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

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OK

November 21, 2002

TO: Internal File

THRU: Wayne Western, Environmental Scientist III/Engineer and Team Lead W#W

FROM:  Priscilla Burton, Environmental Scientist III/Soils

RE: 4th East Portal Facility at the Emery Deep Mine, Consolidation Coal Company, Emery Deep Mine, C/015/015-AM02-1B

SUMMARY

The 4th East Portal entries are contemplated in the currently approved MRP, Section IV.A.2 and Plate IV-3. The proposed site of the 4th East Portal development is in Section 27, T. 22 S. R. 6 E. Salt Lake Meridian. The 4th East Portal entry was previously envisioned as a ramp down to the top of the I & J seams (70 feet below the surface) with three portal entries, a 73,000 cu yd excavated material pile, topsoil pile and an undisturbed diversion ditch.

With this submittal, the Permittee has modified plans for portal development and surface facilities layout to include an air shaft, a 1,500 ton surge pile, crusher, coal handling facilities, 10,000 ton processed coal stockpile, a 100 ton rock dust bin, water tank, storage yard, two retention ponds and a sediment pond. The proposed excavated material pile doubled in size, and is now projected to be 128,000 cu yds.

Originally, the plans were to strip topsoil from the entire 15 acre disturbance, but during discussions held at the Division on April 22, 2002, the Division recommended that topsoil be stored in-place beneath the inert, pile of excavated material, to limit environmental damage both to the immediate removal site and to a subsequent storage site for the topsoil. Topsoil was salvaged from ten acres. Approximately 12,000 cubic yards of topsoil has been stored in a topsoil pile and in berms at the site.

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TECHNICAL ANALYSIS:

GENERAL CONTENTS

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

The application indicates on page 15, Chapter III that there will be one proposed portal at the Emery Mine. This is a reference to the 4th East portal that is actually three entries. Page III-15 describes reclamation of the three portal entries at the 4th East Portal.

The disturbance at the 4th E. Portal on page IV-16 and in Table III-2 is correctly referred to in this revision of the submittal.

Findings:

The information provided meets the minimum requirements for Permit Application Format and Contents.

REPORTING OF TECHNICAL DATA

Regulatory Reference: 30 CFR 777.13; R645-301-130.

Analysis:

The qualifications and ARCPACS certification of the consulting soil scientist are disclosed in Appendix VII-3.

Findings:

The information provided meets the minimum requirements for Reporting of Technical Data.

ENVIRONMENTAL RESOURCE INFORMATION

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

CLIMATOLOGICAL RESOURCE INFORMATION

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

Analysis:

Climatological information is provided in Chapter X Part B of the MRP. Precipitation records have been kept at the Emery weather station since 1901. The MRP summarizes the data from 1901 to 1978 as follows:

- 7.55 inches of precipitation annually
- 2.97 inches during "winter," October through March
- 4.58 inches during "summer," April through September.
- 75% of the precipitation enters the soil
- 66% of the soil moisture is lost due to evapotranspiration.

The wettest months of the year are August and September.

The town of Emery (elevation 6,220 ft) stopped collecting weather data in 1978. The weather station was moved (between 1978 – 86) northwest to an elevation of 7,600 ft (personal communication between Mr. Tim Kirschbaum and Ms. Priscilla Burton on November 25, 2002). There it recorded a mean annual rainfall of 15.6. Another nearby weather collection station at Salina (elevation 7,560) has collected data from 1986 to the present, mean annual rainfall of 14 inches. The town of Ferron also has collected weather data for the period 7/1/48 to 12/31/01. The average annual precipitation during this time was 8.47 inches with the highest precipitation seen during the months of July through October. The average annual snowfall was 27 inches with an average snow depth of one inch. These statistics from the Western Regional Climatological Center (www.wrcc.dri.edu/cgi) suggest that the best time for seeding at this semi-desert site is in July through October, depending upon the seasonality of the species to be seeded.

The Permittee plans to install a weather station at the main Emery Mine facilities by January 2003 (Chap.X, page 5). This weather station will collect rainfall, snowfall and record wind speed and direction as well as barometric pressure and temperature.

Findings:

The information provided meets the minimum requirements for Reporting of Technical Data.

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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:

James P. Walsh & Associates, Inc. of Boulder Colorado conducted a soil survey of the 22.5 acre proposed 4th East Portal site in March 1981 by (MRP Section VII.A.1). The soils map is Plate VII-1. Soils mapped by the survey were the Castle Valley extremely stony very fine sandy loam, Persayo-Chipeta Complex, Killpack silty clay loam, Ferron silt loam and Rock Land.

