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

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March 28, 1997

Rick Olsen, General Manager
Canyon Fuel Company, LLC
Soldier Canyon Mine
P. O. Box 1029
Wellington, Utah 84542

Re: Deficiencies in Revised Soldier Canyon Mine Plan, Canyon Fuel Company, LLC, Soldier Canyon Mine, ACT/007/018-96A, Folder #3, Carbon County, Utah

Dear Mr. Olsen:

On October 3, 1996, the Division received your application for renewal of the Soldier Canyon Mine permit. The renewal application contained a number of permit changes which had not previously been reviewed or approved; the most significant of which involved the permitting of a waste rock disposal site. In a letter dated October 18, 1996, the Division informed Soldier Creek Coal Company that the proposed changes would not be reviewed as part of the renewal but instead would be reviewed as permit change 96A. We have now completed said review and have enclosed a copy for your information and files.

The review has identified a number of deficiencies which will need to be addressed before approval can be given. Please review the attached document carefully and address the deficiencies as thoroughly as possible. Failure to address these issues within 60 days may result in the permit changes being denied.

It has also been determined that the addition of the waste rock site involves accessing new acreage from a public road and will require public notice in accordance with R645-300-121. Please provide a proposed notice as soon as possible.

If you have any questions, please call me or my technical staff.

Sincerely,

Daron R. Haddock

Daron R. Haddock
Permit Supervisor

enclosure
cc: Keith Zobell (Canyon Fuel)
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# State of Utah
# Division of Oil, Gas and Mining
# Utah Coal Regulatory Program

Canyon Fuel Company, LLC
ACT/007/018
Technical Analysis
March 27, 1997

## TABLE OF CONTENTS

Introduction . . . . . vi

Summary of Deficiencies . . . . . vii

# TECHNICAL ANALYSIS . . . . . 1

## ENVIRONMENTAL RESOURCE INFORMATION

General . . . . . 1

Permit Area . . . . . 2

Historic and Archeological Resource Information . . . . . 2

Climatological Resource Information . . . . . 3

Vegetation Resource Information . . . . . 3

Fish and Wildlife Resource Information
- Wildlife Information . . . . . 5
- Threatened or Endangered Species . . . . . 5

Land-Use Resource Information . . . . . 6

Alluvial Valley Floors . . . . . 6

Soils Resource Information
- Prime Farmland Investigation . . . . . 7
- Soil Survey . . . . . 8
- Soil Characterization . . . . . 9
- Substitute Topsoil . . . . . 9
- Mine Development Waste . . . . . 10

Geological Resource Information . . . . . 11

Hydrolic Resource Information
- Sampling and Analysis (ERI) . . . . . 12
- Baseline Information (ERI) . . . . . 12
- Water Rights and Use (ERI) . . . . . 13
- Ground Water Information (ERI) . . . . . 13
- Surface Water Information (ERI) . . . . . 14

Baseline Cumulative Impact Area Information (ERI) . . . . . 15
Modeling (ERI) . . . . . 15
Alternative Water Source Information (ERI) . . . . . 15
Probable Hydrolic Consequences Determination (ERI) . . . . . 15

Maps, Plans, and Cross Sections of Resource Information
Affected Area Boundary Maps . . . . . 17
Coal Resource and Geological Information Maps . . . . . 18
Existing Structures and Facilities Maps . . . . . 18
Existing Surface Configuration Maps . . . . . 18
Mine Working Maps . . . . . 19
Monitoring Sampling Location Maps . . . . . 19
Permit Area Boundary Maps . . . . . 19
Surface and Subsurface Ownership Maps . . . . . 20
Subsurface Water Resource Maps . . . . . 20
Well Maps . . . . . 20
Contour Maps . . . . . 20

**OPERATION PLAN**

Mining Operations and Facilities
General . . . . . 21
Type and Method of Mining Operations . . . . . 21
Facilities and Structures . . . . . 21

Existing Structures . . . . . 23

Relocation or Use of Public Roads . . . . . 23

Air Pollution Control Plan . . . . . 24

Coal Recovery . . . . . 24

Subsidence Control Plan
Renewable Resources Survey . . . . . 24
Subsidence Control Plan . . . . . 24
Performance Standards for Subsidence Control . . . . . 25

Slides and Other Damage . . . . . 25

Fish and Wildlife Information . . . . . 25

Topsoil and Subsoil
Soil Salvage-Waste Rock Disposal Area . . . . . 26
Topsoil Storage Area . . . . . 28

Vegetation . . . . . 29

Road Systems and Other Transportation Facilities
Road Classification . . . . . 29
Plans and Drawings . . . . . 29
Other Transportation Facilities . . . . . 30

Spoil and Waste Materials
Disposal of Non-Coal Waste . . . . . 30
Coal Mine Waste . . . . . 30
Refuse Piles . . . . . 31

Hydrolic Information
Groundwater Monitoring . . . . . 32
Surface Water Monitoring . . . . . 32
Acid and Toxic-Forming Materials . . . . . 33
Transfer of Wells . . . . . 33
Discharges Into an Underground Mine . . . . . 33
Gravity Discharges . . . . . 33
Water Quality Standards and Effluent Limitations . . . . . 34
Diversions . . . . . 34
Stream Buffer Zones . . . . . 35
Sediment Control Measures . . . . . 35
Siltation Structures . . . . . 35
Sedimentation Ponds . . . . . 36
Other Treatment Facilities . . . . . 38
Exemptions for Siltation Structures . . . . . 38
Discharge for Structures . . . . . 38
Impoundments . . . . . 38
Casing and Sealing of Wells . . . . . 38

Support Facilities and Utility Installations . . . . . 40

Signs and Markers . . . . . 40

Use of Explosives . . . . . 40

Maps, Plans, and Cross Sections of Mining Operations
Affected Area Maps . . . . . 41
Mining Facilities Maps . . . . . 41
Mine Workings Maps . . . . . 41
Monitoring and Sample Location Maps . . . . . 41
Surface Water Resources Maps . . . . . 41

## RECLAMATION PLAN


Postmining Land Uses . . . . . 42

Approximate Original Contour Restoration . . . . . 42

Backfilling and Grading . . . . . 43

Mine Openings . . . . . 45

Topsoil and Subsoil
- Waste Rock Disposal Site . . . . . 45
- Soldier Canyon Mine . . . . . 46

Road Systems and Other Transportation Facilities . . . . . 48

Hydrologic Information
- Ground-Water Monitoring . . . . . 48
- Surface-Water Monitoring . . . . . 48
- Acid and Toxic-Forming Materials . . . . . 49
- Transfer of Wells . . . . . 49
- Discharges Into an Underground Mine . . . . . 49
- Gravity Discharges . . . . . 49
- Water Quality Standards and Effluent Limitations . . . . . 49
- Diversions . . . . . 49
- Stream Buffer Zones . . . . . 50
- Sediment Control Measures . . . . . 50
- Siltation Structures . . . . . 51
- Sedimentation Ponds . . . . . 51
- Other Treatment Facilities . . . . . 51
- Exemptions for Siltation Structures . . . . . 51
- Discharge Structures . . . . . 51
- Impoundments . . . . . 51
- Casing and Sealing of Wells . . . . . 52

Revegetion
- Revegetion Plan . . . . . 52
- Revegetation Success Standards . . . . . 54
- Wildlife Habitat . . . . . 55

Cessation of Operations . . . . . 56

Maps, Plans, and Cross Sections of Reclamation Operations . . . . . 57
- Reclamation Backfilling and Grading Maps . . . . . 57

Bonding and Insurance Requirements . . . . . 57
Determination of Bond Amount . . . . . 57

# INTRODUCTION

This Technical Analysis (TA) is written as part of the permit review process. It documents the Finding that the Division has made to date regarding the application for a permit and is the basis for permitting decisions with regard to the application. The TA is broken down into logical section headings which comprise the necessary components of an application. Each section is analyzed and specific findings are then provided which indicate whether or not the application is in compliance with the requirements.

It may be that not every topic or regulatory requirement is discussed in this version of the TA. Generally only those sections are analyzed that pertain to a particular permitting action. TA's may have been completed previously and the revised information has not altered the original findings. Those sections that are not discussed in this document are generally considered to be in compliance.

## SUMMARY OF DEFICIENCIES

As determined in the findings of the Technical Analysis, approval of the plan is dependant upon resolution of the following deficiencies. Thus, the permittee must address the deficiencies as specified, and in accordance with the requirements of:

**R645-301.** Provide a clear and accurate map which delineates the disturbed area boundaries and permit area boundaries. Clearly delineate the full extent of the watersheds identified and clearly present the label associated the watershed. If additional drainage areas are being transported to existing drainage designs the permittee should demonstrate that the designs pass the required flow event. Provide an accurate north arrow on the map. Provide contours or slope measurements for the waste rock site.

**R645-301-120.** Soil salvage and reclamation summary information needs to be updated, corrected and clarified for all topsoil and substitute topsoil yardage volumes, acreage, and needed reclamation volumes as contained in Section 2.32 and Appendix 5E. Projected volumes and area descriptions seem to conflict and/or don't agree. Check information for accuracy, consistency and clarity. Appendix 5E needs to be updated for the waste rock disposal area.

**R645-301-120.** They stated that the topographic configuration is presented on Plate 5-3 (in the text page 5-70) but, this map could not be found in the plan.

**R645-301-121.100:** The conclusion that the underground development waste is neither acid nor toxic forming is based on the assumption that the waste material analyzed in 1989 is the same as waste material to be mined in 1997 or later. This assumption is wrong since it is based on obsolete data.

**R645-301-221 and R645-302-310:** Leland Sassar of the NRCS on February 26, 1997, gave verbal acknowledgment to the Division for a positive Prime Farmland determination of the Hernandez soil immediately south of the irrigation ditch. In response to the verbal acknowledgment, the Division has requested the NRCS to make a new Prime Farmland reconnaissance investigation for the area (Sections 24 and 36, T13S, R11E). Consequently, the NRCS will make a formal Prime Farmland investigation of the area with written verification or refutation to the Division. If Prime Farmland exists within the permit area next to the waste rock disposal area, then SC3 must provide all applicable information and adhere to all applicable regulations as outlined in R645-302-310.

**R645-301-223 and R645-302-314.100:** Although field soil descriptions are in Appendix 2-B for the waste rock area soil survey, the descriptions are lacking specificity and do not adhere to the standards of the National Cooperative Soil Survey (R645-302-314.100). In addition, soil pit density is lacking to adequately assess the Hernandez and Gerst-Badland Complex soils for an Order I soil survey.

**R645-301-233.100.** The needed soils and fills for the four feet of cover on the final face of the refuse pile should be salvaged from the waste rock disposal area, not obtained from the 20,602

yd3 of excess cut material. The excess cut material could then be used to supplement the 10,994 yd3 of topsoil and substitute topsoil for reclaiming pre- and post-SMCRA areas. This extra supplement would enhance reclamation efforts by providing a much deeper soil cover than the projected five and 12 inches slated for the pre- and post-SMCRA areas, respectively.

**R645-301-232.** (1) Soil salvage information needs to be presented and correlated with reclamation efforts for obtaining the needed four feet minimum cover of soils and fills for the entire surface and future face of the waste rock pile. Based on the four feet minimum cover, soil salvage depth and projected salvage volumes need to be provided for the waste rock disposal area. (2) A professional soil scientist needs to be available during salvage operations for insuring optimum soil salvage, proper excavation and separation of adequate quantities of topsoil and subsoil. Soil salvage should be based on soil survey results, recoverable soil depth and needed soil reclamation volumes, not on a stated value of 18 inches. (3) In non-prime farmland areas, the Division currently does not consider high percentages of coarse rock fragments as a limiting factor in mine reclamation soils. A certain amount of coarse fragments can be tolerated depending upon the size of fragment and on the intended use of the reclaimed area. (4) Only vegetation cover that would interfere with soil salvage should be removed. All other vegetation should be salvaged with the soil; live haul of soil materials will heighten reclamation and revegetation success. The applicant should save all removed vegetation material to be placed and/or incorporated in the surface of the topsoil pile

**R645-301-242.200.** Scarification and/or ripping of the compacted fill material should take place before the topsoil is applied. Scarification helps relieve the effects of excessive compaction, reduces potential slippage of the fills, promotes water infiltration and encourages root penetration. After the topsoil is applied, additional surface roughening of the soil surface by deep gouging and rock placement will provide micro-environments that encourage seed germination and promote water harvesting.

**R645-301-243.** Based on the given soil test results presented in Table 2.42-1, the Division has determined that fertilizer recommendations are in error. The nitrate-nitrogen levels range from 101 to 510 ppm and are completely within desirable levels for successful revegetation; therefore, no nitrogen is needed. Phosphorus levels range from 0.22 to 2.74 ppm. These phosphorus levels are low; therefore, 50 to 70 pounds per acre of $P_2O_5$ are needed. Potassium concentrations range from 4.5 to 62 ppm. These potassium levels are extremely low and are not within acceptable limits. Potassium fertilization rates should range between 140 to 220 pounds of $K_2O$ per acre. These fertilization rates are based on dryland farming conditions for wheat.

**R645-301-321.** The application contains some productivity information that apparently applies to the proposed reference areas and disturbed areas; however, the plan needs to clarify to which areas this productivity information applies.

**R645-301-333.** The applicant needs to mitigate for the loss of critical deer winter range that would be disturbed by the proposed waste rock disposal area.

**R645-301-341.210.** The seed mix for the proposed waste rock disposal area needs to

be modified. Juniper needs to be taken out of the mix. The Division recommends adding certain other species and establishment methods. The species include, fourwing saltbush, black sage, big sage, scarlet globe mallow and galleta.

**R645-301-341.220.** On gentle slopes, the applicant has proposed to broadcast seed shrubs and drill seed all other species. Some of the shrubs need to be drill seeded if they are to become established, and some of the forbs should be broadcast seeded.

**R645-301-341.230.** Where hydromulch is used, the applicant has proposed to apply two tons per acre. This rate is excessive and should be reduced to about one ton per acre.

**R645-301-341.250.** The proposed pinyon-juniper reference area is not an acceptable revegetation success standard. The applicant needs to propose another success standard, such as the sage-grass-juniper reference area.

**R645-301-341.250.** The application needs to include the woody plant density success standard of 3000 per acre established by the Division and Wildlife Resources.

**R645-301-341.300.** The current mining and reclamation plan contains information about the methods that were used to establish the test plots near the main mine site and at the sewage lagoons. The applicant has proposed to delete this information from the plan, but it needs to be retained.

**R645-301-527 and R645-301-534,** must provide the Division with detailed design specification of the roads associated at the waste rock disposal site.

