State of Utah
Division of Oil, Gas and Mining
Utah Coal Regulatory Program

Technical Analysis and Findings
West Ridge Mine Application
PRO/007/041
March 3, 1999

File in:
☐ Confidential
☐ Shelf
☒ Expandable
Refer to Record No 0008 Date 03091999
In C/007/041, 1999, Outgoing
For additional information

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State of Utah
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DIVISION OF OIL, GAS AND MINING

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COPY

March 9, 1999

James Fulton, Chief
Denver Field Division
Office of Surface Mining
1999 Broadway, Suite 3320
Denver, Colorado 80202

Re: Revised Findings and Analysis on Experimental Practice, West Ridge Resources, Inc. Proposed West Ridge Mine, PRO/007/041, File #2, Carbon County, Utah

Dear Mr. Fulton:

As a result of discussions with Bob Postal and Dennis Winterringer of your staff, some changes were made to the experimental practice section of the West Ridge Mine Permit Application Package (PAP). These changes have now been incorporated into the application and the Division has revised our analysis to reflect the changes. In accordance with our regulations at R645-302-210 and OSM Directive Reg-7, we are forwarding a copy of our revised findings to your office and again request your concurrence on this proposal. We are also including a copy of the changes to the application for insertion to OSM's copy of the PAP.

We believe the applicant has provided adequate plans for protecting topsoil resources which will accomplish the objectives of SMCRA and will result in better reclamation than would occur using conventional salvage and replacement techniques. Your expeditious review and concurrence on the experimental practice is greatly appreciated.

If you have any questions or need more information please contact me at (801) 538-5325 or Robert Davidson at (801) 538-5264.

Sincerely,

Daron R. Haddock

Daron R. Haddock
Permit Supervisor

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Refer to:
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Date 030999 For additional information

tam
Enclosures: ta & revised plans
cc: Daron Haddock
Robert Davidson
Jean Semborski (West Ridge)
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INTRODUCTION

This Technical Analysis (TA) is written as part of the permit review process. It documents the Findings that the Division has made to date regarding the application for a permit and is the basis for permitting decisions with regard to the application. The TA is broken down into logical section headings which comprise the necessary components of an application:

- ADMINISTRATIVE
- ENVIRONMENTAL RESOURCES INFORMATION
- OPERATION PLAN
- RECLAMATION PLAN
- SPECIAL CATEGORIES OF MINING

Each section is analyzed and specific findings are then provided which indicate whether or not the application is in compliance with the requirements.

In the event that information presented in the plan is considered adequate if certain provisions or conditions are committed to or met, the Division may issue permit conditions. Some sections of the regulations require special conditions or a variance in writing from the Division for approval. Such special provisions are noted under permit conditions and will be incorporated as a special condition to the permit. In this Technical Analysis we have summarized the permit conditions at the beginning of the document to aid in identifying them.

LIST OF PERMIT CONDITIONS

R645-301-112.700, MSHA numbers need to be included in the application as soon as they become available.

R645-301-800, The Applicant must give the Division a signed reclamation agreement and post a reclamation bond in the amount of no less than $2,117,000.

R645-302-210, Issuance of this permit will specifically authorize West Ridge Resources, Inc. to conduct an experimental practice in conjunction with their approved Coal Mining and Reclamation Operations which allows for the protection of topsoil "IN-PLACE" rather than salvaging soil and stockpiling it for future reclamation. West Ridge Resources, Inc. will follow the plans as outlined in the approved Mining and Reclamation Plan, Chapter 2 and Appendix 2-6 and will be required to evaluate the effectiveness of the experimental practice on an annual basis. The Division will conduct annual reviews of the practice to ensure that it fully protects the environment and the public health and safety. In the event that the experimental practice is determined to be not as environmentally protective as would otherwise be required by standards promulgated under R645-301 and R645-302, revised reclamation plans which utilize standard reclamation technology will be required.

ADMINISTRATIVE INFORMATION

IDENTIFICATION OF INTERESTS

Regulatory Reference: R645-301-112

Analysis:

West Ridge Resources, Inc., has applied for a permit to mine in an area north of East Carbon in Carbon County. The applicant is a corporation existing under the laws of Delaware and qualified to do business in Utah. The application shows the applicant's address, telephone number, employer identification number, and resident agent. The applicant will pay the abandoned mine reclamation fee.

The applicant is owned jointly by the Intermountain Power Agency (IPA) and by Andalex Resources, Inc. Names, addresses, and employer identification numbers of persons that own or control the applicant are in Section 112.300 and Appendix 1-7. Appendix 1-5 lists affiliated coal mining and reclamation operations and these operations' permit and MSHA numbers (where MSHA numbers are available) together with dates of issuance. This information will need to be checked through the applicant violator system.

In Section 112.500, the application lists surface and subsurface owners in the proposed permit area. Map 5-2 shows surface land ownership in the area, and Map 5-3 shows subsurface ownership. Surface owners in the proposed permit area are the Bureau of Land Management (BLM), the State School and Institutional Trust Lands Administration (SITLA), and Penta Creek, LLC. The BLM and SITLA are subsurface owners. The BLM, SITLA, and Penta Creek own contiguous property, both surface and subsurface.

MSHA numbers have not yet been issued, and they need to be included in the application as soon as they are available.

West Ridge Resources has applied for a lease by application in an area north and west of the proposed permit area. They have also obtained an option to acquire mining rights for adjacent State coal reserves.

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:

R645-301-112.700, MSHA numbers need to be included in the application as soon as they become available.

VIOLATION INFORMATION

Regulatory Reference: R645-301-113

Analysis:

Neither the applicant nor any subsidiary, affiliate, or any persons controlled by or under common control with the applicant has had a federal or state coal mining and reclamation permit suspended or revoked in the past five years, nor have they forfeited any performance bond or similar security.

Appendix 1-2 has a list of violations received by the applicant and associated entities within the three year period before the application date. MSHA numbers are not listed with the violations but can be found in Appendix 1-5.

Findings:

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

RIGHT OF ENTRY INFORMATION

Regulatory Reference: R645-301-114

Analysis:

The applicant holds federal coal lease SL-068754 and bases its right to enter most of the proposed permit area on language in the lease. This lease was modified on September 1, 1998, to include the, SE¼ SE¼ of Sect. 10 and the NE¼ NE¼ of Sect. 15, Township 14 South, Range 13 East.

The proposed topsoil borrow site is on land administered by SITLA, and Appendix 1-10 of the application includes a copy of the special use lease agreement with SITLA.

Findings:

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

UNSUITABILITY CLAIMS

Regulatory Reference: R645-301-115

Analysis:

The application says the proposed permit area is not within an area designated as unsuitable for mining, and West Ridge Resources is not aware of any petitions to designate the area as unsuitable for coal mining and reclamation activities.

The operations will not be conducted within 100 feet of an occupied dwelling, and the application contains a copy of letter from Carbon County granting permission to conduct mining and reclamation operations within 100 feet of the proposed C Canyon road. The letter includes certain stipulations:

1. Andalex (West Ridge Resources) should avoid any negative impacts to the road and should place a sign on the road indicating that a controlled access area lies beyond.

2. Ingress and egress from the county road to the mine facilities should be designed and constructed to provide maximum safety to public users of the road.

3. All mining operations adjacent to the road should be conducted in a manner that assures safety to the public.

4. Andalex (West Ridge Resources) will be responsible for maintenance of the portion of the road within the disturbed area.

5. Carbon County requires that Andalex (West Ridge Resources) leave the road in place and intact upon final reclamation and terminate the road at a parking/turnaround area for public use.

The public notice advertising that an administratively complete plan was available indicated the mine would be within 100 feet of a public road. This is in compliance with the requirements of R645-300-121.150.

Findings:

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

PERMIT TERM, INSURANCE, PROOF OF PUBLICATION, FACILITIES OR STRUCTURES USED IN COMMON, FILING FEE, NOTARIZED SIGNATURE

Regulatory Reference: R645-301-116, -117, -118, and -120

Analysis:

The application contains a general schedule for mining operations. The schedule shows construction beginning in April 1999 with mining starting in January 2000.

The term of the permit would be for five years.

Appendix 1-1, Attachment 1-1 contains a certificate of liability insurance that meets the requirements of the State Program.

Proof of publication and a copy of the newspaper advertisement are in Attachments 1-3 and 1-2 in Appendix 1-1.

ADMINISTRATIVE

There are no facilities or structures that would be in common with any other coal mining and reclamation operation.

A copy of the $5.00 check for the filing fee is in the application, and the application also contains a statement with the notarized signature of Samuel Quigley that the information in the application is true and correct to the best of his information and belief.

For this portion of the technical analysis, the application was not reviewed for compliance with other aspects of the cited rules.

Findings:

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

ENVIRONMENTAL RESOURCE INFORMATION

GENERAL

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

Analysis:

The West Ridge Mine is located on the western escarpment of the Book Cliffs about 25 miles east of Price and 5 miles northwest of the town of East Carbon. The Book Cliffs consist of steep canyons and high mountains east of the mine site. Topographic elevations within the permit area range from 6,500 to over 8,800 feet. The highest point located above West Ridge is approximately 8,866 feet. Because of the rugged topography in the region, the present land uses are limited to wildlife habitat, rangeland and recreation. The average annual precipitation in the area of the mine site is 12-14 inches with the majority of the precipitation occurring from October to March. The mean annual air temperature is 45-47 degrees F and the average frost-free period is 80 to 120 days.

Within the permit area, all of the 2,571 acres are controlled by the BLM. There is a small area of privately owned land (surface only) in the permit area on the east side. Refer to Map 5-2.

Carbon County's zoning classification for the mine area is Mining and Grazing.

Findings:

Information provided in the plan meets the requirements of this section.

PERMIT AREA

Regulatory Reference: R645-301-521

Analysis:

The proposed permit area and adjacent lands are shown on Maps 1-1, 5-2, 5-3, and others. Previous disturbance is shown on Map 5-1. Section R645-301-114 contains a legal description of the proposed permit area together with right of entry information.

Under the current permit application package, all mining would be done on 2650.67 acres of federal leases, but the applicant is attempting to obtain other leases in the area. In addition, the permit area would contain a 9.6-acre area of state land that could be used as a topsoil borrow area.

Findings:

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

HISTORIC AND ARCHAEOLOGICAL RESOURCE INFORMATION

Regulatory Reference: R645-301-411.140

Analysis:

There have been several archaeological studies done in the area including an intensive study done for this project in the area that would be disturbed by the mine. Other than the areas proposed to be disturbed, only a few relatively small areas have been surveyed within the proposed permit area.

No archaeological sites have been found within the proposed permit area. Eight sites are in nearby areas as shown on Map 4-2. One of these is a group of ruins north of Grassy Trail Reservoir, and the archaeological report says it should be considered eligible for listing in the National Register of Historic Places pending further research. None of the other sites is considered eligible. They consist of lithic scatters, old log cabins, and a trash dump.

Appendix 4-2 contains two letters from the Division of State History, one to the Bureau of Land Management and one to the State School and Institutional Trust Lands Administration. Both letters recommend a determination of no historic properties. Based on the information in the application, the Division should determine the mine will have no effect on archaeological resources.

The proposed permit area includes no cemeteries, trails in the National Trails System, rivers in the Wild and Scenic Rivers System, or public parks.

Findings:

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

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: R645-301-724

Analysis:

Information on climatic resources can be found in chapters, 2, 4, and 7 and are summarized in the following paragraphs. This site is located within the Region 6 and Region 7, Palmer Hydrologic Drought Index boundaries. A precipitation gauge was installed in 1998 and data from the 1998 season is presented in the plan.

The mean annual air temperature is 45 to 47 degrees F and the average frost free period is 80 to 120 days. Average annual precipitation is 12-14 inches with the majority occurring from October to March (chapter 2, pg. 2-1).

Daily Climatic information is collected at the National Weather Service Station in Sunnyside, Utah. Average annual precipitation is about-13 inches at the Sunnyside, Utah station. Snow accumulations ranged from 0-21 inches at Whitmore Canyon (6,750 ft). Pan evaporation for this site is 0.69 (chapter 4). Average

annual wind speed in Dragerton, Utah south east of the site are 6.2 mph and predominately flow from the north-north east (section 724.412).

Findings:

The applicant has met the minimum regulatory requirements for this section.

VEGETATION RESOURCE INFORMATION

Regulatory Reference: R645-301-321

Analysis:

Vegetation information is in Chapter 3, Section R645-301-321; Appendices 3-1, 3-1A, 3-5 and 3-8; and Maps 3-1, 3-2, and 3-3. A study of nonvascular plants in the Douglas fir/Rocky Mountain juniper area is in Appendix 3-8. Appendix 3-1 has a detailed vegetation study of the proposed mine site, and a study of the potential topsoil borrow area is in Appendix 3-5. Appendix 3-1A is a study of a proposed reference area in the Douglas fir/maple community. Plant communities that could be affected by the proposed mine include pinyon/juniper, Douglas fir/maple, and Douglas fir/Rocky Mountain juniper. Sagebrush/grass and pinyon/juniper communities would be disturbed if the topsoil borrow area is used.

With the methods used for the vegetation studies, percentages of vegetative cover from both understory and overstory combined with litter, bare ground, and rock add to 100%. This method makes comparison of the reference and proposed disturbed areas much simpler than if the overstory and understory were kept separate.

The pinyon juniper community is mostly on the northwest side of the canyon and on both sides of the left fork. Most of the area sampled as "proposed disturbed" is not actually in the area proposed to be disturbed. Because of the rugged topography, it was very difficult to place the sampling points within the proposed disturbed area.

In the pinyon/juniper community, total cover was greater in the reference area than in the proposed disturbed area (52.83% compared to 47.93%), but the difference was not statistically significant. The report says woody plant density values were the same for the two areas although it does not give enough information for the Division to evaluate this statement. Production in both areas was estimated by the Natural Resources Conservation Service as 750 pounds per acre, and the range conditions were both rated as good. Adequate samples of vegetative cover were taken for both areas.

Because of differences in topography and elevation, there are greater differences between the pinyon/juniper reference area and the proposed disturbed pinyon/juniper area at the topsoil borrow area. The reference area is in C Canyon, but the potential topsoil borrow area is on a relatively level bench outside the canyon. However, according to the Division's calculations, vegetative cover in these two areas is only slightly different statistically, and since the reference area has more cover than the proposed disturbed area, there should be no concerns about having too low of a standard. There are some differences in species composition, but these can be accounted for in setting diversity and other success standards.

Cover values were not statistically different between the proposed disturbed and reference areas for the Douglas fir/maple community. Production was slightly greater in the proposed reference area (1400 lbs.

per acre) compared to the proposed disturbed area (1300 lbs. per acre), and the range condition of the proposed disturbed area was only rated as fair while the range condition of the reference area was shown as good. The reference area had a greater number of species, and the proposed disturbed area had dogbane (*Apocynum cannabinum*), a species that indicates past disturbance. Canyon sweetvetch (*Hedysarum occidentale* var. *canone*) was encountered in the proposed disturbed area but not the reference area.

Species compositions in the proposed disturbed Douglas fir/Rocky Mountain juniper area and its corresponding reference area are very similar. Using a standard t-test on unaltered data, the Division found a statistical difference in vegetative cover between the reference and proposed disturbed areas, but the applicant's consultant did not. This is because the consultant used a 95% confidence interval, but the Division used a 90% confidence interval. The proposed disturbed area had 75.75% vegetative cover where the reference area had 66.00% cover. The primary difference was that the proposed disturbed area had more cover from Douglas fir than the reference area. Production in both areas was the same, and both were in good range condition.

There were no statistical differences found between the proposed disturbed and the reference area for sagebrush/grass at the potential topsoil borrow area. The proposed disturbed area was in good range condition where the reference area was in fair condition Both areas were estimated to have 800 pounds of annual production. Some species in both areas are not desirable, but they do not constitute a major part of the cover.

In addition to the detailed studies of the proposed disturbed areas, the application includes a map showing vegetation communities in the entire permit area. Also, the applicant has committed to take aerial infrared photographs every five years to monitor the effects of underground mining on vegetation.

Although cryptogams are not vascular plants, and some are not even plants, they can be an important component of the ecosystem. However, establishment of cryptogams is not required as a revegetation success standard, and the Division does not normally require cryptogam cover information. Because cryptogams probably contribute to the success of other species, it is conceivable that it would be necessary to establish cryptogams to promote the growth of vascular species to the levels of the success standards. This is not anticipated.

Appendix 3-8 shows cover from cryptogams in the proposed disturbed and reference area for the Douglas fir/Rocky Mountain juniper community.

Findings:

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

FISH AND WILDLIFE RESOURCE INFORMATION

Regulatory Reference: R645-301-322

Analysis:

Wildlife Information

Appendix 3-3 has a list of wildlife species potentially occurring in the proposed permit area. Maps 3-4A, B, C, and D show information about raptor nests and deer, elk and antelope habitat.

There are several golden eagle, falcon, and buteo nests in and near the proposed permit area. Six eagle nests have been found in C Canyon, and there are several other raptor nests in and near the proposed permit area. A peregrine falcon nesting territory has been found near the Centennial Project area, but it is more than ten miles from the proposed permit area.

The proposed mine site includes high value deer and elk winter habitat. The potential topsoil borrow area contains critical deer winter range, and much of the proposed permit area, not including the area that would be disturbed by surface operations, contains critical deer summer range. No pronghorn habitat is shown as being in the proposed permit area.

There is a small number of resident elk and a moderate number of wintering elk in the general area of C Canyon. This area has a high potential carrying capacity for wintering elk, however, it is currently at the population objective according to the Division of Wildlife Resources.

About 360 species potentially exist in and near the proposed permit area, and the application includes relatively general information about several of these species. The only wildlife information gathered for the purpose of the application is the raptor nesting information.

It is unlikely there are significant populations of bats in the area because there is no perennial source of water. Few cliffs will be affected by construction, and it is nearly impossible to survey for bats that roost in trees. In addition, the site does not contain habitat for species that have large, concentrated populations. Therefore, even if there are bats in the area, which is unlikely, they would be very difficult to find and only a few would potentially be lost. For these reasons, information about bats is not required.

The area contains habitat for passerine birds, but there are no sensitive species known to nest in the proposed disturbed area. Even so, nearly all birds are protected. The applicant intends to begin construction in April 1999, and this is prior to when these birds nest. Therefore, there should not be any effects on nesting birds. If construction begins after April, however, nest survey information and a protection or mitigation plan may be required.

The application says there are no perennial streams, wetlands, or riparian areas within the proposed permit area. For this reason, the value for wildlife is restricted, and there are no amphibians or fish that are likely to be affected. While snakes inhabit the area, there is no known critical habitat.

Threatened or Endangered Species

ENVIRONMENTAL RESOURCE INFORMATION

The application contains a January 12, 1998, letter from the Fish and Wildlife Service identifying eight listed and candidate threatened or endangered species that could occur in Carbon County. It also quotes a letter from the Fish and Wildlife Service written for the West Ridge Project Environmental Analysis. According to the application, this letter says no federally-listed species are known to occur in the project area.

The only species likely to occur in the permit area are the bald eagle and peregrine falcon. There are only four known bald eagle nests in Utah, and the closest is near Castle Dale. Most bald eagles in Utah spend the winter but do not breed here.

As discussed above, a peregrine falcon nesting territory has been found in the Book Cliffs more than ten miles from the proposed mine site, but no nests were found in the raptor survey. Assuming the application is approved, the applicant will need to conduct further surveys to look for nesting activity of all raptors, including peregrines. If found, protection or mitigation plans would need to be developed.

Although there are no fish in the proposed permit area, the mine has a potential, through water depletion, of adversely affecting threatened or endangered fish of the Upper Colorado River. This issue is addressed as part of the fish and wildlife protection plan.

The Fish and Wildlife Service letter indicates Carbon County is within the historical range of black-footed ferrets. There have been no confirmed sightings in the county in several years.

The letter from the Fish and Wildlife Service includes Graham beardtongue (*Penstemon grahamii*) as a candidate species that occurs in Carbon County. According to Ben Franklin of the Utah Natural Heritage Program, there is a historical collection of this species in the extreme northeastern corner of the county a few hundred feet from the county line. It is an endemic that occurs almost exclusively on the Green River formation in Uintah and Duchesne counties. There is virtually no likelihood the mine would affect this species.

Canyon sweetvetch is no longer a candidate threatened or endangered plant species, but it is on the Bureau of Land Management's list of sensitive species. It is relatively common in the area of the proposed mine as documented in the vegetation studies.

The application says the burrowing owl is not expected to be found within the permit area as they use prairie dog burrows as nest sites; however, the Fish and Wildlife Service commented that they also use badger and marmot burrows for their nest sites. It is not anticipated, though, that the proposed permit area contains suitable habitat.

Findings:

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

The applicant intends to begin construction in April 1999, and this is before passerine birds are likely to be nesting. If construction begins later in the season, a bird survey together with a protection or mitigation plan may be required.

SOILS RESOURCE INFORMATION

ENVIRONMENTAL RESOURCE INFORMATION

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

Analysis:

Chapter 2, Soils, Sections R645-301-220 through -224, discuss the soil resources within the proposed West Ridge Mine area. Relevant soils information includes prime farmland investigation, current and published soil surveys, soil characterizations, and substitute topsoil identification. The Analysis section discusses resource information as follows:

- Soil Survey Information
- Soil Characterization
- Substitute Topsoil Borrow Area

Soil Survey Information

The soil survey information contains both general and site specific surveys as follows:

General, Third Order Soil Survey

Appendix 2-1 and Soils Map 2-1 make up the general Order-III soil survey. Relevant portions of soil survey for the proposed permit area and regional soils map for the proposed permit area are reproduced from the Carbon County Soil Survey, published by the United States Department of Agriculture, Soil Conservation Service, National Cooperative Soil Survey, issued in June 1988.

Site specific, First Order Soil Surveys

A site specific Order-I soil survey was performed and prepared by Mr. James Nyenhuis, Certified Professional Soil Scientist (ARCPACS #2753). The different Order-I soil surveys performed and reported are as follows:

- Appendix 2-2 and Soils Map 2-2 - proposed disturbed area mine site.
- Appendix 2-4 and Soils Map 2-3 - proposed topsoil borrow area.
- Appendix 2-5 - proposed gravel borrow areas.

Soil identification and soil descriptions are contained in each of the respective Appendices (2-1, 2-2 & 2-4) for each of the soil surveys. All mapping and soil survey work were performed according to the standards of the National Cooperative Soil Survey. The First Order Soil Surveys for the proposed disturbed area mine site area, topsoil borrow area, and gravel borrow area were correlated with the published National Cooperative Soil Survey. Based on the site-specific soil descriptions, and laboratory data, each of the soils were classified according to current NRCS soil taxonomy, and correlated to specific soil series names. Correlation of site-specific soils with NRCS soil series criteria allows for subsequent reference to and use of established NRCS soil interpretation values for these soils.

For the disturbed area mine site, four mapping units are delineated (Map 2-2) and include Rock Outcrop-Rubbleland-Travessilla complex, Midfork very stony fine sandy loam, Brycan loam and Strych stony fine sandy loam. In the proposed topsoil borrow area, three soil units were mapped (Map 2-3) as Strych stony fine sandy loam, Atrac fine sandy loam and Gerst-Badland-Rubbleland complex. For the gravel borrow area, one soil series, Strych gravelly loam, is present across the entire sampled area.

Soil productivity of existing soils was determined by Mr. George Cook from the Natural Resources Conservation Services and results are shown in Appendix 3-1.

Soil Characterization

Soil pedons were characterized by the soil horizons at each sampling location. All profile descriptions were recorded on standard NRCS "232" forms and are provided in each of the appendices.

The soil horizons at each sampling location were sampled and characterized according to the State of Utah Division of Oil, Gas and Mining (DOGM) guidelines for topsoil and overburden[1]. Sampled parameters included: soil texture; pH; organic matter percent; saturation percent; electrical conductivity; $CaCO_3$; soluble potassium, magnesium, calcium and sodium; sodium absorption ratio, and extractable selenium and boron. Available water capacity, alkalinity, total nitrogen and available phosphorus were not analyzed at this time; these parameters can be tested at reclamation time. Organic matter percent was substituted for organic carbon. Soil texture by hand-texture method, rock fragment content (% by volume), Munsell color, and qualitative calcium carbonate content were determined in the field by Mr Nyenhuis.

No unacceptable criteria were found for salvageable soils and substitute soils except for percent rock content within the mine site disturbance or proposed facilities area. Although DOGM suitability criteria 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 rock content.**" Appendix 2-2 reports that native soils can be salvaged containing a higher rock content than the DOGM guidelines deems acceptable. Ultimate site reclaimability using these rocky soils enhances reclamation success by providing an environment similar to native conditions. Higher rock content soils provide for a more stable reclaimed surface, aid in water harvesting and ultimate water holding capacity of interstitial soils, and create wildlife habitat and niches on the surface were surface boulders and larger cobble sized rocks are placed.

