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

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November 27, 1998

Jean Semborski, Environmental Coordinator
West Ridge Resources, Inc.
6750 Airport Road
P. O. Box 902
Price, Utah 84501

Re: Second Round Technical Analysis, West Ridge Mine Application, West Ridge Resources, Inc., West Ridge Mine, PRO/007/041, Folder #3, Carbon County, Utah

Dear Ms. Semborski:

The Division has completed a second round Technical Analysis of the West Ridge Mine Application, which analyzes all of the information submitted to date. A copy of our Technical Analysis (TA) is enclosed for your information and files. The purpose of this TA is to determine the Technical Adequacy of your application and ascertain whether or not all of the regulatory requirements for obtaining a permit have been met. You will note, there still remain a few areas of deficiency in your application that prevent us from approving it at this time. Please review the TA carefully to make sure you understand the remaining concerns. These deficiencies will need to be adequately addressed before your application can be approved. In order for us to continue processing your application, please provide a response by no later than December 31, 1998.

We recognize that completing the final steps in the permitting process can sometimes be frustrating but it appears that you are making steady progress. We appreciate your help in completing this process. Please call if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Daron R. Haddock".

Daron R. Haddock
Permit Supervisor

tam
Enclosure: Technical Analysis
cc: R. Davidson
P. Hess
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**State of Utah
Division of Oil, Gas and Mining
Utah Coal Regulatory Program**



**Technical Analysis and Findings
West Ridge Mine Application
PRO/007/041
November 25, 1998**

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INTRODUCTION

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

Often the technical review of an application finds that the application contains some deficiencies. The deficiencies are discussed in the body of the TA and are identified by a regulatory reference which describes the minimum requirements. In this Technical Analysis we have summarized the deficiencies at the beginning of the document to aid in responding to them.

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

LIST OF DEFICIENCIES

November 27, 1998

LIST OF DEFICIENCIES

R645-301-112.410, The applicant needs to clarify the former relationship between IPA and the Wellington Preparation Plant. Currently, the application lists this facility, its MSHA numbers, and the permittee, but it does not show how this is related to the applicant for the West Ridge Mine.

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

R645-301-114, The applicant needs to provide right of entry information for the entire proposed permit area.

R645-301-521.190, The Applicant must give the Division a legal description of the permit boundaries, the total number of acres in the permit boundaries, and the amount of acres in the permit boundaries owned by the federal, state, and local governments, and private individuals.

R645-301-321, It appears from the application that the applicant intends to use the reference area method for judging revegetation success for the Douglas fir/maple community. If this is the case, the application needs to include adequate data from this area to compare to the proposed disturbed Douglas fir/maple community.

R645-301-322, Information on the elk and deer herds in the area of the proposed mine needs to be updated.

R645-301-723 - through a misunderstanding, probably the fault of UDOGM, reference is made in the PAP to UDOGM directive Tech-006; this should be Tech-004.

R645-301-723 - clarify the methodology used in sampling and analyzing water samples. Karla Knoop's notes (Appendix 2) indicate that the applicant is using single stage samplers for surface-water sample collection and crest stage gauges at ST-6, ST-6a, and ST-7 and perhaps other sites, but this is not clear from the text of the PAP.

R645-301-724 -It is unclear from the PAP whether the topsoil borrow area is part of this permit application or not. Baseline surface and ground water quality and quantity information for the topsoil borrow area need to be addressed in the PAP, and especially the PHC determination needs to include this area.

R645-301-724, -121.100 -clarify the conflicting information on Map 7-6 and in Table A-1 concerning springs SP-14, WR-2, S-168, and S-177. Map 7-6 shows SP-14 to be the same as S-168, and WR-2 to be the same as S-177, at locations several thousand feet apart. Table A-1 of the addendum indicates that SP-14 and S-177 are the same site, and S-168 is not listed in the table.

R645-301-724, -121.100 - clarify why 14 of the springs on Map 7-5 are designated as "Spring Monitoring Station (1985-1986)" and how these 14 sites differ from the others; all springs on Map 7-5 were monitored in the 1985-1986 surveys.

R645-301-724 - 1998 baseline data to sufficiently demonstrate seasonal variation and water usage.

R645-301-722.300 - locations of monitoring sites ST-1 (M-1) and ST-6a are not shown on a map.

R645-301-540, The applicant needs to show in the text and on a map where snow will be stored.

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R645-301-420, Upon receipt of the Approval Order from DEQ/BAQ, the permittee will meet the requirements of the R645 rules.

R645-301-731.530 and R645-301-121, The commitment on page 5-18 should be re-worded in order to be consistent with page 3-9. The loss of water use should be replaced regardless of the "permanent" nature of the loss.

R645-301-333, The application needs to discuss potential effects of blasting on nesting eagles.

R645-301-220 and R645-301-120, The plan repeatedly states that the RO/RL areas are "devoid" of topsoil. "Devoid of Topsoil" is an inaccurate phrase and needs to be corrected and removed from the plan.

R645-301-220 and R645-301-230, Since the RO/RL Travessilla Complex mapping unit contains 35% soils in addition to rock and native parent material, CGM is in all aspects, a true soil and needs to be protected and preserved as any other soil resource. The following apply for salvaging and stockpiling CGM:

- The plan needs to address the CGM salvage areas in terms of dimensions, depth, and projected volumes of salvaged soil materials.
- CGM salvaged from the Coal slope and slated for storage underneath the coal stockpile, should either (1) be stored in the secondary topsoil storage area, or (2) have the Travessilla soil salvaged separated prior to placement in the pad.
- The Loop CGM storage areas, located on the sediment pond out slopes (Map 5-10), need to be identified as topsoil storage areas, properly signed and protected.

R645-301-231.100 and R645-301-232, Since pockets of Travessilla soil are not delineated on the soils map, an on-site Soil Scientist must be present to ensure that these soils are salvaged during this phase of mine development.

R645-301-233 and R645-302-200, An addendum to Appendix 2-5 describes an additional commercial gravel borrow source. The area is identified as the Himonas Pit and is located in the NW¼, Section 1, T15S, R12E. These gravel fills are very dissimilar to the native materials in C-Canyon and contain elevated levels of salt, sodium and selenium. Therefore, during development and stockpiling of these gravel fills from the Himonas pit, the processed material needs to be 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 within the poor and unacceptable range will be rejected, segregated out, and not used as fill for the West Ridge site.

R645-301-331, The applicant needs to include canyon sweetvetch in the seed mixture for interim revegetation on the topsoil stockpile(s).

R645-301-512.200 & R645-301-534, classification and designs for all roads to be used within the permit area. Designs for primary roads will need to be certified by a registered professional engineer.

R645-301.320 and R645-301-536, West Ridge should form a contingency plan for handling and surface disposal of coal mine development waste in the event that underground disposal can not be accomplished.

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- R645-301-121.100** - The statement "Should any ground water sample indicate 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 will provide the results of the sampling to the Division.", on page 7-18 should include surface water.
- R645-301-731.200** - If the criteria in UDOGM directive Tech 004, Part 5E are met and with UDOGM's approval, required quarterly monitoring may be reduced to field parameters and the parameters identified in R645-301-731.200, plus one complete operational sample collected during the low flow (August or September) season. The applicant has not demonstrated that the criteria have been met and is presupposing that they will be met after operational data are collected for two years.
- R645-301-731.200** - The proposed reduction in monitoring after two years does not include one complete operational sample collected annually during the low flow (August or September) season, as discussed in UDOGM directive Tech 004, Part 5E.
- R645-301-731.220**. A method must be provided to obtain a discharge sample from the pond outlet prior to discharge to the bypass culvert. It is recommended a walkway be constructed for access.
- R645-301-731**. The UPDES permit should be issued and incorporated into this plan prior to PAP approval. Approval for construction through the stream channel or, a letter indicating the requirements for Section 404 of the Clean Water act are fulfilled needs to be provided from the regulating agency.
- R645-301-722.200** - Designation of all reclamation channels on M 5-9, and indication of the Stream Alteration Permit Application or determination that one is not needed.
- R645-301-731.513**. The mine plan needs to contemplate the potential for intercepting water potentially accumulating in the old Sunnyside Mine workings.
- R645-301-742.400**. Geotextile manufacturing specifications and specifications for construction must be supplied for all fabrics to be used.
- R645-301-742**. The sequence proposed for placing temporary sediment control measures needs to be clear and need to be in place prior any disturbance to the site including timber removal and vegetation removal at the site.
- R645-301-742**. A reference to construction methods and a drawing are needed for the silt fence proposed across the stream using the UDOT post and mesh method. In general silt fences placed in drainages fail when substantial flows are observed therefore; BTCA includes designs for a notched spillway and construction so the silt fence is not extended above the bank elevation to prevent water from eroding around the structure. [A temporary series of two low elevation check dams constructed with compacted, well graded material, anchored into the embankment (3-5 feet) with spillways may be a better temporary solution and would require fewer materials]. Either structure should be removed from directly in front of the culvert when flow is allowed to pass through the culvert.
- R645-301-742**. 1) Include a short discussion on how the sediment control measures will transition from the temporary sedimentation pond to the permanent pond, 2) A commitment to construct the temporary pond under direction of a P.E. and, P.E. certification designs are necessary. Due to the ponds temporary nature, size criteria can reduced through division approval according to 742.231. With

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minor additional information and existing information from the culverted, disturbed and undisturbed sections a maximum runoff volume and peak flows for the structure can be presented.

R645-301-742, The applicant has failed to address the issue of snow removal. A snow removal plan has not been submitted; on site storage areas for snow have not been identified on either the Surface Facility Map (Map 5-5), or the Mine Site Drainage Map (Map 7-2).

R645-301-742.220. The sediment pond spillway designs for the upper and middle cells are needed show they adequately pass the greater peak flow from a 25-year, 6-hour event or, the peak flow from 10-year, 24-hour event to the lower ponds since, the total pond volume relies on the spillways to pass the water associated with the 10 year- 24 hour event to the lower pond.

R645-301-740. The ASCA-Z needs to incorporate drainage from the undisturbed area that will combine with the disturbed area drainage.

R645-301-120. The emergency spillway on Pond C discharges into the bypass culvert. Chapter 5 and Chapter 7 and Map 7-4 need to be made consistent. (Some examples of inconsistencies are: 1) Appendix 5-5 states that all open channel spillways will be constructed to pass the 10-year, 24-hour storm event and have a freeboard depth of 2 feet but, Map 7-5 shows the freeboard to be 1.5 in the two upper cells, 2) The lower cell has an incorrect elevation for the primary spillway on Map 7-5, 3) Discussions on decanting in Appendix 7-4 and Section R645-301-742 should be made consistent, 4) The maximum culvert size recommended by the engineer is for a four foot culvert. However, in section 728.331 the permittee commits to placing a five foot diameter culvert. The plan again contradicts the commitment to place a five foot culvert on page 7-17, 5) Sediment storage volume in section R645-301-733 does not match the volume provided in Appendix 7-4, etc.

R645-301-526.200 and R645-301-541.300, The plan indicates that the powerline, which will be installed and maintained by Utah Power and Light up to the substation (which is 1180 feet inside the disturbed area perimeter) will be reclaimed. In order to return the disturbed area to approximate original contour, the support structures for the transmission lines will have to be removed. There are two possible options here:

- 1) The permittee will purchase the powerline from the point of disturbed area entrance to the substation, and have a maintenance agreement with the Utility company, or
- 2) UP & L will retain ownership of the line up to the substation, but a legal agreement will be in place which will allow the permittee to reclaim the line up to the point where it enters either the disturbed area boundary or the permit area.

R645-301-121.200, Some maps show a 46 KV line; some maps show a 69 KV line.

R645-301-521.200, The revisions dated 9/9/98 did not address all of the specifications requirements for signs and markers mentioned in the 9/10/98 TA. This is a minimum regulatory requirement which must be addressed.

