



# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

1594 West North Temple, Suite 1210  
PO Box 145801  
Salt Lake City, Utah 84114-5801  
(801) 538-5340 telephone  
(801) 359-3940 fax  
(801) 538-7223 TTY  
www.nr.utah.gov

Michael O. Leavitt  
Governor  
Robert L. Morgan  
Executive Director  
Lowell P. Braxton  
Division Director

October 10, 2002

**TO:** Internal File

**THRU:** ~~AK~~ Greg Galecki, Reclamation Hydrologist and Team Lead

**FROM:** ~~AK~~ Priscilla Burton, Reclamation Specialist/Soils

**RE:** Refuse Pile, Canyon Fuel Company, Dugout Canyon Mine, C/007/039-SR02D, Internal File

## SUMMARY:

Coal mine waste from the Dugout Canyon Mine is currently disposed of underground or at the approved waste rock disposal facility at either SUFCO or Skyline Mines or at the Banning Loadout (Section 528.300 of the approved MRP). A proposal for a waste rock storage site was presented to the Division in April of 2002, four years after mine construction. Requested supplemental information was received in August 2002.

The proposed refuse disposal area is located in T14S R12E Section 18. The site is located at an elevation of 5,900 feet on a pediment composed of gravelly alluvial deposits overlying the Mancos Shale. The triangular shaped disturbed site covers 16 acres (RA Attachment 2-2) and is immediately adjacent to the county road. The refuse storage area will consume 5.7 acres. The rest of the site (10 acres) will either be dedicated for topsoil storage, access roads, general storage or remain undisturbed.

The major points of this review are listed here:

- The acreage that will not be disturbed must be disclosed.
- Plate RA-2-1 Soils Map for the proposed refuse site must identify soils immediately adjacent to the north and west permit boundary as well as the extent of the existing disturbance, so that an educated guesstimate for the salvageable topsoil beneath Map Unit F can be made.

**TECHNICAL MEMO**

---

- The potential for a subsoil pile containing soils of Map Units B and C and a substitute topsoil pile containing the more desirable soils of D, E, and F should be explored and a plan for distribution of subsoil followed by topsoil should be promoted and approximate yardage and cover thickness for each type of cover material should be specified in RA Attachment 2-2.
- Boulders, gravel and projected soil recovery in excess of that recommended for substitute topsoil in RA Attachment 2-1 may not be stored in the substitute topsoil storage pile.
- The layout of the area dedicated to stockpiling and the approximate acreage designated for the substitute topsoil stockpile must be indicated on a map so that the adequacy of the site to store 44,000 cu yds can be assessed.
- A single set of analytical data represents the chemical characteristics of the mine waste. There have been several sets of samples taken of gob, mine waste, refuse, and sediment pond clean-out. All sampling information must be included in the application and the location of such information should be referred to in Section 536.200 of the MRP.
- The application should include as part of the reclamation plan best management practices to reduce wind and water erosion at the site. i.e. The Division has noted that the incorporation of straw or hay into the surface prior to seeding and gouging of the surface reduce wind and water erosion.

**TECHNICAL ANALYSIS:**

**ENVIRONMENTAL RESOURCE INFORMATION**

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

**GENERAL**

Regulatory Reference: 30 CFR 783.12; R645-301-411, -301-521, -301-721.

**Analysis:**

The proposed refuse disposal area is located in T14S R12E Section 18. The site is located at an elevation of 5,900 feet on a pediment composed of gravelly alluvial deposits overlying the Mancos Shale. The triangular shaped disturbed site covers approximately 16 acres (RA Attachment 2-2) and is immediately adjacent to the county road. The land is owned by the Permittee. The site has been used as a source of gravel and fill for the county road construction and for the mine site.

Pinyon-juniper and Black sagebrush/galleta grass vegetation communities exist at the site. The soils of the area were evaluated by the Soil Conservation Service (SCS) and serve as the typical pedon of Haverdad loam 1 to 8 percent slopes in the 1988 Carbon County Soil Survey (Appendix S5 of RA Attachment 2-1). The SCS estimated the average annual precipitation to be about 12 – 14 inches.

### **Findings**

The information provided is adequate for general environmental description.

## **CLIMATOLOGICAL RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.18; R645-301-724.

### **Analysis:**

Page 7-4 of the submittal and page 7-39 of the approved MRP indicate that climatological information for the site is summarized in Appendix 4-2 of the MRP. This is an incorrect reference, Appendix 4-2 is titled Land Uses. The Division could not locate the climatological information referred to on page 7-39 of the MRP and on page 7-4 of the submittal.

