

September 21, 2004

Derrell Curtis, General Manager  
Hidden Splendor Resources, Inc.  
57 West 200 South, Suite 400  
Salt Lake City, Utah 84101

Re: Permit Boundary Expansion, Hidden Splendor Resources, Inc., Horizon Mine, C/007/0020, Task ID #1933, Outgoing File

Dear Mr. Curtis:

The above-referenced amendment has been reviewed. There are deficiencies that must be adequately addressed prior to approval. A copy of our Technical Analysis is enclosed for your information. In order for us to continue to process your application, please respond to these deficiencies by December 13, 2004. Please let me know if you would like to set up a meeting to discuss these deficiencies.

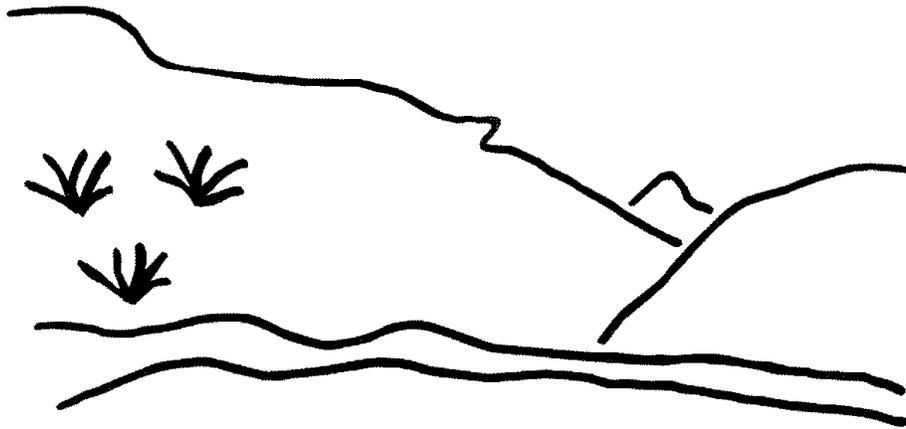
If you have any questions, please call me at (801) 538-5268 or Jim Smith at (801) 538-5262.

Sincerely,

Pamela Grubaugh-Littig  
Permit Supervisor

an  
Enclosure  
cc: Price Field Office  
O:\007020.HZN\FINAL\TA\TA1933.DOC

# State of Utah



## Utah Oil Gas and Mining

### Coal Regulatory Program

Horizon Mine  
Permit Boundary Expansion  
C/007/0020, Task # 1933  
Technical Analysis  
September 21, 2004



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## TECHNICAL ANALYSIS

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# TECHNICAL ANALYSIS

The Division of Oil, Gas and Mining (the Division) regulates the Surface Mining Control and Reclamation Act of 1977(SMCRA). When mines submit a Permit Application Package or an amendment to their Mining and Reclamation Plan, the Division reviews the proposal for conformance to the R645-Coal Mining Rules. This Technical Analysis is such a review. Regardless of these analyses, the permittee must comply with the minimum regulatory requirements as established by SMCRA.

Readers of this document must be aware that the regulatory requirements are included by reference. A complete and current copy of these regulations and a copy of the Technical Analysis and Findings Review Guide can be found at <http://ogm.utah.gov/coal>

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 that comprise the necessary components of an application. Each section is analyzed and specific findings are then provided that 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 that 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.

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**TECHNICAL ANALYSIS**

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## INTRODUCTION

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# INTRODUCTION

Hidden Splendor Resources (HSR) submitted an amendment to the Horizon Mine MRP on May 21, 2004. HSR has been the owner and operator of the Horizon Mine since March 2003, when it acquired the rights to the Horizon Mine from Lodestar Energy, Inc. through the US Bankruptcy Court for the Eastern District of Kentucky.

In 2001, Lodestar Energy, Inc. received a permit to extend mine operations into the 406 acres of Federal Lease UTU-74804 located south of Beaver Creek. Knowledge of the hydrology north of Beaver Creek was not sufficient to allow permitting of the entire federal lease at that time.

