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ENERGY WEST MINING COMPANY
A SUBSIDIARY OF PACIFICORP

Energy West Mining Company
P. O. Box 310
15 No Main Street
Huntington, UT 84528

March 12, 2008

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

RE: NOMINATION FOR OSM SURFACE COAL MINING RECLAMATION AWARD - ENERGY WEST MINING COMPANY

Energy West Mining Company hereby proudly submits its nomination for the Office of Surface Mining Excellence in Surface Coal Mining Reclamation - National Award and Best-of-the-Best Awards, entitled Reclamation of the Des-Bee-Dove Mining Complex - A Detailed Soils Assessment for a Pre-SMCRA Site, in Emery County, Utah.

The Des-Bee-Dove mining complex had over 100 years of mining history, during which multiple pre-SMCRA underground mine operations were constructed over 29.5 acres in a narrow, precipitous canyon. No plans were made for reclamation of these sites; final reclamation relied on innovative use of soil science and reclamation construction techniques to achieve reconstruction of the original canyon conditions. Reclamation activities took place between 1999 and 2003 in an arid, rugged environment between 7,000 and 7,500 feet above sea level, where climatic conditions for reclamation activities and for post-reclamation growth are harsh. Since final reclamation in 2003, the site has continued to support growth, prevent erosion, and improve in appearance to resemble the original rugged pre-mining canyon conditions.

Energy West feels that the innovative use of soil science and construction techniques to achieve the final outstanding reclamation results as illustrated in this nomination document easily qualify this project for the OSM Surface Coal Mining Reclamation National Award and Best-of-the-Best Awards. Your consideration and support is greatly appreciated.

Sincerely,

Neil Getzelman
President, Energy West Mining Company

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MAR 12 2008
DIV. OF OIL, GAS & MINING

Enclosures (6 copies: 1 bound and 5 stapled)
cc: Scott Child (Interwest) w/encl.

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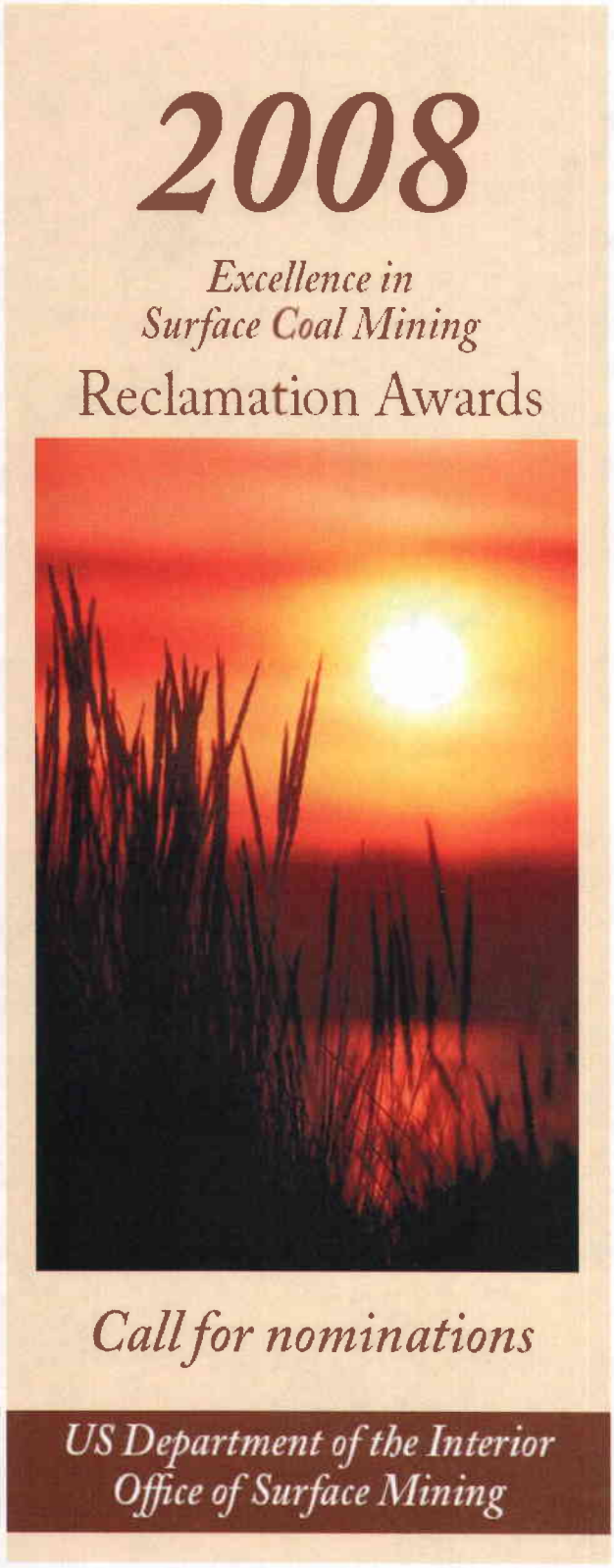
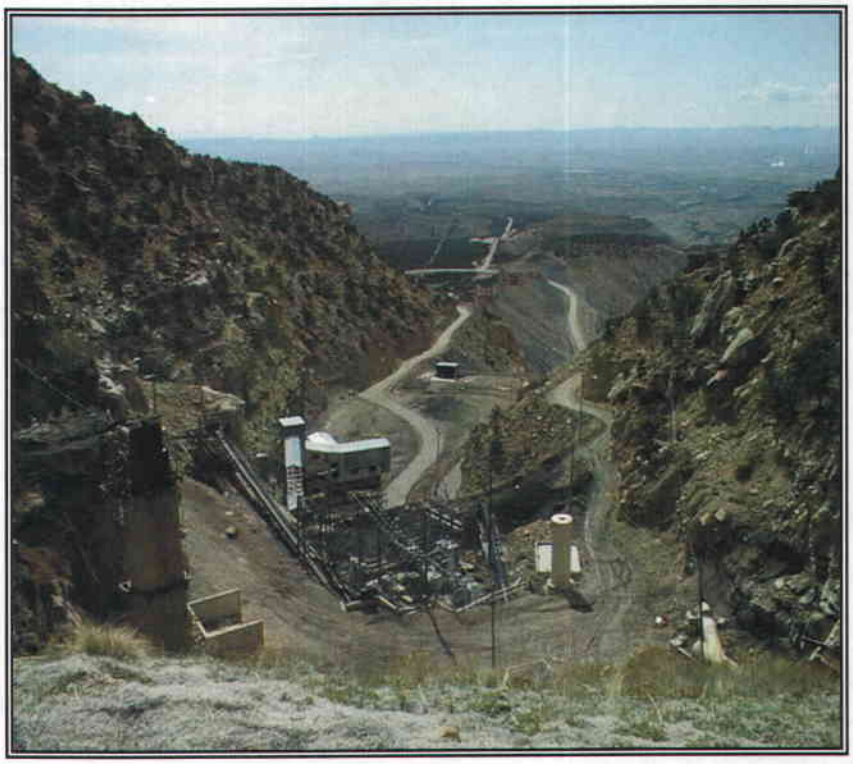
Reclamation of the Des-Bee-Dove Mine Complex - A Detailed Soils Assessment for a Pre-SMCRA Site - 2008 Office of Surface Mining Awards Presentation March 15, 2008





Des-Bee-Dove Mine site prior to reclamation 1999.

Des-Bee-Dove Mine site in September 2007 after reclamation.

Reclamation of the Des-Bee-Dove Mine Complex- A Detailed Soils Assessment for a Pre-SMRCA Site

C. A. Semborski and D. C. Oakley*

ABSTRACT

The Des-Bee-Dove Mine complex (owned by PacifiCorp and operated by Energy West Mining Company) had a long and rich mining history beginning in the 1880's. Since development of the mine surface facilities pre-dated SMCRA, initial construction did not include segregation and storage of soils. A total of approximately 13.8 hectares were disturbed prior to the commencement of reclamation in 1999. The goal of the reclamation project was to reclaim the mine site to within approximate original contour (AOC) using existing soil resources excavated on-site and achieve a diverse vegetative stand that would stabilize and protect the reclaimed slopes. Within this disturbed site, there were 14 portal openings necessitating elimination of approximately 762 meters of cut slopes. Also within this site was a 1.0 ha pad constructed into the side of steep canyon walls. This pad alone required approximately 36,000 m^3 to fill to AOC.

With the cooperation of the Utah Division of Oil, Gas and Mining, a comprehensive soil management plan was developed. This plan assessed the quantity and quality of soils available for final reclamation throughout the mine site. The assessment involved excavating a series of trenches, placing them in strategic locations. These trenches were not only utilized to assess the quantity and quality of available substitute soil material, but also to ascertain the characteristics of the subsurface geology. Knowing this geology, approximate locations of natural drainages, rock faces, and drops were determined.

By June 2003, approximately 215,000 m^3 of spoil and suitable soil were moved and placed to achieve the final reclaimed contour. Approximately 272 kg of native seed along with 3,500 bare root and containerized plants were manually planted. All work occurred on slopes with an approximate grade of 2 horizontal to 1 vertical.

Today, two years after the completion of final reclamation, the Des-Bee-Dove Mine complex supports a broad vegetative cover that has protected and stabilized the reclaimed surface. Perennial grasses and woody plant species have begun to outnumber the exotic annuals. As desirable plant species progressively dominate the site, vegetative diversity increases significantly.

Reclamation of the
Des-Bee-Dove Mine Complex

- A Detailed Soils Assessment for a Pre-SMCRA Site -

2008 Office of Surface Mining Awards Presentation

March 15, 2008

National Award Category: Best of the Best Award

D. C. Oakley and C. A. Semborski

Introduction

The Des-Bee-Dove Mine complex is located in southeastern Utah in Emery County, approximately 8 miles north of the town of Orangeville, Utah. Geographically, the mine is located on the southern end of East Mountain, a large, relatively flat plateau, containing two mineable coal seams.

Mining began as early as 1898 in the unnamed canyon where the Des-Bee-Dove Mine complex is located. The original mine workings, called the Griffith Mine, were limited in extent due to the rugged terrain and poor access. The Griffith workings were purchased in 1936 by two men, Edwards and Broderick, who fashioned a crude access road and mined until 1938.

Castle Valley Fuel Company purchased the Edwards and Broderick property in 1938. The company produced coal and operated the facility until 1946. Also in 1938, the Church of Jesus Christ of Latter-Day Saints (LDS Church) purchased coal lands adjacent to Castle Valley Fuel Company and began its own operations in that same year. The Church Mine was operated under a private contract by Mr. John Frank Killian of Orangeville until it was closed in 1943 due to wartime shortages of materials needed to operate the mine. A decision was made to close the mine until conditions became more favorable.

In 1946, economic conditions improved and the LDS Church purchased Castle Valley Fuel's operation and combined operations to form Deseret Coal Company, an LDS Church welfare project, and provided coal for its membership. Deseret Coal Company continued operations until Utah Power & Light Company (UP&L) acquired the property in 1972.

Three separate room and pillar mines existed in the canyon. They were named the Deseret, Beehive, and Little Dove mines. Thus, the "Des-Bee-Dove" Mine complex was established and named. The Deseret Mine is located in the lower coal seam, referred to as the Hiawatha Seam. The Beehive and Little Dove mines are located in the upper coal seam, referred to as the Blind Canyon Seam. The two seams are in the lower portion of the Blackhawk Formation (see Figure 1), separated by approximately 100 feet of interburden. As a result of this interburden thickness, mine portals were developed on two separate levels.

UP&L operated the mine from 1972 until the mine was temporarily idled in 1987. Total coal production from the Des-Bee-Dove mines is estimated at approximately 10 million tons. Majority of the coal produced was used locality to fuel the Carbon Power Plant located in Helper, Utah. The property sat idle from 1987 through 1997 as attempts were made to sell the mine and its assets. In 1997, PacifiCorp, which purchased UP&L in 1992, submitted a Notice of Intent (NOI) to the Utah Division of Oil, Gas, and Mining (UDOGM) to reclaim the entire Des-Bee-Dove Mine complex.

The historical use of the Des-Bee-Dove Mine site pre-dates the passage of the Surface Mining Control and Reclamation Act of 1977 (SMCRA). As surface facilities were constructed, soils were neither salvaged nor stored for their future use in reclamation. As a result of the NOI to reclaim the property, the UDOGM urged PacifiCorp to develop a complete soil management plan. This plan would require the development of sufficient substitute topsoil materials for reclamation in a quantity that would cover the 29.5 acres of disturbed area.

This document presents the development of the soil management plan and how this plan influenced the final and successful reclamation of the mine site. The final reclamation plan was completely rewritten, incorporating a new channel design and redesigned fill

slopes as the result of unexpected subsurface findings. More importantly, the plan used a soil management plan that integrated the utilization of existing spoils to backfill cut slopes with identification of potential borrow areas for providing a sufficient and productive substitute topsoil to cover the entire reclamation site.

Environmental Description

The Des-Bee-Dove Mine portals and support facilities were developed in steep, nearly vertical rock cliffs in an area with sparse vegetation and a dry climate. Elevation at the mine varies from 7,000 ft to 7,500 ft above sea level. Natural slopes in the area range from 5° to 40° with the majority of the vegetation occurring on steeper slopes. Vegetation of the area is dependent upon geology and exposure with diverse types ranging from salt-desert shrub in the lower elevations to pinyon-juniper at the mine elevation level. Average annual precipitation is ranges 6 to 8 inches. The area is dominated by rock outcrops, rubble land, and shallow soils. Early soil tests conducted on the disturbed, undisturbed, and coal waste areas showed that the materials should support selected vegetation (Southard, 1980). The largest percentage of soils in the area consists of a gravelly loam or sandy loam surface layer mixed with sandstone fragments. This layer is underlain by a gravelly or stony loam with sandstone fragments. Bedrock underlies this surface covering. Rubble lands are those areas where the soils are covered by large boulders so close together that there is little area between the boulders for plants to grow. Rock outcrops are exposed areas of bedrock. These areas are often nearly vertical cliff walls in canyons.

Initial Preparation for Reclamation

After PacifiCorp submitted the Notice of Intent (NOI) to reclaim the mine site to the Utah Division of Oil, Gas, and Mining (UDOGM) in 1997, Emery County expressed interest in retaining the haul road as part of its county road system. The haul road is utilized primarily for industrial use. However, many recreationalists use the road to access hunting, climbing and hiking activities in the area. In 1998, PacifiCorp and Emery County entered into an agreement to transfer the haul road into the county road system. This cooperative effort resulted in the removal of approximately 100 acres from PacifiCorp's permit area while allowing industrial use and the general public to access recreational areas. The UDOGM approved a Phase III Bond Release for this area for these purposes.

Administratively, PacifiCorp maintained a complete and state-approved Mining and Reclamation Plan (MRP) for the Des-Bee-Dove mine that allowed mining and reclamation activities. This plan permitted PacifiCorp to initiate final reclamation by first demolishing and removing all of the on-site surface facilities. Structures removed included: bathhouse, warehouse, offices, tipple, belt structures, fan facilities, substations, etc. At the conclusion of this work, 14 mine portals were permanently sealed and backfilled according to the permit stipulations.

Also in 1999, final reclamation was completed on the Pumphouse Area. The Pumphouse Area was an isolated facility located below the main mine site and was used for pumping supply water to the mining facilities. This 1.62 acre site was abandoned in the early 1980's. Final reclamation was conducted using a rubber-tired backhoe and seeding by hand (refer to figures 2 and 3).

In 2000, permit requirements required that soil sampling be conducted on five-year intervals at designated locations. Soil sampling of these locations had begun in 1985 to

form a baseline soils analysis of the disturbed and undisturbed areas. Sampling continued every five years thereafter comparing selective disturbed and undisturbed areas to determine whether mining activities on the surface were impacting soil quality. Because of the initiation of final reclamation, additional samples were taken in areas where the potential for soil contamination was high (e.g. tipple/material storage yard, see Figure 4).

This additional sampling was conducted using a truck mounted 8 inch auger drill. The plan required the collection of samples at 2 foot depth intervals to 5 feet. Three samples would be collected per site; one at 2 feet, one at 4 feet, and one at the extent of the auger hole.

The first sample site was placed on the south end of the tipple/material storage yard. After drilling approximately 3 feet, coal fines began surfacing from the auger. At 5 feet, the full extent of one auger steel length, coal was still evident. Curiosity dictated that the total depth of the coal be determined since the reclamation plan called for the construction of a designed drainage channel through this area. A total of 65 feet of auger steel (total on truck) was used without finding the bottom extent of the coal. A second sample site was selected approximately 50 feet west of the first site. Similar results were realized.

The next step became to calculate the volume of coal that had been placed in the canyon by previous owners during the early (pre-1950's) life of the mine. Auger holes were drilled on 50 foot centers throughout the extent of the tipple/material storage yard. Cross-sections were established and a volume of approximately 110,000 tons of usable coal fines was estimated to be stored in the canyon. Figure 5 shows the extent of the buried coal within the storage yard.