R645-301-722.300 - (repeat) locations of monitoring sites ST-1 (M-1) and ST-6a are not shown on a map

R645-301-540, Address each of the following:

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- Provide an approved MSHA plan for hauling excess fill back into the underground mine workings.
- The Division and MSHA approved plans must include a map of the underground workings showing the storage volume required to backfill the 92,000 cubic yards.
- Table 5-1, page 5-46 shows the removal of structures in the portals/highwall area prior to hauling pad material underground. The permittee should consider by what means the mine fan and the belt drives will be powered, and possibly revise the reclamation time line. In order to remove the fill from four of the conveyor support structures (i.e., fill removal of pad to return it to AOC), it will be necessary to relocate a belt drive to the #4 portal area pad.
- Section 553.200, page 5-52, says excess fill material will be hauled off site or disposed of in the abandoned mine workings. As spills occur, contaminated fill material should be disposed of in a State certified landfill.
- Can the material, that is in place at time of reclamation, be viewed as "clean"? Should the top 12 inches be disposed of as contaminated material? If the approval is given from the Division to haul fill off site, what approved area is the permittee considering? Is the approved area something that can be determined at the time of reclamation?
- The cost for underground storage of fill material shown in the reclamation cost survey is \$159,999, and this is not an accurate figure. This figure is only the material hauling cost. Mine operation costs must also be figured in. As noted above, approval to do this must be obtained from MSHA prior to DOGM approval, (R645-301-513.300). A more detailed cost analysis for this procedure must be made and included as part of the reclamation bond costs.

R645-301-233, Co-mingling of native and imported fills will occur to a limited extent. 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, a protective layer of good-fair fill material could be placed between the native and any imported poor-quality fill materials. During reclamation, the poor quality fills would be removed first, thus exposing the good quality fills and contact native fills. These contact soils would then be used first as backfill against the cutslopes, thus further minimizing any negative impact from possible salt contamination.

R645-301-514.100, a commitment to provide a Soils Scientist at reclamation to oversee topsoil redistribution.

R645-301-731.200, -751 - It is unclear from the PAP whether the topsoil borrow area is part of this permit application or not. Sediment control and any proposed related surface and ground water monitoring for the topsoil borrow area need to be addressed in the PAP.

R645-301-731.214 and 731.224 - inclusion of surface water monitoring points on the west slope of Westridge.

R645-301-722.200 - Designation of all reclamation channels on M 5-9, Mine Site Reclamation.

R645-301-742 and -532:

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- Provide design information demonstrating the adequacy of the sediment traps constructed in the stream for reclamation. Include a commitment to maintain these traps during reclamation until bond release.
- Alternatively to sediment trap design, use silt fences to control sediment during revegetation at reclamation.
- Show the culvert on Map 5-11, Construction Sequence.
- Provide a revised reclamation construction sequence that minimizes the time soils are left exposed to storms and erosion.
- Provide a demonstration that the sediment loads will be reduced by the roughening method described in the plan.

R645-301-341.100, It appears from the application that seeding would be delayed until all grading is complete. The applicant needs to show that seeding will occur as soon after grading and surface preparation as possible.

R645-301-341.250, The application does not include quantitative vegetation information for the Douglas fir/maple reference area shown on Map 3-1. Without this data, the Division cannot approve the reference area.

R645-301-341.250, The applicant has included a method for measuring diversity, but it needs to propose a standard.

R645-301-341.300, The applicant needs to use the same methods for revegetating the test plots as are planned for final reclamation (except those treatments that are being tested, such as inoculation). These include surface preparation and the seed mixture.

R645-301-341.300, The applicant intends to inoculate soil in the test plot with surface soil from the topsoil stockpile. This method should not be used since, in final reclamation, it would necessitate disturbing additional areas. However, at least one method of inoculation should be tried.

R645-301-342, The application says Appendix 3-6 contains comments from the Division of Wildlife Resources, but this appendix is empty. The applicant will need to use wildlife habitat enhancement techniques that fall within the definition of the best technology currently available.

R645-301-860, The Applicant did not discuss the type of bond that will be posted. That information is usually contained in the reclamation agreement. Until the Division has determined the bond amount and approved the PAP the Applicant does not need to provide the Division with that information.

R645-301-121.200, Map 5-12 must be revised so that text states that concrete and asphalt may be disposed of on-site.

R645-301-542.200, The Applicant must show or describe the location and thickness of the cap layer shown on Map 5-12. The Applicant must also state where the cap material will be permanently placed.

R645-301-542, Prior to issuing the permit the Applicant must state the location of the commercial pit where the commercial fill will be shipped, the distance from the mine to the pit and the travel

LIST OF DEFICIENCIES

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time. The Applicant must also commit to provide proof that the pit would be willing to accept the material at no cost during each midterm and permit renewal.

R645-301-528.320, Prior to issuing a permit the Applicant must show that all coal mine waste will be disposed in an approved disposal facility.

R645-301-542, The Division considers the activities in steps 3-5 and step 7 to be unsafe or unfeasible. Most equipment cannot operate on the contour if the slope is steeper than 3:1 to 5:1. Most equipment cannot move material efficiently on slopes steeper than 5:1. The Applicant must change either the reclamation plan or show that equipment can operate on steep slopes safely and efficiently.

R645-301-830.140, The Applicant must state how much geotextile material will be removed. The Applicant must give the Division a detailed plan for removing the geotextile material.

R645-301-890, The Applicant did not address the issue for terms and conditions for liability insurance.

R645-302-200, Three Experimental Practices concerns remain for protecting soil Resources at the West Ridge Mine site:

- The test plot study contains a treatment where the soil surface is inoculated using a 2-3 inch layer of soil from the adjacent topsoil stockpile. Unless West Ridge Resource is able to include this soil inoculum treatment during final reclamation, it should not be utilized during the test plot study. Supplying soil inoculum from undisturbed soil areas during reclamation will require additional surface disturbance. Inoculum and/or microbial stimulant should be supplied from a source that doesn't increase surface disturbance (e.g., commercial supplied sources).
- The buried RO/RL Travessilla Complex mapping unit needs to 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 will require the same soil and rock parameters as currently exist to establish revegetation success standards. By preserving these soils in-place underneath the pad fills, successful revegetation should be achieved. However, 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 flagging for the purpose of identifying the original surface during reclamation and excavation of the pad fills.
- The frequency rate for placing the brightly colored flagging over the buried RO/RL areas needs to be specified in the plan.

ADMINISTRATIVE

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.

Until 1995, IPA was involved with the Wellington Preparation Plant, so information about this operation needs to be included in the application. Some information about the Wellington Preparation Plant has been included, but the application needs to clarify the ownership and control relationship to the applicant. The current permittee is Nevada Electric Investment Company, as shown in the application, but there is no indication of the former tie to IPA.

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. Prior to approval, the applicant must provide the following in accordance with:

R645-301-112.410, The applicant needs to clarify the former relationship between IPA and the Wellington Preparation Plant. Currently, the application lists this facility, its MSHA numbers, and the permittee, but it does not show how this is related to the applicant for the West Ridge Mine.

ADMINISTRATIVE

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 Township 14 South, Range 13 East, SE $\frac{1}{4}$ SE $\frac{1}{4}$ of Sect. 10 and the NE $\frac{1}{4}$ NE $\frac{1}{4}$ of Sect. 15.

The proposed topsoil borrow site is on land administered by SITLA, and the application says SITLA has issued a long-term special use permit for this area. The application also says this special use permit is pending. The applicant needs to provide complete right of entry information for the entire proposed permit area.

Findings:

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

R645-301-114, The applicant needs to provide right of entry information for the entire proposed permit area.

UNSUITABILITY CLAIMS

ADMINISTRATIVE

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.

ADMINISTRATIVE

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.

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

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

Analysis:

The Applicant must give the Division a legal description of the permit boundaries and acres in the permit boundaries. The Permittee must identify how many acres in the permit boundaries are owned by the federal government, state government, local governments and private parties. The Division needs that information for several reasons including to verify the permit boundary maps and number of acres in the permit boundaries. The Division often receives request for legal descriptions of permit areas from other government agencies and private individuals. Under the requirements of R645-301-521.190 the Division is authorized to require the Applicant to provide other relevant information.

Findings:

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

R645-301-521.190, The Applicant must give the Division a legal description of the permit boundaries, the total number of acres in the permit boundaries, and the amount of acres in

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the permit boundaries owned by the federal, state, and local governments, and private individuals.

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.

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).

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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. It is recommended that an onsite climatic station be installed for the operational and reclamation period.

VEGETATION RESOURCE INFORMATION

Regulatory Reference: R645-301-321

Analysis:

Vegetation information is in Chapter 3, Section R645-301-321, Appendices 3-1, 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. 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.

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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 disturbed area (1300 lbs. per acre) compared to the reference area (1200 lbs. per acre), but 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 both the proposed disturbed area and the reference area.

The applicant intends to disturb the Douglas fir/maple reference area included in the vegetation study. Map 3-1 shows a new reference area farther up the canyon, so it appears the applicant intends to use this method for judging revegetation success. The Division needs data from this area so it can be compared to the area proposed to be disturbed.

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 the 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 not considered adequate to meet the requirements of this section of the regulations. Prior to final approval, the applicant must provide the following in accordance with:

R645-301-321, It appears from the application that the applicant intends to use the reference area method for judging revegetation success for the Douglas fir/maple community. If this is the

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case, the application needs to include adequate data from this area to compare to the proposed disturbed Douglas fir/maple community.

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.

The application says the proposed permit area is in the southern part of Game Unit 27B and that this unit occupies the eastern half of Carbon County. The Division of Wildlife Resources commented that it has changed the Game Management Unit numbers in the area of the West Ridge Mine. Presently, the area is in the Anthro/Range Creek herd unit #11. This should be updated in the application.

According to the application, the closest elk herd is the Book Cliffs-Unit #21, over 40 miles away. This information is outdated. There is currently 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. These differences should be corrected in the permit application.

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

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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

The application contains a 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 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 not considered adequate to meet the requirements of this section of the regulations. Prior to approval, the applicant must provide the following in accordance with:

R645-301-322, Information on the elk and deer herds in the area of the proposed mine needs to be updated.

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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

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:

- Prime Farmland Investigation
- Soil Survey Information
- Soil Characterization
- Substitute Topsoil Borrow Area

Prime Farmland Investigation

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.

Soil Survey Information

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

(1) 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.

(2) 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

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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 (DOG M) guidelines for topsoil and overburden¹. Sampled parameters included: soil texture; pH; organic matter percent; saturation percent; electrical conductivity; CaCO₃; 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 where surface boulders and larger cobble sized rocks are placed.

Substitute Topsoil Borrow Area

¹Leatherwood, 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.

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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 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

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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.

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- 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 Andalex 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.

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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.

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

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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.

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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. Laboratory reporting sheets in Appendices 7-2 and 7-3 indicate the specific method that have used for each parameter.

Karla Knoop's notes (Appendix 2) indicate that the applicant is using single stage samplers for surface-water sample collection and crest stage gages at ST-6, ST-6a, and ST-7 and perhaps other sites, but this is not clear from the text of the PAP.

Through a misunderstanding, probably the fault of UDOGM, reference is made in the PAP to UDOGM directive Tech-006; this should be Tech-004.

Baseline information.

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Baseline ground water and surface water data are described in the Mayo and Associates report in Appendix 7-1. Table 1 in 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 7-6 and 7-7 and on pages 6 through 9 in Appendix 7-1.

It is unclear from the PAP whether the topsoil borrow area is part of this permit application or not. If it is, baseline surface and ground water quality and quantity information needs to be addressed in the PAP.

Ground-water information.

Locations of wells and springs 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

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 SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 17, T. 14 S., R. 14 E. DH 90-1 is shown on Map 7-6 but 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 Sunnyside Coal Company records 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. 7-4). There is no water-quality or depth information on this well in the PAP.

Only one ground-water monitoring well, DH 86-2 in C Canyon, exists in the permit area. This is open to the entire thickness of the Sunnyside Member of the Blackhawk Formation, which is below the coal seam that will be mined. Well DH 86-1, which has been monitored in the past, is located in Whitmore Canyon approximately one mile below Grassy Creek Reservoir. Locations are shown on Maps 7-6 and 7-7, and data for both wells are in the addendum to Appendix 7-1.

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 evaluate the density of springs over a mined out area compared to the permit area which 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. 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 existing Sunnyside Mines has produced no quantifiable difference in flow of seeps and springs on the west side of Whitmore Canyon.

