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

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March 6, 1997

TO: File

THRU: Daron Haddock, Permit Supervisor

FROM: Sharon Falvey, Senior Reclamation Hydrologist

RE: Waste Rock Amendment, Soldier Creek Coal Company, Soldier Canyon Mine, ACT\007\018, 96A, Folder #2, Carbon County, Utah

SUMMARY:

Amendment 96A was submitted to the Division on October 3, 1996. Changes to the plan include: 1) An addition of a waste rock storage site in the area of the previously proposed refuse pile. 2) Increase in topsoil storage area to accept topsoil from the Dugout Mine and the waste rock site. 3) A new runoff control map (proposed to replace exhibits; 4.2-5; 10.2-4; 14.2-6; 4.2-2 and figure 7). 4) a new central mine facilities map; and, 5) A change in the mining sequence. The Permittee has recently submitted additional information to the Alkali Lease Tract amendment but, this information was not inserted into the Waste Rock amendment and therefore, was not a part of this review.

TECHNICAL ANALYSIS

ENVIRONMENTAL RESOURCE INFORMATION (ERI)

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

GENERAL (ERI)

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

Analysis:

Surface water resources within and adjacent to the proposed waste rock permit area include; Soldier Creek, irrigation ditches and, Anderson Reservoir. The water rights associated with these resources are shown on Exhibit 7.21-1 and listed on 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 provides recharge to the reservoir. Anderson Reservoir was constructed in the 1920's.

The irrigation ditch water adjacent to the waste rock site and Anderson Reservoir have not been adequately described. The plan states that no natural subsurface flows were identified in the upper portion of the watershed, based on information from test pits excavated adjacent to the channels. However, the breached irrigation ditch provides subsurface flow to the drainage. This subsurface flow may continue to recharge the subsurface to the waste rock site. See further discussions and requirements under **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 past 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 contributed from the irrigation waters to recharge the Anderson Reservoir.

CLIMATOLOGICAL RESOURCE INFORMATION (ERI)

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

Analysis:

Information on climate can be found in the following sections in the plan: Section 7.28.2 and 7.24.4. Annual precipitation within the permit area ranges from 10 to 20 inches. A majority 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 average direction 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 survey section 2.22 indicates the climate at the waste rock site is similar to the description presented for the mine site. Annual precipitation amounts for the soils in the area are described as ranging from 8 to 14 inches per year and average temperatures are described as ranging from 45 °F to 50 °F.

Findings:

The permittee has met the minimum requirements of this regulation.

ALLUVIAL VALLEY FLOORS (ERI)

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

Analysis:

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

The area in question, as it pertains to determining presence of an AVF, is actually downstream of the waste rock site. The adjacent area according to regulatory definition means "... the area 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 could be adversely impacted by the proposed operations and since the water is used for irrigation. The area downstream and adjacent to the waste rock site should be assessed for the presence of an AVF.

The February 4, 1987 permit approval states that no lands designated as AVF occur 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, a potential AVF was determined to exist downstream along Soldier Creek. Although a negative determination for existence of an AVF was determined for the permit area described in 1987, no information or determination was conducted by the division for the areas within, adjacent 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 make a determination on the presence or absence of an AVF adjacent to the proposed waste rock site.

HYDROLOGIC RESOURCE INFORMATION (ERI)

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

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 (ERI)

Regulatory Reference: 30 CFR Sec. 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Existing Surface Configuration Maps (ERI).

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

Monitoring Sampling Location Maps (ERI).

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

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

Subsurface Water Resource Maps (ERI).

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

Geologic Resource Maps (ERI).

Waste rock site Geologic formations are presented in chapter 6 on plate 6-1 and plate 6-2.

Surface Water Resource Maps (ERI).

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

Well Maps (ERI).

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

Contour Maps (ERI).
The existing contour configuration is presented on Plates 7-2 and 7-1.

Findings:

The permittee has met minimum requirements for the maps reviewed as they pertain to the regulatory requirements of this section.

OPERATION PLAN(OP)

HYDROLOGIC INFORMATION (OP)

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

Analysis:

General Water Monitoring (OP).