The 866 acres in this proposed permit extension are the part of Federal Lease UTU-74804 that lies north of Beaver Creek. This is a significant revision of the mine plan as it will increase the permitted acreage from 711 acres to 1,577 acres: 1,272 acres in UTU-74804 and 305 acres of fee coal owned by HSR.

There are also some minor changes to the surface facilities.

Steve and Pete Stamitakis own the surface surrounding Beaver Creek. They have written the Division to express concerns about loss of water in streams and springs due to mining and surface disturbance from subsidence (letter received August 20, 2004). They have expressed these same concerns in the past.

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## **INTRODUCTION**

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**SUMMARY OF DEFICIENCIES**

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**SUMMARY OF DEFICIENCIES**

The Technical analysis of the proposed permit changes cannot be completed at this time. Additional information is requested of the permittee to address deficiencies in the proposal. A summary of deficiencies is provided below. Additional comments and concerns may also be found within the analysis and findings made in this Draft Technical Analysis. Upon finalization of this review, any deficiencies will be evaluated for compliance with the regulatory requirements. Such deficiencies may be conditioned to the requirements of the permit issued by the Division, result in denial of the proposed permit changes, or may result in other executive or enforcement action and deemed necessary by the Division at that time to achieve compliance with the Utah Coal Regulatory Program.

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

***Regulations***

**R645-300-120, R645-301-117.200**, A copy of the notice as published in the newspaper needs to be included in the proposed amendment as Appendix 2-2. .... 12

**R645-300-121.120; R645-301-112.800; R645-301-141; R645-301-115**, The legal description on page 2-7 of the proposed amendment needs to be corrected. .... 11

**R645-300-132, R645-301-113**, The text on page 2-6 of the proposed amendment needs to be changed to reflect the current status of the mine’s violation history. .... 10

**R645-301-121.100, -121.200, -122, -131**, HSR must provide referenced materials to the Division or make them readily available. There should be explicit citations to clearly identify referenced sources..... 13

**R645-301-121.200**, HSR must correct grammatical problems in the text of the proposed amendment, such as incomplete sentences and problems as outlined above, that are unclear or confusing..... 38

**R645-301-121.200**, The Permittee needs to carefully check the entire document, insert missing pages and tables, and correct formatting and printing problems. .... 12

**SUMMARY OF DEFICIENCIES**

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**R645-301-121.220**, Page 6-2 with Figure 6-1, the Location Map, must be restored to the plan. 35

**R645-301-122 and R645-301-131**, HSR must state the references and sources that were used to determine the location of the old mine workings..... 35

**R645-301-322, -301-333**, The portion of Beaver Creek and associated riparian areas that extend through the proposed lease area from southwest to northeast would be considered high-value and/or crucial habitats, as well as any springs in the area. The proposed amendment indicates that these areas will be undermined and uniformly subsided. Therefore the proposed amendment needs to develop a protection and enhancement plan for these habitat areas that may be impacted by subsidence. Additional comments are provided in the Protection and Enhancement Plan section of this document. The plan should be developed in cooperation with the Division of Wildlife Resources and the Division of Oil, Gas and Mining. .... 45

**R645-301-322**, the permittee needs to include the letter from the DWR stating that it is no longer necessary to conduct raptor surveys of the Horizon permit area. .... 20

**R645-301-322**, The text on page 10-25 and Table 10-1 of the MRP need to be updated to reflect the current status of Threatened, Endangered and Candidate species. .... 45

**R645-301-521**, HSR must state in the text of the MRP the correct total acreage within the disturbed area boundaries. .... 18

**R645-301-521.190**, On Plate 1-1, Permit Boundary, and in other relevant sections of the MRP, HSR must show the following: 1) When each area was incorporated into the permit; and 2) In the map legend, the line type for the permit boundary. .... 18