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Ground-water quality and quantity data for the 1985 and 1986 seep and spring surveys are in both Appendix 7-6 and Table A-2 of Appendix 7-1. Information includes flow, temperature, pH, and specific conductivity but does not include total iron and total manganese. All the springs on Map 7-5 were in the 1985-1986 survey, but 14 of them are designated by a green triangle as "Spring Monitoring Station (1985-1986)"; it is unclear what this means and how these 14 sites differ from the other springs on the map.

Map 7-6 shows SP-14 to be the same as S-168, and WR-2 to be the same as S-177. The two springs are several thousand feet apart. Table A-1 of the addendum indicates that SP-14, S-177, and W-2 are the same spring, and S-168 is not listed.

Additional data on some of the 1985-86 springs, including a few analyses for total iron and total manganese, were collected by Kaiser Coal Company in 1988 and 1989. From the 1988 and 1989 group of springs, S-30, S-22, S-7, S-16, S-1, S-145, S-144, S-172, S-177, S-190, and S-208 were monitored in 1997 as SP-6, SP-7, SP-8, SP-9, SP-10, SP-11, SP-12, SP-13, SP-14, SP-15, and SP-16, respectively. Data from 1985, 1986, 1988, 1989, and 1997 for these 11 springs are in Table A-1 in the addendum to Appendix 7-1. Five of these springs, SP-8, SP-12, SP-13, SP-15, and SP-16, are proposed to be used for operational monitoring. SP-8 discharges in the upper drainage of C Canyon and the other four discharge from the lower slopes of West Ridge in Whitmore Canyon.

(Although there was nothing found in the PAP to indicate it, it is possible that there is a correlation between the 11 springs monitored in 1985, 1986, 1988, 1989, and 1997 and those designated as "Spring Monitoring Station (1985-1986)" in Map 7-5. However, springs S-57 and S-205 are marked with triangles on the map but were not monitored in 1997 and are not in Table A-1 in the addendum, and data for springs S-39 and S-40 from 1986, 1988, and 1989 are included in Table A-1 but these two springs are not marked as "Spring Monitoring Station (1985-1986)" sites on Map 7-5 and were not monitored 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 survey, but 1986 to 1992 data on seasonal quality and quantity and usage are in Appendix 7-2 and Table A-1 in the addendum to Appendix 7-1: WR-1 is the same as F-2 and S-205, and W-2 the same as F-10 and S-177. 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 these springs (Table 7-1).

Flow or water level, temperature, pH, both specific conductivity and TDS, and total iron and total manganese were determined for the samples collected in the 1997 ground-water survey (Appendix 7-3). Analyses were also done for the other parameters listed in UDOGM directive Tech 004. Field parameters were measured and samples were collected between May and October, but seasonal variation has not been adequately determined by data from a single year, and the 1998 data are needed for a minimally complete baseline characterization.

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.

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Locations of stream monitoring sites used in the past are shown on Map 7-6 and Figure 8 of Appendix 7-1. Data for 1987, 1988, and 1989 are in the updated 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, 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 additional sites are included in the addendum to Appendix 7-1. Locations are on Figures 8 and 10 of that appendix.

1997 surface-water baseline monitoring data are discussed in Appendix 7-1. Sites identified as M-1, M-4, M-5, and M-6 in the Kaiser Coal Company 1987-1989 data are being monitored as ST-1, ST-6, ST-7, and ST-2, respectively in 1997-1998, and ST-3, ST-4, ST-5, ST-8 are new sites. In 1997 there was no flow at ST-6 and ST-4 and no data were collected at ST-1 (addendum to Appendix 7-1). TSS, flow, temperature, pH, specific conductivity and TDS, total iron, and total manganese were determined for samples collected in 1997 at sites ST-2, ST-3, ST-5, ST-7, and ST-8 (Appendix 7-2), and analyses were also done for the additional parameters listed in UDOGM directive Tech-004, including acidity and alkalinity. Field parameters were measured and samples were collected between May and October, but the dates of monitoring vary from site to site.

The updated Table A-1 in the addendum to Appendix 7-1 includes data showing no-flow at ST-4, ST-5, ST-6, and ST-7 during April, May, and June 1998. There are no 1998 data in the PAP for ST-1, ST-2, ST-3, and ST-8.

On page 7-18 the applicant commits to three years of baseline data, to consist 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. The PHC will be updated, if needed, following the collection and analyses of information gathered during the 1998 field season (p. 7-9).

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.

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 West Ridge Mine. However the amount of acid produced will be small because of the small amount of pyrite present; 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 tons/1000 tons, respectively (Appendix 6-1). Iron is readily precipitated as iron-hydroxide and 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 on-site storage (p. 6-16).

Climatological information including seasonal precipitation and the Palmer Hydrologic Drought Index (PHDI), wind direction and velocity, and seasonal temperature ranges is on pages 7-6 and 7-7 and on pages 6 through 9 in Appendix 7-1.

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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.

Baseline cumulative impact area information.

Mayo and Associates (Appendix 7-1) have analyzed geologic and hydrologic information and prepared a report 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 to assess the probable cumulative hydrologic impacts of coal mining and reclamation operations at the 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 the applicant has not prepared information regarding alternative water sources.

Probable hydrologic consequences determination.

The Probable Hydrologic Consequences (PHC) determination is on pages 7-9 through 7-15. This PHC determination is based on one-year 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 is not based on data statistically representative of the site. The PHC will be updated, if needed, following the collection and analyses of information gathered during the 1998 field season (p. 7-9).

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; acidity, total suspended and dissolved solids, and other important water quality parameters of local impact; flooding or streamflow alteration; 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.

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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, namely pyrite and marcasite, which, when exposed to air and water, are oxidized and produce acid. Oxidation of pyrite will occur in the West Ridge Mine; however, it is anticipated that any acid will quickly be neutralized by abundant, naturally occurring carbonate minerals. Iron is readily precipitated, as iron-hydroxide, and 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. At the time of reclamation, the coal will be removed from the site prior to the commencement of any regrading activities. The applicant intends to produce a run-of-mine product without any coal-processing waste for disposal or on-site storage (p. 6-16). Also, 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.

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 7-10 and 7-11. 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 5-foot

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diameter corrugated metal pipe, which meets or exceeds 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 event. The sediment pond has been designed to handle the sediment yield from the disturbed area, calculated to be 0.3600 acre-feet per year, 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. Sediment traps at regular intervals along the drainage bottom will 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.

Important water quality parameters

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.

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.

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. 7-12). 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. 7-13).

Water discharged from the proposed West Ridge mine (most of such water, according to the PAP) 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 permittee, 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

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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. The thick Mancos Shale will prevent the migration of any mine discharge water downward to formations underlying the Mancos Shale.

Flooding or streamflow alteration

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. 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 SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 17, T. 14 S., R. 14 E. (Map 7-6). According to Sunnyside Coal

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Company records 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. 7-4). There is no water-quality or depth information on this well in the PAP.

Ground-water monitoring plan.

Locations for baseline ground-water monitoring are on Map 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 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. 1997 sampling was done when the sites were accessible in May, July, August, and October, so monitoring has not been monthly but has been frequent enough that it should detect seasonal changes if continued as planned.

No ground-water monitoring results from 1998 are reported in the PAP. Planned baseline ground-water monitoring should be 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 (Table 7-1).

Table 7-1 indicates data will be collected quarterly, and there is a commitment on page 7-18 that operational water monitoring reports will be submitted on a quarterly basis to UDOGM.

On page 7-18 the applicant commits to three years of baseline data, to consist 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. The PHC will be updated, if needed, following the collection and analyses of information gathered during the 1998 field season (p. 7-9).

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.

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, to consist of the 1997 and 1998 data plus at least one year additional data from earlier monitoring (Kaiser Coal Company data from 1985 to 1989 and Sunnyside Coal Company data from 1986 to 1993), and two years of operational data (p. 7-18).

Springs

Eleven springs (SP-6, SP-7, SP-8, SP-9, SP-10, 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. Most of the stations in the proposed operational ground-water monitoring program are located on the east slope of West Ridge. This is because, according to the applicant, there are no springs that are suitable for monitoring on the west side of West Ridge except for SP-8.

ENVIRONMENTAL RESOURCE INFORMATION

Springs SP-12, SP-13, SP-15, and SP-16 discharge from the lower slopes of West Ridge in Whitmore Canyon. Spring SP-8 discharges in the upper drainage of C Canyon. Water-quality data for these five springs, 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 for all five springs (plus SP-14 and SP-62) were analyzed for all baseline parameters listed in UDOGM directive Tech-004 (Appendix 7-3).

Springs WR-1 and WR-2 discharge from the upper slope of West Ridge in Whitmore Canyon. 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. There are no reported flow or water-quality data for 1997.

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 (Appendix 7-3) were analyzed for all baseline parameters listed in UDOGM directive Tech-004. The applicant proposes that after three years of baseline and two years of operational monitoring, water level only will be measured in this well.

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.

Sunnyside City and East Carbon City have a water right from water-supply well DH 90-1 in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 17, T. 14 S., R. 14 E. (Map 7-6). The well has a gravel pack from 207 to 500 feet below ground surface, bring 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. 7-4).

Surface-water monitoring plan.

Locations for baseline surface-water monitoring are on Map 7-6 and Figures 8 and 10 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 (Appendix 7-3) 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. In 1997 sampling was done when the sites were accessible in May, July, August, and October, so monitoring has not been monthly but has been frequent enough that it should detect seasonal changes if continued as planned.

Planned baseline surface-water monitoring should be 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 (Table 7-1).

ENVIRONMENTAL RESOURCE INFORMATION

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, to consist of the 1997 and 1998 data plus at least one year additional data from earlier monitoring (Kaiser Coal Company data from 1985 to 1989 and Sunnyside Coal Company data from 1986 to 1993, and two years of operational data (p. 7-18).

Streams

Except for ST-1 and ST-6a, baseline stream monitoring sites are shown on Map 7-6. Sites currently being monitored are ST-1, ST-2, ST-3, ST-4, ST-5, ST-6, ST-7, and ST-8: sites ST-1, ST-6, ST-7, and ST-2 are the same as M-1, M-4, M-5, and M-6 in the Kaiser Coal Company 1987-1989 data. ST-6a, above the proposed mine site, was monitored in 1997 and 1998 but there was no flow recorded. Samples collected at sites ST-2, ST-3, and ST-8 in 1997 were analyzed for the parameters listed in UDOGM directive Tech-004, including acidity and alkalinity. ST-5 and ST-7 had some flow in 1997 and water samples collected by an automatic sampler were analyzed for TDS, TSS, total iron, total and manganese; at ST-5 pH was measured in the field. ST-4 and ST-6 were dry and ST-1 was not monitored. Field parameters were measured and samples were collected between May and October 1997, but the dates of monitoring vary from site to site (Appendix 7-2).

Monitoring in May, June, and July 1998 at ST-4, ST-5, ST-6, ST-6a, and ST-7 showed no flow (addendum to Appendix 7-1). 1998 monitoring results at ST-1, ST-2, ST-3, and ST-8 are not reported in the PAP.

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 (Map 7-6). Stream site ST-3 is located below the confluence with Hanging Rock Canyon and is upstream of the permit area. Stream site ST-8 is located just above the confluence with Water Canyon, downstream of the permit area.

If it becomes necessary to discharge water from the proposed mine, the water will discharge into the C Canyon drainage. Baseline data are being collected at ST-5 and ST-6 on this intermittent stream. ST-5 had some flow in 1997 and water samples collected by an ISCO automatic sampler were analyzed for TDS, TSS, total iron, and total manganese in the laboratory, and pH in the field (Appendix 7-2). Monitoring in May, June, and July 1998 showed no flow. Karla Knoop's notes (Appendix 2) indicate that the applicant is using single stage samplers for surface-water sample collection and crest stage gages at ST-6, ST-6a, and ST-7 and perhaps other sites, but this is not clear from the text of the PAP. Additional 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). There was one sample collected in A Canyon at ST-7 in 1997 that was analyzed for TDS, TSS, total iron, and total manganese but not pH. Because flow in C Canyon is intermittent, the applicant does not propose any operational surface-water monitoring locations in this drainage. Discharge 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, no operational monitoring in the C Canyon drainage below the mine discharge is proposed.