The submittal refers to Appendix VII-3, received May 17, 2002 in response to Division Order dated May 4, 2002. Appendix VII-3 is a May 2002 report prepared by Mt. Nebo Scientific, Inc, entitled, "Soil Resources Report at the 4th East Portal Area." This report summarizes the information in the plan for the 4th East portal and suggests that the rock land and Persayo-Chipeta complex dominate acreage proposed for disturbance. The report states that within the 22 acre disturbed area, 15 acres are proposed for disturbance, and approximately 13,000 cubic yards of topsoil could be salvaged.

The report was followed by a site visit on May 31, 2002 by a Jim Nyenhuis (ARCPACS certification #2753), a certified soil scientist. Mr. Nyenhuis contacted the Division following the site visit with the following information, 38 backhoe pits were dug on the proposed 15 acres of disturbance. As a result, the area mapped as rock outcrop (RY) was reduced and the area covered by Castle Valley soils was enlarged and two inclusions were outlined: Montwel and Begay soils. Castle Valley series has been renamed Hideout by the Natural Resources Conservation Service (NRCS). Contrary to the suggestion in the 1981 soil survey, there was no evidence of excessive sodium. Mr. Nyenhuis made the recommendation that all soil could be salvaged down to the sandstone in sequence from the northwest to the southeast of the proposed disturbed area.

The following soil series were mapped by Mr. Nyenhuis:

Hideout Soil Series = Loamy, mixed, superactive, calcareous, mesic Lithic Ustic Torriorthents;
Montwel Soil Series = Fine-loamy, mixed, superactive, calcareous, mesic Typic Torriorthents;
Begay Soil Series = Coarse-loamy, mixed, superactive, mesic Ustic Haplocambids;
Persayo Soil Series = Loamy, mixed, calcareous, mesic, shallow Typic Torriorthents;
Chipeta Soil Series = Clayey, mixed, active, calcareous, mesic, shallow Typic Torriorthents.

A summary of Mr. Nyenhuis' May 31, 2002 site visit, field notes, discussion, conclusions and revised soils map have been included in Appendix III of Appendix VII-3 of the submittal.

Findings:

The information provided meets the minimum requirements for Environmental Resource Soils.

ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR 785.19; 30 CFR 822; R645-302-320.

Analysis:

Alluvial valley floor determination

Alluvial Valley Floor information is discussed in Chapter XI of the MRP and illustrated on Plate 2 Alluvial Deposits and Soils Map of Appendix XI-1 and on Plate XI Potential Alluvial Valley Floor Along Upper Quitcupah Creek.

The following quote comes from the February 25, 1985 TA for the Emery Deep Mine:

In determining the potential for Alluvial Valley floors (AVF's) on and adjacent to Consolidation Coal Company's Emery Deep Mine, the regulatory authority evaluated areas along Quitcupah Creek and Christiansen Wash in sections 19 – 22, 28 – 30, 32 and 33 of T22S, R6E Salt Lake Meridian.

Section 510(b)(5) of the Surface Mining Control and Reclamation Act (SMCRA) provides specific protection for AVF's. A proviso in Section 510(b)(5) of SMCRA exempts from the requirements of Section 510(b)(5) those surface coal mining operations which in a year preceeding the enactment of the Act (August 3, 1977) produced coal in commercial quantities and were located within or adjacent to AVF's or had specific permit approval from the State regulatory authority to conduct surface coal mining operations on AVF's.

Consol meets the requirements provided in this proviso for land sections 28, 29, 32, and 33 since a state permit was in affect and they were mining commercial quantities of coal prior to August 3, 1976.

Consol will be required to provide mitigating measures to areas within the exempted area where subsidence from mining operation occurs.....

The regulatory authority determined that AVF's do not exist along Christiansen Wash. Information provided by the applicant points out that the flow in Christiansen Wash is produced mainly by flood irrigation return from fields that are initially supplied by Muddy Creek, a stream in an adjacent drainage basin.....

The regulatory authority has determined that AVF's exist in sections 19 and 30 of the 5

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year permit area which must be protected according to the established regulations governing AVF's. The applicant has committed to protecting that area known as Jack Lewis field shown as area III in Figure 1 (March 2, 1984 submittal) and has supplied the necessary information for its protection as an AVF. The regulatory authority has determined that the hatched area outlined in the accompanying map must be protected as AVF. Historically irrigation water has been diverted from Quitchupah Creek and there exists the potential that area II as well as other areas outlined in the accompanying map could be flood irrigated and subirrigated with waters from Quitchupah Creek. Since no mining will occur in Area II, no adverse impacts should effect the delineated alluvial valley floor.