**R645-301-527.122,** the Permittee must classify all roads in the waste rock site as primary.

**R645-301-528,** the Permittee must provide the Division with an adequate description of how the waste rock site will be constructed. That description must include the types of compaction equipment and compaction standards.

**R645-301-528,** The current narrative does not describe the procedure for storing and transporting material from the temporary coal mine waste storage area. The Permittee must also address the shipment of coal mine waste to the Skyline and SUFCO facilities.

**R645-301-536.100,** The Permittee must provide the Division with prudent engineering designs for the waste rock site. The designs must include compaction specifications.

**R645-301-553.100,** the proposed final contours at the waste rock site do not meet the approximate original contour requirement. The Permittee could meet this requirement by smoothing the contours at the bottom of the waste rock site.

**R645-301-553.130,** The Permittee must modify the final contours so that they bend in with the surrounding topography. The sharp corners at the bottom of the waste rock site will

appear unnatural.

**R645-301-553.250 and R645-301-553.300.** Following final grading of any refuse pile, the coal mine waste will be covered with a minimum of four feet of cover. As discussed in the Operation Section and in the event that an acid or toxic problem is identified, enough fill and soil cover should be salvaged from the waste rock storage site to provide the minimum four feet of cover for the refuse pile surface and final face. If the acid and/or toxic problem is critical, SC3 needs to commit for developing additional mitigation that will help offset any potential environmental harm.

**R645-301-553.252 and R645-301-746.211,** the Permittee must either address how the under drains will be constructed or demonstrate that under drains are not needed.

**R645-301-720.** Provide a discussion in the plan that includes the history of the irrigation and the time span over which the breached irrigation canal has contributed flow to the drainage above Anderson Reservoir. Provide data on the flow rates observed in the drainage originating from the irrigation canal. Provide a water budget that quantifies the volume of flow from the irrigation waters to recharge the Anderson Reservoir.

**R645-301-724.** Provide discussions, in the text of the plan, summarizing baseline information as it relates to the following: 1) Discuss the site specific seasonal variation in water quantity and quality of Anderson Reservoir, include discussions of water quality variation with changes in water storage; 2) Provide a description of seasonal quantity and quality for water from the wells and seeps/surface water sites in Anderson Basin; 3) Provide data describing the seasonal water quantity and quality of irrigation waters upstream of the waste rock site and within the Anderson Reservoir Basin above the reservoir; 4) All data collected for baseline information and associated laboratory sheets must be provided; 5) Provide a discussion to clarify the existing flow characteristics at the waste rock site which includes influences from the breached irrigation ditch; 6) Seeps associated with the waste rock site (exhibit 7-2) should be re-named as some of them currently conflict with existing monitored spring records; 7) Provide baseline data for the water monitoring wells, Anderson Reservoir, and the irrigation ditch which include analysis for Boron and Selenium, other parameters such as dissolved Arsenic, Cadmium, Chromium, and Copper should also be considered important as they have associated water quality criteria for irrigation waters.

**R645-301-724.700.** Provide applicable AVF information as required by R645-302-320 so that the Division can decide the presence or absence of an AVF next to the proposed waste rock site.

**R645-301-728.** Provide discussions, in the text of the plan, assessing the potential impacts from the following: 1) Hydrocarbon Contamination should be addressed, since no oil skimmer is proposed on the waste rock area sedimentation pond. 2) Reservoir Recharge and Storage that may be brought about by the proposed operations should be provided and should include potential changes in runoff, evaporation, sediment pond storage and, sediment production. 3)

Discuss the potential changes to seasonal water quality on Anderson Reservoir and irrigation waters exiting the reservoir.

**R645-301-728.320** Provide discussions, in the text of the plan, assessing the potential impacts from acid and toxic forming materials at the waste rock site. The following items need to be provided: 1) Update text on acid and toxic forming potential in sections where the discussion relates to the waste rock site including section 7.28.32. 2) Provide representative samples from areas where waste rock will be removed to assess the potential for acid and toxic forming materials.

**R645-301- 731.** Prior to discharging from the sedimentation pond the permittee must obtain a discharge permit from the Department of Environmental Quality. Prior to placing fill in the waste rock site the permittee must obtain a determination from the state engineers office as to whether this action requires a permit to alter a natural water way of the state.

**R645-301-731.211.** The operational groundwater monitoring plan should include at minimum the water quality parameters required under R645-301-731.211.

**R645-301-731.220.** The permittee needs to provide an operational water monitoring plan for the irrigation ditch waters upstream of the waste rock site and above the inlet to the reservoir or, demonstrate that the existing monitoring plan will account for variation in water quality changes that may occur at Anderson Reservoir due to the variation in irrigation water v.s. the water that may originate from the waste rock site.

**R645-301-731-221.** Provide a water quality monitoring program for reclamation that shows the waters from the waste rock site flowing to Anderson Reservoir meet the requirements for the intended post mining land use.

**R645-301-742.300.** Provide drainage designs for drainage associated with the interim phases at the Waste Rock Site presented on Figure 5-1, include the measures used to protect topsoil, below the waste rock site, from potential contamination through transport of sediment from drainage originating from the waste rock site.

**R645-301-742.314.** The permittee must demonstrate by collection of site specific geologic data or soils analysis that the CN used for watershed UD-1 and the associated drainage diversion ditch is appropriate. Provide a symbol for the operational drainage ditches which can be distinguished from other elements represented on Plate-1.

**R645-301-742.314.** Provide design information providing sediment control measures for the topsoil storage sites.

**R645-301-742.314.** Provide a decanting operation plan which describes how the decant will be adequate to maintain detention time

**R645-301-745.120-122.** The permittee must provide a design for an under-drain system that meets the regulatory requirements

**R645-301-745.222.** Provide a grading and drainage plan for the area next to the proposed waste rock site that assures runoff from the breached irrigation ditch will remains a stabilized diversion above the fill area and provide any necessary changes in the disturbed area boundaries (they could start This plan when the lower extent of the pile reaches the location of the breached irrigation channel).

**R645-301-830.140,** the Permittee must provide the Division with detailed reclamation cost estimates for the waste rock site.

**R645-302-212.** Correct the text in section 7.27 which indicate that adverse affects to domestic stock or wildlife sources will be mitigated with measures found in section 7.28. Mitigating measures in section 7.28 could not be found.

# ENVIRONMENTAL RESOURCE INFORMATION

## GENERAL

Surface water resources within and next to the proposed waste rock permit area includes; Soldier Creek, irrigation ditches and, Anderson Reservoir. The Permittee shows the water rights associated with the waste rock site on Exhibit 7.21-1 and listed the surface water resources in Table 7.24-1. A seep and spring survey conducted for the proposed waste rock site and adjacent area is presented on Plate 7-2.

The water in the irrigation ditches can be significantly different from the stream water. The irrigation water travels to Anderson Reservoir and recharges the reservoir. Anderson Reservoir was constructed in the 1920's.

The Permittee has not described the irrigation ditch water next to the waste rock site and Anderson Reservoir adequately. Their studies of the test pits next to the channel found that no natural subsurface water flows in the upper portion of the watershed. However, the breached irrigation ditch provides subsurface flow to the waste rock site drainage. This subsurface flow may continue to recharge the ground water at the waste rock site. Additional information on the subject is presented in the **HYDROLOGIC RESOURCE INFORMATION** of this T.A.

**Findings:**

The permittee has not met the requirements of this section. The permittee must provide the following in accordance with:

**R645-301-720.** Provide a discussion in the plan that includes the history of the irrigation and the time span over which the breached irrigation canal has contributed flow to the drainage above Anderson Reservoir. Provide data on the flow rates observed in the drainage originating from the irrigation canal. Provide a water budget that quantifies the volume of flow from the irrigation waters to recharge the Anderson Reservoir.

## PERMIT AREA

**Analysis:**

The Division requires that the Applicant describe the lands subject to surface coal mining operations over the estimated life of the mine. They have met this requirement by showing the permit boundaries and the general location of the waste rock site on Exhibit 1.12-1. Plate I shows the exact location of disturbed area boundaries. A professional engineer has certified both those maps.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

**Analysis:**

The Permittee has conducted two surveys for cultural resources in the general area of the proposed waste rock disposal area. Three small, isolated lithic scatters were found in the area that they would disturb, but the applicant's consultant did not consider these sites to be significant. The study that found these three sites was done in part to satisfy Bureau of Land Management requirements for a land exchange. One other site was found near Anderson Reservoir in an area that they would not disturb. This site was considered to meet eligibility requirements for listing in the National Register of Historic Places.

In 1991, Soldier Creek Coal Company first proposed the waste rock site, but the Division did not review the proposal. Comments made by the Division of State History then do not mention the expansion specifically, so the Division does not know if they examined the cultural resources information in the plan. Therefore, the Division should seek concurrence from State History. Because the sites that they would disturb are not considered significant, the Division should recommend that State History give its approval for the waste rock disposal site.

**Findings:**

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations in regards to the proposed permit change for the addition of the waste rock site. The Division needs to receive concurrence for this project from the Division of State History. Based on the information in the mining and reclamation plan, the Division should recommend that State History give its approval.

# CLIMATOLOGICAL RESOURCE INFORMATION

**Analysis:**

Information on a climate can be found in sections 7.28.2 and 7.24.4. Annual precipitation within the permit area ranges from 10 to 20 inches. Most of the precipitation received (60%) occurs as snowfall. Mean annual potential evaporation was estimated to be approximately 22 inches (Vaughn Hansen Associates, 1980). Peak runoff from snowmelt typically occurs between late May and early June.

The directions of prevailing winds are from the south in the morning and afternoon, and from the north in the evening. The average wind speed, determined at the Wellington site between May 1978 and April 1979, averaged 2 meters/second (m/s) with a maximum speed of 10.3 m/s.

Average monthly temperatures range from about 15 °F in January to 70 °F in the fall. Average annual temperature for the area near the Soldier Canyon Mine between May, 1978 and April 1979 was 45 °F. Summer temperatures may reach 100 °F and winter low temperatures may fall as low as -15 °F.

Information presented in the soils surveys, section 2.22, shows the climate at the waste rock site is similar to the description presented for the mine site. The Permittee described annual precipitation amounts for the soils in the area as ranging from eight to 14 inches per year and they describe average temperatures as ranging from 45 °F to 50 °F.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

# VEGETATION RESOURCE INFORMATION

**Analysis:**

The current mining and reclamation plan includes results from vegetation studies done in 1990 and 1991. They sampled several areas in these studies, including the proposed waste rock disposal site and two reference areas.

The proposed waste rock disposal site contains three vegetation communities, but they sampled them together. These communities are pinyon/juniper, black sagebrush/shadscale, and greasewood/galleta. The communities change primarily in response to changing soil

conditions. About 70% of the vegetation cover was from shrubs, primarily black sage, greasewood, shadscale, and juniper. Grasses made up 29% of the cover, and broadleaf forbs only had 1%.

The two reference areas are in pinyon-juniper and sage-grass-juniper communities. Most cover in the pinyon-juniper area was from the overstory with only 12.63% ground cover from understory plants. They encountered no grasses in the sampling, and there was 0.71% cover from broadleaf forbs. Other than the cover from juniper, there was a total of 2.70% vegetative cover in the understory. The overstory had 31.63% cover, all from pinyon and juniper.

The sage-grass-juniper reference area had a total of 31.95% vegetative cover of which 65.52% was from shrubs, 31.25% from grasses, and 3.23% from broadleaf forbs. Dominant species were sagebrush and Indian ricegrass.

There is an area south of the topsoil storage site where the applicant intends to put an access road to the refuse pile. This road would cross a field cultivated in the past. It would also cross an undisturbed area with grass-sage-juniper and pinyon-juniper communities. These two communities had vegetation very similar to the reference areas with the same designations. In the vegetation report, the area once used as an agricultural field a previously disturbed sage-grass-juniper community. The vegetation in this area was composed primarily of big sage and several weedy forbs.

In the vegetation reports, sample sizes were calculated according to the Division's guidelines in place at the time the Permittee took the samples. However, the Division has recalculated the sample sizes according to current guidelines. The sample sizes were adequate for all areas except the pinyon-juniper reference area where 90 samples were needed for understory vegetation, and 138 samples were needed for the overstory. Achieving sample adequacy unless sampling for bond release is not necessary or when a sample will be used as the revegetation success standard; therefore, the sample sizes are considered adequate.

The Division requires that the application contain productivity information for the area proposed to be disturbed, and the Division requires that reference areas have a range condition of fair or better determined using Natural Resources Conservation Service (NRCS) methods. The current plans contain two letters from the Soil Conservation Service (SCS--now NRCS) showing the current and potential production and range conditions of various areas. Deciding to which areas these descriptions apply is difficult, based on the information in the plan. This needs to be clarified or, alternately, the proposed disturbed and reference areas need to be reexamined for productivity and range condition.

**Findings:**

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Before approval, the applicant must provide the following in accordance with:

**R645-301-321.** The application contains some productivity information that apparently applies to the proposed reference areas and disturbed areas; however, the plan needs to clarify to which areas this productivity information applies.

## FISH AND WILDLIFE RESOURCE INFORMATION

**Analysis:**

**Wildlife Information**

The current mining and reclamation plan contains wildlife inventories conducted in the early 1980's. These studies included at least part of the proposed waste rock site. The only habitat of unusually high value identified in the area is critical deer winter range. Wildlife Resources has confirmed that the area contains a habitat that is heavily used during winter months.

The application includes an updated map showing raptor nests in and near the permit area. It also shows riparian areas and springs.

**Threatened or Endangered Species**

The application identifies three listed threatened or endangered species, bald eagles, peregrine falcons, and black-footed ferrets, that could inhabit the general area. There have been no recent confirmed sightings of black-footed ferrets in Carbon County although there was an unconfirmed sighting in East Carbon in 1980. Black-footed ferrets are closely associated with prairie dogs, and there are no known prairie dog colonies in the area.

In the raptor surveys conducted within and next to the permit area, no peregrine falcon or bald eagle nests have been found. Bald eagles frequently roost in trees along the road to the mine and could roost near Andersen Reservoir. However, there are only a few small cottonwoods near Andersen Reservoir, so it would not be an important site for wintering birds.