An extensive historical records search showed that most of the coal mined in the early days of the mine site was processed for lump or stoker coal for the LDS Church Welfare Project (LDS Church Document, 2002). Coal was screened to accommodate the stoker coal size specifications. Smaller sized product was considered unusable and dumped as waste into the canyon.

In 2001, PacifiCorp obtained permission from UDOGM to remove the coal from the canyon. Also, because the coal removal project would ultimately reconfigure the topography of the mine surface, PacifiCorp realized it had to completely amend the current reclamation plan. Coal removal took approximately four months to complete and recovered approximately 108,000 tons of high BTU, low ash coal from the canyon. All spoil from this project (approximately 17,000 cubic yards) was stored on the bathhouse pad and used as fill in that area (refer to Figure 6). Figures 7 through 11 show coal removal activities at the Des-Bee-Dove Mine site.

The reclamation plan was redesigned in two separate phases. Phase 1, the upper mine facilities, was designed in-house. With the complex channel design and fill slope calculations of the Phase 2 (lower mine facilities) area, PacifiCorp found it necessary to acquire the assistance of an outside private consulting firm to develop the Phase 2 reclamation plan.

Development of the Amended Reclamation Plan

Surface facilities supporting the Deseret, Beehive, and Little Dove portals and underground operations had been developed on each level. The Phase 1 area contained a facilities pad which included two ventilation fans (one for each mine in the upper seam), belt structures, electrical substation, etc. Figures 12 and 13 show upper mine pad prior to

reclamation. The Phase 2 area contained three facility pads. One pad housed a bathhouse, warehouse, and office facilities. Another pad contained the portals and fan facilities. The tipple and storage pad was located on the third and lowest pad. Figures 14 through 18 show these facilities prior to reclamation.

During the construction of the pre-SMCRA mine complex, no soils were salvaged or stored for reclamation. As a result of the coal removal project, a detailed soil management and placement plan was developed to analyze and replace soils on these impacted slopes.

In cooperation with the UDOGM, PacifiCorp developed a comprehensive soil management plan to assess all available soils in the Phase 1 and Phase 2 areas for their potential use as substitute topsoil. The Soil Management Plan required excavation of ten trenches (shown on Figure 19) which were used to assess the quantity of available soils, locate bedrock interfaces, evaluate the quality of available substitute topsoil, and also to assist in the reconstructed channel design and placement. Utilizing a track-hoe, trenches were excavated up to 60 feet in length with a maximum depth of 20 feet. Several trenches were constructed in two segments as a result of rock outcrop contacts. Each trench was numbered with the second segment of the trench assigned the letter "A" after the trench number. Figures 20 through 23 show trenches after each were excavated.

Samples were collected that were representative of the various potential substitute topsoil materials encountered. A total of 23 samples were collected. Seventeen samples were selected for laboratory analysis and submitted to a certified laboratory and analyzed using the criteria outlined in Table 1 and Table 2. Field observations (refer to required criteria in Table 3) examined texture, structure, and color of the soil, paste pH and electrical conductivity was assessment, and an estimation of the percentage of rock/coal mixture in soil was made. These observations were recorded on the NRCS form 232 (refer to Exhibit 1).

Additional sampling was conducted on the coal waste material found throughout the site. Samples were analyzed to determine the total organic content (TOC) of the material, as well as the acid/toxicity potential. Four trench locations consisted of distinct coal refuse material which justified the sampling of this material. Table 4 discusses the field assessment of each trench while Table 5 summarizes the laboratory testing data for each sample collected.

As analysis of each of the samplings was completed, the data was compiled, analyzed, and compared to a substitute topsoil suitability ratings table developed by Leatherman and Duce, 1988. These criteria look at specific soil quality parameters and rated them as good, fair, poor, or unacceptable (Refer to Table 6).

Based on the suitability ratings, the amount of suitable material for substitute topsoil rated fair to good was quite limited. The most suitable soil was the upper two feet of soil material on the bathhouse outslope. A quantifiable amount of suitable soil was also found in the fill material at the Deseret Mine portal site. Some of the mixed coal and soil at the load-out site (T10) also tested to be quite suitable, but the material would have been difficult to separate from less suitable material (coal) at the site.

Four areas within the entire mine site had potential to produce suitable soils for reclamation. These areas were: 1) the soils in the upper 36 inches on the outslope near the Beehive Mine (T2A), 2) surface soil at the Little Dove and Beehive Mine pad, 3) colluvial fill material at the Little Dove and Beehive Mine site (T1A, T2A), and 4) the soil materials of trench T5. All of these materials proved to be acceptable materials for the

establishment of a successful stand of vegetation for post mining land use and controlling erosion.

The coal waste material tested fair to good in most respects, but was considered unsuitable by having too high total organic carbon (TOC) content. Mixing the coal refuse with other soil materials could have been conducted; however, the TOC content would need to be reexamined and could not exceed 10 percent. These soils were buried in the fill slopes.

Variegated clayey material of reddish and yellowish colors such as those noted at the Little Dove Mine pad site (T1) and the access road (T3) was marked to be buried and not allowed to be used as surface (topsoil) material due to its physical and chemical characteristics.

The erodibility of the substitute topsoil materials at the mine site was considered low to moderate. This was based primarily on soil properties and rock fragment content. Erosion potential could be quite high when the steep slopes, runoff characteristics, and storm event intensity are all taken into consideration. Surface protection and runoff control is essential to maintaining topsoil in place. A summary of the suitability ratings and acceptability of each of the soil samples in the assessed trenches is given in Table 6.

With the gathered soils suitability data and information obtained in relation to the locations of bedrock contacts throughout the site, a comprehensive reclamation plan was developed and implemented. This plan outlined the design for fill slopes that economically and effectively buried all unproductive soils in areas which in turn accentuated and blended in with the natural surrounding topography. The plan quantified adequate volumes of substitute topsoil material to cover the entire site with a productive soil for vegetation development. Adequate soils were found on-site eliminating the need for importing these materials. Also, by delineating the locations of the bedrock contacts, it allowed engineers to utilize rock features in their designs for developing stable ephemeral channels. This also reduced construction costs as well as made for a more esthetic appearance blending the channels into the natural topography of the land. Figures 24 through 51 illustrate the reclamation of the Des-Bee-Dove Mine in its entirety.

Conclusion

The historical Des-Bee-Dove Mine site pre-dates the passage of the Surface Mining Control and Reclamation Act of 1977 (SMCRA). During development, facilities were constructed on the site without any thought of reclamation. No topsoil or subsoil were ever stripped, segregated or stored for reclamation. Coal, rock, spoil and miscellaneous non-coal waste was distributed throughout the area and used to construct facility pad areas and buried in valley fills.

Through extensive research and data gathering for this site, PacifiCorp was able to develop a comprehensive soil management plan. Quality substitute soils were identified and utilized successfully in sufficient amounts to cover all areas of the mine site disturbance. These soils established a successful stand of vegetation for post mining land use and controlling erosion. Approximately 281,210 cubic yards of spoil and suitable soil were moved and placed to achieve the final reclaimed contour. Approximately 600 pounds of native seed along with 3,500 bare root and containerized plants were planted by hand. Most all work occurred on slopes with an approximate grade of 2 horizontal to 1 vertical.

Today, nearly 5 years after the completion of final reclamation, the Des-Bee-Dove Mine

complex supports a broad vegetative cover that has protected and stabilized the reclaimed surface. Phase I Bond Release for the 29.5 acre site was awarded in February 2007. Figures 52 and 53 show the appearance of the mine site prior to reclamation, and how over 100 years of disturbance to the natural surface of the land has been restored to support a variety of post mining land uses. As desirable plant species progressively dominate the site, vegetative diversity will continue to increase significantly.

Literature Cited

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R.G. Gavlak, et al, 1994. Plant, Soil and Water Reference Methods for the Western Region, Western Regional Extension Publication (WREP) 125, 58 pages, Western Rural Development Center, Corvallis, Oregon.

Leatherwood and Duce, 1988, Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining, State of Utah, department of Natural Resources, Division of Oil, Gas, and Mining, Salt Lake City, Utah.

Table 1: Parameters for Characterization of the Des Bee Dove Mine Site Soils (UDOGM, 2003)*

TEST TO BE PERFORMED	REPORTED AS	SUGGESTED METHODS
pH	saturated paste standard units	Soil Science Society of America. 1996. Series No. 5. Methods of Soil Analysis: Part 3 - Chemical Methods. Chapter 14, page 420 and Chapter 16, page 487.
Saturation %	%	Ibid. Chapter 14, pp 420 - 422.
EC_e	dS/m @ 25°C (or mS/cm)	Ibid. Chapter 14, pp 420 - 422 and pp 427 - 431.
Soluble Na, K, Mg, Ca	meq/L	Ibid. Chapters 14 pp 420-422 (saturation extract);Chapter 19 pp 555-557; Chapter 20 pp586-590 (spectroscopic methods).
ALKALINITY OF THE SATURATION EXTRACT	HCO_3 mg/L as $CaCO_3$	Western States Laboratory Proficiency Testing Program Soil and Plant Analytical Methods (R.G. Gavlak, et al, 1994). 1998. v 4.10. p 19. (Saturation Paste Extract Alkalinity, titration with 0.02N HCl)
Available NO_3-N	mg/Kg	Soil Science Society of America. 1996. Series No. 5. Methods of Soil Analysis: Part 3 - Chemical Methods. Chapter 38. p 1129 (KCl extraction). For analysis follow: Sims, J.R. and G.D. Jackson. 1971. Rapid Analysis of Soil Nitrate with Chromotropic Acid. Soil Sci. Soc. Am. Proc. 35-603-606.
Available Phosphorus	mg/Kg	Soil Science Society of America. 1996. Series No. 5. Methods of Soil Analysis: Part 3 - Chemical Methods. Chapter 32, page 895. ($NaHCO_3$ Extraction.)
Particle Size Analysis	% sand, **very fine sand**, silt, and clay	Soil Science Society of America. 1986. Series No. 5. Methods of Soil Analysis: Part 1 - Physical and Mineralogical Methods. Chapter 15 pp 398 and 404-409 (Hydrometer Method).
Organic Matter	%	Western States Laboratory Proficiency Testing Program Soil and Plant Analytical Methods. 1998. v 4.10. p 86. (Loss on Ignition, convert %LOI to OM by regression intercept value as noted in method)
$CaCO_3$ %	%	Ibid. p. 99 (Soil Carbonates, Gravimetric Determination after extraction with 3 M HCl.) Total Inorganic Carbon = %$CaCO_3$ x 0.12.

* Exchangeable Sodium Percentage analyzed when the SAR values are greater than 15 for clay textures and 20 for coarse textured soils.

Table 2: Additional Analyses Required toCharacterize the Des Bee Dove Refuse/Coal Mine Waste (UDOGM, 2003).

PARAMETERS	REPORTED AS	RECOMMENDED METHOD
Total Organic Carbon	%	Western States Laboratory Proficiency Testing Program Soil and Plant Analytical Methods. 1998. v 4.10. p 88. (Combustion Method)
Acid Potential	% pyritic S	U.S. EPA, 1978, EPA 600/278-054. Method 3.2.6, pg 60
Neutralization Potential	% $CaCO_3$	U.S. EPA, 1978, EPA 600/278-054. Method 3.2.3, pg 47

Table 3: Field Parameters For Characterization of the Des Bee Dove Mine Site Soils (UDOGM, 2003).

TEST TO BE PERFORMED	REPORTED AS	SUGGESTED METHODS
Texture	% sand, silt, clay	U.S. Department of Agriculture, Natural Resource Conservation Service, 1998. Field Book for Describing and Sampling Soils, Version 1.1. p 2-28 -2-31.
Structure/Consistence	grade, size, type	Ibid. p 2-38 through 2-51.
Visual Estimate % Coal	% area & size fragments	Ibid. p 2-20, 2-26, 7-1, 2-29, and 2-37.
Internal Rock	% volume & size fragments	Ibid. p2-32 through 2-37 and p2-20 and p 2-26.
Surface Rock	% cover & size fragments	Ibid. loc cit.
Soil Color	Hue Value/Chroma	Ibid. p 2-7 through 2-15.
Chemical Response	Effervescence	Ibid. p 2-65.
	Gypsum	U.S. Salinity Laboratory Staff. 1954. Diagnosis and improvement of saline and alkali soils. USDA Handbook 60. Method 22a. p102.

Table 4: Brief assessment of the soil materials identified in each trench.

Trench ID	Trench Assessment Narrative
#T1	This trench was located on the Little Dove Mine pad. Materials consisted of gravel and coal fines over a clayey layer, weathered sandstone, and coal. Sandstone bedrock was 0.6 m to 1.2 m (2 ft to 4 ft) in depth.
#T1A	This trench was located in the fill slope and included a portion of the pad at the Little Dove Mine site. A low berm of mixed coal fines and gravel was at the edge of the slope. Materials consisted of gravel and coal refuse in the upper 76 cm (30 in) on the flatter pad portion of the trench. Below was a dark grayish-brown cobbly colluvial material mixed with reddish-brown clayey material and coal waste. Overall texture was loam with spots of clay loam. Also included were some mining waste materials, such as concrete and a few boulders. The outer slope had less coal and gravel at the surface than the pad site and consisted mostly of colluvial fill material
#T2	This trench was located on the pad site near the portal of the Beehive Mine. It consisted mostly of waste coal and rock over sandstone bedrock at a depth of 0.9 m to 1.2 m (3 ft to 4 ft). A 6 m (20 ft) section along the end of the trench near the portal had very dark grayish-brown loam soil material of better quality than elsewhere in the trench. It was of limited extent but visually was suitable substitute topsoil material.
#T2A	This trench was located along the fill slope below the Beehive Mine and was similar to T1A. The upper 0.9 m (3 ft) of soil material on the outslope was a dark brown gravelly loam having good root distribution from vegetation. The remainder of the trench consisted of a gravelly surface over mixed colluvium and coal waste. Sandstone bedrock was at about 1.2 m (4 ft) in depth at the end of the trench.
#T3	This trench was located at the edge of the road at a switchback between the Little Dove/Beehive and Deseret Mines. It was a very small source area for soil material. The surface was mixed coal refuse, gravel and soil material about 40 cm (16 in) thick. Below was a mixed, fairly clayey, multi-colored cobbly colluvial material. At 1.5 m (5 ft) a coal bed was present. Trench depth was to 1.8 m (6 ft).
#T4	This trench was located at the pad site of the Deseret Mine. Materials consist mostly of coal refuse to a depth of 4.6 m (15 ft) over sandstone. Near the portal there was a portion of dark yellowish-brown colluvial soil material that would be suitable substitute topsoil material but was of limited extent.
#T4A	This trench was located on the fill slope at the Deseret Mine site. It was dug to about 4.6 m (15 ft) in depth and consisted entirely of black coal refuse with a few pockets of dark yellowish-brown soil material.
#T5	This trench was located at the coal storage site below the Deseret Mine. It consisted of two distinct materials: black coal refuse and dark yellowish-brown stony colluvial material. Sandstone bedrock was at 4.6 m to 6 m (15 ft to 20 ft) in depth.
#T6	This trench was located along the fill slope and extended into the pad area of the bath house pad site. It was dug to about 4.6 m (15 ft) in depth. Materials were stony colluvium (fill) with some darker colored soil along the surface of the outer slope and in pockets within the trench. Many roots occurred in the soil on the outslope where vegetation was present indicating suitable soil materials for plant growth.
#T7	This trench was located in the coal waste pile on the bath house pad site. Materials consisted of black coal waste and pockets of dark brown sandy loam. The black coal waste was the major component. The trench was dug to about 6 m (20 ft) in depth.
#T7A	This section of trench was located along the fill slope of the bath house pad near trench #7. The surface was composed mostly of gravel and a gravel/soil mix. Below was stony colluvial fill material.
#T8	This trench was excavated on the bathhouse pad site near the edge of the coal waste pile. The surface was a mixture of asphalt, coal, road gravel, and rock about 0.6 m (2 ft) thick. Below was a dark yellowish-brown stony colluvial material (fill) which overlies sandstone bedrock at depths of 0.9 m to 2.1 m (3 ft to 7 ft).
#T8A	This trench was located in the fill slope and included as part of the pad (or road) at the bath house site. The surface included mixed coal, soil, and gravel in the berm and gravel and asphalt on the flat surface. These materials extended to about 0.9 m (3 ft) in depth over dark yellowish-brown stony colluvium. Along the outer slope where vegetation was present, the soils had a brown color and were of better quality. Thickness was approximately 0.9 m (3 ft).
#T9	This trench was dug in a coal waste pile identified as a potential source of substitute topsoil. It consisted of black coal refuse with some sandy soil and sandstone rock fragments mixed in. It was very high in coal content (Total Organic Carbon (TOC) >26%).
#T10	This trench was located in the storage yard below the load-out site. It consisted of some coarse coal refuse and rock, sandy colluvial type soil, and a mixture of coal refuse and mineral soil. It was a complex arrangement of materials.