Substitute Topsoil Borrow Area

A supplemental soil resource areas has been identified in the event that reclamation efforts are not successful utilizing the topsoil Resources at the mine site. The borrow topsoil site has been investigated to document the physical and chemical characteristics of this material and to determine the soil's suitability (see Appendix 2-4).

Appendix 2-5 gives the soil resource assessment of the gravel borrow material that will be used for fill during culvert installation and pad construction. The appendix contains information for two separate borrow sites as follows:

- *Original Gravel Borrow Site*
  - Report by Mt. Nebo Scientific, Mr. James H. Nyenhuis
  - Submitted January 1998
  - Location is SE¼, SE¼, Section 16, T14S, R13E. The pediment cap is located immediately south and adjacent to soil borrow area, just at the base of the Book Cliffs and just outside the C Canyon.
  - Description characterizes the soil and surficial geologic resources for the pediment cap as glacial fan terrace-outwash plain material. Soil cover is primarily Strych. Soil and native parent material are suitable as fill material and substitute topsoil for reclamation of the West Ridge Mine and should be considered suitable growth medium. The PAP, Appendix 5-5 describes the material as " . . . chemically and

[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.

physically identical to the native materials existing naturally in the vicinity of the mine site." Approximately 15 feet of suitable material is available for use as construction fill.

- *Himonas Pit Soil/Gravel Borrow Area*
  - Report by Mr. James H. Nyenhuis
  - Submitted October 1998
  - Location NW¼, Section 1, T15S, R12E.
  - Private, commercial lease area proposed to supply a mix of soil and gravel material as fill for the West Ridge Mine. Material from this lease is currently being used for construction of the new Carbon County C Canyon road.
  - Soil cover is primarily Hernandez family, 1 to 3 percent slopes. The chemical and physical characteristics of the material described in the addendum to Appendix 2-5 are very dissimilar to the materials at the mine site. Analyses of the material indicate it has moderately high salt, SAR and selenium concentrations and that it is less suited for reclamation than the material at the proposed mine site. While not all samples showed elevated salt and selenium levels, those that did represent the majority of the depth of the sampled horizons.

Based on additional field sampling and analyses results for material from the Himonas pit, the main problems rest primarily with SAR and selenium levels. The majority of the samples and primary volume of material have SAR values rated in the fair range. The few samples that showed elevated SAR values in the poor to unacceptable range, primarily occurred in the 5 to 11 foot depth range. Material located 11+ feet deep showed elevated selenium values greater than 0.1 mg/Kg which is unacceptable.

Findings:

The information provided meets the regulatory requirements of this section.

LAND USE RESOURCE INFORMATION

Regulatory Reference: R645-301-411

Analysis:

According to the application, land uses in the proposed permit area have included grazing, wildlife habitat, coal mining, and recreational activities. Use of the land is limited largely by topography. There is an elevation change of about 2000 feet from the lowest to the highest parts of the proposed permit area. Steep-walled canyons, cliffs, and numerous large rocks on the slopes make other uses very difficult to impossible.

All but a small portion of the proposed permit area is in the Grassy Trail and Bear Canyon grazing allotments. The locations of these and other nearby allotments are shown on Map 4-1. The Bear Canyon and Grassy Trail allotments produce a total of 150 animal unit months of forage. In 1985, the Soil Conservation Service estimated production in the proposed disturbed area as 300 pounds per acre, but more recent estimates are in Chapter 3.

The area is zoned by Carbon County for mining and grazing use, and West Ridge Resources has obtained a conditional use permit from the county.

According to the application, previous mining consists of exploration activities in the proposed disturbed area where a total of less than one ton of coal was removed from the Lower Sunnyside Seam. In addition, Kaiser Coal mined a two entry exploration section northeastward into the center of the lease in 1959 and 1960. A section was developed from the main entry, and this section broke out into B Canyon. The breakout was used as an air intake until it was sealed in 1991.

Findings:

Information in the application is considered 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 PAP presented several factors that preclude the mine site, both permit and adjacent areas, including the substitute topsoil borrow area, from being classified as alluvial valley floors. Based on information presented, the following findings can be made:

- The proposed mine is located in C Canyon which is drained by an ephemeral drainage system. During the Order 1 soil survey conducted during the summer of 1997, no water was encountered or observed in any of the excavated test pits that were placed in the canyon bottom alluvial/colluvial soils.
- Steeper slopes and limited flat areas within the vicinity of the mine site and permit area preclude cultivation and irrigation.
- No seeps or springs are present within the proposed disturbed area. Due to the rock outcrop and bed dip, this area does not produce groundwater discharge from the exposed stratigraphy.
- There are no agriculturally beneficial plant species in the mine site area.
- Irrigation water is not available.
- No farming exists or has ever existed within the permit area.

Findings:

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:

Prime Farmland site investigations were performed by the Natural Resources Conservation Service (NRCS). No prime farmland or farmland of statewide importance were found within the proposed permit area, mine site and topsoil borrow site because of slope and soil erodibility. The determination letter from the NRCS dated August 7, 1998, was sent to West Ridge Resources, Inc., and is included in Appendix 2-3.

Findings:

The information provided meets the regulatory requirements of this section.

GEOLOGIC RESOURCE INFORMATION

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

Analysis:

Geologic information in the plan is based on maps and plans required as resource information for the plan, detailed site specific information, and geologic literature and practices. The application includes geologic information in sufficient detail to assist in preparing the subsidence control plan.

Chapter 6 and Appendix 7-1 include descriptions of the stratigraphy of the proposed permit and adjacent areas, starting with the Cretaceous Mancos Shale and the basal sandstone and coal-bearing units of the Blackhawk Formation that intertongue with the Mancos and continuing up through the Eocene Colton Formation. The main sandstone bearing units of the Blackhawk are, starting with the lowest, the Aberdeen, Kenilworth, and Sunnyside Members. The coal seam to be mined at the West Ridge Mine, the Lower Sunnyside Seam, lies directly above the Sunnyside Sandstone.

Strike of the beds at the West Ridge Mine site is northwest-southeast and generally parallel to the face of the Book Cliffs. Dip is 3 to 8 degrees to the northeast (it is shown as 13%, or 7 degrees, on Map 6-2). No major faults have been mapped by the applicant within the mine permit area, but two small faults have been mapped just to the northeast (Map 6-1). The Sunnyside fault is a major north-northwest striking fault throughout much of the Sunnyside Mining District to the south. The vertical displacement on this fault decreases northward and is not detectable from surface mapping within the lease area. Maps done by the Utah Geological Survey (UGS) indicate at least two other faults in the area of Bear, C, and B Canyons that strike approximately northwest-southeast, but 1997 field work by Agapito Associates, Inc. did not locate faults in this area (p. 6-13).

The Upper Sunnyside Seam lies as little as 5 to 10 feet above the Lower Sunnyside Seam in places. The Upper Sunnyside Seam consists of six lenticular beds that, according to the applicant, cannot be correlated between widely spaced data points(page 6-4). This seam ranges in overall thickness from 2 to 15 feet in the Sunnyside Mine to an average of 7 feet in the Sunnyside No. 1 Mine and 5.7 feet in the workings of the Sunnyside No. 3 Mine. On the West Ridge Mine lease area the average seam height is less than 4 feet. Because of its thinness and close proximity to the Lower Sunnyside Seam, none of the Upper Sunnyside is considered to be mineable using underground mining methods

ENVIRONMENTAL RESOURCE INFORMATION

Strata above the coal seam to be mined will not be removed. Samples for analysis for acid- or toxic-forming materials were collected from a single outcrop exposure in the Left Fork of B Canyon. There were only three samples, one each from the coal seam to be mined and the strata immediately above and below the coal. Results of chemical analyses for acid- or toxic-forming materials, including pyritic sulfur for the coal, are in Appendix 6-1. Because of the lateral uniformity of lithologies in the Book Cliffs Coal Field these three samples may be sufficient to characterize the mine permit area; the roof and floor materials and the coal are known to be consistent throughout the area. To confirm the results of the three outcrop samples from the left fork, the applicant commits to taking additional roof and floor samples when the coal seam is exposed in the right fork (p. 6-16).

Drill-hole logs are in Appendix 6-2. These show the lithologic characteristics, including physical properties and thickness of immediately adjacent stratum that may be impacted. The logs show the strata from immediately below the Lower Sunnyside Seam up to the Upper Sunnyside Seam, and up to 30 feet of strata above the Upper Seam. There are logs for 25 holes. These are drawings, apparently based on the original drillers logs, not copies of the original logs. They are not certified.

The applicant states that the original drill-hole logs contain no information about ground water encountered during drilling (p. 6-15). It is unknown if water was not encountered or if ground water was simply not noted on the logs used to create the drawings in Appendix 6-2. Ground water has been monitored in drill-hole DH 86-1 in the past, is being monitored in drill hole DH 86-2 (Appendix 7-3), and DH 90-1 has been used as a water-supply well, so it is likely that ground water was encountered in other bore holes also. The drill-hole log for DH 86-2 in Appendix 6-2 does not show where water was encountered.

The two methods being proposed for mining the coal are standard room-and-pillar mining to develop the main, headgate and tailgate entries and longwall mining to mine the outlined panels. For standard room-and-pillar mining operations samples are to be collected and analyzed to provide the thickness and engineering properties of clays or soft rock such as clay shale, if any, in the stratum immediately above and below each coal seam to be mined. Because most mining is to be done by longwall rather than standard room-and-pillar operations, the applicant contends this regulation is not applicable.

Subsidence, including the Subsidence Control Plan, is discussed starting on page 5-15. The surface above mined out longwall panels may be subject to conditions associated with subsidence. Subsidence may occur under the mined out area. Map 5-7 identifies the mining area for which planned subsidence mining methods will be used. Based on experience at other nearby mines located in the Book Cliffs (i.e. Soldier Creek, Sunnyside and Tower), a conservative angle of draw of 20 degrees was used to project the maximum extent of subsidence.

UDOGM has not determined at this time that collection, analysis, and description of additional geologic information is necessary to protect the hydrologic balance, to minimize or prevent subsidence, or to meet the performance standards. The applicant has made no request to the Division to waive in whole or in part the requirements of the borehole information or analysis required of this section.

Geologic information is sufficiently detailed to assist in determining the proposed West Ridge Mine has been designed to prevent material damage to the hydrologic balance outside the permit area; to assist in determining all potentially acid- or toxic-forming strata down to and including the stratum immediately below the coal seam to be mined; 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 to assist in determining if reclamation can be accomplished. Areal and structural geology of the permit and adjacent areas are discussed adequately to show how the areal and structural geology may affect the occurrence, availability, movement, quantity, and

quality of potentially impacted surface and ground water. There are no known geologic conditions that could influence the required reclamation in a way so as to require collection of additional information or monitoring of other parameters.

Findings:

Geologic information provided in the PAP is considered adequate to meet the requirements of this section.

HYDROLOGIC RESOURCE INFORMATION

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

Analysis:

Sampling and analysis.

Water-quality sampling and analyses have been and will be conducted according to the "Standard Methods for the Examination of Water and Wastewater" or EPA methods listed in 40 CFR Parts 136 and 434 (p. 7-3). Laboratory reporting sheets in Appendices 7-2 and 7-3 indicate the specific method that have used for each parameter.

On the west side of West Ridge, five stations have monitored ephemeral drainages contributing to lower Grassy Trail Creek: ST-4 in lower Bear Creek; ST-5 below the confluence of B and C Canyons; ST-6A and ST-6, respectively above and below the mine site in C Canyon; and ST-7 in lower A Canyon. ST-4 was simply visual observation of the channel for flowing water. ST-5 has had a crest gauge and an ISCO automatic sampler, while ST-6A, ST-6 and ST-7 have each had a crest gauge and bottle samplers.

A crest gauge is a steel pipe with a hole near the bottom so that water can rise in the pipe and record the maximum flow height on a stick inside of the pipe. Bottle samplers consist of one liter plastic bottles that are strapped to the pipe at specific heights. The bottle cap has two copper tubes that allow a sample to flow into the bottle when flow-height reaches the inlet level.

Baseline information.

Baseline ground-water and surface-water data are described in the Mayo and Associates report in Appendix 7-1. Table A-1 in the Addendum to Appendix 7-1 summarizes water monitoring periods, locations, geologic units, and who did the monitoring. Baseline geologic information is found in Chapter 6 and Appendix 7-1. Baseline climatological information including seasonal precipitation and the Palmer Hydrologic Drought Index (PHDI), wind direction and velocity, and seasonal temperature ranges is on pages 7-8 and 7-9 and on pages 6 through 9 in Appendix 7-1.

The topsoil borrow area is included as part of the permit area. Information on hydrologic resources of this 9.6 acre area is provided in Sections 724.200 and 728.331. No seeps or springs exist in or around the borrow site, and there are no known aquifers in this area that would be recharged by this watershed area. Surface runoff is minimized by vegetative cover and relatively deep soil horizons, and what little runoff there is from this small area flows to ephemeral drainages.

Ground-water information.

Locations of wells and springs used for baseline data are shown on Maps 7-5 and 7-6 in the PAP and on Figures 8 and 10 in Appendix 7-1. Ground-water rights in and around the permit and adjacent areas are shown on Map 7-3. A summary of water rights in Appendix 7-5 includes usage, and water right numbers and map numbers from Appendix 7-5 correlate with the numbers on Map 7-3. There are no filings for water rights within the initial permit area, but there are three within the LBA.

Wells

Only one ground-water monitoring well exists in the proposed West Ridge permit area, DH 86-2 in C Canyon. This well is open to the entire thickness of the Sunnyside Member of the Blackhawk Formation, which is below the coal seam that will be mined. It was monitored for water quality and water levels from 1987 to 1989 and in 1997 and 1998, and the data are in the Addendum to Appendix 7-1 and Appendix 7-3.

Well DH 86-1 is located in Whitmore Canyon approximately one mile below Grassy Creek Reservoir. Water quality and depths were monitored from 1986 to 1993, and data are in the Addendum to Appendix 7-1.

Sunnyside City and East Carbon City have water right 91-4960 for 31.621 ac-ft per year (19.6 gpm) from water-supply well DH 90-1 in the SW¼ SW¼ of Section 17, T. 14 S., R. 14 E. DH 90-1 is shown in the NW¼ NW¼ of Section 16 on Map 7-6, but it is just off the east edge of most of the other maps in the PAP, including Map 7-3, Water Rights. Information from the state engineers office in Price (Mark Page, Personal Communication to West Ridge Resources) indicates that the well has a total depth of 500 feet. The well has a gravel pack from 207 to 500 feet below ground surface. According to information from the Sunnyside Coal Company that is cited in the PAP, the well is completed in the Price River and North Horn Formations. Because the well is located over a mile from the lease boundary and is completed in the Price River and North Horn Formations, the applicant feels it is very unlikely that mining in the permit area will affect groundwater systems that contribute water to DH 90-1 (p. 7-5). There is no water-quality or depth information on this well in the PAP.

Springs

In the fall of 1985 and spring of 1986, a seep and spring survey was done on West Ridge by Kaiser Coal Corporation to compare the density, or spatial distribution, of springs between a mined-out area and an area that had not been mined (p. 5-15). Approximately 150 seeps and springs were identified. Locations are shown on Map 7-5 and Figures 8 and 10 in Appendix 7-1. Sites monitored in fall 1985 are designated with "F" and those monitored in spring 1986 with "S".

The seep and spring density was found to be roughly the same in both areas: the mined out area had a density of 21.1 springs and seeps per square mile producing an average of 74.8 gpm/sq mi compared with 22.4 springs and seeps per square mile in the unmined area, producing an average of 79.3 gpm/sq mi. This information indicates that subsidence from mining in the Sunnyside Mines produced no quantifiable difference in flow of seeps and springs on the west side of Whitmore Canyon.

Flow, temperature, pH, and specific conductivity data for the seeps and springs identified in Kaiser's 1985 and 1986 surveys are in Appendix 7-6 and Table A-2 of Appendix 7-1. The seeps and springs are shown on Map 7-5, and fourteen of the springs are marked with a green triangle on that map and designated as "Spring Monitoring Station (1985-1986)". These fourteen springs were monitored for additional water-quality parameters, but these additional parameters did not include total iron and total manganese. Mayo and

Associates incorporated the water-quality information for twelve of these fourteen springs into Appendix 7-1, but there is no information included for the other two springs, S-57 and S-205.

In 1988 and 1989 Kaiser Coal Company collected additional data on some of the 1985-86 springs, including a few analyses for total iron and total manganese. From that 1988 and 1989 group of springs, the applicant monitored nine in 1997 and 1998: the springs designated by Kaiser as S-30, S-7, S-16, S-145, S-144, S-172, S-168, S-190, and S-208 were monitored as SP-6, SP-8, SP-9, SP-11, SP-12, SP-13, SP-14, SP-15, and SP-16, respectively.

Data from 1985, 1986, 1988, 1989, 1997, and 1998 for the nine springs are in Table A-1 in the Addendum to Appendix 7-1. Analyses were done for the baseline parameters listed in UDOGM directive Tech 004 for the samples collected in the 1997 and 1998 ground-water survey at SP-8, SP-12, SP-13, SP-14, SP-15, and SP-16: laboratory analysis reports are in Appendix 7-3. There was no observed flow at SP-6, SP-9, and SP-11 either year. Field parameters were measured and samples were collected between May and October.

Five of the six flowing springs, SP-8, SP-12, SP-13, SP-15, and SP-16, are proposed to be used for operational monitoring. SP-14, located near Grassy Trail Reservoir (Map 7-6), is not included in the operational monitoring plan. SP-8 discharges in the upper drainage of C Canyon and the other four springs discharge from the lower slopes of West Ridge in Whitmore Canyon.

ENVIRONMENTAL RESOURCE INFORMATION

Kaiser Coal Company					Sunnyside Coal Company	West Ridge Resources	
1985 and 1986				1987 to 1989	1986 to 1992	1997 and 1998	Operational Monitoring
1985	1986	Data in Appendix 7-1	Detailed Survey *	Appendix 7-1	Appendix 7-1	Appendices 7-1 and 7-3	
					9 underground sites **		
					DH-86-1**		
					DH-86-2**		
					PC-1**		
	S-1	yes	yes	S-1 - no flow		SP-10 - not monitored***	
F-39	S-7	yes	yes	S-7		SP-8	SP-8
	S-16	yes	yes	S-16**		SP-9 - no flow	
F-66	S-22	yes	yes	S-22 - no flow		SP-7 - not monitored***	
F-69	S-30	yes	yes	S-30**		SP-6 - no flow	
	S-39	yes	no	S-39		SP-5 - not monitored	
	S-40	yes	no	S-40		SP-4 - not monitored	
	S-57	no	yes				
	S-144	yes	yes	S-144**		SP-12	SP-12
	S-145	yes	yes	S-145**		SP-11 - no flow	
	S-168	no	yes			SP-14	
	S-172	yes	yes	S-172**		SP-13	SP-13
F-10	S-177	yes	yes	S-177	WR-2**		WR-2
F-29	S-190	yes	yes	S-190		SP-15	SP-15
F-2	S-205	no	yes		WR-1		WR-1
F-17	S-208	yes	yes	S-208		SP-16	SP-16

* Shown by triangles on Map 7-5 in PAP; did not include total iron and total manganese.
** Kaiser or Sunnyside monitoring that included at least one sample analyzed for minimum baseline parameters.
*** No flow when visited in 1997.

WR-1 and WR-2, also proposed for operational monitoring, discharge from the upper slope of West Ridge in Whitmore Canyon. These two springs were not included in the 1997 and 1998 surveys, but 1986 to 1992 data on seasonal quality and quantity and usage are in Table A-1 (Addendum to Appendix 7-1). WR-1 is the same as F-2 and S-205 and WR-2 the same as F-10 and S-177 (Maps 7-5 and 7-6, Table A-1). There are no total manganese values for WR-1. In addition to this past monitoring, a minimum of two years operational field and laboratory data will be collected at WR-1 and WR-2 (Table 7-1). The data at these two springs were collected by Sunnyside Coal Company, which also monitored spring PC-1 in Pole Canyon (Figure 8 in Appendix 7-1), drill holes DH-86-1 and DH-86-2, and at least nine underground sites: data for these sites are also in Table A-1 in the Addendum to Appendix 7-1.

Springs SP-4, SP-5, SP-7, and SP-10 are not being monitored by the applicant even though they are listed with the baseline data in Table A-1 in Appendix 7-1. In a monitoring plan prepared in 1996 for BP Minerals, JBR consultants renumbered S-40, S-39, S-22, and S-1 of the Kaiser surveys as SP-4, SP-5, SP-7, and SP-10, respectively. The current applicant started monitoring in 1997 and decided to use the JBR numbering scheme rather than create a new one, even though not all sites identified and numbered by JBR would be monitored. Locations are shown on Map 7-6. Sites SP-7 and SP-10 were discussed in the JBR plan although they were not marked on the JBR maps and the recommendation was that they not be monitored. No flow was found at SP-7 and SP-10 when they were visited in 1988, 1989, and 1997. On page 7-4 the applicant briefly discusses these four sites, along with SP-1, SP-2, and SP-3, and why they have not been monitored.

Mayo and Associates collected numerous ground-water samples for isotope analyses in 1997. The locations of these samples and a discussion of the analysis results are in Appendix 7-1. Many of the sites correspond with the baseline water-quality monitoring sites but others, such as S-40 (SP-4), do not.

Surface-water information.

The locations of streams and reservoirs are shown on Map 4-1. No stock watering ponds are indicated. Surface-water rights in and around the permit and adjacent area are shown on Map 7-3 and summarized in Appendix 7-5.

The applicant anticipates that as mining progresses it may become necessary to discharge water from the proposed mine. Mine water will be discharged to the intermittent drainage in C Canyon. The location of proposed mine discharge point UPDES #1 is shown on Map 7-2.

Sites monitored for baseline data are ST-2, ST-3, ST-4, ST-5, ST-6, ST-6A, ST-7, and ST-8. Sites identified as M-6, M-4, and M-5 in the Kaiser Coal Company 1987-1989 data are being monitored as ST-2, ST-6, and ST-7, respectively, in 1997 and 1998, and ST-3, ST-4, ST-5, ST-6A, and ST-8 are new sites. Baseline stream monitoring sites are shown on Map 7-6 and on Figure 8 of Appendix 7-1.

Data for 1987, 1988, and 1989 are in Table A-1 in the Addendum to Appendix 7-1 for sites M-1 through M-7, along with data for several other sites. Data generally include flow, pH, TDS or specific conductivity, total iron, and total manganese; however, total suspended solids (TSS) is not reported. Analyses results are reported for several other water-quality parameters that are listed in UDOGM directive Tech-004.

Water-quality data for several sites monitored only by Sunnyside Coal Company from 1986 to 1992 are included in Table A-1 in the Addendum to Appendix 7-1. Locations are on Figures 8 and 10 of that appendix.

The applicants 1997 baseline surface-water monitoring data are discussed in Appendix 7-1. TSS, TDS, total iron, and total manganese were determined for samples collected at sites ST-5 and ST-7 (Appendix 7-2). Samples from ST-2, ST-3, and ST-8 were analyzed for all the baseline parameters listed in UDOGM directive Tech-004. Field parameters were measured and samples were collected between May and October , but the dates of monitoring vary from site to site. There were indications of two small but unmeasurable flows at ST-4, and no indications of flow at ST-6 and ST-6A.

ENVIRONMENTAL RESOURCE INFORMATION

Kaiser Coal Company	Sunnyside Coal Company	West Ridge Resources	
1987 to 1989 Appendix 7-1	1986 to 1992 Appendix 7-1	1997 and 1998 Appendices 7-1 and 7-3	Operational Monitoring
	BOOK CLIFFS-1 *		
	GT-1 *		
	GT-2 *		
	GT-3 *		
	GT-4 *		
	WC-1 *		
M-1 *		ST-1 - not monitored	
M-2 *			
M-3 - no flow			
M-4 - no flow		ST-6 - no flow	ST-6
M-5 - no flow		ST-7 ***	ST-7
M-6 *		ST-2	
M-7 *			
		ST-3	ST-3
		ST-4 **	ST-4
		ST-5 ***	ST-5
		ST-6A - no flow	ST-6A
		ST-8	ST-8

* Baseline parameters except for TSS.
** Small, unmeasurable flows with no samples.
*** Samples analyzed for a limited number of parameters.

Data for 1998 for ST-2, ST-3, ST-5, ST-7, and ST-8 are in Appendix 7-2. Samples from ST-2, ST-3, and ST-8 were analyzed for the baseline parameters listed in UDOGM directive Tech-004. The updated Table A-1 in the Addendum to Appendix 7-1 indicates no-flow at ST-5 and ST-7, but the data summaries in Appendix 7-2 show that several small flows did occur at these two sites. Although most of these flows were too small to be sampled, on July 30 the ISCO automatic sampler at ST-5 did collect samples that were analyzed for total iron, total manganese, TSS, TDS, conductivity, and pH. Table A-1 shows no flow for ST-4, ST-6, and ST-6A during April, May, and June 1998.