There is no habitat for threatened or endangered plant species within the area proposed to be disturbed. Two candidate species, canyon sweet vetch and Creutzfeldt catseye, could be in the area, but the vegetation consultant searched for and did not find

them.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## LAND-USE RESOURCE INFORMATION

**Analysis:**

Section 4.11 discusses current land uses in the area that include grazing, wildlife habitat, mining, and recreation. These uses are consistent with county zoning information contained in the plan.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## ALLUVIAL VALLEY FLOORS

**Analysis:**

They provide Alluvial Valley Floors information in chapter 9. The plan shows segments of drainage contain discontinuous patches of unconsolidated alluvial deposits that are not mapped. The Permittee states there are no man caused flood irrigation or sub-irrigation within the LOM area. Volume 5 Appendix B contains an SCS Soils/Wetlands Investigation conducted in 1991. This analysis referred to the proposed waste rock site as ". . . alluvial foot slopes of the adjacent mesa/plateau dissected by inset fans (gullies) that is really the source of alluvial transport and erosion."

The area in question, as it pertains to determining presence of an AVF, is downstream of the waste rock site. The adjacent area according to regulatory definition means " . . . the areas outside the permit area where a resource or resources, determined according to the context in which adjacent area is used, are or reasonably could be expected to be adversely impacted by proposed coal mining and reclamation operations . . . " Since Anderson Reservoir is a water resource that the proposed operations could adversely impact and since the water is used for irrigation. They should assess the area downstream and next to the waste rock site for the presence of an AVF.

The February 4, 1987 permit approval states that no lands designated as AVF occurs on the permit area. The permit area has expanded beyond that referenced in the original approval. According to the 1987 CHIA a negative AVF determination for the mine site was based on the studies conducted by Sunedco Coal Company in the Sage Point Dugout Canyon mine plan. However, they determined that a potential AVF existed downstream along Soldier Creek. Although they determined a negative determination for existence of an AVF for the permit area described in 1987, the division for the areas conducted no information or determination within, next to and, down stream of the proposed waste rock site (Prime farmland determinations previously contained in section 3.9 were found in Appendix A).

**Findings:**

The plan does not meet the minimum requirements of this section. The permittee must provide the following in accordance with:

**R645-301-724.700.** Provide applicable AVF information as required by R645-302-320 so that the Division can decide the presence or absence of an AVF next to the proposed waste rock site.

## Soils Resource Information

**Analysis:**

**Prime Farmland Investigation**

Prime Farmland Investigations by the Natural Resource Conservation Service (NRCS), formerly the Soil Conservation Services (SCS), show that Prime Farmland exits within the NE¼ of the NE¼ of Section 36, T13S, R11E. This area is immediately south of the proposed waste rock disposal area and is associated with the Hernandez family soil. This soil unit is in the capability class IIIe-2, irrigated unit. As shown on the soils map for the waste rock disposal area, the Hernandez family soil unit continues north of the Prime Farmland area and lies between the waste rock disposal area and the county road. The upper end of the Hernandez soil contains the Topsoil Storage area. An old irrigation ditch that diagonally crosses defines the southern border of the Topsoil Storage area, on a southwest angle, the upper tongue of the Hernandez soil unit. The ditch eventually continues south along the western border of the soil unit. Historically, this ditch was used to irrigate the southern portion of Hernandez soil below the topsoil storage area. *Leland Sassar of the NRCS on February 26, 1997, gave verbal acknowledgment to the Division for a positive Prime Farmland determination of the Hernandez soil immediately south of the irrigation ditch. In response to the verbal acknowledgment, the Division has requested the NRCS to make a new Prime Farmland reconnaissance investigation for the area (Sections 24 and 36, T13S, R11E). Consequently, the NRCS will make a formal*

*Prime Farmland investigation of the area with written verification or refutation to the Division. If Prime Farmland exists within the permit area next to the waste rock disposal area, then SC3 must provide all applicable information and follow all applicable regulations as outlined in R645-302-310.*

**Soil Survey**

The applicant has provided a soil survey for the waste rock disposal area. They conducted initial field soil investigations in May 1990, and consisted of four test pits (OTP 1 thru 4). The Permittee conducted a supplemental field investigation in April 1991 and consisted of five stream bank sections (SCC 1 thru 5), four test pits (TP 1 thru 4) and ten auger holes (AH 1 thru 10). They identified three soil mapping units during these investigations and are mapped in Figure 1, Refuse Disposal Area, Order 1 Soils Map. Soils descriptions are taken from the Carbon Area Soil Survey with some text modifications made in the MRP section 2.22, Soil Survey, to represent the exact field conditions encountered at the waste rock disposal area. Field soil descriptions are in Appendix 2-B. Soil identifications are as follows:

- Hernandez Soil - a tongue of soil immediately east and next to the waste rock disposal area. The upper portion of this soil group contains the 4.5 acre topsoil storage area represented by soil sample OTP #1. Non-irrigated soils are in capability subclass VIe and are generally unsuitable for cultivation. The prime farmland irrigated soil is in capability unit IIIe-2. Unprotected soils are highly susceptible to erosion.

- The Hernandez soil unit consists of very deep, well-drained soils developed on fan terraces. These soils formed in alluvium derived from sandstone and shale. Slopes are 1 to 8 per cent. The soil is fine loamy, mixed, mesic Ustollic Calciothids.

- Gerst-Badland Complex - Includes the hills slope and upper elevations of the waste rock disposal area and is represented by soil samples OTP #2 and #4. The Gerst soil is in capability class VIIe non-irrigated soil and is unsuitable for cultivation. The Badland soils are in capability class VIIIe and are precluded from being used for crop production. Both soils are highly susceptible to erosion.

- This series consists of shallow, well drained, moderately permeable soils on mesa side slopes, benches, terraces and canyons and on mountain slopes and hill slopes. These soils formed in residuum and colluvium derived from shale and sandstone. The slope averages 30 to 70 percent. The soils are loamy, mixed (calcareous) mesic shallow Usitic Torriorthents. Deeper horizons are partly weathered Mancos Shale with a paralithic contact at 18-20 inches.

- Haverdad Soil - Includes the soils confined to the valley floor of the waste rock disposal area. The area is represented by soil samples OTP #3, TP 1 through 4, AH 1 through 10, and SCC 1 through 5. Non-irrigated soils are in capability subclass VIe, are generally unsuitable for cultivation, and are highly susceptible to erosion. When irrigated, this soil unit is in capability class IIIe-2.

- The Haverdad soils are deep, well drained, moderately permeable soils on fan terraces and valley floors. These soils formed in stratified alluvium derived from sandstone and shale. Slopes average 1 to 8 per cent. The soils are fine-loamy, mixed (calcareous) mesic Ustic Torrifluvents.

Table 2.22-4 lists the potential productivity of soil mapping units. Values are taken from the SCS Soils Interpretation Records for the Carbon Soil Survey Area. The MRP states that the soil units occurring at the waste rock disposal site limit the present and potential productivity for the area. Present productivity of selected vegetation communities in terms of herbaceous and shrub stratum components can be found in Chapter 3, Appendix 3-D.

**Soil Characterization**

The MRP states that " . . . soil surveys were conducted according to procedures by the Soil Survey Staff of the USDA . . . " *Although field soil descriptions are in Appendix 2-B for the waste rock area soil survey, the descriptions are lacking specificity and do not adhere to the standards of the National Cooperative Soil Survey (R645-302-314.100). In addition, soil pit density is lacking adequately to assess the Hernandez and Gerst-Badland Complex soils for an Order I soil survey.*

**Substitute Topsoil**

There is limited thickness or total absence of A and B horizons in the Haverdad Series and the Gerst-Badland complex soils. Therefore, the subsoil from these soil groups will be used as substitute topsoil. Acceptance of these subsoils as substitute topsoil is based on the chemical and physical analyses as outlined by the Division's guidelines for topsoil and overburden[1].

**Mine Development Waste**

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[1]Leatherwood, J., and Duce, D., 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.

Based on preliminary analyses of material similar to those that will be placed in the refuse site, the MRP states that no acid or toxic-forming problems are anticipated with the mine's underground development waste (see Appendix 6-B). *The conclusion that the underground development waste is neither acid nor toxic forming is based on the assumption that the waste material analyzed in 1989 is the same as waste material to be mined in 1997 or later. This assumption is wrong since it is based on obsolete data.*

**Findings:**

The permittee must provide the following, prior to approval, in accordance with the requirements of:

**R645-301-221 and R645-302-310:** Leland Sassar of the NRCS on February 26, 1997, gave verbal acknowledgment to the Division for a positive Prime Farmland determination of the Hernandez soil immediately south of the irrigation ditch. In response to the verbal acknowledgment, the Division has requested the NRCS to make a new Prime Farmland reconnaissance investigation for the area (Sections 24 and 36, T13S, R11E). Consequently, the NRCS will make a formal Prime Farmland investigation of the area with written verification or refutation to the Division. If Prime Farmland exists within the permit area next to the waste rock disposal area, then SC3 must provide all applicable information and adhere to all applicable regulations as outlined in R645-302-310.

**R645-301-223 and R645-302-314.100:** Although field soil descriptions are in Appendix 2-B for the waste rock area soil survey, the descriptions are lacking specificity and do not adhere to the standards of the National Cooperative Soil Survey (R645-302-314.100). In addition, soil pit density is lacking to adequately assess the Hernandez and Gerst-Badland Complex soils for an Order I soil survey.

**R645-301-121.100:** The conclusion that the underground development waste is neither acid nor toxic forming is based on the assumption that the waste material analyzed in 1989 is the same as waste material to be mined in 1997 or later. This assumption is wrong since it is based on obsolete data.

## GEOLOGIC RESOURCE INFORMATION

**Analysis:**

The Permittee presents the geologic information in Chapter 6 of the Geology of the Waste Rock Disposal Site amendment. That information is similar to that presented in Chapter 6 in the current MRP. The only difference between the two versions of Chapter 6 is that wherever the word "refuse" appears in the current MRP they have replaced it with

"waste rock" in the amendment or, in a few places, they removed the word "refuse."

Geologic information in the Waste Rock Disposal Site amendment is in sufficient detail to help in: determining the probable hydrologic consequences of the operation upon the quality and quantity of surface and ground water in the permit and adjacent areas, including the extent to which surface- and ground-water monitoring is necessary; determining all potentially acid- or toxic-forming strata down to and including the stratum immediately below the coal seam to be mined; determining whether reclamation can be accomplished and whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area; and, preparing the subsidence control plan.

Geologic information includes a description of the geology of the proposed permit and adjacent areas down to and including the deeper of either the stratum immediately below the lowest coal seam to be mined or any aquifer below the lowest coal seam to be mined which may be adversely impacted by mining. This description includes the areal and structural geology of the permit and adjacent areas, and other parameters which influence the required reclamation and it also show how the areal and structural geology may affect the occurrence, availability, movement, quantity, and quality of potentially impacted surface and ground water. Geologic information is based on maps and plans required as resource information for the plan, detailed site specific information, and geologic literature and practices.

In no portion of the Soldier Canyon Mine permit area and adjacent areas are the strata down to the coal seam to be mined to be removed. The strata down to the coal seam to be mined are exposed at outcrops in and adjacent to these areas. Coal seam isopach, structure, interburden isopach, and overburden isopach maps are based on data from forty-six exploratory bore holes, three gas exploratory bore holes, and outcrop and in-mine measured sections. No new samples have been collected and analyzed for the Waste Rock Disposal Site amendment.

Samples collected from test borings or drill cores have been analyzed to provide logs of drill holes that show the lithologic characteristics, including physical properties and thickness of each stratum that may be impacted. Location of ground water is noted where it was encountered. Elevations and locations of test borings and core samplings are on Exhibits 6.22-1, 6.22-2, and 6.22-3.

Samples collected from test borings or drill cores of strata immediately above and below the coal seam to be mined have been submitted for chemical analyses for acid- or toxic-forming or alkalinity-producing materials. Strata immediately above and below each coal seam to be mined were also found to have very low clay content. Samples of the coal seam to be mined have been analyzed for acid- or toxic-forming materials, including total sulfur and pyritic sulfur. Analyses have also been done on samples from fresh, unweathered and uncontaminated rock that was exposed by facilities expansion and portal development,

down to and including the Rock Canyon Seam. Pyritic sulfur was not determined for these samples because of high iron oxide content.

Collection, analysis, and description of additional geologic information has been determined not to be necessary. To protect the hydrologic balance, to minimize or prevent subsidence, or to meet the performance standards.

The applicant has not requested that the Division waive in whole or in part the requirements of the borehole information or analysis required of this section.

**Findings:**

Geologic information for the Waste Rock Disposal Area at the Soldier Canyon Mine MRP is complete and accurate.

## HYDROLOGIC RESOURCE INFORMATION

**Analysis:**

**Sampling and analysis (ERI)**

The plan states that all water samples will be collected and analyzed according to methods in either the current edition of "Standard Methods for the Examination of Water and Waste Water" or the 40 CFR parts 136 and 434. All laboratory analysis will be done by certified laboratories.

**Baseline information (ERI)**

Regional hydrology is presented in the hydrology report which describes water characteristics in the Book Cliffs and the Price River to the confluence with the Green River. Discussions pertaining from Soldier Creek to the Anderson Reservoir are provided in section 7.42.2. Soldier Creek is considered intermittent above Section 28, T12S, R12E. Springs contribute to flows but, evaporate or infiltrate within a few hundred feet. Below Section 28, to the Anderson Reservoir, the stream is considered perennial.

The permittee has conducted a site survey which identified springs and irrigation water diversions in the proposed waste rock site and adjacent area as presented on exhibit 7-2. The permittee identified seep(s) SP-3 through SP-10 along the length of the drainage leading to Anderson Reservoir. These sites are located within the valley location for the proposed waste rock site. Seeps SP-11 and SP-12 were identified in the adjacent area.

A discussion of site specific seasonal variation in water quantity and quality and the water budget quantifying irrigation flows to the Anderson Reservoir needs to be presented. A description of seasonal quantity and quality in the waters from the wells and seeps located within the Anderson Basin were not presented.

**Water Rights and Use (ERI)**

Water rights are presented on Table 7-24-2. Water rights associated with Anderson Reservoir and the irrigation ditches are presented on Exhibit 7.21-2 (D-319). Specific identification of the water rights associated with the irrigation ditches were not made by the permittee, however, water rights 548, 36, 725, 497, and 2574 appear to be associated with water from the Anderson Reservoir and the adjacent irrigation ditch.

| Use | Time of use | Quantity of use (Acre Feet) | Owner (Right no.) |
|---|---|---|---|
| Irrigation | year round | 484.1 | Sunoco Energy (725, 36, 497) |
| Stock watering | year round | 1.88 | Hattie Olson (548) |
| Stock watering | year round | 10.64 | US BLM (2574) |

In section 7.29 the permittee has stated that should mining operations have an impact on a water source, this information will be coordinated with the Utah Division of Water Rights. **It should be noted, that following analysis of any sample which indicates non compliance with the permit conditions, the regulations R645-301-731.200 and R645-301-731.220 require the permittee to promptly notify the Division of Oil Gas and Mining.** The plan is considered to meet the minimum requirements of this section.

