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

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June 13, 1996

Brad Bourquin, P. E.
Horizon Coal Company
1131 South Dover Street
Lakewood, Colorado 80232

Re: Technical Analysis and Outstanding Deficiencies, Horizon Coal Company, Horizon Mine, PRO/007/020, Folder #3, Carbon County, Utah

Dear Mr. Bourquin:

The Division has completed a Technical Review of your application for the proposed Horizon Mine. A copy of the analysis is enclosed for your information and files. As you will note there are a number of remaining deficiencies in your application. These have been summarized near the front of each major section for your convenience. Most of these items have been discussed with you or with Earthfax previously and I believe Vicky Bailey is making strides toward correcting these deficiencies.

Once the deficiencies have been adequately addressed the Division should be able to issue approval of the Permit Application Package. Please call me or the appropriate member of my technical staff if you have any questions or need assistance in completing the permitting process.

Sincerely,

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

Daron R. Haddock
Permit Supervisor

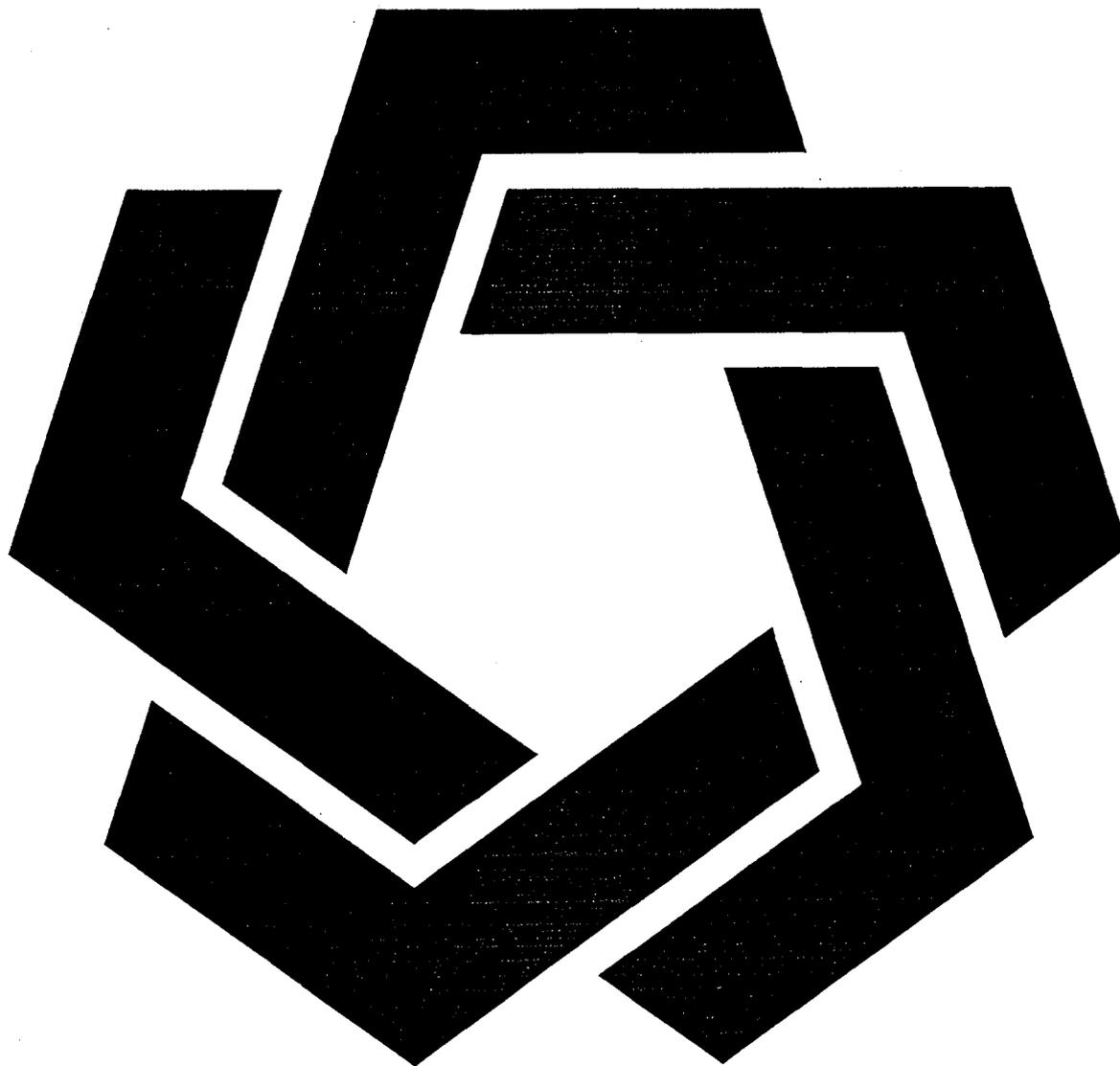
Enclosure

cc: V. Bailey, Earthfax (w/encl)
L. Braxton
S. Fa.lvey
S. White
J. Kelley
D. Darby
B. Davidson
P. Grubaugh-Littig

TACOVER.HOR



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



Technical Analysis

**HORIZON COAL COMPANY
HORIZON MINE
PRO/007/020**

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INTRODUCTION

This Technical Analysis (TA) is written as part of the permit review process. It documents the Findings that the Division has made to date regarding the application for a permit and is the basis for permitting decisions with regard to the application. The TA is broken down into logical section headings which comprise the necessary components of an application. 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 first 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. Once all of the deficiencies have been adequately addressed, the TA will be considered final for the permitting action..

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.

TECHNICAL ANALYSIS

Last revised - June 13, 1996

ENVIRONMENTAL RESOURCE INFORMATION
SUMMARY OF OUTSTANDING DEFICIENCIES

VEGETATION RESOURCE INFORMATION

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

R645-301-321.200

The applicant must describe the productivity of the land prior to mining.

FISH AND WILDLIFE RESOURCE INFORMATION

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

R645-301-322.100

The application must contain current population inventories and other requisite information on fish and macro invertebrate populations in North Fork Gordon Creek. These studies must be made in consultation with DWR and the Division.

The application must contain current information concerning the use of the existing area by bats. Site specific information must be made by a qualified person.

R645-301-130

The determination of no findings for threatened and endangered species must be qualified that Patrick Collins determination was for plants only. DWR states that the Bald eagle are likely to be found within the permit area, the permit must be corrected to reflect this..

SOILS RESOURCE INFORMATION

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

R645-301-222

The quality of the materials in the topsoil storage area and sediment pond area must be analyzed and described as possible sources of growth medium and for amounts of coal waste which must be disposed.

HYDROLOGIC RESOURCE INFORMATION

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

R645-301-114.100

The Applicant must: 1) include in the plan information which demonstrates the right to the proposed water use(s) related to mining activities is granted prior to their use.

R645-301-724

The Applicant must: 1) provide a table of the baseline parameters monitored; 2) commit to collect baseline parameters every fifth year prior to permit renewal, at low flow, as indicated in the Division water monitoring guidelines; 3) Include in the plan a summary which gives the starting and termination dates of all actions taken pursuant to baseline accusation, (this summary should include a discussion of the changes made in baseline acquisition and the time period in which baseline data was gathered according to those parameters); and, 4) identify the adjacent area for the hydrologic balance based on potential surface and ground water impacts which include geologic controls on groundwater.

R645-301-724.100

The Applicant must: 1) provide additional water level information to substantiate that the HZ wells are at equilibrium; 2) provide the geophysical and lithologic logs and hydrologic conductivity (pump test information) for these wells and include applicable discussions in the text; 3) provide additional water quality information, without the affects of the drilling fluid, to characterize the baseline water quality of the HZ wells; 4) provide a map showing spring locations in the permit and adjacent area; and, 5) describe why the Gunnison Homestead Spring is considered a source spring for Beaver Creek but, is not included as a monitoring site, or describe why the spring is not within the potential impact area,

R645-301-724.200

The Applicant must: 1) demonstrate, to the satisfaction of the Division, that the North Fork of Gordon Creek, Sand Gulch, the "Unnamed Tributary" to Beaver Creek and Jump Creek will not be affected, in the quantity or quality of flow, by mining operations or provide baseline and operational water monitoring plans for these surface waters; 2) clarify by observation and quantitative monitoring whether the intermittent flow at surface station number 3 reemerges as perennial flow downstream; and, 3) provide for the installation of additional baseline surface water stations with continuous recording flumes on the North Fork of Gordon Creek, Jewkes Creek and Beaver Creek unless it can be demonstrated to the Divisions satisfaction that the proposed monitoring is adequate to determine impacts to these streams.

R645-301-728

The Applicant must: 1) provide a finding in the PHC or reference applicable portions of the text to address whether acid- and toxic-forming materials could result in the contamination of surface or groundwater, and whether adverse impacts may occur to the hydrologic balance; 2) correct the statement contained in Section 6.5.7.1. to reflect the information regarding roof and floor material where a sample contained a high pyritic sulfur content; and, 3) provide the location and extent of all known abandoned underground mine workings within the permit area and adjacent area.

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R645-301-731

The Applicant must: 1) correct Section 3.4.3 of the PAP, since there is no discussion found in Section 7.1.6 regarding replacement of water rights; 2) provide a cross reference to Section 3.4.3 under Section 7.1.6, so the plan is clear and accurate in describing the actions to be taken should loss of use of a water right result from mining activities; 3) provide a discussion in the PHC on potential changes in water quality based on data obtained from the Blue Blaze in mine waters; 4) provide a certified copy of the SPCC Plan and include clean up procedures for small scale spills, a commitment to retain absorbent materials on site, and provide either a concrete containment structure or provide other methods for disposal and sampling of the earth material below areas of hydrocarbon use that prevents surface and ground water impacts; 5) provide a discussion on the width of the buffer zone for perennial and intermittent streams that may be mined under and provide specifics on how mining is designed to preclude subsidence of perennial and intermittent stream reaches; 6) provide data to support the statement that indications of significant mining related flow depletions were not evident for previously mined areas; and, 7) commit to immediately notify the Division and other concerned parties, and obtain approval for site specific mitigation plans prior to completing final mitigation measures if impacts occur to perennial or intermittent streams due to mining activities.

R645-301-731.200

The Applicant must: 1) clarify how groundwater and surface water monitoring will be used to determine the impacts of mining operations on the hydrologic balance; 2) include a description indicating how water monitoring of Beaver Creek will be used to determine whether a marked decrease in flow occurred due to subsidence or intercepted flows from fracture/fault systems; and, 3) provide the description on how operations will be conducted to minimize interception of water bearing faults/fractures, based on the potential to mine into faults/fractures.

R645-301-731.220

The Applicant must: 1) clarify the purpose of proposed monitoring sites identified in Sections 7.2.2.2 and 7.2.2.3 which conflict; and, 2) provide the location of the NPDES pond discharge monitoring point on the monitoring map.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

The plan does not fulfill the requirements of this section. The applicant must provide the following, prior to approval, in accordance with the requirements of:

R645-301-120

The applicant must provide adequate labels for drainages that may be referenced, altered or changed during mining and reclamation operations. The names of important perennial and intermittent drainages, where available, must be included for surface waters in the permit and adjacent area for all appropriate maps.

ENVIRONMENTAL RESOURCE INFORMATION

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

GENERAL

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

PERMIT AREA

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

Analysis:

The permit area comprises approximately 345.5 acres. It is located entirely in Sections 8 and 17 of Township 13 South, Range 8 East, Salt Lake Baseline and Meridian, and includes Sweet's Pond. In addition to the permit area, the applicant has obtained from the BLM several small parcels which make up a right-of-way, by way of which an otherwise inaccessible northern parcel will be mined.

Descriptions of the permit area are found on page 2-6 and in the newspaper advertisement in Appendix 2-2. In addition, the permit area is shown graphically on Plate 1-1--Permit Boundary, Plate 3-3--Five Year Mine Plan, Plate 3-5--Subsidence Monitoring Plan, Plate 4-1--Property and Land Use Map, Figure 4-1--Surface Ownership (page 4-4), Figure 4-2--Coal Ownership (page 4-5), Plate 4-2--Permit Area, Plate 6-1--Geologic/Structure Map, Plate 7-1--Water Monitoring Locations, Plate 7-2--Area Topography, Plate 7-3--Water Rights, Plate 7-5--Drainage-Operations, Plate 7-7--Drainage-Reclamation, Plate 8-2--Area Soils, Plate 9-1--Vegetation, and Plate 10-1--Wildlife. The BLM right-of-way is discussed and described in Appendix 2-3 and is shown on Attachment II of that appendix.

The permit area is represented accurately and consistently throughout the plan. The BLM right-of-way is delineated correctly and adequately in Appendix 2-3. Plate 3-3--Five Year Mine Plan shows the boundaries of those subareas for which it is anticipated that additional permits for mining will be sought.

Findings:

The plan fulfills the requirements of this section.

TECHNICAL ANALYSIS

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HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

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

Analysis:

The proposed Horizon Mine site is the former site of the Consumers or Blue Blaze Mine. The Consumers Mine was developed in the 1920's. The community of Consumers had a four-story apartment house, a store service station and a post office. The Consumers Mine closed in 1938 and was again opened at a later date. By 1952, all of the Gordon Creek mines had shut down. Numerous features still remain from the old mine as described in Appendix 5-1, pages 27 to 34. Most of these features will be removed during the construction of the Horizon Mine.

In 1985, Desert West Research designated the Consumers site 42Cb517 and listed it as a potential nominee to the National Historic Register. Since that time significant impacts have occurred to the site. The applicant's consultant, Baseline Data, Inc., concludes in its report (Appendix 5-1, page 37) that Title IV activities at the site have adversely impacted or removed major site features and have thus changed that determination of eligibility for nomination to the National Historic Register. Since other records such as maps, photos, and agency records provide information on the site, no mitigation should be required. In an October 24, 1995 letter to the Division and in a December 5, 1995 telephone conversation with Division representatives, State Historic Preservation Officer James Dykmann concurs with this determination that the proposed work will have no impact on historic properties.

Findings:

Information provided in Chapter 5 of the plan meets the requirements of this section.

CLIMATOLOGICAL RESOURCE INFORMATION

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

Analysis:

Climate is discussed in Chapter 11, in the soils section, in the biology section, and in the Cultural and Paleontological Resources Study Addendum.

The climate information in the plan was gathered at 3 monitoring sites: the nearby Skyline Mine, the nearby town of Price, Utah, and the nearby town of Hiawatha. Elevation and aspect are the major determining factors of climate at these sites. The Skyline Mine lies in a high mountain canyon at an elevation of 8710 feet, while the town of Price lies in a river valley at an elevation of 5700 feet. The proposed mine site is in a canyon at an elevation of approximately 7600 feet. Each of the monitoring sites thus lies in a climate zone which is slightly different from that of the proposed mine site.

Chapter 11 of the plan puts the respective average annual temperatures for 1993, at the Skyline Mine and at Price, at 37.7°F and 62.1°F. Chapter 11 puts the respective cumulative annual precipitation amounts for these same locations at 27.37 inches and 10.94 inches. At the Skyline Mine, the coldest month of 1993 was January, with an average temperature of -9°F, while the warmest month was August, with an average temperature of 80°F.

TECHNICAL ANALYSIS

The soils section states that the average annual temperature at the proposed mine site ranges from 36°F to 45°F and that the cumulative annual precipitation ranges from 12 inches to 30 inches. The biology section puts the range of cumulative annual precipitation at 16 inches to 20 inches.

Appendix 5-1, Cultural and Paleontological Resources Study Addendum, describes the prevailing climate using data from records compiled at the nearby town of Hiawatha, Utah. Hiawatha was used because its location on the east edge of the Wasatch Plateau is similar to that of the proposed mine site. Hiawatha is at an elevation of 7200 feet and has a mean annual temperature of 45.5°F and a mean annual precipitation of 14.5 inches for the period of record reported by the U.S. Department of Commerce in 1973. The area receives its highest precipitation in August, with an average precipitation for that month of 2 inches for the period of record.

Findings:

The plan contains no site-specific climatological data, but an approximate range of data can be determined from the information scattered throughout the plan. The Division finds that this information meets the minimum regulatory requirements. The Division recommends, however, that the applicant set up a weather station at the site so that precipitation events can be correlated with other monitoring data.

VEGETATION RESOURCE INFORMATION

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

Analysis:

The Horizon permit area covers eight vegetative communities (page 9-2). The Oakbrush and Salina Wildrye communities combined make up over half the total acreage of the eight communities (Plate 9-1). The proposed new disturbance will be on areas that have been previously impacted by coal mining activities. Various degrees of mining-related impacts have occurred on the vegetation within the proposed disturbance. Therefore, the communities have been designated as: 1) slightly disturbed (altered) drainage bottoms, 2) moderately disturbed areas, and 3) severely disturbed areas. Prior to disturbance, the drainages were probably dominated by sagebrush/grass/rabbitbrush communities with aspen, oakbrush and fir in the deeper and more protected drainages. The slopes surrounding the drainages and valleys are now dominated by oakbrush and Salina wildrye communities (page 9-12).

The following information was removed from the text of the permit. The Soil Conservation Service estimates that premining forage production rates were 950 lbs per acre for the sagebrush/grass/rabbitbrush communities and 900 lbs per acre for the oakbrush/salina wildrye communities. Productivity should be either reassessed or the information returned to the text of the permit.

In the course of a wetlands determination site visit in August 1995, Rick Smith of the Engineering Planning Group determined that a wetland exists at the proposed site of the sediment pond. The wetland/riparian area is approximately .42 acres in size (page 9-7). Further study and delineation will be done as part of an application for approval to alter the wetland which will be made to the U.S. Army Corps of Engineers (page 9-7).

TECHNICAL ANALYSIS

Last revised - June 13, 1996

Findings:

Information provided in the plan does not meet the requirements of this section.

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

R645-301-321.200

The applicant must describe the productivity of the land prior to mining.

FISH AND WILDLIFE RESOURCE INFORMATION

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

Analysis:

Two major aquatic habitats occur within the Horizon Mine permit area (page 10-7), North Fork Gordon Creek and Beaver Creek. The Division of Wildlife Resources (DWR) states in a letter dated October 31, 1995 that Gordon Creek supports a population of Cutthroat trout and they plan to create a sport fishery. Beaver Creek is ranked by DWR as being of substantial value as a salmonid fishery. The greatest value of both Gordon Creek and Beaver Creek aquatic habitats is the water, cover, food and breeding sites they provide to a variety of terrestrial vertebrates (pages 10-8 and 10-15).

Aquatic surveys were conducted in 1980 and 1981 (page 10-4; pages 10-20 thru 10-24, and Appendix 10-2) in Beaver Creek and North Fork Gordon Creek. These surveys are of some value as baseline data in Beaver Creek, although dated. The study conducted on the North Fork Gordon Creek is of limited value because the study was designed and sites selected for a study which was done for the Gordon Creek 2, 7, and 8 mines. The statements on page 10-4 implies that the sampling sites were upstream and down stream of the Horizon Mine disturbed area. This is in direct contradiction with the map in Appendix 10-2 and should be removed. DWR has recommended that the applicant fund a baseline data survey of North Fork Gordon Creek since this resource has significantly improved since the 1980 study. The Division also is requiring this study since the probability exists that the mine may impacts these waters. This study should provide baseline information on both the macroinvertebrate and fish populations upstream and downstream from the Horizon site.

The entire permit area is classified as critical elk summer range and critical deer summer range (Plate 10-1). The permit area is located just northwest of the DWR Gordon Creek Wildlife Management Area (WMA) which is approximately 22,000 acres and managed for big game winter range.

In June 1989, DWR conducted a raptor inventory of the permit area. One active Golden Eagle nest with two young and three inactive Golden Eagle nests were found (page 10-14, Appendix 10-1). . A 1995 study was conducted in the area and the nests were found to be inactive. A commitment is made to survey the trees for nests before removal for surface facilities (page 10-37). The DWR states in a letter dated October 31, 1995 that no bald eagle nests have been found in the area but courtship activity has been observed at the winter roost on the Gordon Creek Wildlife Management Area. The letter continues to include that Bald eagles are likely to use the permit area (page 10-34). Golden eagles and red-tail hawks are found and Sharpshinned hawks and goshawks may use the area.

TECHNICAL ANALYSIS

No threatened or endangered species were found on or near the permit area (page 9-10). Table 9-6 list Federally listed plant species. The statement of no findings made by Patrick Collins August 21, 1995 should be qualified to reference plants.

In 1981, the U.S. Fish and Wildlife Services (USFWS) inspected the site. The biologist concluded that although power lines were considered unsafe, hazard was slight due to positioning.

A letter to DWR from Mr. Skaggs, dated April 30, 1992 (Appendix 7), states that no bats had been observed inhabiting the old mine workings. This observation should be updated with recent investigations from a qualified person specifically looking for bats. The applicant should contact the Division concerning this requirement.

Findings:

The plan does not fulfill the requirements of this section.

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

R645-301-322.100

The application must contain current population inventories and other requisite information on fish and macro invertebrate populations in North Fork Gordon Creek. These studies must be made in consultation with DWR and the Division.

The application must contain current information concerning the use of the existing area by bats. Site specific information must be made by a qualified person.

R645-301-130

The determination of no findings for threatened and endangered species must be qualified that Patrick Collins determination was for plants only. DWR states that the Bald eagle are likely to be found within the permit area, the permit must be corrected to reflect this..

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.21, 817.200(c); R645-301-411, -301-233.

Analysis:

The soils within the proposed disturbance (page 8-2 through 8-9, Plate 8-1, Appendix 8-1) are primarily colluvium, alluvium, and residuum derived from sandstone and shale. The soils tend to be silty clay loam to loam within the Shupert-Winetti Complex and gravelly loam to loam within the Brycan, Rabbitex, Senchert and Curecanti Series.

The soil capability classification ranges from III-e3 irrigated to VII-e nonirrigated. Under native vegetation, the water erosion hazard associated with these soils is slight to moderate. The erosion hazard for disturbed soils is primarily moderate. The soils are generally deep, well drained and moderately permeable. The pH of the surface horizon ranges from 7.2 to 8.0. The electrical conductivity ranges from 0.4 to 1.2

TECHNICAL ANALYSIS

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mmhos/cm at 25°C. The depths of reported A horizon range from 0 to 43 inches. The majority of the disturbed area is within the Brycan Series (A horizon = 34 to 43 inches) and the Shupert-Winetti Complex (A horizon = 0 to 10 inches).

The Horizon Mine soil resource was surveyed at the Order II scale (Henry Sauer, personal communication with Leland Sasser USDA/SCS, 1991). Correlation of site map units with currently recognized soil series or complexes are as follows:

- 1) Brycan Loam - fine - loamy, mixed Cumulic Haploborolls
- 2) Curecanti Family - loamy - skeletal, mixed Typic Argiborolis
- 3) Rabbitex Site Loam 15 to 50 percent slope - fine - loamy, mixed Typic Calciborolls
- 4) Senchert Loam - fine - loamy, mixed Argic Pachic Cryoborolls
- 5) Shupert-Winetti Complex - loamy - skeletal, mixed (calcareous), frigid Typic Ustifluent.

Soil profile depths generally range from 60 to 70 inches.

The major limiting factors for the soils within the planned disturbance are high clay content (>40% clay) and high percent coarse rock fragments (>35% coarse rock fragments), which the Division currently does not consider limiting in mine reclamation soils. Hence, the commitment to remove large boulders, prior to soil placement in stockpiles, employing standard earth moving equipment and/or a commercial rock picker (page 8-20) is unnecessary. Also the unsuitability of soils based on high coarse fragment content should be reassessed. Most of the soils within the mine dumps designation will not be salvaged for stockpiling (plate 8-1). No soil pits were examined in the area where the topsoil stockpile and the sediment ponds will be placed. The quantity of coal waste or salvageable growth medium within the topsoil storage area and sediment pond area is unknown and therefore must be addressed in the application.

