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

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August 2, 2000

Wendell Owen, Mine Manager
Co-Op Mining Company
P.O. Box 1245
Huntington, Utah 84528

Re: Wild Horse Ridge Lease Addition, Co-Op Mining Company, Bear Canyon Mine, ACT/015/025-SR98(1)-3, Outgoing File

Dear Mr. Owen:

Enclosed is a copy of the Division's most recent review of the significant revision to the Bear Canyon Mine permit area. The attached technical analysis outlines deficiencies that need to be addressed prior to approval of the significant revision.

Please feel free to contact me if you would like to arrange a meeting to discuss these deficiencies. As you are aware, you need to respond to these deficiencies within 90 days, or the Division will return this application to you.

Sincerely,

Daron R. Haddock
Permit Supervisor

rad/sm
Enclosure
cc: PFO

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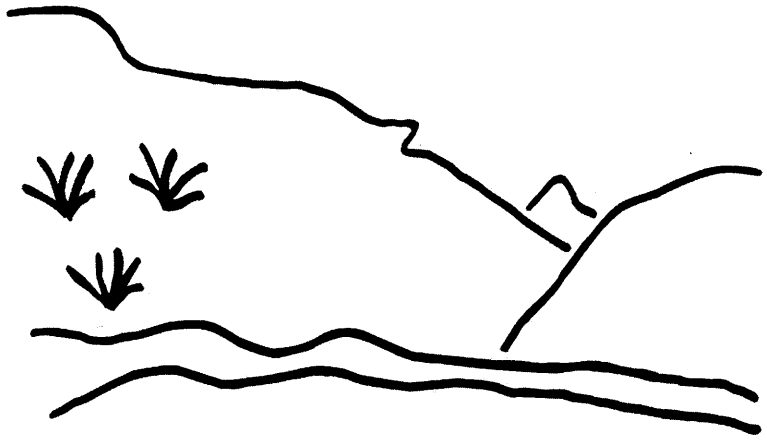
State of Utah



Utah Oil Gas and Mining

Coal Regulatory Program

Bear Canyon Mine
Wild Horse Ridge Lease Addition
ACT/015/025 - SR98(1)-3
Technical Analysis
July 28, 2000

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INTRODUCTION

The proposed Wild Horse Ridge significant revision amendment to the Bear Canyon Mine MRP was received by the Division on 12/18/98. This significant revision is for the addition of Federal Leases U-020668 and U-38727 and fee coal. The proposed leases are east of the Bear Canyon Fault and the proposal includes new surface facilities in the Bear Canyon Right Fork. The Division determined the amendment to be Administratively Complete on 11/3/99. The first technical review completed on 1/24/00 found the amendment deficient. The package was resubmitted on 5/8/00.

INTRODUCTION

SUMMARY OF OUTSTANDING DEFICIENCIES

The Technical Analysis regarding the proposed permit changes is not complete at this time, pending submittal of additional information by the Permittee and further review by the Division, to address outstanding deficiencies in the proposal. A summary of those outstanding deficiencies is provided below. Additional comments, concerns, and deficiencies may also be found withing the analysis and finding make in the Draft Technical Analysis which have not been presented in this summary. Upon finalization of this review, any outstanding deficiencies will be evaluated for compliance with the regulatory requirements. Such deficiencies may be conditioned to the requirements of the permit issued by the Division, result in denial of the proposed permit changes, or may result in other executive or enforcement actions as deemed necessary by the Division at that time to achieve compliance with the Utah Coal Regulatory Program.

Accordingly, the permittee must address those deficiencies as found within this Draft Technical Analysis and provide the following, prior to approval, in accordance with the requirements of:

R645-301-521.200, The permittee must address the signs and markers requirements as listed in this section. The information is not listed in the MRP or the Wild Horse Ridge amendment. 58

R645-301-121.200., **(1)** The plan needs to clearly state that the operational monitoring will continue through reclamation to bond release. Also, considerable clarity needs to be achieved by dividing the monitoring points into wells, springs, and streams. This would be consistent with the PHC, which is formatted in this manner, and is standard practice for coal mines that the Division regulates. **(2)** Water age dating and chemical make-up with stiff diagrams should also be conducted to verify the information found west of the Bear Canyon Fault can be applied to the Star Point Sandstone Formation east of the Fault. 31

R645-301-121.200, Several places in the submittal require typographic or other corrections to make the document readable and understandable. These include: **(1)** The completed, although unapproved, Stream Alteration Permit is included in an unnamed appendix behind Appendix 7-M. This appendix needs to be numbered and named. **(2)** A Decant Structure Detail is included on Plate 7-11, however, it's unclear which end is in the pond and which end is at the outlet of the culvert under the portal area. This should be clearly labeled with the oil skimmer end in the pond. The term"oil skimmer" is spelled incorrectly on the plate. **(3)** The amendment, Chapter 3, Table of Contents indicates the Wild Horse Ridge sections begin on page 111, while they actually begin on page 117. Other similar discrepancies were found, for example Tables 7.1.7 and 7.1.8 in the MRP do not fit with the amendment. The Applicant needs to check the amendment and the original MRP to make

sure the amendment can be inserted and the page references in the MRP remain accurate. The review process often changes page numbers and this may require that this be the last task done. **(4)** The table on amendment page 7-29 needs a designation or number and a title. It should be included in the index as well. **(5)** Page 2-9 indicates, "Final termination date for mining operation is expected to be 2023." Page 3-80, the Reclamation Schedule, goes from 2012 to 2014. These are inconsistent and need to be resolved. **(6)** Catch Basin 1 is not labeled on Plate 2-4F. **(7)** Page 3-3, last paragraph, the term "conversion bolt" probably should be "conveyor belt." Similarly, page 3-7, last paragraph needs the word "adequate." **(8)** Page 3O-5, first paragraph, last sentence, needs the word "pond" added after "sediment." **(9)** Plate 7-1 G, the fifth area "W" (at the coal storage bin), described on page 7K-15 is not labeled on the plate. **(10)** Plate 7-1F has the BTCA area in the upper left corner labeled "X" and "W". One or the other needs to be eliminated. Also, culvert C-23U is shown on a ridge and needs to be moved to be shown in the stream. **(11)** On Plate 2-4G, culvert C34-U (unlabeled) is not in the correct location when compared to Plate 7-1G. The culvert should be in the stream and not under the road. 70

R645-301-121.200, The permittee must clearly show the subsidence area boundaries on Plate 3-3 and clarify what areas are included in the angle of draw and area of influence. The term buffer zone must also be defined. 39

R645-301-121.200, -624, Exploration hole TS-5 is discussed in section 7.1.4 (p. 7-21), but there is no TS-5 on Plate 6-11, in Appendix 6-A, nor in Table 7.1-5. TS-5 initially flowed 0.5 gpm, which corresponds to TS-13 in Table 7.1-5. The identity of TS-5 needs to be clarified. 26

R645-301-121.200, -624, The well completion diagram for monitoring well MW91-14 has been submitted for inclusion in Appendix 7-A. This well is referred to as MW-114 throughout the MRP. It needs to be clarified in Appendix 7-A that MW91-14 is the same as MW-114. 25

R645-301-122, The permittee must include a copy of the paper that they sited for pillar stability and ground control, Analysis of Retreat Mining Pillar Stability (ARMPS). Paper in Proceedings on New Technology for Ground Control in Retreat Mining, 1997, NIOSH pub. 97-133, pp 17-34. 40

R645-301-231 and R645-301-120, Concerning disturbance acreage and soil salvage volumes for the Wild Horse Ridge area, the following are needed: **(1)** Correct the inconsistencies between disturbance acreage values listed in Table 8.3-2, Table 8.9-1, and Table 8.11-1. **(2)** Based on corrected disturbance acreage for each soil unit, calculate projected soil salvage volumes for each soil unit and correct Section 8.9.6, Table 8.9-3, and Table 3O-1. 47

R645-301-242.110, Correct the average soil replacement depths based on corrected values for projected soil salvage disturbed acres and resulting changes in soil salvage volumes. 67

R645-301-243 and R645-301-130, In addition to analyzing the samples for micro nutrients, analyses should also include standard fertility test for pH, EC, nitrogen, phosphorus, and potassium. All sampling, testing and result interpretation must be done by a qualified Soil Scientist. The Soil Scientist must be qualified to sample, test and interpret data results. Prior to sampling and testing of the topsoil material, the soil scientist's qualifications must be reviewed by the Division. 67

R645-301-312.4, An approved Stream Alteration Permit obtained from the State Division of Water Rights for the proposed several stream channel alterations will need to be provided when it's received. This information is necessary to make buffer zone findings. The unnamed appendix behind Appendix 7-M needs to be numbered and named. 58

R645-301-322, (1) Plate 3-3 needs to be updated to reflect the raptor survey completed earlier this spring. **(2)** The area contains some plants tentatively identified as the Link Trail columbine. If this is the correct identification, the application may need to contain some information about these plants and their locations. 17

R645-301-333, The applicant needs to show how they will use the best technology currently available to protect and enhance critical big game habitat in the proposed surface facilities area. The applicant needs to develop and implement a mitigation plan in cooperation with Wildlife Resources and the Division. 41

R645-301-333, The application needs to contain more design information about the conveyor. The conveyor should be designed to not overly restrict movements of wintering deer and elk. 42

R645-301-333, Use of the raptor nests near the proposed surface facilities will probably be adversely affected during the operations. At least two options are available for mitigating this loss, and the applicant needs to develop and implement a mitigation plan in cooperation with Wildlife Resources and the Division. 42

R645-301-341, The section of the application discussing mulching methods needs to be clarified. 73

R645-301-411.140, The application needs to contain all available information about cultural resources in the area, but it does not include information about areas that would be undermined although it appears this information exists. 14

R645-301-512.240, Current prudent engineering practices need to be followed: **(1)** An oil skimmer is must be provided on the Sediment Pond D outlet spillway. **(2)** Full containment berms around fuel tanks are standard on the rest of the site, and one should be included for this one, at the portal area. 57

R645-301-521 and R645-301-120, Correct discrepancies between Plate 8-7 and Appendix 3O, Figure 3O-1 and associated cross sections showing the topsoil stockpile final configuration and resulting slopes. 47

R645-301-521.140, The permittee will show the correct permit boundaries on Plate 3-4A. 33

R645-301-521.190, The permittee must show the location of the cross sections used to calculate the cut and fill volumes (cross section in Appendix 3-O) on the detailed topographic maps (Plate 3-7F, Plate 3-7G, Plate 3-2F and Plate 3-2G). 50

R645-301-526.200 thru R645-301-526.222, The permittee must address these sections. They must describe how support facilities will be installed and operated. They must also make specific commitments to the Division about the facilities. 58

R645-301-528.323.1, The permittee must address how burning and burned waste material will be handled. Note: R645-301-528.323.1 does not make exceptions for temporary storage piles. 52

R645-301-534.120, The permittee must show that they will use only nonacid- or nontoxic forming substances for road surfaces. The Division is concerned about the high levels of selenium in some soils near the No. 3 Mine Portal Area. 50

R645-301-536, The permittee must address how coal mine waste from the Wild Horse Ridge project will be handled if the material must be brought to the surface and if the material cannot be returned underground. The Division concern is that coal near the outcrops may be burnt or weathered. If so then the permittee may not be able to dispose of the material underground. Should such a scenario occur then the permittee would need to find an alternative disposal site for the mine development waste. If the permittee done not want to have an alternative disposal site (refuse pile) then they should show that if burnt or weather coal is encountered that MSHA will allow that material to be placed underground. 52

R645-301-542.200, The permittee must give the Division detailed maps and cross sections that show the location of the highwalls, cut slopes and coal seams. 75

R645-301-542.730, The permittee must show that MSHA has approved the disposal of large amounts of coal material underground. The current coal mine waste plan is based on limited amounts of rock material being placed in abandoned underground workings. **The Division needs assurances that MSHA will allow the permittee is dispose of large amounts of coal mine waste underground should the need arise.** 64

R645-301-553.100 and R645-301-542.200, The permittee must give the Division detailed cross sections that show the reclamation of each highwall, what cut slopes if any will be retained and how the coal seams will be backfilled. The cross sections in Appendix 3-O do not show the location of the highwalls, cut slopes or coal seams. The highwalls, cut slopes and coal seams must clearly be shown on the cross sections. Without that information the Division is unable to make a finding about highwall elimination. 64

R645-301-553.100-R645-302-553.150, The permittee must either show that lift 36" thick can adequately compacted or develop another backfilling and regrading plan for reclaiming the roads. 50

R645-301-553.110, The amendment must show that the reclamation plan will comply with the approximate original contours and include description of any highwall or cut slopes to be retained. 62

R645-301-553.130, The permittee must show that all reclaimed slopes will have a safety factor of at least 1.3. The safety factor analysis in the amendment appears to deal only with the slopes in the operational phase. The permittee reply to this deficiency was that a reference had been added to Page 3-118 to reference the slope stability factor information. Slope stability analyses are contained in Appendix 3-O. **The slope stability analyses (cross sections) may not be for the reclaimed slopes, rather the operational.** The permittee needs to clarify this issue. If the slope stability analysis is for the operational phase then they must also include slope stability analysis for the reclamation phase. 64

R645-301-622.100, Locations for TS-12 through TS-14 are not shown on Plate 6-11 (nor any other map), contrary to the statement at the bottom of Table 7.1-5. 26

R645-301-730, (1) The areas proposed to be terraced should be shown on the reclamation map. **(2)** "In areas where cuts existed prior to mining, the (fill) material will be placed so as to backfill the cut to the extent possible. These areas are shown on Plates 3-2", (pg. 3-119). No such designated areas could be found on Plates 3-2, F and G and they need to be provided. 61

R645-301-731, **(1)** The plan needs to clearly state that the operational ground-water monitoring will continue through reclamation to bond release. **(2)** The plan needs to clearly state that the operational surface-water monitoring will continue through reclamation to bond release. 70

R645-301-731, (1) A site visit by the Division evaluation team followed by discussions with the Applicant resulted in an agreement that the Division Hydrologist will be notified in time to make a field visit when the blasting is to occur above this spring, SBC-14, (WHR-6) and when construction for the culvert above this spring is to take place. This will need to be added to the amendment. **(2)** Based on the letter accompanying the latest submittal, it's expected that the SPCC plan will be updated and available at the site "within six months of implementation of the Wild Horse Ridge construction". A determination will then be made as to whether the proposed plan minimizes potential for hydrocarbons to be released off the permit area. This needs to be included in the plan. **(3)** Due to past problems with erosion control matting failures, the Division requires the Applicant to commit to install the matting in strict conformance with the manufacturers instructions. 57

R645-301-742.223, Spillways are required to be "of non-erodible construction" such as rock riprap. Such protection will need to be provided for both of the catch basin spillways. 57

R645-301-742, The statement on page 3-42 regarding no water rights could be impacted needs to be eliminated or modified. 33

ADMINISTRATIVE INFORMATION

OWNERSHIP AND CONTROL

Regulatory Reference: R645-301-112

Analysis:

Chapter 1 of the mining and reclamation plan is an introduction describing where information is located in the plan, and proposed changes are minor and general in nature.

Ownership and control information is in Chapter 2. The applicant is Co-Op Mining Company, and the mining and reclamation plan includes Co-Op's address, telephone number, resident agent, and employer identification number. The application also shows the officers and directors of CW Mining Company, a corporation which is doing business as Co-Op Mining Company. Thus, these people are, in effect, the officers and directors of Co-Op Mining Company. CW Mining Company will pay the abandoned mine reclamation fee.

Table 2-1 shows property ownership in and contiguous to the current and proposed addition to the permit area. This information and the legal description in Section 2.2.2 correspond with the information on Plates 2-1 and 2-2 and appear to be correct.

The current plan includes MSHA numbers for the Bear Canyon No. 1 and No. 2 Mines, and the application shows an MSHA number for the proposed facilities the Bear Canyon No. 3 Mine. The MSHA number for the Bear Canyon No. 4 Mine will be included during phase II of Wild Horse Ridge permitting (not yet proposed).

Findings:

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

VIOLATION INFORMATION

Regulatory Reference: R645-301-113

Analysis:

Appendix 2-A of the current mining and reclamation plan has a list of notices of violation and other enforcement actions taken by the Division, the Office of Surface Mining, and the Division of Air Quality. The applicant has received no violation notices in the past three years.

The plan says neither the applicant nor any subsidiary, affiliate, or persons controlled by or under common control with the applicant has had a federal or state permit to conduct coal mining and reclamation operations suspended or revoked in the five years preceding the date of submission of the application; or forfeited a performance bond or similar security deposited in lieu of bond.

Findings:

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

RIGHT OF ENTRY

Regulatory Reference: R645-301-114

Analysis:

The application includes copies of the leases for the areas proposed to be added to the permit area, and the legal descriptions in these leases match the areas shown on the permit area maps and in Section 2.2.2. It appears the applicant has the required right of entry.

