



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

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May 3, 1999

TO: File

THRU.: Joe Helfrich, Permit Supervisor *JCH*

FROM: Paul Baker, Reclamation Specialist *PB*
Robert Davidson, Reclamation Specialist *RD*
Peter Hess, Reclamation Specialist *PH*
Sharon Falvey, Reclamation Specialist *SF*
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RE: Barn Canyon Shaft, Cyprus Plateau Mining, Willow Creek Mine, ACT/007/038-98B, File #2, Carbon County, Utah

SUMMARY:

The Permittee for the Willow Creek Mine submitted an amendment for the Barn Canyon shaft. The Division found several deficiencies in the amendment and they are noted in the following technical review.

ENVIRONMENTAL RESOURCE INFORMATION

GENERAL

Regulatory Reference: R645-301-411, -301-521, -301-721.

Clear and Accurate

Page 3.7-96 does not fit directly into the text in the existing plan. A portion of the existing page, including section heading 3.7.9, is not found in the page(s) submitted for the amendment. The applicant will be required to submit a complete copy removing the redline strike-out and should correct any deficiencies related to inserting the amendment into the existing plan at that time.

Findings:

This amendment does not meet the minimum requirements of this section. The amendment must include the following:

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R645-301-120. Submit a complete amendment in a format that: 1) removes the redline strike-out, 2) can be directly inserted into the existing plan, 3) includes the missing text from page 3.7-96, and 4) corrects any pages which do not coalesce with the existing plan.

VEGETATION AND FISH AND WILDLIFE RESOURCES

Regulatory Reference: R645-301-320

Analysis:

The application includes a qualitative survey of the vegetation in the area of the proposed shaft. Because the shaft would be near the bottom of the canyon, there are two aspects and three vegetation communities. They are pinyon/juniper, grass/sage, and Gambel oak/maple. The application also includes a discussion of the predominant species in these communities.

Two of these three communities are described in detail in the current mining and reclamation plan. The plan does not contain a description of the Gambel oak/maple community, but it does have a description of a very similar community, mixed brush. However, considering the size of the proposed disturbance and the similarity of the vegetation to what is described in the plan, it is not necessary to acquire additional quantitative vegetation information.

The proposed shaft is near where a golden eagle nest was found in about 1995. The applicant monitored the area from the ground weekly during the spring of 1998, but no birds were seen. In a helicopter check in May of 1998, the nest could not be found.

The current mining and reclamation plan contains information about other wildlife species in the area. Barn Canyon in the vicinity of the proposed shaft contains critical elk and deer winter range.

Findings:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.

SOILS RESOURCE INFORMATION

Regulatory Reference: R645-301-411, -301-220.

Analysis:

The Barn Canyon Ventilation Facility amendment contains information regarding the soils environmental resources as follows:

- Order-I Soil Survey
- Order-I Soil Survey Map
- Soils Identification, Description and Characterization

Order-I Soil Survey

An Order-I soil survey supplies information for the ventilation facility area. Mr. Jim Nyenhuis, ARCPACS Certified Professional Soil Scientist, conducted the survey for Mt. Nebo Scientific on January 14, 1998. Mr. Robert Davidson, Soils Senior Reclamation Specialist, Utah Division Oil, Gas and Mining (DOG M), was also present on the site during fieldwork. Four soil pits were dug, described, and sampled for the survey. Two native, undisturbed soils (BC3 and BC4), and two disturbed sites (BC1 and BC2) were sampled. For site BC2, the surface had been disturbed with the underlying soil substratum C horizon) still present. Standard soil descriptions were completed in the field and a total of eleven soil samples were collected from the four pits. *Copies of the actual field data sheets are not provided with the amendment submittal and need to be included with the submittal for inclusion with the MRP.*

Order-I Soil Survey Map

The amendment contains an Order-I soils map delineating each soil, sampling locations and soil descriptions for each map unit (Figure 3.1-1). The map scale 1:360 is within the required 1:15,840 or larger scale for Order-I surveys. Likewise, the 0.91 acre surveyed site is within the minimum delineation size (2.5 acres) for an Order-I soil survey.