Pit 8 soil sample analysis done in 1990 (Appendix 8-1) indicates suspect levels of Boron. The 0 to 12 inch contained 4.8 mg/kg boron and in the 10 to 11 feet zone the boron level was 5.19 mg/kg. Boron which exceeds 5 mg/kg is considered unsuitable growth medium and must be covered with a minimum of 4 feet of suitable growth medium. This material in pit 8 is assumed to be refuse/coal waste material.

Findings:

Information presented in the plan does not meet the minimum requirements of this section.

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

R645-301-222

The quality of the materials in the topsoil storage area and sediment pond area must be analyzed and described as possible sources of growth medium and for amounts of coal waste which must be disposed.

LAND-USE RESOURCE INFORMATION

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

Analysis:

The canyon in which the Horizon Mine is proposed to be built has been used for coal mining since the early 1900's and apparently abandoned in 1953. Other than coal mining, the area has been used for wildlife habitat, limited sheep grazing and recreation (page 4-7). Carbon County has zoned the proposed Horizon Mine site area as M & G.1 (page 4-7 and Plate 4-1). M & G 1 is a mining and grazing zone.

The permit area has been extensively mined previously (Plates 4-1 and page 4-7). Room and pillar methods of mining were commonly used in both the Hiawatha seam and the Castlegate 'A' seam. Prior to coal mining (late 1800's), the area was used primarily for ranching with limited timber operations.

No public park or cemetery is located within or adjacent to the permit area. Carbon County owns and maintains two roads which run parallel to and through the disturbed area. The roads are currently (1995) being used extensively by logging trucks with county maintenance.

Findings:

Information regarding land use classification meets the minimum regulatory requirements of this section.

ALLUVIAL VALLEY FLOORS

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

Analysis:

The Applicant provides a discussion on Alluvial Valley Floors (AVF's) in Section 7.4. In Appendix 7-6, a memo dated June 13, 1980 from the Soil Conservation Service State Soil Scientist, T. B. Hutchings addresses AVF's. According to the memo no AVF's, as defined in the Permanent Regulatory Program Office of Surface Mining Department of Interior, exists in Section 17, T 13S. R. 8.E. SLBM. This location is specific to the proposed disturbed area and does not mention the adjacent areas.

According to the reconnaissance map completed by the Office of Surface Mining in June 1985, Gordon Creek, downstream of the mine site, is a "Potential" Alluvial Valley Floor. Mining is not expected to materially damage the water supply of these potential alluvial valley floors because the mine site is contained in a relatively small contributing section of the watershed.

Information on Plate 6-1 indicates alluvial deposits exist in the permit and adjacent areas along Beaver Creek, the North Fork of Gordon Creek, and Jewkes Creek, as well as short distances into the tributaries above the drainages. Alluvial deposits were also identified at the mouth of Jewkes Creek and along the North Fork of Gordon Creek. Alluvial deposits at the mouth of Jewkes Creek and North Fork Gordon Creek are below the coal outcrop and therefore could not be directly impacted by mine subsidence. Soils in the valley exhibit localized signs of being flooded or water logged.

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According to the Applicant agricultural developments are not found along the North Fork of Gordon Creek or along Beaver Creek and their tributaries. The agricultural value in these areas is limited by the soil capability and short growing season. If these areas would be developed for agriculture, development would be restricted to grasses and pasture, however, because of the high elevation, short growing season and narrow valleys the development of meadow or pasture is not practical. Grazing on undeveloped rangelands can be found on Plate 4-1: the Land Use map.

Based on the information presented in the plan, the Division makes the following findings, in accordance with R645-302-321.310:

- 1) Unconsolidated stream-laid deposits holding stream channels are found in the area of the proposed mine site.
- 2) There is sufficient water to support agricultural activities, as evidenced by subirrigation of the lands in question.
- 3) The undeveloped rangelands found in the permit and adjacent area on alluvial materials are not significant to farming and therefore are exempt to prohibition of mining according to the Alluvial Valley Floor Identification and Study Guidelines provided by the U. S. Department of the Interior Office of Surface Mining Reclamation and Enforcement, 1983.

Findings:

The Applicant has met the requirements of this section.

GEOLOGIC RESOURCE INFORMATION

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

Analysis:

The Applicant is required to provide geologic information to meet the requirements of R645-301-601. Characterization of the lithology and structure in the adjacent and mine plan area provides the basis for analyzing groundwater quality and groundwater movement, coal reserves, and surface subsidence.

Stratigraphy

The Applicant presents a geologic description of the mine plan area in Chapter 6. A generalized stratigraphic column in Table 6-1 illustrates the stratigraphic sequence. The site is characterized by Cretaceous and Tertiary formations deposited along the western edge of a ocean basin. The lithology and structure are described and illustrated in Figures 6-2 and 6-3. A short summary of each stratigraphic unit depicts the thickness, origin and character of each formation or member functioning as an aquifer or coal bed.

The alternating sequences of shales and sandstones in the Mancos Shale and heterogeneous terrestrial, fluvial, paludal and marine characteristics of the coal bearing Blackhawk Formation reveals a depositional environment in a fluctuating regressive seaway.

The Blackhawk Formation is the only formation in the area that contains coal bearing units. Eight coal beds have been identified in the vicinity of the mine plan area, four of which outcrop in the North Fork of Gordon Creek Canyon, Coal Canyon and Bryner Canyon.

The Hiawatha and Castlegate 'A' coal seams are the only beds in the area thick enough to mine.

Structure

The minesite is surrounded by two major fault systems: the Gordon Creek fault zone, trending north-south, and the Fish Creek fault zone trending approximately north 60 degrees west. Two major faults of the Fish Creek fault zone create a graben and enclose the lease block.

This area has a history of mining. The Horizon Mine will initially mine coal between the old National Mine and Beaver Creek Coal Company #3 Mine on the east and the Blue Blaze No. 2 and 3 Mines on the west. The National and Beaver Creek Coal Company #3 Mine were developed within the graben area of the Fish Creek Graben. Plate 3-5 identifies some of the older workings, however several old mines adjacent to the proposed workings have not been depicted. The Applicant should identify all old workings in the vicinity of the proposed mining operation and indicate in which seam they were developed.

Personal communication with Dan Guy identified that Gordon Creek Coal Company intercepted a flow of approximately 600 gallons per minute from a fault in the Fish Creek Graben system. Fault systems can act as conduits for groundwater which can supply springs with flow or act as dams to store water when two facies of different permeabilities align as a result of the offset. The extent of faulting shown on the Geology Map, Plate 6-1, identifies an extensive fault system with some fault extending several miles through other drainages. Future mining adjacent and through these faults, as identified in the BLM application boundary on Plate 3-5, will require an analysis of the storage and transmissivity of faults.

Cross-Sections

The Applicant submitted geologic cross-sections, Plates 6-2 and 6-3 to project the horizontal extent of the lithologic layers and relationships between fault zones and coal zones. Plate 6-2 illustrates the trends from north to south from 7 drill sites, and Plate 6-3 shows a west-east diagram of 13 drill sites. ARCO's measured section 1980 and LCM-4 of Plate 6-3 reveal the local lithology. The lithologic data from drill logs HZ 95-1, HZ95-2 and HZ-95-3 should be incorporated to the cross-section information. Better yet, a fence diagram should be constructed to reveal the association of faults to lithofacies.

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Subsidence Monitoring Information

The Applicant has submitted a subsidence monitoring plan identifying subsidence monitoring stations and stream buffer zones on Plate 3-3. The subsidence monitoring stations are established along Beaver and Jump Creeks, the area of maximum subsidence will likely be in the center of mining. Additional survey markers should be stationed between Beaver and Jump Creeks to detect subsidence impacts. The Applicant has not submitted an overburden isopach map for either the Hiawatha or Castlegate "A" coal seams. The Applicant needs to address the method used to establish the stream buffer zone for Beaver Creek.

Acid- and Toxic-Forming Materials

Acid- and toxic-forming materials were addressed by the operator in Section 6.5.7.1. of the MRP. From the data and information presented, there is minimal chance that acid and toxic condition minerals will be present in sufficient quantities to cause deleterious impacts to water or soil. The Applicant also proposes to sample and test for acid and toxic material on 2000 foot intervals throughout the mine.

Findings:

There is only one geological related deficiency for the one year mine permit that has to be addressed before the permit can be issued.

- 1) The Applicant shall submit overburden isopach maps for the Hiawatha and Castlegate "A" seams.

Prior to mining the proposed federal lease the Applicant will need to address the following deficiencies.

- 1) The Applicant shall submit overburden isopach maps for the Hiawatha and Castlegate "A" seams.
- 2) The Applicant should incorporate the Horizon drill holes into the cross-section matrix, preferably in the form of a fence diagram.
- 3) The Applicant shall present the method by which the stream buffer zone was established.
- 4) Additional survey markers should be stationed between Beaver and Jump Creeks to detect subsidence impacts.
- 5) The Applicant shall analyze the storage and transmissivity potential of faults that will likely be encountered during mining.

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- 6) The Applicant should identify all old workings in the vicinity of the proposed mining operation and indicate in which seam they were developed.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-720.

Analysis:

Sampling and Analysis.

The Applicant is required to perform all sampling and analysis in a manner that meets the requirements of R645-301-723. Sampling times dates and methods are not available for all samples, however, recent data has included sample date, time, and method of analysis beginning in December, 1993.

Baseline Information.

Water Rights and Points of Diversion

The Applicant has provided information on water rights included in Appendix 3-5. The point of diversion for water rights near the mine operations are presented on Plate 7-3. Designated uses and season of use for some water rights are not included in the water rights table provided. The Applicant has indicated that the area is almost exclusively used for stock watering. A use description and timing of use should be provided for the water rights. However, this information can be obtained from the Division of Water Rights.

The Applicant presented a duplicate of a five year water right lease agreement, dated May 1, 1995. The agreement between Horizon and Florence A. Sweet includes water rights, 91-94, 91-353 and, 91-330. Also, a duplicate application for permit change filed at the Division of Water Rights is included in the MRP. The water rights are associated with two unnamed springs and an underground water tunnel. The point of use associated with the spring(s) are proposed to be changed to Sweets Pond. Domestic and Industrial uses are proposed in association with the Horizon Mine operations. The Applicant must have received the right to use the described water and, must include in the plan information which demonstrates the right to the proposed water use(s) related to mining activities was granted.

Table 1
Water Rights Used in Mining

Water Right #	Season of Use	Quantity of Use (cfs)	Potential Total for Season of Use (AF)
91-94	9/1 to 5/1	0.1500	72.00
91-353	5/1 to 9/1	0.0150	3.66
91-330	1/1 to 12/31	0.5570	2565.00

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General Baseline Water Quality

Baseline information was collected according to the 1986 Division guidelines. In early baseline data acquisition the Applicant collected data according to the 1986 guideline. The Division has a new guideline, effective April 1995. The major difference between the data collected through 1996 and the data required by the new guidelines is the acquisition of certain dissolved constituents, total alkalinity, and phosphates as orthophosphates. Although older data acquisition will provide useful information, new data should be collected according to the new guidelines. The baseline data analysis for the parameters obtained according to each guideline should be discussed in the plan. Baseline information is being collected in accordance with the new guidelines starting in 1996. The Applicant should provide a table of the baseline parameters. Division guidelines request that baseline parameters be collected at low flow for monitored sites every fifth year prior to permit renewal.

Groundwater Information.

Section 6.4.1 discusses site stratigraphy and provides information relative to groundwater in relation to the mine operations. Section 7.1.2 discusses the groundwater resources.

The Gordon Creek area is considered a regional recharge area to groundwater, although locally in the permit area it is not a region with potential for large scale groundwater development. Snowmelt and rainfall are the main sources of recharge to the groundwater system in the permit and adjacent areas. The Applicant provides Figure 7-4 to delineate potential recharge areas and shows a limited recharge potential except in the northern portion of the permit area and in canyon bottoms downstream. The "small" number of springs in the area is described to demonstrate the result of relatively low area permeabilities by the Applicant. The Applicant has not clearly developed what the relationship to "small number" of springs is, relative to the local area aquifers.

The regional area aquifers are the Emery and Ferron Sandstone of the Mancos shale, which probably do not extend to Gordon Creek (thus, the mine area), and the Star Point Sandstone and Blackhawk formations which are located in the mine area.

The area is also heavily faulted by major fault zones. The North Gordon and Fish Creek fault zones trend North and South, and North 60 degrees West, respectively. The faulting appears to have influenced the development of Gordon Creek and the locations of springs and seeps in the permit area. Faulting and fracturing provide conduits for surface water to enter the groundwater and allows movement between aquifers. Another major structural feature controlling groundwater occurrence is the Beaver Creek Syncline trending NE-SW with dip at approximately 3.5 degrees.

Locally, potential water bearing members below the Hiawatha coal seam includes the Blackhawk and the Blackhawk-Star Point aquifer. Both the Blackhawk and Star Point Formations serve as sources of spring and seep flows. According to Price and Arnow, 1974, the upper cretaceous sediments of the area have a low hydraulic conductivities and specific yields of 0.2 to 0.7%. Two pump tests from wells drilled in the Blackhawk formation in Eccles Canyon indicate transmissivities of 21 and 16.3 gallons per day per foot. The Blackhawk aquifers are generally laterally discontinuous perched aquifers and fluvial channel sandstones

The Hiawatha Coal Seam in the Blackhawk Formation directly overlies the Star Point Sandstone. The Star Point Sandstone consists of the Panther, Storrs and Spring Canyon Sandstone members from the stratigraphically lowest to highest member respectively. The Spring Canyon Member is composed of fluvial

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shales siltstone and channel sandstones (Section 6.5.2.1). The Star Point is approximately 900 feet thick in the Gordon Creek area. The recharge to the Star Point occurs primarily from vertical movement thorough the Blackhawk. The Applicant suggest that due to the low vertical permeability the magnitude of the recharge is limited. However, the vertical permeability from fractures in the area may be relatively significant.

Above the Hiawatha, the Castle Gate "A" coal seam overlies the Aberdeen Sandstone. Drill logs indicate this sandstone member thins near the mine and is discontinuous over the permit area pinching out on the east west stratigraphic section between LMC-4 and the Arco section. The sandstone is interbedded with silts tones and shales. The Applicant indicates this sandstone is not anticipated to be a significant aquifer because it has a thin interbedded lithology and no springs in the permit or adjacent area issue from the formation (Section 6). The Applicant has determined it is not practical to mine this seam in the permit area.

The floor of the Castle Gate "A" seam is carbonaceous silty shale to fine grained fluvial sandstone. Water production was not observed from the floor in previously mined areas according to the Applicant. The roof consists of carbonaceous silty shales over 80 % of the permit area and the remaining 20% consists of fluvial channel sandstones that initially produce water then tend to dry up. The general channel trend is NE-SW and the channels tend to increase in frequency to the West. If these channels connect with a Fault, water may be diverted to the mine workings and directed/redirected based on the prominent ground water control mechanisms. The flow rate would be dependent on the fault/channel systems transmissivity. Whether or not this connection exists is unknown

Other members containing aquifers above the coal to be mined include the Castle Gate Sandstone, the Price River Formation and unconsolidated alluvial sediment deposits. The Castle Gate Sandstone is exposed in the central and northeastern section of the lease block and is approximately 300 feet thick in the Gordon Creek area. The Price River formation overlies the Castlegate Sandstone and occurs in the north eastern portion of the permit area. Additionally, unconsolidated deposits occur along valley floors and at the base of steep slopes. Some of these deposits are recharged from the Blackhawk and Star Point aquifers. The thickest alluvial deposits in the permit area occur along Beaver Creek.

Local Drilling Information and Occurrence of Ground Water

The information regarding baseline groundwater data collection is discussed in Chapter 7, Section 7.1.2.2. Four exploratory holes drilled in 1970's and 1980's were recently monitored for water occurrence in 1995. Drill logs of Holes LMC 1, LMC 2, LMC 3, and LMC 4 are found in Appendix 3 A. Also, three wells were drilled and completed in the Star Point Spring Canyon Sandstone in 1995 and are discussed below.

Tables 1A and Table 1B were generated to present information gathered from the LMC drill holes and the HZ wells to present data used in determining ground-water occurrence in the permit and adjacent areas.

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Table 2.1
 LMC Drill Hole Information

HOLE ID	DATE DRILLED	DEPTH DRILLED	DEPTH OF PLUG	1992 Drill Hole Depth ft msl (depth)	CASTLEGATE Elevation ft msl (depth)	HIAWATHA DEPTH*
LMC-1	Sept. 1976	900 ft.	600 ft.	7,852 (599 ft)	7,658 (793 ft)	Unknown*
LMC-2	Oct. 1976	568 ft.	50 ft.	None	518 ft.	Unknown*
LMC-3	Nov. 1976	836 ft.	665 ft.	7,556 (664 ft)	7,590 (630 ft)	791 ft.
LMC-4	Jan. 1980	430 ft.	220 ft.	7,587 (217 ft)	7,698.8 (105.2 ft)	7,588.7 ft.

* Drilling completed before reaching the Hiawatha Seam.

The data presented indicate that groundwater occurrence above, within, and immediately below the Castlegate 'A' seam is not continuous and may be inconsequential in the strata above the mine. Documentation of the LMC drilling procedure was provided in a notarized letter from Mr. Joseph A. Harvey to Rich White, Engineering Consultant for Horizon Mine, on March 24, 1992 (Appendix 7-1). As stated in Mr. Harvey's letter, all these holes were drilled with air rotary, monitored for water occurrence, and found to be dry (during drilling). Thus, no water quality data was collected. Following drilling the drill holes were injected with compressed air and then mud for geophysical logging. The drill holes were abandoned by injecting cement. Mr. Harvey indicated there was an inability to cement the full length of the drill holes because there were large voids connected to the drill hole annulus, thus, resulting in the existing hole depths as measured in the 1995 monitoring.

If one can assume the drill holes would seep water during drilling, and given there were no noted water occurrences in the cuttings, then these drill holes indicate the stratigraphic members above, within, and below the Castlegate 'A' seam are probably dry. LMC 1 was originally drilled to 200 feet above the Castlegate 'A' seam. LMC 2 was originally drilled through the Castle Gate "A" seam. LMC 3 was originally drilled through the Hiawatha Seam and 32.8 feet into the Upper Spring Canyon Sandstone. LMC-3 is located north east of old workings developed from the Blue Blaze No.3, Castlegate "A" Seam. Drill hole LMC-4 extended through the Hiawatha Seam, ending 213 feet into the Storrs Sandstone. LMC-4 penetrates old workings in the Hiawatha coal seam and is located in an area that is possibly hydrologically disconnected from the majority of the area to be mined due to the surrounding faults (see Plate 6-1). Therefore, LMC-4 probably does not represent information on groundwater occurrences for the unmined portions of the lease outside of the surrounding faults.

Section 6.5.1.1 states that Drill holes LMC-1, LMC-2 and LMC-3 will be plugged and abandoned following State approved methods. Of the LMC drill holes, it seems as though well LMC-4 could provide information for the mined out area should it flood during or after mining. However, it appears to provide little useful information on aquifers in the baseline/operational phases for the proposed mining area. These wells should be capped now unless they are considered necessary for further monitoring purposes.

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Table 2.2
 HZ Drill Hole and Well Completion Information

Hole ID	Date Drilled	Drilled Depth ft msl (Depth from surface ft)	Completed Formation	Base of Hiawatha Coal Seam (ft msl)	Screen Completion	Water Elevation Dec.1995
HZ-95-1	12/13/95	7,272.6 (1080)	Star Point Spring Canyon	7331.6	7,277.6-7,287.6	7570.7
HZ-95-1S	12/5/95	8132.6 (220)	Blackhawk	NA	8,101.6-8,110.6	8221.5
HZ-95-2	12/5/95	7,146.3 (1200).	Star Point Spring Canyon	7189.3	7,151.3-7161.3	7519.3
HZ-95-3	10/28/95	7,427.6 (470)	Star Point Spring Canyon	7477.6	7,432.6-7,442.6	7522.7

With the information provided from the HZ wells, the Applicant has constructed a piezometric map for the Spring Canyon Sandstone. The presented information suggests the Spring Canyon aquifer has a hydraulic gradient of 0.014 and an east southeast direction. The overlay of the potentiometric surface and elevation of the Spring Canyon Tongue was used to estimate the saturated portion of the coal formation. The Applicant indicates the Hiawatha coal may be saturated very soon in the mining operations. It should be noted that the coal itself may not be saturated and water that may occur in mine could be produced from the floor.

In building the potentiometric surface map, the Applicant has assumed maximum water level fluctuations of + or - 30 feet based on Skyline Mine well data from 1982 to the present. The intent in using this data for this purpose is not clear since mining has occurred at Skyline and the change in water levels may not be considered "baseline" information, therefore the use of this data may not be appropriate for the comparison presented.

The HZ wells all appear to be drilled near associated fracture systems. The location of these wells near fractures may influence the assumptions used in the potentiometric surface presented in Figure 7-2. Each well, if fracture influenced, may respond according to the behavior of the fracture feature and not the overall piezometric surface of the Starpoint.

For instance the piezometric surface elevation varies by 51 feet over approximately 4,000 aerial feet between HZ95-2 and HZ95-1, having an approximate 0.0128 feet/foot water surface gradient between those wells. If one looks further into the structural geology of the area it would be noted that the permit area sits between a WNW-ESE trending fault. A gentle NW-NE dip is associated with the Beaver Creek Syncline. The Beaver Creek Syncline axis trends and plunges to the north. Rocks dip 3-5 degrees on both limbs of the fold except where steepened by fault drag or fault displacement. The fold follows Beaver Creek drainage up to Section 8, T13 S R8 E where Beaver Creek diverges from the

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axis to the north east along a suspected fault zone. HZ95-1 appears to be located on the other side of the Beaver Creek Fault Zone. If the structural geology controls the piezometric surface such that the south side of the Beaver Creek Fault Zone has a piezometric surface somewhat separate from the north side, a gradient for the piezometric surface may occur on the south side of Beaver Creek in a north west direction.

Except for the HZ-95-1S well, the majority of the springs issue above the presented Piezometric surface of the Starpoint wells. This may indicate the Starpoint is not in connection with the fractures. However, the Applicant has not completed this well fully through the formation and there is some question as to whether lower sandstone tongues may have a greater connection with the fractures. Additionally, no lithologic or geologic logs are presented and the initial occurrence of water was not presented in the MRP. Water levels, other than the December value, could not be located in the MRP. Because many of the formations in this region are fairly slow to transmit water it is unknown if the well has reached equilibrium. Additional water level information should be presented to substantiate that the wells are at equilibrium. No pumping test data or drill logs are presented for these wells. Pump testing or other methods of determining the hydraulic conductivity of these wells would provide a great deal of necessary information on whether these wells were influenced by the nearby fracture zones. Logs of these wells should verify whether aquifers exist above the coal seam as identified by the presented LMC holes. Unfortunately it appears these wells are all completed in the upper tongue of the Starpoint and are not completed through the formation. The Applicant must provide the geophysical and lithologic logs and hydrologic conductivity (pump test data) for these wells.

The advantage to the location of these wells becomes critical should the mining operations intercept the related fracture system. These wells will be useful in determining the first year mining impacts. However, the Applicant's five year mine plan proposes to mine through the Beaver Creek Fault Zone and will also mine through well HZ95-1 eliminating the third point used to monitor the Starpoint piezometric surface. The Applicant will, therefore, need to supply an additional well for the proposed five year lease area. Since mining this area is not approved in this permit this request is a consideration for future baseline needs. There is a possibility the information would be necessary to complete the CHIA if additional information does not adequately describe the groundwater system. It is recommended that the additional well be placed on the north side of Beaver Creek and outside of the proposed mining area, within the graben but, away from a local fracture and be completed through the formation, in each sandstone tongue: not just the first tongue of the Starpoint. It should be noted that the Deficiency from the previous Blue Blaze mine proposal required the well be drilled through the formation in order to mine into the Hiawatha coal seam.