Area III and area II referred to in the above quotation, are outlined on Plate XI-1 of the MRP. Area I is actively flood irrigated and lies in the "grandfathered" zone, above existing workings in Section 29. Area II falls in Section 30. Area III is active flood irrigated Quitchupah Creek water in sections 19 and 30.

The 4th East Portals lie in the NE1/4 of Section 27, T. 22 S. R. 6 E. Salt Lake Meridian, on land that drains to Christiansen Wash.

Findings:

The Division determined in 1985 that an AVF exists in Sections 19 and 30 T. 22 S. R. 6 E. Salt Lake Meridian. There is not an AVF in the NE1/4 of Section 27, T. 22 S. R. 6 E. Salt Lake Meridian, where the 4th East Portals will be developed.

PRIME FARMLAND

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

Analysis:

Plate 7-8 included with the 1988 Annual Report indicates areas of flood irrigated and specially managed agricultural land in Sections 8 - 11, 13 - 17, 19 - 23, and 28 - 32 of T. 22 S. R. 6 E. Salt Lake Meridian. Diversion structures shown on this map are on the western boundary of the permit area. Plate XI-1 indicates three areas of active flood irrigation within the southwest portion of the permit area. Plate VIII-1 confirms the prevalence of pastureland and hayland within the permit area.

The 1985 TA for the Emery Mine states:

The areas of prime farmland within the Detailed Mapping Area are shown on Plate 8-3.... The potential exists that prime farmland may be impacted by subsidence in the future (see subsidence section in this TA). Prime farmland that may be impacted is located in T. 22 S., R. 6 E.; Secs 20, 22, 29, 30 and 31. These areas were identified by matching areas of prime farmland to areas of present or future underground mining.

Plate IV-1 shows the mine progression underneath the irrigated pasture lands. The Permittee commits to notifying landowners six months prior to mining beneath their property (Chap V page 39). The notification will include information on measures to prevent, minimize or control subsidence. Mitigation is discussed in Chapter V page 41.

Appendix VII-3 (submitted May 17, 2002 in response to Division Order 02A), indicates that there are no prime farmlands or important farmlands at the site of the 4th East Portal Area development, Section 27, T. 22 S. R. 6 E. Salt Lake Meridian.

Findings:

The Division finds that there are prime farmlands within the permit area, but not within the area of 4th East Portal development, NE1/4 of Section 27, T. 22 S. R. 6 E. Salt Lake Meridian.

OPERATION PLAN

AIR POLLUTION CONTROL PLAN

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

Analysis:

The facility will include a 2,600 ton surge stockpile, a screening/crusher building, and a 10,000 ton processed coal stockpile along with associated conveyors. The facility will handle a capacity of approximately 2,000,000 tons of coal per year (page 17b, Chapter II).

Appendix X.C-2 contains the Air Quality Approval Order (AO) from the Division of Air Quality dated August 5, 2002. The AO itemizes the equipment located at the new portal site.

The AO indicates the following:

- The production limit of 1,300,000 tons/yr should not be exceeded
- The ROM surge pile may contain 1500 tons maximum.
- The maximum time period of operation for the 425 hp diesel generator should be 300 hours of operation /12 mo period (using #2 diesel fuel oil).
- Visible emissions from conveyor transfer points should not exceed 10% opacity and emissions from all other sources should not exceed 20% opacity. Observations of opacity are to be made in accordance with 40 CFR 60.11 (b) and 40 CFR 60, Appendix A, Method 9.

Item 9 of the General Conditions listed in the AO requires that Consolidation Coal Company "notify the Executive Secretary in writing when the installation of the equipment listed

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under the new portal site has been completed and the equipment is operation, as an initial compliance inspection is required.”

The excavated material pile will cover 4.10 acres (see page VI.B.3-188a). The excavated material is angular sandstone. The pile will have many voids to collect loose grains. A berm has been created on the top of the pile and large rocks will be scattered across the surface of the pile to break the wind and prevent wind erosion of the pile.

Findings:

The information meets the minimum requirements for Air Pollution Control Plan.