Figure 3.1-1 shows the order 1 soil survey. The following problems are identified:

- *No elevation markers are given for identifying the map contour intervals.*
- *No bar scale is provided to ensure the map's accuracy (e.g., 1" = 30').*
- *The map, dated Feb. 20, 1998, is not current with the most recent submittal made on March 9, 1999, nor does the Figure 3.1-1 correlate with Map 31A, Barn Canyon Facility Site Plan, of the current submittal. Disturbed area boundaries are not accurate. Undisturbed contour lines do not match or correlate. A topsoil stockpile area is located down the canyon from the ventilation shaft area which is inconsistent with the current submittal.*

Soils Identification, Description and Characterization

For the Order-I soil survey, the four soil areas described are listed as follows with their respective soil series and taxonomic class:

MAP UNIT	PIT LOCATION	SOIL SERIES	TAXONOMIC CLASS ¹
A	BC-4	Perma Sandy Loam 10-25% slopes	loamy-skeletal, mixed, Typic Haploboroll
B	BC-3	Pathead Cobbly Loam 35-65% slopes	loamy-skeletal, mixed (calcareous), frigid Typic Ustorthent
C	BC-2	Disturbed Hillside Pathead C horizon) 4-12% slopes	loamy-skeletal, mixed (calcareous), frigid Typic Ustorthent
D	BC-1	Disturbed Drainage 3-8% slopes.	None

The Order-I soil survey provides (1) a description of each map unit in areas A, B, C, and D; (2) a profile description of each of the soils at the four sample sites, BC1 through 4; and (3) a copy of the soil laboratory data for the eleven soil samples taken from the four sample sites.

Samples were sent to Inter-Mountain Laboratory (IML, Farmington, NM) for analysis according to the Division's Guidelines for Management of Topsoil and Overburden² and by consultation with Mr. Robert Davidson, DOGM. Parameters analyzed include pH, EC, saturation percent, Ca, Mg, Na, SAR, texture, CaCO₃, soluble B, soluble Se, TOC, and organic matter.

With the exception of rock fragments, soils have physical and chemical properties that are within DOGM's acceptable range for soil and overburden guidelines. The Division recognizes that native soils contain high percentages of rock fragments, is inevitable and does not present a reclamation hazard. Certainly, to reclaim and restore the land to pre-mining conditions will require soils with indigenous rock fragment volumes and content. Therefore, it is not only acceptable, but desirable to salvage soils containing intrinsic rock, gravels, cobbles and boulders.

¹ Jensen, E.H., and Borchert, J.W., 1988. Soil Survey of Carbon Area, Utah Soil Conservation Service, United States Department of Agriculture, Washington D.C.

² Leatherwood, James, and Dan Duce. 1988. Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining. State of Utah, Department of Natural Resources, Division of Oil, Gas and Mining. Salt Lake City, Utah.

Findings:

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

R645-301-120, Include copies of the actual field data sheets with the submittal for inclusion into the MRP. The second submittal (July 13, 1998) included the field data sheets, but did not incorporate the sheets into the appropriate soils survey appendix.

R645-301-140, Figure 3.1-1 shows the order 1 soil survey. The following problems and inconsistencies need to be corrected:

- Provide elevation markers identifying map contour intervals.
- Provide a bar scale to ensure the map's accuracy (e.g., 1" = 30').
- Update the Feb. 20, 1998 map (Figure 3.1-1) to be current with the most recent submittal made on March 9, 1999, which includes correlating Figure 3.1-1 (Feb. 20, 1998) with Map 31A, Barn Canyon Facility Site Plan, of the current submittal (March 9, 1999).
 - Disturbed area boundaries are not accurate.
 - Undisturbed contour lines do not match or correlate.
 - A topsoil stockpile area is located down the canyon from the ventilation shaft area which is inconsistent with the current submittal.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: R645-100-200, -301-724.

Analysis:

Surface-water information.

The Barn Canyon contains an ephemeral drainage. By regulatory definition this drainage is intermittent because it is greater than 1 square mile.

Probable hydrologic consequences determination.

The Barn Canyon ventilation shaft will be sealed with a five foot re-enforced upward expanding concrete plug on top of the bulkhead, and will be buried by four feet of soil that is re-enforced with rock around its base. It is expected that this seal will result in minimizing potential impacts to the HYDROLOGIC balance by preventing runoff from entering the underground entry. The applicant shows the ventilation portal location in relation to the postmining drainage along the road on Map 32A.

Construction at the Barn Canyon ventilation shaft is not expected to involve intercepting ground water that would need to be discharged from the underground workings. Currently ground water encountered in the mine has characteristics that do not meet UPDES discharge requirements. If intercepted groundwater needs to be discharged, the plan commits to convey the ground water to the raw water pond and retain it in a closed loop system. Encountered ground water will be analyzed according to the ground water baseline parameters outlined in the plan, and the Permittee will obtain Division approval prior to discharge or use (pg. 4.7-10). The amendment also provides commitments to wash down the cement trucks into the raw water pond to reduce potential for impacts to the Price River downstream from the construction site.