Findings:

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

UNSUITABILITY CLAIMS

Regulatory Reference: R645-301-115

Analysis:

The proposed operations will not be within 100 feet of a public road or within 300 feet of an occupied dwelling. The existing mine is within 300 feet of occupied dwellings, but the plan contains approval letters from the owners and renters of these buildings.

According to the current mining and reclamation plan, no portion of the area to be permitted is within an area designated as unsuitable for mining, and it has several paragraphs, some of which were revised for this submittal, describing why it should not be considered unsuitable. The Division is unaware of any study or petition for designation as unsuitable.

Findings:

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

PERMIT TERM, INSURANCE, PROOF OF PUBLICATION, AND FACILITIES OR STRUCTURES USED IN COMMON

Regulatory Reference: R645-301-116, R645-301-117

Analysis:

Most of this information has not been changed. The projected termination date for mining operations was changed from 2007 to 2023.

The Division has on file a copy of the applicant's insurance policy, and it meets regulatory requirements.

The application includes a copy of the proof of publication. The advertisements ran from December 7 through December 28, 1999, in *The Salt Lake Tribune*, the *Deseret New*, and the *Emery County Progress*.

No facilities would be used in common with any other permitted operation.

Findings:

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

ENVIRONMENTAL RESOURCE INFORMATION

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

GENERAL

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

Analysis:

Analyses of the existing, pre-mining environmental resources within the permit and adjacent area that may be affected or impacted by the proposed underground mining activities are discussed under other headings in this TA

Findings:

A determination of adequacy for this section will be determined to meet the regulatory requirements when all other information in this TA are determined adequate.

PERMIT AREA

Regulatory Requirements: 30 CFR Sec. 783.12; R645-301-521.

Analysis:

The disturbed area boundaries for the Wild Horse Ridge are shown on Plate 2-4B, Plate 2-4C, Plate 2-4F and Plate 2-4G. The disturbed acreage are listed in Section 3.3.14 on Table 3.3-1, Surface Disturbance Summary. The permittee will increase the disturbed area from 29.10 acres to 35.99 acres. None of the new disturbed acreage contains lands disturbed by mining activities prior to1977. The new disturbed areas include the Wild Horse Ridge access road, conveyor belt access/topsoil stockpile, upper conveyor belt access roads No. 1 and No. 2, and the Wild Horse Ridge Blind Canyon seam portal area.

The permit area is described in Section 2.2.2 of the PAP and shown on Plate 2-1, Permit Area Map. The permit area contains 3,336.18 acres and has the following boundaries:

Township 16 South, Range 7 East, SLBM

Section 13:	W1/4
Section 14:	S1/2, NE1/4
Section 23:	E1/2, E1/2 W1/2
Section 24:	W1/2, SE1/4, W1/2 NE1/4, SE1/4 NE1/4
Section 25:	ALL
Section 26:	NE1/4 NE1/4, NW1/4 NE1/4, N1/2 SW1/4 NE1/4

The access/haul road and topsoil storage area as shown on Plate 2-1 of the Mining and Reclamation Plan

Township 16 South, Range 8 East, SLBM
Section 19: S1/2 NW1/4, SW1/4, SW1/4 SE1/4
Section 30: W1/2, W1/2 NE1/4, NW1/4 SE1/4
Section 31: NE1/4 NW1/4, NW1/4 NE1/4

Findings:

The permittee has met the minimum requirements of this section.

HISTORIC AND ARCHAEOLOGICAL RESOURCE INFORMATION

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

Analysis:

The current mining and reclamation plan contains information about one cultural resource site, the Bear Creek Shelter, in the area of the lower part of the conveyor. The application contains a report discussing the significance of this site and also showing results of a survey of the entire area proposed to be disturbed. No other sites were found. The Bear Creek Shelter is considered eligible for listing in the National Register of Historic Places.

The application discusses a cultural resources report done by Kenneth Juell of the University of Utah Archeological Center. The applicant was not able to find a copy of this report but did find reference to it in another mine plan. According to the application, the survey was done in the Wild Horse Ridge area and included drill sites and access roads on ridges and in the canyon. It is understood no significant archaeological sites were found, but this report is available from the Archaeological Center and should be included in the application. The Division would like to confirm the results and know exactly which areas were surveyed.

Findings:

Information in the application is not adequate to meet the requirements of this section of the regulations. Prior to approval, the applicant must supply the following in accordance with:

R645-301-411.140, The application needs to contain all available information about cultural resources in the area, but it does not include information about areas that would be undermined although it appears this information exists.

CLIMATOLOGICAL RESOURCE INFORMATION

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

Analysis:

The Mayo and Associates PHC, August 1999 incorporates current climatic information into the plan. Average annual precipitations are recorded between 10 and 15 inches from lower elevation gauging stations within the permit and adjacent area. Average annual precipitation is recorded as 29 and 33 inches in the high elevation gauging stations. The Palmer Hydrologic Drought Index for Utah Division 4 and Division 5 climatic regions are presented and discussed.

Findings:

The application meets the minimum requirements for this section.

VEGETATION RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.19; R645-301-320.

Analysis:

Appendix 9-G is a report on the vegetation of the area that would be disturbed. It includes quantitative measurements of vegetative cover and woody plant density in the proposed disturbed area and a reference area. It also contains measurements of vegetation productivity.

The proposed disturbed area has a variety of vegetation communities because there is a variety of aspects and soils over the length of the proposed conveyor and road. Except for the facilities area, disturbances would be fairly narrow and small in each community, so the 1different communities were not sampled separately. This did not, however, lead to a large sample size.

The vegetation communities in the proposed disturbed area include varying amounts of riparian, Salina wild rye, pinyon/juniper, Ponderosa pine, mountain brush, and sagebrush/grass. Dominant species were Salina wild rye, needle and thread grass, Utah juniper, and smooth brome, but several other species were also present. Vegetative cover was 42.50%, and woody plant density was 1010 per acre.

The reference area was chosen to be transitional between the lower drainage area and the pinyon/juniper/grass areas on the upper slopes. Dominant species were Salina wild rye, corymbed buckwheat, rubber rabbitbrush, Kentucky bluegrass, and hoary aster. While the proposed disturbed area was strongly dominated by grasses, the proposed reference area had cover more balanced between grasses and shrubs. Vegetative cover was 46.25%, and woody plant density was 1405 per acre.

Productivity in the area proposed to be disturbed was 125.31 pounds per acre for herbaceous species and 122.37 pounds per acre for woody species for a total of 247.68 pounds per acre. Vegetation productivity in the reference area was 286.17 pounds per acre for herbaceous species and 310.15 pounds per acre for woody species for a total of 596.32 pounds per acre. Obviously, productivity in the reference area was much greater than in the proposed disturbed area. This is acceptable because the success standard would be higher than what currently exists, and the consultant who wrote the report argues that the reference area continues to be an appropriate standard.

Findings:

Information in the proposal is adequate to meet the requirements of this section of the regulations.

FISH AND WILDLIFE RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.21; R645-301-322.

Analysis:

Wildlife Information

Plates 3-3 and 10-1 have been revised to include the proposed addition to the permit area. These maps show raptor nests and big game habitat. The entire proposed addition to the permit area is either critical elk or deer winter range. Several raptor nests are in the area including two within about 2000 feet of the proposed surface facilities.

The right fork of Bear Creek consistently has water in a few places, but it is not a fishery.

The Division has consulted with the Division of Wildlife Resources concerning the adequacy of wildlife information in the application and in the current mining and reclamation plan. The applicant needs to update the raptor nesting information as a result of the survey conducted earlier this spring.

Threatened and Endangered Species

Most threatened or endangered species that could occur in Emery County occur at lower elevations than the mine and have no habitat in the proposed disturbed area. These are Barneby reed-mustard, Jones cycladenia, last chance Townsendia, Maguire daisy, Despain footcactus, Wright fishhook cactus, and the Winkler cactus. There have been no confirmed sightings of black-footed ferrets in Emery county in several years.

Bald eagles are common in the area during the winter and could occasionally fly through or roost in the proposed addition to the permit area. Mining would have negligible effects on these birds.

The proposed disturbed area does not contain habitat for the southwestern willow flycatcher, but it is not known whether suitable habitat exists in other parts of the proposed permit area addition. The proposed disturbed area has some willows and riparian vegetation, but it was not enough that it was encountered in vegetation cover samples or that it would provide habitat for southwestern willow flycatchers. Woody plant density measurements included coyote willow at a density of 25 per acre.

Canyon sweetvetch (*Hedysarum occidentale* Var. *canone*) is listed by Region 4 of the Forest Service as a sensitive species. This species has been found in the proposed disturbed area, and locations are documented in the vegetation report in Appendix 9-G.

A plant tentatively identified as the Link Trail columbine (*Aquilegia flavescens* Var. *rubicunda*) has been found in the right fork of Bear Canyon. This plant is classified as a sensitive species by Region 4 of the Forest Service. The Division is working with Dr. Patrick Collins, the same person who conducted the vegetation inventory, to make positive identification. If this plant is actually the Link Trail columbine, the application will need to indicate this species is in the area. Since the plant grows mainly in wet areas and the applicant is trying to avoid these types of areas, little or no mitigation should be required.

Findings:

Information provided in the application is not adequate to meet the requirements of this section of the regulations. Prior to final approval, the applicant must supply the following in accordance with:

R645-301-322, (1) Plate 3-3 needs to be updated to reflect the raptor survey completed earlier this spring. **(2)** The area contains some plants tentatively identified as the Link Trail columbine. If this is the correct identification, the application may need to contain some information about these plants and their locations.

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.21, 817.200(c); R645-301-411, -301-220.

Analysis:

Chapter 8, Soil Resources, Sections 8.1 through 8.7, discusses the soil resources within the proposed Wild Horse Ridge project for the Bear Canyon Mine. Relevant soils information includes prime farmland investigation, current and past soil surveys, soil characterizations, and substitute topsoil identification. The Analysis section discusses resource information as follows:

- Soil Survey Information
- Soil Characterization
- Substitute Topsoil

Soil Survey Information

Chapter 8 supplies soil resource information for the Bear Canyon Mine and the proposed Wild Horse Ridge expansion based on six soil surveys as follows:

- 1980. Soil and vegetation survey for Bear Canyon, USDA San Rafael Soil Conservation District and the Soil Conservation Service, Appendix 8-B pp 1 to 13.
- 1990. Order I soil survey, USDA Soil Conservation Service, Appendix 8-B pp 13
- 1992. Substitute topsoil survey for Bear Canyon, Appendix 8-E.
- 1996. Soil samples collected by Co-Op for Wild Horse Ridge. Appendix 8-F.
- 1998. Order II soil survey of Wild Horse Ridge, USDA Natural Resource Conservation Service.
- 1999. Order I soil survey of Wild Horse Ridge, conducted by Environmental Industrial Services, Appendix 8-F. The survey incorporates information from the 1998 Order II, NRCS soil survey and the 1996 soil sampling. The Wild Horse Ridge site contains seven soil mapping units as follows:

A	Pathead-Cabba Complex, 30 to 70 % slopes
B	Winetti, High Elevation, 5 to 30 % slopes
C	Winetti, High Elevation-Rock Outcrop, 10 to 30 % slopes
D	Doney, Deep, 10 to 30 % slopes
E	Datino-Guben Complex, 30 to 80 % slopes
F	Guben-Pathead Complex, 30 to 80 % slopes
G	Doney-Cabba-Podo Complex, 30 to 80 % slopes

All mapping and soil survey work were performed according to the standards of the National Cooperative Soil Survey. Based on the site-specific soil descriptions, and laboratory data, each of the soils was classified according to current NRCS soil taxonomy, and correlated with NRCS's Order II soil survey. Documentation of field data is presented in Map B-Soil Data Collection Map; Appendix C-Field Soil Profile Descriptions and Transect Data; Appendix D-Soil Profile and Landscape Photographs. Appendix F contains information comparing soil mapping units between the 1999 Order I soil survey to NRCS's Order II soil survey. Adjustment summarizations were given for each specific change in identifying and renaming soils within the Wild Horse Ridge area.

The 1990 and 1999 Order I soil survey for the Bear Canyon Mine and Wild Horse Ridge cover approximately 32 acres in Bear Canyon and in the Wild Horse Ridge mine expansion area. Approximately 480 acres are mapped on two soil maps (Plate 8-1 and Plate 8-1A) which are scaled at 1-inch equals 200-feet, with 5-foot contour intervals. A total of 10 different soil mapping units are identified. Plate 8-1 shows three soil mapping units as DZE, PDR, and TR, with "D" identified as disturbed area soils. These three mapping units are for the existing Bear Canyon Mine disturbance area. Plate 8-1A identifies the 7 soil mapping units as contained in the 1999 Order I soil survey for the Wild Horse Ridge mine expansion project as follows:

Appendix 8-F Soil Map Unit	MRP Soil Map Unit	Soil Name
A	PC	Pathead-Cabba Complex
B	WIN	Winetti, High Elevation
C	WR	Winetti, High Elevation-Rock Outcrop
D	DON	Doney, Deep
E	DG	Datino-Guben Complex
F	GP	Guben-Pathead Complex
G	DCP	Doney-Cabba-Podo Complex

Soil Characterization

Section 8.3, Soil Information, identifies and describes each of the 10 soil groups as contained in the 1990 and 1999 Order I soil surveys. Soil descriptions for each of the 10 soil mapping units are summarized in Table 8.3-1 and in Section 8.3.2.

Wild Horse Ridge

In May 1999, a site specific Order 1 soil survey for the proposed Wild Horse Ridge project area was performed and prepared by Mr. Daniel Larsen, Soil Scientist, Environmental Industrial Services (Appendix 8-F). The detailed survey contains soil descriptions, soil pedon descriptions, soil salvage suitability analysis, laboratory soil testing data, field soil profile descriptions, soil and landscape photographs, soils map, soil data collection map and salvageable soils map. Soil pedons were characterized by the soil horizons at each sampling location. All profile descriptions were recorded on standard NRCS forms and are provided in Appendix C within Appendix 8-F. Field parameters for each soil pedon description includes horizon information, soil color, texture, rock fragment, soil structure, roots, clay films, and effervescence with 0.1N hydrochloric acid. In addition, general site descriptions include vegetation, climate regimes, land form physiography, relief, elevation, slope, aspect, erosion condition, permeability, drainage class, depth to saturation (ground water) if encountered, salts or alkali if present, and surface rock. Generalized soil properties are summarized as follows for each soil type:

In 1996, four soil pits (WHRS-1 thru WHRS-4) were analyzed in the Wild Horse Ridge planned disturbance area. Test results are included with the Order I soil Survey in Appendix F. Pit locations are shown on Plate 8-1A.

Map Unit	Map Symbol	Land Form	% Slope	Parent Material	Soil Depth	Texture	Rock Fragment Class	General Vegetation
A	PC	foothills	30-70	colluvium and shale	shallow to deep	sl, l, cl	stony to very cobbly	Pinion-Juniper
B	WIN	narrow canyon bottoms	5-30	alluvium and colluvium	deep	sl, l, ls	gravelly to bouldery	Cottonwood Douglas-fir Dogwood Wildrose
C	WR	narrow canyon bottoms	5-30	alluvium, colluvium and sandstone	shallow to deep	sl, l, ls	gravelly to bouldery	Cottonwood Douglas-fir Dogwood Wildrose
D	DON	toe slope, slight bench	10-30	colluvium, slope wash	deep	sl, l, ls	non-stony to stony	Ponderosa Pine Juniper Douglas-fir
E	DG	steep canyon slope, north aspect	30-80	colluvium and shale	moderate deep to deep	sl, l, cl	very stony to non-stony	Douglas-fir Pinion Mt. Mahogany Serviceberry
F	GP	canyon side slope	30-80	colluvium, sandstone and shale	shallow to moderate deep	sl, l, cl	very stony to bouldery	Douglas-fir Pinion Mt. Mahogany
G	DCP	steep canyon slope, south aspect	30-80	sandstone, shale and colluvium	shallow to moderate deep	sl, l, cl	very stony to non-stony	Pinion-Juniper Grass

Seven soil samples were selected from representative soil layers during soil inventory and were characterized according to the State of Utah Division of Oil, Gas and Mining (DOGM) guidelines for topsoil and overburden[1]. Sampled parameters include: pH; electrical conductivity; saturation percent; SAR includes Ca, Mg, and Na; texture includes % very fine sand, sand, silt and clay; TOC includes organic matter percent; $CaCO_3$; Boron ($CaCl_2$ extraction); Selenium (AB-DPTA extraction); AWC includes 1/3 and 15 bar analyses; and ESP.

Soil samples were sent to Inter-Mountain Laboratories, Inc. for analysis. Appendix B contains the laboratory data sheets for all analysis on the seven samples. Some summarys of soil laboratory results are noted below, excluding sample CW10-1 which is discussed below:

[1]Leatherwood, J., and Duce, D., 1988. Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining. State of Utah Department of Natural Resources, Division of Oil, Gas and Mining.