Based on monthly monitoring of ST-4 during 1997 and 1998, the applicant has determined that intermittent flow does not occur in the lower section of Bear Creek and that the channel responds only as an ephemeral drainage following substantial rainfall events. ST-6 and ST-6A are located, respectively, below and above the proposed mine site in C Canyon. The crest gauges at these two sites did not record any flow in

the channel in 1997 or 1998 even though records from the rain gauge in C Canyon indicated events of one to two inches occurred.

M-1 (ST-1) was a Kaiser Coal monitoring point in Rock Canyon, approximately two miles northwest of the proposed West Ridge permit area (NW¼ SW¼, Section 32, T. 13 S., R. 13 E.). Although it is listed in Appendix 7-1 as ST-1, implying that it is a current monitoring point, no data were collected at ST-1 in 1997 and 1998 (Addendum to Appendix 7-1). This site was numbered ST-1 by JBR consultants in a monitoring plan prepared for BP Minerals in 1996, and when the applicant took over that monitoring plan in 1997 it was decided to continue with the same numbering system rather than create new one, even though some numbered sites would not be monitored,. The applicant has not monitored ST-1 because of its distance from the proposed West Ridge permit area and the very small likelihood that the mining operation will have any impact on this drainage.

Mayo and Associates collected numerous surface-water samples for isotope analyses in 1997. The locations of these samples and a discussion of the analysis results are in Appendix 7-1. Many of the sites correspond with the baseline water-quality monitoring sites.

On page 7-20 the applicant commits to three years of baseline data, consisting of the 1997 and 1998 data plus at least one year additional data from earlier monitoring, which includes Kaiser Coal Company 1987-1989 data for sites M-1 through M-7. There is a commitment to update the Probable Hydrologic Consequences (PHC) determination, if needed, following the collection and analyses of information gathered during the 1998 field season (p. 7-11): some changes were made in the PHC determination in the final version of the PAP, but none appear related to the 1998 data.

Baseline monitoring will be performed until construction of the mine and mine facilities begins. Once construction is initiated, the operational monitoring schedule will be utilized. The protocols and locations for operational monitoring are in Table 7-1. Monitoring will continue through reclamation until bond release (p. 7-20).

No acid drainage is expected from the proposed mining operation. Acid-forming materials in western coals generally consist of sulfate minerals such as pyrite and marcasite that oxidize when exposed to air and water and produce acid. Oxidation of pyrite can be expected in the proposed West Ridge Mine; however the amount of acid produced will be small because of the small amount of pyrite present: the analysis results from a single sample (Appendix 6-1) indicate 0.08% pyrite in the coal. Furthermore it is anticipated that any acid will quickly be neutralized by abundant, naturally occurring carbonate minerals: the acid-base potential of the roof and floor samples are 162 and 1.35 t/1000tons, respectively (Appendix 6-1). Because iron is readily precipitated as iron-hydroxide it is not expected that excess iron will be observed in mine discharge water. No other acid-forming materials or any toxic-forming materials have been identified or are suspected to exist in materials to be disturbed by mining. The applicant intends to produce a run-of-mine product without any coal-processing waste for disposal or permanent on-site storage (p. 6-16).

Supplemental Information

The determination of the PHC did not indicated that adverse impacts may occur to the hydrologic balance on or off the proposed permit area, or that acid-forming or toxic-forming material is present that may result in the contamination of ground-water or surface-water supplies. As a result there is no requirement for supplemental information.

Baseline cumulative impact area information.

Mayo and Associates have analyzed geologic and hydrologic information and prepared a report (Appendix 7-1) describing the surface-water and ground-water systems of the permit and adjacent areas. UDOGM will use this information along with information from federal and state agencies and the Sunnyside Mine to assess the probable cumulative hydrologic impacts of coal mining and reclamation operations at the proposed West Ridge Mine and prepare the Cumulative Hydrologic Impact Assessment (CHIA).

Modeling.

No modeling techniques, interpolation, or statistical techniques have been used in preparation of the PAP.

Alternative water source information.

The determination of the Probable Hydrologic Consequences (PHC) has indicated that the proposed coal mining activities will not result in the contamination, diminution, or interruption of ground-water or surface-water sources within the proposed or adjacent areas. Therefore West Ridge Resources, Inc. has not prepared information regarding alternative water sources.

Probable hydrologic consequences determination.

The Probable Hydrologic Consequences (PHC) determination is on pages 7-10 through 7-17. This PHC determination is based on a minimum of two years of baseline hydrologic data, plus geologic and other information collected for the permit application. Most of this information is in Chapter 7 and the report by Mayo and Associates in Appendix 7-1 of the PAP. The PHC determination was not based on data statistically representative of the site. There is a commitment to update the PHC determination, if needed, following the collection and analyses of information gathered during the 1998 field season (p. 7-11): some changes were made in the PHC determination in the final version of the PAP, but none appear related to the 1998 data.

The PHC determination includes findings on: whether adverse impacts may occur to the hydrologic balance; whether acid-forming or toxic-forming materials are present that could result in the contamination of surface- or ground-water supplies; what impact the proposed operation will have on sediment yield from the disturbed area, including the top soil borrow area; acidity, suspended and dissolved solids, and other important water-quality parameters of local impact; flooding or streamflow alteration; and ground-water and surface-water availability. No other characteristics were identified as necessary for the PHC determination.

Adverse impacts to the hydrologic balance

Identified potential adverse impacts to the hydrologic balance are land subsidence and bedrock fracturing, which have the potential to impact the hydrologic balance if fracturing increases the vertical hydraulic conductivity of overburden rock. Such vertical fracturing has the possibility of decreasing discharge rates of near-surface ground water while increasing the recharge rates of deeper ground-water systems. There is also a possibility that water in the old Sunnyside Mine workings could be intercepted; this possibility will be greatly reduced, for economic and safety reasons, with careful surveying and exploratory drilling ahead of mining.

Based on their analysis of the probable hydrologic consequences (PHC), the applicant has concluded that it is highly unlikely that mining in the West Ridge area will result in the decrease of near-surface ground-water discharge rates:

1) Thick interburden between the mined horizon and the near-surface ground-water systems and the presence of swelling clays in the North Horn Formation will prevent fracturing and subsidence from increasing vertical hydraulic conductivities and decreasing spring discharge rates.

2) Ground water that is encountered by mining operations will likely be old, meaning that recharge occurred thousands of years in the past. Water in the Sunnyside Sandstone in well DH 86-2 has a radiocarbon age in excess of 11,000 years.

3) Ground-water systems encountered in the Blackhawk Formation occur in isolated sandstone paleochannels, fractures, and faults. These ground-water systems are not in active hydraulic communication with the subsurface and have limited areal and vertical extent. Mining could dewater some of these systems if they are intercepted during mining operations, but because of the limited spatial extent of these systems, discharge from these isolated ground-water systems will cease soon after interception by mine workings.

The thickness and low permeability of the interburden between the mined horizon and the near-surface ground-water systems, the presence of swelling clays, and the lack of interconnectivity between elements of the hydrologic system and between those elements and the surface all diminish the probability that fracturing and subsidence will adversely affect the ground-water resources. The long residence time ("age") of the water supports the concepts of slow movement and poor interconnectivity.

Acid-forming or toxic-forming materials

Acid-forming materials in western coal mines generally consist of sulfide minerals that oxidize and produce acid when exposed to air and water. Oxidation of pyrite will occur in the proposed West Ridge Mine; however, it is anticipated that any acid will quickly be neutralized by abundant, naturally occurring carbonate minerals. Because iron is readily precipitated as iron-hydroxide it is not expected that excess iron will be observed in mine discharge water.

Coal will be stockpiled in a relatively contained area of the mineyard and all runoff from the site will flow to the sediment pond for containment. The applicant intends to produce a run-of-mine product without any coal-processing waste for disposal or permanent on-site storage (p. 6-16). Waste rock generated through underground activities, such as construction of overcasts, will be permanently stored underground and therefore should not be a factor in surface reclamation activities. Prior to reclamation of the minesite, all coal will be removed from the minesite and sold (p. 7-27).

No other acid-forming materials or any toxic-forming materials have been identified or are suspected to exist in materials to be disturbed by mining.

Sediment yield from the disturbed area

The probable hydrologic consequences of sediment yield from the disturbed area are discussed on pages 7-12 and 7-13. The drainage control system for the mine site is shown on Map 7-2. Culverts and ditches are designed to handle drainage from a 10 year, 24 hour event. Most undisturbed drainage from C Canyon upstream from the mine yard facility area will be culverted underneath the mine site through a 4-foot

diameter corrugated metal pipe in the right fork and a 3-foot diameter culvert in the left fork drainage, which are sized to meet or exceed the design-storm for this drainage area. Runoff from the disturbed area and natural runoff that flows onto the disturbed area will be channeled to the sediment pond, which is designed to completely contain the 10 year, 24 hour storm-event.

The sediment pond has been designed to handle the sediment yield from the disturbed area, calculated to be 0.3090 acre-feet per year during the operational phase, and retain it in the pond. This will effectively reduce the sediment yield from the disturbed area during the operational phase to an insignificant amount.

The sediment pond will be constructed as soon as practical. During reclamation the sediment pond will be removed during removal of the bypass culvert and restoration of the channel. Silt fences will be installed adjacent to the reclaimed channel and approximately along contour to collect and contain sediment from the regraded site. The surface of the regraded area will be gouged with a backhoe bucket to create large depressions, which will act as sediment traps. Anticipated sediment yield from the reclaimed area will be similar to adjacent undisturbed areas.

If the topsoil borrow area is used for reclamation, silt fencing will be used to control sediment in runoff. Contouring and gouging will be used at reclamation of the borrow area to maximize infiltration and minimize runoff.

Important water-quality parameters

Impacts to important water-quality parameters are discussed on page 7-13 to 7-15. It is unlikely that the water discharged from the mine into the C Canyon drainage will flow all the way to Grassy Trail Creek. Except during large storms or heavy snowmelt, water in similar intermittent drainages nearby is entirely lost to infiltration or evapotranspiration before reaching Grassy Trail Creek.

Because it is anticipated that only a small volume of mine discharge water will flow into Grassy Trail Creek; because of the anticipated chemical similarities of the mine discharge water to the water in the Grassy Trail Creek; and because of the poor quality of the water naturally flowing in Grassy Trail Creek, overall water quality in Grassy Trail Creek will likely not be significantly impacted and specific water-quality parameters such as sodium, sulfate, and bicarbonate will not be significantly increased as a result of discharging water from the mine.

The TDS concentration of discharge water from the proposed mine will probably be similar to the discharge from the Sunnyside Mines, which had TDS concentrations of about 1,600 mg/l, with the dominant ions being sodium, sulfate, and bicarbonate. This chemical composition is similar to that of waters that have been in contact with the Mancos Shale (p. 7-14). Sunnyside Coal Company had a UPDES permit with a TDS concentration limit of 1,650 mg/l for the mine water discharge. Water discharged from the mine workings was put to beneficial uses such as growing alfalfa crops and irrigating the municipal golf course and city park. Excess water was discharged into Grassy Trail Creek where it was utilized by cattle and wildlife (p. 7-15).

Water discharged from the proposed West Ridge Mine (most of such water, according to the applicant) will infiltrate into the alluvial sediments near the Book Cliffs escarpment, which will raise the local water table or create a perched water table above the Mancos Shale. Raising of the local water table may result in increased vegetation, which in turn will could have a positive impact on wildlife and the local ecosystem. Quality of ground waters in the Mancos Shale is naturally poor, with TDS significantly greater than 1,600 mg/l, so addition of mine discharge water will not have detrimental effects on water quality.

The applicant asserts that the chemical quality of ground water discharging from springs above the proposed coal mine will not be adversely affected by underground mining operations. According to the applicant, Mayo and Associates (Appendix 7-1) have demonstrated that deep ground waters adjacent to the coal seams throughout the Book Cliffs and Wasatch Plateau coal fields are hydraulically isolated from shallow overlying ground-water systems that support springs and provide baseflow to streams at the surface. No mechanism has been identified by which important water-quality parameters in shallow ground-water systems above the proposed coal mine may be adversely impacted by mining operations. Furthermore, there are no known springs of significance in the lease and adjacent area that discharge from locations that are stratigraphically or topographically below the coal seam to be mined, and there are no springs or seeps within or adjacent to the topsoil borrow area.. The thick Mancos Shale will prevent the migration of any mine discharge water downward to formations underlying the Mancos Shale.

Flooding or streamflow alteration

Flooding or streamflow alteration are discussed on page 7-16. The applicant anticipates that at some time it may be necessary to discharge water from its proposed mine into the C Canyon drainage. The discharge point will be about one mile above the confluence with B Canyon. Both C and B Canyons are intermittent drainages that rarely have flow. The stream channel in this drainage is large enough to contain torrential thunderstorm events that commonly exceed several cfs in this region.

The anticipated discharge rate from the mine is unknown at this time; however, discharges from the nearby Soldier Canyon and Sunnyside mines have averaged about 300 to 400 gpm (0.7 to 0.9 cfs). It is possible that over the life of the proposed West Ridge Mine the discharge rate could be in this same range. Discharge rates from other mines in the Book Cliffs have been quite variable over time due to the nature of the ground-water systems encountered in the mines. Ground-water flows encountered in coal mines in the Book Cliffs and Wasatch Plateau coal fields are contained mostly in sandstone channels and in fractures and faults. It is not unusual for large portions of mines to be mostly dry: at the Soldier Canyon Mine, mining proceeded for several years before water was encountered in quantities sufficient to require discharge from the mine. Similar experiences are reported at Andalex's Tower (Centennial) Mine. As new mine workings are developed in "wet" areas, the discharge rate may temporarily exceed 300 to 400 gpm. The mine discharge rate appears to be more a function of the amount of new mine area recently opened than the total size of the mine.

A discharge of 300 to 400 gpm will not cause flooding or significant alteration of the streambed in the C Canyon drainage. The channel geometry in C Canyon is primarily the result of erosion that occurs during torrential thunderstorm events when the flow in the drainage is several times that anticipated from the proposed West Ridge Mine. The mine discharge will easily be contained within the inner stream channel, which should be stable. Additionally, if a constant discharge is achieved in C Canyon as a result of mine discharge, increased vegetation densities along the stream bank will increase bank stability and decrease erosion. Wildlife habitat will also be improved with the available water and the vegetation growing on the stream bank.

Ground-water and surface-water availability

Mining in the permit area will not significantly affect the availability of ground water. Ground waters in the Blackhawk Formation exist in highly compartmentalized partitions, both vertically and horizontally, and the formation does not act as a hydraulically continuous aquifer. Ground-water systems in the Blackhawk Formation are hydraulically isolated from overlying, modern ground waters. The effects of locally dewatering the Blackhawk Formation adjacent to mine openings will not have any significant impact on ground-water availability in the region surrounding the mine.

The applicant indicates there are no ground-water supply wells in the mine lease area or adjacent to it and that the removal of water from horizons immediately above and below the mined horizon will not impact any water supplies. Rather, the applicant contends that underground mining makes available water from the Blackhawk Formation that was previously inaccessible.

Sunnyside City and East Carbon City have a water right for 31.621 ac-ft per year from water-supply well DH 90-1 in the SW¼ SW¼ of Section 17, T. 14 S., R. 14 E. (Map 7-6; DH 90-1 is shown in the nw1/4 nw1/4 of Section 16 on Map 7-6). According to information from the Sunnyside Coal Company that is cited in the PAP, the well is completed in the Price River and North Horn Formations and has a gravel pack from 207 to 500 feet below ground surface. Because the well is located over a mile from the lease boundary and is completed in the Price River and North Horn Formations, the applicant feels it is very unlikely that mining in the permit area will affect groundwater systems that contribute water to DH 90-1 (p. 7-5). There is no water-quality or depth information on this well in the PAP.

Ground-water monitoring plan.

Locations for baseline ground-water monitoring sites are on Maps 7-5 and 7-6 and Figures 8 and 10 in Appendix 7-1. The PAP does not contain an explicit baseline ground-water monitoring plan, and parameters to be monitored are not listed in the PAP, but data analysis reports in Appendices 7-2 and 7-3 indicate that water-quality samples for 1997 and 1998 were analyzed for all baseline parameters listed in UDOGM directive Tech-004. Tech-004 provides for the monitoring of parameters that relate to the suitability of the ground water for current and approved postmining land uses and to the objectives for protection of the hydrologic balance. Baseline ground-water sampling was done when the sites were accessible between May and October, and although not every site was monitored every month during that interval, sampling was frequent enough to detect seasonal changes.

Planned baseline ground-water monitoring was completed in the fall of 1998, but baseline monitoring will continue until construction of the mine and mine facilities begins. Once construction is initiated, the operational monitoring schedule in Table 7-1 will be utilized (p. 7-20). Monitoring will continue through reclamation until bond release.

Table 7-1 indicates data will be collected quarterly, and there is a commitment on page 7-20 that operational water monitoring reports will be submitted on a quarterly basis to UDOGM.

On page 7-20 the applicant commits to three years of baseline data, consisting of the 1997 and 1998 data plus at least one year additional data from earlier monitoring, which includes Kaiser Coal Company data from 1985 to 1989 and Sunnyside Coal Company data from 1986 to 1993. There is a commitment to update the PHC determination, if needed, following the collection and analyses of information gathered during the 1998 field season (p. 7-11): some changes were made in the PHC determination in the final version of the PAP, but none appear related to the 1998 data.

The applicant is of the opinion that physical parameters and chemical composition of springs and streams in and around the permit area will be adequately characterized following the collection of three years of baseline data and two years of operational data (p. 7-20).

Springs

Springs WR-1 and WR-2, which are to be included in the operational monitoring, were not monitored in 1997 and 1998. Minimal baseline data for springs WR-1 and WR-2 from 1986 to 1992 are in

the Addendum to Appendix 7-1, except there are no total manganese values for WR-1. A minimum of two years of operational data will be collected at these two springs (Table 7-1).

Nine springs (SP-6, SP-8, SP-9 , SP-11 , SP-12, SP-13, SP-14 , SP-15, and SP-16) in the permit and adjacent areas are being monitored for baseline data (Map 7-6). Five of these springs, SP-8, SP-12, SP-13, SP-15, and SP-16, are proposed to be used for operational monitoring: SP-12, SP-13, SP-15, and SP-16 are located in Whitmore Canyon on the east slope of West Ridge, and SP-8 discharges in the upper drainage of C Canyon. The applicant feels that, with the exception of SP-8, there are no springs suitable for monitoring on the west side of West Ridge.

Water-quality data for SP-8, SP-12, SP-13, SP-15, and SP-16, from 1986 to 1989, are in the Addendum to Appendix 7-1. Flow, pH, conductivity, and TDS were determined for these springs, along with several other parameters. However total iron and total manganese are not reported for SP-8 and SP-15, and only the September 1989 samples from the three other springs show analysis results for these two constituents. Baseline water-quality samples for 1997 and 1998 for all five springs (plus SP-14) were analyzed for all baseline parameters listed in UDOGM directive Tech-004 (Appendix 7-3).

Wells

Only one ground-water monitoring well, DH 86-2 in C Canyon, exists in the permit area. It is open to the entire thickness of the Sunnyside Member of the Blackhawk Formation, which is below the coal seam that will be mined. Water-quality data for DH 86-2 from 1987 to 1989 are in the Addendum to Appendix 7-1. Water depth, pH, conductivity, TDS, total iron, and total manganese were determined for these samples, along with several other parameters. Baseline water-quality samples for 1997 and 1998, in Appendix 7-3, were analyzed for all baseline parameters listed in UDOGM directive Tech-004.

Baseline monitoring will be performed until construction of the mine and mine facilities begins. After construction begins, operational monitoring will be measurement of water levels only (p. 7-22 and Table 7-1). Monitoring will continue through reclamation until bond release.

Water-quality and water-level data from 1987 to 1993 for well DH 86-1, located in Whitmore Canyon approximately one mile below Grassy Creek Reservoir, are also in the Addendum to Appendix 7-1.

Sunnyside City and East Carbon City have a water right from water-supply well DH 90-1 in the SW¼ SW¼ of Section 17, T. 14 S., R. 14 E. (DH 90-1 is shown in the nw1/4 nw1/4 of Section 16 on Map 7-6). Because the well is located over a mile from the lease boundary, and is completed in the Price River and North Horn Formations, the applicant feels it is very unlikely that mining in the permit area will affect groundwater systems that contribute water to DH 90-1 (p. 7-5). There is no water-quality or depth information on this well in the PAP and the applicant has collected no baseline data.

Surface-water monitoring plan.

Locations for baseline surface-water monitoring are on Map 7-6 and Figure 8 in Appendix 7-1. The PAP does not contain an explicit baseline surface-water monitoring plan and parameters to be monitored for baseline water quality are not listed in the PAP, but data analysis reports in Appendices 7-2 and 7-3 indicate that water-quality samples for 1997 and 1998 (Appendix 7-2) were analyzed for all baseline parameters listed in UDOGM directive Tech-004. Tech-004 provides for the monitoring of parameters that relate to the suitability of the surface water for current and approved postmining land uses and to the objectives for protection of the hydrologic balance. Baseline surface-water sampling was done when the sites were

accessible between April and October, and although not every site was monitored every month during that interval, sampling was frequent enough to detect seasonal changes.

Planned baseline surface-water monitoring was completed in the fall of 1998, but baseline monitoring will be performed until construction of the mine and mine facilities begins. Once construction is initiated, the operational monitoring schedule will be utilized. Monitoring will continue through reclamation until bond release (p. 7-20).

The applicant is of the opinion that physical parameters and chemical composition of streams in and around the permit area will be adequately characterized following the collection of three years of baseline data, consisting of the 1997 and 1998 data plus at least one year additional data from earlier monitoring. Operational field and laboratory parameters will be measured for the first two years of mine operation: after that time, if sampling has adequately characterized the hydrology in the area, a request will be made to reduce monitoring to field parameters quarterly and one operational analytical sample collected during low flow, August or September (p. 7-19).

Streams

Baseline stream monitoring sites are shown on Map 7-6 and Figure 8 of Appendix 7-1. Sites monitored in 1997 and 1998 were ST-2, ST-3, ST-4, ST-5, ST-6, ST-6A, ST-7, and ST-8. Data were collected at sites M-1 through M-7 and several other sites in 1987, 1988, and 1989 (sites ST-2, ST-7, and ST-6 are the same as M-6, —5, and M-4 in the 1987-1989 data).

On the west side of West Ridge, five stations have monitored intermittent drainages contributing to lower Grassy Trail Creek: ST-4 in lower Bear Creek; ST-5 below the confluence of B and C Canyons; ST-6A and ST-6, respectively above and below the mine site in C Canyon; and ST-7 in lower A Canyon. ST-4 has been simply visual observation of the channel for flowing water. ST-5 has had a crest gauge and an ISCO automatic sampler while ST-6, ST-6A and ST-7 each have had a crest gauge and bottle samplers.

Both the B and C Canyon drainages respond as ephemeral drainages, but observations at ST-5 indicate that all of the flow comes from the B Canyon drainage, primarily the lower drainages and adjacent Mancos Shale slopes. ST-6 and ST-6A are located, respectively, below and above the proposed West Ridge Mine site in C Canyon. The crest gauges did not record any flow in the channel in 1997 or 1998 even though the rain gauge in C Canyon has recorded as much as two inches of precipitation in a single event during the same period. Based on monthly monitoring of ST-4 during 1997 and 1998, the applicant has determined that intermittent flow does not occur in the lower section of Bear Creek and that the channel responds only as an ephemeral drainage following substantial rainfall events.

Grassy Trail Creek is the only perennial stream in the permit and adjacent areas. The permit area does not include any portion of the upper Grassy Trail Creek watershed. Nevertheless, two sites on Grassy Trail Creek are being monitored for baseline data: ST-3 is located below the confluence with Hanging Rock Canyon and is upstream of the permit area, and ST-8 is located just above the confluence with Water Canyon, downstream of the permit area. Grassy Trail Creek is intermittent between the Sunnyside area and its confluence with the Price River.

If it becomes necessary for the applicant to discharge water from the proposed mine, the water will discharge into the C Canyon drainage. The applicant has collected baseline data at ST-5, ST-6, and ST-6A on this intermittent stream. ST-5 had some flow in 1997 and 1998. The applicant has used single-stage bottle samplers and crest stage gauges at ST-6 and ST-6A. Data show that, except for one minor flow, ST-6

was dry when monitored in 1988 and 1989. ST-6A, above the proposed mine site, was monitored in 1997 and 1998 but there was no flow recorded (Addendum to Appendix 7-1).

Findings:

Hydrologic resource information provided in the PAP is considered adequate to meet the requirements of this section.

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.

Analyses:

Affected Area Boundary Maps

The boundary of areas to be affected by mining is identified on numerous maps in the application. e.g. Map 5-5, Surface Facilities Map and Map 7-2, Mine Site Drainage Map.

Archeological and Cultural Resource Maps

Plate 4-2 shows cultural and archaeological resources in the area.

