drying out)

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: CV Spur - Savage Loadout Applicant/Owner: Savage Investigator: D. Steen w/ D. Langer	Date: 4/8/02 County: Carbon State: Utah
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: #2 Transect ID: Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. S. vermiculatus	WS	FACW	9.		
2. Atriplex confertifolia	WS	FACW	10.		
3. S. altissimum	HF	FACW-	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0 %

Remarks: Typical Salt Desert Shrub Habitat

HYDROLOGY

X Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- X Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Weak, old drainage - no surface water flow indications in some time (+5 yrs)

SOILS

Map Unit Name (Series and Phase): Km Bg (Killpack)

Drainage Class: somewhat poor

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup): Typic Torriorthents

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1	A_1	10YR 2/2			SIL
1-4	A_2	2.5Y 4/3			SICL, WFGR
4-9	B_2	10YR 4/3 - 2.5Y 4/3	10YR 5/4 *	few, fine, faint	SICL, WMSBK
9-16	C_{2y}	2.5Y 4/3 - 4/3	**		SICL, WMSBK
16-20	C_{p1}	2.5Y 4/2			≈ 80% soft shale frag
20+	C_{p2}	≈ 100% shale			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: * common 2.5Y 7/2
** abundant 2.5Y 7/2
may be a Libbings soil

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes **No** (Circle)	(Circle)
Wetland Hydrology Present?	Yes **No**	Is this Sampling Point Within a Wetland? Yes **No**
Hydric Soils Present?	Yes **No**	

Remarks: See Point #1 Comments

Receeding old drainage w/ no surface support

Approved by HQUSACE 2/92

DATA FORM 3

ATYPICAL SITUATIONS

Applicant Name: SAVAGE INDUSTRIES Application Number: _____ Project Name: CU SPUR - SAVAGE LOOP

Location: Carbon County, UT Plot Numbers: 1-2 Date: 4/8/02

A. VEGETATION:

1. Type of Alteration: ROAD CONSTRUCTION AND ROW LINE BUILT IN 1980, ALSO NEAR COAL STORAGE FACILITY EMBANKMENT BUILT AT SAME TIME

2. Effect on Vegetation: VEGETATION PRESENT THAT IS EACH, BUT MOSTLY ORUPHYTIC SPECIES

3. Previous Vegetation: VEGETATION IN PLACE IS TYPICAL ALMOST (Attach documentation) SEE MFP AND AERIAL PHOTOS

4. Hydrophytic Vegetation? Yes _____ No X

B. SOILS:

1. Type of Alteration: SAME AS VEGETATION - NO AFFECT TO SOILS FROM FIRE

2. Effect on Soils: PRESENCE OF ORGANIC MATTERS, WITH DRYING CONDITIONS OVER TIME

3. Previous Soils: SEE ROUTINE DETERMINATION AND (Attach documentation) MFP.

4. Hydric Soils? Yes _____ No X

C. HYDROLOGY:

1. Type of Alteration: CONSTRUCTION OF ROAD, ROW LINE AND COAL FACILITY WITHIN CUP SURFACE EPHEMERAL DRAINAGE

2. Effect on Hydrology: AREA IS DRYING OUT, RUNS FROM SURFACE IRRIGATION OR CHANNEL PROHIBITED BY ALTERATIONS

3. Previous Hydrology: NEVER IRRIGATED, BUT RECEIVED (Attach documentation) FLOWS FROM IRRIGATION CANAL

4. Wetland Hydrology? Yes _____ No X

Characterized By: D SEED

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: CV Spur - Savage Loadout Applicant/Owner: Investigator:	Date: 4/8/02 County: Carbon State: Utah
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: #3 Transect ID: Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Distichlis stricata	HF-6	FACW+	9.		
2. C. nauseosus	WS	FACU	10.		
3. S. vermiculatus	WS	FACU	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 60%

Remarks: ✓ Good mosaic of saltgrass and salt desert shrub upland species
✓ Fill/Road base along N. edge

HYDROLOGY

X Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- X Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- X Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Apparent drift lines/pumping in recent past (last year?)

SOILS

Map Unit Name (Series and Phase): Liddings / Kilpack Transition

Drainage Class: Somewhat poor

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup): Typic Sarcothid / Typic Torch.

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2	Ad	2.5Y 2.5/1			SICL ES
2-8	AB	2.5Y 3/2 + 3/3			SICL-SIC, MFSBK EF
8-14	C_2	2.5Y 4/2	2.5Y 5/4	Few, Med, Faint	SIC, MFBSK, HARD EV
14-18	C_2 y	2.5Y 4/2	*		SIC V. Hard

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- X Reducing Conditions – marginal
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: * common white spots – carbonates and salt crystals dry profile, slightly moist below 4"

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No (Circle)
Wetland Hydrology Present? Yes No
Hydric Soils Present? Yes No

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks:

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: CV Spur - Savage Landfill Applicant/Owner: Savage Investigator: O. Steed w/ O. Lansen	Date: 4/8/02 County: Carbon State: Utah
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: #4 Transect ID: ____ Plot ID: ____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. O. stricata	HF-6	FACW+	9.		
2. Agropyron cristatum	6	FACU+	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 90%

Remarks: mix of upland shrubs mark border (area of drier soils, higher in drainage

HYDROLOGY

✓ Recorded Data (Describe in Remarks): __ Stream, Lake, or Tide Gauge ✓ Aerial Photographs __ Other __ No Recorded Data Available Field Observations: Depth of Surface Water: 0 (in.) Depth to Free Water in Pit: 0 (in.) Depth to Saturated Soil: 0 (in.)	Wetland Hydrology Indicators: Primary Indicators: __ Inundated __ Saturated in Upper 12 Inches ✓ Water Marks ✓ Drift Lines __ Sediment Deposits ✓ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): __ Oxidized Root Channels in Upper 12 Inches __ Water-Stained Leaves __ Local Soil Survey Data __ FAC-Neutral Test __ Other (Explain in Remarks)

Remarks: presence of a basin, wetted area

SOILS

Map Unit Name (Series and Phase): Li (Libbings)

Drainage Class: Poor - somewhat poor

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup): Typic Sandorthids

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6	A	2.5Y 3/2	2.5Y 4/3	FEW, med, faint	SICL, SFGR
6-14	B2	2.5Y 4/2	10YR 5/8	FEW, FINE, distinct	SICL, MMGR-SBK
14-20	C2	2.5Y 5/3	7.5YR 5/6	common, med, distinct	SICL-SIL-massive

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- X Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Drainage has changed (? due to fill to N.) 1980 survey identified area as Sandair series - not now, disturbance influence - coal dust/chunks on surface, fill

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No (Circle)
Wetland Hydrology Present? Yes No
Hydric Soils Present? Yes No

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks:

Strong boundary w/ upland based on soil character

Approved by HQUSACE 2/92

DATA FORM 3

ATYPICAL SITUATIONS

Applicant Name: Savage Industries
Application Number: _____
Project Name: CV Spur - Savage Landout
Location: Carbon County, Ut
Plot Number: 3-4
Date: 4/8/02

A. VEGETATION:

1. Type of Alteration: Same as Plots 1 and 2 pre can road, railline and embankment vegetation is 60-90% FACW.

2. Effect on Vegetation: Area still maintains enough seasonal moisture due to embankment in low drainage to maintain FACW spp.

3. Previous Vegetation: Same. Little change
(Attach documentation) _____

4. Hydrophytic Vegetation? Yes X No _____.

B. SOILS:

1. Type of Alteration: Same as Points 1 and 2

2. Effect on Soils: Little change within boundary area

3. Previous Soils: Same
(Attach documentation) See MF? and routine determination

4. Hydric Soils? Yes X No _____.

C. HYDROLOGY:

1. Type of Alteration: Road and railline closed irrigation fed drainage, embankment holds moisture in drainage.

2. Effect on Hydrology: Change drainage pattern

3. Previous Hydrology: See MF? and maps
(Attach documentation) _____

4. Wetland Hydrology? Yes X No _____.

Characterized By: D. Seed

Savage Services Corporation
Savage Coal Terminal
C/007/022

Chapter 4

Land Use

R645-301-400

Table of Contents
Savage Coal Terminal
Chapter 4 - Land Use

R645-301-400.	Land Use and Air Quality
R645-301-410.	Land Use
R645-301-411.	Environmental Description
R645-301-412.	Reclamation Plan
R645-301-413.	Performance Standards
R645-301-420.	Air Quality
R645-301-422.	Air Quality Control Plan
Appendix 4-1	Property Agreement
Appendix 4-2	Utility Easements
Appendix 4-3	Division of Air Quality Approval Order
Plate 4-1	Archeological Map (In Confidential Binder)

R645. Natural Resources; Oil, Gas and Mining; Coal.

R645-301. Coal Mine Permitting: Permit Application Requirements.

R645-301-400. Land Use and Air Quality.

The rules in R645-301-400 present the requirements for information related to Land Use and Air Quality which are to be included in each permit application.

410. Land Use.

The Savage Coal Terminal proposed permit area is presently being used as a coal preparation and loadout facility. Plate 5-2 Surface Facilities Layout, shows the existing surface use.

Prior to establishment of coal processing facilities on the land currently known as Savage Coal Terminal, the land was capable of supporting very limited cattle grazing and attempts to establish cultivated crops were not feasible (personal communication, R.D. Campbell).

The prior owner of the land estimated 120 acres would be needed for every animal unit grazed. Approximately 41 acres of this land contained cultivated crops during the 1940's until it became economically unfeasible to continue the operation. The prior cultivated area is currently influenced by weed invasion and holds little, if any, value for grazing.

411. Environmental Description.

Range Characteristics.

Two range sites existed on the Savage Coal Terminal property prior to disturbance. They are the Desert Shallow Shale and Desert Loamy Shale ranges sites. Due to the amount of disturbance that has occurred on this area, a very limited acreage of these range sites is now present (U.S. Department of Agriculture, 1975).

The Desert Shallow Shale range site is characterized by nearly level to steep sloping shale hills and elevations range from 4000 to 6500 feet. Native vegetation at climax stage is approximately 25% grasses, 5% forbes, and 70% shrubs. Total annual production is 200 pounds per acre air-dry in favorable years, 150 pounds in average years, and 100 pounds in unfavorable years. (See Chapter 3 for a more detailed discussion of vegetation).

Approximately 75 to 80% of the plants supply some forage for livestock. Plant species are few in number but of enough variety to provide good nutrition for cattle and sheep. The site is grazed to best advantage during the winter.

The soils on this site are very shallow, fine, and moderately fine textured. They are unstable and puddle easily. In places, the underlying soft decomposing shale is exposed. Moisture holding capacity is 1 to 2 inches and water supplying capacity is 1 to 2.5 inches.

This site is poor for camping, picnicking, hiking, and hunting. Wildlife habitat is poor to very poor. Only small mammals and birds are known to use this site.

The Desert Loamy Shale range site is characterized by nearly level to moderately steep slopes, and elevations are from 4000 to 5000 feet. Native vegetation and climax stage is 40% grasses, 5% forbes, and 55% shrubs. Total annual production is 400 pounds per acre air-dry favorable years, 275 pounds per acre air-dry average years, and 150 pounds per air-dry unfavorable years. (See Chapter 3 for a more detailed discussion of vegetation).

Approximately 90 to 95% of the plants supply some forage for livestock. Plant species are extremely limited in yield and number of species. Enough variety exists to provide excellent nutrition for sheep and cattle. The site is grazed to its best advantage during the winter.

The soils on this site are shallow and very shallow in depth, medium, moderately fine, and fine textured underlain by shale. These soils are moderately erodible. Moisture holding capacity is 2.5 to 3.5 inches and water supplying capacity is 1.5 to 3.0 inches.

Zoning.

Savage Coal Terminal is currently zoned for industrial use by Carbon County; prior to December 17, 1973, it was zoned agricultural use (personal communication, Joe Delpha, Carbon County Courthouse). Adjacent areas are zoned for either agricultural or industrial use.

411.100. Premining land use information is described under Section 411 above.

411.110. Plate 5-2 depicts the use of the land at the time of this application. The use is described in Section 411 above. There has been no change in the land use over the past 5 years.

411.120. Land capacity in conjunction with other environmental resource information is described in Section 411. above.

411.130. Existing land use and zoning is described under Section 411. above.

411.140. Cultural Resources

Scope

Studies have been completed to ensure that historical and cultural information that might exist on the permit area would not be irretrievably affected by the proposed operations. Literature and field surveys were conducted to determine the presence and/or significance of sites which could warrant inclusion in the National Register of Historic Places. (Refer to Confidential Binder for further information).

411.141. Cultural and historic resources are shown on Plate 4-1. (See Confidential Binder).

411.141.1 There are no known archaeological sites, public parks or other cultural or historical resources listed or eligible for listing in the National Register of Historic Places within the permit or adjacent areas.

411.141.2 N/A - There are no cemeteries located in or within 100 feet of the permit area (See Plate 4-1).

411.141.3. N/A - There is no land within the permit area which is within the boundaries of any units of the National System of Trails or the Wild and Scenic Rivers System, including study rivers designated under section 5(a) of the Wild and Scenic Rivers Act.

411.142. Complete information on studies and coordination efforts are described in Section 411.140 above. As indicated in Section 411.141.1, there are no publicly owned parks or places listed on the National Register of Historic Places that may be adversely affected by the proposed coal mining and reclamation operations.

411.142.1. N/A - None listed.

411.142.2. N/A - None Listed.

411.143. The Division may require the applicant to identify and evaluate important historic and archeological resources that may be eligible for listing on the national Register of Historic Places through:

411.143.1. Collection of additional information;

411.143.2. Conducting field investigations; or

411.143.3. Other appropriate analyses.

411.144. This site was disturbed prior to SMCRA, and has been in continuous operation since 1977. The studies conducted on the permit and adjacent areas have indicated only one historic site within 1000 feet of the study area. As indicated in Section 411.140, the site is outside the permit area and removed from any activity associated with the coal terminal, and there will be no impact to the site as a result of the operation.

411.200. The permit area was previously used for limited agricultural purposes. In 1973, the site was re-zoned for industrial use and the area was utilized as a coal processing and shipping site for Utah Power. Swisher Coal Co. purchased the site in 1976, and began construction of most of the facilities that exist today. The property has changed owners since the original construction; however, it has remained in continuous operation as a coal processing and shipping facility since 1977. This is a surface-located coal processing facility. There are no mining activities conducted at this site.

411.210 through 411.250. N/A - No mining at this site.

412. Reclamation Plan.

The complete reclamation plan for the site is described in Section 540. of this permit. The proposed reclamation plan is to restore the area to a wildlife habitat as described in the following section.

412.100. Postmining Land-Use Plan. Each application will contain a detailed description of the proposed use, following reclamation, of the land within the proposed permit area, including a discussion of the utility and capacity of the reclaimed land to support a variety of alternative uses, and the relationship of the proposed use to existing land-use policies and plans. The plan will explain:

412.100. The proposed post-mining land use for the Savage Coal Terminal is "Light Industrial", since the area is presently zoned for industrial use. However, since the pre-disturbance land use was primarily song bird and small mammal habitat, Savage Services Corporation will reclaim toward this goal to maximize usable area for wildlife in the event local economics preclude continued industrial use of the site.

Livestock grazing and agricultural use are not proposed as post-mining land uses, even though both activities did take place here during the pre-mining period. As discussed earlier in this chapter, both activities met with little or no success, and it would be counter-productive to propose a land use that has already been proven unsuccessful at this site.

412.110. The proposed post-mining land use is to be achieved by regrading and reseeding the area as described in Section 540.

412.120. N/A - Reclamation is not for range or grazing purposes.

412.130. N/A - Post mining land use is the same as the pre-mining land use.

412.140. This is private-owned land which is zoned for industrial use. The proposed post-mining land use is consistent with the local land use designations for this area - i.e. - industrial/agricultural.

412.200. Savage Services Corporation is the owner of record of this site.

412.300. This is a renewal of an existing, approved permit for this site. Regrading and revegetation plans discussed in Section 540. have previously been determined to be compatible with the natural surroundings and the approved post-mining land use.

413. Performance Standards.

The reclamation of the site is described in detail in Section 540. of this plan.

413.100. The reclamation plan in Section 540. is designed to restore all disturbed areas in a timely manner to the uses they were capable of supporting prior to disturbance. (See Section 412.100 for post-mining land use).

413.110. See 413.100 above.

413.120. See 413.100 above.

413.200. Determining Premining Uses of Land.

413.210. The pre-mining use of this land has been described in Section 411.

413.220. The post-mining land use is compatible with the pre-mining land use, as described in Section 412.100. The area will be reclaimed as described in Section 540.

413.300. N/A - No alternate land uses are proposed for this site.

414. N/A - No alternate postmining land use approval is requested for this site.

420. Air Quality.

Existing Environment

Climate

The climate of the Price, Utah area is varied and strongly influenced by topography. The climate can be characterized as arid, specifically dry continental. The prevailing local low-level meteorological influences are mountain-valley breeze systems. The low amount of annual precipitation is a result of the Sierra Nevada and Cascade Ranges which act as natural barriers and prevent moist maritime air from the North Pacific from reaching the interior basins to the east.

422. Air Quality Control Plan

The Savage Coal Terminal is operated under an approved Air Quality Permit DAQE-ANI793003-06, issued by the State of Utah Department of Environmental Quality, on August 16, 2006. A copy of the approval order is included in Appendix 4-3.

423. N/A - This is not a Surface Mining operation.

423.100. N/A

423.200. N/A

424. N/A - This is not a Surface Mining Operation.

425. N/A - This is not a Surface Mining operation.

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Appendix 4-1

Property Agreement

Savage Services Corporation
Savage Coal Terminal

AGREEMENT

THIS AGREEMENT made and entered into this 3RD day of August, 1977 by and between GENERAL EXPLORATION COMPANY, a ~~Texas~~ DELAWARE corporation, hereinafter referred to as "GEX" and ROY D. CAMPBELL and PEGGY L. CAMPBELL of Carbon County, State of Utah, hereinafter jointly referred to as "Campbells",

W I T N E S S E T H :

WHEREAS, Campbells are the owners of a residence, farmlands and related property located near Wellington, Carbon County, Utah, and

WHEREAS, Utah Power & Light Company, hereinafter UP & L has heretofore operated a coal storage and loading facility on property adjoining the Denver and Rio Grande railroad spur which loading operations and railroad facilities are located adjacent to the residence, farmlands and related property owned by Campbells, and

WHEREAS, UP & L has terminated its coal storage and loading operations on said adjoining property and has given to Campbells an option to purchase the property, consisting of approximately 153 acres, a copy of which option, dated July 29, 1977, is attached hereto as Exhibit "A", and

WHEREAS, said option was granted by UP & L to Campbells as part of a settlement of claims for nuisance and damages by the Campbells against UP & L as a result of said coal storage and loading operations, and

WHEREAS, GEX desires to acquire Campbells' rights in said option, dated July 29, 1977, and to place upon the property described therein a coal storage, processing and loading facility generally as depicted and described in Exhibit "B" attached hereto, and

Option executed - see correspondence and UT-310-1-1

SC-CL-0993

WHEREAS, GEX desires in connection with the operation and construction of said facility to be relieved of any claims which might be made by Campbells, their heirs, successors and assigns for nuisance or for damages as a result thereof, and

WHEREAS, Campbells are willing to assign to GEX their rights under said option and to permit the construction and operation on a permanent basis, the said coal storage, processing and loading facility upon the terms and conditions herein set forth, and to relieve GEX of any claims for nuisance or damages which result from the contemplated activities on the option property, and

WHEREAS, the parties desire in this agreement to set forth their agreement.

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

1. Campbells do by this agreement hereby assign to GEX all of their right, title and interest in and to said option agreement, dated July 29, 1977, Exhibit "A". As consideration for said assignment, GEX hereby agrees to pay concurrently with the execution of this agreement the sum of $7,500.00 of which $2,500.00 represents a reimbursement to Campbells for the option payment to UP & L for said option. In connection with said option agreement Campbells hereby agree to use their best efforts in cooperation with GEX to obtain a reduction in the purchase price of the property described in said option from UP & L. As further consideration of the assignment of said option by Campbells, and the agreement to cooperate toward reducing the purchase price, GEX hereby agrees to timely exercise said option and to purchase the property described therein. GEX further agrees that for so long as Campbells own the adjoining property it

will not transfer, convey, assign or sell the property described in the option to any third party without the consent of Campbells, unless such transfer, conveyance, assignment or sale is made to a third party which shall agree in writing to be bound by the terms of this agreement. GEX also hereby agrees that for so long as the adjoining property owned by Campbells is used for farming operations by Campbells, their heirs, administrators and assigns and persons so using and operating the said adjoining property reside thereon, the covenants of GEX under this agreement willrun with the option land so as to protect the Campbells, their heirs, administrators and assigns against other parties who may wish to conduct on the premises described in the operations which are objectionable to Campbells.

2. Campbells have applied to the SCS office for assistance in lining the ditches which transverse the said option property. GEX hereby agrees that it will pay all sums related to such lining of said ditches to the extent the same are not paid by SCS, not to exceed $5,000.00.

3. GEX hereby promises and agrees to pay to Campbells as compensation for the nuisance which it is anticipated their activities and operations on the option property will cause the Campbells in the form of noise, dust, lights, smells and other similar objectionable features of their operation the sum of per year in advance for the first five (5) years of their operation, that is, for the period commencing January 1, 1978 through and including January 1, 1982 and thereafter at the rate of per year for each and every year that GEX conducts operations on the option property. It is understood and agreed that the obligations to pay nuisance damages as above set forth shall be a covenant that shall run with the option property for so long as the

adjoining property owned by Campbells is used for farming operations by Campbells, their heirs, administrators and assigns and persons so using and operating the said adjoining property reside thereon.

4. Campbells hereby agree that in consideration of the nuisance payments provided in the next preceding paragraph hereby waive and relinquish any and all rights to claim that the operations of GEX on the option property are a nuisance or cause of any kind of damage to Campbells, so long as said operations are carried on generally as indicated on Exhibit "B" attached hereto, it being understood that GEX shall have the right to make such reasonable changes from time to time as may be needed to maintain, upgrade and update their said facilities and operations. In this regard, the Campbells do hereby also acknowledge and agree that the said waiver and relinquishment of the right to claim nuisance and damage run with title to the land which they presently own adjacent to the option property, including the properties they presently own, in sections 2 and 11.

5. During the period while this agreement is in effect, GEX will not voluntarily grant to any third party rights-of-way upon or across the option property for the purpose of serving any other coal storage, processing or loading facilities.

DATED this 3rd day of August, 1977.

"GEX"

GENERAL EXPLORATION COMPANY,
a Delaware corporation

By _____
Its VICE PRESIDENT

"Campbells"

_____
ROY D. CAMPBELL

_____
PEGGY L. CAMPBELL

OPTION

FOR AND IN CONSIDERATION of the sum of Two Thousand Five Hundred and No/100 Dollars ($2,500.00), receipt of which is hereby acknowledged, UTAH POWER & LIGHT COMPANY, a corporation, hereinafter designated as "Owner," hereby grants to ROY D. CAMPBELL and PEGGY CAMPBELL, his wife, of Wellington, Carbon County, Utah, hereinafter designated as "Campbells," an exclusive option, subject to the terms, conditions and reservations hereinafter specified, to purchase the following described tract of land located in Carbon County, State of Utah, and hereinafter called "Premises":

> The Southwest 1/4 of Section 11, Township 15 South, Range 10 East, Salt Lake Base and Meridian, excepting therefrom the most Easterly 100 feet thereof.

The conditions of this option are as follows:

1. The term of this option shall be for a period of six (6) months commencing on the 1st day of August, 1977, and expiring on the 31st day of January, 1978, and unless exercised, will automatically terminate at the close of business on the latter date and neither party will thereafter have any further obligation with respect to purchase or sale of the premises.

2. The purchase price for the Premises shall be the sum of Two Thousand Three Hundred Ninety and No/100 Dollars ($2,390.00) per acre for a total purchase price for the 153.94 acre tract of Three Hundred Sixty-seven Thousand Nine Hundred Sixteen and 60/100 Dollars ($367,916.60) which sum shall be paid in full at the time of closing which will be within thirty (30) days after exercise of this option, unless otherwise mutually agreed by the parties.

3. In the event this option is duly exercised, the consideration paid for same shall be credited as a part of the purchase price and in the event this option is not exercised, then said consideration shall be retained by the Owner as full satisfaction for the granting of same.

4. An Abstract of Title to the Premises, continued to date, shall be furnished at the expense of Owner and Owner shall

Exhibit "A"

convey the Premises by delivery of a Special Warranty Deed. Such conveyance shall be specifically subject to any encumbrances or reservation of rights as disclosed by public record or abstract(s) of title to the Premises and shall be further subject to the continued operation and maintenance of any electrical lines now located, or to be constructed during the option period, on, over, under and across the Premises.

5. This option may be exercised prior to the expiration date specified herein by written notice of election to exercise same sent by registered mail or personal delivery to Owner at P. O. Box 899, Salt Lake City, Utah, 84110, Attention Corporate Secretary; provided, however, that any such exercise will be subject to Owner's right to remain in possession of the Premises until November 1, 1977.

6. This option may be extended for an additional period of six (6) months immediately following the date of expiration hereof upon the payment by Campbells to Owner of the additional sum of Five Thousand and No/100 Dollars ($5,000.00), which amount will be submitted prior to the expiration of the initial option term and upon receipt of same this option will be extended for an additional six-month period upon the same terms and conditions set forth herein for the initial option period.

WITNESS the hand of Owner this 29 day of July, 1977.

UTAH POWER & LIGHT COMPANY

By _____

ATTEST:

_____
Secretary

The foregoing option is received and accepted this 2nd day of August, 1977.

_____
Roy D. Campbell

_____
Peggy Campbell

EXHIBIT "B"

1. Loading facilities shall consist of one or more hoppers or silos designed and constructed in such manner as to permit loading of unit trains. Discharge outlets from such hoppers or silos will be designed in such manner as to permit loading from a lowered chute or tube to minimize dust emissions.

2. Preparation facilities will be of an enclosed design so that raw coal will not be exposed to the winds during processing or movement into or out of the plant.

3. All coal conveyor belts shall be covered to minimize or eliminate dust emissions. Lowering wells shall be used for the discharge of coal from the conveyor belts into principle storage piles.

4. Water facilities shall be available and used if necessary for the suppression of dust from storage piles in the event of unusually high winds.

5. In addition to the foregoing facilities, GEX shall build upon the option lands such building and structures as may be reasonable and necessary for the operations contemplated hereby, including the building of roads, bridges, water tanks and ponds, parking areas, maintenance, warehouse, and office buildings and such additional buildings, fixtures, facilities and equipment as may be reasonably necessary for the proposed operation.

6. It is expressly understood that GEX shall maintain on the option lands such items of equipment as may be reasonably necessary for the movement of coal as may be required to keep coal piles compact and for clean up and construction work, and for loading into trucks or rail cars under temporary conditions, if such occasion should arise.

MEMORANDUM OF UNDERSTANDING

With respect to the attorneys' fee to be charged by Snow, Christensen & Martineau for services in connection with the Campbell-Swisher deal, it has been agreed that GEX is to pay the same on behalf of Campbell. This is to be accomplished as follows:

1. At the closing of the transaction Snow, Christensen & Martineau is to receive a fee of $30,000.00.

2. Snow, Christensen & Martineau is to continue its efforts to obtain a reduction in the option price payable to Utah Power & Light. In this regard, as the option price is reduced so that GEX pays $300,000.00 or less, Snow, Christensen & Martineau is to receive an additional $10,000.00, making a total of $40,000.00.

3. In the event the purchase price of the option property is reduced to $260,000.00 or less, Snow, Christensen & Martineau is to receive an additional $10,000.00, making a total of $50,000.00.

REED L. MARTINEAU

JOE E. STARKS

AGREEMENT AND RELEASE

THIS AGREEMENT AND RELEASE, made and executed this 9th day of June, 1977 by and between ROY D. CAMPBELL and PEGGY CAMPBELL, his wife, hereinafter "Campbells" and UTAH POWER & LIGHT COMPANY, a corporation, hereinafter "U P & L".

W I T N E S S E T H:

WHEREAS, commencing in 1973 U P & L constructed and has operated a coal loading facility, hereinafter "coal yard", in Carbon County, Utah which is located adjacent and in proximity to the home and farm lands owned by Campbells, and

WHEREAS, Campbells have heretofore complained of the dust, dirt, noise, lights and other problems caused them by the construction, maintenance and operation of the coal yard in that location, and

WHEREAS, on or about July 15, 1974, Campbells filed a suit in the District Court of Carbon County, Utah entitled "Roy D. Campbell and Peggy Campbell, Plaintiffs, vs. Utah Power & Light Company, a corporation, Defendant, Civil No. 10443" for an injunction and for damages as a result of said coal yard operations, and

WHEREAS, in September, 1974 said suit was dismissed without prejudice on the basis of a settlement between the parties and the payment by U P & L to Campbell of attorney's fees of $10,000.00, general damages theretofore incurred of $48,000.00 and future general damages through October 14, 1975 of $20,000.00, but no punitive damages, and reserving to Campbells all claims for damages following October 14, 1975, and

WHEREAS, Campbells claim that following October 14, 1975 and to the present date they have continued to be damaged by the dust, dirt, noise, lights and other problems caused by the operation of said coal yard, and

WHEREAS, on April 26, 1977 Campbells filed a second suit in the District Court of Carbon County, Civil No. 11768 to enjoin the maintenance and operation of said coal yard, and

WHEREAS, the parties desire by this Agreement and Release to fully settle as between themselves all matters related to the maintenance and operation of said coal yard.

NOW, THEREFORE, in consideration of the terms and conditions herein set forth, the parties hereby agree as follows:

1. U P & L hereby agrees that on or before November 1, 1977 it will remove from its premises located adjacent and in proximity to the home and farm of Campbells all of the coal, machinery, equipment and personal property located therein and to leave the same in a clean and sightly condition so as to eliminate the dust, dirt, lights, noise and other conditions which have caused discomfort and inconvenience to Campbells.

2. U P & L hereby agrees that concurrently with the execution of this Agreement it will pay to Campbells the sum of $65,000.00 representing general damages incurred by Campbells in the sum of $55,000.00 and damage to crops in the sum of $10,000.00. In addition, U P & L will at the same time pay to Snow, Christensen & Martineau the further sum of $10,000.00 representing attorney's fees of Campbell's counsel in connection with said suit, No. 11268 and the settlement

incorporated in this Agreement and Release. No sum has been or will be paid by U P & L to Campbells as punitive damages of any kind or in any form, it being specifically agreed and stipulated that no such damages have been discussed or considered in connection with the settlement provided herein, it being conceded by Campbells that no basis for punitive damages exist.

3. Upon execution of this Agreement and Release and payment of U P & L of the sums referred to in Paragraph 2 above, Campbells will cause said suit No. 11268 to be dismissed with prejudice and without costs as is provided in the form of Stipulation, Motion and Order of Dismissal with Prejudice, a copy of which is attached hereto.

4. Upon the execution of this Agreement and Release, the payment by U P & L of the sums provided in Paragraph 2 above and performance by U P & L of the obligations provided in Paragraph 1 above, Campbells do hereby agree that they will forever release, acquit and discharge U P & L, its officers, agents, servants and employees from any and all claims, damages, suits, actions and causes of action because of, arising out of or in any way related to the construction-maintenance and operation by U P & L of the said coal yard to the date hereof and to and including November 1, 1977.

CAMPBELLS:

Roy D. Campbell
ROY D. CAMPBELL

Peggy Campbell
PEGGY CAMPBELL

U P & L:

ATTEST:

UTAH POWER & LIGHT COMPANY

Secretary

By _____

Its _____

AGREEMENT

This Agreement made and entered into this _____ day of November, 1973, by and between ROY D. CAMPBELL, General Delivery, Wellington, Utah, hereinafter referred to as "Campbell", and UTAH POWER & LIGHT COMPANY, P. O. Box 899, Salt Lake City, Utah, hereinafter referred to as "Utah Power & Light";

WHEREAS, Campbell has agreed to sell a portion of his real estate to Utah Power & Light to be used for coal storage and coal loading facilities; and

WHEREAS, one of the conditions of the sale was that Utah Power & Light be responsible for damages caused to Campbell because of its operation; and

WHEREAS, it is now mutually agreed as follows:

1. Any damages, as proven by Campbell, to real property, ditches, water supply, or crops, owned by Campbell, directly caused by Utah Power & Light's coal storage and coal loading facilities shall be paid for by Utah Power & Light.

WITNESS the hands of the parties in duplicate the day and year first above written.

Roy D Campbell
ROY D. CAMPBELL

UTAH POWER & LIGHT COMPANY

BY _____

Its Vice President

Appendix 4-2

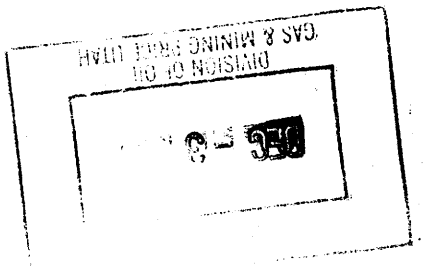
Utility Easements

Savage Services Corporation
Savage Coal Terminal

APPENDIX 4-2

UTILITY EASEMENTS

GW0



ER 15-1041 6/21/78

For Recording Data

Entry No. 149846
Indexed ✓✓
Abstracted ✓
Rec. Fee 5.00

STATE OF UTAH } ss
COUNTY OF CARBON
FILED AND RECORDED FOR
Utah Power & Light Co.
JUN 15 9 32 AM '79
BOOK 189 OF Records
PAGE 151
ANN O'BRIEN
COUNTY RECORDER

FORM 2008 10-72 1500

(UTAH CORPORATION)

UTAH POWER & LIGHT COMPANY

1.

EASEMENT

SWISHER COAL CO., a corporation doing business in the State of Utah, Grantor, hereby conveys to UTAH POWER & LIGHT COMPANY, a corporation, its successors in interest and assigns, Grantee, for the sum of One ($1.00) Dollar and other valuable consideration, a perpetual easement and right of way for the erection, operation and continued maintenance, repair, alteration, inspection, relocation and replacement of the electric transmission and distribution circuits of the Grantee, with the necessary poles, towers, guys, stubs, crossarms, braces and other attachments affixed thereto, for the support of said circuits, on, over and across a tract of land located in Carbon, County, Utah, along a center line described as follows:

Beginning on the Grantor's land at a point 2605 feet north and 100 feet west, more or less, from the south one quarter corner of Section 11, T. 15 S., R. 10 E., S.L.M., thence N.39°56'W. 59 feet, more or less, thence N.89°39'W. 2475 feet, thence S.40°21'W. 60 feet, thence S.0°18'W. 2540 feet, more or less, to the south boundary line of said land and being in the N 1/2 of the SW 1/4 and the SW 1/4 of the SW 1/4 of said Section 11.

Utah Power & Light Company hereby recognizes that Swisher Coal Co. has an underground drainage system in the approximate location covered by the foregoing description. Utah Power & Light Company hereby accepts responsibility, and agrees to immediately reimburse Swisher Coal Co., for any damage to the drain line and/or subsequent interruption or restriction of water flow therefrom because of work done by Utah Power & Light Company in and around the drain line area during the construction of transmission lines and any subsequent inspection, repair and relocation work.

Together with all rights of ingress and egress necessary or convenient for the full and complete use, occupation and enjoyment of the easement hereby granted, and all rights and privileges incident thereto, including the right to cut and remove timber, trees, brush, overhanging branches and other obstructions which may injure or interfere with the Grantee's use, occupation or enjoyment of this easement.

WITNESS the hand of the Grantor, this 1st day of March, A. D. 1979

Swisher Coal Co.

By [signature] President

Attest: [signature] Assistant Secretary

STATE OF UTAH }
County of Carbon } ss.

On the 1st day of March, A.D. 19 79, personally appeared before me, Max A. Robb, who being by me duly sworn did say that he is the President of Swisher Coal Co., a corporation, and that said instrument was signed in behalf of said corporation by authority of Swisher Coal Co. and said President acknowledged to me that said corporation executed the same.

My Commission expires:
June 12, 1982

[signature] Notary Public
Residing at Cleveland, Utah

Description Approved KW
Form & Execution Approved

File No.

FILE NO. 48909

15

For Recording Dat

Entry No. 161789
Indexed ✓✓
Abstracted ✓
Recg. Fee 4.00

STATE OF UTAH } SS
COUNTY OF CARBON }
FILED AND RECORDED FOR
Utah Power & Light C
JAN 20 1 54 PM '82
BOOK 214 OF Records
PAGE 84 (UTAH CORPORATION)
ANN O'BRIEN
COUNTY RECORDER

FORM 2060 10-78 1000

UTAH POWER & LIGHT COMPANY

EASEMENT

1. Beaver Creek Coal Corp., a corporation doing business in the State of Utah, Grantor, hereby conveys to UTAH POWER & LIGHT COMPANY, a corporation, its successors in interest and assigns, Grantee, for the sum of One ($1.00) Dollar and other valuable consideration, a perpetual easement and right of way for the erection, operation and continued maintenance, repair, alteration, inspection, relocation and replacement of the electric transmission and distribution circuits of the Grantee, with the necessary poles, towers, guys, stubs, crossarms, braces and other attachments affixed thereto, for the support of said circuits, on, over and across a tract of land located in Carbon, County, Utah being 10 feet in width, 5 feet each side of the following described center line:

Beginning at the north boundary fence on the Grantor's land at a point 5 feet east, more or less, from the west one quarter corner of Section 11, T. 15 S., R. 10 E., S. L. M., thence S. 0° 07' W. 48 feet to an existing pole on said land and being in the NW 1/4 of the SW 1/4 of said Section 11.

Together with all rights of ingress and egress necessary or convenient for the full and complete use, occupation and enjoyment of the easement hereby granted, and all rights and privileges incident thereto, including the right to cut and remove timber, trees, brush, overhanging branches and other obstructions which may injure or interfere with the Grantee's use, occupation or enjoyment of this easement.

WITNESS the hand of the Grantor, this 28th day of September, 19 81

Beaver Creek Coal Company

By [signature] President

Attest: [signature] Secretary

STATE OF UTAH, County of Carbon } ss.

On the 28th day of September, 19 81, personally appeared before me, MAX A ROBB, who being by me duly sworn did say that he is the President of BEAVER CREEK COAL, a corporation, and that said instrument was signed in behalf of said corporation by authority of BOARD OF DIRECTORS, and said PRESIDENT acknowledged to me that said corporation executed the same.

My Commission expires: JUNE 12, 1982

[signature] Notary Public

Residing at [illegible]

Description Approved [signature]

Form & Execution Approved

File No.

9L0D

RECORDING INFORMATION ONLY	Entry No. 163158	FILED AND RECORDED FOR Mtn Bell
	Indexed ✓✓	Apr 26 9 27 AM '82
	Abstracted ✓	BOOK 216 OF Records
	Recdg. Fee 4.00	PAGE 228-229
		ANN O'BRIEN COUNTY RECORDER

RIGHT-OF-WAY EASEMENT

The Undersigned Grantor (and each and all of them if more than one) for and in consideration of TEN------- dollars ($10.00) and other good and valuable consideration in hand paid by the Grantee, the receip whereof is hereby acknowledged, hereby grants, bargains and conveys unto The Mountain States Telephone an Telegraph Company, A Colorado corporation, 931 14th Street, Denver, Colorado, 80202, Grantee, its successors assigns, lessees, licensees and agents a Right-of-Way Easement and the right to construct, operate, maintain an remove such communication and other facilities, from time to time, as said Grantee may require upon, over, unde and across the following described land which the Grantor owns or in which the Grantor has any interest, to wit:

An easement 5 feet in width being 2½ feet on each side of buried telephone facilities as shown on Exhibit "A" attached hereto and made a part hereof across Beaver Creek Coal Company property in the Southwest Quarter of Section 11, Township 15 South, Range 10 East, Salt Lake Base and Meridian,

situate in County of CARBON, State of Utah, TOGETHER with the right of ingress and egress over and across the lands of the Grantor to and from the above-described property, the right to clear and keep cleared all trees and other obstructions as may be necessary.

The Grantor reserves the right to occupy, use, and cultivate said property for all purposes not inconsistent with the rights herein granted.

Signed and delivered this 6th day of April, A.D., 1982

At PRICE, UTAH Grantor Beaver Creek Coal Company

By Albert W. Jeanselme

Title: PROJECT COORDINATOR BEAVER CREEK COAL COMPANY

STATE OF UTAH)
COUNTY OF CARBON) ss.

On the 6TH day of APRIL, 1982, personally appeared before me, ALBERT W. JEANSELME, the signer of the above instrument, who duly acknowledged to me that (he) or (she) executed the same.

WITNESS my hand and official seal this 6TH day of APRIL, 1982.

MICHAEL JOHNSON NOTARY PUBLIC STATE OF UTAH

My commission expires November 4, 1985

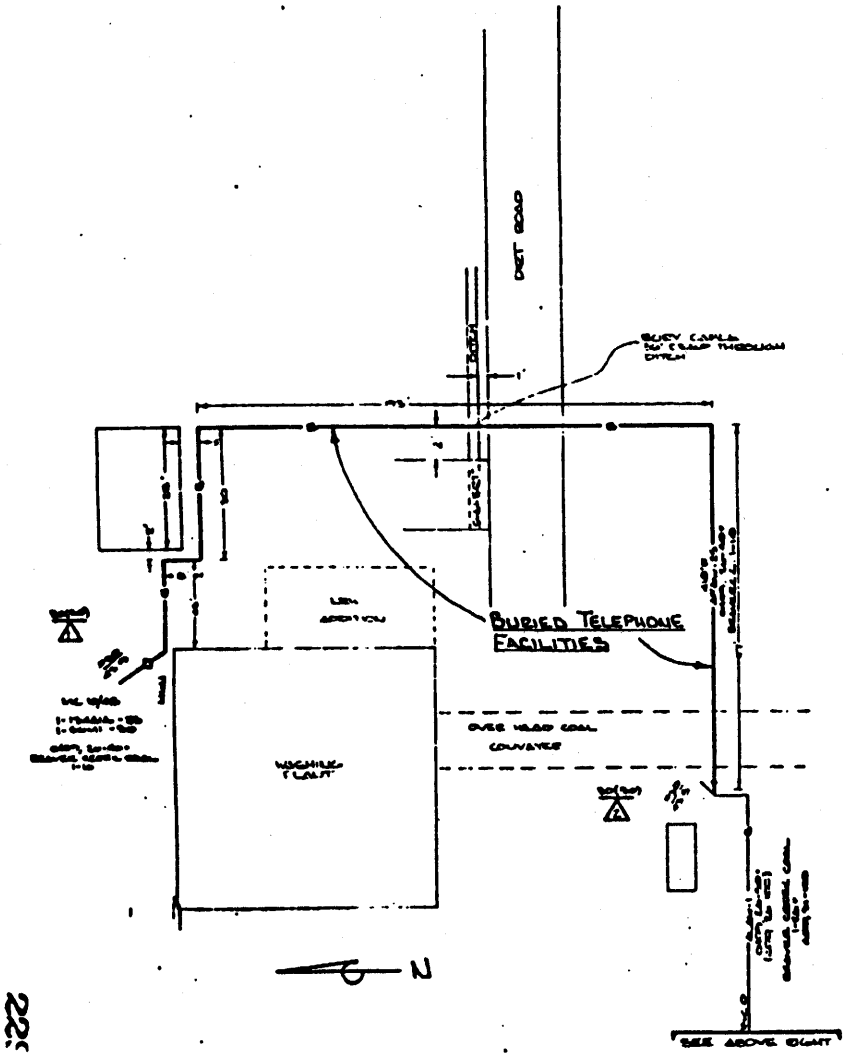
Residing in PRICE, UTAH

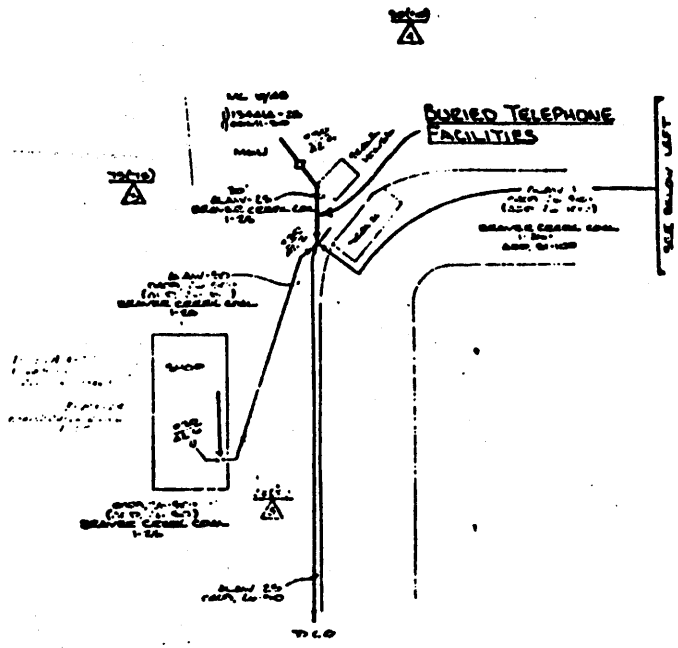
F. Michael Johnson
Notary Public

QUD

R/W NUMBER RW076616		QUARTER SECTION	S	W	1/4							REMARKS
EXCHANGE CODE	AGENT	SECTION	1	1								
JOB NO.	ACCT.	TOWNSHIP	1	5	S							
RR NAME, GOV. AGENCY		RANGE	1	0	E							MAIL TO: THE MOUNTAIN S TELEPHONE & TELEGRAPH
GEO. LOCATION		PRINCIPAL MERIDIAN	S	L	B	M						

EXHIBIT "A"





222

FILED FOR RECORD FOR
Mountain Bell
MAR 14 - 9 35 AM '80
BOOK 196 OF Records
PAGE 362-363
AND RECORDED

Entry No. 153362
Indexed ✓ ✓
Abstracted ✓
Rec. Fee 5.00

M.S.T. & T. CO. FORM 7331 (9-70)U

R/W RW 74071

RIGHT-OF-WAY EASEMENT

The Undersigned Grantor (and each and all of them if more than one) for and in consideration of

ONE DOLLAR AND NO/100 dollars ($1.00) in hand paid by the Grantee, the receipt whereof is hereby acknowledged, hereby grants, bargains and conveys unto The Mountain States Telephone and Telegraph Company, a Colorado corporation, 931 14th Street, Denver, Colorado, 80202, Grantee, its successors, assigns, lessees, licensees and agents, a Right-of-Way Easement and the right to construct, operate, maintain and remove such communication and other facilities, from time to time, as said Grantee may require upon, over, under and across the following described land which the Grantor owns or in which the Grantor has any interest, to-wit:

A five foot easement being 2. 5 feet on each side of a buried telephone cable as shown on Exhibit "A" attached hereto and made a part hereof over and across the Southwest Quarter of Section 11, Township 15 South, Range 10 East, Salt Lake Base and Meridian,

situate in County of Carbon, State of Utah

TOGETHER with the right of ingress and egress over and across the lands of the Grantor to and from the above-described property, ~~the right to clear and keep cleared all trees and other obstructions as may be necessary and the right to permit other utility companies to use the right of way jointly with Grantee for their utility purposes.~~

The Grantor reserves the right to occupy, use, and cultivate said property for all purposes not inconsistent with the rights herein granted.

Signed and delivered this 19th day of February A.D., 19 80.

At Swisher Coal Company
1109 South Carbon Avenue
Price, Utah 84501

Max A. Robb, President

Max A. Robb

STATE OF UTAH
County of ~~Emery~~ Carbon } ss.

On the 19th day of FEBRUARY, A.D. 19 80, personally appeared before me Max A. Robb, President, Swisher Coal Company,

the (signer) ~~(signers)~~ of the above instrument, who duly acknowledged to me that (he) ~~(she)~~ ~~(they)~~ executed the same.

WITNESS my hand and official seal this 19th day of February, 1980.

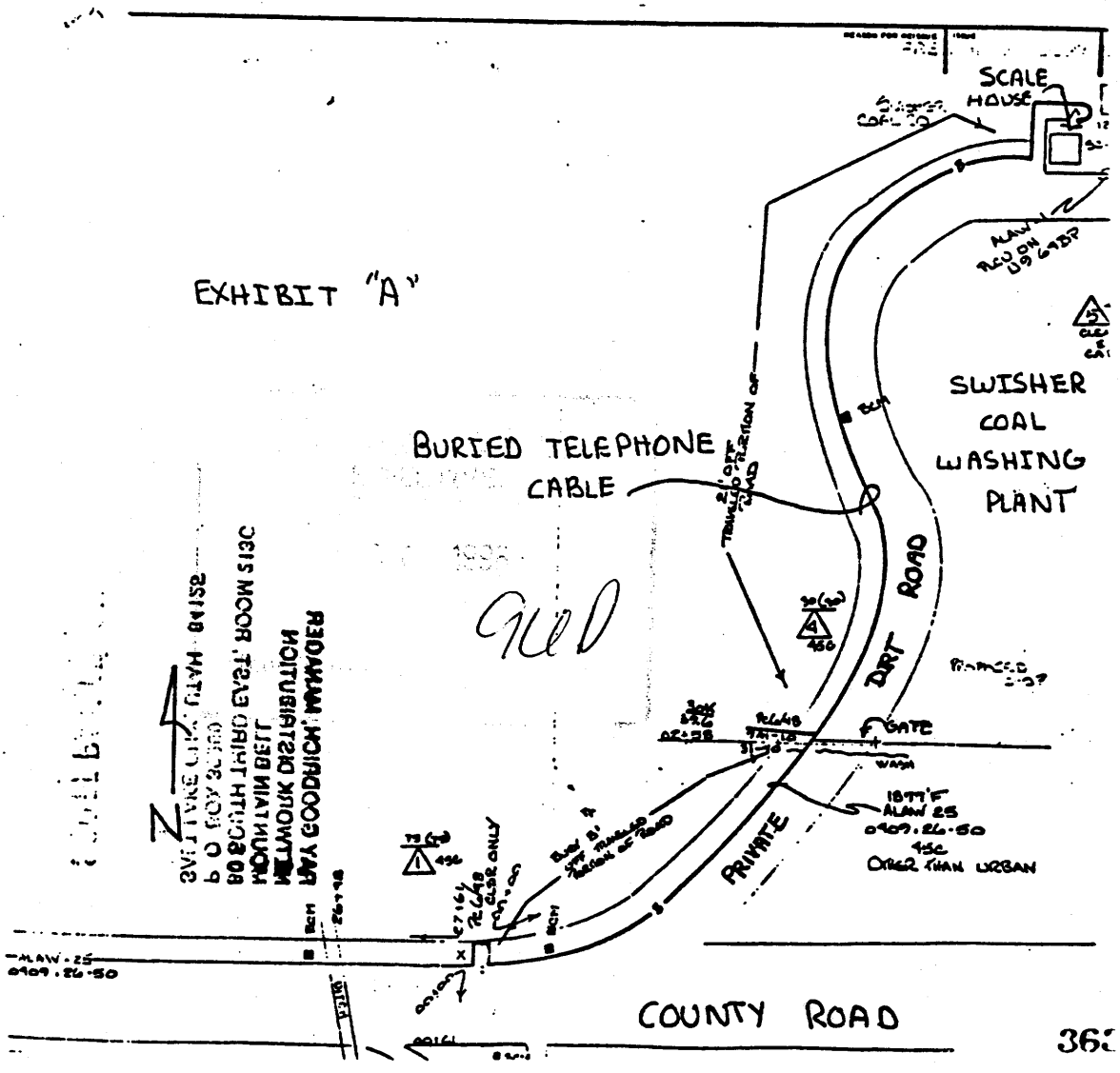
My commission expires June 12, 1982

Notary Public

Grantor is obligated by Government Regulation to maintain drainage ditches to channel runoff waters away from coal storage piles. This easement is given pursuant to the understanding that buried cable will be a minimum of 30-inches under surface at all points.

AWD

EXHIBIT "A"


SCALE HOUSE
SWISHER COAL WASHING PLANT
BURIED TELEPHONE CABLE
DIRT ROAD
GATE
PRIVATE
COUNTY ROAD
N

FOR Mountain Bell
DEC. 13 12 14 PM '79
BOOK 194 OF Records
PAGE 256-257
ANN O'BRIEN
COUNTY RECORDER

Entry No. 152393
Indexed ✓
Abstracted ✓
Rec. Fee 5.00

M.S.T. & T. CO. FORM 7321 (9-70)U

R/W RW 73619

RIGHT-OF-WAY EASEMENT

The Undersigned Grantor (and each and all of them if more than one) for and in consideration of

ONE AND NO/100 dollars ($1.00) in hand paid by the Grantee, the receipt whereof is hereby acknowledged, hereby grants, bargains and conveys unto The Mountain States Telephone and Telegraph Company, a Colorado corporation, 931 14th Street, Denver, Colorado, 80202, Grantee, its successors, assigns, lessees, licensees and agents, a Right-of-Way Easement and the right to construct, operate, maintain and remove such communication and other facilities, from time to time, as said Grantee may require upon, over, under and across the following described land which the Grantor owns or in which the Grantor has any interest, to-wit:

A five foot easement being 2.5 on each side of buried telephone cable as shown on Exhibit "A" attached hereto and made a part hereof over and across property located in the Southwest Quarter of Section 11, Township 15 South, Range 10 East, Salt Lake Base and Meridian,

situate in County of Carbon, State of Utah,

TOGETHER with the right of ingress and egress over and across the lands of the Grantor to and from the above-described property, the right to clear and keep cleared all trees and other obstructions as may be necessary and the right to permit other utility companies to use the right of way jointly with Grantee for their utility purposes.

The Grantor reserves the right to occupy, use, and cultivate said property for all purposes not inconsistent with the rights herein granted.

Signed and delivered this 5th day of November A.D., 1979

At Price, Utah

For Swisher Coal Company:

Max A. Rabb

PRESIDENT

STATE OF UTAH
County of Carbon } ss.

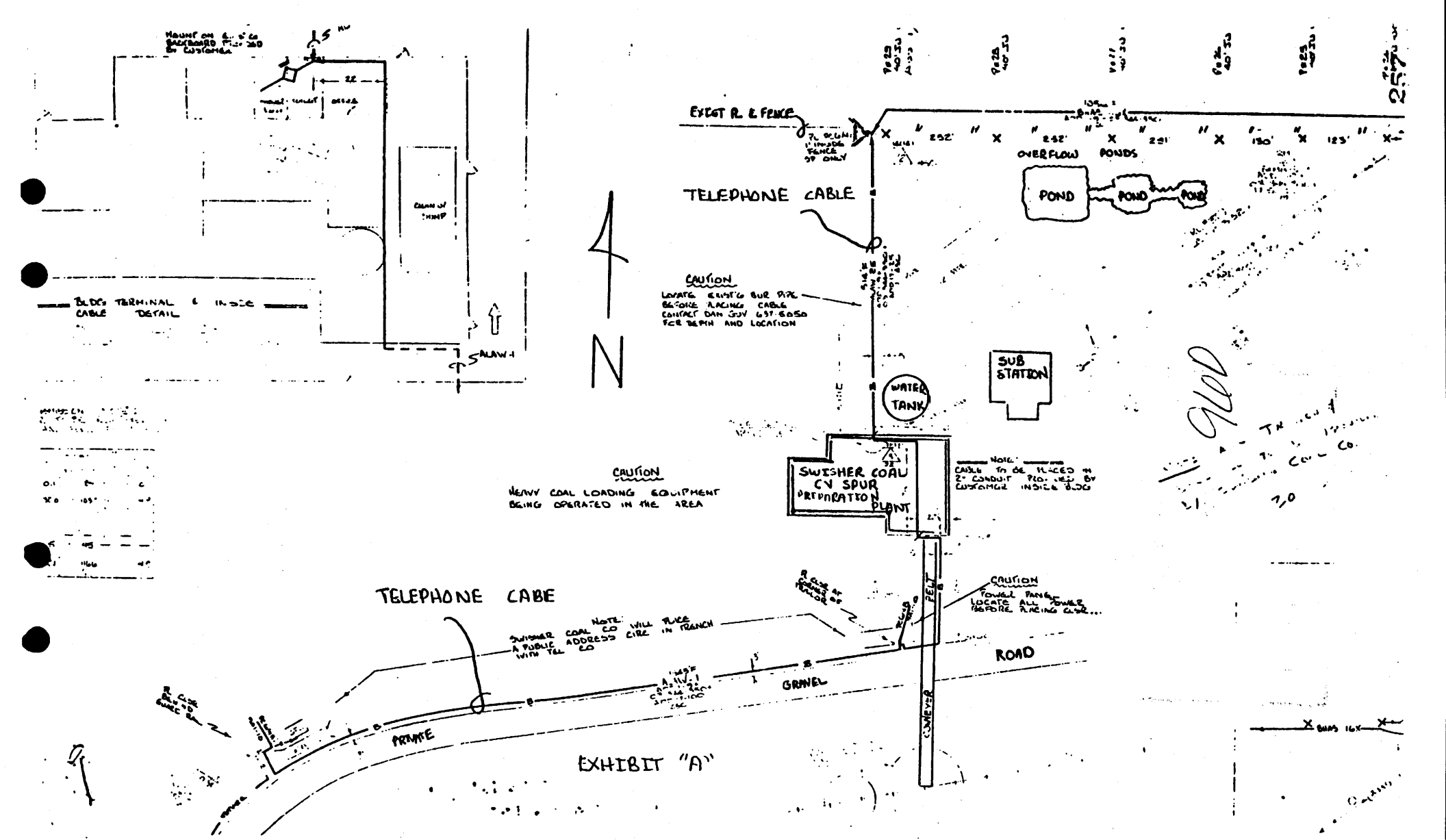
On the 5th day of November, A.D. 1979, personally appeared before me Max A. Rabb, President of Swisher Coal Company the (signer) (signers) of the above instrument, who duly acknowledged to me that (he) (she) (they) executed the same.

WITNESS my hand and official seal this 5th day of November 1979

My commission expires June 12, 1982

Notary Public

9UD


BLDG TERMINAL & INSIDE CABLE DETAIL
EXIST R. & FENCE
OVERFLOW PONDS
POND
POND
POND
TELEPHONE CABLE
CAUTION
LOCATE EXIST'G BUR PIPE BEFORE PLACING CABLE CONTACT DAN GUY 697-6050 FOR DEPTH AND LOCATION
SUB STATION
WATER TANK
N
CAUTION
HEAVY COAL LOADING EQUIPMENT BEING OPERATED IN THE AREA
SWISHER COAL CV SPUR PREPARATION PLANT
NOTE: CABLE TO BE PLACED IN 2" CONDUIT PROVIDED BY CUSTOMER INSIDE BLDG
CAUTION
POWER PANEL LOCATE ALL POWER BEFORE PLACING CABLE
TELEPHONE CABE
SWISHER COAL CO WILL PLACE A PUBLIC ADDRESS CIRC IN TRENCH WITH TEL CO
ROAD
GRAVEL
PRIVATE
CONVEYER
EXHIBIT "A"

Appendix 4-3

Division of Air Quality
Approval Order DAQE-ANI793003-06

Savage Services Corporation
Savage Coal Terminal

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

State of Utah

Department of
Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF AIR QUALITY
Richard W. Sprott
Director

DAQE-AN1793003-06

August 16, 2006

Boyd Rhodes
Manager
Savage Services Corporation
2025 East 5000 South
P.O. Box 1001
Price, Utah 84501

Dear Mr. Rhodes:

Re: Approval Order: Modification to the Approval Order to Increase Coal Throughput, Carbon County – CDS SM; NSPS, Title V Minor
Project Code: N1793-003

The attached document is the Approval Order (AO) for the above-referenced project.

Future correspondence on this Approval Order should include the engineer's name as well as the DAQE number as shown on the upper right-hand corner of this letter. Please direct any technical questions you may have on this project to Mr. Maung Maung. He may be reached at (801) 536-4153.

Sincerely,

Richard W. Sprott, Executive Secretary
Utah Air Quality Board

RWS:MM:kw

cc: Southeastern Utah District Health Department

STATE OF UTAH

Department of Environmental Quality

Division of Air Quality

APPROVAL ORDER: Modification to the Approval Order to Increase Coal Throughput

Prepared By: Maung Maung, Engineer
(801) 536-4153
Email: mmaung@utah.gov

APPROVAL ORDER NUMBER

DAQE-AN1793003-06

Date: August 16, 2006

Savage Industries Incorporated

Source Contact
Boyd Rhodes
(435) 637-5664

Richard W. Sprott
Executive Secretary
Utah Air Quality Board

Abstract

Savage Services Corporation has proposed to modify its existing Approval Order DAQE-563-98 to increase coal throughput from 8 million to 10 million tons per year. The company also proposes to change the company name on the approval order to Savage Services Corporation. There is no change in ownership.

The Savage Coal Terminal is located in Carbon County, which is an attainment area of the National Ambient Air Quality Standards (NAAQS) for all pollutants. New Source Performance Standards (NSPS) 40 CFR part 60 subpart Y - Standards of Performance for Coal Preparation Plants applies to this source. Therefore, Title V of the Clean Air Act applies to this source. However, the source does not need to submit an application for Title V permit since it is a minor source. National Emission Standards for Hazardous Air Pollutants (NESHAP) and Maximum Available Control Technology (MACT) do not apply to this source.

The proposed emissions changes (in tons per year) will be as follows: PM_{10} = 1.53, SO_2 = 0.11, NO_x = 1.67, CO = 0.36, VOC = 0.14, aldehydes = 0.02.

The changes in emissions will result in the following potential to emit totals in tons per year: PM_{10} = 49.13, NO_x = 54.64, SO_2 = 3.59, CO = 11.77, VOC = 4.46, Aldehydes = 0.98.

The project has been evaluated and found to be consistent with the requirements of the Utah Administrative Code Rule 307 (UAC R307). A public comment period was held in accordance with UAC R307-401-7 and no comments were received. This air quality Approval Order (AO) authorizes the project with the following conditions, and failure to comply with any of the conditions may constitute a violation of this order.

General Conditions:

1. This Approval Order (AO) applies to the following company:

Facility Location	Corporate Office Location
Savage Coal Terminal	Savage Coal Terminal
2025 East 5000 South	2025 East 5000 South
Price, Utah 84501	Price, Utah

Phone Number: (435) 637-5664
Fax Number: (435) 637-2431
The equipment listed below in this AO shall be operated at the following location:

PLANT LOCATION:

Universal Transverse Mercator (UTM) Coordinate System: UTM Datum NAD27
4,374.0 kilometers Northing; 520.0 kilometers Easting; Zone 12

2. All definitions, terms, abbreviations, and references used in this AO conform to those used in the Utah Administrative Code (UAC) Rule 307 (R307) and Title 40 of the Code of

Federal Regulations (40 CFR). Unless noted otherwise, references cited in these AO conditions refer to those rules.

3. The limits set forth in this AO shall not be exceeded without prior approval in accordance with R307-401.

4. Modifications to the equipment or processes approved by this AO that could affect the emissions covered by this AO must be reviewed and approved in accordance with R307-401.

5. All records referenced in this AO or in applicable NSPS, which are required to be kept by the owner/operator, shall be made available to the Executive Secretary or Executive Secretary's representative upon request. Records shall be kept for the following minimum periods:

A.	Emission inventories	Five years from the due date of each emission statement or until the next inventory is due, whichever is longer.
B.	All other records	Five years

6. Savage Services Corporation shall conduct its operations in accordance with the terms and conditions of this AO, which was written pursuant to Savage Coal Corporation's Notice of Intent submitted to the Division of Air Quality (DAQ) on April 24, 2006 and additional information submitted on June 5, 2006 and June 22, 2006.

7. This AO shall replace the AO DAQE-563-98, dated September 3, 1998.

8. The approved installations shall consist of the following equipment or equivalent*:

A. Five truck unloading facilities with enclosed receiving hoppers and sprays
B. One coal crusher rated at 400 tons per hour-enclosed
C. One screen plant rated at 250 tons per hour
D. One radial stacker
E. Two underpile reclaim systems
F. One 10,000 tons silo with extendable chute for loading railcar-enclosed
G. Four stacking tubes with associated coal stockpiles
H. Associated mobile diesel equipment
I. Treated, gravel haul roads
J. Associated conveyors
K. Wash plant with associated screens, crushers and conveyors shall be totally enclosed
L. One screen- 200 TPH
M. One crusher- 450TPH (both screen/crusher are below the new underground hopper)
N. One 36"X 100" Radial stocker conveyor
O. One underground reclaim (Doger Trap)
P. One 36"X 150" conveyor to loadout belt (covered)

* Equivalency shall be determined by the Executive Secretary.

Limitations and Tests Procedures

9. Visible emissions from the following emission points shall not exceed the following values:

   A. All crushers - 15% opacity
   B. All screens - 10% opacity
   C. All conveyor transfer points - 10% opacity
   D. All diesel engines - 20% opacity
   E. Conveyor drop points - 10% opacity
   F. Silo - 10% opacity
   G. All other points - 10% opacity

   Opacity observations of emissions from stationary sources shall be conducted according to 40 CFR 60, Appendix A, Method 9.

   For sources that are subject to NSPS, opacity shall be determined by conducting observations in accordance with 40 CFR 60.11(b) and 40 CFR 60, Appendix A, Method 9.

10. The following production limit shall not be exceeded:

    10,000,000 tons of coal per rolling 12-month period
    3,000,000 tons of coal crushed per 12-month period
    1,000,000 tons of coal screened per 12-month period

    To determine compliance with a rolling 12-month total, the owner/operator shall calculate a new 12-month total by the twentieth day of each month using data from the previous 12 months. Records of throughput, crushed and screened shall be kept for all periods when the plant is in operation. Throughput shall be determined by examination of truck scale records. Amount of coal crushed or screened shall be determined by supervisor monitoring and maintaining of an operations log. The records of throughput, crushed, and screening shall be kept on a daily basis.

Roads and Fugitive Dust

11. The facility shall abide by all applicable requirements of UAC R307- 205 for Fugitive Emission and Fugitive Dust sources.

12. All unpaved roads and other unpaved operational areas that are used by mobile equipment shall be water sprayed and/or chemically treated to control fugitive dust. Treatment shall be of sufficient frequency and quantity to maintain the surface material in a damp/moist condition or unless it is below freezing. Records of water and/or chemical treatment shall be kept for all periods when the plant is in operation. The records shall include the following items:

    A. Date
    B. Number of treatments made, dilution ratio, and quantity
    C. Rainfall received, if any, and approximate amount

D. Time of day treatments were made
E. Records of temperature if the temperature is below freezing

13. Visible fugitive dust emissions from haul-road traffic and mobile equipment in operational areas shall not exceed 20% opacity. Visible emissions determinations for traffic sources shall use procedures similar to Method 9. The normal requirement for observations to be made at 15-second intervals over a six-minute period, however, shall not apply. Six points, distributed along the length of the haul road or in the operational area, shall be chosen by the Executive Secretary or the Executive Secretary's representative. An opacity reading shall be made at each point when a vehicle passes the selected points. Opacity readings shall be made one half vehicle length or greater behind the vehicle and at approximately one half the height of the vehicle or greater. The accumulated six readings shall be averaged for the compliance value.

14. The paved haul road loop shall not exceed 0.57 miles in length. The paved haul road shall be watered, flushed, and/or broom swept as necessary to not exceed the opacity limits specified in condition #9.G. Records of cleaning paved roads shall be made available to the Executive Secretary or a representative upon request. Record shall include a period of two years before the date of request. The haul road speed shall be posted. It shall be 15 mph.

15. Control of disturbed or stripped areas is required at all times (24 hours per day every day) for the duration of the project/operation until the area is reclaimed. Areas disturbed during construction of the facility and not subjected to repeated disturbance shall be revegetated. Repeatedly disturbed areas shall be chemically treated with $MgCl_2$ as necessary to meet the opacity limitation of condition #9.

16. The storage piles shall be watered to minimize generation of fugitive dusts as dry conditions warrant or as determined necessary by the Executive Secretary. Records of water and/or chemical treatment shall be kept for all periods when the plant is in operation.

17. All above ground conveyors shall be covered. All reclaim points for the primary coal storage shall be below the stockpile.

18. The following transfer points shall be enclosed:

A. Each conveyor to conveyor transfer point
B. Reclaim conveyor from the primary coal stockpile to the stacking tube
C. All wash plant with associated screens, crushers and conveyors

19. Water sprays or chemical dust suppression sprays shall be installed at the following points to control fugitive emissions:

A. All crushers
B. All screens

The sprays shall operate whenever dry conditions warrant or as determined necessary by the Executive Secretary.

Fuels

20. The owner/operator shall use only #2 fuel oil or lighter as a primary fuel in diesel engine for electrical generator and liquefied petroleum gas (LPG) as a fuel in the furnace.

21. The sulfur content of any fuel oil or diesel burned shall not exceed 0.5 percent by weight for diesel fuels consumed in all diesel engines. Sulfur content shall be determined by ASTM Method D-4294-89 or approved equivalent. Certification of sulfur content shall be either by source's own testing or test reports from the fuel supplier. Records of test report on sulfur content shall be available on-site for each load delivered.

Federal Limitations and Requirements

22. In addition to the requirements of this AO, all applicable provisions of 40 CFR 60, New Source Performance Standards (NSPS) Subpart A, 40 CFR 60.1 to 60.18 and Subpart Y, 40 CFR 60.250 to 60.254 (Standards of Performance for Coal Preparation Plants) apply to this installation. The facility must operate in accordance with the most current version of 40 CFR 60 applicable to this source. The following emission points are subject to Subpart Y:

    A. All crushers (above ground)
    B. All screens (above ground)
    C. All conveyors (above ground)
    D. Storage silo stack

Records & Miscellaneous

23. At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any equipment approved under this Approval Order including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Executive Secretary which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. All maintenance performed on equipment authorized by this AO shall be recorded.

24. The owner/operator shall comply with R307-107. General Requirements: Unavoidable Breakdowns.

25. The owner/operator shall comply with R307-150 Series. Inventories, Testing and Monitoring.

The Executive Secretary shall be notified in writing if the company is sold or changes its name.

This AO in no way releases the owner or operator from any liability for compliance with all other applicable federal, state, and local regulations including R307.

A copy of the rules, regulations and/or attachments addressed in this AO may be obtained by contacting the Division of Air Quality. The Utah Administrative Code R307 rules used by DAQ, the Notice of Intent (NOI) guide, and other air quality documents and forms may also be obtained on the Internet at the following web site:
http://www.airquality.utah.gov

The annual emissions estimation below includes mobile equipment and associated fugitive dust emissions. These emissions are for the purpose of determining the applicability of Prevention of Significant Deterioration, non-attainment area, maintenance area, and Title V source requirements of the R307. They are not to be used for determining compliance.