TOPSOIL AND SUBSOIL

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

Analysis:

Removal and Storage

Topsoil will be protected in-place beneath the topsoil storage pile and the excavated material storage pile (5.35 acres total, according to page VI.B.3-188a). As described in the submittal on page IV-7, the topsoil handling deviated from the norm in the location of the excavated material pile and the topsoil stockpile. The Division invoked R645-301-232.710 and allowed this practice based on the following information:

1. The Excavated material storage pile lies above rock land, Montwel and Castle Valley soils (now correlated to the Hideout Series). These are shallow soils over sandstone bedrock. Average depth to bedrock is twelve inches (page 9 Appendix VII-3). A typical profile of the Hideout Series is described by the NRCS (page C-5, App VII-3) as “A -- 0 – 2 inches; C--2 to 20 inches; R -- 10 inches.”
2. The soils will be covered with excavated overburden only, no refuse from roof and floor will be deposited with the excavated material;
3. Minimal rainfall will limit any leaching of minerals from excavated material to native surface soils.
4. Cryptogams considered critical to the reclamation of the site would be buried with the in-place soils. Crushing the cryptogams in place seems preferable to removing them entirely from the site, especially since lichen spores would stay in place ready to germinate upon re-exposure to light and moisture (Biological Soil Crusts: Ecology and Management. U.S.D.I. BLM Tech Ref 1730-2. 2001. Sec 4.3.4).

The undisturbed topsoil remains underneath the excavated material stockpile and the topsoil stockpile (pp IV-7 and III-15a). The native ground was left intact and demarcated with

four inch wide yellow plastic flagging which was laid down on a ten foot by ten foot grid (page IV-7).

The Permittee will ensure that excavated material placed on the topsoil does not fall into the category of underground development waste as defined by R645-100 (page IV-8). Storage of topsoil beneath the excavated material pile does not relieve the Permittee from the requirements to protect the topsoil from contaminants. To this end, the submittal describes analysis of the in-place topsoil, prior its use during reclamation (page III-20).

Soil was removed from nine acres (page III-21) and stored as shown on as shown on Plate III-1. The storage pile lies on Persayo/Chipeta complex soils. The topsoil stockpile contains 10,600 cubic yards (page III-21). The topsoil stockpile covers one acre (page VI.B.3-188a).

As noted in Chapter II page 17a, approximately 1,400 cu yds of topsoil was also stored in berms on the east and west perimeter of the site.

Soil was not removed from one acre of stream channel or the rock outcrop shown in the map created during Mr. Nyenhuis' May 31, 2002 site visit (see Appendix III of Appendix VII-3).

Protection of the stored topsoil is described on page IV-7. The submittal indicates that the topsoil pile was seeded on July 10, 2002 with the (cold season) interim mix #2 outlined in VIII C. 3 of the MRP, containing Russian Wild Rye, HighCrest Crested Wheatgrass, and Fourwing Saltbush. A warm season seed mix was seeded on the berms surrounding the pile. This berm mix consisted of the species listed in the interim mix #1 (outlined in VIII C. 3 of the MRP) and Castle Valley Clover (*Atriplex cuneata*) and Indian Ricegrass (*Oryzopsis hymenoides*) was used. A portion of the topsoil pile berm was irrigated where accessible on the southern side of the topsoil pile.

An as-built drawing of the topsoil stockpile is expected upon completion of construction at the site.

Findings:

The information provided meets the minimum requirements for Operations Topsoil Subsoil.

SPOIL AND WASTE MATERIALS

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Analysis:

Refuse piles

The proposal indicates on Chapter III page 12a that acid-toxic forming material (or refuse) will be disposed of in one of three locations:

1. the permanent underground development waste site; or
2. the abandoned underground mine workings; or
3. the coarse refuse disposal area.

A "proposed coarse refuse disposal area" is in the currently approved MRP and shown on Plate II-2. This coarse refuse disposal area is not located at the 4th East Portal breakout, but is located on the hilltop adjacent to the northwest coal stockpile at the main mine facility. However, Chap III page 9 indicates that this coarse refuse disposal area will not be constructed until the Preparation Plant becomes a reality.

The Permittee has estimated on page IV-8 that 93,500 cu yds of rock will be excavated and stored in the excavated material pile at the 4th East Portal site. The Permittee anticipates 4,300 cu yds of coal to be extracted during development. The Permittee does not anticipate any refuse to be generated at the 4th East portal due too the mine plan dictating that coal will be left in-place in the roof and floor. Any refuse encountered will be hauled to the approved refuse disposal site at the main Emery mine facility. The submittal specifically indicates (page IV 8) that no coal or refuse will be placed in the excavated material pile.