Findings:

This amendment does meet the minimum requirements of this section.

OPERATION PLAN

RELOCATION OR USE OF PUBLIC ROADS

Regulatory Reference: R645-301-521, -301-526.

Analysis:

There are no public roads associated with the Barn Canyon ventilation fan project.

Findings:

The Permittee met the minimum requirements of this section.

SUBSIDENCE CONTROL PLAN

Regulatory Reference: R645-301-521, -301-525, -301-724.

Analysis:

Subsidence control plan.

Maps 19A through 19D and 20 shows the areas where subsidence could occur. The Barn Canyon ventilation fan and the access road are outside the planned subsidence zone.

Performance standards for subsidence control.

Findings:

The Permittee met the minimum requirements of this section.

TOPSOIL AND SUBSOIL

Regulatory Reference: R645-301-230.

Analysis:

The Order-I soil survey for Barn Canyon Air Ventilation Shaft and emergency escape hoist includes discussion of topsoil suitability, potential soil salvage depths, soil storage and stockpiling, and discussion for salvaging excess fills as substitute topsoil for each of the four soil map units as follows:

- Topsoil Salvage and Segregation
- Substitute Topsoil
- Topsoil Storage

Topsoil Salvage

Soil salvage recommendations are based on the Order-I soil survey which identifies topsoil suitability and volumes calculated for each of the four soil map units.

Map Unit A, Perma sandy loam, is mapped in an undisturbed area under predominantly Gambel's oak vegetation. An average 2 feet of suitable soil is available for salvage. Pockets of soil salvage may reach depths of 35 inches, but are not included within the projected soil salvage volumes.

Map Unit B, Pathead cobbly loam, is mapped in an undisturbed area under mixed vegetation including scattered Juniper. An average of 18 inches of suitable soil is available for salvage.

Map Unit C, disturbed hillside, is located in an old disturbed side-hill cut where a pad site was created. Present vegetation consists of mixed grasses and some sagebrush. Six inches of this soil is identified for salvage.

Map Unit D, disturbed drainage, is located adjacent to the main dirt road in Barn Canyon

and includes the Barn Canyon drainage channel bottom areas . No soil salvage will occur from this unit because the exposed surface soils are compacted and the underlying soil substratum contain greater than 65% total gravels, cobbles and stones.

Topsoil salvage projections need to be updated for each Map Unit as affected by disturbance acreage which is given in the current March 1999 submittal. Within the Barn Canyon submittal, potential topsoil salvage depths and volumes need to be summarized for each of the four soil map units as follows:

MAP UNIT	AVERAGE SOIL SALVAGE DEPTH (INCHES)	AFFECTED ACREAGE	SOIL SALVAGE (CUBIC YARDS)
A	24	?	?
B	18	?	?
C	6	?	?
D	0	-	-
Total	?	?	?

Substitute Topsoil

The Barn Canyon submittal, Map 31B, Shaft Facility Operational Cross Sections, and Map 31B, Shaft Facility Reclamation Cross Sections, both identify excess cut produced during construction and the need for excess fill during reclamation. The cut and fill balance is also shown in Table 5.4-1, Barn Canyon Shaft Facility Cut and Fill balance as follows:

Surfaces Being Compared	Cut (yd3)	Fill (yd3)	Net (yd3)
Existing & Operational	3090	538	2552 (a)
Operational & Reclaimed	611	3251	2640 (b)

(a) Excess cut will be hauled to the Gravel Canyon topsoil stockpile except for the Mollisol soil which will be hauled to the Willow Creek Mine topsoil stockpile.

(b) The excess fill needed for reclamation will be hauled from the Gravel Canyon topsoil stockpile where it was stored during construction of the Barn Canyon shaft facility. The stockpiled Mollisol soil will be hauled back to the Barn Canyon shaft facility area when it is time for the facility to be reclaimed.

The submittal states that the excess cut (2552 CY) will be stored in the Gravel Canyon topsoil stockpile, and that upon reclamation, the excess stored material will be retrieved to restore the cut slopes at the Barn Canyon facility area. The exact amount of soil identified for salvage is 906 CY, which when subtracted from the 2552 CY of excess cut, leaves 1646 CY of excess material. This 1646 CY of excess cut material is primarily deeper soils taken from both Map Unit A, Perma sandy loam, and from Map Unit B, Pathead cobbly loam. In particular, Map Unit A, Perma sandy loam soils, are deep soils. Subsoils from both these soils are identified within the Order I soil survey. In addition, the Natural Resource Conservation Service's Carbon County Order III soil survey, provides additional soil characteristic information on subsoils. Therefore, excess fills obtained from the colluvium and residuum materials, qualify as acceptable substitute topsoil.