The Potential To Emit (PTE) emissions for Savage Coal Services Corporation are currently calculated at the following values:

	Pollutant	Tons/yr
A.	PM_{10}	49.13
B.	SO_2	3.59
C.	NO_x	54.64
D.	CO	11.77
E.	VOC	4.46
F.	Aldehydes	0.98

The Division of Air Quality is authorized to charge a fee for reimbursement of the actual costs incurred in the issuance of an AO. An invoice will follow upon issuance of the final Approval Order.

Approved By:

Richard W. Sprott, Executive Secretary
Utah Air Quality Board

Savage Services Corporation
Savage Coal Terminal
C/007/022

Chapter 5

Engineering

R645-301-500

R645. Natural Resources; Oil, Gas and Mining; Coal.

R645-301. Coal Mine Permitting: Permit Application Requirements.

R645-301-500. Engineering.

510. Introduction.

The engineering section of this permit application is divided into the operation plan, reclamation plan, design criteria, and performance standards. All of the activities associated with the coal mining and reclamation operations are designed, located, constructed, maintained, and reclaimed in accordance with the operation and reclamation plan. All of the design criteria associated with the operation and reclamation plan will be met.

511. General Requirements.

Each permit application will include descriptions of:

511.100. Proposed Operations

This section outlines the scope of mining, environmental control and reclamation activities that will occur under the terms of the permit. The purpose of this plan is to provide the regulatory authority with comprehensive and reliable information which ensures that proposed activities will be conducted in compliance with the Act, the regulations, and guidelines of the permanent regulatory program.

Surface Facilities

Site Selection and Preparation

Utah Power & Light originally leased the site for coal loading operations because of its proximity to the Denver and Rio Grande Western (D&RGW) railroad siding. Swisher Coal Company purchased the SW ½ Section 11 for the purpose of developing a preparation and loadout facility for unit coal trains. The site was also advantageous because of its central location to the contributing coal mines. Original UP&L disturbance occurred in 1975. Expansion activities by Swisher Coal Company were conducted between October 1977 and April 1978. The site was purchased by ARCO in 1980, and was sold to Savage Industries, Inc. (now Savage Service Corporation) in 1995. The facility name was then changed to Savage Coal Terminal. Plate 5-1 presents surface disturbance as of the submittal date of this application.

Maintenance

All support facilities at Savage Coal Terminal will be maintained and used in a manner which prevent damage to fish, wildlife and related environmental values and prevents additional contributions of suspended solids to streamflow or runoff outside the permit area.

Facilities Construction Dates

The following is a list of facilities and approximate dates on which construction begun and completed on each:

Facility	Construction Begun	Construction Completed
Preparation Plant	10/77	12/78
Conveyors	10/77	4/78
Silo/Loadout	10/77	4/78
Shop/Lab/Warehouse	3/80	6/80
Power Line/Substation	10/77	4/78
Pumphouse	8/78	10/78
Scales/Scalehouse	2/78	4/78
Refuse Pile	12/78	On-Going
Railroad Loop	10/77	4/78
Roads/Parking Areas	10/77	4/78
Water System	10/77	10/78
Culinary Water	8/84	9/84
Sewage System	3/80	5/80
Diversion Ditches	6/78	6/79
Sedimentation Ponds	6/78	6/79
New Shop/Oil Storage	10/05	4/06
New Reclaim Conveyor	10/05	6/06
New Stacking Tube	04/06	8/06
New Plant Feed Conveyor	08/06	11/06
New Stacking Conveyor	08/06	11/06
New Raw Coal Conveyor	08/06	11/06
Settling Ponds	08/06	11/06
Refuse Conveyor	08/06	11/06
Storage to Silo Conveyor	10/07	12/07

Buildings and Structures

All buildings and structures at the Savage Coal Terminal are shown on Plate 5-2. There are no present plans to modify or re-construct any structures at this site.

Coal Refuse and Non-Coal Storage/Disposal

Storage sites for stockpiled coal and disposal of coal processing refuse and non-coal wastes are shown on Plate 5-2.

Non-Coal Waste Disposal

Temporary storage of non-coal waste is in a metal trash receptacle and/or a designated storage area. As needed, the garbage is loaded into a truck and disposed of within an approved sanitary landfill. See Plate 5-2 for locations.

Oil and Grease Disposal

Oil and grease wastes are collected in a surface tank for temporary on-site storage. As needed, this tank is pumped out by a licensed contractor and removed for recycling. All oil, grease and anti-freeze wastes at Savage Coal Terminal are recycled, and none of these wastes are stored in underground tanks or disposed of in any landfill.

Coal Processing Waste Disposal

The coal processing waste disposal sites are designed and constructed to meet all requirements of R645-301-536. Plate 5-3, Refuse Disposal Plan, shows the planned locations and cross-sections of refuse disposal areas #1, #2, and #3. Coal processing waste from the 2006 plant restart is taken to the approved Dugout Canyon Mine refuse site per contract agreement.

Transportation Facilities

Roads

The location of access and coal haulage roads and parking areas are provided on Plates 5-2 and 5-4.

All roads on the site will be maintained throughout their life to meet the design standards. This will include, as necessary, regrading, resurfacing, cleaning of ditches and culverts, watering and/or sweeping for dust control.

If a road is damaged by a catastrophic event, it will be repaired as soon as practical after the damage has occurred.

All roads will be removed and regraded upon final reclamation of the site.

The following is a description of each of the primary roads on this site:

PR-1
Main entrance and coal haul road on west side. Road runs from west entrance to preparation plant. Approximately 1705' long with an average grade of 2.23%. Approximately 770' of road is paved, and the balance is gravel-surfaced. Road is approximately 24' wide.

PR-2
Haul road from SW entrance to intersection with PR-1. Approximately 1720' long with an average grade of 1.51%. Entire length of road is paved, and is 24' wide.

PR-3
This is the No. 1 Truck Dump loop road. The road is approximately 1425' in length with a maximum plus grade of 7.06% and a maximum minus grade of 6.45%. This is a gravel-surfaced road and is 24' wide.

PR-4
Refuse haul road, running from the wash plant to the refuse pile. The road is approximately 3840' long and has an average grade of 0.42%. This road is gravel-surfaced and maintained at a width of 20'.

PR-5
This is the pumphouse road running from the intersection with the refuse road (PR-4) to the pumphouse. The road is approximately 625' long with an average grade of 0.96%. It is gravel-surfaced and approximately 16' wide.

PR-6
Sample house road, running from the refuse road (PR-4) to the sample building/loadout tunnel. The road is approximately 545' long with an average grade of 1.83%. It is gravel-surfaced and approximately 16' wide.

PR-7
No. 2 Truck Dump Road, running from its intersection with PR-1, over the truck dump and back to the intersection with PR-2. The road is approximately 2340' in length with an average grade of 1.28%. It is a gravel-surfaced road with a width of approximately 24'.

PR-8
Truck Dump No. 5 Road, running from PR-7, across the No. 5 Truck Dump and back to the PR-7. This road is approximately 890' in length with an average grade of 2.02%. The road is gravel-surfaced and is 20' wide. Maximum grade down from the truck dump is 9.00%.

PR-9
Topsoil Pile Road, running from PR-7 to the refuse road (PR-4). This road is approximately 420' long with an average grade of 1.91%. The road is gravel-surfaced and approximately 20' wide.

PR-10
Truck Dump No. 3 Road running from the refuse road (PR-4) over the No. 3 truck dump and back to PR-4. It is approximately 560' in length with a maximum grade of +10.00% up and -10.34% down. The road is gravel-surfaced and approximately 16' wide.

PR-11
This is a short length of road constructed to tie the 2 main haul roads, PR-1 and PR-2, together. The road is approximately 400' in length with an average grade of 0.25%. This road is gravel-surfaced and approximately 24' wide.

PR-12
Office/Shop Road, running from PR-1 across the office parking pad and down to the intersection of PR-1 and PR-3. The road is approximately 575' in length with an average grade of 1.74%. It is gravel-surfaced and approximately 20' wide.

PR-13
This is the access/haul road for the new settling ponds. The road runs from PR-12, below the office, to the settling ponds. The road is approximately 415' in length with an average grade of approximately 2.22%. The road is gravel-surfaced and approximately 16' wide.

The above referenced roads are all considered "Primary Roads" as provided in R645-301-527.100. All other roads on the site are considered "Ancillary Roads".

The following information pertains to all roads on the site:

1- Roads are located, designed, constructed, reconstructed, used, maintained and will be reclaimed to:

a. Prevent or control damage to public or private property;
b. Use non-acid or non-toxic substances in road surfacing;
c. Have a minimum static safety factor of 1.3 for all embankments;
d. Be removed and regraded during the final site reclamation;
e. Using current, prudent engineering practices to control or prevent erosion, siltation or air pollution;
f. To ensure environmental protection and safety by designing roads with appropriate limits for use and type and size of equipment used.

In addition, all Primary Roads will meet the following requirements:

a. Be located, constructed and maintained in such a manner as to protect fish wildlife and related environmental values by avoiding wetlands, using non-acid and non-toxic materials, providing adequate drainage and employing the lowest practical speed limits on site;
b. Be located on the most stable available surface (see Plate 3-2);
c. Be surfaced with crushed gravel or asphalt to provide durability for the volume, weight and speed of the anticipated vehicles;
d. Be routinely maintained to provide intended use;
e. Have culverts designed, installed and maintained to sustain the vertical soil pressure, passive resistance to the foundation, and the weight of the vehicles using the road. All culverts are steel or corrugated metal pipe and are of adequate strength to withstand expected vehicle weights. No failures have ever been noted.

Railroads

A major railroad grade embankment (approximately 4'-12' in height) is located on the eastern edge of the site, immediately outside of the permit area. This grade supports the main rail line(s) and is owned and maintained by the Denver and Rio Grande Western Railroad. This line will undoubtedly remain in service after closure of the Savage Coal Terminal.

The railroad loop within the Savage Coal Terminal is owned by Savage Services Corporation. It consists of a single set of tracks slightly elevated (3') above natural ground. This rail serves as a loop for the unit trains to travel head-first into the silo, eliminating the need for engine switching. The loop is 8,340 feet long. This rail line will be used and maintained throughout the Savage Coal Terminal operational life.

Grades and typical cross-section of the rail loop are shown on Plate 5-5, "Railroad Facilities".

Conveyors

There are eighteen (18) separate, permanent conveyor runs at the C.V. Spur (see Figure 3-7). In addition, there are temporary, portable conveyors used on the site. The number and location of the temporary conveyors varies according to need.

Conveyor #1 - 36" x 250' long stacking conveyor from the truck dump to the raw coal stacking tube.

Conveyor #1a - 36" x 250' long stacking tube conveyor from the above raw coal stacking tube to a new steel stacking tube. (Appendix 3-8 BC-01)

Conveyor #1b - 36" x 233' conveyor from new stacking tube area to wash plant. (Appendix 3-8 BC-02)

Conveyor #1c - 36" x 130' stacking conveyor from wash plant to clean coal pile on north side. (Appendix 3-8 BC-05)

Conveyor #1d - 36" x 200' conveyor for -1/4" coal from wash plant to raw coal pile to west. (Appendix 3-8 BC-03)

Conveyor #1e - 36" x 101' conveyor to carry refuse from the wash plant to the refuse bin. (Appendix 3-8 BC-04)

Conveyor #2 - 36' x 300' reclaim conveyor from raw coal pile to conveyor #9.

Conveyor(s)#3-(2) 36" x 365' clean fine and coarse coal conveyors from the plant to the clean coal stacking tube.

Conveyor #4 - 36" x 225' clean fine coal transfer conveyor from coarse coal stacking tube to fine coal stacking tube.

Conveyor #5 - 48" x 600' clean coal reclaim conveyor from clean coal piles to transfer in loadout sample building.

Conveyor #6 - 48" x 660' loading conveyor from transfer point in sample building to 10,000 ton silo.

Conveyor #7 - This conveyor is 36" x approximately 350' and runs from the new truck dump to a crushed coal stacking tube.

Conveyor #8 - 42" x 150' conveyor from the new truck dump to the twin 36" conveyors described in #3 above.

Conveyor #9 - 48" x 440' conveyor from the plant feed belt to the clean coal stacking tube area.

Conveyor #10 - 48" x 728' elevated conveyor from truck loop storage area to conveyor #9.

Conveyor #11 - 48" x 246' feed conveyor from the truck loop storage area to conveyor #10.

Conveyor #12 - 48" x 564' surface transfer system to move coal from the track loop storage area to conveyors #10 and #11.

Conveyor #13 - 48" x 375' feed conveyor from storage area to silo feed conveyor #6.

Grades of all conveyors are shown on Figure 5-7. "Conveyors - Loadout & Grades". All surface conveyors are covered and equipped with walkways. All conveyors will be used throughout the Savage Coal Terminal operational life.

Maintenance

Transportation facilities are maintained and will be restored to prevent damage to fish, wildlife and related environmental values, as well as additional contributions of suspended solids to streamflow or runoff outside the permit area. In addition, they are maintained in a manner to control and minimize degradation of water quality and quantity, control and minimize erosion and siltation as well as pollution. This is accomplished in the following ways:

(1) All conveyors are covered to minimize fugitive dust;

(2) The use of stacking tubes for coal pile minimizes fugitive dust from free-falling coal;

(3) Coal is drawn into the plant and silo conveyors by underground feeders, equipped with water sprays to minimize dust;

(4) The unit train loadout is within an enclosed area, and water sprays are available if necessary to reduce dust;

(5) Roads are paved and/or watered as necessary to minimize dust:

(6) Drainage controls are maintained to prevent contaminated water from the disturbed area from leaving the permit area.

Water Management Facilities

The process water system for the preparation plant is designed so that under normal operating conditions no waste water is discharged and makeup water is added only to replace absorption losses of water into the coal and refuse. A six-inch pipeline from a pumping station at the Price River is the primary water supply. This pipeline, as well as the secondary makeup water source (the sedimentation ponds) feeds a collection sump housed on the northeast corner of the site. (See Plate 5-2) From there water is then drawn on demand into the prep plant.

Sewage System

There are two (2) wastewater disposal facilities at Savage Coal Terminal (see Plate 5-2). Both sites are of the septic tank-drainfield type and each is approved by the Utah Health Department.

Storm Runoff and Sedimentation Control

Sedimentation ponds provide for collection and treatment of surface water runoff from all disturbed areas at the sire. Water control facilities are shown on Plate 5-2 and further described in Chapter 7.

Undisturbed Flow Diversions

Overland runoff from areas west and northwest of the Savage Coal Terminal site is intercepted by a diversion ditch which carries the runoff northeasterly around the site, emptying into a drainage ditch leading northwards away form the site. Shallow groundwater flows moving toward the site from the west and the north are intercepted by a buried perforated pipe which carries the flows around the west and north edge of the site to a sump (housed on the northeast corner of the site, see Operations Map) where it can then be piplined to the Price River. These facilities are important to the entire water management system at the Savage Coal Terminal, but because they are simply diversions of off-site flows, no UPDES permitting of the discharges is required.

Sedimentation Ponds

All disturbed area surface runoff up to the 10-year, 24-hour storm level is collected in a series of incised impoundments connected by spillways and drawdown pipelines. The lowermost pond (No. 6) is equipped with gravel filter dikes, an open channel spillway, and a 6-inch steel drainpipe connecting the pond to the nearby prep plant makeup water line. The gravel dikes and drain pipe provide for useful return of cleaned surface water to the preparation plant, thereby minimizing off-site discharge from the sedimentation ponds. Issuance of UPDES discharge permit by the EPA and Utah Health Department has established the open-channel spillway of pond No. 6 as UPDES Outfall No. 001.

Power Supply and Transmission Lines

The primary electrical service for the Savage Coal Terminal is from a 44.5k V transmission line owned and operated by Utah Power and Light Company. This HVTL skirts the north and west edge of the property and lies within the permit boundary on a utility easement.

A 12.5k V overhead line extends from the northeast corner of the property to the substation adjacent to the coal processing plant (see Plate 5-2).

A 12.5k V overhead distribution line extends from the west edge of the property to the shop/lab/warehouse facility.

Various lower voltage underground distribution lines extend from the substation to the truck dumps, stacking tubes, etc.

Operations Plan

Plant Processing System

Raw coal will be fed into the plant wash box via the existing feed conveyor. -1/4" material will be separated prior to washing, and conveyed to the 2 x 0 clean coal pile west of the plant. It should be noted this will include the majority of the minus 28 mesh material which is to be later separated in the settling ponds. Refuse will be separated from the coal and placed in the refuse bin for loadout. The clean coal will continue through the plant systems for sizing and drying, with the final, clean product being stockpiled on the north side of the plant. Residual minus 28 mesh material from the washing cycle will be pumped to the settling ponds where the solids are settled out and the process water is clarified and returned to the plant wash cycle.

Washed Coal System

The washing cycle will operate in the same manner as the previous plant operation, except there will be no static thickener for removal of fines and water clarification. Minus 1/4" material will not be washed. As the +1/4" product is washed, only the residual minus 28 mesh material still adhering to the larger product is pumped to the series of settling ponds constructed northeast of the main office building. The fines will be settled in these ponds, and the clarified water will return to the plant in a separate line for reuse in the washing cycle. A dual set of ponds have been constructed as shown on Plate 5-2. When one set of ponds become full of settled fines, the valves can be switched to the other set of ponds, allowing the previous set to be cleaned.

It should be noted that the ponds are constructed in such a manner as to prevent inflow from site runoff, and will not be part of the sedimentation and drainage control system for the site. The ponds are incised; however, they are also be surrounded by a raised berm to prevent runoff inflow, as shown on Plate 7-6. The settling ponds provide the same function as the previously operated static thickener, and still allow for the plant wash cycle to operate as a closed-loop circuit with no discharge except in the event of an emergency. If such an emergency should occur, any discharge from the plant or settling ponds would be contained by the sedimentation ponds on site.

The -28 mesh coal slurry to be settled in the ponds will be pumped to the ponds at a rate of approximately 25 gpm, with a projected maximum amount of -28 mesh material of 1 ton per hour. The material removed from the settling ponds during cleaning will be treated as a coal product and blended in with coal shipments, rather than being disposed of as refuse.

When one set of ponds become full of settled material, the valves will be switched to use the adjacent set of ponds, while the full set is allowed to dry and be cleaned. Cleaning will be accomplished by a trackhoe, loader or dozer, or a combination of equipment. Actual equipment utilized for cleaning will depend on availability and conditions at that particular time; however, all pond cleaning operations will be conducted to minimize damage to the ponds and to minimize impacts to the environment.

It should be noted that the ponds are constructed with raised berms all around as shown on Figure 5-13. Runoff from the undisturbed area west of the ponds will flow into the undisturbed diversion ditch UD-1. Runoff from the disturbed area around the ponds, as well as from the material cleaned from the ponds will flow to the existing disturbed area collection ditch CD-6 and to the sediment ponds, as shown on Plate 7-2.

The material removed from the ponds will be windrowed on the northwest side of the ponds or trucked to a coal storage area for drying. Once the material is dry enough to handle, it will be taken by a front-end loader to the 2 x 0 clean coal pile west of the plant. The proposed drying area is considered part of the overall coal stockpile area in the air quality approval order. It should be noted that, since the minus 1/4" material is not washed, the only minus 28 mesh material settled in the ponds will be the residual material adhering to the larger size washed product. As a result, the settling ponds will very likely not need cleaning more than once a year.

The details for the proposed settling ponds are shown on Plate 7-6 and Plate 5-2. The ponds have a total capacity of 11.11 acre feet and therefore do not meet any of the criteria of 30 CFR 77.216(a).

The ponds were constructed under the supervision of a registered professional engineer. The pond construction was monitored and inspected by the P.E. during construction, and certified upon completion, to ensure compliance with performance standards. The ponds will be inspected by a qualified individual at least quarterly, and certified with other impoundments annually. The ponds will be checked and maintained on a regular basis to ensure they operate in a safe, efficient manner. Maintenance may include cleaning, drainage control and erosion control.

The settling ponds have a total storage capacity of 11.11 acre feet. Only 2 of the 4 ponds will be used at one time, reducing the active water storage capacity to 5.56 acre-feet. The ponds are approximately 95% incised, with only a small portion of the dam above ground level. This would leave only 0.278 acre-feet of potential water release in the event of a failure of the ponds. This water would flow to the disturbed ditch CD-6 and into Ponds 1, 2, 3 and 6. The wash plant will contain a maximum of 23,500 gallons, or approximately 0.07 ac.ft. of water at any given time. In the event of a failure, at least 10,000 gallons of this water would remain in the plant in 2 below-floor sumps, with the balance of approximately 13,500 gallons, or 0.04 acre feet of water going to Ponds 1, 2, 3 and 6. This amount added to the maximum potential release from

the ponds, will total 0.319 acre feet, or approximately 0.012 ac.ft. less than the excess pond capacity. Therefore, the ponds would safely contain a worst case discharge from both the settling ponds and plant along with the runoff and sediment from a 10-year, 24-hour precipitation event. The sedimentation ponds have previously been shown to present no significant risk of harm to the environment or public health; therefore, since the proposed settling ponds would flow to and be contained by, the sediment ponds, they also present no significant risk of harm to the environment or public health.

Non-Washed Coal System

Contract coal from various customers is received in double trailer bottom dump and rear dump highway trucks. This coal may be shipped as received, or crushed and screened as necessary. Facilities used for this operation include truck dumps, transfer belts, stacking tubes, and a reclaim belt and tunnel.

Loadout System

The loadout silo is totally enclosed, and will contain 10,000 tons of coal for loading. Unit trains of up to one hundred 100-ton cars are brought into the property, around the track loop and into the base of the silo. Loading of the train is controlled by 2 hydraulic operated gates and chutes. Trains are then loaded out at a rate of 5,000 to 7,500 tons per hour.

Coal Handling

The Savage Coal Terminal facility has the capability and approval for shipping up to 10.0 million tons per year.

Signs, Fences and Gates

The main access road entrances to the site are marked with a permit identification sign (Figure 5-1) identifying the name, operator, and current operating permits. Other signs encountered on the site include perimeter boundary markers, soil stockpile signs, vegetation reference area signs, and MSHA-required refuse area disposal signs. (Figures 5-1 and 5-2.)

A three-strand wire fence encircles the quarter-section site. One vegetation reference area is separately fenced with a 3-strand barbed wire fence. Locked gates secure the main access to the site during non-operating hours.

Savage Services Corporation will install and maintain signs or markers required during the activities to which they pertain, or until bond release.

Safety, Fire Protection and Security

Savage Services Corporation Safety Department personnel routinely inspect all phases of the operation for compliance with Mine Health Safety Administration (MSHA) safety standards.

Fire protection meets or exceeds all MSHA standards. Fire protection maps are posted on each floor which designates locations of fire extinguishers and escape routes. The plant is also equipped with a hydrant system and strategically located firehoses.

Safety during non-operating hours is accomplished by the locked main access gates.

Operating Schedule and Employment

The Savage Coal Terminal operates two (2) shifts/day and the third shift is a scheduled maintenance shift. The operation is scheduled 240 days per year.

Three (3) salaried and seventeen (17) hourly employees currently operate the facility.

511.200. Potential Impacts and Protection

Upon completion of operations at Savage Coal Terminal, final reclamation work will commence. Reclamation efforts will be directed to recreating the pre-disturbance land use which was small mammal and songbird habitat.

This will be achieved by use of an acceptable seed mixture with shrubs and grasses.

Projected Impacts of Mining on Current and Future Land Use

Surface disturbance will be limited to what is necessary for operations at Savage Coal Terminal. Future disturbance will consist mainly of areas needed for additional coal storage areas. Operations have not affected public facilities or roads and are not projected to at the present time.

Control Measures to Mitigate Impacts

Based on the boundaries of the present surface disturbance, no public parks or historic places will be impacted by operations so mitigation measures need not be discussed here. A further discussion of Cultural Resources may be found in Chapter 4.

Protection of Human Values

As discussed in Chapter 4, there are no sites currently registered on or proposed for the National Register of Historic Places. Also no known archaeological sites are known to occur in the area.

Preservation of Soil Resources and Projected Impacts of Mining on Soil Resources

Soils of Savage Coal Terminal were mapped and analyzed in July, 1980. At that time natural occurring soil bodies were distinguished from disturbed land fill. The purpose of the survey was two-fold; (a) to identify soils and their stripping depths for salvaging and suitability prior to additional disturbance and (b) to determine the amount of topsoil available for final reclamation.

Most of the disturbance at Savage Coal Terminal occurred prior to enactment of P.L. 95-87 or the Utah Interim Program that established regulations for salvaging topsoil. Soil disturbance is displayed on the Soils Map, Plate 2-1, where areas mapped as disturbed land fill constitutes roads and areas for which no topsoil was salvaged.

The current plans are to disturb additional land only as it becomes necessary for coal storage. Areas that may be disturbed are presented on Plate 5-2. Prior to disturbance, suitable topsoil and subsoil will be stripped and stored in their respective piles until needed for permanent reclamation.

Due to the fact that topsoil was not salvaged for areas disturbed prior to the reclamation laws adopted in 1978, it becomes necessary to evaluate a substitute material for final reclamation. The chemical and physical analysis from the disturbed land fill indicated the material has a poor rating as topsoil material (see Chapter 2, Soil Resources). However, since no other topsoil materials exist in the immediate vicinity of disturbance, Savage Services Corporation proposed the use of disturbed land fill as a substitute for topsoil in final reclamation (see Chapter 2 for justification).

Control Measures to Mitigate Impact to Soil Resources

Disturbed areas will be protected to prevent excessive erosion of soils on disturbed sites. These areas include pond embankments, diversions, soil piles, and selected areas no longer used for everyday operations.

Protection of Vegetative Resources

A reclamation plan has been designated which will establish on all areas disturbed by surface operations and facilities a diverse, effective and permanent vegetative cover which will be capable for supporting the uses which the land was capable for supporting before mining. This plan is fully described in Section 540.

Areas to be planted will be "roughened" by tilling (or other means) to help hold the seeds in place. The seed mixtures, found on Tables 5-1, 5-2 and 5-3 will be spread either by drill seeder or hydroseeder. Mulch will then be applied at a rate of 2,000 pounds per acre either by machine crimping with a disc or stabilization onto the surface with a tackifier. The revegetated area will be monitored and if success appears unlikely, alterations will be made until revegetation is successful.

All disturbed lands, will be seeded or planted to achieve a permanent vegetative cover of the same seasonal variety native to the area of disturbed land.

Mitigating Measures to be Employed to Reduce Impacts on Vegetative Resources

Vegetation resources will be disturbed only as necessary for additional storage area. Surface disturbance will be conducted immediately prior to the need for additional area. Upon completion, all disturbed areas will be reclaimed to return vegetation to these areas as described in Section 540.

Monitoring Procedures - Reference Areas, and Revegetation

The reference areas have been established at the Savage Coal Terminal.

The location of the reference areas are shown on Plates 5-2 and 3-1.

The shadscale (or upland) reference area is 2.0 acres in size. It is located within and adjacent to the southwest corner of the permit boundary. The reference area represents the shadscale phase of the salt desert community, which is the typical upland vegetation at Savage Coal Terminal.

A second reference area has been established to represent the lowland areas of the site. This reference area is located in the undisturbed area north of the No. 1 Truck Dump.

The upland reference area is fenced, since it is located near the county road, and outside the main property gates. The lowland area is not fenced; however, corners are marked, and it is located in an undisturbed and controlled access area of the site.

Details on reference areas can be found in Section R645-301-321.100.

Protection of Fish and Wildlife

As an initial part of the fish and wildlife study, open file data and wildlife range maps available from the DWR Regional Office in Price, Utah were reviewed. Study methods were discussed informally with the DWR in Price, Utah, in September, 1980. The final reclamation seed mixture will consist of species that are adapted to onsite conditions and are of known value to wildlife for cover, forage, or both.

Potential Impacts on Fish and Wildlife

As discussed in Chapter 3, the Savage Coal Terminal contains limited wildlife habitat. The wildlife that does occur on the site consist mainly of small mammals and songbirds. These species appear to be unaffected by on-going operations as compared to larger species of birds and mammals that are more furtive in nature. At the time of decommissioning it is most likely that wildlife inhabiting the surrounding areas will quickly re-inhabit Savage Coal Terminal.

Mitigation and Management Plans

Since Savage Coal Terminal is an existing operation, wildlife management measures have been designed to prevent additional impacts from continuing operations. This will be achieved in the following ways:

(1) Limiting the amount of disturbance to what is necessary for on-going operations and refuse disposal.

(2) Preventing hunting or harassment of wildlife in the permit area.

(3) "Employee awareness" programs will specifically inform mine personnel of especially sensitive periods (e.g., the nesting of raptors, snake dens, etc.).

These policies will enhance wildlife usage of the site during operations and help facilitate the rapid return of the site to wildlife habitat after decommissioning.

Protection of Air Quality

The air quality at Savage Coal Terminal will be protected through implementation of control devices such as covered conveyors, water sprays to minimize wind erosion from coal piles and dust in reclaim tunnels, water trucks and chemical dust suppressants to control emissions from unpaved roads and coal piles, silo enclosures, and vibrating feeders for the pile load-in area.

Projected Impacts of Mining Operation on Air Quality

Impacts from dust emissions at Savage Coal Terminal will be localized close to the source of emission. Most of the emissions are anticipated to be composed of large-sized particles grater than 10 micrometers, which settle out within a half mile of the emission source. The large particles do not produce any health effects since they are not inhalable or respirable. Since most light scattering is caused by micron-sized particles, little impact on visibility is anticipated from dust emissions from the Savage Coal Terminal processing facilities. Most of the air quality impact from facility emissions, if any, will be generally confined to the plant site.

Mitigating Measures to be Employed to Control Air Pollutants

Since emissions from unpaved roads compose the largest source of particulate emissions at Savage Coal Terminal, paving, adequate watering of the road surfaces, proper road application of chemical dust suppressants on an as needed basis, and vehicular speed controls are appropriate mitigation measures to be employed.

Air Quality Monitoring Plan

Particulate matter is the only air pollutant which might degrade air quality at the plant site. The particulate matter is predominantly fugitive dust. Increases in concentrations of other pollutants such as sulfur dioxide, nitrogen oxides, carbon monoxide, and photochemical oxidants are insignificant.

No air monitoring program is currently planned for the Savage Coal Terminal facility. The plant is considered to be a minor air pollution source by the Utah Bureau of Air Quality and no air monitoring has been required. Particulate emissions at the plant site are minor and are estimated to be less than 30 ton/year. Sources of this magnitude are generally considered insignificant by air regulatory agencies. Secondly, fugitive dusts from materials handling are predominantly large particles (greater than 10-30 um) which fall out rapidly due to gravitational settling. These dust particles will not impact air quality to any great degree at distances greater than one-half mile from a source.

Refuse Stability

Refuse piles are inspected regularly under MSHA requirements and construction procedures assure the long-term stability of the piles (see Section 536). No adverse impacts to human safety or environmental quality are foreseen. Should a slide occur which may have a potential adverse effect on public, property, health, safety or the environment, the company shall notify the Division immediately and comply with remedial measures required by the Division.

Waste Disposal Plans

Two (2) septic tank/drainfields serve the preparation plant and the office/shop/warehouse. All necessary county and state permits have been obtained for operation of these facilities.

511.300. Reclamation.

Complete reclamation plans are discussed under Section 540.

512. Certification.

512.100. All required maps in this plan have been prepared by, or under the direction of, and certified by a qualified, registered, professional engineer in the State of Utah.

512.110. N/A - This is a surface operation.

512.120. Surface Facilities and operations maps are certified.

512.130. Surface configuration maps are certified.

512.140. Hydrology maps are certified (see Chapter 7).

512.150. Geologic maps are certified (see Chapter 6).

512.200. Refuse pile, impoundments and primary road designs are certified.

512.210. N/A - There are no excess spoil plans for this site.

512.220. N/A - There are no durable rock fills planned for this site.

512.230. The refuse pile design is certified by a professional engineer experienced in such designs.

512.240. Impoundment designs use current, prudent engineering practices, and are certified by an experienced professional engineer according to R645-301-743.

512.250. Design and construction of primary roads are certified as meeting the requirements of R645-301-534.200 and R645-301-742.420.

512.260. The only variance from approximate original contour is the permanent refuse pile. Designs for this pile are certified.

513. Compliance With MSHA Regulations and MSHA Approvals.

513.100. N/A - There are no coal processing waste dams or embankments proposed for this site.

513.200. N/A - There are no impoundments or sedimentation ponds meeting the size of other qualifying criteria of MSHA, 30 CFR 77.216 (a).

513.300. N/A - There are no underground workings at this site.

513.400. Refuse piles have been designed and constructed to meet the requirements of MSHA, 30 CFR 77.214 and 30 CFR 77.215. MSHA has issued approvals and I.D. numbers for all refuse areas.

513.500. N/A - This is a surface operation.

513.600. N/A - There are no underground mines at this site.

513.700. N/A - This is not a surface mining operation.

513.800. A plan for extinguishing coal mine waste (refuse pile) fires is discussed in Section 536.

514. Inspections.

All required inspections, except quarterly impoundment inspections, are conducted by a qualified, registered professional engineer or other qualified professional specialist under the direction of the professional engineer.

514.100. N/A - There are 2 topsoil piles and one refuse pile at Savage Coal Terminal. Each of these piles were constructed and inspected under the direction of a professional engineer, and are presently stable. The soil piles are temporary, and will be removed upon reclamation. The refuse pile is permanent, and has been and continues to be, inspected on a regular, quarterly basis. It should be noted that the refuse pile has been approved for removal for waste utilization; however, only a portion of the pile has been removed at this time. None of these piles meet the definition of Excess Spoil.

514.110. N/A - These piles do not meet the definition of Excess Spoil.

514.120. Refuse pile inspections are certified and made available to MSHA and the Division on a quarterly basis. These reports include appearances of instability, structural weakness and other hazardous conditions.

514.130. N/A - No drainage system or protective filter reports are required.

514.200. The refuse pile has been, and continues to be, inspected by a registered, professional engineer. See Figure 5-1 for Inspection Form.

514.210. The refuse pile is active; however, it receives only minor amounts of material from periodic ditch, culvert and sediment pond cleaning. Inspections are conducted on a quarterly basis.

514.220. Inspections are conducted on the refuse pile on a quarterly basis, whether any new material has been added, or not.

514.221. Although this is on the Inspection Form, no new foundation preparation is necessary for this existing pile.

514.222. N/A - There are no underdrains or protective filter systems associated with this pile.

514.223. Surface drainage controls are inspected quarterly.

514.224. N/A- The pile has not reached final configuration.

514.230. Refuse pile inspection reports are made available to MSHA and the Division promptly after each inspection. These reports include appearances of instability, structural weakness and other hazardous conditions.

514.240. N/A - There are no underdrains or protective filters associated with this pile.

514.250. A copy of each refuse pile inspection report is retained at Savage Coal Terminal.

514.300. There are a total of 9 impoundments at this site. Five are considered sedimentation ponds and 4 are settling ponds for the plant.

514.310. All impoundments are inspected on a quarterly basis by a professional engineer or specialist experienced in the construction of impoundments. Impoundments are also inspected and certified on an annual basis by a professional engineer.

514.311. Impoundments are inspected quarterly and certified on an annual basis. This will continue until removal of the structure or release of the performance bond.

514.312. Annual certified reports are submitted to the Division with the Annual Report for the Coal Terminal, as required. These reports include discussion of appearances of instability, structural weakness or other hazardous conditions, depth and elevation of impounded water, existing storage capacity, existing or required monitoring procedures and instrumentation and any other aspects of the structure affecting stability, such as erosion and inlet/outlet conditions.

514.313. A copy of all impoundments inspection reports are retained at Savage Coal Terminal.

514.320. N/A - There are no impoundments subject to MSHA, 30 CFR 77.216, at this site.

514.330. As indicated above, all impoundments are inspected at least quarterly by a professional engineer or qualified person.

515. Reporting and Emergency Procedures.

515.100. The Savage Coal Terminal is located on relatively flat land (less than 5% slope) and very little potential exists for a slide; however, in the event of such an occurrence, the following procedure would be followed:

"At any time a slide occurs which may have a potential adverse effect on public, property, health, safety or the environment, Savage Services Corporation will notify the Division by the fastest available means and comply with any remedial measures required by the Division."

515.200. All impoundments at Savage Coal Terminal are incised, and present little, if any, hazard; however, if a potential impoundment hazard is discovered, the following procedure will be followed:

"If any examination or inspection discloses that a potential hazard exists, the person who examined the impoundment will promptly inform the Division of the finding and of the emergency procedures formulated for public protection and remedial action." Emergency procedures and remedial action will be discussed with Savage Coal Terminal supervisors, and a course of action determined at that time. If adequate procedures cannot be formulated or implemented, the Division will be notified immediately.

515.300. See 515.322 for procedures to be employed during a temporary cessation.

515.310. It is understood that Savage Services Corporation has an obligation to comply with provisions of the approved permit during temporary cessation.

515.311. N/A - This is a surface operation.

515.312. All surface facilities will be secured during a temporary cessation.

515.320. See Section 515.322.

515.321. N/A - This is a surface operation.

515.322. Whenever it is known that operations are to be temporarily ceased for more than 30 days, Savage Services Corporation shall submit to the Division a notice of intention to cease or abandon the operations, in accordance with R645-301-575.300 and to MSHA standards.

This notice will describe mitigation measures to be employed in accordance with the terms and conditions of the permit approval, such as a statement of the number of surface acres involved in the cessation, extent of sub-surface strata, prior reclamation efforts accomplished on the property, and identification of all backfilling, regrading, revegetation, environmental monitoring, underground opening closures and water treatment activities that will continue during the temporary cessation.

516. N/A - This is not a Surface Mining Operation.

520. Operation Plan.

521. The Savage Coal Terminal receives, processes, stores and ships coal from various coal mines in the area. In general, coal is brought in by truck and dumped through 1 of 5 separate truck dump locations. The coal is then screened and/or crushed, washed if required, and conveyed into specific storage areas. When ordered, specific coal is withdrawn from the pile and loaded into the silo by conveyor. The coal is then loaded into a unit train at the silo, and shipped to the desired location.

The Savage Coal Terminal is operated under an approved Mining and Reclamation Plan, and has an excellent history of compliance with that plan and the R645 Regulation.

521.110. Previously Mined Areas.

521.110. This is a surface operation. Original disturbance on the site occurred in 1975 under Utah Power & Light ownership. The site was expanded under Swisher Coal Co. between October 1977 and April 1978. Some additional disturbed area was added after the Arco Coal Co. purchase in 1980.

Previous and present disturbance on the area are shown on Plate 5-1.

521.111. N/A - Surface operation.

521.112. This is not a surface mine; however, the extent of surface disturbance is shown on Plate 5-1.

521.120. Existing surface and subsurface facilities are shown on Plate 5-2.

521.121. See Plate 5-2.

521.122. See Plate 5-2.

521.123. See Plate 5-2.

521.124. See Plate 5-2 and 5-6.

521.125. See Plate 5-2 and 7-3.

521.130. Landowner and Right of Entry and Public Interest Maps are on Plate 1-1.

521.131. See Plate 1-1.

521.132. See Plate 1-1.

521.133. N/A - There are no operations within 100 feet of the right-of-way line of a public road, and there are no plans to relocate a public road.

521.140. Mine Maps and Permit Area Maps

521.141. See Plate 5-2.

521.142. N/A - This is a surface operation.

521.143. See Plate 5-2 and Section R645-301-536.

521.150. Land Surface configuration is shown on Plates 5-1 and 5-2.

521.151. See Plate 5-1. Pertinent maps are prepared and certified according to R645-301-512.

521.160. Maps and Cross Sections of the Proposed Features for the Proposed Permit Area are shown on Plate 5-2.

521.161. See Plate 5-2.

521.162. See Plate 5-2.

521.163. See Plate 5-2.

521.164. See Plate 5-2.

521.165. See Plate 5-2.

521.166. See Plate 5-2.

521.167. N/A - No explosive storage or holding at this site.

521.168. N/A - No air pollution collection or control facility.

521.169. N/A - No coal processing waste bank.

521.170. Transportation Facilities Maps are on Plate 5-2 and described in Section 511.100.

521.180. Support Facilities are shown on Plate 5-2.

521.190. N/A - Other relevant information has not been requested.

521.200. Signs and Markers.

All signs and markers will:

521.210. Be posted, maintained and removed by Savage Services Corporation;

521.220. Be of a uniform design that can be easily seen and read; be made of durable material; and conform to local laws and regulations;

521.230. Be maintained during all activities to which they pertain.

521.240. A typical mine identification sign is shown on Figure 5-1.

521.241. N/A - This is a surface operation.

521.242. Identification signs are placed at each point of access to the permit area from public roads. (See Plate 5-2).

521.243. See Figure 5-1.

521.244. Identification signs will be retained and maintained until after the release of all bonds for the permit area.

521.250. A typical perimeter marker is shown on Figure 5-2.

521.251. N/A - This is a surface operation.

521.252. The perimeter of the permit area is clearly marked. (See Plate 5-2).

521.260. N/A - There are no buffer zones associated with this operation.

521.261. N/A

521.262. N/A

521.270. A typical topsoil marker is shown on Figure 5-2.

522. N/A - This is a surface preparation and shipping facility.

523. N/A - No mining takes place at this operation.

523.100. N/A - There are no operations proposed within 500 feet of an underground mine.

523.200. N/A

523.210. N/A

523.220. N/A

524. N/A - There are no plans for blasting or explosives at this facility during the life of operation. Any blasting during reclamation activities will be performed by licensed, certified contractors and in accordance with local, state and federal regulations.

525. N/A - This is a surface preparation and shipping operation. No underground mining takes place here.

526. Plant facilities are described under Section 511.100 and 511.200. Reclamation is described in Section 550.

526.100. Mine Structures and Facilities.

526.110. See Section 511.100.

526.111. See Plate 5-2.

526.112. See Section 511.100.

526.113. See Section 511.100.

526.114. See Section 511.100.

526.115. N/A - There are no plans to modify or reconstruct any facilities at this time.

526.116. N/A - There are no plans to conduct operations within 100 feet of the right of way line of a public road or to relocate a public road.

526.200. Utility Installation and Support Facilities.

The majority of utility and support facilities for this operation were installed 20 - 30 years ago, and have been reviewed and approved by relevant agencies whenever required. See Section 511.100.

526.210. "All operations will be conducted in a manner which minimizes damage, destruction, or disruption of services provided by oil, gas, and water wells; oil, gas, and coal-slurry pipelines, railroads; electric and telephone lines; and water and sewage lines which pass over, under, or through the permit area, unless otherwise approved by the owner of those facilities and the Division.

526.220. Support facilities are operated in accordance with the permit issued for this facility, and in a manner which:

526.221. Prevents or controls erosion and siltation, water pollution, and damage to public or private property; and

526.222. To the extent possible using the best technology currently available - minimizes damage to fish, wildlife, and related environmental values; and minimizes additional contributions of suspended solids to streamflow or runoff outside the permit area. Any such contributions will not be in excess of limitations of Utah or Federal law;

526.300. Water pollution control facilities are described in Chapter 7 (Section R645.700) of this Permit.

526.400. See Section 511.200.

527. Transportation Facilities are described under Section 511.100.

527.100. See Section 511.100.

527.110. See Section 511.100.

527.120. See Section 511.100.

527.130. See Section 511.100.

527.200. See Section 511.100.

527.210. See Section 511.100.

527.220. See Section 511.100.

527.230. See Section 511.100.

527.240. If a road is damaged by a catastrophic event, such as a flood or earthquake, the road will be repaired as soon as practical after the damage has occurred.

527.250. N/A - No alternative specifications or steep cut slopes are planned for this operation.

528. See Sections 511.100 and 536 for details on coal and refuse handling.

528.100. See Section 511.100.

528.200. N/A - This is not a mining operation.

528.300. See Section 536.

528.310. N/A - No excess spoil is generated.

528.320. See Section 536.

528.321. N/A - There are no plans to return coal processing waste to underground workings.

528.322. See Section 536.

528.323. See Section 536 for complete fire fighting plans.

528.330. Handling and disposal of non-coal mine waste is discussed under Section 511.100.

528.331. See Section 511.100.

528.332. See Section 511.100.

528.333. See Section 536.

528.334. Any non-coal mine waste defined as "hazardous" under 3001 of the Resource Conservation and Recovery Act (RCRA) (Pub.L. 94-580, as amended) and 40 CFR Part 261 will be handled in accordance with the requirements of Subtitle C of RCRA and any implementing regulations.

528.340. See Section 536.

528.350. See Section 536.

528.400. Dams, embankments and other impoundments are discussed in Section 511.100 and in Chapter 7 (R645-301-700).

529. N/A - This is a surface operation.

530. Operational Design Criteria and Plans.

531. Operational designs and plans are discussed under Sections 511.100, 536 and Chapter 7 (R645-301-700).

532. Complete designs for sediment control are discussed in Chapter 7 (R645-301-700).

532.100. See Chapter 7.

532.200. See Chapter 7.

533. Complete designs for impoundments are discussed in Chapter 7 (R645-301-700).

533.100. There are no impoundments meeting the size or other criteria of 30CFR 77.216(a), or located where failure would be expected to cause loss of life or serious property damage. All impoundments at this site are incised.

533.200. See Chapter 7.

533.210. See Chapter 7.

533.220. See Chapter 7.

533.300. See Chapter 7.

533.400. See Chapter 7.

533.500. See Chapter 7.

533.600. N/A

533.610. N/A

533.620. N/A

533.700. See Chapter 7 (R645-301-700).

534. Roads are discussed under Section 511.100.

534.100. See Section 511.100.

534.200. See Section 511.100.

534.300. See Section 511.100.

535. N/A - This is a surface preparation and shipping facility. No spoil is generated at this site.

536. The refuse pile at Savage Coal Terminal is composed primarily of coal processing waste generated prior to 1984; however, a small percentage of the pile is made up of coal mine waste generated by the operations prior to ownership by Savage Services Corporation.

The primary use of the refuse pile at this time is for disposal of sediment from the cleanout of ponds, ditches and culverts.

The main refuse disposal area is approved to be removed and burned in the Sunnyside Cogeneration Power Plant, starting in the fall of 2000. The pile has been surveyed and found to contain approximately 684,000 cubic yards of material. As of 2007, only a relatively small amount of material has been removed from the east and west ends of the pile. The power plant has been utilizing waste material from another site; however, it is still anticipated that the Savage Coal Terminal refuse will be used in the future.

An alternative proposal has been made and approved to use the refuse as a B.T.U. resource recovery material. This is simply another form of waste utilization for the refuse, and provides Savage Services Corporation with an alternate method of removing the refuse pile and having it used beneficially. The details of the B.T.U. resource recovery plan are provided in Appendix 5-2. This plan is not intended to replace or supercede the original plan for the refuse pile removal, but merely to supplement the original plan. Having an additional or alternate plan will help ensure that the refuse is removed and used in an approved and beneficial manner.

The material will be removed over a period of 3-4 years, and the area will be utilized as a coal storage area through the operational life of the facility. When the area is no longer required for the operation, it will be reclaimed according to the approved plan.

Details on the refuse pile and plan for removal are found in Appendices 5-1 and 5-2 of this plan.

Although the pile is being removed periodically, it is still considered active since ditch, culvert and sediment pond cleanout material as well as other site cleanup material are disposed of in the pile. The following is the approved Coal Processing Waste Disposal Plan for this site.

Coal Processing Waste Disposal

Coal processing waste at Savage Coal Terminal was truck hauled from the preparation plant to the designated disposal site within the permit area. The design, construction and maintenance of the waste bank is under the supervision of a registered professional engineer. The refuse pile is approved by MSHA, and marked with an identification sign as shown in Figure 5-1.

The coal processing waste is the reject from the washing cycle used to clean and upgrade the coal from the Beaver Creek Coal Company mines in the Carbon-Emery County area. Coal was washed from the Gordon Creek #2 Mine (Castle Gate "A" Seam), Gordon Creek #3 Mine (Hiawatha Seam), and Huntington Canyon #4 Mine (Blind Canyon Seam). All of the seams were low-sulfur (0.5% to 0.8%). The reject is also low-sulfur, non-acid, and non-toxic. The attached analyses show the typical quality of the coal and the refuse product (Figure 5-3 and 5-4).

The wash plant has been idle since 1984; however, it was restarted during the fall of 2006. Equipment was replaced or upgraded within the plant as required. The coal to be washed under this restart plan is owned by another company, and the refuse generated by the washing cycle will be disposed of in their refuse pile.

At the present time, no coal processing waste is being deposited on the refuse pile from the plant. Materials from ditch and pond cleaning are periodically placed on the refuse pile.

The texture of the refuse material has been classified as "coarse", as indicated by the following typical screen analysis:

+4	-	5%
4" x 2"	-	5%
2" x 3/4"	-	15%
3/4" x 1/4"	-	20%
1/4" x 28m	-	25%
28m x 0	-	30%

Additional refuse analyses are provided in Appendices 5-1 and 5-2.

Based on the analyses, there is no apparent reason that the toxicity of the refuse product should change; however, if water analysis in the area should indicate a change in pH or other possible toxic levels after the refuse has weathered, additional sampling will be performed to check for acid-toxic levels in the refuse.

If the tests show an acid or toxic forming potential, the disposal material will be covered with 4 feet of non-acid, non-toxic material.

Site Inspection

The refuse banks are inspected under the supervision of a qualified registered engineer at least quarterly; this will continue until the bank has been graded, covered, and reseeded. Inspections include observations of any potential safety hazards, to assure that organic material and topsoil is removed before deposition and that construction and maintenance are being performed in accordance with the design plan.

If such inspection discloses a potential hazard, the inspector will immediately notify the regulatory authority of the hazard and the emergency procedures to be implemented.

Copies of the inspection findings are maintained and available for review on site.

Water Control Measures

The surface drainage from the refuse pile is carried by collection ditches sized to convey runoff from a 100 year-6 hour event, and deposited into a sediment pond (#5) downslope. The overflow (if any) from this pond is conveyed through an additional collection ditch to a final filtering pond and discharged into the same underground sump to be recirculated through the plant as washdown, sprinkler and roadway water. Slope protection is provided at the face of the refuse bank through the use of grading and berms along the top. Upon completion, the bank will be graded, covered with suitable plant growth material and revegetated. All earthlined collection and diversion ditches will be revegetated upon completion of construction.

The completed refuse pile is not designed to purposely impound water, but rather to drain the top and side slopes to properly sized structures which convey runoff to Pond 5; however, during the course of pile construction, minor undulations may exist temporarily due to the large surface area of the pile and the periodic nature of material deposition without the consistent import from the wash plant. These areas may impound small amounts of water for short periods of time.

The pile is regraded on a regular basis, and any such undulations will be graded out at least quarterly. The overall slope on the refuse pile will be maintained to provide positive drainage as shown in the plan.

Protection of water resources is accomplished through the use of sedimentation and filtering ponds and a system designed for no discharge from the permit area within a 10 year - 24 hour precipitation event.

Construction Requirements. The following is a general refuse disposal procedure employed at this site:

Preparation

(1) Remove vegetation and topsoil and place in uncompacted lifts of 2 feet or less on designated storage area.

(2) Remove lower soil to a depth as allowed by as ground conditions. This material will also be place in uncompacted lifts of 24 inches or less in a designated storage area.

Dumping

1. Refuse should be dumped on the extreme perimeter of the prepared area. Truckloads dumped should have three to five feet clearance from previous loads to allow spreading. Refuse will not be dumped beyond the perimeter or upon any unprepared area.

2. Continue dumping around perimeter until filled:

   a. If using more than one area, proceed to next prepared area and repeat above dumping procedure.

   b. If only using one large area begin dumping back at original point or as near as possible to this point.

Spreading and Compaction

1. Refuse piles should be knocked down and spread as soon as practical. Spread the refuse as thinly as possible to allow for more efficient drying. Moisture should be at 10% to 12% for effective compaction. The entire previously compacted pile area or prepared area may be used for drying if necessary.

2. Compaction should take place during spreading operation if possible. If refuse is too wet to compact, allow for air-drying and then proceed. Compact in layers not to exceed 24 inches, starting at the perimeter and working out. This will allow for the building of the height of the pile in a series of stable lifts. Compaction will be to 90% of maximum dry density. The pile will be graded and maintained in a manner to allow drainage and prevent water impoundment as per the plan on Plate 5-3.

Burning

Proper compaction and maintenance of the waste bank should prevent any combustion from occurring; however, in the event of a fire, the following plan will be followed:

The plant manager will be notified immediately. The operations manager of chief engineer will also be notified.

The plant manager will examine the fire area and determine its severity. He will then confer with the operations manager or chief engineer to determine the extinguishing method to be employed. The manager shall contact the regulatory authority and MSHA to discuss a plan for extinguishing the fire. In lieu of other suggestions or plans, one of the following two methods will be used, depending upon the extent of the fire:

1. Small area of heat or fire: with a small area, it will be best to smother the fire by hauling incombustible earth material only from a previously soil-stripped zone and spreading and compacting the borrow over the burning area to eliminate the air supply.

2. Large area of heat or fire: with an area grater than 100 feet x 100 feet, it will be necessary to begin removal of the burning material. The removed material will be spread in thin layers onto a soil-stripped area for extinguishing. This area will be within that proposed for refuse disposal and pre-stripped as per the plan. Water will be employed only if the spreading material is not sufficient to prevent further burning. Once a fire is extinguished, a layer of incombustible material at least eighteen inches thick will be placed over the burned material and compacted before any further waste deposition takes place over it.

Only the plant manager and operators or others designated by him will be allowed to participate in fire extinguishing procedures. All authorized persons will be familiar with the above techniques prior to working around a fire, and adequate safety measures will be employed to ensure the safety of the fire fighters and the public in general.

Burned Waste Utilization

It is currently not anticipated that any burned coal waste, other minerals, or refuse is to be removed from any disposal area. However, should this become necessary, a plan for removal shall be certified by a qualified engineer and approval obtained from the regulatory authority.

The Office of Surface Mining has completed a stability analyses using the Slope IV computer for worst case conditions at the Savage Coal Terminal which indicates a static safety factor of 1.98 (OSM Review Document, C.V. Spur Application, May 1981 (Figure 5-5). MSHA has reviewed processing waste disposal design and construction specifications and determined that the proposed piles present no safety hazard (Figure 5-6).

Soil Stockpiles

The locations of topsoil stockpile is shown on Plate 5-2. The majority of the material in the main topsoil pile was salvaged from areas shown on Plate 5-1 which were disturbed between May 1978 and December 1981. Additional stripped topsoil was added to the pile in 2002. This material came from the railroad loop area shown on Plate 5-2. It is not anticipated that additional stripping or soil salvaging operations will occur during the new permit term. Stockpiles will be vegetated to minimize wind and water erosion, with all runoff draining into sedimentations ponds.

536.100. See Section 536.

536.110. See Section 536.

536.120. See Section 536.

536.200. See Section 536.

536.210. See Section 536.

536.220. See Section 536.

536.230. See Section 536.

536.300. N/A - No Excess Spoil Fills.

536.400. N/A - No Impounding Structures from Coal Mine Waste.

536.500. Disposal of Coal Mine Waste in Special Areas.

536.510. N/A - No coal mine waste from outside a permit area is planned to be disposed of at this operation.

536.520. N/A - There are no plans to dispose of coal mine waste in underground workings.

536.600. N/A - There are no future plans to dispose of underground development waste at this site.

536.700. N/A - This is a surface operation with no plans to return coal processing waste to underground workings.

536.800. See Section 536. There are no plans for coal processing waste dams.

536.810. See Section 536.

536.820. See Section 536.

536.900. See Section 536.

537. Regraded Slopes.

537.100. N/A - There are no plans for steep cut slopes at this site.

537.200. N/A - This is a surface operation.

540. Reclamation Plan.

541. Contemporaneous Reclamation

At the present time it is not possible to project the life of the Savage Coal Terminal facility, as it may be used indefinitely. Therefore, only inactive refuse disposal areas may be reclaimed as the piles are completed. These areas will be covered with an appropriate amount of plant growth material. Seeding, fertilizing, and mulching will be performed simultaneous with placement of subsoil and topsoil.

541.100 When operations at Savage Coal Terminal are finally terminated, all surface facilities will be removed and the surface area graded (except the refuse disposal sites), topsoiled and revegetated. After revegetation efforts have been completed, all drainage structures, culverts, and diversions will be removed and the areas reclaimed.

Reclamation efforts, including backfilling, grading, topsoil replacement and revegetation shall occur as contemporaneously as practicable.

Seeding and planting will occur immediately after site preparation and during the first normal period of planting conditions.

Soil Removal and Storage

The soil survey conducted in July, 1980 distinguished disturbed soils from undisturbed soil mapping units (See Plate 2-1, Soils Map). Areas mapped as Disturbed Land were areas where the soils, vegetation, both were affected by operations. Disturbance of areas which now occupy roads and surface facility sites occurred prior to enactment of reclamation legislation so no topsoil was salvaged from these areas. However, soils underlying disturbance are considered to be in-place aside from the top several inches of coal fines, and compaction.

The undisturbed soil mapping units will have topsoil removed immediately prior to disturbance based on stripping depths that have been assigned to each soil type. The stripping depths were derived from soil physical and chemical analysis (see Section 8.5). Subsoil is that material which exist between the topsoil and the parent material.

Where chemical analysis substantiates, subsoil will be stripped down to the parent material.

The location of the topsoil piles that currently exist at Savage Coal Terminal are displayed on Plate 5-2. These stockpiles were placed on level ground and revegetated with the temporary seed mixture to reduced wind and water erosion. As additional topsoil and subsoil is placed on the respective stockpiles they are reclaimed contemporaneously with the first suitable growing season.

The present stockpiles are most likely expanded to their maximum size at this time. Materials from the stockpiles will not be moved until needed for final reclamation.

541.200 Final Abandonment

Upon final cessation of operations all surface structures and facilities for the operation will be removed. There are no plans to transfer any wells to other parties. The shallow monitoring wells located within and around the property has been sealed by filling them with cement or other inert sealing material. All salvageable materials will be recovered and removed for sale or re-use. Non-salvageable materials (concrete, gravel, etc.) will be placed to the extent possible in existing impoundment excavations and low areas as fill prior to final grading and stored on the berms of sedimentation ponds. Remaining material will be taken off site to an approved landfill. The schedule and cost of removal is detailed in Chapter 8.

541.300 N/A - This is a surface operation.

541.400 Disposition of Drill Holes

Thirteen observation (ground water monitoring) wells were drilled at C.V. Spur in the period 1980-1982. Nine holes were within the permit area, with an additional four holes drilled on adjacent farmland. By Division approval, all ground water monitoring wells were filled and capped as of July, 1999. Two new water monitoring wells were drilled in 2006. When no longer needed, these wells will also be filled and capped as described above.

Removal of Impoundments and Diversions

All sedimentation ponds and diversion ditches will remain in place until an effective vegetation cover has been reestablished to reduce suspended solids runoff from the affected areas.

The success of the revegetation will be monitored and measured. Once the success of revegetation is determined to be acceptable, all diversions and sedimentation ponds will be filled in first with the concrete rubble and gravel stored on the berms. See Chapter 7 for details of post-mining hydrology.

The berms around the ponds will then be pushed in and compacted to complete the backfilling. The diversions will then be removed by pushing the berms into the ditches.

These areas will then be prepared and planted in accordance with the revegetation plan. The ponds will be removed in numerical order (1, 2, 3, 5, 6); the diversions will be the last to be removed (D-1, D-2) to minimize the risk of a major precipitation event eroding the newly revegetated area.

Removal of Roads/Railroads

The roads required for access to the sedimentation ponds and diversions will be left in place until pond and diversion reclamation is under way. The roads will then be removed and reclaimed in the same manner. There are no plans to leave any roads at this property.

The loop track within the property belongs to Savage Services Corporation, and will be removed upon completion of operations. The spur track is the easternmost track running north-south, and is the property of D & RGW railroad, and will remain in place upon reclamation. The final configuration of the property is shown on Plate 5-6.

Reclamation of River Pump/Pipeline System

The pipeline system consists of 2 PVC pipes laid parallel in a trench approximately 30" wide for a distance of approximately 10,000 feet, from the C.V. Spur pumphouse to the Price River. The lines are a 6" PVC which provides water from the river pump to the Savage Coal Terminal facility, and an 8" PVC line for discharge of ground water from the Savage Coal Terminal French Drain to the Price River. The river pump facility consists of a 6' diameter, perforated C.M.P. culvert placed vertically in a hole approximately 30' deep, and 20' wide, surrounded by drain rock to allow entry of water into the pipe. A concrete base and steel grating cover the pipe. A deep-well pump is mounted over the well and hooked to the 6" pipeline to the plant. A steel hinged building covers the well and pump for protection.

During reclamation, the pipelines will be removed and the area reclaimed according to the plan. The pumphouse, pump, grating, and 6' CMP well will be removed. The concrete will be broken up and dozed into the well hole, and the remainder of the hole will be filled in with existing material on site (originally taken from the hole). The pumphouse and pipeline area will be regraded to original contour and reseeded according to the plan, using the seed mix described in Table 5-4. The pumphouse area is a natural low spot, therefore, the reclamation will be in a small, non-draining area and

no silt fence or additional runoff controls should be required. Sediment controls on the reclaimed pipeline area will be provided only if deemed necessary. The area is designated a Small Exemption Area with no required sediment control based on a Sed-Cad analysis.

The river pump/pipeline system is shown on Plates 5-7 and 5-8.

542 Narratives, Maps and Plans

542.100 Schedule of Reclamation

Upon completion of operations at C.V. Spur, the following approximate schedule will be followed for final reclamation. Time frames are approximated and may overlap, decreasing the overall time. The sequence of events may also be slightly altered. This procedure will begin within 180 days of termination of operations.

Procedure, Time Frame, Accumulative Time

Procedure	Time Frame	Accumulative Time	Time of Year
Remove Structures	44 Weeks	44 Weeks	Spring-Spring
Regrade Areas	18 Weeks	62 Weeks	Summer - Fall
Topsoil and Soil Placement	2 Weeks	64 Weeks	Fall - Winter
Seeding & Mulching	2 Weeks	68 Weeks	Winter (after 10/15)

* Removal of Sediment Ponds and Diversions 2 Weeks
* To be completed after the revegetation cover meets the standards described in Section 3.5.3.1.

Cost of Reclamation

Estimates of the cost of reclamation are detailed in Chapter 8, Appendix 8-1.

542.200 Backfilling and Grading Plans

With the termination of Savage Coal Terminal operations, the surface area will be graded, except refuse disposal sites. The post-mining topography and drainage for the refuse disposal areas is shown on Plate 5-6. Cross-sections of the reclaimed refuse disposal areas are shown on Plate 5-3. For the most part, reclamation backfilling and grading will be minimal since no overburden will be removed.

Areas to be backfilled will consist of the 5 ponds, diversions, and any other depressions that will act to trap water. In each case, the material to be used for backfilling is either stored adjacent to the structure in the form of berms or dams, or will be placed there prior to the backfilling (i.e. - concrete to be placed in the ponds). The entire disturbed area will be graded to the necessary degree to reach the configuration shown on Plate 5-6, Post Mining Topography and Drainage.

Recontouring

All final grading, preparation and placement of topsoil (where applicable) will be done along the contour to minimize subsequent erosion and instability.

Rills or gullies deeper than 9 inches in regraded areas will be filled, graded or otherwise stabilized and reseeded.

The proposed final configuration of this area is shown on Plate 5-6. This final recontouring is compatible with the surrounding terrain and the post-mining land use.

Terracing and Erosion Control

As a part of the final reclamation work, native hay will be placed on the side slope of the refuse disposal piles and crimped into the soil. Other organic mulches will be used with a tackifier on steeper slope areas where native hay cannot be crimped into the soil.

Soil Redistribution and Stabilization

On pre-law disturbed areas (see Plate 5-1) the disturbed land fill will be used as a seedbed material. Any material which has been contaminated by more than 50% coal or coal refuse will be removed. Areas with excessive rock (more than 50% or rocks greater than 12" diameter will not be utilized as a soil substitute but

will be salvaged to be employed as rip-rap. The balance of the material will be ripped at a depth of 14" to 18" utilizing a D-6 or the equivalent crawler tractor on approximately 18" center to center spacing.

Note: The 50% coal contamination will be determined visually; however, if such areas are left, they will have coal % verified by laboratory analyses. Contaminated material will be disposed of on site.

Post law disturbed areas will have an average of 6" of topsoil respread onto the area. This material as well as the disturbed land fill will be scarified (disced or tilled) in areas of less than 20% slopes to reduce clodiness.

The redistributed topsoil will be random sampled on a basis of 1 composite sample per acre. The sample sites will be randomly located on a grid of the reclaimed area by numbering each grid from 1 to 100/acre and selecting numbers to sample from a random number table. The sites will be located on the ground and a 4" soil auger will be utilized to extract a 4" to 6" core of surface material for laboratory analyses. The sample will be labeled as to its location and shipped to a certified lab to be analyzed as to those parameters the regulatory agency requires at the time of reclamation.

Revegetation Plan

Soil Preparation

Prior to seeding soil samples will be taken from all areas to be reclaimed to determine appropriate fertilizer types and application rates from the soil analysis.

Seeding and Transplanting

Areas which have been disturbed during mining will be reseeded with either native species or a mixture of native and introduced species. Mixtures containing introduced species may be more efficient in establishing ground cover for preventing erosion and protecting topsoil since some may grow faster and produce cover more quickly than native species.

Presently, Savage Services Corporation has been granted permission to use the Seed Mixture in Table 5-1. This mixture contains some introduced species that the company feels may be valuable for reclamation of the site. By studying the effects of specific introduced and native species planted together on Savage Coal Terminal during temporary reclamation, the company will be able to design a permanent reclamation seed mixture most compatible with the site. At the present time, the permanent reclamation seed mixture consists of the species and rates found in Tables 5-2 and 5-3 for the upland and lowland areas, respectively. The mix in Table 5-4 will be used to revegetate the disturbed area on the Price River pipeline system. The revegetation plan for the Price River Well area also includes the planting of Sandbar Willows at a density of 150 per acre (to a distance of 200 feet from the river).

In most cases the post-mining topography will be gentle enough to drill seed along the contour. On steeper areas (greater than 4:1), a combination of hydroseeding and broadcast seeding will be utilized. Hydroseeding and broadcast seeding will be applied at twice the rate of drill seeding. Areas to be hydroseeded are shown on Plate 5-6, all other areas are to be drill seeded.

Seeding will take place after September 1 to the first snowfall to allow for optimum growing conditions. Success of the revegetation program will be determined by comparing the percent ground cover and shrub density on the reclaimed area with that on the reference areas described in Chapter 3. Success standards will be those required by the Division.

Establishment of acceptable shrub densities may be achieved either through the use of seed or by planting bare root or containerized seedlings.

Mulching

To protect newly reclaimed areas against erosion, drying, and frost heave, planted areas will be mulched following seeding. The type of mulch and method of application will vary depending on slope conditions.

On 3:1 slopes or less, wood fiber or hay mulch will be used. The application rate will be 1 ton per acre. Seed will be inspected by the State Department of Agriculture prior to use.

Slopes steeper than 3:1 will be hydromulched using wood fiber mulches or other commercial mulches at a rate of 2,000 pounds per acre which have been proven successful on other areas. Tackifiers will also be used at a rate of 120 pounds/acre on all areas hydroseeded to keep mulch in place. Hydromulch will be applied at a rate of 2000 lbs./acre for slopes between 2:1 and 3:1, and at a rate of 2500 lbs./acre for slopes steeper than 2:1.

Reclamation Management

The reclaimed area will be monitored closely to determine if maintenance is necessary for areas of soil erosion, weed control, pest control, reseeding of small areas and maintenance fertilization.

Soil erosion will be controlled through the use of mulch, chemical stabilizers, or other appropriate techniques. Gullies will be filled and stabilized. During revegetation, activities will be conducted parallel to the contour.

Bare patches of failed planting will be reprepared and planted. Where there is evidence of erosion, additional mulch, jute, or excelsior will be applied as needed to stabilize the area until vegetation can reestablish.

Attempts will be made to control noxious weeds. At present bindweed is present on and adjacent to the site. One year prior to reclamation, an inventory of the area will be conducted with the purpose of locating this noxious weed as well as all others listed on the state and county control program. Carbon County has a cooperative program wherein the county will spray noxious weeds when located, and in cooperation with the local land owners. It is the company's intent to work within the guidelines established by the county to control weeds both prior to and during the reclamation period.

Insect problems will be controlled with insecticides, or other appropriate methods. Savage Industries, Inc. will not use persistent pesticides unless approved by the regulatory authority. Grazing of revegetated areas by domestic livestock and wildlife will be restricted by fencing until vegetation is mature enough to maintain regrowth and control of erosion.

The success of revegetation efforts will be compared with an established reference area as shown on Plate 3-1 and described in Chapter 3. Reclaimed areas will be monitored utilizing methods approved by the division and will meet sample adequacy requirements. Both the reclaimed area and corresponding reference area will be sampled during the 9th and 10th year following reclamation. The monitoring schedule is as follows:

Monitoring Schedule

Year	Qualitative Sampling	Quantitative Sampling
1	X	
2	X	X
3	X	X
4	X	
5	X	X
6	X	
7	X	
8	X	
9	X	X
10	X	X

Schedule of Reclamation

Upon completion of operations at Savage Coal Terminal, the following approximate schedule will be followed for final reclamation. Time frames are approximate and may overlap, decreasing the overall time. The sequence of events may also be slightly altered. This procedure will begin within 180 days of termination of operations.

542.300. Post Mining Topography is shown on Plate 5-6.

542.400. See Section 541.400.

542.500. See Section 542.100.

542.600. See Section 541.400.

542.700. See Section 541.200.

542.710. N/A

542.720. N/A

542.730. N/A

542.740. See Section 541.200.

542.800. See Section 542.100 and Chapter 8.

550. Reclamation Design Criteria and Plans.

Each permit application will include site specific plans that incorporate the following design criteria for reclamation activities.