### **Findings**

The information provided does not adequately addresses the minimum requirements of the climatological information section of the regulations. Prior to approval, please provide the following in accordance with:

**R645-301-724**, The application must include climatological information for the mine site.

## **SOILS RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

### **Analysis:**

The soils of the area were evaluated by the Soil Conservation Service and serve as the typical pedon of Haverdad loam [fine-loamy, mixed (calcareous), mesic Ustic Torrifuvents] one to eight percent slopes in the 1988 Carbon County Soil Survey (Appendix S5 of RA Attachment 2-1). The site has since been developed into a gravel pit.

TECHNICAL MEMO

The refuse disposal site was surveyed in 1999 by Mr. Daniel Larsen, Soil Scientist with Environmental Industrial Services of Helper, Utah. Using supporting information obtained from 10 pits and twenty-two soil samples, Attachment 2-1 identifies and describes thirteen soil map units at the site. The soil map units are shown on Soils Inventory Map SM-1 in Attachment 2-1. The map units have been reproduced on Soils Map RA Plate 2-1, except that RA Plate 2-1 does not show the soil type L that covers an area of about 50 X 85 feet (approximately 0.1 acres). Soil characteristics at the site are also described in RA Attachment 5-2.

Undisturbed soils remain to a limited extent within the proposed permit boundary. The Typic Haplocalcids are represented by sample site DCW5 or Map Unit I on the southwest edge of the disturbed area and sample location DCW6 or Map Unit D on the west. Mr. Larsen indicates that the texture of the soils places them either in the Strych or Hernandez series.

Strych soils are loamy-skeletal, mixed mesic Ustic Haplocalcid (formerly classified as Ustollic Calciorthisds in the 1988 Carbon County Soil Survey). Hernandez soils are fine-loamy, mixed, mesic Ustollic Calciorthisds. The Hernandez soils are deeper soils than the Strych, with far less stones, cobbles, and pebbles.

Order: Aridisol (formed in desert climate)  
Suborder: Calcid (accumulation of calcium carbonate)  
Great Group: Haplocalcid (other calcids)  
Subgroup: Ustic Haplocalcid  
(moisture control section is dry less than  $\frac{3}{4}$  of the time when the temperature is above 5 C and aridic soil moisture regime bordering on ustic)

The Haverdad loam series soils (Typic Torrifluvents) are represented by site DCW10 or Map Unit H along the south and east of the disturbed area.

Order: Entisol (young, little horizonation, little pedogenesis)  
Suborder: Fluvents (flood plain)  
Great Group: Torrifluvents (aridic or torric moisture regime)  
Subgroup: Typic Torrifluvents (other Torrifluvents)

Map Unit J has been outlined between Map Unit H and the gravel pit, but there is no supporting information for the designation.

Plate 2-1 Native Soil Types Present in the Dugout Canyon Mine Permit Area does not extend to Township 14 South. The information provided by RA Attachment 2-1 seems randomly chosen and does not include map unit and soil identification along the undisturbed north and western boundary of the proposed refuse site. This information is necessary in this case, since all soils within the permit area have been previously disturbed. The information will prove useful for estimating the depth of soil available in Map Unit F for use as topsoil (RA Attachment 2-2).

RA Attachment 2-1 and Plate RA-2-1 Soils Map for the proposed refuse site must identify soils immediately adjacent to the north and west permit area boundary.

Soil productivity at the site was evaluated in June, 1998, by Mr. Georg S. Cook, Range Conservationist with the NRCS (Section 321.200). Productivity on the topsoil storage area was reported to be 460 lbs/acre with a potential for 500 lbs/ac. The condition of the topsoil pile was fair. The gravel borrow pit (proposed as the location of the refuse disposal site) was estimated to have 500 lbs/acre productivity with a potential for 550 lbs/ac. The condition was also Mid Seral fair. Productivity of the reference area shown on RA Figure 3-1 was not evaluated by Mr. Cook as described in Section 321.200.

The application describes the dominant grasses as Salina wildrye and galleta grass and the dominant forb as locoweed. Locoweed is a common name for species within three plant genus: Aragalus, Astragalus and Oxytropis.

### **Findings**

The information provided does not adequately addresses the minimum requirements of the climatological information section of the regulations. Prior to approval, please provide the following in accordance with:

**R645-301-222**, 1) RA Attachment 2-1 and Plate RA-2-1 Soils Map for the proposed refuse site must identify soils immediately adjacent to the north and west permit boundary as well as the extent of the existing disturbance. 2) Provide supporting information for Map Unit J.