Parameter	Results (Range)	DOGM Rating *
pH	7.4 - 7.8	Good
EC (mmhos/cm)	0.33 - 0.64	Good to Poor
Saturation %	30 - 48	Good
SAR	0.3 - 0.7	Good
Texture	SIL, SL, L	Good
Boron (mg/Kg)	0.5 - 1.6	Good
Selenium (mg/Kg)	<0.02	Good
Avail Water Cap. (in/in)	0.06 - 0.14	Fair to Good

* State of Utah Division of Oil, Gas and Mining (DOGM) guidelines for topsoil and overburden.

For all soils, except CW10-1, soil tests indicate that the soils generally rate fair to good for reclamation use. The one exception is soil sample CW10-1, which was taken from a light-colored soil layer at about 20 to 30 inches in depth on a road cut in Soil Map Unit F. The sample was taken to document properties of a calcic horizon in a Guben soil. Soil test results indicate an unacceptable level of selenium (0.26 mg/Kg) and a poor rating for electrical conductivity (10.2 mmhos/cm). The sample was also higher in boron (2.5 mg/Kg), calcium (7.5 meq/L), magnesium (160 meq/L), sodium (35 meq/L), SAR (3.7) and pH (8.3) than the other soil samples. The CW10-1 sample site is at the edge of the existing road accessing the future portal site. The soil survey states that Co-Op Mining does not anticipate that this soil would be involved in site disturbance for portal development and that further assessment may be required if disturbance along this section of road is proposed. Every effort should be made to minimize disturbing and/or mixing the deeper subsoils (20 to 30 inches) of this section of road cut.

The **percent rock content** within the mine site disturbance or proposed facilities area is the main deterrent for soil suitability based on the current DOGM guidelines. Although DOGM suitability criterion considers >30% (by volume) rock fragments (for both gravels <3" in size and cobbles 3 to 10" in size) to be unacceptable, and >10% stones and boulders >10" in size to also be unacceptable, the recent trend by DOGM is to salvage **native soils** with **intrinsic or indigenous rock content.** Using indigenous rocky soils should enhance reclamation success by providing an environment similar to native conditions. However, higher rock content greater than is present in the surface soils needs to be avoided. Natural, intrinsic rock content provides for a more stable reclaimed surface, aids in water harvesting and water holding capacity of interstitial soils, and creates wildlife habitat and niches on the surface were surface boulders and larger cobble sized rocks are placed.

Substitute Topsoil

The PAP does not propose any borrow as a source for substitute topsoil. However, in 1992, in-place overburden and disturbed soils within the facilities area, were evaluated for use as substitute topsoil material. Results are contained in Appendix 8-E.

Findings:

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

LAND-USE RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.22; R645-301-411.

Analysis:

According to information in the application and the current mining and reclamation plan, the current permit area and the proposed addition are zoned by Emery County as Mining and Grazing and Critical Environmental. The land is used for mining, cattle grazing, timber, recreation, and wildlife. Parts of the area are included in a Private [Posted] Hunting Unit, and the access road to the Wild Horse Ridge surface facilities also provides access to a hunting cabin. This road will be maintained during the mining operations.

The application discusses previous mining activity in the area. Various entities have operated mines in the area since 1885.

The application says there are no public parks, cemeteries, or units of the Wild and Scenic Rivers system or the National System of Trails.

Findings:

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

ALLUVIAL VALLEY FLOORS

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

Analysis:

The Natural Resources Conservation Service (NRCS) reported that there are alluvial soils in the bottoms of Fish Creek Canyon and the right fork of Bear Creek in sections 24 or 25 T.16S. R.

7E. and sections 19 and 30 T. 16S. R. 8E (see Prime Farmland Letter, dated July 9. 1999, Appendix 8C-5).

The Wild Horse Ridge amendment is situated near alluvial valley floors and the following and the following findings are made based on the proposed operations:

- Unconsolidated streamlaid deposits holding a stream are present in Bear Creek, the right fork of Bear Creek, Fish Creek and Huntington Creek.

- Steep slopes and limited flat areas preclude cultivation and irrigation within the permit area and agricultural activities in the adjacent are associated with Huntington Creek.

- The proposed operation is not expected to materially damage adjacent area AVF water supplies primarily because water from the proposed Wild Horse Ridge area contributes a very small portion of water contributed to the Huntington Creek basin. Although adjacent area farmlands were not identified by the applicant, this information was obtained from the Water Resource data base updated in 1998. Undeveloped range in the permit and adjacent area is not significant to farming primarily because the alluvial grazing is conducted in narrow canyons that preclude farming.

Based on the above analysis, the Division concludes the proposed Wild Horse Ridge operations occurs adjacent to alluvial valley floors but will not preclude farming on an Alluvial Valley Floor and any undeveloped range in the permit and adjacent area is not significant to farming.

Findings:

Additional information relative to R645-302-321 is not required. The information provided meets the regulatory requirements of this section.

PRIME FARMLAND

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

Analysis:

A Prime Farmland site investigation was performed by the Natural Resources Conservation Service (NRCS). A negative determination was made for Prime Farmland or farmland of statewide importance within the proposed Wild Horse Ridge area (sections 24 and 25 T.16S. R. 7E. and sections 19 and 30 T.16S. R. 8E). The determination letter from the NRCS is dated July 9, 1999, and is included in Appendix 8-C.

Findings:

The application meets the minimum requirements for this section.

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.22; R645-301-623, -301-724.

Analysis:

Changes to the text, mostly minor, have been made on pages 6-3, 6-6, 6-10, 6-11, 6-13, 6-16, 6-18, and 6-19 of Chapter 6. The proposed permit boundary as shown on revised Plates 6-1 through 6-12 includes federal leases U-020668 and U-38727 and fee coal owned by C.O.P. Development. Plate 6-1 is the Geology Map. Plates 6-2, 6-6, and 6-10 are overburden maps, Plates 6-3, 6-7, and 6-11 are isopach thickness maps, Plates 6-4, 6-8, 6-12 are structure contour maps, and Plates 6-5 and 6-9 are interseam isopach maps. Plates 6-2 through 6-12 are based on information from numerous borings and outcrop measurements: logs from many of these borings are in the MRP.

Plates 7-9 and 7-9A are stratigraphic cross-sections. Generalized logs for bore-holes T-1, T-2, T-3, T-5, SDH-1, SDH-2, and SDH-3 are shown on Plate 7-9 and those for WHR-1, WHR-2 , WHR-3, WHR-5, WHR-8, F-76-1, F-77-5, F-76-6, 77-3A, and F-77-11-A are on Plate 7-9A. The logs are not arranged on Plate 7-9A in a sequence that would usually be expected of a geologic cross section. 7-J1 and 7-J2 are stratigraphic cross-sections based on logs from bore holes SDH-1, SDH-2, MW-116, and MW-117. The MRP does not contain the original logs for any of these bore holes. Except for F-76-4 and F-77-B (Plate 7-9A), Plate 6-2 shows the locations for all bore-holes on Plates 7-9, 7-9A, 7J-1, and 7J-2.

The well completion diagram for MW91-14 has been submitted for inclusion in Appendix 7-A. This well is referred to as MW-114 throughout the MRP. It needs to be clarified in the MRP that MW91-14 and MW-114 designate the same well or bore-hole.

Drill-hole DH-3 was abandoned in 1993 and replaced by DH-4. Bore-hole logs and well completion diagrams for DH-1, DH-2, DH-3, and DH-4 are Appendix 7N-G (p. 6-13).

Logs for drill holes TS-6 through TS- 10 and TS-14 are in Appendix 6-A, but logs are not available for TS-12 and TS-13: there is apparently no TS-11. Locations for TS-6 through TS-10 are shown on Plates 6-9, 6-10, and 6-11. Locations for TS-12 through TS-14 are not shown on any of the maps, contrary to the statement at the bottom of Table 7.1-5. Exploration hole TS-5 is discussed in section 7.1.4 (p. 7-21), but there is no TS-5 on Plate 6-11, in Appendix 6-A, nor in Table 7.1-5. TS-5 initially flowed 0.5 gpm, which corresponds to TS-13 in Table 7.1-5. The identity of TS-5 needs to be clarified.

Logs for twelve in-mine bore holes are in Appendix 7A, but locations are not shown on a map. Locations for a "H" series of in-mine bore holes are shown on Plates 6-5 and 6-7, but there are no logs for these holes in the MRP.

There is no hydrology information available for the "WHR" series of bore-holes (Section 7.1-4, p. 7-20).

The current MRP includes a description of the areal and structural geology of the proposed permit and adjacent areas, including federal leases U-020668 and U-38727 and fee coal tract owned by C.O.P. Development. The description is based on maps and plans required as resource information for the plan, detailed site specific information, and geologic literature and practices. Additional geologic information has been submitted as part of Appendix 7J-I, Investigation of Groundwater and Surface Water Systems and Probable Hydrologic Consequences, a report by Mayo and Associates, LC. These descriptions show how areal and structural geology may affect the occurrence, availability, movement, quantity, and quality of potentially impacted surface and ground water.

Coal isopach thickness maps indicate the Blind Canyon and Tank seams, but not the Hiawatha seam, are of minable thickness in portions of the Wild Horse Ridge area. The Hiawatha seam was previously thought to be continuous and of minable thickness, but recent drilling has revealed several sandstone channels that render the seam unminable in the vicinity of Bear and Fish Creeks (pp. 6-18 and 6-19 and Plate 6-7) and this seam is described as not minable in Table 3C-1. Revised Plates 3-4A and 3-4C show projected mining in the Blind Canyon and Tank seams, respectively, in the Wild Horse Ridge addition.

Subsidence is discussed in Appendix 3-C. Total calculated subsidence in the Wild Horse Ridge area is 7.3 feet, based on an average total thickness of 16.5 feet for the Tank and Blind Canyon seams: in the existing permit area, the calculated maximum subsidence is 14.1 feet based on an average total thickness of 22 feet for the Tank, Hiawatha, and Blind Canyon seams (Table 3C-1). Average thickness of the Blind Canyon seam is 9 feet and average depth is 1,200 feet, and for the Tank seam the averages are 7.5 feet thick and 950 feet deep.

Except as noted below, the application includes geologic information in sufficient detail to assist in determining the probable hydrologic consequences of the operation upon the quality and quantity of surface and ground water in the permit and adjacent areas, including the extent to which surface and ground-water monitoring is necessary, and determining whether reclamation as required by the Utah Coal Mining Rules can be accomplished and whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area.

At this time the Division does not require the collection, analysis, and description of additional geologic information to protect the hydrologic balance, to minimize or prevent subsidence, or to meet the performance standards. The Permittee has made no request to the Division to waive in whole or in part the requirements of the bore hole information or analysis required of this section.

Findings:

Information on geologic resources is not considered adequate to meet the requirements of this section. Prior to approval the Permittee must provide the following in accordance with:

R645-301-121.200, -624, The well completion diagram for monitoring well MW91-14 has been submitted for inclusion in Appendix 7-A. This well is referred to

as MW-114 throughout the MRP. It needs to be clarified in Appendix 7-A that MW91-14 is the same as MW-114.

R645-301-121.200, -624, Exploration hole TS-5 is discussed in section 7.1.4 (p. 7-21), but there is no TS-5 on Plate 6-11, in Appendix 6-A, nor in Table 7.1-5. TS-5 initially flowed 0.5 gpm, which corresponds to TS-13 in Table 7.1-5. The identity of TS-5 needs to be clarified.

R645-301-622.100, Locations for TS-12 through TS-14 are not shown on Plate 6-11 (nor any other map), contrary to the statement at the bottom of Table 7.1-5.

HYDROLOGIC RESOURCE INFORMATION

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

Analysis:

Sampling and analysis

Holding time and sample analysis problems occurred at sites 16-7-13-1, 16-18-14 and 16-8-20-1. See Tables 2b and 3 in this TA For surface water site WHR-1, fluoride was not distilled for baseline data on June and August 1993; however, fluoride is no longer considered a required baseline parameter. Holding time expired on Sulfate on 10/93. For all samples dissolved metals, which were filtered at lab, were received within one day. Lab sheets for all sites where data was collected on July 1991 were missing from the amendment since they could not be found. However, the data had been recorded and was submitted.

Baseline information

Appendix 7-M, Spring and Seep inventory Federal Lease Area, provides a discussion of the seeps, springs, and streams in and adjacent to the Wild Horse Ridge addition. Attachment 7M-A, Surface and Groundwater Water Quality Information provides the lab sheets for baseline monitoring. Table 7.1-8, Water Monitoring Matrix: Operational Phase of Mining lists the proposed monitoring plan for the mine which now includes the new addition. The surface and ground water parameters monitored remain the same as in the original Mining and Reclamation Plan. The plan needs to clearly state that the operational monitoring will continue through reclamation to bond release. Also, considerable clarity will be achieved by dividing the monitoring points into wells, springs, and streams. This would be consistent with the PHC, which is formatted in this manner, and is standard practice for coal mines that the Division regulates.

Although included, adjacent area sampling associated with the Mc Cadden Hollow area were not reviewed. This information was not considered to be directly related to the proposed Wild Horse permit area, but will be considered applicable to the Cumulative Impact Area (CIA) information.

Ground-water information

Numerous sources for ground water related information is found throughout the plan. The baseline information relative to groundwater, seeps, and springs in the proposed Wild Horse Ridge permit are presented in Tables 1, 2 and, 2b in this TA. Data for groundwater well information, identified in Table 1, were collected in 1996 and 1997.

Table-1: Wild Horse Ridge Monitoring Wells*

Well Number	Formation Monitored & Relative Location	Screen Intervals	General Observations
MW-114	Spring Canyon Sandstone - East of the Bear Canyon Fault.	Upper screen interval 1795-1805 ft. Lower screen interval 1819-1829 ft.	Water elevation measured on 8/22/96, 09-24-96 and 10-23-97 varied from 7649.5 to7650.5 feet. Potentiometric water level - approximately 26 ft below Hiawatha Seam.
MW-116	Spring Canyon - East of the Bear Canyon Fault	Upper screen interval 1720-1730 ft. Lower screen interval 1743.3-1753.3 ft.	Water elevation measured on 10/18/95,7/19/96, 09/24/96 and 10/23/97 varied from 7743.9 to7744.5 feet. Potentiometric water level - approximately 71.2 ft below Hiawatha Seam.
MW-117	Spring Canyon - near fault line - East of the Bear Canyon Fault Section 12, T. 16 S. R.7 E.	Upper screen interval 1720-1730 ft. Lower screen interval 1743.3-1759.7 ft.	At 1720 ft. fault gouge and fractured material encountered. Caving continued with out a defined Star Point Formation. Water elevation measured on 10/18/95, 07/19/96, 9/24/96 and 10/23/97 varied from 7746.2 to7746.5 feet. Hiawatha Seam not identified on log.

*Data obtained from Cyprus-Mohrland Project Drill Report.

The Wells MW-114 and 117 will be monitored for water level prior to mining the Wild Horse Ridge to verify the existing water elevations recorded at these wells are the same as the elevations obtained during 1996 and 1997. This way, should mining in the Wild Horse Ridge intercept water from a sand channel or other significant in mine flow, the pre-mining status at these wells will not be in question. Water age dating and chemical make-up with stiff diagrams should also be conducted to verify the information found west of the Bear Canyon Fault can be applied to the Star Point Sandstone Formation east of the Fault. This was brought out in the previous Technical Analysis.

Plates 6-2 through 6-12 also show locations for WHR-1, WHR-2, WHR-3, WHR-5, and WHR-8. These five drill-holes fall within the adjacent area and the Cumulative Impact Area (CIA). The notation for springs and drill logs are the same and this can be confusing.

Spring Data

Spring sampling was conducted for the Wild Horse Ridge lease addition and adjacent area as summarized in Table 2 below. Information on springs within and adjacent to the Wild Horse Ridge area include springs WHR-2, WHR-3 and WHR-4. Spring WHR-4A was included in the Probable Hydrologic Consequence document and on a map, but there was no flow recorded for that location (Figure 1, Mayo and Associate Report, August 1999). Spring identification labels have been clarified by providing both labels on Plate 7-4, Water Monitoring and a cross reference table is included in Appendix B of the Mayo and Associates Report. In addition, Table 1 includes a legend of geologic formation abbreviations, and Figure 15 includes the geologic structure for the various stiff diagrams.