Excess spoil

During operations, there will be an excavated material storage pile that will hold approximately 128,000 cubic yards of material (pp II-17a, and IV-8) and cover 4.1 acres (Chap VI.B.3). This material will come from:

- The development of the airshaft in the southwest corner of the site will generate 520 cu yds of rock (70 ft deep X 16 ft diameter, pp IV-8 and II-17c).
- Excavation of the ramp down to the portal cuts and across the face of the three portals each 8 x 14 on 45 foot centers (93,500 cu yds).
- The temporary diversion construction.
- Construction of the surge stockpile and coal handling facility (cross section B-B' Plate IV-3).
- The sediment pond (IV-8).

The submittal specifically indicates (page IV 8) that no coal or refuse will be placed in the excavated material pile. The Division is emphatic about this requirement due to the fact that

1. There is a permitted disposal site for refuse within the permit area and

2. Topsoil being stored beneath the excavated material must be protected from contaminants.

Reclamation of the 4th East portal will require grading of 132,149 loose cubic yards of spoil in to the box cut and over the surface to achieve approximate original contour. There will be no excess spoil.

Findings:

The information provided meets the minimum required for Operations Spoil and Waste Materials.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Acid and toxic-forming materials

Drill Hole FC 702 provides an analysis above and below the I & J coal seams in the 4th East Portal location (page IV-2 through IV-6). This core indicates that the highest Electrical Conductivity and Sodium Adsorption Ratios are in the top ten feet of this material. Selenium and Boron are not a problem in the depths to be excavated. A layer of black sooty coal is encountered at approximately 34 feet. The band is about 6 inches thick and is low in pH (5.2) and has elevated copper (4.0 ppm) and iron content (821 ppm). The submittal specifically indicates (page IV 8) that no coal or refuse will be placed in the excavated material pile.

Findings:

The information provided meets the minimum required for Operations Hydrologic Information Acid and Toxic Forming Material.

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526,

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-301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

The demonstration test plot was constructed in 1984 and reworked in 1987 in an effort to determine successful revegetation techniques for use on subsoils derived from the Mancos Shale. The chemical characteristics of the soils in this plot are described with the Vegetation Data in the 1991 Annual Report. They are extremely sodic, with average values in the top six inches of 9.3 pH and 19.8 SAR. The variables tested in the plots were:

- topsoil and no topsoil treatments;
- irrigation and no irrigation treatments;
- mulch and no mulch treatments;
- furrows and no furrows; and
- mature versus containerized transplants.

The demonstration test plots were evaluated in 1989 and 1990 by Richard Denning and David Larson of Consolidation Coal Company. The results of the evaluation are included in the Annual Reports for 1988 and 1989. Mortality of transplants and containerized plants was high. At the end of the monitoring period, the 33% of the mature transplants survived and 10% of the containerized transplants were living. The most successful plots were those that received mulch and contained shallow depressions. Thus, the test plots emphasize that the most important variable is the availability of water. Water not only irrigates the plants, but also leaches the salts from the soil.

The Permittee has committed to evaluating the reclamation practices used at the mine site thus far and to revise the MRP with the best practices available (Chap III, page 4a).

Findings:

The information provided adequately meets the General Requirements of the Regulations for the purposes of this amendment.

BACKFILLING AND GRADING

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

Analysis:

General

The 4th East Portal will be graded to approximate original contour, with a slight

mounding (2.5 - 3.0feet) over the area of the box cut (page III-15a), due to a 20% swell factor. All coal waste will be placed in the bottom of the box cut (WorkSheet 1 in Chap IV). Material from the excavated material pile will be placed in three foot lifts into the box cut and compacted by the passage of heavy equipment. The WorkSheet indicates that the last three lifts will not be compacted. Large boulders (3 ft diameter or larger) will be separated and used for the construction of the stream channel and habitat enhancement.

Topsoil stored in the topsoil pile and in the berms around the topsoil pile as well as the berms on the east and west perimeter of the disturbed area will be applied to nine acres where topsoil was removed (Chap IV Worksheet 1 Earthmoving Activity). The separation of topsoil in berms from the general fill is also itemized in the Bonding Table in Chapter IV WorkSheet 1). The WorkSheet indicates segregation of the surface two inches of the surface of the topsoil pile for topdressing on the re-spread topsoil. The nine acres receiving topsoil will be surface roughened with a 416 backhoe. The five acres of land re-exposed after removal of the material excavation pile will be ripped to twelve inches with a spacing of two feet using a Cat D6 with 3 shank ripper.