**R645-301-222.400**, The application must correctly state locations of productivity measurements. i.e. the reference area shown on RA Figure 3-1 was not measured for productivity.

### **PRIME FARMLAND**

Regulatory Reference: 30 CFR 785.16, 823; R645-301-221, -302-270.

### **Analysis:**

As noted in Section 221, the prime farmland status of the area was investigated in April 1996 by the Natural Resources Conservation Service. A letter from the NRCS is located at the end of RA Attachment 3-1 Vegetation Data. In the letter, the State Soil Scientist, William Broderson, writes that the area could not contain important farmlands because there is no developed irrigation system on arid soils.

**TECHNICAL MEMO**

---

Two of the soils identified in Appendix S5 of RA Attachment 2-1, soil #50 Haverdad loam and soil Hernandez family soils are potentially prime farmland soils, when irrigated. Soil #50 Haverdad loam is in the land use capability class II-e-2. Soils in the Hernandez family range from land use capability class II-e-2 to III-e-2.

The recent use of the site (1988- 1999) has been for a gravel pit and much of the original soil surface has been lost. The site is bisected by a deep ravine. The Dugout Canyon Mine is the land-owner. The post-mining land use is wildlife habitat and grazing.

**Findings**

The Division concurs with the Natural Resources Conservation Service that there is no source of irrigation for farming and therefore no prime farmlands at the site.

**OPERATION PLAN**

**AIR POLLUTION CONTROL PLAN**

Regulatory Reference: 30 CFR 784.26, 817.95; R645-301-244, -301-420.

**Analysis:**

The application indicates that operations will be conducted in accordance with the current Air Quality Approval Order (AO) dated January 5, 1999 (Appendix 4-1). The AO indicates that visible emissions are limited to 20% opacity and fugitive dust will be controlled with water sprays and/or chemically treated. Treatment shall be of sufficient frequency and quantity to maintain a damp surface.

**Findings:**

The information provided meets the requirements of the regulations.

**TOPSOIL AND SUBSOIL**

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

**Analysis:**

**Topsoil Removal and Storage**

The triangular shaped disturbed site covers approximately 16 acres (RA Attachment 2-2) and is immediately adjacent to the county road. The refuse storage area will consume 5.68 acres. The rest of the site (10.4 acres) will either be dedicated for topsoil storage, access roads, general storage or undisturbed. The application must provide the acreage of Map Unit H and J that will be undisturbed.

There is no topsoil available for salvage on the previously disturbed site. However, there are areas of suitable substitute topsoil. The application indicates that a professional soil scientist "or equivalent" will be on-site during soil salvage operations. This is not very clear.

RA Plate 2-1 outlines areas of substitute topsoil salvage and depths of salvage. No soil will be salvaged in map units H and J on the eastern leg of the triangular disturbed area. The combined acreage of H and J must be provided, so that the acreage to be reclaimed can be figured.

RA Table 2-2 estimates the volume of salvageable soil as 44,317 cubic yards. The acreage of recovery sums to 16.1 acres. Half of the substitute topsoil will come from areas B, C and E described in RA Table 2-1 as gravelly, loam and gravelly, clay loam. Soils in map units B and C would be better suited as a subsoil according to section 3.4 of Attachment 2-1. The least rocky soils and most suitable substitute topsoils in the project area are those in map units D, E, and F. Accordingly, the Permittee should evaluate the possibility of having a subsoil and topsoil pile on the site.

The recovery of substitute topsoil described in RA Table 2-2 and RA Attachment 2-2 does not agree with the professional soil scientist recommendation for recovery in Table 3.41 of Attachment 2-1. In the case of soil units A, B, C, E, G, K, L and M soil recovery has been over estimated. The total over estimation is approximately 5,840 cu yds. This excess soil, boulders (unit K) and piled gravel (unit L) may not be stored in the substitute topsoil storage pile.

Substitute topsoil will be stockpiled in the northwest corner of the disturbed area (RA Plate 5-1). The Permittee indicates actual cross sections of the soil stockpile can not be shown because salvage quantities are uncertain. A portion of the topsoil stockpile area will be dedicated to a road around the stockpile and a berm to protect the stockpile. The layout of the area dedicated to stockpiling and the approximate acreage designated for the substitute topsoil stockpile must be indicated on a map so that the Division can calculate the adequacy of the proposal to store 44,000 cu yds on the site. The topsoil storage area must be shown on a map that has been prepared and certified according by a professional engineer.