**R645-301-522**, HSR must give the Division additional information on maximizing economic coal recovery. HSR can either provide the Division with a copy of the R2P2, a summary of the R2P2 and approval letter from the BLM, or the same information given to the BLM..... 39

**R645-301-525.100, -525.130, -525.300, -728.333**, The PHC must address the possible effects that subsidence will create at the bounding faults of the graben and resultant potential impacts both on and off the permit area. .... 33

**R645-301-525.120, -525.480, -525.500**, The Permittee needs to add a discussion of the potential for damage to the private unpaved roads adjacent to Beaver Creek, in Sand Gulch, and in an unnamed side canyon to Jump Creek that could be affected by subsidence, and formulate a plan to repair any damage that results in impairment, loss of use, or material damage to these roads..... 53

**SUMMARY OF DEFICIENCIES**

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**R645-301-525.240, -623.300, -724.310**, The Permittee needs to show the relationship of the existing and projected mine workings and projected angle-of-draw to the bounding faults of the graben on Plate 3-3 or another appropriate map. .... 55

**R645-301-525.290**, HSR must provide the following information in the proposed amendment: 1) The references used to determine a 35 degree angle of draw; 2) A map with the subsidence area boundaries; 3) The reasons why orienting the panels perpendicular to Beaver Creek would minimize subsidence damage, and 4) The protection and mitigation plans for the roads within the subsidence zone. .... 43

**R645-301-525.440**, At a minimum HSR must: 1) Establish a subsidence monitoring program that will establish the angle of draw for the area; 2) Subside a monitoring station every year that retreat mining occurs; and 3) Conduct a land survey over each panel no sooner than six months after the panel was mined out but no more that one year after. The land survey must include critical areas such as areas of maximum tension and compression. .... 43

**R645-301-525.480, -525, -731.530**, The Permittee needs to add a plan to promptly replace contaminated, diminished, or interrupted water supplies. .... 53

**R645-301-525.490**, HSR must address the specific methods that they will use to replace the loss of State-appropriated water. In addition, HSR must remove the comment from the MRP about waiting until after mining ceases before they replace lost water. .... 43

**R645-301-623.300**, HSR needs to provide an overburden thickness isopach map. .... 52

**R645-301-722.200**, HSR must add information from piezometer HZ-01-06-1 to the potentiometric surface maps and update the contours. .... 35

**R645-301-724.310**, Streams need to be shown on Plate 6-1. .... 35

**R645-301-728.333**, The PHC must include a discussion what impact the discharge at UTG040019-002, which does not pass through the sedimentation pond or other sediment control device, will have on the potential for flooding and streamflow alteration. .... 33

**R645-301-731.211**, Table 7-2 must be included in the plan. .... 52

**R645-301-731.222.2**, The Permittee needs to include a copy of the current UPDES permit in the MRP. .... 52

**R645-301-830.140**, HSR must submit updated reclamation cost estimates that include the proposed modifications to the surface facilities. .... 62

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**SUMMARY OF DEFICIENCIES**

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## GENERAL CONTENTS

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# GENERAL CONTENTS

## IDENTIFICATION OF INTERESTS

Regulatory Reference: 30 CFR 773.22; 30 CFR 778.13; R645-301-112

### **Analysis:**

Hidden Splendor Resources, Inc. (HSR) is incorporated under the laws of the state of Nevada and is in good standing with legal corporate existence. HSR is also the applicant and mine operator. Alexander H. Walker III is the resident agent and Cecil Ann Walker will pay the abandoned mine land reclamation fee. Officers of the applicant are listed on page 2-2 of the proposed amendment.

### **Findings:**

The information provided is adequate to meet the requirements of this section of the regulations.