Previous Mining History

According to the Applicant the Gordon Creek #2 Mine operated by BCCC in the Castlegate A seam received sporadic occurrences of groundwater inflow which dried in a short time period. The Gordon Creek #3 Mine operated by BCCC in the Hiawatha Seam (located east and down gradient of the permit area) received approximately 400 g.p.m. inflow when a 12 foot graben was encountered in the northeast section of the mine. Water was produced from the floor. When retreat mined later the area was dry as a result of previous dewatering or elevation differences upgradient of the mine. It was also deemed possible that groundwater stored in the fault zone did not have a significant recharge rate that maintained the flow.

The location and extent of all known abandoned underground mine workings within the permit area and adjacent area are not shown on Plate 3-3. This information is critical to the development of the PHC and the CHIA.

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Springs

The PAP indicates baseline reconnaissance information was gathered in the field with an Oil, Gas and Mining employee named Darin Worden from 1988 to 1990. Other information was derived from state and federal published open file reports. A complete spring and seep survey in the proposed permit and adjacent area was not conducted. Currently the PAP does not contain a map showing spring locations in the permit and adjacent area.

The baseline sampling information is gathered from springs which issue from the Blackhawk Formation and were characterized as Calcium Bicarbonate type waters.

Table 2.3
 Baseline Spring Sampling Summary
 (Summary of information from Plate 7-1, Figure 7-3 and Sections 7.1.3, 7.1.5 and 7.2.6)

Sampling Point	Monitoring History	Location (Formation)	Water Quality	Water Quantity	Comments
SP-1 1989 to present	Station #1 1989 through 1993	Issues from Hillside and flows into Jewkes Creek (Blackhawk Sandstone unit above coal seams 8195 ft msl.)	TDS 230-330 mg/l pH 7.5 - 8.5	Late Spring 10-15 gpm High flow on 5/89 was 45 gpm Late Summer/Fall 5 to 6 gpm	
SP-2 1989 to present	Station #2 1989 through 1993 (This description matches the station number 1 previously; Channel in North Fork of Gordon Creek.)	Issues from Hillside and usually flows approximately 100 feet (Blackhawk, 8005 ft msl)	TDS 480-540 mg/l pH 7.5 - 8.5	Flow in Late Spring 1-2.5 gpm Flow in Late Summer/Fall <1 gpm Dry 7/1991, 8/1991, through 12/1992	Spring flows through alluvium below the point of origin.
SP-4 1989 to present	#4 1989 through 1993	Jewkes Creek Drainage flows along road empties into Jewkes Creek (Blackhawk, 8102 ft msl)	TDS 350-480 mg/l pH 7.5 - 8.5	Flow in Late Spring 1-2.25 gpm Flow in Late Summer/Fall <1 gpm	Location not clearly mapped

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Sampling Point	Monitoring History	Location (Formation)	Water Quality	Water Quantity	Comments
SP-6 1989 to 1995	#6 1989 to 1995	Upstream from the proposed mine portal (Blackhawk)	N/A	dry from 1989 through 1995	This location is not a spring and will not be included in future monitoring
not found	Gunnison Homestead Spring/Tributary to Beaver Creek near confluence of spring discharge channel and Beaver Creek	(Blackhawk)	not discussed	3-136 gpm the 136 gpm included snowmelt runoff.	Location removed from Figure 7-3
SP-9	Jewkes Spring U.S.G.S. 1979-1983 Station 2-5-W Beaver Creek Coal Company 1985-1995	Near Beaver Creek Channel, south west corner of proposed LOM permit area. (Blackhawk, 8550 ft msl)	TDS 240-300 mg/l pH 7.5 - 8.5	Typical Late Spring flow 20 to 60 gpm decreasing late fall 1.10 to 38 gpm (Maximum flow on 7/85 was 1372 gpm considered inaccurate)	Location mapped on Figure 7-3 Information on flow discussion in Section 7.2.2.2 varies from Section 7.1.2.2

In Section 6.4.2 the Applicant has indicated a series of springs in the North Fork of Gordon Creek in the north west corner of Section 18 T13S R8 E may be related to faults bisecting the area. The North Fork drainage may have formed subsequent or contemporaneously with the movement along the Gordon Creek Fault Zone.

The Applicant has stated the Homestead Spring is one of the main contributing springs to Beaver Creek. However, the Applicant has not included this spring in the baseline or operational monitoring regime. The Applicant has identified this spring as important to Beaver Creek flows, but has not indicated why the spring should not be part of a sampling point (i.e.; why is this spring considered outside the zone of potential impact?).

Groundwater Quality

Two water quality samples were collected in the Blue Blaze No. 1 Mine workings, one in May 1992 and one in November 1995. The water was determined to be a calcium bicarbonate type with TDS ranging from 414 to 452 mg/l and pH from 6.8 to 7.66.

Groundwater collected from the HZ wells in December 1995, November 1996, and January 1996 may have been somewhat affected from the foam drilling fluid used during installation. Data analyses indicate TDS ranged from 380 to 680 mg/l. Due to the potential effects from the foam drilling additional water quality data is necessary.

Surface-Water Information.

The Horizon Mine lies within the headwater streams of the Price River Basin. Major drainages within the permit and adjacent area are; Beaver Creek north of the mine site, and the North Fork of Gordon Creek and Gordon Creek south of the mine site. The disturbed area drains into the North Fork of Gordon Creek. The State Division of Water Quality classifies Gordon Creek as Class 3C and Class 4 waters. These classifications are designated as; non-game and aquatic life, and agricultural uses, respectively. Beaver Creek, located over the future proposed mine workings, is classified as 1C and 3A, designated as domestic and agricultural uses respectively. Down stream of the proposed disturbed area in Gordon Creek there are fisheries. Information on the fisheries is lacking in the plan. For further discussions see the **Fish and Wildlife** sections in this TA.

Drainages adjacent to the proposed disturbed area are named for referencing purposes as shown on Plate 7-4. The following designated names are assigned for the drainages flowing through the proposed disturbed area:

- 1) Jewkes Creek - the main drainage through the site which joins the North Fork of Gordon Creek's main stem at the southern boundary of the permit area.
- 2) Portal Canyon - this drainage is the first drainage entering from the west after crossing the permit area boundary and joins Jewkes Creek. The portal entries are located in this drainage.
- 3) Spring Two Canyon - is the second drainage entering from the west after crossing the permit area boundary and joins Jewkes Creek. This drainage is upstream of the disturbed area.

Streams within the permit area receive their maximum flows in late spring and early summer as a result of snowmelt runoff. Flows decrease significantly during the autumn and winter months. Jewkes Creek has experienced no flow during the winter and late summer months.

Beaver Creek is a perennial stream with base flow maintained by seeps and springs. Beaver ponds are common in Beaver Creek and also play a part in providing perennial flows. Springs contributing to base flow include the Gunnison Homestead Spring, within one mile west of the

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proposed additional lease area, and Jewkes Springs one mile west of the permit area near the north west corner. Discharges from these springs vary between 3 to 136 gpm and 1.1 to 38 gpm respectively.

The USGS maintains a gauging station (09312700) near the mouth of Beaver Creek several miles northeast of the permit area with a period of record from 1960 through 1989. The minimum annual discharge for this period was 338 acre feet in 1961. The maximum annual discharge of 1,610 occurred in 1973. The average annual discharge for the 29 year period of record was 3,310 acre feet. Decreases in downstream flow are observed in Beaver Creek between monitoring stations SS-7 and SS-8. The decrease is most prevalent during the low flow season. This losing stream section may occur due to either alluvium, fracture and fault systems or other unknown factors.

The Applicant discusses the annual variability of flow in Beaver Creek. Although there is annual variability, the variability in base flow related to snowfall and possibly spring run off would provide more significant information. Snowmelt survey and precipitation information, where available, should be used to compare annual base flow changes with the precipitation rates.

Jewkes Creek drains a watershed area slightly greater than 1 square mile and discharges to the North Fork of Gordon Creek. The Applicant has referred to this stream as intermittent. The flow data submitted indicate that normally the creek flows all year at Sampling Point 5, but becomes intermittent at Sampling Point 3. The flow diminishes in a downstream direction beyond sampling point SS-5, infiltrates into the alluvium and does not reappear immediately downstream according to information in the PAP. Water may reappear one half mile down stream in the North Fork Gordon Creek where the Mancos shale outcrops. A potential reason for the diminished flows in this area may be due to recharge of subsurface soils in the riparian area near this monitoring site. Characterization, by collecting water quantity data and by observation in the North Fork of Gordon Creek, to determine whether this stream re-emerges as constant flow downstream should be made.

The North Fork of Gordon Creek flows along County Road 290 southeast of the permit area. The elevation of the creek is lower than the Hiawatha coal seam. The Applicant suggests the mining of the Hiawatha would not affect the quantity or quality of flow in the North Fork of Gordon Creek. However, the Applicant has shown the Spring Canyon Aquifer below the Hiawatha coal seam contains water and mining might reduce the piezometric water elevation potentially affecting the surface water in this stream. Discharge from the Starpoint aquifer to this stream section should be determined. Losing and gaining reaches in this section of the stream should be identified.

The proposed Five Year Mine Plan as shown on Plate 3-3, illustrates a proposed lease area to the north and east of the currently designated permit area. The surface water descriptions and baseline information for the permits adjacent area have not been presented. The Applicant's future mining operations are proposed to take place under Sand Gulch and an unnamed drainage to the north. No baseline information was collected for this area. In addition, Plate 3-3 shows the major fault systems which run northeast and southwest of the proposed mine operations. This fault system should be used to describe the geologically defined adjacent area. The graben and fault system appears to extend all the way up to Jump Creek. Additional baseline information will be necessary to permit this site in the

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future and may be necessary to complete the CHIA. Further baseline sampling should focus on the springs and surface waters potentially impacted through intercepting water from faults and fractures and diverting. Baseline information should extend to Jump Creek until adequate information is supplied to the Division to consider Jump Creek outside of the adjacent area.

Table 2.4
 Baseline Surface Water Sampling

Sampling Point	Location	Flow	Water Quality	Comments
#3 1993 through 1995	Channel in Jewkes Creek /below disturbed area upstream of the intersection with the North Fork of Gordon Creek and below the surface facilities.	Intermittent	TDS 388 to 799 mg/l. Total Fe < 0.02 to 8.7 mg/l Total Mn < 0.01 to 0.05 mg/l TSS < 1 to 72 mg/l pH 6.25 to 9.5	Information presented in the text does not match the data in appendices
#5 1993 through 1995	Jewkes Creek upstream of disturbed area but downstream of the confluence with Spring Two Canyon.	Perennial	TDS 198 to 550 mg/l. Total Fe .05 to 3.9 mg/l Total Mn 0.05 to 1.0 mg/l TSS 1 to 245 mg/l pH 6.7 to 8.99	Information presented in the text does not match the data in appendices
#6 1991 through present	Right Fork North Fork Gordon Creek In the east Drainage above proposed portals and disturbed area	Ephemeral	Removed from proposed monitoring schedule. Samples were never obtained.	This should be monitored on the same day as sites 3 and 7 when sampling during a precipitation event or snowmelt period
#7 1991 through present	Beaver Creek above pond upstream of the proposed future permit area outside of potential subsidence zone?.	Perennial	TDS 216 to 353 mg/l. Total Fe 0.05 to 5.19 mg/l Total Mn < 0.1 to 0.19 mg/l TSS < 1 to 297 mg/l pH 6.0 to 8.54	Beaver Creek tends to have a lower TDS than Jewkes Creek.

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Sampling Point	Location	Flow	Water Quality	Comments
#8 1991 through present	Beaver Creek station downstream, does not appear to be downstream of potential impact area for future mine plan.(see Plate 3-3 and 7-1).	Perennial	TDS 192 to 357 mg/l. Total Fe <0.02 to 1.3 mg/l Total Mn <0.01 to 0.078 mg/l TSS 4.0 to 52 mg/l pH 6.6 to 8.69	Flows tend to be lower than the upstream Beaver Creek station. Located near the Fault system.
2-2-W	Gordon Creek above confluence of North Fork Gordon Creek below the Hiawatha	Perennial	Not discussed.	Impact more likely to be below confluence because of fracture system.
2-3-W	Beaver Creek	Perennial	Not discussed	Monitored by Beaver Creek Coal. Not found on any map
2-4-W 1982-	Beaver Creek 1 -1/2 mile west of permit area	Perennial	Not discussed	Monitored by Beaver Creek Coal.

The Applicant has not adequately discussed the variation in the data presented as baseline information. Data presented in the text does not reflect data presented in the appendices.

Baseline Cumulative Impact Area Information.

A cumulative impact area assessment is being conducted by the Division. Currently there is not enough information in the plan to definitively determine the adjacent area associated with proposed surface mining activities.

Modeling.

No specific modeling was presented.

Alternative Water Source Information.

In Section 7.1.6 the Applicant purports no significant impacts are foreseen to ground water as a result of mining in the permit area. In Section 3.4.3, page 3-18, the Applicant states, "As noted in Section 7.1.6, alternative sources will be developed and provided if water rights or uses are affected by mining operations", however, no discussion on alternative sources were presented in this section. Section 3.4.3 states, "Should Horizon's mining activities cause an adverse impact on the areas water supply, the Applicant intends to mitigate the effects. The mitigation will be negotiated between Horizon and the injured party".

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Because "Alternative Water Source Information" applies to Surface Mining and Reclamation activities under R645-301-727 there are no requirements under this regulation as it applies to underground mining. However, the Applicant is required to notify the Division of Oil Gas and Mining when analysis of any ground-water or surface water sample indicates non compliance with the permit conditions, which include the performance standards under 752.220 through 752.250. The Division of Water Rights and other agencies may also request notification should a water use be disrupted.

Information provided in the PAP indicate the water rights applied for are a leased right and not an acquired right. Therefore, the Applicant would not be able to replace a right with these sources should diminution or quality of a water right be impacted through mining activities.

In the MRP, Section 3.4.3, the Applicant should remove the reference to discussions found in Section 7.1.6, regarding replacement of water rights, since there are no such discussions. The Applicant should cross reference Section 3.4.3, which describes the actions to be taken should loss of a water right use result from mining activities under Section 7.1.6 in order to provide a clear plan. The requirements under R645-301- 731.223 and 731.212, should be addressed. The Applicant should provide a plan which clarifies who will be notified should it be known that a water resource has been impacted by mining activities

Probable Hydrologic Consequences Determination.

Acid- and Toxic-Forming Material

Operational Monitoring and Identification of Acid- and Toxic-Forming Materials

The Applicant has not provided a specific discussion for the potential for acid and toxic forming materials under the Probable Hydrologic impacts. However, the Applicant provided the following in other sections of the plan:

- 1) Disposal of waste rock from partings and splits will be in underground workings. No acid or toxic forming materials are present in the overburden or underburden for samples analyzed (Section 6.5.7.1), suggesting no acid or toxic forming materials will be in the partings. The waste rock will be backfilled and compacted after second mining subsidence occurs and the waste rock will not be saturated, thus, water quality would not be impacted (Section 3.3).
- 2) If underground waste cannot be blended, sold, or gobbed, arrangements will be made to dispose of this material in permitted refuse piles at a nearby mine.
- 3) Noncoal waste rock from initial development will be incorporated as fill in the mine yard (Section 3.3).

Table 6-5 summarizes the quality of the Hiawatha Coal seam. The acid base potential of each of the three coal samples collected from the HZ-series holes indicate the coal has a potential to be acid-forming (Section 6.5.6). Coal will be stored on the surface for short periods and run off from the coal stockpile will be routed through the sedimentation pond where it will mix with run off water that is more alkaline.

Tests for acid and toxic forming materials were conducted on roof and floor samples in LMC-4 and HZ drill holes. One sample contained a high pyritic sulfur content of 0.24 percent. The Applicant suggests

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this pyritic sulfur content is likely of limited areal extent. This information conflicts with the statement in Section 6.5.7.1.

In Section 6.5.6, the Applicant has presented analysis from a core sample of the coal obtained from the Hiawatha Seam, drill hole LMC-4. The presented analyses has a sulfur content of 0.47% of which 0.04% is Pyrite Sulfur with Marcasite, 0.038% Pyrite and 0.002% is Marcasite.

All of the coal will not be removed from underground. Much of this coal will be in contact with air and water during the mining operations and may cause a lowering in the pH of those waters. Currently water from the old Blue Blaze No.1 Mine workings are shown to have a pH of 6.8 to 7.66. In general, these are lower than the surrounding area pH values.

Acid forming discharges have been uncommon and are generally not regionally extensive. Should the presence of pyrite in the mine area cause a decreased pH locally the mixing with higher pH waters in the system would result in localized affects due to downstream buffering.

Where material is trucked to permitted refuse piles at a nearby mine, the acid and toxic characteristic of this material should be known at the permitted mine receiving the waste.

Potential Groundwater Impacts

The Applicant indicates inter basin transfer out of the Price River drainage cannot occur in this region. However, inter basin transfer between Beaver Creek and Gordon Creek could occur. Because the coal seams dip away from the portal entrance, flow is likely to be sumped underground and could be directed toward the fault systems to the northwest, however, the Applicants information indicates the Piezometric surface for the Starpoint regional aquifer is to the east southeast. Flow will occur in the direction influenced by the prevailing geologic controls which are not definitively known at this time.

The control of faulting on groundwater flow can be seen by comparing the potentiometric surface map to the geologic structure. The Applicant indicates that due to low permeability, and due to the plan to avoid mining into faulted zones, in flow to the mine from faulted zones is projected to be minimal (Section 7.1.2.2). Discussions on how the faults will be avoided were not presented.

The Applicant has concluded that the Hiawatha coal seam will be saturated from the beginning of mining operations. The rate of inflow will depend primarily on whether a faulted zone is encountered that contains groundwater in storage or that is in connection with an overlying perched aquifer. Although the possibility of a significant sustained inflow occurring is probably low to moderate, the actual potential impact from intercepting a fracture reservoir and depleting or intercepting the flow is moderate to high. A resulting loss of head could disrupt stream and spring flows and possibly recharge the fracture zone down dip to the north east or in the direction of regional flow to the east southeast. Changes in quantity and quality to spring and surface water discharges associated with the faults could be the result.

Waste rock from the mining procedure is proposed to be gobbed underground and backfilled. Because the materials will have an increased surface area due to removal the potential impacts, should water and air come in contact with the materials, would be increased TDS (ions in solution) and potential acid and toxic formation. Data from a recent underground mine water sample from the No. 1 Mine is found in

Chapter 7 and may be indicative of some potential water quality changes. See the section above on **Acid and Toxic Forming Materials** in this TA.

Section 3.3.1, Plate 3-3, does not show all known and existing mine workings in the permit and adjacent area. These areas are critical to supporting documentation regarding the Probable Hydrologic Consequences of mining as it might relate to other mines v.s. the proposed Horizon Mine. The operator must include this information in the plan for all seams and mining in the permit adjacent area.

The Applicant states, "It is not anticipated that large quantities of ground water will be encountered throughout the duration of mining". The Division believes the potential for impact increases, if water is intercepted by mining through paleochannels associated with fractures, or a water bearing fault/fracture system is intercepted by mining activities. The potential for impact appears to be highest if fracture associated flows in the Hiawatha Seam are intercepted as occurred in the Beaver Creek Coal Mine.

The Applicant has estimated the "worst case" potential inflow through a porous formation (exclusive of fracture flows) to be 2.6×10^{-4} and to have an average potential inflow of 1.5×10^{-4} . Or, a flow rate of 9 and 5 gpm per section. Assuming six sections the total potential inflow would vary between 30 and 54 gpm. This information assumes a worst case scenario between 270 to 130 feet of head. Therefore, the potential is that a decrease of head in the Starpoint aquifer of between 270 and 130 feet could occur over time. The extent to which this affects the adjacent area is limited to the interaction of the members along the fault zones and determination of discharge areas. The aquifer may be dewatered within the graben with out interaction with the fracture/fault related waters or, may affect the waters associated with the fault system.

Potential Surface Water Impacts

On page 7-22, the Applicant states that proposed mining operations will occur north of Gordon Creek and should not effect the quantity or quality of water in this drainage. However, it was noted that approximately 400 g.p.m. inflow was produced from the floor when mining the Hiawatha Seam. This information, along with the dewatering estimates discussed above under the *Potential Groundwater Impacts* of this T.A., indicate there may be a potential to intercept groundwater flow from below the Star Point below the Hiawatha Seam. This flow interception could impact base flow to Gordon Creek, or relocate the source of the flow. Supporting information can be determined by assuming the control point for the piezometric surface would likely be at the elevation related to the dip. With a dip of 5.3% to the northwest an outcrop elevation of approximately 7,600 and a maximum linear distance down dip of 5,000 feet the zone of influence most likely to be impacted below the Hiawatha Seam would be from approximately 7,600 ft to 7,335 ft. This is also within the range of the piezometric surface of 7,500 and is in the general direction of the assumed groundwater flow. Water quantity, water quality, and loosing and gaining sections for reach segments should be determined for Gordon Creek above and below this section. A continuous recording flume is recommended for operational monitoring if the characteristic of the stream is determined to be potentially impacted.

The Applicant indicates the water associated with the Beaver Creek Coal Company No. 3 Mine is believed to be in communication with Beaver Creek and will be avoided when mining the proposed Horizon No. 1 Mine. Avoidance will occur by closely monitoring the activities in the fault area. The Applicant has not demonstrated why they believe the communication with Beaver Creek exists and has not provided a monitoring plan which addresses this potential impact.

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Subsidence Control and Renewable Resource Protection

The Stream Buffer Zones will be maintained beneath Beaver Creek and the North Fork of Gordon Creek should mining proceed beneath either creek (Section 3.3.2.2).

The proposed stream channel buffer zone is shown on Plates 3-1 and 3-3. Retreat mining will not occur under those areas shown to be within the buffer zone. A discussion on the width of the buffer zone was not found. The Applicant has stated that mining is designed to preclude subsidence of perennial and intermittent stream reaches. Specifics to the statements regarding these buffer zone areas could not be located. However, comments made by the Applicant suggest that massive sandstone units make it unlikely that subsidence will reach the surface, and swelling shales in the overburden would have a tendency to heal fractures.

According to the Applicants subsidence plan a measurable subsidence effect would include a marked decrease in flow of 30%. In order to determine whether a marked decrease in flow occurred frequent monitoring would be required. The Applicant should describe how the monitoring plan monitors for this potential impact.

The Applicant suggests the following reasons indicate potential for damage due to subsidence will be low because no noticeable mining subsidence has occurred in the Gordon Creek #2 area (mined over 40 years ago) and in the Consumers No. 3 Mine, Section 3.2.3. The following areas were previously mined beneath Beaver Creek

- Swisher Coal Company mined under Beaver Creek in the northern most west panel of the Castle Gate "A" seam in January 1978. Overburden is approximately 650 ft.
- Beaver Creek Coal company mined under Beaver Creek in the "A" panel in September 1981. Overburden was approximately 425 feet.

The Division has received a Public Complaint that suggests subsidence has occurred in areas of Beaver Creek. This concern is under further investigation. The Applicant states that during previous mining in the area no documented indications of significant mining related flow depletions were evident. No data reference supported this statement.

Although longwall mining subsidence occurs immediately following mining, room and pillar subsidence may not occur for a long period of time. The proposal to monitor subsidence annually for two years following cessation of mining is probably adequate for determining immediate subsidence response. However, prior to bond release the lack of, or presence of, subsidence should be confirmed.