Table 2: Baseline Spring Sampling Wild Horse Ridge Mayo Report

Site/Location	No. Data Samples sampling period	Geology	Flow rate (gpm) Min/Max
WHR-2 Fish Creek LF-East	7 7/31/91 - 8/30/94	Tf-TKnh	0.2/20
WHR-3 Head Fish Creek	8 7/30/91 - 10/31/94	Tf	0.5/70
WHR-4/SBC-13/SBC-16 Fish Creek LF-West	8 7/30/91 - 10/31/94	Tf-TKnh	0/65
WHR-5/SBC-15 Bear Canyon RF (above coal outcrop)	8 7/31/91 - 10/30/94	Tf-TKnh	0.0/17
WHR-6/SBC-14 Bear Canyon RF (near disturbed area)	8 10/26/93 - 6/24/97	Kbh	0.5/15
WHR-7 Fish Creek LF- West	1 7/30/91	Kbh	40
WHR-8 Wild Horse Ridge	1 7/31/91	Kbh	5
16-7-24-3 Bear Canyon Cliff Face	1 3/17/99	Kbh	no flow reported- chemical analysis obtained
16-7-24-4/SBC-17 Bear Canyon Fault	1 3/17/99	Kbh	no flow reported- chemical analysis obtained

Tf- Flagstaff Formation
TF-TKnh- at the contact between the Flagstaff and North Horn Formation
Kbh-Black Hawk Formation

Table 2b: Baseline Spring Sampling Wild Horse Ridge

Site/Location	Date				Comments
	1st Q	2nd Q	3rd Q	4th Q	
WHR-2 1991			7/31/91		Left Fork Fish Creek east side
1992				10/28/92	dry 10/31/94
1993					
1994		6/24/93	8/15/93	10/13/93	
1997		5/30/94	8/30/94	10/31/94	
		6/25/97	9/10/97	10/20/97	
WHR-3 1991			7/30/91		Head waters of Fish Creek
1992				10/27/92	Fluoride not distilled 10/92, 6/93, 8/93.
1993		6/24/93	8/15/93	10/13/93	Holding time expired on Ortho Phosphate
1994		5/30/94	8/30/94	10/31/94	10/13/93.
1997		6/25/97	9/10/97	10/20/97	Dissolved metals filtered at lab received within a day. Sample > 6 deg C on 10/94.
WHR-4 1991			7/30/91		Left Fork Fish Creek west side.
1992				10/28/92	03/93, 03/94 not accessible.
1993	03/22/93	6/24/93	8/15/93	10/13/93	Fluoride not distilled 10/92, 6/93, 8/93.
1994	03/30/94	5/30/94	8/29/94	10/31/94	Holding time expired on Ortho Phosphate
1997		6/24/97	9/10/97		10/13/93. Dissolved metals filtered at lab received within a day. Sample > 6 deg C on 10/94.
WHR-5 1991			7/30/91		Right Fork - Left Fork Bear Canyon
1992				10/28/92	03/93, 03/94 not accessible.
1993		6/24/93	8/15/93	10/13/93	Fluoride not distilled 10/92, 6/93, 8/93.
1994		5/30/94	8/29/94	10/31/94	Holding time expired on Ortho Phosphate
1997		6/24/97	9/10/97	10/20/97	10/13/93. Dissolved metals filtered at lab received within a day. Sample > 6 deg C, on 10/94.
WHR-6 1993				10/26/93	Right Fork - Right Fork Bear Canyon
1994	3/23/94	6/01/94	8/28/94	10/26/94	03/94 not accessible.
1995		5/24/95	8/22/95		Holding time expired on Sulfate 10/93.
1997					Possible matrix interference with Cl-6/94.
		6/24/97	09/18/97	10/28/97	Possible matrix interference with Nitrite-10/94. Possible matrix interference with Selenium-5/95. Dissolved metals filtered at lab received within a day. Sample > 6 deg C, on 8/95.

The Mayo Report discusses spring discharge rates by formation using a calculated R-value which is the sum of the minimum flows, over the sum of the maximum flows for all springs issuing from the formation. This analysis provides a generalized description for the formation while

individual r-values for springs within the formation may vary from the generalized description. Data used for the springs do not have a continuous record; therefore, high and low flow data is not represented for each year within the period of record (1991 to 1999). The climate, from 1991 to 1999, consisted of the end of a 4 year long dry spell, moving into short periods of moderately to severely wet climate disrupted by intermittent dry periods (Region 4 and 5 drought index). Some data used in the analysis may be influenced by historic mining activities. Although the Mayo Report states that Figure 6a and 6b represent the maximum and minimum discharge rates from each formation, the data record is not continuous enough to support this statement. However, the general high and low flow pattern for these formations is probably representative.

Surface-water information

The Mayo Report identifies Trail Creek, Bear Creek, Fish Creek and Lower Cedar Creek as perennial. The upper Trail Creek, Mc Cadden Hollow, Blind Canyon, and Upper Cedar Creek are intermittent or ephemeral.

Baseflow to Lower Trail Creek was attributed to be sustained by flow from springs in the area especially TS-1. Baseflow appears to be about 25 gpm for the period of record until mid 1995 where baseflow appears to increase. Baseflow to Bear Canyon Creek is estimated to be about 30 to 50 gpm and is attributed to be sustained from springs such as FBC-12, emerging from the North Horn Formation.

According to the PHC, Fish Creek is a perennial stream. During 1996 and 1997 low flow was 15 gpm in Fish Creek in both the Left and Right Forks. It's suspected that these drainages may become intermittent during periods of prolonged drought.

Baseline cumulative impact area information

Adjacent area information is included within this permit application package for areas where future mining is likely to occur.

Table 3: Baseline Stream Sampling Wild Horse Ridge

Site/Location	Date				Site Flow Rates (gpm)	Comments
	1st Q	2nd Q	3rd Q	4th Q		
CK-1 (not on Map)		06/94 06/95 07/96		10/94 10/95 10/96	Max 1104 Min 103 Average 666	Field data only. No sample date.
CK-2 (not on Map)		06/94 06/95 07/96		10/94 10/95 10/96	Max 950 Min 4 Average 241	Field data only. No sample date.

LF-1	1994 1995 1996		06/09/94	 07/10/95 07/16/96	10/27/94 10/18/95 10/15/96	Max 266 Min 15 Average 68.5	
RF-1	1994 1995 1996		06/09/94	 07/10/95 07/16/96	10/27/94 10/18/95 10/15/96	Max 191 Min 15 Average 66.5	
WHR-1	1991 1992 1993 1994 1997	 03/29/93 03/23/94	 06/24/93 06/01/94 06/29/97	07/31/91 08/15/93 08/29/94 09/17/97	 10/28/92 10/26/93 10/30/94	Max 650 Min 0 Average 89.0	No access on 03/93. Dry 08/94. No flow recorded 10/28.

Modeling

Modeling is not proposed to be used instead of data acquisition.

Alternative water source information

No additional information on alternative water source information was presented in this amendment.

Probable hydrologic consequences determination

The probable hydrologic consequences determination is provided in Mayo and Associates, LC "Investigation of Groundwater and Surface - Water Systems in the C.W. Mining Company Federal Coal Leases and Fee Lands, Southern Gentry Mountain, Emery and Carbon Counties, Utah: Probable Hydrologic Consequences of Coal Mining in the Bear Canyon Mine Permit Area and Recommendations for Surface Water and Ground Water Monitoring" August 1999. Pertinent portions from this determination will be used to update the CHIA and complete technical directive process at Birch Spring and Big Bear Spring.

Findings:

The application does not meet the minimum regulatory requirements for this section. The permit must be updated to meet the following:

R645-301-121.200., (1) The plan needs to clearly state that the operational monitoring will continue through reclamation to bond release. Also, considerable clarity needs to be achieved by dividing the monitoring points into wells, springs, and streams. This would be consistent with the PHC, which is formatted in this manner, and is standard practice for coal mines that the Division regulates. **(2)** Water age dating and chemical make-up with stiff diagrams should also be conducted to verify the information found west of the Bear Canyon Fault can be applied to the Star Point Sandstone Formation east of the Fault.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

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

Analysis:

Affected Area Boundary Maps

The permittee did not give the Division a map that shows the affected area boundaries. The permittee did give the Division a permit boundary map, Plate 2-1. Information in the PAP suggests that the permit area and affected area boundaries are the same. The Division concluded that Plate 2-1 is adequate to show the affected area boundaries.

Contour Maps

The permittee gave the Division detailed contour maps for the proposed premining disturbed areas. Those maps are labeled Plate 3-7F and Plate 3-7G.

Existing Structures and Facilities Maps

The only existing structure in the Wild Horse Ridge area mentioned by the permittee is a hunting cabin and the access road. Both are shown on Plate 2-4G and Plate 3-7G. The hunting cabin is not labeled on Plate 3-7G, but an outline of the building is shown.

Existing Surface Configuration Maps

Plate 3-7F and Plate 3-7G, show the existing surface topography. The hunting cabin is not labeled but an outline of the building is shown on Plate 3-7G.

Mine Workings Maps

The permittee gave the Division maps that show the mine workings in the Blind Canyon Seam, Plate 3-4A, and the Tank Seam, Plate 3-4C. The mine maps show the areas of past and future mining.

Monitoring Sampling Location Maps

Plate 7-4, Water Monitoring, shows nearly all the monitoring locations proposed in Table 7.1-8, Water Monitoring Matrix, Operational Phase of Mining. Sites SBC-3 and MW-117 could not be shown due to the scale of the map, however, they are shown on Plate7N-2, Water Sampling Locations.

Permit Area Boundary Maps

Plate 2-1, Permit Area, and other maps show the permit boundaries. The Division checked

the proposed permit addition with the legal description. The permit boundary map appears to be accurate.

Plate 3-4A does not show the correct permit boundaries. The permittee must update that map.

Surface and Subsurface Ownership Maps

Plate 2-2 shows the surface ownership with the permit boundaries for the Wild Horse Ridge area. Plate 2-3 shows the subsurface ownership with the permit boundaries for the Wild Horse Ridge area.

Surface Water Resource Maps

Water rights have been updated on Plate 7-4. A check of the Utah Division of Water Rights Internet page shows the appropriate water rights have been shown on the map. It should be noted that the statement on page 3-42 is not correct. This indicates, "No state appropriated water exists within areas of the permit area which could be impacted by subsidence". Underground mining always has the potential to impact water supplies. Several water rights in and near the Wild Horse Ridge could possibly be affected by the mining. The intent of the monitoring program is to determine possible impacts. The statement needs to be eliminated or modified.

Findings:

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

R645-301-521.140, The permittee will show the correct permit boundaries on Plate 3-4A.

R645-301-742, The statement on page 3-42 regarding no water rights could be impacted needs to be eliminated or modified.

OPERATION PLAN

MINING OPERATIONS AND FACILITIES

Regulatory Reference: 30 CFR Sec. 784.2, 784.11; R645-301-231, -301-526, -301-528.

Analysis:

General

In Section 3.4 the permittee states "Co-Op started its mining operating through an existing mine in the Blind Canyon Seam and later extended into the Hiawatha seam below. Access to the Hiawatha Seam was made in the summer of 1986 through two new portals in the outcrop, and through a rock slope tunnel from the Blind Canyon seam. In 1995, Co-Op extended operations into the Tank Seam, located above the Blind Canyon seam. In 1999, Co-Op plans to extend operations into the Blind Canyon and Tank Seams East of the Bear Canyon Fault. The four main seams in the Bear Canyon property are, the Tank Seam, the Bear Canyon seam, Blind Canyon seam and Hiawatha seam. The permittee does not plan to mine the upper Bear Canyon seam due to the proximity of the seam to the Blind Canyon Seam (0.30 feet interburden). Nor do they plan to mine the Hiawatha Seam in Wild Horse Ridge due to the thinning of the seam. Mining plan, sequence and projected development for the Bear Canyon, Hiawatha and Tank seams are shown on Plate 3-4A, 3-4B and 3-4C respectively."

Type and Method of Mining Operations

In Section 3.4.1.2 the permittee states "The mining at the Bear Canyon complex is done by continuous miners. The miners discharge into shuttle cars (diesel or electric) which carry the coal to a feeder breaker. The feeder breaker discharges the coal onto the belt conveyor where it is taken out of the mine." The mining methods are consistent with the proposed surface facilities expansion.

Facilities and Structures

A list of new structures associated with the Wild Horse Ridge is given in Appendix 3A. The new structures are shown on Table 3A-1, in Appendix 3A. The new structures include a conveyor belt, substation, shop building, water tank and fuel tank. The proposed structures were included in the bond calculations.

Findings:

The permittee met the minimum requirements of this section.

EXISTING STRUCTURES:

Regulatory Reference: 30 CFR Sec. 784.12; R645-301-526.

The application states that the only existing structure in the minable portion of the permit area consists of a hunting lodge that exists in the Wild Horse Ridge area. The hunting cabin is shown on Plate 2-4G.

Findings:

Information provided in the amendment is adequate to meet the regulatory requirements for this section.

PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES

Regulatory Reference: 30 CFR Sec. 784.17; R645-301-411.

Analysis:

The Bear Creek Shelter is the only known cultural resource in the proposed addition to the permit area that is eligible for listing in the National Register of Historic Places. This site is not within the proposed disturbed area. In the lower part of the canyon where this shelter is, the conveyor is on the other side of a ridge and the road is on the other side of the canyon. For these reasons, there is little likelihood for accidental disturbance.

The Division has received a letter from the State Historic Preservation Office concurring with the Division's determination that no historic properties would be affected based on avoidance of the Bear Creek Shelter.

Findings:

Information in the proposal is adequate to meet the requirements of this section of the regulations.

RELOCATION OR USE OF PUBLIC ROADS

Regulatory Reference: 30 CFR Sec. 784.18; R645-301-521, -301-526.

Analysis:

No public roads exist in the Wild Horse Ridge area. However, the Bear Canyon haul road and the No. 3 Mine Access road are also used by customers of Sportsman's Hunting to access a hunting cabin that exists in the right fork of Bear Canyon. Hunters will use the road primarily from

May to November, typically 2-3 times per week.

A road can be defined as a public road if there is more than incidental use by the public. The term incidental use is not defined but is left to the discretion of the Division. The Division found that the use of a road 2-3 times per week for seven months is incidental. Therefore, none of the roads associated with the Wild Horse Ridge project are considered public roads. The permittee will not relocate or use a public road as part of the Wild Horse Ridge project.

Findings:

The permittee met the minimum requirements of this section.

AIR POLLUTION CONTROL PLAN

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

Analysis:

The regulations require the applicant to show its coordination efforts with the Division of Air Quality, and the application contains copies of the Notice of Intent and of Air Quality's Intent to Approve. Therefore, the application contains information required in R645-301-420, but, before beginning operations, the applicant will need to obtain final approval from Air Quality.

Findings:

Information in the application is adequate to meet the regulatory requirements for this section; however, before beginning construction, the applicant will need to provide proof of the final Air Quality Approval Order.

COAL RECOVERY

Regulatory Reference: 30 CFR Sec. 817.59; R645-301-522.

Analysis:

The permittee gave the Division a general commitment to maximize coal recovery. Most of the information in the R2P2 is contained in the MRP. The permittee plans to mine the coal using room-and–pillar methods. The projected coal recovery rate is between 70% to 80%. The Division reviewed the mine maps and other information in the PAP about coal recovery. The Division found that the permittee is planning to maximize coal recovery.

Before the permittee can begin mining, the mining plan must be approved by the BLM. One item that the BLM reviewed is the maximum economic coal recovery plan. Thus, the coal recovery plan is reviewed by state and federal agencies.

Findings:

The permittee met the minimum regulatory requirements of this section.

SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR Sec. 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

Analysis:

Renewable Resources Survey

The permittee and the Division found that renewable resources exist within the Wild Horse Ridge mining unit. The Division is concerned that subsidence could: impact ground and surface water, create large subsidence cracks similar to those that occurred on Bear Canyon ridge could also occur in the Wild Horse Ridge area, could cause escarpment failure and damage to eagle nests. Since renewable resources were found in the area, the permittee must develop a subsidence control plan.

Subsidence Control Plan

- The permittee proposes to use room-and-pillar mining to extract all the coal in the Bear Canyon complex. The permittee expects to recover 75% of the coal in full extraction areas and 50% in first mining areas. The sequence and timing of mining is shown on the mine maps 3-4A, Blind Canyon Seam (lower), and 3-4C, Tank Seam (upper). Note: no mining is scheduled for the Hiawatha Seam in the Wild Horse Ridge project. The mine plan is typical for this area.

- The permittee shows the underground workings for the Blind Canyon Seam (lower) on Plate 3-4A and the Tank Seam (upper) on Plate 3-4C. Plate 3-3 shows the projected subsidence for the Wild Horse Ridge project.

  Plate 3-3, Subsidence Map, shows the subsidence protection areas that include escapement areas. Plate 3-3 does not clearly identify the areas that will be subsided. The permittee did not identify the areas of subsidence in the legend. Other information appears inconsistent.

  - The words "area of influence" which the Division assumes means area where subsidence will occur are in areas identified by hatching as a subsidence protection zones on Plate 3-3.

  - The words "angle of draw" is also shown in areas that are not clearly marked as subsidence zones on Plate 3-3.

- The permittee needs to show the subsidence zones on Plate 3-3.

- The permittee needs to clarify what is meant by the buffer zone on Plate 3-3.

The permittee shows where full extraction will occur on the mine maps. Areas marked panel or development will be first mined only. Areas that will be fully extracted are identified as pillar and development.