551. N/A - Surface Operation.

552. N/A - No permanent structures are proposed for this operation.

552.100. See Section 542.200.

552.200. N/A - There are no plans for permanent impoundments.

553. See Section 542.200.

553.100. See Section 542.200.

553.200. N/A - This is a surface processing and shipping operation - no spoil will be generated.

553.250 Refuse Piles.

553.251. See Section 542.200 and Plates 5-3 and 5-6.

553.252. See Section 542.200.

553.260. N/A - There are no plans to dispose of coal processing or underground development waste in mined-out areas.

553.300. See Section 542.200

553.400. N/A - No cut and fill terraces are proposed for reclamation.

553.500. N/A - There are no PMA'S, CMA'S or highwalls associated with this site.

553.700. N/A - This is not a mining operation.

553.800. N/A - This is not a mining operation.

553.900. N/A - Fills are not spoil or underground development waste.

560. Performance Standards.

Coal mining and reclamation operations will be conducted in accordance with the approved permit and requirements of R645-301-510 through R645-301-553.

TABLE 5-1
TEMPORARY RECLAMATION SEED MIXTURE

LIVE SPECIES	POUND OF PURE SEED/ACRE*
SHRUBS:	
Atriplex corrugata (Mat saltbush)	2.0
Atriplex gardneri var. cuneata (Castle valley clover)	2.0
Ceratoides lanata (Winterfat)	2.0
Atriplex canescens (Fourwing saltbush)	2.0
FORBS:	
Sphaeralcea coccinea (Scarlet globemallow)	1.5
GRASSES:	
Stipa hymenoides (Indian ricegrass)	4.0
Bouteloua gracilis (Blue grama)	1.0
Elymus elymoides (Bottlebrush squirreltail)	4.0
Pseudoroegneria spicata (Bluebunch wheatgrass)	7.0
Sporobolus airoides (Alkali sacaton)	0.5
TOTAL:	31.0
* Broadcast or hydroseeded.	
Drill seed at ½ above rates.	

TABLE 5-2
SEED MIX FOR THE SHADSCALE (UPLAND AREAS)

SCIENTIFIC NAME	COMMON NAME	PLS/Acre*	Seeds/Ft^2
SHRUBS			
Atriplex gardneri var. cuneata	Castle Valley saltbush	2.00	5.10
Atriplex confertifolia	Shadscale	4.00	5.88
Chrysothamnus nauseosus	Rubber rabbitbrush	0.30	2.75
Ceratoides lanata	Winterfat	4.00	5.05
FORBS			
Eriogonum inflatum	Desert trumpet	1.00	4.80
Helianthus annuus	Annual sunflower	4.00	5.33
Oenothera caespitosa	Evening primrose	0.30	6.20
Sphaeralcea coccinea	Globemallow	0.50	5.74
GRASSES			
Bouteloua gracilis	Blue grama	0.50	8.16
Elymus lanceolatus	Thickspike wheatgrass	2.00	7.07
Hilaria jamesii	Galleta	2.00	7.30
Sporobolus airoides	Alkali sacaton	0.20	8.03
Stipa comata	Needle-and-thread	3.00	7.92
Stipa hymenoides	Indian ricegrass	2.00	8.63
TOTALS		25.80	87.96

* Based on broadcast seeding methods

TABLE 5-3
SEED MIX FOR THE GREASEWOOD (LOWLAND AREAS)

SCIENTIFIC NAME	COMMON NAME	PLS/Acre	Seeds/Ft^2
SHRUBS			
Atriplex confertifolia	Fourwing saltbush	4.00	5.88
Atriplex corrugata	Mat saltbush	3.00	4.13
Atriplex gardneri var. cuneata	Castle Valley saltbush	2.00	5.10
Chrysothamnus nauseosus	Rubber rabbitbrush	0.50	4.59
Sarcobatus vermiculatus	Greasewood	0.50	3.28
FORBS			
Eriogonum inflatum	Desert trumpet	1.00	4.80
Helianthus annuus	Annual sunflower	4.00	5.33
Oenothera caespitosa	Evening primrose	0.30	6.20
Sphaeralcea coccinea	Globemallow	0.50	5.74
GRASSES			
Bouteloua gracilis	Blue grama	0.30	4.90
Distichlis spicata	Saltgrass	0.50	5.97
Elymus cinereus	Gt. Basin wildrye	2.00	4.36
Elymus smithii	Western wheatgrass	1.00	2.89
Hilaria jamesii	Galleta	1.50	5.48
Sporobolus airoides	Alkali sacaton	0.10	4.02
TOTALS		21.20	72.65
* Based on broadcast seeding methods.			

TABLE 5-4
PERMANENT RECLAMATION SEED MIXTURE
PRICE RIVER SYSTEM
(5.28 Acres)

Name	Acreage 1 Pounds PLS/Acre	Price/#	# Seeds/Pound	Total
Steambank Wheat Grass	5	$3.25	137,830	16.25
Tall Wheat Grass	3	$0.80	76,805	2.40
Alkali Sacaton	2	$3.00		6.60
Crested Wheat Grass Fairway	3	$1.20	319,660	3.60
Yellow Sweet Clover	2	$0.40	258,560	.80
Total	15			$29.65

Containerized of Bare Root Stock	Number Per Acre
Rubber Rabbitbrush	200 - $158 (@ .79 per plant)
Sandbar Willow	150 - $118
	$279/Acre
Fourwing Salt Brush Winter Fat Shadscale	May be utilized to supplement the shrub density as containerized stock depending on the success of the seeding effort.

TABLE 5-5
PROJECTED WATER CONSUMPTION

Use	Calculation Basis	Volume
1- Road Watering Dust Control	*1.20 gal/ton x 10MM ton/yr. = 12,000,000 gal/yr.	36.83 ac. ft./ yr.
2- Coal Washing	**2.5 gpm x 60 min./hr. 16 hr./day x 250 days/yr. = 6,000,000 gal/yr.	18.42 ac. ft./yr.
3- Bath House/Office	35 gal./day/person x 25 people/day x 250 day/yr. = 218,750 gal/yr.	0.67 ac. ft/yr.
	Total Projected Water Usage =	55.92 ac.ft./yr.

* Average usage over last 5 years.
** Projected make-up water for washing circuit.

I.D. SIGN

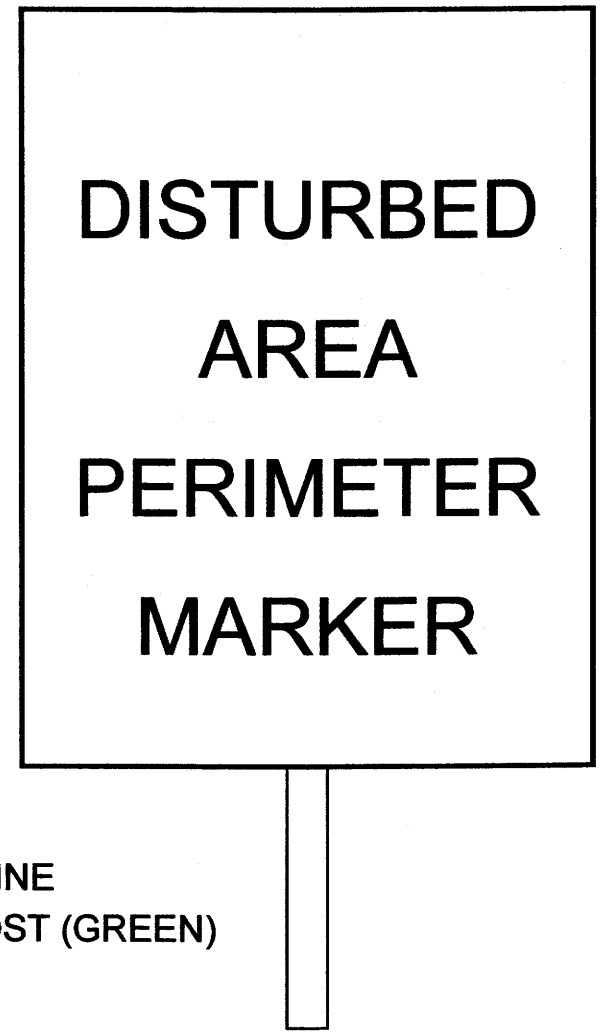
SAVAGE COAL TERMINAL
I.D.-42-01444
SAVAGE SERVICES CORPORATION
6340 SOUTH 3000 EAST, #600
SALT LAKE CITY, UTAH 84121
(801) 944-6600
PERMIT NO. C/007/022

REFUSE PILE SIGN

SAVAGE COAL TERMINAL
REFUSE FILL AREA
I.D. NO. 1211-UT-09-01444-01

FIGURE 5-1

PERIMETER MARKERS
STEEL SIGN (12" x 8")



48" STEEL LINE
T FENCE POST (GREEN)

TOPSOIL STORAGE MARKER
(18" x 12")

FIGURE 5-2

FIGURE 5-3

TYPICAL COAL ANALYSIS

NO. 7 MINE - CASTLE GATE "A" SEAM

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (312) 953-9300

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
224 SO. CARBON AVE., PRICE, UT 84501
TELEPHONE: (801) 637-7540

BEAVER CREEK COAL CO.
P.O. Box 1378
Price, Utah 84501

February 6, 1989

Sample identification by: Beaver Creek Coal Co.

Kind of sample reported to us	Coal
Sample taken at	C V Spur
Sample taken by	Beaver Creek Coal Co.
Date sampled	12/30/88
Date received	01/24/89

Analysis report no. 57-28459

SHORT PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	8.63	xxxxx
% Ash	6.54	7.16
Btu/lb	12380	13549
% Sulfur	0.50	0.55

% Air Dry Loss =	6.93
Moisture, Ash-free Btu =	14594
Pounds of SO2 per 10^6 Btu =	0.81
Moist, Mineral matter free Btu * =	13333
(Based on as rec'd moisture)*	
Pounds of Sulfur per 10^6 Btu =	0.41
% Residual moisture =	1.83

NEUTRALIZATION POTENTIAL 6 tons $CaCO_3$ / 1000 tons
ACID POTENTIAL (of pyritic sulfur) 3 tons $CaCO_3$ / 1000 tons

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Darlene Pennington

DP/rf

Manager, Price Laboratory

Original Copy Watermarked For Your Protection

FIGURE 5-4

REFUSE PILE ANALYSIS

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (312) 953-9300
E 1908
Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
224 SO. CARBON AVE., PRICE, UT 84501
TELEPHONE: (801) 637-7540

BEAVER CREEK COAL CO.
P.O. Box 1378
Price, Utah 84501

February 6, 1989

Sample identification by

Beaver Creek Coal Co.

Refuse material

Kind of sample reported to us	Coal
Sample taken at	C V Spur
Sample taken by	Beaver Creek Coal Co.
Date sampled	12/30/88
Date received	01/24/89

Analysis report no. 57-28458

SHORT PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	5.75	xxxxx
% Ash	30.96	32.85
Btu/lb	8483	9000
% Sulfur	0.62	0.66

% Air Dry Loss =	4.77
Moisture, Ash-free Btu =	13403
Pounds of SO2 per 10^6 Btu =	1.47
Moist, Mineral matter free Btu * =	12763
(Based on as rec'd moisture)*	
Pounds of Sulfur per 10^6 Btu =	0.73
% Residual moisture =	1.03

NEUTRALIZATION POTENTIAL 97 tons $CaCO_3$ / 1000 tons
ACID POTENTIAL (of pyritic sulfur) 10 tons $caCO_3$ / 1000 tons

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Darlene Pennington

Manager, Price Laboratory

DP/rf

Original Copy Watermarked For Your Protection

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

Reply to
139 South Main
Helper, Utah 84526

Phone: 801-472-3537

March 25, 1980

Mr. Herman Beckman
BEAVER CREEK COAL CO.
P. O. Box AU
Price, Utah 84501

ANALYTICAL REPORT

Acidity and pH were determined on a 1:1 w/v water extract prepared according to the procedures of U.S.D.A. Agriculture Handbook No. 60.

Separate portions of the sample were extracted following the procedures of the U.S. EPA as outlined in the Federal Register, Part IV, December 18, 1978. The extracts were then analyzed for barium, cadmium, chromium, lead, and silver by flame atomic absorption, for arsenic and selenium by hydride generation atomic absorption, and for mercury by cold vapor flameless atomic absorption.

The results of these analyses are presented in Table No. 1 and are reported in mg/l unless otherwise indicated.

If you have any questions concerning these analyses, please call.

Jack Blair, Manager
Helper Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

STERN DIVISION MANAGER
LLOYD W. TAYLOR, JR.

PLEASE ADDRESS ALL CORRESPONDENCE TO
139 SOUTH MAIN, HELPER, UTAH 84526
OFFICE TEL. (801) 472-3537

BEAVER CREEK COAL CO.
P. O. Box AU
Price, Utah 84501

Mar. 25, 1980

Sample identification by Beaver Creek Coal Co.
Refuse Elevator-Coarse

Kind of sample reported to us	Coal Refuse
Sample taken at	C. V. Spur
Sample taken by	Beaver Creek Coal Co.
Date sampled	12-04-79
Date received	12-05-79

Analysis report no. 57-3117 page 3

Table No. 1

Parameter	Concentration in mg/l
Acidity, as $CaCO_3$	15
pH	7.8
Arsenic	≤0.003
Barium	0.32
Cadmium	≤0.003
Chromium	≤0.02
Lead	≤0.09
Mercury, ug/l	0.12
Selenium	≤0.004
Silver	≤0.005

JB/gp

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.
Jack Blair,
Manager, Helper Laboratory