Table 5: Summary of Laboratory Testing Data and Suitability Ratings

PARAMETER	RANGE IN VALUES	SUITABILITY
Saturation Percentage	22.5 to 49.8	All rated as good except sample DBD12501 which rated as poor at less than 25%.
pH	7.2 to 8.1	All rated as good.
EC	1.01 to 9.01 mS/cm	Mostly fair and good; poor for samples DBD11901, DBD12201, and DBD12401 at > 8mmhos/cm.
SAR	0.48 to 11.0	Mostly good; fair for samples DBD12201 and DBD12401; poor for sample DBD12501 at > 10.
$\%CaCO_3$	1.4 to 36.3	Mostly fair to poor except for sample DBD10801 (clayey material). Six samples had > 30%. One sample < 19%.
Texture	Clay Loam-Sandy Loam	All rated as good except for sample DBD10801 (clay loam) rating fair.
Total Organic Carbon	0.3 to 26.1%	Four samples high in coal content had > 10% TOC and rated as unacceptable. All others rated as acceptable.
Available Water Capacity	Based on Texture (clay loam to sandy loam)	Most samples rated between 0.10 to 0.18 in/in.
K-factor*	Based on particle size	All samples rated as good.
Acid/Base Potential	16.3 to 369 tons/1000tons	Only one sample (DBD10801) was unacceptable.

*Average portions by particle size are:
Loam – 41% sand, 38% silt, 21% clay (42% silt plus very fine sand).
Sandy Loam - 60% sand, 26% silt, 14% clay (34% silt plus very fine sand).

Table 6: Substitute Topsoil Suitability Evaluation (UDOGM, 2003).

CRITERIA	GOOD	FAIR	POOR	UNACCEPTABLE
Saturation %	25 to 80		<25 >80	
PH	6.1 to 8.2	5.1 to 6.1 8.2 to 8.4	4.5 to 5.0 8.5 to 9.0	< 4.5 > 9.0
EC (mS/cm 25°C)	0 to 4	4 to 8	8 to 15	> 15
SAR [a,b]	0 to 4	5 to 10	11 to 15	> 15 [a]
%$CaCO_3$	<15	15 - 30	>30	
Texture [c]	sl, l, sil, scl, vfsl, fsl	c, cl, sicl, sc, ls, lfs	sic, s, sc, c, cos, fs, vfs	g, vcos
Total Organic Carbon	<10%			≥10%
Available Water Capacity[d]	> 0.10 moderate	0.05 to 0.10 low	< 0.05 very low	
K factor[e]	< 0.37		> 0.37	
Acid/Base Potential				$\frac{\leq 0 \text{ tons } CaCO_3}{1000 \text{ tons}}$

[a] For clay textured soils unacceptable is SAR >14. For sandy textured soils unacceptable is >20.

[b] For most Western soils, the SAR to ESP relationship is usually 1:1, up to ESP ≈ 20. If SAR>20, then determine ESP.

[c] s=sand, l= loam, si= silt, c= clay, v= very, f= fine, co=coarse, g=gravel

[d] Available Water Capacity is adjusted for texture.

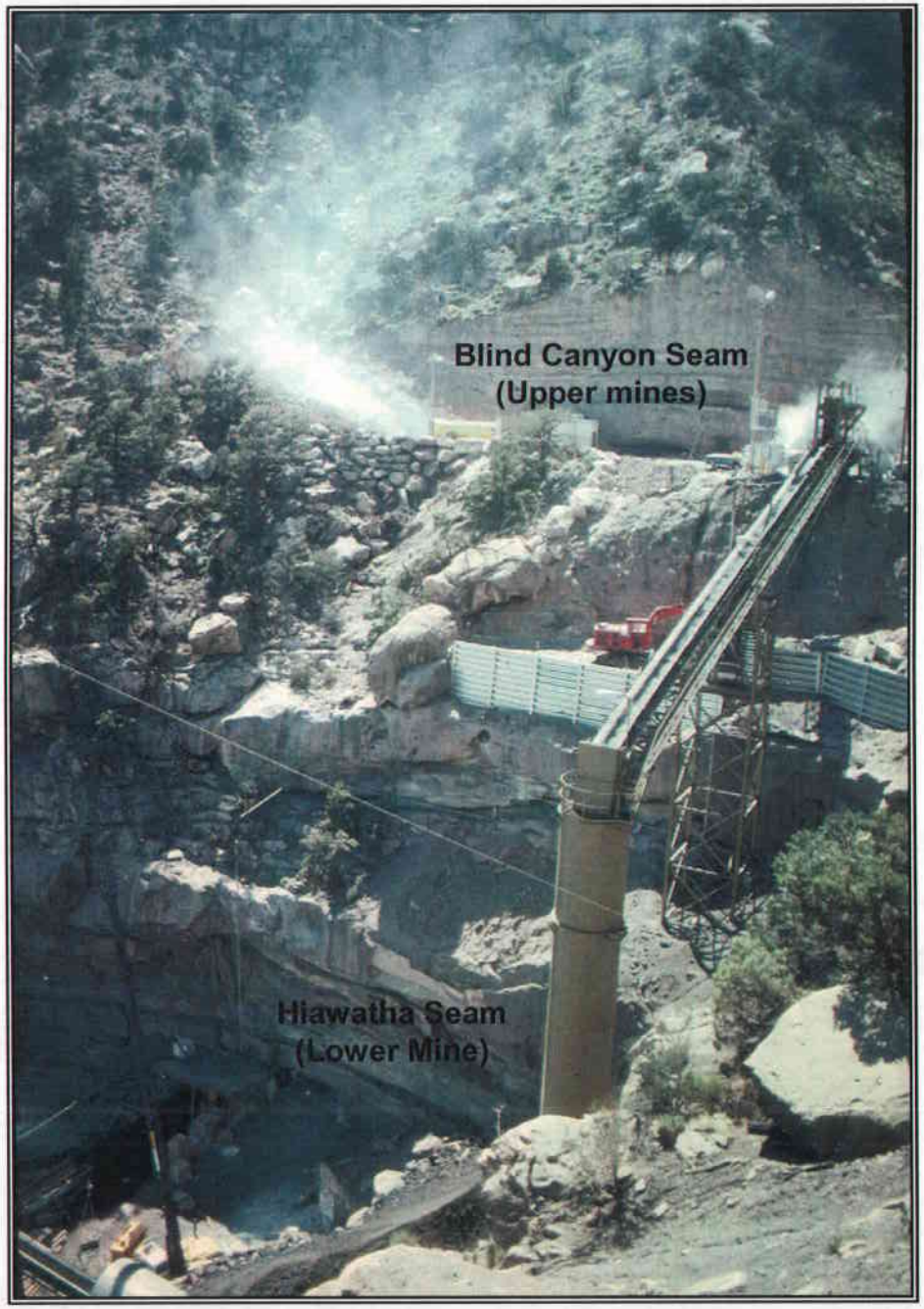
[e] K factor recommendations from the USDA Soil Conservation Service.1978. National Soils Handbook Notice 24. (3/31/78). NSH Part II –403.6(a).

Table 6: Assessment of Soil Sample Ratings for Substitute Topsoil Material at the Des-Bee-Dove Mines

Trench ID	Sample I.D.	Most Restrictive Rating	Acceptable
#T1	DBD10601	Poor (CO_3)	Yes-
#T1	DBD10701	Unacceptable (TOC) Poor (CO_3)	No+
#T1	DBD10801	Unacceptable (ABP)	No
#T1A	DBD11001	Poor (CO_3)	Yes-
#T2A	DBD11101	Poor (CO_3)	Yes-
#T2	DBD11301	Poor (CO_3)	Yes-
#T4	DBD11401	Fair (CO_3)	Yes
#T5	DBD11701	Poor (CO_3)	Yes
#T6	DBD11801	Fair (CO_3)	Yes
#T6	DBD11901	Poor (CO_3)	Yes-
#T7	DBD12001	Unacceptable (TOC)	No
#T7A	DBD12101	Fair (CO_3)	Yes
#T7A	DBD12201	Poor (EC)	Yes-
#T8A	DBD12401	Unacceptable (TOC) Poor (EC)	No
#T8A	DBD12501	Poor (EC, SAR, Sat %)	Yes-
#T9	DBD12601	Unacceptable (TOC)	No
#T10	DBD12701	Fair (EC, CO_3, TOC)	Yes-

Based on criteria given in October 3, 2001 TA; Table 4 "Substitute Topsoil Suitability Evaluation". TOC – Total Organic Carbon, EC – Electrical Conductivity, CO_3 – Carbonates, SAR – Sodium Adsorption Ratio, Sat. % - Saturation Percentage, ABP – Acid/Base Potential.

Figure 1: This photo shows the upper and lower mine pads. Outcropping rock of the Blackhawk Formation separates the two mine facilities.



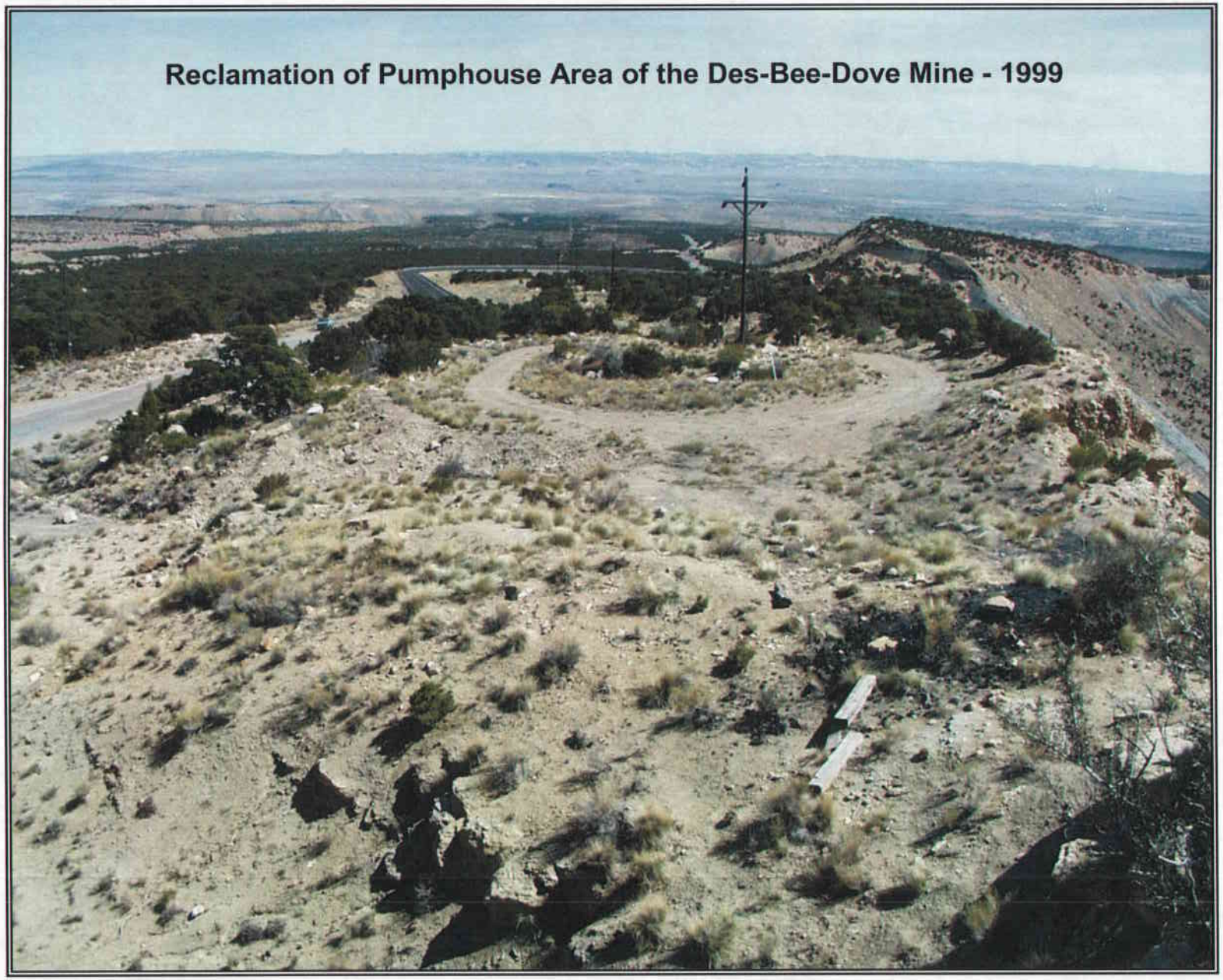


Figure 2: Pumphouse disturbed area without structures.

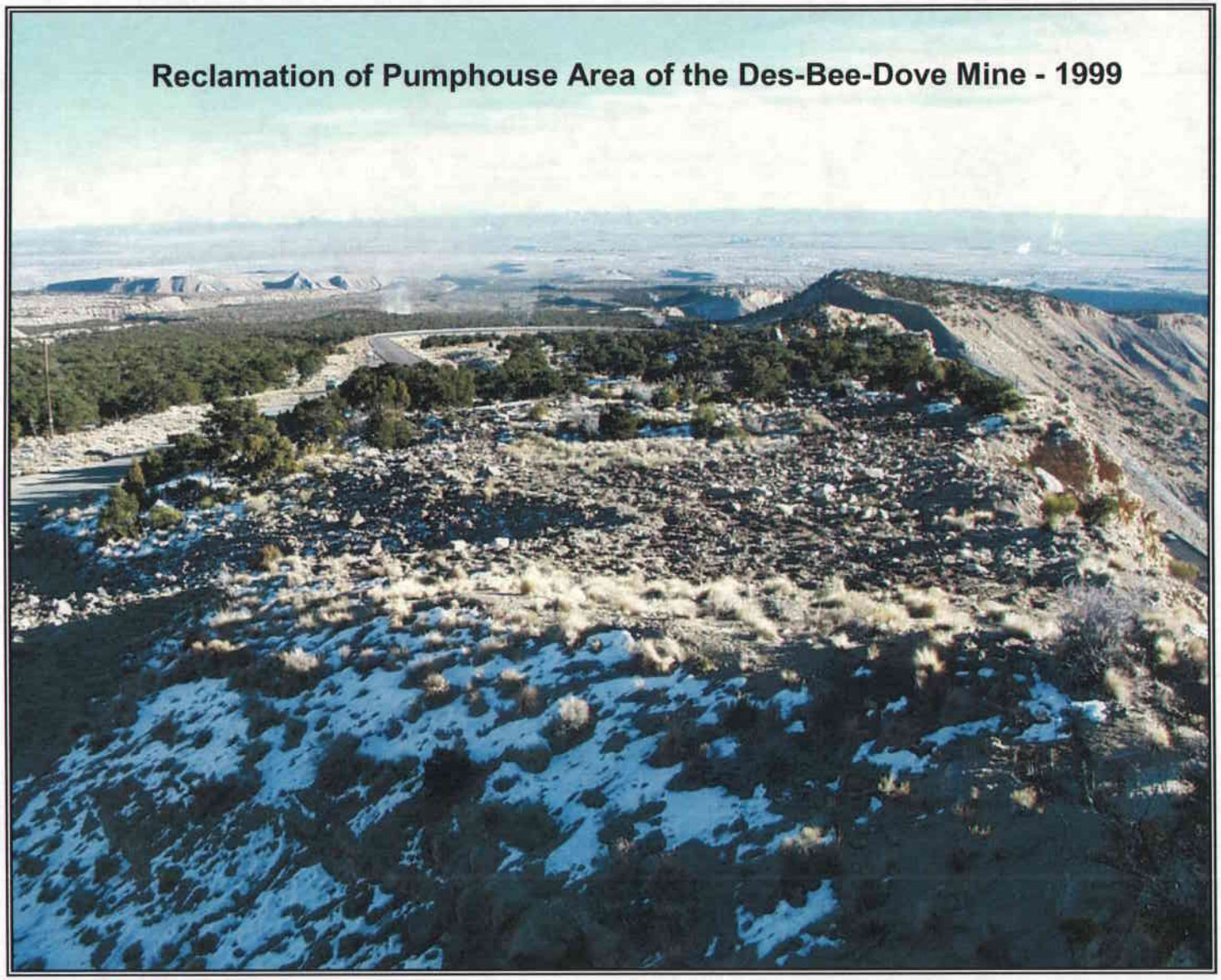


Figure 3: Pumphouse disturbed area after reclamation.

Figure 4: Tipple/material storage yard area where a high potential for soil contamination was prevalent.

Figure 5: Extent of coal buried at the tipple/material storage yard. Note the size of the pile compared to the D8 Caterpillar dozer. Approximately 108,000 tons of high BTU, low ash coal was removed from canyon.

Figure 6: Coal waste material to fill cut on bathhouse pad. Approximately 17,000 yards of material was utilized.

Figure 7: Mobilization of equipment for coal removal project.

Figure 8: Surface layer being scraped off to expose raw coal material.

Figure 9: Segregation of clean coal into piles for loading and transportation activities.

Figure 10: Loading and shipping of coal product.

Figure 11: Coal product completely removed from canyon.

Figure 12: Upper mine pad and Little Dove belt portal.

Figure 13: Upper mine pad (Little Dove and Beehive mines) with facilities removed and portals backfilled.