In order for the excess cut material (i.e., 1646 CY) to be stored in the Gravel Canyon topsoil stockpile, the amendment needs to identify the excess cut material as substitute topsoil. The amendment needs to update all appropriate tables and text to reflect the extra material being stored in the Gravel Canyon topsoil stockpile (e.g., Table 4.2-1).

Topsoil Storage

Both the disturbed Map Unit C and undisturbed Map Unit B soils will be stored in the Gravel Canyon topsoil stockpile. Map Unit A Mollisol from the Barn Canyon shaft will be segregated and stored separately at the Willow Creek topsoil stockpile for later use as a final top dressing during reclamation of the Barn Canyon shaft site. *The Map Unit A Mollisol stored at the Willow Creek topsoil stockpile needs to be signed and segregated thru the life of the mine.*

Summary (Subtotals) information in Table 4.2-1 needs some minor corrections:

- *Riparian "Direct Placement" acreage should be 1.5 instead of 2.8*
- *Disturbed acreage should be 31.2 instead of 30.0*
- *Average thicknesses need to be recalculated for updated acreage and volumes*
- *Barn Canyon excess-cut substitute topsoil (1646 CY) stored in Gravel Canyon stockpile needs to be identified and included in the table.*

Findings:

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

R645-301-231.400, Based on new projected disturbance acreage, update topsoil salvage projections for each soil survey Map Unit.

R645-301-233, The excess cut material (i.e., 1646 CY) must be characterized as substitute topsoil in order for the excess cut material to be stored in the Gravel Canyon topsoil stockpile. Update all appropriate tables and text to reflect the extra substitute topsoil material being stored in the Gravel Canyon topsoil stockpile (e.g., Table 4.2-1).

R645-301-234.200, Map Unit A Mollisol stored at the Willow Creek topsoil stockpile needs to be signed and segregated from other stockpiled topsoil through the life of the mine.

R645-301-120, Summary (Subtotals) information in Table 4.2-1 needs some minor corrections as follows:

- Riparian "Direct Placement" acreage should be 1.5 instead of 2.8
- Disturbed acreage should be 31.2 instead of 30.0
- Average thicknesses need to be recalculated for updated acreage and volumes
- Barn Canyon excess-cut substitute topsoil (1646 CY) stored in Gravel Canyon stockpile needs to be identified and included in the table.

PROTECTION OF BIOLOGICAL RESOURCES

Regulatory Reference: R645-301-330

Analysis:

The current mining and reclamation plan contains a plan for interim re vegetation of disturbed areas, and this should be adequate for this site.

Although there were no signs of nesting activity and no nest was found in 1998, it is possible birds could return to the area at some time in the future. However, because the disturbance will be ongoing, returning birds would necessarily be able to tolerate the disturbance.

To not disturb wintering big game, the applicant has committed to not do shaft construction between December 1 and April 15. If the shaft is built, the applicant would need to inspect the site weekly, and this could cause some disruption of big game. Anyone using the road during the winter needs to be instructed to not harass big game, and they should not stop to observe the animals.

In a visit to the Willow Creek Mine on March 18, 1998, a Division representative saw thirteen deer in the Barn Canyon substation area. These deer seemed to have habituated to the

nearby disturbance and were not particularly frightened.

Findings:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: R645-301-521, -301-527, -301-534, -301-732.

Analysis:

Road Systems

Road classification system.

The Barn Canyon access road was classified as a primary road by the Permittee. The road was classified as primary because it will be used for more than six months and is proposed to be left as part of the postmining land use. The access road to the Barn Canyon ventilation shaft is a private road. The road was constructed no later than 1956 when a 138 KVA power line was constructed in the canyon.

Plans and drawings

Map 33 shows the general plans for the Barn Canyon access road. The Permittee proposed to construct parts of the road in an intermittent stream because:

1. The existing road is stable and shows no signs of instability or major erosion.
2. The channel is technically ephemeral
3. The road surface material is sandy, cobbly, boulder material
4. To construct a new road out of the flow path would create extensive and unnecessary environmental degradation.
5. Typical flows (10 year 6 hour events) can be diverted off the road in sections below the shaft site where the road is not the channel. Two culverts will also be constructed to keep these flows off of the road in locations. (See Map 33 and Exhibit 22).
6. Where swales are installed, these will be constructed using washed gravel (thereby removing particle sizes smaller than 8 mesh). Construction of the swale will begin downstream from the natural channel to minimize contributions of sediment to the stream.