Original Copy Watermarked For Your Protection

Charter Member

FIGURE 5-5

OSM SAFETY FACTOR CALCULATIONS

FOR

REFUSE PILE

* SLOPE STABILITY ANALYSIS *

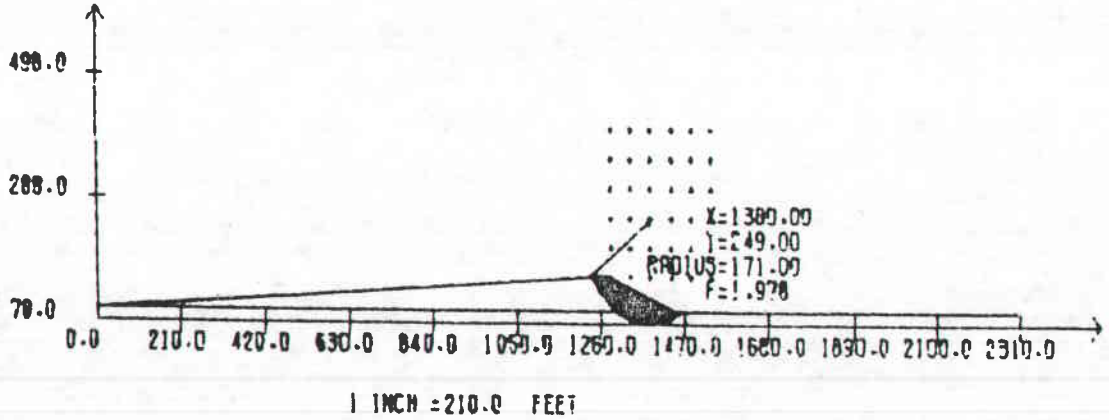
DATE: 12-19-00 RUN NUMBER: 5 PROJECT: WORST CASE CONDITION BEAVER CREEK COAL CO

SIMPLIFIED BISHOP'S METHOD

Figure - 1
OSM Stability Analysis
Processing Waste Pile, C.V. Spur

① UNIT WEIGHT = 115.00 PCF
COHESION = 100.00 PSF
FRICTION ANGLE = 25.00 DEGREES

② UNIT WEIGHT = 145.00 PCF
COHESION = 500.00 PSF
FRICTION ANGLE = 20.00 DEGREES



1 INCH = 210.0 FEET

```
 80/12/19. 11.11.36.
PROGRAM   SLPOUT

1
         1         2         3         4         5         6         7         8
 12345678901234567890123456789012345678901234567890123456789012345678901234567890

 HEAD21112-19-80   5     WORST CASE CONDITION BEAVER CREEK COAL CO   112 11  1
 GRID  0
   0.01280. 50.0    5 149. 50.0    5  0.0  0.0   10 135.  40.  0.00.000 0.00  0.0

 GEOM  2
    0.1270.1445.2300.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0

  100. 160. 100. 100.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
    0.2300.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0

  100. 100.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
 SOIL  2
     115.00     100.00      25.00       0.00  COAL WASTE WORST CASE              10

     145.00     500.00      20.00       0.00  MANCOS SHALE WORST CASE            20

 POR4  2 WORST CASE PORE PRESSURE
    0.1140.1445.2300.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0

  100. 120. 100. 100.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
    0.1140.1445.2300.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0

  100. 120. 100. 100.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
 CALC  0
         1         2         3         4         5         6         7         8
 12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

For definition of key words and data input information, refer to Slope II Computer Program User's Manual S-10 available in the Earth Sciences and Geotechnical Branch, OSM, Region V.

FIGURE 5-6

MSHA LETTERS

FOR

REFUSE PILES

U. S. Department of Labor

Mine Safety and Health Administration
P.O. Box 25367
Denver, Colorado 80225-0367

Coal Mine Safety and Health
District 9

31

Charles Boyd Rhodes
Savage Industries Inc.
3321 Soldier Creek Road
P. O. Box 587
Wellington, UT 84542

RE: Savage Coal Terminal
Mine ID No.42-01444
Refuse Pile
ID No. 1211-UT-09-01444-01
Reassigned Identification Number

Dear Mr. Rhodes:

Our files show one(1) refuse pile, ID No. 1211-UT-09-0034. In order to update the files, the District Manager is reassigning the following identification number for the refuse pile.

NEW NUMBER	OLD NUMBER
ID No. 1211-UT-09-01444-01	ID No. 1211-UT-09-0034

Please change all markers to indicate the new number and refer to the reassigned identification number on future correspondence with this office.

Sincerely,

John A. Kuzar
District Manager

U. S. Department of Labor

Mine Safety and Health Administration
P O Box 25367
Denver, Colorado 80225
Coal Mine Safety & Health
District 9

March 2, 1981

Dan W. Guy, P.E.
Chief Engineer
Beaver Creek Coal Company
P.O. Box AU
Price, UT 84501

Re: C. V. Spur Prep Facility, I.D. No. 42-01444
Site I.D. No. 1211-UT-9-0034
Refuse Pile Report

Dear Mr. Guy:

The refuse pile report submitted for the subject site has been reviewed by this office and will be maintained on file.

No further information need be submitted to this office regarding this site unless the site is determined to present a hazard by the District Manager, or at such time the site is to be abandoned.

Sincerely,

Harold E. Nolan
for John W. Barton
District Manager

U. S. Department of Labor

Mine Safety and Health Administration
P O Box 25367
Denver, Colorado 80225
Coal Mine Safety & Health
District 9

March 19, 1981

Dan W. Guy, P.E.
Chief Engineer
Beaver Creek Coal Company
P.O. Box A.U.
Price, UT 84501

Re: C.V. Spur Prep Facility, ID No. 42-01444
Site ID No. 1211-UT-9-0033
Refuse Pile Report

Dear Mr. Guy:

The refuse pile report submitted March 5, 1981, for the subject site has been reviewed by this office and will be maintained on file.

No further information need be submitted to this office regarding this site unless the site is determined to present a hazard by the District Manager, or at such time the site is to be abandoned.

Sincerely,

for John W. Barton
District Manager

U.S. DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
Mailing Address:
P.O. Box 25367, DFC
Denver, Colorado 80225
Street Address:
730 Simms
Lakewood, Colorado

Coal Mine Safety and Health
District 9

October 2, 1979

Dan W. Guy, P. E.
Chief Engineer
Swisher Coal Company
P. O. Box A. U.
Price, Utah 84501

Re: C. V. Spur Preparation Facility
I. D. No. 42-01444
Temporary Refuse Fill Area No. 1, I. D. No. 1211-UT-9-0033
Refuse Dumping Site Area No. 2, I. D. No. 1211-UT-9-0034

Dear Mr. Guy:

Your letter of June 28, 1979, notifying this office of two (2) new refuse sites at the C. V. Spur Preparation Facility, has been received and the following identification numbers assigned:

(a) Temporary Refuse Fill Area No. 1, I. D. No. 1211-UT-9-0033
(b) Refuse Dumping Site Area No. 2, I. D. No. 1211-UT-9-0034

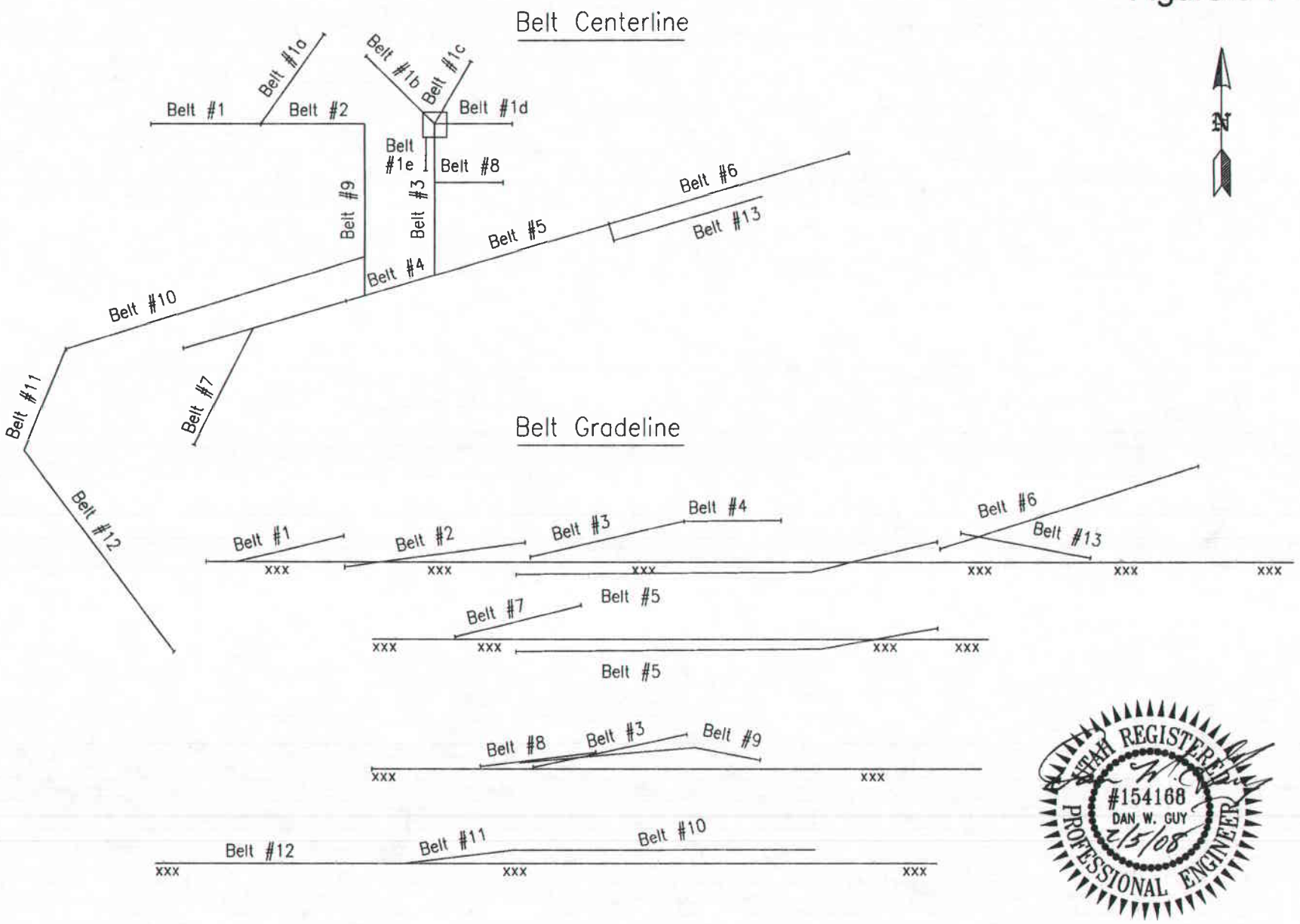
Please note that Section 77.215-1, 30 CFR, requires an identification marker to be placed at each site, and Section 77.215-2, 30 CFR, requires a refuse pile report be submitted within 180 days of the date of this acknowledgement letter. Please refer to these two sections of Title 30 concerning the marker and report requirements.

Sincerely,

Harold E. Dolan

Harold E. Dolan
Supervisory Mining Engineer

Figure 5-7

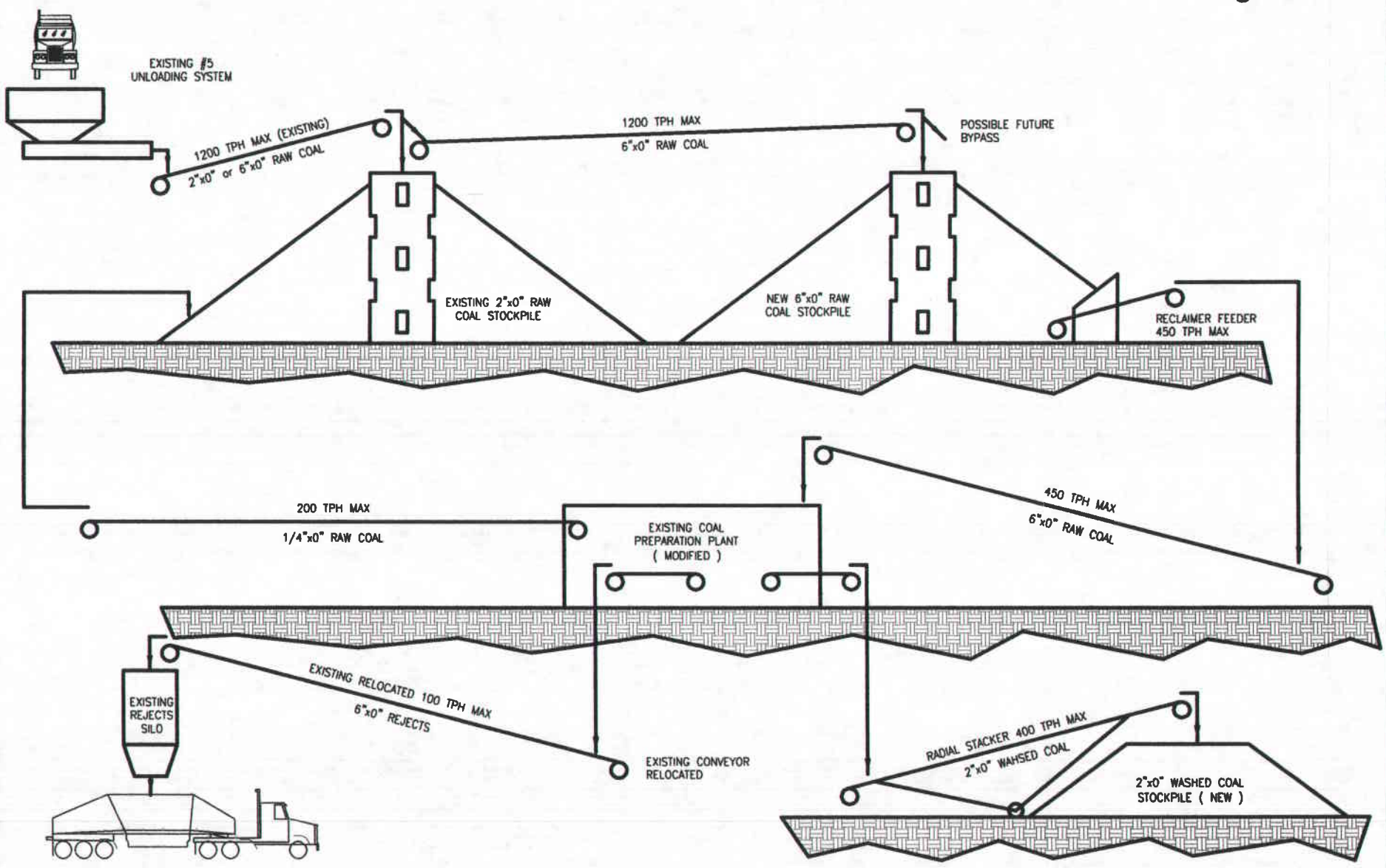


UTAH REGISTERED
#154168
DAN W. GUY
2/5/08
PROFESSIONAL ENGINEER

Savage Coal Terminal
Centerline and Grade of Belts

C.V. Spur 1"=300' August 2007

Figure 5-8



Savage Coal Terminal
Processing Flow Chart

C.V. Spur

Appendix 5-1

Proposed Removal of Main Refuse Pile

Savage Services Corporation
Savage Coal Terminal

Proposed Removal of Main Refuse Pile

I. Introduction

Savage Industries, Inc. has entered into an agreement with the Sunnyside Cogeneration Associates (SCA) to burn the refuse from the Savage Coal Terminal in their waste-coal fired production facility location in Sunnyside, Utah. This amendment is being submitted to provide details required for Division approval to remove and burn the coal waste material contained in the main refuse pile located at the Savage Coal Terminal.

II. General

The basic plan is to begin removal of the refuse material in August of this year. At that time, approximately 5000 tons of material will be placed in the permitted lay-down area at the Sunnyside Facility, to provide for a small back-up or surge area as needed. After that it is planned to haul approximately 450 to 600 tons/day of the refuse material directly to the power plant feed. This is intended to continue 7 days/week until the pile is removed and burned.

Removal of the refuse is proposed to start at the northeast corner of the pile, and continue toward the southwest until the entire pile is removed, as shown on Figure 1.

All environmental controls (i.e. - drainage, etc.) will be maintained throughout the removal process. There are no plans to reclaim the removal area in the near future, since this area will likely be used as a coal stockpile area for the life of the facility; however, it will be reclaimed per the plan when it is no longer required for the operation. A submittal has been made to OSM requesting a determination of the applicability of reclamation fees for this pile, along with information to support the request for a no value/fee determination. A ground control plan has also been submitted to MSHA for their approval of the removal of this pile. A sample location map and analyses are included as Figure 2 and Attachment 1, respectively.

III. Timing

As indicated above, refuse removal is proposed to start in August of 2000, and continue at the proposed rate of 450-600 tons per day until completed. At the projected rate, final removal of the pile will be completed in late 2004. The projected pile removal locations for each year are shown on Figure 1. It is possible that the removal process could be slightly accelerated if the power plant is capable of burning at a higher rate in the future; however, at this time the rates will be as proposed.

IV. Environmental Controls

The proposed method and direction of extraction allow for existing environmental controls (berms, ditches, culverts) to remain in place for approximately one year before they have to be simply relocated on the pile.

A. Hydrology

The main environmental controls for this pile consist of hydrologic protection in the form of ditches, berms and culverts. During the removal process, the existing ditches CD-13 and CD-7 will remain in place and continue to be maintained to the size required for runoff from a 100 year-6 hour event. The erosion protection berm on the top of the pile and the flex pipe (Culvert C-22) will remain in place as long as they can be properly operated. Once extraction approaches the berm and culvert, they will be relocated as shown on Figure 1. This will continue until the pile is eliminated. The operation and maintenance of existing hydrologic controls will therefore remain the same throughout the removal process, although specific drainage areas will be less and locations will vary with the reduction of the pile.

It should also be noted that all runoff will continue to go to Sediment Pond No. 5 as per the plan.

B. Vegetation

None of the refuse area has been resoiled or revegetated, with the exception of the small test plot on the southwest corner. This test plot has been in place for more than 10 years, and has been regularly monitored during that time. A further evaluation of this test plot will be made in 2000, and a proposal will be made after that time as to whether the test plot should be removed or relocated. This will be covered by a separate amendment.

C. Soils

No new removal of soils will be needed for this amendment. Existing soils stockpiles were taken from this area; however, since the refuse area will be used as a coal stockpile area, no soil replacement is planned until final reclamation.

D. Air Quality

The refuse pile is included in the present Air Quality Permit as a stockpile area. Since the site will remain as a stockpile area, no changes are needed to the plan. The actual impact on the removal will likely be positive, since the area covered by the refuse is likely larger than that which will be covered by a coal stockpile at any given time.

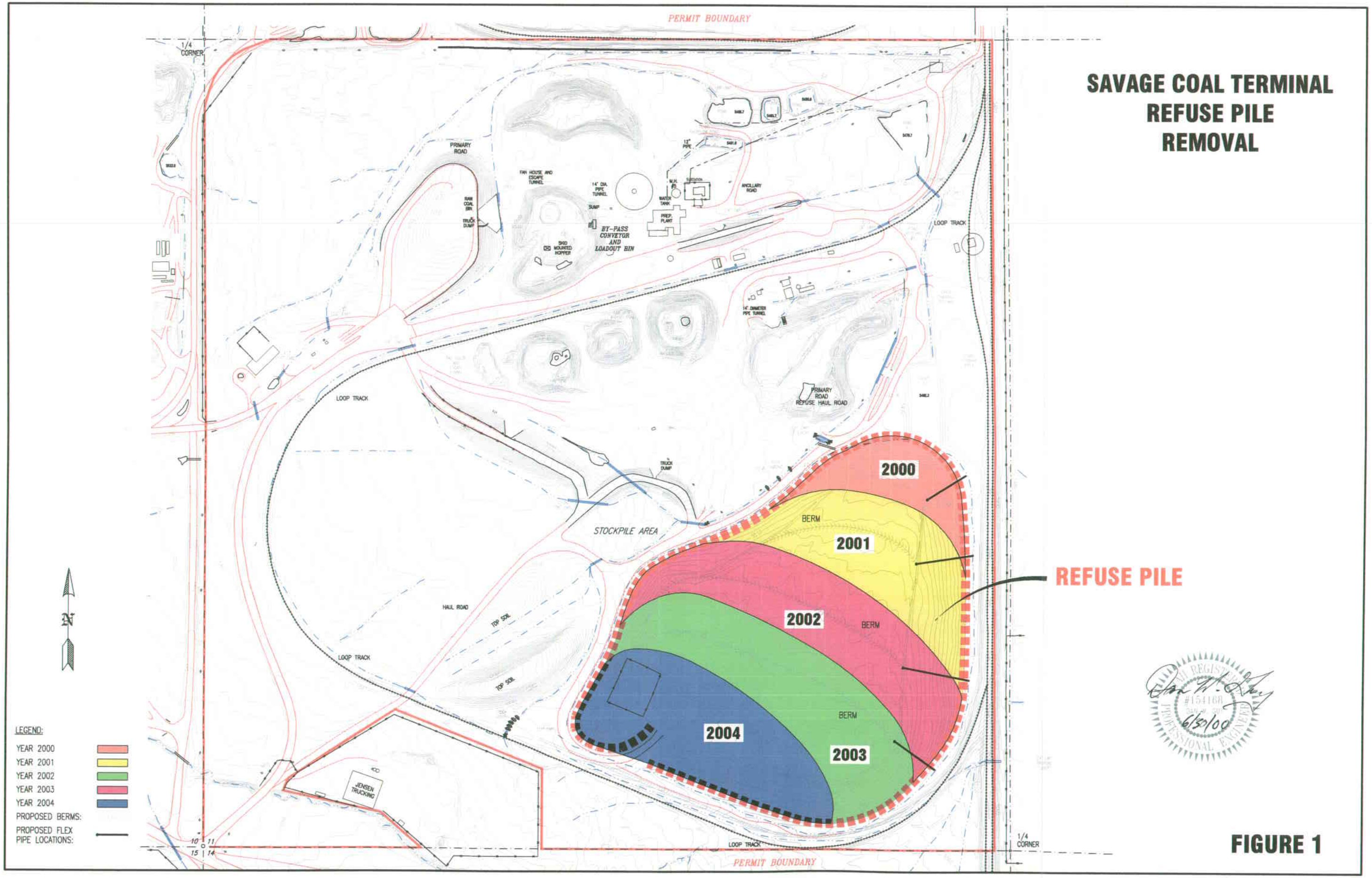
E. Reclamation

Since this is a disturbed area, it is planned to continue to use the site for needed coal storage area after the refuse is removed. Once the area is no longer required for the operation, it will be reclaimed according to the approved reclamation plan. The depth of soil replacement, treatment and seeding will be the same as that approved for the refuse area.

Attachment 1

Refuse Pile Analyses

SAVAGE COAL TERMINAL
REFUSE PILE
REMOVAL



REGISTERED #15416R PROFESSIONAL ENGINEER 6/3/10

FIGURE 1

SAVAGE COAL TERMINAL
REFUSE PILE
SAMPLE LOCATION
MAP

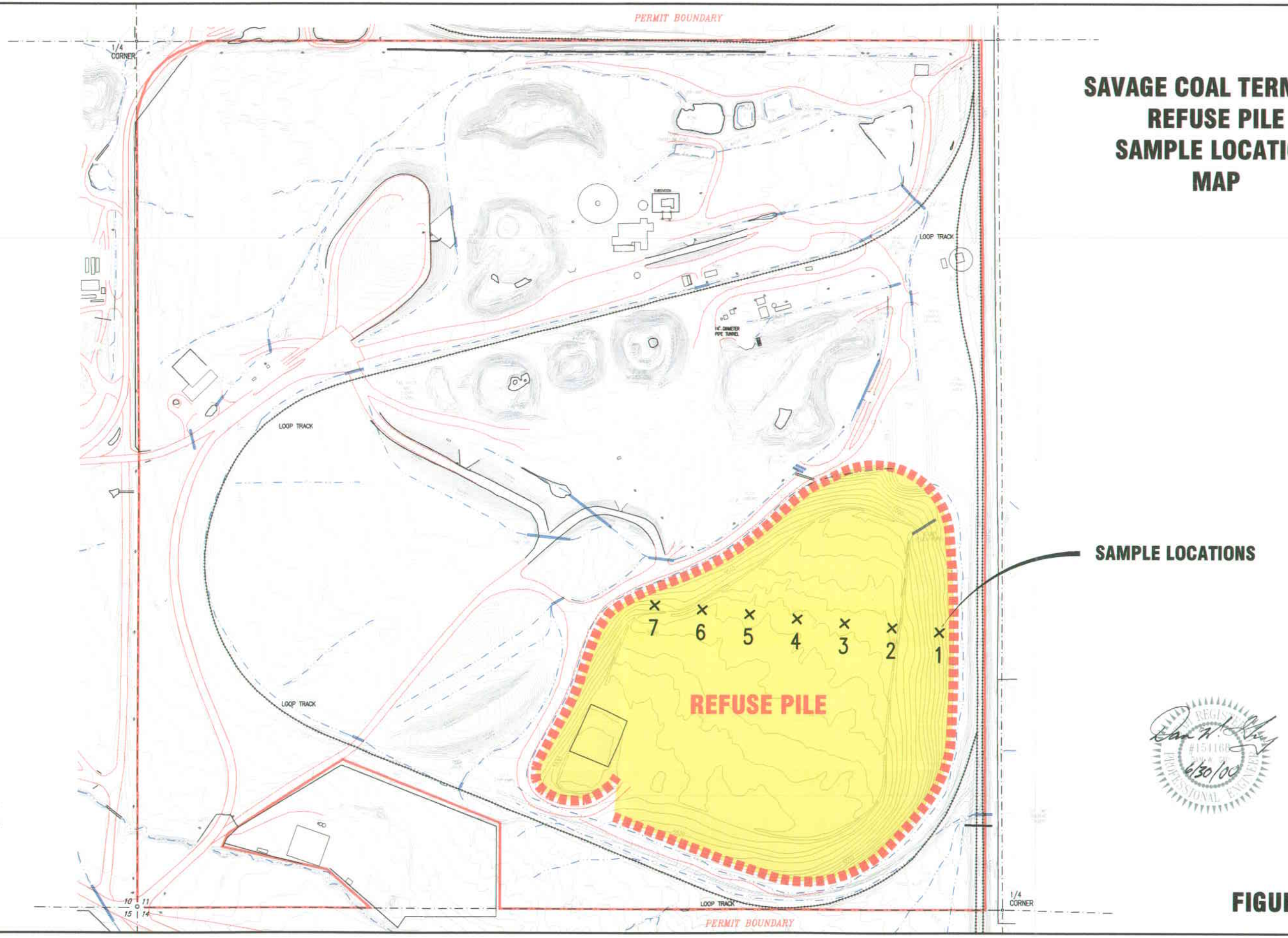


FIGURE 2

Appendix 5-2

B.T.U. Resource Recovery Plan for Refuse Pile

Savage Services Corporation
Savage Coal Terminal

(Revised October 2005)

B.T.U. Resource Recovery Plan
for
Refuse Material

Introduction : Savage Services Corporation is proposing to utilize a portion of the existing Savage Coal Terminal refuse pile as a B.T.U. Resource Recovery Material. A plan and approval are in place for removal of the refuse pile and subsequent burning of the material in the Sunnyside Cogeneration Associates power plant. This proposal is not intended to replace that plan, but to supplement it, since the power plant has not been consistent in its usage of the material.

General : The proposal is to remove from 15,000 to 100,000 tons of refuse material to be used as a B.T.U. resource recovery material. The refuse will be blended with a coal product, shipped to and burned in cement plants. The actual amount of refuse material to be recovered will be determined by analyses and customer demand.

The plan for removal is detailed in Appendix 5-1. The removal plan will remain the same; however, dates of removal will vary since Sunnyside Cogeneration Associates have not been taking the refuse on a regular basis.

Under this alternate scenario, refuse will be removed and cleaned using a patented air cleaning technology. The cleaned product will actually be the B.T.U. Resource Recovery product to be blended or shipped to the customer. The company which will perform the cleaning and distribution to the customer is operating under approved permits for these activities; however, since they are not considered a coal preparation facility they do not have an approved refuse disposal site. Therefore, this proposal is to allow removal and cleaning of the refuse, and then to return the reject from the cleaning back to the Savage Coal Terminal refuse pile.

The refuse to be returned will be sampled for acid-toxic potential according to Division guidelines, at no less than 5000 ton intervals. Sampling and testing will be completed and the material will be shown to be non-acid and non-toxic prior to return and final placement at Savage Coal Terminal.

The following parameters will be tested on the refuse designated for return: pH, EC, Soluble Na, K, Mg, Ca (October 2005 Soil Guidelines, Table 3), and total Organic Carbon, Soluble Selenium, Available Born, Acid Potential, Neutralization Potential (October 2005 Soil Guidelines, Table 7).

Under this proposal, only tested material from the Savage Refuse Pile would be returned to the Savage Coal Terminal. The reject material would be placed and compacted in the refuse pile according to the approved refuse disposal plan, after test results show the material to be non-acid and non-toxic.

Although this procedure will not completely eliminate the refuse pile, it will at least partially reduce the size of the pile, reduce the potential for a pile fire by substantially reducing the combustible material and provide for the original intent of the plan, which is B.T.U. Resource Recovery. Refuse will be provided at no cost as per the "no value determination". Refuse remains under ownership of Savage Services Corporation until shipped.

The refuse, or B.T.U. resource recovery material, will be handled and burned by the customer in the same manner as any other fuel product at their site.

The material has been tested and found to be non-acid and non-toxic. (See Attachment 1). The cleaning process uses only air, and there will be no chemicals or other material added to the refuse; therefore, the returned material will also be non-acid and non-toxic.

The removal plan will be as shown and described in Appendix 5-1, whether the refuse material is shipped to Sunnyside Cogeneration Associated, or utilized as a B.T.U. resource recovery material.

Existing Approvals :

1- Removal of the entire refuse pile for burning at the Sunnyside Cogeneration Plant was approved by the Division on 8/10/2000;

2- A "No Value Determination" for the refuse was made by OSM on 10/28/2000;

3- MSHA approved the removal and ground control plan on 7/31/2000.

4- DOGM approved the removal of 15,000 tons of the refuse material (without the return of reject) on August 19, 2005.

Environmental Controls : The method of removal and environmental controls will remain the same as described and approved in Appendix 5-1 of this M.R.P.

Attachment 1

Acid-Toxic Analysis
for
Savage Coal Terminal Refuse

HORIZON LABORATORIES

General Offices: P.O. Box 995 Price, Utah 84501 435-637-4343
Laboratory: 545 East 100 North Price, Utah 84501

Submitted to:

6/1/2005

Commonwealth Coal Sales
5413 Patterson Ave.
Suite 205
Richmond, VA 23226

Date Sampled: 5/4/2005
Date Received: 5/4/2005

Sampled By: SCT Auto
Identification By: WRRI

Sample Identification:
Composite of Savage Holes
H33-S1, H31-S2, H34-S1

Analysis Report #: 49997

CERTIFICATE OF ANALYSIS

Mineral Ash Analysis

Parameter	Percent Weight Ignited Basis
Silica, Si02	55.34
Alumina, Al203	10.51
Titania. Ti02	0.97
Lime, Ca0	6.55
Ferric Oxide, Fe203	2.87
Potassium Oxide, K20	0.82
Magnesia. Mg0	2.44
Sodium Oxide, Na20	0.71
Sulfure Trioxide, S03	17.30
Phosphorus Pentoxide. P205	0.50
Undetermined	1.99
Alkalie Content, Total on Ash =	0.26
Silica Value =	82.35
Base to Acid Ratio =	0.20
Estimated Temperature of Critical Viscosity =	xxxx
Estimated T250 Temperature =	2700

Respectfully Submitted.
HORIZON LABORATORIES

Laboratory Manager

HORIZON LABORATORIES

General Offices: P.O. Box 995 Price, Utah 84501 435-637-4343
Laboratory: 545 East 100 North Price, Utah 84501

Submitted to:

6/1/2005

Commonwealth Coal Sales
5413 Patterson Ave.
Suite 205
Richmond, VA 23226

Date Sampled: 5/4/2005
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Sampled By: SCT Auto
Identification By: WRRI

Sample Identification:
Composite of Savage Holes
H33-S1, H31-S2, H34-S1

Analysis Report #: 49997

CERTIFICATE OF ANALYSIS

Proximate

	As Received Basis	Dry Basis
% Moisture	7.73	-----
% Ash	19.21	20.82
% Volatile Matter	34.67	37.57
% Fixed Carbon	38.39	41.61
	100.00	100.00
% Sulfur	0.66	0.71
Btu/Lb.	10053	10895

Moisture Ash Free Btu/Lb. 13760

Respectfully Submitted,
HORIZON LABORATORIES

Laboratory Manager

HORIZON LABORATORIES

General Offices: P.O. Box 995 Price, Utah 84501 435-637-4343
Laboratory: 545 East 100 North Price. Utah 84501

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Sampled By: SCT Auto
Identification By: WRRI

Sample Identification:
Composite of Savage Holes
H33-S1, H31-S2, H34-S1

Analysis Report #: 49997

CERTIFICATE OF ANALYSIS

Ultimate Analysis

%	As Received Basis	Dry Basis
Moisture	7.73	------
Carbon	57.90	62.75
Hydrogen	3.77	4.09
Nitrogen	1.23	1.33
Ash	19.21	20.82
Sulfur	0.66	0.71
Oxygen	9.50	10.30
	100.00	100.00

Respectfully Submitted,
HORIZON LABORATORIES

Laboratory Manager

N 437,500

N 437,000

N 436,500

E 2,205,500

E 2,207,000

TRUCK DUMP

STOCKPILE AREA

SILT FENCE

CD-13

C-3 (18" CMP) (2 EACH)

CD-9

SEDIMENT POND 5

C-22 (FLEX PIPE)

REFUSE AREA

CD-7

STOCKPILE AREA

LOOP TRACK

(24" CMP) RAILROAD CULVERT

RECEIVED
APR 09 2008
DIV. OF OIL, GAS & MINING

REVISION #	DESCRIPTION

LEGEND:

1980 CONTOURS

2006 CONTOURS

UTAH REGISTERED #154168 DAN W. GUY 2/5/08 PROFESSIONAL ENGINEER

N

SAVAGE

SAVAGE COAL TERMINAL
REFUSE PILE - AS CONTRUCTED

SCALE:	DRAWN BY:
1" = 150'	BLACKHAWK ENGINEERING
DATE:	PLATE:
FEBRUARY 2008	PLATE 5-3

PERMIT BOUNDARY

1/4 CORNER

N 438,500

N 438,000

N 437,500

N 437,000

N 436,500

RELOCATED DIVERSION UD-1

SETTLING PONDS

POND 1

POND 2

POND 3

POND 4

6" WATER LINE FROM RANCH PUMP

PUMP HOUSE

WATER TRUCK PAD

8" DRAIN LINE

8" WATER LINE

COAL PILE

CONVEYOR AND STACKING TUBE

14' DIA PIPE TUNNEL

FAN HOUSE AND ESCAPE TUNNEL

CONVEYOR

TRUCK DUMP

SUBSTATION

PREP. PLANT

MCC

SHOP

SUB-SOIL

TOPSOIL

OFFICE

SAMPLER BUILDING

48" LOADOUT CONVEYOR

SAMPLE HOUSE

14' DIAMETER PIPE TUNNEL

COAL STORAGE AREA

STOCKPILE AREA

REFUSE AREA

TOP SOIL

MATERIAL STORAGE AREA

JENSEN TRUCKING

JENSEN PROPERTY (DELETED FROM PERMIT AREA)

UNDISTURBED

GATE

PHONE BOX

LOOP TRACK

MAIN LINE TRACK

PR-1

PR-2

PR-3

PR-4

PR-5

PR-6

PR-7

PR-8

PR-9

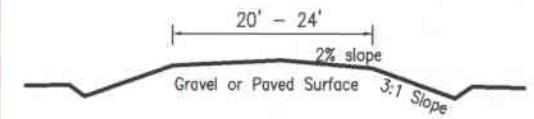
PR-10

PR-11

PR-12

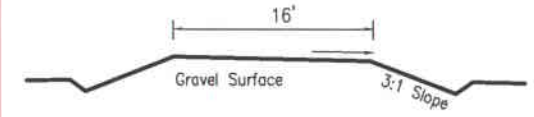
PR-13

TYPICAL CROSS SECTION
Haul Road



Ditch flow is parallel to the road centerline.

TYPICAL CROSS SECTION
Primary Access Road



Ditch flow is parallel to the road centerline.

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DIV. OF OIL, GAS & MINING

UTAH REGISTERED
#154168
DAN W. GUY
4/5/08
PROFESSIONAL ENGINEER

LEGEND:

- PERMIT BOUNDARY/BONDED AREA
- SURFACE DRAINAGE
- FENCE
- RAILROAD
- EXISTING UNDERGROUND DRAIN
- POWER POLE
- PRIMARY ROAD DESIGNATION PR-7
- ANCILLARY ROAD

CONTOUR INTERVAL: 2'

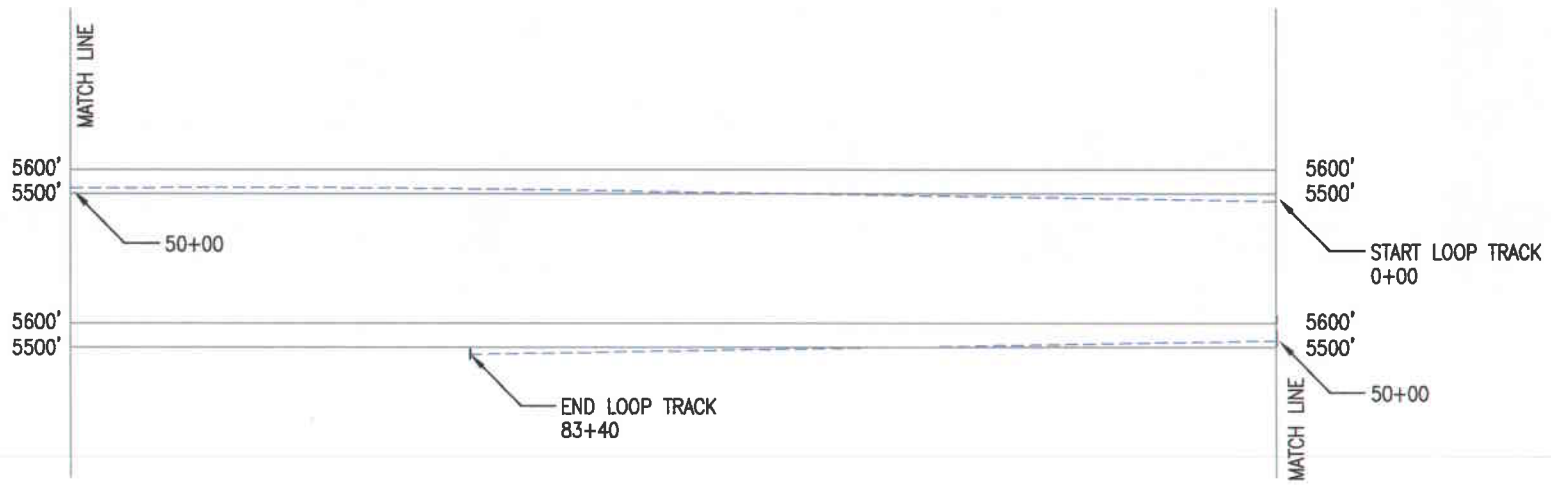
REVISIONS:

N

SAVAGE

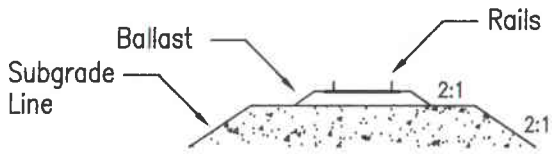
SAVAGE COAL TERMINAL
ROAD MAP

SCALE:	DRAWN BY:
1" = 300'	BLACKHAWK ENGINEERING
DATE:	PLATE:
JULY 2006	PLATE 5-4



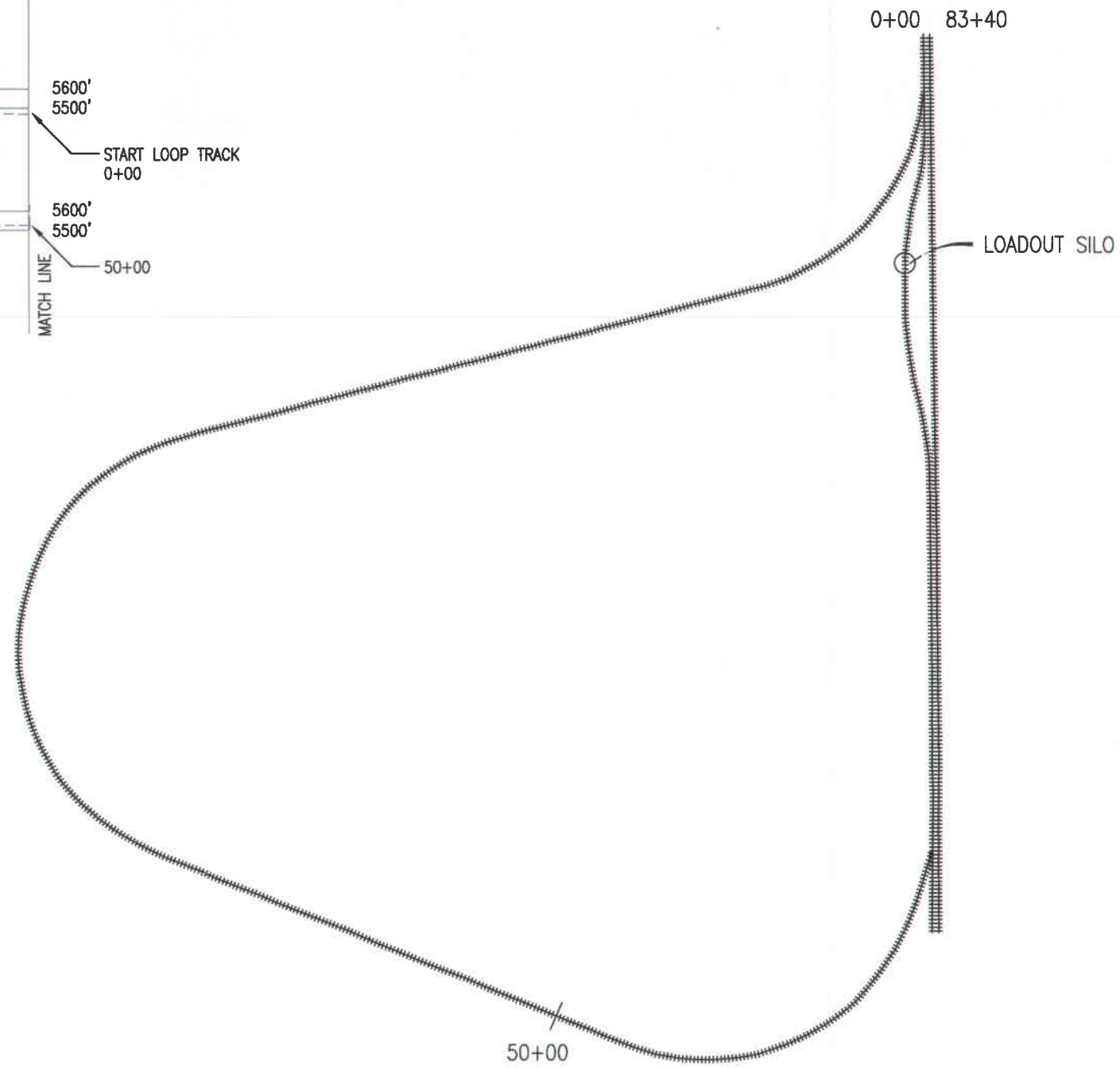
CENTERLINE AND GRADE OF RAILROAD LOOP

1" = 800'



TYPICAL CROSS SECTION

NTS



CENTERLINE RAILROAD TRACKS

1" = 400'

RECEIVED
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DIV. OF OIL, GAS & MINING

REVISION #	DESCRIPTION

File in:
- ☐ Confidential
- ☒ Shelf
- ☐ Expandable

Refer to Record No 0004 Date 04/09/2008
In C/007/022, 2008, Jneeming
For additional information

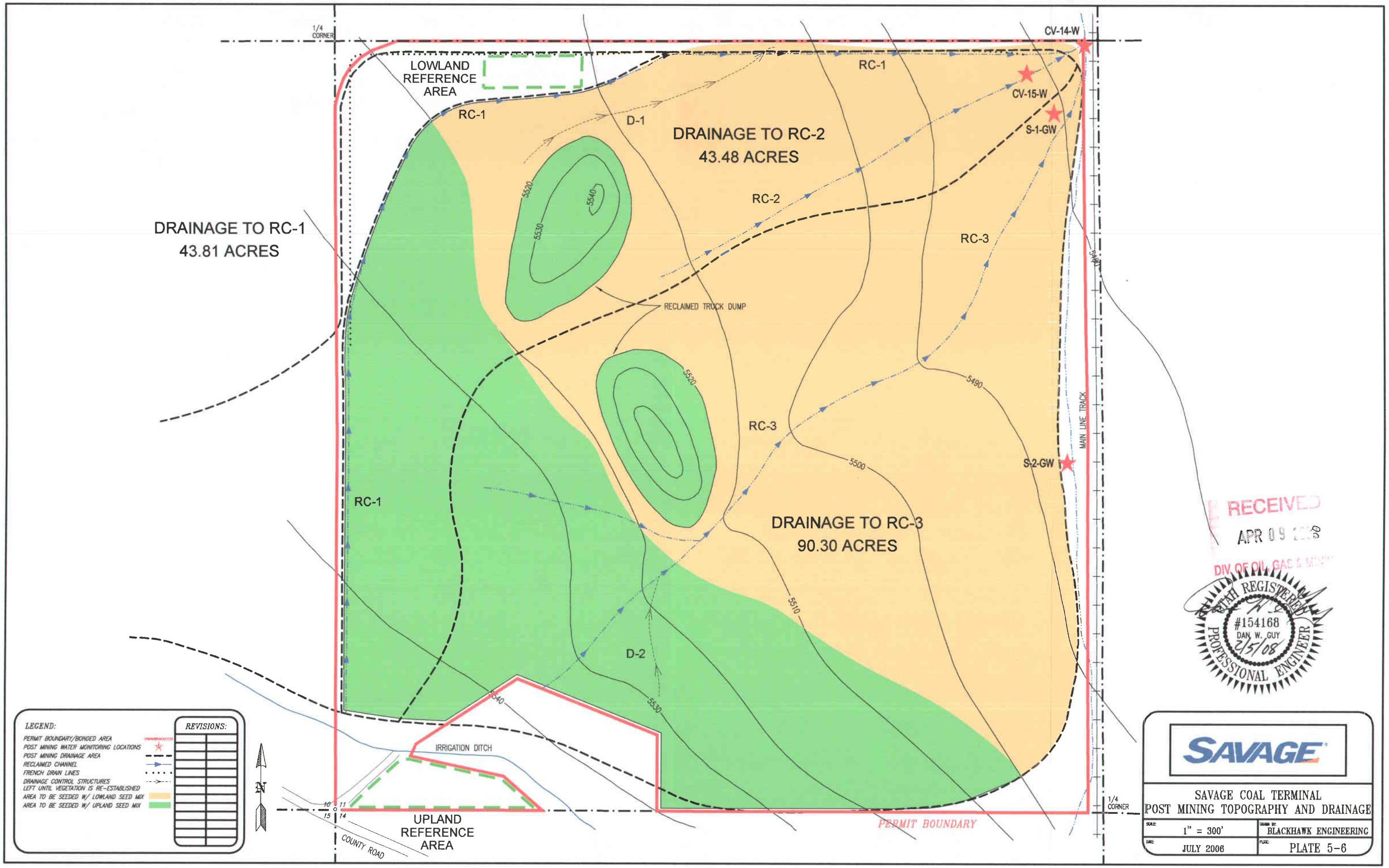
UTAH REGISTERED #154168 DAN W. GUY 2/5/08 PROFESSIONAL ENGINEER

N

SAVAGE

SAVAGE COAL TERMINAL
RAILROAD FACILITIES

SCALE	AS SHOWN	DESIGNED BY	BLACKHAWK ENGINEERING
DATE	JANUARY 2008	PLATE	PLATE 5-5



RECEIVED
APR 09 2008
DIV. OF OIL, GAS & MINING

UTAH REGISTERED
#154168
DAN W. GUY
2/5/08
PROFESSIONAL ENGINEER

SAVAGE

SAVAGE COAL TERMINAL
POST MINING TOPOGRAPHY AND DRAINAGE

SCALE:	DRAWN BY:
1" = 300'	BLACKHAWK ENGINEERING
DATE:	PLATE:
JULY 2006	PLATE 5-6

PRICE RIVER

5459

T14S R10E
T15S R10E

5538

5500

RIVER PUMP AREA

6" SUPPLY LINE

B.T.C.A. AREA #6
0.69 ACRES
TREATMENT: TOTAL CONTAINMENT

8" DISCHARGE LINE

EXISTING FARM/ACCESS ROAD

S.A.E. #1 PIPELINE 20' R/W

PRICE RIVER

3

2

1

R.R. RIGHT OF WAY

5500

S.A.E. #1 PIPELINE 20' R/W

EXISTING FARM/ACCESS ROAD

5600

8" DISCHARGE LINE

10

11

12

PUMPHOUSE

SAVAGE COAL TERMINAL

6" SUPPLY LINE

5500

R.R. RIGHT OF WAY

5500

5540

15

14

13

5531

RECEIVED
APR 09 2008
DIV. OF OIL, GAS & MINING

REVISION #	DESCRIPTION

LEGEND:

PERMIT AREA:

6" SUPPLY LINE:

8" DISCHARGE LINE:

UTAH REGISTERED
#154168
DAN W. GUY
3/17/08
PROFESSIONAL ENGINEER

N

SAVAGE

SAVAGE COAL TERMINAL
RIVER PUMP & PIPELINE SYSTEM (EXISTING)

SCALE:	DRAWN BY:
1" = 1000'	BLACKHAWK ENGINEERING
DATE:	PLATE:
MARCH 2008	PLATE 5-7

PRICE RIVER

5459

T14S R10E
T15S R10E

5538

5500

6" SUPPLY LINE
AND 8" DISCHARGE LINE
CUT-OFF CONCRETE PLUG

RECLAIMED RIVER PUMP AREA
STRUCTURES REMOVED,
RECONTOURED, RESEEDED
TREATMENT: TOTAL CONTAINMENT

PIPELINES LEFT IN
PLACE BENEATH
CULTIVATED FARM AREA
AND FARM ROAD

EXISTING
FARM/ACCESS
ROAD

PRICE RIVER

3

2

1

PIPELINES LEFT IN
PLACE BENEATH
FARM ROAD

R.R. RIGHT OF WAY

5500

PIPELINES LEFT IN
PLACE BENEATH
UNCULTIVATED
FARM AREA

EXISTING
FARM/ACCESS
ROAD

5600

PIPELINES LEFT IN
PLACE BENEATH RAILCO
LOADOUT AREA

RAILCO
LOADOUT

8" DISCHARGE
LINE CUT-OFF
CONCRETE PLUG

10

11

12

6" SUPPLY
LINE CUT-OFF
CONCRETE PLUG

SAVAGE
COAL TERMINAL
RECLAIMED PER
PLATE 5-6

5500

R.R. RIGHT OF WAY

5500

5540

15

14

13

5531

RECEIVED
APR 09 2008
DIV. OF OIL, GAS & MINING

REVISION #	DESCRIPTION

LEGEND:

PERMIT AREA:
6" SUPPLY LINE: ----------
8" DISCHARGE LINE: ----------

UTAH REGISTERED
#154168
DAN W. GUY
3/7/08
PROFESSIONAL ENGINEER

N

SAVAGE

SAVAGE COAL TERMINAL
RIVER PUMP & PIPELINE SYSTEM (RECLAIMED)

SCALE:	DRAWN BY:
1" = 1000'	BLACKHAWK ENGINEERING
DATE:	PLATE:
MARCH 2008	PLATE 5-8

SAVAGE COAL TERMINAL

PROCESSING AND LOADOUT FACILITY
MINING AND RECLAMATION PLAN

VOLUME 2

File in:
❑ Confidential
☒ Shelf
❑ Expandable
Refer to Record No 0004 Date 4/09/08
In C1007002 2008, Incoming
For additional information

Savage Services Corporation
Savage Coal Terminal
C/007/022

Chapter 6

Geology

R645-301-600

Table of Contents
Savage Coal Terminal
Chapter 6 - Geology

R645-301-600.	Geology
R645-301-610.	Introduction
R645-301-620.	Environmental Description
R645-301-622.	Cross Sections, Maps and Plans
R645-301-623.	Geologic Information
R645-301-624.	Geologic Information for Mining
R645-301-630.	Operation Plan
R645-301-640.	Performance Standards
R645-301-630.	Operational Design Criteria and Plans

Figure 6-1	Log of Holmes-McGee Well No. 1 (From Public Records)
Figure 6-2	Test Boring and Core Sample Locations
Figure 6-3	Core Sample Logs

Plate 6-1	Geologic Map

File in:
☐ Confidential
☒ Shelf
☐ Expandable
Refer to Record No 0004 Date 4/09/2008
In C/007/022, 2008, Incoming
For additional information

R645. Natural Resources; Oil, Gas and Mining; Coal.

R645-301. Coal Mine Permitting: Permit Application Requirements.

R645-301-600. Geology.

The rules in R645-301-600 present the requirements for information related to geology which is to be included in each permit application.

610. Introduction.

611. General Requirements. Each permit application will include descriptions of:

611.100. Since this is an existing surface operation, geology within and adjacent to the permit area is provided for applicable sections R645-301-621 through R645-301-627.

611.200. N/A - This is an existing operation.

612. All cross sections, maps and plans as required by R645-301-622 have been prepared and certified as described under R645-301-512.100.

620. Environmental Description.

621. The Savage Coal Terminal is near the middle of Castle Valley, a broad featureless plain between the Wasatch Plateau to the west, the Book Cliffs to the north, and the San Rafael swell to the east. Castle Valley has been formed by erosion of flat-lying sedimentary beds and is composed entirely of the Mancos formation of Upper Cretaceous age. The formation of the valley is not inherently related to faulting, but faults do cut through portions of the valley. The nearest known faulting is about seven miles to the southeast on the western wide of the Farnham upfold. This fault is about three miles in length, downthrown on the west with a throw of approximately 200 feet. The strata generally dip from three to six degrees to the northwest. Plate 6-1 is a geologic map of the area.

The Mancos formation consists of approximately 5000 feet of dark blue-gray shale with several prominent members. A study of the Mancos formation by Maxfield (1976) recognized three major marine shale transgressive sequences separated stratigraphically by two sandstone delta complexes which built from the west. The Savage Coal Terminal is located in the middle Bluegate shale member and 500 feet above the Ferron sandstone member as shown by the log of a gas well drilled 1/4 mile to the south. The well location is shown on Plate 6-1 and the log is included as Figure 6-1.

The Bluegate is a dark blue-gray marine mudstone with some thin lenses of shaley sandstone, sandy limestone, and calcareous shale. Parting and laminations of calcite, gypsum, and bentonite also occur infrequently. It weathers rapidly to a light gray, friable, semi-powdery mass that forms a dark gray sticky clay when wet.

The Ferron sandstone member of the Mancos shale is approximately 100 feet thick and composed of poorly cemented, light gray, fine grained, sub-rounded quartz. Cotter (1975) reports that this sandstone is a shallow marine deposit representative of a low energy eperici sea shore environment. The nearest outcrop of the Ferron sandstone is along the flank of the Farnham anticline 7 miles east of the loading facility.

Many of the ridges located throughout Castle Valley are capped by a loose deposit of boulders and gravels derived from the sandstones and limestones of the surrounding plateaus. These gravel caps are usually five to seventy five feet thick and are remnants of former erosional surfaces. One of these gravel terraces caps the ridge just 1 mile northwest of the loading facility at an elevation 200 feet above the facility. The exact age of the gravel deposits is unknown but is believed to be Late Tertiary or Early Quaternary on the basis of erosional evidence (Spieker, 1931). Slag deposits in the vicinity, formed as the underlying weathered shale is washed away, suggest that pockets and lenses of this terrace material exist as discontinuous layers within the weathered shale surface.

The Savage Coal Terminal is located on a low slope within the middle Bluegate shale member of the Mancos formation. Cores drilled at this site reveal that below to 20 to 25 feet the Bluegate is a dark blue-gray dense mudstone with veinlets of calcite and gypsum. The upper 20 feet consists of weathered brown to gray semi-powdery clay with some gypsum and calcite crystals and a few thin silty layers. This weathered surface may contain lenses and pods of gravelly material left behind as residuum as the overlying gravel terrace was eroded. During times of more rigorous climate, this residuum may have been worked into the weathered surface.

622. Cross Sections, Maps and Plans.

622.100. Locations of cores drilled at Savage Coal Terminal (formerly C.V. Spur) prior to plant construction in 1977 are presented in Figure 6-2. Logs of these core holes are shown on Figure 6-3.

These holes were drilled for a geotechnical analysis of soil foundation characteristics. The following information provides the results of these studies.

The soils of residual-type material characteristic of the apparent bedrock which is Mancos shale. Previous investigations of the westerly portion of the site indicated that the depth to unweathered bedrock was approximately 10 feet. However, the depth to bedrock on the easterly portion of the site may be substantially greater than this value. Foundations placed directly on the solid shale, which was permitted to weather under the exposure to air and water, have exhibited poor foundation performance. Swelling and contracting changes during the weathering process have resulted in considerable differential settlement. The subsurface profile at the proposed site can generally be defined in terms of three zones.

Zone #1, which extends from a depth of between 8 and 20 feet below ground surface, consists of a brown clay. The clay material in this zone is residual soils formed from the weathering of shale material. The clay soils in this zone are in a stiff condition with an unconfined compressive strength of generally greater than one ton per square foot.

Zone #2 is a transition zone between the brown clay and the hard unweathered shale. In this zone, the shale is quite highly weathered and is considerably fractured. Since the zone is a transition zone, the weathering is greatest near the upper portion of the zone and gradually decreases with depth. The thickness of this zone varies from 10 to 15 feet.

Zone #3 consists of the hard weathered shale. The unconfined compressive strengths of the material within the zone are generally greater than 1600 pounds per square inch.

When the moisture content of these materials is low, some swell potential exists in the soils and it can be anticipated that some swelling of these materials will occur if it becomes saturated throughout the life of the facility. No swelling will occur, however, at this site if the foundation pressures exceed the swell pressure for the clay material. No static water levels exist at the proposed site and no groundwater problems are anticipated for this area. Because of the relative and previous characteristics of the subsurface shales throughout the site, it is possible that a perched water table could exist above the shale if irrigation was heavily utilized.

622.200. N/A - Surface Operation Only.

622.300. N/A

622.400. N/A - There are no gas or oil wells within the permit area.

623. Geologic Information.

623.100. N/A - Surface Operation Only.

623.200. See Section R645-301-540 (Chapter 5) for reclamation details.

623.300. N/A - Surface Operation Only.

624. Geologic Information for Mining.

624.100. N/A - Surface Operation Only. No coal will be mined.

624.200. N/A - Surface Operation Only. No coal will be mined.

624.300. N/A - Surface Operation Only. No coal will be mined.

625. N/A - Surface Operation Only.

626. N/A - Surface Operation Only.

627. N/A - Surface Operation Only.

630. Operation Plan.

631. The only holes drilled at the Savage Coal Terminal have been for original foundation studies in 1977 as described in Section R645-301-622.100, and ground water monitoring wells.

The original foundation study borings have been removed by facility construction. The original ground water monitoring wells have also been removed. These wells were closed in the following manner:

(1) The PVC pipe was cut off approximately 4" - 6" below ground level:

(2) The well was filled with gravel to within approximately 3' of the surface:

(3) The remainder of the well was filled with concrete to form a permanent plug;

(4) The well surface was covered over with native soil.

Two new, shallow (20' - 22') ground water monitoring wells were installed in 2006. Details on these wells are included in Chapter 7. These wells will be removed and sealed in the same manner described above, when no longer required.

631.100. N/A - All wells have been removed and permanently sealed, with the exception of the 2 new ground water monitoring wells.

631.200. See Section R645-301-631 above for permanent closure methods.

632. N/A - Surface Operation Only. No coal will be mined.

640. Performance Standards.

641. See Section R645-301-631.

642. N/A - Surface Operation Only. No coal will be mined.

Bibliography

Rollins, R.L., R.O. Brown, R.D. Gunnell, 1977. Soil Investigations, Swisher Coal Facilities, Price, Utah.

Rollins, R.L., R.O. Brown, R.D. Gunnell, 1980. Hydrologic Study, Beaver Creek Coal Division Loading Facility Near Price, Utah.

FIGURE 6-1

LOG OF HOLMES-MCGEE WELL NO. 1 (FROM PUBLIC RECORDS)

Log of: HOLMES-MCGEE Well No. 1
Address: Amarillo, Texas

Field: S Wellington, Carbon County, Utah
Serial No.: 038175
Elevation: 5530
Location: S14, T15S, R10E. Meridian SLM. Location center of subdivision.

Date: September 17, 1927
Commenced drilling: March 31, 1927
Finished drilling: September 10, 1927

Cable tools were used from 0 feet to 2462 feet.

FORMATION RECORD

From	To	Total Feet	Formation
0	500	500	Upper Mancos
500	600	100	Ferron Sandstone
600	1120	520	Lower Mancos
1120	1160	40	Dakota Sandstone
1160	2462	1302	McElmo Formation vari colored shales

HISTORY OF WELL

The well located by J.W. McGee of Amarillo, Texas, in March 1927 and drilled by Holmes McGee Co. from March to September 1927. Formations show small field closed against a dyke to the south. It was thought worth drilling, but has proven fruitless, formation appeared to be broken and out of place, no Gypsum was encountered in McElmo formation which at other places is so frequent, there was an absence of water, gas or any showing whatsoever, to justify any further expenditure.

FIGURE 6-1
(Continued)

COPY OF DRILLING LOGS OF HOLMES MCGEE WELL ON MILLER CREEK, CARBON COUNTY, UTAH

FEET	TO	FEET	
0	-	500	shale, upper Mancos
500	-	555	sand, Ferron Sandstone
555	-	505	sand little gas
505	-	530	sand little fresh water
530	-	600	Sandy lime
600	-	645	shale little gas
645	-	1040	shale lower Mancos, set 8 1/4" caseing
1040	-	1070	Sandstone DAKOTA
1070	-	1120	Slate
1120	-	1160	Pink shale
1160	-	1205	sand small showing of il
1205	-	1255	sand
1255	-	1295	shale
1295	-	1335	Pink shale
1335	-	1400	Lime & breaks of shale
1400	-	1450	Sand
1450	-	1480	gray shale
1480	-	1505	pink shale
1505	-	1515	lime
1515	-	1615	slate & lime shells
1615	-	1640	brown shale
1640	-	1670	red white and brown shales
1670	-	1710	gray sand
1710	-	1772	shale and shell
1772	-	1777	sand
1777	-	1795	broken lime
1795	-	1805	sand & little gas
1805	-	1835	shale & shells
1835	-	1915	broken lime
1915	-	1926	hard lime
1926	-	2050	broken lime
2050	-	2057	red sand
2057	-	2215	broken lime
2215	-	2225	sand
2225	-	2245	gritty lime
2245	-	2270	red sand
2270	-	2295	white soft lime
2295	-	2400	gray lime broken
2400	-	2462	red shale mixed with lime

TOTAL DEPTH 2462 feet

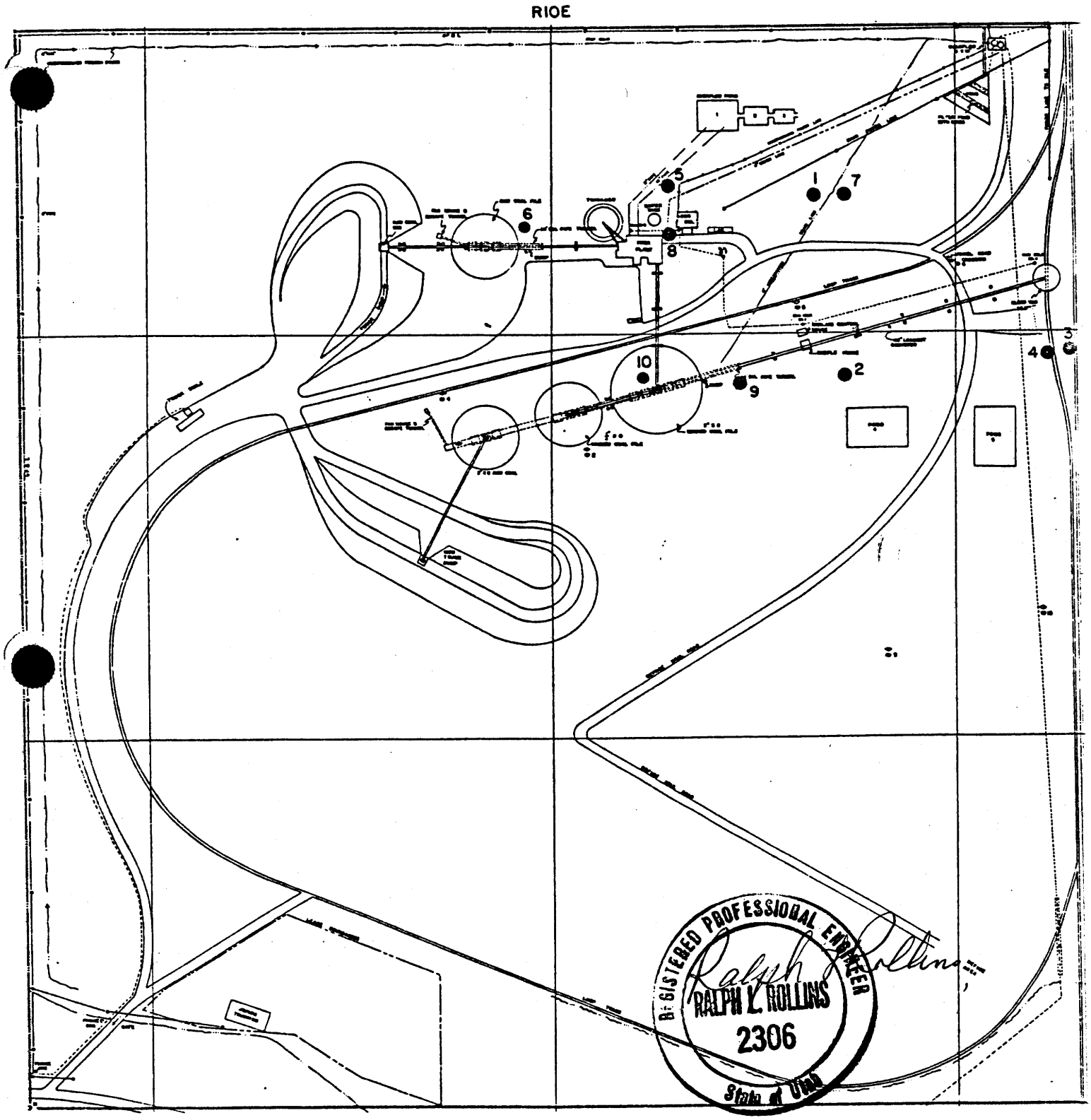
FIGURE 6-2

TEST BORING

AND

CORE SAMPLE LOCATIONS

TEST BORING AND CORE SAMPLE LOCATIONS



ELEVATIONS:

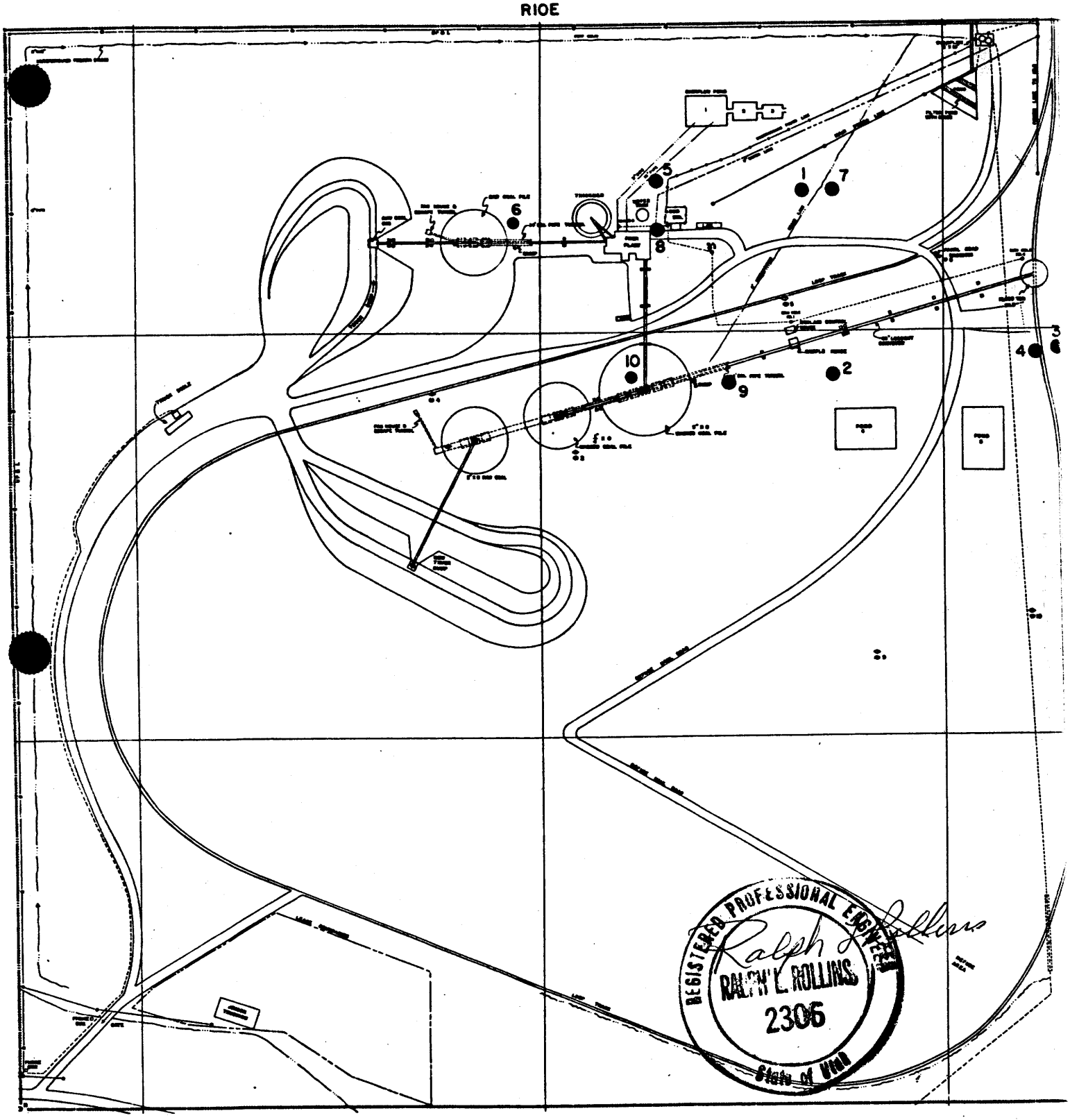
1.	5490'	6.	5504'
2.	5492'	7.	5489'
3.	5482'	8.	5498'
4.	5484'	9.	5496'
5.	5497'	10.	5502'

FIGURE 6-2

TEST BORING AND CORE SAMPLE LOCATIONS

Figure 6-2 (continued)

RIOE



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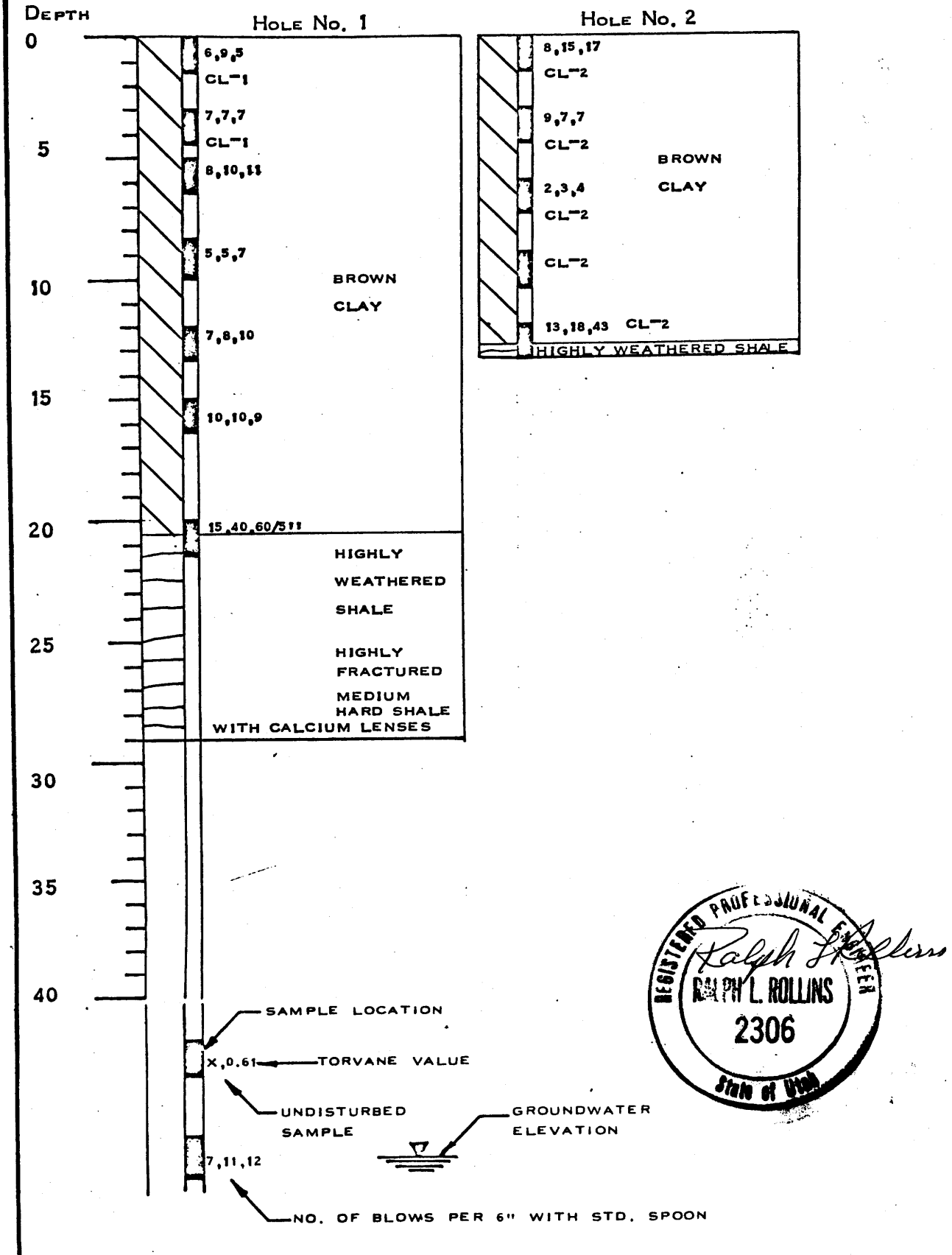
4.	5484'	9.	5496'
5.	5497'	10.	5502'

FIGURE 6-2

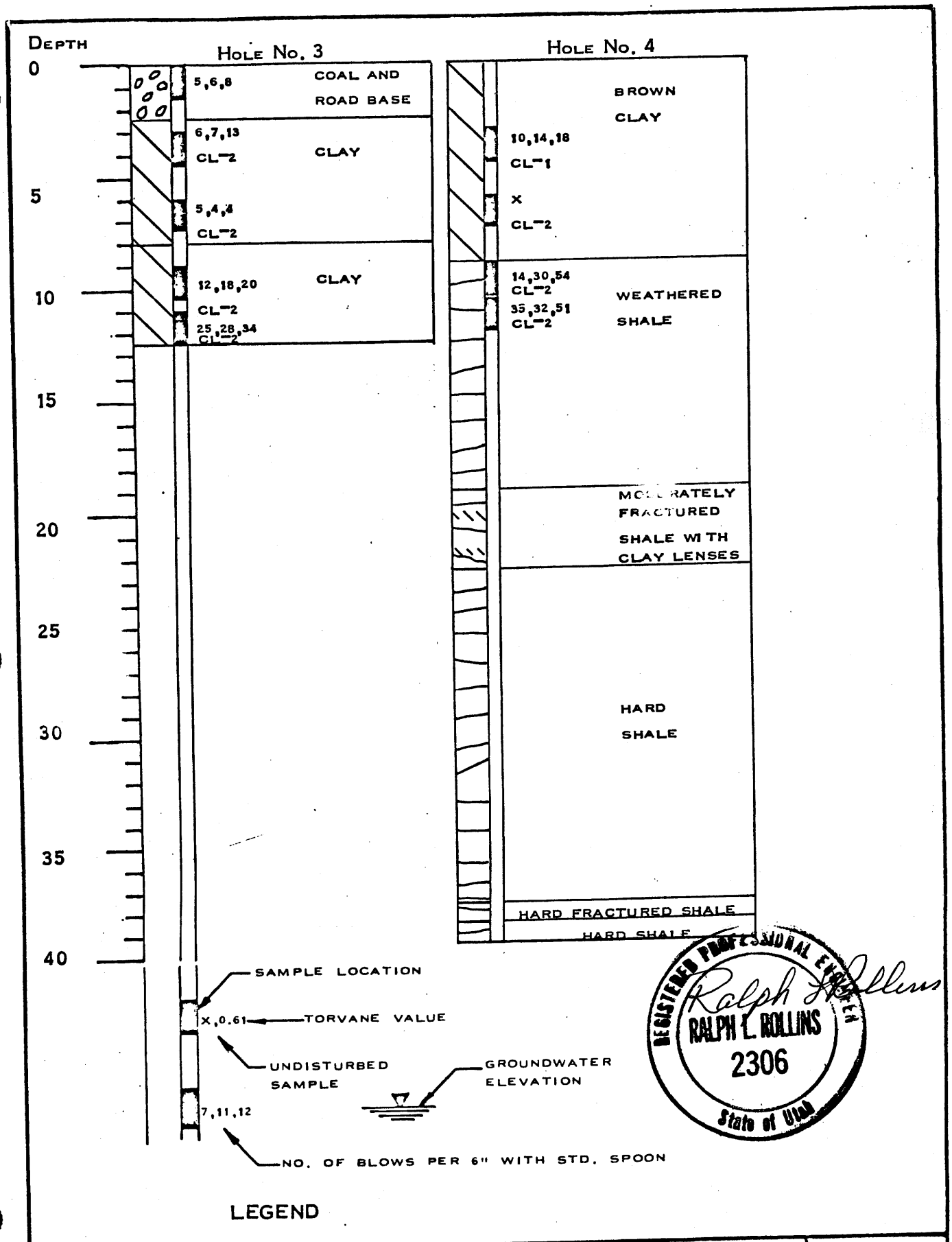
FIGURE 6-3

CORE SAMPLE LOGS



REGISTERED PROFESSIONAL ENGINEER
RALPH L. ROLLINS
2306
State of Utah

LOG OF BORINGS FOR: SWISHER COAL PHASE II	ROLLINS, BROWN AND GUNNELL, INC. CONSULTING ENGINEERS	FIGURE NO. 6-3



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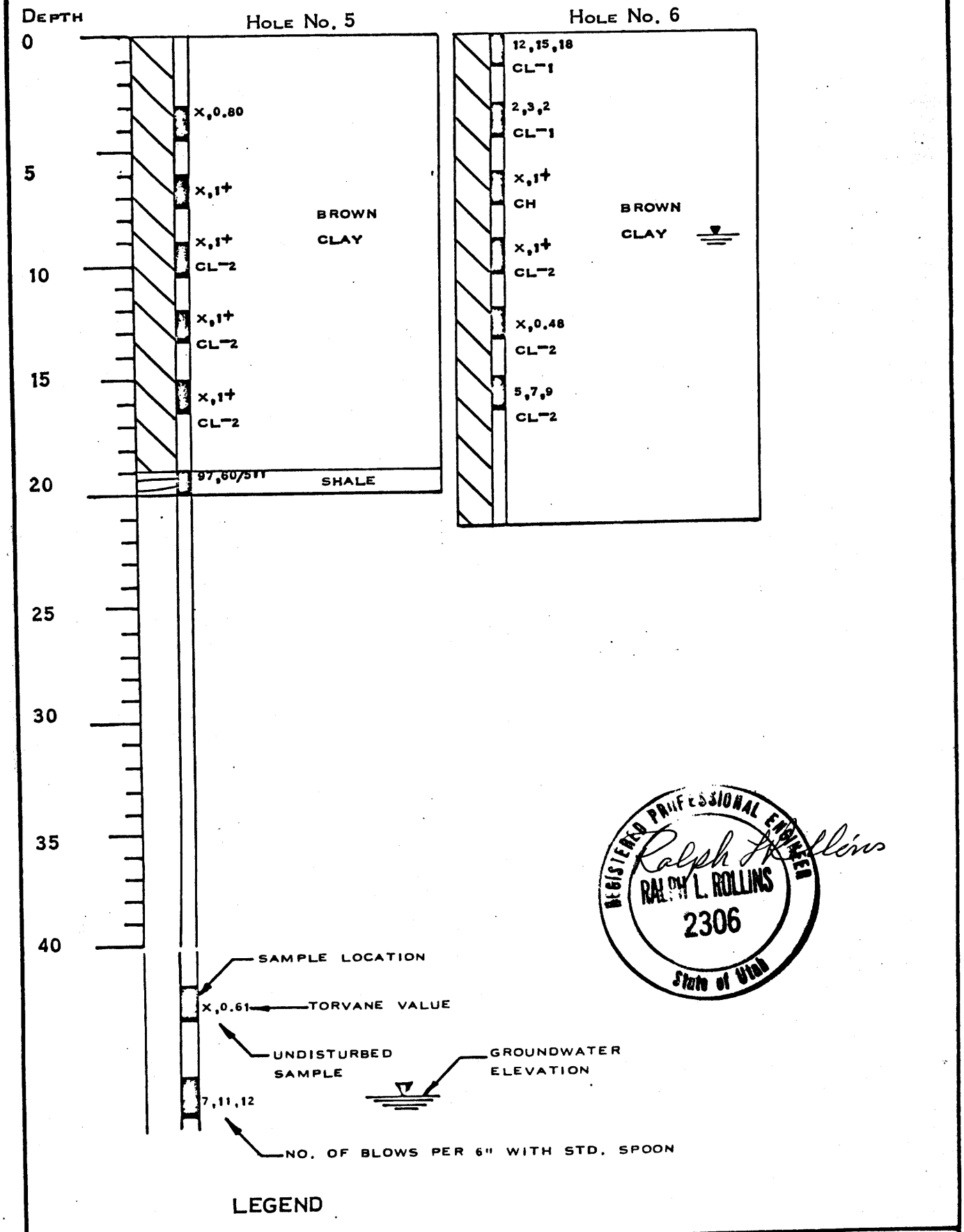
LOG OF BORINGS FOR: SWISHER COAL PHASE II	ROLLINS, BROWN AND GUNNELL, INC. CONSULTING ENGINEERS	FIGURE NO. 6-3



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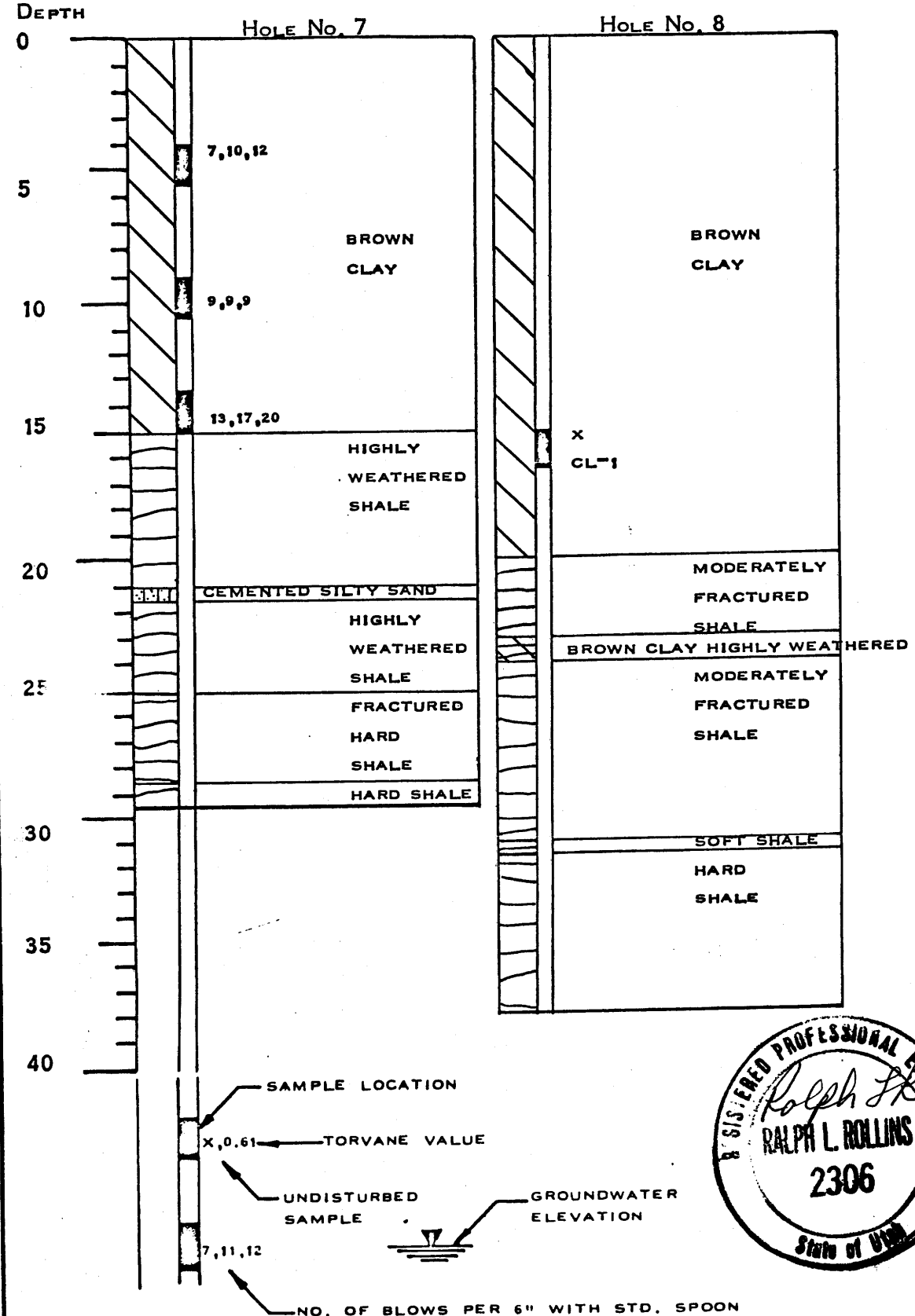
LOG OF BORINGS FOR: SWISHER COAL PHASE II	ROLLINS, BROWN AND GUNNELL, INC. CONSULTING ENGINEERS	FIGURE No. 6-3



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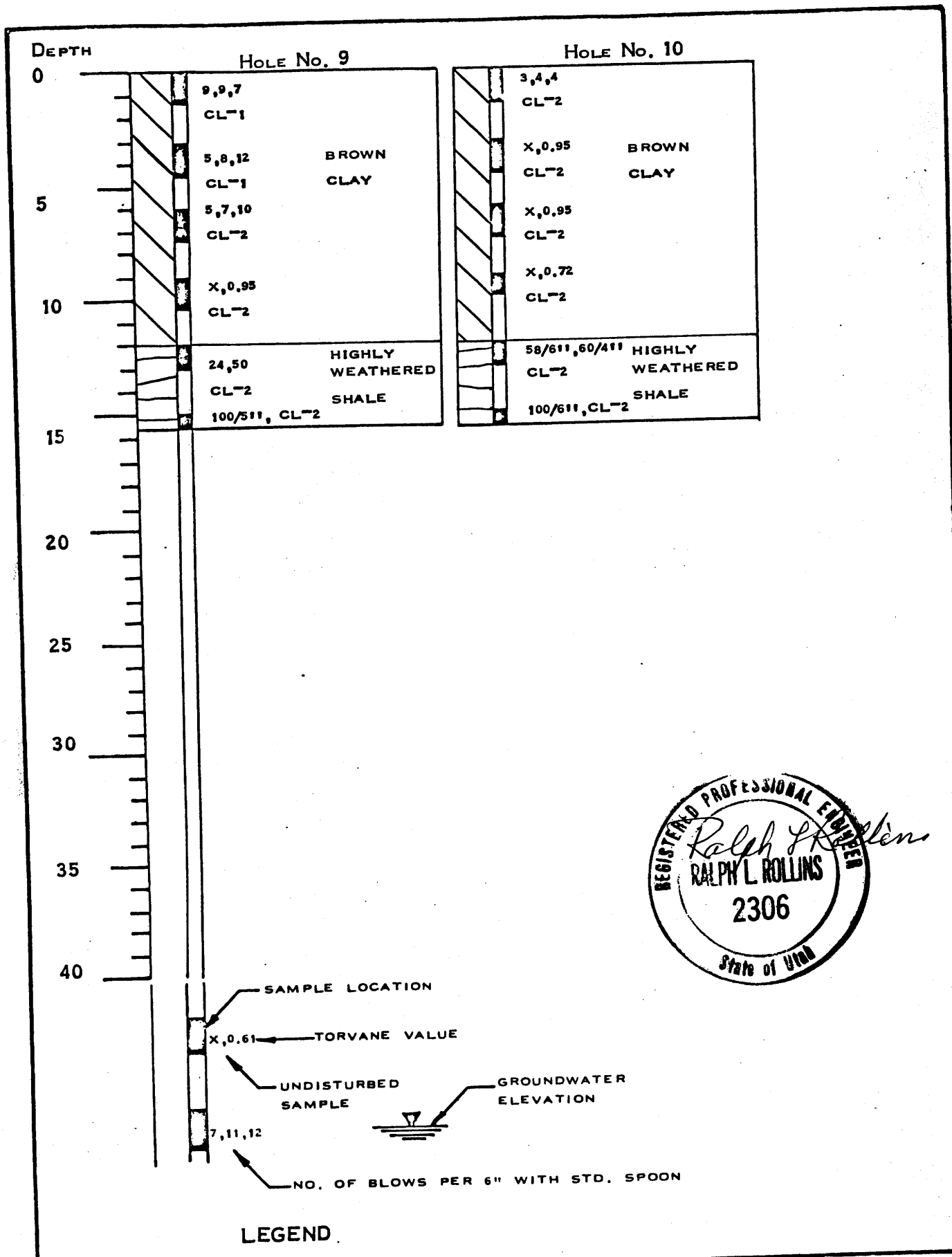
LOG OF BORINGS FOR: SWISHER COAL PHASE II	ROLLINS, BROWN AND GUNNELL, INC. CONSULTING ENGINEERS	FIGURE No. 6-3



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LEGEND

LOG OF BORINGS FOR: SWISHER COAL PHASE II	ROLLINS, BROWN AND GUNNELL, INC. CONSULTING ENGINEERS	FIGURE No6-3

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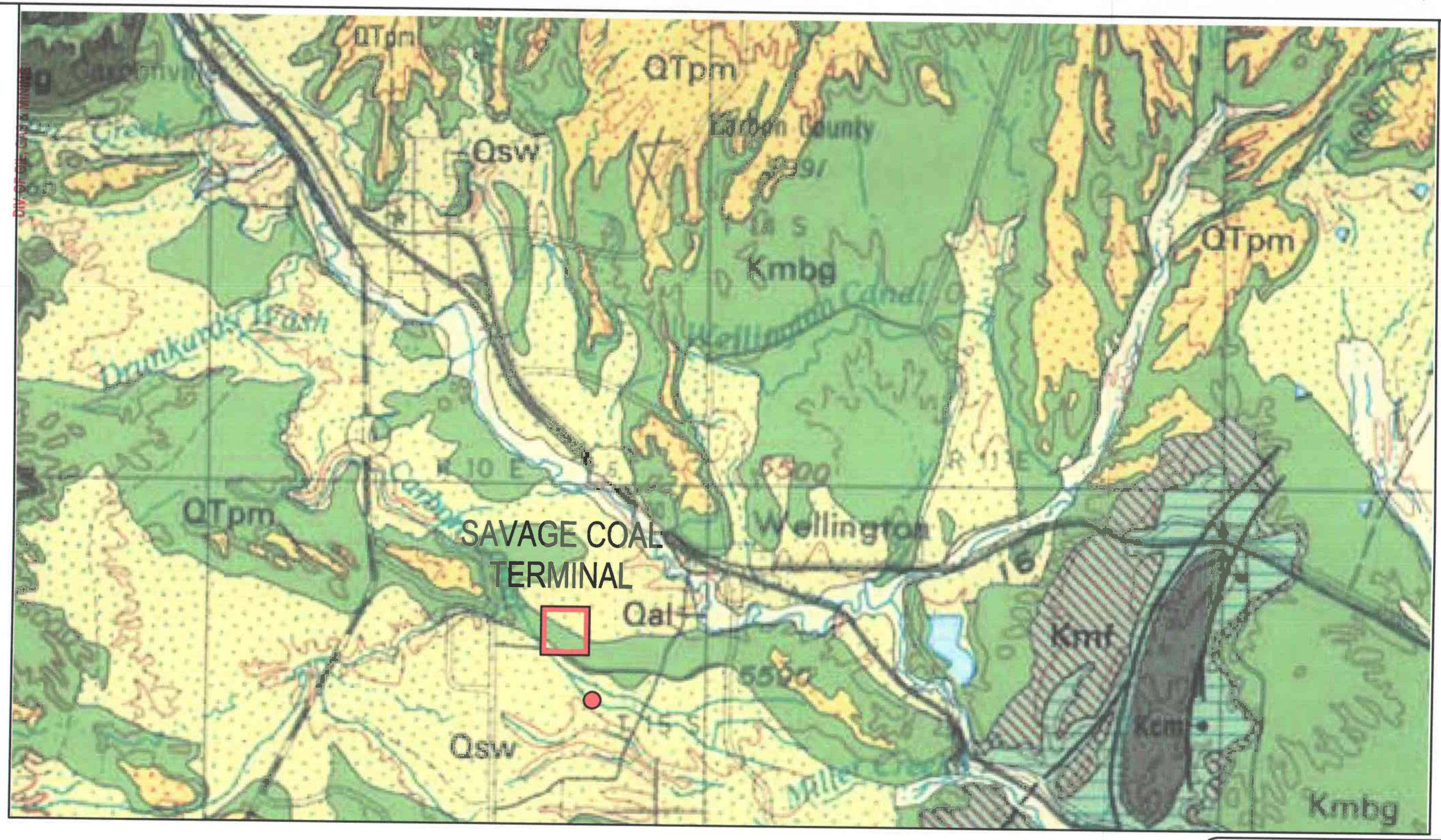


LEGEND:

Qal = Quarternary Alluvium
QTpm = Quarternary Pediment Mantle
Qsw = Quarternary Slope Wash Deposits
Kmbg = Cretaceous Blue Gate Shale Member of Mancos Formation

Kmt = Cretaceous Tununk Shale Member of Mancos Formation
Kmf = Cretaceous Ferron Sandstone Member of Mancos Formation
Kcm = Cretaceous Cedar Mountain Formation
● = Holmes Magee Well #1

N

SAVAGE

SAVAGE COAL TERMINAL
GEOLOGIC MAP

SCALE:	DRAWN BY:
NTS	BLACKHAWK ENGINEERING
DATE:	PLATE:
AUGUST 2006	PLATE 6-1

Savage Services Corporation
Savage Coal Terminal
C/007/022

Chapter 7

Hydrology

R645-301-700

Table of Contents
Savage Coal Terminal
Chapter 7 - Hydrology

R645-301-700.	Hydrology
R645-301-710.	Introduction
R645-301-720.	Environmental Description
R645-301-722.	Cross Sections and Maps
R645-301-723.	Water Quality
R645-301-724.	Baseline Information
R645-301-725.	Baseline Cumulative Impact Area Information
R645-301-727.	Alternative Water Source Information
R645-301-728.	Probable Hydrologic Consequences (PHC) Determination
R645-301-729.	Cumulative Hydrologic Impact Assessment (CHIA).
R645-301-730.	Operation Plan
R645-301-732.	Sediment Control Measures
R645-301-733.	Impoundments
R645-301-740.	Design Criteria and Plans
R645-301-741.	Mine Plan Area Watersheds and Surface Runoff
R645-301-742.	Sediment Control Measures
R645-301-743.	Impoundments
R645-301-744	Discharge Structures

Table 7-1	Groundwater Observations
Table 7-1A	Groundwater Monitoring Wells
Table 7-2	Pump Test Data
Table 7-3	Ground Water Chemical Analyses at two sites near the Savage Coal Terminal Loading Facility
Table 7-4	French Drain Water Quality
Table 7-4a	French Drain Water Quality Summary
Table 7-5	Well CV2W Quality
Table 7-5a	Well CV2W Quality Summary
Table 7-6	Well CV3W Quality
Table 7-6a	Well CV3W Quality Summary
Table 7-7	Well CV4W Quality
Table 7-7a	Well CV4W Quality Summary
Table 7-8	Well CV5W Quality
Table 7-8a	Well CV5W Quality Summary
Table 7-9	Well CV6W Quality

Table 7-9a Well CV6W Quality Summary
Table 7-10 Well CV7W Quality
Table 7-10a Well CV7W Quality Summary
Table 7-11 Well CV8W Quality
Table 7-11a Well CV8W Quality Summary
Table 7-12 Well CV10W Quality
Table 7-12a Well CV10W Quality Summary
Table 7-13 Well CV11W Quality
Table 7-13a Well CV11W Quality Summary
Table 7-14 Well CV12W Quality
Table 7-14a Well CV12W Quality Summary
Table 7-14b Chemical Analyses of Storm runoff at three sites near the Savage Coal Terminal Loading Facility
Table 7-14c Chemical Analysis of Surface Water from Ditch North of Site
Table 7-15 Price Warehouses
Table 7-16 Mean Seasonal Wind Speeds in the Castle Valley Area
Table 7-17 Water Monitoring Report
Table 7-18 Weighted Curve Number Determination
Table 7-19 Runoff Volumes Estimates
Table 7-20 Diversion Design Calculations
Table 7-21 Sedimentation Pond Design Capacities
Table 7-22 Direct Precipitation to Sediment Ponds
Table 7-23 Erosion Rate Determination
Table 7-24 TR-20 Analysis of Pond Outlets for 25 Year-24 Hour Rainfall Event
Table 7-25 Culvert Design Specifications
Table 7-26 Refuse Pile Drainage

Figure 7-1 Monitoring Well Design
Figure 7-2 Chemical Analysis - Price River
Figure 7-3 Chemical Analysis - Carbon Canal
Figure 7-4 Drainage Areas
Figure 7-5 Area Subdrainages
Figure 7-6 Location of Irrigation Canals
Figure 7-7 AVF and Zoning Figure
Figure 7-8 Typical Silt Fence
Figure 7-9 Typical Straw Bale Installation
Figure 7-10 Typical Wire Gabion
Figure 7-11 Refuse Pile Drainage Channels
Figure 7-12 Jensen Property Berm
Figure 7-13 Typical Collection Ditches
Figure 7-14 Reclaimed Channel
Figure 7-15 Sediment Marker

Appendix 7-1	Small Area Exemption - River Pump/Pipeline
Appendix 7-2	Water Rights Documentation
Appendix 7-3	Probable Hydrologic Consequences Determination
Plate 7-1	Water Monitoring Location Map
Plate 7-2	Hydrology Map
Plate 7-3	Sediment Ponds 1, 2 and 3
Plate 7-4	Sediment Pond 5
Plate 7-5	Sediment Pond 6
Plate 7-6	Settling Ponds

R645. Natural Resources; Oil, Gas and Mining; Coal.

R645-301. Coal Mine Permitting: Permit Application Requirements.

R645-301-700. Hydrology.

710. Introduction.

711. General Requirements. Each permit application will include descriptions of:

711.100. Existing Hydrologic Resources. (See Section 720.)

711.200. Proposed Operations. (See Section 730.)

711.300. Methods and Calculations. (See Section 740.)

711.400. Performance Standards. (See Section 750.)

711.500. Reclamation. (See Section 760.)

712. All required cross-sections, maps and plans have been prepared under the direction of, and certified by, a qualified, registered professional engineer of the State of Utah.

713. Inspection. Impoundments will be inspected as described under R645-301-514.300.

720. Environmental Description.

721. See Sections 724.100 and 724.200 for descriptions of the groundwater and surface water, respectively.

722. Cross Sections and Maps.

722.100. Location of Subsurface Water. (See Plates 7-1 and 7-2.)

722.200. Location of Surface Water. (See Plates 7-1 and 7-2.)

722.300. Monitoring Stations. (See Plate 7-1.)

722.400. Water Wells. (See Plates 7-1 and 7-2.)

722.500. Topography. (See Plate 7-1.)

723. Water Quality.

All water quality analyses are conducted in accordance with requirements of R645-301-723.

724. Baseline Information.

The application will include the following baseline hydrologic, geologic and climatologic information, and any additional information required by the Division.

724.100. Groundwater Hydrology

Methodology - A groundwater investigation was developed to:

1. Review all published data and geologic information concerning potential aquifers and groundwater resources in the vicinity of the Savage Coal Terminal site.

2. Identify and locate any discharge areas and uses of groundwater using photo field reconnaissance.

3. Install monitoring wells to locate the water table or pearched groundwater levels in the area and to determine aquifer characteristics.

4. Monitor water quality characteristics of the aquifer in order to establish a baseline with seasonal variation.

5. Determine rate and direction of groundwater movement.

Existing Groundwater Resources

The Savage Coal Terminal is near the middle of Castle Valley, a broad featureless plain between the Wasatch Plateau to the west and the San Rafael Swell to the east. A detailed geologic discussion is developed in Chapter 6. Briefly, the Savage Coal Terminal facility is located on the middle Bluegate shale member of the Mancos Formation and is approximately 500 feet above the Ferron sandstone member of the Mancos Formation. The Blue gate member consists of dark blue-gray marine mudstone and acts as an aquitard. The upper 10 to 20 feet consists of weathered clays, occasional lenses and pods of gravelly residuum, and residual type silty clay loam soils characteristic of the weathered Mancos shale.

Regional Groundwater Hydrology

Published groundwater data for the area surrounding the Savage Coal Terminal site is limited. However, the U.S. Geologic Survey (1979) has compiled the published selected groundwater data in the Wasatch Plateau and Book Cliffs area. Also, drilling logs for oil and gas wells drilled in the area were obtained from the Utah Division of Oil, Gas and Mining. This data is sufficient to give a good indication as to the existence and relative location of water bearing strata in the area.

Logs of oil and gas wells drilled in the area indicate that regional groundwater was first encountered in the Ferron Sandstone approximately 500 feet below the surface. Five of thirteen wells recovered brackish or salty water from this strata. The other 8 wells did not find water in this strata. Because of the variable and discontinuous nature of the sandstone and the poor quality of the water, the Ferron is not an important aquifer in this area.

A water table does exist in some locations above the impermeable Bluegate shale. In the general area, this water table exists in the alluvium or weathered shale and gravelly pods above the Bluegate Shale.

Ground Water Levels

Note: The following discussion on the observation wells is included for informational purposes, although all of the wells described have been decommissioned and removed at this time. 2 new wells were drilled in 2006; however, there is very limited data available on them at this time.

The measurements in the observation wells as recorded in Table 7-1 indicate that there is no regional ground water table at the site, although a perched water table exists at some locations on the site. The aerial extent of this perched water table could not be precisely determined from existing monitoring well network.

Wells No. CV0W, CV7W, and CV9W were dry indicating that no water table exists above the Bluegate Shale at these locations. Well CV2W was also dry throughout much of the baseline monitoring. Well CV0W was apparently influenced by the French Drain intercepting shallow groundwater flow from the north and west. Well CV9W may also be influenced by the other French Drain. Wells CV7W and CV2W appear to have been near a bedrock ridge where groundwater seldom occurs.

A water table existed near Wells CV3W, CV4W, CV6W and CV8W. The water level fluctuations in CV8W and CV6W had similar pattern with an initial rise of about one foot during August, 1980 and the generally increased during the monitoring period until November, 1981 when water levels decreased nearly one foot in CV8W and one half foot in CV6W. The direction of groundwater flow was from CV8W to CV6W although the magnitude of the potentiometric gradient varies from about 1.4 feet to 0.1 feet.

A swampy area exists on the east side of the railroad tracks in close proximity to Well CV6W (See Plate 7-1). The surface elevation of this area is approximately at the same elevation as the water level was at Well CV6W. Heavy accumulations of salt exist on the soil surface in this swampy area indicating substantial amounts of water have been lost to evaporation in the past. This location is considered to be a groundwater discharge area for water which is found beneath the Savage Coal Terminal site.

Well CV10W was located in an alfalfa field about 1,000 feet east of the swampy area. The water level in Well CV10W rose at first and then declined until it eventually went dry. A substantial water surface elevation drop existed between the swampy area near Well CV6W and Well CV10W. One would expect ground water to move towards Well CV10W from the swampy area; however, Well CV10W went dry during the monitoring period while the water level in the vicinity of Well CV6W did not change substantially. Thus, ground water does not appear to flow eastward toward observation Well No. 10. An explanation for this is that the ground water in the area of Wells CV8W and CV6W was ponded in a bedrock swale of the impermeable shale with the boggy area located along eastern edge of this swale.

Although observation Well CV9W was dry, a high water level in Well CV3W and the existence of a small swampy area between wells CV9W and CV3W suggested a perched water table west of Well CV9W. The source of this water is seepage from the canal along the southern perimeter of the property near the top of the ridge. This water probably moves downslope toward the center of the property and was a source of groundwater in the vicinity of observation wells CV6W and CV8W. In fact, water levels in CV6W and CV8W appeared to increase during the late summer when irrigation water has been flowing in the canal.

The water level in wells CV4W, CV5W, CV11W, CV12W and CV13W appeared to be influenced by the application of irrigation water to the farmland north of the site. The water level in Well CV4W was 4.5 to 6 feet below to water level indicating the influence of the french drain along the northern boundary of the Savage Coal Terminal property. It is believed that a groundwater mound exists below the irrigation fields and that irrigation return flows from the fields to the north is the dominant source of the water which discharges from the drain. The large fluctuations in observation Well CV5W on the north side of the drain indicated the influence of irrigation water applied to the adjacent field.

Table 7-1 presents the water table elevation at the various observation wells on August 1980 through December 1982. Wells which were dry show elevations for the bottom at those wells. A vertical difference of approximately one foot existed between the water levels in Wells CV6W and CV8W. If the value for hydraulic conductivity computed from the pump test is assumed to be representative, ground water will move 6 feet per year toward the east at this gradient. Ground water will move approximately 30 feet per year along the gradient toward observation well CV11W to the northeast. Consequently, a net movement of 21 feet per year to the northeast will occur.

A substantial gradient also existed between observation Well CV4W and CV11W. If no obstructions from impermeable shales exist between these two wells, groundwater movements may range from 8 to 50 feet per year depending upon the location and gradient. However, a continuous water table is not found at the site. Water is consistently found in bedrock lows but often absent along bedrock highs.

A typical ground water monitoring well design is shown on Figure 7-1.

TABLE 7-1
GROUNDWATER OBSERVATIONS

Well No.	CV2W	CV3W	CV4W	CV5W	CV6W	CV7W	CV8W	CV9W	CV10W	CV11W	CV12W	CV13W	CV0W
Total Feet Depth	11.0	6.5	17.6	16.7	16.3	9.5	18.9	18.1	17.2	17.5	19.5	14.1	11.3
Ground Surface Elevation Feet	5520.2	5531.4	5481.3	5504.4	5482.1	5538.9	5495.7	5500.8	5465.1	5454.3	5481.2	5505.2	5525.1
Dry 12/13/79 Through 02/29/80													
DEPTH TO WATER LEVEL FROM GROUND SURFACE - FEET													
08/05/80	8.0	2.0	10.3	14.1	4.3	Dry	16.9	Dry	11.4	-	-	-	Dry
08/13/80	8.9	2.0	10.9	-	4.4	Dry	16.5	Dry	-	-	6.5	Dry	
08/20/80	8.5	1.4	10.8	13.3	4.0	Dry	16.5	Dry	8.6	4.4	6.2	Dry	
08/27/80	-	-	12.2	13.7	3.3	-	15.9	Dry	-	-	6.9	Dry	
08/29/80	10.1	2.0	12.2	11.2	-	Dry	15.8	Dry	9.0	4.8	6.5	Dry	
09/30/80	-	-	-	-	3.2	-	15.9	-	-	-	-	-	
09/04/80	Dry	2.2	11.0	13.2	-	Dry	15.9	Dry	Dry	4.4	6.5	Dry	
09/11/80	Dry	1.6	10.4	12.9	3.3	Dry	15.9	Dry	Dry	4.2	6.1	Dry	
06/05/81	-	-	-	-	3.8	Dry	-	Dry	Dry	3.2	4.3	Dry	
07/21/81	Dry	2.3	10.8	13.4	2.8	Muddy	-	Muddy	Dry	2.4	4.3	Muddy	
08/18/81	Dry	2.5	11.4	13.4	2.7	Muddy	-	Dry	Dry	3.2	5.4	Muddy	
09/14/81	Dry	2.7	-	14.4	2.4	Muddy	-	Dry	Muddy	3.8	5.8	Muddy	
10/27/81	Dry	1.4	10.5	13.1	1.6	Muddy	-	Dry	Dry	2.5	4.2	Muddy	

11/22/81	Dry	3.7	11.7	13.4	2.2	Muddy	15.7	Dry	Dry	-	5.8	Muddy	
12/11/81	Dry	3.9	11.7	13.4	2.8	Muddy	16.8	Dry	Dry	4.2	6.1	Muddy	
01/19/82	Dry	4.9	14.9	14.2	2.5	Dry	16.8	Dry	Dry	4.4	6.7	Dry	
02/22/82	Dry	4.3	13.5	14.7	2.4	Dry	16.9	Dry	Dry	5.4	7.3	Dry	
03/22/82	Dry	4.7	11.6	14.3	2.4	Dry	17.0	Dry	Dry	5.9	-	Dry	
04/22/82	Dry	5.0	12.1	14.8	2.6	Dry	-	Dry	Dry	3.4	6.3	Dry	

GROUNDWATER OBSERVATIONS - SAVAGE COAL TERMINAL

Well No.	CV2W	CV3W	CV4W	CV5W	CV6W	CV7W	CV8W	CV9W	CV10W	CV11W	CV12W	CV13W	CV0W
Total Depth Feet	11.0	6.5	17.6	16.7	16.3	9.5	18.9	18.1	17.2	17.5	19.5	14.1	11.3
Ground Surface Elevation Feet	5520.2	5531.4	5481.3	5504.4	5482.1	5538.9	5495.7	5500.8	5465.1	5454.3	5481.2	5505.2	5525.1

Dry 12/13/79 through 02/29/80

DEPTH TO WATER LEVEL FROM GROUND SURFACE - FEET

05/29/82	Dry	3.2	12.5	14.3	2.2	Dry	-	Dry	Dry	2.1	-	Dry	
06/22/82	Dry	0.1	13.0	14.0	2.2	Dry	-	Dry	9.8	2.1	5.6	Dry	
07/20/82	Dry	1.5	11.7	14.5	1.0	Dry	-	Dry	9.9	0.6	5.9	Dry	
08/25/82	Dry	2.2	12.3	13.5	2.1	Dry	-	Dry	9.6	3.0	6.7	Dry	
09/23/82	Dry	3.0	13.0	14.0	2.7	Dry	-	Dry	6.2	3.6	7.1	Dry	
10/13/82	Dry	2.8	13.0	14.5	3.0	Dry	-	Dry	6.3	4.3	7.5	Dry	
11/21/82	Dry	-	-	-	-	Dry	-	Dry	-	-	-	Dry	
12/29/82	Dry	4.1	9.9	14.5	2.8	Dry	-	Dry	9.4	4.5	8.3	Dry	

TABLE 7-1A GROUNDWATER MONITORING WELLS					
Well No.	Location	Total Depth (Ft.)	Casing PVC	Completion	Hole Elevation
CV0W	N.W. Corner Permit	11.3	13.3	Capped	5525.1
CV2W*	W. Central Permit	11.0	11.0	Capped	5520.2
CV3W	So. Central Permit	6.5	8.5	Capped	5531.4
CV4W	N.E. Corner Permit	17.6	19.6	Capped	5481.3
CV5W	No. Central Permit	16.7	18.7	Capped	5504.4
CV6W	E. Central Permit	16.3	18.3	Capped	5482.1
CV7W	W. Central Permit	9.5	9.5	Capped	5538.9
CV8W	E. Central Permit	18.9	18.9	Capped	5495.7
CV9W	S.E. Corner Permit	18.1	18.1	Capped	5500.8
CV10W	S.E. Adj. Property	17.2	19.2	Capped	5465.1
CV11W	N.E. Adj. Property	17.5	19.5	Capped	5454.3
CV12W	No. Adj. Property	19.5	21.5	Capped	5481.2
CV13W	N. Central Adj. Property	14.1	14.1	Capped	5505.2
S-1-GW	N.E. Corner Permit	19.5	23.5	Active	5481.0
S-2-GW	E. Central Permit	21.5	25.5	Active	5488.2

Permeability

A pump test was performed using observation Well CV6W to estimate the permeability and storage coefficient associated with the water table aquifer in the area. Two additional observation wells were drilled fifteen feet and forty feet from Well CV6W. Well CV6W was then pumped at a constant rate and measurements of draw down versus time were recorded. Analysis of the data indicated a hydraulic conductivity K of 0.007 ft/min. and an apparent specific yield of 0.27. Pump test data and calculations are provided in Table 7-2.

These values are of the magnitude of those expected for silty sand and are some what high for the clay soils at the Savage Coal Terminal site. The geology of the area indicated that there might be local pockets of granular materials in the weathered clay. Lenses of sand were found in some of the bore holes made for foundation at the site. If one of these sand lenses exist in the area of the test well, it could influence the test.

Two test Wells, CV6D and CV5D were installed and sealed in the shale and used to determine the permeability of the shale. These were filled with water and the loss measured. There was no loss in the initial measuring period. It was concluded that the permeability was extremely low.

Ground Water Quality

From a review of published ground water quality data for the area, data was obtained for two sites relatively close to the Savage Coal Terminal facility. One site is a spring which is located close to Wellington on the opposite side of the Price River. The other site is located in Miller Creek at Highway 10 just southwest of the Savage Coal Terminal facility. At this site, water seepage through the soil profile into Miller Creek from the Carbon Canal was analyzed. The chemical analyses for these two sites are given in Table 7-3.

Three observation wells were drilled at the Savage Coal Terminal site in 1977 and the personnel at the facility collected ground water quality samples from these wells beginning in December, 1979.

Ten additional wells were drilled during the summer of 1980 in order to better characterize the shallow groundwater associated with the Savage Coal Terminal Facility. Chemical analysis of water samples taken from Savage Coal Terminal wells are reported in Tables 7-5 through 7-14. Also, water quality samples were taken from the French Drain at the pump house and are reported in Table 7-4.

Available data is presented separately for each station by two tables.

The first table for each well presents the results of field and laboratory chemical analyses for each sampling performed on that well. Those parameters for which concentrations are outside the standards for aquatic or agricultural use are also identified.

The second table for each well presents the quality standards for aquatic and agricultural use. This table summarizes chemical quality data by presenting the maximum, minimum and mean concentration including the standard deviation for each parameter for the period of record. The second table also summarizes the number of times each parameter exceeded the standard or limiting range for that particular parameter with respect to domestic, agricultural use. The source for quality standards for domestic, aquatic or agriculture used in the tables were determined from the numeric stream standards for the Price River below Castle Gate. There are no domestic standards for this reach of the Price River.

Ground water quality is generally poor and dominated by sodium sulfate. Seasonal variation in TDS or conductivity is found to occur in many of the wells. Some exhibit higher concentrations during the winter and spring than in summer or fall. In other wells, no definite pattern is discernible.

It should be noted that all of the above ground water monitoring wells have been removed and plugged as of May 1999. This was approved by the Division under an amendment to the plan. Two new ground water monitoring wells were installed in 2006.

TABLE 7-2
PUMP TEST DATA

Pertinent Information

Pumped Well: Well CV6W located on east side of Savage Coal Terminal site.
Date: Starting date was September 3, 1980.
Observation Wells: Two observation wells with r = 14.3 ft. and r = 40ft.
Aquifer Thickness: M = 10 ft.
All wells are fully penetrating.

Analysis Results (Delayed drainage method)

Reference: Lohman (1979), Groundwater Hydraulics, USGS Professional Paper 708, pp 34-40.
A log-log plot of drawdown, s, versus time, t, at the observation well at distance r = 14.3 ft. was prepared. This plot was superimposed on Plate 8 from Lohman (1979) and a match point obtained for the best match with the curve r/8 = 1.5. The four parameters at the match point are:

s	=	4.56 ft.
t	=	197 min.
4 pi ts/Q	=	1.0
$4 Tt/r^2Se$	=	1.0

The corresponding values for Transmisivity, T, and specific yield, are obtained by solution of equation (109) and (110) Lohman (1979):

$$(109)\ T = \frac{(1.0)Q}{4\ pi\ s} = \frac{(1.0)(30)\ gal\ min^{-1}}{(12.57)(4.56\ ft)(7.48\ gal\ ft^3)}$$

$$T = 0.07\ ft^2\ min^{-1}$$

$$(110)\ Se = \frac{4Tt}{r^2(1.0)} = \frac{(4)(.07\ ft^2\ min^{-1})(197\ min)}{(14.3\ ft)^2(1.0)}$$

$$Se = 0.27$$

Hydraulic Conductivity is determined by dividing T by the aquifer thickness, M:

$$K = \frac{T}{M} = \frac{.07}{10} = 0.007\ ft.\ min^{-1}$$

TEST RESULTS			
Time Since Pumping Began (minutes)	Observed Drawdown in Well #1 (So) (feet)	Adjusted Drawdown (Sa) (feet)	Observed Drawdown in Well #2 (feet)
0	0.00	0.00	
11	0.00	0.00	
21	0.00	0.00	
26	0.01	0.01	