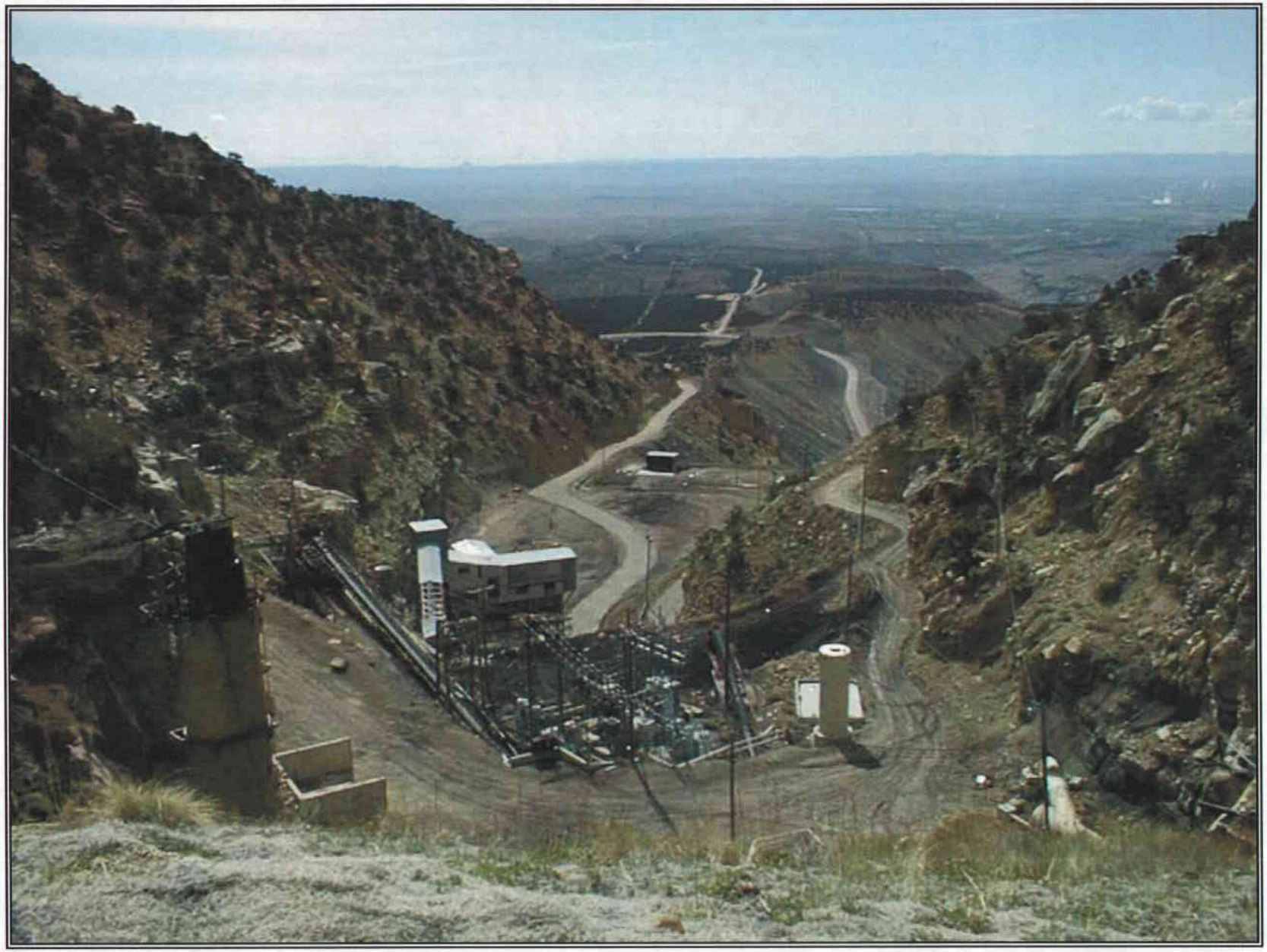


Figure 14: Looking down from the upper mine pad to the lower mine pad (Deseret Mine) prior to the start of reclamation.

Figure 15: Deseret Mine portal pad prior to relcamation.

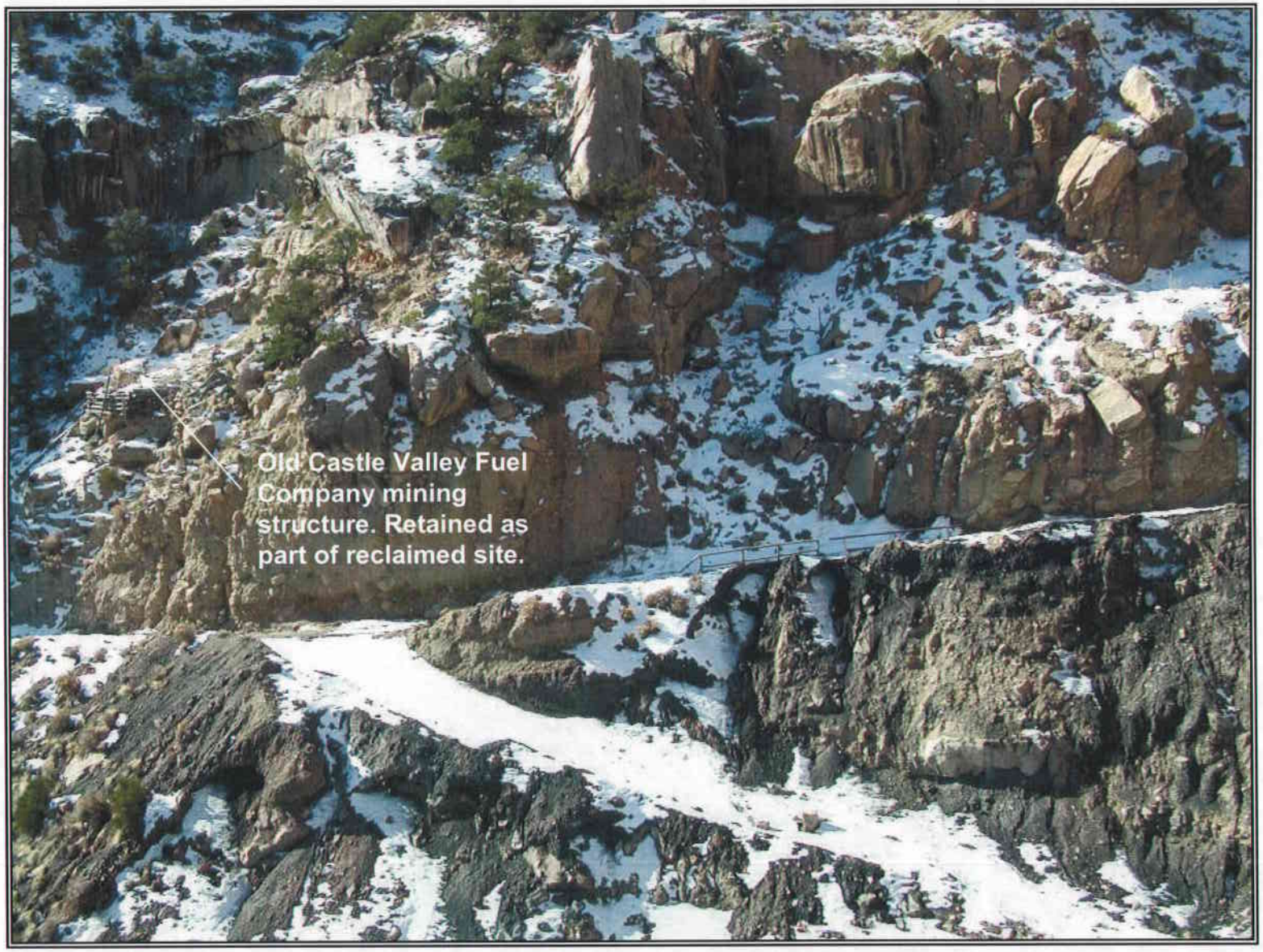


Figure 16: Access road to Deseret Mine portal pad.

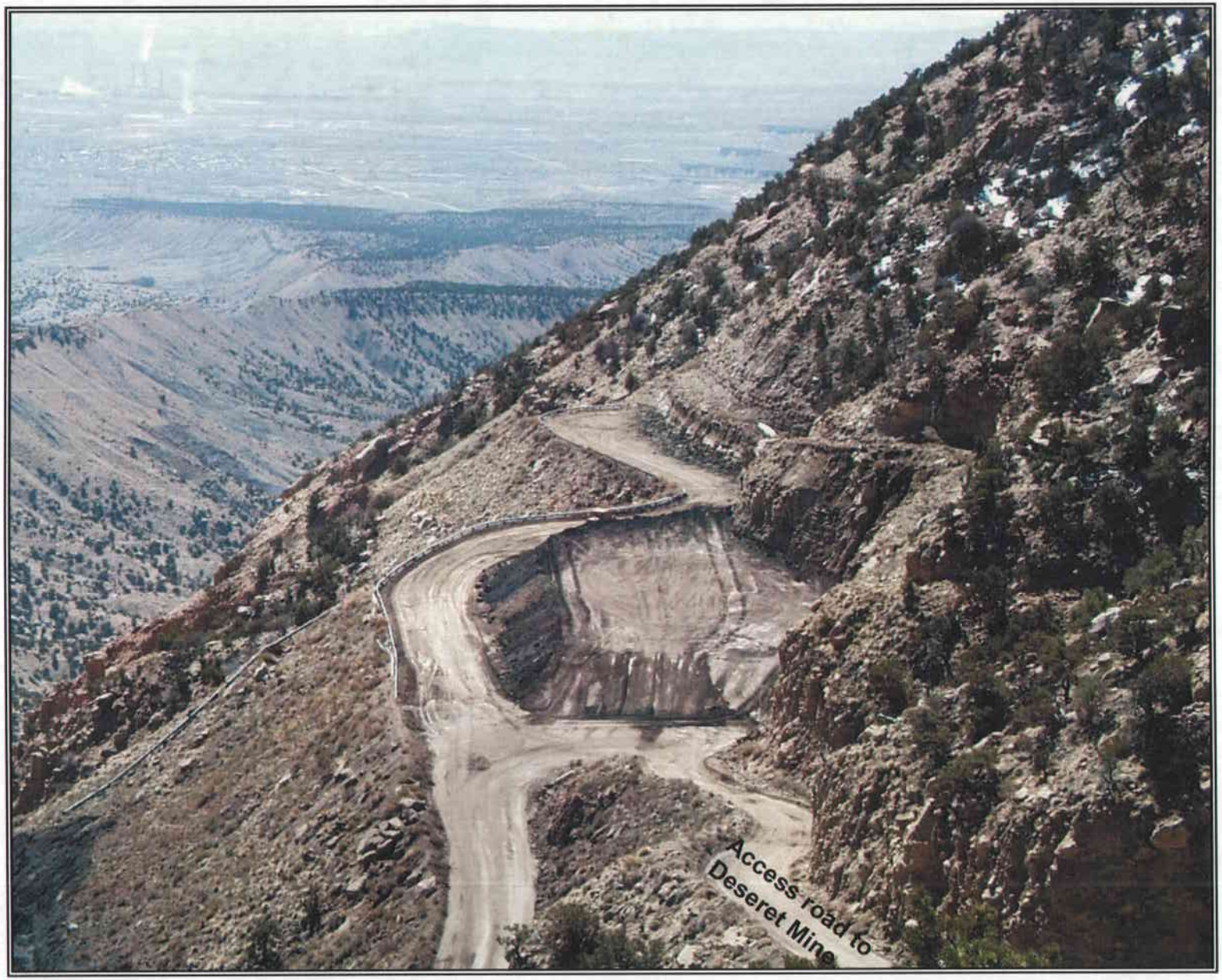
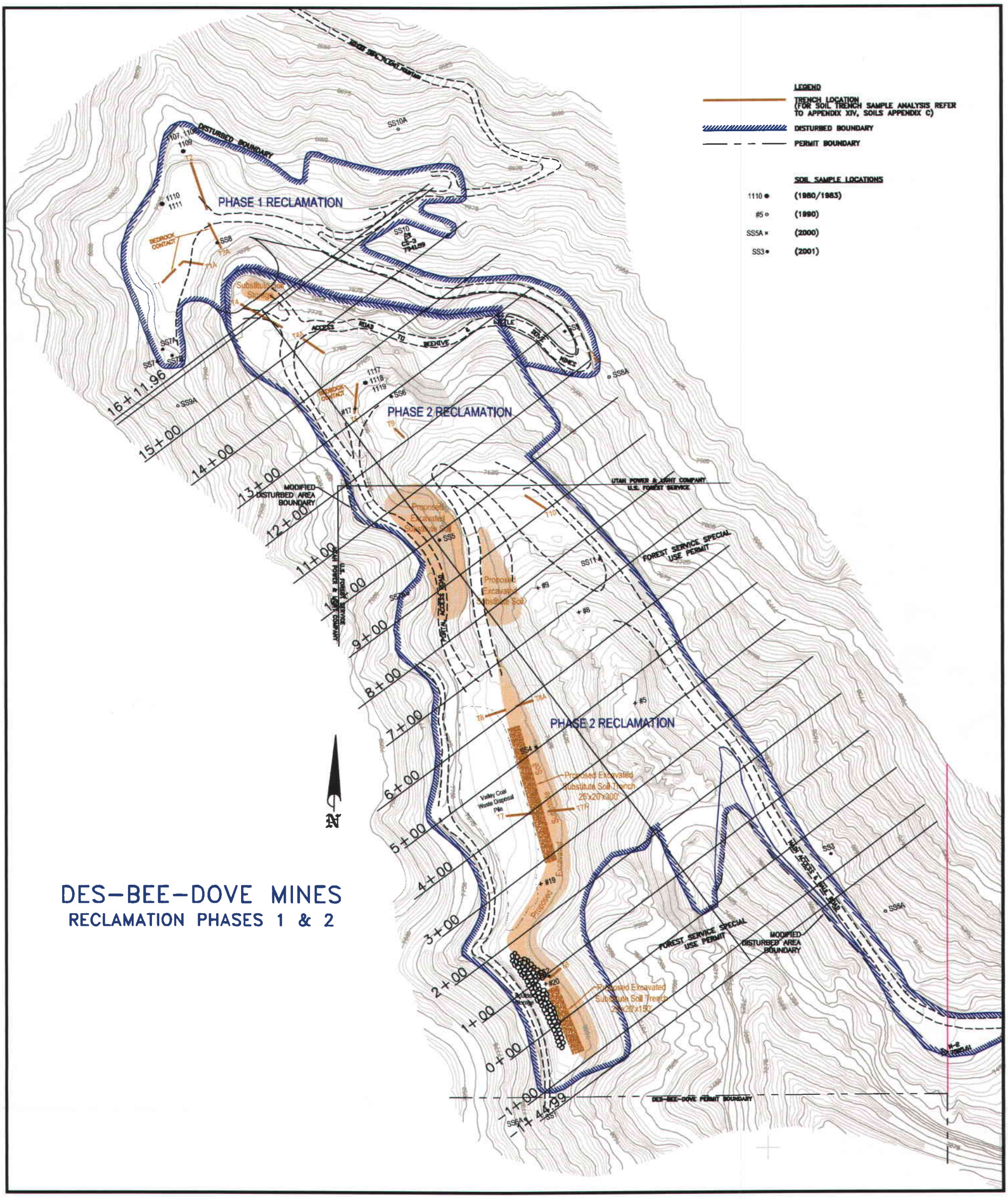


Figure 17: Bathhouse pad with coal waste material used to fill cut.

Figure 18: Access road to upper mine pad. Note upper mine level in upper left hand corner.



DES–BEE–DOVE MINES
RECLAMATION PHASES 1 & 2

Figure 19: Map of the Des Bee Dove Mine site. Area shows trench locations.

Figure 19

Figure 20: Soil sampling in Trench #1.