Findings:

Hydrologic resource information provided in the PAP is not considered adequate to meet the requirements of this section. Prior to approval the applicant must provide the following information:

ENVIRONMENTAL RESOURCE INFORMATION

R645-301-723 - through a misunderstanding, probably the fault of UDOGM, reference is made in the PAP to UDOGM directive Tech-006; this should be Tech-004.

R645-301-723 - clarify the methodology used in sampling and analyzing water samples. Karla Knoop's notes (Appendix 2) indicate that the applicant is using single stage samplers for surface-water sample collection and crest stage gauges at ST-6, ST-6a, and ST-7 and perhaps other sites, but this is not clear from the text of the PAP.

R645-301-724 -It is unclear from the PAP whether the topsoil borrow area is part of this permit application or not. Baseline surface and ground water quality and quantity information for the topsoil borrow area need to be addressed in the PAP, and especially the PHC determination needs to include this area.

R645-301-724, -121.100 -clarify the conflicting information on Map 7-6 and in Table A-1 concerning springs SP-14, WR-2, S-168, and S-177. Map 7-6 shows SP-14 to be the same as S-168, and WR-2 to be the same as S-177, at locations several thousand feet apart. Table A-1 of the addendum indicates that SP-14 and S-177 are the same site, and S-168 is not listed in the table.

R645-301-724, -121.100 - clarify why 14 of the springs on Map 7-5 are designated as "Spring Monitoring Station (1985-1986)" and how these 14 sites differ from the others; all springs on Map 7-5 were monitored in the 1985-1986 surveys.

R645-301-724 - 1998 baseline data to sufficiently demonstrate seasonal variation and water usage.

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 feet. 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.

ENVIRONMENTAL RESOURCE INFORMATION

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, the applicant 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 minable 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

Except for ST-1 (M-1) and ST-6a, elevations and locations of monitoring stations used to gather data on water quality and quantity are shown on Map 7-6. Locations of test holes bored from the surface and in-mine from Kaiser's exploratory entries are shown on Map 6-2. Drill hole locations are shown on Map 6-2. Drill-hole collar elevations, intervals cored, and depths drilled are tabulated in Appendix 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.

ENVIRONMENTAL RESOURCE INFORMATION

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. It is asserted that no aquifers exist in the permit and adjacent areas and therefore no map has been prepared to show the location and extent of subsurface water.

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 SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 17, T. 14 S., R. 14 E. Ground water has been encountered in bore holes DH 86-1 and DH 86-2. These 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 overburden between the coal seam and the North Horn and Colton will possibly preclude or minimize impacts from mining on the ground water, but this is not discussed in the PAP. Maps and cross sections are not used to show the location and extent of ground water and to clarify the relationship between the ground-water resources and the proposed mining operation. Instead the ground-water resources are dismissed as inconsequential because there is no mappable aquifer, and potential impacts from mining treated as non-existent; such dismissal is questionable.

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. In addition the towns have a water-supply well in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 17, T. 14 S., R. 14 E., which is just off the east edge of the PAP maps.

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

ENVIRONMENTAL RESOURCE INFORMATION

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 SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 17, T. 14 S., R. 14 E. (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 1986, 1987 and 1997, 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 resource information provided in the PAP are not considered adequate to meet the requirements of this section. Prior to approval the applicant must provide the following information:

R645-301-722.300 - locations of monitoring sites ST-1 (M-1) and ST-6a are not shown on a map.

OPERATION PLAN

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OPERATIONS AND FACILITIES

Regulatory Reference: R645-301-540

Analysis:

There is nothing in Chapter five of the application addressing snow removal and showing an on-site storage plan. At a minimum, snow storage areas should be shown on a disturbed area map of the site. As the mine site is very small in disturbed area acreage, snow storage could easily become a critical issue,

Findings:

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

R645-301-540, The applicant needs to show in the text and on a map where snow will be stored.

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.

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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 scheduled to be 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 applicant is required by law to obtain an air quality permit through the Utah Dept. of Environmental Quality, Division of Air Quality. Compliance with the requirements of this approval order by the permittee will keep the West Ridge Mine in compliance with the R645 rules.

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Findings:

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

R645-301-420, Upon receipt of the Approval Order from DEQ/BAQ, the permittee will meet the requirements of the R645 rules.

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 re-affect 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.

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Chapter 5 (page 5-18) of the PAP makes the following statement- "However, if mining induced subsidence were to cause a permanent water loss, West Ridge commits to replacing the quantity of water depleted." The commitment to replace water quantities once a permanent water loss has been deduced is of no consequence to the rancher and/or the landowner. Chapter 3 (page 3-9) commits to replacing seep/spring quantities which are depleted. 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 commitment on page 5-18 should be re-worded in order to be consistent with page 3-9 and meet the requirements of R645-301-731.530. The loss of water use should be replaced regardless of the "permanent" nature of the loss.

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

R645-301-731.530 and R645-301-121, The commitment on page 5-18 should be re-worded in order to be consistent with page 3-9. The loss of water use should be replaced regardless of the "permanent" nature of the loss.

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:

The Applicant met the minimum requirements of this section.

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.

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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. Blasting may be needed during construction of the mine, and this has a potential of disrupting nesting activity outside the buffer zone. However, if properly done, blasting toward the lower end of the proposed mine would probably have little effect. The application needs to discuss blasting and potential effects on nesting eagles.

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.

Through water use, the mine has the potential of adversely affecting threatened and endangered fish of the Upper Colorado River. In Appendix 7-7, the application includes estimates of how much water will be used, and it is less than one hundred acre feet per year. 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 now.

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 would be from the proposed road. While it does not appear the Division will 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

OPERATION PLAN

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 not considered adequate to meet the requirements of this section of the regulations. Prior to final approval, the applicant must provide the following in accordance with:

R645-301-333, The application needs to discuss potential effects of blasting on nesting eagles.

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 in-place soils with a layer of geotextile fabric. 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.

(1) *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.

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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 (yd³)
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

(2) *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 generally not recommended because this area is “devoid” of topsoil.

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. Either the RO/RL surface slopes are safe for constructing cut slopes and likewise soil salvage, or they’re not safe for either activity. 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 repeatedly states that the RO/RL areas are “devoid” of topsoil. “Devoid of Topsoil” is an inaccurate phrase and needs to be corrected and removed from the plan. The fact is, RO/RL Travessilla Complex mapping units contain significant amounts of soils (35% soils by volume - 25% Travessilla plus 10% other) that support a significant vegetation community - 750 lbs/acre of

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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 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 needs to be protected and preserved as any other soil resource.*

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:

- Colluvial growth/surface material (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 needs to address the CGM salvage areas in terms of dimensions, depth, and projected volumes of salvaged soil materials.*
- 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 pockets of Travessilla soil are not delineated on the soils map, an on-site Soil Scientist must be present to ensure that these soils are salvaged during this phase of mine development. Appendix 5-5, section 7e, Area Type SRC, does not specify any soil salvage prior to cutting the slopes.*

Topsoil Handling Summary

Map 5-11, Construction Sequence, illustrates the different stages of construction for the West Ridge Mine site. 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 installing geotextile fabric over topsoil 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.

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. Based on DOGM's soil and overburden guidelines, gravel fills located on the pediment terraces located at the base of the Book Cliffs suitable as substitute topsoil based physical and chemical characterization.

An addendum to Appendix 2-5 describes an additional commercial gravel borrow source. The area is identified as the Himonas Pit and is located in the NW¼, Section 1, T15S, R12E. These gravel fills are very dissimilar to the native materials in C-Canyon and contain elevated levels of salt, sodium and

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selenium. Therefore, during development and stockpiling of these gravel fills from the Himonas pit, the processed material needs to be 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 within the poor and unacceptable 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.

CGM repository areas are in reality soil stockpiles. 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:

- *CGM salvaged from the Coal slope and slated for storage underneath the coal stockpile, should either (1) be stored in the secondary topsoil storage area, or (2) have the Travessilla soil salvaged separated prior to placement in the pad.*
- *The Loop CGM storage areas, located on the sediment pond out slopes (Map 5-10), need to be identified as topsoil storage areas, properly signed and protected.*

Findings:

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

R645-301-220 and R645-301-120, The plan repeatedly states that the RO/RL areas are "devoid" of topsoil. "Devoid of Topsoil" is an inaccurate phrase and needs to be corrected and removed from the plan.

R645-301-220 and R645-301-230, Since the RO/RL Travessilla Complex mapping unit contains 35% soils in addition to rock and native parent material, CGM is in all aspects, a true soil and needs to be protected and preserved as any other soil resource. The following apply for salvaging and stockpiling CGM:

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- The plan needs to address the CGM salvage areas in terms of dimensions, depth, and projected volumes of salvaged soil materials.
- CGM salvaged from the Coal slope and slated for storage underneath the coal stockpile, should either (1) be stored in the secondary topsoil storage area, or (2) have the Travessilla soil salvaged separated prior to placement in the pad.
- The Loop CGM storage areas, located on the sediment pond out slopes (Map 5-10), need to be identified as topsoil storage areas, properly signed and protected.

R645-301-231.100 and R645-301-232, Since pockets of Travessilla soil are not delineated on the soils map, an on-site Soil Scientist must be present to ensure that these soils are salvaged during this phase of mine development.

R645-301-233 and R645-302-200, An addendum to Appendix 2-5 describes an additional commercial gravel borrow source. The area is identified as the Himonas Pit and is located in the NW¼, Section 1, T15S, R12E. These gravel fills are very dissimilar to the native materials in C-Canyon and contain elevated levels of salt, sodium and selenium. Therefore, during development and stockpiling of these gravel fills from the Himonas pit, the processed material needs to be 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 within the poor and unacceptable range will be rejected, segregated out, and not used as fill for the West Ridge site.

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 final reclamation, but it is not shown in the seed mix for interim revegetation. While it is expected the seed of this species will retain its viability for relatively long periods, most of the seed collected in 1997 will probably not still be viable when the mine is reclaimed. The applicant needs to propose a method of propagating seed of this species, and the Division recommends

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planting it with the interim seed mix on the topsoil stockpile. 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 not considered adequate to meet the requirements of this section of the regulations. Prior to approval, the applicant must provide the following in accordance with:

R645-301-331, The applicant needs to include canyon sweetvetch in the seed mixture for interim revegetation on the topsoil stockpile(s).

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

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. 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 from regulation under the Utah Coal Regulatory Program and that section of road inside the disturbed area boundary will be permitted.

The application also states that, "There are no plans for the construction of primary or ancillary roads in the permit area." This seems to be a contradictory statement since the surface facilities map shows other segments of roads extending beyond the public road within the disturbed area boundary (truck loop and road to portal area). These roads must be classified, and if they are primary roads the designs will require certification by a registered professional engineer.

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Findings:

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

R645-301-512.200 & R645-301-534, classification and designs for all roads to be used within the permit area. Designs for primary roads will need to be certified by a registered professional engineer.

SPOIL AND WASTE MATERIALS

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

The permittee has stressed since the inception of the West Ridge Mine idea that no refuse will be generated, stored or disposed of within the permit area. 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). It is the permittee's intent to store underground development waste in "gob" rooms underground.

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 not be stored in surface excess spoil piles (no surface excess spoil piles are being proposed).
- All waste generated from the construction of overcasts, belt transfers, and other areas requiring additional height will be stored underground.
- 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. ECDC is not a DOGM permitted site. This may present a problem.
- 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:

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This PAP meets the minimum regulatory requirements for the handling and disposal of coal mine development waste. However, the following RECOMMENDATION is made by Division:

R645-301.320 and R645-301-536, West Ridge should form a contingency plan for handling and surface disposal of coal mine development waste in the event that underground disposal can not be accomplished.

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:

General

Operational Water Monitoring Plan

The PAP includes ground-water and surface-water monitoring plans based upon the PHC determination and the analysis of all 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. Locations of water monitoring stations are shown on Map 7-6.

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.