Statements in the PAP indicate that if significant inflow of groundwater occurs mitigation measures may include; attempts to seal the inflow, increased monitoring program, lining the stream bed through an affected area, and replacement of water, should it be indicated through monitoring to be mining related (Section 3.4.8.2). In Section 3.4.8.4, the Applicant commits to notify the Division in writing and begin implementation of the approved mitigation plan if adverse impacts to Beaver Creek are noted as a result of mining. The Applicant will be encouraged to complete short term mitigation measures such as sealing the flow from in the mine. However, Division notification should occur as soon as possible and coordination with concerned parties may be necessary prior to approval of a site specific mitigation plan.

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Water Use

"Water will be pumped from the North Fork of Gordon Creek into the mine for use in dust abatement". Based on the predicted inflow information the Applicant has estimated approximately 31 acre feet per year will need to be pumped into the mine, while it is estimated that 41 acre feet will be removed with the coal each year. The water rights applied for by the Applicant exceeds the predicted water needs.

Sediment Yield

The potential for increased suspended solids and sediment loading to Gordon Creek is probably highest during the construction phase of operation and reclamation. The Applicant has committed to monitor for turbidity of the water upstream and downstream of the site during the construction phases. A criteria for Class 3C allows a turbidity increase of 15 (NTU).

Increases in sediment during the operational period will be minimized through the use of a sedimentation pond and drainage controls. The Applicant has also committed to store snow in sites that will directly drain to the sedimentation pond (Section 3.3). During the reclamation period it is not clear whether alternate sediment control measures or sedimentation pond measures will be used.

Surface Water Quality

Currently coal mining waste may exist near Test Pit No. 8. This waste (potentially 9,718 cubic yards) is proposed to be stockpiled adjacent to the coal stockpile and blended (Section 3.3.2.7). The Applicant has stated that if acid and toxic materials remain on site they will be buried by 4 feet of cover. Currently water moves through the fill and seeps toward Jewkes Creek. The water quality of this site is likely to be improved with the proposed reclamation measures.

The Applicant should provide a discussion on potential changes in water quality based on data obtained from the Blue Blaze in mine waters. Based on impacts from other mining operations the potential for increased TDS is likely in the permit area. The Applicant sites downstream increases in TDS when flowing over Mancos as a factor in considering impact as minimal. Because downstream waters are naturally degraded the use and quality of the upstream waters retains its importance. However, impacts to downstream waters would probably not be notable.

The road to the mine is maintained as a gravel road therefore the use of road salting is not likely to affect water quality.

Hydrocarbons

Horizon Coal indicates Diesel fuel, oils, greases and hydrocarbon products will be stored above-ground and may be spilled in the mine and on the surface during mining operations. An above ground 5,000 gallon diesel fuel tank will be located between the coal stockpile and the truck turn around as indicated on Plate 3-1 (review plate for proximity to surface water). A shop maintenance area will be located next to the mine office area.

The Applicant proposes the berm surrounding the tank will be adequate to contain the total volume of the tank, in the event water needs to be drained from the berm. The Applicant indicates spills will be

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handled in accordance with the Spill Prevention Control and Countermeasure (SPCC) Plan. This plan is provided in draft form without a certified signature in the PAP under Appendix 7-8. Elements of the plan include:

- Visual inspection of all tanks, associated valves piping and containment areas
- Notification to the Mine Manager and containment of the spill
Reporting requirements for spills
- Procedures for preventing spills during filling tanks.
- A copy will be maintained on file in the Mine Manager's Office and the Mine Engineer's office.

The Applicant's proposal uses accepted practices for their SPCC plan. The Applicant should include clean up procedures for small scale spills, commit to retain absorbent materials on site and, should provide either a concrete containment structure with a drain or provide for disposal and sampling of the earth material below the fuel tanks and areas of hydrocarbon use.

The Applicant can provide additional reasonable operation measures to minimize hydrologic impacts on and off the permit area.

Flooding or Streamflow Alteration.

The Applicant discusses the potential for flooding as being diminished due to the sedimentation pond reducing peak flows. In addition to the Applicants comments, it is likely that the water flowing through the culvert will have increased flow velocity over the natural velocities for the same discharge rates. A potential impact includes downstream erosion. The Applicant has provided riprap channel designs for the velocities than may occur from a 100 year- 6 hour event which meets the minimum regulatory requirements. Other potentials for streamflow alteration are discussed under Potential Surface Water Impacts and Potential Groundwater Impacts.

Findings:

The plan does not fulfill the requirements of this section.

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

R645-301-114.100

The Applicant must: 1) include in the plan information which demonstrates the right to the proposed water use(s) related to mining activities is granted prior to their use.

R645-301-724

The Applicant must: 1) provide a table of the baseline parameters monitored; 2) commit to collect baseline parameters every fifth year prior to permit renewal, at low flow, as indicated in the Division water monitoring guidelines; 3) Include in the plan a summary which gives the starting and termination dates of all actions taken pursuant to baseline accusation, (this summary should include a

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discussion of the changes made in baseline acquisition and the time period in which baseline data was gathered according to those parameters); and, 4) identify the adjacent area for the hydrologic balance based on potential surface and ground water impacts which include geologic controls on groundwater.

R645-301-724.100

The Applicant must: 1) provide additional water level information to substantiate that the HZ wells are at equilibrium; 2) provide the geophysical and lithologic logs and hydrologic conductivity (pump test information) for these wells and include applicable discussions in the text; 3) provide additional water quality information, without the affects of the drilling fluid, to characterize the baseline water quality of the HZ wells; 4) provide a map showing spring locations in the permit and adjacent area; and, 5) describe why the Gunnison Homestead Spring is considered a source spring for Beaver Creek but, is not included as a monitoring site, or describe why the spring is not within the potential impact area,

R645-301-724.200

The Applicant must: 1) demonstrate, to the satisfaction of the Division, that the North Fork of Gordon Creek, Sand Gulch, the "Unnamed Tributary" to Beaver Creek and Jump Creek will not be affected, in the quantity or quality of flow, by mining operations or provide baseline and operational water monitoring plans for these surface waters; 2) clarify by observation and quantitative monitoring whether the intermittent flow at surface station number 3 reemerges as perennial flow downstream; and, 3) provide for the installation of additional baseline surface water stations with continuous recording flumes on the North Fork of Gordon Creek, Jewkes Creek and Beaver Creek unless it can be demonstrated to the Divisions satisfaction that the proposed monitoring is adequate to determine impacts to these streams.

R645-301-728

The Applicant must: 1) provide a finding in the PHC or reference applicable portions of the text to address whether acid- and toxic-forming materials could result in the contamination of surface or groundwater, and whether adverse impacts may occur to the hydrologic balance; 2) correct the statement contained in Section 6.5.7.1. to reflect the information regarding roof and floor material where a sample contained a high pyritic sulfur content; and, 3) provide the location and extent of all known abandoned underground mine workings within the permit area and adjacent area.

R645-301-731

The Applicant must: 1) correct Section 3.4.3 of the PAP, since there is no discussion found in Section 7.1.6 regarding replacement of water rights; 2) provide a cross reference to Section 3.4.3 under Section 7.1.6, so the plan is clear and accurate in describing the actions to be taken should loss of use of a water right result from mining activities; 3) provide a discussion in the PHC on potential changes in water quality based on data obtained from the Blue Blaze in mine waters; 4) provide a certified copy of the SPCC Plan and include clean up procedures for small scale spills, a commitment to retain absorbent materials on site, and provide either a concrete containment structure or provide other methods for disposal and sampling of the earth material below areas of hydrocarbon use that prevents surface and ground water impacts; 5) provide a discussion on the width of the buffer zone for perennial and intermittent streams that may be mined under and provide specifics on how mining is designed to preclude subsidence of perennial and intermittent stream reaches; 6) provide data to support the statement that indications of significant mining related flow

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depletions were not evident for previously mined areas; and, 7) commit to immediately notify the Division and other concerned parties, and obtain approval for site specific mitigation plans prior to completing final mitigation measures if impacts occur to perennial or intermittent streams due to mining activities.

R645-301-731.200

The Applicant must: 1) clarify how groundwater and surface water monitoring will be used to determine the impacts of mining operations on the hydrologic balance; 2) include a description indicating how water monitoring of Beaver Creek will be used to determine whether a marked decrease in flow occurred due to subsidence or intercepted flows from fracture/fault systems; and, 3) provide the description on how operations will be conducted to minimize interception of water bearing faults/fractures, based on the potential to mine into faults/fractures.

R645-301-731.220

The Applicant must: 1) clarify the purpose of proposed monitoring sites identified in Sections 7.2.2.2 and 7.2.2.3 which conflict; and, 2) provide the location of the NPDES pond discharge monitoring point on the monitoring map.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

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

Analysis:

All of the plates in the plan, including the resource information maps listed in this section, consist of, or are based on, old Swisher Coal Company maps. The plates were created originally as part of the mine plan for the proposed Blue Blaze operation. They were revised in 1990 to include the proposed permit and disturbed area boundaries, the proposed surface facilities, additional geologic information, and other information relevant to that operation. They were again revised in early 1996 to correct some inconsistencies in the permit area boundaries and to update them to the applicant's format. All were certified in 1996, after their latest revision, by Richard B. White, a professional engineer registered in the state of Utah.

Affected Area Boundary Maps

The affected area, as defined by R645-100-200, includes both the area of actual surface disturbance and the area above the underground mine workings, which might be affected by subsidence resulting from the underground mining operation.

The boundary of the disturbed area of the Horizon Coal operation, which includes proposed as well as previous disturbance, is shown on Plate 3-1--Surface Facilities. The boundaries of all areas which are to be newly disturbed by this operation are also shown on Plate 3-6--Premining Topography and Plate 3-7--Post Mining Topography.

The boundary of the permit area, including the disturbed area, is shown on Plate 1-1--Permit Boundary. It is also shown on the other relevant maps.

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The boundaries of the disturbed area, as well as those of its component areas of previous and proposed disturbance, are shown adequately on Plates 3-1, 3-6, and 3-7.

Archeological Site Maps

No known archeological sites are located within or immediately adjacent to the permit area.

Coal Resource and Geologic Information Maps

The nature, depth, and thickness of the Hiawatha (lower) Seam, which is the seam to be mined, the coal and rider seams above that seam, each stratum of the overburden, and the stratum immediately below the Hiawatha Seam, as determined from borings at individual sites designated LMC-1, LMC-2, LMC-3, and LMC-4, are shown on Plate 6-1--Geology. These same data are shown in more detail in geologic cross sections on Plate 6-2--N-S Geologic Cross Section and Plate 6-3--W-E Geologic Cross Section.

Cultural Resource Maps

No public parks, and no cultural or historical places or cemeteries which might be listed or eligible for listing in the National Register of Historic Places, are found within the permit area. This finding was made by State Historical Preservation Officer Jim Dykman and documented in an October 24, 1995 letter to the Division.

Existing Structures and Facilities Maps

The locations and dimensions of all existing structures and previously disturbed areas within and adjacent to the permit area, including buildings, dams, embankments, and areas wherein spoil, waste, coal development waste, and noncoal waste have been disposed of, are shown on Plate 3-1--Surface Facilities and Plate 3-6--Premining Topography. The boundaries of all areas which are to be newly disturbed by this operation are also shown on Plate 3-6--Premining Topography and Plate 3-7--Post Mining Topography. These maps show that most of the permit area has not been disturbed, but that all of the proposed 10.77-acre disturbed area and much of the land contiguous to and surrounding it have been disturbed repeatedly in the past by other mining operations, by camping and offroad vehicles, and by livestock-related activities. Consequently, the entire area is sparsely vegetated, is covered with coal waste, debris, and trash, and contains old concrete building ruins, old highwall remnants, and abandoned portals and portal faceups.

Representatives of the Division visited this site several times in 1991 and 1992, in connection with the Division's review of the original Blue Blaze proposal, in order to observe the site and check the accuracy and completeness of the maps, which are identical to the maps found in the present plan. The Division found that the existing structures and facilities maps--Plate 3-1--Surface Facilities, Plate 3-6--Premining Topography, and Plate 3-7--Post Mining Topography--accurately show all existing structures, facilities, and previously disturbed areas within the permit area, as defined in this section, and thus fulfill the requirements of this section.

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Existing Surface Configuration Maps

The topography of the proposed disturbed area is shown by contours on Plate 3-6--Premining Topography and by profiles on Plate 3-2--Premining and Operational Cross Sections. Plate 3-6 also shows the extent and nature of existing disturbance and all existing manmade structures.

Representatives of the Division visited this site several times in 1991 and 1992, in connection with the Division's review of the original Blue Blaze proposal, in order to observe the site and check the accuracy and completeness of the maps, which are identical to the maps found in the present plan. The Division found that the maps cited in this section--Plate 3-6--Premining Topography and Plate 3-2--Premining and Operational Cross Sections--accurately show the existing surface configuration of the proposed disturbed area, as defined in this section, and thus fulfill the requirements of this section.

Mine Workings Maps

The location and extent of all known abandoned underground mine workings, including mine openings to the surface within the proposed permit and adjacent areas, are shown on Plate 3-3--Five Year Mine Plan. There are no active underground mines and there has been no surface mining within the permit and adjacent areas.

Monitoring Sampling Location Maps

Both geologic and groundwater information were obtained from test borings done at sites designated LMC-1, LMC-2, LMC-3, and LMC-4. The locations of these sites are shown on Plate 6-1--Geology and Plate 7-1--Water Monitoring Locations.

Information on water quality and quantity was obtained from monitoring stations designated 1, 2, 3, 4, 5, 6, and 7. The elevations and locations of these sites are shown on Plate 7-1--Water Monitoring Locations.

Permit Area Boundary Maps

The permit area boundary is shown on Plate 1-1--Permit Boundary and on all other relevant maps.

Subsurface Water Resource Maps

The aquifers associated with the Castle Gate "A" seam were determined to be discontinuous over the area to be mined and therefore have not been mapped. Information for the Hiawatha seam is presently being gathered.

Surface and Subsurface Manmade Features Maps

All surface and subsurface manmade features within and adjacent to the permit area are shown on Plate 3-1--Surface Facilities and Plate 1-1--Permit Boundary. These include the concrete ruins of several abandoned buildings, a substation, a short segment of powerline which feeds the substation and continues to the west, a short, gravel surfaced segment of Utah State Highway 139, and an unimproved dirt road which starts at the state highway, crosses the southwest corner of the permit area, and continues to the northwest.

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There are no major electric transmission lines, pipelines, agricultural drainage tile fields, or occupied buildings in or within 1,000 feet of the permit area.

Surface and Subsurface Ownership Maps

All boundaries of lands and names of present owners of record of those lands, both surface and subsurface, included in or contiguous to the permit area, are shown on Plate 4-1--Land Use and on Figure 4-1--Surface Ownership (page 4-4) and Figure 4-2--Coal Ownership (page 4-5).

Surface Water Resource Maps

While surface water drainages can be found on surface maps, names or designated labels are not presented. In order to have a clear understanding of the surface hydrology discussions and designs the Applicant must provide adequate labels for drainages that may be referenced altered or changed during mining and reclamation operations. The names of important perennial and intermittent drainages where available must be included for surface waters in the permit and adjacent area.

Vegetation Reference Area Maps

No vegetation reference areas are proposed for the vegetation success standard.

Well Maps

There are no gas or oil wells within, and no water wells within or adjacent to, the proposed permit area, as shown by Plate 3-1--Surface Facilities and Plate 1-1--Permit Boundary. These maps, as stated above, show all surface and subsurface manmade features within and adjacent to the permit area.

Findings:

The plan does not fulfill the requirements of this section. The applicant must provide the following, prior to approval, in accordance with the requirements of:

R645-301-120

The applicant must provide adequate labels for drainages that may be referenced, altered or changed during mining and reclamation operations. The names of important perennial and intermittent drainages, where available, must be included for surface waters in the permit and adjacent area for all appropriate maps.

OPERATION PLAN

SUMMARY OF OUTSTANDING DEFICIENCIES

FISH AND WILDLIFE INFORMATION

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

R645-301-358.400

The applicant will avoid disturbances to wetlands and riparian vegetation. Avoidance measures must be investigated and discussed in relation to the designated wetland.

R645-301-358

Map 10-1 must clearly show which raptor species belongs to which nest. Plate 3-3, as identified on page 3-17 does not show the area to be protected from second mining around the eagle nest as committed to and therefore must be shown or otherwise stated.

TOPSOIL AND SUBSOIL

Information regarding this section was found not to meet all of the minimum regulatory requirements. The applicant must provide the following prior to approval, in accordance with the requirements of:

R645-301-231.100

The permit must clearly depict and/or describe where the topsoil/growth medium will be salvaged. An Isopach Map and/or detailed description is required in order to quantify available material.

The permit must identify all available soil/growth medium on site. Current described quantities indicate nine inches of available topsoil/growth material. The application must discuss potential additional material and/or borrow sites and the quality of the upper four feet of fill material.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

The plan does not fulfill the requirements of this section. The applicant must provide the following, prior to approval, in accordance with the requirements of:

R645-301-521.170, R645-301-527, R645-301-534

The applicant must revise the plan to accurately and completely describe the permitted roads. The road description found in the list of surface facilities on pages 3-2 and 3-3 must be made to correctly describe and classify the Main Haul Road and the Hiawatha Fan Portal Access Road. The map and design for each road must include, at a minimum, a plan view of the road, appropriate lateral cross sections (a single typical cross section will suffice if the cross-sectional configuration of the road is fairly uniform over its entire

length), a simple longitudinal cross section which shows the road's gradients and the cuts and fills made in its construction, and specifications for each of the road parameters listed under R645-301-521.170 and R645-301-527.210. Since the Main Haul Road will be a primary road, its designs must be certified by a registered professional engineer, as required by R645-301-512.250.

SPOIL AND WASTE MATERIALS

The plan does not fulfill the requirements of this section. The applicant must provide the following, prior to approval, in accordance with the requirements of:

R645-301-521.165, R645-301-528.300

The applicant must revise the plan to adequately describe the temporary surface storage of underground development waste and any waste material from the embankment near Test Pit #8. The surface facilities map must show the site of the waste storage pile and the plan must specify its operation and design parameters (approximate dimensions, maintenance plan, drainage control). The plan must also provide for the disposal of underground development waste at another permitted site in the event that it cannot be placed underground.

HYDROLOGIC INFORMATION

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

R645-301-742

The Applicant must: 1) either obtain an additional mine water discharge point for the UPDES permit or, adequately design the sedimentation pond to treat mine water discharge. Correct the statement regarding dewatering plans under Section 3.3.1.6. which conflicts with the remainder of the plan; 2) provide the even numbered pages to the copy of the UPDES permit; 3) provide designs which demonstrate the Applicant has prevented to the extent possible additional contributions of sediment to the adjacent area where undisturbed drainages have steep slopes up to 0.5 feet/foot (failure is common with riprapped drainages at this slope), and; 4) remove the discussions of excess design capacity for the sedimentation pond or provide technical design information for the estimated erosion sediment production; and, 5) clarify proposed permitting actions for Sweets Pond.

R645-301-731.121

The Applicant must: 1) provide the protection of aquatic life through providing an oil skimming design on the sedimentation pond.

R645-301-742.322

The Applicant must: 1) provide the calculations for the values presented to demonstrate that the design capacity for the intermittent stream is at least equal to the unmodified stream channel above and below the site.

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R645-301-742.300

The Applicant must: 1) provide filter blanket designs for the riprapped spillway outlet.

R645-301-742.400

Provide a discussion on information specific to road drainage designs.

R645-301-730

To meet all applicable federal and state laws the Applicant must obtain a stream alteration permit.

R645-301-731.500 and .513

The Applicant must: 1) address the requirements of this regulation as it relates to the proposed underground water rights to be used in the mine.

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OPERATION PLAN

MINING OPERATIONS AND FACILITIES

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

Analysis:

General

The Horizon Coal operation will be located in Gordon Creek Canyon, approximately 14 miles northwest of Price, Utah. All coal and surface land now in the permit area is privately owned. The mine will operate in the Hiawatha Seam. Production is expected to be about 700,000 tons per year.

The applicant now holds a lease with Hidden Splendor Resources, Ltd. A right-of-way granted to the applicant by BLM in 1996 (ROW Application UPU-73227) will allow the applicant to mine about one year's worth of reserves. On August 16, 1995, the applicant filed a lease application with BLM (Application No. UPU-74804) for an additional 1,288 acres of Federal coal to the northwest of the present permit area. This lease area contains an estimated 4 to 5 years' worth of coal.

Type and Method of Mining Operations

The Hiawatha Seam lies on top of the Starpoint Sandstone and is estimated to contain 4.85 million recoverable tons of coal. Of this total tonnage, 3,578,000 tons are considered minable. Since the anticipated recovery rate is 60%, the applicant expects to mine approximately 2,147,000 tons from the Horizon operation. This will make for a total operational mine life of 6-10 years, depending on production rates and market conditions.

Coal will be mined by continuous mining machinery, loaded into shuttle cars, and hauled to a feeder breaker. The feeder breaker will reduce the coal to a top size of 8 inches. The coal will then be placed on a rope-hung conveyor which will carry it to the surface. It will then be transferred to a fixed, covered conveyor which will carry it to a crusher, which will further reduce its size. From the crusher, the coal will be carried, again by covered, fixed conveyor, to the coal storage pile. From the coal storage pile, it will be loaded into trucks by belt or front-end loader and hauled to its final destination.

There will be 2 entries in the Horizon Mine. The air intake entry will occupy the present rock slope. It will be expanded and divided into 2 entries: one air intake/manway and one beltway. The second entry will be an exhaust entry.

The actual mining operation will proceed as follows: 3 main entries will be driven, on 70-foot centers, to within 80-100 feet of the property boundaries. Three-entry sub-main entries will be driven from the main entries and standard room-and-pillar panels will be developed from the sub-main entries on 140-foot centers.

100- to 300-foot barrier pillars will be left between main entries and extracted on final retreat. 80- to 100-foot barrier pillars will be left at all property boundaries, as required by Utah law. 100-foot barrier pillars will be left at all coal outcrops.

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Facilities and Structures

All surface facilities are shown on Plate 3-1--Surface Facilities. There are at this site no existing structures, as defined in this section. All surface facilities will be removed during final reclamation. Following is a list and description of all surface facilities (see pages 3-2 through 3-5):

- a) Portals - There will be 2 portals in the Hiawatha seam: one air intake/manway, one air return/beltway.

The portal faceups and mine bench cuts and the outslopes of the mine bench were analyzed for stability. These analyses are found in Appendix 3-3--Static Safety Factor Calculations. The portal faceups and the mine bench cuts will have a maximum slope of approximately 72° (0.3h:1v), while the outslopes of the mine bench will have a maximum slope of approximately 34° (1.5h:1v). The portal faceups and mine bench cuts and the mine bench outslopes will have respective minimum static stability safety factors (under saturated conditions) of 2.6 and 1.4, both of which are greater than the minimum of 1.3 required by R645-301-534.130.
- b) Fans - An exhaust fan will provide ventilation for the entire mine. The Hiawatha fan will be located just above the main pad and will be accessed by a 600-foot primary road.
- c) Mine Building - This 20-foot X 40-foot trailer will serve as mine office, lamphouse, and temporary bathhouse. A 14-foot X 60-foot permanent bathhouse will be constructed later, after approval by the Division and the Utah Department of Health. The mine building will be located on the main pad, adjacent to the Hiawatha portal.
- d) Conveyor - Coal will be brought from the mine by a covered conveyor. The conveyor will transport the coal to the coal stockpile.
- e) Supply Trailers - These trailers will be located on the main pad next to the conveyor. They will serve as onsite warehouses for maintenance parts and equipment.
- f) Substation - The substation will be located on the main pad adjacent to the Hiawatha portal.
- g) Diversions - One undisturbed diversion will be placed on the east edge of the main pad. It will take undisturbed drainage from the canyons above the site and route it into the main undisturbed culvert, which bypasses the sediment pond and empties into the main drainage approximately 600 feet from the mouth of the main canyon.
- h) Roads - There will be 2 permitted roads within the permit area: the Main Access Road and the Hiawatha Fan Access Road.