**Ground-water information (ERI)**

The permittee has located 12 seeps or wet areas on Plate 7-2 for the proposed waste rock site and adjacent area. These seeps are designated SP-1 through SP-13. These seeps should be renamed as some of them currently conflict with existing monitored spring records. The plan does not include discussions on seasonal variation in the depth to water in the wells and has not included seasonal variation in water quality of the wells. Data collected for baseline information in 1991 was found in volume 5, appendix B. Additional data stated to have been collected over the past four and a half years and their associated laboratory sheets could not be located. Groundwater baseline information did not include Selenium and Boron analysis. These parameters have state water quality limits associated with the downstream use. This data as background information is important because the

Anderson Reservoir below the waste rock site can concentrate these metals and the reservoir may recharge the groundwater and affect water quality.

Ground water information can be found in the PHC under section 7-75. A report completed by Mayo and Associates can be found in Appendix 7M. Information contained in the Mayo report identify the wells at the proposed waste rock site incorrectly as being associated with the Sewage Lagoon. Mean solute chemistry for these wells is summarized in Table 7.28-5. No seasonal variation in water quantity or water quality was presented or is discussed.

**Surface-water information (ERI)**

Surface waters in and around the waste rock site include the Anderson Reservoir, the surface water drainage in the valley of the proposed waste rock site, Soldier Creek and adjacent area irrigation ditches. Characterization of the nature of flow in the proposed waste rock site drainage was presented as ephemeral. Plate 7-2 identified seeps or moist areas in the upper drainage of the waste rock site. Data could not be located which identify the characteristics of these seeps. The plan indicates that no natural subsurface flows were identified in the upper portion of the watershed from test pits excavated adjacent to the channels. However, the breached irrigation canal provides subsurface flow to the drainage. This subsurface flow may continue following in direction of the canal. Seasonal flow data collected at these sites should be presented and discussed to describe the existing and historic drainage characteristics.

The irrigation ditch adjacent to the waste rock site was sampled at least once in the spring of 1991 and flowed from 10 to 15 gpm. Flowing irrigation sites were identified in three areas, according to information on Plate 7-2, one was located upstream of the waste rock site and two were located within the drainage above Anderson Reservoir. No data nor lab sheets from sampling the irrigation sites could be located in the plan. It is unknown how many baseline samples, if any, were obtained. No analysis of the variation in water quality of irrigation ditch waters was identified. The characteristics of the irrigation water need to be understood since this water is passed adjacent to the waste rock pile and is a significant recharge source to the Anderson Reservoir.

It is probable that the characteristics of the irrigation water before the water enters the area of the proposed waste rock site differs from water at the base of the site. The drainage in the area of the waste rock site flows over colluvium deposits overlying the Mancos shale. Water coming in contact with the Mancos shale increases the concentration of Sodium and Sulfate ions and, TDS. The seasonal baseline information of the irrigation water should be described to quantify and qualitatively identify these influences and should include at a minimum Boron and Selenium. Should a chemical change occur in the water contained in Anderson Reservoir the quality and quantity of the irrigation water above the reservoir and within the drainage would need to be understood, as well as, the characteristics of the waters

which may come from the waste rock site.

The water level in Anderson Reservoir can also affect the water quality of the reservoir. The changes in water level and water quality of the reservoir should be analyzed as part of the baseline characterization of the reservoir. The permittee must demonstrate that baseline information for the irrigation water and Anderson Reservoir is adequate to make these determinations or, provide other sampling measures that will adequately characterize these waters.

**Baseline cumulative impact area information (ERI)**

The cumulative hydrologic impact area can be updated when the permittee has adequately addressed the necessary baseline information and updated the PHC with discussions on potential impacts from the waste rock site. See discussions in the previous paragraphs of this TA.

**Modeling.(ERI)**

No modeling related to the waste rock site was presented in the plan.

**Alternative water source information.(ERI)**

Alternative water source information is presented in section 7.27 and 7.28. Text in section 7.27 indicate that adverse affects to domestic stock or wildlife sources will be mitigated with measures identified in section 7.28. Mitigating measures in section 7.28 could not be found. However, the permittee has committed to report adverse effects on water rights to the Division of Water Rights and identify and implement mitigation measures. No determination of damage to a water right has been demonstrated as of the writing of this T.A.

**Probable hydrologic consequences determination.(ERI)**

The permittee has not adequately addressed issues associated with the proposed waste rock site in the PHC. The PHC, contained in section 7.28.32, includes statements that do not reflect the proposed activity at the waste rock site. The information in the plan should be updated to include information on acid and toxic forming potential at the waste rock site. Overburden and under burden data presented in section 5-54 are from 1989 core samples and were not obtained from areas in which the waste rock will be removed. Representative samples of the overburden from the Dugout Canyon mine and the Alkali Lease area should be used in the discussions presented.

A discussion of the potential changes to seasonal quantity and quality of the irrigation

waters below the reservoir, and Anderson Reservoir should also be addressed. Changes to the watershed drainage and potential changes in reservoir recharge brought about by the proposed operations should include influences from changes in runoff/infiltration characteristics, evaporation, and sediment pond storage.

Commonly in coal mining operations sedimentation ponds have an oil skimmer. No oil skimmer is proposed on the waste rock area sedimentation pond. Discussions on the potential for hydrocarbon contamination to the reservoir should be addressed.

**Findings:**

The permittee has not adequately met the requirements of this section. The permittee must provide the following in accordance with:

**R645-302-212.** Correct the text in section 7.27 which indicate that adverse affects to domestic stock or wildlife sources will be mitigated with measures found in section 7.28. Mitigating measures in section 7.28 could not be found.

**R645-301-724.** Provide discussions, in the text of the plan, summarizing baseline information as it relates to the following: 1) Discuss the site specific seasonal variation in water quantity and quality of Anderson Reservoir, include discussions of water quality variation with changes in water storage; 2) Provide a description of seasonal quantity and quality for water from the wells and seeps/surface water sites in Anderson Basin; 3) Provide data describing the seasonal water quantity and quality of irrigation waters upstream of the waste rock site and within the Anderson Reservoir Basin above the reservoir; 4) All data collected for baseline information and associated laboratory sheets must be provided; 5) Provide a discussion to clarify the existing flow characteristics at the waste rock site which includes influences from the breached irrigation ditch; 6) Seeps associated with the waste rock site (exhibit 7-2) should be re-named as some of them currently conflict with existing monitored spring records; 7) Provide baseline data for the water monitoring wells, Anderson Reservoir, and the irrigation ditch which include analysis for Boron and Selenium, other parameters such as dissolved Arsenic, Cadmium, Chromium, and Copper should also be considered important as they have associated water quality criteria for

irrigation waters.

**R645-301-728.** Provide discussions, in the text of the plan, assessing the potential impacts from the following: 1) Hydrocarbon Contamination should be addressed, since no oil skimmer is proposed on the waste rock area sedimentation pond. 2) Reservoir Recharge and Storage that may be brought about by the proposed operations should be provided and should include potential changes in runoff, evaporation, sediment pond storage and, sediment production. 3) Discuss the potential changes to seasonal water quality on Anderson Reservoir and irrigation waters exiting the reservoir.

**R645-301-728.320** Provide discussions, in the text of the plan, assessing the potential impacts from acid and toxic forming materials at the waste rock site. The following items need to be provided: 1) Update text on acid and toxic forming potential in sections where the discussion relates to the waste rock site including section 7.28.32. 2) Provide representative samples from areas where waste rock will be removed to assess the potential for acid and toxic forming materials.

## MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

**Analysis:**

**Affected Area Boundary Maps**

**Analysis:**

Plate I and Exhibit 1.12-1 show the location of the permit and disturbed area boundaries.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

**Coal Resource and Geologic Information Maps**

**Analysis:**

Coal Resource and geologic information maps in the currently approved MRP and in the Waste Rock Disposal Site amendment show areal geology, coal crop lines, strike and dip of the coal to be mined, coal seam thickness, and interburden thickness. Geologic cross sections show depth of coal seams to be mined and thickness of overburden, or, at the Waste Rock Disposal Site, the nature and thickness of strata on which waste rock will be placed. Cross sections, maps, and plans included in Chapter 6 of the Waste Rock Disposal Site amendment have been certified by a professional engineer as required by this section.

**Findings:**

The Waste Rock Disposal Site amendment meets the minimum requirements for coal resource and geologic information maps.

**Existing Structures and Facilities Maps**

**Analysis:**

The Permittee has stated that there are no existing structures or facilities at the waste rock site. No existing structures or facilities are shown on any maps associated with the proposed waste rock site.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

**Existing Surface Configuration Maps**

**Analysis:**

The existing pre-mining waste rock surface configuration is presented on Plate 7-2 and 7-1.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

**Mine Workings Maps**

**Analysis:**

There are no mine workings beneath or adjacent to the waste rock site. The current mine working maps show that there will be no mining near the waste rock site.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

**Monitoring Sampling Location Maps**

**Analysis:**

Monitoring sites associated with hydrologic baseline information are provided on Plate 7-2. Sites proposed for operational hydrologic monitoring are included on Plate 7-1. Elevations and locations of test borings and geological core samplings are shown on Exhibits 6.22-1, 6.22-2, and 6.22-3.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

**Permit Area Boundary Maps**

**Analysis:**

The permit boundaries for the waste rock site are shown on Exhibit 1.12.1

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

**Surface and Subsurface Ownership Maps**

**Analysis:**

The surface ownership of the lands in and adjacent to the waste rock site is shown in Exhibit 1.12-1. The coal ownership is shown on Exhibit 1.12-2.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

**Subsurface Water Resource Maps**

The potentiometric water surface below the proposed waste rock site is provided on Plate 7-1.

**Surface Water Resource Maps**

The surface water resources for the waste rock site are presented on Plate 7-2.

**Well Maps**

**Analysis:**

There are no gas and oil wells within the proposed permit area. There are three natural gas exploration wells approximately one-half to one mile north of the Soldier Canyon Mine permit area that are shown on Exhibits 6.22-1, 6.22-2, and 6.22-3.

Well Monitoring sites associated with hydrologic baseline information are provided on Plate 7-2.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

**Contour Maps**

**Analysis:**

The existing contour configuration is presented on Plates 7-2 and 7-1.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

# OPERATION PLAN

## MINING OPERATIONS AND FACILITIES

**Analysis:**

**General**

**Type and Method of Mining Operations**

Coal will not be mined at or near the waste rock site. Information about the type and method of coal mining is presented in the MRP.

**Facilities and Structures**

The waste rock disposal site is located approximately 3.0 miles southwest of the mine site. The construction of the site is for disposal of coal mine waste that will be generated during underground operations. No buildings or utilities are planned for the waste rock disposal area. The site facilities will include the access road, the waste rock disposal area, diversion ditches for the disturbed and undisturbed areas, and a sediment pond.

Section R645-301-528.320 requires that the Permittee place all coal mine waste in a disposal site that has been approved by the Division. Under the currently approved plan the Permittee can store up to 1,000 cubic yards of coal mine waste in a temporary storage area at the mine site. All excess material will be disposed of at either the SUFCO or Skyline disposal sites.

The Permittee does not address what will happen to the temporary storage site. In section 5.28 of the amendment the Permittee states that sampling of all future coal mine waste stockpiled for longer than 3 months will be sampled for acid and toxic characteristics. That implies that the temporary site will still be used to store material for more than 3 months. However, Exhibit 5.21-1 does not show the location of the temporary coal mine waste disposal site. The future of the temporary coal mine waste site is not adequately addressed in the proposal.

In the current plan the Permittee is authorized to ship coal mine waste generated at the Soldier Creek mine to the permanent disposal areas at the SUFCO and Skyline mines. The Permittee does not address the shipment of material to the SUFCO and Skyline mines in this proposal. This issue needs clarification.

The waste rock pile will be constructed by placing the material for each segment of the pile in 100 foot wide benches with horizontal lifts not to exceed two vertical feet. The material shall be dumped from haul trucks and reworked by suitable earth moving equipment capable of spreading compacting, and leveling the lifts. This method will assist in achieving the desired densities and prevent the formation of large voids in the materials. Additional compaction for each lift can be achieved by controlling the routing of the loaded haul trucks to cover the entire surface of a given segment of a lift evenly. During construction the outfacing slopes should not be steeper than 2h:1v. The final exterior slopes of the fill outface should no be steeper than 3h:1v.

Based on the preliminary analyses of material similar to that which will be place at the site, no acid or toxic-forming problems are anticipated. Samples of the waste rock materials will be collected quarterly when the site is receiving materials and will be analyzed for acid and toxic-forming potential. Should a problem be identified, a mitigation plan will be prepared and submitted to DOGM for approval within 30 days of receipt of the analysis. Once the mitigation plan is approved, all identified potential acid and/or toxic-forming materials will be disposed of in accordance with the approved plan.

Once the lifts of each segment of the pile reach the proposed top elevation for that segment of the pile the surface of the pile will be regraded to conform with the proposed final topographic configuration. This material will then be covered with the fill which has been previously removed and stockpiled from a prior segment of the pile. It is planned that future operations at the facility will allow fill and topsoil stripped from expansion sections to be place directly on areas which have been regraded and are ready to be covered. This will minimize the amount of double handling of the materials. This regrading and covering will be conducted in accordance with the regrading and reclamation plans.

R645-301-528 states that the permit application will include a narrative explaining the construction, modification, use, maintenance, and removal of the following facilities (unless retention of such facility is necessary for the postmining land use as specified under R645-301-413.100 through R645-301-413.334, R645-302-270, R645-302-271.100 through R645-302-271.400, R645-302-271.600, R645-302-271.800, and R645-302-271.900). R645-301-528.320 and R645-301-528.321 require that all coal mine waste be placed in approved disposal areas within permitted area, which can include underground disposal. The current narrative for the temporary coal mine waste storage facility is inadequate. The Permittee must describe the procedure for storing the coal mine waste at the temporary facility and for moving the material a permanent facility. Under the currently approved plan the Permittee is authorized to ship coal mine waste to the disposal facilities at the Skyline and SUFCO mines. The Permittee does not state if any material from the Soldier Canyon Mine will be sent to other facilities for final disposal.

**Findings:**

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the Permittee must provide the following in accordance with

**R645-301-528,** The current narrative does not describe the procedure for storing and transporting material from the temporary coal mine waste storage area. The Permittee must also address the shipment of coal mine waste to the Skyline and SUFCO facilities.