Coal Resource and Geologic Information Maps

Overburden depths (cover lines) for the Lower Sunnyside Seam are shown on Map 5-7. The maximum cover exceeds 2,500 feet. The average overburden under West Ridge is approximately 1,500'. Nature of the overburden and the stratum immediately below the lowest coal seam to be mined is indicated on the bore-hole logs in Appendix 6-2 and on the Geologic Cross-section, Map 6-1A.

Thickness of the Lower Sunnyside Seam is shown on Map 6-3. The nature of this coal is indicated by the bore-hole logs in Appendix 6-2 and the coal analysis in Appendix 6-1.

Thickness and nature of the Upper Sunnyside Seam is indicated on the logs in Appendix 6-2; however, there is no analysis of this coal and no isopach map. From the bore-hole logs in Appendix 6-2, the Upper Seam appears thick enough to be mined; however, West Ridge Resources contends the average seam height is less than 4 feet, that it consists of six lenticular beds, and that it cannot be correlated between widely spaced data points (page 6-4). The Upper Sunnyside Seam lies as little as 5 to 10 feet above the lower seam in places and because of the thin interburden both seams cannot be recovered using current underground mining methods. Isopach maps of the Upper Seam and Upper to Lower Seam interburden would help in determining if any Mineable sections of the Upper Seam are located where mining operations in the Lower seam would not interfere with or prevent mining in the Upper Seam, and visa-versa. However, because the currently proposed permit area involves federal coal and potential future additions to the permit will involve federal and state coal, this is more appropriately the concern of the BLM and SITLA.

Coal outcrop lines and strike-and-dip of the Lower Sunnyside Seam are shown on Map 6-2 and several other maps in the PAP.

Existing Structures and Facilities Maps

Page 5-6 of the PAP refers to Map 4-1, Existing Land Use, which is a P. E. certified map. The text on page 5-6 indicates that the only man made features which exist within the current proposed permit area are RS2477 roads. The Grassy Trail Reservoir is not inside the currently proposed permit area. There are no spoil, waste, noncoal waste, dams, embankments, sediment ponds, water treatment or air pollution control facilities within the proposed permit area.

Existing Surface Configuration Maps

Plate 5-1 shows premine disturbance of the area.

Mine Workings Maps

The West Ridge Mine area is located northwest of U.S. Steel Corporation's old Sunnyside No. 1 underground mine workings. The old workings adjacent to the proposed West Ridge Mine are shown on Map 5-7 . Kaiser Coal Company extended a set of test entries from the Sunnyside No. 1 mine through the area of the proposed West Ridge Mine to a portal in B Canyon. Map 5-7 also shows these underground test entries and the location of the portal, which still exists but has been sealed.

Monitoring Sampling Location Maps

Elevations and locations of monitoring stations used to gather baseline data on water quality and quantity are shown on Map 7-6. Drill-hole collar elevations, intervals cored, and depths drilled are tabulated in Appendix 6-2. Locations of test holes bored from the surface and in-mine from Kaiser's exploratory entries are shown on Map 6-2.

Permit Area Boundary Maps

The boundary of areas to be permitted is identified on numerous maps in the application. e.g. Map 1-1, Location Map and Maps 5-2 & 5-3, Surface and Subsurface ownership Maps.

Surface and Subsurface Manmade Features Maps

Existing surface disturbance and features is shown on Map 5-1, Previous Disturbance and Map 4-1, Existing Land Use. Previous mining by Kaiser Steel is shown on Map 5-4A, Mining Projections.

Surface and Subsurface Ownership Maps

Surface and subsurface ownership are shown on Maps 5-2 and 5-3.

Subsurface-water Resource Maps

As described by Mayo and Associates (Appendix 7-1), ground-water systems in the permit and adjacent area have limited areal and vertical extent due to the heterogeneous lithology of the rock units containing and overlying the coal-bearing strata, which are shown on Map 6-1A. The applicant asserts that no aquifers exist in the permit and adjacent areas so therefore no map has been prepared to show the location

and extent of subsurface water. Ground-water resources are generally dismissed as inconsequential because there is no mappable aquifer, and potential impacts from mining treated as non-existent; such light dismissal is questionable.

Sunnyside City and East Carbon City have water right 91-4960 for 31.621 ac-ft per year from water-supply well DH 90-1 in the SW¼ SW¼ of Section 17, T. 14 S., R. 14 E. (DH 90-1 is shown in the nw1/4 nw1/4 of Section 16 on Map 7-6). Ground water has been encountered in bore holes DH 86-1 and DH 86-2, which are shown on Map 7-6. It is likely that ground water was encountered in other bore holes, but the occurrence of ground water was not marked on drillers logs. The number of springs and seeps, and the water rights on those springs and seeps and on the streams fed by ground-water baseflow, indicates that there are valuable ground-water resources, especially in the North Horn and Colton Formations on West Ridge and in Whitmore Canyon.

Thick, low-permeability overburden between the coal seam and the North Horn and Colton will possibly preclude or minimize impacts from mining on the ground water. The generalized cross section in Figure 20 of Appendix 7-1 shows the conceptualized relationship between the ground-water resources and the proposed mining operation.

Surface-water Resource Maps

The location of surface-water bodies can be found on Map 7-3, which shows Grassy Trail Reservoir and its location with respect to the permit area. Grassy Trail Reservoir stores culinary water for East Carbon City and the town of Sunnyside and for other uses such as irrigation. The water supply intake for the culinary water, located at the reservoir, is marked on Map 7-3.

The applicant anticipates that as mining progresses it may become necessary to discharge water from the proposed mine. Mine water will be discharged to the intermittent drainage in C Canyon. The location of mine discharge point UPDES #1 is shown on Map 7-2. Surface drainage from the disturbed area will pass through a sediment pond into the B Canyon drainage. The sediment pond is shown on Map 5-5 and in detail on Map 7-4. There are irrigation ditches that divert flow from Grassy Trail Creek but none of them are within the proposed permit and adjacent areas.

Vegetation Reference Area Maps

Two of the vegetation reference areas are shown on Map 3-2, but the sagebrush/grass and Douglas fir/Rocky Mountain juniper reference areas are not shown on the maps. The applicant needs to show the locations of these reference areas.

Well Maps

No oil and gas wells exist within the proposed permit area.

Sunnyside City and East Carbon City have water right 91-4960 for 31.621 ac-ft per year from water-supply well DH 90-1 in the SW¼ SW¼ of Section 17, T. 14 S., R. 14 E. (DH 90-1 is shown in the nw1/4 nw1/4 of Section 16 on Map 7-6).

The locations of water monitoring wells DH 86-1, which was monitored from 1987 to 1993 , and DH 86-2, which was monitored during 1987, 1988, 1989, 1997, and 1998, are on Map 7-6.

Contour Maps

The PAP contains sufficient slope measurements or contour maps to adequately represent the existing land surface configuration of proposed disturbed areas for underground coal mining and reclamation activities, to take into account natural variations in slope, and to provide accurate representation of the range of natural slopes and reflect geomorphic differences of the area to be disturbed.

Certification

All maps in Chapters 6 and 7 of the PAP have been certified by a qualified, registered, professional engineer.

Findings:

Maps, plans, and cross sections of hydrologic resource information provided in the PAP are considered adequate to meet the requirements of this section.

OPERATION PLAN

OPERATIONS AND FACILITIES

Regulatory Reference: R645-301-540

Analysis:

General:

West Ridge Resources, Inc., is proposing to develop an underground coal mine in the area of the Book Cliffs coal region NW of Sunnyside, Utah. The surface facilities will disturb approximately 25 acres in "C" Canyon. The applicant is proposing to ship run-of-mine product via a newly constructed Carbon County road to a nearly rail loadout facility. Annual production forecasts are anticipated in the vicinity of 3 million TPY; current leases estimate 20 million recoverable tons during the anticipated six year mine life. If additional State and Federal leases are procured, mine life could be extended to as high as twenty years, recovering an additional 27 million tons.

Type and Method of Mining Operation

West Ridge Mine will be developed by utilizing two continuous miner sections utilizing shuttle car/belt conveyor haulage. Head and tailgate entries, and ventilation bleeders will be developed using the same procedure, outlining the longwall panels. Upon completion of panel development, the applicant will move longwall machinery into place, and initiate high volume coal extraction.

Standard, accepted engineering practices will be used to construct, develop, extract, and reclaim the mine site.

All surface facilities within the "C" Canyon disturbed area will be reclaimed, with the exception of approximately 1000 feet of Carbon County road which will remain, as part of the approved post-mining land use. All man made materials will be disposed of in acceptable disposal areas. "C" Canyon will be returned to its pre-mining surface configuration by back-hauling all fill material either into the underground entries or to the fill's original borrow area.

The status of the reclamation requirements for certain other facilities which will be built to service the mine (i.e., the 49 KVA power line, the six inch water line, and the telephone communications lines) is unknown, as same will cross lands owned by SITLA, BLM and private ownership. These lands are generally outside of the Mine's permit area, ungoverned by SMCRA or the State of Utah R645 coal mining rules.

Facilities and Structures

Dams, Embankments and other Impoundments

The impoundments at the site will consist of a dual cell (in series) sedimentation pond to collect and treat all disturbed area runoff above the mine office parking area, and a small catch basin to treat the parking area runoff (ASCA "Z"). The embankments associated with same will be designed, constructed, and maintained using current, prudent engineering practices as mandated by the R645 coal rules.

There are no dams, slurry cells, or refuse embankments associated with the West Ridge Mine.

Overburden and Topsoil Handling and Storage Areas and Structures

This is an underground coal mining proposal; there will be no overburden removal.

The applicant is proposing to implement an experimental practice regarding the topsoil which exists within the disturbed area perimeter. That practice will be to protect the in situ material in place using geotextile fabric, and then revitalize same upon removal of the overlying fill material. The approval of this experimental practice prior to implementation rests with the U. S. Department of the Interior, Office of Surface Mining.

Two small topsoil storage areas have been permitted in the upper reaches of the left and right hand forks of "C" Canyon.

Coal Removal, Handling, Storage, Cleaning, and Transportation Areas and Structures

Coal removal will be achieved by underground longwall methods, utilizing continuous miner/shuttle car/conveyor haulage to develop the longwall panels. An annual production rate of 3 million tons per year is forecast.

Run-of-mine coal will be conveyed to the outside, where it will be temporarily stored in an open stockpile in the left hand fork of "C" Canyon. Reclaim facilities will reload the stockpiled coal onto an automated truck loading conveyor. The trucks will then transport the run-of-mine product to a rail loading facility via County and State roads.

As indicated, the permittee anticipates that only run-of-mine coal will be shipped from the facility; there will be no wet processing. The facility will probably have a small crusher for chunk reduction for the purpose of preventing blocked transfers.

Spoil, Coal Processing Waste, Mine Development Waste; Noncoal Waste Removal, Handling, Storage, Transportation Areas and Structures

This is an underground mining proposal; no spoil will be generated.

Only run-of-mine product is being anticipated; no coal processing waste will be generated.

The applicant anticipates that there will be very little mine development waste generated during the face up of the portal area. Any material that is produced from roof-fall cleanup, overcasts, or belt transfer construction can be stored underground. However, should it be necessary for mine development waste to be removed from the Mine, the applicant has permitted two temporary waste rock storage sites within the "C" Canyon disturbed area. The PAP proposes that the material be temporarily stored in these areas will then be hauled and permanently disposed of within the DOGM permitted waste rock facility, ACT/007/033.

Noncoal waste which is generated underground and on the surface will be collected, and temporarily stored in metal dumpsters strategically located within the disturbed area. It will then be hauled off of the permit area and permanently disposed of in a State permitted land fill. This paragraph is relative to combustible wastes only.

The PAP addresses the disposal of solid, noncombustible waste, (i.e., abandoned mining machinery) as being "placed and stored in a controlled manner in a designated portion of the "permit" area." Abandoned mining machinery is classified as noncoal waste under R645-301-528.331.

The PAP makes the commitment that "final disposal of noncoal mine waste will be in a State-approved solid waste disposal site such as ECDC."

The PAP also commits to proper handling and disposal of any "noncoal mine wastes" classified as "hazardous" under RCRA and 40 CFR Part 261.

The minimum regulatory requirements for disposal of noncoal waste have been met. No noncoal waste disposal areas are proposed within the surface disturbed area of the West Ridge Mine facilities area.

Mine Facilities

The West Ridge Mine will consist of the following facilities located within the "C" Canyon disturbance:

1) Mine office and parking area
2) A two cell in series sedimentation pond
3) An electrical substation which will step down 49 KVA to appropriate mine voltages
4) Warehouse facilities including lubricant and fuel storage
5) Maintenance shop facilities
6) Open storage facilities for bulk materials (i.e., roof bolts, rock dust, machinery, etc.)

7) Bath house facilities (2)
8) Mine ventilation fan
9) Explosive and blasting cap storage facilities
10) Conveyor systems, coal crushing, storage and reclaim facilities as well as truck loading facilities
11) Lamp house
12) Culinary water storage
13) Noncoal waste storage facilities
14) Undisturbed by-pass culvert through the facilities area
15) Mine portals

Water Pollution Control Facilities

The water pollution control facilities at the West Ridge Mine will consist of the following:

1) The undisturbed bypass culvert through the mine site disturbance.
2) The two cell in series mine site sedimentation pond.
3) Two ASCA's associated with the topsoil storage areas in the upper reaches of the left and right hand forks of "C" Canyon.
4) One ASCA associated with the Mine office/parking area.

It should be noted that as of 2/9/99, there is no treatment facility in place for the UPDES outfall #2, (mine water discharge point to the "C" Canyon drainage via the undisturbed by-pass culvert).

Findings:

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

EXISTING STRUCTURES

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

Analyses:

No surface or subsurface features, such as buildings, transmission lines, pipelines, or agricultural related features, exist in or near the proposed permit area. The Grassy Trail Reservoir is not inside the currently proposed permit area (see Map 4-1, Existing Land Use). Section 521.120 states that the only man made features which exist within the current proposed permit area are RS2477 roads. Section 526.110 states that no structures currently exist within the proposed surface facility area other than the monitoring well. This well is shown on Map 5-1, Previous Disturbance. There are no spoil, waste, noncoal waste, dams, embankments, sediment ponds, water treatment or air pollution control facilities within the proposed permit area. Map 5-1, Previous Disturbance shows the areal extent of the old coal exploration adit.

Findings:

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

PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES

Regulatory Reference: R645-301-411

Analysis:

The proposed permit area contains no known sites listed or eligible for listing in the National Register of Historic Places and no public parks, cemeteries, or lands within the boundaries of any units of the National System of Trails or the Wild and Scenic Rivers System. Therefore, there should be no effect on these resources.

Findings:

Information provided in the application is considered 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:

The C Canyon road is currently being upgraded and realigned by Carbon County in order to provide permanent and unrestricted access to State school trust lands and Federal public lands for multiple-use activities. On March 25, 1998 the Division completed a separate analysis (letter to Mine Permit File from Mary Ann Wright, Associate Director) in regard to "Permitting of Roads". The analysis indicates that during operation of the West Ridge Mine, the C Canyon Road will remain a public road, allowing access by multiple

purpose users up to a public turnaround area within the proposed mine surface facilities area. The C Canyon Road is found under this analysis to be exempt from regulation according to the State of Utah Coal Mining Rules, R645, et seq. and the UDOGM July 3, 1995 policy on roads. The road within the disturbed area boundary of the mine and mine roads beyond the public turnaround area and will be permitted and maintained by the coal mining company, Andalex, (the Permittee).

Findings:

Information provided in the plan meets the requirements of this section. For detailed analysis and findings see March 25, 1998 "Letter To File" from Mary Ann Wright, Associate Director.

AIR QUALITY

Regulatory Reference: R645-301-420

Analysis:

The application is required to show the coordination that has been undertaken with the Division of Air Quality to comply with the requirements of the Clean Air Act. Appendix 4-5 includes a copy of the Intent to Approve New Coal Mine in C Canyon from the Division of Air Quality. When the actual approval order is received, it will need to be included in the application.

Findings:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations. However, the application will need to be updated as the Air Quality Approval Order is issued.

COAL RECOVERY

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

Analysis:

The Lower Sunnyside Seam is the most important coal seam in the area. According to information on page 6-3, it exceeds 6 feet throughout most of lease SL-068754, the West Ridge Mine area.

Thickness and nature of the Upper Sunnyside Seam is indicated on the logs in Appendix 6-2, but there is no analysis of this coal and no isopach map. From the bore-hole logs in Appendix 6-2, the Upper Seam appears thick enough to be mined; however, the applicant states that the average seam height is less than 4 feet, that it consists of six lenticular beds, and that it cannot be correlated between widely spaced data points (page 6-4). The Upper Sunnyside Seam lies as little as 5 to 10 feet above the lower seam in places and because of this thin interburden both seams cannot be recovered using current underground mining methods.

In leases SL-068754 and UTU-76577 the BLM has apparently determined the Upper Sunnyside Seam to be non-economic. Sterilization of this seam by mining of the Lower Seam will eliminate any need to reaffect these leases in the future through coal mining and reclamation operations.

Findings:

Operation information on coal recovery provided in the PAP is considered adequate to meet the requirements of this section.

SUBSIDENCE CONTROL PLAN

Regulatory Reference: R645-301-525, R645-301-332

Analysis:

The PAP commits to implementing a subsidence monitoring plan by installing ground control points on the surface outside of the area susceptible to mining related impacts. Baseline data elevations and aerial photogrammetry will be used to evaluate subsidence, pre- and post-mining. The applicant includes a commitment to monitor subsidence annually. Once subsidence has reached the point at which the settling differential is less than six inches per year, that area will no longer be monitored. Subsidence monitoring locations are shown on Map 5-7, Subsidence Map.

Both Chapter 5 (page 5-18) and Chapter 3 (page 3-9) commit to replacing seep/spring quantities in the West Ridge area if the water loss is determined to have been caused by mining. WR-1 and WR-2 are the two spring sources on West Ridge which are used by livestock and wildlife. The number of cattle allowed to graze the area is determined by the flow quantities of the two springs. The commitments stated in both chapters are consistent and meet the requirements of R645-301-731.530.

Chapter 3 (page 3-8) of the PAP commits to compensation for the loss of any grazing animals due to mining induced subsidence. This meets with the minimum regulatory requirements of R645-301-321.

Findings:

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

SLIDES AND OTHER DAMAGE

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

Analysis:

The Applicant committed to comply with the requirements of R645-301-515.100 and R645-301-515.200. Those regulations require the Applicant to report slides and impoundment hazards to the Division. The Applicant will describe the remedial action that they will take to protect the public and the environment. The Division will review the action plan. If the plan is not adequate then the Applicant will follow the remedial plan developed by the Division.

Findings:

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

FISH AND WILDLIFE RESOURCE PROTECTION

Regulatory Reference: R645-301-333

Analysis:

Power lines will be designed and installed using raptor-proof designs. Hunting platforms could be installed on select poles.

Areas in the proposed permit area containing potential raptor nesting habitat will be surveyed in the field within one year of any mining activity that could result in subsidence. Should any nests be found, the applicant would consult with the Division, the Division of Wildlife Resources, and the Fish and Wildlife Service.

Surface water quality will be protected using sedimentation controls. The sediment ponds will be monitored for any adverse effects on wildlife, and these effects would be reported to the Division of Wildlife Resources. Should mining disrupt a seep or spring that was utilized by cattle or wildlife, the applicant would replace the quantity of water depleted from that source at a similar location unless the seep is restored naturally in a nearby area.

As mentioned above, there are six golden eagle nests in C Canyon near the proposed mine. Five are in the right fork, but the mine site is not visible from them. In addition, the closest part of the mine surface facilities to the nests is the topsoil pile where there should be little activity. Therefore, a buffer zone was established in the vicinity of these nests where no surface mining activities should occur.

Wildlife Resources did not consider blasting when it established the buffer zones, and blasting may be necessary during construction of the mine. According to the application, it is unlikely blasting will be

needed. There are two areas where it might be necessary if bedrock is encountered, but even if these areas have bedrock, it would probably be possible to use hydraulic pick hammers mounted on trackhoes. If the applicant must blast, it would be limited to daylight hours. The nests are about 4000 feet away and screened by both the canyon walls and vegetation. Considering these factors, blasting can be allowed but should be avoided if possible.

In the left fork of the canyon is a nest that was inactive in 1981, 1997 and 1998, and much of the proposed minesite is within one-half mile of this nest. The application says this nest would be considered abandoned under Bureau of Land Management guidelines and that no take permit is necessary. In a letter dated October 15, 1998, the Division of Wildlife Resources concurred with this assessment.

As mining begins, the applicant would need to continue to monitor the nests in the area and may need to obtain take permits. It may also be necessary to preclude birds from nesting in particular places because of the potential of losing the nests through cliff spalling or other results of subsidence. At other mines, chain link fencing material has been put over nests to keep birds away during the time when subsidence was anticipated.

Through water use, the mine has the potential of adversely affecting four threatened and endangered fish species of the Upper Colorado River. In Appendix 7-7, the application includes estimates of how much water will be used. It is estimated the mine would use 21,804,600 gallons or about 67 acre-feet per year, which includes evaporation from ventilation, washdown, culinary uses, and what would be used by the longwall, continuous miner, and roof bolter. Above one hundred acre feet per year, the Fish and Wildlife Service would require a mitigation fee. A final determination of effect will need to be made by the Office of Surface Mining, Reclamation and Enforcement in consultation with the Fish and Wildlife Service.

The site for potential topsoil borrow is in critical deer winter range, and the applicant has committed to perform mitigation work if the site is ever used. Because the site may not be disturbed, it is not necessary to perform the mitigation or pay for it at this time.

The Division requires enhancement or avoidance for areas of critical habitat, but it is understood the Bureau of Land Management requires mitigation for areas of high priority habitat as well. The mine site is in high priority habitat.

Some of the greatest effects on wildlife will be from the road. While the Division will not have jurisdiction over most of the road, drivers need to be instructed on the importance of maintaining a proper speed through the area and of removing any big game animals killed as far as possible from the road. Killed animals should also be reported to the Division of Wildlife Resources. By removing these carcasses or keeping them as far away from the road as possible, the risk of collisions with eagles, other raptors, and vultures can be reduced.

The applicant has committed to conduct wildlife education session for its and its contractors' employees. Many conflicts with wildlife can be avoided through knowing what actions may be detrimental or beneficial.

Findings:

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

TOPSOIL AND SUBSOIL

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

Analysis:

Chapter 2, Soils, Sections R645-301-230 through -234, and R645-302-200 through -218, discusses the soil's operation plan for the proposed West Ridge Mine. Topsoil protection incorporates traditional methods of salvaging/stockpiling and an experimental practice method for protecting soils in-place beneath operational-pad fills. The **Experimental Practice** is unique by taking a **Reclamation Approach** for topsoil protection. Relevant analysis information includes soil salvage, stockpiling, topsoil substitutes and supplements, and experimental practice. The Analysis section discusses operation information as follows:

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

Topsoil and Subsoil Removal - Traditional Methods

For the purpose of maximizing topsoil recovery during construction, all topsoil salvage will occur under the on-site supervision of a Soil Scientist. Traditional methods for protecting topsoil resources will occur in (1) excavated topsoil areas and (2) excavated RO/RL Travessilla Complex areas.

Excavated Topsoil areas

Traditional topsoil salvage methods will occur from those areas of the mine yard where material will be excavated in order to achieve final yard configuration. Topsoil salvage areas are identified by the First Order soil survey as Brycan, Midfork and Strych soil units. A total of 6500 CY of topsoil is projected for salvage from 2.69 acres. Topsoil material will be excavated using a trackhoe, then trucked to the topsoil storage piles. The primary Topsoil Storage Pile is located in the right fork as shown on Map 2-4, Proposed Topsoil Storage Areas.

Topsoil salvage areas are identified on Map 2-2, Mine Site Order 1 Soil Survey, and on Map 5-10, Construction/Reclamation Area-types. Map 5-10 shows topsoil salvage areas as dark blue and labeled as Slope/Topsoil/Cut (S/T/C). Map 2-2 identifies topsoil salvage as follows:

Topsoil Salvage Areas and Volumes			
Soil Name	**Location**	**Acres**	**Volume (yd^3)**
Midfork	M1	0.23	552
	M2	0.22	537
	M3	1.5	3634
Strych	S1	0.27	656
	S2	0.14	342
Brycan	B1	0.32	785
Total		2.69	6506

RO/RL Travessilla Complex

The Permit Application Package (PAP) and Soil Resource Assessment report conclude the following for the RO/RL Travessilla Complex mapping unit:

- The RO/RL Travessilla Complex mapping unit is dominantly unsuitable for soil salvage.
- Topsoil salvage from the RO/RL Travessilla complex is limited to salvaging pockets of Travessilla soil under the direction of a soils specialist.