## VIOLATION INFORMATION

Regulatory Reference: 30 CFR 773.15(b); 30 CFR 773.23; 30 CFR 778.14; R645-300-132; R645-301-113

### **Analysis:**

Neither HSR nor any of its affiliates have had a permit suspended or revoked in the past five years nor forfeited a bond, as noted on page 2-6 of the proposed amendment. The proposed amendment states that violation information is listed in Appendix 2-4 of the proposed amendment. As there is no Appendix 2-4 in the proposed amendment or MRP it is not clear whether there have been no violations or the required information has not been provided. By way of phone conversation on June 29, 2004, Joe Helfrich of the Division spoke with Kit Pappas of HSR regarding Appendix 2-4. According to Mr. Pappas there have been no violations in connection with the mine in the past three years. The text on page 2-6 of the proposed amendment needs to be changed to reflect the current status of the mine's violation history.

**Findings:**

The information provided is not adequate to meet the requirements of this section of the regulations. Prior to approval the following information must be provided in accordance with:

**R645-300-132, R645-301-113**, The text on page 2-6 of the proposed amendment needs to be changed to reflect the current status of the mine's violation history.

**RIGHT OF ENTRY**

Regulatory Reference: 30 CFR 778.15; R645-301-114

**Analysis:**

The US Bankruptcy Court for the Eastern District of Kentucky assigned the right, title, and interest to the Horizon Mine to HSR on March 24, 2003. HSR has the right to enter and undertake coal mining based on the assignment from Lodestar by its Chapter 11 trustee, the designation of Operator executed by Lodestar and the federal coal lease. The Horizon mine was issued Right-of Way SL 063011 through the BLM lands in 1966 to facilitate mining coal from fee lands. Documents pertinent to these actions are included in Appendices 2-1 and 2-3.

**Findings:**

The information provided is adequate to meet the requirements of this section of the regulations.

**LEGAL DESCRIPTION AND STATUS OF UNSUITABILITY CLAIMS**

Regulatory Reference: 30 CFR 778.16; 30 CFR 779.12(a); 30 CFR 779.24(a)(b)(c); R645-300-121.120; R645-301-112.800; R645-300-141; R645-301-115.

**Analysis:**

Page 2-7 of Chapter 2 describes the legal description of the permit boundary. On July 6, 2004 the Division received an e-mail from Mr. Pappas noting the corrected legal description for the proposed public notice. The second parcel in Section 17 was changed from E1/2NE1/4 to W1/2NE1/4. The legal description in the proposed amendment needs to be corrected also. Page 2-8 of Chapter 2 describes the status of unsuitability claims. The remaining portion of the lease is not within an area under study as an area designated as unsuitable for mining. There are no petitions filed with the Division that could affect the proposed lease application. As there is no

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surface disturbance associated with the mining of the additional lease area, there will be no activities within 300 feet of an occupied dwelling or 100 feet from a cemetery.

### **Findings:**

The information provided is not adequate to meet the requirements of this section of the regulations. Prior to approval the following information must be provided in accordance with:

**R645-300-121.120; R645-301-112.800; R645-301-141; R645-301-115,** The legal description on page 2-7 of the proposed amendment needs to be corrected.

## **PERMIT TERM**

Regulatory References: 30 CFR 778.17; R645-301-116.

### **Analysis:**

As stated in Chapter 2, on page 2-8 of the proposed amendment, the permit term is for five years.

### **Findings:**

The information provided is adequate to meet the requirements of this section of the regulations.

## **PUBLIC NOTICE AND COMMENT**

Regulatory References: 30 CFR 778.21; 30 CFR 773.13; R645-300-120; R645-301-117.200.

### **Analysis:**

The proposed amendment states that the public notice is included in Appendix 2-2. However there is no Appendix 2-2 in the submittal. On July 6, 2004 the Division received an e-mail from Mr. Pappas noting the corrected legal description for the proposed public notice. For proof of publication, a copy of the notice as published in the newspaper needs to be included in the proposed amendment as Appendix 2-2.

**Findings:**

The information provided is not adequate to meet the requirements of this section of the regulations. Prior to approval the following information must be provided in accordance with:

**R645-300-120, R645-301-117.200,** A copy of the notice as published in the newspaper needs to be included in the proposed amendment as Appendix 2-2.