## EXISTING STRUCTURES:

**Analysis:**

In Section 5.26 of the PAP the Permittee states that all surface buildings and structures that presently exist are shown on Table 5.26-1 and on Exhibit 5.21-1. Neither Table 5.26.1 or Exhibit 5.21-1 show any existing structure in or near the waste rock site. The Division assumes that there are no existing structures at the coal mine waste facility.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## RELOCATION OR USE OF PUBLIC ROADS

**Analysis:**

The Permittee does not propose to conduct underground mining activities within 100 feet of the right-of-way of a public road, except where the mine access road joins that right-of-way or to relocate a public road.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## AIR POLLUTION CONTROL PLAN

**Analysis:**

The current mining and reclamation plan contains an approval order dated September 3, 1991, from the Division of Air Quality. This approval order includes the waste rock disposal facility and contains several stipulations on how operations are to be conducted.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## COAL RECOVERY

**Analysis:**

Coal will not be extracted in or around the waste rock site. Since the Permittee already has assess to waste rock facilities the permitting of the new facility will have no significant effect on coal recovery.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## SUBSIDENCE CONTROL PLAN

**Analysis:**

**Renewable resources survey.**

The Permittee states that the waste rock disposal site is located outside of the areas where subsidence will occur. The Division has determined from the mine and surface maps that no subsidence will occur in or around the proposed waste rock site.

**Subsidence control plan.**

N/A

**Performance standards for subsidence control.**

N/A

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## SLIDES AND OTHER DAMAGE

**Analysis:**

In Section 5.15 of the amendment the Permittee has committed to notify the Division of any slides at the waste rock site that have a potential adverse effect on public property, health, safety or the environment.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## FISH AND WILDLIFE INFORMATION

**Analysis:**

Section 3.33 contains commitments intended to minimize adverse effects to wildlife. Most of these relate to the underground mining operation. The applicant commits to operate and maintain all transportation systems and support facilities under their control in a manner that minimizes impacts to fish and wildlife. A wildlife awareness and protection training is included in the annual training curriculum for all employees, and the haulage contractor is required to include such training in its employee education program.

The area proposed to be disturbed is critical deer winter range, and it is heavily used during the winter. The Division and Wildlife Resources normally require mitigation at a rate of three acres of enhanced habitat for each acre of disturbance. However, the lower part of the proposed disturbed area where greasewood dominates the vegetation has limited forage or cover value. The portion of the proposed disturbed area not dominated by greasewood contains about 38 acres.

The mining and reclamation plan contains a copy of a letter from Wildlife Resources dated August 2, 1989, discussing payment of $4,752 to mitigate for a planned disturbance. At the time, the applicant had proposed another waste rock disposal site of about 26 acres, but this area was never disturbed. Since the applicant has already paid for mitigation for this area but since the area was never actually disturbed, the 1989 mitigation could partially fulfill the requirement to mitigate for currently-proposed project.

**Findings:**

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the applicant must provide the following in accordance with:

**R645-301-333.** The applicant needs to mitigate for the loss of critical deer winter range that would be disturbed by the proposed waste rock disposal area.

# TOPSOIL AND SUBSOIL

**Analysis:**

**Soil Salvage - Waste Rock Disposal Area**

The waste rock material will be sampled and analyzed for acid and toxic-forming potential on a quarterly basis. Should a problem be identified, the Permittee commits to developing a mitigation plan for DOGM's approval, and thereby disposing of all acid and/or toxic-forming materials in accordance with an approved plan. *Enough fill and soil cover should be salvaged from the waste rock storage site to provide the minimum four feet of cover for the refuse pile surface and final face. Then, if an acid or toxic problem is identified during the quarterly sampling, the needed minimum cover will already be provided.*

All topsoil and subsoil resources that could be potentially disturbed or covered by disposal activities will be removed and salvaged, unless it would be unsafe or impractical because of slope, rockiness or limited soil depth. Plans for soil removal and sequence of removal are contained in Sections 2.32 and 5.28 of the MRP. In summary, the excavation of soil will take place sequentially, removing only the amount of soil from the area required for waste rock disposal. This procedure will prevent undue exposure of soil and allow vegetation to remain in place until the area is required for waste rock placement. Sequential excavation also will aid in maintaining the existing physical and chemical characteristics of the undisturbed soils. The waste rock pile will be constructed in segments starting at the top of the ravine. As each segment is finished, the pile surface will be regraded for final topographic configuration and then covered with the excavated fill and topsoil. Future sequential stripping of topsoil and subsoil fills from the expansion sections will be placed directly on the regraded areas, thus minimizing the amount of double handling of materials.

Initially, the soil will be stripped and stockpiled from the areas to be used for access roads and two small work areas within the disposal area. These two small areas are located in the upper disposal site drainage area and in the lower drainage area for the construction of the sediment pond.

Soldier Creek Coal Company is planning to salvage soil from the steeper side slopes of the disposal area drainage. According to the Division's guidelines, the rock fragment percentage

in this area is high. Salvage operations will continue until SC3 determines that the operations have become unsafe or impractical due to slope and/or rockiness of the slope soils. SC3 will confer with the DOGM for approval of the decision to cease soil salvage on the steep slopes. *In non-prime farmland areas, the Division currently does not consider high percentages of coarse rock fragments as a limiting factor in mine reclamation soils. A certain amount of coarse fragments can be tolerated depending upon the size of fragment and on the intended use of the reclaimed area.*

Once the soil materials required have been stripped from an area proposed for storage of waste rock material, SC3 plans to excavate the subsoil materials. These materials will be used as fill to cover the waste rock before redistribution and placement of the soil materials. The depth of subsoil in the upper portions of the disposal area drainage will be thinner than in the lower portions of the drainage.

In those areas where the topsoil (A and B horizons) is less than six inches thick, soil salvage will include both the topsoil and a portion of the subsoil materials (C horizons) as a mixture. Otherwise, topsoil and subsoil will be segregated with the subsoil being used as substitute topsoil and initial cover as explained above. The plan states that an average of 18 inches of soil will be salvaged. As with the subsoils, topsoil in the upper end of the disposal area are anticipated to be limiting in depth due to head cutting of the drainage and contact with Mancos Shale. Soils in the lower drainage are much thicker; SC3 commits to salvaging additional soil volumes where deeper soils of suitable quality exist. *Soil salvage should be based on soil survey results, recoverable soil depth and needed soil reclamation volumes, not on a stated value of 18 inches. A professional soil scientist needs to be available during salvage operations for insuring optimum soil salvage, proper excavation and separation of adequate quantities of topsoil and subsoil. Soil salvage information needs to be presented and correlated with reclamation efforts for obtaining the needed four feet minimum cover of soils and fills for the entire surface and future face of the waste rock pile. Based on the four feet minimum cover requirement, soil salvage depth and projected salvage volumes need to be provided for the waste rock disposal area.*

The MRP states that before any soil removal, vegetation will be burned or cleared and buried. *Only vegetation cover that would interfere with soil salvage should be removed. All other vegetation should be salvaged with the soil; live haul of soil materials will heighten reclamation and revegetation success. The applicant should save all removed vegetation material to be placed and/or incorporated in the surface of the topsoil pile.*

**Topsoil Storage Area**

The present topsoil storage site is approved for storage of topsoil, substitute topsoil and landscape boulders. Currently, the 4.5 acre site has four piles occupying 2.3 acres with material salvaged from surface facilities expansion and road relocation areas. The remainder 2.2 acres

will be used for storing topsoil and substitute topsoil salvaged from the waste rock disposal site, and from the proposed Dugout Canyon mine site. Soil from The Dugout Canyon mine site will be stored exclusively in a designated area which is separate from the other piles. Any further placement of topsoil necessitates the formation of new soil piles to eliminate disturbance to the currently established piles.

Topsoil will be stripped from the topsoil storage site's remaining 2.2 acres prior to placement of any salvaged soil. All salvaged and stockpiled topsoil/substitute topsoil will be protected from excessive erosion and instability by placing the soil on a stable site with proper identification signs, by establishing runoff control and diversion measures, by establishing an interim vegetation cover, and by not disturbing the topsoil until redistribution.

**Findings:**

The permittee must provide the following, prior to approval, in accordance with the requirements of:

**R645-301-232.** (1) Soil salvage information needs to be presented and correlated with reclamation efforts for obtaining the needed four feet minimum cover of soils and fills for the entire surface and future face of the waste rock pile. Based on the four feet minimum cover, soil salvage depth and projected salvage volumes need to be provided for the waste rock disposal area. (2) A professional soil scientist needs to be available during salvage operations for insuring optimum soil salvage, proper excavation and separation of adequate quantities of topsoil and subsoil. Soil salvage should be based on soil survey results, recoverable soil depth and needed soil reclamation volumes, not on a stated value of 18 inches. (3) In non-prime farmland areas, the Division currently does not consider high percentages of coarse rock fragments as a limiting factor in mine reclamation soils. A certain amount of coarse fragments can be tolerated depending upon the size of fragment and on the intended use of the reclaimed area. (4) Only vegetation cover that would interfere with soil salvage should be removed. All other vegetation should be salvaged with the soil; live haul of soil materials will heighten reclamation and revegetation success. The applicant should save all removed vegetation material to be placed and/or incorporated in the surface of the topsoil pile.

## VEGETATION

**Analysis:**

The current mining and reclamation plan includes a plan for interim reclamation. Generally, these areas would be revegetated using the same methods as for final reclamation; however, smaller areas would be fertilized, planted, and mulched by hand. The interim seed

mix has been used successful on the topsoil stockpiles, but the permittee should consider adding more seed of aggressive species that will establish quickly. The amount of intermediate wheatgrass could be increased by one or two pounds per acre, or some other species, like Hycrest crested wheatgrass or Russian wild rye, might be added.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

**Analysis:**

**Road Classification**

There are two roads associated with the waste rock site. The Permittee classified the main access road as primary and the sediment pond access road as ancillary.

The Division has reviewed the design and purpose of the sediment pond access road and determined that it should be classified as a primary road. The sediment pond access road must be classified as primary since it will be used through out the life of mine and will be used frequently during reclamation.

**Plans and drawings.**

In Section 5.34 subsection Waste Rock Disposal Site of the permit amendment, the Permittee states that designs, specifications, and plans for the roads are presented in Appendix 5-B. It appears that Appendix 5-B is missing from the submittal. The only appendix submitted with this amendment was Appendix 5-E, which has to do with reclamation mass balance calculations. In Volume 3 of the mining and reclamation plan Appendix 5-A and Appendix 5-D are listed. Neither of the two appendixes give detailed design information on the waste rock disposal site roads. The Permittee has failed to provide the Division the road design information required by R645-301-527 and R645-301-534.

**Other Transportation Facilities**

There are no other transportation facilities associated with the waste rock site.

**Findings:**

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the Permittee must provide the following in accordance with:

**R645-301-527 and R645-301-534,** must provide the Division with detailed design specification of the roads associated at the waste rock disposal site.

**R645-301-527.122,** the Permittee must classify all roads in the waste rock site as primary.

## SPOIL AND WASTE MATERIALS

**Analysis:**

**Disposal of non-coal waste**

The Permittee's current plan for disposal of non-coal waste is located in the approved MRP. That plan is adequate to cover the disposal of all non-coal waste associated with the waste rock disposal site.

**Coal mine waste.**

Appendix 5-A, Geotechnical Evaluation Report, Section 4.0 presents the slope stability analyses done by EarthFax for the coal mine waste site. The slope stability analysis were done for the access road, the refuse pile while under construction and at final configuration and the refuse pile sediment pond. The stability analysis done by EarthFax indicate that all the slopes will be stable if the assumptions used for the calculations are valid.

In Section 1 of Appendix 5-A the EarthFac engineers state "Because the engineering properties of soil can vary significantly over a small distance, a limited soils exploration and testing program may not adequately address all design factors. A qualified engineer or geologist should be at the site during embankment and road construction to monitor field conditions and make field decisions as necessary. The Permittee did not address how the consultant recommendation for a qualified engineer to be on site during construction will be achieved.

In Section 5.28 of the amendment, the Permittee states that prior to the placement of any waste rock for the initial or any subsequent segment of the pile, all vegetative cover shall be removed. After removal of the vegetation from the given sediment pond area, the topsoil shall be removed, stockpiled, and properly protected for future reclamation purposes. The topsoil will be stockpiled at the temporary topsoil stockpile area indicated on Plate 5-1. The

waste rock pile will be constructed by placing material for each segment of the pile in 100 foot wide benches with horizontal lifts not to exceed two vertical feet. The material shall be dumped from haul trucks and reworked by suitable earth moving equipment capable of spreading, compacting, and leveling the lifts. This method will assist in achieving the desired densities and prevent the formation of large voids in the materials. Additional compaction for each lift can be achieved by controlling the routing of the loaded haul trucks to cover the entire surface of a given segment of a lift evenly. During construction the outfacing slopes will not be steeper than 2h:1v. The final outfacing slopes should not be steeper than 3h:1v.

The Permittee states that he will compact the coal mine waste material with the proper equipment to achieve the desired densities and prevent the formation of large voids. He does not state what the compaction equipment will be or the compaction specifications. This information is needed by the Division to determine if the material is properly compacted. In order to achieve the proper compaction the Permittee must use the appropriate equipment and control the materials water content.

The Permittee did not address how combustion will be controlled at the site. Under R645-301-536.230 the Permittee is required to place the coal mine waste in a manner to prevent combustion. The Permittee is not required under R645-301-536.230 to address how combustion will be prevented from occurring during placement.

**Refuse piles.**

In Section R645-100-200, a refuse pile is defined as a surface deposit of coal mine waste that does not impound water, slurry, or other liquid or semi liquid material. The waste rock disposal site is by definition a refuse pile. Section R645-301-553.252 states the engineering regulatory requirements for under drains in refuse pile. Section R645-301-746.211 states the hydrology regulations for under drains in refuse piles. That regulation states if the disposal area contains springs, natural or manmade water courses, or wet weather seeps, the design will include diversions and under drains as necessary to control erosion, prevent water infiltration into the disposal facility and ensure stability.

There may be seeps in the waste rock site associated with channel. If so then the PAP must contain designs for the under drains. The Permittee has not addressed this issue.

**Findings:**

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the Permittee must provide the following

in accordance with:

**R645-301-528,** the Permittee must provide the Division with an adequate description of how the waste rock site will be constructed. That description must include the types of compaction equipment and compaction standards.

**R645-301-553.252 and R645-301-746.211,** the Permittee must either address how the under drains will be constructed or demonstrate that under drains are not needed.