TECHNICAL MEMO

---

The soil will be placed in 1.5 to 2 foot lifts with track equipment. The stockpile will be stabilized by the interim seed mix described in Section 341.200 and protected with a berm. The Permittee should instruct the contractor to handle soils only when they are in a loose or friable condition or when the moisture content is an optimal 10 – 15%. Generally, two rules apply: 1) If the soil sticks to the equipment, wait until the soil has dried to a friable state. 2) If the soil is too dry and hard to handle, resembling flour, add water until the soil is wetted to a loose, friable condition.

Although the applicant indicates in Sections 231.100 and 234.300 that approval from the Division will be sought before disturbing the soils in the substitute topsoil storage pile.

**Findings:**

The information provided does not adequately addresses the minimum operations topsoil and subsoil requirements of the regulations. Prior to approval, please provide the following in accordance with:

**R645-301-120**, Clear and concise issues with the soils section include 1) The application should define the “equivalent” of a soil scientist as used in the text on page 2-7 section 232.100. 2) The combined acreage of H and J must be provided, so that the acreage to be reclaimed can be figured by difference.

**R645-310-232.500**, The potential for a subsoil pile containing soils of Map Units B and C and a substitute topsoil pile containing the more desirable soils of D, E, and F should be explored and a plan for distribution of subsoil followed by topsoil should be promoted and approximate yardage and cover thickness for each type of cover material should be specified in RA Attachment 2-2

**R645-301-233.100**, Boulders, gravel and projected soil recovery in excess of that recommended for substitute topsoil in RA Attachment 2-1 may not be stored in the substitute topsoil storage pile.

**R645-301-234.210**, The layout of the area dedicated to stockpiling and the approximate acreage designated for the substitute topsoil stockpile must be indicated on a map so that the adequacy of the site to store 44,000 cu yds can be assessed.

**R645-301-242.120, -242.130**, The application should indicate that soils will be handled only when they are in a loose or friable condition or when the moisture content is an optimal 10 – 15%. Generally, two rules apply: a) If the soil sticks to the equipment, wait until the soil has dried to a friable state. b) If the soil is too dry and hard to handle, resembling flour, add water until the soil is wetted to a loose, friable condition.

## SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

### Analysis:

#### Refuse Piles

Coal mine waste consisting of shale, sandstone, and sediment pond waste will be stored in the refuse pile (Section 536.200). A representative sample of the Rock Canyon Seam and the Gilson Seam, roof and floor was taken of the waste in 1995. Results are located in RA Attachment 5-4. For the Rock Canyon coal sample, the Sodium Adsorption Ratio, pH and Available Water Capacity are rated poor. Both the Rock Canyon and the Gilson Roof coal samples are sodic since their Exchangeable Sodium Percentages both exceed 15% (i.e., 19% and 33%, respectively). The analysis suggests that the Rock Canyon Seam is sodic whereas the Gilson Seam and roof have little carbonate buffering capacity. The pulverized material has a texture of sand, sandy loam or loam.

Appendix 5.7 of the MRP contains the analytical results of waste rock samples taken in 1998. This waste also had little buffering capacity and met the requirements for a Fair rating due to Electrical Conductivity (4.36 mmhos/cm). The Division is aware of more gob, waste rock, sediment pond clean out and portal entry sampling that has been done since 1995. These samples should all be placed in one location and referred to in Section 536.200 of the application.

The proposed refuse pile has the capacity for 48,900 cu yds (72,600 Tons at a unit weight of 1.10 lb/ft<sup>3</sup>) of coal mine waste (RA Attachment 5-3). The life of the site is estimated at 15 years (Section 536.100) with a production of 5,000 Tons/yr. Geotechnical characteristics of this waste are described in RA Attachment 5-2. The waste has a Unified Soil Classification of GP-GM (gravel sand silt mixture).

A representative sample will be collected of every 2000 cu yds (or 2,970 Tons) to be analyzed for acid toxic characteristics of pH, Electrical Conductivity, Selenium, Boron, and Acid/base potential (Section 536.200). Sampling should include the full suite of parameters required by Table 6 of the 1988 Division Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining, including: Sodium Adsorption Ratio, particle size analysis, Total and Nitrate-nitrogen, % Organic Carbon, Exchangeable Sodium and Available Water Capacity.

**TECHNICAL MEMO**

---

This rate of sampling amounts to 24 samples for the completed 6 acre site. This information would be best supplied with the Annual Report for the Dugout Canyon Mine site.