35	0.01	0.01	
45	0.01	0.01	
55	0.02	0.02	
85	0.02	0.02	
145	0.03	0.03	
205	0.04	0.04	
265	0.26	0.26	
267	0.35	0.34	
270	0.43	0.42	0.02
280	0.55	0.53	
290	0.68	0.66	
300	0.76	0.73	
310	0.86	0.82	0.02
325	1.00	0.95	
340	1.09	1.03	
355	1.17	1.10	0.05
385	1.29	1.21	0.05
415	1.38	1.28	0.05
445	1.43	1.33	
485	1.53	1.41	
505	1.55	1.43	0.05
535	1.60	1.47	
565	1.65	1.51	0.08

TEST RESULTS			
Time Since Pumping Began (minutes)	Observed Drawdown in Well #1 (So) (feet)	Adjusted Drawdown (Sa) (feet)	Observed Drawdown in Well #2 (feet)
625	1.74	1.59	
685	1.80	1.64	
750	1.84	1.67	0.08
805	1.85	1.68	
885	1.87	1.69	0.09
925	1.88	1.70	
985	1.87	1.69	
1045	1.88	1.70	0.09
1105	1.89	1.71	
1150	1.90	1.72	0.11

TABLE 7-3
GROUND WATER CHEMICAL ANALYSES AT TWO SITES NEAR THE SAVAGE COAL TERMINAL LOADING FACILITY

Parameter pH	Spring Near Wellington 7.1 Mg/l	Seepage Water at Miller Creek 7.8 Mg/l
Silica (siO_2)	31.00	7.3
Calcium (Ca)	215.00	397.0
Magnesium (mg)	19.00	319.0
Sodium (Na)	-	649.0
Potassium (K)	-	12.0
Bicarbonate (HCO_3)	562.00	341.0
Carbonate (CO_3)	-	0.0
Sulfate (SO_3)	755.00	3010.0
Chloride (Cl)	43.00	161.0
Fluoride (F)	0.400	0.8
Nitrate (NO_3	0.54	0.0
Boron (B)	-	0.3
Dissolved solids	1708.00	4720.0
Hardness as $CaCO_3$	739.00	2300.0
Noncarbonate hardness as $CaCO_3$	-	2020.0

TABLE 7-4
FRENCH DRAIN WATER QUALITY

Water - Quality Data Report for Station: CV1W (French Drain) Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	11/29/77	03/08/78	04/21/79	12/18/79	01/22/80	02/29/80	12/11/81	04/22/82
Turbidity, N.T.U.	32.0	19.0	73.0	-	-	-	-	-
Lab Conductivity @25C, micromhos/cm	21100	28500	-	11000	11000	5200	9300	20000
Lab pH, std. Units	7.87	7.72	7.72	8.20	8.20	7.90	8.40	7.90
TDS @ 180C, mg/l (lab.)	13700LA	18500LA	340	7150LA	7700LA	3430LA	6480LA	13500LA
Total Alkalinity, mg/l ($CaCO_3$)	366	360	222	-	-	-	-	-
Total Hardness, mg/l ($CaCO_3$)	2900	3100	252	-	-	-	-	-
Arsenic, Total, mg/l (As)	0.001	0.001	0.002	-	-	-	-	-
Bicarbonate, mg/l (HCO_3)	447	439	271	-	-	-	-	-
Barium, Total, mg/l (Ba)	0.110	0.340	0.130	-	-	-	-	-
Baron, Total, mg/l (B)	1.10	0.880	0.100	-	-	-	-	-
Cadmium, Total, mg/l (Cd)	0.020	0.001	<0.100	-	-	-	-	-
Calcium, mg/l (Ca)	360	388	60.0	-	-	-	-	-
Carbonate, mg/l (CO_3)	0.010	0.010	0.010	-	-	-	-	-
Chloride, mg/l (Cl)	89.0	160	12.0	114	114	142	21.5	25.4
Chromium, Total, mg/l (Cr)	0.041	0.080	<1.00	-	-	-	-	-

TABLE 7-4
FRENCH DRAIN WATER QUALITY

Water - Quality Data Report for Station: CV1W (French Drain) Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	11/29/77	03/08/78	04/21/79	12/18/79	01/22/80	02/29/80	12/11/81	04/22/82
Copper, Total, mg/l (Cu)	0.036	0.017	0.011	-	-	-	-	-
Fluoride, mg/l (F)	0.760	0.380	0.190	-	-	-	-	-
Phosphate, mg/l ($PO_{4)}$	0.120	-	-	-	-	-	-	-
Iron, Total, mg/l (Fe)	0.799	0.425	0.714	0.850	0.060	0.050	0.090	0.080
Lead, Total, mg/l (Pb)	0.038	0.115	0.001	-	-	-	-	-
Magnesium, mg/l (Mg)	480	511	24.5	-	-	-	-	-
Manganese, Total, mg/l (Mn)	0.205	0.089	0.241	0.125	0.020	0.010	0.025	0.020
Mercury, Total, mg/l (Hg)	<0.000	<0.000	<0.000	-	-	-	-	-
Nickel, Total, mg/l (Ni)	0.001	0.004	<0.001	-	-	-	-	-
Nitrate as N, mg/l (NO_3)	9.10	2.80	0.140	1.20	9.80	6.30	3.77	3.47
Nitrate as N, mg/l (NO_2)	0.010	0.010	-	-	-	-	-	-
-Potassium, mg/l (K)	18.9	54.2	1.72	-	-	-	-	-
Selenium, Total, mg/l (Se)	0.001	0.001	<0.001	-	-	-	-	-
Silica, mg/l (SiO_2)	7.80	7.00	10.5	-	-	-	-	-
Silver, Total, mg/l (Ag)	0.033	0.039	<0.001	-	-	-	-	-
Sulfate, mg/l (SO_4)	9200	12400	41.0	7500	7600	5200	5700	7200

TABLE 7-4
FRENCH DRAIN WATER QUALITY

Water - Quality Data Report for Station: CV1W (French Drain) Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	11/29/77	03/08/78	04/21/79	12/18/79	01/22/80	02/29/80	12/11/81	04/22/82
Sodium, mg/l (Na)	3320LA	4790LA	19.8	-	-	-	-	-
Zinc, Total, mg/l (Zn)	0.107	0.067	0.047	-	-	-	-	-
TSS, mg/l	-	-	-	22.0	18.0	17.0	58.0	22.0

" - " missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-4
FRENCH DRAIN WATER QUALITY

Water - Quality Data Report for Station: CV1W (French Drain) Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	08/25/82	09/23/82	10/13/82					
Turbidity, N.T.U.	-	-	-					
Lab Conductivity @25C, micromhos/cm	12700	13000	13100					
Lab pH, std. Units	7.60	7.57	7.87					
TDS @ 180C, mg/l (lab.)	12100LA	12200LA	12500LA					
Total Alkalinity, mg/l ($CaCO_3$)	-	-	-					
Total Hardness, mg/l ($CaCO_3$)	-	-	-					
Arsenic, Total, mg/l (As)	-	-	-					
Bicarbonate, mg/l (HCO_3)	-	-	-					
Barium, Total, mg/l (Ba)	-	-	-					
Baron, Total, mg/l (B)	-	-	-					
Cadmium, Total, mg/l (Cd)	-	-	-					
Calcium, mg/l (Ca)	-	-	-					
Carbonate, mg/l (CO_3)	-	-	-					
Chloride, mg/l (Cl)	132	132	153					
Chromium, Total, mg/l (Cr)	-	-	-					

TABLE 7-4
FRENCH DRAIN WATER QUALITY

Water - Quality Data Report for Station: CV1W (French Drain) Property: Savage Coal Terminal

Latitude: Section: # County: Carbon
Longitude: Township: TN State: Utah
Elevation: Range: RW Country: U.S.A.

Parameter Title	08/25/82	09/23/82	10/13/82					
Copper, Total, mg/l (Cu)	-	-	-					
Fluoride, mg/l (F)	-	-	-					
Phosphate, mg/l ($PO_{4)}$	-	-	-					
Iron, Total, mg/l (Fe)	0.330	45.0	3.80					
Lead, Total, mg/l (Pb)	-	-	-					
Magnesium, mg/l (Mg)	-	-	-					
Manganese, Total, mg/l (Mn)	<0.030	0.030	<0.030					
Mercury, Total, mg/l (Hg)	-	-	-					
Nickel, Total, mg/l (Ni)	-	-	-					
Nitrate as N, mg/l (NO_3)	4.78	5.03	4.85					
Nitrate as N, mg/l (NO_2)	-	-	-					
-Potassium, mg/l (K)	-	-	-					
Selenium, Total, mg/l (Se)	-	-	-					
Silica, mg/l (SiO_2)	-	-	-					
Silver, Total, mg/l (Ag)	-	-	-					
Sulfate, mg/l (SO_4)	8810	8850	9010					

TABLE 7-4
FRENCH DRAIN WATER QUALITY

Water - Quality Data Report for Station: CV1W (French Drain) Property: Savage Coal Terminal

Latitude: Section: # County: Carbon
Longitude: Township: TN State: Utah
Elevation: Range: RW Country: U.S.A.

Parameter Title	08/25/82	09/23/82	10/13/82					
Sodium, mg/l (Na)	-	-	-					
Zinc, Total, mg/l (Zn)	-	-	-					
TSS, mg/l	38.0	28.0	38.0					

" - " missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-4a
FRENCH DRAIN WATER QUALITY SUMMARY

Water - Quality Data Report for Station: CV1W (French Drain) Property: Savage Coal Terminal

Latitude: Section: # County: Carbon
Longitude: Township: TN State: Utah
Elevation: Range: RW Country: U.S.A.

Quality Standards – # of Times Exceeded/Value

Parameter Title	Domestic	Aquatic (3C)	Agricultural (4)	Min.	Max.	Mean	Std. Dev.
Turbidity, N.T.U.	-	-	-	19.0	73.0	41.3	28.2
Lab Conductivity @25C, micromhos/cm	-	-	-	5200	28500	14500	6790
Lab pH, std. Units	-	8.50	9.00	7.57	8.40	7.90	0.264
TDS @ 180C, mg/l (lab.)	-	10 500	10 2000	340	18500LA	9790	5260
Total Alkalinity, mg/l ($CaCO_3$)	-	-	-	222	366	316	81.5
Total Hardness, mg/l ($CaCO_3$)	-	-	-	252	3100	2080	1590
Arsenic, Total, mg/l (As)	-	-	-	0.001	0.002	0.001	0.001
Bicarbonate, mg/l (HCO_3)	-	-	-	271	447	386	99.4
Barium, Total, mg/l (Ba)	-	-	-	0.110	0.340	0.193	0.127
Baron, Total, mg/l (B)	-	-	-	0.100	1.10	0.693	0.525
Cadmium, Total, mg/l (Cd)	-	-	-	0.001	0.100	0.040	0.053
Calcium, mg/l (Ca)	-	-	-	60.0	388	269	182
Carbonate, mg/l (CO_3)	-	-	-	0.010	0.010	0.010	0

TABLE 7-4a
FRENCH DRAIN WATER QUALITY SUMMARY

Water - Quality Data Report for Station: CV1W (French Drain) Property: Savage Coal Terminal

Latitude: Section: # County: Carbon
Longitude: Township: TN State: Utah
Elevation: Range: RW Country: U.S.A.

	Quality Standards – # of Times Exceeded/Value						
Parameter Title	Domestic	Aquatic (3C)	Agricultural (4)	Min.	Max.	Mean	Std. Dev.
Chloride, mg/l (Cl)	-	-	-	12.0	160	100	54.9
Chromium, Total, mg/l (Cr)	-	-	-	0.041	1.00	0.374	0.543
Copper, Total, mg/l (Cu)	-	-	-	0.011	0.036	0.021	0.013
Fluoride, mg/l (F)	-	-	-	0.190	0.760	0.443	0.290
Phosphate, mg/l ($PO_{4)}$	-	-	-	0.120	0.120	0.120	-
Iron, Total, mg/l (Fe)	-	-	-	0.050	45.0	4.75	13.4
Lead, Total, mg/l (Pb)	-	-	5.00	0.001	0.115	0.051	0.058
Magnesium, mg/l (Mg)	-	-	-	24.5	511	340	272
Manganese, Total, mg/l (Mn)	-	-	-	0.010	0.241	0.075	0.081
Mercury, Total, mg/l (Hg)	-	-	0.200	0.000	0.000	0.000	0.000
Nickel, Total, mg/l (Ni)	-	-	-	0.001	0.004	0.002	0.002
Nitrate as N, mg/l (NO_3)	-	-	-	0.140	9.80	4.66	2.95
Nitrate as N, mg/l (NO_2)	-	-	-	0.010	0.010	0.010	0
-Potassium, mg/l (K)	-	-	-	1.72	54.2	24.9	26.8

TABLE 7-4a
FRENCH DRAIN WATER QUALITY SUMMARY

Water - Quality Data Report for Station: CV1W (French Drain) Property: Savage Coal Terminal

Latitude: Section: # County: Carbon
Longitude: Township: TN State: Utah
Elevation: Range: RW Country: U.S.A.

Quality Standards – # of Times Exceeded/Value

Parameter Title	Domestic	Aquatic (3C)	Agricultural (4)	Min.	Max.	Mean	Std. Dev.
Selenium, Total, mg/l (Se)	-	-	-	0.001	0.001	0.001	0
Silica, mg/l (SiO_2)	-	-	-	7.00	10.5	8.43	1.83
Silver, Total, mg/l (Ag)	-	-	-	0.001	0.039	0.024	0.020
Sulfate, mg/l (SO_4)	-	-	-	41.0	12400	7410	3110
Sodium, mg/l (Na)	-	2 3000	2 200	19.8	4790LA	2710	2440
Zinc, Total, mg/l (Zn)	-	-	-	0.047	0.107	0.074	0.031
TSS, mg/l	-	-	-	17.0	58.0	30.1	13.9

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-5
WELL CV2W QUALITY

Water - Quality Data Report for Station: CV2W Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	02/29/80	03/14/80	06/24/80	07/21/80	08/26/80			
Lab pH, std. Units	7.80	7.40	7.80	7.70	7.40			
Field Temperature, deg. C.	-	-	-	-	-			
Lab Conductivity @25C, micromhos/cm	3400	3200	7100	10800	7850			
TDS @ 180C, mg/l (lab.)	2240A	2100A	4620A	7000A	5500A			
TSS, mg/l	2540	866	980	404	238			
Iron, Total, mg/l (Fe)	2.55	1.09	3.61	3.20	0.330			
Manganese, Total, mg/l (Mn)	0.470A	0.260A	0.580A	0.120	0.320A			
Nitrate as N, mg/l (NO_3)	4.20	4.50	17.7	19.0	90.0			
Sulfate, mg/l (SO_4)	3200A	5300A	3100A	2550A	1550A			
Chloride, mg/l (Cl)	8.00	6.40	124A	132A	128A			

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-5a
WELL CV2W QUALITY SUMMARY

Water - Quality Data Report for Station: CV2W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Quality Standards – # of Times Exceeded/Value

Parameter Title	Domestic	Aquatic (3C)	Agriculture (4)	Min.	Max.	Mean	Std. Dev.
Lab pH, std. Units	-	9.00	9.00	7.40	7.80	7.62	0.205
Field Temperature, deg. C.	-	27.0	-	-	-	-	-
Lab Conductivity @25C, micromhos/cm	-	-	-	3200	10800	6470	3210
TDS @ 180C, mg/l (lab.)	-	-	5 2000	2100A	7000A	4290	2120
TSS, mg/l	-	-	-	238	2540	1010	914
Iron, Total, mg/l (Fe)	-	-	5.00	0.330	3.61	2.16	1.40
Manganese, Total, mg/l (Mn)	-	-	4 0.200	0.120	0.580A	0.350	0.180
Nitrate as N, mg/l (NO_3)	-	-	-	4.20	90.0	27.1	35.9
Sulfate, mg/l (SO_4)	-	-	5 200	2550A	5300A	3340	1140
Chloride, mg/l (Cl)	-	-	3 100	6.40	132A	79.7	66.2

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-6
WELL CV3W QUALITY

Water - Quality Data Report for Station: CV3W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	12/13/79	01/22/80	02/29/80	03/14/80	04/16/80	05/01/80	06/26/80	07/21/80
Lab pH, std. Units	8.10	-	-	7.60	7.00	7.40	7.70	7.60
Field Temperature, deg. C.	-	-	-	-	-	-	-	-
Lab Conductivity @25C, micromhos/cm	7900	5500	2400	2900	4850	5600	5200	4900
TDS @ 180C, mg/l (lab.)	5100A	-	-	1890	3150A	3640A	3400A	3200A
TSS, mg/l	112	50.0	280	87.3	25.0	25.0	29.0	92.0
Iron, Total, mg/l (Fe)	0.169	0.030	1.52	0.330	0.036	0.036	1.85	0.520
Manganese, Total, mg/l (Mn)	0.019	0.060	0.300A	0.150	0.045	0.020	0.420A	0.320
Nitrate as N, mg/l (NO_3)	0.120	0.440	0.320	0.580	0.250	0.220	0.100	0.170
Sulfate, mg/l (SO_4)	4200A	3000A	3300A	4000A	2300A	2850A	3000A	2730A
Chloride, mg/l (Cl)	118A	70.0	68.0	72.0	66.0	68.0	58.0	54.0

" - " missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-6
WELL CV3W QUALITY

Water - Quality Data Report for Station: CV3W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	08/26/80	09/24/80	04/08/81	07/21/81	08/18/81	09/14/81	10/27/81	11/22/81
Lab pH, std. Units	7.20	7.40	7.60	8.10	7.80	7.80	8.00	7.70
Field Temperature, deg. C.	-	-	-	-	-	-	-	14.0
Lab Conductivity @25C, micromhos/cm	3800	5800	4400	770	4700	4700	4760	4700
TDS @ 180C, mg/l (lab.)	2650A	3720A	2860A	3100A	3100A	3050A	3100A	3100A
TSS, mg/l	58.0	76.0	69.0	101	38.0	61.0	88.0	65.0
Iron, Total, mg/l (Fe)	0.550	0.580	0.420	0.510	0.340	0.400	0.760	0.570
Manganese, Total, mg/l (Mn)	0.310A	0.064	0.500A	0.480A	0.170	0.165	0.140	0.260A
Nitrate as N, mg/l (NO_3)	0.200	2.00	0.090	0.090	<0.010	3.35	0.180	0.130
Sulfate, mg/l (SO_4)	2820A	3300A	2690A	2600A	3000A	2040A	2400A	2520A
Chloride, mg/l (Cl)	56.0	43.5	66.0	31.2	50.0	50.0	18.7	21.0

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-6
WELL CV3W QUALITY

Water - Quality Data Report for Station: CV3W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	12/11/81	01/19/82	02/22/82	03/22/82	04/22/82	06/22/82	07/20/82	08/25/82
Lab pH, std. Units	7.80	7.40	7.60	7.50	7.40	7.80	7.40	7.25
Field Temperature, deg. C.	9.00	6.00	8.00	9.00	11.0	17.0	24.0	23.0
Lab Conductivity @25C, micromhos/cm	4000	3400	5950	6400	4700	370	2800	4050
TDS @ 180C, mg/l (lab.)	2730A	2210A	3880A	4120A	3100A	245	4010A	3780A
TSS, mg/l	60.0	83.0	189	232	534	44.0	36.0	30.0
Iron, Total, mg/l (Fe)	0.300	1.05	2.62	3.09	7.03A	0.090	0.295	0.600
Manganese, Total, mg/l (Mn)	0.166	0.289A	0.765A	0.740A	0.730A	0.165	0.200	0.180
Nitrate as N, mg/l (NO_3)	0.030	0.090	0.070	<0.010	0.060	<0.010	0.090	1.18
Sulfate, mg/l (SO_4)	2610A	420A	105	1560A	450A	2190A	330A	2620A
Chloride, mg/l (Cl)	22.1	23.5	18.2	21.4	42.1	12.1	21.6	32.0

" - " missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-6
WELL CV3W QUALITY

Water - Quality Data Report for Station: CV3W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	09/23/82	10/13/82	11/21/82	12/29/82				
Lab pH, std. Units	7.06	7.02	7.36	7.74				
Field Temperature, deg. C.	16.0	13.0	-	7.00				
Lab Conductivity @25C, micromhos/cm	4330	4220	4180	4220				
TDS @ 180C, mg/l (lab.)	4280A	4090A	4150A	4260A				
TSS, mg/l	18.0	70.0	36.0	12.0				
Iron, Total, mg/l (Fe)	0.530	3.81	0.590	1.04				
Manganese, Total, mg/l (Mn)	0.140	<0.030	0.260A	0.240A				
Nitrate as N, mg/l (NO_3)	1.17	1.28	0.150	0.120				
Sulfate, mg/l (SO_4)	1390A	2900A	2820A	2580A				
Chloride, mg/l (Cl)	35.0	37.0	41.0	42.0				

" - " missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-6a
WELL CV3W QUALITY SUMMARY

Water - Quality Data Report for Station: CV3W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Quality Standards – # of Times Exceeded/Value

Parameter Title	Domestic	Aquatic (3C)	Agriculture (4)	Min.	Max.	Mean	Std. Dev.
Lab pH, std. Units	-	9.00	9.00	7.00	8.10	7.55	0.306
Field Temperature, deg. C.	-	27.0	-	6.00	25.0	13.1	5.98
Lab Conductivity @25C, micromhos/cm	-	-	-	370	7900	4340	1550
TDS @ 180C, mg/l (lab.)	-	-	24 2000	245	5100A	3300	944
TSS, mg/l	-	-	-	12.0	534	92.9	107
Iron, Total, mg/l (Fe)	-	-	1 5.00	0.030	7.03A	1.06	1.50
Manganese, Total, mg/l (Mn)	-	-	13 0.200	0.019	0.765A	0.262	0.213
Nitrate as N, mg/l (NO_3)	-	-	-	0.010	3.35	0.447	0.745
Sulfate, mg/l (SO_4)	-	-	27 200	105	4200A	2380	1030
Chloride, mg/l (Cl)	-	-	1 100	12.1	118A	44.9	23.4

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-7
WELL CV4W QUALITY

Water - Quality Data Report for Station: CV4W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	08/26/80	09/24/80	04/08/81	07/21/81	08/18/81	09/14/81	10/27/81	11/22/81
Lab pH, std. Units	7.50	7.60	7.60	8.20	7.60	8.30	8.00	7.30
Field Temperature, deg. C.	-	-	-	-	-	-	-	12.0
Lab Conductivity @25C, micromhos/cm	7800	2800	18000	14000	-	3500	4700	6700
TDS @ 180C, mg/l (lab.)	5450A	1790	11700A	9100A	5000A	2300A	3050A	4400A
TSS, mg/l	-	89.0	97.0	113	38.0	139	162	107
Iron, Total, mg/l (Fe)	0.320	0.350	0.110	0.120	1.190	0.210	2.70	2.11
Manganese, Total, mg/l (Mn)	0.155	0.520A	0.090	0.076	0.070	0.800A	0.150	0.360A
Nitrate as N, mg/l (NO_3)	0.720	0.380	6.10	1.19	0.380	1.38	0.880	0.080
Sulfate, mg/l (SO_4)	4050A	1530A	12600A	13800A	2550A	1230A	1980A	2100A
Chloride, mg/l (Cl)	38.0	11.1	330A	250A	250A	70.0	48.1	49.3

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-7
WELL CV4W QUALITY

Water - Quality Data Report for Station: CV4W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	12/11/81	01/19/82	02/22/82	03/22/82	04/22/82	05/29/82	06/22/82	07/20/82
Lab pH, std. Units	7.40	7.20	7.70	7.60	7.50	7.30	7.40	7.40
Field Temperature, deg. C.	11.0	9.00	10.0	10.0	12.0	10.0	12.0	19.0
Lab Conductivity @25C, micromhos/cm	9900	8400	16600	0	29000	18500	16000	16000
TDS @ 180C, mg/l (lab.)	6950A	5500A	10800A	15600A	19100A	12100A	10500A	19900A
TSS, mg/l	123	287	433	124	231	430	100	361
Iron, Total, mg/l (Fe)	1.80	3.90	3.74	1.55	1.57	3.63	0.230	3.55
Manganese, Total, mg/l (Mn)	0.145	0.310A	0.550A	0.300A	0.180	0.225A	0.190	0.218A
Nitrate as N, mg/l (NO_3)	0.150	0.170	0.120	0.560	0.600	2.33	1.11	1.06
Sulfate, mg/l (SO_4)	3000A	237A	3.00	4500A	630A	5700A	3600A	300A
Chloride, mg/l (Cl)	46.6	36.9	38.8	38.1	26.2	47.6	32.7	35.0

" - " missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-7
WELL CV4W QUALITY

Water - Quality Data Report for Station: CV4W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	08/25/82	09/23/82	10/13/82	11/21/82	12/29/82			
Lab pH, std. Units	7.26	7.06	6.85	7.43	7.68			
Field Temperature, deg. C.	14.0	17.0	13.0	-	9.00			
Lab Conductivity @25C, micromhos/cm	17800	18200	18200	18700	19100			
TDS @ 180C, mg/l (lab.)	18800A	19000A	19600A	19700A	19800A			
TSS, mg/l	256	64.0	126	82.0	50.0			
Iron, Total, mg/l (Fe)	5.97A	1.06	1.88	1.05	1.78			
Manganese, Total, mg/l (Mn)	0.510A	0.480A	0.440A	0.410A	0.030			
Nitrate as N, mg/l (NO_3)	1.17	0.820	2.01	0.710	1.16			
Sulfate, mg/l (SO_4)	13000A	13700A	13000A	13700A	11200A			
Chloride, mg/l (Cl)	220A	180A	202A	184A	234A			

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-7a
WELL CV4W QUALITY SUMMARY

Water - Quality Data Report for Station: CV4W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Quality Standards – # of Times Exceeded/Value

Parameter Title	Domestic	Aquatic (3C)	Agriculture (4)	Min.	Max.	Mean	Std. Dev.
Lab pH, std. Units	-	9.00	9.00	6.85	8.30	7.52	0.344
Field Temperature, deg. C.	-	27.0	-	9.00	19.0	12.2	3.02
Lab Conductivity @25C, micromhos/cm	-	-	-	2800	29000	13900	6810
TDS @ 180C, mg/l (lab.)	-	-	20 2000	1790	19900A	11400	6710
TSS, mg/l	-	-	-	38.0	433	171	121
Iron, Total, mg/l (Fe)	-	-	1 5.00	0.110	5.97A	1.80	1.61
Manganese, Total, mg/l (Mn)	-	-	12 0.200	0.030	0.800A	0.296	0.200
Nitrate as N, mg/l (NO_3)	-	-	-	0.080	6.10	1.10	1.29
Sulfate, mg/l (SO_4)	-	-	20 200	3.00	13800A	5830	5410
Chloride, mg/l (Cl)	-	-	8 100	11.1	330A	113	100

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-8
WELL CV5W QUALITY

Water - Quality Data Report for Station: CV5W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	08/26/80	09/24/80	01/04/81	02/03/81	03/04/81	04/08/81	07/21/81	08/18/81
Lab pH, std. Units	7.40	7.60	7.40	7.60	7.60	7.60	7.63	8.00
Field Temperature, deg. C.	-	-	-	-	-	-	-	-
Lab Conductivity @25C, micromhos/cm	7800	9400	28500	17200	16000	18000	17000	15000
TDS @ 180C, mg/l (lab.)	4900A	6020A	20000A	11200A	8540A	11700A	11000A	9750A
TSS, mg/l	4680	401	254	2150	1940	1340	537	107
Iron, Total, mg/l (Fe)	0.620	0.620	0.230	8.80A	2.10	0.460	0.380	0.090
Manganese, Total, mg/l (Mn)	0.200	0.430	0.700A	0.650A	1.10A	1.10A	0.990A	0.040
Nitrate as N, mg/l (NO_3)	0.120	0.080	<0.010	0.130	0.070	0.130	0.070	<0.010
Sulfate, mg/l (SO_4)	3400A	5700A	26600A	9900A	12000A	10800A	06400A	11100A
Chloride, mg/l (Cl)	116A	180A	570A	202A	180A	200A	238A	240A

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-8
WELL CV5W QUALITY

Water - Quality Data Report for Station: CV5W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	09/14/81	10/27/81	11/22/81	12/11/81	01/19/82	02/22/82	03/22/82	04/22/82
Lab pH, std. Units	8.00	8.30	8.10	7.80	7.70	7.90	7.60	7.80
Field Temperature, deg. C.	-	-	12.0	12.0	10.0	11.0	12.0	13.0
Lab Conductivity @25C, micromhos/cm	16600	24600	18000	15400	15300	29000	24000	32000
TDS @ 180C, mg/l (lab.)	10800A	16000A	17000A	10800A	9990A	19600A	15700A	21100A
TSS, mg/l	231	417	573	1260	1810	658	6770	15800
Iron, Total, mg/l (Fe)	0.095	1.75	3.25	5.15A	5.40A	2.49	24.0A	0.120
Manganese, Total, mg/l (Mn)	0.025	0.500A	0.620A	0.620A	0.490A	1.25A	1.50A	2.10A
Nitrate as N, mg/l (NO_3)	0.290	0.100	0.480	0.140	0.110	0.130	3.69	0.120
Sulfate, mg/l (SO_4)	6600A	228A	8100A	129	0.174	3.00	4800A	570A
Chloride, mg/l (Cl)	240A	17.7	18.2	20.0	24.1	21.9	17.4	39.0

" - " missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-8
WELL CV5W QUALITY

Water - Quality Data Report for Station: CV5W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	05/29/82	06/22/82	07/20/82	08/25/82	09/23/82	10/13/82	11/21/82	12/29/82
Lab pH, std. Units	7.60	7.80	7.80	7.94	7.71	7.50	7.85	7.90
Field Temperature, deg. C.	13.0	13.0	19.0	15.0	16.0	12.0	-	11.0
Lab Conductivity @25C, micromhos/cm	32000	19500	13200	15000	15500	14800	15400	16500
TDS @ 180C, mg/l (lab.)	20800A	12900A	1890	15700A	16400A	15900A	16500A	16800A
TSS, mg/l	1380	375	1190	112	256	208	742	64.0
Iron, Total, mg/l (Fe)	17.8A	0.380	0.395	3.60	1.67	16.0A	0.780	2.12
Manganese, Total, mg/l (Mn)	3.70A	0.200	0.220A	0.900A	0.230A	1.50A	0.170	0.540A
Nitrate as N, mg/l (NO_3)	0.120	<0.010	0.080	0.320	0.540	0.610	0.550	0.810
Sulfate, mg/l (SO_4)	6900A	3300A	450A	11200A	11400A	1130A	3200A	9570A
Chloride, mg/l (Cl)	13.4	38.7	22.6	152A	144A	153A	159A	178A

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-8a
WELL CV5W QUALITY SUMMARY

Water - Quality Data Report for Station: CV5W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Quality Standards – # of Times Exceeded/Value

Parameter Title	Domestic	Aquatic (3C)	Agriculture (4)	Min.	Max.	Mean	Std. Dev.
Lab pH, std. Units	-	9.00	9.00	7.40	8.30	7.76	0.220
Field Temperature, deg. C.	-	27.0	-	10.0	19.0	13.0	2.42
Lab Conductivity @25C, micromhos/cm	-	-	-	7000	32000	18500	6530
TDS @ 180C, mg/l (lab.)	-	-	23 2000	1890	21100A	13400	5090
TSS, mg/l	-	-	-	64.0	15800	1800	3370
Iron, Total, mg/l (Fe)	-	-	6 5.00	0.090	24.0A	4.10	6.34
Manganese, Total, mg/l (Mn)	-	-	19 0.200	0.025	3.70A	0.824	0.806
Nitrate as N, mg/l (NO_3)	-	-	-	0.010	3.69	0.363	0.741
Sulfate, mg/l (SO_4)	-	-	21 200	0.174	26600A	6810	6380
Chloride, mg/l (Cl)	-	-	14 100	13.4	570A	133	126

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-9
WELL CV6W QUALITY

Water - Quality Data Report for Station: CV6W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	08/26/80	09/24/80	01/04/81	02/03/81	03/04/81	04/08/81	07/21/81	08/18/81
Lab pH, std. Units	7.80	7.40	7.10	7.80	7.60	7.60	8.30	7.80
Field Temperature, deg. C.	-	-	-	-	-	-	-	-
Lab Conductivity @25C, micromhos/cm	14000	2200	2000	2850	2800	2900	1700	1520
TDS @ 180C, mg/l (lab.)	9800A	1410	1470	1860	2340A	1890	1100	1000
TSS, mg/l	226	47.0	109	314	176	164	107	16.0
Iron, Total, mg/l (Fe)	0.530	0.540	-	3.00	1.62	1.50	1.63	0.050
Manganese, Total, mg/l (Mn)	0.185	1.31A	0.040	0.039	0.110	0.080	0.075	0.020
Nitrate as N, mg/l (NO_3)	9.60	0.620	1.22	1.29	1.29	1.40	0.960	0.340
Sulfate, mg/l (SO_4)	12200A	1950A	600A	630A	-	765A	450A	1010A
Chloride, mg/l (Cl)	234A	7.90	73.3	69.9	73.0	70.0	58.4	0.620

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-9
WELL CV6W QUALITY

Water - Quality Data Report for Station: CV6W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	09/14/81	10/27/81	11/22/81	12/11/81	01/19/82	02/22/82	03/22/82	04/22/82
Lab pH, std. Units	8.00	8.20	7.70	7.80	8.00	8.10	7.70	7.80
Field Temperature, deg. C.	-	-	14.0	10.0	6.00	7.00	8.00	10.0
Lab Conductivity @25C, micromhos/cm	1670	1380	1400	1600	1270	2400	1850	1800
TDS @ 180C, mg/l (lab.)	1100	900	950	1100	825	1550	1200	1200
TSS, mg/l	63.0	93.0	35.0	199	51.0	130	40.0	139
Iron, Total, mg/l (Fe)	0.065	0.620	0.350	0.340	0.360	0.860	0.460	0.460
Manganese, Total, mg/l (Mn)	0.018	0.040	0.030	0.053	0.035	0.030	0.020	0.040
Nitrate as N, mg/l (NO_3)	1.38	0.650	0.480	0.870	1.09	1.43	0.480	1.52
Sulfate, mg/l (SO_4)	720A	360A	1020A	510A	210A	300A	420A	330A
Chloride, mg/l (Cl)	75.0	34.2	34.0	40.8	35.2	36.6	39.0	41.9

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-9
WELL CV6W QUALITY

Water - Quality Data Report for Station: CV6W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	05/29/82	06/22/82	07/20/82	08/25/82	09/23/82	10/13/82	11/21/82	12/29/82
Lab pH, std. Units	8.00	8.00	7.90	8.31	7.85	7.56	8.10	8.09
Field Temperature, deg. C.	19.0	18.0	24.0	20.0	17.0	12.0	-	4.00
Lab Conductivity @25C, micromhos/cm	800	560	590	790	790	620	1100	1250
TDS @ 180C, mg/l (lab.)	526	365	488	380	425	440	585	845
TSS, mg/l	122	52.0	66.0	38.0	92.0	36.0	48.0	8.00
Iron, Total, mg/l (Fe)	2.21	0.110	0.140	1.38	1.35	3.68	-	1.02
Manganese, Total, mg/l (Mn)	0.450A	0.020	0.023	0.030	0.030	<0.030	0.030	0.030
Nitrate as N, mg/l (NO_3)	0.110	<0.010	0.320	0.630	0.940	2.31	1.39	1.78
Sulfate, mg/l (SO_4)	420A	3900A	570A	187	156	158	270A	449A
Chloride, mg/l (Cl)	18.1	7.50	14.5	14.0	15.0	15.0	22.0	25.0

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-9a
WELL CV6W QUALITY SUMMARY

Water - Quality Data Report for Station: CV6W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Quality Standards – # of Times Exceeded/Value

Parameter Title	Domestic	Aquatic (3C)	Agriculture (4)	Min.	Max.	Mean	Std. Dev.
Lab pH, std. Units	-	9.00	9.00	7.10	8.31	7.85	0.283
Field Temperature, deg. C.	-	27.0	-	4.00	24.0	13.0	6.18
Lab Conductivity @25C, micromhos/cm	-	-	-	560	14000	2080	2640
TDS @ 180C, mg/l (lab.)	-	-	2 2000	365	9800A	1410	1860
TSS, mg/l	-	-	-	8.00	314	98.8	74.7
Iron, Total, mg/l (Fe)	-	-	5.00	0.050	3.68	1.01	0.968
Manganese, Total, mg/l (Mn)	-	-	2 0.200	0.018	1.31A	0.115	0.270
Nitrate as N, mg/l (NO_3)	-	-	-	0.010	9.60	1.34	1.85
Sulfate, mg/l (SO_4)	-	-	20 200	156	12200A	1200	2520
Chloride, mg/l (Cl)	-	-	1 100	0.620	234A	44.0	46.7

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-10
WELL CV7W QUALITY

Water - Quality Data Report for Station: CV7W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	08/26/80							
Lab pH, std. Units	7.60							
Field Temperature, deg. C.	-							
Lab Conductivity @25C, micromhos/cm	8570							
TDS @ 180C, mg/l (lab.)	6000A							
TSS, mg/l	1260							
Iron, Total, mg/l (Fe)	0.480							
Manganese, Total, mg/l (Mn)	0.265A							
Nitrate as N, mg/l (NO_3)	0.010							
Sulfate, mg/l (SO_4)	3450A							
Chloride, mg/l (Cl)	64.0							

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-10a
WELL CV7W QUALITY SUMMARY

Water - Quality Data Report for Station: CV7W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Quality Standards – # of Times Exceeded/Value

Parameter Title	Domestic	Aquatic (3C)	Agriculture (4)	Min.	Max.	Mean	Std. Dev.
Lab pH, std. Units	-	9.00	9.00	7.60	7.60	7.60	-
Field Temperature, deg. C.	-	27.0	-	-	-	-	-
Lab Conductivity @25C, micromhos/cm	-	-	-	8570	8570	8570	-
TDS @ 180C, mg/l (lab.)	-	-	1 2000	6000A	6000A	6000	-
TSS, mg/l	-	-	-	1260	1260	1260	-
Iron, Total, mg/l (Fe)	-	-	5.00	0.480	0.480	0.480	-
Manganese, Total, mg/l (Mn)	-	-	1 0.200	0.265A	0.265A	0.265	-
Nitrate as N, mg/l (NO_3)	-	-	-	0.010	0.010	0.010	-
Sulfate, mg/l (SO_4)	-	-	1 200	3450A	3450A	3450	-
Chloride, mg/l (Cl)	-	-	100	64.0	64.0	64.0	-

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-11
WELL CV8W QUALITY

Water - Quality Data Report for Station: CV8W — Property: Savage Coal Terminal

Latitude: — Section: # — County: Carbon
Longitude: — Township: TN — State: Utah
Elevation: — Range: RW — Country: U.S.A.

Parameter Title	01/04/81	02/03/81	03/04/81	04/08/81	11/22/81	12/11/81	01/19/82	02/22/82
Lab pH, std. Units	7.00	7.60	7.40	7.80	7.80	7.60	7.50	7.60
Field Temperature, deg. C.	-	-	-	-	14.0	12.0	10.0	14.0
Lab Conductivity @25C, micromhos/cm	14000	14500	16000	17000	16800	14800	12200	23000A
TDS @ 180C, mg/l (lab.)	9800A	9450A	8550A	11100A	06000A	11100A	8000A	15100A
TSS, mg/l	2200	2640	2820	1200	249	1260	110	5170
Iron, Total, mg/l (Fe)	0.090	18.5A	9.30A	6.30A	1.40	5.00	9.25A	0.250
Manganese, Total, mg/l (Mn)	0.770A	0.766A	0.680A	0.430A	0.220A	1.19A	0.225A	1.25A
Nitrate as N, mg/l (NO_3)	1.10	1.83	1.86	2.00	2.62	4.04	3.63	3.89
Sulfate, mg/l (SO_4)	9000A	6600A	9450A	10200A	8700A	9300A	156	6.00
Chloride, mg/l (Cl)	122A	134A	136A	150A	21.4	22.6	40.2	42.2

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-11
WELL CV8W QUALITY

Water - Quality Data Report for Station: CV8W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	03/22/82							
Lab pH, std. Units	7.60							
Field Temperature, deg. C.	14.0							
Lab Conductivity @25C, micromhos/cm	24000							
TDS @ 180C, mg/l (lab.)	15700A							
TSS, mg/l	6770							
Iron, Total, mg/l (Fe)	24.0A							
Manganese, Total, mg/l (Mn)	1.50A							
Nitrate as N, mg/l (NO_3)	3.69							
Sulfate, mg/l (SO_4)	4800A							
Chloride, mg/l (Cl)	27.7							

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-11a
WELL CV8W QUALITY SUMMARY

Water - Quality Data Report for Station: CV8W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Quality Standards – # of Times Exceeded/Value

Parameter Title	Domestic	Aquatic (3C)	Agriculture (4)	Min.	Max.	Mean	Std. Dev.
Lab pH, std. Units	-	9.00	9.00	7.00	7.80	7.54	0.240
Field Temperature, deg. C.	-	27.0	-	10.0	14.0	12.8	1.79
Lab Conductivity @25C, micromhos/cm	-	-	-	12200	24000	16900	4020
TDS @ 180C, mg/l (lab.)	-	-	9 2000	8000A	16000A	11600	3140
TSS, mg/l	-	-	-	110	6770	2490	2230
Iron, Total, mg/l (Fe)	-	-	5 5.00	0.090	24.0A	8.23	8.27
Manganese, Total, mg/l (Mn)	-	-	9 0.200	0.220A	1.50A	0.781	0.456
Nitrate as N, mg/l (NO_3)	-	-	-	1.10	4.04	2.74	1.09
Sulfate, mg/l (SO_4)	-	-	7 200	6.00	10200A	6470	3980
Chloride, mg/l (Cl)	-	-	4 100	21.4	150A	77.3	56.0

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-12
WELL CV10W QUALITY

Water - Quality Data Report for Station: CV10W — Property: Savage Coal Terminal

Latitude: — Section: # — County: Carbon
Longitude: — Township: TN — State: Utah
Elevation: — Range: RW — Country: U.S.A.

Parameter Title	08/26/80	04/08/81	06/22/82	07/20/82	08/25/82	09/23/82	10/13/82	11/21/82
Lab pH, std. Units	7.20	6.90	7.10	7.10	6.96	6.86	6.96	6.90
Field Temperature, deg. C.	-	-	14.0	17.0	17.0	17.0	16.0	-
Lab Conductivity @25C, micromhos/cm	2570	3600	3900	3610	5350	5700	4560	5500
TDS @ 180C, mg/l (lab.)	1800	2340A	2590A	4630A	5130A	5300A	4400A	4780A
TSS, mg/l	289	764	117	686	1040	236	78.0	829
Iron, Total, mg/l (Fe)	1.04	11.7A	0.640	0.650	46.0A	4.23	0.320	14.5A
Manganese, Total, mg/l (Mn)	0.250A	0.800	0.205A	0.195	0.900A	1.11A	0.830A	2.30A
Nitrate as N, mg/l (NO_3)	0.960	0.110	0.910	2.36	5.67	2.40	0.770	0.260
Sulfate, mg/l (SO_4)	915A	1860A	1770A	270A	3030A	1350A	2390A	2660A
Chloride, mg/l (Cl)	0.540	128A	70.1	129A	306A	291A	264A	295A

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-12
WELL CV10W QUALITY

Water - Quality Data Report for Station: CV10W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	12/29/82							
Lab pH, std. Units	7.38							
Field Temperature, deg. C.	7.00							
Lab Conductivity @25C, micromhos/cm	5420							
TDS @ 180C, mg/l (lab.)	4460A							
TSS, mg/l	203							
Iron, Total, mg/l (Fe)	7.72A							
Manganese, Total, mg/l (Mn)	1.88A							
Nitrate as N, mg/l (NO_3)	0.150							
Sulfate, mg/l (SO_4)	2410A							
Chloride, mg/l (Cl)	286A							

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-12a
WELL CV10W QUALITY SUMMARY

Water - Quality Data Report for Station: CV10W — Property: Savage Coal Terminal

Latitude: — Section: # — County: Carbon
Longitude: — Township: TN — State: Utah
Elevation: — Range: RW — Country: U.S.A.

Quality Standards – # of Times Exceeded/Value

Parameter Title	Domestic	Aquatic (3C)	Agriculture (4)	Min.	Max.	Mean	Std. Dev.
Lab pH, std. Units	-	9.00	9.00	6.86	7.38	7.04	0.171
Field Temperature, deg. C.	-	27.0	-	7.00	17.0	14.7	3.93
Lab Conductivity @25C, micromhos/cm	-	-	-	2570	5700	4470	1100
TDS @ 180C, mg/l (lab.)	-	-	8 2000	1800	5300A	3940	1320
TSS, mg/l	-	-	-	78.0	1040	471	358
Iron, Total, mg/l (Fe)	-	-	4 5.00	0.320	46.0A	9.64	14.6
Manganese, Total, mg/l (Mn)	-	-	8 0.200	0.195	2.30A	0.941	0.739
Nitrate as N, mg/l (NO_3)	-	-	-	0.110	5.67	1.51	1.78
Sulfate, mg/l (SO_4)	-	-	9 200	270A	3030A	1850	886
Chloride, mg/l (Cl)	-	-	7 100	0.540	306A	197	116

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-13
WELL CV11W QUALITY

Water - Quality Data Report for Station: CV11W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	08/26/80	09/24/80	01/04/81	02/03/81	03/04/81	07/21/81	08/18/81	09/14/81
Lab pH, std. Units	7.90	8.10	7.40	8.00	7.80	8.20	8.30	8.40
Field Temperature, deg. C.	-	-	-	-	-	-	-	-
Lab Conductivity @25C, micromhos/cm	2400	24000	28500	31200	28000	30000	30000	30700
TDS @ 180C, mg/l (lab.)	16800A	15400A	20000A	20300A	23500A	19500A	19600A	20000A
TSS, mg/l	63.0	228	254	616	627	192	93.0	135
Iron, Total, mg/l (Fe)	0.540	0.510	0.230	1.60	0.600	2.25	0.250	1.45
Manganese, Total, mg/l (Mn)	0.185	0.359A	0.700A	0.710A	0.710	1.13A	0.810A	0.851A
Nitrate as N, mg/l (NO_3)	0.050	<0.010	<0.010	<0.010	<0.010	0.020	<0.010	0.270
Sulfate, mg/l (SO_4)	28200A	16500A	26600A	26700A	27600A	33000A	24000A	-
Chloride, mg/l (Cl)	440A	540A	570A	479A	475A	502A	540A	520A

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-13
WELL CV11W QUALITY

Water - Quality Data Report for Station: CV11W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	10/27/81	11/22/81	12/11/81	01/19/82	02/22/82	03/22/82	04/22/82	05/29/82
Lab pH, std. Units	8.40	8.20	8.20	8.40	8.40	7.90	7.80	7.80
Field Temperature, deg. C.	-	13.0	9.00	8.00	7.00	7.00	10.0	16.0
Lab Conductivity @25C, micromhos/cm	61000	31500	28000	28600	30000	83000	79000	73000
TDS @ 180C, mg/l (lab.)	40000A	30000A	21800A	18600A	19000A	54100A	51600A	47500A
TSS, mg/l	106	143	212	2280	150	55.0	119	127
Iron, Total, mg/l (Fe)	0.620	0.800	0.420	0.480	0.560	0.520	0.350	0.400
Manganese, Total, mg/l (Mn)	0.760A	0.900A	0.720	0.860A	1.25A	1.10A	0.800A	0.655A
Nitrate as N, mg/l (NO_3)	0.020	0.310	0.350	<0.010	1.41	0.160	0.060	0.060
Sulfate, mg/l (SO_4)	129	9900A	30000A	<3.00	12.0	240A	66.0	3900A
Chloride, mg/l (Cl)	13.9	21.9	33.1	14.2	19.4	15.3	18.5	10.3

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-13
WELL CV11W QUALITY

Water - Quality Data Report for Station: CV11W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	06/22/82	07/20/82	08/25/82	09/23/82	10/13/82	11/21/82	12/29/82	
Lab pH, std. Units	7.90	7.90	7.82	7.66	7.49	7.92	7.92	
Field Temperature, deg. C.	18.0	25.0	20.0	20.0	15.0	-	5.00	
Lab Conductivity @25C, micromhos/cm	34000	32000	32000	34200	30800	32800	34000	
TDS @ 180C, mg/l (lab.)	22200A	46100A	40900A	46200A	40700A	42500A	41900A	
TSS, mg/l	37.0	160	102	104	92.0	152	86.0	
Iron, Total, mg/l (Fe)	0.220	0.270	0.900	0.860	1.95	0.930	0.920	
Manganese, Total, mg/l (Mn)	0.580A	0.620A	0.600A	0.590A	0.420A	0.740A	0.690A	
Nitrate as N, mg/l (NO_3)	<0.010	<0.010	0.440	0.260	10.9	0.260	1.20	
Sulfate, mg/l (SO_4)	4200A	240A	29100A	30900A	28600A	24500A	30700A	
Chloride, mg/l (Cl)	26.3	17.7	453A	460A	445A	460A	455A	

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-13a
WELL CV11W QUALITY SUMMARY

Water - Quality Data Report for Station: CV11W — Property: Savage Coal Terminal

Latitude:	Section: #	County: Carbon
Longitude:	Township: TN	State: Utah
Elevation:	Range: RW	Country: U.S.A.

Quality Standards – # of Times Exceeded/Value

Parameter Title	Domestic	Aquatic (3C)	Agriculture (4)	Min.	Max.	Mean	Std. Dev.
Lab pH, std. Units	-	9.00	9.00	7.40	8.40	7.99	0.286
Field Temperature, deg. C.	-	27.0	-	5.00	25.0	13.3	6.22
Lab Conductivity @25C, micromhos/cm	-	-	-	2400	83000	36900	18800
TDS @ 180C, mg/l (lab.)	-	-	23 2000	15400A	54100A	31200	13100
TSS, mg/l	-	-	-	37.0	2280	267	464
Iron, Total, mg/l (Fe)	-	-	5.00	0.220	2.25	0.767	0.553
Manganese, Total, mg/l (Mn)	-	-	22 0.200	0.185	1.25A	0.728	0.239
Nitrate as N, mg/l (NO_3)	-	-	-	0.010	10.9	0.690	2.26
Sulfate, mg/l (SO_4)	-	-	18 200	3.00	33000A	17000	13300
Chloride, mg/l (Cl)	-	-	13 100	10.3	570A	284	240

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-14
WELL CV12W QUALITY

Water - Quality Data Report for Station: CV12W — Property: Savage Coal Terminal

Latitude:
Longitude:
Elevation:

Section: #
Township: TN
Range: RW

County: Carbon
State: Utah
Country: U.S.A.

Parameter Title	08/26/80	09/24/80	07/21/81	08/18/81	09/14/81	10/27/81	11/22/81	12/11/81
Lab pH, std. Units	7.40	7.60	8.30	7.80	7.80	7.60	7.80	7.40
Field Temperature, deg. C.	-	-	-	-	-	-	13.0	13.0
Lab Conductivity @25C, micromhos/cm	6500	4200	4300	4300	4500	4500	5000	3700
TDS @ 180C, mg/l (lab.)	4550A	2690A	2900A	2800A	2950A	2950A	2300A	2830A
TSS, mg/l	208	4.00	271	42.0	81.0	53.0	57.0	86.0
Iron, Total, mg/l (Fe)	0.490	0.456	0.850	0.130	2.35	0.460	0.330	0.140
Manganese, Total, mg/l (Mn)	0.160	0.910A	1.19A	2.08A	1.23A	2.45A	2.20	2.85A
Nitrate as N, mg/l (NO_3)	<0.010	0.010	0.560	0.430	1.78	0.180	0.150	0.230
Sulfate, mg/l (SO_4)	1800A	2870A	2400A	2400A	2220A	2160A	201A	2700A
Chloride, mg/l (Cl)	38.0	27.0	66.8	90.0	40.0	42.7	42.3	35.9

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-14
WELL CV12W QUALITY

Water - Quality Data Report for Station: CV12W — Property: Savage Coal Terminal

Latitude: — Section: # — County: Carbon
Longitude: — Township: TN — State: Utah
Elevation: — Range: RW — Country: U.S.A.

Parameter Title	01/19/82	02/22/82	03/22/82	04/22/82	06/22/82	07/20/82	08/25/82	09/23/82
Lab pH, std. Units	7.50	7.50	7.30	7.20	7.40	7.30	7.22	7.09
Field Temperature, deg. C.	10.0	10.0	11.0	10.0	13.0	19.0	18.0	18.0
Lab Conductivity @25C, micromhos/cm	3300	5200	64000	4500	3800	3400	3900	4100
TDS @ 180C, mg/l (lab.)	2180A	4790A	4210A	2980A	2500A	4350A	3970A	4190A
TSS, mg/l	181	51.0	53.0	56.0	48.0	84.0	44.0	24.0
Iron, Total, mg/l (Fe)	0.280	0.430	0.480	0.390	0.090	0.155	1.38	0.440
Manganese, Total, mg/l (Mn)	2.18A	0.650A	0.300A	0.440A	0.125	0.130	3.60A	5.43A
Nitrate as N, mg/l (NO_3)	0.170	<0.010	<0.010	0.130	0.090	<0.010	7.97	3.19
Sulfate, mg/l (SO_4)	240A	75.0	1260A	420A	2520A	300A	2690A	1320A
Chloride, mg/l (Cl)	20.1	19.1	32.3	31.8	27.5	27.7	46.0	42.0

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-14
WELL CV12W QUALITY

Water - Quality Data Report for Station: CV12W — Property: Savage Coal Terminal

Latitude: — Section: # — County: Carbon
Longitude: — Township: TN — State: Utah
Elevation: — Range: RW — Country: U.S.A.

Parameter Title	10/13/82	11/21/82	12/29/82					
Lab pH, std. Units	7.00	7.51	7.43					
Field Temperature, deg. C.	16.0	-	7.00					
Lab Conductivity @25C, micromhos/cm	4050	4790	4330					
TDS @ 180C, mg/l (lab.)	4220A	4330A	4090A					
TSS, mg/l	58.0	30.0	28.0					
Iron, Total, mg/l (Fe)	3.30	0.210	2.82					
Manganese, Total, mg/l (Mn)	6.11A	5.57A	2.36A					
Nitrate as N, mg/l (NO_3)	3.20	0.790	0.300					
Sulfate, mg/l (SO_4)	2700A	2700A	2680A					
Chloride, mg/l (Cl)	42.0	40.0	25.0					

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

TABLE 7-14a
WELL CV12W QUALITY SUMMARY

Water - Quality Data Report for Station: CV12W — Property: Savage Coal Terminal

Latitude: — Section: # — County: Carbon
Longitude: — Township: TN — State: Utah
Elevation: — Range: RW — Country: U.S.A.

Quality Standards – # of Times Exceeded/Value

Parameter Title	Domestic	Aquatic (3C)	Agriculture (4)	Min.	Max.	Mean	Std. Dev.
Lab pH, std. Units	-	9.00	9.00	7.00	8.30	7.48	0.300
Field Temperature, deg. C.	-	27.0	-	7.00	19.0	13.2	3.83
Lab Conductivity @25C, micromhos/cm	-	-	-	3300	64000	7490	13700
TDS @ 180C, mg/l (lab.)	-	-	19 2000	2180A	4970A	3510	835
TSS, mg/l	-	-	-	4.00	271	76.8	68.6
Iron, Total, mg/l (Fe)	-	-	5.00	0.090	3.30	0.799	0.960
Manganese, Total, mg/l (Mn)	-	-	16 0.200	0.125	6.11A	2.10	1.90
Nitrate as N, mg/l (NO_3)	-	-	-	0.010	7.97	1.01	1.96
Sulfate, mg/l (SO_4)	-	-	18 200	75.0	2870A	1770	1040
Chloride, mg/l (Cl)	-	-	100	18.1	90.0	38.7	16.5

" -" missing data
" * " impossible data
Units are in mg/l, unless otherwise noted.

D - domestic standards exceeded
L - aquatic standards exceeded
A - agricultural standards exceeded

724.200. Surface Water Hydrology

Methodology

A hydrologic investigation was performed based on state and federal agency data, baseline monitoring data, and field reconnaissance. The investigation focused on the following:

a) The surface hydrology was characterized with descriptions of drainage basin features, including storm runoff estimates, irrigation patterns and canal usage and seepage estimates. Irrigation district and local soil conservation personnel were contacted to determine irrigation practices in the area.

b) Baseline water quality parameters and surface runoff quantity from undisturbed areas were estimated. A monitoring station, CV14W shown on Plate 7-1, was established. This station was sampled monthly, when possible, during the baseline monitoring period in order to characterize surface water quality. Due to the ephemeral nature of surface water flow at Savage Coal Terminal, flow measurements cannot be taken at any regular interval and consequently water quality samples are sporadic.

c) Water and sediment control measures were designed to minimize adverse impacts of operations on receiving waters.

Regional Surface Water Hydrology

The Department of the Interior has drafted a regional environmental statement, published in 1978, which covers the development of coal resources in Central Utah. The regional area is drained by tributaries to the Green and Colorado Rivers; principal tributaries are the Price and San Rafael Rivers and Muddy Creek. The flow is usually intermittent or perennial, in small streams in the mountains and in larger streams that originate in the higher mountains. Snowmelt is major contributor to streamflow and it provides the continuity of flow in the perennial streams as well as some seasonal flow to intermittent streams. Many streams are ephemeral and flow only in direct response to precipitation or snowmelt. Ephemeral flow is characteristic of the lowlands such as Castle Valley where the Savage Coal Terminal facility is located. Summer precipitation does not usually produce much runoff, although intense rainfall may cause high runoff in localized areas.

The Savage Coal Terminal site drains into the Price River which flows into the Green River. The water in the upper reaches of the Price River is of high quality; however, as the river traverses the central and lower portion of the Price River basin, the quality of the water in the river steadily degrades due to the geologic nature of the area and to the irrigation return flow which enters the river. Total dissolved solids concentrations are less than 400 mg/l in the upper reaches, but by the time the water reaches Wellington the total dissolved concentrations are between 600 and 2,400 mg/l. At Woodside, Utah which is 22 miles upstream from the mouth, average total dissolved solids range between 2,000 and 4,000 mg/l. Chemical analysis of Price River water sampled near the Savage Coal Terminal water supply intake above Wellington is provided in Figure 7-2.

Water is diverted from the Price River into the Carbon and Price-Wellington Canals as it enters the central portion of the basin. The Carbon Canal trends north and south and passes within about one half mile of the Savage Coal Terminal Coal loading facility. This water is used for irrigation in the area and is of good quality since it is diverted as it leaves the upper portion of the basin. In the vicinity of the Savage Coal Terminal facility, the total dissolved concentration of water in the canal ranges between 250 and 600 mg/l. Water quality analysis of Carbon Canal Water is provided in Figure 7-3.

Flow in the Price River is affected by diversions of water, mainly for irrigation and by storage reservoirs. Interbasin diversions are common.

Canal Usage and Seepage Routes

The Carbon Canal located about one-half mile to the west and uphill from the Savage Coal Terminal site (see Figure 7-6) is used nearly year round. During the irrigation season, which extends from April to October, up to 140 cfs is diverted into the canal from the Price River. During the winter, up to 25 cfs is diverted into the canal for purposes of supplying stockwater with diversion discontinued at times when icing occurs. Seepage loss from the Carbon Canal in the vicinity of the Savage Coal Terminal site is estimated at 0.30 cfs per canal mile or about 65 acre-feet annual loss assuming flow 300 days per year. Seepage losses were estimated by a method proposed by Worstell (1976) which allows estimation of seepage losses from canal length, canal width, and soil type.

The two lateral canals, one on the north and one on the south, are used mainly during the irrigation season during which time water is diverted from the Carbon Canal almost continuously (see Figure 7-6). The canal on the ridge to the south of the Savage Coal Terminal site is also used intermittently during the winter for purposes of providing stock water. Seepage loss from this canal is estimated at about 0.10 cfs per canal mile or about 45 acre-feet annual loss assuming flow 180 days per year. Seepage from the canal on the north is felt to not significantly affect the Savage Coal Terminal site.

Irrigation Patterns and Practices

The owners of the alfalfa fields adjacent to the Savage Coal Terminal site were contacted to determine irrigation patterns. They indicated that the fields are now irrigated at least two and up to three times per cutting with cutting occurring every 4 to 5 weeks. Irrigation begins sometime in April and the annual application is 3 to 4 acre feet per acre.

The water used to irrigate the fields is from the Carbon Canal and is of good quality. The total dissolved solids of this water ranges between 250 and 600 mg/l. There is no usage of groundwater for irrigation in the area at the present time and it is not anticipated that ground water will be used in the future due to its very poor quality.

There are no water intakes located within the permit area. One intake is located on the adjacent property; however, this intake is from the canal running south (upslope) of the property, and is located some 1200' from Savage Coal Terminal, across the county road and D. & R.G.W. railroad spur. The intake location and canal locations are shown on Figure 7-6.

Stream Channels

All stream channels in the vicinity of the site are of an ephemeral nature. The highest stream order which can be distinguished from aerial photographs for these ephemeral stream channels is 4. The banks and bottom sediments of many of the stream channels are covered by white salt deposits known as efflorescence.

Readily soluble salt efflorescences cover the bars, banks, and exposed pebbles of nearly all stream channels in the central portion of the Price River Basin. Efflorescences also accumulate on the general soil surface as soil water evaporates and accumulations can be especially heavy in areas where ground water is very close to the surface. Several of these areas of heavy accumulation of salt efflorescences occur at or near the Savage Coal Terminal site. These salt efflorescences are predominantly sodium and sulfate with significant amounts of magnesium (Utah Department of Natural Resources, 1972). Salt efflorescence is a major initial source of salinity in surface runoff, while the inherent characteristics of the soil determine the equilibrium salt output of a given hydrologic event (White, 1976).

Surface Water Quality

The U.S. Geological Survey in cooperation with the Utah Division of Water Rights conducted an investigation of the chemical quality of surface water in the Price River basin during 1969 and 1970. Water quality sampling was conducted at three sites during storm runoff on August 29, 1969 near the Savage Coal Terminal facility. Data which were obtained from these sites give a good indication as to the natural chemical quality of surface runoff which could be expected from Savage Coal Terminal site. The three sites include Drunkards Wash which is located several miles north of the Savage Coal Terminal, an unnamed creek located just south of Drunkards Wash, and Miller Creek which is located just south of the site. Total dissolved solids for storm runoff at these three sites was 2,770, 2,620, and 2,060 mg/l respectively. The chemical analyses of the samples from each site are given in Table 7-14b.

TABLE 7-14b
CHEMICAL ANALYSES OF STORM RUNOFF AT THREE SITES NEAR THE SAVAGE COAL TERMINAL LOADING FACILITY

Parameter pH	Drunkards Wash at Highway 10 7.4 Mg/l	Unnamed Creek at Highway 10 7.5 Mg/l	Miller Creek near Wellington 8.0 Mg/l
Silica (siO_2)	14.00	-	5.80
Calcium (Ca)	430.00	337.00	164.00
Magnesium (mg)	102.00	71.00	117.00
Sodium (Na)	272.00	377.00	310.00
Potassium (K)	11.00	-	7.00
Bicarbonate (HCO_3)	205.00	103.00	305.00
Carbonate (CO_3)	0.00	0.00	0.00
Sulfate (SO_3)	1810.00	1750.00	1260.00
Chloride (Cl)	25.00	30.00	46.00
Fluoride (F)	0.80	-	0.50
Nitrate (NO_3	0.60	0.40	4.30
Boron (B)	0.41	-	0.28
Dissolved solids	2770.00	2620.00	2060.00
Hardness as $CaCO_3$	1490.00	1130.00	890.00
Noncarbonate hardness as $CaCO_3$	1320.00	1050.00	640.00

TABLE 7-14c
CHEMICAL ANALYSIS OF SURFACE WATER FROM DITCH NORTH OF SITE

Station CV14W	12/13/79	1/23/80	2/29/80
Turbidity NTU		No Data	
Conductivity	8,000.000	Water Froze	7,700.000
pH	8.100		8.200
TDS mg/l	5,200.000		1,750.000
Alkalinity $CaCO_3$ mg/l			
Hardness $CaCO_3$			
As			
HCO_3			
Ba			
B			
Cd			
CO_3			
Cl mg/l	110.000		94.000
Cr (Total)			
Cu			
Surfactants MBAS			
F			
PO_4 -Pl			
Fe (Total) mg/l	.160		.690
Fe (Filtered)			
Pb			
Mg			
Mn mg/l	.016		.060
Hg			
Ni			
NO_3 -N mg/l	11.800		.280
NO_2 -N			
K			
Se			
SiO_2			
Ag			
SO_4 mg/l	4,200.000		3,000.000
Na			
Zn			
Oil and Grease mg/l	17.000		144.700
Suspended Solids mg/l	42.000		111.000
Acidiity			

The natural surface runoff in the area is of poor quality with total dissolved solids ranging from 2000 to 3000 mg/l. Surface runoff from most of the site occurs infrequently. The data in Table 7-14b is indicative of the water quality to be expected from the site. Water quality samples have been collected by the Company from a drainage ditch, Station CV14W, located at the northeast corner of the property. This drainage ditch receives natural runoff and irrigation return flows from the "undisturbed" watershed subarea A. The water quality analysis of samples taken from this drainage ditch are presented in Table 7-14c.

Irrigation water is of high quality with total dissolved solids of 200 to 600 mg/l. Levels of groundwater in the fields adjacent to the site are below the plant root zone. It would appear that irrigation practices in the area are designed to leach soluble salts from the soil resulting in high dissolved solids in irrigation return flows.

724.300. Geologic Information. Each application will include geologic information in sufficient detail, as given under R645-301-624, to assist in:

724.310. See Chapter 6 and Sections 724.100 and 724.200.

724.320. See Chapter 6 and Sections 724.100 and 724.200.

724.400. Climatological Information.

Existing Environment

Climate

The climate of the Price, Utah area is varied and strongly influenced by topography. The climate can be characterized as arid, specifically dry continental. The prevailing local low-level meteorological influences are mountain-valley breeze systems. The low amount of annual precipitation is a result of the Sierra Nevada and Cascade Ranges which act as natural barriers and prevent moist maritime air from the North Pacific from reaching the interior basins to the east.

On a more local scale the Wasatch Mountains to the west of Castle Valley and the Tavaputs Plateau to the north provide a shelter from storms associated with westerly and northerly winds. Areas on the lee side of the Wasatch Range generally receive less than 10 inches of precipitation annually.

The Savage Coal Terminal is located approximately 6 miles south of Price, Utah; therefore, climatological data for Price is representative of this site.

Table 7-15 is a tabulation of Temperature, Rainfall, and Snowfall for the Price area from 1992 through April 2002. This information was provided by the Utah Climate Center, Utah State University, Logan, Utah.

Precipitation and Temperature

Based on the data in Table 7-15, the average annual precipitation over the 10 year period was 10.36 inches, with a low monthly average precipitation of 0.36 inches in December and a high monthly average precipitation of 1.37 inches in August. The record high daily precipitation for this period was 1.99 inches, which occurred during August.

The average mean temperature for this area is 51.0° F. The average maximum annual temperature is 65.0° F. with a high maximum of 89.0° F in August and a low maximum of 36.1° F in January. The average minimum annual temperature is 37.0° F, with a high minimum occurring during July and a low minimum during January. The record high temperature is 101° F in June and the record low temperature is -4° F in January.

The average annual snowfall is 19.6 inches with measured amounts during the months of October through April. The record daily snow measured was 20.0 inches, which occurred in the month of January.

TABLE 7-15

Price Warehouses													
County: Carbon Latitude: 39°37' Longitude: 110°48' Elevation: 5700 feet Period: 1992 - 2002													
Element	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average max temp	36.1	42.4	58.9	71.5	76.8	83.3	88.1	89.0	80.9	65.1	46.9	39.0	65.0
Average min temp	14.4	21.5	31.9	43.1	47.8	50.2	54.7	57.0	47.3	37.6	22.4	16.8	37.0
Average mean temp	26.2	32.0	46.4	59.3	62.3	66.8	71.4	73.0	64.1	51.3	34.6	27.9	51.0
Record high temp	54	66	71	84	90	101	99	99	94	84	61	50	101
Record low temp	-4	4	19	23	28	33	42	41	35	26	4	0	-4
Average precipitation	0.92	0.96	0.66	0.81	0.91	0.68	0.70	1.37	1.14	1.34	0.52	0.36	10.36
Record monthly precipitation	2.36	1.99	1.54	2.01	2.34	2.14	1.86	4.21	3.12	2.70	1.26	1.17	4.21
Record daily precipitation	1.65	0.61	0.74	0.99	0.83	1.17	1.36	1.99	0.86	1.13	0.59	0.53	1.99
Average snowfall	7.9	4.2	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.1	2.7	3.8	19.6
Record monthly snow	31.6	10.7	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.5	7.8	16.5	31.6
Record daily snow	20.0	6.1	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.5	5.0	7.3	20.0

Provided by Utah Climate Center, Utah State University, Logan, Utah.

Wind

Winds are generally light to moderate all seasons of the year. Strongest winds generally occur in the spring with moderate to strong southerly flow for several days at a time. The prevailing Castle Valley area winds are from the north through north-northwest during autumn, winter and early spring months with a shift to the south-southeast during late spring and summer.[2] Table 7-16 summarizes the mean wind speeds in Castle Valley. Depending on the proximity to the mountain and canyons a particular location in Castle Valley may experience pronounced diurnal wind flow patterns. Daytime flow may be influenced by upslope easterly winds caused by greater heating of the eastern face of the Wasatch Plateau than in the valley. At night the northwesterly drainage flow from the mountains to the valley may prevail. In summary, no one wind direction or diurnal wind flow pattern is applicable for all locations in Castle Valley. Weaker diurnal wind flow patterns are expected in locations further away from a canyon or mountain.

TABLE 7-16
MEAN SEASONAL WIND SPEEDS IN THE CASTLE VALLEY AREA

	SEASON				
Direction	Fall (m/s)	Winter (m/s)	Spring (m/s)	Summer (m/s)	Annual (m/s)
N	3.3	1.8	3.5	3.1	3.0
NNE	4.1	1.4	2.4	2.4	2.6
NE	2.2	1.6	1.6	1.9	1.8
ENE	1.8	1.3	1.6	2.1	1.6
E	1.8	1.3	1.9	1.9	1.7
ESE	1.8	1.4	2.4	2.1	1.9
SE	2.0	1.4	2.1	2.6	2.1
SSE	2.5	1.4	2.5	3.0	2.5
S	3.7	1.4	3.4	3.8	3.2
SSW	4.0	1.4	6.2	4.3	4.3
SW	3.1	1.3	4.0	3.9	3.2
WSW	2.9	1.3	4.3	3.9	3.2
W	2.9	1.7	4.0	3.8	3.1
WNW	2.3	2.0	5.3	4.6	3.9
NW	4.2	4.9	6.0	4.5	5.1
NNW	4.8	4.4	5.7	4.0	4.8
Seasonal Mean (m/s)	2.7	1.3	3.5	3.2	2.7

(To convert to miles/hour multiply by 2.2369)

Source: An evaluation of the Meteorology and Air Quality Impact for the Emery Plant, Emery County, Utah. A.J. Anderson and J.L. Sutherland, North American Weather Consultants, November 1974.

Evapotranspiration and Growing Season

The average annual evapotranspiration for this area is listed as 47.43 inches, with the maximum of 8.07 in July and the minimum of 0.85 in January.

The growing season, based on freeze-free dates, runs from 118 to 196 days, with an average of 147 days. The last spring freeze averages May 12 and the first fall freeze averages October 6.[1]

Air Quality

The Savage Coal Terminal is a coal preparation facility which blends, sizes, and stores raw coal. Material handling, sizing and storage procedures and associated air pollution control problems are largely those of dust and particulate matter emitted from the mechanical processes. The only criteria pollutant which is expected to be emitted in quantity is suspended particulate matter. The only combustion processes associated with the facility will be those associated with mobile sources, which includes light duty vehicles, heavy duty vehicles, and train locomotive. The gaseous emissions emitted from these vehicles exhausts will have a negligible impact on the air quality of the area because the emissions levels are quite low.

Run-of-mine coal must be broken, sized and screened before loading it. These processes, along with handling, moving, storage and general housekeeping account for most of the dust emissions from the facility.

Coal from the surrounding mines is transported to the site by trucks. On-site, the coal is dumped into an underground hopper. Coal is crushed or screened as necessary.

The coal is then taken from the hopper via covered conveyor and placed into a stacking tube. The coal stacking tubes with windows are allowed to open for cone stacking. The stacking tubes reduce and minimize the dust from freefall. The coal from the open stockpiles is recovered via underground feeders and carried by covered conveyor to a totally enclosed 10,000 ton silo for unit train loading. Water spray systems are located on the underground reclaimed feeders.

Air Quality

Efforts have been made throughout the coal handling system to minimize the generation of dust. This has been done through the utilization of enclosures to prevent wind action upon materials on conveyors, in the loadout silos, in the stacking tubes, and in the truck dumps. Water sprays have also been added to reduce dust emissions at the breaker, beneath pile reclaim feeders, and the stacking tubes. The inherent moisture of the coal also aids in the reduction of the dust emissions.

Estimate of Uncontrolled Emissions

The potential exists for fugitive dust emissions resulting from vehicle traffic on the access and haul roads at Savage Coal Terminal. These roads are surfaced with asphalt, or crushed or pit-run gravel. Administrative controls will be applied to maintain strict speed control at the site, which will aid in reducing the fugitive dust potential. The gravel roads are treated with Magnesium Chloride and watered as necessary to help alleviate the dust produced by traffic. The frequency of application will be determined by visual observations of the degree of road dustiness.

Air Quality Control Plan

The Savage Coal Terminal is operated under an approved Air Quality Permit DAQE-ANI793003-06, issued by the State of Utah Department of Environmental Quality. Under this permit, the facility is approved to handle up to 10 million tons of coal per year.

724.500. Supplemental information. If the determination of the PHC required by R645-301-728 indicates that adverse impacts on or off the proposed permit area may occur to the hydrologic balance, or that acid-forming or toxic-forming material is present that may result in the contamination of ground-water or surface-water supplies, then information supplemental to that required under R645-301-724.100 and R645-301-724.200 will be provided to evaluate such probable hydrologic consequences and to plan remedial and reclamation activities. Such supplemental information may be based upon drilling, aquifer tests, hydrogeologic analysis of the water-bearing strata, flood flows, or analysis of other water quality or quantity characteristics.