The road will be approximately 15 feet wide, 2,000 feet long and has an average grade of 7%. Two 30 inch culverts will be used to route water away from the road. Swells and riprap will be

used to protect the road surface. Passing area will be constructed at two locations.

The Division does not have guidelines for road construction. The Division usually relies upon information and expertise from the design engineer along with current road construction practices. The road designs appear to be adequate and are similar to other roads in the area. The designs were certified by a professional engineer.

The Division is allowing the Permittee to alter the natural drainage way in order to construct a road because:

1. The stream channel has already been altered by road construction.
2. The only alternative would be to have the Permittee construction a new road on slopes with slopes greater than 30°.
3. The road has been properly engineered.

Findings:

The Permittee has met the minimum requirements of this section.

SPOIL AND WASTE MATERIALS

Regulatory Reference: R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Coal mine waste.

On Page 4.5-59 of the March 9, 1999 submittal the Permittee states:

Shaft rock from ventilation shaft construction, including that resulting from construction of the Barn Canyon shaft, will be placed in the School House Canyon Refuse Pile. In the refuse stockpile area, waste ventilation-shaft rock will be handled and placed in essentially the same way as coal refuse material as discussed in the subsequent subsection titled Coal Processing Waste Handling and Disposal.

The Permittee has responded to the issue of where the mine development waste generated during the construction of the air shaft will be placed. All waste will be placed on the School House Canyon refuse pile which is a permitted site meeting all requirements of the R645 regulations.

Findings:

The Permittee met the minimum requirements of this section.

HYDROLOGIC INFORMATION

Regulatory Reference: 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:

Discharges into an underground mine.

No discharge into an underground mine is applied for or granted with this amendment.

Diversions.

Diversions around the fan portal were designed to convey runoff from a 10 year - 6 hour event. Drainage is routed along the pad perimeter. The disturbed area is an alternate sediment control area that will be treated with gravel to minimize erosion. Ditch UD-24 is not shown to drain to any existing drainage features but, will join road ditch DD-31. The last five feet of this ditch are to be flattened and expanded to convey runoff across the road.

Drainage associated with the ventilation shaft access road are presented on Maps 31A, 31B, and 33. The mine intends to retain an existing road for site access. The existing road lies in the canyon drainage at some locations. The existing road shows no signs of instability or excessive erosion. (This was verified on May 13, 1998: See the DOGM field visit form). Alterations proposed to improve the existing road include; two passing areas, two swales, two culverts and two adjacent road ditches DD-31 and DD-32. The plan shows an existing road configuration, in section DD-31b, where the road is not sloped adequately to promote runoff flow along the roadside. **The applicant should provide proof of the effort in cutting this section to the design presented in DD-31a as is recommended by the consultant. It is recognized the road substrate is composed of rock and cobbles and re-grading may not be feasible in this section without blasting. However, attempts should be made to re-grade this section.**

Stream buffer zones.

The ventilation pad is within an ephemeral drainage. An existing road will be utilized for access and maintenance issues. The existing road is aligned in the drainage through the canyon. Stream buffer zone regulations apply to this site because the site drains a watershed area greater than one square mile. The minimum design requirements for the 10 year- 6 hour event on the road is considered adequate based on the following:

- The proposed road is to be used for maintenance access only after construction is completed.
- The proposed design will promote runoff to flow into existing stream channels rather than the current conditions which convey flow along portions of the road and by-pass natural stream channel sections.

The Division is granting an exemption to R645-742.412 because the applicant has committed to the following at the request of the Division and in accordance with R645-301-730:

- Clean gravel will be used, particles smaller than + 8 mesh (2.38 m.m.) will be removed.
- Truck wash down from cement mixing associated with the site construction will be drained into the thickener pond.
- Gravel use will be minimized and applied only in the areas designated. Swale construction will avoid placing gravel in the flow path from the existing natural channel (Development will begin downstream from the natural channel to minimize contributing sediment to the channel).

Sediment control measures.