Since the RO/RL Travessilla Complex occupies the majority of the surface disturbance area within the West Ridge Mine site, then the "unsuitable" nature of this mapping unit for soil salvage renders the site generally "unsuitable" for reclamation success unless soil salvage occurs from these areas. The Soil Resource Assessment report further concedes that attempting to salvage the RO/RL Travessilla Complex soils might de-stabilize immediate upslope areas endangering equipment operators with possible boulder slides. However, the PAP operation plan clearly shows (as shown on Map 5-5, Surface Facility Map) that nearly every slope located along the entire length of "C" canyon, including the left and right hand forks, will be cut to widen the pad surfaces. The majority of these cut slopes are contained exclusively within the RO/RL mapping unit. If the RO/RL surface slopes, then they are safe for are safe for constructing cut slopes and likewise soil salvage. If the RO/RL soils and surface materials render themselves suitable for constructing purposes using conventional construction equipment, (e.g., sediment pond basins, and pad fill), then these same indigenous soil and rock material from the unconsolidated RO/RL surfaces can likewise be salvaged and stockpiled for later reclamation use.

The plan states that the RO/RL areas contain limited topsoil resources. The NRCS soil survey identifies the RO/RL Travessilla Complex mapping unit as containing significant amounts of soils (35% soils by volume - 25% Travessilla plus 10% other) that support a significant vegetation community - 750 lbs/acre of Pinyon/Juniper versus 1500 lbs/acre of Douglas Fir/Rocky Mountain Juniper in the Midfork soils. These "rocky" soils have intrinsic value for restoring RO/RL slopes and surfaces during reclamation to match current soil and vegetation conditions. The current vegetation community evolved to fit environmental conditions as they currently exist. Successful reclamation will therefore require the same soil and rock parameters as currently exist to establish revegetation success standards.

The plan identifies mixtures of rock and soil in the RO/RL Travessilla Complex mapping areas as naturally occurring **Colluvial Growth Material** (CGM). Since the RO/RL Travessilla Complex mapping unit contains 35% soils, CGM is in all aspects, a true soil and will therefore be protected and preserved as any other soil resource. These RO/RL soils will either be protected by salvaging the pockets of Travessilla soil first within the cut areas, or by preserving the soil and rock in-place in the fill areas. Soil preservation in-place is described under experimental practices. After salvaging the pockets of Travessilla soils from CGM areas, the remaining CGM material will be salvaged and stockpiled. Therefore, during construction and excavation of cut slopes in the RO/RL areas, the plan commits to salvage soil from the RO/RL Travessilla Complex unit as follows:

- During construction in the loop area and the coal pad slope area, the identified topsoil deposits, including the pockets of Travessilla soil, will be salvaged first and stored in the right fork soil storage area.

- The remaining colluvial growth/surface material (CGM) is also considered a reclamation resource. Therefore, the remaining CGM will be salvaged from the truck loop area and the west side of the left fork coal storage area as shown on Map 5-10, Construction/Reclamation Area-Types. The plan addresses CGM salvage in terms of dimensions, depth, and projected volumes of salvaged soil materials. The loop area CGM covers an area of about 59,400 square feet; the coal slope CGM covers about 21,600 square feet (see Map 5-10). Assuming an average salvage depth of 12 inches, approximately 2,200 cubic yards of CGM should be salvaged from the loop area, while 800 cubic yards is expected from the coal pile area.

- The plan states that isolated pockets of Travessilla soil will be salvaged from the RO/RL Travessilla Complex units outside the CGM areas where cut slope excavation will occur. Since these pockets of Travessilla soil are not delineated on the soils map, an on-site soils specialist will be present to ensure that these soils are salvaged during this phase of mine development.

Topsoil Substitutes and Supplements

Imported Gravel Fills

Appendix 2-5 gives the soil resource assessment of the gravel borrow material that will be used for fill during culvert installation and pad construction. There are presently two borrow sites which are the most probable sources of borrow for the mine. The first borrow site is located on Utah School Trust property and is presently under lease to Carbon County. This site is located approximately 2 miles from the mine site in Section 16 T.14S., R.13E. Based on DOGM's soil and overburden guidelines, gravel fills located on these pediment terraces located at the base of the Book Cliffs suitable as substitute topsoil based physical and chemical characterization. The School Trust site is undeveloped and is located in a previously undisturbed area.

An addendum to Appendix 2-5 describes a second commercial gravel borrow source. The area is identified as the Himonas Pit and is located about 7 miles from the mine site in NW¼, Section 1, T15S, R12E. The Himonas borrow site is part of an existing commercial gravel crushing and screening operation, complete with a developed water source and roadside access to the newly constructed C Canyon County road. These gravel fills are very dissimilar to the native materials in C-Canyon and contain higher levels of salt, sodium and selenium. Therefore, all gravels and fill materials from the Himonas pit will be pre-tested and approved prior to loading and hauling to the West Ridge site. Based on the Division's Guidelines for Topsoil

and Overburden, suitability of the material will be appraised on pH, EC, SAR and AB-DTPA extractable Se. Any material that falls outside the Division's acceptable criteria range will be rejected, segregated out, and not used as fill for the West Ridge site.

Topsoil Storage

The PAP states that soil salvaged from the cutslopes above the pads and from the M1, M2, B1, and S1 areas will be stockpiled, segregated in separate pile locations and preserved for final reclamation. Two separate sites are identified for soil storage. The primary stockpile is located in the right fork and the secondary pile is located in the left fork.

The sites are located up and away from the active mine yard area. The stockpiled soils will be seeded and mulched to minimize erosion. Both stockpile areas combined hold about 11,000 CY of soil with outslopes of 2:1 and depths ranging up to 15 feet. The outslope surfaces will be surface roughened and pitted to help retain moisture and minimize runoff. Map 2-4 shows details for each stockpile.

The primary topsoil storage area will be located in the right fork. This area is large enough to accommodate the total projected volume of salvaged topsoil. If extra capacity is needed, then the left fork area will be utilized for soil storage.

Construction of the topsoil stockpiles will begin by vegetation removal and installing the bypass culvert in the drainage channel. The stockpiles will be built up over the bypass culvert with diversion ditches installed along both flanks.

The CGM repository areas within the coal stockpile pad area, the sediment pond impoundment dams' out slopes, and the office pad are identified on Maps 5-10 and Map 7-4. Map 7-4 illustrates the sediment pond cross sections which show the CGM stored in the impoundment dam's interior core and out slope. A structural face of imported fill material, compacted to 95%, is placed over the CGM on impoundment dam's in slope embankment. Salvaged surface colluvium from the RO/RL Travessilla Complex unit contains significant quantities of soil (25% Travessilla and 10% other soils) in addition to rock and native parent material. The following apply for salvaging and stockpiling CGM:

- Salvage of all topsoil, including pockets of Travessilla soil, and CGM will be under the direction of an on-site soils specialist.
- Topsoil and pockets of Travessilla soil will be salvaged separately from the CGM and stockpiled with the other topsoil in the right fork topsoil storage area. CGM salvage areas include the loop area and the coal pad slope area.
- The Loop CGM storage areas, located on the sediment pond out slopes (Map 5-10), will be identified as topsoil storage areas, properly signed and protected.
- The CGM material placed on the out slopes of the pond embankments will be roughened and seeded with the interim revegetation seed mix. The reseeded area will then be mulched.

Construction Sequence Summary

Map 5-11, Construction Sequence, illustrates the different stages of construction for the West Ridge Mine site, which includes the experimental practice methods. Steps 1 through 4 are preparatory steps prior to topsoil salvage. Step 1 is removing vegetation; Step 2 is installing culvert and culvert backfill; Step 3 is the implementation of the Experimental Practices by installing geotextile fabric over topsoil fill slopes or marker

strips over the RO/RL fill slopes; and Step 4 is pulling boulders from the surface of slopes that will be cut. Topsoil salvage occurs in Step 5. After topsoil salvage has occurred from the topsoil area and RO/RL areas, excavation of the side slopes will occur in Step 6. These excavated native materials will be used as pad fill and will be placed over the backfilled culvert adjacent to the cut slopes. Step 7 shows completion of the pad level by hauling in imported fill from offsite, commercial gravel borrow areas. A final cap layer of road base material is placed over the imported fill surface as shown in Step 8.

Findings:

The information provided meets the regulatory requirements of this section.

INTERIM STABILIZATION

Regulatory Reference: R645-301-331

Analysis:

The plan for interim revegetation is to seed the mixture shown in Table 3-3 in late fall or early spring on topsoil stockpiles and regraded slopes. Among the areas that would be seeded are the outslope of the sediment pond, fill slopes, and side slopes.

Alfalfa is the only introduced species in this seed mixture, and it is not expected to spread inordinately or to dominate the other vegetation. The species in this mixture should provide good erosion protection.

In areas where the interim seed mixture will be used, the soil surface will first be roughened or gouged. Fertilizer would be applied if necessary and the area seeded in late fall or early spring. The interim seed mixture will be hand broadcast and the areas raked to cover the seed. Straw mulch would then be spread with a mulch and tackifier applied over the straw in larger areas such as the topsoil stockpile.

Canyon sweetvetch is included in the seed mix for both interim and final reclamation. The seeding rate will depend on future field tests and seed availability. It will be planted on topsoil piles both for interim revegetation and to propagate seed for final reclamation. Areas planted with this seed will need to be monitored closely.

This rule requires the applicant to minimize disturbance. As far as possible the applicant needs to avoid using the topsoil borrow area.

Findings:

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

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

OPERATION PLAN

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

Analysis:

The primary access and haulage route to and from the mine will be the C Canyon County road, which is a public road under the jurisdiction of Carbon County. Carbon County has provided authorization to Andalex Resources to construct their mining facilities within 100 feet of the C Canyon road and also maintain approximately 1000 feet of the road as part of the mining operation. The application states, "Approximately 1,000 feet of the northern end of the Carbon County road will extend into the minesite disturbed area. The road will terminate at the junction of the truck loop. A turn around will be constructed at this terminus to give public vehicles an opportunity to turn around without having to drive through the mine yard. This 1,000 foot long segment of the public road, from the terminus of the road at the truck loop junction to just below the office at the southern end of the disturbed area, will be included within the permit area of the West Ridge mine and will be classified as a primary road. Carbon County will allow special mine-related utilization of this segment of the road, such as the ability to operate mine vehicles thereon. In return, WEST RIDGE Resources, Inc. will be responsible for maintenance along this road segment, including maintenance of drainage ditches and culverts. Runoff from this road surface will be treated according to the mine's sedimentation and drainage control plan, as presented in Appendix 7-4. Refer to Figure 5-3 West Ridge Road - Typical Cross-Section for the typical engineering cross-section of the Carbon County road."

An Analysis and Finding for the C Canyon Road were previously done on March 25, 1998 (See letter to file from Mary Ann Wright, Associate Director, Mining). The analysis determined that the C Canyon road leading from County Road 123 up to the proposed West Ridge Mine disturbed area boundary is exempt form regulation under the Utah Coal Regulatory Program and that section of road inside the disturbed area boundary will be permitted.

The mine roads that are planned for use as part of the operation are shown on the Surface Facilities Map (Map 5-5). All primary roads are planned so as to meet the standards applicable to primary roads and their designs have been certified by a registered professional engineer.

Findings:

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

SPOIL AND WASTE MATERIALS

Regulatory Reference: R645-301-528.300, R645-301-536

The construction of overcasts, and belt transfer points will require the taking down of primary roof (average mineable thickness of the Lower Sunnyside is approximately eight feet).
In terms of handling and disposing of mine and underground development waste, excess spoil , coal processing waste, the application states the following:

- Underground development waste will primarily be stored underground in "gob" rooms. Therefore, all waste generated from the construction of overcasts, belt transfers, and other areas requiring additional height will be stored underground.

- The PAP commits to placing any mine development waste generated at West Ridge which cannot be stored underground in a permitted site approved by the DOGM; the waste storage facility at the Wildcat Coal Loadout facility is the permitted area to be utilized. Any mine development waste which is hauled to the surface at West Ridge Mine will be temporarily stored in two areas of the "C" Canyon disturbed area until 12 cubic yards has accumulated, or 180 days has passed. Locations are depicted on Map 5-5, Surface Facility Map. Section 528.320 requires that coal mine waste will meet the design criteria of R645-301-536. As the Wildcat storage facility is already permitted, these requirements have already been met. The PAP is discussing the final disposal of any mine development waste hauled from West Ridge to Wildcat, the requirements of R645-301-536.510 **must be addressed via an amendment to the Wildcat permit, ACT/007/033 before any material can be hauled from the West Ridge permit area to the Wildcat Loadout.**

- There will be no coal processing waste generated, as the applicant intends to ship run-of-mine product.

- The application makes a commitment to dispose of sediment pond cleanout material in a State permitted landfill, such as ECDC. The ECDC facility is not permitted by the Division to receive underground coal mine waste. ECDC is permitted and bonded by the State to dispose of hazardous waste. Material disposed at the ECDC facility will be placed in a lined cell so that leachate will not adversely effect surface and groundwater, will be stable, not adversely effect the postmining land use, not create a public hazard and prevent combustion.

  The Utah Coal Rules do not specially state that underground mine development waste can be shipped to a State approved hazardous waste disposal facility. R645-301-536.500 does allow underground coal mine waste to be shipped offsite to an approved waste disposal site.

  R645-100 defines a permit area as: **"Permit Area"** means the area of land, indicated on the approved map submitted by the operator with his or her application required to be covered by the operator's performance bond under R645-301-800 and which will include the area of land upon which the operator purposes to conduct coal mining and reclamation operations under the permit, including all disturbed areas, **provided that areas adequately bonded under another valid permit may be excluded from the permit area**.

  Since the ECDC facility is permitted and bonded to accept hazardous waste material the Division will allow the Applicant to dispose of underground mine development waste at that facility even though the ECDC facility is not in the permit area.

- The face-up of the four portals at the lower Sunnyside outcrop will probably generate some non-saleable product. This will be placed in the surface facilities pad as part of the fill. The applicant commits to meeting all requirements of the R645 rules mentioned under 528.340. Map 5-10, Construction/Reclamation Area-Types, shows the placement location of the face-up development waste in the facilities pad. If the material tests positive for acid and/or toxic forming, then it will be disposed at State permitted disposal site, such as ECDC. ECDC is not a DOGM permitted site. This may present a problem.

Findings:

The West Ridge PAP has met the minimum regulatory requirements for placing any mine development waste generated off the permit area; the permit for the receiving area must be amended before any material can be shipped.

HYDROLOGIC INFORMATION

Regulatory Reference: R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Operational Water Monitoring Plan

The PAP includes operational ground-water and surface-water monitoring plans based upon the PHC determination and the analysis of baseline hydrologic, geologic, and other information in the permit application. These plans provide for the monitoring of parameters that relate to the suitability of surface and ground water for current and approved postmining land uses and to the objectives for protection of the hydrologic balance, as well as the effluent limitations found at 40 CFR Part 434. They identify the quantity and quality parameters to be monitored, sampling frequency, and site locations.

Baseline monitoring will be performed until construction of the mine and mine facilities begins. Once construction is initiated, the operational monitoring schedule will be utilized. Monitoring will continue through reclamation until bond release. Operational field and laboratory parameters will be measured for the first two years of mine operation.

Locations of operational monitoring stations are depicted on Map 7-7. Operational monitoring locations, hydrologic monitoring protocols, and sampling frequencies are listed in Table 7-1. Operational field and laboratory hydrologic monitoring parameters for surface water are listed in 7-2. Operational field and laboratory hydrologic monitoring parameters for ground water are listed in Table 7-3. The hydrologic monitoring parameters have been selected in consultation with UDOGM directive Tech-004.

The applicant proposes that operational field and laboratory parameters will be measured for the first two years of mine operation, after which, if sampling has adequately characterized the hydrology in the area, a request will be made to reduce monitoring to field parameters quarterly and one operational analytical sample collected during low flow (August or September). The applicant is of the opinion that the physical parameters and chemical composition of springs and streams in and around the permit area should be

adequately characterized following the collection of three years of baseline laboratory data and two years of operational laboratory data. Continuing laboratory analyses for operational parameters beyond two years will probably not enhance the understanding of hydrologic systems, and monitoring of field parameters (flow or water level, pH, specific conductivity, and temperature, plus dissolved oxygen for surface water) during mine operation will identify mining-related impacts to the discharge and chemical characteristics of streams and springs in the permit and adjacent areas. If the field parameters at any sampling site deviate significantly from historical values, monitoring of operational laboratory water quality will resume at that site.

The applicant believes that discontinuance of laboratory parameters after two years of operation is acceptable for two reasons. According to the applicant mechanisms whereby the chemical composition of springs and streams that are above the mine workings can be adversely impacted by mining activities are absent. The applicant also states that this type of ground-water monitoring program has been approved for the Soldier and Dugout Canyon Mines, ten miles north of the West Ridge area.

A procedure for modifying the monitoring plan is outlined in UDOGM directive Tech 004, Part 5E. The applicant has not yet met these criteria. Amendments to monitoring programs will be approved on a site specific basis. Generally, quarterly sampling will still be required at each surface-and ground-water monitoring location. Required monitoring may be reduced to field parameters and the parameters identified in R645-301-731.200 on a quarterly basis plus one complete operational sample collected during the low flow (August or September) season if, using the monitoring data obtained, the operator demonstrates: that the operation has minimized disturbance to the prevailing hydrologic balance in the permit and adjacent areas and prevented material damage to the hydrologic balance outside the permit area; that water quantity and quality are suitable to support approved postmining land uses; or that monitoring is no longer necessary to achieve the purposes set forth in the monitoring plan. Inaccessibility will not be considered an excuse to forego the annual operational sample.

{By following the procedure in directive Tech 004, UDOGM concluded that the requested modification of the Soldier Canyon Mine monitoring plan was justified at the time the Alkali lease addition was approved. Furthermore, the monitoring programs at Soldier and Dugout Canyon Mines are subject to ongoing evaluation by UDOGM to assure that the monitoring is meeting the objective of protection of the hydrologic balance and that the monitoring includes parameters that relate to the suitability of the water for current and approved postmining land uses. The modified monitoring programs at both Soldier Canyon and Dugout include semi-annual (high-flow and low-flow) water-quality analysis and weekly base-flow hydrograph measurements during "wet" and "dry" years that are not included in the proposed West Ridge monitoring plan nor in Tech-004. Furthermore, failure to establish the distinction between baseline and operational monitoring produced some confusion at the Dugout Mine, and the Dugout ground-water monitoring plan now includes, in addition to the "wet" and "dry" year monitoring, quarterly laboratory analysis for operational parameters for at least two years, and analysis for baseline parameters every five years.}

Table 7-1 indicates data will be collected quarterly, with bottle samplers to be checked following precipitation events. There is a commitment that water monitoring reports will be submitted on a quarterly basis to UDOGM on page 7-20. When the analysis of any ground-water sample indicates noncompliance with the permit conditions, the operator will promptly notify the Division and immediately provide for any accelerated or additional monitoring necessary to determine the nature and extent of noncompliance and the results of the noncompliance (p. 7-20).

Groundwater Monitoring

Operational hydrologic monitoring protocols, sampling frequencies, and sampling sites are described in Table 7-1. Operational field and laboratory hydrologic monitoring parameters for surface water are listed in 7-2. The hydrologic monitoring parameters have been selected in consultation with UDOGM directive Tech-004. Locations of monitoring sites are on Map 7-7.

In order to comply with UDOGM directive Tech-004, samples will be collected for analysis of baseline parameters during the low flow (fall) sampling beginning with the first mid-term review. This will be repeated every five years until reclamation is complete (p. 7-20).

Springs

Seven springs in the permit and adjacent areas will be monitored. SP-12, SP-13, SP-15, and SP-16 discharge from the lower slopes of West Ridge in Whitmore Canyon. WR-1 and WR-2 discharge from the upper slope of West Ridge in Whitmore Canyon. According to the applicant SP-8 is the only spring suitable for monitoring on the west side of West Ridge, and maps and data submitted by the applicant support this. SP-8 discharges in the upper drainage of C Canyon.

Wells

Only one ground-water monitoring well, DH 86-2 in C Canyon, exists in the permit area. It is open to the entire thickness of the Sunnyside Member of the Blackhawk Formation, which is below the coal seam that will be mined. Baseline monitoring will be performed until construction of the mine and mine facilities begins. After construction begins, operational monitoring will be measurement of water levels only (p. 7-21 and Table 7-1). Monitoring will continue through reclamation until bond release (p. 7-22).

Sealing of the ground-water monitoring well and any future wells will comply with R645-301-748 (page 7-37).

Sunnyside City and East Carbon City have a water right for 31.621 ac-ft per year from water-supply well DH 90-1 in the SW¼ SW¼ of Section 17, T. 14 S., R. 14 E. (DH 90-1 is shown in the nw1/4 nw1/4 of Section 16 on Map 7-6). The well has a total depth of 500 feet, with a gravel pack from 207 to 500 feet below ground surface. According to information from the Sunnyside Coal Company that is cited in the PAP, the well is completed in the Price River and North Horn Formations. Because the well is located over a mile from the lease boundary, and is completed in the Price River and North Horn Formations, the applicant feels it is very unlikely that mining in the permit area will affect groundwater systems that contribute water to DH 90-1 (p. 7-5), and it is not included in the monitoring plan.

Surface Water Monitoring

Operational hydrologic monitoring protocols, sampling frequencies, and sampling sites are described in Table 7-1. Operational field and laboratory hydrologic monitoring parameters for surface water are listed in 7-2. The hydrologic monitoring parameters have been selected in consultation with UDOGM directive Tech-004. Locations of operational monitoring stations are depicted on Map 7-7.

In order to comply with UDOGM directive Tech-004, baseline samples will be collected from each stream monitoring site in the monitoring program during the low flow (fall) sampling beginning with the first mid-term review. This will be repeated every five years until reclamation is complete (p. 7-20).

The applicant will obtain a UPDES discharge permit to cover any possible discharge from the sediment pond (page 7-45).

Streams

Grassy Trail Creek is the only perennial stream in the permit and adjacent areas. The permit area does not include any significant portion of the upper Grassy Trail Creek watershed. Nevertheless, two sites on Grassy Trail Creek will be monitored. Stream site ST-3 is located below the confluence with Hanging Rock Canyon and is upstream of the permit area and Grassy Trail Reservoir. Stream site ST-8 is located just above the confluence with Water Canyon, downstream of the permit area and Grassy Trail Reservoir.

On the west side of West Ridge, five stations will monitor ephemeral drainages contributing to lower Grassy Trail Creek: ST-4 in lower Bear Creek; ST-5 below the confluence of B and C Canyons; ST-6A and ST-6, respectively above and below the mine site in C Canyon; and ST-7 in lower A Canyon. ST-4 will be simply visual observation of the channel for flowing water. ST-5 will have a crest gauge and an ISCO automatic sampler while ST-6A, ST-6 and ST-7 will each have a crest gauge and bottle samplers.

Both the B and C Canyon drainages respond as ephemeral drainages, but baseline observations at ST-5 indicate that all of the flow comes from the B Canyon drainage, primarily the lower drainages and adjacent Mancos slopes. ST-6 and ST-6A are located, respectively, below and above the proposed mine site in C Canyon. The crest gauges did not record any flow in the channel during baseline monitoring in 1997 or 1998 even though the rain gauge in C Canyon recorded precipitation events of up to two inches during theat period. Based on monthly monitoring of ST-4 during 1997 and 1998, the applicant has determined that intermittent flow does not occur in the lower section of Bear Creek and that the channel responds only as an ephemeral drainage following substantial rainfall events.

If it becomes necessary to discharge water from the proposed mine, this water will discharge into the C Canyon drainage. In addition to being monitored at ST-5 and ST-6, discharged water will be subject to monthly monitoring stipulated by a UPDES permit. Because the monitoring required under the UPDES permit is more stringent and more frequent than that proposed in this permit application, discharge samples will be collected from the UPDES discharge monitoring point rather than at the drainage monitoring stations.

Acid and toxic-forming materials and underground development waste.

Data in Appendix 6-1 indicate that the potential for acid and/or toxic-forming material is minimal. No acid-forming materials or any toxic-forming materials have been identified or are suspected to exist in materials to be disturbed by mining (p. 7-12).

The applicant intends to produce a run-of-mine product without any coal-processing waste for disposal or on-site storage (p. 6-16). It is not likely that any significant amount of the roof, floor or coal material would be incorporated in the regraded fill material at the time of final reclamation. Coal will be stockpiled in a relatively contained area of the mineyard and all runoff from the site will flow to the sediment pond for containment (p. 6-8). Any waste rock generated through underground activities, such as construction of overcasts, will be permanently stored underground and therefore should not be a factor in surface reclamation activities (p. 6-7). Roof and floor materials will be permanently stored underground and will not brought to the surface for disposal. There will be no coal processing or coal preparation at the minesite. Prior to reclamation of the minesite, all coal will be removed from the minesite and sold (p. 7-27).

Hydrocarbons

The Spill Prevention and Control Countermeasure Plan is included in Appendix 5-6 and, it describes the steps to be taken to minimize disturbance to the hydrologic balance intended to meet applicable federal and Utah water quality laws and regulations regarding hydrocarbons. The applicant provides adequate

information about hydrocarbons used at the minesite from which the probable hydrologic impacts can be determined.