**FILING FEE**

Regulatory Reference: 30 CFR 777.17; R645-301-118.

**Analysis:**

There is no filing fee required for this permitting action.

**Findings:**

The information provided is adequate to meet the requirements of this section of the regulations.

**PERMIT APPLICATION FORMAT AND CONTENTS**

Regulatory Reference: 30 CFR 777.11; R645-301-120.

**Analysis:**

The proposed amendment has been formatted in accordance with the R645 rules of the Utah coal regulatory program.

Pages 7-47 through 7-52 were replaced after the initial submittal because they were not readable. There are numerous other pages in the submittal that are not readable, such as the incomplete formulas on page 7-19 and illegible text on page 6-5. Page 7-78 and Table 7-2 are missing. Before submitting the document, HSR needs to carefully check it for formatting and printing problems.

**Findings:**

**R645-301-121.200,** HSR needs to carefully check the entire document, insert missing pages and tables, and correct formatting and printing problems.

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### REPORTING OF TECHNICAL DATA

Regulatory Reference: 30 CFR 777.13; R645-301-130.

#### Analysis:

The proposed amendment contains a statement to the effect that all technical data submitted in the application will be accompanied by the name or organization responsible for the collection and analysis of the data. The applicant's technical data have been analyzed under the requirements of the regulations. Authorized and certified entities and individuals are referenced in the proposed amendment.

If used in the permit application, referenced materials will either be provided to the Division by the applicant or be readily available to the Division. If provided, relevant portions of referenced published materials will be presented briefly and concisely in the application by photocopying or abstracting and with explicit citations. At a minimum, there should be explicit citations to clearly identify referenced sources.

Sources of technical information used in the MRP but not included in the References sections include:

#### Chapter 6 - Geology

Leatherwood and  
Duce, 1988

#### Chapter 7 – Hydrology

Bouwer and Rice, 1976  
Duffield and Rumbaugh, 1989  
Freeze and Cherry, 1979  
Gentry and Abel, 1978

Neumann, 1974  
Skaggs, 1992  
US Soil Conservation Service, 1986  
Von Schonfeldt et al., 1980

Some of these are fairly standard or well known, but others are not. For example, the discussion in the PHC on potential effects of subsidence on ground water refers to Von Schonfeldt et al., 1980 and Gentry and Abel, 1978, which are references not typically found in mine plans in Utah and not readily available to the Division.

#### Findings:

**R645-301-121.100, -121.200, -122, -131**, HSR must provide referenced materials to the Division or make them readily available. There should be explicit citations to clearly identify referenced sources.

Chapter 6 - Geology

Leatherwood and  
Duce, 1988

Chapter 7 - Hydrology

Bouwer and Rice, 1976  
Duffield and Rumbaugh, 1989  
Freeze and Cherry, 1979  
Gentry and Abel, 1978

Neumann, 1974  
Skaggs, 1992  
US Soil Conservation Service, 1986  
Von Schonfeldt et al., 1980

## MAPS AND PLANS

Regulatory Reference: 30 CFR 777.14; R645-301-140.

### Analysis:

Maps and plans submitted with the proposed amendment include the Permit Boundary, Mine Plan and Subsidence Monitoring Points, Old Workings Castlegate A Seam, Old Workings Hiawatha Seam, Land Use, Surface Ownership, Coal Ownership, Geology, Water Monitoring Locations, Water Rights, Soils, Vegetation and Wildlife. The maps have been certified by Mark Wayment, a certified Professional Engineer registered with the state of Utah. The maps are to appropriate scale and contain information set forth on the USGS 1:24,000 scale series.

### Findings:

The information provided is adequate to meet the requirements of this section of the regulations.

## COMPLETENESS

Regulatory Reference: 30 CFR 777.15; R645-301-150.