The sediment control plan is presented on the Barn Canyon Fan Pad Site Plan (Map 31A). Design calculations are provided in Exhibit 22. An Alternate Sediment Control (ASC) measure is used to treat the sediment coming from the Barn Canyon ventilation site. The pad is treated by surfacing the disturbed area with two inches of washed gravel and placing a boulder re-enforced toe along the cut slope. Washed gravel, eliminating particle sizes less than 8 mesh, will be used to minimize the potential for additional sediment contributions. Gravel will be placed downstream from the natural drainage to minimize contributions to the channel in locations where swales are constructed and will be applied only in designated areas.

Although the proposed method for sediment control is considered acceptable, specific information still needs to be supplied for the ASC measures to be employed. Designs and maintenance for the erosion control methods, and sediment storage capacity of practices in and downstream from the disturbed area need to be addressed. Suggested ways to provide this information include; 1) estimating the roughened pocket area and volume of sediment that may be contained in the roughened surfaces, 2) monitoring for visual movement of gravel and sediment from the site and clean up if movement is excessive, 3) replacing gravel on the pad if gravel is displaced from the site, 4) a commitment to provide additional measures should sediment from the site become excessive.

The submitted information includes an estimate for sediment yield and compares undisturbed, operational and post-reclamation site conditions. The estimate provided shows the reclamation configuration to be less erosive than the natural conditions. The division disagrees with some assumptions used in this comparison. The K factor, after manipulation for the reclaimed section, is not expected to be less erosive than the factor for undisturbed soils. The

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mulching practice, was accounted for as soil organic matter to adjust the K factor and then was also accounted for as an erosion control practice. This effectively resulted in reducing erosion from one practice, twice. Also, specific mulch application and roughening methods were not referenced. Still, the proposed method for sediment control is considered acceptable because the area is relatively small, and the determination for success in the practices conducted at the site will be determined from ongoing site inspection.

Topsoil will be transported to the Gravel Canyon topsoil stockpile. Sediment control measures for the topsoil storage area include surrounding the storage site with a berm, roughening the surface and establishing vegetation.

Exemptions for siltation structures.

No exemption from siltation structures was requested or granted associated with the Barn Canyon ventilation portal amendment.

Findings:

This amendment does not meet the minimum requirements of this section. The amendment must include the following:

R645-301-740. Specific information needs to be supplied for the ASC measures to be employed for operational and reclamation phases. The designs and maintenance for the erosion control methods need to be provided and the sediment storage capacity of practices in and downstream from the disturbed area should be used to predict the degree to which the successful mining and reclamation techniques are applied (See: T.A. for suggestions). Discrepancies in the K factor for reclamation conditions, and the adjustments to the K factor (increasing the organic matter through mulching practices) needs further references, description, or clarification.

SUPPORT FACILITIES AND UTILITY INSTALLATIONS

Regulatory Reference: R645-301-526.

Analysis:

A general description of how the ventilation shaft will be constructed is given in Exhibit 22 of the March 9, 1999 submittal. The Permittee states that the shaft will be approximately 16 to 20 feet in diameter and will be approximately 493 feet deep. The Permittee anticipates that very little ground water will be encountered. However, if significant quantities of groundwater are encountered, the groundwater will be collected and pumped to the surface during construction and handled as discussed in Section 4.7.2.2. After construction the groundwater will be

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discharged into the mine workings.

Two methods that may be used to remove groundwater are a water ring or perforated pipe behind the liner. The selection and sizing of the groundwater collection system will be determined at the time groundwater is encountered.

The emergency hoist equipment to be installed in the Barn Canyon shaft is an E.C.A. 5-30 stiff leg derrick. The hoist is diesel powered. Plans for the hoist are on Exhibit 22 Map 1.

Findings:

The Permittee has met the minimum requirements of this section.

USE OF EXPLOSIVES

Regulatory Reference: R645-301-524.

USE OF EXPLOSIVES

Regulatory Reference: R645-301-524.

Analysis:

Blasting and Explosives

In the April 2, 1998 deficiency response to the Barn Canyon submittal, the applicant committed on page 4.5-28, paragraph one to address the initial round of the shaft excavation as a surface blast as mandated by R645-301-524.

Exhibit 22, page 1, paragraph 1 of VENTILATION SHAFT CONSTRUCTION indicates that, based on bore hole data from MC-018, up to forty-five feet of soil and loose rock will have to be excavated to expose the initial bedrock layers. At least two 10 foot rounds will need to be shot and mucked such that an in hole concrete foundation can be poured to initiate the shaft lining. At that point, it is not known if the top forty feet of the shaft will be poured up and backfilled to the original surface elevation, or if the remaining shaft lining will be excavated and poured down to the "D" seam. Then, the top forty feet of coping can be poured and the surface restored.