The Main Access Road will be a primary road. It will be approximately 1200 feet long and will go from Carbon County Road 290 (formerly Utah State Highway 139) at the mouth of the canyon, to the coal stockpile area.

The Main Access Road will be of incised construction except at the one point where it will cross the culvert which will divert flow from the North Fork of Gordon Creek. The road will be 20 feet wide and will be surfaced with gravel. Its surface will slope away from the crest at

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approximately 3% and its grade will not exceed 6%. A plan view of this road is shown on Plate 3-1 and a detailed design is shown on Plate 3-4.

The embankment designs for the Main Access Road were analyzed for stability and this analysis is found in Appendix 3-1. Using the Hoek method with a standard rotational stability model, the applicant has calculated a dry factor of safety for the road embankments of 1.9 and a factor of safety for saturated conditions of 1.4. These figures compare favorably with the minimum factor of safety of 1.3 required by R645-301-534.130.

The treatment of the roads in the plan is entirely incorrect and inadequate. A complete analysis of the roads and a finding of deficiency for those parts of the plan which deal therewith is found in the subsection entitled **Road Systems** under **ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES** below.

- I) Water Supply System - Non-culinary water will be pumped from Sweet's Pond. A series of sumps will be constructed underground to store water. Culinary water will be purchased from Price River Water Improvement District, hauled to the site, and stored in a holding tank on the main facilities pad near the mine office trailer.
- j) Bathhouses - There will be two bathhouses, one for men and one for women. They will be trailer units and will be located on the main pad adjacent to the mine office trailer.
- k) Sediment Pond (see pages 7-42 and 7-44, Plate 7-6) - Runoff from the entire Horizon site will go to a single sediment pond. This pond will be located just east of the Main Access Road about 800 feet from the mouth of the canyon.

The sediment pond will be of combined incised/embankment construction, with approximately 2h:1v side inslopes, and is designed to completely contain the runoff from a 10-year, 24-hour storm. Its total design capacity is 2.38 acre-feet, which consists of a minimum runoff capacity of 1.03 acre-feet and a maximum sediment capacity of 1.25 acre-feet. The 60% sediment cleanout volume of the pond, the level of which will be marked on a post placed permanently in the pond, is 0.75 acre-feet (60% of the 1.25-acre-foot maximum sediment capacity).

The pond inlets and the emergency spillway will be nonerodible open channels lined with grouted riprap. The riprap in the pond inlets will be underlain by a layer of geotextile filter fabric as well. The emergency spillway will be 1.3 feet deep and 10 feet wide, with 2h:1v side slopes, and is designed to pass the peak flow from a 25-year, 6-hour storm with 1 foot of freeboard, measured at its inlet, between the top of the sediment pond and the top of that peak flow.

The pond decant line will consist of 2-inch pipe with a lockable inlet valve. The inlet valve will be located at a point 2 feet above the level of the 60% sediment cleanout volume and 3.4 feet below the elevation of the emergency spillway. The inlet valve will be opened to decant the pond 24 hours after a storm and will remain locked at all other times.

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The applicant has analyzed the pond embankment designs for stability, and this analysis is found in Appendix 3-3--Static Safety Factor Calculations. Using a standard, circular failure model and the Hoek Circular Failure Charts, the applicant has found that the pond embankments, which will have a maximum slope of 2h:1v, will have a static safety factor of 4.81 for dry conditions and 4.44 for saturated conditions. These figures are almost three times the minimum of 1.3 required by R645-301-533.100.

The sediment pond will be inspected at the end of construction and yearly thereafter by a professional engineer. The professional engineer will promptly, after each inspection, provide to the Division a certified report indicating that the sediment pond has been constructed and maintained as designed and in accordance with the approved plan and the R645 Rules, as required by R645-301-514.310. The annual pond inspection report will be submitted to the Division with the full Annual Report.

In addition to the certified inspections, the pond will also be inspected quarterly by a qualified individual designated by the applicant. A copy of the report on these quarterly inspections will be compiled, recognizing any appearance of structural instability or other hazardous condition, as required by R645-301-514.330.

- l) Sewage System - This will initially consist of chemical toilets, the sewage from which will be taken from the site by a private contractor. Eventually, this system will be replaced by a permanent system after approval by the Division and the Utah Department of Health.
- m) Fuel Tank - This 5000-gallon diesel fuel tank will be located above ground at the south edge of the main pad.
- n) Shop - The maintenance shop will be located on the main pad between the mine office and the substation.
- o) Temporary Coal Mine Waste Stockpile - This pile will contain underground development waste and coal refuse from site cleanup for a maximum of 90 days until it can be disposed of underground. It will be surrounded by a berm and will be located adjacent to the coal stockpile (pages 3-10, 3-18). A full analysis of the temporary surface storage of coal mine waste and a finding of deficiency for the plans thereof is found in the subsection entitled **Coal Mine Waste** under **SPOIL AND WASTE MATERIALS** below.

Findings:

The plan fulfills the requirements of this section.

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EXISTING STRUCTURES

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

Analysis:

No existing structures, as defined in this section, will be used in connection with or to facilitate the proposed coal mining and reclamation operation at this site.

Findings:

The plan fulfills the requirements of this section.

PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES

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

Analysis:

No public parks, and no cultural or historical places or cemeteries which might be listed or eligible for listing in the National Register of Historic Places, are found within the permit area. This finding was made by State Historical Preservation Officer Jim Dykman in an October 24, 1995 letter to the Division.

Findings:

The information provided meets the regulatory requirements of this section.

RELOCATION OR USE OF PUBLIC ROADS

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

Analysis:

No public road will be relocated by this operation. However, the operation will extend to within 100 feet of the right-of-way line of Carbon County Road 290 (formerly Utah State Highway 139).

Page 3-2 and Appendix 3-1 of the plan adequately describes the measures used by the applicant to insure that the interests of the public and landowners will be protected from coal mining and reclamation operations which will be conducted within 100 feet of Carbon County Road 290 (formerly Utah State Highway 139). The former applicant, Blue Blaze Coal Company, provided an opportunity for a public hearing by publishing for four (4) consecutive weeks in the Sun Advocate, a weekly newspaper of general circulation, beginning on April 25, 1991, a notice of intention to commence underground mining operations (Appendix 2-2). An identical notice was also published in April and May of 1991 in the Salt Lake Tribune and the Deseret News (Appendix 2-2), which are daily newspapers of general circulation. No public comment was received and no public hearing requested as a result of the publication of this notice. Consequently, in a May 5, 1992 letter, Emma R. Kuykendall, Commissioner of Carbon County, which has jurisdiction over Carbon County Road 290, stated her finding that the interests of the public and affected

landowners will be protected under R645-301-234.400 and granted the former applicant permission to use the road for coal haulage (page 3-5). Since the Horizon operation will be identical to that planned by the former applicant, the Division is satisfied that the requirements of this section have been fulfilled.

Findings:

The plan fulfills the requirements of this section.

AIR POLLUTION CONTROL PLAN

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

Analysis:

The only air pollutant from this site will be fugitive dust from coal handling and from the use of improved haul roads. However, the effect on air quality of fugitive dust is expected to be small because of the rapid fallout of particles with distance from the source and the high moisture content of the loaded out coal (page 11-1).

Topsoil stockpiles will be seeded with a temporary seed mix to help protect the topsoil material from erosion by wind and precipitation. Once the temporary vegetation is established, dust from the stockpiles will be minimal (page 11-1).

The in situ moisture content of the coal is approximately 4.4%. In addition, water is added to the coal for dust suppression both at the continuous miner face and at the point where coal is loaded onto the mine conveyor. The high moisture content of the coal will thus serve to minimize air pollution from coal dust (Appendix 11-1).

Road dust is the greatest potential source of air pollution from fugitive dust. The applicant commits to watering the haul road and pad areas as necessary. In addition, the applicant commits to using a chemical dust suppressant (magnesium chloride) and perhaps road surface stabilizers if dust levels exceed standards established by the Utah Division of Air Quality (page 11-2).

The Utah Department of Environmental Quality requires that all operators obtain an Air Quality permit. A copy of this permit is found in Appendix 11-1.

Findings:

The plan fulfills the requirements of this section.

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COAL RECOVERY

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

Analysis:

The Horizon Mine will operate in the Hiawatha Seam. Production is expected to be about 700,000 tons per year.

Room-and-pillar mining methods with continuous mining machinery will be employed in this operation. By extracting the highest ratio of coal safely extractable, the applicant expects to achieve a coal recovery rate of approximately 60%, which is the average recovery rate for room-and-pillar operations in the United States. The applicant commits to extract the maximum coal possible while working with the U.S. Bureau of Land Management on any changes in the resource recovery plan.

The Hiawatha Seam is estimated to contain 4.85 million recoverable tons of coal. Of this total tonnage, 3,578,000 tons are considered minable. Since the anticipated recovery rate is 60%, the applicant expects to mine approximately 2,147,000 tons from the Horizon operation.

The applicant now holds a lease with Hidden Splendor Resources, Ltd. A right-of-way granted to the applicant by BLM in 1996 (ROW Application UPU-73227) will allow the applicant to mine about one year's worth of reserves. On August 16, 1995, the applicant filed a lease application with BLM (Application No. UPU-74804) for an additional 1,288 acres of Federal coal to the northwest of the present permit area. This lease area contains an estimated 4 to 5 years' worth of coal. This will make for a total operational mine life of 6-10 years, depending on production rates and market conditions (pages 3-8, 3-10, 3-11).

Findings:

The plan fulfills the requirements of this section.

SUBSIDENCE CONTROL PLAN

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

Analysis:

Renewable Resources Survey.

There are no manmade structures above the permit area. The only renewable resources in the area are rangeland, two springs, and one perennial stream (Beaver Creek). There will be a minimum of more than 800 feet of cover below Beaver Creek.

Based on the past experience of other operations in this area, no significant subsidence effects are expected. Swisher Coal Company mined beneath Beaver Creek in 1978 and removed pillars. No subsidence occurred due to this operation. In addition, mining operations were carried out more than 30 years ago in the Gordon Creek No. 2 Mine and in the Consumers No. 3 Mine. To date, there has been no observable subsidence from these operations.

No damage of consequence is likely to occur to the vegetative resources in the area. In the event of subsidence, vegetation will not be damaged but will merely be displaced along with the ground surface (page 3-21).

Subsidence Control Plan.

Mining in the Horizon operation will be by room-and-pillar methods with pillar extraction. Barrier pillars will be left at seam outcrops and permit area boundaries. Development will proceed from north to south in the Hiawatha seam (year-one). Development will be followed by pillar extraction, which is expected to last through year 6.

A network of subsidence monitoring stations will be established, subsidence data from which will be submitted to the Division with each Annual Report. Monuments will be steel rebar with aluminum caps. There will be a total of 26 stations: four base stations and 22 monitoring stations, five of which will be above Beaver Creek (page 3-23, Plate 3-5).

Subsidence will be monitored by the periodic redetermination of the northing, easting, and elevation coordinates of all monuments. This will be done with a one-second theodolite and a six-mile electronic distance measurement (EDM) device. After the initial coordinates of a station have been established, monitoring of that station will begin and will continue to be done at nominal one-year intervals until 2 years after the cessation of mining operations (page 3-24). According to the nomogram which constitutes Figure 33 of the *Subsidence Engineers' Handbook*, given the depth of cover, the face advance rate, and the limit angle (assumed to be the same as that at nearby sites) at this site, all subsidence should have occurred within one year after mining has ceased in any given area (see *Subsidence Engineers' Handbook*, Second Edition, National Coal Board, London, 1975; page 43). The extended monitoring period of 2 years for all monuments will both allow for the development of a broad and comprehensive picture of subsidence at this site and also give the applicant the empirical data necessary to determine when subsidence is complete and verify that for the Division and other regulatory agencies.

Data compiled by the National Coal Board of Great Britain indicate that with geometric parameters such as those which are found at this site, subsidence could reach a maximum of about 2.33 feet (see *Subsidence Engineers' Handbook*, Second Edition, National Coal Board, London, 1975; pages 9-10). However, given the past experience of other operators in this area, and given the presence of massive, well-consolidated sandstone beds above the coal seam, there is every reason to believe that subsidence will never be this great (page 3-23).

Performance Standards for Subsidence Control.

As a necessary part of the operation, a map of the underground workings will be kept current from the time that underground development begins. An updated copy of this map will be submitted to the Division with each Annual Report or whenever the Division requests (page 3-7).

In the event that subsidence causes a diminution of flow in Beaver Creek, the applicant proposes to stem the loss by either grouting the affected area or lining the streambed of Beaver Creek with impermeable clay material, or both. Such a diminution of flow, however, is very unlikely for two reasons. First, Beaver Creek Coal Company mined beneath Beaver Creek for a number of years with no effect on the creek's flow. Second, subsidence cracks are very unlikely to reach Beaver Creek because there are approximately 800 feet

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of massive, well-consolidated sandstone cover above the workings in this area. If cracks reached the channel of Beaver Creek and inflow occurred, the interbeds of swelling shale in the area would tend to "heal" the cracks and quickly bolt the inflow (page 3-21).

R645-301-525.300 requires that, at least 6 months prior to mining, the operator notify all owners of surface property located above the underground workings. The plan contains this commitment on page 3-20.

Findings:

The plan fulfills the requirements of this section.

SLIDES AND OTHER DAMAGE

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

Analysis:

At any time a slide occurs which may have a potential adverse effect on public health, property or safety, or on the environment, the applicant will notify the Division as quickly as possible. The applicant also commits to comply with any remedial measures required by the Division (page 3-18).

If any examination or inspection discloses that a potential impoundment hazard exists, the applicant will promptly inform the Division of the finding and of the emergency procedures formulated for public protection and remedial action (page 3-20).

Findings:

The plan fulfills the requirements of this section.

FISH AND WILDLIFE INFORMATION

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

Analysis:

Protection and Enhancement Plan.

The applicant minimizes potential impact to fish and wildlife from the mining operation on page 3-34 and 3-35. The first impact is loss of habitat and since the area is small the impact should be minimal. The previously disturbed area has mostly revegetated and provides food, shelter and cover to resident wildlife. The DWR estimates that 327 acres of critical deer winter range will be lost due to increased traffic along the haul route (county road).

The applicant states that to minimize adverse impacts to the fish and wildlife of the area firstly by initiating an employee awareness program to reduce wildlife harassment and road kills. The applicant recognizes the potential for big game kill through the Wildlife Management Area (page 10-35) and has committed to controlled speed limits. Horizon has committed to monitoring road kills and reporting numbers

weekly to the DWR. And agrees to remove killed deer and elk from the road between the Wildcat Coal Loadout and the mine site.

A wildlife monitoring program is to be conducted throughout the operation life of the mine by an environmental specialist (page 3-37), as required by the Division.

Endangered and Threatened Species.

Fish and wildlife species which are listed endangered, threatened and of special interest are listed on pages 10-25 thru 10-33. The permit states that only the American Peregrine Falcon and the Bald Eagle would likely be present in the area (page 10-24) but not within the permit area. The DWR states that bald eagles are likely to use the permit area. They also state that while no bald eagle nest have been found in the Gordon Creek area courtship activity has been observed at the winter roost.

Bald and Golden Eagles.

Bald and golden eagles are likely to use the permit area. Golden eagle nests are shown on a map in Appendix 10-1. The map does not clearly show which species belong to which nest. Plate 3-3, as identified on page 3-17 does not show the area to be protected from second mining around the nest. Since, these nests have been inactive for years it may be possible that a permit could be obtained from the U.S. Fish and Wildlife service for a take permit. The permit provides for a half mile buffer zone around nests, however the maps do not. The golden eagle nests identified in Appendix 10-1 will be protected from subsidence by not removing the barrier pillars as identified on Plates 3-3. Clearer maps as requested in the resource information section will help locate this and other nest areas.

A raptor hazard survey was conducted in the area which document hazardous power lines (page 10-34). The permit concludes that potential electrocutions are slight because of nonuse. The commitment is made on page 10-35 to construct all power lines within the permit area to minimize electrocution hazards to raptors.

Wetlands and Habitats of Unusually High Value for Fish and Wildlife.

The permit fails to adequately address the wetland/riparian area and the importance and high value this area provides for fish and wildlife. The permit must discuss avoidance of this wetland/riparian area and other placement of the sediment pond. Mitigation, replacement and restoration will not be discussed in this Draft Technical Analysis by the Division until avoidance and other alternatives have first been explored by the applicant.

Findings:

Information regarding this section was found not to meet all of the minimum regulatory requirements.

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

R645-301-358.400

The applicant will avoid disturbances to wetlands and riparian vegetation. Avoidance measures must be investigated and discussed in relation to the designated wetland.

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R645-301-358

Map 10-1 must clearly show which raptor species belongs to which nest. Plate 3-3, as identified on page 3-17 does not show the area to be protected from second mining around the eagle nest as committed to and therefore must be shown or otherwise stated.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-232, -301-233, -301-234, -301-242, -301-243.

Analysis:

Topsoil and subsoil will be separately removed within the Shupert-Winetti, Rabbitex, and Bryan Soil type. (Page 8-9 and Plate 8-1) from approximately 2.0 acres. The remaining 8.7 acres will not have topsoil removed because of the poor soil rating and/or contamination present from previous mining activities. No clear map or description is given to document where or how much soil will be salvaged. The previous submittal contained an Isopach Map of soil stripping volume. This type of information or other detail is required to clarify soil quantities.

Two soils within the disturbance did not have site specific soil profile descriptions. These soils (Curecanti Family and Senchert Series) must have the A or E horizon removed prior to disturbance. Depth of topsoil (A or E horizon) will be considered that described for the particular soil series as found on pages 110 and 129 of the USDA/SCS Soil Survey of Carbon Area, Utah (page 8-11).

Approximately 11,782.4 cubic yards of topsoil and subsoil will be salvaged (page 8-9). Estimates of salvageable soil quantities (volume) may vary because of the amount and type of coarse rock fragments and the highly variable ranges allowed within soil taxonomic classifications. As a means of insuring proper excavation and separation of adequate quantities of topsoil (A or E horizon) and subsoil (B and/or C horizon) the applicant has committed to having a professional soil scientist on site during topsoil and subsoil removal operations (page 8-18). Topsoil (A or E horizons) and subsoil (B and/or C horizons) excavation will be exacted by employing the "islands" method (page 8-18) of removal.

Prior to topsoil removal, vegetation which would interfere with topsoil removal will be removed prior to excavation (page 8-10). The applicant should save all removed vegetation material to be placed and/or incorporated into the surface of the topsoil pile. The applicant states that trash, concrete, and debris will be hauled to a properly licensed disposal facility as it is removed from the mine site during topsoil removal.

Coal waste that exist at the site as a result of past mining will be segregated during construction and temporarily stockpiled. The waste will then be blended with coal and shipped from the site (page 8-11).

Three separate subsoil and topsoil stockpiles will be created and surveyed to verify the amount of topsoil and subsoil salvaged (page 8-12). In the event that stored soil volume is insufficient for final reclamation, soil will be imported from outside the permit area (page 8-11). At this time amounts are insufficient for final reclamation. Topsoil quantities as shown on Plate 8-1 cover the reclaimed site to approximately 9 inches. The suitability of the fill material as a growth medium has not been discussed. Generally, more than 9 inches of topsoil is required. The application does not discuss the

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possibility of salvaging material from the sediment pond or topsoil stockpile area. The applicant must address the issues of fill quality, topsoil quantity and/or any potential borrow areas within the permit area.

Topsoil and subsoil stockpiles will not exceed a height of eight feet. Side slopes will not exceed 2h:1v. The stockpiles will be protected from wind and water erosion through construction of a containment berm around the stockpiles, the prompt establishment of a vegetative cover, and the application of straw mulch at a rate of two tons/acre. The stockpile area will be fenced to prevent livestock from entering the area.

Prior to seeding, the stockpiled soil will be sampled and analyzed for fertilizer and amendment requirements. Fertilizers and amendments will be applied in accordance with the soil laboratory results (page 8-18).

Findings:

Information regarding this section was found not to meet all of the minimum regulatory requirements. The applicant must provide the following prior to approval, in accordance with the requirements of:

R645-301-231.100

The permit must clearly depict and/or describe where the topsoil/growth medium will be salvaged. An Isopach Map and/or detailed description is required in order to quantify available material.

The permit must identify all available soil/growth medium on site. Current described quantities indicate nine inches of available topsoil/growth material. The application must discuss potential additional material and/or borrow sites and the quality of the upper four feet of fill material.

VEGETATION

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

Analysis:

The applicant has committed to interim revegetation of areas disturbed to develop the mine but not used for the mining operation (page 3-32). On these sites, a temporary seed mixture will be used for interim stabilization (page 3-34). The seed mixture of mostly grasses was designed primarily for quick establishment.

Findings:

Information found in the plan was found to meet the minimum requirements of this section.

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ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

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

Analysis:

Road Systems

There will be one primary road and one ancillary road. The Main Access Road will be a primary road and the Hiawatha Fan Portal Access Road will be an ancillary road.

A plan view of the Main Access Road is shown on Plate 3-1 and designs are shown on Plate 3-4. This road will be approximately 1200 feet long and will go from Carbon County Road 290 (formerly Utah State Highway 139), at the mouth of the canyon, to the coal stockpile area.

The plan fails to include plans or specifications of any kind for the Hiawatha Fan Portal Access Road.

The treatment of the roads in the plan is entirely inadequate. The road descriptions found in the list of surface facilities on pages 3-2 and 3-3 do not contain adequate specifications or design details. Plate 3-4 depicts an obsolete design for the Main Haul Road and the plan contains no design details for the Hiawatha Fan Portal Access Road. R645-301-521.170 and R645-301-527.200 require that the plan include a description of each road which comprises a map, cross sections, and specifications for "each road width, road gradient, road surface, road cut, fill embankment, culvert, bridge, drainage ditch, and drainage structure. R645-301-512.250 further requires that designs of primary roads be certified by a registered professional engineer.

Other Transportation Facilities

Coal will be brought from both seams by covered, 42-inch conveyors. The conveyor from the Castlegate 'A' seam will go to a crusher on the main pad and thence to the 2000-ton coal stockpile. The conveyor from the Hiawatha seam will transfer its coal to the Castlegate 'A' conveyor at a point on the main pad approximately 150 feet up canyon from the crusher (pages 3-7 through 3-9, Plate 3-1).

Findings:

The plan does not fulfill the requirements of this section. The applicant must provide the following, prior to approval, in accordance with the requirements of:

R645-301-521.170, R645-301-527, R645-301-534

The applicant must revise the plan to accurately and completely describe the permitted roads. The road description found in the list of surface facilities on pages 3-2 and 3-3 must be made to correctly describe and classify the Main Haul Road and the Hiawatha Fan Portal Access Road. The map and design for each road must include, at a minimum, a plan view of the road, appropriate lateral cross sections (a single typical cross section will suffice if the cross-sectional configuration of the road is fairly uniform over its entire length), a simple longitudinal cross section which shows the road's gradients and the cuts and fills made in its construction, and specifications for each of the road parameters listed under R645-301-521.170 and

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R645-301-527.210. Since the Main Haul Road will be a primary road, its designs must be certified by a registered professional engineer, as required by R645-301-512.250.

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Disposal of Noncoal Waste.

Noncoal mine waste--trash--will be temporarily stored in a metal dumpster within a fenced area on the site. The dumpster will be unloaded as necessary by a local contractor and the trash material hauled to the Carbon County Landfill. Additional dumpsters will be provided if necessary (page 3-7).

Coal Mine Waste.

By definition, coal mine waste includes both underground development waste and coal processing waste. Since no coal processing waste will be generated by this operation, only underground development waste will need to be handled.