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 waste 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 have associated water quality criteria for irrigation waters. Should high Boron or Selenium be identified in the waste rock site analysis these constituents may become important parameters in the operational sampling program.

Surface-water monitoring (OP).

The surface water monitoring plan is included in Table 7.31-1. The surface proposed monitoring station associated with 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 in the irrigation ditch above the waste rock site since this ditch feeds the reservoir. This is the only means to provide a determination of what water sources may affect the water quality/quantity that might be observed in the reservoir.

Acid and toxic-forming materials (OP).

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 (OP).

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 (OP).

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 (OP).

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 (OP).

The waste rock sedimentation pond is designed to receive and treat discharges originating from the waste rock site. On March 3, the Division was informed per a conversation with Steve McNeal from the Utah Department of Environmental Quality that the waste rock site sedimentation pond was not included in the Soldier Creek mine plan under permit number UT-0023680. Prior to discharging from the sedimentation pond the permittee must obtain a permit from the Department of Environmental Quality. Other state water quality standards are included in Table 7.24-6.

Diversions (OP).

The permittee has provided a typical drawing of the refuse pile area on Figure 5-1.

This drawing illustrates an interim configuration. Locations of drainages for interim ditches and drainage associated with the interim phases at the Waste Rock Site were not presented. The drainage locations, the direction of sheet flow and the measures used to protect topsoil from potential contamination from waste transport were not presented. Diversion designs should 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 precipitation 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 collected to characterize these seeps were not presented. Also, some mottled soils were found in the topsoil storage area and at the refuse site adjacent area slopes. 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 raised surface elevation. Evaporation of the subsurface water around the margins of the reservoir may decrease and may increase the water table elevation near the reservoir. Another design consideration for the contact with the waste, should be the erosive nature of Mancos Shale and a tendency of the shale 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.

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

Stream buffer zones (OP).

The permittee has classified the waste rock site drainage as an ephemeral system. 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 from the state as to whether it is necessary to obtain a permit at the site for placing fill into a natural water-way.

Sediment control measures (OP).

The plan indicates that the sediment control measures are designed to disturb the smallest practical area through providing contemporaneous reclamation and stabilizing the regraded 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 thus reducing the runoff volume and sediment delivery rate from the site. Suitable mulch and other soil stabilizing practices will be used on all areas covered by topsoil and topsoil substitute materials (page 2-56).

Siltation structures (OP).

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."

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 (OP).

The plan includes a statement that inspections will meet R614-301-514.300 requirements and provide a commitment 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 to contain runoff from the 10 year - 24 hour precipitation event and includes a maximum five year sediment storage volume , but commits to clean out the pond at 60% of capacity. The plan meets the minimum requirements for treating runoff from the 10 year-24 hour precipitation event. The plan meets 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 or approximately 2 feet above the spillway. The proposed pond design provides for a six inch decant but did not provide a decanting operation plan which describes how the decant will maintain detention time.

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

Other treatment facilities.(OP)

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.(OP)

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

Discharge structures (OP)

The discharge structures meet the minimum design criteria.

Impoundments.(OP)

In the plan section 5.36 states the waste rock site is to be constructed so that it will not impound water. 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.(OP)

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 an UPPES discharge permit for the pond. Prior to placing fill in the waste rock site, the permittee must obtain a determination from the appropriate agency 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 from drainage originating from the disturbed area.

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. Provide an operational water monitoring plan to sample irrigation ditch waters upstream of the waste rock site and above the inlet to the reservoir.

R645-301-742.314. Demonstrate by presenting site specific geologic data, soils , or other information that the CN used for watershed UD-1 and the associated drainage diversion ditch is appropriate. Provide a symbol for the operational drainage ditch locations which can be distinguished from other elements represented on Plate-1.

R645-301-742.314. Provide design information for sediment control measures to be used at the topsoil storage sites.

R645-301-742.314. Describe 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 appropriate regulatory requirements of this section.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

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

Analysis:

Monitoring and sample location maps (OP).

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

Surface Water Resource Maps (OP).

The permittee submitted a runoff control map as exhibit 7.32-1. The map provides new contour information which may provide increased accuracy of the existing site configuration. 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 to check against existing 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 associated with the watershed. The north arrow points in the wrong direction. The map legend has stated 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 table of contents or in the plan. The permittee has provided a label for a typical road cross section but, does not show 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 with 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.