- The descriptions of the physical conditions that affect the likelihood or extent of subsidence are addressed in the geologic section of the TA.

- The permittee described the monitoring program in Appendix 3C in Section 5 of the amendment. The permittee committed to installing 26 monitoring points to the Wild Horse Ridge area. The stations will be monitored yearly plus they will conduct an annual on the ground survey to look for subsidence effects. The subsidence monitoring program is similar to the existing program. The existing program seems adequate.

- The permittee proposes to protect sensitive surface features from subsidence by first mining only. The protected areas are marked on the Plate 3-3. The pillars in the subsidence protection zones have safety factors of 1.5. The permittee quoted references that state subsidence should not occur if the pillar safety factor is at least 1.5. The reference is a NIOSH publication to which the Division does not have access. Therefore, the permittee should include a copy of the reference in the MRP.

- The estimated amount of subsidence in the Blind Canyon Seam is 3.2 feet and subsidence in the Tank Seam is 4.1 feet. The maximum amount of subsidence in the Wild Horse Ridge area is 7.3 feet.

- The permittee described the measures that will be taken to mitigate or remedy any subsidence-related damage. The main item of concern is water replacement. The permittee committed to purchase either water rights to replace damaged water right or repair damage to existing rights. Subsidence cracks are filled in to the extent practical.

Performance Standards for Subsidence Control

The permittee is required to meet the performance standards for subsidence control.

Findings:

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

R645-301-121.200, The permittee must clearly show the subsidence area boundaries on Plate 3-3 and clarify what areas are included in the angle of draw and area of influence. The term buffer zone must also be defined.

R645-301-122, The permittee must include a copy of the paper that they sited for pillar stability and ground control, Analysis of Retreat Mining Pillar Stability (ARMPS). Paper in Proceedings on New Technology for Ground Control in Retreat Mining, 1997, NIOSH pub. 97-133, pp 17-34.

SLIDES AND OTHER DAMAGE

Regulatory Reference: 30 CFR Sec. 817.99; R645-301-515.

Analysis:

In case of a slide or other damage, the permittee committed to notify the Division by the fastest possible method. The permittee will repair the damage. If the permittee is unable to determine the best way of repairing the damage, they will wait for the Division to recommend a repair plan.

Findings:

The permittee met the minimum requirements of this section.

FISH AND WILDLIFE PROTECTION PLAN

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

Analysis:

Protection and enhancement plan.

Subsidence is not likely to adversely affect critical big game habitat, but the disturbed areas would be lost during the life of the mine. The applicant is required to use the best technology currently available to protect and enhance wildlife habitat, and the application needs to show how adverse effects to big game would be mitigated.

The Division of Wildlife Resources commonly accepts mitigation at a ratio of three acres of enhanced habitat for each acre disturbed. A Wildlife Resources representative has visited the site and is considering ways the disturbance could be mitigated. Until they decide the best method, the applicant should commit to working closely with Wildlife Resources and the Division to plan and implement the best technology currently available.

Because the surface disturbance would be in critical winter range, construction should not be started in the winter months from about November 1 until April 15, and the application needs to contain a commitment to this effect.

The application has been revised to contain more design information about the conveyor. Conveyors can inhibit big game movements, and although deer and elk are known to cross under conveyors, they usually need at least three feet of clearance. The most common deer and elk movements in the winter are along ridges, but there is some movement through canyon bottoms and up and down the sides of canyons. The conveyor has been designed to not overly restrict these movements providing a minimum of three feet of clearance.

Endangered and Threatened Species and Bald and Golden Eagles

On December 21, 1999, two Division representatives met with Chris Colt of the Division of Wildlife Resources and with the applicant's representative to discuss eagle nests in the area. It was decided nesting birds could be adversely affected if construction was begun during the nesting season and if any of the nearby nests was active. Therefore, construction should be started outside the nesting season, February 1-August 15, unless monitoring shows the nests are not active. If construction or mining has already begun when the nesting season starts, the birds would have the opportunity to judge whether they can accept the disturbance and nest or if they should go elsewhere.

The Fish and Wildlife Service recommended constructing two or three nearby alternate nests at least one-half mile from human disturbance areas. In a telephone conversation, a Wildlife Resources representative suggested a better alternative might be to do some habitat manipulation to increase the prey base, mainly jackrabbits and cottontail rabbits. This could be done in a degraded pinyon/juniper area and could be in conjunction with the mitigation for loss of big game habitat. A Fish and Wildlife Service representative agreed, again by telephone, that this would be an acceptable choice but suggested the applicant could do a combination of artificial nest sites and habitat manipulation. The applicant needs to commit to work with the Division of Wildlife Resources and the Division to develop and implement a plan.

The mine plan has been designed so no mining that would cause subsidence is planned for any areas under known raptor nests.

As discussed in the wildlife information section of this review, no proposed or listed threatened or endangered species is known to have habitat in the proposed addition to the permit area; however, the mine has potential, through water depletions, of adversely affecting four listed threatened and endangered fish species of the upper Colorado River drainage. The Fish and Wildlife Service requires mitigation when water depletions exceed 100 acre-feet annually. According to information in Section 3-3.6, the total estimated water requirements will be 0.05 cubic feet per second or 36.2 acre-feet annually. Therefore, no mitigation is required.

Findings:

Information in the application is not adequate to meet the requirements of this section of the regulations. Prior to final approval, the applicant must supply the following in accordance with:

R645-301-333, The applicant needs to show how they will use the best technology currently available to protect and enhance critical big game habitat in the proposed surface facilities area. The applicant needs to develop and implement a mitigation plan in cooperation with Wildlife Resources and the Division.

R645-301-333, The application needs to contain more design information about the conveyor. The conveyor should be designed to not overly restrict movements of wintering deer and elk.

R645-301-333, Use of the raptor nests near the proposed surface facilities will probably be adversely affected during the operations. At least two options are available for mitigating this loss, and the applicant needs to develop and implement a mitigation plan in cooperation with Wildlife Resources and the Division.

TOPSOIL AND SUBSOIL

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

Analysis:

Chapter 8, Soil Resources, Section 8.8, Removal, Storage and Protection of Soils, and Section 8.9, Selected Overburden Materials or Substitutes, discuss the soil's operation plan for the proposed Wild Horse Ridge area. For topsoil protection, Co-Op is using traditional methods of salvaging and stockpiling. The Analysis section discusses operation information as follows:

- Topsoil and Subsoil Removal
- Topsoil Substitutes and Supplements
- Topsoil Storage

Topsoil and Subsoil Removal

Topsoil Salvage Volumes

Based on DOGM guidelines and the Order 1 soil survey, Appendix 8-F identifies the approximate range and average soil salvage depth for each soil map unit. Potential salvage depths were generated for each map unit based on evaluations of all field and laboratory data, plant rooting depth and soil rock content. Topsoil salvage areas are broken down by soil survey map units and are identified on the Soil Suitability Map C, Appendix 8-F, Order 1 Soil Survey. The following table for salvage areas lists the depth of salvage along with root and subsurface rock information:

Map Unit	Salvage Layer (inches)		Fine Roots Rooting Depth (inches)	Subsurface Rock Within Soil Salvage Layer (percent)
	Approximate Range	Average Depth		
PC	8 - 15	12	15	<5 to 45
WIN	10 -30	15	no pit	no pit information
WR	0 - 20	10	24	50 to 60
DON	30 -60	40	60	7 to 15
DG	20 - 40	30	20	45
GP	0 - 30	10	36	60
DCP	6 - 30	15	34	12 to 40

Table 3O-1 shows 7,110 CY of soil salvaged from the lower conveyor access road (1,774 CY), the upper conveyor access road (3,332 CY), and the Blind Canyon seam portal pad (4,729 CY). Table 3O-1, Cut and Fill Volumes, is located in Appendix 3-O, Blind Canyon Seam Pad and Conveyor Access Roads. Section 8.9.6, Wild Horse Ridge Disturbance, discusses an additional 2,354 CY of topsoil within the stockpile area that will not be disturbed, but is included in the summary Table 8.9-3 as being available. Therefore, the Wild Horse Ridge topsoil pile is estimated as containing the 7,110 CY of salvaged soils and the in-place 2,354 CY of soil for a total of 9,464 CY of soil. The native, undisturbed soil held in place will be demarcated by permeable fabric strips placed over the soil surface prior placing salvaged topsoil in the stockpile. Co-Op Mining plans on using the additional 2,354 CY of topsoil held in place during reclamation; therefore, this soil is actually considered soil borrow.

Based on the projected average soil salvage depth form the Order I soil survey, Appendix 8-F, and the projected soil salvage acres from Table 8.3-2, an approximate 9,699 CY of projected soil salvage is calculated (see Table below) for the Wild Horse Ridge area. Table 8.9-1 shows that the Wild Horse Ridge total disturbance area will add 6.89 acres of total disturbance area, but actual disturbance will be 4.35 acres based on re-contour acres. The Wild Horse Ridge access road is already disturbed and will remain after reclamation (~ 2.07 acres) and therefore will add an additional 0.91 acres of disturbance. Both conveyor access road areas are shown as actually disturbing 0.47 fewer acres. Therefore, based on the projected 9,699 CY of soil salvage from the remaining 4.35 acres, the average soil salvage depth is 17 inches. *The calculated 9,699 CY of soil salvage value is greater than the 9,469 CY value based on Table 3O-1 and shown in Table 8.9-3. Based on the 9469 CY salvage figure from Table 3O-1 from the 4.35 acres, the average soil salvage depth is 16 inches.*

Wild Horse Ridge Topsoil Areas and Available Salvage Volumes					
Soil Map Unit	**Estimated Salvage (inches)**	**Total Disturbance Acres**	**Potential Volume (yd^3)**	**Projected Salvage Acres**	**Projected Volume (yd^3)**
PC	12	0.68	1097	0.35	564
WIN	15	2.11	4255	0.14	283
WR	10	0.72	968	0.38	511
DON	40	0.43	2312	0.43	2312
DG	30	1.75	7058	1.36	5485
GP	10	1.16	1560	0.12	161
DCP	15	0.19	383	0.19	383
Total		7.04	17633	2.97	9699

For the Wild Horse Ridge area, there are inconsistencies between acreage values listed in Table 8.3-2, Soil Unit Acreage Within the Disturbed Area, and values listed in Table 8.9-1, Reclamation Area Summary, and Table 8.11-1, Final Grading Test Sample Density. Inconsistencies are listed as follows:

- *The total disturbed acreage calculated for Wild Horse Ridge in Table 8.3-2 is 7.04 acres while Tables 8.9-1 and 8.11-1 show 6.89 acres.*
- *Re-contour acres do not agree with projected soil salvage acres for Wild Horse Ridge. Tables 8.9-1& 8.11-1 show re-contouring on 4.35 acres while Table 8.3-2 shows projected soil salvage over 2.97 acres.*
- *The Wild Horse Ridge access road is shown as disturbing an additional 0.91 acres in Table 8.9-1. These soils are identified as Winetti, and therefore; soil should be salvaged at 15 inches from 0.91 acres of the Winetti soil unit. However, Table 8.3-2 shows soil being salvaged at 15 inches from 0.14 acres within the Winetti soil unit.*

The plan states that actual soil salvage depth and resulting volumes may vary according to actual conditions as they are encountered in the field during construction. State regulation R645-301-232.100 is specific in requiring that all topsoil be removed from the area to be disturbed. The plan states that Charles Reynolds or other supervisory personnel approved by the Division will be present during topsoil salvage to instruct equipment operators in the proper techniques of salvage and to ensure that required horizons are removed. Approved supervisory personnel will document topsoil salvage operations, including salvage history, soil salvage areas, soil salvage volumes, and soil placement in the stockpiles.

Subsoil Segregation and Soil Salvage Practices

In several of the soil mapping units the topsoil is less than six inches. State regulations state that if topsoil is less than six inches, the operator may remove the topsoil and the unconsolidated materials immediately below the topsoil and treat the mixture as topsoil. Therefore, the Order I soil survey, Appendix 8-F, shows that topsoil salvage will include the topsoil and the underlaying horizon material immediately below the topsoil. Salvage of suitable subsoils with the topsoil is based on rooting depth and soil suitability criteria established in the Order 1 soil survey. Soil type, depth and rock content strongly influence re-vegetation, plant diversity, and erosion control.

Adverse Conditions

Section 8.9.6, Wild Horse Ridge Disturbance, states that topsoil salvage will vary where bouldery material precludes accurate salvage of the specified depths. If bouldery surface areas and otherwise steep areas are accessible to construction machinery, then soils in these same areas are expected to be salvaged. Either steep, rocky surface slopes are safe for constructing cut slopes and likewise soil salvage, or they're not safe for either activity. Likewise, if steep, rocky slopes and extremely bouldery surface materials render themselves suitable for construction and as construction fill using conventional construction equipment, then these same areas and indigenous materials can be rendered suitable for topsoil salvage. Therefore, the plan states that topsoil will be salvaged from all areas accessible by equipment, including bouldery and steep slopes.

Rocks - Boulders and Large Stones

Reference to Robert Davidson's discussion with Jim Nyenhuis (Nyenhuis 1997) concerning salvaging soils with higher rock content has been misrepresented in the Appendix 8-F, Section 2.5, Soil Suitability for Salvage. The general idea is to salvage otherwise suitable soil containing indigenous amounts of rock that are typical within the soil salvage area. The main idea is that native soils with a higher intrinsic rock content than Division guidelines deem acceptable, offer a greater potential for reclamation success as follows:

- Allow a greater potential for moisture infiltration into the interstitial soils.
- Provide for a more stable reclaimed surface.
- Provide additional surface cover in sparsely vegetated areas, thus helping protect against rain drop impact and resulting soil surface erosion.
- Create wildlife habitat niches.
- Create micro-climates for plant establishment and vegetation survival.

Topsoil Substitutes and Supplements

The amendment does not propose the use of any substitute topsoil for the Wild Horse Ridge project area.

Topsoil Storage

The Section 8.9.6 states that the Wild Horse Ridge topsoil stockpile will be located in the lower section of the right fork of Bear Canyon in the area of soil map unit "DON" (Plate 8-1A). The topsoil stockpile is shown on Plate 2-4F in the lower convergence section between the primary No. 3 mine access roads and the primary conveyor access road No. 1.

The application further states that the topsoil stockpile will be surrounded with a containment berm and protected as discussed in Section 8.8.1.3. Prior to stockpiling salvaged topsoil, permeable fabric strips will be placed over the original soil surface to preserve the location of the contact zone between the native topsoil and the stockpile.

Topsoil stockpile information concerning soil compaction and stockpile size and dimension is provided as follows:

- During topsoil pile construction, soil compaction will be minimized by limiting the extent of equipment traffic and affected area. Where compaction does occur, the compacted material will be ripped and loosened prior to seeding.

- The Wild Horse Ridge topsoil stockpile is detailed on Plate 8-7 which shows the projected stockpile, size, placement, final configuration and cross sections. According to Plate 8-7, typical slopes range from approximately 6:1 for east facing, 2:1 for west facing, 3:1 for north facing, and 2:1 for south facing.

- *Appendix 3O, Figure 3O-1 and associated cross sections show the lower conveyor access road and topsoil stockpile. Cross sections showing the topsoil stockpile final configuration and resulting slopes do not correlate with Plate 8-7.*

Shower House Topsoil Stockpile

Prior to construction on the shower house pad, topsoil was salvaged and stockpiled. The final topsoil stockpile consisted of 1200 cubic yards. The Wild Horse Ridge amendment states that Co-Op proposes to relocate this topsoil stockpile to the Wild Horse Ridge topsoil stockpile. Following relocation, As-builts will be submitted updating the MRP.

Tank Seam Access Road Topsoil Stockpile

Topsoil was salvaged and stockpiled from the Bear Canyon Mine Tank Seem access road during construction. Volume of topsoil contained in this stockpile is approximately 1000 cubic yards. During construction of the Wild Horse Ridge area, Co-Op proposes to relocate this topsoil stockpile from the upper storage pad to the Wild Horse Ridge topsoil stockpile. Following relocation, As-builts will be submitted updating the MRP.

Topsoil Salvage and Stockpile Summary

The plan summarizes (Table 8.9-3) topsoil salvage and storage as follows:

Topsoil Stockpile Description	Cubic Yards
Main	1,480
Ball Park	3,400
Shower House Pad	1,200
Tank Seam Road	1,000
Wild Horse Ridge	9,464
Total	**16,544**

Findings:

Information provided in the application is not considered adequate to meet the requirements of this section of the regulations. The applicant must provide the following in accordance with:

R645-301-231 and R645-301-120, Concerning disturbance acreage and soil salvage volumes for the Wild Horse Ridge area, the following are needed: **(1)** Correct the inconsistencies between disturbance acreage values listed in Table 8.3-2, Table 8.9-1, and Table 8.11-1. **(2)** Based on corrected disturbance acreage for each soil unit, calculate projected soil salvage volumes for each soil unit and correct Section 8.9.6, Table 8.9-3, and Table 3O-1.