# HYDROLOGIC INFORMATION

**Analysis:**

**Ground-water monitoring.**

Ground water monitoring information is presented in section 7.31.2. The permittee proposes to monitor the wells for water elevation on a quarterly basis. No proposed water quality monitoring is presented. It is recognized that the water quality of the groundwater is of low quality and not likely to be adversely impacted by the rock site, however, the materials in the waste rock site could affect a change in the water quality of Anderson Reservoir. The wells may provide necessary information to assist in determining whether changes that occur might occur from the waste rock site drainage or other influences. The well water monitoring plan should include the minimum water quality parameters required under R645-301-731.211. Groundwater operational information does not include Selenium and Boron analysis. These parameters are water quality parameters with criteria set by the state as for the downstream use of irrigation. This data as background operational information are important because Anderson Reservoir may recharge the groundwater especially near the reservoir. If, high Boron or Selenium are identified in the waste rock site analysis these constituents may become important parameters in the operational sampling program.

**Surface-water monitoring.**

The surface water monitoring plan is included in Table 7.31-1. The surface stations added to the plan for the waste rock site includes Anderson Reservoir. The permittee indicates the surface water "stream" sampling protocol will be used for monitoring the reservoir. Because the reservoir is a water basin and not a flowing stream the permittee must clarify that water level elevations will be obtained for the reservoir. This is necessary because the elevation of water in the basin will affect the concentration of chemical constituents in the reservoir. Additionally, the

permittee needs to provide upstream sampling points below the waste rock site and in the irrigation ditch above the waste rock site as this ditch feeds the reservoir. This is the only means to provide a determination of what waters may change the water quality/quantity that might be observed in the reservoir.

**Acid and toxic-forming materials.**

The permittee has indicated there are no plans to include acid and toxic forming materials in the pile and if acid and toxic forming materials are identified then they will be covered with a minimum of four feet of fill, section 2.42, page 2-52 (rev.9/25/96). The permittee has identified a sampling scheme to collect samples quarterly when the site receives material. Should a problem be identified, a mitigation plan will be prepared and submitted within 30 days of receipt of analysis. The plan will be followed once approved (section 5.28). The operation plan meets the minimum requirements for the regulations pertaining to this section.

The sediments and materials collected in the sediment pond will be tested as described in section 5.28 and deposited in the waste rock site.

**Transfer of wells.**

No transfer of wells is proposed. The operation plan meets the minimum requirements for the regulations pertaining to this section.

**Discharges into an underground mine.**

No underground mines are associated with the waste rock disposal area. The operation plan meets the minimum requirements for the regulations pertaining to this section.

**Gravity discharges.**

No underground mines are associated with the waste rock disposal area. The operation plan meets the minimum requirements for the regulations pertaining to this section.

**Water quality standards and effluent limitations.**

The waste rock sedimentation pond receives discharge from the waste rock site. On March 3, it was determined that the waste rock site sedimentation pond was not included in the Soldier Creek mine plan under permit number UT-0023680 per a conversation with Steve

McNeal from the Utah Department of Environmental Quality. Prior to discharging from the sedimentation pond the permittee must obtain a permit from the Department of Environmental Quality. Other state water quality standards that apply based on use of the waters are included in Table 7.24-6.

**Diversions.**

The permittee has provided a typical drawing of the refuse pile area on Figure 5-1. This drawing provides an interim concept between the final configuration presented on Plate 3. Locations of drainages for interim ditches and drainage associated with these phases at the Waste Rock Site were not presented. The locations of drainages or direction of sheet flow and the measures used to protect topsoil from potential contamination through transport of sediment from drainage on the waste rock site were not presented. Diversion designs may not contemplate the steepest slope at the base of the waste rock site during interim stages.

Road designs were presented in Appendix 5-B. Road ditches and culverts were sized to handle the 10 year 6 hour event and meet minimum design requirements. The designs presented for the access roads were labeled, and are presented on Plate 1.

The waste rock designs are considered to meet the regulatory definition of "valley fill" since the side slopes of the existing valley at the steepest point are greater than 20 degrees. This information was determined by the Division from information presented on Plate 5-2.

The permittee has not provided a design for sub-drainage flows at the waste rock site. Although the permittee has stated the channel flows in response to ephemeral flows, the permittee has also identified flow in the stream channel through the seep and spring survey. The baseline data to characterize these seeps were not presented. Also, some mottled soils were found in the topsoil storage area and at the refuse site in an adjacent area. These mottles are most likely present from subsurface flows fed by the irrigation canal. This canal was breached causing irrigation water to run into the valley proposed to contain the waste rock site however, the subsurface flow may continue even after the road culvert is placed across the breached channel section. Additionally, development of the waste rock site will create a superficial raised surface elevation. Evaporation of the subsurface water around the margins of the reservoir may be decreased and increase the water table elevation end near the reservoir. Another design consideration for the contact with the waste, should be the erosive nature of Mancos and a tendency of the Mancos to pipe when coming in contact with water.

The drainage plan calls for diverting drainage from above the fill into a channel which transports the drainage across the slope above the north west end of the proposed extent of the refuse pile. This concept is adequate for a short term diversion. However, parameters used in the design do not appear adequate. Although the curve number seems to contain

reasonable assumptions based on the soils information presented, the geologic plate 6-2 describes this area to be a quaternary pediment. Recollection of personal observations of the area in UD-1 suggest the curve number (75), used in the design to determine runoff from this area, is not appropriate. This area is largely comprised of large boulders and possibly bedrock. Additionally, the proposed design does not consider some site specific elements affecting long-term function of the drainage. Localized high flashy flows from thunder clouds are not uncommon in this region and may exceed the runoff estimated from a 100 year - 6 hour event. The area downstream of this ditch grades back toward the waste rock site and is likely to flow into the proposed waste rock site at a downstream location. It would be prudent for the permittee to design this ditch to take the flow across the slope at the site of the existing natural drainage for the reclamation channel design.

The location of the diversion ditches associated with the refuse pile can not be determined as they mesh with the line showing he maximum extent of the pile.

**Stream buffer zones.**

The permittee has classified this drainage as an ephemeral system. Although the waste rock is being placed in the drainage above the Anderson Reservoir the site, based on the presented information, does not appear to require a stream buffer zone variance as this drainage has not been classified as intermittent or perennial. However the permittee needs to obtain a determination on whether it is necessary to obtain a permit from the state to place fill into a natural water-way prior to constructing the waste rock site.

**Sediment control measures.**

The permittee has indicated that the sediment control measures are designed to disturb the smallest practical area through providing contemporaneous reclamation and stabilizing the regraded and contoured refuse material as soon as practical. The maximum disturbed area of the waste rock disposal site will range from 4 to 8 acres at any one time according to text in section, 3.22.22. These activities will result in a reduction of the runoff and sediment rate and volume expected from the site area. Suitable mulch and other soil stabilizing practices will be used on all areas covered by topsoil an topsoil substitute materials (page 2-56).

**Siltation structures.**

The plan states that "Original runoff control facilities for disposal and stockpile areas will be maintained and sequencing of reclamation will be used to reduce the potential for erosion of the newly planted surfaces. The remedial measures will stay in affect until such time as the natural vegetative cover is well established and can naturally control erosion." The removal of runoff control facilities requires approval of the Division.

It is not clear whether the proposed topsoil storage area includes the area currently treated by a berm surrounding the storage site. Information on sediment control measures for the topsoil storage sites could not be found.

**Sedimentation ponds.**

No permanent impoundments are planned for the waste rock disposal area. The only impoundment planned is the temporary sediment pond used for the purpose of sediment control during the life of the disposal and reclamation operations. This pond has been designed by EarthFax Engineering, Inc. The sizing and hydrologic design of the pond are presented in Chapter 7 of this application. A geotechnical investigation of the proposed sediment pond was conducted by EarthFax Engineering Inc. and is presented in Appendix 5-A. The EarthFax report indicates that the sediment pond will have a minimum 1.5 static safety factor and a minimum 1.2 seismic safety factor.

The physical design of the sediment pond requires that the foundation and abutments be cleared of all vegetative and organic matter. The foundation site will be excavated to the design depth. The top 9 inches of the area for embankment construction shall be scarified and recompacted to 90 percent of the maximum dry density as determined by ASTM D1557. Moisture content during compaction should be maintained a +/- 2 percent of the optimum as determined by ASTM D1557.

The embankment fill material shall be placed in horizontal lifts not to exceed 12 inches in thickness prior to compaction. Embankment materials shall be compacted to 90 percent of the maximum dry density as determined by ASTM D1557. Moisture content during compaction should be maintained a +/- 2 percent of the optimum as determined by ASTM D1557.

Embankment materials shall be free of organic material. The ML materials identified in test pit TP-1 shall be used in the construction of the embankment. No refuse materials shall be used in the embankment fill.

During the embankment construction, the CMP pipes for the principle and emergency spillways shall be placed at an average gradient of 2.5 percent through the embankment. Structural fill within 2.0 feet of the CMP pipes shall be compacted to a dry density of at least 90 percent of ASTM D1557 at a moisture content of +/- 2 percent of the optimum. During the placement and compaction of the fill along the CMP pipes, the pipes should be preloaded to prevent them from pushing up and out to alignment. Preloads should be maintained until a fill depth of at least on pipe diameter has been placed and compacted.

Two anti-seep collars within minimum dimensions of four feet by four feet shall be placed around each of the CMP pipes, at 30-foot spacings along the length of the pipes. The anti-seep collars shall have water tight connections to the CMP pipes.

To prevent erosion, the interior and exterior slopes of the embankment should be vegetated with the temporary seed mix as discussed in Section 3.31 of the application.

The Permittee did not discuss the size of the sediment pond and if it meet the requirements for being an MSHA pond in the engineering section. Since an MSHA pond must met stricter requirements this information in essential for reviewing the designs, see R645-301-533.100

The Permittee did not address how the pond will be protected against sudden drawdown, see R645-301-533.300. That regulation is designed to prevent slope failure do to pore water pressure inside the dam.

The permittee includes a statement that inspections will meet R614-301-514.300 requirements and commits to conduct reporting and emergency procedures in sections 5.14 and 5.15. The plan meets minimum regulatory requirements for inspection and emergency reporting procedures.

Information regarding the Waste Rock Disposal site are found in section 5.33 and in Chapter 7. A geotechnical investigation was presented in Appendix 5-A. According to this investigation the pond will have a minimum 1.5 static safety factor and 1.2 seismic safety factor.

Proposed design criteria include retaining moisture during compaction at level +/- 2 percent of the ASTM D1557 standard for moisture content. Scarification and compaction of the top 9" of the base of the embankment is proposed, and removal of vegetative and organic matter will be completed. The fill will be compacted in 1 ft lifts. No refuse will be used in the embankment. Materials will come from those identified in TP-1. Two anti-seep collars will be placed at 30 ft spacings along the length of the pipe. The slopes of the sedimentation pond will be stabilized with the intermediate seed mix in Appendix 3-E.

The sediment pond design was sized for containment of runoff from the 10 year - 24 hour event and includes a five year sediment storage volume with a commitment to clean out the pond at the 60 % clean out level. The plan meets the minimum requirements for treating runoff from the 10 year-24 hour precipitation event. The plan meet minimum design requirements for sediment storage.

Two trickle tube spillways, 2.5 foot diameter culverts, are proposed to meet spillway requirements. Design calculations were based on the runoff from a 25 year-6 hour precipitation event calculated to be 24.82 cfs. One trickle tube spillway is shown to pass the design event. The second spillway is considered an emergency spillway. The spillway designs presented in the plan meet the minimum design criteria for spillways.

One of the spillways is designed to have a decant with a trash rack and skimmer with a valve control on the sediment pond embankment. The decant is proposed to be located approximately 2 feet above the 60% clean out elevation and 3 feet below the spillway. The elevation between the calculated spillway flow line and the embankment is 1 foot, approximately 2 feet above the spillway. The proposed pond design provides for a six inch decant operation but did not provide a decanting operation plan which describes how the decant will be adequate to maintain detention time.

Spoils, resulting from the sediment pond waste, will be disposed of within the waste rock disposal site.

**Other treatment facilities.**

No other treatment facilities are proposed in relation to the waste rock site operations. The plan meets the applicable minimum regulatory requirements for this section.

**Exemptions for siltation structures.**

Siltation structure exemptions were not proposed for areas related to the waste rock site.

**Discharge structures.**

The discharge structures meet the minimum design criteria. The plan meets the applicable minimum regulatory requirements for this section.

**Impoundments.**

Text in the plan indicate the waste rock site is proposed to be constructed so that it will not impound water section 5.36. No impoundments other than the waste rock site sedimentation pond are proposed. The plan meets the applicable minimum regulatory requirements for this section.

**Casing and sealing of wells.**

The permittee has committed to temporary casing and sealing of water monitoring wells according to the requirements of R645-301-748. The plan meets the applicable minimum regulatory requirements for this section.

**Findings:**

The permittee has not adequately addressed the requirements of this section. The permittee must provide the following in accordance with:

**R645-301- 731.** Prior to discharging from the sedimentation pond the permittee must obtain a discharge permit from the Department of Environmental Quality. Prior to placing fill in the waste rock site the permittee must obtain a determination from the state engineers office as to whether this action requires a permit to alter a natural water way of the state.

**R645-301-742.300.** Provide drainage designs for drainage associated with the interim phases at the Waste Rock Site presented on Figure 5-1, include the measures used to protect topsoil, below the waste rock site, from potential contamination through transport of sediment from drainage originating from the waste rock site.

**R645-301-731.211.** The operational groundwater monitoring plan should include at minimum the water quality parameters required under R645-301-731.211.

**R645-301-731.220.** The permittee needs to provide an operational water monitoring plan for the irrigation ditch waters upstream of the waste rock site and above the inlet to the reservoir or, demonstrate that the existing monitoring plan will account for variation in water quality changes that may occur at Anderson Reservoir due to the variation in irrigation water v.s. the water that may originate from the waste rock site.

**R645-301-742.314.** The permittee must demonstrate by collection of site specific geologic data or soils analysis that the CN used for watershed UD-1 and the associated drainage diversion ditch is appropriate. Provide a symbol for the operational drainage ditches which can be distinguished from other elements represented on Plate-1.

**R645-301-742.314.** Provide design information providing sediment control measures for the topsoil storage sites.

**R645-301-742.314.** Provide a decanting operation plan which describes how the decant will be adequate to maintain detention time.

**R645-301-745.120-122.** The permittee must provide a design for an under-drain system that meets the regulatory requirements.