Figure 21: Location of the bedrock contact in Trench #2

Figure 22: Location of the bedrock contact and suitable soils below coal waste material in Trench #5

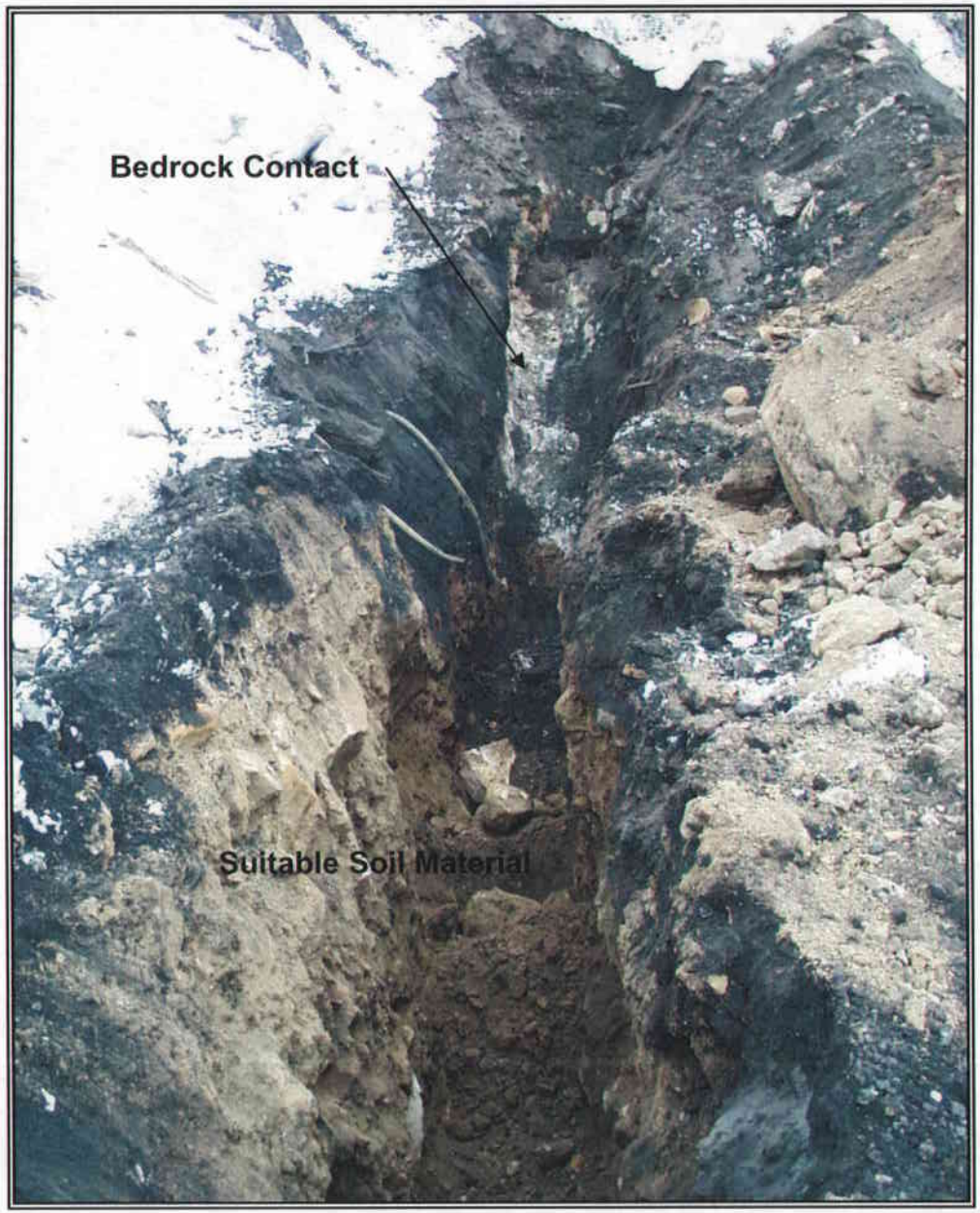


Figure 23: Unsuitable soil in Trench #9. This material was used as fill at the base of cut slopes.

Phase 1 Reclamation
Little Dove/Beehive
Mine Pad

Figure 24: Start of project. Operator segregating soils on the outslope of the upper mine facility pad.

Figure 25: Construction of fill slopes to cover highwall.

Phase 1 Reclamation
Little Dove/Beehive
Mine Pad

Figure 26: Final Reclamation on west side of mine pad.

Figure 27: Finding the natural drainage channel.

Phase 1 Reclamation Little Dove/Beehive Mine Pad

Figure 28: Hydromulching/tackifying reclaimed slopes.

Figure 29: Deep "pocks" were constructed in slopes to control erosion, catch runoff, and enhance vegetation growth.

Note: Because of slope stability concerns, slopes were limited to a 2h:1v configuration and compacted to a 95% proctor. The narrowness of the pad prohibited complete elimination of highwalls in this area.

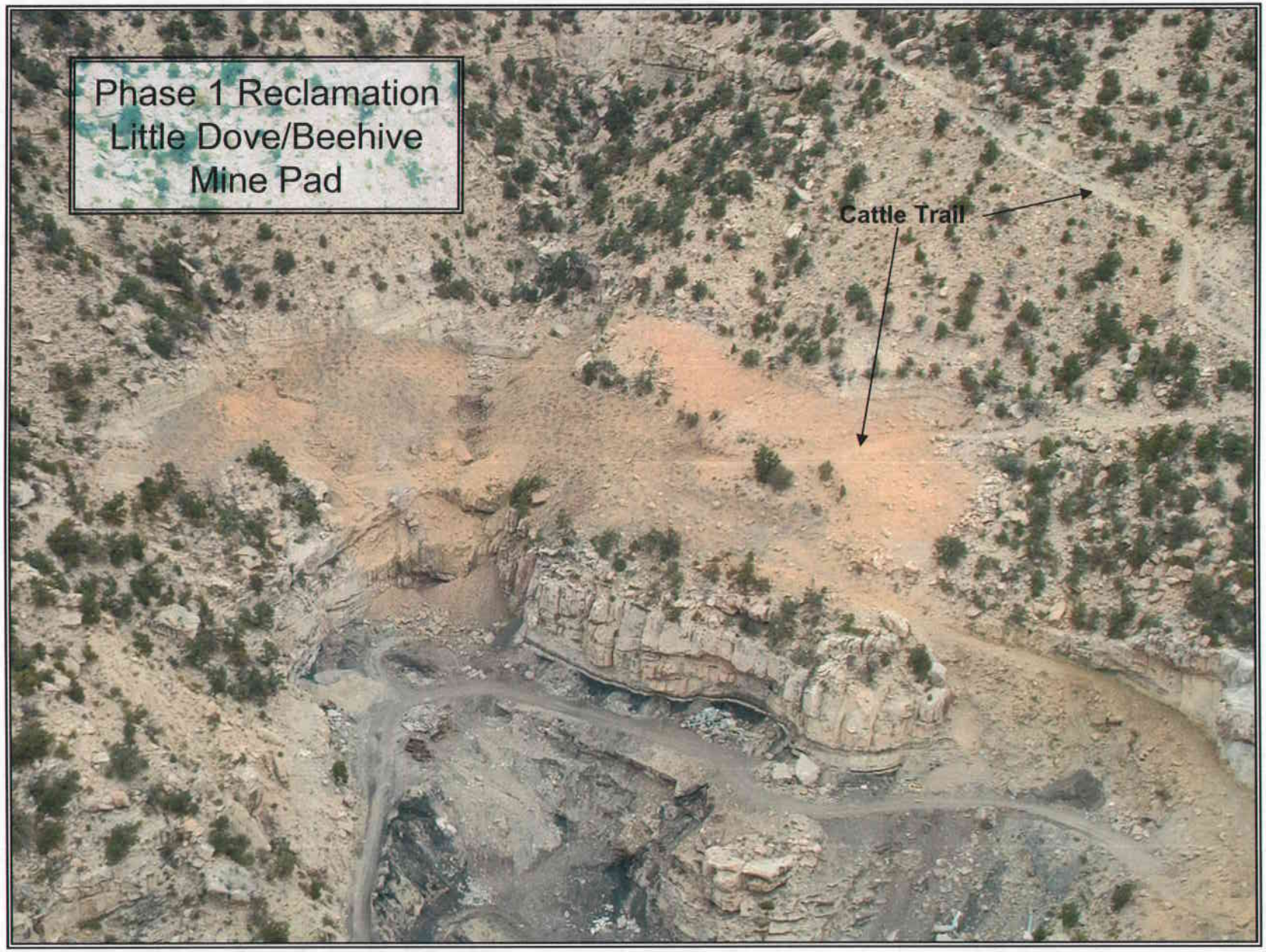


Figure 30: Final reclamation of the Little Dove/Beehive Mine pad, May 2001.

Phase 2 Reclamation
Deseret Mine and
Little Dove/Beehive
Access Road

Figure 31: Track-hoe excavating good soil material and exposing bedrock.

Figure 32: Dozer utilizing the excavated soil material to cover the coal waste fill.

Phase 2 Reclamation
Deseret Mine and
Bathhouse Pad

Figure 34: Coal waste fill on bathhouse pad.

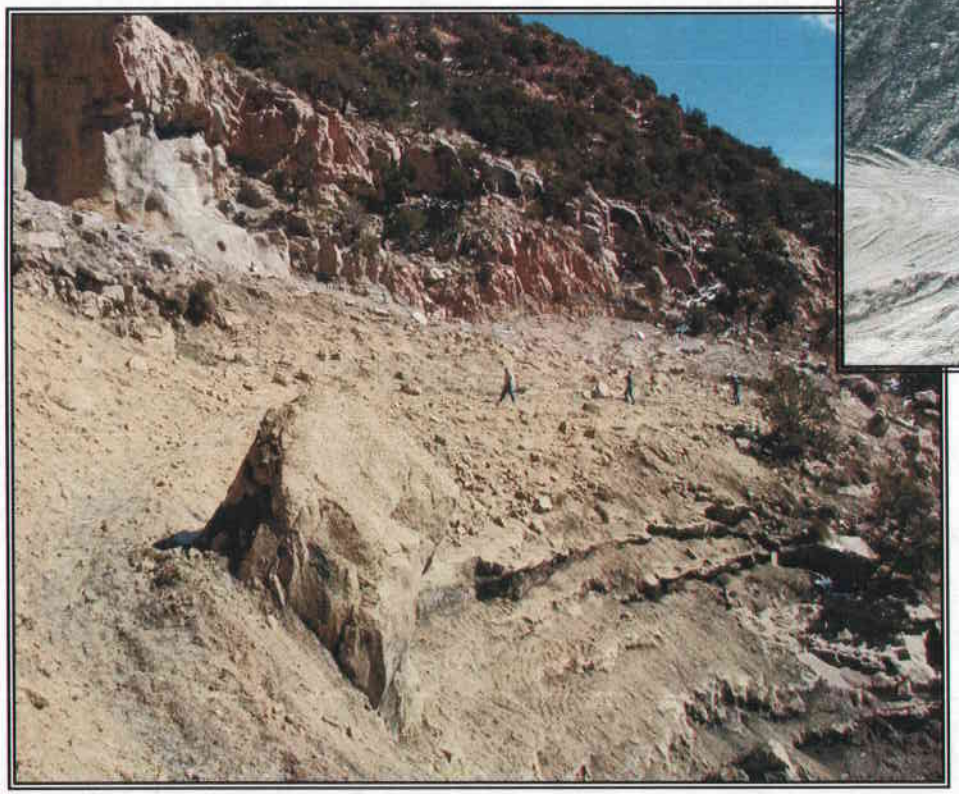


Figure 33: Final reclamation of the upper mine access road

Phase 2 Reclamation
Deseret Mine and
Bathhouse Pad

Figure 35: Substitute topsoil excavated from trench on bathhouse pad. Trench is backfilled with coal waste.

Figure 36: Covering coal waste fill on bathhouse pad with substitute topsoil.

Phase 2 Reclamation
Deseret Mine and
Bathhouse Pad

Figure 37: Final reclamation of bathhouse pad. The track-hoes and dozer work to reclaim down slope to canyon bottom. An additional 20,500 yards of substitute topsoil material was gained from two excavated bathhouse pad trenches and the bathhouse outslope. Rock and soil from this work was used to riprap the main channel and cover the opposite side of the canyon with a substitute topsoil material.

Phase 2 Reclamation
Deseret Mine and
Bathhouse Pad

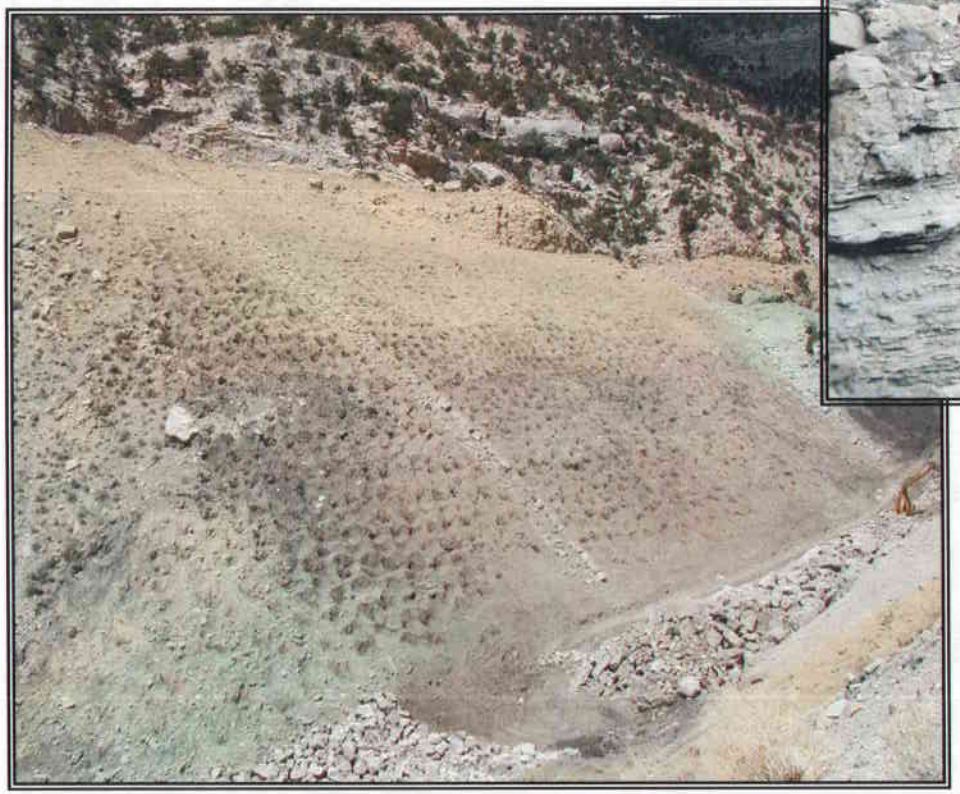


Figure 38: Final reclamation of bathhouse pad and outslope.

Figure 39: Simultaneously, as crews are working to finish bathhouse pad, and operator takes a track-hoe off the face of the slope below the upper mine access road to remove all coal waste from this slope. Final reclamation is completed as the operator descends the slope.

Phase 2 Reclamation
Deseret Mine and
Main Channel

Figure 40: Deseret Mine pad. A riprap apron is being built where ephemeral flows from the upper mine area fall onto the lower mine pad.

Figure 41: Crews drilling holes that will eventually be loaded with explosives to blast a keyway to anchor in the riprap apron.

Phase 2 Reclamation
Deseret Mine and
Main Channel

Figure 43: Continued construction of main channel down channel. Note the outcropping rock on the left side of channel.

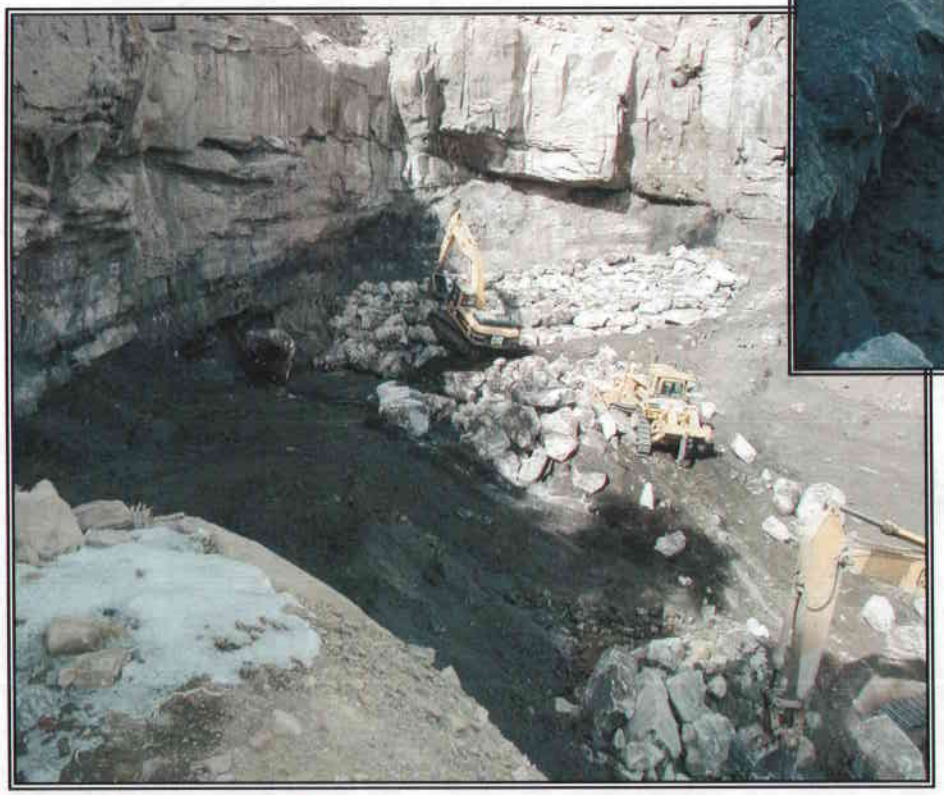


Figure 42: Deseret Mine pad. A riprap apron is being built where ephemeral flows from the upper mine area fall onto the lower mine pad.