724.600. N/A - This is a surface operation.

724.700. N/A - No operations are proposed in a valley holding a stream.

725. Baseline Cumulative Impact Area Information.

725.100. This information has been previously compiled.

725.200. If this information is not available from such agencies, then the applicant may gather and submit this information to the Division as part of the permit application.

725.300. The permit will not be approved until the necessary hydrologic and geologic information is available to the Division.

726. N/A - Not required.

727. Alternative Water Source Information

Since there are no subsurface operations here, and since existing water rights are for irrigation and stock watering from established canals or creeks away from the operations, no adverse effect on water quantity should result from operation of this facility. In the event that a diminution of an existing water right should be shown to be a direct result of this operation, Savage Services Corporation will replace the proven lost portion of said right with water from its 357 shares of reservoir water. (See Appendix 7-2 for documentation of water rights.)

Water rights have been researched for the immediate and adjacent areas at Savage Coal Terminal, and are documented below:

*91 AREA T. 15 S.; R. 10 E.

SECTION	SERIAL NUMBER
10	None
11	2, 3, 78, 366, 764, 765, 3396, 3397, 4126
14	3294, 3295
15	3280, 3289, 3290, 3156

* Copies are on file at the State Engineer-Water Rights Office in Price, Utah.

728. Probable Hydrologic Consequences (PHC) Determination.

The probable hydrologic consequences determination is presented in Appendix 7-3.

728.100. See Appendix 7-3.

728.200. See Appendix 7-3.

728.300. See Appendix 7-3.

728.400. An application for a permit revision will be reviewed by the Division to determine whether a new or updated PHC determination will be required.

729. Cumulative Hydrologic Impact Assessment (CHIA).

729.100. Per Division.

729.200. An application for a permit revision will be reviewed by the Division to determine whether a new or updated CHIA will be required.

730. Operation Plan.

731. General

Water supply, drainage and sediment control are critical and essential factors to the successful operation of the Savage Coal Terminal. The main water supply for the operation is from the Price River, however, nearly all precipitation runoff is recirculated into the plant water system for beneficial use following sedimentation treatment. Shallow groundwater which occurred prior to site development is now intercepted and diverted around the area for the benefit to site stability.

Culinary water is supplied by Price River Water Improvement District through a buried waterline to the facility.

The primary source of water for the facility is from the Price River. A shallow, high-volume well is installed at the Price River north of the site and is pumped on demand via a 6-inch pipeline into a sump located at the northeast corner of the site (see Plate 5-2).

Savage Services Corporation has acquired rights to 357 shares of water from Scofield Reservoir. The usage at the facility is measured by a totalizing flowmeter which monitors incoming water from both the pipeline and sedimentation pond sources. Present usage averages 30-35 acre-feet per year.

Undisturbed Runoff Diversions

Runoff from approximately 7.16 acres of undisturbed area to the west of the operations area is intercepted by a diversion ditch and routed around the west and north edge of the facilities area. This undisturbed area includes subarea A shown on Figure 7-4. The diversion is designed to accommodated the peak discharge from a 10 year - 24 hour precipitation event. The diversion is designed, constructed and maintained to prevent additional contributions of suspended solids to runoff outside the permit area.

Disturbed area runoff from the site is routed to the sediment ponds via collection ditches, as shown on Plate 7-2. Collection ditches vary in size and configuration; however, ditches will be maintained at minimum cross sectional areas as shown on Figure 7-13.

Sedimentation Control

Sedimentation Ponds and on-site drainage controls are shown on Plate 7-2. Sedimentation ponds are located to collect and treat runoff from various sub-drainages. All ponds are designed to store at least one year of sediment plus the runoff volume from a 10 year - 24 hour rainfall. The sedimentation ponds are arranged in series such that all runoff from disturbed areas passes through Sedimentation Pond No. 6. The outlet of Sedimentation Pond No. 6 is a UPDES discharge monitoring point.

Water from Pond 6 is normally not discharged, but is placed back into the preparation plant for re-use.

The sedimentation and other ponds will be cleaned periodically to maintain at least one year's sediment storage capacity. Cleaning is accomplished by a backhoe or dragline.

The drainage from the refuse pile is also collected in the sediment ponds with the other runoff water; therefore, the system is essentially a closed type, with no expected discharge, except in the event of a storm which exceeds the pond design limits.

Groundwater

Two groundwater drains have been installed at the Savage Coal Terminal site in the past and are located as shown in Plate 7-1. The drain on the eastern side of the property was installed to drain a boggy area, in order to facilitate construction of the present railroad grade. Flow from the drain gradually diminished after installation and eventually it ceased. The other drain, which is located along the north and west property lines is 26 feet deep at the pump house and is installed at the surface of the Bluegate shale just below the weathered shale and soil. It flows continually throughout the year. The drain discharges into a sump and the water is used for coal preparation and dust control at the site. A flow from the drain of 22 gal/min was measured on August 20, 1980. Plant personnel report that the flow from the drain varies somewhat with the time of year.

Effects of Operations on Groundwater

In various places at or near the Savage Coal Terminal site, the water table approaches the surface and groundwater is lost to evaporation. The areas are distinguishable by heavy accumulations of salt on the soil surface and are generally soft and boggy. Two of these areas are found downslope from the Savage Coal Terminal site. One is found on the west side of the property immediately adjacent to the railroad tracks and several hundred yards south of the coal loading silo. The other is found in the farmland a half mile to the northeast of the site. Since shallow groundwater moves downslope toward the Price River, it eventually either seeps into the stream or is lost to evapotranspiration.

The principal effect of the Savage Coal Terminal operation on groundwater results from the operation of the French Drain. The drain intercepts shallow groundwater flows. This water is utilized by the facility as a source of water with excess water diverted to the Price River. Although the quality of the water is poor it is thought to be of superior quality to the water that would eventually seep into the Price River downslope of the site. Groundwater quality of water coming from the French Drain would be of superior quality to the water that would eventually seep into the Price River because it would not be subject to the degree of evaporation and concentration of salts that would occur upon natural seepage. Without direct measurements of seeps near the Price River, it is difficult to substantiate this statement. However, a review of water quality data of the two wells downgradient from the French Drain show increasing concentration at CV4W is 11,400 mg/T while the mean concentration of TDS is the French Drain is 9,790 mg/l. These data suggest decrease in groundwater quality downgradient. These trends are thought to be due to extensive evaporation of groundwater seepage.

Refuse disposal is not anticipated to impact groundwater conditions. The refuse has been determined to be non-toxic and non-acid forming (see Chapter 5). The site is a natural groundwater discharge area. The French Drain has lowered the water table and reduced the rate of seepage and evaporation. As a result seepage or saturation of the refuse material is not expected to occur during operations. Leaching may occur but the rate will be extremely slow because of the high evaporation rates. Water extract analyses of the coal refuse reported in Chapter 5, Figure 5-2 indicate that leaching will not contaminate local groundwater.

Since the refuse pile is built up from ground level, there is little, if any, chance that saturation potential is also minimized by the fact that the refuse is located at the upper or higher elevation of the site, and the gradient of the groundwater flow is to the low (northeast corner) of the property. The French Drain will be rendered unusable during the reclamation period; at this time, groundwater elevations at the site can be expected to rise to levels encountered prior to the drain installation.

The areas of refuse storage were not observed to contain high or surfacing groundwater prior to refuse disposal; therefore, it is not expected that these sites will be affected by groundwater saturation in the future.

The French Drain consists of a trench, originally dug to the unweathered shale, with a 12" perforated, galvanized culvert laid on the bottom. The trench was then filled with +2" drain rock for a depth of 4' or greater, covered with an impervious material and backfilled.

It has been in operation for nearly 30 years with no sign of plugging or failure. There is no reason to believe that the system will not continue to operate throughout the life of Savage Coal Terminal; however, should it fail at some point in time, it would be repaired. Such a failure could be detected by a sharp decrease or stoppage of the flow into the pump house. The impact of such a failure would likely not even become evident on the surface in the time it would take to restore the system, since the groundwater flow in the area is of such a small magnitude.

Since all major structures at the site are on pilings driven to bedrock, no major impacts would be expected with a failure of the drain system.

731.100. Hydrologic-Balance Protection.

731.110. Ground-Water Protection. In order to protect the hydrologic balance, coal mining and reclamation operations will be conducted according to the plan approved under R645-301-731 and the following:

731.111. Ground-water quality will be protected by handling earth materials and runoff in a manner that minimizes acidic, toxic or other harmful infiltration to ground-water systems and by managing excavations and other disturbances to prevent or control the discharge of pollutants into the ground water; and

731.112. For the purposes of SURFACE COAL MINING AND RECLAMATION ACTIVITIES ground-water quantity will be protected by handling earth materials and runoff in a manner that will restore approximate premining recharge capacity of the reclaimed area as a whole, excluding coal mine waste disposal areas and fills, so as to allow the movement of water to the ground-water system.

731.120. Surface-Water Protection. In order to protect the hydrologic balance, coal mining and reclamation operations will be conducted according to the plan approved under R645-301-731 and the following:

731.121. Surface-water quality will be protected by handling earth materials, ground-water discharges and runoff in a manner that minimizes the formation of acidic or toxic drainage; prevents, to the extent possible using the best technology currently available, additional contributions of suspended solids to streamflow outside the permit area; and, otherwise prevent water pollution. If drainage control, restabilization and revegetation of disturbed areas, diversion of runoff, mulching or other reclamation and remedial practices are not adequate to meet the requirements of R645-301-731.100 through R645-301-731.522, R645-301-731.800 and R645-301-751, the operator will use and maintain the necessary water treatment facilities or water quality controls; and

731.122. Surface-water quantity and flow rates will be protected by handling earth materials and runoff in accordance with the steps outlined in the plan approved under R645-301-731.

731.200. There are presently 2 surface water monitoring points and 3 groundwater monitoring stations at the Savage Coal Terminal. All other ground water monitoring wells have been removed and sealed as of May 1999. The following is a list of existing water monitoring stations, along with sample frequency:

WATER MONITORING PROGRAM

Station	Location	Type	Frequency	Flow Device	Results To	Remarks
CV-1-W	Pumphouse	French Drain	Bi-annually	Time/Volume or Depth	DOGM	Sample during 2nd and 4th Quarters.
CV-14-W	N.E. Corner Property	Ditch	Bi-annually	Time/Volume	DOGM	Sample during 2nd and 4th Quarters.
CV-15-W	Sediment Pond Discharge	Pond Outlet	Monthly	Hand-Held Time/Volume	E.P.A., DOGM, Utah Health Dept.	Monitored per UPDES Permit
S-1-GW	South of French Drain	Ground Water Monitoring Well	Quarterly	Grab Sample Depth	DOGM	Quarterly - 2 years Bi-Annual - After
S-2-GW	South of Pond 5	Ground Water Monitoring Well	Quarterly	Grab Sample Depth	DOGM	Quarterly - 2 years Bi-Annual - After

Water monitoring will include parameters on Table 7-17. Results will be submitted to the Division within 60 days following the end of each sampling cycle.

731.210. Ground-Water Monitoring. Ground-water monitoring will be conducted according to the plan approved under R645-301-731.200 and the following:

731.211. See 731.200 and Table 7-17.

731.212. Ground-water will be monitored and data will be submitted at least every six months for the French Drain and every quarter for the ground water monitoring wells S-1-GW and S-2-GW. Monitoring submittals will include analytical results from each sample taken during the approved reporting period. When the analysis of any ground-water sample indicates noncompliance with the permit conditions, then the operator will promptly notify the Division and immediately take the actions provided for in R645-300-145 and R645-301-731.

732.213. N/A - Not requested.

731.214. Groundwater monitoring will continue through operation; however, since the French Drain and monitoring wells will be removed during reclamation further monitoring of those sites will not be possible.

TABLE 7-17
SAVAGE COAL TERMINAL WATER MONITORING REPORT

Property:	
Date Sampled:	
Station:	
Location:	
Type:	
Frequency:	
Field Measurements:	
Water Level or Flow:	
pH:	
Specific Conductivity:	
Temperature:	
Dissolved Oxygen: (Perennial streams only)	
Laboratory Measurements (mg/l):	
**Total Settleable Solids:	
Total Suspended Solids:	
Total Dissolved Solids:	
Total Hardness (as $CACO_3$):	
Acidity ($CaCO_3$):	
*Carbonate (CO_3^{-2}):	
*Bicarbonate $(HC)_3^{-1}$):	
*Calcium (Ca):	
Chloride (Cl^-):	
Iron (Fe):	
*Magnesium (Mg):	
*Total Manganese (Mn):	
*Potassium (K):	
*Sodium (Na):	
*Sulfate (SO_4^{-2}):	
***Oil and Grease:	
Cation - Anion Balance:	

* Dissolved Form ** NPDES Samples Only *** Designated Samples Only

731.215. Equipment, structures and other devices used in conjunction with monitoring the quality and quantity of ground water on-site and off-site will be properly installed, maintained and operated and will be removed by the operator when no longer needed.

731.220. Surface-Water Monitoring. Surface-water monitoring will be conducted according to the plan approved under R645-301-731.220 and the following:

731.221. See Section 731.200 and Table 7-17.

731.222. See Section 731.200 and Table 7-17.

731.223. See Section 731.200.

731.224. Surface water monitoring will proceed through operation and continue until bond release; however, only station CV14W will remain after removal of the sediment ponds. CV15W is a UPDES Discharge Point, and will be terminated upon removal of Sediment Pond No. 6.

731.225. Equipment, structures and other devices used in conjunction with monitoring the quality and quantity of surface water on-site and off-site will be properly installed, maintained and operated and will be removed by the operator when no longer needed.

731.300. Acid- and Toxic-Forming Materials.

731.310. Drainage from acid- and toxic-forming materials and underground development waste into surface water and ground water will be avoided by:

731.311. The refuse pile has been tested and does not contain acid- or toxic-forming materials. The only other potentially acid- or toxic-forming material on site is in the form of oils, grease or fuels. These materials are stored within an enclosed concrete basin and trailer, and the fueling area is bermed to prevent spillage from reaching any drainage.

731.312. See Section 731.311 above.

731.320. Storage, burial or treatment practices will be consistent with other material handling and disposal provisions of R645 Rules.

731.400. All previously installed water monitoring wells have been removed and sealed in a safe and environmentally sound manner approved by the Division. The only remaining wells are the French Drain containment, 2 new water monitoring wells and the river pump well. These structures will be removed upon reclamation and sealed in accordance with the reclamation plan in Section R645-301-540.

731.500. Discharges.

731.510. N/A - This is a surface operation.

731.520. N/A - This is a surface operation.

731.600. N/A - There are no areas of disturbance within 100 feet of a perennial or intermittent stream.

731.610. N/A.

731.620. N/A.

731.700. Cross Sections and Maps.

731.710. See Plate 7-1.

731.720. See Plates 7-1 and 7-2.

731.730. See Plate 7-1.

731.740. See Plate 7-2.

731.750. See Plates 7-3 through 7-5.

731.760. See Plates 7-3 through 7-5.

731.800. See Section 727.

732. Sediment Control Measures.

732.100. Siltation structures on site consist of rock gabions straw bales and silt fences. A typical section of each is shown in Figures 7-8, 7-9 and 7-10. These structures are maintained on a regular basis, and will be removed upon reclamation or when no longer needed.

732.200. There are a total of 5 sedimentation ponds on this site. See Plate 7-2 for location and Section 740 for design details.

732.210. All ponds on this site are temporary, and will be removed upon reclamation.

732.220. N/A - There are no coal processing waste dams, and no ponds meet the size or other qualifying criteria of MSHA, 30 CFR 77.216(a).

732.300. There are both undisturbed and disturbed diversions on this site. See Plate 7-2 for location, and Section 740 for design details.

732.400. See Section 742.400.

732.410. N/A - There are no plans to alter or relocate a natural drainageway.

732.420. N/A - There are no ditch relief culverts on this site.

733. Impoundments.

733.100 There are a total of 9 impoundments on this site. See Plate 7-2 for location, and Section 741 for design details.

733.110. All impoundment plans have been prepared and certified by a qualified, registered professional engineer in the State of Utah.

733.120. See Plates 7-3, 7-4, 7-5 and 7-6.

733.130. See Section 741.

733.140. N/A - No underground mining has occurred here.

733.150. See Section 741.

733.160. N/A - All impoundments are constructed and there are no plans for modifications.

733.200. All impoundments are temporary and will be removed upon final reclamation.

733.210. All impoundments are incised, which eliminates possibility of embankment failure. None of the impoundments meet the size or other qualifying criteria of MSHA 30 CFR 77.216(a).

733.220. N/A - All impoundments are temporary.

733.230. All impoundments are constructed and are temporary.

733.240. If any examination or inspection discloses that a potential hazard exists, the person who examined the impoundment will promptly inform the Division according to R645-301-515.200.

734. Discharge Structures, See Section 744.

735. Excess Spoil, See Section 745.

736. Coal Mine Waste, See Section 746.

737. Non-coal Mine Waste, See Section 747.

738. Temporary Casing & Sealing of Wells, See Section 748.

740. Design Criteria and Plans.

741. Mine Plan Area Watersheds and Surface Runoff

For the purposes of computing surface runoff and designing water diversion and sediment control structures, the watershed associated with the Savage Coal Terminal site was divided into seven subareas as shown on Figure 7-4. Subareas A, B and C are undisturbed areas and include upslope areas to the west of the site. The remaining subareas comprise drainage units that are affected by operations and are subject to sediment control. Surface runoff from subareas A and B are diverted around the site by a diversion. The remaining subareas drain into sedimentation ponds on site.

The 10 year - 24 hour precipitation event for the area was determined from an isopluvial map prepared by the National Weather Service (NOAA, 1973) and was found to be 1.7 inches. The SCS curve number method (Soil Conversation Service, 1972) was used to determine runoff volumes.

Runoff Volumes

Each of the on-site subareas was further subdivided as shown on Figure 7-5 and Plate 7-2. Weighted curve numbers for the subareas were determined by the following procedure.

The percentage of each on-site sub-drainage that is occupied by the following categories was determined:

a) Roads, buildings, pads and embankments.
b) Topsoil, or soil, stockpiles.
c) Coal Stockpiles.
d) Compacted coal refuse piles.
e) Other areas, including undisturbed area.
f) Ponds.

The areas, except for ponds, were determined by making planimeter measurements on a 1:2400 scale base map. Pond areas were determined from Plates 7-3 through 7-5. Aerial photographs were used as an aid in interpreting the areal extent of each category. The percentage in each category was determined by dividing the area in a given category by the total area of the sub-drainage (excluding pond area).

An average curve number for each category was determined based on soil type, general condition, and hydrologic soil group. Hydrologic soil group was determined from the Soils map, Plate 2-1. In those areas where the soil type was mapped as disturbed land, hydrologic soil group "D" was assumed. The curve numbers determined are (corresponding with the above categories):

a) 89
b) 80
c) 82
d) 87
e) 87

The ponds, of course, receive direct precipitation and therefore are considered separately from the other categories.

Table 7-18 presents the percentage of each category that was measured in each sub-drainage, and the weighted curve number for each sub-drainage.

Total runoff in each sub-drainage was determined by using the weighted curve numbers, area of each sub-drainage, and SCS rainfall-runoff relationship:

Q = rainfall excess (inches)

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

Where:

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

CN = Weighted curve number
P = 10 year - 24 hour precipitation value = 1.7 in. (NOAA, 1973)

Rainfall excess, Q, is generally determined graphically. In this instance, however, it was not practical to use the graphical method with the actual values, and therefore, the rainfall-runoff equation was used. Table 7-19 lists the runoff volume calculated for each sub-drainage.

TABLE 7-18
WEIGHTED CURVE NUMBER DETERMINATION

Drainage Area Number from Figure 7-5	Building Roads, Pads and Embankments CN-90 (%)	Topsoil or Soil Stockpiles CN=80 (%)	Coal Stockpiles CN=87 (%)	Compacted Coal Refuse Piles CN=87 (%)	Other Areas (excluding ponds) CN=87 (%)	Pond Areas (acres)	Total Acreage (acres)	Weighted CN for the Drainage
1a	15.0	-	12.1	-	73	0.61	14.96	87
1b	68.0	-	-	-	32.0	-	5.46	88
1c*	7.43	-	-	-	92.57	0.16**	36.65	87
5a	7.7	-	-	68.9	23.4	0.73	35.87	87
5b	9.2	-	52.3	-	38.5	-	14.31	85
5c	60.2	-	-	-	39.8	-	1.94	88
5d	14.2	-	-	-	85.5	-	17.03	87
5e	57.2	-	-	-	42.8	-	0.84	88
5f	-	10.0	-	-	-	-	4.38	80
6a	5.2	-	-	-	94.8	0.22	3.81	87
6b	66.7	-	26.7	-	6.6	-	5.46	87
6c	50.0	-	-	-	50.0	-	5.55	88
6d	10.0	-	-	-	90.0	-	2.45	87
6e	-	-	-	-	100.0	-	6.80	87
6f	10.0	-	-	-	100.0	-	5.44	87
A	-	-	-	-	100.0	-	7.16	87

* Includes subdrainage C ** Depression, no drainage but not a pond.

TABLE 7-19
RUNOFF VOLUMES ESTIMATES

Area No.	Weighted Curve No.	Q in.	A acres	Total Runoff Acre-Feet
1a	87	0.68	14.96	0.848
1b	88	0.73	5.46	0.332
1c*	87	0.68	36.65	2.08
5a	87	0.68	35.87	2.030
5b	85	0.58	14.31	0.692
5c	88	0.73	1.94	0.118
5d	87	0.68	17.03	0.965
5e	88	0.73	0.84	0.051
5f	80	0.39	4.38	0.142
6a	87	0.68	3.81	0.216
6b	87	0.68	5.46	0.309
6c	88	0.73	5.55	0.338
6d	87	0.68	2.45	0.139
6e	87	0.68	6.80	0.385
6f	87	0.68	5.44	0.308
A	87	0.68	7.16	0.406

* Includes the offsite drainage designated C, because area C drains through Pond 1.

Note: Drainage areas are based on figure 7-5 and updated hydrology map and topography.

Determination of Peak Discharge from Off-Site Area A

The OSM Storm computer program was used to determine the peak discharges from the off-site area A, whose runoff is intercepted by the diversion shown on Figure 7-4 and Plate 7-2. Physical basin parameters were determined from topographic maps. The curve number of 87 was determined from the soil survey and vegetation characteristics. For the 10 year - 24 hour rainfall event, the highest peak discharge to be conveyed by the diversion was found to be 6.3 cfs.

Size of Diversion Channel

The diversion, shown on Figure 7-4, is intended to intercept and divert runoff from drainage A. It was excavated in the native soil, and is earth lined. Low velocities and regular maintenance serve to impede erosion. The channel is maintained with a minimum cross-sectional area of 4 ft^2. A typical diversion cross section is provided in Plate 7-3.

The length of the diversion is about 1,650 ft., and the elevation change along it is about 29 ft. The average slope of the channel is therefore about 0.0176.

Manning's formula was used to determine the adequacy of the channel. Manning's N, the roughness coefficient, was assumed to be 0.05.

The water depth, in the channel, is about 0.77 ft. for a discharge of 6.3 cfs. When depths of 0.5 ft. and 1.0 ft. were assumed, the discharge was found to be about 3.0 and 10.0, respectively. In all cases channel flow velocities are less than 3 ft. per second.

TABLE 7-20
DIVERSION DESIGN CALCULATIONS

OSM CHANNEL FLOW		OSM CHANNEL FLOW		OSM CHANNEL FLOW	
6.3	Q	0.	Q	0.	Q
1.	Z	1.	Z	1.	Z
0.	Y	0.5	Y	1.	Y
0.016	S	0.016	S	0.016	S
0.05	N	0.05	N	0.05	N
NORMAL FLOW		NORMAL FLOW		NORMAL FLOW	
2.49578998	V	1.988722023	V	2.848320997	V
2.524970153	A	1.5	A	3.5	A
6.3	Q	2.983083035	Q	9.969123489	Q
1.	Z	1.	Z	1.	Z
2.5	W	2.5	W	2.5	W
.7714323391	Y	0.5	Y	1.	Y
0.016	S	0.016	S	0.016	S
0.05	N	0.05	N	0.05	N

For:

Q = 6.3cfs Y = 0.5 ft. Y = 1.0 ft.

Where:

Q	=	discharge, cfs
Z	=	side slope, H:V
W	=	bottom width, ft
Y	=	flow depth, ft
S	=	bed slope, rise/run
N	=	roughness coefficient

Sedimentation Pond Designs

The ponds are built below the level of the natural ground. Overflow of adequate capacity is provided at, or near, original ground level with a compacted berm approximately three feet high around the pond. The berm is for added protection from overflow only and does not serve as a dam. All ponds were constructed under the supervision of, and certified by, a registered, professional engineer.

Sedimentation Pond design specifications and details are provided in Plate 7-4, 7-5 & 7-6. The design capacities of each of the existing sedimentation ponds together with the required capacities for sediment storage and runoff volume are provided in Table 7-21.

Pond Number 1 refers to the series of ponds designated as 1, 2, and 3 on Plate 7-2. Pond Number 1 collects and treats runoff from sub-drainage areas 1 and C shown on Figure 7-4. Overflows from Pond Number 1 and Pond Number 5 flow to Pond Number 6.

The required runoff volume capacities reported in Table 7-21 were determined by adding the direct precipitation on the pond to the runoff volume from a 10 year - 24 hour rainfall for each of the sub-areas contributing to the pond. The direct precipitation to the ponds from a 10 year - 24 hour precipitation event is provided in Table 7-22. Runoff volume estimates for the various sub-areas are developed in Table 7-19.

The sediment capacity requirements were determined using the one year soil loss estimated by the USLE. Sediment capacity estimates are developed below:

Soil Loss and Sedimentation

The Universal Soil Loss Equation (USLE) was used to predict the rate of erosion for each on-site sub-drainage. The method, while having limitations, was useful because no better method was available. The USLE is,

$A = (R)(K)(LS)(C)(P)$
= erosion rate (ton/acre/year)

The variables, R, K, LS, C, and P, are defined in the following discussion.

R is the rainfall factor, which, simply stated, accounts for the erosive force of specific rainfall. R is either found on an isoerodent map, or calculated from

$R = 27P^{2.2}$, where P is the 2 year - 6 hour precipitation value (Barfield, Warner, and Haan, 1981). P, for Savage Coal Terminal, is 0.8 inch, and therefore, R is 16.5 (NOAA, 1973).

K is the soil erodibility factor. Appendix A of Preliminary Guidance for Estimating Erosion on Areas Disturbed by Surface Mining Activities in the Interior Western United States (EPA, 1977), lists K values for all established soil series in the western U. S. The K value for the native soils, except the Saltair series, is 0.43. K for the Saltair series is 0.55. Ka values are unknown for coal piles, coal refuse piles, roads, embankments, and other disturbed lands. A certain amount of judgment had to be exercised in selecting K values for the above types of areas. The K value for loose coal is likely relatively high, due to coal's low density and a large percentage of fines. A K of 0.60 was therefore assumed for the sub-drainages containing coal stockpiles.

The K value for intentionally compacted constructions, such as refuse piles, roads and embankments was assumed to be 0.50. The K value for relatively undisturbed native soils was assumed to be 0.43.

LS, the length slope factor, accounts for the length and steepness of the slopes on which erosion occurs. Length and slope estimates for the various sub-drainages are listed in Table 7-23. LS for the various areas was determined from these estimates using the procedure from the previously mentioned EPA reference (EPA, 1977).

The cover factor, C, accounts for the effects of various types of ground cover on erosion. For no ground cover a value of 1.0 is suggested. In this analysis, C was assumed to be 1.0 for most areas. For three relatively undisturbed areas, C was assumed to be 0.22 based on percentage and type of cover.

TABLE 7-21
SEDIMENTATION POND DESIGN CAPACITIES

Pond [1] Number	Design Capacity (acre - feet)	Required [2] Runoff Capacity (acre - feet)	Required [3] Sediment Capacity (acre - feet)
1	3.300	3.346	0.022
5	4.199	4.101	0.105
6*	2.150	1.726	0.025
Total	9.649	9.173	0.152

1 Pond Number 1 includes ponds 1, 2 and 3 in Series.

2 Required Runoff capacity includes runoff from a 10 year - 24 hour rainfall plus direct precipitation on the ponds.

3 Required Sediment Capacity is the estimated one year soil loss as determined from the USLE.

a.* Design Capacity is excluding filter dikes.

b. Flow through filter dikes is approximately 40 gpm, based on measurements.

c. Water entering pond No. 6 will be at a rate of approximately 40 gpm (pumping), except in the event of inflow from Ponds 1 or 5.

d. Porosity of filter dikes allows for passage of 40 gpm by actual measurement.

e. Design capacity is excluding static water level allowing for plant or thickener overflows.

TABLE 7-22
DIRECT PRECIPITATION TO SEDIMENT PONDS*

Pond No.	Pond Area (acres)	Volume (ft^3)	Volume (acre-feet)
1	0.61	3754	0.0864
5	0.73	4505	0.1034
6	0.22	1360	0.0312

* 10 year - 24 hour precipitation value is 1.7 inch (NOAA, 1973).

TABLE 7-23
EROSION RATE DETERMINATION

Area No.	R	K	L(A)	S%	LS	C	P	A t/a/yr	Area (acres)	Erosion Rate (tons/yr)
1a	16.5	0.60	150	1	0.15	1.00	1.0	1.485	14.96	22.216
1b	16.5	0.50	250	2	0.27	1.00	1.0	2.228	5.46	12.165
1c	16.5	0.50	70	2	0.18	1.00	1.0	1.485	8.54	12.682
5a	16.5	0.50	800	2	0.38	1.00	1.0	3.135	35.87	112.453
5b	16.5	0.60	450	2	0.32	1.00	1.0	3.168	14.31	45.334
5c	16.5	0.50	70	4	0.35	1.00	1.0	2.888	1.94	5.603
5d	16.5	0.60	700	2	0.36	1.00	1.0	3.564	17.03	60.695
5e	16.5	0.50	150	1	0.15	1.00	1.0	1.238	0.84	1.040
5f	16.5	0.43	400	3	0.44	0.22	1.0	0.687	4.38	3.008
6a	16.5	0.50	200	2	0.25	1.00	1.0	2.063	3.81	7.860
6b	16.5	0.60	500	2	0.33	1.00	1.0	3.267	5.46	17.838
6c	16.5	0.50	100	2	0.20	1.00	1.0	1.650	5.55	9.158
6d	16.5	0.50	100	1	0.13	1.00	1.0	1.073	2.45	2.629
6e	16.5	0.50	300	2	0.28	1.00	1.0	2.310	6.80	15.708
6f	16.5	0.43	110	2	0.21	0.22	1.0	0.328	5.44	1.784

1) L was measured on topographic map.

2) C value of 0.22 was derived from Table 4, EPA-908/4-77-005, 1977.
Assumption was, no appreciable canopy, weeds, 25% ground cover.

	tons/yr	ac/ft/yr
1	47.063	0.022
5	228.133	0.105
6	54.977	0.025
Total	330.173	0.152

TABLE 7-24
TR-20 ANALYSIS OF POND OUTLETS FOR
25 YEAR - 24 HOUR RAINFALL EVENT

Pond Number	Peak Inflow cfs	Discharge Outflow cfs	Outflow Water Depth ft	Slope %	Velocity ft/sec
1	7.03	6.82	0.89	1.0	3.25
2	6.82	6.78	0.88	1.0	3.24
3	6.78	6.73	0.87	1.0	3.23
5	11.31	9.71	1.28	0.5	2.75
6	20.29	19.93	1.16	1.0	4.16

P is the erosion control practice factor. When no erosion control measures are taken, P is assumed to be 1.0. In this analysis, P is assumed to be 1.0.

Erosion rates were estimated for each of the sub-drainages using the USLE factors and basin areas as shown in Table 7-23. The total weight of sediment eroded from each sub-drainage (in on year) was determined by adding the erosion rates for all of the sub-areas in each sub-drainage. A unit weight of 100 lbs/ft ^{3} was assumed in order to determine the yearly volume of soil loss that may be delivered to the ponds (a sediment delivery ratio of 1.0 was assumed). The required sediment capacity provided in Table 7-21 represents the total annual soil loss from the dub-drainage contributing to the pond.

Outlet Designs

The design specifications for outlet structures are listed in Plates 7-3, 7-4 & 7-5. A stage-discharge relation was developed for the outlet channels using Manning's equation with the channel dimensions listed and a roughness coefficient of 0.03.

An inflow hydrograph to each was derived using the SCS runoff Curve Number procedures and the associated computer model TR-20. A weighted curve number was obtained for each sub-drainage using the procedures described in Table 7-18.

SAVAGE COAL TERMINAL
SPILLWAY CALCULATIONS

PARAMETER	POND NO. 5	POND NO. 6
Q = Flow (cfs)	9.71	19.93
b = Bottom Width (ft.)	4.00	6.00
H = Depth of Flow (ft.)	0.85	1.05

Based on Broad-Crested Weir Formula $Q = 3.087\ b\ H^{1.5}$

Sediment Cleanout Determination

Each pond will be equipped with a sediment marker for determination of sediment level. The sediment pond markers will be checked on a quarterly basis to determine sediment levels.

When the sediment accumulation reaches the cleanout depths as listed below (60% of maximum sediment storage) measures will be implemented to clean the affected pond within 60 days, weather permitting, of the measurement.

Cleanout levels for each of the ponds are as follows:

POND NUMBER	*SEDIMENT DEPTH (UP FROM BOTTOM)
1	1.20'
2	1.20'
3	0.96'
5	1.14'
6	0.72'

* Corresponding to the Bolt Location as shown on Figure 7-15.

The results of the TR-20 analysis for a 25 year - 24 hour rainfall and the Fletcher-Farmer Rainfall Distribution are provided in Table 7-24. The analyses was performed for the pond full when the event occurred.

Based on the analyses summarized above, the structures are more than adequate to accommodate the peak discharge from a 25 year - 24 hour rainfall. In the rare event that a discharge overtops a structure, little damage or erosion should occur because the ponds are incised.

Each of the sediment ponds is equipped with an overflow structure with erosion protection. The overflows between Pond number 1, 2, 3 and 6 consist of grouted rip-rap and concrete. The overflow from Pond 5 is protected with 8" drainrock leading into a channel with a gradient of approximately 1% flowing into Pond 6. Sediment Pond 6 has concrete and rip=rapped inlet structures, and the overflow or emergency spillway is protected by 8" drainrock channeled into an open channel discharge. Sediment pond details (including overflows) are shown on Plates 7-3, 7-4 & 7-5.

Site Drainage Control

The TR-20 storm hydrology analysis performed to assess sediment pond outlet adequacies was also structured to permit assessment of collection ditch and culvert capacities. Storm hydrographs from each sub-drainage are routed through the culverts and ditches shown on Plate 7-2. Design dimensions and design discharges and velocities for the collection ditches are provided on Plate 7-5. Design dimensions to the culverts designated on Plate 7-2 are provided in Table 7-25. All designed analyses were performed for a 25 year - 24 hour rainfall event using the Farmer-Fletcher rainfall distribution.

B.T.C.A. Areas

There are 7 small areas located within the permit area which do not drain into the sedimentation ponds. Six of these areas have been designated as "Best Technology Currently Available" or "B.T.C.A." Areas, and are shown on Plates 7-2 and 1-1 of this M.R.P. In addition, the buried pipeline area is designated a "Small Area Exemption" as shown on Plate 1-1 and detailed in Appendix 7-1. The following is a description of each area along with the treatment used for sediment control:

(1) B.T.C.A. Area #1 - This is an area of approximately 0.69 acres located between the pump house access road and the railroad tracks. The area is blocked off by a berm and is mostly vegetated. The area drains to the north-east corner of the property where it joins the sediment pond #6 outlet ditch. A silt fence is maintained at the edge of the area for additional sediment control. The only runoff from this area is from direct rainfall, which is calculated to be 0.098 acre feet for a 10 year - 24 hour event (1.7 inches, NOAA, 1973). Treatment of runoff is by vegetative filter and silt fence. (Plate 7-2).

(2) B.T.C.A. Ara #2 - This is a small area of approximately 0.28 acres located between the railroad loop and loadout tracks. The area has minimal vegetation, and is covered mostly by railroad ballast (slag). The top of the ballast is approximately 1.25 feet at the low end. Based on the slight slope, approximately ½ of the area of 0.14 acres will contain runoff at an average depth of 0.625 feet, giving the area a potential storage volume of 0.088 acre feet. Since the only runoff to this area will be from direct precipitation, a 10 year - 24 or event would result in approximately 0.040 acre feet of runoff. The area is more than adequate to contain the expected runoff; therefore, the only treatment used for this area is total containment. (Plate 7-2).

(3) B.T.C.A Area #3 - This is an area along the east edge of the property between the main railroad spur track and the silo loadout track. The area contains approximately 0.85 acres, and slopes to the north, where any runoff is contained between the two sets of tracks. The track (ballast) height is approximately 1.50' on the low end. Due to the slope, only 1/4 of the area (0.22 acres) will contain runoff. This calculates to a potential storage volume of 0.165 acre feet for this area. Since the runoff from a 10 year - 24 hour event on this area is only 0.120 acre feet, the potential storage volume is more than adequate. Total containment is therefore the only treatment proposed for this area. (Plate 7-2).

(4) B.T.C.A. Area #4 - This is an area of approximately 0.521 acres surrounding the pump house at the northeast corner of the site. A ditch on the west side intercept runoff and directs it into Pond #6. The area is in a slight depression, and is protected by berms to contain runoff. B.T.C.A for this area is total containment, since the only runoff here is from direct rainfall. The potential runoff from a 10 year - 24 hour event on this area is approximately 0.074 acre feet. The potential containment area is calculated to be a minimum of 0.26 acre feet, which is based on ½ the area at a depth of 1 foot (due to the slight slope). The area is therefore more than adequate to contain expected runoff. (Plate 7-2).

(5) B.T.C.A. Area #5 - This is an area of approximately 0.86 acres, consisting of the outslope of the railroad loop south of the refuse pile from culvert C-1 to the "Y" in the railroad. This area drains along the toe of the railroad and passes through a silt fence and a vegetated area for treatment prior to entering the 24" CMP beneath the main railroad spur track. The potential runoff from a 10 year - 24 hour event is approximately 0.12 acre feet. Treatment is by vegetation and a silt fence as mentioned above. (Plate 3-2).

(6) B.T.C.A. Area #6 - This is the area surrounding the river pump located approximately 7,500' due north of the Northeast corner of the Savage Coal Terminal. The area is approximately 0.690 acres, and includes the well, pump, pump house and associated disturbance. The entire B.T.C.A. area is in a depression and does not drain. The treatment for this area is therefore, total containment. The potential containment area is calculated to be a minimum of 0.345 acre feet, which is based on ½ the area at a depth of 1 foot (due to slight slopes). The potential runoff from a 10 year - 24 hour precipitation event is from direct rainfall, and is calculated to be 0.098 acre feet. The area is therefore more than adequate to contain the expected runoff. (Plate 1-1).

(7) Small area Exemption #1 - This is the area consisting of the 20' Right-of-Way for the buried pipeline from the river pump to the northeast corner of the Savage Coal Terminal, as described in Chapter 1 and as shown on Plate 1-1 and detailed in Appendix 7-1. The entire area for exemption is approximately 20' wide by 10,000' long, or 4.59 acres. The exemption from siltation structures or alternate sediment control measures is based on R645-301-742.240, and the following:

(a) The pipeline was installed in 1977-1978, and is totally buried;

(b) The line passes beneath farm roads and cultivated (and uncultivated) farm lands, which are graded and/or plowed at the discretion of the farmers;

(c) The area above the line is naturally revegetated or cultivated except where it passes beneath or along the roads; therefore, no surface evidence of the line exists;

(d) The area is small compared to the 160 acre permit area;

(e) It is not practical to install surface sediment controls in this area, which is used for farmland and livestock grazing.

Refuse Pile Drainage

The drainage from the refuse pile has been upgraded to accommodate a 100 year - 6 hour event (1.91 inches). As a result of the revised storm design requirements, 2 ditches and one culvert have been re-designed. Collection ditch CD-13 is on the north end of the pile parallel to the road, and drains the north and west slopes of the pile. Collection ditch CD-7 is along the south and east side of the pile, between the pile and the railroad. This is generally a broad, well vegetated area, and drains the south and east slopes of the pile. Drainage from the top of the pile is controlled by berms, which prevent drainage down the slope, and direct it to the low point of the pile where it flows into a 24" flexible culvert. This culvert is shown on Table 7-25 "Culvert Design Specifications."

The following pages will summarize the methodology used in the ditch and culvert design.

A typical cross section of the refuse pile drainage channels is shown on Figure 7-11. Design details are summarized for each of the channels in Table 7-26. The channel design is based on the following criteria:

(1) 100 year - 6 hour precipitation event - 1.91 inches.

(2) OSM Hydrology Program, using SCS-TR55 method for Type II storms.

(3) Drainage areas taken from Plate 7-2.

(4) Slopes taken from Plate 7-2.

(5) Runoff curve number of 87 used as an average for the refuse area on Table 7-18 "Refuse Area".

(6) Manning's No. of 0.035 used for roughness coefficient.

(7) Critical velocity for erosion - 5 fps.

(8) Runoff based on rainfall-runoff equation

$$Q = \frac{(P-0.2S)^2}{P+0.8S} = 0.83; \text{ where}$$

$$S = \frac{1000}{CN} - 10; \; CN = 87; \; P = 1.91 \text{ in.}$$

TABLE 7-25
CULVERT DESIGN SPECIFICATIONS

Culvert	Design	Diameter	Length	Normal Depth	Velocity
C-1	0.81	1.0	30	0.45	2.38
C-1a	0.81	2.0	55	0.45	2.38
C-2	0.98	1.5	400	0.35	2.80
C-3	3.70	(2) 1.5	60	0.59	2.90
C-4	1.11	1.5	100	0.40	2.05
C-5	9.68	2.0	260	1.35	3.59
C-6	0.80	1.5	30	0.38	2.20
C-6A	0.80	2.0	300	0.38	2.20
C-7	10.56	2.0	40	1.43	4.40
C-8	0.77	1.5	60	0.38	2.20
C-9	1.44	1.5	50	0.51	2.70
C-10	11.97	2.0	40	1.60	4.44
C-12	5.11	1.5	40	1.11	3.64
C-13	5.11	1.5	130	1.17	4.73
C-13A	5.11	1.5	60	1.11	3.64
C-13B	5.11	1.50	100	1.11	3.64
C-15	20.50	2.0	30	2.87*	7.60*
C-16	1.34	2.0	350	0.45	2.10
C-17	0.80	1.5	160	0.46	2.20
C-18	0.80	1.5	100	0.46	2.20
C-19	0.22	1.0	50	0.28	1.19
C-20	0.22	1.0	50	0.28	1.19
C-21	1.11	2.0	200	0.34	2.05
C-22	13.88	2.0	175	2.10****	11.49
C-23	0.15	1.0	45	0.20	1.50
C-24	1.44	1.5	40	0.51	2.70
C-25	1.11	1.5	60	0.40	2.05
C-25A	1.11	1.5	50	0.40	2.05
C-26	1.44	1.5	50	0.51	2.70
C-27	1.44	1.5	50	0.51	2.70
C-28	1.44	1.5	50	0.51	2.70

* Head Water Depth = 3.50 ft.

*** Erosion to be minimized by the use of 9" med. diam. rip-rap at the culvert outlet.

**** Head Water Depth - 3.50 ft.

TABLE 7-26 REFUSE PILE DRAINAGE			
Design Details			
Structure	CD-13	CD-7	C-22
Drainage Area (acres)	4.16	7.18	16.45
Precipitation: 100 year - 6 hour (inches)	1.91	1.91	1.91
Peak Discharge - Q100 (cfs)	5.20	8.98	13.88
Slope (%)	4.00	3.00	2.00
Bottom Width (feet)	0.00	2.00	24" cmp
Side Slope (H:V)	1:1	1:1	N/A
Manning's No.	0.035	0.035	0.024
Velocity (fps)	4.46	4.57	11.49
Runoff Curve No.	87	87	87
Rip-Rap Required (Y/N)	N*	N*	N*
Flow Depth (feet)	1.08	0.72	2.10
Time of Conc. (hours)	0.02	0.02	0.30

* Channels will be constructed within Mancos Shale or compacted refuse where erosive velocities are estimated at 6 fps or greater ("Applied Hydrology and Sedimentology for Disturbed Areas," Table 3-2, p. 162, Barfield, Warner & Haan, 1973). If erosion becomes evident, channels will be rip-rapped as necessary.

Jensen Property Berm

The constructed berm around the Jensen property provides for diversion of drainage from this area eastward along the railroad loop to the 24" culvert beneath the main line of the railroad at the southeast corner of the property. Cross-Section of the berm is shown on Figure 7-12, and location is shown on Plate 7-2.

The berm is more than adequate to divert the entire runoff from Area 5e shown on Figure 7-5 and described on Table 7-25, which shows an expected runoff of only 0.318 acre feet with a design peak flow of 0.81 cfs (Culvert C-1). Culvert C-1 will remain in place to divert drainage from the disturbed area remaining between the Jensen Property and the railroad loop.

742. Sediment Control Measures, See Section 741.

742.100. General Requirements.

742.110. Appropriate sediment control measures are designed, constructed and maintained using the best technology currently available to:

742.111. Prevent, to the extent possible, additional contributions of sediment to stream flow or to runoff outside the permit area; (See Section 741.)

742.112. Meet the effluent limitations under R645-301-751; and (See Section 741.)

742.113. Minimize erosion to the extent possible. (See Section 741.)

742.120. Sediment control measures include practices carried out within and adjacent to the disturbed area. See Section 741.

742.121. Sediment will be retained within the disturbed area. (See Section 741.).

742.122. See Section 741 and Plate 7-2 for details on undisturbed diversions.

742.123. See Section 741.

742.124. See Section 741.

742.125. N/A - There are no plans to treat runoff with chemicals.

742.126. N/A - This is a surface operation.

742.200. Siltation Structures.

742.210. See Section 741.

742.211. Additional contributions of suspended solids and sediment to streamflow or runoff outside the permit area will be prevented to the extent possible using the best technology currently available. (See Section 741).

742.212. All siltation structures have been constructed and certified.

742.213. N/A - Siltation structures are not designed to impound water.

742.214. N/A - This is a surface operation.

742.220. Sedimentation Ponds.

There are 5 sedimentation ponds on this site. See Plate 7-2 for location and Section 741 for design details.

742.221. Sedimentation ponds, meet the following criteria:

742.221.1. Sedimentation ponds are used both in series and individually. (See Plate 7-2).

742.221.2. All ponds are located within the disturbed area and none are within a perennial stream.

742.221.3. All ponds are designed, constructed, and maintained to:

742.221.31. Provide adequate sediment storage volume - See Section 741.

742.221.32. Provide adequate detention time - See Section 741.

742.221.33. Contain the 10 year-24 hour precipitation event - See Section 741.

742.221.34. Provide a nonclogging dewatering device adequate to maintain the detention time required under R645-301-742.221.32 - See Section 741.

742.221.35. Minimize short circuiting - See Section 741.

742.221.36. Provide periodic sediment removal - See Section 741.

742.221.37. Ensure against excessive settlement - See Section 741.

742.221.38. Be free of extraneous or toxic materials - See Section 741.

742.221.39. Be compacted properly - See Section 741.

742.222. N/A - Sedimentation ponds do not meet the size or other qualifying criteria of MSHA 30 CFR 77.216(a).

742.223. All ponds are equipped with an adequately sized open-channel spillway.

742.223.1. Spillways are lined with concrete or rip-rap.

742.223.2. N/A

742.224. N/A - Ponds have open-channel spillways.

742.225. N/A - No exception rquested.

742.230 Other Treatment Facilities

The only other treatment facilities on site are the B.T.C.A. areas and S.A.E. discussed in Section 741.

742.231 B.T.C.A. areas and S.A.E. are designed to treat or contain runoff from a 10 year - 24 hour precipitation event.

742.232 See Section 741.

742.240 N/A - No exemptions are requested with the exception of the B.T.C.A. areas and S.A.E. discussed in Section 741.

742.300 Diversions are discussed in detail in Section 741.

742.310 Undisturbed diversions are noted with a UD-n number. Disturbed area diversions or collection ditches are noted with a CD-n number. All diversions are shown on Plate 7-2.

742.311 N/A

742.312 Diversion designs are detailed in Section 741 and on Figure 7-13.

742.312.1 Diversions are designed to be stable. The majority of the existing diversions have been in place for over 25 years with no instability problems.

742.312.2 Diversions provide protection against flooding and resultant damage to life and property. See Section 741.

742.312.3 Diversions are designed to prevent, to the extent possible using the best technology currently available, additional contributions of suspended solids to streamflow outside the permit area. (See Section 741).

742.312.4 Diversions have been constructed with Division and O.S.M. approval, and comply with applicable local, Utah and federal laws and regulations.

742.313 All diversions are considered temporary, and will be removed and reclaimed during final site reclamation.

742.314 N/A

742.320 N/A - There are no perennial or intermittent streams at this site.

742.321 N/A

742.322 N/A

742.323 N/A

742.324 N/A

742.330 Diversion of Miscellaneous Flows

742.331 Diversion of miscellaneous flows on this site consist of the main undisturbed diversion UD-1 to divert undisturbed runoff around the disturbed area, and the French Drain to divert ground water. These diversions are discussed in detail in Sections 741 and 731.

742.332 See Plate 7-2 and Sections 731 and 741.

742.333 The undisturbed diversion is sized to carry runoff from a 10 year - 24 hour precipitation event.

742.400 Road Drainage

742.410 All roads on site are considered primary roads, and are constructed with appropriate drainage controls.

742.411 Portions of the main haul roads on site are now paved, with the remaining roads gravel surfaced and treated with magnesium chloride. All ditches and culverts have been designed and approved in accordance with Diversion criteria.

742.412 N/A - No roads are within the channel of an intermittent or perennial stream.

742.413 Runoff from all roads is collected in sediment ponds to prevent sedimentation and flooding.

742.420 All roads on site are considered primary roads.

742.421 All roads are located on stable surfaces, and all haul roads are paved or gravel-surfaced.

742.422 N/A - There are no stream fords at this site.

742.423 Drainage Control. Drainage control for all roads consists of a combination of adequately sized ditches and culverts, as shown on Plate 7-2.

742.423.1 Drainage controls for all roads are sized to carry the peak runoff from a 10 year - 24 hour precipitation event. (See Section 741).

742.423.2 Drainage pipes and culverts are constructed to avoid plugging or collapse and are equipped with erosion protection wherever needed.

742.423.3 See Section 741 for design details on drainage ditches.

742.423.4 N/A - No natural stream channels are altered or relocated at this site.

742.423.5 N/A - There are no stream channel crossings at this site.

743 Impoundments.

743.100 All impoundments at this site are considered temporary.

743.110 N/A - There are no impoundments meeting the criteria of MSHA, 30 CFR 77.216(a).

743.120 See Section 741 for impoundment design.

743.130 All impoundments are equipped with a single open-channel spillway.

743.131 Open-channel spillways are approved by the Division, and are constructed of grouted rip-rap, or are earth-lined and vegetated and carry infrequent flows at non-erosive velocities.

743.132 N/A.

743.140 Impoundments are inspected quarterly and certified on an annual basis in accordance with R645-301-514.300.

743.200 N/A - All impoundments are temporary.

743.300 All impoundments are equipped with spillways sized to carry runoff from a 25 year - 6 hour precipitation event. (See Section 741).

744 Discharge Structures.

744.100 Discharges from ponds, culverts or diversions are considered non-erosive at less than 5 feet per second. Whenever, calculations or site conditions indicate erosive velocities, outlets are protected by grouted rip-rap or rip-rap as described in Section 741.

744.200 See Section 741.

745 N/A - There is no excess spoil generated at this operation.

745.100 N/A - No excess spoil.

745.200 N/A - There are no valley or head of hollow fills.

745.300 N/A - No durable rock fills.

745.400 N/A - No pre-existing benches or excess spoil.

746.100 The only coal mine waste generated at this site is in the form of cleanout material from ditches and sediment ponds. Prep plant reject is hauled to the plant operator's approved site.

746.110 All coal waste is placed in the existing, approved refuse pile.

746.120 Coal waste is placed in the refuse pile and treated as refuse.

746.200 Savage Coal Terminal has an MSHA approved refuse pile which is still considered active. Design and operation details of the pile are described in Chapter 5.

746.210 The refuse pile is approved by both the Division and MSHA, and meets all applicable regulations as described in Chapter 5.

746.211 N/A - The refuse pile does not contain springs, water courses or seeps and is not constructed with underdrains.

746.212 The top of the refuse pile is surrounded by a berm to prevent uncontrolled runoff from the outslopes of the pile. The perimeter of the pile is also drained by diversion ditches sized to carry the runoff from the pile from a 100 year - 6 hour precipitation event, as required.

746.213 N/A - There are no underdrains.

746.220 The refuse pile is constructed by an approved plan which provides for stability through adequate compaction and drainage control.

746.221 The refuse pile is considered active and still under construction (and/or removal as discussed in Chapter 5); therefore, slopes and diversions have not been revegetated at this time.

746.222 N/A - No impoundments are planned on the refuse pile.

746.300 N/A - No impounding structures are constructed of coal mine waste.

746.400 N/A - There are no plans to return coal processing waste abandoned underground workings.

747 Non-coal mine waste is collected, stored and disposed of as described in Section 528.330.

747.100 See Section 528.330.

747.200 See Section 528.330.

747.300 See Section 528.330.

748 All decommissioned water monitoring wells have been plugged and sealed as approved by the Division. The 2 existing water monitoring wells, French Drain collection sump and river pump well are shallow, water systems. They will be reclaimed according to the approved plan as described in Section 540 of this permit.

750 All coal mining and reclamation operations will be conducted to minimize disturbance to the hydrologic balance within the permit and adjacent areas, to prevent material damage to the hydrologic balance outside the permit area and support approved postmining land uses in accordance with the terms and conditions of the approved permit and the performance standards of R645-301 and R645-302.

751 Discharges or water from areas disturbed by coal processing and reclamation operations will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for coal mining promulgated by the U.S. Environmental Protection Agency set forth in 40 CFR Part 434. (See approved UPDES Permit).

752 Sediment control measures are located, maintained, constructed and will be reclaimed according to plans and designs given under R645-301-312.240, R645-301-732, R645-301-742 and R645-301-760.

753 See Section 741.

754 See Section 528.

755 See Section 748.

760 Reclamation is discussed in Section 540 of this M.R.P.

761 Reclamation will be performed as per Sections 540 and 550

762 All roads will be removed and reclaimed during final reclamation.

763 Siltation structures will remain in place as described in Section 540, until removal by the Division.

764 See Section 540 for reclamation timetable.

765 See Section 540 and 748 for details on sealing of wells.

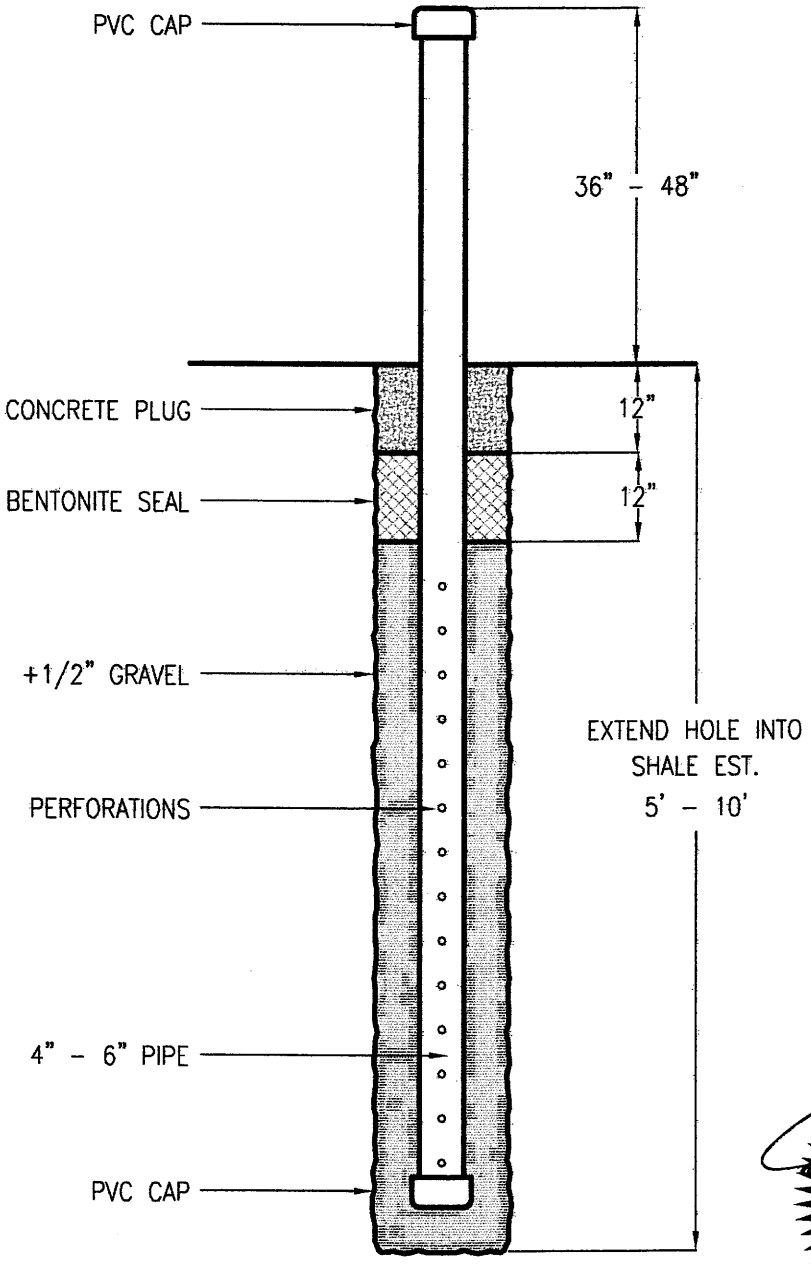
References

[1] "Utah Climate", by Gaylene L. Ashcroft, Donald T. Jensen and Jeffrey L. Brown, Utah Climate Center, Utah State University, 1992.

[2] Utah Power & Light Company, 1974: Emery Generating Station Applicants Environmental Analysis - Volume II. Salt Lake City, p. 50.

SAVAGE COAL TERMINAL
MONITORING WELL DESIGN

(NOT TO SCALE)

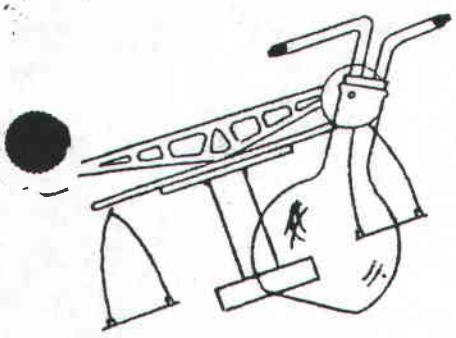


TYPICAL GROUND WATER MONITORING WELL

FIGURE 7-1

FIGURE 7-2
CHEMICAL ANALYSIS
PRICE RIVER

MINING AND RECLAMATION PLAN



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

RECEIVED
EFFECTIVE:
SEP 13 2007