R645-301-521 and R645-301-120, Correct discrepancies between Plate 8-7 and Appendix 3O, Figure 3O-1 and associated cross sections showing the topsoil stockpile final configuration and resulting slopes.

INTERIM REVEGETATION

Regulatory Reference: R645-301-330, -301-331, -301-332.

Analysis:

The current mining and reclamation plan says the applicant has maintained a commitment to reclaim the unused disturbed areas to the extent of the cover of the natural vegetation on the mine plan area, and Appendix 3G includes a plan for interim revegetation. The seed mixture in Table 3G-1 would be drilled or broadcast seeded followed by application of 1500-2000 pounds per acre of wood fiber hydromulch with a tackifier added. All but one of the species in the seed mix are native to the area, they are all adapted to the site, and they should provide god erosion protection.

In addition, the applicant commits to monitor interim revegetation sites for five years or until vegetation standards are met. Reseeding would be done if necessary.

Findings:

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

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 784.24, 817.150, 817.151; R645-301-521, -301-527, -301-534, -301-732.

Analysis:

Road Classification System

The roads associated with the Wild Horse Ridge project are all classified as primary roads. Those roads are the existing Wild Horse Ridge road, the extension of the Wild Horse Ridge road to the portal area and the two new conveyor access roads. Note the extension of the Wild Horse Ridge road is referred to in the PAP as the No. 3 Mine Portal Access Road and the extension of the road to the portal area is called the No. 3 Mine Portals and Pad Area..

The No. 3 Mine Portal Access Road is an existing road 4,850 feet long. The road has an average grade of 10.5% with the steepest grade being 18%. The road was in existed prior to mining and will be retained for the post-mining land use. The Division agrees with those classifications.

The conveyor access roads will provide access to the areas where the conveyor system will be built, operated and reclaimed. The lower road is approximately 600 feet long and has an average grade of 10%. The upper road is approximately 590 feet long and has an average grade of 19.5%. Those two roads will be reclaimed after mining is completed.

The Division has concerns about the steep grades. However, the Division does not have standards that require gentler grades. For road designs the Division relies heavy on the judgement of the engineer that designed as certified the roads.

The Division does not consider the No. 3 Mine Portals and Pad Area a road. The Division considers that area as a pad area. Therefore, detailed road designs are not required.

Road Systems

Plate 3-5D and cross sections in Appendix 3-O show the roads widths and drainages. The roads slope at 2% to ditches that parallel the roads to direct runoff. The cross sections are on 100 foot centers and show cut and fill requirements for both construction and reclamation.. The Division will use that information to bond calculations.

In Appendix 3-O the permittee shows a detailed plan for the construction and reclamation of the roads. In Section 3.6.12 of the amendment the permittee gives a detailed reclamation plan for the roads in the Wild Horse Ridge site. Since no material will be down cast all fill material will either be haul back to the site or excavated from the fill areas. Because the native material contain large boulders (3' to 5' in diameter) the lifts will be a maximum or 36". The fill will be compacted with earthmoving equipment. The permittee and their consultant do not believe that conventional compaction equipment will work at the site. The Division does not believe that 36" lifts can be adequately compacted. Therefore, the Division needs the permittee to demonstrate that 36" lifts can be compacted adequately or they must develop another compaction plan.

The designs for the main haul road in the No. 3 Mine Portals and Pad Area are in Appendix 3-O. Most of the cut slopes the area will be reclaimed. Since some cut slopes do exist in the area total elimination of cut slopes may not be possible.

Performance standards

The roads will be constructed of in-place material and/or road base. Similar material was used to construct other mine roads and have been adequate. The Division does have concerns about the road base. Soil samples show that some material has high selenium levels. See Page 3-7 of PAP

The permittee committed to repair road damage caused by a catastrophic event as soon as practical. In addition to the above, primary roads will meet the following requirements:

- Primary No.3 Mine Access Road is the main road to the portal area. Certified maps showing the road are Plate 3-5D Road-Details and Plate 2-4G, 2-4F Surface Facilities.

- Primary Conveyor Access Road No.1 is the lower conveyor access road and is shown on Plate 3-5D Road-Details and Plate 2-4F Surface Facilities.

- Primary Conveyor Access Road No.2 is the upper conveyor access road and is shown on Plate 3-5D Road-Details and Plate 2-4G Surface Facilities.

- The cross sections show the road width and drainage. The roads slope at 2% slope and have parallel ditches that direct runoff. The cross sections are insufficient to show cut and fill requirements. That information is needed to determine reclaimablility. The permittee must give the Division detailed cross section of the road. The cross section must show the operational and reclamational cuts and fills. If the permittee proposes to leave cut slopes then they must meet the requirements of R645-301-527.250.

- Appendix 3-O-6 contains the slope stability study conducted by Dames & Moore. The consultant outlined the soil and rock sampling, procedures and testing. The stability analysis was described. All slopes had a minimum safety factor of 1.6, and the minimum required safety factor is 1.3.

- Most of Primary No.3 Mine Access Road will be constructed on an existing dirt road. By upgrading the existing dirt road the permittee will be minimizing erosion. Since the roads must be constructed in a narrow canyon, the permittee has limited options about where to place the road. The Division reviewed the road designs and concluded that the erosion will be minimized and that the roads are located on the most stable available surface.

- The permittee does not propose to construct fords in any perennial or intermittent streams.

Primary road certification

The designs submitted by the permittee were certified.

Other Transportation Facilities

The conveyor system goes from the coal bin near the portals to the tipple facilities then to the coal storage pad. The conveyor system will be inclosed to fugitive coal dust. The R645 rules have few design specifications for conveyor systems. The Division reviewed the conveyor plans and found that they meet the minimum engineering requirements. See Appendix 7K Page13 for information of dust control.

Findings:

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

R645-301-553.100-R645-302-553.150, The permittee must either show that lift 36" thick can adequately compacted or develop another backfilling and regrading plan for reclaiming the roads.

R645-301-534.120, The permittee must show that they will use only nonacid- or nontoxic forming substances for road surfaces. The Division is concerned about the high levels of selenium in some soils near the No. 3 Mine Portal Area.

R645-301-521.190, The permittee must show the location of the cross sections used to calculate the cut and fill volumes (cross section in Appendix 3-O) on the detailed topographic maps (Plate 3-7F, Plate 3-7G, Plate 3-2F and Plate 3-2G).

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87,

817.89; 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:

Disposal of Noncoal Waste

Noncoal waste will be placed in metal dumpsters that are on the property. A local trash collector is contracted to replace these bins when they are near capacity. This is standard procedure for most coal mines.

Coal Mine Waste

The approved MRP allows the permittee to dispose of coal mine waste underground. In the past that plan has been adequate.

The Division concern is that the permittee could encounter burnt or weather coal near the outcrops. If such conditions exist then the permittee would have to dispose of that material. The Division has had several problems involving mines that did not have disposal plans for coal mine waste based on assumptions that no coal mine waste would be brought to the surface. Often that assumption is wrong and then permittee has no plan for disposal of coal mine waste. To avoid such problems the Division needs the permittee to have a contingency plan for handling coal processing waste.

Refuse Piles

The permittee does not propose to construct a refuse pile. Without a refuse pile the permittee has no other choice than to dispose of the coal mine waste underground.

Impounding Structures

The permittee does not propose constructing an impoundment out of coal mine waste.

Burning and Burned Waste Utilization

The permittee did not address burning and burned waste utilization. See R645-301-528.323

Return of Coal Processing Waste to Abandoned Underground Workings

The permittee has approval for disposing of coal mine waste underground. The plan is mainly for small amounts of roof material. The Division is concerned that when the Wild Horse Ridge is developed large amounts of burned or weather coal could be encountered near the outcrops. If such conditions exist the permittee may not be able to dispose of the coal development waste underground. Therefore, the Division encourages the permittee to develop a contingency plan for disposal of coal mine waste.

Excess Spoil

The permittee does not plan on generating any excess spoil.

Findings:

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

R645-301-528.323.1, The permittee must address how burning and burned waste material will be handled. Note: R645-301-528.323.1 does not make exceptions for temporary storage piles.

R645-301-536, The permittee must address how coal mine waste from the Wild Horse Ridge project will be handled if the material must be brought to the surface and if the material cannot be returned underground. The Division concern is that coal near the outcrops may be burnt or weathered. If so then the permittee may not be able to dispose of the material underground. Should such a scenario occur then the permittee would need to find an alternative disposal site for the mine development waste. If the permittee done not want to have an alternative disposal site (refuse pile) then they should show that if burnt or weather coal is encountered that MSHA will allow that material to be placed underground.

HYDROLOGIC INFORMATION

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

Analysis:

Ground-water monitoring

The plan references a recommended water monitoring plan, included in Appendix 7-J, section 10.0. The proposed monitoring plan is contained in section 7.1.7.

One flow measurement was obtained at springs WHR-7 and WHR-8. No information was provided for WHR-9. The plan indicates that these springs will not be monitored because WHR-4 will represent these springs. Site WHR-7 was estimated to be approximately 400 ft above the Tank Seam while WHR-9 and WHR-8 are close to drill logs showing no coal.

The PHC, Appendix 7-J, includes a discussion in the subsidence section on multiple coal seam removal. Mining the Tank (upper) and Blind Canyon (lower) seams in other sections of permit area has seen cracking extend upward no more than 250 feet above the Blind Canyon Seam. The surface fractures extend down about 100 feet. Average overburden for the Tank Seam is 950 feet while for the Blind Canyon Seam it's 1200 feet. Total subsidence for the two seams has been calculated to be 7.3 feet. Reference Table 3C-1. However, springs having significant discharge within the Wild Horse Ridge area are separated from the Tank Seam by 1000 feet. Thus, the PHC states, the potential for mining to impact these springs appears to be minimal. Given the surface fracturing, the possibility exists that surface recharge to the springs could be affected, one way or the other.

The PHC indicates it is unknown whether water may be encountered along the Bear Canyon Fault from the east, but that this water is suspected to have antiquity. The well closest the fault, MW-117, will be monitored in conjunction with MW-114, as these wells would most likely show effects if waters with antiquity do discharge to the fault should it be encountered during mining.

Surface-water monitoring

The Upper Right Fork Bear Creek, BC-4, above the proposed disturbed area, has been added to the monitoring plan. Surface water monitoring at the Left Fork of Fish Creek, FC-1 and McCadden Hollow, MH-1, were added to the monitoring plan.

Acid and toxic-forming materials

Information is contained in Appendix 6-C of the MRP. According to the PHC, strata in the proposed permit area is expected to be identical to the existing permit area. Acid from pyrite oxidation is readily consumed by dissolution of carbonate minerals available in the mine area.

Transfer of wells

No discussion on transfer of wells in the new permit area is provided. It is assumed all wells will be properly abandoned when no longer needed for mining.

Discharges into an underground mine

It was estimated that 0.05 cfs water will be required for mining associated with the Wild Horse Ridge. A Water line from #1 mine to the #3 and #4 mine is located along the conveyor. This water is to be used for a bath-house, drinking water and for spray; on the working face, at coal belt heads, at transfer points and at the tipple for dust suppression. Page 7-56 indicates, "No water will be discharged into the mine during or following reclamation".

Gravity discharges

No gravity discharges are expected for the Wild Horse Ridge mines, Bear Canyon No. 3 or No. 4 (reference page 7-56).

Water quality standards and effluent limitations

Water quality standards and effluent limitations must be conducted according to State Standards and the approved UPDES permit. A copy of the current permit, which includes a discharge point for Pond D is included in Appendix 7-B.

Diversions

Diversion designs are provided for the 10 year- 6 hour event. The applicant committed to maintain the minimum required cross sectional area. Freeboard was presented to be 0.30 ft to 0.48 ft. Standard engineering practices generally use a minium of 0.3 ft so this is acceptable. Along the roads, additional culverted cross drains may be advantageous in meeting the ditch requirements without requiring changes in the road surface slope.

The culvert containing Bear Creek for the road to get to the new addition has been designed to meet the 100-year 6-hour storm. This is described in Appendix 7-G. This is the appropriate design storm.

Road Drainage

The applicant should consider placing a culvert at the approximate location of label D-21U on Plate 7-1 F. The primary road retains this drainage along the in slope for a significant distance in this region. Also, the slope breaks from a steep section to a low gradient area at this location which may result in maintenance problems due to sediment settling out in the ditch.

Stream buffer zones

The Division will need to grant approval for construction in a buffer zone. This will be completed when all deficiencies for the proposed mine application are addressed. Also, the approved Stream Alteration Permit from the State Division of Water Rights is needed to complete the stream buffer zone section of this Technical Analysis. The completed, although unapproved, Stream Alteration Permit is included in an unnamed appendix behind Appendix 7-M. This appendix needs to be numbered and named.

Sediment control measures

Construction - Sediment Control Methods

A berm will be created on the downslope side of a cut. Road cuts will be made into the slope rather than parallel to the slope. Blasts will be designed to drop material into the cut area behind the berm, pg. 3O-3. The blasting methods used here will be the same as have proven successful in constructing the other roads in the permit area. Along the Blind Canyon Seam Portal Pad temporary and permanent silt fences will be placed to treat all runoff from the disturbed area not contained by a berm. Fences will remain in place until all runoff is directed to the sedimentation pond and erosion control matting will be used on the out slope of the Blind Canyon Seam Portal pad

fill, pg. 30-5. Due to past problems with erosion control matting failures, the Division requires the Applicant to commit to install the matting in strict conformance with the manufacturers instructions.

Discussions related to culvert placement and pad and operational construction in the drainages are detailed. The applicant states that, "Following initial pad contouring the sediment pond will be constructed followed by road crowning and ditch and culvert placement." pg. 3O-6. More construction detail is contained on pages 3O-2 through 5. Culverts will first be placed in the ephemeral drainages at each crossing to separate disturbed and undisturbed drainages in the event of storms during construction. Also, that way the catch basins will not receive runoff from undisturbed drainages. Special care is to be taken at a "small riparian area.....adjacent to this road". This is above the spring designated SBC-14, (WHR-6) which is a unique area. A site visit by the Division evaluation team followed by discussions with the Applicant resulted in an agreement that the Division Hydrologist will be notified in time to make a field visit when the blasting is to occur above this spring, SBC-14, (WHR-6) and when construction for the culvert above this spring is to take place. This will need to be added to the amendment.

Operational - Sediment Control Methods

Sediment control measures include using a sedimentation pond and BTCA erosion control areas "V" and "W". The BTCA area "V" includes the out slope along the conveyor access road and the Blind Canyon portal pad out slope area. These areas are mapped on Plate 7-1G. Erosion control matting will be used on the out slope and a berm will be placed on the outside edge to prevent water from flowing onto the slopes.

BTCA areas "W" include the conveyor belt areas. A silt fence will be placed down slope during construction and be evaluated for removal following construction. During operations, coal fines will be captured in a metal pan below the belt and will be cleaned off the pan. A dust cover will be placed over the belt to prevent fine coal wind transport. Details of the conveyor belt are presented in Figure 7K-1, Typical Conveyor Pan Structure. These appear to be reasonable measures to minimize the amount of coal fines leaving the conveyor belt.

In the lowest belt area, the pan will be cleaned with water draining to disturbed area ditch D-3D, which reports to the lower area sediment pond. The two upper conveyor belt areas will report to two catch basins, No. 1 and 2. The Wild Horse Ridge Coal Storage Bin area also reports to catch basin No. 2. These areas are mapped on Plates 7-1C, 7-1F and 7-1G. The designs, calculations and certification for these basins are provided in Appendix 7-K. Capacity was based on a 10 year 6hr storm peak. Catch basins will be inspected and cleaned as necessary to maintain capacity. Both of the catch basins have an outlet spillway , so flow from the basin is controlled under situations that exceed the storage volume. These are detailed in Figures 7K -3 and -4. However, spillways are required to be "of non-erodible construction" such as rock riprap. Such protection will need to be provided for both of the catch basin spillways.

Siltation structures

See: Sedimentation Ponds.

Sedimentation ponds

The proposed Wild Horse Ridge area includes designs for sedimentation pond 'D'. All runoff from the portal pad area will report to this pond. The pond was designed to the appropriate 10-year, 24-hour storm event using runoff curves of 90, which is appropriate for the pad area and rocky drainage area leading to the pond. The pond is designed to store the full volume of the design storm. Reference Table 7.2-15, and Plate 7-11.

The sedimentation pond must maintain adequate sediment storage capacity. The proposed clean out level of 60% meets this requirement. Reference Section 7.2.8.4 and Plate 7-11, Sediment Pond "D". At pond 'D, the decant structure is located above the 60% clean out level. The clean out elevation is 0.55 ft below the decant elevation. A Decant Structure Detail is included, however, it's unclear which end is in the pond and which end is at the outlet of the culvert under the portal area. This should be clearly labeled with the oil skimmer end in the pond.