Phase 2 Reclamation
Deseret Mine and
Main Channel

Figure 44: Deseret Mine pad looking down canyon. Main channel construction. On left side of channel rock outcrop is exposed. On right side of channel large boulders are placed against fill.

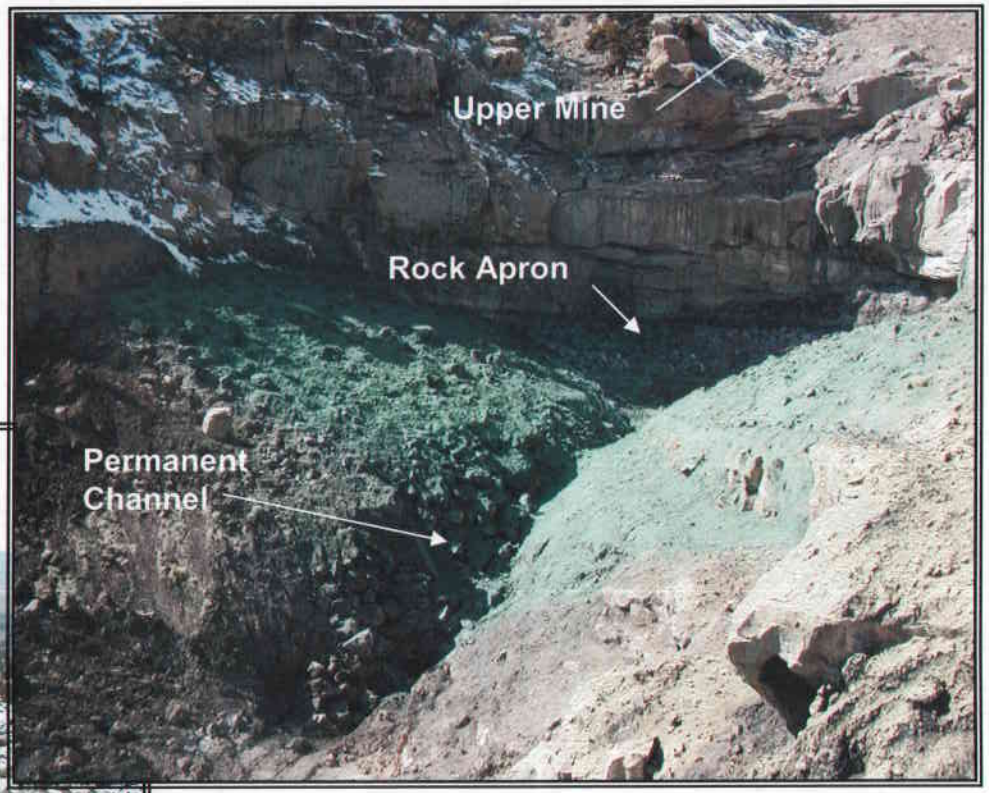


Figure 45: Final reclamation of the Deseret Mine pad. View looking up canyon.

Phase 2 Reclamation
Deseret Mine and
Main Channel

Figure 46: Below Deseret Mine pad. Moving coal waste down canyon.

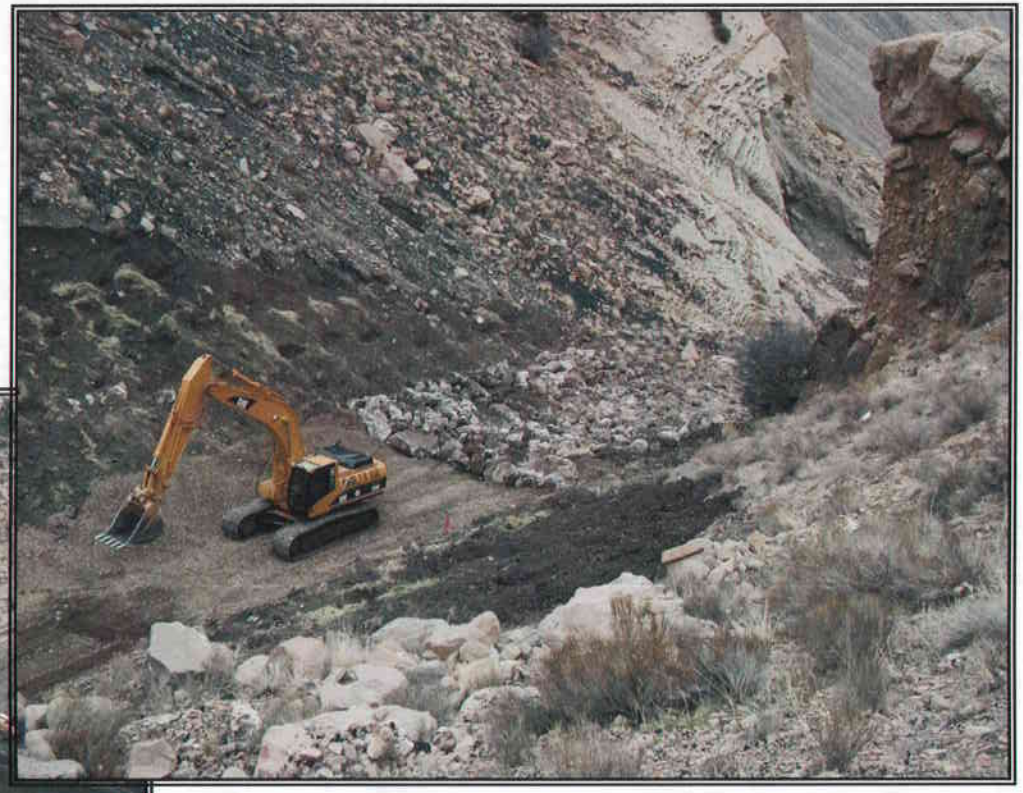


Figure 47: Construction of main channel working from the bottom of the project site up the canyon.

Phase 2 Reclamation
Deseret Mine and
Main Channel

Figure 48: The construction of the main channel worked from the top down and the bottom up. This photo shows where construction crews connected the channel before continuing reclamation down the main access road.

Figure 49: Final reclamation activities working out to the main access road.

Phase 2 Reclamation
Des-Bee-Dove
Access Road

Figure 50: Spreading Substitute topsoil material over fill of main access road.

Figure 51: Looking toward the end of the project area. Final reclamation complete.

Figure 52: Des-Bee-Dove Mine at the completion of reclamation, June 2003.

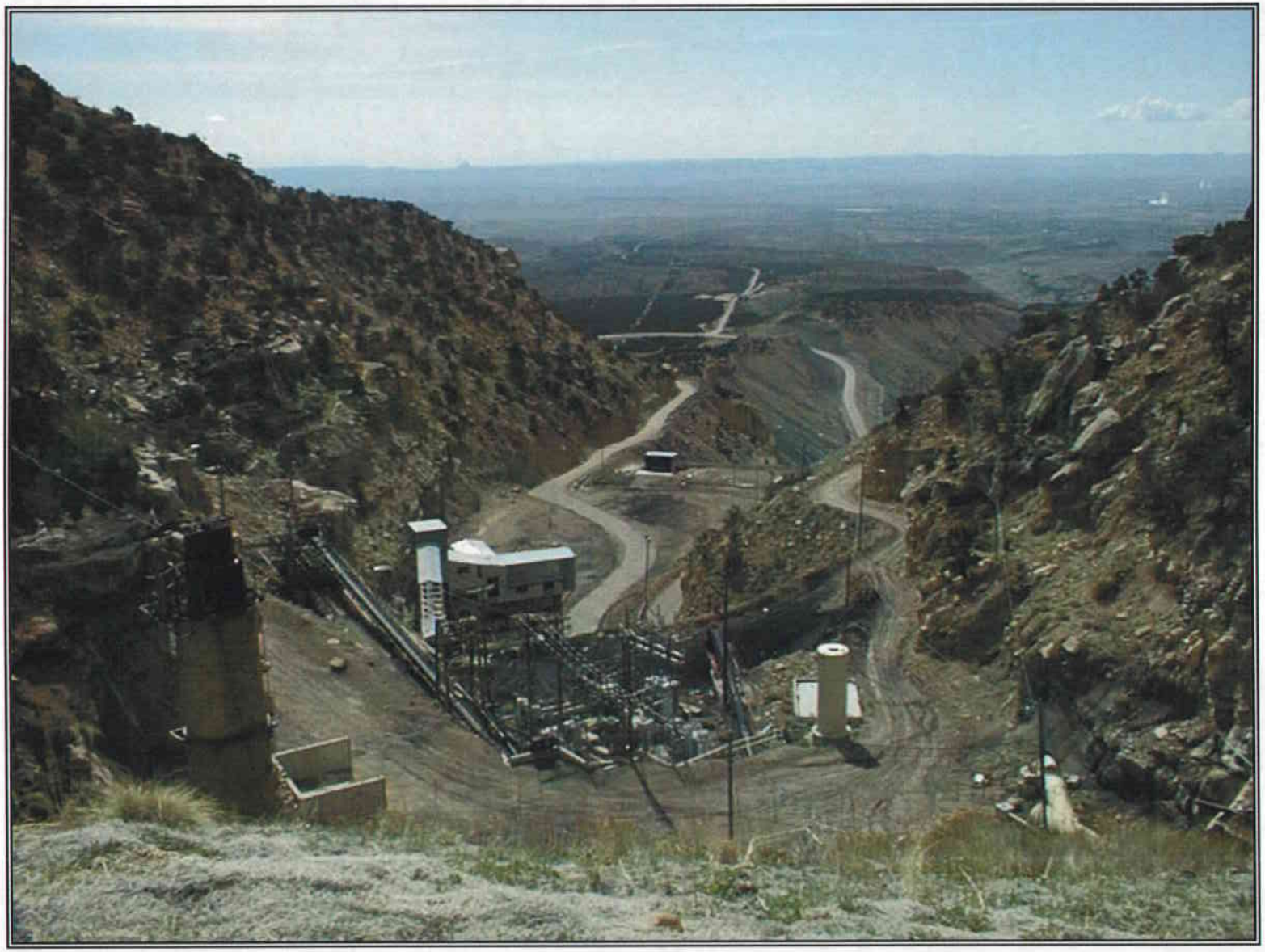


Figure 53: Des-Bee-Dove Mine site prior to reclamation.

Figure 54: Des-Bee-Dove Mine site in September 2007 after reclamation.

Exhibit 1

SCS-SOILS-232G

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL DESCRIPTION

Soil type

File No. DBD-T1

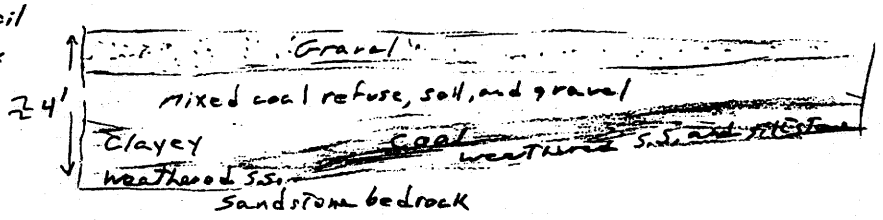
Area Des-Bee-Dove Mines, Emery Co. UT	Date 12-3-01	By: D. Larsen P. Burton	Stop No. 1
Classification Disturbed land			
Location Little Dove mine pad			
N. veg. (or crop) Pinyon-Juniper, rabbitbrush, ephedra (site)			Climate Ustic, Frigid bordering on mesic, aridic
Parent material Sandstone, shale, coal			
Physiography			
Relief	Drainage Well drained		Salt or alkali
Elevation 7915'	Gr. water		Stoniness
Slope Nearly level	Moisture		
Aspect SE	Root distrib.		% Clay *
Erosion	% Coarse fragments *		% Coarser than V.F.S. *
Permeability			

Additional notes DBD-T1 and T1A are two segments at the Little Dove mine site

Samples Taken:

DBD 10601 0-15" Surface gravel+soil
DBD 10701 15-28" Soil, gravel, coal mix
DBD 10801 28-35" Variegated clay
DBD10901 35-40" Coal

Depth to bedrock is 2 to 4 feet



Representative Profile - Ave. depths

* Control section average G-Gravel, Co-Cobble, S-Stones

Layer	Horizon	Thickness Range / Depth Ave.	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments	Root Distribution		Coal
1	Pad/rd Gravel	8-20" / 0-15"	Brown 10YR 5/3	Brown 10YR 4/3	GAV L	WFGR-OSG	SH	FR-FI	SS/SP	EM 7.3	CW	¼-1" Gravel 50%	Not vegetated		
2	Mixed Coal refuse and gravel	12-14" / 15-28"	very dark grayish brown 10YR 3/2	Black 2.5Y 2.5/1	GRV L-CL	WFGR-OSG	SH	FR	SS/SP	EM 7.2	CW	40 Gr 5 Co			50% coal fine + fine gravel
C	Variegated Clay	4-10" / 28-35"	Gray (M) Red (M)	7.5YR 5/1 2.5YR 5/6	CL-368C	OM	H	VFI	S/P	EO 7.2	AW	<2			
CR	coal	3-12" / 35-40"		Black 10YR 2/1	SIL-S	COPL-COABK	H	VFI	NS/NP	EO	AW	~100% coal bed layer			
CR	Weathered sandstone + siltstone	40-46"	Yellowish Red (M) Light yellowish Brown (M)	5YR 5/8 10YR 6/4	vfs-si	OM	SH	FI	NS/NP	EO	CW	30 Gr 30 Co		Weathered rock fragments break easily	
R	Sandstone Bedrock (Brown to yellowish brown)									very fine to medium grain					

SCS-SOILS-232G

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL DESCRIPTION

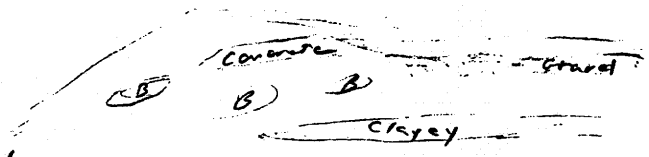
Soil type

File No. DBD-TA

Area Des-Bee-Dove Mines	Date 12/3/01	By: DLarsen	Stop No. 2
Classification			
Location Little Dove Mine, edge of fill slope to DBD-TA			
N. veg. (or crop) P-J		Climate	
Parent material Sandstone and shale, coal			
Physiography			
Relief	Drainage		Salt or alkali
Elevation ≈ 7915 feet	Gr. water		Stoniness
Slope –	Moisture		
Aspect SE	Root distrib.		% Clay *
Erosion	% Coarse fragments *		% Coarser than V.F.S. *
Permeability			

Additional notes Deep fill slope-to 20', mixed materials
Sample DBD 11001
Mixed soil material from
The excavated material
From 3 to 20 feet

Large slab of concrete in
Trench, + timbers
Berm has mixed soil, gravel and coal



* Control section average

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments	Root Distribution		% Coal
	0-12"	Mixed coal fines and gravel	10YR 2/1	L	WFGR-OSGR	SH	FR	SS SP	EM	CS	35G 40 Cob	Fines		45% fines & fine gravel sized
	12-28"	Gravel pad materials	10YR 4/3	L	OSGR	SH-LO	FR	SS SP	EM	CS	55G ¼-1"			2-5% fines
	28" to 14 FT	Dark Grayish Brown (M)	10YR 4/2 mixed	L-CL	WMSBK-OM	SH	FI	S/P	7.3 EM	GB	15G 15Co 10S			5%
	14-17 FT	Reddish Brown (M)	≈ 2.5YR 4/4	CL	OM	H	VFI	VS VP	EM	GB	20G			5%
	17-20FT	Pockets of coal in Dark Brown soil												20% gravel & cobble sized

SCS-SOILS-232G

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL DESCRIPTION

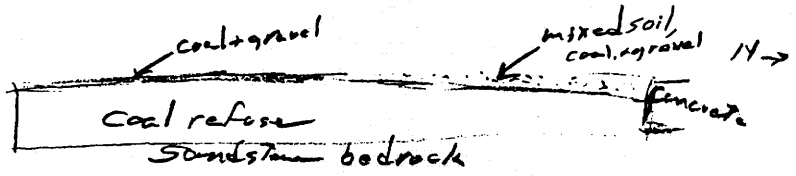
Soil type

File No. DBD-T2

Area Des-Bee-Dove Mines	Date 12/3/01	By: D. Larsen	Stop No. 4
Classification			
Location Beehive mine pad			
N. veg. (or crop)		Climate	
Parent material Coal Refuse, gravel, sandstone			
Physiography			
Relief	Drainage	Salt or alkali	
Elevation ± 7915 ft.	Gr. water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.	% Clay *	
Erosion	% Coarse fragments *	% Coarser than V.F.S. *	
Permeability			
Additional notes			

Sample:
DBD 11301 0-18"
Mixed soil, gravel, sand
Coal on north end of Trench

3 to 4 feet to sandstone bedrock



* Control section average

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments	Root Distribution		% Coal
AC	0-18"	very dark grayish brown	10YR 3/2	L	WFGR-OM	SH	FR	SS SP	7.6 EM	CB CW	40 G			15% fines + gravel
	OM	North 1/3 of Trench												
	0-8"	Coal and gravel	10YR 2/1 Black											40% gr + coal fines
	8-40"	Coal refuse	Black with reddish brown and yellowish brown								50% sandstone			50% gr-co