### Analysis:

The proposed amendment was determined Administratively Complete by the Division on June 28, 2004. "**Administratively Complete Application**" means an application for permit approval or approval for coal exploration, where required, which the Division determines to contain information addressing each application requirement of the State Program and to contain all information necessary to initiate processing and public review.

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### **Findings:**

The information provided is adequate to meet the requirements of this section of the regulations.

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## **ENVIRONMENTAL RESOURCE INFORMATION**

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

### **GENERAL**

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

#### **Analysis:**

The MRP includes a description of the existing, pre-mining environmental resources within the proposed permit area and adjacent areas that may be affected or impacted by the proposed underground mining activities.

Steve and Pete Stamatikis own the surface surrounding Beaver Creek. They have written the Division to express concerns about loss of water in streams and springs due to mining and surface disturbance from subsidence (letter received August 20, 2004). They have expressed these same concerns in the past.

#### **Findings:**

General Environmental Resource Information is sufficient to satisfy the requirements of the Coal Mining Rules.

### **PERMIT AREA**

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

#### **Analysis:**

The applicant has submitted an amendment to increase the size of the permit area by 866 acres, from 711 acres to 1,577 acres. Plate 1-1, Permit Boundary of the proposed amendment includes permit boundaries for the additional acreage. Plate 1-1 does not show dates when the permit boundary was changed or identified what areas were added. HSR must show the permit area and when the permit boundary changes occurred. The Division considers a record of changes to the permit area as important information. In addition, HSR must show the line type used to represent the permit boundaries on the map legend of Plate 1-1.

In the MRP, HSR stated, "The disturbed area contained 8.23 acres, however the reclamation bond was based on 9.15 acres." In this proposed amendment, HSR has removed information about the disturbed area acreage. The Division needs to know the disturbed area acreage for several reasons including bond calculation. HSR must state the correct disturbed area acreage in this proposed amendment to the MRP.

**Findings:**

The information in this section of the proposed amendment is not adequate to meet the requirements of this section of the regulations. Before approval, HSR must provide the following in accordance with:

**R645-301-521.190**, On Plate 1-1, Permit Boundary, and in other relevant sections of the MRP, HSR must show the following: 1) When each area was incorporated into the permit; and 2) In the map legend, the line type for the permit boundary.

**R645-301-521**, HSR must state in the text of the MRP the correct total acreage within the disturbed area boundaries.

## **CLIMATOLOGICAL RESOURCE INFORMATION**

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

**Analysis:**

Climate information in Chapter 11 is from the nearby Skyline Mine. In the past the Division has recommended that the operator set up a weather station at the site so that precipitation events can be correlated with other monitoring data: this has not been done.

**Findings:**

Climatological Resource Information meets the minimum regulatory requirements.

## **VEGETATION RESOURCE INFORMATION**

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

**Analysis:**

Chapter 9 of the current operation and reclamation plan provides the vegetation resource information. Plate 9-1, depicting the vegetative communities and acreage, has been updated to include the proposed permit area extension. Vegetative communities include Oakbrush, Salina Wildrye, Maple/Oakbrush/Aspen, Fir/aspen, Alpine Herb/Grassland, Manzanita, and Sagebrush/grass/ Rabbitbrush. This information is adequate to predict the potential for reestablishing vegetation. Because there is no surface disturbance proposed with mining in this area north of Beaver Creek, it is unlikely that there will be a need for reclamation practices to occur.