## SUPPORT FACILITIES AND UTILITY INSTALLATIONS

**Analysis:**

There will be no support facilities or utility installations associated with the waste rock site.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## SIGNS AND MARKERS

**Analysis:**

Signs and markers will be posted, maintained, and removed by the operator; will be a uniform design that can be easily seen and read; be made of durable materials; and conform to local laws and regulations; and be maintained during all activities to which they pertain. These signs shall include a mine and permit identification sign, perimeter markers, buffer zone, and topsoil markers.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## USE OF EXPLOSIVES

**Analysis:**

The Permittee has not stated that there will be any explosives used at the waste rock site. From the general description of how the site will be constructed there is no indication that explosives will be used. If the Permittee chooses to use explosives during the construction of the waste rock site he must first receive approval from the Division.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

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

**Analysis:**

**Affected area maps.**

Figure 5-1 does not show the location of the permit or disturbed area boundaries as required by R645-301-521.140.

**Mining facilities maps.**

Figure 5.1 does not show the contours at the waste rock site or give sufficient slope measurement as required by R645-301-521.151.

**Mine workings maps.**

**Monitoring and sample location maps.**

Sites proposed for operational monitoring are included on Plate 7-1.

**Surface Water Resources Maps**

The permittee submitted a runoff control map as exhibit 7.32-1. The map provides new contour information which provides for a more accurate site description from the previous topographic maps. However, the map scale is smaller and it makes the presented information more difficult to illustrate. The map does not have a legend that clearly identifies what the delineations represent, disturbed area boundaries and permit area boundaries are not delineated making the submittal unclear and difficult if not impossible to check against designs. If additional drainage areas are being transported to existing drainage designs the permittee should demonstrate that the designs pass the required flow event. The map does not clearly delineate the full extent of the watersheds identified and in some cases it is difficult to identify the label with the watershed. The north arrow points in the wrong direction. The map legend has indicated that this map replaces exhibits 4.2-5, 10.2-4-1, 4.2-6, 4.2-2 and figure 7. None of these exhibits could be found in the exiting plan table of contents or in the plan. The permittee has provided a label for a typical road cross section but, does not include the cross section on the map. Other inconsistencies may exist.

**Findings:**

The permittee has not met the requirements of this section. The permittee must provide the following prior to approval.

**R645-301.** Provide a clear and accurate map which delineates the disturbed area boundaries and permit area boundaries. Clearly delineate the full extent of the watersheds identified and clearly present the label associated the watershed. If additional drainage areas are being transported to existing drainage designs the permittee should demonstrate that the designs pass the required flow event. Provide an accurate north arrow on the map. Provide contours or slope measurements for the waste rock site.

# RECLAMATION PLAN

## POSTMINING LAND USES

**Analysis:**

The applicant proposes to return the land to its premining land uses of rangeland, wildlife habitat, and recreational use. The Permittee has not proposed any alternative postmining land uses.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## APPROXIMATE ORIGINAL CONTOUR RESTORATION

**Analysis:**

Plate 5-2 shows the contour lines for the reclaimed waste rock site. At the base of the waste rock site the contour lines bend at 90°. The sharp bend in the contour lines does not approximate the natural contours of the area. The Permittee should consider rounding the contours at the base of the waste rock site.

**Findings:**

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the Permittee msut provide the following in accordance with:

**R645-301-553.100,** the proposed final contours at the waste rock site do not meet the approximate original contour requirement. The Permittee could meet this requirement by smoothing the contours at the bottom of the waste rock site.

## BACKFILLING AND GRADING

**Analysis:**

As indicated, no facilities will remain after they reclaim the site. Upon cessation of operations, due to the phased construction and reclamation of the waste rock pile, they estimate that few facilities will remain. Those facilities will consist of the access road, the active portion of the pile, the sediment pond and associated runoff control structures, and the temporary topsoil storage area.

The reclamation of the disposal site will consist of site regrading, fill and topsoil placement, reseeding, and soil stabilization. The specific configuration for site regrading is presented as a topographic contour map and cross-section (see Plate 5-2 and Appendix 5-C). As discussed in Section 2.40, 5.28 and 5.37, they will grade and smooth the area to the final topographic configuration. They will rework the waste rock material to break down the large pieces and a compactor or other piece of construction equipment will compact them with comparable load distribution. They will remove the all-weather road surface and rip the area to a depth of at least 12 inches. Construction staking will ensure they are maintaining the proper grades.

Following the regrading, the fill and topsoil stored in the temporary topsoil storage area will be distributed according to the plan presented in Section 2.40 of this application. During the placement and distribution of the fill and topsoil, they will attempt to maintain a uniform thickness over the reclaimed area.

Once they distribute the soil materials, the seed bed will be prepared. This will be done according to the topsoil plan presented in Section 2.40 and 2.43 of the PAP. The seed bed preparation will include scarification and addition of soil nutrients and amendments if needed.

They will conduct reseeding according to the revegetation plan presented in Section 3.41 of the PAP. They will conduct the reseeding in the fall of the year to allow the greatest possibility of revegetation success.

Following the reseeding, they will apply mulch to stabilize the soils as described in Section 2.44 and 3.41.23 of the PAP. This practice will help in reducing the erosion and maximizing the potential of revegetation success.

In Appendix 5-E the Permittee show the results of a slope stability analysis for the refuse pile. The analysis was done with the aid a geotechnical computer program called GEOSLOPE. According to the analysis the minimum static safety factor for the waste rock pile is 2.164. The R645-301-553.130 requires that the postmining slopes have a minimum safety factor of 1.3. Based on that study the Division has determined that the slopes will be stable.

The Permittee states that the refuse material will be compacted. He does not state that the compaction requirements for the waste rock site. Without that information the Division cannot determine if the compaction efforts are satisfactory. The Permittee must state what the compaction specifications are for the waste rock. R645-301-536.100 requires that the Permittee design the disposal facility using current prudent engineering practices. The Division has determined that compaction specification are part of a prudent design.

As mention in the Approximate Original Contour section of this TA the backfilling and grading plan do not meet the AOC requirements. The contour lines for the backfilling and grading plan do not blend in with the surrounding topography. Smoothing the contour at the bottom of the waste rock pile could meet that requirement. See the Approximate Original Contour section of this TA for more details.

**Findings:**

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the Permittee must provide the following in accordance with:

**R645-301-536.100,** The Permittee must provide the Division with prudent engineering designs for the waste rock site. The designs must include compaction specifications.

**R645-301-553.130,** The Permittee must modify the final contours so that they bend in with the surrounding topography. The sharp corners at the bottom of the waste rock site will appear unnatural.

## MINE OPENINGS

**Analysis:**

No mine openings are at the waste rock site.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## TOPSOIL AND SUBSOIL

**Analysis:**

**Waste Rock Disposal Site**

Soldier Creek Coal Company plans to place a fill cover of 24 to 30 inches and 6 to 12 inches of topsoil over the waste rock. This cover is based on the assumption that the material is neither acid nor toxic forming. The plan states that in the event they identify that acid or toxic forming materials, then SC3 will cover the waste rock with a minimum of four feet of the best available, nontoxic and noncombustible material. *Following final grading of any refuse pile, they will cover the coal mine waste with a minimum of four feet of cover. As discussed in the Operation Section if they identify an acid or toxic problem, enough fill and soil cover should be salvaged from the waste rock storage site to provide the minimum four feet of cover for the refuse pile surface and final face. If the acid and/or toxic problem is critical, SC3 needs to commit for developing additional mitigation that will help offset any potential environmental harm.*

They will construct the waste rock pile in segments. They will reclaim each segment at each portion of the site is exhausted. The surface of the filled sections will be graded to the final topographic configuration. They will rework the waste rock consisting of cobble size fragments of shale, sandstone and siltstone at the surface to break down large pieces and compact them. After regrading and surface preparations are complete, the fill material will be uniformly placed over the waste rock. During the placement of the fill, the area will be adequately compacted to provide a stable fill cover and to prevent slippage of the fill materials. Following the placement of the fill materials, the soils will be placed uniformly over the entire fill area and scarified to a depth of at least 10 inches. *Scarification and/or ripping of the compacted fill material should take place before they apply the topsoil. Scarification helps relieve the effects of excessive compaction, reduces potential slippage of the fills, promotes water infiltration and encourages root penetration. After they apply the topsoil, additional surface roughening of the soil surface by deep gouging and rock placement will provide micro-environments that encourage seed germination and promote water harvesting.*

During topsoil placement, they will take random excavations of the topsoil fill to ensure compliance. After they achieve final grade, random sampling of the soil will help determine

fertilizer requirements. Analyses will include pH, texture, percent organic matter, ammonium and nitrate nitrogen, phosphorus, potassium, electrical conductivity, and sodium absorption ratio.

Based on current soil nutrient levels of the Hernandez soil, they project fertilization rates for the topsoil storage area and for the waste rock disposal area. The plan proposes to add nitrogen by applying 88 pounds per acre of sulfur coated urea, 45-0-0. They will apply treble superphosphate, 0-46-0, at 65 pounds per acre. The plan states that potassium concentrations are within the desirable levels for successful revegetation. *Based on the given soil test results presented in Table 2.42-1, the Division has determined that fertilizer recommendations are in error. The nitrate-nitrogen levels range from 101 to 510 ppm and are completely within desirable levels for successful revegetation; therefore, no nitrogen is needed. Phosphorus levels range from 0.22 to 2.74 ppm. These phosphorus levels are low; therefore, 50 to 70 pounds per acre of $P_2O_5$ are needed. Potassium concentrations range from 4.5 to 62 ppm. These potassium levels are extremely low and are not within acceptable limits. Potassium fertilization rates should range between 140 to 220 pounds of $K_2O$ per acre. These fertilization rates are based on dryland farming conditions for wheat.*

**Soldier Canyon Mine**

Appendix 5E, Reclamation Mass Balance Calculations, shows the total of excess cut material to be 20,602 $yd^3$. The appendix discussion concludes that the best use of this material would be for the final face of the refuse pile, providing 4 feet of cover. *The needed soils and fills for the four feet of cover on the final face of the refuse pile should be salvaged from the waste rock disposal area, not obtained from the 20,602 yd3 of excess cut material. The excess cut material could then be used to supplement the 10,994 yd3 of topsoil and substitute topsoil for reclaiming pre- and post-SMCRA areas. This extra supplement would enhance reclamation efforts by providing a much deeper soil cover than the projected five and 12 inches slated for the pre- and post-SMCRA areas, respectively.*

*Soil salvage and reclamation summary information needs to be updated, corrected and clarified for all topsoil and substitute topsoil yardage volumes, acreage, and needed reclamation volumes as contained in Section 2.32 and Appendix 5E. Projected volumes and area descriptions seem to conflict and/or don't agree. Check information for accuracy, consistency and clarity. Appendix 5E needs to be updated for the waste rock disposal area.*

**Findings:**

The permittee must provide the following, prior to approval, in accordance with the requirements of:

**R645-301-553.250 and R645-301-553.300.** Following final grading of any refuse pile, the coal mine waste will be covered with a minimum of four feet of cover. As

discussed in the Operation Section and in the event that an acid or toxic problem is identified, enough fill and soil cover should be salvaged from the waste rock storage site to provide the minimum four feet of cover for the refuse pile surface and final face. If the acid and/or toxic problem is critical, SC3 needs to commit for developing additional mitigation that will help offset any potential environmental harm.

**R645-301-242.200.** Scarification and/or ripping of the compacted fill material should take place before the topsoil is applied. Scarification helps relieve the effects of excessive compaction, reduces potential slippage of the fills, promotes water infiltration and encourages root penetration. After the topsoil is applied, additional surface roughening of the soil surface by deep gouging and rock placement will provide micro-environments that encourage seed germination and promote water harvesting.

**R645-301-243.** Based on the given soil test results presented in Table 2.42-1, the Division has determined that fertilizer recommendations are in error. The nitrate-nitrogen levels range from 101 to 510 ppm and are completely within desirable levels for successful revegetation; therefore, no nitrogen is needed. Phosphorus levels range from 0.22 to 2.74 ppm. These phosphorus levels are low; therefore, 50 to 70 pounds per acre of $P_2O_5$ are needed. Potassium concentrations range from 4.5 to 62 ppm. These potassium levels are extremely low and are not within acceptable limits. Potassium fertilization rates should range between 140 to 220 pounds of $K_2O$ per acre. These fertilization rates are based on dryland farming conditions for wheat.

**R645-301-233.100.** The needed soils and fills for the four feet of cover on the final face of the refuse pile should be salvaged from the waste rock disposal area, not obtained from the 20,602 yd3 of excess cut material. The excess cut material could then be used to supplement the 10,994 yd3 of topsoil and substitute topsoil for reclaiming pre- and post-SMCRA areas. This extra supplement would enhance reclamation efforts by providing a much deeper soil cover than the projected five and 12 inches slated for the pre- and post-SMCRA areas, respectively.

**R645-301-120.** Soil salvage and reclamation summary information needs to be updated, corrected and clarified for all topsoil and substitute topsoil yardage volumes, acreage, and needed reclamation volumes as contained in Section 2.32 and Appendix 5E. Projected volumes and area descriptions seem to conflict and/or don't agree. Check information for accuracy, consistency and clarity. Appendix 5E needs to be updated for the waste rock disposal area.

# ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

**Analysis:**

The Permittee has committed to reclaim the access road at the waste rock site.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

# HYDROLOGIC INFORMATION

**Analysis:**

**Ground-water monitoring.**

No discussion relating to monitoring through the reclamation period was found in the text of the plan. The location for wells MW-1M and MW-1C are located downstream of the proposed extent of the waste rock site. Perimeter wells MW-2M and MW-3M will also remain accessible on the periphery of the waste rock pile. Because these waters currently have no associated use, except their relationship to Anderson Reservoir, the only requirement necessary at this time is that the operation monitoring plan be followed until bond release. Since this is a requirement of R645-301-731.214, the permittee is considered to meet the requirements of this section.

**Surface-water monitoring.**

No discussion related to monitoring through the reclamation period was found in the text of the plan. The permittee needs to provide a water quality monitoring program for the reclamation plan that demonstrates the waters from the waste rock site meet the state requirements for downstream uses. It is assumed the operational plan will be followed until bond release as required by R645-301-731.224 or, as otherwise approved or required under the R645 regulations.

**Acid and toxic-forming materials.**

In the plan the permittee has committed to cover acid and toxic forming material with a minimum of four feet of fill, section 2.42, page 2-52 (rev.9/25/96). Additionally, the permittee has committed to prepare and submit a mitigation plan, within 30 days of receipt of an analysis that indicates a problem. The plan will be followed once approved (section 5.28). The plan meets the minimum requirements for handling acid and toxic forming

materials in this section.

**Transfer of wells.**

No transfer of wells is proposed. The pl ry requirements for this section.