SCS-SOILS-232G

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

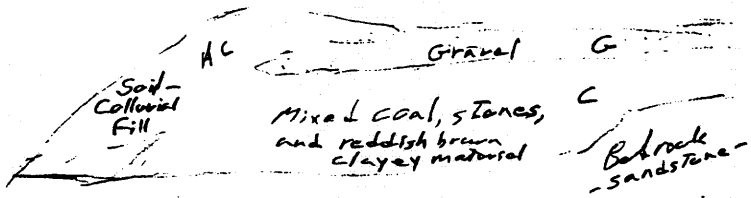
SOIL DESCRIPTION

Soil type

File No. DBD-T2A

Area Des-Bee-Dove Mines	Date 12/3/01	By: D. Larsen	Stop No. 3
Classification			
Location Beehive Mine Area, Mostly fill slope			
N. veg. (or crop) Pinyon-Juniper site		Climate	
Parent material Sandstone and shale			
Physiography			
Relief	Drainage	Salt or alkali	
Elevation ± 7915 feet	Gr. water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.	% Clay *	
Erosion	% Coarse fragments *	% Coarser than V.F.S. *	
Permeability			
Additional notes			

Samples Taken:
DBD 11101 0-36"
Mixed soil and colluvial fill
DBD 11201 3 to 12 feet
Mixed fill, mostly colluvial



* Control section average

Horizon	Depth	Color (Dry)	Color (Moist)	Texture	Structure	Consistence (Dry)	Consistence (Moist)	Consistence (Wet)	Reaction	Boundary	% Rock Fragments	Root Distribution	Pores	Coal %
AC1	0-36"		Dark Brown 10YR 3/3	L-CL	MFGR	SO-SH	FR	SS SP	7.4 EM	GW	25G 5Co 5S	CF-M FC		± 5% fines + gravel
AC2	36-42"	Dark Brown (M)	10YR 3/3 - 4, 5YR 3/2	L-CL	WFGR-WFSBK	SH	FR-FI	SS SP	EM	GW	25G 10C 5S	CF		
C	FT 6-20	Black and Reddish brown	10YR 2/1											40% gr-co
G	0-24	Dark yellowish brown	10YR 4/4	L							55G			5% fine
		Surface gravel with some mixed coal and soil												

on fill slope

pad/road (flat surface)

SCS-SOILS-232G

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL DESCRIPTION

Soil type

File No. DBD-T3

Area Des-Bee-Dove Mines	Date 12/4/01	By: D. Larsen	Stop No. 3

Classification

Location AT switch back in road between Deseret and Beehive mines

N. veg. (or crop) | Climate

Parent material Colluvium and mixed materials from sandstone and shale,

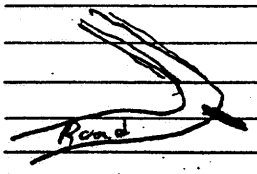
Physiography road gravel and coal fines

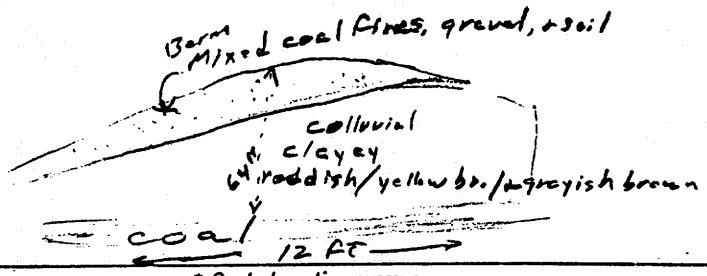
Relief	Drainage	Salt or alkali
Elevation ≈ 7820	Gr. water	Stoniness
Slope	Moisture	
Aspect	Root distrib.	% Clay *
Erosion	% Coarse fragments *	% Coarser than V.F.S. *

Permeability

Additional notes

Sample:
DBD 11601 0-16"
Mixed coal fines + soil





* Control section average

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments	Root Distribution		% Coal
AC	0-16	Very dark grayish brown to Dark brown	10YR 3/2 - 10YR 3/3	L	WFGR-	SO	FR	SS SP	EM	CB	40 G 5C 2S			40% Coal fine + gravel
* C	16-64	Reddish Brown Yellowish Brown Grayish Brown	5YR 5/4 10YR 4/4 - 6/4 2.5Y 4/2	CL	WFSBK- OM	H	FI	SP		AS	20G 20C 15S	FF		<5%
CR	64-72+	Coal bed	10YR 2/1 Black	NA										100%
*	Mixed clayey colluvial material and/or disturbed, mixed parent materials													
Note -	Road will be left as a trail for cattle													
	Will not plan to excavate material from this site													
	Use berm material for reclamation													

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SOIL CONSERVATION SERVICE

SOIL DESCRIPTION

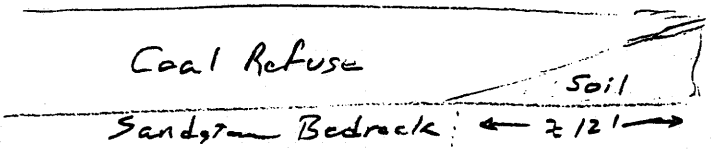
Soil type

File No. DBD-T4

Area Des-Bee-Dove Mines	Date 12/4/01	By: D. Larsen	Stop No. 1
Classification			
Location Deseret Mine Site			
N. veg. (or crop)		Climate	
Parent material Sandstone and shale (colluvium), coal			
Physiography			
Relief	Drainage	Salt or alkali	
Elevation 7740 feet	Gr. water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.	% Clay *	
Erosion	% Coarse fragments *	% Coarser than V.F.S. *	
Permeability			
Additional notes			

Sample:
DBD 11401 3-8 feet
Colluvium or Fill

Coal refuse not sampled
It would be buried



* Control section average

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments	Root Distribution		% Coal
C	FT 2-9	Colluvial soil material (Fill)	10YR 4/4	L	WFSBK OM	SH	FR	SS SP	7.4 EM	CW	30G 10Co 5S			<5%
Waste Coal	FT 0-15	Black	10YR 2/1	Coal refuse, concrete, and other junk					EM "					40% Pm + gr. 40% Cgl/c gr
R	FT 8 to 15 feet	Sandstone bedrock												

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SOIL CONSERVATION SERVICE

SOIL DESCRIPTION

Soil type

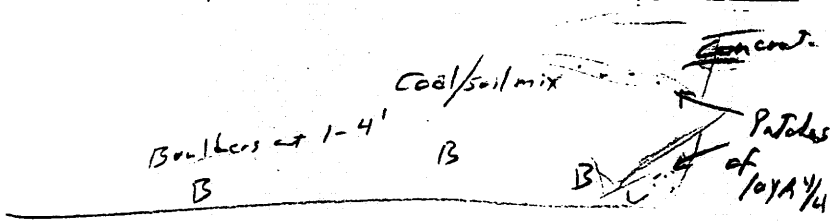
File No. DBD-T4/1

Area Des-Bee-Dove Mines	Date 3/4/01	By: D. Larsen	Stop No. 2

Classification		
Location Deseret Mine, outer slope		
N. veg. (or crop) Pinyon-Juniper		Climate
Parent material Sandstone, shale, coal (Mixed waste material)		
Physiography		
Relief	Drainage	Salt or alkali
Elevation 7760 - 7770 FT	Gr. water	Stoniness
Slope 2a - 40 %	Moisture	
Aspect SE 130°	Root distrib.	% Clay *
Erosion	% Coarse fragments *	% Coarser than V.F.S. *
Permeability		
Additional notes		

Sample DBD11501 0-15feet
Mixed material from excavated pile.

Mixed soil and coal
Large stones and boulders are common



Trench about 15 feet deep

* Control section average

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments	Root Distribution		% Coal
	Up to 15 FT		Black 10YR 2/1	SL	OM		FR	SS/SP	7.4		20 G 15 Co 10 S 75 B			40% fines gr-co
		Pockets of dark yellowish brown	10YR 4/4	L										5%
	Some boulders up to about 36" Taken out with Trackhoe													

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SOIL CONSERVATION SERVICE

SOIL DESCRIPTION

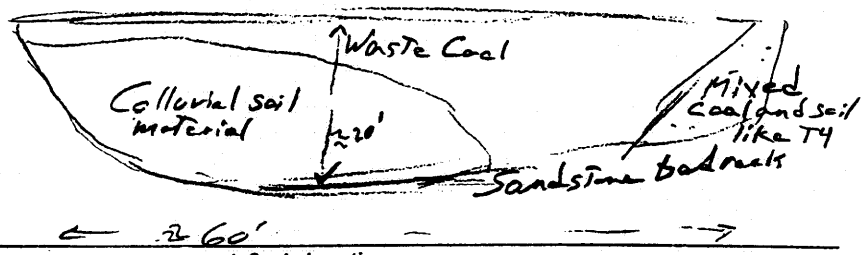
Soil type

File No. DBT-TS

Area Des-Bee-Dave Mines	Date 12/4/01	By: D. Larsen	Stop No. 41
Classification			
Location Tipple Site, below Deseret Mine			
N. veg. (or crop)		Climate	
Parent material Coal, Colluvium from sandstone and shale			
Physiography			
Relief	Drainage	Salt or alkali	
Elevation 7710	Gr. water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.	% Clay *	
Erosion	% Coarse fragments *	% Coarser than V.F.S. *	
Permeability			

Additional notes Mostly a coal waste site, steep side slopes

Sample:
DBD 11701 2 To 20 Feet
Colluvial material from
sandstone and shale



* Control section average

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments	Root Distribution		% Coal
Coal	FT 1-15	Waste Coal	10YR 2/1 Black											40 fines 20 or 20 cobble
C	FT 2-20	Dark yellowish brown	10YR 4/4	L		SH-LO	FR	SS SP	7.6		20G 15C 15S 10B			<5%
		Colluvial Soil		50-75 of Sandy loam and clay loam										
R	AT 15-20'	Sandstone bedrock												

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SOIL CONSERVATION SERVICE

SOIL DESCRIPTION

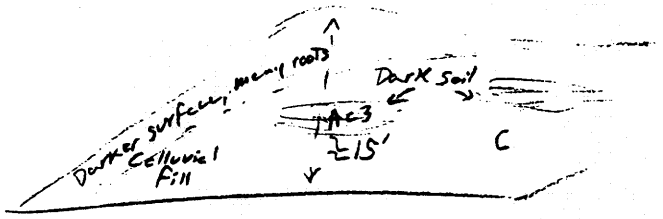
Soil type

File No. DBD-T6

Area Des-Bee-Dove Mines	Date 12/4/01	By: D. LARSEN	Stop No. 5
Classification			
Location Bath House Pad + Fill Slope			
N. veg. (or crop) Pad site, Rabbitbrush and grasses		Climate	
Parent material Colluvium derived from sandstone and shale			
Physiography			
Relief	Drainage	Salt or alkali	
Elevation 7640 - 7655 FT.	Gr. water	Stoniness	
Slope 75% on downslope	Moisture		
Aspect	Root distrib. Observed To about 8 feet	% Clay *	
Erosion	% Coarse fragments *	% Coarser than V.F.S. *	
Permeability			

Additional notes All above 10' looks like suitable soil material

Samples:
DBD-11801 0-24"
DBD-11901 4-12 ft



T.D. 15'

* Control section average

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments	Root Distribution		% Coal
AC1	0-12"		10YR 3/2 - 4/2 Very dark grayish brown	L	MAGR	SO	FR	SS SP	7.6 EM	GW	20G 15C 5S 2B	MVF-M		10% gr+ Fines
AC2	12-24"		10YR 3/3 - 4/2 Dark Brown	L	WFGR WFSBK	SH	FR-FI	SS SP	7.6 EM	GW	"	CF-M		<5%
AC3	24-60"	In pockets	Very dark brown 10YR 3/2	L	MASBK OM	SH	FI	SS SP	EM	CB	20G 15Co 15S 2B	CF-M		10% gr+ Fines
AC4	5-10 FT		10YR 4/2	L	OM	SH	FI	SS SP	7.5 EM	CW		FF		<5%
C	10-15 FT	Dark yellowish brown	10YR 4/4	SL-L	OM	SH	FI	SS SP	EM			-		<1%
Mostly mixed surface soil and colluvial fill														

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U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

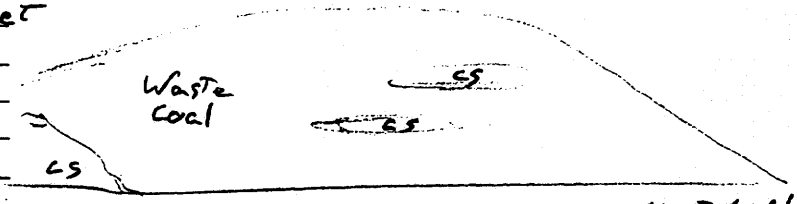
SOIL DESCRIPTION

Soil type

File No. DBD-T7

Area Des-Bee-Dove Mines	Date 12/4/01	By: D. LARSEN	Stop No. 6
Classification			
Location Coal Waste Pile, Bath house pad			
N. veg. (or crop)		Climate	
Parent material Coal Waste			
Physiography			
Relief	Drainage	Salt or alkali	
Elevation 7655' - 7675' AT	Gr. water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.	% Clay *	
Erosion	% Coarse fragments *	% Coarser than V.F.S. *	
Permeability			
Additional notes			

Sample:
DBD 12001 2-12 feet
Waste coal with some soil mixed in.



CS = Colluvial soil

About 65' long and 20' deep

* Control section average

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments	Root Distribution		% Coal
Coal	AT 0-20		Black 10YR 2/1	SL	SGA		VFR	SS/SP	7.4		10%	C,F,ST		30 fines 30 gr 10 cc
C	Pocket Up To 2' Thick by 15' long Est. soil material 25%		Dark Brown 7.5YR 3/4	SL							20G SCo SST			10% or fines

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SOIL DESCRIPTION

Soil type

File No. DBDT7A

Area Des-Bee-Dove Mines	Date 12/5/01	By: D.LARSEN	Stop No. 1

Classification

Location Bathhouse pad, by coal waste pile - Edge of fill slope and onto pad

N. veg. (or crop) P-J, Rabbitbrush + grasses — Climate

Parent material Colluvium from sandstone and shale

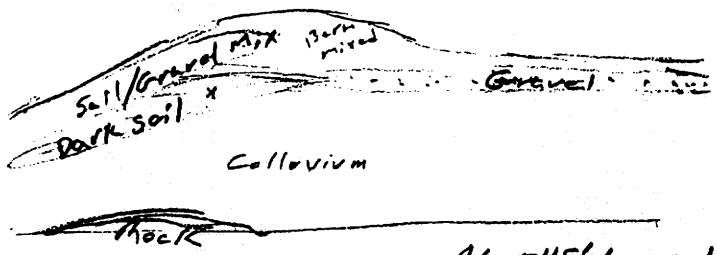
Physiography

Relief	Drainage	Salt or alkali
Elevation 7635-7655 FT	Gr. water	Stoniness
Slope 75-80% ↓	Moisture	
Aspect	Root distrib.	% Clay *
Erosion	% Coarse fragments *	% Coarser than V.F.S. *

Permeability

Additional notes

Samples:
DBD12101 0-13" Surface
DBD12201 21-31" Dark soil
DBD12301 3-10FT Colluvial



About 45' Long x 15' Deep

* Control section average

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments	Where Vegetation Root Distribution		% Coal
A/C	0-13"	Soil material with gravel	10YR 3/4-4/4 Dark yellowish brown	L	WMGR	SO	FR	SS SP	7.5 EM	CW	25G 5Co	C-M F+M		10% fines + gr
C	13-21"	Road-pad surface gravel	10YR 4/6-5/4 yellowish brown	L	OSG	SH-L	FR-FI	NS NP	EM	CW	55 1/4-1"	-		<5%
A *	21-31	Darker soil layer	10YR 3/1 Very dark gray	L-CL		H	FI	SS SP	7.4 EM	CW	15G 10Co	FF -		10% gr. + fine
C	31" - 15FT	Colluvium/fill	10YR 4/4-4/3 Dark yellowish brown - Brown	L-CL	OM	SH	FI	SS SP	EM		25G 10Co 5S 5B			<5%
	Some spots of sandy loam below 10 feet													
*	Minor amounts of coal fragments													