Based on the fact that 45 feet of earth will be excavated prior to the initial excavation rounds, the rounds are no longer under the jurisdiction of R645 surface blasting requirements. All rounds will be under the jurisdiction of 30 CFR 77, Subpart N.

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Regulatory Reference: R645-301-524.200.
R645-301-524.210.

Analysis:

**Anticipated Blast Design in Permit Application
Anticipated Blast Design**

Based on Figure 2, page 4 of Exhibit 22, the depth of this air shaft will be approximately 493 feet from surface to top of the "D" coal seam. Based on the regulatory requirements of R645-301-524.212, Blasting Operations within 500 feet of an Active Underground Coal Mine, the applicant has submitted Figure 1, Typical Shot Pattern for Ventilation Shaft. Figure 1 addresses drill hole or shot pattern, delay periods, depth of round, and drill hole diameters. Underground entries have, as of the date of this analysis, not been developed in the area of the "D" coal seam where the Barn Canyon air shaft will be constructed.

Using the indicated hole diameters of 1-3/8" to 1-1/2", and the ten foot hole depth, it can be calculated that approximately 108 pounds of dynamite (240, 1-1/4" x 8" sticks) will be used per explosive round. This calculation does not include the loading of the perimeter or trim holes which are always loaded at a lighter rate to prevent excessive over fracturing of the shaft walls.

Although Figure 1 is not to scale, and there is no indication of hole spacing, it must be realized that this is merely an anticipated blast design. It will be up to the discretion and experience of the certified blaster on site to change design parameters as necessary to meet the fragmentation requirements necessary to expedite the mucking process. Once the finalized blast design has been determined by the certified blaster and approved by MSHA, it should be forwarded to the Division. This will meet the requirements of R645-301-524.220.

Blast design requirements which require methods to protect the public from air blast, fly rock and ground vibration have not been discussed within the submitted anticipated design. The initial delays in the submitted design will send fractured material vertically; the secondary and tertiary delays will send fractured material toward the center of the excavation. There may be a few pieces of machinery within the immediate area of the shaft coping which will need protection from fly rock on the initial rounds. As shaft depth increases, almost all flyrock will be contained within the hole. As only a few hundred pounds of dynamite will be used per round, air blast and ground vibration will be negligent in the surrounding area. There are no residents within a half mile radius of the Barn Canyon shaft construction site.

Although Figure 1, page 3 of Exhibit 22 lacks detailed information with regard to the requirements of R645-301-524.230, sufficient information can be determined through utilization of a Blasters Handbook to meet the aforementioned.

The excavation rounds for this air shaft are considered to be under full jurisdiction of the

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U. S. Department of Labor, Mine Safety and Health Administration through 30 CFR 77, Subpart N.

In conclusion, the blasting design requirements of the R645 rules relative to underground coal mining and reclamation activities as they pertain to the initial blast rounds in shaft construction have been adequately addressed. The anticipated blast design which has been submitted should be approved.

Analysis:

Pre-blast Surveys

There are no residents or occupiable dwellings within one-half mile of the Barn Canyon shaft construction site. The closest structure is a storage building located across from the preparation plant substation (permittee owned); horizontal distance from the building to the shaft construction site is .43 miles.

Findings:

The Permittee met the minimum requirements of this section.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Maps 19A through 19D and 20 show the past mining activities and the proposed mine plan until the year 2002. Some of the proposed mine workings and subsidence zones are outside the permit boundaries. The Permittee states on those maps and in the text (Sections 4.5.1.5 and 4.5.2.2) that no mining or subsidence will occur outside the permit boundaries. Those maps show the life-of-mine affected areas as required by R645-301-521.141.

Maps 19A through 19D and 20 also show the areas where planned subsidence mining will be used. The Permittee states on the maps that panels and their associated subsidence which extend outside the indicated permit area will not be mined until the permit area are appropriately expanded.

Monitoring and sample location maps.

Findings:

The Permittee has met the minimum requirements of this section.

RECLAMATION PLAN

POSTMINING LAND USES

Regulatory Reference: R645-301-400

Analysis:

Land uses in the area are described in the existing mining and reclamation plan, and no additional information is needed. The area has been surveyed for cultural resources, and none were found. The application contains a clearance letter from the Division of State History giving their determination of no effect.