RECLAMATION PLAN

HYDROLOGIC RECLAMATION INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Ground-water monitoring (REC).

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 for 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 (REC).

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 (REC).

In section 2.42 the permittee has committed to cover acid and toxic forming material with a minimum of four feet of fill. 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 (REC).

No transfer of wells is proposed. The plan meets the applicable minimum regulatory requirements for this section.

Discharges into an underground mine (REC).

No underground mines are associated with the waste rock disposal area. The plan meets the applicable minimum regulatory requirements for this section.

Gravity discharges (REC).

No underground mines are associated with the waste rock disposal area. The plan meets the applicable minimum regulatory requirements for this section.

Water quality standards and effluent limitations (REC).

The bond will not be released until applicable water quality standards and effluent limits are demonstrated to be met.

Diversions (REC).

According to section 3.41.22-24, reclamation activities will include construction of the intermediate reclaimed channel sections and removal of the access road and culverts. Following pond removal the final section of reclaimed channels will be constructed.

Following removal of the sedimentation pond the access road will be reclaimed. No retention of permanent structures related to roads or other facilities at the waste rock site were proposed.

The planned reclamation channel designs provides drainage around the refuse site and, are designed for the 100 year - 6 hour precipitation event. The presented design meets the minimum regulatory requirements. This design is a common practice however, some site specific elements may effect the stability of the design. As the flow from WS-1A above the waste rock site reaches the short flat section at the top of the pile it will tend to deposit sediments, increasing the potential for the ditch to breach at some point in the future. Additionally localized high flashy flows from thunder burst are not uncommon in this region and may exceed the runoff estimated from a 100 year - 6 hour event. If the ditch and grading plan were to design transport the flow across the slope from the existing natural drainage to the lower diversion ditch the potential having uncontrolled drainage flow over the pile 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 value seems more reasonable than the value used for the operational design but, should be checked against the information presented in response to this TA under R645-301-742.314. Likewise the small drainage in WS-1B 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 included in the design and the drainage be constructed to carry runoff 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 which 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 this irrigation canal will reduce the potential of runon to the waste rock site to 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 area boundaries.

Stream buffer zones (REC).

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 (REC).

The sedimentation pond is proposed to remain in place until adequate vegetative cover is established. Then the pond will be removed and regraded. In section 3.56.30, the permittee has committed to retain siltation structures until authorized by the Division.

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 anchored by crimping, or hydromulching at 2 tons per acre. For slopes steeper than 3:1 or 4:1 the slope will be left in a roughened condition by a 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 (REC).

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 meet the minimum requirements of this section.

Sedimentation ponds (REC)

No permanent impoundments are proposed 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. The topographic configuration for the reclaimed surface was stated to be presented on Plate 5-3 (page 5-70) but, this map could not be found in the plan. The permittee needs to correct the sited reference.

Other treatment facilities (REC)

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

Exemptions for siltation structures (REC)

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

Discharge structures (REC).

No discharge structures are proposed for retention as a postmining reclamation feature. The plan meets the regulatory requirements related to this section.

Impoundments (REC).

No impoundments are requested to be retained as a postmining reclamation feature. The plan meets the regulatory requirements related to this section.

Casing and sealing of wells (REC)

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 applicable state water quality laws and regulations, which includes the rules for water well drillers. Therefore, it is assumed 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 which demonstrates the waters from the waste rock site flowing to Anderson Reservoir meet the requirements for the intended post mining use for those waters.

R645-301-120. Provide the correct reference to the sedimentation ponds reclaimed topographic configuration stated to be presented on Plate 5-3 (in the text page 5-70).

R645-301-745.222. Provide a surface grading and drainage plan for the area adjacent to the proposed waste rock site to assure that runoff from the breached irrigation ditch will remain a stabilized diversion above the fill area. Provide any necessary changes to the disturbed area boundaries (This plan could be implemented when the lower extent of the pile reaches the location of the breached irrigation channel).

Recommendations:

The permittee should be required to submit the information requested herein prior to approval of the waste rock site and coordinate applicable Alkali Lease Tract information with the reply to this T.A.