SCS-SOILS-232b

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

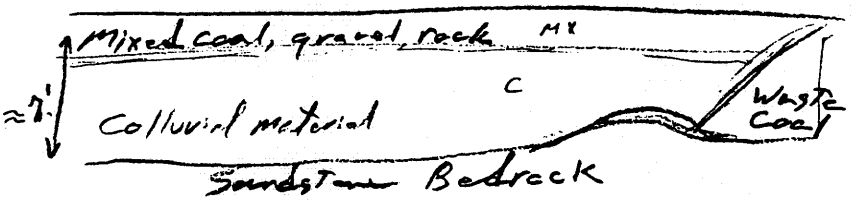
SOIL DESCRIPTION

Soil type

File No. DBD-T8

Area Des-Bee-Dove Mines	Date 12/5/01	By: D. LARSEN	Stop No. 3
Classification			
Location North end of bath house pad just beyond the coal waste pile			
N. veg. (or crop) P-J site		Climate	
Parent material Sandstone, shale, coal			
Physiography			
Relief	Drainage	Salt or alkali	
Elevation ≈ 7655 Feet	Gr. water	Stoniness	
Slope Nearly level	Moisture		
Aspect	Root distrib.	% Clay *	
Erosion	% Coarse fragments *	% Coarser than V.F.S. *	
Permeability			
Additional notes			

No. Samples Taken



* Control section average

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments	Root Distribution		% Coal
MX	0-24"	Mixed asphalt, coal, road gravel, and rock												30% Fresh gravel size
C	24"-7'	Dark yellowish brown colluvium / Fill	10YR 4/4-4/6	L-SL	OM	SH	FI	SS SP	EM		20% 15 Gr 15 ST 5 B			< 5%
R	AT 3-7 Feet	Sandstone Bedrock												-
WC	at and 0-7	Black Waste Coal												60% fines, gravel, some cobble
		Colluvial material is like DBD T8A												

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SOIL DESCRIPTION

Soil type

File No. DBDT8A

Area Des-Bee-Dove Mines	Date 12/5/01	By: D. LARSEN	Stop No. 2

Classification

Location Near bathhouse pad, North of Coal waste pile, edge of pad and into fill slope

N. veg. (or crop) P-J site - Rabbitbrush & grasses on slope — Climate

Parent material Colluvium from sandstone and shale

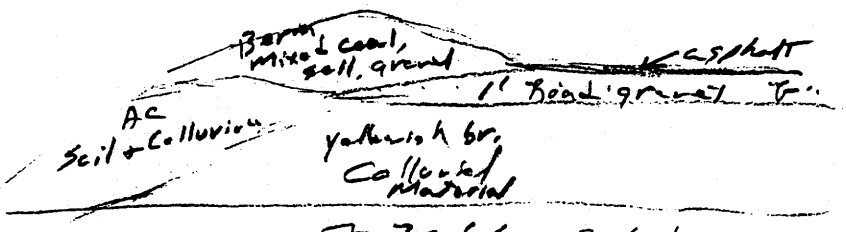
Physiography Canyon side fill slope + pad

Relief V. steep ↓	Drainage	Salt or alkali
Elevation 7650 feet	Gr. water	Stoniness
Slope 70-80% off edge	Moisture	
Aspect E 80°	Root distrib.	% Clay *
Erosion	% Coarse fragments *	% Coarser than V.F.S. *

Permeability

Additional notes

Samples:
DBD 12401 0-30" Berm mixed soil & coal
DBD 12501 3-20 feet colluvium from pile



* Control section average

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments	Root Distribution		% Coal
Berm	0-3 ft	Black to dark brown mixed soil + coal	10YR 2/1 - 3/3	L	WFGR	SO	FR	SS SP	EM	CW	20G 5Co	C F	M	30% fines + gr
AC	0-3 ft	Brown surface soil and colluvial fill	10YR 4/3 - 4/4	L	WFGR-SBK	SH	FI	SS SP	7.6 EM	GW	20F 15Co 10S			5% fine gr
C	3-20 ft	Dark yellowish brown Colluvium/fill	10YR 4/4 - 4/6	L-SL	OM	SH-LO	FI	SS SP	8.1 EM		20G 15Co 15S 5B			< 2%
Roadway G	0-3 ft	Road gravel		SL							60G			5% fines + gr
Covered by 2-3" of asphalt														

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SOIL DESCRIPTION

SOIL CONSERVATION SERVICE

Soil type

File No. DBD T9

Area Des-Bee-Dove Mines | Date 12/5/01 | By: D. LARSEN | Stop No. 4

Classification

Location Coal Waste Pile - Substitute Topsoil pile on map

N. veg. (or crop) | Climate

Parent material Waste coal, Very little soil material; some sandstone

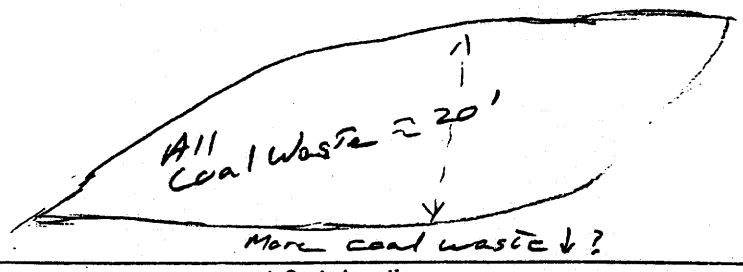
Physiography

Relief Vi. Steep	Drainage	Salt or alkali
Elevation ≈ 7675 Feet	Gr. water	Stoniness
Slope	Moisture	
Aspect	Root distrib.	% Clay *
Erosion	% Coarse fragments *	% Coarser than V.F.S. *

Permeability

Additional notes

Sample DBD 12601 0-12 Feet
Waste Coal



* Control section average

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments S.S.	Root Distribution		% Coal
Waste Coal	FT 0-20	Black	10YR 2/1	? SL	OSG OM	L	VFA	NS NP	7.3		10% gr-co			50 fines 20 co.

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SOIL DESCRIPTION

SOIL CONSERVATION SERVICE

Soil type

File No. DBD-T/c

Area Des-Bee-Dove Mines	Date 12/5/01	By: D. LARSEN	Stop No. 5

Classification

Location Loadout site, Bench inside of curve in road

N. veg. (or crop) | Climate

Parent material Coal, sandstone + shale (Colluvial)

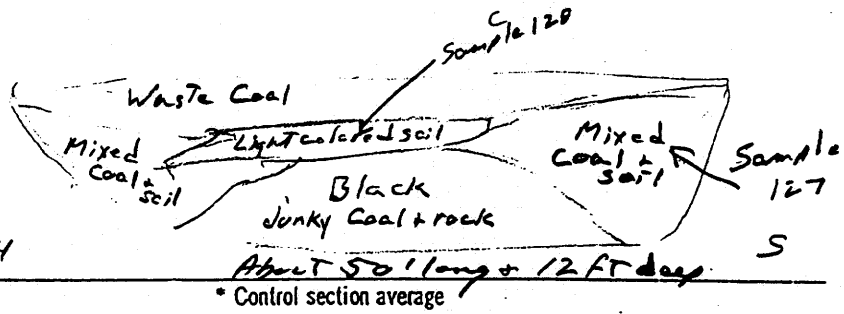
Physiography

Relief Gently sloping	Drainage	Salt or alkali
Elevation ≈ 7620 feet	Gr. water	Stoniness
Slope	Moisture	
Aspect	Root distrib.	% Clay *
Erosion	% Coarse fragments *	% Coarser than V.F.S. *

Permeability

Additional notes

Samples:
DBD 12701 3-12 Feet
Mixed coal, soil, and rock
DBD 12801 4-6 Feet
Yellowish brown colluvial
soil material



* Control section average

Horizon	Thickness / Depth FT	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	% Rock Fragments S.S.	Root Distribution		% Coal
WC1	2-4' / 0-3'	Waste Coal	10YR 2/1 Black	SL	OSG	SH-LO	FR	NS NP		GW	10 G 10 Co 5 S	NA		30 gr + coal Fr. 20 Co
C	1-3' / 3-6'	Dark yellowish brown (M) Colluvial soil material	10YR 4/6	SL	OM	SH-LO	FR-FI	SS SP	EM	CB	25 G 10 C 5 S			5 gr
WC2	≈6' / 6-12'	Coarse Waste Coal	10YR 2/1 Black	M/A	OM-OSTER					CB	5 G 5 Co 5 St			20 G 30 Co 5 ST
MXC	2-10' / 2-12	Black to dark reddish brown mixed coal and soil material	5YR 2.5/1 - 2.5/2	L-CL	OM	H	FI-VFI	SS SP	7-3 EM		15 G 15 Co			15 G 10 Co

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SOIL PROFILE DESCRIPTIONS FOOTNOTES

[1] Soil Series, and Soil Classification according to current NRCS information. Soil classification based on Keys to Soil Taxonomy, 7th edition (Soil Survey Staff 1996).

[2] Horizon and Depth based on site-specific conditions at the sample location.

[3] Texture and texture modifier abbreviations:

S	Sand	SCL	Sandy Clay Loam	CB	Cobbly	GR	Gravely
LS	Loamy Sand	CL	Clay Loam	CBV	Very Cobbly	GRV	Very Gravely
SL	Sandy Loam	SICL	Silty Clay Loam	CBX	Extremely Cobbly	GRX	Extremely Gravely
L	Loam	SIC	Silty Clay	CN	Channery	SH	Shaley
SIL	Silt Loam	C	Clay	CNV	Very Channery	SR	Stratified
SI	Silt			CNX	Extremely Channery		

[4] Color, Dry and Moist: Munsell Soil Color Chart, 1994 Edition.

[5] Structure:

Grade	Size	Type
W Weak	VF Very Fine	PL Platy
M Moderate	F Fine	GR Granular
S Strong	M Medium	SBK Subangular Blocky
	CO Coarse	ABK Angular Blocky
	VCO Very Coarse	PR Prismatic
		W Massive Weak Massive
		Massive
		S Massive Strong Massive
		SG Single Grained
		Cloddy

Structureless
OM Massive
OSG Single grain

[6] Consistency:

Dry		Moist		Wet	
LO	Loose	LO	Loose	NS	Non Sticky
SO	Soft	VFR	Very Friable	SS	Slightly Sticky
SH	Slightly Hard	FR	Friable	S	Sticky
H	Hard	FI	Firm	VS	Very Sticky
VH	Very Hard	VFI	Very Firm	NP	Non Plastic
EH	Extremely Hard	EFI	Extremely Firm	SP	Slightly Plastic
				P	Plastic
				VP	Very Plastic

[7] Roots:

Number	Type	
Very Few	VF	Very Fine
Few	F	Fine
Com (Common)	M	Medium
Many	CO	Coarse

Roots are described in terms of a specified size (type) and quantity (number). The size classes are:

Very Fine: Less than 1 mm in diameter
Fine: 1 to 2 mm in diameter
Medium: 2 to 5 mm in diameter
Coarse: 5 mm or larger in diameter
Roots larger than 10 mm in diameter may be described separately.

Quantity classes or roots are defined in terms of numbers of each size per unit area–1 square centimeter for very fine and fine roots, and 1 square decimeter for medium and coarse roots. All roots smaller than 10 mm in diameter are described in terms of the following quantity classes:

Few: Less than 1 per unit area of the specified size
Common: 1 to 5 per unit area of the specified size
Many: More than 5 per unit area of the specified size
Roots are described as to number first, and type second.

[8] Rock Fragments: All rock fragment percentages (% by volume) are taken from the field soil profile descriptions. Geologic modifier types (gravelly, channery, etc.) are also taken from the field soil profile description forms for each sampled profile.

[9] Reaction:

Effervescence

EO	Non-Effervescent
SE	Slightly Effervescent
EM	Moderately Effervescent
ES	Strongly Effervescent
EV	Violently Effervescent

Reaction		pH
Str. Acid	Strongly Acid	5.1 - 5.5
Mod. Acid	Moderately Acid	5.6 - 6.0
Sl. Acid	Slightly Acid	6.1 - 6.5
Neutral	Neutral	6.6 - 7.3
Mild. Alk.	Mildly Alkaline	7.4 - 7.8
Mod. Alk.	Moderately Alkaline	7.9 - 8.4
Strong Alk.	Strongly Alkaline	8.5 - 9.0
Very Strong Alk.	Very Strongly Alkaline	>9.0

[10] Horizon Boundaries:

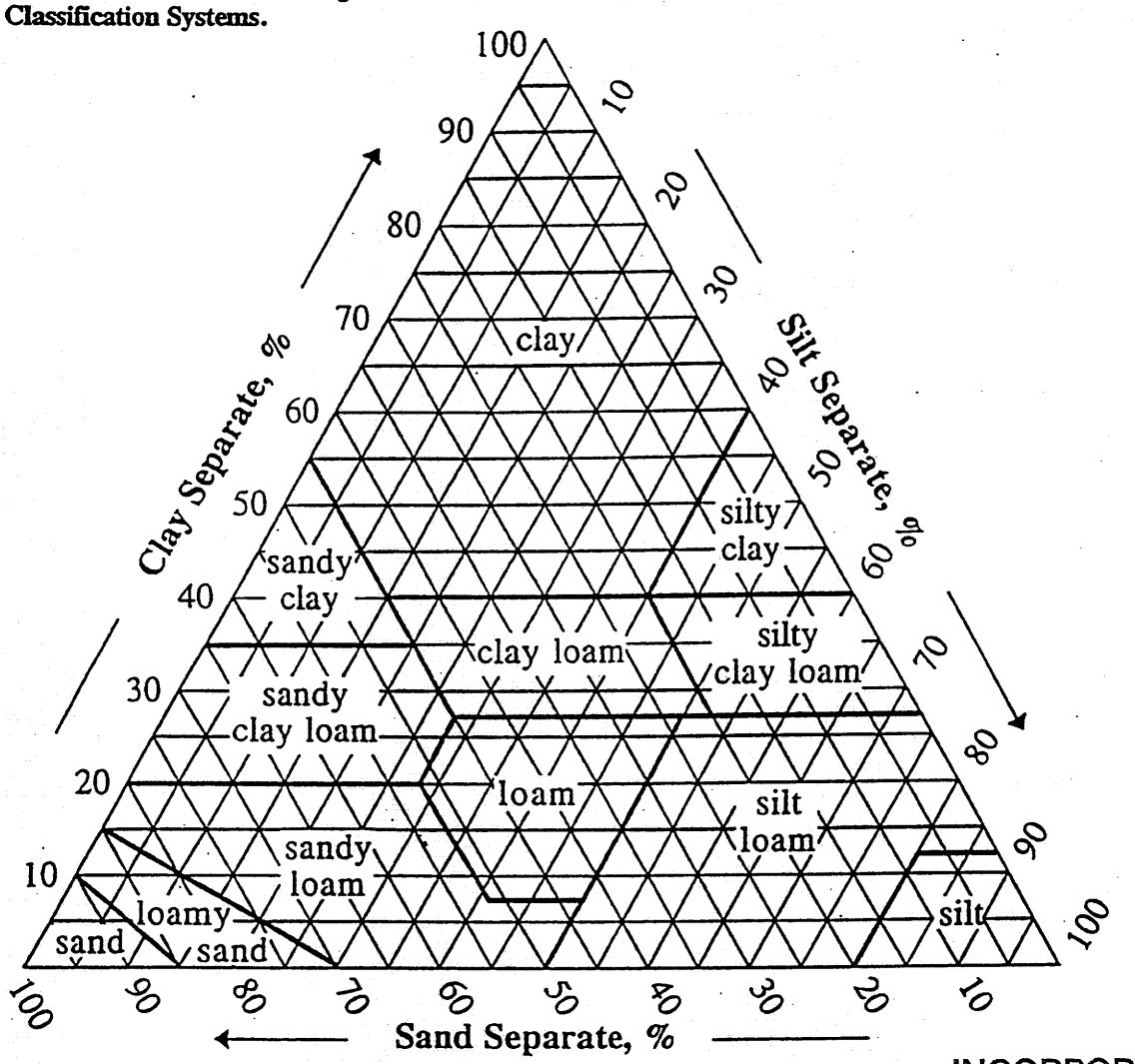
Distinctness

A	Abrupt (<2 cm thick)
C	Clear (2 to 5 cm thick)
G	Gradual (5 to 15 cm thick)
D	Diffuse (>15 cm thick)

Topography

S	Smooth (the boundary is a plane with few or no irregularities)
W	Wavy (the boundary has undulations in which depressions are wider than they are deep)
I	Irregular (the boundary has pockets that are deeper than they are wide)
B	Broken (at least one of the horizons or layers separated by the boundary is discontinuous and the boundary is interrupted).

Exhibit 618-8 Texture Triangle and Particle-Size Limits of AASHTO, USDA, and Unified Classification Systems.



COMPARISON OF PARTICLE SIZE SCALES

Sieve Opening in Inches: 3, 2, 1½, 1, ¾, ½, ¾, 4, 10, 20, 40, 60, 200 — U.S. Standard Sieve Numbers

USDA	GRAVEL	SAND					SILT	CLAY
		Very Coarse	Coarse	Medium	Fine	Very Fine		

UNIFIED	GRAVEL		SAND			SILT OR CLAY
	Coarse	Fine	Coarse	Medium	Fine	

AASHO	GRAVEL OR STONE			SAND		SILT - CLAY	
	Coarse	Medium	Fine	Coarse	Fine	Silt	Clay

100, 50, 10, 5, 2, 1, 0.5, 0.42, 0.25, 0.1, 0.074, 0.05, 0.02, 0.01, 0.005, 0.002, 0.001

Grain Size in Millileters

(430-VI-NSSH, Nov. 1993)