**Findings:**

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

## **FISH AND WILDLIFE RESOURCE INFORMATION**

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

**Analysis:**

The Fish and Wildlife Information in the proposed amendment is referenced in Section 3.4.6 et seq. and discussed in Chapter 10 of the current plan. Plate 10-1 has been revised to include the proposed addition to the permit area. This map shows the proposed permit boundary, the location and status of raptor nests, and big game habitat. The proposed addition to the permit area is divided into critical yearlong elk habitat and critical summer deer and elk habitats. The map has been revised to show the identification and location of the three nests located during the May 12, 2000 raptor survey. There are three-digit numbers associated with each of the nests shown on the map, 482- Golden Eagle-inactive, 484-Golden Eagle-old/dilapidated, 936-American Kestrel-active. The 2001 raptor survey is included in the 2001 Annual Report. It is labeled 2001 Raptor Survey-Horizon Mine, Jump Creek UT Quad. The map depicts the flight path of the survey that extends into and covers the majority of the proposed lease area. There were no nests identified in this area. According to the applicant, the Division of Wildlife Resources (DWR) provided them with a letter indicating that raptor surveys within the Horizon permit area were no longer necessary. Typically, the Division requires a raptor survey current to the year of the permitting activity. In this case, because previous surveys have also shown no evidence of nesting raptors in the proposed lease area and the DWR supports no additional surveys, the 2001 survey would be sufficient. A copy of the letter from the DWR should be included in the proposed amendment.

**Findings:**

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

**R645-301-322**, the permittee needs to include the letter from the DWR stating that it is no longer necessary to conduct raptor surveys of the Horizon permit area.

**LAND-USE RESOURCE INFORMATION**

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

**Analysis:**

The land use information is located in Chapter 4. Current land uses consist of grazing, logging, mining, mining reclamation activities, recreation, and wildlife habitat. This permit extension lies beneath an area that is undeveloped. The names and addresses of the surface owners are provided and identified on Plate 4-2. Plate 4-3 shows the ownership and location of the mineral tracts. The applicants' legal right to enter is shown on Plate 1-1 and discussed in the lease documentation located in Chapter 2.

**Findings:**

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

**GEOLOGIC RESOURCE INFORMATION**

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

The Horizon No. 1 Mine is located in the northern portion of the Wasatch Plateau (Figure 6-1)

**Analysis:**

Chapter 6 includes the geologic information for the Horizon Mine area in accordance with the requirements set forth in R645-301-600. HSR has submitted a stratigraphic column in Table 6-1.

Previously assembled geologic data obtained from Beaver Creek Coal Co. have been used as a basis for this chapter. The data from Beaver Creek Coal Co. include drill logs generated during their mining efforts. Information from recent geologic publications and in-house reports is also included to supplement the information obtained from Beaver Creek Coal Co.

The minable seams for the area are found in the lower 350 feet of the Blackhawk Formation. Plates 6-2 and 6-3 are geologic cross sections that illustrate the stratigraphic relationships of the Blackhawk and Star Point formations and the mappable coal beds present in the Horizon No. 1 Mine area.

A total of eight coal seams can be identified in the Gordon Creek region. Four of the eight seams are present in the mine area and crop out on the walls of the North Fork Gordon Creek Canyon, Coal Canyon, and Bryner Canyon. Weathering, burning, and vegetation obscure the majority of coal outcrops of the Hiawatha, Gordon, Castlegate A, and Bob Wright Seams. Only the Hiawatha and Castlegate A Seams have been economically mined in the area; however, Hidden Splendor has plans to mine only the Hiawatha Seam.

The Hiawatha Seam marks the base of the Blackhawk Formation. The Castlegate A Seam overlies the Aberdeen Sandstone. The Aberdeen is a marine sandstone sequence that coarsens upward, and is similar in character to the Star Point Sandstone. The Aberdeen measures over 120 feet at Price Canyon (Sec. 12, T13S, R9E) and thins to the west. In the vicinity of the Horizon No. 1 Mine and the National Mine (Sec. 17, T13S, R8E), the Aberdeen Sandstone is apparently discontinuous and not easily recognizable on outcrop. The westward pinch-out of the Aberdeen Sandstone is illustrated on the west-east stratigraphic section between drill hole LMC-4 and the Arco measured section near the National Mine as illustrated on Plate 6-3.

#### *Acid- and Toxic-forming Materials*

Table 6-5 summarizes the quality of the Hiawatha Seam. The analyses were performed on core samples from drill hole LMC-4 as well as the HZ drill holes. Supporting laboratory data sheets are provided in Appendix 6-2.