**Discharges into an underground mine.**

No underground mines are associated with meets the applicable minimum regulatory requirer

**Gravity discharges.**

No underground mines are associated with a meets the applicable minimum regulatory requirem

**Water quality standards and effluent limi**

The Division will not release the bond until quality standards and effluent limits are met.

**Diversions.**

Section 3.41.22-24, reclamation activities wi ediate sections of the reclaimed channels and removal of th ing pond removal, the Permittee will construct the final

Following removal of the sedimentation pond, cess road. No retention of permanent structures related to aste rock site were proposed to be retained.

The planned reclamation channel designs provi te and, are designed for the 100 year - 6 hour precipitation ev s the minimum regulatory requirements. This design is a co site specific elements may effect the stability of the design. above this site reaches the short flat section at the top of the nt. This increases the potential that the ditch may breach a calized high flashy flows from thunder burst are common in th runoff estimated from a 100 year - 6 hour event. If the desig re to transport the flow across the slope from the existing na version ditch drainage the potential for drainage flowing over th would

likely be reduced. The drawback to this design would be a potential increase in water contact with the waste rock materials. The reclaimed channel design uses a slightly more conservative curve number of 80. This values seems more reasonable than the value used for the operational design but, should be checked against the information presented during the review of the operational designs as required by this TA under R645-301-742.314. Likewise the small drainage south of UD-1 appears to have a potential to receive runoff from the area above the boundary identified as the watershed area. The drainage area appears to have the potential to split and travel to the waste rock site area under high intensity runoff situations. It is recommended this area also be designed to receive drainage across the refuse into a designed channel.

R645-301-745.222 requires that runoff from the areas above the fill be diverted into stabilized drainage channels. The existing plan shows the irrigation ditch that runs above the waste rock site to be culverted where the ditch previously down cut into the valley to contain the waste rock site. Culverting of this irrigation canal will reduce the potential of run onto the waste rock site. Maintenance problems and events larger than the maximum culvert capacity would cause water to be carried down the existing cut to the waste rock pile. In order to provide for a stabilized diversion above the fill area. The permittee should provide a grading and drainage plan for the down cut area adjacent to the fill. This plan could be constructed when the lower extent of the pile reaches the location of the breached irrigation channel. This may also require changes in the disturbed are boundaries.

**Stream buffer zones.**

No designation for a stream buffer zone is required for the proposed waste rock site as it was defined as an ephemeral stream.

**Sediment control measures.**

The Permittee proposes that the sedimentation pond remain in place until they establish adequate vegetative cover. Then they will remove the pond and the area regraded. In section 3.56.30 the permittee has committed to retain siltation structures until the Division approves removal of those structures.

Reclamation activities completed to minimize sediment transport in combination with revegetation goals include; conducting all operations along the contour and; mulching with straw or hay, or hydro mulching at 2 tons per acre and anchored by crimping. For slopes steeper than 3:1 or 4:1 the slope will be left in a roughened condition by dozer tracking perpendicular to the slope. Plastic netting will be used to anchor mulch. The plan meets the minimum applicable requirements for this section.

**Siltation structures.**

The plan states that the sedimentation pond will remain in place at least two years following the last augmented seeding of the reclaimed surface in section 5.42.20. The plan meets the minimum requirements of this section.

**Sedimentation ponds.**

The Permittee proposes no permanent impoundments for the waste rock disposal area. The sediment pond located at the waste rock site is proposed to be removed following completion of the refuse pile. They stated that the topographic configuration was presented on Plate 5-3 (page 5-70) but, this map could not be found in the plan. The permittee needs to clarify the reference sited so the Division can make a determination of adequacy regarding regrading of the sedimentation pond.

**Other treatment facilities.**

They identified no other treatment facilities for the postmining land use or for retention as a postmining structure. The plan meets the regulatory requirements related to this section.

**Exemptions for siltation structures.**

The Permittee requested or identified no siltation structures exemption within the plan for the proposed waste rock site. The plan meets the regulatory requirements related to this section.

**Discharge structures.**

The Permittee proposes no discharge structures for retention as a postmining reclamation feature. The plan meets the regulatory requirements related to this section.

**Impoundments.**

The Permittee wants all impoundments removed during reclamation. The plan meets the regulatory requirements related to this section.

**Casing and sealing of wells.**

The permittee has committed to permanent casing and sealing of exploration holes and boreholes as required under R645-301-631 and 30 CFR 75.1711. Regulatory reference R645-301-631 cross references R645-301-731 for boreholes used as monitoring wells. Regulatory requirement R645-301-731 states that the plan will meet all other state applicable

Utah water quality laws and regulations, and includes the applicable rules for water well drillers. Therefore, The Division assumes that the references, through cross reference, have met the applicable requirements for casing and sealing wells.

**Findings:**

The permittee has not adequately addressed the requirements of this section. The permittee must provide the following in accordance with:

**R645-301-731-221.** Provide a water quality monitoring program for reclamation that shows the waters from the waste rock site flowing to Anderson Reservoir meet the requirements for the intended post mining land use.

**R645-301-120.** They stated that the topographic configuration is presented on Plate 5-3 (in the text page 5-70) but, this map could not be found in the plan.

**R645-301-745.222.** Provide a grading and drainage plan for the area next to the proposed waste rock site that assures runoff from the breached irrigation ditch will remains a stabilized diversion above the fill area and provide any necessary changes in the disturbed area boundaries (they could start This plan when the lower extent of the pile reaches the location of the breached irrigation channel).

## REVEGETATION

**Analysis:**

**Revegetation Plan**

The current mining and reclamation plan includes several commitments concerning the quality of materials for reclamation and how the Permittee will handle these materials. These commitments are very desirable and should help to ensure revegetation success.

The revegetation plan is contained in Section 3.41. They would grade and rip gentle slopes two-feet deep on four-foot centers after which the Permittee would apply the soil material. After analyzing the soil for fertilizer needs, they would apply and incorporate the fertilizer with a disc. Grass and forb seed would then be drilled one-half inch deep, and shrub seed would be broadcast seeded. The Permittee would then apply straw, hay, or wood

fiber mulch at the rate of two tons per acre. They would crimp the mulch.

Steep slopes would receive about the same treatments, except for ripping. They would also seed some area using broadcast seeding instead of drill seeding. To help revegetation success some seeded areas would be run over with dozers. The dozer tracks prove micro environments where vegetation is more likely to occur.

The Division has seen many areas where leaving the soil surface very rough appears to have greatly increased vegetation establishment. Leaving dozer tracks on the site would decrease surface roughness, and the Division does not recommend that procedure.

The applicant needs to make some changes to the seed mix for the proposed waste rock disposal area. The Permittee may need other changes to the revegetation plan in the future. The waste rock area is unique because the soils are presently in a valley where they may have a tendency to accumulate further soil and salt deposits. When they reclaim the area the soils will be elevated. Predicting what type of vegetation community the area would best support is hard. Therefore, the applicant needs to be willing to try some different revegetation techniques on the first reclaimed section of the waste rock pile and to change the revegetation plan for future sections.

There is plenty of pinyon-juniper woodland in areas next to the proposed waste rock disposal area, so it is not necessary to establish this vegetation community. It would be much better to add diversity and greater forage production. Consequently, they should eliminate juniper from the seed mix.

Galleta is a dominant grass in the undisturbed area, but galleta has not established from seedings at other reclaimed coal mines in Utah. One reason may be that most galleta seed production is in Midwestern and Southwestern states that have ecotypes that are different from those at the mine site. In the time between initial disturbance and initial reclamation, The Division recommends that the applicant or a contractor for the applicant collect galleta seed from nearby areas and use this seed either to plant directly or to grow plugs for transplanting. This would be an experiment to see if they can establish galleta using these methods, and it would not necessarily need to be extensive.

Fourwing saltbush was not included in the seed mixes for any areas at the mine. It is probably adapted to all but the riparian areas. For the waste rock disposal area, this species is adapted to soils containing moderate and high salt levels in upland areas. It is also a pioneer species that is highly palatable to wildlife, and they should include it in the seed mixture.

One of the few forb species found in the area was scarlet globe mallow. Seed of this species is available commercially, and they should include it in the seed mixture.

Black sage grows in the proposed disturbed area but since they will change the topography, it is uncertain if black sage would grow on the reclaimed refuse pile. At least one of the big sage subspecies, most likely basin big sage, would probably grow on the refuse pile. The applicant may want to add seed of black sage and mountain, Wyoming, and basin big sage to see which species will grow.

A few years after the Permittee reclaims the first section of the waste rock pile, it will be possible to see which species in the seed mix have been successful. Once the Division and the Permittee have that information they will adjust the seed mix as needed.

Rather than broadcasting the seed of all shrubs, it would be better to only broadcast the seed of certain species, such as rabbit brush, sagebrush, and winterfat. Other species, including bitter brush, mountain mahogany, and service berry, should be drill seeded. It would also be better to broadcast some species of forbs, including blue flax, yarrow, blue leaf aster, and Rocky Mountain penstemon.

Two tons per acre of straw or hay mulch appears, from various studies, to be the optimum rate, but two tons per acre of wood fiber hydromulch is excessive. If wood fiber hydromulch is used, they should reduce the rate to about one ton per acre.

The Permittee established three sets of test plots near the mine and at the sewage lagoons. They monitored the test plots periodically through 1994. The plan does not need to contain results from monitoring these plots since those results are in annual reports. However, the MRP shows the methods used to establish the test plots. In the current application, the applicant has proposed to eliminate this information, but it needs to be retained for future reference. Otherwise, much of the information gained through conducting the field trials will be lost.

**Revegetation Success Standards**

The Permittee says in Section 3.41.25 that they describe three reference areas in Appendices 3-A and 3-B. They design those reference areas to help determine revegetation success standards that for final bond release. Information in Appendices 3-A and 3-B describe four reference areas including two near the proposed waste rock disposal area. The PAP does not discuss what those reference areas would be compared to for judging successful revegetation. The consultant's reports indicate the sage-grass-juniper reference area would be used for the topsoil storage area and that the pinyon-juniper reference area would be used for the waste rock disposal site.

As discussed above, it is likely the vegetation of the waste rock disposal site will be altered because the topography will be changed. The consultant's report says the site will probably revert to a pinyon-juniper community since the area will be at the same elevation as

adjacent pinyon-juniper areas. This may ultimately happen, but this is not the most desirable situation. Mature pinyon-juniper communities typically provide excellent cover for wildlife but very little forage. Because there are extensive areas of pinyon-juniper habitat in the immediate vicinity, it would be much more desirable to establish vegetation comprised of desirable grasses and shrubs rather than pinyon and juniper.

The proposed pinyon juniper reference area was apparently in poor range condition when George Cook of the evaluated it in 1991 (then) Soil Conservation Service. The Division's Vegetation Information Guidelines, referenced for revegetation success standards in the regulations, require that reference areas be in fair or better range condition. The vegetation report showed it only had 2.70% cover from species other than pinyon and juniper, and they encountered no grasses in the sampling. This is not an acceptable revegetation success standard.

The sage-grass-juniper reference area is on a strip of land parallel to the pinyon-juniper reference area. It contains a good diversity of shrubs, grasses, and forbs, and it appears to have been in fair condition when the SCS in 1990 evaluated it. (It is not clear this is the reference area Mr. Cook evaluated.) This reference area would be a much better revegetation success standard.

Past land use for part of the area where they would build the access road was for cropland, but it is now used for wildlife habitat and grazing. This area is prime farmland, but the applicant does not propose to return it to the use of cropland. Since grazing and wildlife habitats is considered the premining land use, these can be considered acceptable postmining land uses. The revegetation success standard would be the sage-grass-juniper reference area.

The Division is required to consult with State wildlife agencies and establish woody plant density success standards. The proposed refuse pile area had 2956 woody plants per acre when they sampled it in 1990. While the proposed disturbed sagebrush-grass-juniper materials storage yard, as described in the vegetation report, had 3081 individuals per acre. Based on this information and considering that these areas still had good cover from grasses and forbs, a standard of 3000 woody plants per acre is considered a reasonable standard. They need to show that success standard in the plan.

**Wildlife Habitat**

The primary goal of reclamation will be to establish productive and useful range and wildlife habitat and to create an aesthetically acceptable site. The Permittee intends the revegetation plan to accomplish these goals.

The Division and Wildlife Resources do not consider other wildlife habitat enhancement measures to be either necessary or desirable.

**Findings:**

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Before approval, the applicant must provide the following in accordance with:

**R645-301-341.210.** The seed mix for the proposed waste rock disposal area needs to be modified. Juniper needs to be taken out of the mix. The Division recommends adding certain other species and establishment methods. The species include, fourwing saltbush, black sage, big sage, scarlet globe mallow and galleta.

**R645-301-341.220.** On gentle slopes, the applicant has proposed to broadcast seed shrubs and drill seed all other species. Some of the shrubs need to be drill seeded if they are to become established, and some of the forbs should be broadcast seeded.

**R645-301-341.230.** Where hydromulch is used, the applicant has proposed to apply two tons per acre. This rate is excessive and should be reduced to about one ton per acre.

**R645-301-341.250.** The proposed pinyon-juniper reference area is not an acceptable revegetation success standard. The applicant needs to propose another success standard, such as the sage-grass-juniper reference area.

**R645-301-341.250.** The application needs to include the woody plant density success standard of 3000 per acre established by the Division and Wildlife Resources.

**R645-301-341.300.** The current mining and reclamation plan contains information about the methods that were used to establish the test plots near the main mine site and at the sewage lagoons. The applicant has proposed to delete this information from the plan, but it needs to be retained.

## CESSATION OF OPERATIONS

**Analysis:**

The Permittee described how they would meet the cessation of operations requirements in the MRP.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

**Analysis:**

**Reclamation backfilling and grading maps.**

Plate 5-2 shows the reclamation plans for the backfilling and grading.

**Findings:**

The requirements of this section of the regulations are considered adequate in regard to the proposed permit change for the addition of the waste rock site.

## BONDING AND INSURANCE REQUIREMENTS

**Determination of bond amount.**

The Permittee's revised reclamation cost estimates are shown in Appendix 5E of the PAP. The Division has examined the revised cost and noticed that there are no earthwork costs associated with the waste rock site. When the other earthwork costs were studied the Division found it impossible to identify the location of the subareas listed in Appendix 5E with the reclamation maps. Without this information the Division cannot determine the reclamation costs. The Permittee has not met the requirements of R645-301-830.140.

**Findings:**

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the Permittee must provide the following in accordance with:

**R645-301-830.140,** the Permittee must provide the Division with detailed reclamation cost estimates for the waste rock site.