Findings:

The information provided meets the minimum required for Reclamation Backfilling and Grading.

TOPSOIL AND SUBSOIL

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

Analysis:

Redistribution

Chapter III, page 20 discusses the topsoil application to the re-graded surface as follows:

- the graded land will be surface roughened prior to respreading topsoil either by ripping or gouging or both.
- Topsoil will be redistributed with front end loaders and dump trucks.
- Topsoil will be graded to the approximate depth using dozers and backhoes.
- Stakes will be used to determine the final topsoil grade.
- Topsoil will be analyzed according to Table 1 of the Division Guidelines (1988) prior to seeding.
- If cryptogams are harvested, they will be re-applied after seeding to selected locations (such as depressions).
- The site will be seeded with a warm season mixture described in Chapter VIII.C.4.

The in-place topsoil, stored beneath the excavated material will be sampled and analyzed during final reclamation for the chemical parameters listed in Table 6 of the Division's 1988

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Topsoil and Overburden Guidelines (Chap III, page 20). The topsoil stored in the topsoil pile and in berms will be analyzed for Nitrogen, Phosphorus, Potassium and texture.

The Permittee calculates that 12,000 cu yds replaced over 9 acres of disturbed area will provide nearly ten (9.9) inches of replaced topsoil (Chapter III page 21 and Chap IV Worksheet 1).

The submittal indicates that the soils will be handled on when they are in a loose or friable condition or when the moisture content is an optimal 10 – 15% (Chap III, page 20).

Findings:

The information provided meets the minimum required for Reclamation Topsoil and Subsoil

CONTEMPORANEOUS RECLAMATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.100; R645-301-352, -301-553, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

General

The Borehole site and the Flume site were reclaimed in 1984. Mulching appears to have been one of the treatments. The last evaluation of the site is in the 1991 Annual report. The most frequently encountered species at the Flume site were *Atriplex canescens* (Four Wing Saltbush) and *Salsola kali* (Russian Thistle).

According to the 1988 Annual Report, mat saltbush was transplanted to the Borehole site in 1987. The most recent monitoring of the Borehole site (1990) indicates that of the three of the twenty mat saltbush transplants survived. Species most frequently encountered at the Borehole site were *Bouteloua gracilis* (Blue Grama); *Atriplex sp.*; and *Halogeton glomeratus*.

The 1990 Annual report indicates that the Borehole Pump #3 and Sedimentation Pond #6 were built in the spring of 1989 and were seeded after construction without mulching. The initial seeding was unsuccessful. The areas were reseeded in October of 1991. As described in the 1991 Annual report, the following steps were taken in reseeding the topsoil piles and pipeline right of way:

- creation of depressions 4 – 5 feet square and six inches deep;
- discing the soil;
- seeding and mulching the soil by hand;
- then re-discing to crimp the 2 Tons/ac native hay mulch.

The reseeded topsoil piles were evaluated in November 1993 by Paul Baker, Reclamation Biologist for the Division:

Best growth on all three piles is on the top where it is relatively flat. There is also a limited amount of growth in the gouges that were made on the sides of the slopes. Even though some plants appear to have become established, plant density is still low...Disturbance of the piles has led to growth of more halogeton and kochia than was present in 1991. The native grasses have not grown sufficiently that they can be identified...Shrubs that I found are winterfat, shadscale, and fourwing saltbush. Winterfat was by far the most prevalent of the shrubs. I did not see any seeded forbs...

Findings:

The information provided in the application does not advance the Permittee's understanding of reclamation procedures for the Emery Mine and is therefore inadequate. A deficiency concerning reclamation has been written by another reviewer under Reclamation Plan, Revegetation, R645-301-340.

STABILIZATION OF SURFACE AREAS

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

Analysis:

Chapter II page 23 describes the use of gouging to provide protection from wind erosion. This page also describes the plan to separately harvest cryptogams and re-apply them to the surface of topsoil stockpiles in an effort to provide a source of spores and mycelium during reclamation.

The Permittee indicates in the submittal that large rocks will be strewn across the reclaimed surface for wildlife habitat. These rocks will also serve as windbreaks. The Permittee has indicated in Chapter III, page 4a that an evaluation of the best revegetation methods will ensue and improvements would be made on the methods outlined in the MRP as a result. These improvements will be reviewed for their erosion control potential by the Division.

Findings:

The information provided is adequate for the purposes of Reclamation Stabilization of Surface Areas.

RECOMMENDATIONS:

Approval is recommended.