Underground development waste will be disposed of permanently in gob areas which consist of entries and cross cuts no longer needed for operation of the mine. Since the mining operation will be intersecting old workings, underground conditions cannot be accurately predicted at this time. Consequently, no detailed plan or location for underground disposal of development waste is provided by the applicant. However, the applicant commits to provide such a plan, for Division and MSHA approval, as soon as underground conditions are known. The Division and MSHA will be notified and plans for such disposal will be submitted for approval at least 30 days prior to the anticipated use of these areas (page 3-6).

During initial mine development and perhaps at other times, gob areas may not be adequate to store all of the underground development waste generated by the operation. In that event, the waste material will be temporarily stored on the surface, adjacent to the coal stockpile, and will be disposed of in the permitted refuse pile of another mine (page 3-7).

The plan does not adequately describe the temporary surface storage of underground development waste prior to its permanent disposal underground or its disposal in the event that it cannot be disposed of underground. The site of the surface storage pile is not shown on any of the maps, the plan says nothing of its operation and design parameters (approximate maximum volume, maintenance, and drainage control), and the cost of its reclamation is not included in the reclamation cost estimate. Furthermore, the plan makes no provision for the disposal of underground development waste at another permitted site in the event that it cannot be placed underground.

Refuse Piles.

There will be no permanent refuse piles at this site.

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Impounding Structures.

There will be no impounding structures built of coal mine waste at this site.

Burning and Burned Waste Utilization.

Coal mine waste fires will be extinguished only by mine personnel, all of whom will be trained in fire fighting techniques. Fire fighting will employ, in succession, first water, then fire extinguishers, then rock dust, then foam, and lastly the sealing off of the section in which a fire is located (page 3-12).

Return of Coal Processing Waste to Abandoned Underground Workings.

No coal processing waste will be generated or handled at this site.

Excess Spoil.

Sediment pond waste is, by definition, excess spoil and will be the only excess spoil handled at this operation. After cleaning of the sediment pond, the sediment pond waste will be removed immediately from the site by blending with the outgoing coal. Though not the usual practice, this procedure is fairly common and is acceptable for the disposal of sediment pond waste (page 7-47).

There is at test pit #8 (see Plate 8-1) an embankment containing perhaps 9,718 yd³ of material from earlier mining operations which is high in coal content. During initial site construction, this material will be stored adjacent to the coal stockpile and will, like sediment pond waste, be disposed of by blending with outgoing coal (page 3-10).

Findings:

The plan does not fulfill the requirements of this section. The applicant must provide the following, prior to approval, in accordance with the requirements of:

R645-301-521.165, R645-301-528.300

The applicant must revise the plan to adequately describe the temporary surface storage of underground development waste and any waste material from the embankment near Test Pit #8. The surface facilities map must show the site of the waste storage pile and the plan must specify its operation and design parameters (approximate dimensions, maintenance plan, drainage control). The plan must also provide for the disposal of underground development waste at another permitted site in the event that it cannot be placed underground.

HYDROLOGIC INFORMATION

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

Analysis:

Soils at the site tend to be silty clay loam to loam within the Shupert-Winetti Complex and gravelly loam to loam within the Brycan, Rabbitex, Senchert and Curecanti Series. The SCS information the use of hydrologic groups B and C (undisturbed soils) are considered adequate. In cases where the soil phases were in group B or C the Applicant used group B.

The Applicant has used a CN of 89 for the undisturbed areas. This number is adequate at this time. However, should the Applicant propose additional buildings, road surfacing or pad surfacing the design CN would require re-analysis. The Applicant used a CN of 70 for the additional areas draining to the pond considered "undisturbed" by the Applicant. Some of these areas are disturbed from previous mining operations.

Water Rights/Water Use

Water for non-culinary use will be obtained primarily from Sweet's Pond. Culinary water will be obtained from the Price River Water Improvement District, hauled to the site and stored in an above ground storage tank designed in accordance with applicable Utah Department of Health regulations. Plans will be submitted for approval prior to construction.

Sweets Pond and the pump facilities at Sweets Pond are the only existing structures used in connection with or to facilitate the proposed coal mining and reclamation operation at this site. Pump facilities associated with Sweets Pond and the pond itself may be considered leased rights and may be excluded from bonding requirements. The Applicant must clarify whether it is intended to be part of the permit area or not.

Sumps will be provided underground to store water during periods of excess availability.

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Groundwater Monitoring.

Table 3.1
 Operational Spring Water Sampling

Sampling Point	Location	Formation	Monitored Frequency	Water Parameters	Comments
SP-1	Channel in North Fork of Gordon Creek/Marakis spring	Blackhawk sandstone unit above coal seams	Quarterly (when accessible)	Flow/Parameters Table 7-2	Spring sampling should be done at source when at base flow. Location relative to numerous springs in area is not identifiable on map.
SP-2 1989 through 1993	Right Middle Fork North Fork Gordon Creek Hillside out of Creek Bottom	Blackhawk	Quarterly (when accessible)	Flow/Parameters Table 7-2	Spring flows through alluvium below the point of origin.
SP-4 1989 through 1993	North Fork Gordon Creek Drainage bottom	Not presented	Quarterly (when accessible)		
SP-9			Not discussed		

Table 3.2
 Operational Groundwater Sampling

Sampling Point	Location	Frequency	Water Quality Parameters	Water Quantity	Comments
Sustained in mine flows as close to point of issuance as possible	where exceeding 1 gpm for at least 30 days	Quarterly while accessible	Identified in Table 7-2	yes Table 7-1	2 year review period

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Sampling Point	Location	Frequency	Water Quality Parameters	Water Quantity	Comments
Discharge d mine water	If necessary treated in underground sumps or the Sedimentation Pond. Currently not expected and not a permitted activity. Will need permit approval if it occurs.	In accordance with permit.	In accordance with permit.	In accordance with permit.	Should be conducted in accordance with UPDES permit according to emergency discharge clause.
Well HZ-1 HZ-1S HZ-2 HZ-3	Completed into the Star Point Sandstone	Quarterly while accessible	none proposed	Water level corrected to depth from ground surface	

The Applicant committed to submit quarterly and annual reports. However, the annual report is indicated to be resubmittal of the results received during the year. These reports should be in the format required by the Division memo regarding annual report submittals, as is forwarded to the operators under R645-301-742.420. The Applicant is required to provide the information requested by the Division. The Applicant includes a commitment to notify the Division if data indicate non compliance with permit conditions.

The Applicant has not adequately described how these surface data sites will be used to determine the PHC of mining. The Applicant has stated that springs will provide information on impacts to localized perched aquifers within the Blackhawk Formation. However, I believe it is established that these aquifers are associated with fault systems. The description of monitoring based on hydrologic impacts should be further expanded upon. Similar information will be obtained by monitoring inflows. The HZ monitoring wells will assist in evaluation potential losses of ground water from the Blackhawk Star Point Aquifer. See discussions under **Environmental Resource Description, Hydrology** heading.

Surface-Water Monitoring.

Specifics in monitoring during the construction period were included and the Applicant has committed to collect weekly samples during the operational and reclamation construction period up stream and downstream of construction. The parameter to be analyzed in the field is turbidity.

Proposed operational surface water monitoring is summarized in the following table:

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Table 3.3
 Operational Surface Water Monitoring

Sampling Point	Location	Flow	Water Quantity and Water Quality	Water Quantity	Comments
#3	Channel in Jewkes Creek /below disturbed area upstream of the intersection with the North Fork Gordon Creek and below the bypass culvert	Intermittent	Quarterly According to Table 7-5	Quarterly	
#5	Jewkes Creek upstream of disturbed area but downstream of the confluence with Spring Two Canyon.	Perennial	Quarterly According to Table 7-5	Monthly	
#6	Portal Canyon Drainage and Spring Two Canyon Drainage	Ephemeral	Not proposed	Not proposed	These sites should be monitored on the same day as sites 3 and 7 when sampling during a precipitation event or snowmelt period
#7	Beaver Creek above pond upstream of the permit area outside of potential subsidence zone.	Perennial Monthly	Quarterly According to Table 7-5	Late Spring gpm Late Summer/Fall gpm	
#8	Beaver Creek downstream north east of permit area. Out of potential subsidence zone.	Perennial Monthly	Quarterly According to Table 7-5		Bear Creek is dry below surface water monitoring point 8 as shown in Appendix 7-5 "Historic Mine Development" map 8. This section of the stream is affected by the Fish Creek Fault and Graben.

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Sampling Point	Location	Flow	Water Quantity and Water Quality	Water Quantity	Comments
2-2-W	Gordon Creek above confluence of North Fork Gordon Creek below the Hiawatha	Perennial Monthly	not proposed		Impact more likely to be below confluence because of fracture system.
2-3-W	Beaver Creek	Perennial Monthly	not proposed		Currently monitored by Beaver Creek Coal previously proposed to be monitored by Horizon. Not found on any map
2-4-W	Beaver Creek 1 -1/2 mile west of permit area	Perennial Monthly	not proposed	Flume installed	Currently monitored by Beaver Creek Coal previously proposed to be monitored by Horizon.

Acid- and Toxic-Forming Materials.

The Applicant has indicated that overburden and underburden samples will be gathered at 2,000 foot intervals throughout the mine and tested according to the Division requirements (Section 6.5.7.1). The Division understands this statement to mean the Applicant will test the materials according to current division guidelines for acid and toxic forming materials. See further discussions under **Acid and Toxic** headings of this T.A.

Transfer of Wells.

No transfer of wells are requested or approved at this time.

Discharges into an Underground Mine.

The Applicant has not addressed this regulation. No discharges into an underground mine are approved. The underground water tunnel has a use of 0.557 cfs. This water source, rate of use by the Horizon mining operations, and water quality should be included as part of the operational monitoring plan.

Gravity Discharges.

The dip of the coal is away from the portal faceups. Therefore no gravity discharges are anticipated.

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Water Quality Standards and Effluent Limitations.

The Applicant provided a copy of the UPDES permit for the Horizon Coal Corporation in Appendix 3-6. The permit is effective March 1, 1996 and expires at midnight on April 30, 1998. The permit no. UTG040019 is authorized for discharge at outfall 001 at latitude 39°41'37" and longitude 111°02'58", to the North Fork of Gordon Creek. The Applicant provided a commitment to monitor the sediment pond according to the requirements of UPDES Permit UT-0023761 until bond release, or until the revegetation is adequate to permit removal of the sediment pond.

If underground water is encountered in excess of the amount required for mining, the water will be settled in underground sumps and discharges will be monitored to ensure that effluent limitations are met (Sections 3.4.3 and 3.4.3.2). The Applicant also states that dewatering plans will be developed should it become necessary. (Section 3.3.1.6.). The permit however, allows only one discharge point. Therefore, the Applicant must either obtain an additional mine water discharge point or, adequately design the sedimentation pond to treat mine water discharge. The limits of the discharge that may be handled by the pond should be identified. It should also be noted that the submitted copy of the UPDES permit is missing the even numbered pages. The total amount of TDS discharged from all mine water and decant operations is limited to one ton per day.

Discussions of water quality standards are presented in Section 7.2.2.2, Tables 7-3, and 7-4. Other water requirements and plans needing submittal and approval from the Utah Department of Health include: culinary water facility and sewage facility plans. The Applicant has committed to construct the sewage facility upon plan approval.

Diversions.

Undisturbed diversions are described in the following table. All undisturbed and disturbed diversions are designed to carry the flow from a 10-year, 6-hour event. Culverts UC-4 and UC-5 receive drainage coming from the Jewkes Creek, an intermittent stream, designed to carry the flow from a 100 year - 6 hour event. The Applicant provided culvert sizes that may carry greater flows than the designed flow for the 10-year, 6-hour event.

**Table 3.4
 Undisturbed Drainage Diversions**

Diversion	Ditch (D) or Culvert [©]	Diameter (culvert)	Function
UC-1	C	24"	Collects flow from UD-4 and UD-5 and Portal Canyon and routes it into UC-3.
UC-2	C	36"	Collects flow from UD-3 and routes it into UC-3.
UC-3	C	36"	Collects flow from UC-1 and UC-2 and routes it into UC-5.
UC-4	C	24"	Collects flow from UD-2 and from Left Fork North Fork and routes it into UC-5.

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Diversion	Ditch (D) or Culvert [©]	Diameter (culvert)	Function
UC-5	C	24"	Collects all undisturbed flow from UC-3 and UC-4, bypasses sediment pond, and discharges it into main drainage.
UC-6	C	42"	Carries flow of main drainage (all undisturbed flow) beneath haul road and into Gordon Creek drainage.
UD-1	D	--	Collects runoff from area above topsoil stockpile and routes it into road ditch of Carbon County Road 290.
UD-2	D	--	Collects runoff from above coal stockpile and handling area and routes it into Jewkes Creek above UC-2.
UD-3	D	--	Collects runoff from area above the portal area on south east side of Portal canyon and routes it along the south and east side to a natural channel below the operations then to Jewkes Creek.
UD-4	D	--	Collects runoff from area above the portal area on the north side of Portal Canyon to the disturbed area below the operations.
UD-5	D	--	Collects flow from above the disturbed area in Portal Canyon and routes it into bypass culvert UC-1.

Disturbed diversions are designed to handle the 10-year, 6-hour event and are described in Table 7. Many of the undisturbed drainage ditches are proposed to be designed with an elevated berm. Most of these berms are located where undisturbed drainage is routed around the mine site. While most disturbed area diversions built with a berm are less likely to be an environmental problem, because drainage would still reach the pond if there was a failure, failure of a bermed undisturbed area ditches would send water to the sedimentation pond which is not designed to receive and treat those waters. More prudent designs, including improved grading plans, could be conducted to meet the design requirements rather than building elevated berms for water control. Since the pond is designed to contain or treat the 10 year - 24 hour event, it would be prudent to design the undisturbed bermed diversion drainages to safely handle the flow velocity and volume from a 10 year -24 hour event. If the ditches fail with a peak flow smaller than the 10 year - 24 hour event the Applicant would have failed to adequately treat the run off from the disturbed area 10 year- 24 hour event through their pond.

The Applicant has provided a general channel configuration in Figure 7-7. The Applicant has stated that channel configuration may vary but the minimum cross sectional area will remain the same. While the channel may continue to meet design volume requirements with this statement, the stability of the design may

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not be prudent for slopes greater than 2:1 for certain geologic materials under certain conditions. It would be more prudent for the Applicant to provide a range of acceptable configurations through specific types of geologic materials and commit to maintain these ditches should they fall out of the acceptable range. Additionally, the typical designs do not match the descriptions provided for the ditches. The proposed designs are likely to require high maintenance. However, the Applicant has met minimum design requirements.

The Applicant has provided a berm as the water diversion control at the north east end of Portal Canyon. Drainage area UD-5 is a small drainage area on the north end of the site. According to the map, this area would naturally flow over the pad area. The Applicant is recommended to consider other alternatives for this area such as: grading a small [emphasis added] outslope pad area to allow drainage to reach the culvert and then contemporaneously reclaim the disturbed area, or allow the drainage to flow over the site and be treated in the pond.

The Applicant has considered any flow velocities less than 5 feet per second (fps) as non erosive flows. However, in the literature there are values which indicate velocities less than 5 feet per second are erosive with earthen ditches that have erosive soil types. The Applicant has not considered soil type in the determination of erosive velocities. However, in some cases vegetation will be adequate to control erosion. Degradation and additional erosion control needs for drainages within the pad area draining to the sedimentation pond will be determined through site inspection. Where velocities exceed 5 fps designs must be implemented to minimize erosion.

Drainages are developed by the operator to route undisturbed drainage around the site channels. Drainages with slopes up to 0.5 feet/foot have failed when riprapped. Riprap design procedures were not based on slopes of this steepness. Adequate grading, fill and angular riprap and filter blanket designs are necessary. The Applicant has provided sizing for graded riprap but no filter blanket designs. It is the opinion of the division that the Applicant has not minimized potential impacts to the adjacent area and undisturbed drainage slopes should be reduced where possible.

The proposed topsoil pile directs drainage from DD-3 to DC-2 into the sedimentation pond. No drainage designs specific to road drainage could be located.

Table 3.5
 Disturbed Drainage Diversions

Diversion	Ditch (D) or Culvert [©]	Diameter (culvert)	Function
D-1	D	--	Collects runoff from entire No. 1 and No. 2 Mine areas and routes it into the sediment pond. according to Appendix 3-3 the portal bench will drain to D1
DC-1	C	12"	Collects runoff from area below the facilities pad and routes it beneath the haul road and into the sediment pond.

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Diversion	Ditch (D) or Culvert ©	Diameter (culvert)	Function
DC-2	C	12"	Collects runoff from the topsoil stockpile area and routes it beneath the haul road and into the sediment pond.

Stream Buffer Zones.

The Applicant must demonstrate that all requirements of 742.300 have been met prior to approval and findings of this section. (See R645-301-742.322.) The Applicant is required to provide the stream buffer zones and assure they are adequately marked during the channel construction. Plate 3-1 shows a buffer zone sign location. The text indicates buffer zone signs will be placed adjacent to Jewkes Creek; however, Plate 3-1 does not show a sign located upstream from the disturbance. A sign must be placed at the upstream boundary of the buffer zone.

The Applicant has submitted a stream alteration permit to the Division of Water Rights. The submittal proposes a 3 foot and 2 foot culvert respectively in Jewkes and Portal Canyon. Comments on the proposal were due by May 19, 1996.

Sediment Control Measures.

The Applicant proposes to begin site construction prior to installation of the sediment pond. During this period alternative sediment control measures are proposed to be used. Straw bales and silt fences are proposed to be placed in the stream channels of Portal and Spring Two Canyon Fork to capture sediment. Berms Strawbale dikes and Silt fences will be located between stream channels and areas being disturbed. The Applicant has committed to cleaning these structures once construction is completed using backhoes and shovels.

The culvert is proposed to be installed from the lower end of the pad in an upstream direction. Horizon Coal Company has committed to limit construction to periods when the stream is not flowing to the extent possible. Stream flow will be bypassed around construction activities using a diversion dike and flexible culvert. The Applicant has committed to construct the sedimentation pond as soon as possible following construction of the downstream culvert sections and must obtain a stream alteration permit prior to approval.

The proposed measures for culvert construction are acceptable practices. The ability of these proposed measures to control sediment can only be judged in the field by inspection and technical staff and will be determined adequate based on the ability to meet the performance standards and requirements of R645-301-745.111.

Roads are proposed to be surfaced with 12 inches of crushed gravel road base. These roads are proposed to be crowned and therefore the east portion of the road from the crown at the south end to the limit of the sedimentation pond will drain toward the creek. The main access road will be 20 feet wide not to exceed a 6% vertical grade. Highwalls near the first bend will be 0.33H:1V degrees and 1.2H:1V following removal. Maximum embankment height is 100 feet at 40 degrees and maximum slope height is 50 feet at 32

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degrees. Appendix 3.3 indicates the road will be sloped toward the disturbed drainage ditches. This conflicts with the road surfacing designs.

Ditch UD-2 receives extensive drainage from cut slopes as shown in Plate 3-7A, cross sections E, F, and G. These slopes are steep and can be significant sources of sediment. The Applicant has committed to provide erosion control matting and seeding according to Table 3-2, for all cut slopes which will drain directly to an undisturbed area diversion. As presented in Section 3.3.5.3 mulching and roughening will occur on areas before seeding where slopes are 2½:1 or less. The matting will be applied on slopes 2½:1 or steeper. It should be noted that where competent bedrock is exposed matting may not be practicable.

Currently this road is located on the east side of the stream and outside the permit area, and therefore is a potential source of additional sediment to the stream flow. The fan portal road is to be considered an ancillary road and will be cut into native materials without an engineered surface.

The topsoil is also proposed to be vegetated with interim cover as discussed in Sections 3.4.4.1, page 3-19 and Section 3.5.2. The piles will be contoured, fertilized and seeded. A berm will be placed around each topsoil pile to minimize soil transport. Prior to achieving adequate vegetation establishment other measures are necessary to control erosion.

Siltation Structures.

Sediment ponds and all other treatment facilities are defined as siltation structures. The two siltation structure at this site include Sweets Pond, a pond developed for water rights use, and the sedimentation pond. For a discussion of the mine site sedimentation pond, see the **Sedimentation Ponds** heading below.

Sweets Pond currently is associated with the Gordon Creek Mines 2, 7, and 8. This site would be double permitted until Gordon Creek has obtained bond release. Because this is an impoundment to be associated with the Horizon Mine appropriate regulatory requirements must be addressed.

Sweets Pond also has an existing pumphouse and a water gate to control inlet flows. The Applicant has proposed to build a water line from the pond to the mine. This should be included in the permit area as part of the disturbed area. The pond itself need not be part of the permit area for which bonding is required as described under the "Disturbed Area" and "Permit Area" definition in R645-100, as long as the structures are constructed and maintained in accordance with R645-301 and R645-302.

Sedimentation Ponds.

There will be only one sediment pond. The sediment pond will be a non-MSHA structure. The sediment pond will be inspected during and after construction by a qualified, registered, professional engineer. The pond will be inspected after each storm and cleaned as necessary. Its embankments will be vegetated, to control erosion, with a temporary seed mix as described in Section 3.5.5.2.

The Applicant has analyzed the pond embankment designs for stability. Using a standard, circular failure model and the Hoek Circular Failure Charts, the Applicant has found that the pond embankments have a static safety factor of 4.81 for dry conditions and 4.44 for saturated conditions (Appendix 3).

The Applicant proposes to divert all disturbed area run off to the sedimentation pond, including the proposed north return air fan, receiving runoff from 10.7 acres (Appendix 7-4). The sedimentation pond will

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be mostly incised except at the downstream face, which will be an earthen embankment. The pond has been designed to contain the runoff from a 10-year, 24-hour precipitation event calculated to be 0.83 acre-feet. The permit area surfacing is described as a gravel parking lot. The full extent of gravel is not defined.

The Applicant has assumed sediment production of 0.05 acre feet/acre from the disturbed area. The Applicant has not provided a technical method or calculation to determine where the 0.05 acre feet/acre comes from, Appendix 7-4. However, the final design allowed 1.48 acre-feet for maximum sediment storage, which is closer to 0.1 acre foot/acre per year sediment production for disturbed areas and is considered a conservative estimate. Although the maximum sediment storage is considered adequate at this time, if the Applicant should need additional increases in the sedimentation pond capacity the 0.05 acre feet/acre will not be considered valid until demonstrated to meet standard through accepted design methods. The Applicant must remove the discussions of excess design capacity or provide technical design information.

The total capacity of the pond below its emergency spillway will be 2.3 acre-feet. The sediment will be cleaned out of the pond at 60% of the total sediment volume, or 0.88 acre-feet. The cleanout volume will be marked by a calibrated pole. One pole is generally not adequate to determine sediment capacity because the sediment tends to be deposited in deltaic form at the inlets. The Applicant will be expected to maintain the capacity required for runoff volume.

The pond will also have a 2" decant pipe with a locking valve. Twenty-four hours after a storm, the pond is to be drained by opening the valve on the two inch decant line in the pond. This valve is to remain locked at all times except when decanting storm runoff. The inlet of the decant line is to be located at an elevation of 7576.0 feet, which is 24 inches above the 60% cleanout level and 3.4 feet below the elevation of the spillway.

Should the quantity of water encountered in mining exceed the amount required by the underground operations the Applicant proposes the water be treated by the sediment pond in order to meet effluent standards. This action may be used as an emergency measure but is not an approved design. The use of the pond for this purpose would need to be approved prior to handling any runoff which might exceed the design requirements.

The sediment pond's spillway is designed to pass the peak flow of the 25-year, 6-hour precipitation event. Calculations for the spillway assume the pond is full to the elevation of the spillway prior to the onset of the event. With a depth of 2.3 feet, a width of 10 feet and side slopes of 2h:1v, the spillway will have 2 foot of freeboard between the top of the pond embankment and the maximum flow elevation. The Applicant designed a non-erodible, open channel emergency spillway for which the outlet will have a riprap with a D50 of 4 inches. However, no filter blanket designs were included.