UTAH DIVISION OIL, GAS AND MINING
PRICE FIELD OFFICE

Date: December 21, 1977

Name Swisher Coal Company

Address P.O. Box AU

Price, UT 84501

CERTIFICATE OF ANALYSIS

77-2502-1

Water labeled "11-29 River" received on December 7, 1977.

Analysis started on: December 7, 1977

Turbidity	32.0 NTU	Total Hardness as $CaCO_3$	1,080 mg/l
Conductivity	3,976 umhos/cm	Iron as Fe (Total)	1.301 mg/l
pH	7.69 Units	Iron as Fe (Filtered)	0.355 mg/l
Total Dissolved Solids at 180°C.	2,584 mg/l	Lead as Pb	0.012 mg/l
Alkalinity as $CaCO_3$	300.0 mg/l	Magnesium as Mg	93.6 mg/l
Arsenic as As	<0.001 mg/l	Manganese as Mn	0.155 mg/l
Bicarbonate as HCO_3	366.0 mg/l	Mercury as Hg	<0.0002 mg/l
Barium as Ba	0.08 mg/l	Nickel as Ni	<0.001 mg/l
Boron as B	0.48 mg/l	Nitrate as NO_3-N	1.08 mg/l
Cadmium as Cd	0.005 mg/l	Nitrite as NO_2-N	0.07 mg/l
Calcium as Ca	280.0 mg/l	Potassium as K	6.69 mg/l
Carbonate as CO_3	<0.01 mg/l	Selenium as Se	<0.001 mg/l
Chloride as Cl	42.0 mg/l	Silica as SiO_2	57.0 mg/l
Chromium as Cr (Total)	0.002 mg/l	Silver as Ag	<0.001 mg/l
Chromium as Cr (Hex)	<0.001 mg/l	Sulfate as SO_4	1,580 mg/l
Copper as Cu	0.014 mg/l	Sodium as Na	400.0 mg/l
Surfactants MBAS	<0.01 mg/l	Zinc as Zn	0.030 mg/l
Fluoride as F	0.54 mg/l		
Phosphorus as PO4-P	0.06 mg/l		

Ford Chemical Laboratory, Inc.

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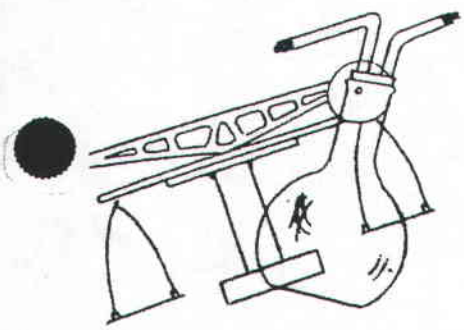
FIGURE 7-3
CHEMICAL ANALYSIS
CARBON CANAL

MINING AND RECLAMATION PLAN



Ford Chemical LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 485-5761

INCORPORATED
EFFECTIVE:
SEP 18 2007
UTAH DIVISION OIL, GAS AND MINING
PRICE FIELD OFFICE

Date: December 21, 1977

Name Swisher Coal Company

Address P.O. Box AU

Price, UT 84501

CERTIFICATE OF ANALYSIS

77-2502-2

Water labeled "11-29 Canal" received on December 7, 1977.

Analysis started on: December 7, 1977

Turbidity	15.0	NTU	Total Hardness as $CaCO_3$	360.0	mg/l
Conductivity	1,556	umhos/cm	Iron as Fe (Total)	0.416	mg/l
pH	7.90	Units	Iron as Fe (Filtered)	0.398	mg/l
Dissolved Solids at 180°C.	1,012	mg/l	Lead as Pb	0.009	mg/l
Alkalinity as $CaCO_3$	238.0	mg/l	Magnesium as Mg	21.6	mg/l
Arsenic as As	<0.001	mg/l	Manganese as Mn	0.025	mg/l
Bicarbonate as HCO_3	290.3	mg/l	Mercury as Hg	<0.0002	mg/l
Barium as Ba	0.10	mg/l	Nickel as Ni	<0.001	mg/l
Boron as B	0.65	mg/l	Nitrate as NO_3-N	1.06	mg/l
Cadmium as Cd	0.002	mg/l	Nitrite as NO_2-N	0.04	mg/l
Calcium as Ca	108.0	mg/l	Potassium as K	3.53	mg/l
Carbonate as CO_3	<0.01	mg/l	Selenium as Se	<0.001	mg/l
Chloride as Cl	28.0	mg/l	Silica as SiO_2	6.10	mg/l
Chromium as Cr (Total)	<0.001	mg/l	Silver as Ag	<0.001	mg/l
Chromium as Cr (Hex)	<0.001	mg/l	Sulfate as SO_4	400.0	mg/l
Copper as Cu	0.016	mg/l	Sodium as Na	307.0	mg/l
Surfactants MBAS	<0.01	mg/l	Zinc as Zn	0.022	mg/l
Fluoride as F	0.50	mg/l			
Phosphorus as Po4-P	0.11	mg/l			

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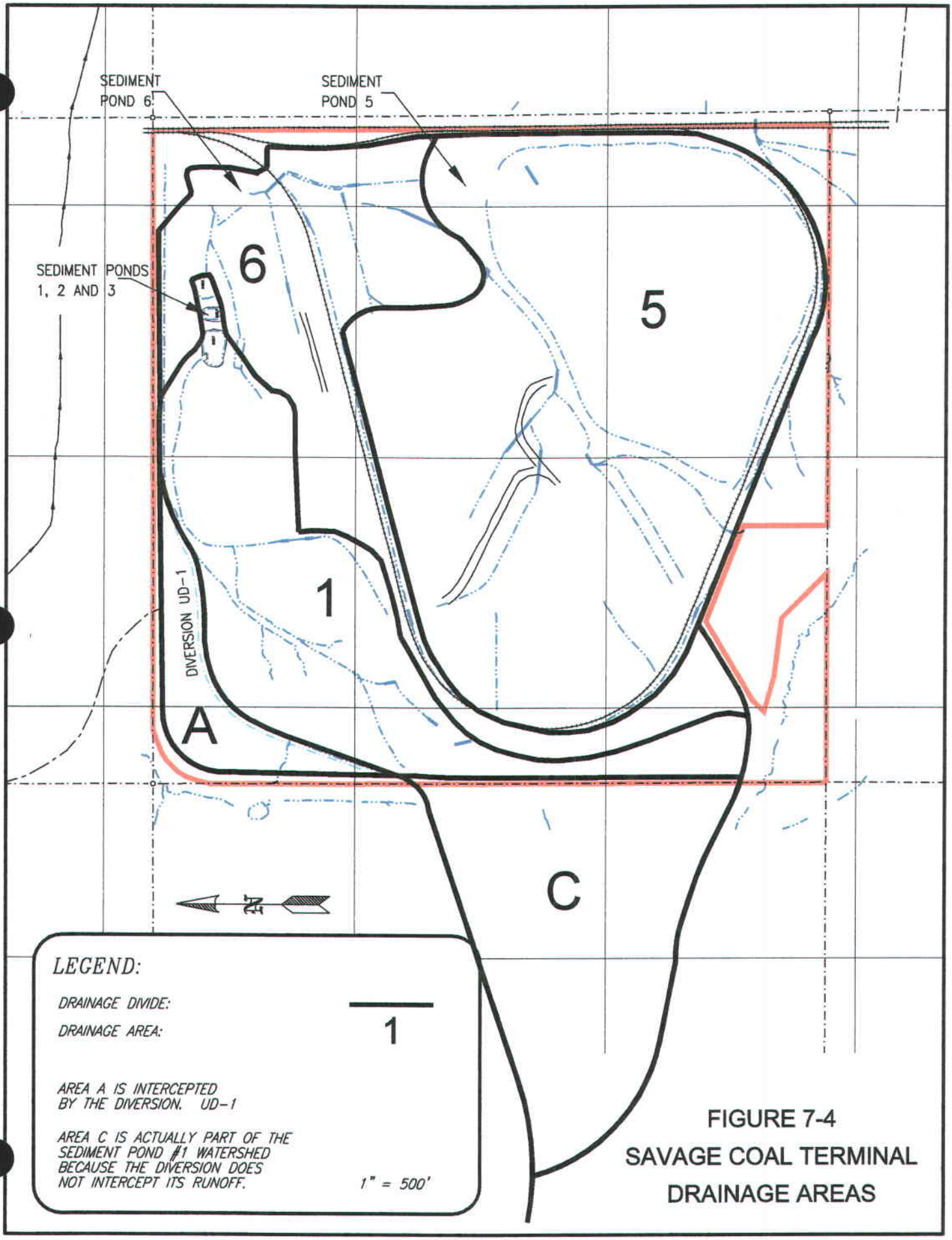


FIGURE 7-4
SAVAGE COAL TERMINAL
DRAINAGE AREAS

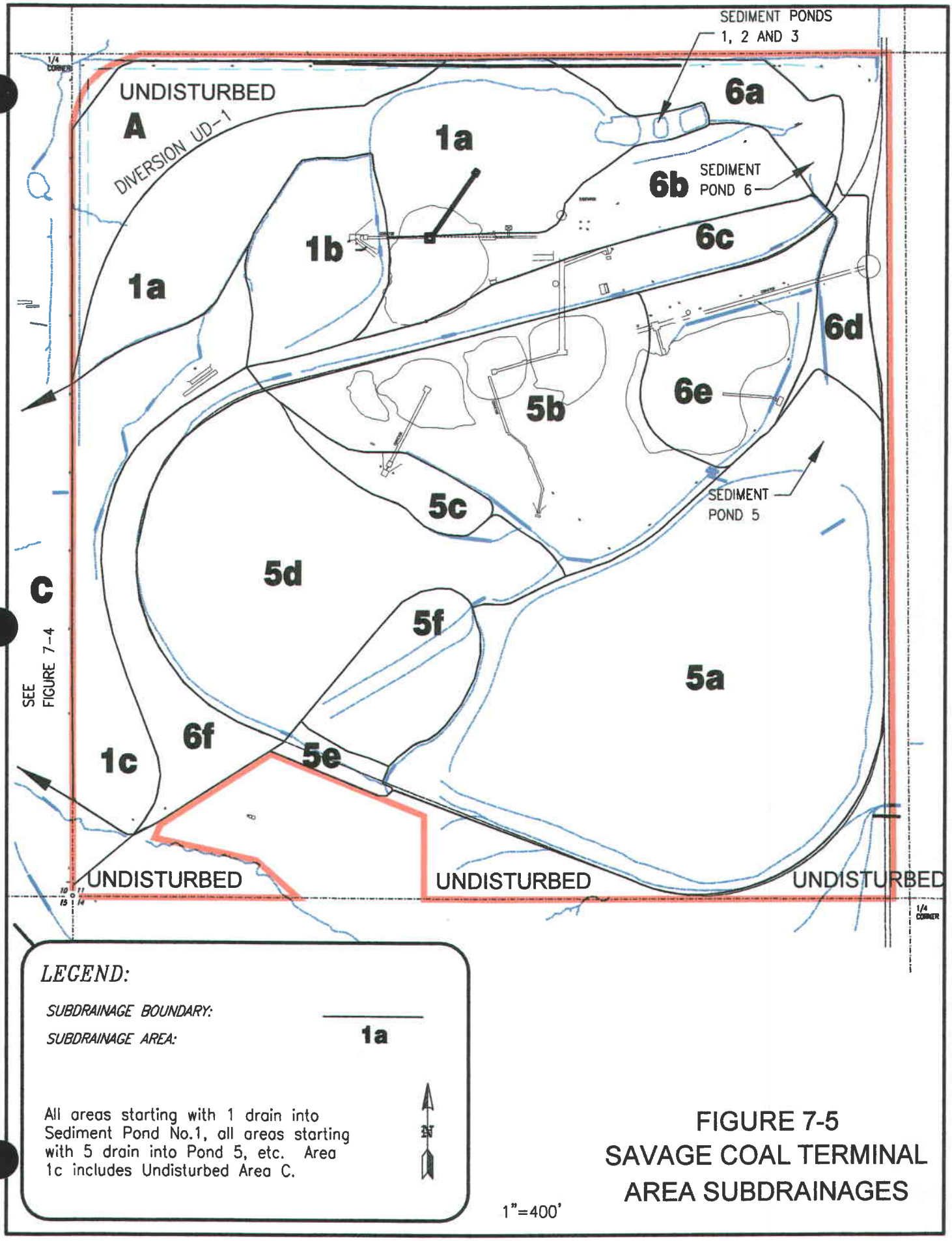
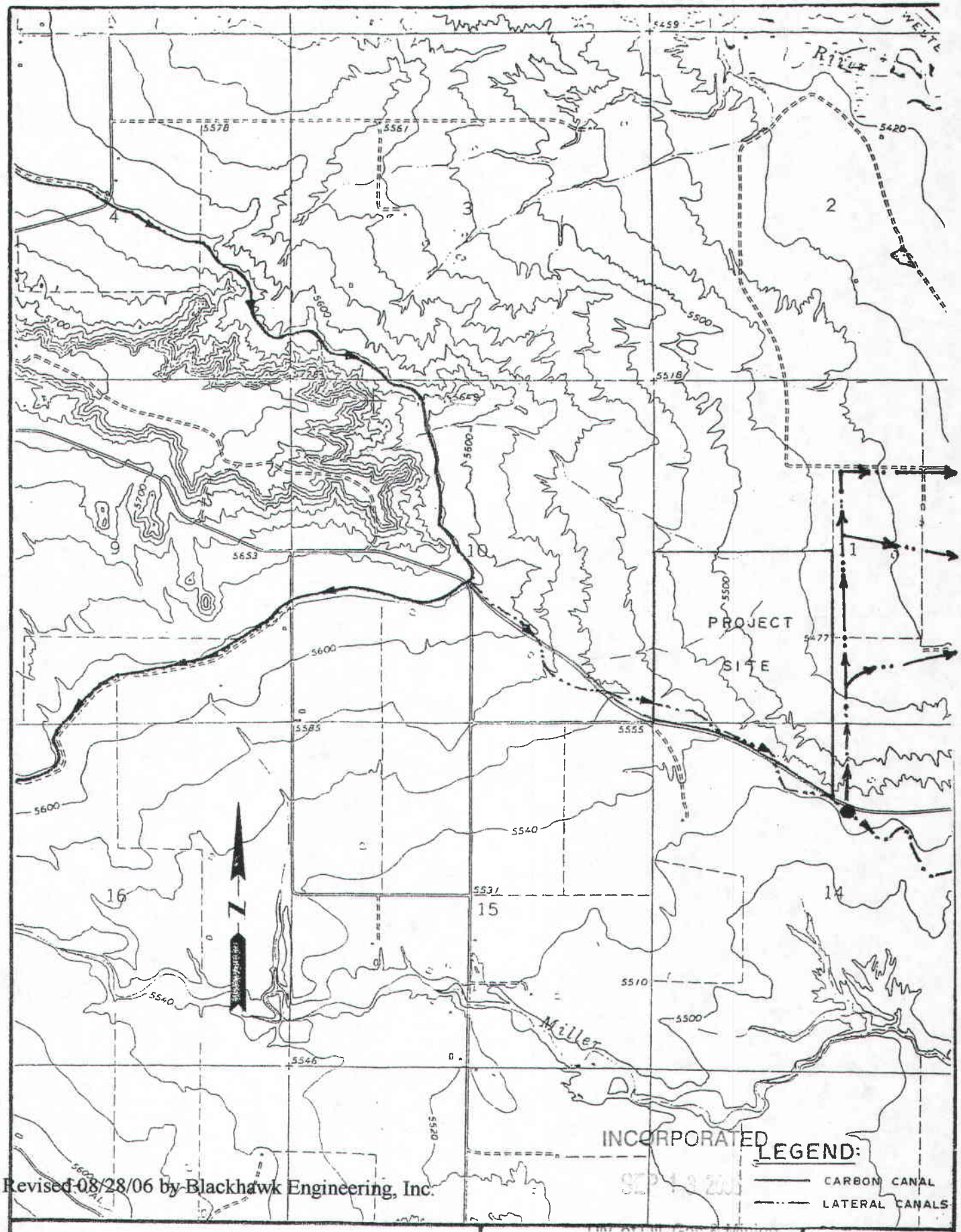


FIGURE 7-5
SAVAGE COAL TERMINAL
AREA SUBDRAINAGES



Revised 08/28/06 by Blackhawk Engineering, Inc.

ROLLINS, BROWN & GUNNELL, INC. CONSULTING ENGINEERS	LOCATION OF IRRIGATION CANALS	FIGURE 7-6

INCORPORATED
SEP 1 9 2006
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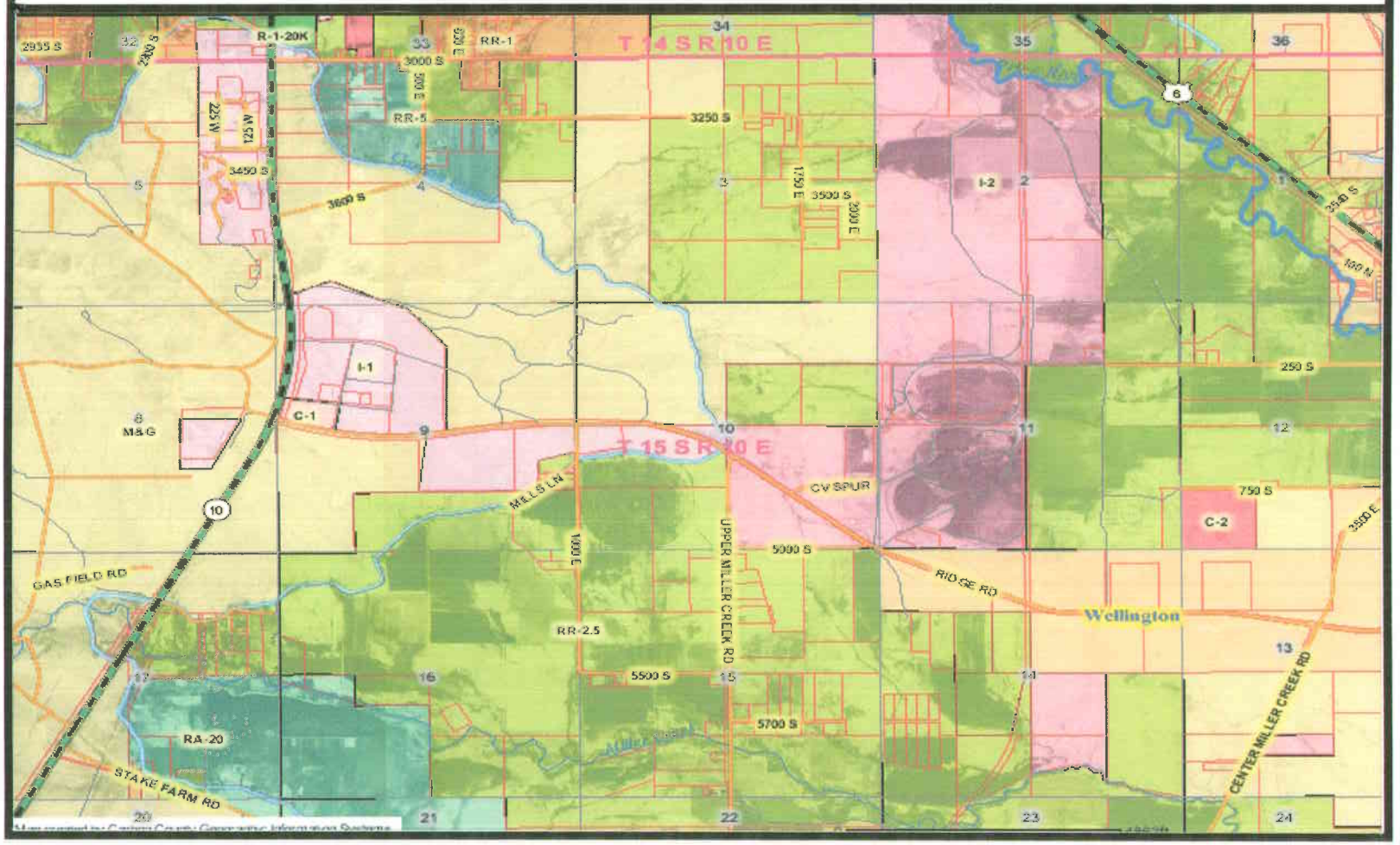
MAR 2 1 2007
DIV. OF OIL, GAS & MINING
RECEIVED
AUG 3 1 2006

AVF and Zoning Figure



I-2		Heavy Industrial Zone
RR-2.5		Rural Residential 2.5 Acre Zone
M&G		Mining and Grazing Zone

Figure 7-7

SAVAGE COAL TERMINAL
TYPICAL SILT FENCE

(NOT TO SCALE)

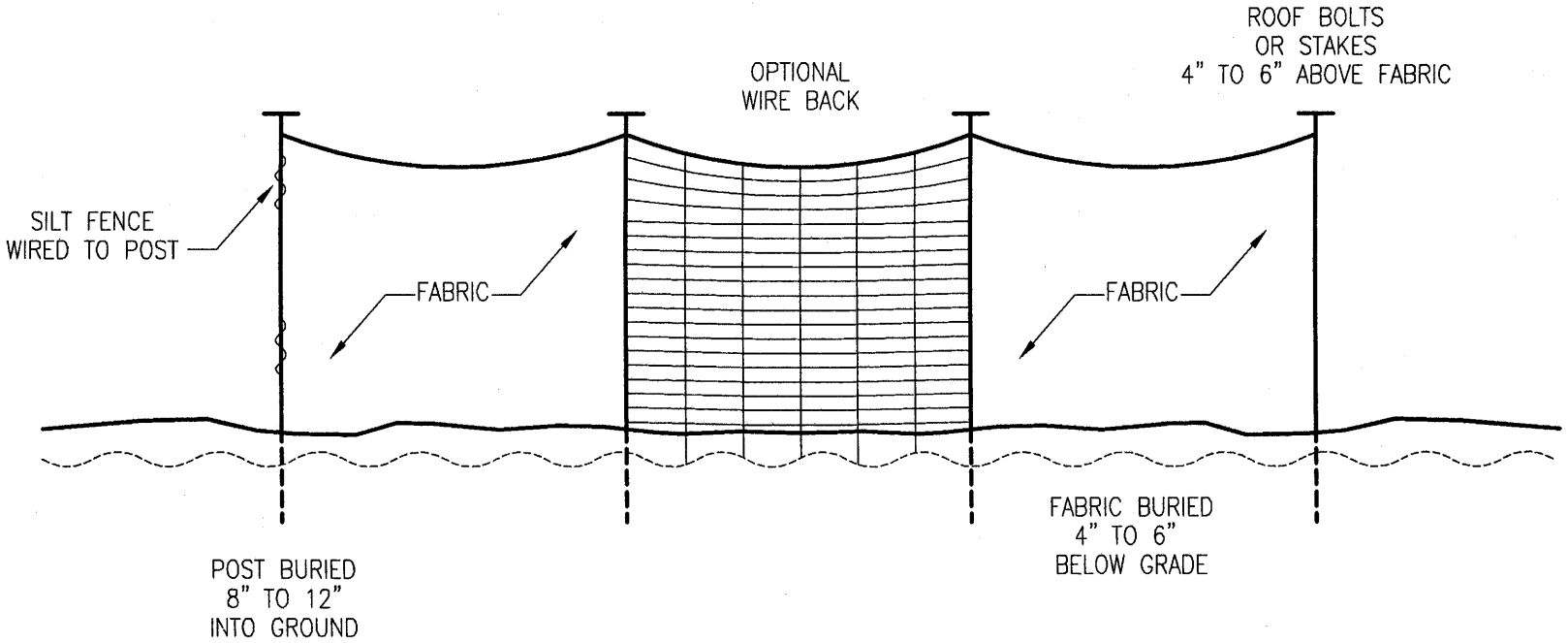
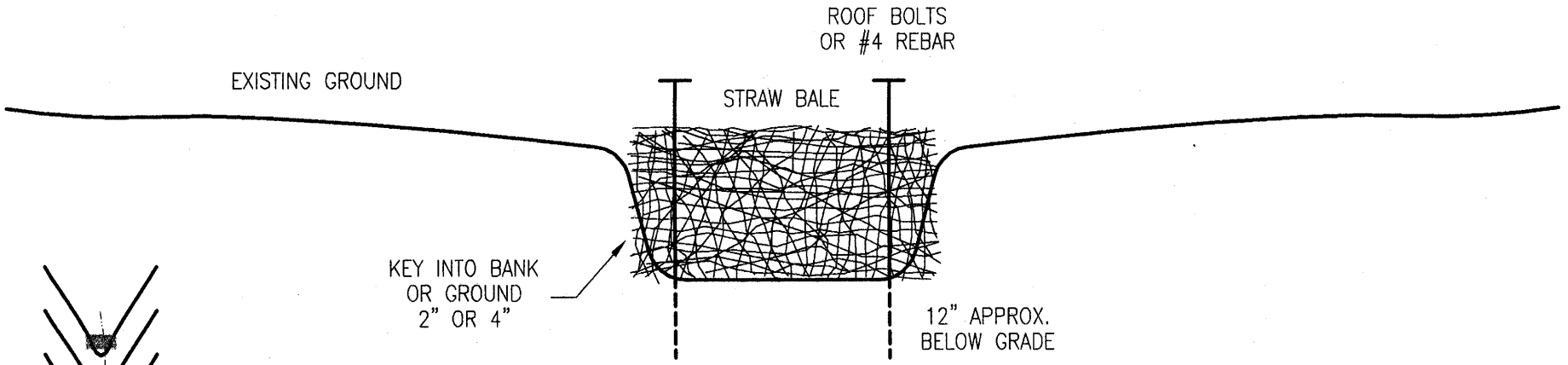
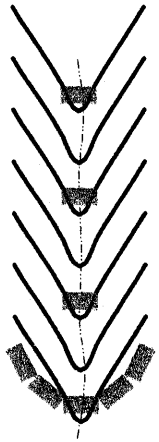


FIGURE 7-8

SAVAGE COAL TERMINAL
TYPICAL STRAW BALE INSTALLATION

(NOT TO SCALE)





SPACING DEPENDENT
UPON GRADE

BALES PLACED IN SERIES

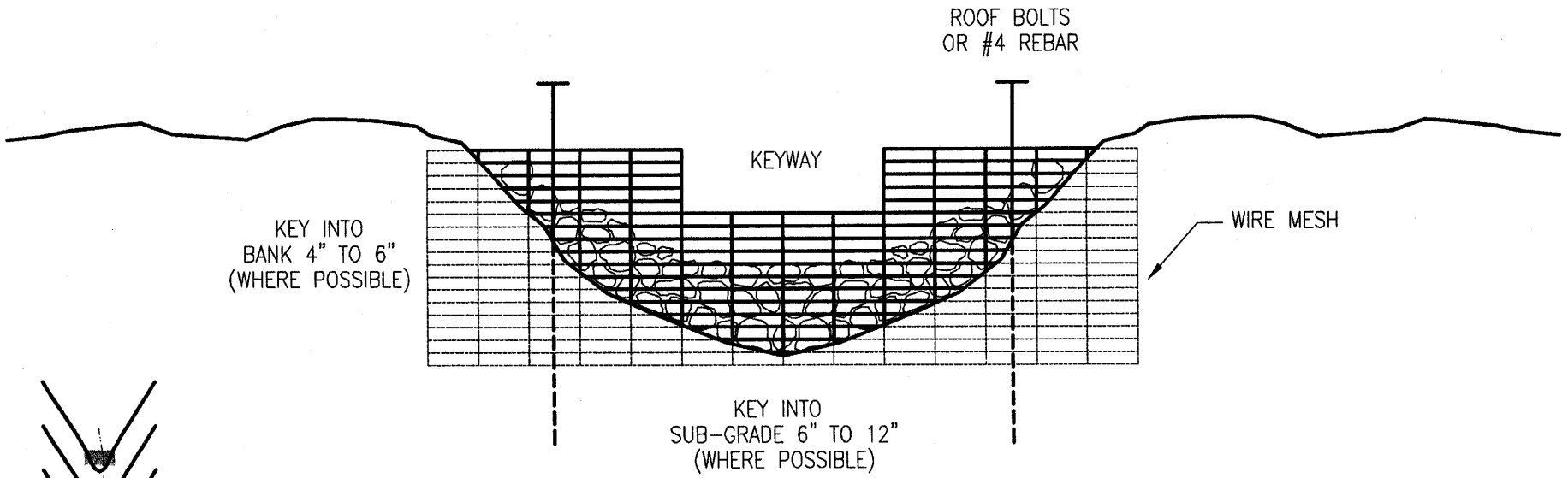
NOTE: STRAW BALES MAY ALSO BE USED AS BERMS WHERE NEEDED.

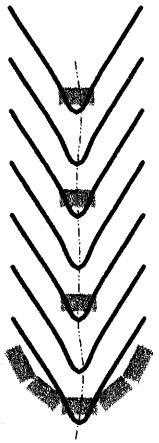
UTAH REGISTERED #154168 DAN W. GUY 2/5/08 PROFESSIONAL ENGINEER

FIGURE 7-9

SAVAGE COAL TERMINAL
TYPICAL WIRE GABION

(NOT TO SCALE)





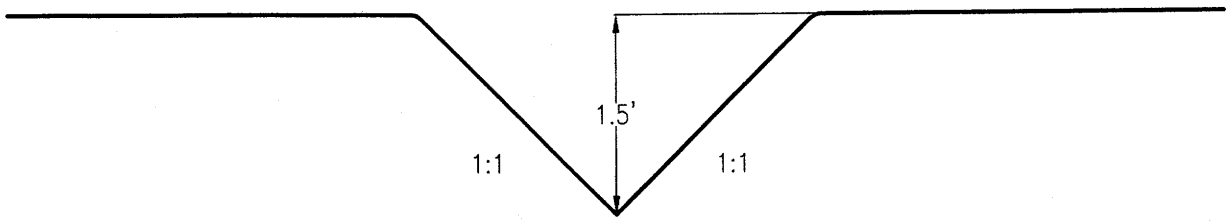
SPACING DEPENDENT
UPON GRADE

BALES PLACED IN SERIES

FIGURE 7-10

SAVAGE COAL TERMINAL
REFUSE PILE DRAINAGE CHANNELS

(NOT TO SCALE)



TYPICAL CROSS-SECTION
CD-7 and CD-13

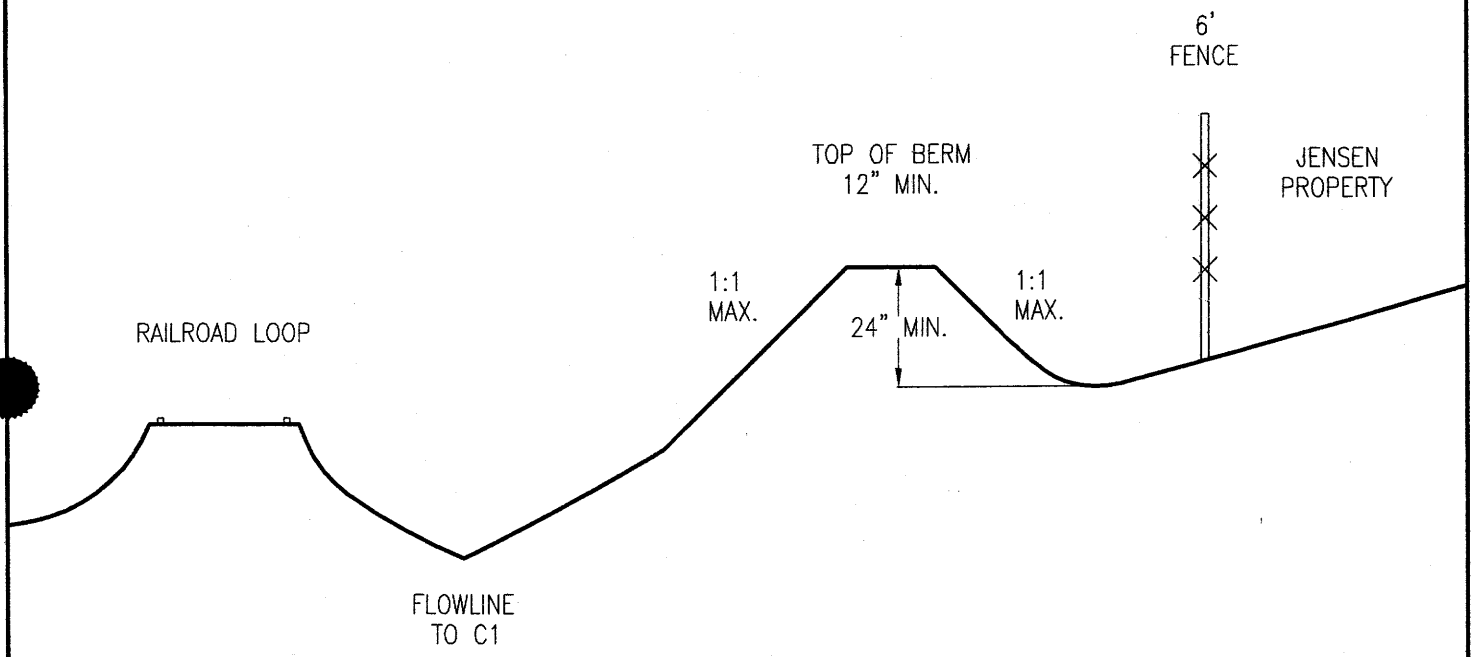
NOTE:

DITCH CONFIGURATION MAY VARY; HOWEVER, DITHCES WILL BE MAINTAINED WITH A MINIMUM CROSS-SECTIONAL AREA OF 2.25 SQUARE FT. DIMENSTIONS FOR CONSTRUCTION PURPOSES ONLY.

FIGURE 7-11

SAVAGE COAL TERMINAL
JENSEN PROPERTY BERM

(NOT TO SCALE)



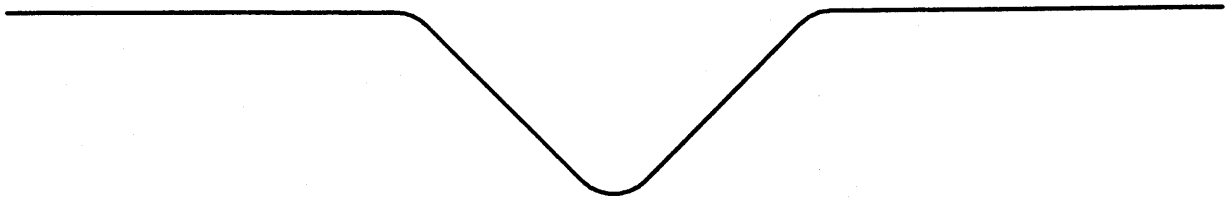
UTAH REGISTERED
#154168
DAN W. GUY
PROFESSIONAL ENGINEER
2/5/08

FIGURE 7-12

SAVAGE COAL TERMINAL
TYPICAL COLLECTION DITCHES

(NOT TO SCALE)

DITCH	MINIMUM X-SECTION AREA FT2	LENGTH AREA FT.	SLOPE %	NORMAL DEPTH FT.	DESIGN VELOCITY FT/SEC	DESIGN DISCHARGE
CD-1	3.00	200	3.0	0.26	2.97	1.64
CD-2	3.00	180	0.5	0.54	2.75	0.80
CD-3	1.50	600	1.8	0.23	2.00	0.57
CD-4	3.00	220	2.5	0.70	4.55	7.03
CD-5	1.50	170	3.5	0.23	2.82	0.82
CD-6	1.50	1440	1.8	0.79	3.83	5.47
CD-7	2.25	2600	3.0	1.40	4.61	8.98
CD-8	1.50	800	2.0	0.56	3.39	2.93
CD-9	1.50	340	1.2	0.86	3.27	5.26
CD-10	1.50	1600	2.0	0.26	2.29	0.77
CD-11	3.00	225	1.0	1.08	3.58	10.48
CD-12	3.00	180	0.5	0.46	1.62	1.44
CD-8A	1.50	630	2.0	0.59	2.30	0.80
CD-13	2.25	1500	4.0	1.08	4.46	5.20



TYPICAL CROSS-SECTION

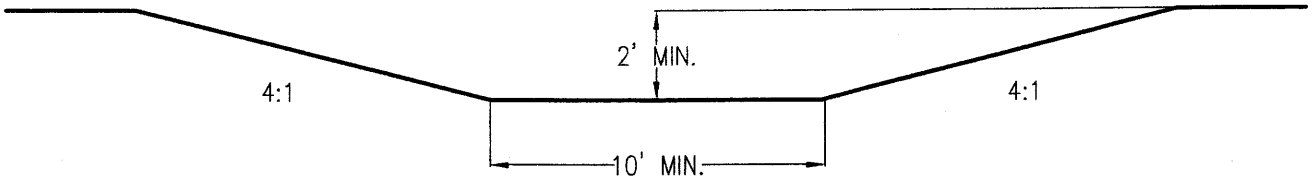
NOTES:

1. COLLECTION DITCHES ARE EARTH-LINED.
2. DITCH CONFIGURATIONS MAY VARY; HOWEVER, DITCHES WILL BE MAINTAINED AT MINIMUM X-SECTION AREAS AS SHOWN ABOVE.

FIGURE 7-13

SAVAGE COAL TERMINAL
RECLAIMED CHANNEL

(NOT TO SCALE)



TYPICAL CROSS-SECTION

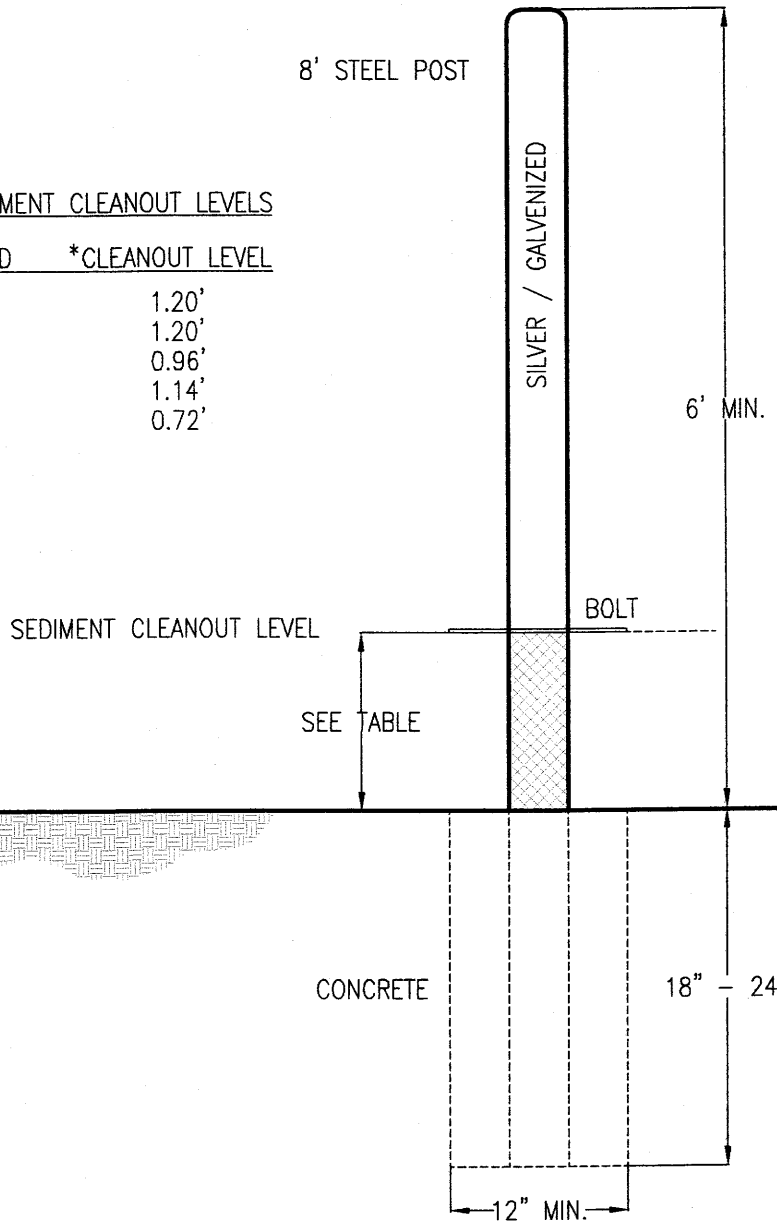
NOTE:

DITCH CONFIGURATION MAY VARY; HOWEVER, DITHCES WILL BE MAINTAINED WITH A MINIMUM CROSS-SECTIONAL AREA OF 15 SQUARE FT. DIMENSTIONS FOR CONSTRUCTION PURPOSES ONLY.

FIGURE 7-14

SAVAGE COAL TERMINAL
SEDIMENT MARKER

(NOT TO SCALE)



SEDIMENT CLEANOUT LEVELS

POND	*CLEANOUT LEVEL
1	1.20'
2	1.20'
3	0.96'
5	1.14'
6	0.72'

NOTES:

* DETERMINED BY BOLT LOCATION. SEDIMENT DEPTH MAY VARY AFTER CLEANING OF PONDS.

FIGURE 7-15

Appendix 7-1

Small Area Exemption

River Pump/Pipeline

Savage Services Corporation
Savage Coal Terminal

May 26, 1994

EarthFax

EarthFax
Engineering Inc.
Engineers/Scientists
7324 So. Union Park Ave.
Suite 100
Midvale, Utah 84047
Telephone 801-561-1555
Fax 801-561-1861

Kathleen G. Welt
Mountain Coal Company
P.O. Box 591
Somerset, Colorado 81434

Subject: Sediment Analysis of C.V. Spur Facility

Dear Kathleen:

The purpose of this letter is to compare the erosion potential from the disturbed area of the C.V. Spur River Pump Pipeline System, under existing conditions, to that of the pre-disturbed area. The Utah Division of Oil, Gas & Mining (DOGM) requested a detailed sediment analysis of the C.V. Spur Pipeline to evaluate the potential for erosion under existing site conditions. Due to the nature of the disturbance, I am not convinced a detailed analysis is required. It is my intent to evaluate the information required for a detailed sediment analysis and determine the deviations between the undisturbed and existing conditions of the C.V. Spur Pipeline within the disturbed area boundary.

The C.V. Spur Pipeline was installed in 1977. The actual disturbance consists of a single trench which contains two pipelines. The length of the disturbance is approximately 10,000 feet, and it crosses portions of farm roads, pasture, cultivated areas, undisturbed areas, and railroad facilities. The width of the trench disturbance is only 30 inches; however, a 20-foot right-of-way was assumed for the disturbed area boundary. The disturbed area was revegetated after the pipeline was installed, and the vegetation is well established under existing conditions.

For the purpose of this discussion, it is assumed that the surface backfill material in the trench is the native material removed from the trench during construction. In addition, it is assumed that the area was re-graded to the approximate original contours after the pipeline was installed.

The information required to perform a detailed sediment analysis using SEDCAD or a similar software consists of hydrologic data and sediment data. The information required to determine the runoff volume and peak flow for the design watershed includes:

- Curve number
- Watershed slope
- Watershed area
- Hydraulic length of watershed
- Design storm and rainfall distribution

In evaluating the hydrologic data for an analysis, the determination of the curve number is the most sensitive piece of information. The curve number for a watershed is determined by evaluating the watershed surface characteristics based on soils and vegetative type. Since

the soils for the disturbed and undisturbed areas are assumed to be the same, the vegetative cover is of primary concern in the curve number determination. The total ground cover (includes vegetation and litter) is used to determine the appropriate curve number. The results of a recent vegetative study conducted by Environmental Industrial Services reported the total ground cover for the disturbed area (under existing conditions) to be 82.3%, and the total ground cover for the undisturbed (reference) area to be 79.3%. The vegetative type identified in both areas consisted primarily of forbs. From this analysis, it is expected that the curve number, although not determined, would be slightly lower for the disturbed area under existing conditions because it had a greater total ground cover.

The watershed characteristics (i.e., area, slope, hydraulic length) for the undisturbed watershed would be the same as those for existing conditions since it is assumed that the disturbed area was re-graded to the approximate original contours. In addition, the design storm and rainfall distribution would be the same for both undisturbed and existing conditions. Therefore, it is expected that the runoff volume and peak flow would be less under existing conditions than for undisturbed conditions due to the lower curve number.

The information required to determine sediment volumes, using the Revised Universal Soil Loss Equation, includes:

- Runoff volume and peak flow (determined from hydrology calculations)
- Soil erodibility factor
- Sediment particle size distribution
- Land-slope factor
- Control-practice factor

In determining the sediment yield for the undisturbed and existing watersheds, the soil erodibility factor is critical. This factor is a numeric representation of the ability of the soil to resist the erosive energy of rain. The soil erodibility factor is independent of slope, and dependent only upon particle size and distribution, structure, void space and pore size, and organic matter. The particle size distributions of the undisturbed and disturbed conditions are assumed to be the same, since the trench was backfilled with the native material excavated during construction. It is possible that the structure of the compacted soil in the trench is different than the native material; however, it is probable that greater compaction was achieved within the trench during backfill operations which would provide the soils a greater resistance to erosion. Thus, it is conservatively assumed that the soil erodibility factor is equal for both undisturbed and existing conditions.

The land-slope factor is a multiplier which accounts for the topography of the surface under evaluation. It is assumed that the land-slope factor is the same for both undisturbed and existing conditions because it is assumed that the disturbed area was re-graded to the approximate original contours.

The control-practice factor is a ratio of sediment loss from an area with a given cover and conservation practice to that of a field in continuous fallow. Since the total ground cover under the existing conditions is slightly greater than that of the undisturbed area, and assuming an equal conservation practice for both conditions, it is expected that the control-practice factor for the existing conditions would be slightly lower than for the undisturbed area.

In summary, it is expected that the sediment yield from the disturbed area of the C.V. Spur Pipeline, under existing conditions, would be slightly less than the sediment yield of the same area before it was disturbed. This conclusion is based primarily on the results of the vegetative study, which indicated that the total ground cover was slightly greater under existing conditions. The greater ground cover will result in a lower curve number determination, and thus a lower runoff volume and peak flow. In addition, the greater ground cover will result in a lower control-practice factor. Both of these effects will, analytically, result in a lower sediment yield from the existing site.

It has been a pleasure to provide this discussion for you. If you have any questions or need additional information, please contact me.

Sincerely,

Carol A. Bjork

Carol A. Bjork, P.E.
Civil Engineer

cc: Dan Guy, Blackhawk Engineering

MOUNTAIN COAL COMPANY: CV SPUR WATERLINE ROW GROUND COVER ASSESSMENT

MAY 11-12, 1994
PERFORMED AND PREPARED BY
ENVIRONMENTAL INDUSTRIAL SERVICES

INTRODUCTION

The analysis detailed within this report was conducted by Environmental Industrial Services (EIS) for Mountain Coal Coal Company on May 11-12, 1994. The purpose of this assessment was to determine ground cover similarity of a water line right-of-way (ROW) to the relatively undisturbed area bordering the ROW. The level of disturbance present in the vicinity of the study site is quite extensive; therefore, this study's determinate degree of "disturbance" is relative only to the ROW. Grazing and farming disturbances limited assessment in and around the length of the ROW to approximately 78,000 square feet. This prevented any sort of significant analysis for more than 100,000 square feet of ROW underlying irrigated alfalfa fields and grazed pasture.

METHODS

Eight (8) transects were established for assessment of ground cover. Four (4) transects were randomly established along the length of the twenty (20) foot wide ROW using a random number generator. Actual lateral location of a particular transect within the ROW was established by the same random number generator. Four (4) transects were established near each ROW transect in relatively undisturbed areas. The transects established in these areas were used as a reference on which to qualitatively determine any difference in percentage of ground cover for the disturbed ROW and the undisturbed sites. Reference transects were established whenever ground cover type was ocularly determined to change (>50 percent community difference).

A modified ten-point frame was used to acquire actual sample points along each one hundred (100) foot transect. Ten (10) sample points were gathered on each side of the transect at every 20 foot increment. Points gathered were classified into litter, bare ground, rock, or vegetation. Vegetation was grouped into grass, forb, or shrub. Four hundred (400) points were gathered for disturbed (ROW) sites. The same was done for reference sites.

Points acquired for each respective grouping were compared to determine similarity. Points for disturbed and reference areas were compared as follows:

$$\frac{\text{Group Cover A}}{\text{Group Cover B*}} = \text{percent similarity}$$

* Where Cover B is determined to be larger value

Percent total cover similarity was determined with this same method. Litter and total living vegetation was lumped together to determine percent similarity between the disturbed and reference (undisturbed) sites.

RESULTS

Total vegetation cover similarity of the disturbed ROW and surrounding undisturbed reference sites was determined to be 74.2% (25.8% difference). Bare ground similarity was 85.5% (14.5% difference), while litter cover similarity was 66.5% (33% difference). Total ground cover similarity was 96.4% (3.6% difference).

Vegetation cover percentage was higher in the undisturbed reference sites (48.5% vs. 36.0% for disturbed sites). Total cover, however, was higher in the disturbed ROW sites (82.3% vs. 79.3% for reference sites). Litter cover was quite extensive for all ROW sites (33.5% higher than undisturbed sites). See TABLE 1 and 2 for this data.

Vegetation type similarity differed widely between the two areas. Grasses were far more abundant along all undisturbed transects and little similarity existed (78.1% difference). Forbs and shrubs were relatively similar for both areas (82.8% and 71.4% respectively). Individual plant similarity of each area varied, favoring the undisturbed area (See TABLE 3 and 4).

DISCUSSION

Though the sample size is too small to obtain any quantitative treatment, a qualitative assessment of cover similarity can readily be obtained. Analysis of points sampled allow us to determine inherent similarities and differences for community sites along the ROW. Although vegetation percentages for ground cover was higher in undisturbed areas, the high similarity between sites for total ground cover (litter and vegetation) leads us to believe that substantial ground cover is present to impede most erosional impacts. Areas not sampled because of use for farmland and grazing have extensive ground cover that contribute to its ability to resist erosional impacts. Therefore it is in our opinion that the pipeline ROW has sufficient ground cover to be exempt from any sort of additional erosion control. We also feel that any future studies, no matter how extensive, will reflect our conclusion.

Species present within disturbed areas had a 50% similarity with those in the undisturbed reference sites. The cause of the diversity seen for plant species is difficult to define. Diversity of individual species within the disturbed area may be the result of past re-seeding efforts. Whatever the reasons for the diversity seen in individual plant cover, the species that compose the vegetative cover of the ROW are predominantly forbs with extensive root growth that will provide adequate soil stabilization.

TABLE 1. GROUP COVER POINTS AND PERCENTAGES FOR DISTURBED (ROW) SITES.

Disturbed Right-of-Way:

Transect 1		Points
Litter		54
Bare		7
Rock		0
Vegetation		39
grasses	7	
forbs	32	
shrubs	0	

Transect 2		
Litter		30
Bare		13
Rock		0
Vegetation		57
grasses	0	
forbs	55	
shrubs	2	

Transect 3		
Litter		70
Bare		8
Rock		0
Vegetation		22
grasses	0	
forbs	19	
shrubs	3	

Transect 4		
Litter		31
Bare		43
Rock		0
Vegetation		26
grasses	0	
forbs	24	
shrubs	2	

Total Disturbance (Transect 1-4)		Percentage
Litter	185	46.25
Bare	71	17.75
Vegetation	144	36.0
grasses	7 (1.75%)	
forbs	130 (32.5%)	
shrubs	7 (1.75%)	

TABLE 2. GROUP COVER POINTS AND PERCENTAGES FOR UNDISTURBED (REFERENCE) SITES

Undisturbed (Reference):

Transect 1		Points
Litter		55
Bare		2
Rock		0
Vegetation		43
grasses	16	
forbs	27	
shrubs	0	

Transect 2		
Litter		20
Bare		3
Rock		0
Vegetation		77
grasses	0	
forbs	77	
shrubs	0	

Transect 3		
Litter		29
Bare		16
Rock		0
Vegetation		55
grasses	11	
forbs	44	
shrubs	0	

Transect 4		
Litter		19
Bare		62
Rock		0
Vegetation		19
grasses	5	
forbs	9	
shrubs	5	

Total Undisturbed (Transect 1-4)		Percentage
Litter	123	30.75
Bare	83	20.75
Vegetation	194	48.5
Grasses	32 (8%)	
Forbs	157 (39.25%)	
Shrubs	5 (1.25%)	

TABLE 3. PERCENT COVER OF PLANT SPECIES PRESENT WITHIN DISTURBED AND UNDISTURBED AREAS

Disturbed

	Species Name	Cover (%)	Common Name
Grasses			
Agrop	Agropyron spp.	3.5	wheatgrass
	Unidentified	1.4	
Forbs			
Kosc	Kochia scoparia	53.5	kochia
Centa	Centaurea spp.	16.0	knapweed
Convo	Convolvulus spp.	2.1	bindweed
Maca	Machaeranthera canescens	2.1	purple aster
Daca	Daucus carota	16.7	wild carrot
Shrubs			
Cadr	Cardaria draba	1.4	hoary cress
Atco	Atriplex confertifolia	0.7	shadscale
Chna	Chrysothamnus nauseosus	2.1	Gray rabbitbrush
		100.0%	

Undisturbed

Grasses			
Elel	Elymus elymoides	4.1	squirreltail
Agrop	Agropyron spp.	6.7	wheatgrass
Forbs			
Kosc	Kochia scoparia	42.3	kochia
Vepe	Veronica peregrina	7.2	purslane speedwell
Centa	Centaurea spp.	8.3	knapweed
Convo	Convolvulus spp.	1.0	bindweed
Daca	Daucus carota	26.8	wild carrot
Mesa	Medicago sativa	1.0	alfalfa
Shrubs			
Atco	Atriplex confertifolia	2.6	shadscale
		100.0%	

TABLE 4. PERCENT COVER SIMILARITY OF VEGETATION FOR DISTURBED AND UNDISTURBED AREAS

COVER	SPECIES	SIMILARITY (%)	FAVOR
Grasses			
	Agropyron spp.	38.5	Undisturbed
Forbs			
	Kochia scoparia	93.9	Undisturbed
	Centaurea spp.	69.6	Disturbed
	Convolvulus spp.	66.6	Disturbed
	Daucus carota	46.2	Undisturbed
Shrubs			
	Atriplex confertifolia	20.0	Undisturbed

Appendix 7-2

Water Rights Documentation

Savage Services Corporation
Savage Coal Terminal

APPENDIX 7-2

WATER RIGHTS DOCUMENTATION

RIGINAL DELIVERING COMPANY

ARBON CANA[illegible] OMPANY

INCORPORATED UNDER THE LAWS OF

State of Utah

No. 2814 Shares 137.1

PRICE RIVER WATER USERS ASSOCIATION

(A NON-PROFIT MUTUAL IRRIGATION CORPORATION)

PRICE, UTAH

This Certifies that SWISHER COAL COMPANY is the owner of ONE HUNDRED THIRTY SEVEN & 1/10 - - - - (137.1) - - Shares of the Capital Stock of

PRICE RIVER WATER USERS ASSOCIATION

[illegible]

In Witness Whereof, [illegible] has caused this Certificate to be signed by [illegible] and to be sealed with the seal of the Corporation

[illegible] 2nd day of May [illegible]

[illegible] SECRETARY

[illegible] PRESIDENT

SHARES Non-Par EACH

©GOES 46

ORIGINAL DELIVERING COMPANY:
WEL[illegible]TON CANAL

INCORPORATED UNDER THE LAWS OF

State of Utah

No. 2589

Shares 20.00

PRICE RIVER WATER USERS ASSOCIATION

(A NON-PROFIT MUTUAL IRRIGATION CORPORATION)

PRICE, UTAH

This Certifies that SWISHER COAL COMPANY is the owner of TWENTY (20.) Shares of the Capital Stock of

PRICE RIVER WATER USERS ASSOCIATION

transferable only on the books of the Corporation by the holder hereof in person or by Attorney upon surrender of this Certificate properly endorsed.

In Witness Whereof, the said Corporation has caused this Certificate to be signed by its duly authorized officers and to be sealed with the Seal of the Corporation this 1st day of March A.D. 1976

Jessie R. Holloway
SECRETARY

Lyle B. Bryner
PRESIDENT

SHARES Non-Par EACH

©GOES 46

BILL OF SALE AND RECEIPT

Pursuant to that certain Agreement dated March 14, 1980, by and between Wallace V. Jacobson and William P. Hansen ("Sellers"), and Atlantic Richfield Company, a Pennsylvania corporation, ("Buyer"), and in consideration for the payment by Buyer of $132,000.00, receipt of which is hereby acknowledged, Sellers hereby sell, transfer and convey to Buyer, free of liens, encumbrances or assessments of any kind, 55 shares of the capital stock of Price River Water Users Association. Sellers warrant that they have valid title to said stock; that said stock is presently free of liens, encumbrances or assessments of any kind; and that they will defend the same at their own cost.

IN WITNESS WHEREOF, the Sellers have executed this Bill of Sale and Receipt this 21st day of March, 1980.

Wallace V. Jacobson

William P. Hansen

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

On this 20 day of March, 1980, personally appeared before me Wallace V. Jacobson and William P. Hansen, the signers of the above instrument, who duly acknowledged to me that they executed the same.

Notary Public

My Commission Expires:

10/15/83

CARBON CANAL CO.

INCORPORATED UNDER THE LAWS OF

No. 3648 State of Utah Fee $5.00

PRICE RIVER WATER USERS ASSOCIATION

(A NON-PROFIT, MUTUAL IRRIGATION CORPORATION)

PRICE, UTAH

This Certifies that ATLANTIC RICHFIELD COMPANY, A Penn Corp is the owner of

FIFTY FIVE & 00/100 ——— 55.00 ——— fully paid and non-assessable Stock of

PRICE RIVER WATER USERS ASSOCIATION

transferable only on the books of the Corporation by the holder hereof in person or by duly authorized Attorney upon surrender of this Certificate properly endorsed.

In Witness Whereof the said Corporation has caused this Certificate to be signed by its duly authorized officers and its corporate seal to be hereunto affixed this 4th day of April A.D. 1980

SECRETARY

PRESIDENT

SHARES 55 Non-Par EACH

©COCS 66

May 2, 1980

Price River Water Users Association
c/o Ann O'Brien
Carbon County Courthouse
Price, UT 84501

Gentlemen:

This letter is to advise you of the sale by Lola Mae Marsing Easton and Ann Kay Marsing Archibald of 150 shares of capital stock of the Price River Water Users Association, to Atlantic Richfield Company, a Pennsylvania corporation. This sale took place on May 2, 1980.

A portion of said 150 shares of stock has been placed in escrow and will be delivered to Atlantic Richfield Company as payments of the purchase price are made over a ten-year period. As the stock is delivered to Atlantic Richfield Company, the company will present it to you in order to obtain stock certificates in its own name. In the meantime, the stock will remain in the names of Lola Mae Marsing Easton and Ann Kay Marsing Archibald.

As of May 2, 1980, Atlantic Richfield Company shall have the sole and exclusive right to the use of all water represented by said 150 shares of stock, and shall be responsible for payment of all water assessments and other charges made upon the stock. Please therefore send all assessments and other charges on the stock to Atlantic Richfield Company at the following address:

John R. Hardin, Land Manager
Atlantic Richfield Company
555 Seventeenth Street
P.O. Box 5300
Denver, CO 80217

Please advise Mr. Hardin if you need any additional information.

Sincerely,

Lola Mae Marsing Easton
Lola Mae Marsing Easton

Ann Kay Marsing Archibald
Ann Kay Marsing Archibald

STATE OF UTAH
NATURAL RESOURCES
Water Rights

Norman H. Bangerter, Governor
Dee C. Hansen, Executive Director
Robert L. Morgan, State Engineer

Southeastern Area • 453 S. Carbon Avenue • P.O. Box 718 • Price, UT 84501-0718 • 801-637-1303

April 19, 1988

Beaver Creek Coal Company
Attn: Dan Guy
P.O. Box AU
Price, Utah 84501

Re: Water Right No. 91-4164

Dear Mr. Guy:

In lieu of Proof of Appropriation on Application No. 91-4164, you executed an Election to File a Water Users Claim, thereby requesting the State Engineer's Office to prepare a Statement of Water Users Claim in the pending general determination of water rights.

The enclosed Water Users Claims have been prepared by the Division of Water Rights to cover the proof on the above referenced application. Examine the claims carefully, and if you are in agreement with the information, please sign the three copies in the presence of a Notary Public, and return the stapled copies to this office within fifteen days of the date hereon. Retain the third copy for your records.

Should you have any questions, please feel free to come into the Southeastern Utah Area Office located at 453 South Carbon Avenue, P.O. Box 718, Price, Utah 84501, or phone us at 637-1303. Thank you for your cooperation.

Sincerely,

Mark P. Page
Area Engineer

Enclosures
MPP/mjk

Form 114
25M 4-63

IN THE SEVENTH JUDICIAL DISTRICT COURT, IN AND FOR THE COUNTY OF CARBON STATE OF UTAH

IN THE MATTER OF THE GENERAL DETERMINATION OF RIGHTS TO THE USE OF WATER, BOTH SURFACE AND UNDERGROUND, WITHIN THE DRAINAGE AREA OF THE PRICE RIVER AND OF THE DRAINAGE AREA OF THE GREEN RIVER FROM THE CONFLUENCE OF THE PRICE AND GREEN RIVERS TO THE CONFLUENCE OF THE GREEN AND COLORADO RIVERS EXCLUDING THE DRAINAGE AREA OF THE SAN RAFAEL RIVER IN UTAH

STATEMENT OF WATER USER'S CLAIM
CODE NO. 91 SERIAL NO. 4164
MAP NO. .....

NOTE: This blank is sent to you in accordance with Utah Law. The information called for herein will be used in connection with the adjudication of water rights on the above mentioned drainage area. All questions applicable to your claim must be answered fully, and one copy of this form must be filed with the Clerk of the District Court at ....., Utah, within sixty (60) days from date of service of the attached Notice. A copy shall be filed with the State Engineer, State Capitol, Salt Lake City. Failure to file the attached Statement of the Water User's Claim with the Clerk of the District Court within the time stated will forever bar and estop you from asserting any right to the use of water from said drainage area.

1. Name of Claimant Beaver Creek Coal Company
   P.O. Box AU Interest Claimed Full
2. Address Price, Utah 84501
3. Name of particular spring, spring area, stream, well, tunnel or drain from which water is diverted is Underground water well in Carbon County.
4. Priority date claimed July 22, 1977 Date when water was first used .....
   Date when work on diverting system was first begun ..... Date when diverting system was completed ..... Nature of work .....
5. Class of Right (Indicate by X):
   (a)..... Right to surface water initiated by beneficial use before 1903 Claim No. .....
   (b)..... Right to underground water initiated before 1935 Claim No. .....
   (c)..... Right decreed by court, cite title of case .....
   (d)...X... Application filed, State Engineer's Office No. 49858 Cert. of App. No. Election
   (e)..... Right acquired by adverse use prior to 1939 .....
6. Nature (Indicate by X), Amount, and Annual Period of Use (by month & day):
   (a)..... Irrigation Sec. Ft..... from..... to..... (both dates incl.)
   (b)..... Stockwatering Sec. Ft..... from..... to..... (both dates incl.)
   (c)..... Domestic Sec. Ft..... from..... to..... (both dates incl.)
   (d)..... Municipal Sec. Ft..... from..... to..... (both dates incl.)
   (e)...X... Industrial Sec. Ft. 0.25 from November 1 to March 31 (both dates incl.)
7. Direct Flow Appropriation (must be described with reference to U. S. Government Survey Corner)
   (a) Point of diversion from spring, spring area, stream, well, tunnel, drain
   S. 520 ft. & W. 105 ft. from N¼ Cor. Sec. 2, T15S, R10E, SLB&M.
   (b) Description of spring area .....
   (c) Point of rediversion or point of return to natural channel .....
   (d) If flow is intermittently diverted, list by number or description, all rights involved .....
8. Where water is used for irrigation purposes:
   (a) Area irrigated in legal subdivisions of land by 40-acre tract. (All sources of water for same land or lands must be described in each instance by name or claim number).....
   (b) Do you get water under a ditch owned by several users..... If so, give names of all users and divisions of interest .....
9. Where water is used for Stockwatering:
   (a) Number of each kind of stock watered .....
   (b) All sources of water for same stock. (Describe by name or claim number) .....
10. Where water is used for Domestic: .....
    (a) Number of families or their equivalent ..... All sources of water for same use. (Describe by name or claim number) .....

11. Where water is used for Municipal Purposes:
(a) Name of city or town supplied ..... Population .....
Number of families ..... Quantity of water .....

12. Where water is used for a purpose not above enumerated:
(a) Nature of Use Industrial Extent of Use
Industrial uses pertinent to a coal preparation and unit load-out facility:
SW¼ Sec. 11, T15S, R10E, SLB&M.

13. Appropriation for Storage Purposes:
(a) Name of reservoir .....
(b) Location of reservoir by legal subdivisions described by 40-acre tracts .....
(c) Maximum capacity of reservoir in acre feet .....: Year construction commenced .....
Completed .....: Water first used ..... Is reservoir located on or off stream.....
(d) Period of Storage from ..... to ..... (both dates incl.). Period of use from .....
to..... (both dates incl.). Maximum area in acres inundated ..... Max. depth in feet.....
Average depth in feet..... Is reservoir drained each year..... Maximum number of fillings per year..... Is reservoir used for equalizing purposes..... If feeder canal is used, give maximum carrying capacity in sec. ft.....

14. Diverting Works:
(a) Surface water diverting dam: Material composed of .....
Max. length..... Max. height.....Max. width at bottom..... Max. width at top.....
(b) Underground water diverting works: Is well flowing or pump..... Depth of well.....
Diameter of well..... Length of drain..... Width of drain ..... Depth of drain.....
Diameter of drain..... Length of tunnel .....Width of tunnel..... Height of tunnel.....
Type of pump..... Capacity of pump.....
(c) Surface and underground water conveying works: Length of ditch to first place of use..... Width of ditch at top ..... Width of ditch at bottom..... Depth of water..... Grade of ditch per 1000 ft..... .. Material through which ditch passes..... Maximum length of pipe line to first place of use..... Diameter of pipe line ..... Grade of pipe line per 1000 feet.....

15. The undersigned hereby enters his appearance and waives service of summons or other process.

STATE OF UTAH
COUNTY OF..... } SS. (To be used if claimant is an individual)

..... being first duly sworn, upon oath deposes and says that he is the claimant whose name appears hereon, that he has read the foregoing statement of his claim and knows the contents thereof, that he has signed the same, and that the answers set forth therein are true to his best knowledge and belief.

.....
Signature of Claimant

Subscribed and sworn to before me this ..... day of ..... 19.....

.....
NOTARY PUBLIC

STATE OF UTAH
COUNTY OF Carbon } SS. (To be used if claimant is a corporation or an estate)

Daniel R. Meadows, being first duly sworn, upon oath deposes and says that he is the authorized representative of the above claimant, that he makes this certification on behalf of said claimant, that he has read the foregoing statement of claim and knows the contents thereof, and that he has signed the name of said claimant to said statement, that the answers set forth therein are true to his best knowledge and belief.

.....

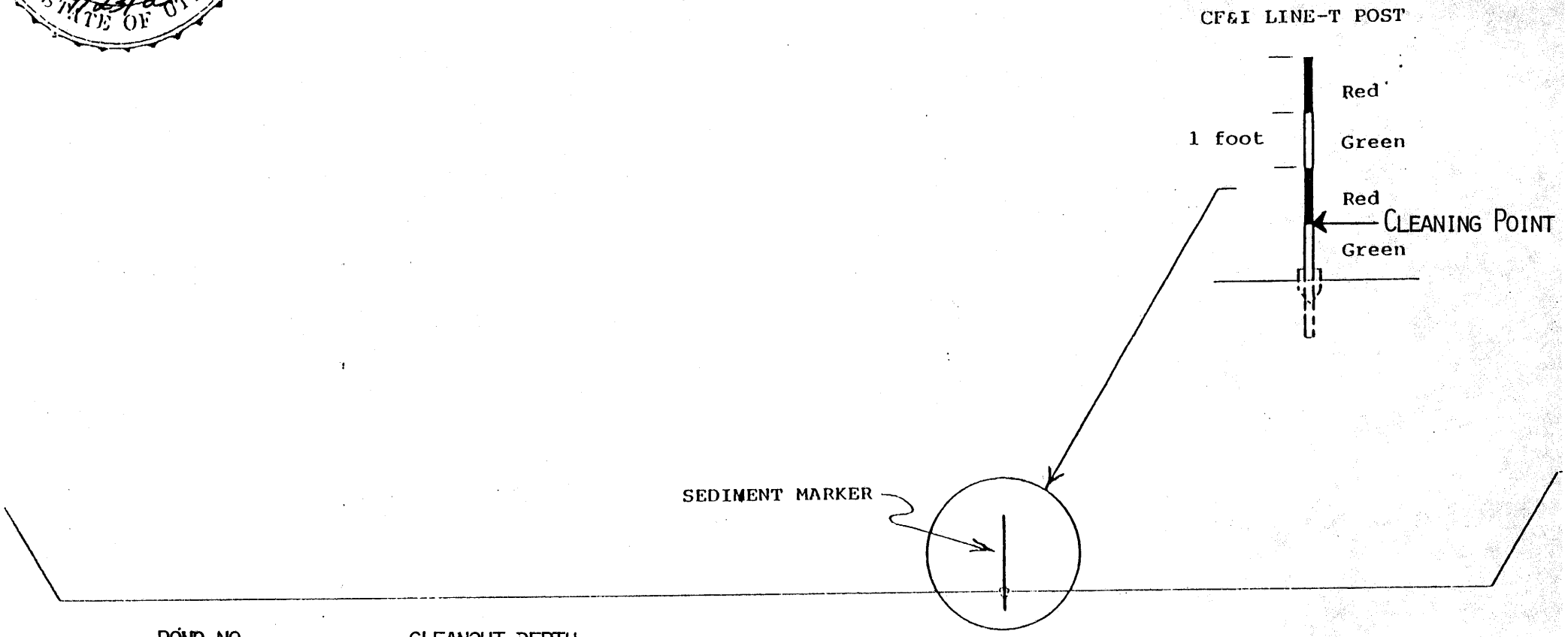
Subscribed and sworn to before me this 6th day of July 1988

.....
NOTARY PUBLIC

MOUNTAIN COAL COMPANY

C.V. SPUR

SEDIMENT MARKER



POND NO.	CLEANOUT DEPTH
1	1.20'
2	1.20'
3	0.96'
5	1.14'
6	0.72'

NOTE: Posts are set so the cleaning point is at the base of the red.

PLATE 7-4C

Appendix 7-3

Probable Hydrologic Consequences Determination

Savage Services Corporation
Savage Coal Terminal

Appendix 7-3
Probable Hydrologic
Consequences Determination

General

The original Probable Hydrologic Consequences Determination, or PHC, was developed for this site in 1983. At this time, the wash plant was operating full time and refuse was actively being deposited on site.

A series of groundwater monitoring wells were installed to monitor changes in water quality and levels. A sediment control plan was also developed to control surface runofff from the site. At that time, based on information provided in Chapter 7 of the MRP, it was determined that the proposed operation would not have an adverse impact on the hydrologic balance.

Since that time, a number of changes have taken place, including cessation of coal washing and refuse placement, and removal of all ground water monitoring wells after acquiring 18 years of data.

At this time, one more major change is proposed for the site. It is proposed to restart the wash plant, and install a series of settling ponds to remove -28 mesh material from the wash water. Refuse will once again be stored on-site, but only on a temporary basis, not to exceed 1 year from start-up.

Procedure

The PHC Determination is based on information provided in Chapter 7, which includes baseline and operational hydrologic data acquired since 1983.

Groundwater Hydrology

Existing Groundwater Resources

The Savage Coal Terminal is near the middle of Castle Valley, a broad featureless plain between the Wasatch Plateau to the west and the San Rafael Swell to the east. The facility is located on the middle Bluegate shale member of the Mancos Formation and is approximately 500 feet above the Ferron sandstone member of the Mancos Formation. The Bluegate member consists of dark blue-gray marine mudstone and acts as an aquitard. The upper 10 to 20 feet consists of weathered clays, occasional lenses and pods of gravelly residuum, and residual type silty clay loam soils characteristic of the weathered Mancos shale.

Regional Groundwater Hydrology

A water table does exist in some locations above the impermeable Bluegate shale. In the general area, this water table exists in the alluvium or weathered shale and gravelly ponds above the Bluegate shale. The water is of poor quality and accumulations of salt are found where the water table approaches the ground surface. Groundwater is not used for irrigation in the area because of its poor quality. The nearest springs or wells to the Savage Coal Terminal site are located close to the town of Wellington on the opposite side of the Price River. Five wells and one spring exist in the alluvium above the Bluegate shale in this area. These wells and springs are in a different drainage and are not associated with the Savage Coal Terminal site.

Mine Plan Area Aquifers

Monitoring wells were completed in the weathered material above the Bluegate shale. In addition several wells were completed in the Bluegate shale in order to test the hypotheses that the low permeability of this unit isolates the water table aquifer from groundwater in the Ferron sandstone or deeper formations.

A total of 13 monitoring wells were completed on this site from 1980 - 1982. The wells were consistently monitored through 1998, when the wells were approved to be deactivated and removed.

The measurements in the observation wells as recorded in Table 7-1 of Chapter 7 indicate that there is no regional ground water table at the site, although a perched water table exists at some locations on the site. The aerial extent of this perched water table could not be precisely determined from existing monitoring well network.

As previously mentioned, the observation wells were monitored for 18 years at this site. When the wells were finally approved for removal, 5 of the 8 remaining wells had been dry for more than 5 years, 2 wells showed some ground water which appeared to be recharged by the irrigation canal south of the site. Water from one of these wells is also evident as ground water in Sediment Pond No. 5. The last remaining well was in an irrigated field east of the site, on land not controlled by Savage Services Corporation.

When the facilities were first constructed in 1977 - 1978, ground water was present throughout the site, ranging in depths from 0' to 20' from the surface. A French Drain system was placed along the western and northern edge of the property to intercept a majority of the ground water, which appears to be recharged primarily by the irrigation canal systems located west of the property. This ground water is collected in a deep tank located at the northeastern corner of the property, and is regularly monitored as point CV-1W.

The French Drain has been in operation for approximately 28 years, and has been monitored on a regular basis. The inflow continues to range from 20 to 25 gpm. Water quality is poor - typical of ground water in this area - with TDS concentrations running approximately 10,000 mg/l.

Proposed Facilities

The primary change to the operation and hydrology will be the restart of the preparation plant, construction of 2 - 2 celled settling ponds, and temporary storage of refuse on site. The water supply system for the wash plant is already in place as is the refuse storage area. The area proposed for the new settling ponds has been checked for ground water, and none is evident to the proposed depth of the ponds. It should also be noted that previous tests of the coal refuse as well as ground water have shown it to be non-acid and non-toxic. The refuse to be temporarily stored on site from the new washing operation will also be checked on a regular basis for acid/toxic potential.

Effects of Operations on Groundwater

This site has been in operation for over 28 years with no negative impacts to the ground water. During this time, the site has had coal washing and refuse generating activities, as well as a long period of operating as a coal storage and loadout facility.

The only potential for negative impact from the proposed facilities would be from possible acid/toxic contamination of the groundwater from the coal or refuse. This potential will be minimized by regular testing of the refuse for acid/toxic potential, as well as regular monitoring of the groundwater.

Based on the past history of the site, and the proposed new operating and testing procedures, there should be no negative impact to the groundwater resources on this site.

Surface Water Hydrology

Regional Surface Water Hydrology

The regional area is drained by tributaries to the Green and Colorado Rivers; principal tributaries are the Price and San Rafael Rivers and Muddy Creek. The flow is usually intermittent or perennial, in small streams in the mountains and in larger streams that originate in the higher mountains. Snowmelt is major contributor to streamflow and it provides the continuity of flow in the perennial streams as well as some seasonal flow to intermittent streams. Many streams are ephemeral and flow only in direct response to precipitation or snowmelt. Ephemeral flow is characteristic of the lowlands such as Castle Valley where the Savage Coal Terminal facility is located. Summer precipitation does not usually produce much runoff, although intense rainfall may cause high runoff in localized areas.

The site drains into the Price River which flows into the Green River. The water in the upper reaches of the Price River is of high quality; however, as the river traverses the central and lower portion of the Price River basin, the quality of the water in the river steadily degrades due to the geologic nature of the area and to the irrigation return flow which enters the river.

Mine Plan Area Watersheds and Surface Runoff

For the purposes of computing surface runoff and designing water diversion and sediment control structures, the watershed associated with the Savage Coal Terminal site was divided into five subareas as shown on Figure 7-4 in Chapter 7. Subareas A and C are undisturbed areas and include upslope areas to the west of the site. The remaining subareas comprise drainage units that are affected by operations and are subject to sediment control. Surface runoff from subarea A is diverted around the site by a diversion. The remaining subareas drain into sedimentation ponds on site.

Runoff from the disturbed areas on site is directed to a series of 5 sediment ponds by a combination of collection ditches and culverts. All surface hydrologic structures are sized to carry runoff from a 10 year-24 hour storm event, including the storage capacity of the sediment ponds. Sediment Ponds 1, 2 and 3 are in series and flow to Sediment Pond 6. Sediment Pond 5 also flows to Sediment Pond 6. The water from Pond 6 is normally drawn into the pumphouse and pumped back to the wash plant for use in the wash cycle or as dust suppression water. In the event Pond 6 overflows, it is sampled according to the approved UPDES Discharge Permit.

The natural surface runoff in the area is of poor quality with total dissolved solids ranging from 2000 to 3000 mg/l. Surface runoff from most of the site occurs infrequently. Site discharges are even less frequent, with only 2 UPDES discharges within the last 5 years.

Proposed Facilities

The proposed restart of the wash plant, temporary refuse storage and settling ponds will have little, if any, effect on the surface water hydrology at the site. The wash plant will recirculate water, as well as use make-up water from the existing supply system and recirculated runoff water from the sediment ponds. The temporary refuse storage area will be within the existing refuse area, and will be drained by the existing refuse pile ditch to Sediment Pond 5. The new settling ponds will be incised with berms to prevent any inflow of surface runoff. The new disturbed area will drain to the existing disturbed ditch to Sediment Pond 1. The undisturbed area runoff will continue to be diverted around the property by a reconstructed diversion ditch.

Effects of Mining on Surface Water

Protection of the hydrologic balance at Savage Coal Terminal is accomplished by control of runoff from disturbed areas, diversion of runoff from undisturbed areas, and diversion collection and recirculation of water supply and storm water. There are no subsurface operations at this site.

In general, most of the disturbed area runoff, poor quality groundwater, and all plant overflow water is cleaned and recirculated with no discharge from the property. The natural (undisturbed) drainage is allowed to flow into natural channels, bypassing the disturbed areas. Excess french drain water may be released to the Price River. Storm water runoff from disturbed areas may also be released to the Price River once effluent limits have been met.

This site has been in operation for more than 28 years, with no negative impacts to surface water quality or quantity. The proposed new washing scenario is very similar to the original system on this site, and therefore, also should not have any negative effects.

It should be noted that the existing water monitoring program will continue to be implemented to evaluate any potential impacts of the operation.

PHC Determination

In accordance with R645-301-728.100, the proposed operation will not have a negative impact on quality and quantity of surface and ground water under seasonal flow conditions for the proposed permit and adjacent areas.

This determination is based on baseline hydrologic, geologic and 26 years of historical operating and monitoring data for this site.

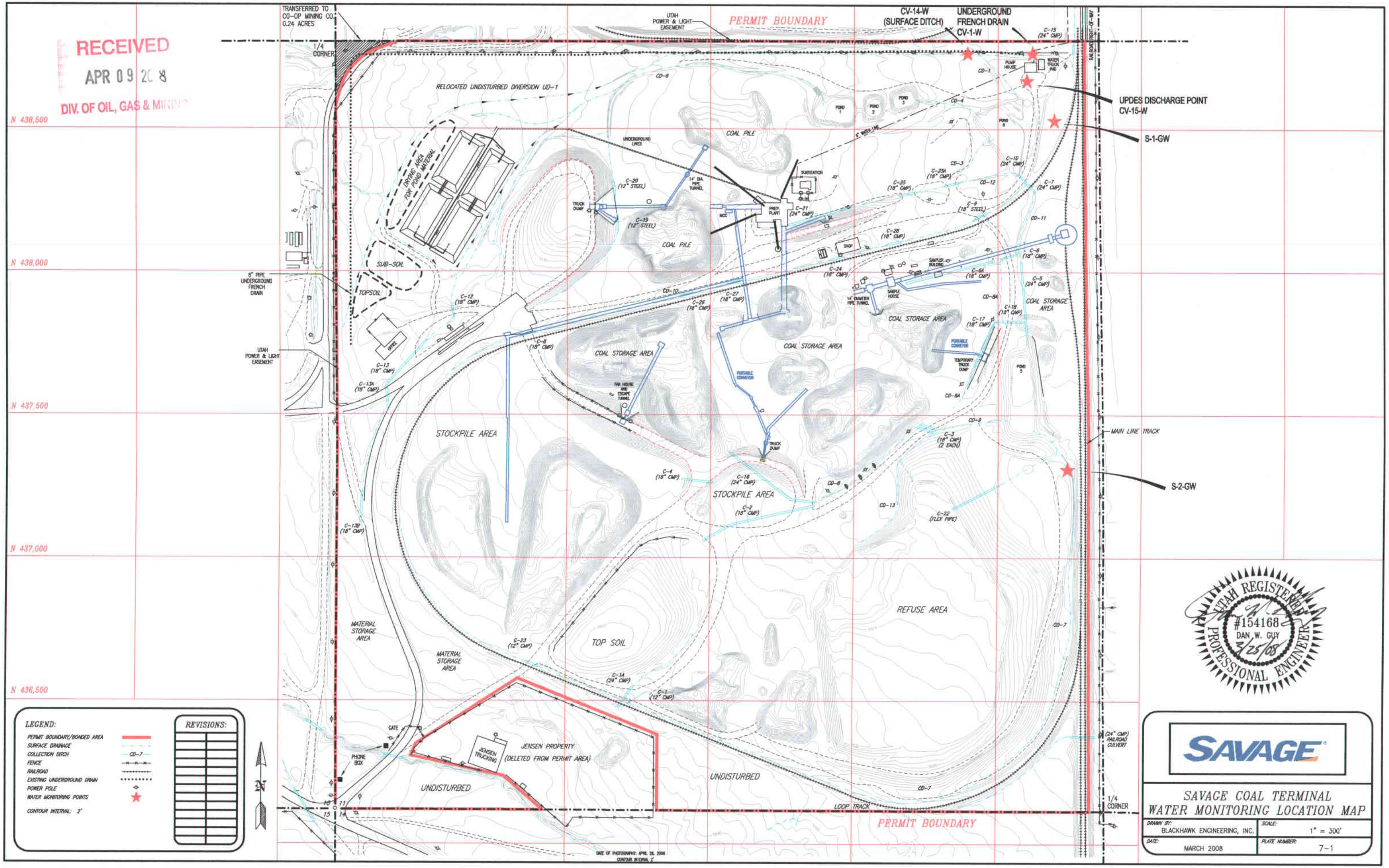
The following findings are included in this PHC determination:

(1) There are no adverse impacts expected to occur to the gydrologic balance, based on historical data;

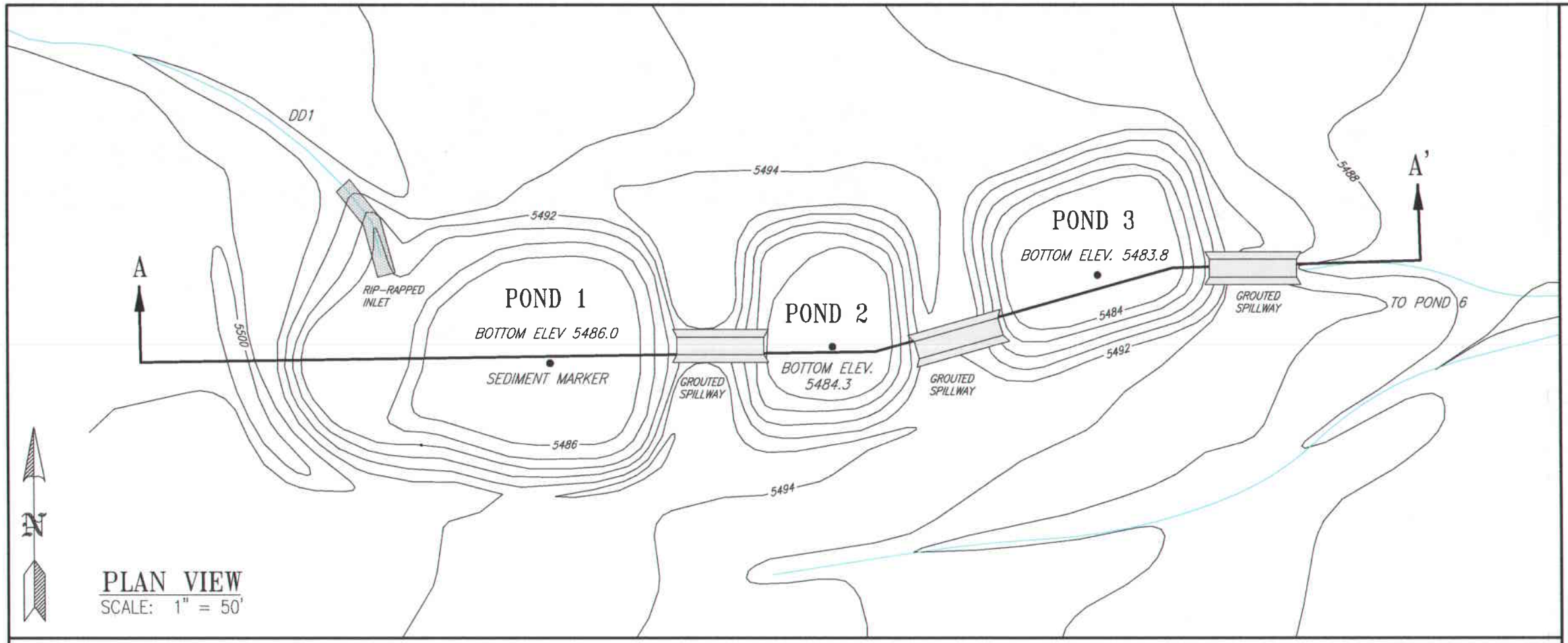
(2) No acid-forming or toxic-forming materials are known or expected to be present, based on past and on-going sampling;

(3) There are no expected impacts from the operation on sediment yield, quality parameters, flooding or streamflow alterations or water availability, as discussed in the previous text;

(4) Based on available data, the proposed operation will likely not proximately result in contamination, diminution or interruption of an underground or surface source of water within the proposed permit or adjacent areas which is used for domestic, agricultural, industrial or other legitimate purpose.



RECEIVED
APR 09 2008
DIV. OF OIL, GAS & MINING
TRANSFERRED TO CO-OP MINING CO. 0.24 ACRES
1/4 CORNER
UTAH POWER & LIGHT EASEMENT
PERMIT BOUNDARY
CV-14-W (SURFACE DITCH)
UNDERGROUND FRENCH DRAIN CV-1-W
UPDES DISCHARGE POINT CV-15-W
S-1-GW
S-2-GW
RELOCATED UNDISTURBED DIVERSION UD-1
COAL PILE
SUB-SOIL
TOPSOIL
8" PIPE UNDERGROUND FRENCH DRAIN
COAL STORAGE AREA
STOCKPILE AREA
MAIN LINE TRACK
REFUSE AREA
TOP SOIL
MATERIAL STORAGE AREA
JENSEN PROPERTY (DELETED FROM PERMIT AREA)
JENSEN TRUCKING
UNDISTURBED
LOOP TRACK
PHONE BOX
GATE
N 438,500
N 438,000
N 437,500
N 437,000
N 436,500
LEGEND:
PERMIT BOUNDARY/BONDED AREA
SURFACE DRAINAGE
COLLECTION DITCH
FENCE
RAILROAD
EXISTING UNDERGROUND DRAIN
POWER POLE
WATER MONITORING POINTS
CONTOUR INTERVAL: 2'
REVISIONS:
UTAH REGISTERED PROFESSIONAL ENGINEER #154168 DAN W. GUY 3/25/08
SAVAGE
SAVAGE COAL TERMINAL
WATER MONITORING LOCATION MAP
DRAWN BY: BLACKHAWK ENGINEERING, INC.
SCALE: 1" = 300'
DATE: MARCH 2008
PLATE NUMBER: 7-1



PLAN VIEW
SCALE: 1" = 50'

POND VOLUMES

ITEM	SEDIMENT VOLUME	VOLUME @ SPILLWAY
POND 1	0.48 AC.FT.	1.40 AC.FT.
POND 2	0.24 AC.FT.	0.96 AC.FT.
POND 3	0.20 AC.FT.	0.94 AC.FT.

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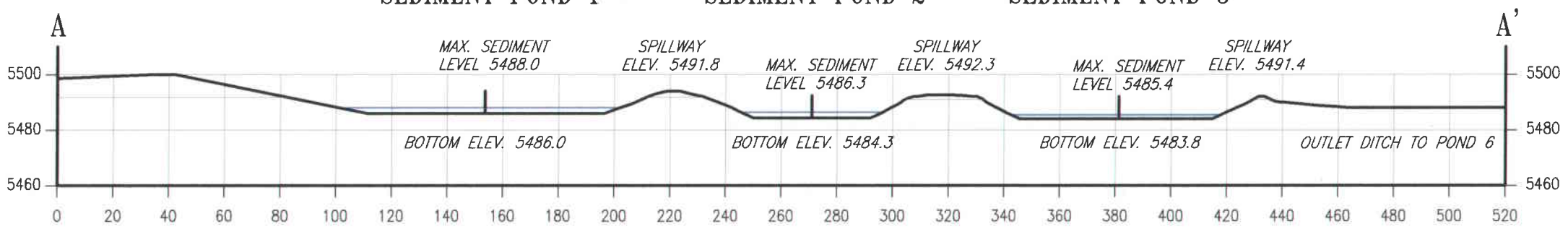
SEDIMENT POND 1 SEDIMENT POND 2 SEDIMENT POND 3



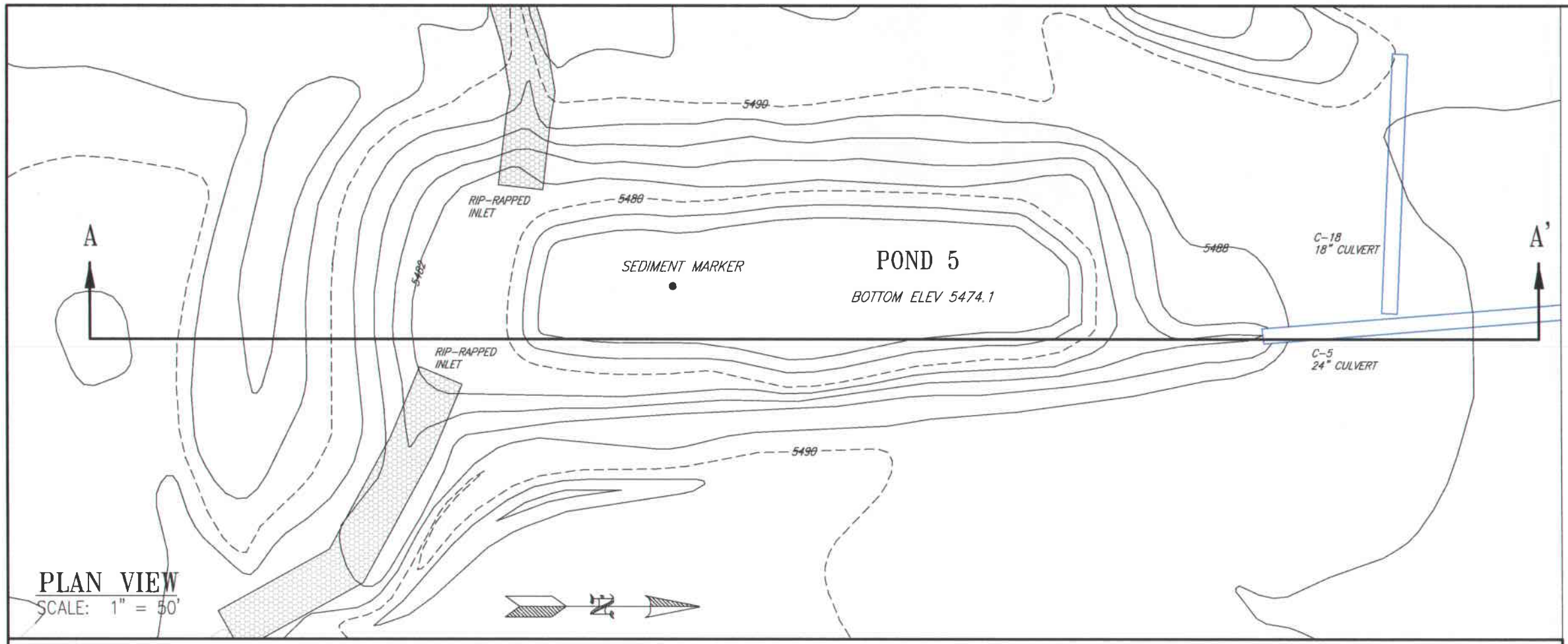
SECTION A-A'
SCALE: 1" = 50'

UTAH REGISTERED #154168 DAN W. GUY 3/31/08 PROFESSIONAL ENGINEER

SAVAGE

SAVAGE COAL TERMINAL
SEDIMENT PONDS 1, 2 AND 3

SCALE:	DRAWN BY:
1" = 50'	BLACKHAWK ENGINEERING
DATE:	PLATE:
MARCH 2008	PLATE 7-3



PLAN VIEW
SCALE: 1" = 50'

POND VOLUMES

ITEM	ELEVATION	VOLUME
SPILLWAY	5482.0	4.16 AC.FT.
MAXIMUM SEDIMENT LEVEL	5476.0	0.59 AC.FT.
BOTTOM OF POND	5474.1	–

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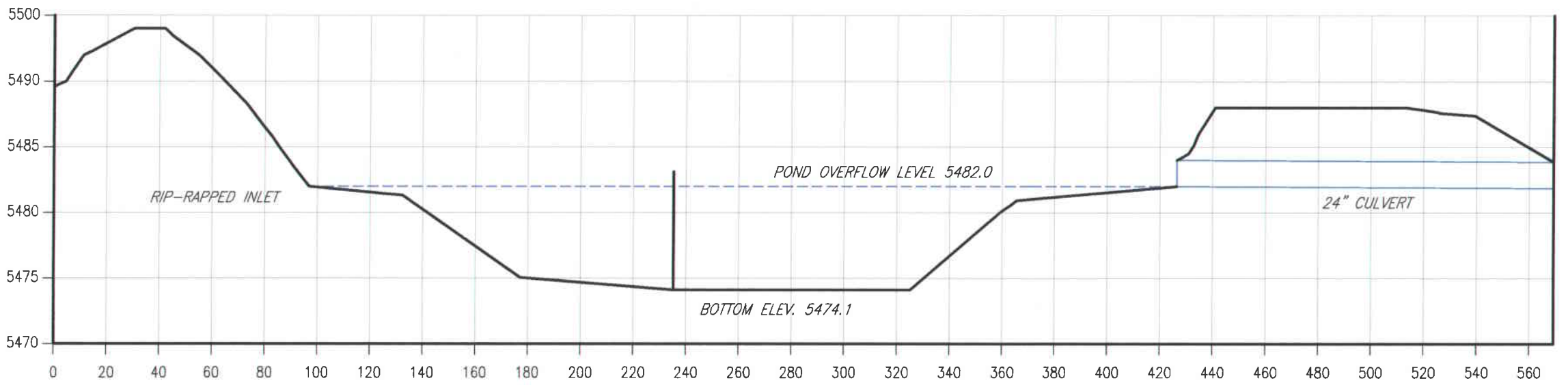


SECTION A-A'
VERTICAL EXAGGERATION 5X

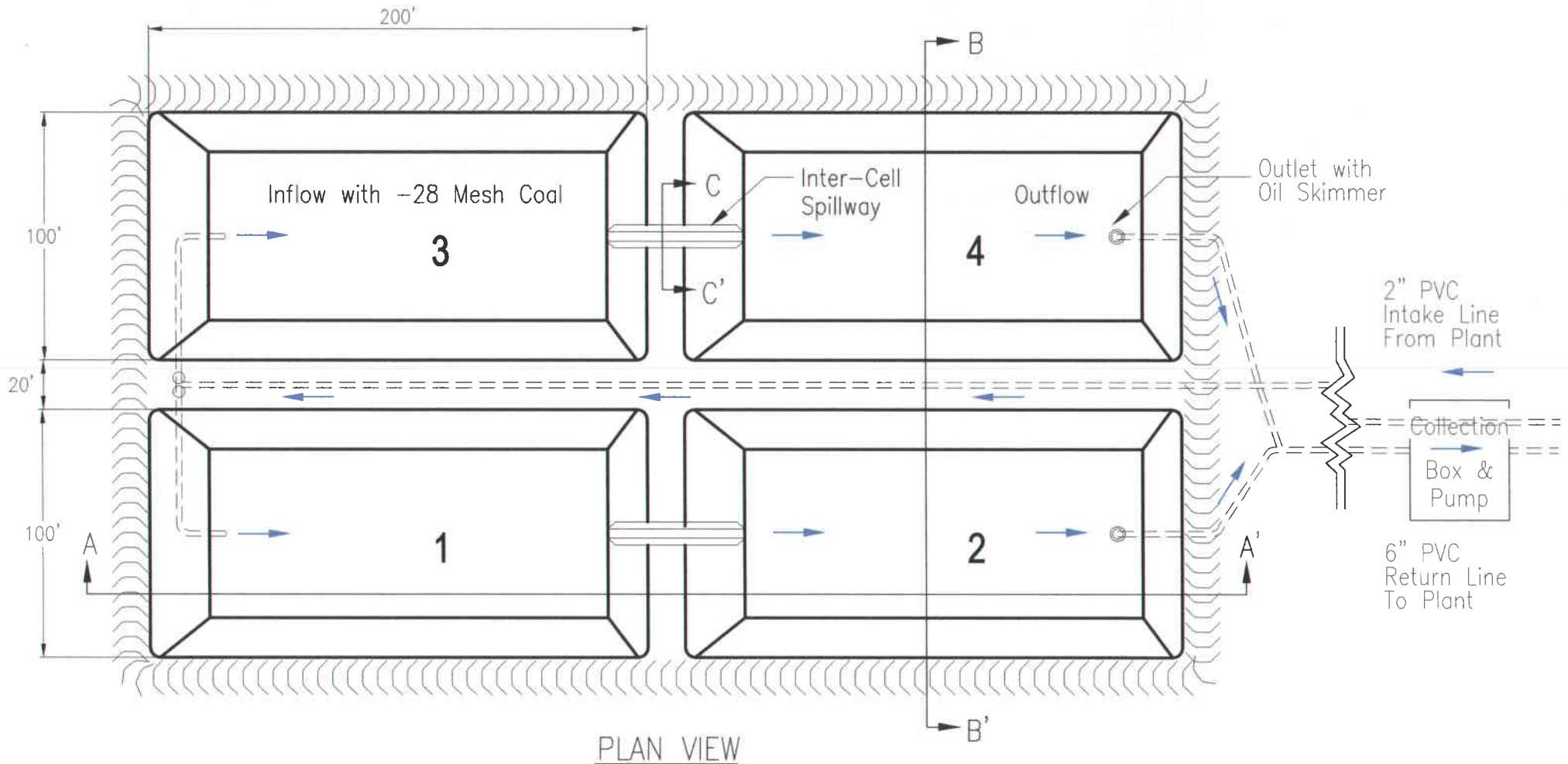
HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

UTAH REGISTERED
#154168
DAN W. GUY
3/31/08
PROFESSIONAL ENGINEER

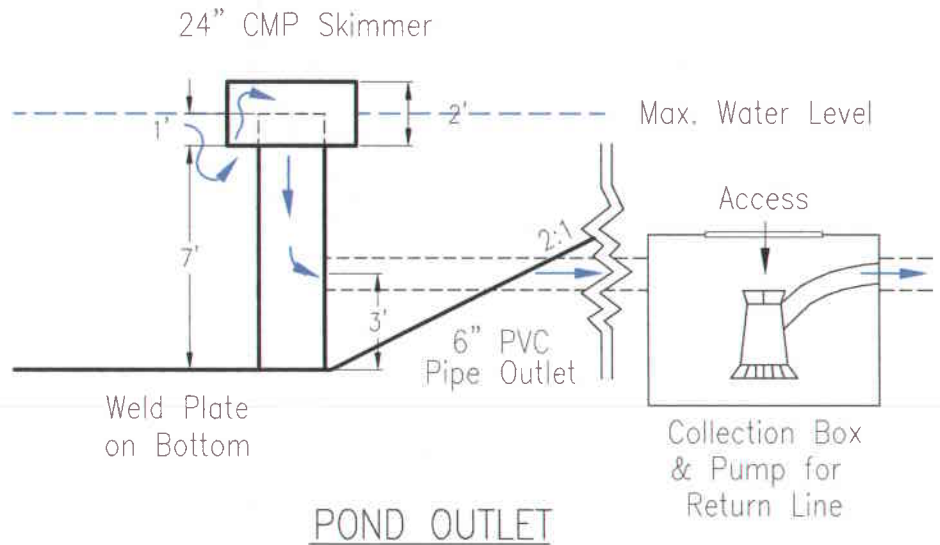
SAVAGE

SAVAGE COAL TERMINAL
SEDIMENT POND 5

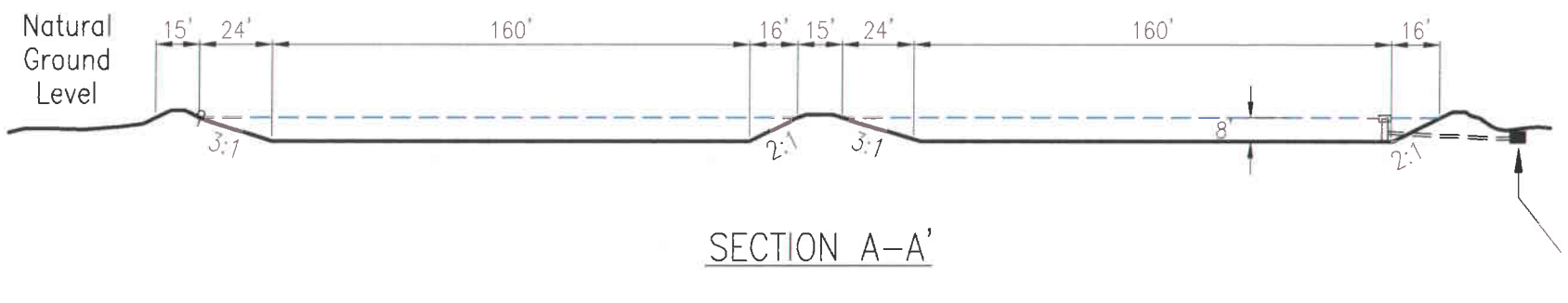
SCALE:	DRAWN BY:
1" = 50'	BLACKHAWK ENGINEERING
DATE:	PLATE:
MARCH 2008	PLATE 7-4



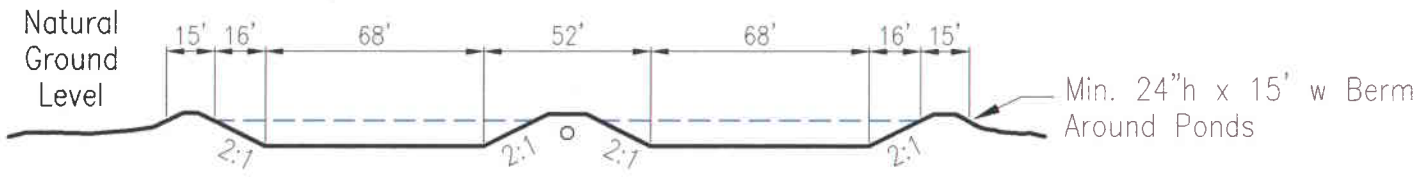
PLAN VIEW



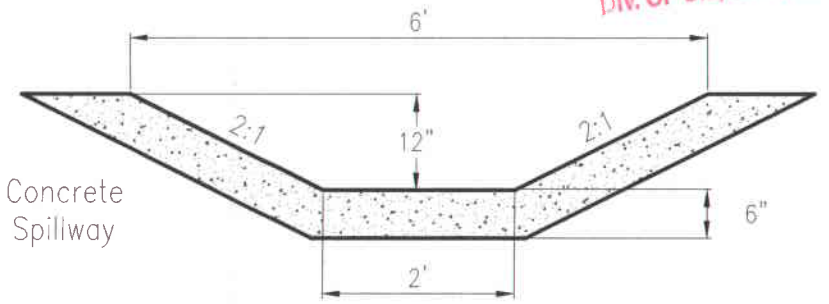
POND OUTLET



SECTION A-A'



SECTION B-B'



SECTION C-C'

INTER-CELL SPILLWAY

NOTE:
EACH POND CELL CAPACITY IS 2.78 AC.FT.

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DIV. OF OIL, GAS & MINING

SAVAGE

SAVAGE COAL TERMINAL
SETTLING PONDS

SCALE: NTS	DRAWN BY: BLACKHAWK ENGINEERING
DATE: MARCH 2008	PLATE: PLATE 7-6

Savage Services Corporation
Savage Coal Terminal
C/007/022

Chapter 8

Bonding and Insurance

R645-301-800

Table of Contents
Savage Coal Terminal
Chapter 8 - Bonding and Insurance

R645-301-800.	Bonding and Insurance
R645-301-820.	Requirements to File a Bond
R645-301-830.	Determination of Bond Amount
R645-301-850.	Bonding Requirements
R645-301-860.	Form of Bond
R645-301-880.	Bond Release Application
R645-301-890.	Liability Insurance

Appendix 8-1	Reclamation Cost Estimate
Appendix 8-2	Reclamation Performance Bond
Appendix 8-3	Liability Insurance

R645. Natural Resources; Oil, Gas and Mining; Coal.

R645-301. Coal Mine Permitting: Permit Application Requirements.

R645-301-800. Bonding and Insurance.

810. Bonding Definitions and Division Responsibilities.

811. Terms used in R645-301-800 may be found defined in R645-100-200.

812. Division Responsibilities -- Bonding.

820. Requirements to File a Bond.

820.100. Savage Services Corporation has an approved permit and bond on file with the Division, on a form prescribed and furnished by the Division, an approved bond payable to the division and conditioned upon the faithful performance of all the requirements of the State Program, the permit and the reclamation plan. (See Appendix 8-1 and 8-2).

820.110. Areas to be covered by the Performance Bond are:

820.111. The bond covers the proposed disturbed area within the permit area.

820.112. N/A - There are no plans at this time for incremental bonding.

820.113. N/A

820.114. N/A

820.120. Savage Services Corporation will not disturb any surface areas prior to acceptance by the Division of the required performance bond. The existing approved bond covers the existing disturbance, facilities and permit area.

820.130. A performance bond is posted for the full reclamation of the entire proposed disturbed area within the permit area.

820.200. Form of the Performance Bond - See Appendix 8-2.

820.221. The bond is a surety bond.

820.300. Period of Liability.

Performance bond liability will be for the duration of the coal mining and reclamation operations and for a period which is coincident with the operator's period of extended responsibility for successful revegetation provided in R645-301-356 or until achievement of the reclamation requirements of the State Program and permit, whichever is later.

820.350. General.

820.351. The bond liability of the permittee will include only those actions which he or she is obligated to take under the permit, including completion of the reclamation plan, so that the land will be capable of supporting the postmining land use approved under R645-301-413.

820.352. Implementation of an alternative postmining land-use approved under R645-301-413.300 which is beyond the control of the permittee need not be covered by the bond. Bond liability for prime farmland will be as specified in R645-301-880.320.

830. Determination of Bond Amount

830.110. The bond amount has been determined by the Division.

830.120. The bonding calculations provided in Appendix 8-1 of this chapter are based on the proposed permit and reclamation plan and have been determined by the Division.

830.130. Bonding calculations provided have been based on probable difficulty of reclamation, with particular emphasis on the geology, hydrology and revegetation potential.

830.140. Detailed estimated bonding costs, with supporting calculations are provided in Appendix 8-1 of this permit application.

830.200. The bond cost in Appendix 8-1 is based on current labor and equipment rates (Means, Cat Handbook) and are expected to be sufficient to assure the completion of the reclamation plan if the work has to be performed by the Division in the event of forfeiture.

830.300. The proposed reclamation cost has been inflated over a 5 year period (permit term) using the latest Gross National Index (GNI).

830.400. Adjustment of Amount - Per Division.

830.410. The amount of the bond or deposit required and the terms of the acceptance of the applicant's bond will be adjusted by the Division from time to time as the area requiring bond coverage is increased or decreased or where the cost of future reclamation changes. The Division may specify periodic times or set a schedule for reevaluating and adjusting the bond amount to fulfill this requirement.

830.420. The Division will:

830.421. Notify the permittee, the surety, and any person with a property interest in collateral who has requested notification under R645-301-860.260 of any proposed adjustment to the bond amount; and

830.422. Provide the permittee an opportunity for an informal conference on the adjustment.

830.430. A permittee may request reduction of the amount of the performance bond upon submission of evidence to the Division providing that the permittee's method of operation or other circumstances reduces the estimated cost for the Division to reclaim the bonded area. Bond adjustments which involve undisturbed land or revision of the cost estimate of reclamation are not considered bond release subject to procedures of R645-301-880.100 through R645-301-880.800.

830.440. In the event that an approved permit is revised in accordance with the R645 rules, the Division will review the bond for adequacy and, if necessary, will require adjustment of the bond to conform to the permit as revised.

830.500. N/A - This is a surface operation.

840. The bond as approved, meets the terms and conditions of this section.

840.100. See Appendix 8-1

840.200. See Appendix 8-2

840.300. See Appendix 8-2

840.400. See Appendix 8-2.

840.500. General.

840.510. See Appendix 8-2.

840.520. See Appendix 8-2.

850. Bonding Requirements.

Bonding Requirements for UNDERGROUND COAL MINING AND RECLAMATION ACTIVITIES and Associated Long-Term Coal-Related Surface Facilities and Structures.

850.100. Responsibilities. The Division will require bond coverage, in an amount determined under R645-301-830, for long-term surface facilities and structures, and for areas disturbed by surface impacts incident to UNDERGROUND COAL MINING AND RECLAMATION ACTIVITIES, for which a permit is required. Specific reclamation techniques required for underground mines and long-term facilities will be considered in determining the amount of bond to complete the reclamation.

850.200. Long-term period of liability.

850.210. N/A - Incremental bonding is not planned for this operation.

850.220. This facility meets the definition of a long-term surface disturbance, and is bonded as such.

850.230. The bond meets the requirements of continuous coverage throughout the required liability period.

850.240. The bond meets the requirements of continuous coverage throughout the required liability period.

850.300. Bond Forfeiture. The Division will take action to forfeit a bond pursuant to R645-301-850 if 30 days prior to bond expiration the operator has not filed:

850.310. The bond will be renewed at least 30 days prior to the expiration of the permit term to provide continuous coverage.

850.320. The bond will be renewed as required to provide coverage for the period of liability, including the period of extended responsibility for successful revegetation.

860. Form of Bonds.

860.100. Savage Services Corporation has posted a surety bond for this operation.

860.110. The surety bond has been executed by Savage Services Corporation and a corporate surety licensed to do business in Utah.

860.120. The surety bond is issued for the expected permit term (5 years) and will be noncancellable during the term.

860.200. N/A - There are no plans for a collateral bond for this operation.

860.220. N/A

860.300. N/A - Self bonding is not planned for this operation.

880. Bond Release Application.

Bond release applications will be submitted upon appropriate schedules after final reclamation.

890. Liability Insurance.

Required liability insurance is included in Appendix 8-3.

890.100. A certificate of liability insurance for the operation is included in this permit application in Appendix 8-3.

890.200. See Appendix 8-3.

890.300. See Appendix 8-3.

890.400. N/A - There are no plans to provide self-insurance.

Appendix 8-1

Reclamation Cost Estimate

Savage Services Corporation
Savage Coal Terminal

Bonding Calculations

Direct Costs		
Subtotal Demolition and Removal	$901,466.00	
Subtotal Backfilling and Grading	$493,173.00	
Subtotal Revegetation	$230,648.00	
Direct Costs	$1,625,287.00	
Indirect Costs		
Mob/Demob	$162,529.00	10.0%
Contingency	$81,264.00	5.0%
Engineering Redesign	$40,632.00	2.5%
Main Office Expense	$110,520.00	6.8%
Project Mainagement Fee	$40,632.00	2.5%
Subtotal Indirect Costs	$435,577.00	26.8%
Total Cost	$2,060,864.00	
Escalation factor		0.032
Number of years		5
Escalation	$351,528.00	
Reclamation Cost Escalated	$2,412,392.00	
Bond Amount (rounded to nearest $1,000) 2012 Dollars	$2,412,000.00	
Bond Posted Dollars	$2,525,000.00	
Difference Between Cost Estimate and Bond	$113,000.00	
Percent Difference	4.68%	

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Shop Office 01																			16329
	Scale House 02																			1721
	No 1 Truck Dump 03																			4851
	No 2 Truck Dump 04																			2638
	No 3 Truck Dump 05																			1551
	No 4 Truck Dump 06																			1885
	No 5 Truck Dump 07																			1143
	Conveyors Eight 08																			9290
	Conveyor 48 inch 09																			9290
	No 4 Radial Stacker 10																			3759
	No 5 Radial Stacker 11																			1043
	Conveyor Piers 12																			2194
	Support Structure 13																			1582
	Water Tank 14																			8737
	Reclaim Tunnel 15																			34896
	Portable Hopper 16																			976
	Trailer 17																			1413
	Transfer Bin 18																			2177
	Preparation Plant 19																			217261
	Substation 20																			6049
	Fuel Storage 21																			4391
	Reclaim Control Bld 22																			1503