Other Chemicals

A commitment to handle and properly dispose of all noncoal mine waste defined as "hazardous" Under the Resource Conservation and Recovery act and 40 CFR part 261 is provided in section 528.33. Longwall mining fluid emergency spill plan is addressed and a list of chemicals to be used at the mine is included in section 731.300. Gravel areas will be sprayed with a chemical surface stabilizer such as potassium chloride, or water control (Chapter 4, pg 4-8). The applicant provides adequate information about chemicals used at the minesite from which the probable hydrologic impacts can be determined.

Transfer of wells

All water wells utilized during the operating phase will be abandoned in accordance with the rules outlined in "Administrative Rules For Water Well Drillers, State of Utah, Division of Water Rights, 1987". Closure of the wells will be conducted by a licensed well driller. The procedure is outlined on page 7-28.

Discharges into an underground mine

No discharge into the underground mine is anticipated (page 7-29). There is a possibility that water in the old Sunnyside Mine workings could be intercepted; this possibility will be greatly reduced, for economic and safety reasons, with careful surveying and exploratory drilling ahead of mining.

Gravity discharges from underground mines.

Surface entries and accesses to underground workings will be located and managed to prevent or control gravity discharge from the mine. All workings will dip away (downdip) from the portals. It is anticipated that the mine will be relatively dry but in the event that discharge becomes necessary, discharge will comply with the performance standards of the regulations and requirements of the UPDES permit before being discharged off the permit area (page 7-29).

Water-quality standards and effluent limitations

Sediment control measures have been designed to prevent, to the extent possible, additional contributions of sediment to stream flow or runoff outside the permit area, to meet effluent limitations and to minimize erosion (page 7-39).

The applicant will obtain a UPDES discharge permit to cover any possible discharge from the sediment pond (page 7-45).

Diversions.

Design Information

In a previous analyses the Division noted the permittee used smaller CN's than the Division felt was acceptable. Apparently, this resulted from differences in the Soil Hydrologic Group used in their analyses. In the PAP the applicant did not adjusted the Soil Hydrologic Group used to determine the CN but, did adjust the CN's. The applicant has included curve numbers that were agreed upon with the Division in a phone

conversation. The following table presents the hydrologic group provided from the Soil Conservation Service and the Hydrologic Group used by the permittee.

Soil Hydrologic Group

Soil (unit#)	Components	% Inclusion	SCS Hydrologic Group	Hydrologic Group used
Midfork Comodor Complex (62)	Midfork Bouldery Loam	50%	B	B
	Commodore Bouldery Loam	30%	D	
	Other	30%		
Rock Outcrop (96)	Rubble Land	30%	NA (impervious)	D
	Rock Outcrop	30%	NA (impervious)	
	Travessilla	25%	D	
	Other	10%		
Croydon (21)	Croydon Loam	100%	B	B
Beje-Trag Complex Plateaus (7)	Beje Loam	55%	D	C
	Trag Clay Loam	20%	C	
Beje Complex - Mountain Ridge Tops (5)	Beje very gravelly fine sandy loam	45%	D	C
	Beje fine sandy loam	35%	D	
	Other	20%		

Source: Soil Survey of Carbon County Area, Utah, USDA SCS June, 1988

The CN range presented below is determined acceptable by the Division and was determined from TR55 methodology with vegetative information provided in the plan and information from the Soil Survey of Carbon County Area, Utah, USDA SCS June, 1988. The CN range determined by the Division are presented, as well as, the CN provided by the operator.

Soil Hydrologic Group

Soil (unit#)	Divisions CN Acceptable Range	Permittee's Adjusted CN (previous CN)	Comments
Midfork Comodor Complex (62)	64 to 62	64 (59)	
Rock Outcrop (96)	80 to 89	80 (78)	Although this is at the low end of the CN acceptable range the Division agrees with the number provided.
Croydon (21)	50 to 60	59 (59)	
Beje-Trag Complex Plateaus (7)	72 to 80	70 (70)	The proposed CN was accepted because this soil type is a small percentage of the area contributing to runoff.
Beje Complex - Mountain Ridge Tops (5)	80 to 89	70 (70)	The proposed CN was accepted because this soil type is a small percentage of the area contributing to runoff.

Source: Soil Survey of Carbon County Area, Utah, USDA SCS June, 1988

Bypass Culvert

The Right Fork Undisturbed Bypass Culvert receives runoff from a 687.8 acre drainage area. This is greater than a square mile; therefore, by definition it is intermittent and it is required to be designed for a 100 yr - 6 hr precipitation event.

Design criteria and design certifications are provided in Appendix 7-4. The applicant uses the Office of Surface Mining Watershed Model, Storm Version 6.20 by Gary E. McIntosh to determine design flows and flow volumes. The SCS upland Curve is used to develop the time of concentration, and a forested unit hydrograph type is assumed for the undisturbed watersheds. Although the Kirpich Method for time of concentration results in a
more conservative design for the 100-yr 6-hr event (all other values held constant), the 50-yr 24-hr event used by the applicant for the bypass culvert design provides an additional capacity exceeding the values obtained using the Kirpich Method for time of concentration for the 100-yr 6-hr event.

The plan uses a CN of 0.020 for cmp culverts. According to Barfield, Warner and Haan, 1981 minimum values of 0.021 and maximum values of 0.025 can be used. If all other values provided by the applicant are held constant the 0.025 value used for the bypass culvert does not provide the capacity estimated for the 50-yr 24-hr event but, it would exceed the peak flow estimated from the 100-yr 6-hr event. In addition, the head created by up-gradient water will increase the volume that can move through the culvert when flowing full to adequately pass the estimated peak flow. The design flow for the 50-yr 24-hr event provided in the plan meets or exceeds the minimum regulatory requirements.

The outlet to the Bypass Culvert will be equipped with a rip-rap apron. Designs are included in Appendix 7-4. Undisturbed drainage culverts will have trash racks and, inlets will be protected with riprap. The designs meet or exceed minimum regulatory requirements.

Road Drainage

The disturbed area drainage is primarily developed along the roads and meet or exceed minimum regulatory requirements for road drainage. The road drainage diverted around the lower pad area is designed to be conveyed to the existing downstream channel beyond the permitted area.

Disturbed Area Drainage

Diversions are sized for the 10-yr 24-hr event using the SCS - TR55 method for Type II storms. The constructed ditch design will include an additional 0.5 foot of freeboard to the design flow depth.

A Manning's n equal to 0.035 is used for all ditch designs. This roughness factor is generally the value used for earthen channels that are small drainage ditches, stony beds with weeds on banks, earth bottom and rubble sides, or large drainage ditches with 4.0-5.0 hydraulic radius. Inspecting the channels under field conditions will ultimately determine design adequacy and erosional stability. Additional drainage may be needed in the pad areas if runoff is not adequately conveyed toward the road drainages. The information presented is designed to meet minimum regulatory requirements.

Stream buffer zones.

A commitment to provide buffer zone signs at the mine pad boundaries upstream and downstream along the right fork drainage is found in section 521.260. The August 1998 letter from the Division of Water Rights indicates no stream alteration permit is required, appendix 7-9.

The Division hereby authorizes mining and reclamation operations through the West Ridge C canyon drainage and finds that:

1) Coal mining and reclamation operations will not cause or contribute to the violation of applicable Utah or Federal Water Quality Standards and will not adversely affect the water quantity and quality or other environmental resources of the stream;

2) There will be a temporary stream channel diversion that complies with R645-301-742.300; and

3) The area not to be disturbed will be designated as a buffer zone, and the operator will mark it as specified in R645-301-521.260.

Sediment control measures.

General Construction plan

Information related to hydrology and sediment control issues identified in the plan include the following commitments for the construction phase:

- The first sediment control measures will be silt fence placed across the stream using the UDOT post and mesh method. Silt fences placed in drainages will include a notched spillway and, will not extend above the streambank elevation. Sediment control measures and drainage control for the early phases of construction are described in the following locations; chapter 5 (section 526.300), Appendix 5-5 (8b), and Appendix 7-4 (section 3.5).

- A sedimentation pond as a temporary measure is proposed to be in place prior to other construction activities (Appendix 7-4, section 3.5).

- The channel will first be culverted through the office pad/lower cell area. After the temporary sedimentation pond is installed construction can begin upstream. The dam embankment will be constructed 12 feet high and the culvert will be fitted with an open riser (Attachment 3, Appendix 5-5). This structure is estimated to be in place for approximately two months. A commitment to construct the pond under direction of a P.E. and, P.E. certification are provided (Appendix 7-4, section 3.5). **Due to the temporary nature the pond size is approved by the division according to R645-301-742.231.**

- Previous submittals proposed siltation structures would be removed from the discharge area surrounding the bypass culvert when flow can pass through the culvert, but could not be found in the recent submittal. The inspector should ensure that the structures are removed from the discharge zone when flow can pass through the culvert to function properly.

- When installing the Bypass Culvert the plan proposes using two methods to place fill. One, in Channel, Rock, Fill (CRF) areas, fill will simply be placed in the existing channel. Second, in Channel, Topsoil, Fill (CTF) areas, geotextile will be placed over the topsoil prior to placing the fill. The culvert will closely follow the existing channel alignment and grade.

  In Channel, Rock, Fill (CRF) areas the plan commits to the following in Appendix 5-5, "The channel bottom will not be graded or bulldozed, however." and "...small irregularities of less than 12 inches will be modified to accommodate the culvert alignment." Also, "Imported bedding material (borrow) will be used to fill minor depressions within the channel prior to installing the culvert." Large boulders will be moved away from the culvert alignment.

  Natural abrupt vertical gradient changes occur in the channel and were designated with the name "Rock Block" by the permittee. The plan commits to ramp the fill to the upstream gradient until the channel becomes level in order to retain these features for reclamation. This is an admirable effort to promote retaining the natural geomorphology of this canyon for channel reclamation.

  In Channel, Topsoil, Fill (CTF) areas the same techniques will be used as for the (CRF) areas. However, the channel banks and sides containing topsoil will be draped with the geotextile material before other construction occurs and the culvert bedding will be placed over the geotextile material followed by culvert placement.

- Once the culvert is constructed 500 feet up canyon from the temporary pond the permanent ponds can be constructed. When the permanent ponds are functional the temporary pond riser can be removed, the bypass culvert can be connected and the temporary pond will be filled (Appendix 7-4).

Top Soil Substitute Area.

This area is proposed to be utilized only if needed during final reclamation. Section 724.200 discusses utilizing silt fencing, roughening and final surface configuration. The applicant discusses insloping the site but, it is not clear what is intended by that statement. Creating a ponded area on the top of the pile may lead to gully erosion if the water can breaches the ponded area.

Alternate Sediment Control Measures

ASCA X and Y will use the following sediment control measures; pocking (also referred to as irregular pitted surfaces), silt fencing around the perimeter, seeding (following topsoil placement and after September 15), and constructing ditches at the base of the pad to convey runoff away from the topsoil stockpile and vegetative refrence ares (section 732.100).

Snow Removal

The PAP includes Map 7-2, Mine Site Drainage Map. The map shows numerous snow storage areas within the Mine site disturbed area perimeter. It is assumed that snow will be removed by regular blading and/or push-load/pickup-haul procedures.

There are no snow storage sites shown within the sediment pond (which is a two cell arrangement) incisements. Some snow will probably end up in the ponds due to side cast plowing; should this amount become excessive, a compliance problem may occur. Virtually all other snow melt will report to the sediment ponds via inlet diversions.

Snow removal stockpiles are shown on drainage map 7-4. Snow from areas other than the area draining to ASCA-Z can not be stockpiled in the ASCA-Z stockpile location because, the design does not consider treatment for runoff from snow beyond the alternate sediment control area. Snow from adjacent areas are therefore not approved to be stockpiled in ASCA-Z. Additionally, care should be conducted when grading the road crest at ASCA-Z to ensure the road drainage, not included in the design, does not enter the ASCA.

Siltation structures.

The siltation structures are sedimentation ponds. See the following discussion.

Sedimentation ponds.

Spillways

Two sedimentation ponds in series will be constructed at this site. The upper pond has an open channel spillway and will be constructed with a minimum 1.5 foot depth. The lower pond has two drop inlet spillways that will discharge to the bypass culvert, the primary spillway has a riser with an oil skimmer. The lower pond is designed with an emergency spillway and a primary spillway that will pass the 25-year, 6-hour storm event. Two feet of freeboard are designed between the emergency spillway (6938 ft) and embankment crest (1640). One foot of head is designed between the primary spillway 6937 ft and the emergency spillway 6938 ft. The primary spillway will carry the peak flow with 0.85 ft of head over the pipe. The plan meets minimum regulatory requirements.

The pond will be constructed with a walkway attached to the primary spillway (section 733.130) to allow for sampling discharged pond water.

Decant

Decanting the pond will be conducted by removal with a portable pump containing an inverted inlet and having a 100 gpm pumping capacity (Appendix 7-4 and section R645-301-742). The plan meets minimum regulatory requirements.

Pond Capacity

This pond is designed so the maximum extent the water can be impounded above the upstream toe is 16.5 ft (to the top of the primary spillway) in cell B. The pond contains less than 20 acre feet. Therefore the pond does not require MSHA approval.

The sedimentation pond design capacity is 7.67 acre feet at the pond spillway. The estimated run off volume 7.05 acre feet for a 10 year 24 hour event was determined but has some minor errors. First, a small addition error was noted in Table 4 regarding the runoff volume to the sedimentation pond. Second, runoff from the downstream portions from ASCA X and Y and adjacent watershed areas are not calculated in the pond and drainage designs. ASCA X and ASCA Y are shown in the plan with two construction options the second option reduces the mineyard area and if, implemented eliminates the error at ASCA X and ASCA Y. The excess pond volume and, the disturbed area which is delineated as extending beyond the proposed cut slopes, should provide a buffer and result in adequate pond capacity.

Pond areas used to determine the Pond Volume Curve were not verified. It is assumed the pond areas presented by the applicant in the pond volume curve are accurate. Sedimentation markers will be provided in both cells. The calculation for sediment yield appears to be estimated using a metric ton rather than a U.S. ton. The maximum sediment volume therefore, is slightly less than a 3 year estimate. The applicant has committed to clean out the pond at the 60% cleanout level and meets minimum requirements for sediment storage. The annual report survey will also track accumulations in the ponds.

Other treatment facilities.

No other treatment facilities are proposed for this site.

Exemptions for siltation structures.

No exemptions for siltation structures were requested or granted with this application.

Discharge structures.

Designs for the spillways in the upper cell is shown to be adequate to pass the 25-year, 6-hour peak flow. The peak flow from 10-year, 24-hour event should be passed to the lower ponds because the total pond volume is to contain the 10-year, 24-hour event. According to the calculations provided the spillway can pass the 10-year, 24-hour event at the 1 foot stage elevation.

Impoundments.

All impoundments are sedimentation ponds. See the discussion above.

Casing and sealing wells.

Sealing of the ground-water monitoring well and any future wells will comply with R645-301-748 (page 7-38). Upon completion of activities, the wells will be permanently sealed to prevent acid or toxic drainage from entering ground or surface water, to minimize disturbance to the hydrologic balance and to ensure safety when no longer utilized. Permanent closure of monitoring well DH 86-2 will be in accordance with the requirements of "Administrative Rules for Water Well Drillers", July 15, 1987, State of Utah, Division of Water Rights. The well abandonment plan is on page 7-28. Any future water or monitoring wells will be abandoned in a similar manner (page 7-45).

Findings:

Hydrologic operation information provided in the PAP is considered adequate to meet the requirements of this section.

SUPPORT FACILITIES AND UTILITY INSTALLATIONS

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

Analyses:

All maps within the PAP show the incoming power line which will be owned and maintained by Utah Power and Light Company having a capacity of 46 KVA. Approximately 1200 feet of this line with its associated support structures will run inside the West Ridge Mine disturbed area perimeter. Upon reclamation of the site, the removal of the support structures and transmission line to the disturbed area perimeter will be accomplished as part of SMCRA's reclamation requirements.

The PAP addresses an agreement with Utah Power and Light which would allow West Ridge Resources the right to reclaim that portion of the Utah Power and Light transmission line which is within the West Ridge Mine disturbed area. Appendix 5-5, Attachment 3, consists of a letter from the utility to the applicant giving them the right to reclaim the power line down to the disturbed area perimeter. This will allow the recovery of the imported fill and the return of the drainage to its pre-mining configuration.

Findings:

The plan meets the minimum regulatory requirements for this section.

SIGNS AND MARKERS

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

Analyses:

Section 521.200 adequately addresses the specification requirements which must be met with regard to the signs and markers which must be posted at a permitted site. This minimum regulatory requirement has been met.

R645-301-521.260, Buffer Zone Markers, commits to placing a stream buffer zone marker in the right fork of the "C" Canyon drainage above the Mine yard disturbance. This meets the minimum regulatory requirements of R645-301-521.261.

Findings:

The plan meets the minimum regulatory requirements for this section.

USE OF EXPLOSIVES

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

Analyses:

R645-301-524.100, Blaster Certification, commits to using an individual having either initial surface blaster certification or recertification training to conduct all surface blasts incidental to underground mining.

R645-301-524.800, Compliance with Utah and Federal Explosive Use Laws and Regulations, commits to complying with all Utah and Federal laws and regulations concerning the use and storage of explosives.

Findings:

The plan meets the minimum regulatory requirements for this section.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

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

Analyses:

Affected Area Subsidence Maps

Map 5-7, Subsidence Map shows possible subsidence areas and also identifies subsidence monitoring stations (photogrammetric control points).

Affected Area Maps

The boundary of areas to be affected by mining is identified on numerous maps in the application. e.g. Map 5-5, Surface Facilities Map and Map 7-2, Mine Site Drainage Map.

Mining Facilities Maps

Map 5-5, Surface Facilities Map shows the surface area to be disturbed and the facilities that are to be installed for the mining operation.

Mine Workings Maps

The development of the West Ridge Mine will come within 350 feet of the #4 slope of the abandoned Sunnyside #1 Mine; development entries of certain panels will intercept and cross certain old workings of the same Mine. Although it is extremely doubtful that the water levels within the abandoned area have risen to the upper levels, these same works are more than likely filled with oxygen deficient atmosphere. As gate entries and bleeders are developed down dip, the necessity of accurate surveys will become paramount in

order to prevent unanticipated flooding. The possibility of intercepting large volumes of mine water through faults in the coal seam is obvious.

Sunnyside Coal Company closed in 1994 due to economic reasons; it is felt that sufficient Mine maps still exist which will accurately reflect the extent of the underground workings. It is hoped that the applicant will utilize these maps to avoid mine emergencies.

Monitoring and Sampling Location Maps.

Elevations and locations of monitoring stations to be used to gather operational data on water quality and quantity are shown on Map 7-7.

Certification Requirements

Cross sections, maps, and plans have been certified by a registered professional engineer.

Findings:

Maps, plans, and cross sections of operations information provided in the PAP are considered adequate to meet the requirements of this section.

CESSATION OF OPERATIONS

Regulatory Reference: 30 CFR Sec. 817.131, 817.132; R645-301-515, -301-545.

Analyses:

West Ridge Resources, Inc., has provided in section 515.300, the necessary commitment to notify the Division of any intent to cease or abandon mine operations for any period extending beyond 30 days. They commit to providing, a statement of the exact number of surface acres and the horizontal and vertical extent of subsurface strata which have been in the permit area prior to cessation or abandonment, the extent and kind of reclamation of surface area which will have been accomplished, and identification of the backfilling, regrading, revegetation, environmental monitoring, underground opening closures and water treatment activities that will continue during the temporary cessation.

Findings:

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

RECLAMATION PLAN

LAND USE RECLAMATION PLAN

Regulatory Reference: R645-301-412

Analysis:

The applicant proposes no changes to the existing land uses. The application includes copies of comments from the Bureau of Land Management and the School and Institutional Trust Lands Administration supporting the proposed and current land uses.

Carbon County requires that the access road be left following mining, including that portion in the proposed permit area. In a letter dated August 14, 1998, the Bureau of Land Management said it acknowledges the road will be retained and finds this acceptable.

Findings:

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

APPROXIMATE ORIGINAL CONTOUR RESTORATION

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

Analysis:

Disturbed areas will be graded to achieve approximate original contour, and no variance from the requirements to restore approximate original contour is requested. The applicant does not intend to grade parts of the proposed disturbed area during construction but will simply place fill on them. Reclamation cross sections show only slight variations from original contour in a few areas.

Most slopes will be 2h:1v or less steep, but some areas near the highwall will be as steep as 1h:1v. Appendix 5-4 contains slope stability analyses for these areas. These are very steep slopes that would not normally be considered compatible with a postmining land use of grazing. However, since the existing slopes are similarly steep, the application is considered to meet regulatory requirements.

Findings:

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

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, -302-232, 302-233.

Analysis:

The backfilling and grading plan for final reclamation is located in Part II of Appendix 5.5. The summary of the backfilling and grading is as follows:

a. Remove Surface Structures
b. Remove Pad Cap Layer
c. Remove Excess Pad Fill
d. Remove Remaining Pad Fill; Backfill All Cutslopes
e. Reclaim Portal Highwall
f. Reapply Topsoil to Backfilled Cutslopes
g. Re-expose and Revitalize the Left-in-Place Topsoil
h. Re-establish the Original Rubbleland Surface

Remove Surface Structures

All coal handling facilities, buildings and ancillary structures will be hauled offsite. Materials which cannot be salvaged or recycled will be disposed of in an approved solid waste land fill.

Remove Pad Cap Layer

The Applicant and the Division assume that the top 6 inches of material in the disturbed area will become contaminated. The volume of contaminated material is estimated to be 3,722 cubic yards. During reclamation the material will be sent to ECDC to final disposal.

Remove Excess Pad Fill

During initial construction of the pad area some imported fill will be shipped onsite. Most of the material will be shipped offsite during final reclamation. The Division has approved the disposal of the excess fill material either by placing it underground or in a commercial borrow pit. The Applicant has approved from the landowner to ship the excess fill material back to the original borrow pit. The Division will calculate the reclamation bond on the assumption that the material will be shipped to a borrow pit or recycling.

The Applicant also has the option of disposing of excess fill underground. The coal rules do not specially address disposal of excess fill underground. However the coal rules do address disposal of coal mine waste underground (R634-301-536.520). Those rules require that the Applicant has MSHA approval. In the PAP the Applicant commits to compliance with MSHA regulations during that operation. Therefore, the Division approved the Applicant plan to dispose of excess fill underground.

Remove Remaining Pad Fill; Backfill All Cutslopes

The Applicant will restore the cut areas to the approximate original contours. All slopes will have a safety factor of at least 1.3. Since some reclaimed areas will have, steep slope topsoil may have to be placed concurrently with backfilling and grading.

Special consider will be given to disposal of the designated portal face-up material. This material was generated during initial construction when the portal highwall area was being excavated. Weathered and/or burned coal material from the outcrop coal seam was removed and stored in the mine pad fill in a non-structural area above the shop/warehouse facilities. During reclamation this portal face-up material will be uncovered and hauled back to the portal area. This material will be placed within the portals and/or adjacent to the portal highwall and then covered with at least four feet of backfill.

The backfilling and grading plan will meet the requirements of R645-301-553 that require the reclaimed area to achieve approximate original contour requirements and have a safety factor of 1.3.

Reclaim Portal Highwall

Special backfilling techniques will be applied at the portal highwall area, and also at the conveyor nose cut. Of the entire mine site, these are the areas that involve the steepest slope cuts. The pre-existing, pre-mining slopes in these areas are as much as 40° (i.e., nearly 1H:1V). During reclamation the portal area will be reclaimed to the approximate original contour. The highwall will be completely eliminated.

Reclamation of the highwall will be done by utilizing large boulders. Large angular boulders will be stacked one on top of another along the outer edge of the portal bench alone the toe of the slope. Fill slopes reinforced with large boulders in this manner can easily stand at the requisite 40° incline needed to reestablish the natural slope. The reclaimed slopes will be similar to existing slopes in the area appear to be stable over a long time.

The reclamation plan for the highwalls meets the requirements of R645-301-522 because the approximate original contours requirement will be achieved, the highwalls will be completely eliminated and the slopes will be stable.

Reapply Topsoil to Backfilled Cutslopes

Topsoil will be placed in the areas that were backfilled and regraded. The topsoil depth will vary from 12" to 18". The surface will be roughed with gouges consisting of imprinting the surface with a pattern of depressions measuring approximately 24" wide, 36" long and 18" deep. The purpose of these pocks is to capture and retain water and provide a cradle for seedlings. The backfilling and grading regulations in R645-301-553 do not have specific requirements for topsoil placement.

Re-expose and Revitalize the Left-in-Place Topsoil

Removal of the fill to re-expose the underlying original surface will result in the establishment of appropriate original contours in fill areas. Those areas will be reclaimed to the original contours and will have stable slopes.

Re-establish the Original Rubbleland Surface

Removal of the fill to re-expose the underlying original surface will result in the establishment of appropriate original contours in fill areas. Those areas will be reclaimed to the original contours and will have stable slopes.

Findings:

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

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.