Although the spillway designs meet the requirements of a single open channel spillway design under R645-301-743.00, the spillway does not provide the protection of aquatic life through providing an oil skimmer. Since this pond will be receiving oils and grease from the site the pond should provide for some type of oil skimmer.

Pond designs, maps and calculations have been prepared under the direction and certification of Richard H. White (State of Utah, Registered Professional Engineer #7102). The information and calculations contained in Appendix 6E are also certified by Mr. White.

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The pond safety factor calculations assume an 11 foot embankment height and a slope angle of 2H:1V (26.56 degrees). The soils are assumed to have soil cohesion and friction angle of 35 psi and 30 degrees respectively, which results in a safety factor of 4.81 dry and 4.44 saturated conditions.

Other Treatment Facilities.

No other treatment facilities area proposed at this time.

Exemptions for Siltation Structures.

No exemptions for siltation structures were requested or are granted at this time.

Discharge Structures.

The sedimentation pond discharge structure is discussed under Siltation Structures.

Impoundments.

The only impoundment proposed by the Applicant is a Sedimentation Pond and Sweets Pond. Clarification of proposed permitting actions in Sweets Pond is necessary. The sedimentation pond is discussed under Siltation Structures. In Section 3.3.5, page 3-2, the Applicant has committed to promptly report impoundment hazards to the Division and formulate remedial action and emergency procedures.

Casing and Sealing of Wells.

The Applicant has stated that approvals and permits to drill wells will be received from the Division of Water Rights and appropriate Government agencies. The final casing and sealing of wells is discussed in more detail in the section entitled **MINE OPENINGS** under **RECLAMATION PLAN** below.

Findings:

The plan does not fulfill the requirements of this section.

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

R645-301-742

The Applicant must: 1) either obtain an additional mine water discharge point for the UPDES permit or, adequately design the sedimentation pond to treat mine water discharge. Correct the statement regarding dewatering plans under Section 3.3.1.6. which conflicts with the remainder of the plan; 2) provide the even numbered pages to the copy of the UPDES permit; 3) provide designs which demonstrate the Applicant has prevented to the extent possible additional contributions of sediment to the adjacent area where undisturbed drainages have steep slopes up to 0.5 feet/foot (failure is common with riprapped drainages at this slope), and; 4) remove the discussions of excess design capacity for the sedimentation pond or provide technical design information for the estimated erosion sediment production; and, 5) clarify proposed permitting actions for Sweets Pond.

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R645-301-731.121

The Applicant must: 1) provide the protection of aquatic life through providing an oil skimming design on the sedimentation pond.

R645-301-742.322

The Applicant must: 1) provide the calculations for the values presented to demonstrate that the design capacity for the intermittent stream is at least equal to the unmodified stream channel above and below the site.

R645-301-742.300

The Applicant must: 1) provide filter blanket designs for the riprapped spillway outlet.

R645-301-742.400

Provide a discussion on information specific to road drainage designs.

R645-301-730

To meet all applicable federal and state laws the Applicant must obtain a stream alteration permit.

R645-301-731.500 and .513

The Applicant must: 1) address the requirements of this regulation as it relates to the proposed underground water rights to be used in the mine.

SUPPORT FACILITIES AND UTILITY INSTALLATIONS

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

Analysis:

There are no major electric transmission lines, pipelines, agricultural drainage tile fields, or occupied buildings within or adjacent to the permit area.

The only utility installation within the permit area and connected with this operation is the substation. As shown on Plate 3-1, the substation will be located on the main pad adjacent to the Hiawatha intake portal. It will receive power from a large main substation which lies just outside the disturbed area at the mouth of the canyon and step the power down for distribution to the mines and surface facilities. It will be built and maintained in accordance with MSHA regulations (page 3-2).

Findings:

The plan fulfills the requirements of this section.

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SIGNS AND MARKERS

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

Analysis:

All signs and markers will be of a standard, easily readable design. All will be made of treated wood or steel and will be mounted on steel or wooden posts (page 3-12).

Signs will include the mine and permit identification sign, perimeter markers, buffer zone markers, topsoil markers, and snow storage area markers. Typical signs are shown on pages 3-4 and 3-15. The mine and permit identification sign will show the mine name, the name, address, and business telephone number of the applicant, the MSHA ID number, and the permit number.

Findings:

The plan fulfills the requirements of this section.

USE OF EXPLOSIVES

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

Analysis:

The plan states that no surface blasting will be done at this site, and thus does not include a blasting plan (pages 3-13, 3-16).

Findings:

The plan fulfills the requirements of this section.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

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

Analysis:

All of the plates in the plan, including the mining operations maps listed in this section, consist of, or are based on, old Swisher Coal Company maps. The plates were created originally as part of the mine plan for the proposed Blue Blaze operation. They were revised in 1990 to include the proposed permit and disturbed area boundaries, the proposed surface facilities, additional geologic information, and other information relevant to that operation. They were again revised in early 1996 to correct some inconsistencies in the permit area boundaries and to update them to the applicant's format. All were certified in 1996, after their latest revision, by Richard B. White, a professional engineer registered in the state of Utah.

Affected Area Maps

The affected area, as defined by R645-100-200, includes both the area of actual surface disturbance and the area above the underground mine workings, which might be affected by subsidence resulting from the underground mining operation.

The boundary of the disturbed area of the Horizon Coal operation, which includes proposed as well as previous disturbance, is shown on Plate 3-1--Surface Facilities. The boundaries of all areas which are to be newly disturbed by this operation are also shown on Plate 3-6--Premining Topography and Plate 3-7--Post Mining Topography.

The boundary of the permit area, including the disturbed area, is shown on Plate 1-1--Permit Boundary. It is also shown on the other relevant maps.

The boundaries of the disturbed area, as well as those of its component areas of previous and proposed disturbance, are shown adequately on Plates 3-1, 3-6, and 3-7.

Mining Facilities Maps

The locations and approximate dimensions of all mine facilities are shown on Plate 3-1--Surface Facilities. Included on this map are all buildings, portals, fans and earthen structures (pads, cuts and embankments), both of the large main drainage bypass culverts, the mine supply substation adjacent to the main portals, the large main substation at the mouth of the canyon, the Main Haul Road, the Hiawatha Fan Portal Access Road, the conveyor from the mine, the coal storage and loading facilities, the topsoil storage area and the sediment pond. This plate was certified in 1996, after its latest revision, by Richard B. White, a professional engineer registered in the state of Utah.

Design details of the sediment pond are shown on Plate 7-6--Sedimentation Pond Detail Map. This plate was certified in 1996 by Richard B. White, a professional engineer registered in the state of Utah.

Design details of the Main Access Road and the Upper Portal Access Road are shown on Plate 3-4--Access & Haulage Road Design. This plate was prepared and certified in 1981 by Sidney W. Smith, a professional engineer registered in the state of Utah, and recertified in 1992 by Joe E. Shoemaker, a land surveyor registered in the state of Utah.

None of the maps and plans contains information regarding the Hiawatha Fan Access Road. A full treatment of the roads and a finding of deficiency for the plans thereof is found in the subsection entitled **Road Systems** under **ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES** above.

The anticipated operational surface configuration is shown by contours on Plate 3-1--Surface Facilities. The premining surface configuration and the operational surface configuration are shown in cross section and as they relate the one to the other on Plate 3-2, which bears the title Premining and Operational Cross Sections. These plates were certified in 1996, after their latest revision, by Richard B. White, a professional engineer registered in the state of Utah.

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Mine Workings Maps

The location and extent of all known abandoned underground mine workings, including mine openings to the surface within the proposed permit and adjacent areas, are shown on Plate 3-3--Five Year Mine Plan. There are no active underground mines and there has been no surface mining within the permit and adjacent areas.

Monitoring and Sample Location Maps

Both geologic and groundwater information were obtained from test borings done at sites designated LMC-1, LMC-2, LMC-3, and LMC-4. The locations of these sites are shown on Plate 6-1--Geology and Plate 7-1--Water Monitoring Locations.

Information on water quality and quantity was obtained from monitoring stations designated 1, 2, 3, 4, 5, 6, and 7. The elevations and locations of these sites are shown on Plate 7-1--Water Monitoring Locations.

Findings:

The plan fulfills the requirements of this section.

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RECLAMATION PLAN

SUMMARY OF OUTSTANDING DEFICIENCIES

HYDROLOGIC RESOURCE INFORMATION

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

R645-301-742.322

The Applicant must: 1) demonstrate that reclaimed intermittent and perennial channels will carry the capacity of the upstream and downstream channel sections

R645-301-742.300

The Applicant must: 1) provide a stable channel design for Portal Canyon drainage (riprapped slopes of approximately 32% are not stable).

R645-301-731.121,

The Applicant must: 1) provide a commitment and control measures to assure acid and toxic materials will not be left as backfill in the location of the reclaimed stream sections and drainages.

R645-301-742,

The Applicant must: 1) correct statements where commitment for removal of the sediment pond at the end of backfilling and grading procedures conflicts with the proposal for removal at Phase II bond release. This section should also describe why placement of the culvert into the location of the Jewkes Creek, allowing retention of the pond and culvert system until Phase II bonding or until vegetation is adequate to control erosion; is not a practical alternative; 2) utilize the BTCA for Utah sites including deep pocking as the roughening factor on applicable slopes; 3) demonstrate that the 50% vegetation for bond release will control erosion since this is used as the standard for BTCA erosion control methods exclusive of the sedimentation pond.

REVEGETATION

R645-301-340.

The applicant must commit to double the seeding rate when broadcast seeding, not just hand broadcast seeding.

R645-301-356.110, R645-301-356.250

The baseline vegetation success standard study must separate the wetland/riparian area from the remainder of the site and this high value area studied as a distinct area. A separate success standard must be proposed for this area.

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A commitment must be made to use the exact same sampling methodologies for final bond release as the baseline studies.

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RECLAMATION PLAN

GENERAL REQUIREMENTS

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

POSTMINING LAND USES

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

Analysis:

Once mining has ceased, the disturbed areas will be reclaimed to its principle pre-mining use, undeveloped land. The general region in the area of the mine site is classified as critical deer and elk summer habitat although most of the habitat is limited to the higher elevations within the permit area (page 4-8). Site inspection verifies the proposed disturbed area shows low big game use. The seed mixture is designed for wildlife food value and the planting should provide for wildlife cover. To demonstrate that the site has met the postmining land use at the time of bond release standards should be set to measure success. A suggestion has been made for a shrub standard described in the revegetation section a discussion could be included in the application to use this shrub standard as a success standard for wildlife habitat reestablishment.

The area of proposed disturbance has been previously mined and disturbed to degrees varying from slight to severe. Areas of slight disturbance have soils which have been somewhat impacted but have remained in place and support vegetation. These soils will be salvaged for use in areas which had been severely disturbed and support none to only weedy plant growth. Thus, the area should be able to support the intended postmining land use.

Surface owner comments concerning the proposed postmining land use are in Appendix 4-1. The letter from Cecil Walker, Hidden Splendor Resources, LTD, states that they accept the reclamation plans and postmining land use proposed by Horizon Coal Corporation in the mine permit application.

Findings:

Information found in the plan was found to meet the minimum requirements of this section.

PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES

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

Analysis:

Wildlife habitat with limited livestock grazing will likely be a secondary postmining land use in the reclaimed disturbed area. Wildlife enhancement measures during reclamation include using a seed mixture which contains a diverse mixture of grass, forbs, and shrubs which are known to be palatable to wildlife. Container stock (page 3-37) will also be planted to provide cover for the wildlife. Rock piles will be created (page 3-38) for wildlife habitat enhancement. Approximately 1000 Salix cuttings per acre (page 3-37) will be planted along the riparian areas after reclamation to stabilize the drainage and start restoration of the riparian habitat.

This review has not detailed the lack of information concerning the restoration of the wetland/riparian area because avoidance of this area has not been discussed in the permit. Therefore, at this point in the review the assumption is made that the sediment pond will be relocated and the wetland/riparian area will not be impacted.

Findings:

Information found in the plan was found to meet the minimum requirements of this section.

APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-270, -301-271, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

Analysis:

All previously disturbed areas within and adjacent to the permit area, including waste embankments and other areas wherein coal mine waste and trash have been disposed of, are shown on Plate 3-1--Surface Facilities and Plate 3-6--Premining Topography. The boundaries of all areas which are to be newly disturbed by this operation are also shown on Plate 3-6--Premining Topography and Plate 3-7--Post Mining Topography. These maps show that all of the proposed 10.77-acre disturbed area and much of the land contiguous to and surrounding it have been disturbed repeatedly in the past by other mining operations, by camping and offroad vehicles, and by livestock-related activities. Consequently, some of the area is sparsely vegetated, is covered with coal waste, debris, and trash, and contains old concrete building ruins, old highwall remnants, and abandoned portals and portal faceups.

This site was originally disturbed by previous mining operations between 1928 and the 1950's. No effort was made in these operations to salvage or store topsoil or substitute topsoil material or to document the premining surface configuration. The restoration of the site to the original, pre-1928 surface configuration is thus not possible. However, the applicant will restore the site to a final surface configuration which not only approximates the existing surface configuration and lends itself to the postmining land use of

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wildlife habitat and limited grazing, but which constitutes a great improvement over the present surface configuration as well (page 3-25).

The coal mine waste and coal material which are now found in various places on the site, including the waste embankment at Test Pit No. 8 (see Plate 3-1), will be gathered and stored adjacent to the coal stockpile, to eventually be disposed of by blending with the outgoing coal (page 3-10).

During final reclamation, all exposed coal outcrops, and all toxic- and acid-forming material, of which the site already contains a fairly large volume, will be covered with at least four feet of suitable substitute soil material (page 3-28). Also during final reclamation, all highwalls, both those created for and those redisturbed by this operation, as well as all road and pad cuts, will be completely backfilled and eliminated (page 3-31).

The final surface configuration is shown by contours on Plate 3-7--Postmining Topography Map. The final surface configuration is also shown by cross sections, as it relates to the operational surface configurations, on Plate 3-7A--Post Mining and Operational Cross Sections. These maps demonstrate that the planned final surface configuration will be close to the existing surface configuration, as required by this section, but will be greatly improved in that all new and existing highwalls, portal structures, earthen structures (pads and embankments), cuts, and fills will be eliminated.

Findings:

The plan fulfills the requirements of this section.

BACKFILLING AND GRADING

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

Analysis:

Since this site was originally disturbed between 1928 and 1950 and topsoil was not saved and segregated, the applicant will only be able to restore the area to an approximate original contour which is close to the present surface configuration and compatible with the postmining land use of wildlife habitat and limited grazing. In general, backfilling and grading will be carried out as follows (page 3-28):

- a) After sealing of the portals and removal of all structures, a backhoe (Cat 235 or larger) will be brought to the upper portal terrace.
- b) The backhoe will reach down over the fill bank, retrieve as much material as possible, and place that material on the terrace.
- c) A dozer (Cat D-7 or larger) will work with the backhoe, taking the retrieved material and compacting it from the cut bank or highwall outward.
- d) The main mine yard will be recontoured, by backhoe and dozer, to drain to the center. A drainage channel will be established to convey runoff through the reclaimed area.

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- e) The procedure previously outlined in a) through d) will continue down the haul road with the backhoe and dozer operating in conjunction to reclaim the area to the permit boundary.
- f) After completion of backfilling and grading, the surface will be scarified to prevent slippage of topsoil and promote plant root penetration.
- g) A front-end loader will load topsoil into haul trucks at the topsoil stockpile. The trucks will deliver the topsoil to where the dozer and backhoe are working. The dozer will evenly distribute the topsoil to a depth of one foot over the entire regraded area.
- h) Following redistribution of topsoil, the area will be reseeded, fertilized, and mulched.

All exposed coal outcrops and toxic- and acid-forming material will be covered with at least four feet of suitable substitute soil material (page 3-28).

All highwalls will be completely reclaimed. The fill material placed against the highwalls will be compacted by repeated passes of machinery in order to stabilize the fills. All material used in backfilling will be placed on the contour to minimize erosion and instability. Repair of erosion damage will be performed by hand as necessary (page 3-31).

There will be no surface disposal of coal mine waste and no surface refuse piles. Such materials will be disposed of underground, as described in the section entitled **SPOIL AND WASTE MATERIALS** under **OPERATION PLAN** above. All available spoil will be used in backfilling and grading.

The applicant has analyzed the postmining slope designs using a standard rotational failure model and the Hoek Circular Failure Charts. Using the soil parameters that prevail at the site, the applicant has found that a fill of slope 1.5h:lv has a static safety factor of 1.92 for dry conditions and 1.37 for saturated conditions. These figures compare favorably with the minimum figure of 1.3 required by 645-301-553.130. Since most reclaimed slopes will be less steep than the 1.5h:lv slopes of the Hoek analysis, the stability safety factor will be even higher than those calculated in the analysis (Appendix 3-4).

A mass balance summary for the reclamation earthwork is included as Table 3-1A on page 3-30 of the plan. This table shows the final reclamation cut and fill volumes to be reasonably balanced--16,211 yd³ of cut and 22,437 yd³ of fill. The cut and fill volumes calculated in this table are derived from the areas of the cross sections shown on Plate 3-7A, the locations of which are shown on Plate 3-1--Surface Facilities, Plate 3-6--Premining Topography, and Plate 3-7--Post Mining Topography. The operational and postmining configurations of the cross sections on Plate 3-7A were taken, respectively, from Plates 3-1 and 3-7.

Findings:

The plan fulfills the requirements of this section.

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MINE OPENINGS

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

Analysis:

Portal locations, of which there will be two, are shown on Plate 3-1--Surface Facilities Map (page 3-8).

In the event that operations are to temporarily cease for 30 days or more, the applicant will submit to the Division a notice of intention to cease or abandon the operation. Each portal that has further projected usefulness will be protected by barricades, fenced, and posted with signs to prevent access by unauthorized persons or wildlife. These closure devices will, from time to time, be inspected and maintained by the applicant (page 3-17).

The permanent sealing of all portals will constitute the first phase of final reclamation. Portals will first be sealed with a double block seal placed 20 to 50 feet from the entrance. A drain will be placed in the block seal of the lowest portal of each seam to prevent the accumulation of hydrostatic pressure behind the seal. The portal structures will then be removed and the exposed coal seams covered. The remaining openings will then be completely backfilled from the block seal to the ground surface (pages 3-25, 3-26, 3-27).

Drill holes LMC-1 and LMC-2 will be plugged and abandoned and new holes will be drilled adjacent to them. Drill holes LMC-3 and LMC-4 will be improved at the surface. Three new holes, designated HZ-1, HZ-2, and HZ-3, have been drilled and completed as monitoring wells for the uppermost saturated zone beneath the Hiawatha seam.

When these 7 holes are no longer required for monitoring, and unless they are approved for title transfer as water wells, they will be capped, sealed, or backfilled, as required by the Division, and abandoned (page 6-10).

Findings:

The plan fulfills the requirements of this section.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-232, -301-233, -301-234, -301-242, -301-243.

Analysis:

Subsequent to backfilling and grading of spoil material and prior to topsoil placement, the spoil will be scarified to a depth of no less than 12 inches (pages 8-18). The topsoil redistribution depth according to estimated quantities is only 9 inches, this may not be a sufficient amount of material, depending on the quality of the fill material as requested in the Soils Resource Information section. Wooden stakes will be marked and placed throughout the site to insure proper depth of topsoil redistribution (page 8-18). Topsoil

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will be placed along the contour (page 3-45). The soil will then be harrowed to break up the cloddy surface and scarified to a depth of 18 inches (page 8-18). This will decrease the potential for a failure surface and facilitate root penetration by breaking up the soil/spoil interface. The graded soil surface will be roughened by pitting and gouging to maximize surface roughness (page 8-18).

All exposed coal outcrops resulting from this operation, underground development waste, as well as toxic and acid forming materials will be covered with a minimum of 4 feet of non-combustible, non-acid, non-toxic material during backfilling and grading (page 3-28). Any refuse or coal waste material remaining on site must be tested for Boron to determine the acid/toxic forming potential prior to reclamation.

Fertilizer type and rate will be determined from soil analysis (page 8-20). Twenty samples per acre will be collected from the top 12 inches. Samples will be composited and thoroughly mixed. Five subsamples will be collected from the composite and analyzed in accordance with the Division Guidelines for the Management of Topsoil and Overburden.

Findings:

The information provided meets the regulatory requirements of this section.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

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

Analysis:

Both roads--the Main Haul Road and the Hiawatha Portal Access Road--will be completely backfilled and eliminated and their culverts removed during final reclamation, as shown on Plates 3-7 and 3-7A. Only that portion of the Main Haul Road which now crosses the lower portion of the disturbed area and which provides access to Beaver Creek from Carbon County Road 290 (formerly Utah State Highway 139) will be retained. This road will follow its present route and will be restored to approximately its present condition and configuration.

Findings:

The plan fulfills the requirements of this section.

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HYDROLOGIC INFORMATION

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

Analysis:

Ground-Water Monitoring

See information under this same heading in the subsection entitled **HYDROLOGIC INFORMATION** under **OPERATION PLAN** above.

Surface-Water Monitoring

See information under this same heading in the subsection entitled **HYDROLOGIC INFORMATION** under **OPERATION PLAN** above.

Acid- and Toxic-Forming Materials

In Section 6.5.7.1 is a commitment to monitor the conditions of the overburden and underburden. Samples will be taken at 2,000 foot intervals through out the mine and tested according to the Division requirements.

The Applicant has committed, in Section 3.5.4, to cover all acid and toxic forming material with four feet of noncombustible, non-acid, non toxic, forming material. This material should also be a suitable growth material. (See the Soils Section.) The Applicant has also committed to backfill a highwall or cut slope with any underground development waste that is temporarily stored on the surface and has committed to cover it with 4 feet of suitable backfill. The maximum extent of material proposed to be used should be identified

Where noncoal waste rock from initial development will be incorporated as fill. The Applicant must provide a commitment and control measures to assure acid and toxic materials will not be left as backfill in the location of the reclaimed stream sections and drainages.

Transfer of Wells.

No request for a transfer of water wells is presented.

Discharges into an Underground Mine.

No discharges into an underground mine are applied for or granted for the reclamation area configuration.

Gravity Discharges.

The Applicant has proposed that a drain be included in the stopping for portal closure. This site may have gravity discharge and should be monitored following closure through bond release.

Water Quality Standards and Effluent Limitations

See information under this same heading in the subsection entitled **HYDROLOGIC INFORMATION** under **OPERATION PLAN** above.

Grading to Drain

The Applicant has committed to keep potential surface drainage from entering sealed entries in Section 3.5.3.1. The Applicant has committed to recontour the area to drain to the final reclamation channel in Section 3-25. In Section 3.3.3.6 the Applicant has proposed to scatter rock piles along the perimeter of Jewkes Creek. The Applicant should not allow the rock piles to interfere with drainage.

Diversions.

The Applicant has proposed a drainage plan which reconfigures Jewkes Creek's drainage channel and Portal Canyon drainage channel. The new configuration of Portal Canyon eliminates the basin behind the existing embankment but, does not greatly reduce the existing refuse embankment. The steepest drainage slope, according to information provided on the post mining topographic map is a 20 foot elevation drop over approximately 56.25 foot horizontal section or approximately a 32% slope. Channels with slopes of this steepness tend to be instable. Mines which operated prior to SMCRA often were limited to steepened channels. At these steepened gradients riprap fails and erosion occurs during high intensity short duration thunderstorms. If the Applicant wishes to maintain this gradient it will be necessary to demonstrate that competent bedrock exists in the channel over the steep section. Otherwise, since it is practical, further grading should be accomplished to reduce this slope. Additionally the presented riprap sizing methods were not developed from information based on channels at the proposed gradient.