No changes to the postmining land use are proposed. The applicant is proposing to permit the road and to leave it for the postmining land use. The application justifies retention of the road because it existed prior to mining. Reclaiming the road would unnecessarily disturb the channel and vegetation, and since the road is compatible with the postmining land use, the Division agrees with the arguments in the plan to retain the road.

Findings:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.

APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: R645-301-234, -301-270, -301-271, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

Analysis:

The Permittee committed to reclaim the Barn Canyon Shaft area to the approximate original contours. The reclamation plan shown on Map 33 shows that the shaft area will have a topography that blends into the surrounding area and complements the surrounding drainage.

Findings:

The Permittee met the minimum requirements of this section.

BACKFILLING AND GRADING

Regulatory Reference: R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

Analysis:

The Permittee has shown that the reclaimed slopes will have a safety factor of 1.3 or greater. The slopes will be revegetated to minimize erosion. The area around the shaft will be reclaimed to the approximate original contours. The road will remain to support the post mining land use. The road culverts will be removed and replaced by low maintenance structures.

Findings:

The Permittee met the minimum requirements of this section.

MINE OPENINGS

Regulatory Reference: R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

An expanding plug will be used to seal the shaft during final reclamation. An expanding plug is the best known shaft sealing method currently available.

Findings:

The Permittee met the minimum requirements of this section.

TOPSOIL AND SUBSOIL

Regulatory Reference: R645-301-240.

Analysis:

The excess fill material needed for reclamation of the Barn Canyon area will be hauled from the Gravel Canyon topsoil stockpile where it was stored during construction ventilation shaft facility area. Excess cut material was stored at the Gravel Canyon topsoil stockpile and included salvaged topsoil and excess cut substitute topsoil.

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The stockpiled Mollisol soil that is stored at the Willow Creek topsoil stockpile will be hauled back to the Barn Canyon shaft facility area at reclamation.

No further information is provided for reclamation commitments of the Barn Canyon ventilation disturbance area other than those generally contained in existing Mine Reclamation Plan.

Findings:

The information provided meets the regulatory requirements of this section.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: R645-100-200, -301-513, -301-521, -301-527, -301-534, -301-537, -301-732.

Retention.

A road to be retained for an approved postmining land use shall be classified as a primary road and designed constructed and maintained in accordance with the requirements for primary roads and in consideration of the approved postmining land use.

Analysis:

The road in Barn Canyon will be retained as part of the approved postmining land use. The road is classified as a primary road and meets the design specifications.

Findings:

The Permittee met the minimum requirements of this section.

HYDROLOGIC INFORMATION

Regulatory Reference: 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.

Analyses:

Diversions.

The CPMC has committed to establish a post mining configuration compatible with the natural drainage pattern of the surrounding terrain. The reclamation plan indicates the culverts

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will be removed and the road, road ditches, and swales will be retained. Presently, no statement from the land owner is provided to acknowledge retaining the road as a post mining land use.

Sediment control measures.

The reclamation sediment control measures to be applied at this site are roughening and mulching. Specific application for these techniques needs to be identified or referenced in the hydrology discussion. See the findings under **Operational HYDROLOGIC Information** presented previously.

Findings:

This amendment does not meet the minimum requirements of this section. The amendment must include the following:

See the requirements under **Operational HYDROLOGIC Information, R645-301-740** above.

REVEGETATION

Regulatory Reference: R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

REVEGETATION

Regulatory Reference: R645-301-341

Analysis:

Except for riparian areas, the same seed mix would be used to revegetate the entire disturbed area of the Willow Creek Mine. This seed mix was designed primarily for big sage/grass and pinyon/juniper areas, and most of the species are adapted to the Barn Canyon site. However, the bottom of the canyon contains oak and maple trees that need to be reestablished. To this end, the applicant proposes to plant big tooth maple and Gambel's oak at the rate of 250 per acre.

Findings:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION

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OPERATIONS

Regulatory Reference: R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Map 32 shows the reclamation contours and cross sections for the Barn Canyon area. The maps are certified by a professional engineer and show all the information required.

Findings:

The Permittee met the minimum requirements of this section.

BONDING AND INSURANCE REQUIREMENTS

Regulatory Reference: R645-301-800, et seq.

Analysis:

The reclamation cost estimate to reclaim the Barn Canyon shaft was estimated to be \$110,000. The current bond amount is over \$10,000,000. The increase in bond amount is less than 5%. The Division usually does not require a Permittee to post additional bond for increases of less than 5%.

Findings:

The Permittee met the minimum requirements of this section.