A single open channel spillway is proposed for discharge from the pond. No controls for an oil skimmer are provided for the sedimentation pond should the runoff exceed the 10 year - 24 hour event. A fuel tank is located on the pad draining to this pond. No tank volume or discussion of the tank containment structure was found. Full containment berms around fuel tanks are standard on the rest of the site, and one should be included for this one. Since the runoff from this pond eventually makes it's way to Huntington Creek and fuel is used in this location, this does not provide adequate protection for fish and wildlife. An oil skimmer is must be provided on the Sediment Pond D outlet spillway. The spillway is one foot wide and one foot deep and a simple straight sheet of corrugated galvanized steel would provide an adequate oil skimmer. This would, of course, extend from well below the spillway invert to the top of the pond. Other configurations would also work and this is only a suggestion for the Applicant.

Based on the letter accompanying the latest submittal, it's expected that the SPCC plan will be updated and available at the site "within six months of implementation of the Wild Horse Ridge construction". A determination will then be made as to whether the proposed plan minimizes potential for hydrocarbons to be released off the permit area. This needs to be included in the plan.

Dames and Moore conducted a stability analysis for the Portal Staging Area sedimentation pond, July 23, 1999. This analysis for steady state seepage assumes a 7 foot deep pond is full and two seepage conditions exist: 1) A straight line condition through the fill, and 2) Seepage controlled by the native sandstone and colluvium interface. Results suggest during a pseudo-static loading condition, shallow surface slide and sloughing from the structural fill and native slopes could be expected with strong ground movement. Proposed embankments have a minimum safety factor of 1.46.

Other treatment facilities

No "other treatment facilities" are proposed.

Exemptions for siltation structures

No exemption from siltation structures is proposed.

Discharge structures

Discharge structures are designed to minimize erosion.

Impoundments

See: Sedimentation Ponds.

Casing and sealing of wells

No changes to the casing and sealing of wells is proposed. The existing plan is assumed to be adequate to handle this regulatory requirement.

Findings:

The application does not meet the minimum regulatory requirements for this section. The permit must be updated to meet the following:

R645-301-731, (1) A site visit by the Division evaluation team followed by discussions with the Applicant resulted in an agreement that the Division Hydrologist will be notified in time to make a field visit when the blasting is to occur above this spring, SBC-14, (WHR-6) and when construction for the culvert above this spring is to take place. This will need to be added to the amendment. **(2)** Based on the letter accompanying the latest submittal, it's expected that the SPCC plan will be updated and available at the site "within six months of implementation of the Wild Horse Ridge construction". A determination will then be made as to whether the proposed plan minimizes potential for hydrocarbons to be released off the permit area. This needs to be included in the plan. **(3)** Due to past problems with erosion control matting failures, the Division requires the Applicant to commit to install the matting in strict conformance with the manufacturers instructions.

R645-301-742.223, Spillways are required to be "of non-erodible construction" such as rock riprap. Such protection will need to be provided for both of the catch basin spillways.

R645-301-512.240, Current prudent engineering practices need to be followed: **(1)** An oil skimmer is must be provided on the Sediment Pond D outlet spillway. **(2)** Full containment berms around fuel tanks are standard on the rest of the site, and one should be included for this one, at the portal area.

R645-301-312.4, An approved Stream Alteration Permit obtained from the State Division of Water Rights for the proposed several stream channel alterations will need to be provided when it's received. This information is necessary to make buffer zone findings. The unnamed appendix behind Appendix 7-M needs to be numbered and named.

SUPPORT FACILITIES AND UTILITY INSTALLATIONS

Regulatory Reference: 30 CFR Sec. 784.30, 817.180, 817.181; R645-301-526.

Analysis:

The permittee did not address the requirements of R645-301-526.200 through R645-301-526.222. Those requirements state that the permittee will comply with State and federal regulations.

Findings:

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

R645-301-526.200 thru R645-301-526.222, The permittee must address these sections. They must describe how support facilities will be installed and operated. They must also make specific commitments to the Division about the facilities.

SIGNS AND MARKERS

Regulatory Reference: 30 CFR Sec. 817.11; R645-301-521.

Analysis:

The current MRP and the Wild Horse Ridge Amendment do not specifically address the signs and markers requirements liste in R645-301-521.

Findings:

R645-301-521.200, The permittee must address the signs and markers requirements as listed in this section. The information is not listed in the MRP or the Wild Horse Ridge amendment.

USE OF EXPLOSIVES

Regulatory Reference: 30 CFR Sec. 817.61, 817.62, 817.64, 817.66, 817.67, 817.68; R645-301-524.

Analysis:

A blast design is submitted as Appendix 3-M which describes a blasting plan for the construction of the conveyor access roads associated with the Wild Horse Ridge addition which will comprise the Bear Canyon #3 and #4 Mines. The anticipated blasting plan has been prepared and signed by Mr. Kevin Petersen, who is known to have a current surface blasting certificate through the State of Utah.

The plan clearly indicates that there are no active or abandoned underground coal mines, dwellings or public buildings within the radial distances described within R645-301-524.211 and -524.212. The response clearly states that there are no active or abandoned underground coal mines within 500 feet of the proposed Wild Horse Ridge blasting area. No other buildings exist within 1,000 feet of the proposed Wild Horse Ridge blasting areas. Although a hunting cabin exists approximately 750 feet from the nearest proposed blasting area, the building cannot be classified as a dwelling, or other public building, (school, church, etc.). Although the permittee's response does contain an anticipated blast design, it was not necessary to submit same. R645-301-524.210 through -524.212 have been adequately addressed. The anticipated blast design which has been submitted appears to be able to successfully meet the fragmentation requirements being sought without incurring significant damage to the surrounding environment.

The permittee's response provides the following information to address deficiencies aired in the initial response:

1) A drawing that shows the burden, spacing and depth of boreholes for the bench type blasting to be used for bedrock removal (establishment of road grade) has been provided. A verbal description of the method to be used for boulder breakage has also been provided.

2) Page 3M-3 of the revised blasting plan clearly states that satchel type directional charges will not be used in order to minimize air blast and fly-rock. A description of the explosive to be used (Irecoal D 378), is not a satchel type directional charge.

3) Borehole sizes have been revised from 1¼ inch diameter to 1½ inch diameter. Although the dynamite cartridges will now fit in the boreholes, 1 3/8 inch diameter boreholes would probably provide better breakage and improve on the tampability of the explosive in the boreholes.

4) The revised blast design has more than doubled the weight of explosive which will be used per borehole. They will be using 1.3 pounds per hole, with a maximum of ten holes per round, hence a maximum of 13 pounds of explosive will be used per round. This improves the powder factor significantly in the anticipated blast design. The

ability to adjust fragmentation within the round is within the jurisdiction of the certified blaster performing the work, and it is not necessary to obtain DOGM approval for minor changes in powder factor.

Findings:

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

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:

Affected Area Maps

Several maps show the permit boundaries and proposed mining areas. Those maps are considered adequate to serve as the affected area map.

Mining Facilities Maps

Plate 2-4G and other maps show the mining facilities.

Mine Workings Maps

The mine maps for the two seams in the Wild Horse Ridge project are Plate 3-4A Bear Canyon seam (lower) and Plate 3-4C Tank seam (upper).

Findings:

The permittee met the minimum requirements of this section.

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

Terracing as a reclamation method is described on page 3-75. The areas proposed to be terraced should be shown on the reclamation map. Although terracing may be appropriate in some locations it is found to be less effective than simple slope changes in many locations in Utah. Slope form or slope brakes that decrease the gradient and retain the overland flow are best technology available for erosion control. In steep sections slope faces steepened at the top and concave toward the base integrated with low angle slopes are known to be successful.

The plan states "Since a cut slope existed along portions of this area prior to mining there may not be enough material to completely eliminate the entire cut. In areas where cuts existed prior to mining, the (fill) material will be placed so as to backfill the cut to the extent possible. These areas are shown on Plates 3-2", (pg. 3-119). No such designated areas could be found on Plates 3-2, F and G and they need to be provided.

Portals will be sealed with backfill beginning at the Blind Canyon portal and backfilling the cut slope as it is excavated from down slope side. A narrow access road will be retained for topsoil access. Topsoil will be placed on excavated areas and then the access road will be reclaimed (3-117 to 3-118). The amendment clarifies the reclamation for the Wild Horse Ridge Blind Canyon portal is separate from the portal west of Bear Creek.

Findings:

The application does not meet the minimum regulatory requirements for this section. The permit must be updated to meet the following:

R645-301-730, (1) The areas proposed to be terraced should be shown on the reclamation map. **(2)** "In areas where cuts existed prior to mining, the (fill) material will be placed so as to backfill the cut to the extent possible. These areas are shown on Plates 3-2", (pg. 3-119). No such designated areas could be found on Plates 3-2, F and G and they need to be provided.

POSTMINING LAND USES

Regulatory Reference: 30 CFR Sec. 784.15, 784.200, 785.16, 817.133; R645-301-412, -301-413, -301-414, -302-270, -302-271, -302-272, -302-273, -302-274, -302-275.

Analysis:

The applicant has proposed no changes to the postmining land use, and information in the current mining and reclamation plan is considered adequate.

Findings:

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

APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; 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 amendment does provide detailed contour maps and cross sections that show the pre-existing, operational and reclaimed topography. The approximate original contour issues associated with the Wild Horse Ridge project are highwall elimination and cut slope retention. The permittee proposes to eliminate all highwalls during final reclamation. Some cut slopes may be left. The cut slope issue will be discussed in the Backfilling and Grading section of this TA.

The amendment did not include a variance from the approximate original contour requirements; therefore, the Division assumes that the plan is to restore the site to AOC.

Findings:

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

R645-301-553.110, The amendment must show that the reclamation plan will comply with the approximate original contours and include description of any highwall or cut slopes to be retained.

BACKFILLING AND GRADING

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

Analysis:

The permittee must give the Division detailed cross sections that show: how the highwalls will be eliminated, what cut slopes will be left and how the coal seams will be backfilled. The cross sections in Appendix 3-O do not show the location of those features.

The permittee needs to clarify the slope stability analysis for the reclaimed slopes. The cross sections in Attachment A Slope Stability Analysis, the report submitted by Dames and Moore dated October 7, 1996 show the cross sections used for the slope stability analysis. The cross sections are not labeled but they may be for the operational slopes not the reclaimed slopes. The permittee needs to clarify this issue. The Division needs slope stability analysis for both the operational and reclaimed slopes.

The permittee states that no coal mine waste will be brought to the surface from the Wild Horse Ridge project. The Division concern is that during development of the Wild Horse Ridge project the permittee may have to dispose of unexpected coal mine waste that contains large amounts of coal. If that were to happen, the current coal mine waste disposal plan would be inadequate.

The current plan for coal mine waste disposal is approved by both MSHA and the Division. The plan is based on the need for limited amounts of rock materials to be disposed underground. If large amounts of coal materials were encountered during mine development then the approved plan would no longer be valid.

The Division major concerns about underground disposal of coal mine waste involves water quality issues. MSHA deals with safety issues. The coal in the mine development waste could be a safety issue. Prior to the permit being issued the permittee must show that MSHA would approve the placement of coal mine waste that contains significant amounts of coal underground.

The permittee states that no spoil will be generated in the Wild Horse Ridge project. The permittee also states that terraces will not be used. The Division reviewed the proposed reclaimed slopes and agreed with the permittee on those issues.

Previously mined areas

No previously mined areas exist in the Wild Horse Ridge project.

Backfilling and grading on steep slopes

The permittee does not propose to mine on steep slopes (mountain top removal).

Special provisions for steep slope mining

This section deals mostly with mountain top removal that will not be done at the Wild Horse Ridge site.

Findings:

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

R645-301-542.730, The permittee must show that MSHA has approved the disposal of large amounts of coal material underground. The current coal mine waste plan is based on limited amounts of rock material being placed in abandoned underground workings. **The Division needs assurances that MSHA will allow the permittee is dispose of large amounts of coal mine waste underground should the need arise.**

R645-301-553.100 and R645-301-542.200, The permittee must give the Division detailed cross sections that show the reclamation of each highwall, what cut slopes if any will be retained and how the coal seams will be backfilled. The cross sections in Appendix 3-O do not show the location of the highwalls, cut slopes or coal seams. The highwalls, cut slopes and coal seams must clearly be shown on the cross sections. Without that information the Division is unable to make a finding about highwall elimination.

R645-301-553.130, The permittee must show that all reclaimed slopes will have a safety factor of at least 1.3. The safety factor analysis in the amendment appears to deal only with the slopes in the operational phase. The permittee reply to this deficiency was that a reference had been added to Page 3-118 to reference the slope stability factor information. Slope stability analyses are contained in Appendix 3-O. **The slope stability analyses (cross sections) may not be for the reclaimed slopes, rather the operational.** The permittee needs to clarify this issue. If the slope stability analysis is for the operational phase then they must also include slope stability analysis for the reclamation phase.

MINE OPENINGS

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

The mine opening closure plan is given in Section 3.6.3.1 of the approved MRP. The plan is adequate for the mine openings at the Wild Horse Ridge.

Findings:

The amendment meets the minimum requirements of this section.

TOPSOIL AND SUBSOIL

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

Analysis:

Chapter 8, Soil Resources, Section 8.10, Redistribution of Soils, and Section 8.11, Nutrients and Soil Amendments, discuss the soil's reclamation plan for the proposed Wild Horse Ridge area. The Analysis section discusses reclamation information as follows:

- Soil Redistribution
- Soil Nutrients and Amendments
- Soil Stabilization

Soil Redistribution

Based on the 4.35 re-contoured acres and the 9464 CY of soil salvage, the average topsoil replacement thickness for the Wild Horse Ridge disturbed area should be around 16 inches. Soil replacement depths may change based on corrected values for projected soil salvage disturbed acres and resulting changes in soil salvage volumes.

The MRP divides the mining area up into different reclamation areas. The Wild Horse Ridge area is divided up into areas TS-12, TS-13, TS-14, and TS-15 as follows:

TS-12, Wild Horse Ridge Access Road

The Wild Horse Ridge Access Road already exists and provides access to a hunting lodge located further up the hillside. After mining, this road will remain and continue providing access to the hunting lodge. During upgrading and widening of the road during mining, topsoil will be recovered (15 inch depth) from isolated areas of new additional disturbance (0.91 acres). During reclamation, salvaged soils will be redistributed to the same additional disturbed areas (0.91 acres) of the road at the same depth (15 inches).

TS-13, Conveyor Belt Access Road/ Topsoil Stockpile Area

The plan states that following re-contouring of this area at the time of final reclamation, topsoil recovered prior to construction will be redistributed to obtain an approximate depth of 13 to 14 inches. Although soil salvage ranges form 12 inches from the slopes in the upper portions of the road to 40 inches from lower portions of the road, the plan states that some topsoil from this area may be available for use in other areas of the mine site.

TS-14, Upper Conveyor belt/Access Road

The upper conveyor belt/access road will have 10 to 30 inches of topsoil recovered. Topsoil redistribution will be performed in conjunction with regrading due to the remoteness of the site and the reclamation procedures of this area. The plan states that topsoil recovered from this area will be redistributed at an average depth of 13 to 14 inches.

TS-15, WHR Blind Canyon Seam Portal

This area will have 10 to 30 inches of topsoil salvaged for reclamation. Topsoil redistribution will be performed in conjunction with regrading due to the remoteness of the site and the reclamation procedures of this area. The plan states that topsoil recovered from this area will be redistributed at an average depth of 13 to 14 inches.

Soil Nutrients and Amendments

Section 8.11, Nutrients and Amendments, states that following final grading, each of the reclamation areas will be sampled (see Table 8.11-1 for Sample Density) and the collected soil samples analyzed. The plan states that additional samples will be taken in the event that the initial sample indicates unsuitable material. Composite samples will be taken from 0 to 2 feet and from 2 to 4 feet at each sample location. The section concludes that all necessary fertilization and chemical treatments will be applied according to the results of the soil sampling and analysis program approved by the Division. *In addition to analyzing the samples for micro nutrients, analyses should also include standard fertility test for pH, EC, nitrogen, phosphorus, and potassium. All sampling, testing and result interpretation must be done by a qualified soil scientist. The soil scientist must be qualified to sample, test and interpret data results. Prior to sampling and testing of the topsoil material, the soil scientist's qualifications must be reviewed by the Division.*

Soil Stabilization

Following backfilling and regrading, the re-graded surface will be scarified by a ripper to a depth of 14 inches to help reduce surface compaction, provide a roughened surface to help topsoil adherence, and help promote root penetration. Steep slope areas will be roughened by ripping to create ledges, crevices, pockets, and screes (talus slopes at the base of cliffs) to allow better soil retention and vegetation establishment.

To minimize compaction of replaced topsoil, travel on reclaimed areas will not be allowed. Co-Op will guard against erosion by using mulch, tackifier, and erosion control matting. Topsoil

will be redistributed in the fall of the year to help promote vegetation establishment. In all cases, a very rough seed bed will be prepared.