Locations of operational monitoring stations are depicted on Map 7-7. Operational monitoring locations, hydrologic monitoring protocols, sampling frequencies, and sampling sites 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 only field parameters will be measured. The applicant is of the opinion that the 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 laboratory data (in progress) and two years of operational laboratory data. Continued monitoring for laboratory parameters will not enhance the scientific understanding of hydrologic systems in the mine permit area. However, monitoring of field parameters - pH, specific conductance, and temperature - will continue during mine operation in order to identify mining-related impacts to the discharge and chemical characteristics of streams and springs in the permit and adjacent area. If the field parameters at any sampling site deviate significantly from historical values, monitoring of operational laboratory water quality will resume at that site.

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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, 10 miles north of the West Ridge area. 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 ground water for current and approved postmining land uses.

The 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. Failure to establish the distinction between baseline and operational monitoring produced problems 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.

The Division may modify the monitoring requirements including the parameters covered and the sampling frequency if the operator demonstrates, using the monitoring data obtained, 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.

A procedure for modifying the monitoring plan is outlined in UDOGM directive Tech 004, Part 5E. 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 certain criteria are met. Inaccessibility will not be considered an excuse to forego the annual operational sample. The West Ridge Mine applicant has not yet met the criteria.

Table 7-1 indicates data will be collected quarterly, and there is a commitment that water monitoring reports will be submitted on a quarterly basis to UDOGM on page 7-18. 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. 7-18).

It is unclear from the PAP whether the topsoil borrow area is part of this permit application or not. If it is, operational surface and ground water monitoring for the topsoil borrow area needs to be addressed in the PAP.

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

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Tech-004. Operational field and laboratory parameters will be measured for the first two years of mine operation, after which the applicant proposes that only field parameters will be measured. The applicant feels 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 laboratory data (in progress) and two years of operational laboratory data.

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. 7-19).

Springs

Seven springs in the permit and adjacent areas will be monitored (Map 7-6). Four of these springs (SP-12, SP-13, SP-15, and SP-16) discharge from the lower slopes of West Ridge in Whitmore Canyon. Two springs, WR-1 and WR-2, discharge from the upper slope of West Ridge in Whitmore Canyon. One spring (SP-8) discharges in the upper drainage of C Canyon. Baseline data for springs WR-1 and WR-2 are in the addendum to Appendix 7-1, except there are no total manganese values for WR-1.

Most of the monitoring stations in this monitoring program are located on the east slope of West Ridge. This is because, with the exception of SP-8, there are no springs that are suitable for monitoring on the west side of West Ridge.

Wells

Only one ground-water monitoring well, DH 86-2, exists in the permit area. This well monitors the Sunnyside Member of the Blackhawk Formation, which is below the coal seam that will be mined. The applicant proposes that after three years of baseline and two years of operational monitoring, water level only will be measured in this well.

Sealing of the ground-water monitoring well and any future wells will comply with R645-301-748 (page 7-27).

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 SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 17, T. 14 S., R. 14 E. (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 Sunnyside Coal Company records 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. 7-4), and it is not included in the monitoring plan in Table 7-1.

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.

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. 7-19).

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The applicant will obtain a UPDES discharge permit to cover any possible discharge from the sediment pond (page 7-34).

Streams

Grassy Trail Creek is the only perennial stream in the permit and adjacent areas. However, 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.

If it becomes necessary to discharge water from the proposed mine, this water will discharge into the C Canyon drainage. Discharge water will be subject to monthly monitoring stipulated by a UPDES permit. Because flow in C Canyon is intermittent and because the monitoring required under the UPDES permit is more stringent and more frequent than that proposed in this permit application, the applicant does not propose any surface-water monitoring locations in this drainage other than the UPDES discharge point.

There is no indication of the Operator having applied for a Stream Alteration Permit from the Utah Division of Water Rights. If one is not needed, as determined by the State Water Rights Dept., then that determination needs to be included in the PAP.

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. 7-10).

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 be 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. 7-25).

Hydrocarbons

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

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 was included under section 528.33 in the plan. A plan for longwall mining fluid emergency spills is addressed and a list of chemicals

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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).

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 7-26.

Discharges into an underground mine

No discharge into the underground mine is anticipated (page 7-27).

Gravity discharges.

No gravity discharges are expected from the mine. The formation dips to the 3 to 8 degrees to the north northeast.

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 7-27).

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 7-35).

The applicant will obtain a UPDES discharge permit to cover any possible discharge from the sediment pond (page 7-40).

Diversions.

Design Information

In the 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 this submittal 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
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Soil Hydrologic Group

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 CN (previous value)	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)	This soil type is a small percentage of the area contributing to runoff.
Beje Complex - Mountain Ridge Tops (5)	80 to 89	70 (70)	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

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Bypass Culvert

The Right Fork Undisturbed Bypass Culvert receives drainage from 687.8 acres and 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. Not the 10 yr- 6 hr event indicated in the plan in Appendix 7-4, page 9 and section 731.600, page 7-27. The culvert design, presented in the plan, exceeds the minimum design requirement.

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. Although the Kirpich Method for time of concentration results in a more conservative design for the 100-year, 6-hour event (all other values held constant), the 50-year, 24-hour event used for the bypass culvert design provides an additional capacity exceeding the 100-year, 6-hour event. The maximum culvert size recommended by the engineer is for a four foot culvert. However, in section 728.331 the permittee commits to placing a five foot diameter culvert. The plan again contradicts the commitment to place a five foot culvert in Section 731.100, on page 7-17.

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 0.0255 can be used. If all other values provided by the applicant are held constant the 0.025 value for the lower sections for the bypass culvert does not provide the capacity estimated for the 50 year 24 hr event but, it would exceed the peak flow estimated from the 100 year - 6 hour event. In addition, the head created by up-gradient water will increase the volume that can move through the culvert and adequately pass the estimated peak flow. When reviewing for storms exceeding the design the Division may use 0.025 unless another value is determined appropriate. The design provided in the plan 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.

Road Drainage

The drainage from area UAZ-b shows the road culvert in the disturbed area as c-county culvert and provided a letter from the county on culvert design size. Other road drainage designs are included in the plan.

Disturbed Area Drainage

Diversions are sized for the 10-year, 24-hour event using the SCS - TR55 method for Type II storms. The constructed ditch design depth will include 0.5 foot of freeboard.

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.

Drainage associated with ASCA's

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Watershed map, watershed areas, calculations and associated drainage plans were corrected at ASCA's X and Y. The ASCA-Z needs to incorporate drainage from the undisturbed area that will combine with the disturbed area drainage.

Stream buffer zones.

A commitment to provide buffer zone signs at the upstream and downstream end of the right fork drainage at the mine pad boundaries is found under Section 521.260. Approval or, a letter indicating requirements for Section 404 of the Clean Water act are fulfilled, needs to be provided.

Sediment control measures.

General Construction plan

Information related to hydrology and sediment control issues identified in the construction plan are:

- Initially the trees will be removed. During this activity removal will occur from the existing road surface and slash will be buried away from the channel culvert location. It is not clear whether the sediment control measures were proposed to be in place at this time.
- The first phase of construction will place a silt fences across the stream using the UDOT post and mesh method. A discussion is included but, a reference to construction methods and a drawing are needed. Concerns for proper use of silt fences are raised when they are placed in drainages. First, silt fences placed in drainages tend to fail when substantial flows are observed and, second, in order to minimize the chance of failure a notched spillway needs to be included. Additionally, the silt fence should not be extended above the elevation of the bank or water tends to erode around the fence.

A temporary series of two low elevation check dams constructed with compacted, well graded material, anchored into the embankment (3-5 feet) with spillways may be a better temporary solution and would require fewer materials. Either structure should be removed from directly in front of the culvert when flow is allowed to pass through the culvert.

- Sediment control measures and drainage control for the early phases of construction are described in item 8b, Appendix 5-5. The channel will first be culverted through the office pad/lower cell area. A temporary sedimentation pond will be installed prior to other construction activities. The dam embankment will be constructed 10 feet high and the culvert will be fitted with an open riser, per attachment 3 of Appendix 5-5. This structure is estimated to be in place for approximately two months. A silt fence will be placed at the bottom of the temporary sedimentation pond structure.

The existing plan contains most of the information needed to provide a design for the temporary sedimentation structure. Information from the culverted, disturbed and undisturbed sections can be combined to show a maximum runoff volume. The 36" spillway information is already in the plan and could pass a maximum of 47 cfs if 2 feet are provided above the inlet. A quick calculation shows this flow rate would pass peak flow from a 10-year 24-hour event. A commitment to construct the pond under direction of a P.E. and, P.E. certification are necessary. Due to the temporary nature size criteria can be approved by the division according to 742.231.

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- Once the culvert is constructed 500 feet up canyon from the temporary pond the permanent ponds can be constructed and the temporary pond can be removed (filled). A short discussion on how this will be achieved should be included.
- 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.

- Geotextile manufacturing specifications and specifications for construction must be supplied for all fabrics to be used.

Top Soil Substitute Area.

This area is proposed to be utilized only if needed during final reclamation. Calculations and quantities for bond estimations assuming the worst case scenario are available in the plan.

Snow Removal and On-Site Storage Plan

The applicant has failed to address this issue in the Round One Deficiency response received 10/7/98. A snow removal plan has not been submitted; on site storage areas for snow have not been identified on either the Surface Facility Map (Map 5-5), or the Mine Site Drainage Map (Map 7-2).

Surface employee's at a mine are generally unfamiliar with SMCRA, and as such view everything from an operational point of view. Snow removal and storage often leads to compliance issues stemming from snow being pushed into either drainage ditches (blocking them) or a sediment pond (which reduces sediment storage volume). These are both compliance issues. The narrow confines of the "C" Canyon surface facilities area will require that every square inch of space be utilized effectively. This narrow confinement will also limit the thawing cycle to short periods. Ice buildup in ditches may occur to the point that they cannot convey water; hence, water will overflow, freezing on the roads. The loading loop area is of particular concern to this inspector.

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It is once again recommended that the applicant address a snow removal and storage plan from two perspectives; 1) it can be used to train surface employee's as to what/where to put snow if and when it does occur, and 2) hopefully, it will help prevent the compliance issues mentioned above.

Alternate Sediment Control Measures

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

ASCA-Z needs to incorporate the runoff from the undisturbed area to the sediment control measure design. Additionally, grading of the crest of the road entering this site will be critical to ensure the road drainage not included in the design does not enter the pad area.

Siltation structures.

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

Sedimentation ponds.

Three sedimentation ponds in series will be constructed at this site. The two upper ponds have open channel spillways. The lower pond has two drop inlet spillways that will lead to the bypass culvert, the primary spillway has a riser with an oil skimmer. The lower pond will have an emergency spillway and a primary spillway that pass the 25-year, 6-hour storm event. There are 2 feet of freeboard above the emergency spillway in the lower cell. No spillway designs are presented for the upper cells.

The UPDES sampling provided in the plan does not allow for gathering a sample during a non-decanting discharge from the pond. A method must be available to obtain a discharge sample from the pond outlet when discharge occurs but, prior to discharge to the bypass culvert.

Most of Chapter 5 and part of Chapter 7 need to be updated to reflect changes made in Appendix 7-4 and Map 7-4. Appendix 5-5 states that all open channel spillways will be constructed to pass the 10 year-24 hour storm event and have a freeboard depth of 2 feet. Two feet of freeboard is a standard engineering practice. However, Map 7-5 shows the freeboard to be 1.5 in the two upper cells, and has an incorrect elevation presented for the primary spillway. Additionally, portions in chapter 7 do not reflect information presented on the map. The plan needs to be made consistent.

Decanting the pond will consist of a portable pump with an inverted inlet. And a 100 gpm pumping capacity (Appendix 7-4). Section R645-301-742 and Appendix 7-4 should be made consistent.

The sedimentation pond is designed so that the upper cell can be used to collect most of the sediment. The sedimentation marker is provided only in the upper cell. Although most sediment will be contained in the upper cells, sediment will be contributed to the lower cells from the county road and overflow. The design provided should minimize accumulations in the lower cells and the annual report survey will track accumulations in the lower two ponds.

The lower pond has 1 foot of freeboard between the primary spillway 6902 ft and the emergency spillway 6903 ft. However the text (pg. 7-25) indicates the primary spillway will carry the peak flow with 1.05 ft of head over the pipe but, this is not constant with Appendix 7-4.