Analyses:

The Applicant committed to seal all portals according to MSHA and Division standards when mining permanently cess. During periods of temporary cessation the Applicant committed to secure the portals with gates and place signs warning the public of the dangers

The Applicant also commits to seal all other underground openings (monitoring wells) when no longer needed. The Division finds that the plans for temporary and permanent closure of all underground openings is adequate to protect the public and the environment.

Findings:

The Applicant met the minimum requirements of this section.

TOPSOIL AND SUBSOIL

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

Analysis:

Chapter 2, Soils, Sections R645-301-240 through -244, discusses the soil's reclamation plan for the proposed West Ridge Mine. The Analysis section discusses reclamation information as follows:

- Soil Redistribution
- Soil Nutrients and Amendments
- Soil Stabilization

Soil Redistribution

Reclamation sequence is shown on Map 5-12 and the sequence detail is explained in Appendix 5-5, Part II, for both cut slopes and buried soils. Section 2 gives a summary of the various area-types within the mine site and include (1) Channel or Slope, (2) Topsoil or Rock, and (3) Fill or Cut. Key reclamation tasks are summarized in Section 3 and detailed in Section 4 as follows:

4a) Remove Surface Structures
4b) Remove Pad Cap Layer
4c) Remove Excess Pad Fill
4d) Remove Remaining Pad Fill; Backfill All Cut Slopes
4e) Reclaim Portal Highwall
4f) Reapply Topsoil to Backfilled Cut Slopes
4g) Re-expose and Revitalize the Left-in-Place Topsoil
4h) Re-establish the Original Rubbleland Surface
4i) Sediment Control
4j) Vegetate the Newly Re-established Slopes
4k) Remove the Bypass Culvert/Re-establish the Original Stream Channel

The sequence for removing the pad fill areas and reclaiming the adjacent cut slope areas will be accomplished in reverse order from the construction sequence. The uppermost part of the fill (excess, imported fill) will be removed first hauled into the mine for underground disposal. The remaining native fill materials (primary native fills) located in the lower, deeper pad levels will be used to backfill the adjacent cut slopes to reach approximate original contour (AOC). Fill material will be inspected and tested to insure that it is free of salts, oil, petroleum products and any other contaminants before being used as backfill in the cut areas.

Co-mingling of native and imported fills will occur to a limited extent. Imported fill quality will be assured by previous testing . However, imported fills from the Himonas pit may contain elevated salts and are therefore not of equal quality to the native soils and fills. To diminish any negative environmental impacts to native soils and fills from salt contamination, the following efforts will be made to minimize co-mingling of the imported fills with native fills and soils:

- Imported fills will be tested to ensure compliance with DOGM guidelines.

- The interface boundary between the imported and native materials will be clearly marked during construction using flagging on an 8 foot grid. This marker boundary will serve as a visual reference for equipment operators and will make it easier to minimize co-mingling during final reclamation and removal of the imported fills.

- After imported fill has been removed, the top layer of native fill will be reclaimed first and placed as backfill in the deepest parts of the adjacent cutslopes. This upper layer of native fill is most likely to be co-mingled and impacted by imported fills. By being buried in the deepest parts of the cutslope, the potential effects of elevated salts will be negated for the purposes of final reclamation and revegetation.

Colluvial Growth Material (CGM) will be used to backfill and soil the cut slopes in the truck loop and coal storage areas.

Buried pad-fill boulders will be retrieved and placed back on the backfilled cut slopes.

Segregated stockpiled topsoil (Brycan and Midfork) will be retrieved and re-applied to their respective areas. Midfork soils will be replaced on the north facing slopes; Brycan soils will be replaced in the flatter, open confluence area. Replacement depth is 12 to 18 inches. After topsoil replacement, the soil surface will be roughened, gouged, mulched and revegetated.

Soil Nutrients and Amendments

Topsoil will be sampled and tested as they are redistributed and re-exposed. Fertilizer needs will be assessed based on analyses for soil nutrients. Nutrients and other amendments can be added by hydroseeding, by broadcasting or by other conventional methods.

Soil Stabilization

After AOC is met for each cut area, the surface will be prepared according to the roughen, vegetate and mulch method (R-V-M). Gouging will be the primary method used to roughen the surface and consists of imprinting the surface with a pattern of depressions measuring approximately 18" x 24" x 8" deep. The purpose of the pocks, or gouges, is to capture and retain water, reduce erosion and provide a cradle for seedling germination and development. Soils on steep slopes need to be protected from erosion prior to vegetation establishment. Soil erosion methods in addition to gouging will include best technology currently available at the time of reclamation (e.g., SOIL LOC®, Tackifier, etc.). Vegetation will be the primary source for erosion control and surface stabilization. Revegetation efforts will include regrading, topsoiling, fertilizing, mulching and seeding.

Reclamation Sequence Summary

Map 5-12, Reclamation Sequence, illustrates the different stages of reclamation for the West Ridge Mine site. Steps 1 through 5 show reclamation steps prior removing geotextile and reclaiming the original soil surface. Step 1 is removing cap layer and surface structures; Step 2 is removing excess imported pad fills; Step 3 is removing remaining native pad fill and backfilling cutslopes; Step 4 is replacing topsoil on re-established slopes; and Step 5 is relocating boulders on re-established slopes and preparing soiled surface for revegetation. Steps 6 through 7 show removal of geotextile, soil restoration steps and revegetation; Step 8 shows final culvert removal and restoration of Channel, which includes geotextile removal and re-exposure of the original soil surfaces while maintaining the geomorphology of the stream channel.

Findings:

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

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

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

Analysis:

The C Canyon County road will be retained as part of the postmining land use. The road will terminate at a public turnaround and will serve as permanent access to public lands in the area.. All other roads built by the mine will be removed and the area reclaimed according to the approved reclamation plan. The twin wheel jeep trail on top of West Ridge is an insignificant feature that will remain until nature reclaims same.

Findings:

Information provided in the application is considered adequate to meet the 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:

The surface water and groundwater monitoring plans designate two stream monitoring sites on Grassy Trail Creek, seven springs (five in the Colton Formation and two in the North Horn Formation), and one well on the disturbed area site. The monitoring parameters and frequency are described and include the appropriate measurements. Included is the commitment to monitor these points "through reclamation until bond release."

Ground-water monitoring.

The operational monitoring program will continue through reclamation until bond release (Table 7-1). In order to comply with UDOGM directive Tech-004, baseline samples will be collected from each spring in the monitoring program during the low flow (fall) sampling beginning with the first mid-term review. This will be repeated every five years until reclamation is complete (p. 7-20).

Final abandonment of water monitoring well DH 86-2 (at the mine site) will be conducted prior to completion of final reclamation (page 7-28).

Surface-water monitoring.

The operational monitoring schedule will continue through reclamation until bond release (Table 7-1). In order to comply with UDOGM directive Tech-004, baseline samples will be collected from each stream monitoring site during low flow beginning with the first mid-term review. This will be repeated every five years until reclamation is complete (p. 7-20).

Acid and toxic-forming materials.

The determination of the PHC has not indicated that adverse impacts may occur to the hydrologic balance on or off the proposed permit area, or that acid-forming or toxic-forming material is present that may result in the contamination of ground-water or surface-water supplies. As a result there is no requirement for supplemental information.

No acid-forming materials or any toxic-forming materials have been identified or are suspected to exist in materials to be disturbed by mining (p. 7-10).

A major consideration in this project is that fill material brought in to construct the mine site pad will be tested and determined to be free of acid- and toxic-forming material. With the above considerations having been addressed, reclamation can be expected to be achieved with minimal concern for acid- and toxic-forming materials becoming a hydrologic problem.

Transfer of wells.

All water wells utilized during the operating phase will be abandoned in accordance with the rules outlined in "Administrative Rules For Water Well Drillers, State of Utah, Division of Water Rights, 1987". Closure of the wells will be conducted by a licensed well driller. The procedure is outlined on page 7-28. Any future water or monitoring wells will be abandoned in a similar manner (page 7-45).

Discharges into an underground mine.

No discharge into the underground mine is anticipated (page 7-29).

Gravity discharges from underground mines.

Surface entries and accesses to underground workings will be located and managed to prevent or control gravity discharge from the mine. All workings will dip away (downdip) from the portals. It is anticipated that the mine will be relatively dry but in the event that discharge becomes necessary, discharge will comply with the performance standards of the regulations and requirements of the UPDES permit before being discharged off the permit area (page 7-29).

Water quality standards and effluent limitations.

Water quality sampling and analyses have been and will be conducted according to the "Standard Methods for the Examination of Water and Wastewater" or EPA methods listed in 40 CFR Parts 136 and 434. Laboratory reporting sheets in Appendices 7-2 and 7-3 indicate the specific method that have used for each parameter.

The UPDES monitoring point on the lower sediment pond will be monitored until the pond is removed during reclamation. At that time the point discharge associated with water quality standards and effluent discharge will cease to exist and the only monitoring will be that associated with the surface water monitoring plan.

The surface water monitoring plan includes monitoring stations on the west slope of West Ridge and includes monitoring stations above and below the disturbed area. The plan covers sampling methods and parameters as discussed in the Operations Section of this Technical Analysis. The monitoring will continue through reclamation to bond release.

Diversions.

Upon reclamation of the site, the bypass culvert diversion is removed and the channel is restored to approximate original contour. The reclamation channels are appropriately designed for the 100-year, 6-hour storm and are appropriate for adequate reclamation. Considerable effort has been devoted to developing a Construction/Reclamation Plan, Appendix 5-5. This includes stream channel reclamation. The overall plan is discussed in the Sediment Controls Measures section below.

On pages 5-48 and 7-36 a commitment is made to construct a turnaround at the end of the county road during reclamation. The Mine Site Reclamation Map, M 5-9 shows this turnaround. The county road and road turnaround will be the only structures left after reclamation of the site.

Stream buffer zones.

As with the construction phase of this project, the reclamation phase will involve construction activities within 100 feet of the ephemeral stream. In fact, the very stream bed will be filled in to create the

mine site pads. The Division has authorized these activities in issuing the mining permit. During the reclamation phase, stream buffer zones will not be appropriate as the stream itself is being restored. As such, stream buffer zones do not apply during reclamation.

Sediment control measures.

The reclamation plan provides considerable details regarding the construction/reclamation sequence and methods. These are explained in Appendix 5-5, Construction/Reclamation Plan and on Map 5-11, Construction Sequence, Map 5-12, Reclamation Sequence, Map 5-9, Mine Site Reclamation, and Map 5-10, Construction/Reclamation Area-Types.

During reclamation the primary sediment control mechanism is the roughening and pocking of the site to prepare the soil for amendments and seeding. There is also a mixing of mulch into the soil. Also reference App. 7-4, page 59. The pocking will be about two feet by three feet by 18 inches deep. This method of sediment control and reclamation of a minesite disturbed area has been used successfully at several mine sites in the state and is expected to work at Westridge. Gradual filling of the pocking occurs while vegetation is reestablished.

Calculations are included in Appendix 7-4, page 59, showing a comparison of the total sediment loads in the Reclaimed State as compared to the Undisturbed State anticipated at the site. These show that the yield of the Reclaimed State would be about one-half that of the Undisturbed State. Sediment loads of 0.0013 tons/year compared to 0.0027 tons/year. This seems somewhat optimistic, based on the parameters selected for use in the USLE equation. However, the point is made that the sediment load will be less with the proposed roughening method than the canyon in its natural state.

In order to minimize sediment inflow to the stream, the reclamation plan uses silt fences along the slope contours, roughly parallel to the stream. These are used on both sides of the ephemeral streams and are staggered to prevent rill formation. Fences are located in areas of longest and steepest slopes. The plan commits to clean out the fences when they reach midpoint of the fence. Map 5-9, Mine Site Reclamation shows the locations of the fences.

Table 5-1, Reclamation Timetable indicates one week between "recontouring & reestablish fill slopes" and "reseed/mulch/revegetate" which is the time period during which top soils are spread and left open to rainfall before they are seeded and protected from erosion. This an appropriate time lapse. The other elements on the timetable appear appropriately timed. The reclamation operation is an ongoing process starting at the top of the canyon and proceeding down the canyon to the lowest point. This will keep from working over reclaimed areas.

During reclamation of the largest part of the disturbed area, the lowest cell of the sediment ponds complex will be left in place providing sediment control at the downstream end of the site. This should protect the entire site to the greatest extent possible. When the culvert is removed, the sediment pond is of no use and there are to be three silt fences installed in the stream at the lowest elevation at the lower end of the site to control sediment from getting off the site. See the Sedimentation Ponds section below for details of the ponds removal.

These methods appear adequate to achieve a successful reclamation with minimal sediment problems. The fact that this is an ephemeral stream makes the risk low also.

Siltation structures.

The only siltation structures in the project are the two sediment ponds in series. Their operation and reclamation is discussed under Sedimentation Ponds.

Sedimentation ponds.

Reference Appendix 5-5, Construction/Reclamation Plan. Primary sediment control during reclamation will be the sediment ponds located at the lower end of the site. The ponds will be left in place during the largest part of site reclamation until the very final stages of the process. As the ponds are removed this will be done from the upper cell to the lower cell. The lower cell will be left until the last part, that is, culvert removal. During removal of the last sediment pond and the area below it, temporary sediment control will be provided by silt fences across the downstream end of the disturbed area. These will provide a last line of sediment control during culvert and lowest sediment pond removal. The sediment ponds will be completely removed at the end of reclamation. These methods appear adequate to achieve a successful reclamation with minimal sediment problems. The fact that this is an ephemeral stream makes the risk low also.

Other treatment facilities.

There are no other treatment facilities in this project.

Exemptions for siltation structures.

The office pad below the lowest sediment pond is the only alternate sediment control area during reclamation. It will be removed similar to the other mine site pads with sediment control being provided by silt fences downstream of the toe area. In addition there will be substantial silt fences across the canyon stream at the lowest end of the site.

Discharge structures.

During the Operation Phase, stream protection at the outlet of the main canyon bypass culvert will be a riprap energy dissipator which will slow the exit velocity of the water leaving the culvert. Appendix 7-4, pg.11, details the design which shows water leaving the dissipator to be about half that of the natural velocity of water in the channel for the same flow volume. The design is based on the appropriate 100-year, 6-hour event and appears to be adequate for the intended purposes.

At reclamation the entire site bypass culvert is removed, including the energy dissipating riprap at the outlet. The channel is regraded to approximate original contour and no discharge structures are left.

Impoundments.

The only impoundments in the project are the two sediment ponds in series. Their operation and reclamation is discussed under Sedimentation Ponds.

Casing and sealing of wells.

Sealing of wells will comply with R645-301-748 (page 7-38). Upon completion of activities, wells will be permanently sealed to prevent acid or toxic drainage from entering ground or surface water, to minimize disturbance to the hydrologic balance and to ensure safety when no longer utilized (p. 7-45). Permanent closure of monitoring well DH 86-2 will be in accordance with the requirements of

"Administrative Rules for Water Well Drillers", July 15, 1987, State of Utah, Division of Water Rights (p. 7-48). Well abandonment plans are on pages 7-28 and 7-48.

Findings:

Hydrologic reclamation information provided in the PAP is considered adequate to meet the requirements of this section.

REVEGETATION

Regulatory Reference: R645-301-341

Analysis:

Revegetation Plan

The revegetation plan is primarily in Section R645-301-341. Three revegetation scenarios are shown, one for areas where topsoil would be salvaged and redistributed, one for areas with topsoil that is covered with a geotextile, and one for rock/rubbleland areas. In the rock/rubbleland areas, there are a few areas where topsoil would be salvaged and later replaced.

Once the site is prepared by grading and replacing topsoil, removing fill (rock/rubbleland), or removing fill and the geotextile (experimental practice area), the same revegetation techniques will be used for the entire area. This sequence is:

1. A weed-free alfalfa hay mulch would be applied at the rate of 2000 pounds per acre, and fertilizer would be added if deemed necessary.

2. The surface will be gouged. In this process, the alfalfa and fertilizer will be mixed into the soil and the soil will be roughened.

3. The seed mix will be broadcast seeded or hydroseeded.

4. The area will be mulched with 2000 pounds per acre of straw, and a wood fiber mulch and tackifier will be applied.

Seeding will be done as soon after regrading as possible but prior to the end of October. According to the timetable in Table 5-1, some seeding could occur as early as June. Seeding this early should be avoided as much as possible, but it is more important to seed before the soil has a chance to crust than to wait until later in the year. As experience is gained at other nearby mine sites, it may become necessary to change the seeding schedule.

The applicant has committed to place large rocks on regraded areas to increase landscape diversity. In addition to making the site look more natural, these will serve as wildlife habitat and provide a greater diversity of sites for different plant species. They create localized areas of concentrated runoff and cooler temperatures where species can become established that would not survive if the site was uniform.

The seed mixes to be used in final reclamation are in Tables 3-2A, B, C, and D. No introduced species are included in these mixtures, and winterfat has been added at the suggestion of the Division of Wildlife Resources.

The applicant has included several species encountered in vegetation sampling that should increase vegetation diversity of the revegetated areas. Seed of all these species is available commercially, but some must be hand-collected.

The applicant has collected seed of canyon sweetvetch and will plant most of this seed on the topsoil pile(s) for the purpose of propagating seed that can be used for final reclamation. Some seed will not be planted in case the initial revegetation efforts fail. Canyon sweetvetch grows well on disturbed sites, and it should grow well in reclaimed areas.

Douglas fir would be planted in Douglas fir/Rocky Mountain juniper areas both from seed and transplants. Since Douglas fir is a common tree grown for timber, it is likely that plants inoculated with ectomycorrhizae are available commercially, and the applicant has committed to attempt to use inoculated plants.

Studies have documented that populations of microorganisms in stockpiled soil decrease with time and depth in the stockpile. At the West Ridge Mine, soil that is stockpiled or under fill is likely to have very few living microorganisms when the mine is reclaimed. In addition, cover from cryptogams, including liverworts, mosses, lichens, and cyanobacteria, will be destroyed.

Most perennial plants form symbiotic relationships with various species of fungi that allow the plants to take up more water and nutrients from the soil. This allows them to better compete with non-mycorrhizal species, especially weeds. Moreover, there is evidence that cryptogams decrease soil erosion and increase the amounts of some nutrients in the soil.

Cryptogams have not traditionally been considered "vegetation" that is required for bond release; however, they may be important for other reasons. Soil inoculation to try to establish cryptogams and vesicular arbuscular mycorrhizae has been tried in a few areas, but there has been little work on coal mines in Utah. Because the efficacy of inoculation is not known, the applicant has not proposed it as a technique to be used in final reclamation but has proposed to use a commercially available soil activator in the test plots. Test plot results will be used to modify the mining and reclamation plan. If the soil activation or other techniques used in the test plots are not as successful as needed, it would be possible to attempt to culture microorganisms in a greenhouse. The Division is unaware of instances were this has been tried on a large scale, so this method is not being required at this time.

The applicant does not intend to irrigate but, instead, will use water harvesting methods. Irrigation should not be necessary at this site.

Pesticides will only be used if a problem is identified and spraying is deemed necessary to control damage to reclamation. The area does not have heavy infestations of noxious weeds, so it is not anticipated herbicides will be needed. The use of other pesticides would depend on what problems are encountered, but none are foreseen.

In Sections 341.300 and 342.100, the application indicates native species have become reestablished in disturbed areas without seed or mulch application or surface preparation. While the Division does not know precisely what reclamation efforts have been undertaken in this area, there are stands of introduced

grasses that have the appearance of having been seeded. Nearby sites with less precipitation, such as Horse Canyon, have had good revegetation success.

The mine site poses certain challenges for reclamation, but considering the soils, climate, the revegetation plan, and other factors, the Division considers the probability of reclamation success to be high. The application includes revegetation techniques that have been tried and proven successful at area mines with similar conditions.

When reclamation begins in the experimental practice area, it is expected that soil will be compacted and essentially devoid of microbial activity. Adding alfalfa hay and gouging should adequately alleviate the compaction.

The proposed disturbed area is relatively narrow with sources of soil organisms that could colonize the nearby disturbed area. Division representatives have seen cryptogamic soil crusts beginning to form in a topsoil borrow area not far from the proposed West Ridge Mine after only eight years. Therefore, it is expected that inoculation will occur naturally. However, the applicant has committed to modify the plan to include a soil activation or inoculation method in the reclamation plan if the test plot results indicate it is needed. Considering these factors, it appears likely microorganisms will be reestablished quickly and that vascular plants can then benefit from them.

Revegetation Success Standards

As discussed in the vegetation information section, there are few differences between the reference areas and the proposed disturbed areas. Using untransformed data, the only significant difference where the proposed reference area has less cover than the proposed disturbed area is in the Rocky Mountain juniper/Douglas fir community. The vegetative cover values were statistically different at 90% but not at 95% confidence. Constructing a 90% confidence interval allows 66.53% cover, and the actual value is 66.00%. However, if one performs a natural logarithm transformation of the data, there is no statistical difference.

Every other aspect of the proposed reference and disturbed areas in the Rocky Mountain juniper/Douglas fir community is the same or very similar, including species composition, aspect, slope, soils, productivity, and range condition. Because of the many similarities, the Division feels the proposed reference area is an acceptable standard.

The Douglas fir/maple reference area is shown on Map 3-1, and quantitative information is included in Appendix 3-1A. Woody plant density and vegetative cover are not statistically different in the proposed reference and disturbed areas; however, the proposed reference area appears to have greater diversity. While achieving this standard may present difficulties, it should be possible to attain the standard using the reclamation plan the applicant has proposed.

The sage/grass and pinyon/juniper proposed disturbed and reference areas are, for the most part, very similar. As discussed in the Vegetation Resource Information section of this review, the proposed pinyon/juniper reference area has greater cover than the proposed disturbed pinyon/juniper community in the potential borrow area; however, because the standard is higher than what currently exists at the site, the application is more stringent than the regulations.

Diversity will be measured using MacArthur's diversity index. The application gives a brief discussion of this index, and it is an acceptable means of measuring diversity. The standard would be that the index for disturbed areas would need to be at least 90% of the index for the reclaimed area. This is a

satisfactory standard, but at the time of final reclamation, the Division and the applicant may find it difficult to achieve and too inflexible. If the applicant is unable to meet this standard during final reclamation, the Division should examine current rules and decide if a different standard would be more applicable based on both current conditions at the time and the baseline information.

Erosion control would be judged using the "Erosion Condition Classification System" originally developed by the Bureau of Land Management and modified by the Office of Surface Mining. Reclamation would be considered successful if soil surface factor values were the same as or lower in the reclaimed areas as in adjacent undisturbed areas.

With the exception of one succulent and one stonecrop species, it appears all species encountered in vegetation sampling are cool season. The two CAM species are relatively insignificant and are not desirable; therefore, the only standard needed for seasonality is that all plants would be cool season. This should be easy to achieve since the warm season plants are normally more difficult to establish.

For areas with a postmining land use of wildlife habitat, the Division is required to consult with State wildlife agencies and gain approval for tree and shrub establishment success standards. The Division has consulted with the Division of Wildlife Resources and developed standards, and these have been included in the application. The standards are based primarily on existing conditions and take into account the species that contribute to the woody plant densities in the various areas. In the sagebrush/grass area, the numbers of woody plants in both the proposed disturbed and reference areas are considered excessive, so the standard is lower than the number currently existing at the site. The established standards are included in the application.

Table 3-4 of the application is a revegetation monitoring schedule. Qualitative observations would be done every year after seeding, but quantitative observations would be done only in the years specified. The monitoring schedule is considered adequate.

Field Trials

Section 341.300 has a brief description of the plan for test plots, but a more detailed description is in Appendix 2-6. The test plots will be established in an areas upstream from the topsoil stockpile in the right fork. As in the experimental practice, soil will not be salvaged from the west half of the test plot area. First, geotextile will be placed in the west half of the test plot area with the culvert and fill material placed on top of the geotextile. Next, topsoil will be salvaged from the two different soil types in the east half of the test plot area and placed separately on the fill on the west side of the test plot area. Geotextile will then be placed on the northeast portion of the test plot area (Strych soil) and the culvert extended through this area. Cut material from the southeast portion of the test plot area from which Midfork topsoil had previously been salvaged will be placed on top of the culvert. Finally, the test plot topsoil stockpiles on the west side of the test plot area and the cut and fill on the east half will be seeded with the interim seed mix.

After five years, the test plot area will be reclaimed. First, fill over the culvert in the east side of the area will be placed in the cut in the southeast part of the area (Midfork soil area) and the culvert removed. Next, soil will be replaced in the east half of the area. Fill material and the culvert in the west half of the area will then be removed and the culvert headwall relocated downstream just above the topsoil stockpile. Finally, revegetation treatments will be applied in the same manner as at final reclamation except that a soil activator may be used.

The test plot area will be accessed via the extreme edge of the topsoil stockpile and the adjacent cutslope during late summer or early fall. Any compaction or disturbance to the stockpile surface will be ripped and reseeded following completion of the test plot installation and reclamation of this area.