The Applicant has provided a centrally-located channel section which is not located against the toe of steepened and backfilled slopes. Near cross section C there is an old coal spoil slope. The channel is placed to avoid the area and to avoid any unnecessary leaching or erosion of that pile. The Applicant has provided a demonstration that the design capacity will be at least equal to the design capacity of the unmodified stream channel up stream and down stream of Jewkes Creek for the by pass culvert design. This information should also demonstrate the capacity of the reclaimed diversions meet these criteria.

The channel design follows practices which have been accepted in the past based on a design flow regulated by the rules. However, the rules also say the flood plain and channel bank must adequately pass the design flow. The channel in the lower reaches should be designed to reflect the function and characteristics of a stream type which would occur naturally through this section. Use of Rosgrin's channel classification system is one method that provides for channel characteristics associated with a wet meadow riparian area. An increased meander with a low gradient channel slope and deep narrow channel configuration would also provide a stream system with characteristics similar to those which might be found in a wet sedge meadow, would be similar to the existing stream configuration, and would better support the proposed postmining land use.

Stream Buffer Zones.

At the time of reclamation the Applicant will need to submit another stream alteration permit. The Applicant must receive approval for stream alteration before the reclamation construction can commence.

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Sediment Control Measures.

The Applicant has proposed the pond be removed during the reclamation phase. The Applicant stated the location of the pond and channel re-establishment makes it impractical to retain the pond through the reclamation period. In Section 3.5.8 the reclamation time table shows that pond maintenance will occur 10 years after seeding. However the Applicant has proposed to remove the sedimentation pond. The Applicant has also shown pond reclamation and grading to occur in Phase II bond release period. The Applicant needs to clarify whether the sedimentation pond is proposed to be removed under Phase I or Phase II reclamation.

If the Applicant placed the culvert into the location of the Jewkes Creek the Applicant could retain the pond and culvert system until Phase II bond release or until vegetation is adequate to control erosion. The Applicant should describe why this is not a practical alternative.

The Applicant states, "If feasible, efforts will be made to minimize reclamation activities during periods of wet weather. During short periods when reclamation construction activities will be suspended, the construction site will be left in a condition which would minimize the impact on the hydrologic system if a rainfall event were to occur". Sediment control measures during the reclamation activities include the following:

- 1) Construction of the reclaimed stream channels and grading to commence at the upstream end of each channel/canyon working downstream. The Applicant also committed to retain the sediment pond in place as long as possible.

Alternative methods employed prior to removal of the sedimentation pond include:

- 1) Strawbale dams will be placed in the stream channels of the North Fork and Right Fork drainages to capture sediment which reaches the channels. These will be cleaned out and removed when reclamation is completed.
- 2) A Sediment Control Monitoring and Maintenance Plan and corrective action measures are outlined on page 7-51.1. In Section 3.5.4.2 the Applicant indicates that rills or gullies will be filled graded or stabilized then reseeded or replanted. Backhoe and hand work may be used. In Section 3.5.5.4 the Applicant indicates erosion will be monitored and will be controlled by regrading (if necessary), mulching, and matting.

Silt fences will be placed parallel to the contours with ends turned up perpendicular to the slope. Approximate locations are on Plate 7-7 and they will be installed according to Figure 7-9. As each reclaimed channel reach is reconstructed, the channel will be lined with silt fence or straw bale dikes. Silt fences or strawbale dikes will be used in road ditches, and immediately downstream of the road ditches. In addition, Section 3.5.4.3 indicates silt fences will be established at the bottom of fill slopes and along the top bank of the reclamation channel.

In Section 3.5.5.1 the Applicant suggests mechanical treatment of disc, harrow or clod buster for seed bed preparation. Mechanical treatment of slopes with a grade of less than 10 percent will be completed by ripping the soil 18 inches deep with shanks placed at 7-foot intervals to achieve parallel slots 4 to 10 inches wide. These areas will be mulched. Additionally, in Section 3.5.4.2 the Applicant indicates the grading and placement of overburden and topsoil will be done along the contour, and in Section 3.5.4.4., the Applicant

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indicates disturbed areas will be loosened by ripping to allow easier back fill and grading operations and compacted zones will be eliminated by deep chiseling. Prior to placement of topsoil the area will be scarified. Although these are accepted practice the BTCA for most Utah sites is to provide deep pocking as the roughening factor. The Applicant is not considered to be using the BTCA for this area unless pocking is proposed for slope roughening technique.

Section 3.5.4.3 indicates slopes 2½:1 or greater will be matted and all areas will be mulched during seeding. Slopes greater than 10 percent will have erosion control matting installed. The Applicant has indicated in Section 3.5.5 that if revegetation is delayed, a sterile cover crop will be planted. The Applicant has not indicated whether mulch will be used also at this time. Since mulching is part of the proposed BTCA practice for erosion control it should also be applied at this time. Although this proposal is acceptable, it conflicts with Chapter 3. Where an area is to be mulched a tackifier or crimping should be provided. The Applicant should commit to install erosion control matting according to the manufacturer's directions.

Estimated erosion production for the proposed methods are compared with erosion production expected from an established vegetative cover of 50 percent and were determined by the Applicant to be adequate. This vegetation standard is based on data which is not current. Additionally the standard assumes that 50% vegetation will control erosion. However, this has not been demonstrated. Should this data be considered inappropriate this section would need to be reevaluated.

Siltation Structures.

No sedimentation ponds, discharge structures, impoundments or other treatment facilities are proposed or approved for retention as a postmining land use.

Sedimentation Ponds.

The sedimentation pond will be removed during Phase II of final reclamation and replaced with alternative sediment control measures. The Applicant has indicated sediment control following removal of the sedimentation pond will be provided as outlined in Section 3.5.4.3. Section 3.5.4.3 indicates the pond will be removed at the end of backfilling and grading procedures and conflicts with the proposal for removal at Phase II bond release. The Applicant should correct this conflict and include reference to information provided in Section 7.2.3.2, which also conflicts with the reclamation time table.

Other Treatment Facilities.

No treatment facilities, other than the sediment pond, will be constructed at this site.

Exemptions for Siltation Structures.

No areas exempt from BTCA are proposed or granted for the applicable portions of the reclamation plan.

Discharge Structures.

The sedimentation pond and its associated discharge structure will be removed during reclamation.

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Impoundments.

The only impoundment proposed at this site is the sedimentation pond, the reclamation of which is discussed under **Sedimentation ponds** above.

Casing and Sealing of Wells.

The final casing and sealing of wells is discussed in more detail under **MINE OPENINGS** above.

Findings:

The plan does not fulfill the requirements of this section.

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

R645-301-742.322

The Applicant must: 1) demonstrate that reclaimed intermittent and perennial channels will carry the capacity of the upstream and downstream channel sections

R645-301-742.300

The Applicant must: 1) provide a stable channel design for Portal Canyon drainage (riprapped slopes of approximately 32% are not stable).

R645-301-731.121,

The Applicant must: 1) provide a commitment and control measures to assure acid and toxic materials will not be left as backfill in the location of the reclaimed stream sections and drainages.

R645-301-742,

The Applicant must: 1) correct statements where commitment for removal of the sediment pond at the end of backfilling and grading procedures conflicts with the proposal for removal at Phase II bond release. This section should also describe why placement of the culvert into the location of the Jewkes Creek, allowing retention of the pond and culvert system until Phase II bonding or until vegetation is adequate to control erosion; is not a practical alternative; 2) utilize the BTCA for Utah sites including deep pocking as the roughening factor on applicable slopes; 3) demonstrate that the 50% vegetation for bond release will control erosion since this is used as the standard for BTCA erosion control methods exclusive of the sedimentation pond.

Recommendation:

It is recommended that the outstanding issues under baseline information and monitoring based on the probable hydrologic consequences be addressed prior to permit approval.

CONTEMPORANEOUS RECLAMATION

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

Analysis:

The applicant commits to contemporaneous reclamation when disturbed areas are no longer needed they will be backfilled, graded, retopsoiled, and revegetated (page 3-24). Because the site is so small all available space will be used and no reclamation will occur until the mine closes and final reclamation activities occur.

Findings:

The applicant is in compliance with this section.

REVEGETATION

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

Analysis:

General Requirements.

A reclamation schedule has been illustrated in Figure 3-40. The schedule fails to detail each major step in the revegetation plan as required in R645-301-341.100. The schedule should illustrate seed, plant and other material ordering with adequate lead times for procurement.

All seeds to be planted on site will comply with all state and federal seed laws (page 3-32).

The seed mixture to be used for permanent seeding is designated on page 3-35 and 36. The seed mixture is comprised of species native to the area and desirable for wildlife use, in particular big game use. The seed mixture includes the Gordon Creek variety of Wyoming big sagebrush which is preferred if available.

The seed will be broadcast seeded (page 3-33) and then raked to ensure proper seed to soil contact. The application states that only when hand broadcast seeding will the application rate be doubled. The method accepted by the industry is to double all broadcast seeded rates and therefore the permit must be changed accordingly. A commitment has been made in the plan to leave the site in a roughened state. This roughened state has proven to be very important to the success of the reclamation project.

Timing.

The plan commits to a fall planting (page 3-33). This is the normally accepted time of year to be seeding in the region. The plan provides for a contingency if seeding is not completed by November 30, then a quick growing ground cover, such as Regreen will be planted until the next growing season.

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Mulching and Other Soil Stabilizing Practices.

Two thousand pounds per acre straw mulch will be applied over the seeded areas and then incorporated while the surface is being roughened before seeding (page 3-33). The permit states that at the time of reclamation the most beneficial type of mulch to be used will be determined by the Division and Applicant. The Division's experience in the area, at this time, has been to place 2 tons per acre alfalfa on the soil surface and incorporate this while the surface is being roughened and then broadcast seed. This commitment to designate mulch type later is acceptable to the Division. All slopes 2.5h:1v or steeper will have erosion control matting installed. The matting will provide the additional protection needed on these steeper slopes.

Standards for Success.

As previously stated, all if not most of the entire operational area has been previously disturbed by mining and not reclaimed to the requirements of the Utah Coal Mining rules. Therefore, the revegetation success standard for bond release is that the vegetative ground cover will be not less than the ground cover existing before redisturbance and adequate to control erosion.

Several vegetative studies have been conducted within the area of the proposed disturbance. The last two studies, 1991 and 1995 are presented and included in Appendix 9-1 of the application to use as a bond release standard. Total vegetative cover averaged 48 and 55 percent cover in 1991 and 1995, respectively. Perennial, nonweedy cover averaged 45 and 49 percent vegetative cover in 1991 and 1995, respectively. Unpaired, nonparametric comparisons of two samples based on rank showed that the 1991 and 1995 nonweedy, perennial cover was not significantly different, however the 1991 and 1995 total cover were significantly different. Two sample comparisons using the normal distribution showed no significant difference in either total or perennial cover. Raw data is presented in Appendix 9-1.

The location of the transects are illustrated on Plate 9-1. Transect B and D are shown as going outside of the disturbed area. Original photographs of the transects indicate that the transects are actually within the disturbed area and this is acceptable to the Division.

The applicant proposes to use the 1995 baseline study as the standard for success. Since the 1991 and 1995 nonweedy, perennial cover was not significantly different then this success standard is acceptable to the Division. Page 9-8 also commits to the same diversity of shrubs, forbs, and grasses as the 1995 study. A commitment is made for the 80/60 rule tree and shrub standard, although this is not required for a prelaw site. However this commitment will ensure that the postmining landuse standard is being met. For the purpose of establishing a standard it is assumed that the same number of shrubs, 7503 per acre, as recorded in the 1995 will be reestablished for bond release.

The wetland/riparian area was not recognized as a high value area in the previous studies and this area should be separated and studied as a distinct area. A commitment must be made to use the exact sampling methodology as the baseline studies.

The period of intended responsibility will be ten years. Vegetation will be quantitatively measured in years 2, 3, 5, 9, and 10 following revegetation (page 9-10).

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This is a previously-mined site and although some areas are considered severely disturbed, the applicant has committed to clean and remove the old spoil material from the site. Some areas were less severely impacted and the topsoil has remained in place with minimal surface disturbance. Adequate topsoil will be salvaged from these areas to use on the more severely impacted areas. The proposed mine site is located in a canyon bottom at approximately 7600 feet elevation with average annual precipitation between 16 and 20 inches. All of these factors, along with the revegetation efforts, should allow the applicant to meet and exceed the performance standards.

Findings:

Information found in the plan does not meet the minimum regulatory requirements of this section. Additional information must be provided by the applicant in order for the Division to approve the revegetation requirement of this section.

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

R645-301-340.

The applicant must commit to double the seeding rate when broadcast seeding, not just hand broadcast seeding.

R645-301-356.110, R645-301-356.250

The baseline vegetation success standard study must separate the wetland/riparian area from the remainder of the site and this high value area studied as a distinct area. A separate success standard must be proposed for this area.

A commitment must be made to use the exact same sampling methodologies for final bond release as the baseline studies.

STABILIZATION OF SURFACE AREAS

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

Analysis:

All final grading and placement of topsoil will be done along the contour to minimize erosion and instability. The applicant has committed to fill, regrade, seed and otherwise stabilize any rills or gullies which develop (page 3-31). The commitment is also made to plant a soil stabilizing cover crop such as Regreen if erosion work is done during that portion of the year in which final seeding is not optimal.

Findings:

The information provided meets the regulatory requirements of this section.

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CESSATION OF OPERATIONS

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

Analysis:

As soon as it is known that operations are to temporarily cease for 30 days or more, the applicant will submit to the Division a notice of intention to cease or abandon the operation. In accordance with 645-301-529.210, each mine entry that has further projected usefulness will be protected by barricades, fenced, and posted with signs to prevent access by unauthorized persons and wildlife. These closure devices will, from time to time, be inspected and maintained by the applicant (page 3-17).

Findings:

The plan fulfills the requirements of this section.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

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

Analysis:

All of the plates in the plan, including the reclamation maps listed in this section, consist of, or are based on, old Swisher Coal Company maps. The plates were created originally as part of the mine plan for the proposed Horizon operation. They were last revised in 1990 to include the proposed permit and disturbed area boundaries, the proposed surface facilities, additional geologic information, the final surface configuration, and other information relevant to that operation. All were certified in 1990, after their latest revision, by Joe E. Shoemaker, a land surveyor registered in the state of Utah. Horizon Coal incorporated the plates into the present mine plan without change in 1995.

Affected Area Boundary Maps

The affected area, as defined by R645-100-200, includes both the area of actual surface disturbance and the area above the underground mine workings, which might be affected by subsidence resulting from the underground mining operation. It is shown on Plate 1-1--Permit Area.

Bonded Area Map

The total bonded area at this site comprises 10.77 acres (page 2-6). Plate 3-1--Surface Facilities shows the boundary of the bonded area in relation to the operational facilities, and Plate 3-7--Post Mining Topography shows the boundary of the bonded area in relation to the reclamation plan and the postmining surface configuration. These maps were certified in 1996, after their latest revision, by Richard B. White, a professional engineer registered in the state of Utah.

Reclamation Backfilling and Grading Maps

The final surface configuration is shown by contours on Plate 3-7--Postmining Topography. The final surface configuration is also shown by cross sections, as it relates to the operational surface configurations,

on Plate 3-7A--Postmining and Operational Cross Sections. These maps were certified in 1996, after their latest revision, by Richard B. White, a professional engineer registered in the state of Utah.

Reclamation Facilities Maps

All surface facilities and structures will be removed during final reclamation. The only permanent features will be the restored drainage channels and that portion of the Main Access Road which now crosses the lower end of the disturbed area. These features are shown in plan view on Plate 3-7--Postmining Topography and in cross section on Plate 3-7A--Postmining and Operational Cross Sections.

The sediment pond will be retained until all backfilling and grading are completed, at which time it too will be backfilled and eliminated. Erosion control during the remaining period of final reclamation will be provided by erosion control matting, by silt fences placed along the restored drainage channels, and eventually, of course, by the reestablished vegetation.

Final Surface Configuration Maps

The final surface configuration is shown by contours on Plate 3-7--Postmining Topography. The final surface configuration is also shown by cross sections, as it relates to the operational surface configuration, on Plate 3-7A--Post Mining and Operational Cross Sections. These maps were certified in 1996, after their latest revision, by Richard B. White, a professional engineer registered in the state of Utah.

Reclamation Monitoring and Sampling Location Maps

Both geologic and groundwater information were obtained from test borings done at sites designated LMC-1, LMC-2, LMC-3, and LMC-4. The elevations and locations of these sites are shown on Plate 6-1--Proposed No. 1 & 2 Mine Geologic/Structure Map, Plate 7-1--Hydrology Map, and Plate 7-2--Drill Hole Data of the Horizon Mine Area. These plates were certified in 1996, after their latest revision, by Richard B. White, a professional engineer registered in the state of Utah.

Information on water quality and quantity was obtained, and will continue to be obtained through final reclamation, from monitoring stations designated 1, 2, 3, 4, 5, 6, and 7. The elevations and locations of these sites are shown on Plate 7-1--Hydrology Map. This plate was certified in 1996, after its latest revision, by Richard B. White, a professional engineer registered in the state of Utah.

Vegetation information was obtained, and will continue to be obtained through final reclamation, from transects done at locations designated A through E. These locations are shown on Plate 9-2--Vegetation Map No. 2. This plate was certified in 1996, after its latest revision, by Richard B. White, a professional engineer registered in the state of Utah.

A network of subsidence monitoring stations will be established, subsidence data from which will be submitted to the Division with each Annual Report. Monuments will be steel rebar with aluminum caps. There will be a total of 26 stations: four base stations and 22 monitoring stations, five of which will be above Beaver Creek. The locations of all subsidence monitoring stations are shown on Plate 3-5--Subsidence Monitoring Plan. Plate 3-5 was certified in 1996, after its latest revision, by Richard B. White, a professional engineer registered in the state of Utah.

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Reclamation Surface and Subsurface Manmade Features Maps

All surface and subsurface manmade features within and adjacent to the permit area are shown on Plate 3-1--Surface Facilities and Plate 4-1--Land Use. There are no major electric transmission lines, pipelines, agricultural drainage tile fields, or occupied buildings in or within 1,000 feet of the permit area.

All manmade surface features associated with mining and reclamation operations will be removed during final reclamation. The only permanent manmade features will be the restored drainage channels and that portion of the Main Haul Road which now crosses the lower end of the disturbed area (page 3-39). These features are shown in plan view on Plate 3-7--Postmining Topography and in cross section on Plate 3-7A--Post Mining and Operational Cross Sections. These plates were certified in 1996, after their latest revision, by Richard B. White, a professional engineer registered in the state of Utah.

Reclamation Treatments Maps

The general features of the reclamation plan, as they relate to the actual mining operation, are shown on Plate 3-7--Post Mining Topography. This map includes the disturbed area and all operational surface features and facilities, as well as reclamation information such as the locations of cuts and fills, the locations of reestablished drainage channels, and the location of the retained portion of the Main Haul Road.

Findings:

The plan fulfills the requirements of this section.

BONDING AND INSURANCE REQUIREMENTS

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

Analysis:

Form of Bond. (Reclamation Agreement)

In accordance with R645-301-830, after this permit application has been approved, but before the permit is issued, the applicant will file a surety bond with the Division. The surety bond will be made payable to the Division and the amount thereof will be determined by the Division using, as a basis, the reclamation cost estimate provided in the plan (page 2-5).

Determination of Bond Amount.

The reclamation costs were estimated using the earthwork volume estimates derived from the cross sections found on Plates 3-2 and 3-7A, the machinery, labor, demolition and earthwork information from *Means Site Work Cost Data*, 11th Annual Edition, 1992, and the equipment and labor costs from the *Rental Rate Blue Book for Construction Equipment*, Volume 1, April 1991. The process by which the cost estimates were made is as follows (see Appendix 3-7).

- 1) The equipment and personnel needed for each step were determined. These determinations were made using the activity scenarios in *Means Site Work Cost Data*, 11th Annual Edition,

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1992, which specify equipment and labor requirements for various activities such as demolition, grading, loading and hauling.

- 2) The time required for each step was estimated. These estimates were also made using the activity scenarios in *Means Site Work Cost Data*, 11th Annual Edition, 1992, together with the dimensions of the surface facilities and the earthwork volume estimates found on page 3-30 of the plan. The activity scenarios include expected productivities in units of area per unit of time, in the case of activities such as demolition or ripping or seeding and mulching, and in units of volume per unit of time, in the case of activities such as earthwork or loading and hauling.
- 3) The estimated cost for each step was calculated. These costs were made using the time estimates made in step 2) above, together with the equipment and personnel costs per unit of time found in the *Rental Rate Blue Book for Construction Equipment*, Volume 1, April 1991.

The cost estimates for the various steps of the reclamation plan were totaled. A flat mobilization cost was then added, along with a 10% contingency and a 5.5% agency inspection and supervision sum. The resulting total, which is in 1992 dollars, was then escalated through the year 2000, using escalation factors provided by the Division, to obtain a total reclamation cost estimate of \$203,700, in 2000 dollars.

The 10% contingency represents the standard contingency rate used by the Division. The 5.5% agency inspection and supervision sum was determined from Graph 3, page 19 of the *OSM Handbook for Calculation of Reclamation Bond Amounts*, 1987.

The time estimates for the various steps in the reclamation plan were summarized and compiled to create a detailed timetable for final reclamation. This timetable begins on page A3-7-1 of Appendix 3-7. The total time estimate for final reclamation is 76 days, or approximately 16 weeks. The actual time required will probably be less, however, since several of the reclamation steps will be carried out concurrently.

There are 3 deficiencies in the reclamation cost estimate which will have to be corrected before the Division can approve the plan.

First, the cost of removing the main 2000-ton coal stockpile and any other stockpiled coal from the site has not been included in the reclamation cost estimate.

Second, the total reclamation cost estimate of \$203,700 on page A3-7-8 is not correct because the escalation calculation has been done incorrectly. The escalation factors for the years 1992 through 2000 have simply been added to obtain one big factor. In order to be done correctly, however, the 1992 cost estimate must be escalated and compounded from year to year using the following escalation factors.

<u>Year</u>	<u>Escalation Factor</u>
1992	2.21% (actual)
1993	2.61% (actual)
1994	3.21% (actual)
1995	1.93% (actual)
1996	2.58% (predicted)
1997	2.58% (predicted)

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<u>Year</u>	<u>Escalation Factor</u>
1998	2.58% (predicted)
1999	2.58% (predicted)
2000	2.58% (predicted)

Third, the cost of removing stockpiled wasterock has not been estimated anywhere in the plan and has not been included in the reclamation cost estimate.

Terms and Conditions for Liability Insurance.

In accordance with R645-301-890, after this permit application has been approved, but before the permit is issued, the applicant will obtain the required liability insurance and submit the required documentation thereof to the Division (page 2-5).

Findings:

The plan does not fulfill the requirements of this section. The applicant must provide the following, prior to approval, in accordance with the requirements of:

R645-301-542.800

The following 3 revisions must be made in the total reclamation cost estimate:

- 1) The total anticipated maximum volume of stockpiled coal, including both the main 2000-ton stockpile and any additional stockpiled coal, must be estimated and the reclamation cost estimate must be revised to include the cost of removing it from the site.
- 2) The total reclamation cost estimate must be escalated *correctly* through the year 2000 to cover the 5-year permit term which will begin when the permit is issued. This must be done using current escalation factors, which are as follows:

<u>Year</u>	<u>Escalation Factor</u>
1992	2.21% (actual)
1993	2.61% (actual)
1994	3.21% (actual)
1995	1.93% (actual)
1996	2.58% (predicted)
1997	2.58% (predicted)
1998	2.58% (predicted)
1999	2.58% (predicted)
2000	2.58% (predicted)

- 3) The cost of removing any stockpiled wasterock must be estimated and included in the total reclamation cost estimate.