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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 cells should be shown to be adequate to pass the greater of the 25-year, 6-hour peak flow or, the peak flow from 10- year, 24- hour event to the lower ponds because the total pond volume relies on the spillways to pass the water associated with the 10-year, 24-hour event to the lower pond.

Impoundments.

All impoundments are sedimentation ponds. See the discussion above.

Casing and sealing wells.

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 7-35).

The applicant will obtain a UPDES discharge permit to cover any possible discharge from the sediment pond (page 7-40).

Findings:

Hydrologic operation information provided in the PAP is not considered adequate to meet the requirements of this section. Prior to approval the applicant must provide the following information:

R645-301-121.100 - The statement "Should any ground water sample indicate 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 will provide the results of the sampling to the Division.", on page 7-18 should include surface water.

R645-301-731.200 - If the criteria in UDOGM directive Tech 004, Part 5E are met and with UDOGM's approval, required quarterly monitoring may be reduced to field parameters and the parameters identified in R645-301-731.200, plus one complete operational sample collected during the low flow (August or September) season. The applicant has not demonstrated that the criteria have been met and is presupposing that they will be met after operational data are collected for two years.

R645-301-731.200 - The proposed reduction in monitoring after two years does not include one complete operational sample collected annually during the low flow (August or September) season, as discussed in UDOGM directive Tech 004, Part 5E.

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- R645-301-731.220.** A method must be provided to obtain a discharge sample from the pond outlet prior to discharge to the bypass culvert. It is recommended a walkway be constructed for access.
- R645-301-731.** The UPDES permit should be issued and incorporated into this plan prior to PAP approval. Approval for construction through the stream channel or, a letter indicating the requirements for Section 404 of the Clean Water act are fulfilled needs to be provided from the regulating agency.
- R645-301-722.200** - Designation of all reclamation channels on M 5-9, and indication of the Stream Alteration Permit Application or determination that one is not needed.
- R645-301-731.513.** The mine plan needs to contemplate the potential for intercepting water potentially accumulating in the old Sunnyside Mine workings.
- R645-301-742.400.** Geotextile manufacturing specifications and specifications for construction must be supplied for all fabrics to be used.
- R645-301-742.** The sequence proposed for placing temporary sediment control measures needs to be clear and need to be in place prior any disturbance to the site including timber removal and vegetation removal at the site.
- R645-301-742.** A reference to construction methods and a drawing are needed for the silt fence proposed across the stream using the UDOT post and mesh method. In general silt fences placed in drainages fail when substantial flows are observed therefore; BTCA includes designs for a notched spillway and construction so the silt fence is not extended above the bank elevation to prevent water from eroding around the structure. [A temporary series of two low elevation check dams constructed with compacted, well graded material, anchored into the embankment (3-5 feet) with spillways may be a better temporary solution and would require fewer materials]. Either structure should be removed from directly in front of the culvert when flow is allowed to pass through the culvert.
- R645-301-742.** 1) Include a short discussion on how the sediment control measures will transition from the temporary sedimentation pond to the permanent pond, 2) A commitment to construct the temporary pond under direction of a P.E. and, P.E. certification designs are necessary. Due to the ponds temporary nature, size criteria can reduced through division approval according to 742.231. With minor additional information and existing information from the culverted, disturbed and undisturbed sections a maximum runoff volume and peak flows for the structure can be presented.
- R645-301-742,** The applicant has failed to address the issue of snow removal. A snow removal plan has not been submitted; on site storage areas for snow have not been identified on either the Surface Facility Map (Map 5-5), or the Mine Site Drainage Map (Map 7-2).
- R645-301-742.220.** The sediment pond spillway designs for the upper and middle cells are needed show they adequately pass the greater peak flow from a 25-year, 6-hour event or, the peak flow from 10-year, 24-hour event to the lower ponds since, the total pond volume relies on the spillways to pass the water associated with the 10 year- 24 hour event to the lower pond.

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R645-301-740. The ASCA-Z needs to incorporate drainage from the undisturbed area that will combine with the disturbed area drainage.

R645-301-120. The emergency spillway on Pond C discharges into the bypass culvert. Chapter 5 and Chapter 7 and Map 7-4 need to be made consistent. (Some examples of inconsistencies are: 1) Appendix 5-5 states that all open channel spillways will be constructed to pass the 10-year, 24-hour storm event and have a freeboard depth of 2 feet but, Map 7-5 shows the freeboard to be 1.5 in the two upper cells, 2) The lower cell has an incorrect elevation for the primary spillway on Map 7-5, 3) Discussions on decanting in Appendix 7-4 and Section R645-301-742 should be made consistent, 4) The maximum culvert size recommended by the engineer is for a four foot culvert. However, in section 728.331 the permittee commits to placing a five foot diameter culvert. The plan again contradicts the commitment to place a five foot culvert on page 7-17, 5) Sediment storage volume in section R645-301-733 does not match the volume provided in Appendix 7-4, etc.

SUPPORT FACILITIES AND UTILITY INSTALLATIONS

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

Analyses:

The applicant has revised Map 5-5, Surface Facility Map to show the 46 KV powerline entering the disturbed area perimeter 100 feet NNW of the Carbon County road turnaround. The location of the line has been shifted from the initial submittal to retain it within the disturbance from entrance to substation. The reclamation requirements of the R645 regulations require the return of all mining related disturbance to approximate original contour. Hence, the Utah Power and Light line will be reclaimed at least up to the disturbed area perimeter; this will leave approximately 1,200 feet of high voltage transmission line between the disturbed area perimeter and the West Ridge Mine permit boundary. The surface management agency for most of the acreage involved in the right of way for the powerline, the six inch water line, and any telephone lines is the United States Bureau of Land Management. As SMCRA and the State of Utah Division of Oil, Gas, and Mining theoretically have no jurisdiction outside of the Mine's permit area, it is felt by this reviewer that it is up to the surface management agency responsible (for the powerline, 70 acres of right-of-way are managed by the USBLM, 5.48 are managed under Utah SITLA, 10.04 acres are privately owned) to establish a reclamation agreement or to approve the retention of the aforementioned utilities as part of the approved post mining land use. Additional acreages will be impacted by the waterline and telephone communications.

Some maps show a 46 KV line; some maps show a 69 KV line. Although this is insignificant, the maps should be consistent, since both are P.E. certified by Mr. Dan Guy. The plan indicates that the powerline, which will be installed and maintained by Utah Power and Light up to the substation (which is 1180 feet inside the disturbed area perimeter) will be reclaimed. In order to return the disturbed area to approximate original contour, the support structures for the transmission lines will have to be removed. There are two possible options here:

- 1) The permittee will purchase the powerline from the point of disturbed area entrance to the substation, and have a maintenance agreement with the Utility company, or

OPERATION PLAN

- 2) UP & L will retain ownership of the line up to the substation, but a legal agreement will be in place which will allow the permittee to reclaim the line up to the point where it enters either the disturbed area boundary or the permit area.

This agreement was mentioned in the first deficiency response to the permittee, but as far as can be determined, has not been addressed in the 9/9/98 response. Same is deficient in that respect. As far as reclamation of the utilities outside of the permit area is concerned, it is up to the surface management agencies involved to determine the post-mining status of same.

Findings:

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

R645-301--526.200 and R645-301-541.300, The plan indicates that the powerline, which will be installed and maintained by Utah Power and Light up to the substation (which is 1180 feet inside the disturbed area perimeter) will be reclaimed. In order to return the disturbed area to approximate original contour, the support structures for the transmission lines will have to be removed. There are two possible options here:

- 1) The permittee will purchase the powerline from the point of disturbed area entrance to the substation, and have a maintenance agreement with the Utility company, or
- 2) UP & L will retain ownership of the line up to the substation, but a legal agreement will be in place which will allow the permittee to reclaim the line up to the point where it enters either the disturbed area boundary or the permit area.

R645-301-121.200, Some maps show a 46 KV line; some maps show a 69 KV line.

SIGNS AND MARKERS

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

Analyses:

R645-301-521.200, Signs and Markers Specifications, Page 5-9 started to address this requirement but for some unknown reason, jumped into verbage required to address permit identification signs. R645-521.200 is a minimum regulatory requirement that needs to be addressed.

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:

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

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R645-301-521.200, The revisions dated 9/9/98 did not address all of the specifications requirements for signs and markers mentioned in the 9/10/98 TA. This is a minimum regulatory requirement which must be addressed.

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:

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

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

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

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

OPERATION PLAN

The TA completed September 10, 1998 indicates that 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.

OPERATION PLAN

Monitoring and Sampling Location Maps.

Except for ST-1 (M-1) and ST-6a, 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

Findings:

Maps, plans, and cross sections of operations information provided in the PAP is not considered adequate to meet the requirements of this section. Prior to approval West Ridge Resources must provide the following information:

R645-301-722.300 - (repeat) locations of monitoring sites ST-1 (M-1) and ST-6a are not shown on a map

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

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 and finds acceptable the retention of the road.

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.

RECLAMATION PLAN

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:

Section R645-301-541.400 discusses hauling excess fill material into the abandoned mine entries. In order to accomplish the backfilling of the anticipated 92,000 cubic yards of fill, using the mine conveyor system in reverse to transport the material to the disposal area, MSHA will require the permittee to operate the mine as if it were still in the coal production mode. Operation of the ventilation system will be mandatory, as will required examinations of the mine. The Division and MSHA approved plan must show a map of the underground workings showing the storage volume required to backfill the 92,000 cubic yards.

Table 5-1, page 5-46 shows the removal of structures in the portals/highwall area prior to hauling pad material underground. The permittee should consider by what means the mine fan and the belt drives will be powered, and possibly revise the reclamation time line. In order to remove the fill from four of the conveyor support structures (i.e., fill removal of pad to return it to AOC), it will be necessary to relocate a belt drive to the #4 portal area pad.

Section 553.200, page 5-52, says excess fill material will be hauled off site or disposed of in the abandoned mine workings. This is an entirely new twist. How does the Division view this fill material? Obviously, if you consider the fact that it will be in place for 20 years, some contamination (oils, hydraulic fluids, fuel spills, etc) will have taken place. This fill should be disposed of as the spills occur in a State certified landfill.

Can the material, that is in place at time of reclamation, be viewed as "clean"? Should the top 12 inches be disposed of as contaminated material? If the approval is given from the Division to haul fill off site, what approved area is the permittee considering? Is the approved area something that can be determined at the time of reclamation?

The cost for underground storage of fill material shown in the reclamation cost survey is \$159,999, and this is not an accurate figure. This figure is only the material hauling cost. Mine operation costs must also be figured in. As noted above, approval to do this must be obtained from MSHA prior to DOGM approval, (R645-301-513.300). A more detailed cost analysis for this procedure must be made and included as part of the reclamation bond costs.

Findings:

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

R645-301-540, Address each of the following:

- Provide an approved MSHA plan for hauling excess fill back into the underground mine workings.
- The Division and MSHA approved plans must include a map of the underground workings showing the storage volume required to backfill the 92,000 cubic yards.

RECLAMATION PLAN

- Table 5-1, page 5-46 shows the removal of structures in the portals/highwall area prior to hauling pad material underground. The permittee should consider by what means the mine fan and the belt drives will be powered, and possibly revise the reclamation time line. In order to remove the fill from four of the conveyor support structures (i.e., fill removal of pad to return it to AOC), it will be necessary to relocate a belt drive to the #4 portal area pad.
- Section 553.200, page 5-52, says excess fill material will be hauled off site or disposed of in the abandoned mine workings. As spills occur, contaminated fill material should be disposed of in a State certified landfill.
- Can the material, that is in place at time of reclamation, be viewed as "clean"? Should the top 12 inches be disposed of as contaminated material? If the approval is given from the Division to haul fill off site, what approved area is the permittee considering? Is the approved area something that can be determined at the time of reclamation?
- The cost for underground storage of fill material shown in the reclamation cost survey is \$159,999, and this is not an accurate figure. This figure is only the material hauling cost. Mine operation costs must also be figured in. As noted above, approval to do this must be obtained from MSHA prior to DOGM approval, (R645-301-513.300). A more detailed cost analysis for this procedure must be made and included as part of the reclamation bond costs.

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.