Monitoring will proceed for five years or until a determination of success has been made and will compare the test plots with each other and with the Douglas fir/maple reference area. If the results show a need to revise the revegetation plan, the applicant will work with the Division to amend the plan and incorporate needed changes.

Table 3-4 shows a monitoring schedule that includes quantitative observations over the five-year period. Using cover measurements, it will be possible to compare vegetation diversity in the different areas.

The methods in the test plot designs closely simulate the construction and reclamation sequence in the application although on a much smaller scale. While the test plots do not include revegetation of rock rubbleland areas, the same principles apply; very similar conditions will prevail in rock rubbleland areas compared to the test plots. Therefore, these test plots will allow the Division to adequately evaluate whether revegetation is likely to be successful in the entire area.

Wildlife Habitat

Plant species in the seed and planting mixtures were selected on the basis of forage nutrition and cover values and adaptability to the environment. While the species in the seed mixtures are not all identical to those currently existing on the site, they are similar and should enhance the value of vegetation for wildlife. Rocks to be used in reclamation will also create wildlife habitat although it will not be to the degree that currently exists on the site.

Appendix 3-6 contains comments from the Division of Wildlife Resources about the application. The comments primarily concern updating basic wildlife information, but there is also a suggestion to add winterfat to the seed mixture. The comments have been addressed, and, based on conversations with Wildlife Resources personnel, it does not appear additional enhancement measures will be needed. Wildlife Resources personnel have indicated they are pleased with the seed mixtures.

The applicant intends to do off-site mitigation in the form of either shrub plantings or installation of a guzzler. According to the application, Wildlife Resources and the BLM are supportive of these options, and the applicant is working with these two agencies on plans for the mitigation. An outline of mitigation measures will need to be included in the application when they are finalized.

Findings:

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

STABILIZATION OF SURFACE AREAS

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

Analyses:

After AOC is met for each cut area, the surface will be prepared according to the roughen, vegetate and mulch method (R-V-M). Gouging will be the primary method used to roughen the surface and consists of imprinting the surface with a pattern of depressions measuring approximately 18" x 24" x 8" deep. The purpose of the pocks, or gouges, is to capture and retain water, reduce erosion and provide a cradle for seedling germination and development. Soils on steep slopes need to be protected from erosion prior to vegetation establishment. Soil erosion methods in addition to gouging will include best technology currently available at the time of reclamation (e.g., SOIL LOC®, Tackifier, etc.). Vegetation will be the primary source for erosion control and surface stabilization. Revegetation efforts will include regrading, topsoiling, fertilizing, mulching and seeding.

Findings:

The information provided meets the regulatory requirements of this section.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: R645-301-526.200, R645-301-541.300

Analysis:

Affected Area Maps

Map 5-9, Mine Site Reclamation identifies the area that will be affected by reclamation treatments upon completion of mining.

Reclamation Backfilling and Grading Maps

The operator has supplied an excellent map which identifies areas to be backfilled and graded and allows the viewer to visualize the quantities involved. This is map 5-10, Construction/Reclamation Area - Types.

Final Surface Configuration AOC Maps

Plate 5-9, Mine Site Reclamation map shows the final surface contours.

Reclamation Surface and Subsurface Manmade Features

The applicant has revised page 5-50 of the PAP (9/9/98), referring to Map 5-9, which shows that portion of the Carbon County road which is within the Mine permit area, and will remain as access for the applied for post mining land use. The twin wheel jeep trail on top of West Ridge is an insignificant feature that will remain until nature reclaims same. The applicant has met the minimum regulatory requirements of 542.320.

At this point, the PAP does not state which, if any, man-made utility features will be left in place within the Mine's permit area; this requirement can be a stipulation of the mid-term or five year permit renewal process as necessary. This map, as required by R645-301-542.320 is not necessary for approval of the PAP. Mid-term reviews and five year permit renewals can require that this map be submitted as the area develops; this will meet the intent of the R645 requirement.

Reclamation monitoring and sampling location maps.

Baseline monitoring will be performed until construction of the mine and mine facilities begins. Once construction is initiated, the operational monitoring schedule will be utilized. Monitoring will continue through reclamation until bond release (Table 7-1). Locations are shown on Map 7-7.

Certification Requirements

Cross sections, maps, and plans have been certified by a registered professional engineer.

Findings:

Maps, plans, and cross sections of reclamation information provided in the PAP are considered adequate to meet the requirements of this section.

BONDING AND INSURANCE REQUIREMENTS

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

Analyses:

Form of bond. (Reclamation Agreement)

The Division can approve the permit before the reclamation bond has been posted or the reclamation agreement signed. However, prior to the Division issuing the permit, the Applicant must post a bond that meets the requirements of R645-301-800.

Determination of bond amount.

Information provided in the plan is adequate to allow the Division to calculate the required bond amount. In February 1999, the Division estimated the cost for the Division to reclaim the West Ridge Mine to be $2,117,000 in 2004 dollars. The Division used the general reclamation plan in the PAP (Section R645-301-540 to R645-301-560) Appendix 5-1 Reclamation Bond Calculations and Appendix 5-5 West Ridge Mine Construction and Reclamation Plan, Means Heavy Construction Cost Data 13th Edit, Blue Book Rental Rates, and the Caterpillar Performance Handbook 29th Edition to calculate the reclamation cost estimate. The Division escalated the reclamation cost to the year 2004.

The Division can approve the PAP without a reclamation bond being posted. However, prior to the permit being issued the Applicant must post the reclamation bond.

Terms and conditions for liability insurance.

A cetificate of insurance showing appropriate coverage has been provided in Appendix 1-1.

Findings:

Information provided in the proposed amendment is considered adequate to meet the requirements of this section. However, prior to permit issuance, the permittee must provide the following in accordance with:

R645-301-800, The Applicant must give the Division a signed reclamation agreement, and post a reclamation bond, no less than $2,117,000 and show proof of insurance.

REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING

EXPERIMENTAL PRACTICES

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:

Chapter 2, Soils, incorporates traditional methods of salvaging/stockpiling and an Experimental Practice method for protecting soils in-place. The **Experimental Practice** is unique by taking a **Reclamation Approach** for topsoil protection.

Operations - Experimental Practices

Appendix 2-6, West Ridge Mine Experimental Practice In-Place Topsoil Protection, details protecting topsoil resources in-place for (1) buried topsoil areas, and (2) buried RO/RL (rock outcrop/rubbleland) Travessilla Complex soil area. These two combined areas account for 16.75 acres of the total 29 acres of disturbed area.

(1) Buried Topsoil Areas

West Ridge Resources is proposing a topsoil protection plan which incorporates **Experimental Practices (R645-302-200) for protecting in-place soil with a layer of geotextile fabric.** The geotextile fabric provides a protective barrier between the existing soils and the imported fill materials used to construct the mine pads. By utilizing this procedure, soils are not only preserved in-place, but the existing stream channel geomorphology and original ground surface configuration are preserved likewise. Approximately 4.75 acres of the proposed 29-acre disturbed area will be affected using the geotextile fabric.

(2) Buried RO/RL Travessilla Complex Areas

The buried RO/RL Travessilla Complex mapping unit will be included in the Experimental Practices. As stated in the Order-III soil survey, the RO/RL Travessilla Complex unit contains 35% soils by volume (25% Travessilla plus 10% other soils) that support a significant vegetation community. Successful reclamation requires the same soil and rock parameters that currently exist to establish revegetation success standards. By preserving these soils in-place underneath the pad fills, successful revegetation should be achieved. Placing the RO/RL Travessilla Complex mapping unit under Experimental Practices will not require the use of geotextile fabric. As stated in the plan, the RO/RL areas will not be covered with geotextile, but instead, fill will be placed directly over the existing ground surface which will be marked with brightly colored marker flagging strips placed on 8-foot centers for the purpose of identifying the original surface during reclamation and excavation of the pad fills. Marker strips will be used on approximately 12 of the 29 acres of the disturbed area.

Construction Sequence

Map 5-11, Construction Sequence, illustrates the different stages of construction for the West Ridge Mine site. Steps 2 and 3 illustrate the Experimental Practice steps for installing geotextile fabric and marker strips. Construction sequence steps are outlined as follows:

- Steps 1 through 4 are preparatory steps prior to topsoil salvage. Step 1 is removing vegetation; Step 2 is installing culvert and culvert backfill while placing geotextile in channel bottom and placing marker strips in RO/RL areas; Step 3 is installing geotextile fabric over topsoil fill slopes, and placing marker strips in RO/RL areas; and Step 4 is pulling boulders from the surface of slopes that will be cut. Topsoil salvage occurs in Step 5. After topsoil salvage has occurred from the topsoil area and RO/RL areas, excavation of the side slopes will occur in Step 6. These excavated native materials will be used as pad fill and will be placed over the backfilled culvert adjacent to the cut slopes. Step 7 shows completion of the pad level by hauling in imported fill from offsite, commercial gravel borrow areas. A final cap layer of road base material is placed over the imported fill surface as shown in Step 8.

Reclamation - Experimental Practices

During fill removal, a 12- to 18-inch deep working layer will be left over the Experimental Practice slopes. Care will be taken not to subexcavate or disturb the geotextile soil surfaces. Equal care will be taken to protect the "ribbon" surfaces in the RO/RL areas. Fill removal from the slopes will be done carefully without disturbing the in-place soils located under the geotextile and marker strips. Fill removal will be done by small earth moving equipment and/or by hand labor if necessary to minimize disturbance of the topsoil. After the pad fill has been removed, the backfilled culvert will serve as the primary access way for machinery and materials associated with the remaining reclamation efforts.

Once the geotextile fabric has been exposed, the fabric will be carefully peeled away from the soil and the condition of the underlying soil materials observed at this time. The soil will be re-exposed in 5-10 foot horizontal zones that can be easily accessed and worked by hand from the adjacent pad fill level.

In RO/RL fill areas, fill will be removed down to the original, undisturbed surface as delineated by the marker strips. Because of the roughness of the ground surface, pad fill be removed to the extent possible.

To relieve soil compaction and increase the ability of the soil to absorb moisture, the re-exposed soil surface will be gouged and hay worked into the soil at the rate of 2,000 pounds per acre. Gouging depressions will approximately measure 24" X 36" X 18" deep and will create a pattern of depressions that help control erosion through water retention, minimize siltation, and allow for air and water penetration into the soil horizon.

Reclamation Sequence

Map 5-12, Reclamation Sequence, illustrates the different stages of reclamation for the West Ridge Mine site. Steps 3 through 8 illustrate all Experimental Practice steps involved with reclamation for removing fill, restoring buried soils and reclaiming the original soil surface. Reclamation sequence steps are outlined as follows:

- Steps 1 through 5 show reclamation steps prior removing geotextile and reclaiming the original soil surface. Step 1 is removing cap layer and surface structures; Step 2 is removing excess imported pad fills; Step 3 is removing remaining native pad fill and backfilling cutslopes; Step 4 is replacing topsoil on re-established slopes; and Step 5 is relocating

boulders on re-established slopes and preparing soiled surface for revegetation. Steps 6 through 7 show removal of geotextile, soil restoration steps and revegetation; Step 8 shows final culvert removal and restoration of Channel, which includes geotextile removal and re-exposure of the original soil surfaces while maintaining the geomorphology of the stream channel.

Field Trials

In order to evaluate the effects of the geotextile and fill over the existing in-place topsoil resources, a test plot study area will be established in the upper right fork northeast of the topsoil stockpile. The purpose for the test plots is to evaluate the Experimental Practice reclamation plan proposed for the mine yard area.

The test plots will be established in an areas upstream from the topsoil stockpile in the right fork. As in the Experimental Practice, soil will not be salvaged from the west half of the test plot area. First, geotextile will be placed in the west half of the test plot area with the culvert and fill material placed on top of the geotextile in the same sequence and manner as used in the mine yard construction. Next, topsoil will be salvaged from the two different soil types in the east half of the test plot area and placed separately on the fill on the west side of the test plot area. Geotextile will then be placed on the northeast portion of the test plot area where soil was stripped (Strych soil) and the culvert extended through this area. Cut material from the southeast portion of the test plot area from which Midfork topsoil had previously been salvaged will be placed on top of the culvert. Finally, the test plot topsoil stockpiles on the west side of the test plot area and the cut and fill on the east half will be seeded with the interim seed mix.

After the test plot area is constructed, the cut/fill area will remain intact for five years to simulate the operation phase of the mine yard. Following the five year period, reclamation will be performed on the test plot area to actually implement and test the final reclamation plan in comparison to conventional reclamation techniques. Appendix 2-6 contains a complete discussion of the Experimental Practice test plot plan.

The resulting four test plots will be grouped into two categories, the "removed topsoil test plot" and the "in-place topsoil test plot". One portion of the test plot area could be treated/inoculated with a commercially available soil activator designed for revitalizing soil in order to evaluate whether inoculating the topsoil promotes faster or more diverse revegetation. Although this is not currently being proposed in the final reclamation plan, it could be used to assist vegetation establishment in the geotextile area at the time of final reclamation.

After the surface treatments have been applied, the plots will be seeded with the final reclamation seed mix. Canyon sweetvetch will also be seeded on the test plots. Because of the small area to be treated (about 0.31 acre), the seed will be broadcast on the surface and raked in by hand. Straw mulch will be applied over the seed bed of the test plot at a rate of 2,000 pounds per acre. Then the surface will be sprayed with a mulch and tackifier.

The test plot area will be accessed via the extreme edge of the topsoil stockpile and the adjacent cutslope during late summer or early fall. Any compaction or disturbance to the stockpile surface will be ripped and reseeded following completion of the test plot installation and reclamation of this area.

Vegetation monitoring will compare the results of plant growth between the Experimental Practice in-place soils to replaced topsoil. Monitoring will compare re-vegetation response for each soil type (Strych and Midfork) for each of the two soil surfaces (channel bottom and hillside). For example, comparisons will be made between in-place soils and replaced soils for the channel bottom soils consisting mainly of Strych; likewise, comparisons will be made for hillside Midfork soils. The experimental test plot area will also be

compared with the reference area for the Douglas Fir/Maple vegetation type. Vegetation will be monitored for five years or until a determination of success has been made for the Experimental Practice. WEST RIDGE Resources will consult closely with the Division regarding the results of the test plot study. Should the results show a need to revise the reclamation plan, WEST RIDGE Resources will work with the Division to amend the plan and incorporate the changes needed to ensure reclamation of the mine yard area will be successful. As a last resort, West Ridge Resources will utilize the soil borrow area for obtaining soils to reclaim the site if the Experimental Practice is determined to be unworkable.

Analysis of the Proposed Experimental Practice

The Utah State soils regulations (R645-301-200) are intended to protect and preserve topsoil resources for the purpose of revegetation, thus providing a stable surface capable of supporting the postmining land use. The proposed Experimental Practice, including operation and reclamation procedures, provides soil resource protection equal to or greater than what would be obtained through traditional methods of salvaging and stockpiling as required in the Utah State soil's regulations. The Division has analyzed the proposed Experimental Practice for preserving topsoil resources in-place with respect and in relation to the State's regulatory obligations, and the applicant has adequately addressed each of these requirements. The following discussion gives an analysis of the proposed Experimental Practice after listing the applicable regulation:

R645-302-214 No application for an experimental practice under R645-302-210 will be approved until the Division first finds in writing and the Office then concurs that:

R645-302-214.100 The experimental practice encourages advances in coal mining and reclamation technology or allows a postmining land use for industrial, commercial, residential, or public use (including recreational facilities) on an experimental basis;

Through the Experimental Practice, the applicant intends to demonstrate that in certain situations, topsoil storage in place provides the same degree of protection for the topsoil materials plus provides a soil bed that promotes faster establishment of vegetative cover and greatly enhances the stability of the reclaimed slopes while providing a very natural looking reclaimed surface. The Division finds that the Experimental Practice encourages advances in coal mining and reclamation technology by providing an opportunity for a demonstration that these goals can be achieved.

The second required finding in this regulation does not apply to the West Ridge proposal.

R645-302-214.200 The experimental practice is potentially more, or at least as, environmentally protective, during and after coal mining and reclamation operations, as would otherwise be required by standards promulgated under R645-301 and R645-302;

The environmental protection standards normally required under R645-301 that are applicable to the Experimental Practice are:

R645-301-232.100 All topsoil will be removed as a separate layer from the area to be disturbed, and segregated.

R645-301-234.200 Stockpiled materials will:

R645-301-234.220. Be protected from contaminants and unnecessary compaction that would interfere with revegetation;

R645-301-234.230. Be protected from wind and water erosion through prompt establishment and maintenance of an effective, quick growing vegetative cover or through other measures approved by the Division; and

R645-301-242 Soil Redistribution

R645-301-243 Soil Nutrients and Amendments. Nutrients and soil amendments will be applied to the initially redistributed material when necessary to establish the vegetative cover.

Under the Experimental Practice, topsoil on a portion of the site will not be salvaged as a separate layer from the area to be disturbed, segregated, and stored for later use. However, it will be protected as required under R645-301-234.200 as follows:

1. **Contamination.** Native soils could be contaminated by imported fill material; however, no imported fill will contact the undisturbed soils. In reclamation, the imported fill will be taken away and the native fill from adjacent slopes will be replaced in the cuts (see Map 5-12). In all cases, there will be a buffer of native fill between the imported fill and the native soils. In order to minimize the impact of any deleterious effects of the imported fill, bright marker flagging will be placed between the native and imported fills to delineate between the two fills during reclamation for the purpose of ensuring complete excavation and removal of the native fills.

   After removing the imported fills, the native fills will be excavated and placed in the cutslopes to achieve approximate original contour. The native fill should not mix with the undisturbed Midfork soils because of the geotextile. There will be some mixing in RO/RL areas, but the native fill is essentially the same material as the RO/RL soil.

   The imported fill may mix with and contaminate some of the native fill; however, this potentially-contaminated material will be the first to be replaced on cutslopes and will be buried the most deeply.

2. **Compaction.** Pad fill material will compact the soil, but in reclamation, the applicant intends to gouge the surface eighteen inches deep and incorporate alfalfa hay. Below eighteen inches, there should be few effects from the fill. This procedure, combined with natural processes (e.g., freeze/thaw), should adequately alleviate compaction and allow vegetation to become established.

3. **Erosion Protection.** Because the soil will be buried under the fill, it will not be vegetated. However, there will obviously be no erosion.

4. **Soil Redistribution.** No topsoil redistribution is necessary since the soils are retained and preserved in-place, thus preserving and re-establishing the original contour surface. In addition to adequately protecting the topsoil for use in reclamation in-place, the Experimental Practice will also preserve the channel geomorphology resulting in decreased erosion and a more stable channel very similar to what currently exists.

5. **Soil Microbial Viability.** The Division considered the question of decreased microbial activity in the soil being stored under the pad. Soil that is buried for several years has been

demonstrated to have few, if any, microorganisms when it is uncovered. Many microorganisms are beneficial in plant establishment and growth.

While soils in the Experimental Practice area may have few live microorganisms when uncovered during reclamation, natural inoculation is likely to occur quickly since the site is surrounded by undisturbed areas. Nearly all of the proposed disturbed area would be less than 200 feet from undisturbed areas with the farthest being about 250 feet away. The Division is aware of a nearby area where cryptobiotic soils have become established naturally on a soil borrow area after only eight years. The applicant will try a soil activation treatment on the test plots, and if the test plots are unsuccessful, a commercial soil inoculant could also be tried.

Soil sterility is also a problem where soil is salvaged, stored for several years, and respread, so there is little difference between the proposed practice and what would normally be required.

In the event the Experimental Practice fails, West Ridge Resources has secured and permitted a topsoil borrow area for supplying substitute soil materials that are equal to, or more suitable for sustaining vegetation on nonprime farmland than the majority of the existing topsoil in the Experimental Practice area. The exception is the Midfork soil, which is identified as a Mollisol. However, the Midfork soil only occupies a small percentage of the geotextile protected surface.

The Division finds that the Experimental Practice adequately protects topsoil with the added benefit that channel geomorphology will be preserved resulting in decreased erosion and sedimentation. Thus, the Experimental Practice is at least as, and potentially more environmentally protective during and after coal mining and reclamation operations as would otherwise be required by standards promulgated under R645-301 and R645-302.

R645-302-214.300 **The coal mining and reclamation operations approved for a particular land use or other purpose are not larger or more numerous than necessary to determine the effectiveness and economic feasibility of the experimental practice;**

The Experimental Practice is being proposed on approximately 4.75 acres for the geotextile placement and 12 acres for the marker strips. This includes the (1) geotextile area which lies in and adjacent to the drainage channel in the right fork of C Canyon overlying Strych and Midfork soils and which would be filled in during construction and (2) the rubbleland areas where brightly colored marker strips would be placed on the original surface prior to fill placement. The only part of the Experimental Practice area where it would be practical to salvage soil is the geotextiled area. The larger 12 acre area is identified as rock rubbleland where numerous rocks and boulders are intermingled with soil materials or where rocks and boulders are so closely spaced that there is little soil. Topsoil removal, storage and replacement would be impractical in this area. Therefore, protecting the soil resources within the rubbleland will preserve these soils in-place which otherwise would have likely been lost.

The entire surface disturbance area is 29 acres. The Experimental Practice area is about 17 acres. The topsoil in the remainder of the disturbed area (~12 acres) will be handled according to the R645-301-200 regulations for salvaging, stockpiling, and redistribution.

The Division finds that the Experimental Practice is being carried out in an area not larger than necessary to determine its effectiveness and economic feasibility.

REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING

R645-302-214.400 The experimental practice does not reduce the protection afforded public health and safety below that provided by standards promulgated under R645-301 and R645-302.

The soils regulations to which the Experimental Practice applies do not contain requirements dealing with public health and safety. Therefore this regulation does not apply to the situation.

The proposed Experimental Practice should have essentially no effect on any aspect of the reclamation dealing with public health and safety. If anything, the reclaimed slopes should be more stable after applying the Experimental Practice since they will not have been excavated and replaced.

Findings:

Information provided in the application is considered adequate to meet the requirements of this section. Specifically, in accordance with:

R645-302-214, The Division finds that the Experimental Practice:

1. Promotes advances in coal mining and reclamation technology by providing an opportunity for the applicant to demonstrate that topsoil storage in place provides the same degree of protection for the topsoil materials plus provides a soil bed that promotes faster establishment of vegetative cover and greatly enhances the stability of the reclaimed slopes while providing a very natural looking reclaimed surface.

   The applicant is not proposing a postmining land use for industrial, commercial, residential, or public use (including recreational facilities) on an experimental basis, so the second finding in R645-302-214.400 does not apply.

2. Provides at least the same degree of protection of the topsoil resource as would be given using traditional salvage operations. Other components of reclamation would be enhanced by the proposed practice. Stream channel morphology is preserved which should lead to less erosion and sedimentation. Soil structure and integrity would be easier to reestablish when the site is reclaimed. Rocks, roots, and other materials should still be present at the time of reclamation, and this should lead to greater surface structural diversity and greater plant and animal species diversity.

3. Is being carried out in an area not larger than necessary to determine its effectiveness and economic feasibility. The majority of the area containing topsoil will have the topsoil removed and stockpiled prior to construction of the proposed mine site. The only part of the Experimental Practice area where it would be practical to salvage soil is the geotextiled area. The larger 12 acre area is identified as rock rubbleland where numerous rocks and boulders are intermingled with soil materials or where rocks and boulders are so closely spaced that there is little soil. Topsoil removal, storage and replacement would be impractical in this area. Therefore, protecting the soil resources within the rubbleland will preserve these soils in-place which otherwise would have likely been lost.

4. Because the soil protection regulations from which the applicant is seeking an exemption do not contain provisions for protection of public health and safety, the requirements of R645-302-214.400 do not apply. However, the proposed Experimental Practice will have no

negative effect on public health and safety. It should, if anything, increase the stability of the reclaimed slopes thus assisting in providing safe and stable slopes.

R645-302-210, Issuance of this permit will specifically authorize West Ridge Resources, Inc. to conduct an Experimental Practice in conjunction with their approved Coal Mining and Reclamation Operations which allows for the protection of topsoil "IN-PLACE" rather than salvaging soil and stockpiling it for future reclamation. West Ridge Resources, Inc. will follow the plans as outlined in the approved Mining and Reclamation Plan, Chapter 2 and Appendix 2-6 and will be required to evaluate the effectiveness of the Experimental Practice on an annual basis. The Division will conduct annual reviews of the practice to ensure that it fully protects the environment and the public health and safety. In the event that the Experimental Practice is determined to be not as environmentally protective as would otherwise be required by standards promulgated under R645-301 and R645-302, revised reclamation plans which utilize standard reclamation technology will be required.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

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

Analysis:

The Division will provide an assessment of the probable cumulative hydrologic impacts (CHIA) of the proposed operation and all anticipated mining upon surface- and ground-water systems in the cumulative impact area. The CHIA will be sufficient to determine, for purposes of permit approval, whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. The Division intends to use data and analyses submitted in the PAP by the applicant, including the report by Mayo and Associates in Appendix 7-1, and information from federal and state agencies and the Sunnyside Mine MRP.