Findings:

Information provided in the application is not considered adequate to meet the requirements of this section of the regulations. The applicant must provide the following in accordance with:

R645-301-242.110, Correct the average soil replacement depths based on corrected values for projected soil salvage disturbed acres and resulting changes in soil salvage volumes.

R645-301-243 and R645-301-130, In addition to analyzing the samples for micro nutrients, analyses should also include standard fertility test for pH, EC, nitrogen, phosphorus, and potassium. All sampling, testing and result interpretation must be done by a qualified Soil Scientist. The Soil Scientist must be qualified to sample, test and interpret data results. Prior to sampling and testing of the topsoil material, the soil scientist's qualifications must be reviewed by the Division.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 701.5, 784.24, 817.150, 817.151; R645-100-200, -301-513, -301-521, -301-527, -301-534, -301-537, -301-732.

Analysis:

Reclamation

In Section 3.6.12 of the Wild Horse Ridge amendment, the permittee states that the portal pad access road will be backfilled. As fill material is placed on the access road, it will result in narrowing the road width, while backfilling the cut slope. Large diameter rocks will be incorporated into the outslope created by filling to aid in surface stability. This procedure will be followed until most of the cuts are backfilled and the road has been narrowed to a "pilot cut" which will still allow the equipment access to the area. The pilot cut will then be reclaimed in the same manner as the Tank Seam Access Road described in Section 3.6.11.

In Section 3.6.3.3 the permittee states the following:

The mine access road below the No. 3 Mine Access Road will be regraded and fitted with post-mining diversion structures as shown on Plate 3-2. Diversion designs are shown in Appendix 7-H. Asphalt road surfacing material from the scalehouse pad will be excavated and disposed of at the Nielson Construction Landfill in Emery County. All roads that are to be reclaimed will be closed to traffic during reclamation. The reclaimed road design will be the same as the operational design, and is shown on Plate 3-5.

As backfilling and grading is completed, operational areas will be scarified by gouging to a depth of approximately 8 inches with a trackhoe. This will reduce compaction and prevent topsoil slippage, and improve soil retention and vegetation establishment in the gouges.

The road reclamation plan adequately addresses the requirements to close the roads to the public during reclamation, describes how the culverts will be reclaimed and disposal of road surface materials.

The permittee did not address road closure during reclamation, or how the roads that provide access to the conveyors would be reclaimed, or the condition that the main access road will be left in and how the road surface material will be disposed and how the road will be scarified.

Retention

The permittee states that those sections of the road that will be retained as part of the post mining land use will have the same design as the roads during operations.

Findings:

The permittee met the minimum requirements of this section.

HYDROLOGIC 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

No additional specifics are provided regarding ground-water monitoring for the Wild Horse Ridge. The plan needs to clearly state that the operational ground-water monitoring will continue through reclamation to bond release.

Surface-water monitoring

No additional specifics are provided regarding surface-water monitoring for the Wild Horse Ridge. The plan needs to clearly state that the operational surface-water monitoring will continue through reclamation to bond release.

Acid and toxic-forming materials

See the operations section of this TA.

Transfer of wells

No discussion on transfer of wells in the new permit area is provided. It is assumed all wells will be properly abandoned when no longer needed for mining.

Discharges into an underground mine

No discharges into an underground mine are proposed for reclamation purposes.

Gravity discharges

No discussion indicating gravity discharges is expected in relation to the Wild Horse Ridge reclamation.

Water quality standards and effluent limitations

No specific information is presented indicating how water quality standards and effluent limitations will be determined prior to bond release.

Diversions

Roads to be retained in place will be re-graded to the proposed post-mining configuration and fitted with diversions. A typical cross section is in 3.6.4, pg. 3-60. To maintain the road for post-mining land use, 11 culverts will be retained. The Wild Horse Ridge Access Road is proposed for retention for post-mining land use. Conveyor Access roads No.1(lower road) and No.2 (upper road) are described in App.3-O and will be reclaimed the same as described in section 3.6.11 and 3.6.12 (3D-7A). Stream channel reclamation uses a riprapped channel design as presented in Appendix 7H. These appear to meet regulatory requirements.

Stream buffer zones

No findings on buffer zone disruption during reclamation procedures will be made by the Division until all other outstanding issues are resolved.

Sediment control measures

All re-graded and top soiled areas will be mulched or otherwise treated to retain moisture and control sediment page 4-13. Related surfaces will be ripped and scarified using a trackhoe, and include roughening to 8-12 inch deep pockets. See sedimentation ponds.

Siltation structures

See sedimentation ponds.

Sedimentation ponds

Sediment pond 'D' is proposed to be removed during reclamation of the portal pad as described in Appendix 7-K, and Section 3.6.12, Wild Horse Reclamation Plan. The reclamation construction sequence describes the methods used during pad area reclamation to minimize sediment contributions to the drainage. These include installation of silt fences on the downstream sides of all construction areas, especially the portal pad area. After highwall removal, the road cut slope will be eliminated. A "pilot cut" will be retained to allow topsoil placement in the area. The pilot cut will then be reclaimed.

Other treatment facilities

No other treatment facilities are proposed in conjunction with the Wild Horse Ridge amendment.

Exemptions for siltation structures

No exemptions for siltation structures are requested in association with the Wild Horse Ridge amendment.

Discharge structures

No Discharge structures are proposed for retention in association with the Wild Horse Ridge amendment.

Impoundments

See sedimentation ponds.

Casing and sealing of wells

No changes are made to the existing plan in conjunction with casing and sealing of wells. It is assumed the existing plan is adequately addresses this requirement.

Findings:

The application does not meet the minimum regulatory requirements for this section. The permit must be updated to meet the following:

R645-301-731, (1) The plan needs to clearly state that the operational ground-water monitoring will continue through reclamation to bond release. **(2)** The plan needs to clearly state that the operational surface-water monitoring will continue through reclamation to bond release.

R645-301-121.200, Several places in the submittal require typographic or other corrections to make the document readable and understandable. These include: **(1)** The completed, although unapproved, Stream Alteration Permit is included in an unnamed appendix behind Appendix 7-M. This appendix needs to be numbered and named. **(2)** A Decant Structure Detail is included on Plate 7-11, however, it's unclear which end is in the pond and which end is at the outlet of the culvert under the portal area. This should be clearly labeled with the oil skimmer end in the pond. The term"oil skimmer" is spelled incorrectly on the plate. **(3)** The amendment, Chapter 3, Table of Contents indicates the Wild Horse Ridge sections begin on page 111, while they actually begin on page 117. Other similar discrepancies were found, for example Tables 7.1.7 and 7.1.8 in the MRP do not fit with the amendment. The Applicant needs to check the amendment and the original MRP to make sure the amendment can be inserted and the page references in the MRP remain accurate. The review process often changes page numbers and this may require that this be the last task done. **(4)** The table on amendment page 7-29 needs a designation or number and a title. It should be included in the index as well. **(5)** Page 2-9 indicates, "Final termination date for mining operation is expected to be 2023." Page 3-80, the Reclamation Schedule, goes from 2012 to 2014. These are inconsistent and need to be resolved. **(6)** Catch Basin 1 is not labeled on Plate 2-4F. **(7)** Page 3-3, last paragraph, the term "conversion bolt" probably should be "conveyor belt." Similarly, page 3-7, last paragraph needs the word "adequate." **(8)** Page 3O-5, first paragraph, last sentence, needs the word "pond" added after "sediment." **(9)** Plate 7-1 G, the fifth area "W" (at the coal storage bin), described on page 7K-15 is not labeled on the plate. **(10)** Plate 7-1F has the BTCA area in the upper left corner labeled "X" and "W". One or the other needs to be eliminated. Also, culvert C-23U is shown on a ridge and needs to be moved to be shown in the stream. **(11)** On Plate 2-4G, culvert C34-U (unlabeled) is not in the correct location when compared to Plate 7-1G. The culvert should be in the stream and not under the road.

CONTEMPORANEOUS RECLAMATION

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

Analysis:

On Page 3-61 the permittee states:

Following the construction of the Wild Horse Ridge expansion area, the topsoil storage area, the Wild Horse Ridge Blind Canyon Seam portal pad, any road outslopes where fill is placed will receive interim reclamation.

Findings:

The permittee met the minimum requirements of this section.

REVEGETATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-341, -301,342, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

Revegetation Methods

Table 9.5-1 of the current mining and reclamation plan is a revegetation schedule. According to this schedule, seeding would be done in October and November with seedlings planted in March and April of the subsequent year. While this schedule is adequate, other operators in the area have had good success planting containerized seedlings in the fall. Bareroot plants or cuttings should be planted in the spring.

Chapters 3 and 8 discuss surface preparation. As backfilling and grading are completed, operational areas will be scarified by gouging about eight inches deep with a trackhoe. All areas will be gouged to increase surface roughness.

Following surface preparation, the site would be hydroseeded or otherwise broadcast seeded. All hydroseeded or hand seeded areas will be raked lightly to ensure adequate seed-soil contact. On slopes steeper than 2h:1v, one-half of the seed will be applied, the area will be raked, then the rest of the seed will be applied.

The applicant has added canyon sweetvetch to the seed mix. This species will be planted on the topsoil pile. The applicant will obtain seed for final reclamation by harvesting seed from the topsoil pile and from nearby undisturbed areas.

The applicant has proposed to reduce the number of rose seedlings, and this reduction is acceptable. Willow will be cut from a source area in close proximity to the mine site and planted in the reclaimed area. In areas of suitable habitat, willows will be planted with at least one cutting every foot. Other operators have needed to come back after a few years to supplement willow plantings, and it may be necessary for the applicant to do this. It is common that sediment builds up over a few year in a riprapped channel, and these areas with sediment accumulation become good places to plant willows.

The plan gives detailed descriptions of how seedlings would be handled and planted and about the quality of seed that would be used. Following these commitments should help ensure successful revegetation.

A minimum of 120 pounds per acre of wood fiber hydromulch will be used when hydroseeding. It is a standard practice to add some hydromulch when hydroseeding, but adding all the mulch when seeding reduces seed contact with the soil.

According to Section 9.5.3.2, all broadcast seeded areas with slopes flatter than 2h:1v will be hydromulched and fertilized. Those slopes exceeding 3h:1v will be mulched with 2000 to 2500 pounds per acre of wood fiber hydromulch and varying amounts of tackifier depending on the slope. Erosion control matting will be used on slopes steeper than 2h:1v.

This section of the application is confusing and needs to be clarified. Slopes "exceeding" 3h:1v would be hydromulched, and it is assumed this means "steeper than" 3h:1v. If so, slopes steeper than 2h:1v would have both erosion control matting and hydromulch. This section also says areas that are drill seeded would be mulched with straw or hay, but the section on seeding says the entire area will be broadcast seeded.

Section 9.5.5.1 contains a list of noxious weeds, and this list has been updated.

The current mining and reclamation plan includes a revegetation monitoring schedule. The performance standards in R645-301-356 require that for lands with a postmining land use of wildlife habitat, at least 80% of woody plants must have been in place for at least 60% of the extended responsibility period, and no trees or shrubs in place for less than two years may be counted toward the success standard. To show this standard has been met, it would be necessary to monitor for woody plant density in the fourth and eighth years after reclamation, and the monitoring schedule in the plan does not show monitoring would be done in these years. This is not considered a deficiency since the regulations do not require a monitoring schedule.

The revegetation methods in the application should provide vegetation that complies with the requirements of R645-301-342 for wildlife habitat and with the performance standards in R645-301-353 and R645-301-356. The Division considers that revegetation is feasible at this site.

Standards for Success

The proposed reference area had more vegetative cover than the proposed disturbed area, but the difference was not significant. The reference area had significantly more woody plants than the proposed disturbed area, but this is not critical because the success standard is a technical standard established in consultation between the Division and Wildlife Resources (see below). While there are some differences in species composition between the reference area and proposed disturbed area, the reference area is similar enough that it is considered an acceptable standard.

The reference area had 1405 woody plants per acre, and the proposed disturbed area had 1010. Considering the plant communities and the topography, 1010 is considered an attainable and acceptable standard for success for woody plant density, and the applicant has included the standard in the application.

Findings:

Information in the application is not adequate to meet the requirements of this section of the regulations. Prior to final approval, the applicant must supply the following in accordance with:

R645-301-341, The section of the application discussing mulching methods needs to be clarified.

STABILIZATION OF SURFACE AREAS

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

Analysis:

This section will be addressed when other deficiencies outlined in this TA under Reclamation Plan are determined complete.

Findings:

This section will be addressed when other deficiencies outlined in this TA under Reclamation Plan are determined complete.

CESSATION OF OPERATIONS

Regulatory Reference: 30 CFR Sec. 817.131, 817.132; R645-301-515, -301-541.

Analysis:

The plan for cessation of the operation is part of the approved MRP.

Findings:

The amendment meets the minimum requirements of this section.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

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

Analysis:

Reclamation backfilling and grading maps.

The permittee must give the Division detailed maps that show how the backfilling and grading requirements will be met. The specific items missing from maps and cross sections are: the location of the highwalls, cut slopes and coal seams

Reclamation facilities maps.

The permittee gave the Division detailed maps of all reclaimed facilities including but not limited to the access road.

Final surface configuration maps.

The permittee gave the Division detailed maps and cross sections that show the final surface configuration.

Reclamation monitoring and sampling location maps.

See the environmental resource and operations section of this TA.

Reclamation surface and subsurface manmade features maps.

See the environmental resource and operations section of this TA.

Reclamation treatments maps.

See the deficiencies under the reclamation section of this TA.

Findings:

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

R645-301-542.200, The permittee must give the Division detailed maps and cross sections that show the location of the highwalls, cut slopes and coal seams.

BONDING AND INSURANCE REQUIREMENTS

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.

Analysis:

Form of bond. (Reclamation Agreement)

The Division will evaluate the form of bond the reclamation plan is approved.

Determination of bond amount.

The Division will evaluate the bond amount when the reclamation plan is approved.

Terms and conditions for liability insurance

The Division will evaluate the terms and conditions for liability insurance when the reclamation is approved.

Findings:

The Division will evaluate these bond requirements when the reclamation plan is approved.

REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING

INTRODUCTION

Regulatory Reference: 30 CFR Sec. 785; R645-302, et seq.

Analysis:

The permittee is not required nor applied for variances or special conditions which require additional information in response to any special categories of mining.

Findings:

This requirements does not apply to this application.

EXPERIMENTAL PRACTICES MINING

Regulatory Reference: 30 CFR Sec. 785.13; R645-302-210, -302-211, -302-212, -302-213, -302-214, -302-215, -302-216, -302-217, -302-218.

Analysis:

The application does not include Experimental Practices Mining.

Findings:

This section is not required to be addressed under the proposed plan.

MOUNTAINTOP REMOVAL MINING

Regulatory Reference: 30 CFR Sec. 785.14, 824; R645-302-220, et. seq.

Analysis:

This application does not include mountaintop removal .

Findings:

This section is not required to be addressed under the proposed plan.

STEEP SLOPE MINING

Regulatory Reference: 30 CFR Sec. 785.15; R645-302-230 et. seq.

Analysis:

Steep slope surface mining is not proposed in this amendment.

Findings:

This section is not required to be addressed under the proposed plan.

PRIME FARMLAND

Regulatory Reference: 30 CFR Sec. 785.16, 823; R645-301-221, -302-300 et seq.

Analysis:

The Prime Farmland analyses described in the Environmental Resource section in this TA states that the area does not meet the criteria of either prime or important farmlands.

Findings:

This section is not required to be addressed under the proposed plan.

COAL PREPARATION PLANTS NOT LOCATED WITHIN THE PERMIT AREA OF A MINE

Regulatory Reference: 30 CFR Sec. 785.21, 827; R645-302-260, et seq.

Analysis:

The coal loading facilities are within this permit area. These facilities are used to size and sort coal materials. Mining in the permit area

Findings:

The coal loading and handling for this facility is conducted in conjunction with the permitted area for this mine; therefore, this section is not required to be addressed under the proposed plan.

OPERATIONS IN ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR Sec. 822; R645-302-324.

Analysis:

Refer to the Analyses under the "Environmental Resource Information - Alluvial Valley Floors" in this TA.

Findings:

This section is not required to be addressed under the proposed plan.

IN SITU PROCESSING

Regulatory Reference: 30 CFR Sec. 828; R645-302-254.

Analysis:

The application does not propose to conduct *in-situ* processing as part in this amendment.

Findings:

This section is not required to be addressed under the proposed plan.

AUGER MINING

Regulatory Reference: 30 CFR Sec. 785.20, 819; R645-302-240 et. seq.

Analysis:

The application does not propose auger mining within the permit area.

Findings:

This section is not required to be addressed according to the proposed plan.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Analysis:

The Cumulative Hydrologic Impact Assessment will be updated to include assess hydrologic impacts from the proposed mining on Wild Horse Ridge.

Findings:

This section will be completed prior to permit approval.

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