RECLAMATION PLAN

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) Revegetate 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 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, a protective layer of good-fair fill material could be placed between the native and any imported poor-quality fill materials. During reclamation, the poor quality fills would be removed first, thus exposing the good quality fills and contact native fills. These contact soils would then be used first as backfill against the cutslopes, thus further minimizing any negative impact from possible salt contamination.

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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.

Appendix 5-5, page 39, indicates, "A reclamation supervisor will oversee the topsoil redistribution operation." After the considerable effort and expense of segregating the various top soils it is not appropriate for their redistribution to be supervised by someone who may or may not be skilled in top soils. The individual overseeing the topsoil redistribution must be a qualified Soils Scientist with the same abilities as was required for the initial topsoil identification and segregation.

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.

Findings:

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

R645-301-233, Co-mingling of native and imported fills will occur to a limited extent. 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, a protective layer of good-fair fill material could be placed between the native and any imported poor-quality fill materials. During reclamation, the poor quality fills would be removed first, thus exposing the good quality fills and contact native fills. These contact soils would then be used first as backfill against the cutslopes, thus further minimizing any negative impact from possible salt contamination.

R645-301-514.100, a commitment to provide a Soils Scientist at reclamation to oversee topsoil redistribution.

RECLAMATION PLAN

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 plan meets 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:

It is unclear from the PAP whether the topsoil borrow area is part of this permit application or not. If it is, reclamation surface and ground water monitoring for the topsoil borrow area needs to be addressed in the PAP.

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. 7-19).

Final abandonment of water monitoring well DH 86-2 (at the mine site) will be conducted prior to completion of final reclamation (page 7-26).

The surface water and groundwater monitoring plan is described, beginning on page 7-18. Included are the designation of 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."

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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. 7-19).

The monitoring points are all located on the east slope of Westridge, with no spring or stream monitoring points on the west slope. This is a significant weakness in the monitoring plan, since this is the area which drains the disturbed area and is also the drainage above where the underground mining is to occur. On page 7-42, a commitment to monitor a station "below the reclaimed disturbed area" has been deleted. This commitment should be restored along with monitoring points being established on Bear Creek (such as ST-4), C Canyon (such as ST-5), and A Canyon (such as ST-7).

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 7-26. Any future water or monitoring wells will be abandoned in a similar manner (page 7-40).

Discharges into an underground mine.

No discharge into the underground mine is anticipated (page 7-27).

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 7-27).

Water quality standards and effluent limitations.

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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 UPSES monitoring point on the lower sediment pond will be monitored until the pond is removed. 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 has been found to be deficient in not having any water monitoring stations on the west slope of Westridge. While the plan does cover sampling methods and parameters, there needs to be at least one monitoring station below the disturbed area to assure effluent limitations for waters downstream of the site until 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. Although the reclamation channels are shown on Map 5-9, Mine Site Reclamation, channel RC-MM is not shown. The design for this reclamation channel is in Appendix 7-4, and the Operational Phase channel is designated on Map 7-2.

Map 7-2, Mine Site Drainage Map shows a drainage at the extreme lowest end of the disturbed area, the southwest end. This drainage has a culvert that has been designed to meet UDOT standards which are the same as other culverts on the county road. These standards exceed the R645 regulations and the culvert design is regarded as satisfactory. This culvert is to be left in place at reclamation as part of the county road as shown on Map 5-9, Mine Site Reclamation. 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, turnaround, and UDOT culvert will be the only structures left at reclamation.

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.

During reclamation the Applicant proposes to use depressions in the stream channel that are two to three feet deep, and spaced every 200 feet. Reference page 5-47 and Appendix 5-5, page 47. This approach to sediment control during reclamation is logical and will probably work. However, there needs to be a design presented that shows that the size and number of such depressions are adequate to control the expected sediment loads generated at the site until the area is fully revegetated and has been restored. In addition, there needs to be a commitment to maintain these depressions in the stream should they fill up and need to be cleaned out. This would be similar to the commitment in Appendix 5-5, page 47, to monitor the stream channel and provide riprap as needed during reclamation.

RECLAMATION PLAN

As an alternate to providing sediment trap design information, the Applicant could consider deleting that approach and simply use silt fences along the stream and areas beside the stream. These would be located at those areas within the reclaimed disturbed area which are most likely to contribute sediment to the stream. Staggering the silt fences to prevent continuous rills and uniformly locating them through areas adjacent to the stream could be an effective method of minimizing the sediment runoff from the site while it revegetates. The silt fences would have to be maintained until revegetation occurs, but could be removed after that.

The reclamation plan provides considerable details regarding the construction/reclamation sequence and methods. These appear to provide a very good likelihood of success in reclaiming the canyon and are detailed in Appendix 5-5, Construction/Reclamation Plan and on Map 5-11, Construction Sequence, Map 5-12, Reclamation Sequence, and Map 5-10, Construction/Reclamation Area-Types.

There is one notable omission on Map 5-11. That is the bypass culvert is not shown as part of the construction sequence. It is shown on the reclamation sequence on Map 5-12.

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. Reference App. 7-4, page 59. 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. All of these techniques appear to be adequate measures to control sediment.

There is, however, one significant change that needs to be implemented in order to prevent excess sediment from being generated during the reclamation time period. As the above references are reviewed, it's apparent that there is a significant, and unnecessary, time period during which top soils are spread and left open to rainfall before they are seeded and protected from erosion. The reclamation plan needs to be revised to allow the very minimum time possible from the time the soils are spread into place (exposing them to erosion) and the time they are reseeded and given their final treatment before allowing plant germination. The plan calls for these operations to start at the top of the canyon and proceed down the canyon. The reclamation operations need to be an ongoing process, perhaps dividing the site into segments, to have these tasks accomplished simultaneously as opposed to waiting and completing them one after the other. Table 5-1, Reclamation Timetable needs also needs to be revised to reflect these needed improvements.

Another omission required by the regulations is the design of the sediment control method of roughening. Calculations need to be included showing a comparison of the roughened and otherwise unroughened sediment loads anticipated at the site. Typical calculations can be derived from SEDCAD, or the USLE (Uniform Soil Loss Equation). Basically, there needs to be a demonstration that the sediment loads will be reduced by using roughening.

Siltation structures.

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

Sedimentation ponds.

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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 lowest 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. This design 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 three sediment ponds in series. Their operation and reclamation is discussed under Sedimentation Ponds.

Casing and sealing of wells.

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. 7-40). 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. 7-43). Well abandonment plans are on pages 7-26 and 7-43. Any future water or monitoring wells will be abandoned in a similar manner (page 7-40).

RECLAMATION PLAN

Findings:

Hydrologic reclamation information provided in the PAP is not considered adequate to meet the requirements of this section. Prior to approval West Ridge Resources must provide the following information:

R645-301-731.200, -751 - It is unclear from the PAP whether the topsoil borrow area is part of this permit application or not. Sediment control and any proposed related surface and ground water monitoring for the topsoil borrow area need to be addressed in the PAP.

R645-301-731.214 and 731.224 - inclusion of surface water monitoring points on the west slope of Westridge.

R645-301-722.200 - Designation of all reclamation channels on M 5-9, Mine Site Reclamation.

R645-301-742 and -532:

- Provide design information demonstrating the adequacy of the sediment traps constructed in the stream for reclamation. Include a commitment to maintain these traps during reclamation until bond release.
- Alternatively to sediment trap design, use silt fences to control sediment during revegetation at reclamation.
- Show the culvert on Map 5-11, Construction Sequence.
- Provide a revised reclamation construction sequence that minimizes the time soils are left exposed to storms and erosion.
- Provide a demonstration that the sediment loads will be reduced by the roughening method described in the plan.

RECLAMATION PLAN

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, or removing fill and the geotextile, 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.
3. The seed mix will be broadcast seeded or hydro seeded.
4. The area will be mulched with 2000 pounds per acre of straw, and a wood fiber mulch and tackifier will be applied.

It appears from the information in Appendix 5-5 and Map 5-12 that revegetation will occur after all grading and surface preparation operations are complete. From a practical viewpoint, this would create accessibility problems for to have revegetation equipment. In addition, it is best to seed an area as soon after grading as possible since the soil tends to crust within a few days and not allow good contact between the seed and soil. Also, leaving the soil exposed with no mulch could create erosion problems. The applicant needs to plan to seed as soon after grading as possible.

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. Yellow sweet clover is the only species in the mixes not native to Utah, and it serves to help reestablish microorganisms. It also competes with weeds during early stages of revegetation.

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.

Wildlife Resources suggested that winterfat be added to the seed mixture at one pound of pure live seed per acre. Winterfat is adapted to the site, but adding this one species is not essential to achieving reclamation success.

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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. Also, 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 proposed to inoculate the topsoil pile test plot with soil from the surface of the topsoil pile. While this type of technique may be needed for final reclamation, it 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.

The addendum report to Appendix 2-5 says a commercial lease area in the NW ¼ of Section 1, Township 15 South, Range 12 East, is being used for construction of the C Canyon Road. This addendum also says, "This commercial lease area could supply a mix of soil and gravel material to be used as fill at the West Ridge Mine."

Appendix 5-5 describes a source of fill material for the mine as being at the base of the Book Cliffs. It also says this material is "... chemically and physically identical to the native materials existing naturally in the vicinity of the minesite."

The applicant needs to clarify exactly where the fill material will come from. The site described in Appendix 5-5 does not appear to be the same as the site described in the addendum to Appendix 2-5. 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. The analyses of this potential fill material indicate it has moderately high salt and selenium concentrations and that it is much 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.

Using the proposed mining and reclamation plan, the fill is likely to contaminate materials being used as soil and lead to reduced vegetation establishment and growth. For these reasons, the applicant may not use the site described in the addendum to Appendix 2-5 as a source for fill material at the mine.

RECLAMATION PLAN

Revegetation Success Standards

As discussed in the vegetation information section, there are few differences between the reference areas and the proposed disturbed areas. 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%. If one performs a natural logarithm transformation of the data, there is no statistical difference.

Other than cover, every 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. Considering there is no difference in cover if one does a natural log transformation of the data, it is felt the similarities outweigh the one possible difference in this case, and the difference is felt to be minor if it exists.

The Douglas fir/maple reference area is shown on Map 3-1, but the application does not include quantitative data about this area. Without the data, it is impossible to compare the reference area to proposed disturbed areas to determine whether it is applicable, and it is impossible to approve it as a revegetation success standard.

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. It has been used at least two other coal mines in Utah. However, the plan needs to give a success standard.

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 the difficult ones 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. These 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. 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.

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. Nevertheless, it appears revegetation of this site will be feasible. Nearby sites with less precipitation, such as Horse Canyon, have had good revegetation success.

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Field Trials

Section 341.300 has a brief description of the plan for test plots, but a more detailed description is in Section 231.300. Section 341.300 indicates the interim seed mixture would be used on the test plots, and this implies it would also be used for the test plots. Instead, the seed mixture for the Douglas fir/maple community should be used.

The topsoil stockpile will be used for test plots. During construction of the topsoil pile, geotextile will be placed in the area where one of the test plots will be. Enough material will be placed over the geotextiled area to simulate the amount of fill that will be on the experimental practice area. After about five years, soil over the geotextile will be removed and placed in a 12-18 inch lift on another part of the topsoil pile. The purpose of these treatments is to simulate the experimental practice area and topsoil salvage and replacement.

Half of each of these plots would be treated with a 2-3 inch layer of soil from adjacent topsoil stockpile areas. This is intended to show whether inoculation with a native soil material benefits plant establishment and growth. This treatment is not part of the current reclamation plan and should be deleted from the field trials. If this method was used for final reclamation in the experimental practice area, it would necessitate disturbing additional areas that would then not have the same microbial element as the reclaimed site.

Other inoculation methods are available for the experimental practice area that the applicant should investigate, especially for the test plots. In addition, however, the revegetation plan should incorporate at least one of these methods until the test plot results are available. In the experimental practice area, native soil could be mixed with the medium for transplants. There are methods of culturing the inoculum in a greenhouse and distributing it. Some commercial inocula are available as a product marketed as a stimulant for microorganisms. The application needs to discuss these methods and include at least one in the plan for the test plots.