**Findings:**

The information provided does not meet the minimum operations spoil and waste material requirements of the regulations. Prior to approval, please provide the following in accordance with:

**R645-301- 536.900,** 1) Analysis of the coal mine waste must include the full suite of parameters listed in Table 6 of the 1988 Division Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining. 2) All previous portal entry, coal mine waste, gob, sediment pond clean-out sampling information must be included in the application and the location of such information should be referred to in Section 536.200 of the MRP.

**MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS**

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

**Analysis:**

**Affected Area Maps**

RA Plate 5-1 Storage Area Layout shows the refuse storage area, an access road, the sediment pond, two storage areas and a location for the topsoil storage. RA Plate 5-1 must also show the layout of the area dedicated to stockpiling and the acreage that will not be disturbed at the site.

**Findings:**

The information provided does not adequately addresses the minimum operations maps and plans requirements of the regulations. Prior to approval, please provide the following in accordance with:

**R645-301-521.165,** The proposed acreage, layout of the topsoil stockpile, access road and berm planned for the topsoil stockpile area must be shown on a map as well as the acreage that will not be disturbed at the site.

## RECLAMATION PLAN

### TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

#### **Analysis:**

##### **Redistribution**

Section 242.100 and RA Attachment 2-2 outlines four feet of cover over the refuse pile. This will require approximately 36,700 cu yds of soil. The Permittee has figured that remainder of the salvaged substitute topsoil (7,610 cu yds) will be applied to the rest of the site. The Permittee has not subtracted from the acreage to be reclaimed the undisturbed map units J and H.

In addition, some of the total cover (44,317 cu yds) is not substitute topsoil, but excess spoil or subsoil. A plan for distribution of subsoil followed by topsoil should be promoted and approximate yardage for each type of cover material should be specified in RA Attachment 2-2 (see discussion under Operations Plan, Topsoil and Subsoil and deficiency written under R645-301-232.500).

Prior to redistribution, the substitute topsoil will be sampled and analyzed for pH, EC, total Carbon, SAR, Phosphorus, Nitrate-nitrogen and water holding capacity.

Where operations have created compaction, the ground will be ripped. The proposed depth of ripping must be indicated. In addition, the four feet of cover over the refuse must be uncompacted to allow root growth. If the refuse is combustible, more cover may be required such that an uncompacted four foot zone can be achieved.

The substitute topsoil will be spread using track-mounted equipment only. Erosion will be controlled with gouging and mulch as described in Chapter 3 of the approved MRP.

#### **Findings:**

The information provided does not adequately addresses the minimum reclamation topsoil and subsoil requirements of the regulations. Prior to approval, please provide the following in accordance with:

TECHNICAL MEMO

---

**R645-301-251**, When determining substitute topsoil cover depth over the reclaimed site, RA Attachment 2-2 and Section 242.100 must account for the acreage of undisturbed soil map units H and J.

**R645-301-242.200**, The plan must indicate the proposed depth of ripping of compacted areas and the plan must indicate the depth of uncompacted cover over the refuse to allow root growth.

## STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

### Analysis:

The soils of the site are Haverdad loam (#50) and the Hernandez family and the Strych series soils. These soils have erosion factors between 0.28 and 0.37 according to the 1988 Carbon County Soil Survey. Even at the relatively mild slope of 3h:1v proposed for the refuse disposal site, these exposed soils will be highly susceptible to erosion from water. Wind erosion is also a concern for these soils once they are disturbed.

The application indicates on page 3-9 that 1 Ton/ac hay mulch will be applied to the topsoil. The approved MRP Section 340 indicates 2000 lbs of wood fiber mulch will be applied with a tackifier to the seeded site.

The application indicates the site will be roughened with gouging and mulched according to the methods described in Chapter 3 of the approved MRP and that Rills and gullies in excess of 9 inches will be filled and reseeded (Section 244.300). Chapter 3 does not describe gouging of all disturbed areas. The MRP indicates that the gouging technique will be limited to slopes to steep to retain a mulch application (page 3-44).

The application should indicate that the hay applied to the topsoil will be gouged into the surface to help reduce wind and water erosion.

### Findings:

The information provided is not adequate for the purposes of the Regulations. Prior to approval, please provide the following in accordance with:

**R645-301-244**, 1) The reclamation plan should include best management practices to reduce wind and water erosion at the site. i.e. The Division has noted that the incorporation of straw or hay into the surface prior to seeding and gouging of the

surface will reduce wind and water erosion. 2) The reclamation plan for the site should specify that all disturbed surfaces will receive extreme surface roughening as described in the Technique Sheet, Part II of The Practical Guide to Reclamation in Utah available on the internet at <http://www.dogm.nr.state.ut.us>.

**RECOMMENDATIONS:**

Further information should be obtained from the Permittee.