	Sample House 23																			4491
	Stacking Tube 24																			46338
	Loadout Silo 25																			225965
	Railroad 26																			15000
	Powerline 27																			2500
	Aphalt 28																			118266
	Pumphouse 29																			13095
	River Pump 30																			204
	Guard Rails 31																			63360
	Culverts 32																			1593
	Stacking Tube 33																			24886
	Coal Sampler Addition 34																			5866
	Conveyor Transfer 35																			17189
	New Shop Oil Storage Bld 36																			20566
	Plant Expansion 37																			7668
	Total																			901466

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Shop Office 01																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	100	45	10								FT		45000	CF	12600
	Structure's Vol. Demolished																0.01	17	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						17					CY		17	CY	595
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			13195
	Equipment 's Disposal Cost	Chain link remove 8'-10'	02 41 13 60 1700	3.57	/LF	240										LF		240	LF	857
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			857
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	100	45	0.5								FT		83	CY	815
	Concrete's Vol. Demolished																1.3	108	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													108	CY	162
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													108	CY	409
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													108	CY	891
	Subtotal																			2277
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			16329

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Scale House 02																			
	Structure's Demolition Cost	Steel Bld, Large	02 41 16 13 0012	0.28	/CF	12	12	8								FT		1152	CF	323
	Structure's Vol. Demolished																0.01	0	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						0					CY		0	CY	
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			323
	Structure's Demolition Cost	Steel Bld, Large	02 41 16 13 0012	0.28	/CF	75	15	3								FT		3375	CF	945
	Structure's Vol. Demolished																0.01	1	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						1					CY		1	CY	35
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			980
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Footer's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY						15					CY		15	CY	147
	Footer's Vol. Demolished																1.3	20	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													20	CY	30
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													20	CY	76
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													20	CY	165
	Subtotal																			418
	Total																			1721

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	No 1 Truck Dump 03																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	16	16	22								FT		5632	CF	1577
	Structure's Vol. Demolished																0.01	2	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						2					CY		2	CY	70
	Subtotal																			1647
	No. 2 Truck Dump	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	16	6	8								FT		768	CF	215
	Structure's Demolition Cost																0.01	1	CY	
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						1					CY		1	CY	35
	Subtotal																			250
	No. 2 Truck Dump	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	200	30	1								FT		8000	CF	1680
	Structure's Demolition Cost																0.01	2	CY	
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						2					CY		2	CY	70
	Subtotal																			1750
	Footer's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	30	40	1								FT		44	CY	432
	Footer's Vol. Demolished																1.3	57	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													57	CY	86
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													57	CY	216
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													57	CY	470
	Subtotal																			1204
	Total																			4851

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	No 2 Truck Dump 04																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	16	16	22								FT		5632	CF	1577
	Structure's Vol. Demolished																0.01	2	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						2					CY		2	CY	70
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			1647
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Footer's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	120	8	1								FT		36	CY	354
	Footer's Vol. Demolished																1.3	47	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													47	CY	71
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													47	CY	178
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													47	CY	388
	Subtotal																			991
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			2638

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	No 3 Truck Dump 05																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	14	14	20								FT		3920	CF	1098
	Structure's Vol. Demolished																0.01	1	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						1					CY		1	CY	35
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			1133
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Footer's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	20	20	1								FT		15	CY	147
	Footer's Vol. Demolished																1.3	20	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													20	CY	30
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													20	CY	76
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													20	CY	165
	Subtotal																			418
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1551

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	No 4 Truck Dump 06																			
	Structure's Demolition Cost	Steel Bld, Large	02 41 16 13 0012	0.28	/CF	16	16	20								FT		5120	CF	1434
	Structure's Vol. Demolished																0.01	2	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						2					CY		2	CY	70
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			1504
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Footer's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	48	4	2								FT		14	CY	137
	Footer's Vol. Demolished																1.3	18	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													18	CY	27
	Transportation Cost	12 CY (18 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													18	CY	68
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													18	CY	149
	Subtotal																			381
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1885

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	No 5 Truck Dump 07																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	30	14	8								FT		3360	CF	941
	Structure's Vol. Demolished																0.01	1	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						1					CY		1	CY	35
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			976
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Footer's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	10	15	1								FT		6	CY	59
	Footer's Vol. Demolished																1.3	8	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													8	CY	12
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													8	CY	30
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													8	CY	66
	Subtotal																			167
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1143

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Conveyors Eight 08																			
	Structure's Demolition Cost	Steel Bld, Large	02 41 16 13 0012	0.28	/CF	1980	4	4								FT		31680	CF	8870
	Structure's Vol. Demolished																0.01	12	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						12					CY		12	CY	420
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			9290
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			9290

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Conveyor 48 inch 09																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	1980	4	4								FT		31680	CF	8870
	Structure's Vol. Demolished																0.01	12	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						12					CY		12	CY	420
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			9290
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Floor Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	10	15	1								FT		0	CY	0
	Floor's Vol. Demolished																1.3	0	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													0	CY	0
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													0	CY	0
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													0	CY	0
	Subtotal																			0
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			9290

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	No 4 Radial Stacker 10																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	200	8	8								FT		12800	CF	3584
	Structure's Vol. Demolished																0.01	5	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						5					CY		5	CY	175
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			3759
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Floor Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	10	15	1								FT		0	CY	0
	Floor's Vol. Demolished																1.3	0	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													0	CY	0
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													0	CY	0
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													0	CY	0
	Subtotal																			0
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			3759

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	No 5 Radial Stacker 11																			
	Structure's Demolition Cost	Steel Bld, Large	02 41 16 13 0012	0.28	/CF	100	6	6								FT		3600	CF	1008
	Structure's Vol. Demolished																0.01	1	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						1					CY		1	CY	35
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			1043
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Floor Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	0	0	0								FT		0	CY	0
	Floor's Vol. Demolished																1.3	0	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													0	CY	0
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													0	CY	0
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													0	CY	0
	Subtotal																			0
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1043

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Conveyor Piers 12																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	0	0	0								FT		0	CF	0
	Structure's Vol. Demolished																0.01	0	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						0					CY		0	CY	0
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			0
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Floor Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	3	3	6							40	FT		80	CY	786
	Floor's Vol. Demolished																1.3	104	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													104	CY	156
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													104	CY	394
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													104	CY	858
	Subtotal																			2194
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			2194

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Support Structure 13																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	300	1	1							18	FT		5400	CF	1512
	Structure's Vol. Demolished																0.01	2	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						2					CY		2	CY	70
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			1582
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Floor Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	0	0	0							0	FT		0	CY	0
	Floor's Vol. Demolished																1.3	0	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													0	CY	0
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													0	CY	0
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													0	CY	0
	Subtotal																			0
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1582

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Water Tank 14																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF						21390					CF		21390	CF	5989
	Structure's Vol. Demolished																0.01	8	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						8					CY		8	CY	280
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			6269
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Floor Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY						90					CY		90	CY	884
	Floor's Vol. Demolished																1.3	117	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													117	CY	176
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													117	CY	443
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													117	CY	965
	Subtotal																			2468
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			8737

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Reclaim Tunnel 15																			
	Structure's Demolition Cost	Steel Bld, Large	02 41 16 13 0012	0.28	/CF	1040	14	8								FT		116480	CF	32614
	Structure's Vol. Demolished																0.01	43	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						43					CY		43	CY	1505
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			34119
	Escape Tunnel																			
	Structure's Demolition Cost	Steel Bld, Large	02 41 16 13 0012	0.28	/CF			160	4							FT		2011	CF	563
	Structure's Vol. Demolished																0.01	1	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						1					CY		1	CY	35
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			598
	Reclaim Tunnel 15																			
	Structure's Demolition Cost	Steel Bld, Large	02 41 16 13 0012	0.28	/CF	4	4	4							2	FT		128	CF	36
	Structure's Vol. Demolished																0.01	0	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						0					CY		0	CY	0
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			36
	Escape Tunnel																			
	Structure's Demolition Cost	Steel Bld, Large	02 41 16 13 0012	0.28	/CF	8	8	8								FT		512	CF	143
	Structure's Vol. Demolished																0.01	0	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						0					CY		0	CY	0
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			143
	Total																			34896

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Portable Hopper 16																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	20	12	14								FT		3360	CF	941
	Structure's Vol. Demolished																0.01	1	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						1					CY		1	CY	35
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			976
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Pad's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	0	0	0								FT		0	CY	0
	Pad's Vol. Demolished																1.3	0	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													0	CY	0
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													0	CY	0
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													0	CY	0
	Subtotal																			0
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			976

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Trailer 17																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	30	8	8								FT		1920	CF	538
	Structure's Vol. Demolished																0.01	1	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						25					CY		25	CY	875
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			1413
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1413

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Transfer Bin 18																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF			30	16							FT		6032	CF	1689
	Structure's Vol. Demolished																0.01	2	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						2					CY		2	CY	70
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			1759
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Pad's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	20	20	1								FT		15	CY	147
	Pad's Vol. Demolished																1.3	20	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													20	CY	30
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													20	CY	76
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													20	CY	165
	Subtotal																			418
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			2177

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Preparation Plant 19																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	110	80	80								FT		704000	CF	197120
	Structure's Vol. Demolished																0.01	261	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						261					CY		261	CY	9135
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			206255
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	110	80	1								FT		326	CY	3201
	Concrete's Vol. Demolished																1.3	424	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													424	CY	636
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													424	CY	1607
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													424	CY	3498
	Subtotal																			8942
	Pad's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY						75					CY		75	CY	737
	Pad's Vol. Demolished																1.3	98	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													98	CY	147
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													98	CY	371
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													98	CY	809
	Subtotal																			2064
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			217261

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Substation 20																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	20	27	8								FT		4320	CF	1210
	Structure's Vol. Demolished																0.01	2	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						64					CY		64	CY	2240
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			3450
	Transformers 's Disposal Cost	Mechanical equipment heavy	25 05 05 10 3600	880	/ton							2				Ton		2	Ton	1760
	Fence Cost	Chain link remove 8'-10'	02 41 13 60 1700	3.57	/LF	180										FT		180	FT	643
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			2423
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	20	27	0.5								FT		10	CY	
	Concrete's Vol. Demolished																1.3	13	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													13	CY	20
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													13	CY	49
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													13	CY	107
	Subtotal																			176
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			6049

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Fuel Storage 21																			
	Structure's Demolition Cost	3000 gal. to 5000 gal. tank	02 65 10 30 0110	630	Ea.										2	EA		2	EA	1260
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						0					CY		0	CY	0
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			1260
	Trailer																			
	Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	10	50	8								FT		4000	CF	1200
	Structure's Vol. Demolished																0.01	1	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						1					CY		1	CY	35
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			1235
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	30	30	0.68							4	FT		91	CY	
	Concrete's Vol. Demolished																1.3	118	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													118	CY	177
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													118	CY	447
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													118	CY	974
	Subtotal																			1598
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	30	30	0.5								FT		17	CY	
	Concrete's Vol. Demolished																1.3	22	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													22	CY	33
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													22	CY	83
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													22	CY	182
	Subtotal																			298
	Total																			4391

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Reclaim Control Bld 22																			
	Structure's Demolition Cost	Steel Bld, Large	02 41 16 13 0012	0.28	/CF	22	16	12								FT		4224	CF	1183
	Structure's Vol. Demolished																0.01	2	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						2					CY		2	CY	70
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			1253
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Pad's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	22	22	0.5								FT		9	CY	88
	Pad's Vol. Demolished																1.3	12	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													12	CY	18
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													12	CY	45
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													12	CY	99
	Subtotal																			250
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1503

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Sample House 23																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	22	22	30								FT		14520	CF	4066
	Structure's Vol. Demolished																0.01	5	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						5					CY		5	CY	175
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			4241
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Pad's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	22	22	0.5								FT		9	CY	88
	Pad's Vol. Demolished																1.3	12	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													12	CY	18
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													12	CY	45
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													12	CY	99
	Subtotal																			250
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			4491

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Stacking Tube 24																			
	Structure's Demolition Cost	Concrete Bld, Large	02 41 16 13 0050	0.4	/CF			200	20						4	FT		62832	CF	25133
	Structure's Vol. Demolished																0.01	23	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						23					CY		23	CY	805
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			25938
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Pad's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY					186					4	CY		744	CY	7306
	Pad's Vol. Demolished																1.3	967	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													967	CY	1451
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													967	CY	3665
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													967	CY	7978
	Subtotal																			20400
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			46338

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Loadout Silo 25																			
	Structure's Demolition Cost	Concrete Bld, Large	02 41 16 13 0050	0.4	/CF			200	50						4	FT		392699	CF	157080
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						145					CY		145	CY	5075
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			162155
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Pad's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY					2327					1	CY		2327	CY	22851
	Pad's Vol. Demolished																1.3	3025	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													3025	CY	4538
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													3025	CY	11465
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													3025	CY	24956
	Subtotal																			63810
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			225965

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Railroad 26																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost	Rail Road Removal	Contractors	10000	/Mi	8100										LF		1.5	Mi	15000
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			15000
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			15000

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Powerline 27																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost	Powerpole	Hiawatha	100	EA										25	EA.		25	EA.	2500
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			2500
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			2500

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Aphalt 28																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Haul Road																			
	Pavement's Demolition																			
	Demolition Cost	Pavement Removal 4-6"	02 41 13 15 5050	7.15	/SY	4700	24									FT		12533	SY	89611
	Pavement's Vol. Demolished							0.5									1.3	2715	CY	
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CY													2715	CY	22399
	Subtotal																			112010
	Parking Lot																			
	Pavement's Demolition																			
	Demolition Cost	Pavement Removal 4-6"	02 41 13 15 5050	7.15	/SY	50	140									FT		778	SY	5563
	Pavement's Vol. Demolished							0.25										84	CY	
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CY													84	CY	693
	Subtotal																			6256
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			118266

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Pumphouse 29																			
	Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	40	26	10								FT		10400	CF	3120
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						135					CY		135	CY	4725
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			7845
	Pumphouse																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF			8	12						1	Ft.		905	CF	253
	Structure's Vol. Demolished																0.01	5	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						5					CY		5	CY	175
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			428
	Pumphouse																			
	Structure's Demolition Cost	Concrete Bld. Large	02 41 16 13 0050	0.4	/CF			30	21						1	Ft.		10391	CF	4156
	Structure's Vol. Demolished																0.01	4	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON						4					CY		4	CY	140
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			4296
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Pad's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	40	26	0.5								FT		19	CY	187
	Pad's Vol. Demolished																1.3	25	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													25	CY	38
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													25	CY	95
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													25	CY	206
	Subtotal																			526
	Total																			13095

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	River Pump 30																			
	Structure's Demolition Cost	Steel Bld, Large	02 41 16 13 0012	0.28	/CF	8	8	8								FT		512	CF	143
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			143
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Pad's Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	8	8	1								FT		2	CY	20
	Pad's Vol. Demolished																	1.3	3	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY														3	CY	5
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY														3	CY	11
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF														3	CY	25
	Subtotal																				61
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			204

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Guard Rails 31																			
	Structure's Demolition Cost	Guiderail remove	02 41 13 33 0800	12.8	LF	4950										LF		4950	LF	63360
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			63360
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			63360

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Culverts 32																			
	Excavate 12" diameter culvert	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	300	2	2								FT		44	CY	82
	Backfill 12" diameter culvert	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	300	2	2								FT		44	CY	75
	Excavate 18" diameter culvert	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	810	2	3								FT		180	CY	335
	Backfill 18" diameter culvert	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	810	2	3								FT		180	CY	308
	Excavate 24" diameter culvert	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	750	2	4								FT		222	CY	413
	Backfill 24" diameter culvert	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	750	2	4								FT		222	CY	380
	Subtotal																			1593
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1593

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Stacking Tube 33																			
	36" Conveyor																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	100	45	10								FT		45000	CF	12600
	Structure's Vol. Demolished																0.1	167	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON											CY		167	CY	5845
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			18445
	Steel Stacking Tube																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF			80.3	10						2	FT		12613	CF	3532
	Structure's Vol. Demolished																0.1	47	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON											CY		47	CY	1645
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			5177
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY						46					CY		46	CY	452
	Concrete's Vol. Demolished																1.3	60	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													60	CY	90
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													60	CY	227
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													60	CY	495
	Subtotal																			1264
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			24886

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Coal Sampler Addition 34																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	27	26	16								FT		11232	CF	3145
	Structure's Vol. Demolished																0.1	42	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON								100			lb/cf		57	ton	1995
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			5140
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	27	26	0.75								FT		19	CY	187
	Concrete's Vol. Demolished																1.3	25	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													25	CY	38
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													25	CY	95
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													25	CY	206
	Subtotal																			526
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			5666

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Convevor Transfer 35																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	1538	7	4								FT		43064	CF	12058
	Structure's Vol. Demolished																0.05	80	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON								100			lb/cf		108	ton	3780
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			15838
	Excavate 18" diameter culvert	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	800	2	3								FT		178	CY	331
	Backfill 18" diameter culvert	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	800	2	3								FT		178	CY	304
	Subtotal																			635
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	8	2	2							22	FT		26	CY	255
	Concrete's Vol. Demolished																1.3	34	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													34	CY	51
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0920	3.79	/CY													34	CY	129
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													34	CY	281
	Subtotal																			716
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			17189

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	New Shop Oil Storage Bld 36																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	40	80	18								FT		57600	CF	16128
	Structure's Vol. Demolished																0.01	21	CY	
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	ECDC	ECDC	35	/TON								100			lb/cf		28	ton	980
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			17108
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			0
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY						126					CY		126	CY	1237
	Concrete's Vol. Demolished																1.3	164	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													164	CY	246
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													164	CY	622
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													164	CY	1353
	Subtotal																			3458
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			20566

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Plant Expansion 37																			
	Plant Feed Conveyor																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	233	4	4								FT		3728	CF	1044
	Structure's Vol. Demolished																0.01	1	CY	
	Fine Raow Coal Conveyor																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	200	4	4								FT		3200	CF	896
	Structure's Vol. Demolished																0.01	1	CY	
	Refuse Conveyor																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	100	4	4								FT		1600	CF	448
	Structure's Vol. Demolished																0.01	1	CY	
	Stacking Conveyor																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	100	4	4								FT		1600	CF	448
	Structure's Vol. Demolished																0.01	1	CY	
	Subtotal																			2836
	Plant Feed Conveyor																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY						42.6					CY		42.6	CY	418
	Concrete's Vol. Demolished																1.3	55	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													55	CY	83
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													55	CY	208
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													55	CY	454
	Subtotal																			1163
	Fine Raow Coal Conveyor																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY						33.1					CY		33.1	CY	325
	Concrete's Vol. Demolished																1.3	43	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													43	CY	65
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													43	CY	163
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													43	CY	355
	Subtotal																			906
	Refuse Conveyor																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY						15.3					CY		15.3	CY	150
	Concrete's Vol. Demolished																1.3	20	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													20	CY	30
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													20	CY	76
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													20	CY	165
	Subtotal																			421
	Stacking Conveyor																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY						85.1					CY		85.1	CY	836
	Concrete's Vol. Demolished																1.3	111	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													111	CY	167
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													111	CY	421
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													111	CY	916
	Subtotal																			2340
	Total																			7668

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Cleanup Coal Piles															8419
Recontouring															263804
Topsoil															109743
Ripping															111207
Subtotal															493173

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Savage Coal Terminal Cleanup Coal Piles															
D9R Semi-U EROPS (9-50) (2H2006)	19530	90.4	0.1	57.85	279.35	1	279.35	HR	1500	CY	187	CY/HR	8	HR	2235
988G EROPS (9-34) (2nd2006) 2005	15505	77.35	0.1	57.85	239.84	1	239.84	HR	1500	CY	187	CY/HR	8	HR	1919
CLAB					44.75	1	44.75	HR					16	HR	716
Foreman Average, Outside					62.25	1	62.25	HR					16	HR	996
5,000 gal H2O truck Diesel (20-17) (2nd2006)	5170	55	0.1	45.65	138.46	1	138.46	HR					16	HR	2215
Pickup Truck Crew 4x4 1 ton (20-17) (2nd2006)	1070	13.1	0.1	0	21.1	1	21.1	HR					16	HR	338
Subtotal															8419

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Svage Coal Terminal Recontouring															
D9R Semi-U EROPS (9-50) (2H2006)	19530	90.4	0.1	57.85	279.35	1	279.35	HR					639	HR	178505
CLAB					44.75	1	44.75	HR					320	HR	14320
Foreman Average, Outside					62.25	1	62.25	HR					320	HR	19920
5,000 gal H2O truck Diesel (20-17) (2nd2006)	5170	55	0.1	45.65	138.46	1	138.46	HR					320	HR	44307
Pickup Truck Crew 4x4 1 ton (20-17) (2nd2006)	1070	13.1	0.1	0	21.1	1	21.1	HR					320	HR	6752
Subtotal															263804

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Savage Coal Terminal Topsoil															
D8R Series II (9-50(2nd2006)	15125	67.55	0.1	57.85	226.69	1	226.69	HR					102	HR	23122
627G EROPS (9-47) (2nd2006)	17460	113.05	0.1	57.85	291.33	1	291.33	HR					204	HR	59431
CLAB					44.75	1	44.75	HR					102	HR	4565
Foreman Average, Outside					62.25	1	62.25	HR					102	HR	6350
5,000 gal H2O truck Diesel (20-17) (2nd2006)	5170	55	0.1	45.65	138.46	1	138.46	HR					102	HR	14123
Pickup Truck Crew 4x4 1 ton (20-17) (2nd2006)	1070	13.1	0.1	0	21.1	1	21.1	HR					102	HR	2152
Subtotal															109743

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Ripping															
D7R Series II (9-50) (2nd2006)	11575	52.85	0.1	57.85	188.33	1	188.33	HR					139	HR	26178
Multi-Shank Ripper 190-259 P (9-56) (2nd2006)	1955	545	0.1		611.72	1	611.72	HR					139	HR	85029
Subtotal															111207

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Vegetation																			
	General Area																			
	Seeding Equipment and Labor	Tractor Spreader (equip. & labor) B-66	Reveg004	12.71	/MSF					132.5						AC		5772	MSF	73362
	Seeding Material	General Seed Mix	Savage07221	151.15	/AC					132.5						AC		132.5	AC	20027
	Mulch	Crew B 65	Reveg008	1090.96	/Day										11	Days		11	Day	12001
		Hay bale	Reveg007	166.1	/ton					132.5						AC		132.5	AC	22008
	Riprarian																			
	Seeding Equipment and Labor	Hydro Spreader (equip. & labor) B-81 80MSI	Reveg002	210.37	/MSF					5.28						AC		230	MSF	48385
	Seeding Material	Riparian Seed Mix	Savage07222	49.5	/AC					5.28						AC		5	AC	248
	Area									5.28										
										5.28						AC				
		Bare root seedlings, 11" to 16" med. soil	32 93 43 10 0140	1.71	Ea										4963	EA		4963	EA	8487
	Subtotal																			184518
	Revegetation																			
	25% Revegetation Rate																			46130
	Subtotal																			46130
	Subtotal																			
	Subtotal																			
	Total																			230648

Appendix 8-2

Reclamation Performance Bond

Savage Services Corporation
Savage Coal Terminal

Orig. Fireproof File
CC: C0070008

L. Dean Rees
Sr. V.P. - Finance & Administrative Services

SAVAGE
Savage Services Corporation
6340 South 3000 East #600
Salt Lake City, UT 84121
(801) 944-6600
Fax (801) 944-6500

February 26, 2004

Fireproof
C/007/0222

Pamela Grubaugh-Littig
State of Utah
Division of Oil, Gas & Mining
P.O. Box 145801
Salt Lake City, UT 84114-5801

Dear Ms. Grubaugh-Littig:

Enclosed is a reclamation bond as required by the State of Utah in the amount of $2,525,000 which covers the property at our coal handling terminal in Carbon County. This bond replaces the bond currently on file. Please return the previous bond so it may be appropriately cancelled by the Surety.

Thank you for your attention to this matter. If you have any questions you may call me at the above listed number.

Sincerely,

L. Dean Rees

RECEIVED
FEB 27 2004
DIV. OF OIL, GAS & MINING

EXHIBIT "B"

Bonding Agreement
Surety Forms

(Non-Federal Coal)

THIS BOND REPLACES NATIONAL FIRE INSURANCE COMPANY OF HARTFORD BOND NO - 158987108

Exhibit "B"
Non-Federal Surety Bond
Non-Federal

Bond Number: 965-003-641

EXHIBIT "B"
SURETY BOND
(NON-FEDERAL COAL)
--ooOOoo--

This **SURETY BOND** entered into by and between the undersigned **PERMITTEE/PRINCIPAL** SAVAGE SERVICES CORPORATION, and **SURETY** LIBERTY MUTUAL INSURANCE COMPANY, hereby jointly and severally bind ourselves, our heirs, administrators, executors, successors and assigns unto the State of Utah, Division of Oil, Gas & Mining (**DIVISION**) in the penal sum of TWO MILLION FIVE HUNDRED TWENTY-FIVE THOUSAND AND NO/100 DOLLARS ($2,525,000.00) ($) (Surety Bond Amount) for the timely performance of reclamation responsibilities of the surface disturbance described in Exhibit "A" of the Reclamation Agreement.

This **SURETY BOND** will remain in effect until all of the **PERMITTEE'S/ PRINCIPAL'S** reclamation obligation have been met and released by the **DIVISION** and is conditioned upon faithful performance of all of the requirements of the Act, the applicable rules and regulations, the approved permit, and the **DIVISION**.

The **SURETY** will not cancel this bond at any time for any reason, including non-payment of premium or bankruptcy of the Principal during the period of liability.

The **SURETY** and their successors and assigns, agree to guarantee the obligation and to indemnify, defend, and hold harmless the **DIVISION** from all expenses which the **DIVISION** may sustain as a result of the **PERMITTEE'S/PRINCIPAL'S** failure to comply with the condition(s) of the reclamation obligation.

The **SURETY** will give prompt notice to the **PERMITTEE/PRINCIPAL** and to the **DIVISION** of any notice received or action alleging the insolvency or bankruptcy of the **SURETY**, or alleging any violations or regulatory requirement which could result in suspension or revocation of the **SURETY'S** license.

Terms for release or adjustment of the **BOND** are as written and agreed to by the **DIVISION** and the **PERMITTEE/PRINCIPAL** in the **RECLAMATION AGREEMENT** incorporated by reference herein, to which this **SURETY AGREEEMNT** has been attached as Exhibit "B".

IN WITNESS WHEREOF, the **PERMITTEE/PRINCIPAL** has hereunto set it's signature and seal this 9TH day of DECEMBER, 2003.

SAVAGE SERVICES CORPORATION
PERMITTEE/PRINCIPAL

By:

S.V.P.
Title:

Exhibit "B"
Non-Federal Surety Bond
Non-Federal

Bond Number: 965-003-641

IN WITNESS WHEREOF, the **SURETY** has hereto set it's signature and seal this 9TH day of DECEMBER, 2003.

LIBERTY MUTUAL INSURANCE COMPANY
SURETY

By:

TINA DAVIS, ATTORNEY-IN-FACT
Title:

ACCEPTED BY THE STATE OF UTAH:

Director,
Division of Oil, Gas & Mining

NOTE: An **Affidavit of Qualification** must be completed and attached to this form for each authorized agent or officer. Where one signs by virtue of Power of Attorney for a company, such Power of Attorney must be filed with this Agreement. If the **PERMITTEE/PRINCIPAL** is a corporation, the Agreement shall be executed by it's duly authorized officer.

AFFIDAVIT OF QUALIFICATION
PERMITTEE
-oo0oo-

I, L. DEAN REES being first duly sworn under oath, deposes and says that he/she is the SR. VICE PRESIDENT of SAVAGE SERVICES CORPORATION, the **PERMITTEE**; and that he is duly authorized to execute and deliver the foregoing obligations; and that said **PERMITTEE** is authorized to execute the same and has complied in all respects with the laws of Utah in reference to commitments, undertakings and obligations herein.

Subscribed and sworn to before me this 9TH day of DECEMBER, ~~19~~ 2003

Notary Public

My Commission Expires:

LISA PIZZA
Notary Public
My Commission Expires Feb. 11, 2007

Attest:

STATE OF UTAH)

COUNTY OF SALT LAKE)ss:

AFFIDAVIT OF QUALIFICATION
SURETY COMPANY
--oo0oo--

I, TINA DAVIS, being first duly sworn under oath, deposes and says that he/she is the (officer or agent) ATTORNEY-IN-FACT of LIBERTY MUTUAL INSURANCE COMPANY; and that he/she is duly authorized to execute and deliver the foregoing obligations; and that said SURETY COMPANY is authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations herein.

(Surety Company Officer)

ATTORNEY-IN-FACT

(Position)

Subscribed and sworn to before me this 9TH day of DECEMBER, XX 2003

Notary Public

My Commission Expires: 10/1/07

NOTARY PUBLIC
AUBREY LOMAX
2097 Fremont Crest Ave.
Syracuse, Utah 84075
My Commission Expires
October 1, 2007
STATE OF UTAH

Attest:

STATE OF UTAH)

COUNTY OF SALT LAKE)ss:

NOTICE FROM SURETY REQUIRED BY TERRORISM RISK INSURANCE ACT OF 2002

In accordance with the Terrorism Risk Insurance Act of 2002 (referred to hereinafter as the "Act"), this disclosure notice is provided for surety bonds on which one or more of the following companies is the issuing surety: Liberty Mutual Insurance Company; Liberty Mutual Fire Insurance Company; LM Insurance Corporation; The First Liberty Insurance Corporation; Liberty Insurance Corporation; Employers Insurance Company of Wausau (formerly "EMPLOYERS INSURANCE OF WAUSAU A Mutual Company"); Peerless Insurance Company; and any other company that is a part of or added to the Liberty Mutual Group for which surety business is underwritten by Liberty Bond Services (referred to collectively hereinafter as the "Issuing Sureties").

NOTICE FORMS PART OF BOND

This notice forms part of surety bonds issued by any one or more of the Issuing Sureties.

DISCLOSURE OF PREMIUM

The premium attributable to any bond coverage for "acts of terrorism" as defined in Section 102(1) of the Act is Zero Dollars ($0.00).

DISCLOSURE OF FEDERAL PARTICIPATION IN PAYMENT OF TERRORISM LOSSES

The United States will reimburse the Issuing Sureties for ninety percent (90%) of any covered losses from terrorist acts certified under the Act exceeding the applicable surety deductible.

Fireproof File

CC: C0070022

Attachment to Pam

CNA SURETY

220 South 500 East Suite 480 Salt Lake City UT 84102

Thomas W. Kershaw
Underwriting Manager
Salt Lake City Branch
Telephone 801-321-4967
800-262-7873
Facsimile 801-364-7532
Internet twkershaw@cnasurety.com

March 2, 2004

Pamela Grubaugh-Littig, Permit Supervisor
State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining
1594 West Temple, Suite 1210
Salt Lake City, UT 84114-5801

Savage Industries, Inc.
Bond #158987108-Reclamation Bond

Dear Ms. Grubaugh-Littig,

It is our understanding that Liberty Mutual Insurance Company Bond Number 965-003-641, issued effective December 9, 2003 in the amount of $2,525,000 for Savage Services Corporation, has replaced the captioned bond.

In as much as Liberty Mutual Insurance Company's bond now provides the surety guarantee for Savage's reclamation obligations under their Reclamation Agreement, we respectfully request that National Fire Insurance Company of Hartford be released effective December 9, 2003 from Bond #158987108 either by the return of the original bond issued December 9, 1997, an unqualified written release of our liability issued on Division letterhead or acknowledging, accepting and returning the enclosed Request For Release.

Thank you for you cooperation in this matter and please advise if you will need additional information.

Regards,

Thomas W. Kershaw

Enc.

RECEIVED

MAR 0 8 2004

DIV. OF OIL, GAS & MINING

CNA SURETY

230 South 500 East, Suite 480, Salt Lake City, UT 84102 (801) 321-4971

MARCH 3, 2004

REQUEST FOR RELEASE

OBLIGEE:

STATE OF UTAH – DEPT. OF NATURAL RESOURCES
DIVISION OF OIL, GAS & MINING
1594 WEST NORTH TEMPLE, SUITE 1210
SALT LAKE CITY, UT 84114-5801

Notice is hereby given of a Request for Release of this Company's Suretyship on behalf of SAVAGE INDUSTRIES, INC. (principal) located in MURRAY, UT for TWO MILLION FIVE HUNDRED TWENTY-FIVE THOUSAND AND 00/100 DOLLARS ($2,525,000.00) under Bond No. 158987108 originally issued on or about NOVEMBER 9, 1997.

Please accept notice of this Request for Release to be effective on December 9, 2003. This Reclamation is now held under **Liberty Mutual Insurance Company bond 965-003-641**, effective December 9, 2003, in the name of Savage Services Corporation. Please sign below and return a copy of this notice in the envelope provided.

NATIONAL FIRE INSURANCE COMPANY OF HARTFORD

By: _____
THOMAS W. KERSHAW, ATTORNEY-IN-FACT

Type of Bond: *RECLAMATION BOND*

CC: AGENT
PRINCIPAL

OBLIGEE: The Obligee hereby gives a complete and unqualified release of liability by acknowledging the receipt and acceptance of this Request for Release of liability.

Obligee
Accepted: _____ Date: _____

A copy of the Obligee's signed acceptance must be returned to the Surety.

POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

Know All Men By These Presents, That Continental Casualty Company, an Illinois corporation, National Fire Insurance Company of Hartford, a Connecticut corporation, and American Casualty Company of Reading, Pennsylvania, a Pennsylvania corporation (herein called "the CNA Companies"), duly organized and existing corporations having their principal offices in the City of Chicago, and State of Illinois, and that they do by virtue of the signatures and seals herein affixed hereby make, constitute and appoint

Jon S. Way, Thomas W. Kershaw, Ronald M. Mitchell, Individually

of their true and lawful Attorney(s)-in-Fact with full power and authority hereby conferred to sign, seal and execute for and on their behalf bonds, undertakings and other obligatory instruments of similar nature

- In Unlimited Amounts -

and to bind them thereby as fully and to the same extent as if such instruments were signed by a duly authorized officer of their corporations and all the acts of said Attorney, pursuant to the authority hereby given is hereby ratified and confirmed.

This Power of Attorney is made and executed pursuant to and by authority of the By-Law and Resolutions, printed on the reverse hereof, duly adopted, as indicated, by the Boards of Directors of the corporations.

In Witness Whereof, the CNA Companies have caused these presents to be signed by their Vice President and their corporate seals to be hereto affixed on this 28th day of July, 2003.

Continental Casualty Company
National Fire Insurance Company of Hartford
American Casualty Company of Reading, Pennsylvania

Michael Gengler — Senior Vice President

State of Illinois, County of Cook, ss:

On this 28th day of July, 2003, before me personally came Michael Gengler to me known, who, being by me duly sworn, did depose and say: that he resides in the City of Chicago, State of Illinois; that he is a Senior Vice President of Continental Casualty Company, an Illinois corporation, National Fire Insurance Company of Hartford, a Connecticut corporation, and American Casualty Company of Reading, Pennsylvania, a Pennsylvania corporation described in and which executed the above instrument; that he knows the seals of said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed pursuant to authority given by the Boards of Directors of said corporations and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said corporations.

OFFICIAL SEAL
ELIZA PRICE
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES: 09/17/06

My Commission Expires September 17, 2006

Eliza Price — Notary Public

CERTIFICATE

I, Mary A. Ribikawskis, Assistant Secretary of Continental Casualty Company, an Illinois corporation, National Fire Insurance Company of Hartford, a Connecticut corporation, and American Casualty Company of Reading, Pennsylvania, a Pennsylvania corporation do hereby certify that the Power of Attorney herein above set forth is still in force, and further certify that the By-Law and Resolution of the Board of Directors of the corporations printed on the reverse hereof is still in force. In testimony whereof I have hereunto subscribed my name and affixed the seal of the said corporations this 3rd day of March, 2004.

Continental Casualty Company
National Fire Insurance Company of Hartford
American Casualty Company of Reading, Pennsylvania

Mary A. Ribikawskis — Assistant Secretary

Form F6853

1403395

HIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.

...er of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to ...nt herein stated.

LIBERTY MUTUAL INSURANCE COMPANY
BOSTON, MASSACHUSETTS
POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS: That Liberty Mutual Insurance Company (the "Company"), a Massachusetts stock insurance company, pursuant to and by authority of the By-law and Authorization hereinafter set forth, does hereby name, constitute and appoint

JACE PEARSON, TINA DAVIS, DORIS MARTIN, KAREN HONE, VICKI SORENSEN, ALL OF THE CITY OF SALT LAKE CITY, STATE OF UTAH

, each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations in the penal sum not exceeding SEVENTY-FIVE MILLION AND 00/100********** DOLLARS ($ 75,000,000.00*****) each, and the execution of such undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents, shall be as binding upon the Company as if they had been duly signed by the president and attested by the secretary of the Company in their own proper persons.

That this power is made and executed pursuant to and by authority of the following By-law and Authorization:

ARTICLE XIII - Execution of Contracts: Section 5. Surety Bonds and Undertakings.
Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

By the following instrument the chairman or the president has authorized the officer or other official named therein to appoint attorneys-in-fact:

Pursuant to Article XIII, Section 5 of the By-Laws, Garnet W. Elliott, Assistant Secretary of Liberty Mutual Insurance Company, is hereby authorized to appoint such attorneys-in-fact as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

That the By-law and the Authorization set forth above are true copies thereof and are now in full force and effect.

...ITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Company and the corporate seal of ...ty Mutual Insurance Company has been affixed thereto in Plymouth Meeting, Pennsylvania this 27th day of October, 2003.

LIBERTY MUTUAL INSURANCE COMPANY

By Garnet W. Elliott
Garnet W. Elliott, Assistant Secretary

COMMONWEALTH OF PENNSYLVANIA ss
COUNTY OF MONTGOMERY

On this 27th day of October, 2003, before me, a Notary Public, personally came Garnet W. Elliott, to me known, and acknowledged that he is an Assistant Secretary of Liberty Mutual Insurance Company; that he knows the seal of said corporation; and that he executed the above Power of Attorney and affixed the corporate seal of Liberty Mutual Insurance Company thereto with the authority and at the direction of said corporation.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Plymouth Meeting, Pennsylvania, on the day and year first above written.

TERESA PASTELLA COMMONWEALTH OF PENNSYLVANIA NOTARY PUBLIC

Notarial Seal
Teresa Pastella, Notary Public
Plymouth Twp., Montgomery County
My Commission Expires Mar. 28, 2005
Member, Pennsylvania Association of Notaries

By Teresa Pastella
Teresa Pastella, Notary Public

CERTIFICATE

I, the undersigned, Assistant Secretary of Liberty Mutual Insurance Company, do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy, is in full force and effect on the date of this certificate; and I do further certify that the officer or official who executed the said power of attorney is an Assistant Secretary specially authorized by the chairman or the president to appoint attorneys-in-fact as provided in Article XIII, Section 5 of the By-laws of Liberty Mutual Insurance Company.

This certificate and the above power of attorney may be signed by facsimile or mechanically reproduced signatures under and by authority of the following vote of the board of directors of Liberty Mutual Insurance Company at a meeting duly called and held on the 12th day of March, 1980.

VOTED that the facsimile or mechanically reproduced signature of any assistant secretary of the company, wherever appearing upon a certified copy of any power of attorney issued by the company in connection with surety bonds, shall be valid and binding upon the company with the same force and effect as though manually affixed.

...N TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the said company, this 9TH day of DECEMBER, 2003.

By David M. Carey
David M. Carey, Assistant Secretary

currency rate, interest rate or residual value guarantees

To confirm the validity of this Power of Attorney call ... business day

Appendix 8-3

Liability Insurance

Savage Services Corporation
Savage Coal Terminal

Pete - FYI Fireproof C/007/0022

MARSH

CERTIFICATE OF INSURANCE

CERTIFICATE NUMBER
SEA-000544769-13

PRODUCER

Marsh USA Risk & Insurance Services
15 West South Temple, Suite 700
Salt Lake City, UT 84101
Attn: Chris Brimhall (801) 533-3627

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER OTHER THAN THOSE PROVIDED IN THE POLICY. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES DESCRIBED HEREIN.

INSURED

SAVAGE COMPANIES
6340 SOUTH 3000 EAST, SUITE 600
SALT LAKE CITY, UT 84121

COMPANIES AFFORDING COVERAGE

COMPANY A: ACE AMERICAN INS CO

COMPANY B: ACE FIRE UNDERWRITERS INSURANCE CO.

COMPANY C:

COMPANY D:

COVERAGES

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

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A	GENERAL LIABILITY	HDOG21702675	04/01/07	04/01/08	GENERAL AGGREGATE	$ 10,000,000
	[X] COMMERCIAL GENERAL LIABILITY				PRODUCTS - COMP/OP AGG	$ 5,000,000
	[ ] CLAIMS MADE [X] OCCUR				PERSONAL & ADV INJURY	$ 5,000,000
	OWNER'S & CONTRACTOR'S PROT				EACH OCCURRENCE	$ 5,000,000
					FIRE DAMAGE (Any one fire)	$ 5,000,000
					MED EXP (Any one person)	$
A	AUTOMOBILE LIABILITY	ISAH08013111	04/01/07	04/01/08	COMBINED SINGLE LIMIT	$ 5,000,000
	[X] ANY AUTO				BODILY INJURY (Per person)	$
	ALL OWNED AUTOS				BODILY INJURY (Per accident)	$
	SCHEDULED AUTOS				PROPERTY DAMAGE	$
	[X] HIRED AUTOS					
	[X] NON-OWNED AUTOS					
	GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT	$
	ANY AUTO				OTHER THAN AUTO ONLY:	
					EACH ACCIDENT	$
					AGGREGATE	$
	EXCESS LIABILITY				EACH OCCURRENCE	$
	UMBRELLA FORM				AGGREGATE	$
	OTHER THAN UMBRELLA FORM					$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY	WLRC44466375 (AOS)	04/01/07	04/01/08	[X] WC STATUTORY LIMITS [ ] OTHER	
A		WLRC44466387 (CA)	04/01/07	04/01/08	EL EACH ACCIDENT	$ 1,000,000
	THE PROPRIETOR/ PARTNERS/EXECUTIVE OFFICERS ARE: [X] INCL [ ] EXCL				EL DISEASE-POLICY LIMIT	$ 1,000,000
					EL DISEASE-EACH EMPLOYEE	$ 1,000,000
	OTHER					

RECEIVED
MAR 29 2007
OGM PRICE FIELD OFFICE

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

SUBJECT TO THE STANDARD EXCLUSIONS IN THE 2000 GENERAL LIABILITY ISO FORM, CG 00 01 10 01, AND THE TERRORIST RELATED ACTS, COVERAGE IS GRANTED FOR DAMAGE CAUSED BY EXPLOSIVES. RE: SAVAGE COAL TERMINAL PROCESS AND LOADOUT FACILITY ACT/007/022.

CERTIFICATE HOLDER

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS & MINING
PO BOX 145801
SALT LAKE CITY, UT 84114-5801

RECEIVED
MAR 27 2007
DIV. OF OIL, GAS & MINING

CANCELLATION

SHOULD ANY OF THE POLICIES DESCRIBED HEREIN BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE INSURER AFFORDING COVERAGE WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED HEREIN. [illegible]

MARSH USA INC.
BY: Chris Brimhall Chris Brimhall

MM1 (3/02)

VALID AS OF: 03/26/07