The test plots will then be seeded and mulched as shown in the plan for final revegetation. This will include seeding with canyon sweetvetch. The applicant should use other techniques in the final reclamation plan, including applying alfalfa hay as a soil amendment and gougung.

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. This schedule is considered adequate.

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 may 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.

RECLAMATION PLAN

The application says Appendix 3-6 contains comments from the Division of Wildlife Resources about additional wildlife enhancement measures and that the applicant has incorporated several of their suggestions in the permit application package. Appendix 3-6 does not contain comments from Wildlife Resources, and the Division will need to receive comments about what habitat enhancement opportunities are available for this site.

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. 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 not considered adequate to meet the requirements of this section of the regulations. Prior to approval the applicant must provide the following in accordance with:

R645-300-133.710, The applicant needs to specify the location of the fill borrow area. A site described in the addendum to Appendix 2-5 does not contain suitable material.

R645-301-341.100, It appears from the application that seeding would be delayed until all grading is complete. The applicant needs to show that seeding will occur as soon after grading and surface preparation as possible.

R645-301-341.250, The application does not include quantitative vegetation information for the Douglas fir/maple reference area shown on Map 3-1. Without this data, the Division cannot approve the reference area.

R645-301-341.250, The applicant has included a method for measuring diversity, but it needs to propose a standard.

R645-301-341.300, The applicant needs to use the same methods for revegetating the test plots as are planned for final reclamation (except those treatments that are being tested, such as inoculation). These include surface preparation and the seed mixture.

R645-301-341.300, The applicant intends to inoculate soil in the test plot with surface soil from the topsoil stockpile. This method should not be used since, in final reclamation, it would necessitate disturbing additional areas. However, at least one method of inoculation should be tried.

R645-301-342, The application says Appendix 3-6 contains comments from the Division of Wildlife Resources, but this appendix is empty. The applicant will need to use wildlife habitat enhancement techniques that fall within the definition of the best technology currently available.

In addition, the Division of Wildlife Resources has recommended adding winterfat to the seed mixture for pinyon/juniper areas at the rate of one pound pure live seed per acre. This is not required but is recommended.

STABILIZATION OF SURFACE AREAS

RECLAMATION PLAN

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.

RECLAMATION PLAN

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:

BONDING AND INSURANCE REQUIREMENTS

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

Analyses:

Form of bond. (Reclamation Agreement)

The Applicant did not discuss the form of the bond or submit a reclamation agreement to the Division. An applicant usually submits the bond for inspection after the permit has been approved but before it has been issued. Therefore, no action is needed at this time. However, the Applicant is reminded that the reclamation agreement must be in place before the permit is issued.

Determination of bond amount.

The Division will determine the reclamation cost estimate based on the requirements of R645-301-830.120, R645-301-830.130, and R645-301.830.140. R645-301-830.120 requires that the reclamation cost estimate be based on the approved reclamation plan. The Division identified deficiencies in the backfilling and grading plan that prevent the Division from calculating the reclamation cost. The backfilling and grading plan is presented in Section R645-301-553 of the PAP and on Map 5-12 Reclamation Sequence.

Step 1:

- a. Remove all structures, concrete, asphalt, etc.; haul to approved disposal facility. For clarification the Applicant should state that concrete and asphalt debris can be disposed of on-site rather than taken to a disposal facility. The Division approves the plan to demolish the structures and dispose of the debris. Inert material such as concrete and asphalt can be buried on-site. Other noncoal waste will be shipped to a state approved landfill.

RECLAMATION PLAN

- b. Remove the cap layer and all other potentially contaminated material; haul to approved disposal facility. The Division is concerned that the surface material could be contaminated. The most likely contaminants are salt and oil. The Division approves the concept of the general disposal plan but needs specific details about the plan. The Applicant needs to identify:
 - those areas that will have a protective cap
 - the thickness of the cap (volume of material)
 - the location of the disposal facility
 - c. Pad removal work can utilize heavier machinery such as dozers and loaders. If the cap material will be used as backfill the Division may assume that scrapper will be used. Scrapers have been used effectively in several coal mine reclamation projects. If both methods are feasible, the Division will use the least costly method.
2. Remove Excess Pad Fill
- a. Remove the excess pad fill (predominantly imported material), for purposes of calculating the bond the Division will assume that the material will be shipped to a commercial pit. The Division needs to know the haul distance, travel time to a commercial pit that would be willing to accept the fill material at no cost. The Division also needs the Applicant to confirm that a commercial pit will accept the fill material during the midterm reviews and permit renewals.
 - b. Remove coal mine waste material; haul to approved disposal facility. The Applicant has not identified the approved disposal facility for the coal mine waste. R645-301-528.320 requires that all coal mine waste be disposed within a permit area that is approved by the Division. Options for the Applicant are to ship the material to an approved disposal facility or develop an on-site disposal facility. The disposal site would have to meet the requirements of R645-301-536. An on-site disposal facility could be constructed as part of the backfilling and grading plan. Note, commercial disposal sites such as ECDC are not currently permitted to accept coal mine waste.

The Applicant needs to state how the commercial material and native soil will be marked so that the equipment operators can tell what material they are working with.
 - c. Fill removal work can utilize heavy equipment such as dozers, loaders, excavators and trucks.
3. Remove Remaining Pad Fill; Backfill Cutslopes
- a. The Division does not find steps 3-5 and parts of step 7 feasible. When reclaiming steep slopes, the contractor usually must backfill, topsoil and seed in one operation. The reason is that most equipment is not safe to operate along the contour of slopes steeper than 3:1 to 5:1. The efficiency of operating equipment parallel to slopes steeper than 5:1 to 10:1 is too low to be economical. The most commonly used method to reclaim a steep slope is to place the material in lifts. The lifts are used as work stations to place topsoil, boulder and seed. Therefore steps 3-5 are usually combined and sometimes seed is done from the lifts.

RECLAMATION PLAN

- b. Use trackhoe to perform delicate pad removal near geotextile boundary and maker strip boundary.
 - c. Leave a 12" to 18" working layer over geotextile to protect in-situ topsoil until backfilling is completed.
4. See comments in step 3.
5. See comments in step 3.
6. Remove geotextile from slopes.
 - a. Remove geotextile from the slope and haul to disposal area. The Applicant did not state how much geotextile must be removed. The Division needs to know volume of geotextile to calculate the removal and disposal costs.
 - b. Removing the geotextile is a specialized job that is time and labor intensive. The Applicant must give a detailed plan for removing the geotextile so that the Division can calculate the cost.
7. Revegetate Reclaimed Slopes.
 - a. The Applicant plans to use the culvert as a staging area for the revegetation work.
 - b. The Applicant will roughen the slopes. As stated in Step 3 this operation must be done as part of the backfilling operation in steep slope areas.
 - c. Spray mulch and tackifier over the re-seeded slopes.
 - d. Hand plant containerized stock in preselected areas.
8. Remove Culvert, Restore Channel.
 - a. Remove culvert one section at a time, starting at the upstream end; haul to disposal facility.
 - b. Remove backfill and bedding material; haul to approved disposal facility.
 - c. Remove geotextile (in C/T/F areas), haul to approved disposal facility.
 - d. Roughen re-exposed channel banks, revegetate.

RECLAMATION PLAN

Terms and conditions for liability insurance.

The Applicant did not address this issue.

Findings:

The information provided in the PAP is not considered adequate to meet the requirements of this section. Prior to approval, the Applicant must provide the following in accordance with:

R645-301-860, The Applicant did not discuss the type of bond that will be posted. That information is usually contained in the reclamation agreement. Until the Division has determined the bond amount and approved the PAP the Applicant does not need to provide the Division with that information.

R645-301-121.200, Map 5-12 must be revised so that text states that concrete and asphalt may be disposed of on-site.

R645-301-542.200, The Applicant must show or describe the location and thickness of the cap layer shown on Map 5-12. The Applicant must also state where the cap material will be permanently placed.

R645-301-542, Prior to issuing the permit the Applicant must state the location of the commercial pit where the commercial fill will be shipped, the distance from the mine to the pit and the travel time. The Applicant must also commit to provide proof that the pit would be willing to accept the material at no cost during each midterm and permit renewal.

R645-301-528.320, Prior to issuing a permit the Applicant must show that all coal mine waste will be disposed in an approved disposal facility.

R645-301-542, The Division considers the activities in steps 3-5 and step 7 to be unsafe or unfeasible. Most equipment cannot operate on the contour if the slope is steeper than 3:1 to 5:1. Most equipment cannot move material efficiently on slopes steeper than 5:1. The Applicant must change either the reclamation plan or show that equipment can operate on steep slopes safely and efficiently.

R645-301-830.140, The Applicant must state how much geotextile material will be removed. The Applicant must give the Division a detailed plan for removing the geotextile material.

R645-301-890, The Applicant did not address the issue for terms and conditions for liability insurance.

REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING

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, and Appendix 2-6, West Ridge Mine Experimental Practice In-Place Topsoil protection incorporates traditional methods of salvaging/stockpiling and an experimental practice method for protecting in-place soils with a layer of geotextile fabric. The Experimental Practice is unique by taking a Reclamation Approach for topsoil protection.

Operations - Experimental Practices

Experimental Practice Methods for protecting topsoil Resources in-place will occur in (1) buried topsoil areas and (2) buried RO/RL Travessilla Complex areas.

(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 acres disturbed area will be affected using the experimental practice.

In order to evaluate the effects of burying soil in-place underneath the pad fill, West Ridge Resources has proposed a test plot study in the right fork topsoil stockpile (Appendix 2-6, Section 6). After the fill material has been in place for five years, the test plot study will be implemented. The purpose of the study is to monitor and compare reclamation success of the Experimental Practice versus traditional reclamation methods using salvaged and replaced topsoil. The test plot study will utilize the same methodology as proposed for final reclamation and will be monitored for five years to assess reclamation. The right-fork topsoil stockpile will be used for the test plots. If reclamation success is not achieved, other options will be reviewed with the Division. 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.

The test plot study contains a treatment where the soil surface is inoculated using a 2-3 inch layer of soil from the adjacent topsoil stockpile. Unless West Ridge Resource is able to include this soil inoculum treatment during final reclamation, it should not be utilized during the test plot study. Supplying soil inoculum from undisturbed soil areas during reclamation will require additional surface disturbance. Inoculum and/or microbial stimulant should be supplied from a source that doesn't increase surface disturbance (e.g., commercial supplied sources).

(2) Buried RO/RL Travessilla Complex Areas

REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING

The buried RO/RL Travessilla Complex mapping unit needs to 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 will require the same soil and rock parameters as currently exist to establish revegetation success standards. By preserving these soils in-place underneath the pad fills, successful revegetation should be achieved. However, 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 flagging for the purpose of identifying the original surface during reclamation and excavation of the pad fills.

The frequency rate for placing the brightly colored flagging over the buried RO/RL areas needs to be specified in the plan.

Map 5-11, Construction Sequence, illustrates the different stages of construction for the West Ridge Mine site. 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 installing geotextile fabric over topsoil 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.

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. To relieve soil compaction and increase the ability of the soil to absorb moisture, the re-exposed soil surface will be gouged and hand 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.

Findings:

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

R645-302-200, Three Experimental Practices concerns remain for protecting soil Resources at the West Ridge Mine site:

REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING

- The test plot study contains a treatment where the soil surface is inoculated using a 2-3 inch layer of soil from the adjacent topsoil stockpile. Unless West Ridge Resource is able to include this soil inoculum treatment during final reclamation, it should not be utilized during the test plot study. Supplying soil inoculum from undisturbed soil areas during reclamation will require additional surface disturbance. Inoculum and/or microbial stimulant should be supplied from a source that doesn't increase surface disturbance (e.g., commercial supplied sources).
- The buried RO/RL Travessilla Complex mapping unit needs to 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 will require the same soil and rock parameters as currently exist to establish revegetation success standards. By preserving these soils in-place underneath the pad fills, successful revegetation should be achieved. However, 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 flagging for the purpose of identifying the original surface during reclamation and excavation of the pad fills.
- The frequency rate for placing the brightly colored flagging over the buried RO/RL areas needs to be specified in the plan.

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 by West Ridge Resources, Inc. in the PAP.