According to data provided in Table 6-5, the average moisture content of the Hiawatha Seam is 7.99 percent. The pyritic sulfur content of the coal is low, with a maximum of 0.07 percent and an average of 0.05 percent.

Data presented in Appendix 6-2 and summarized in Table 6-6 indicate that the Hiawatha Seam does not possess toxic-forming characteristics. Boron and selenium concentrations, as well as sodium adsorption ratios, are all within a range classified as "good", based on work by

Leatherwood and Duce (1988), which HSR references. (Note: there is no citation for Leatherwood and Duce in the References section.) However, the acid-base potential of each of the three coal samples that were collected from the HZ-series holes suggests that the coal has a potential to be acid forming.

The acid-forming potential of the coal will be tempered by its slightly alkaline nature (with a pH that varies from 7.3 to 7.8, according to Appendix 6-2). Furthermore, impacts to the environment of the permit and adjacent areas resulting from this acid-forming potential will be minimized by two factors. First, coal will be stored on the surface for only short periods of time before being shipped off site, thus reducing the potential for weathering, oxidation, and generation of acid drainage. Second, runoff from the coal stockpile will be routed through the facility sedimentation pond, where it will mix with more-alkaline runoff from additional areas, thus neutralizing any acidic drainage that might form.

Table 6-6 lists the analytical results of tests performed to determine the acid- and toxic-forming potential of floor and roof samples collected adjacent to the Hiawatha Seam from LMC-4 and from the HZ holes. Comparing the data in Table 6-6 with the guidelines presented by Leatherwood and Duce (1988) indicates that the roof and floor materials should be neither acid generating nor toxic forming. (Note: there is no citation for Leatherwood and Duce in the References section.) One sample (LMC-4 roof material) did contain an anomalously high pyritic sulfur content of 0.24 percent. However, comparison with other samples collected in the area indicates that this high pyritic sulfur content is likely of limited areal extent. This is further verified by the high neutralization potential of the remaining roof and floor materials (with acid/base potentials varying from 20.3 to 64.0 tons of CaCO<sub>3</sub> per 1000 tons of material).

To monitor conditions of the overburden and underburden, samples will be taken at 2,000 ft intervals throughout the mine and will be tested according to the Division's requirements.

#### Roof and Floor Properties

As discussed in Section 6.5.2, the roof and floor rock of the Castlegate A and Hiawatha Seams varies from shale to competent sandstone. Information obtained from the LMC drill holes and selected drill holes from the Beaver Creek Coal Company permit application for their mines in the area have been utilized to determine roof and floor conditions that can be anticipated while mining the Hiawatha seam. The locations of the of the Beaver Creek drill holes are included on Plate 3-3. Logs of the wells used to determine the properties of the roof and floor rock are included in Appendix 6-1.

The logs of drill holes LMC-3 and LMC-4 indicate the floor rock of the Hiawatha consists of 5 feet of carbonaceous silty shale and silty sandstone overlying the massive sandstone of the Spring Canyon Member of the Star Point Sandstone. No cores were obtained from LMC-3 and LMC-4 to determine the geotechnical properties of roof or floor rock. However, uniaxial

strength tests were performed by Beaver Creek Coal Company on samples of shales and sandstones obtained from drill holes GCD-4, -7, and -10. These drill holes are located approximately 1 mile west-southwest of the Horizon Mine portals. The results of the tests are provided in Table 6-7.

The logs from drill hole LMC 1 indicate the roof of the uppermost split of the Castlegate A seam is approximately 35 feet of sandstone. The floor of the seam consists of 4 feet of shale overlying approximately 30 feet of sandstone. In LMC-2, the upper split roof rock consists of 42 feet of carbonaceous shale and the floor consists of 38 feet of shaley silty sandstone. In LMC-3, the upper split roof rock consists of 4.5 feet of shale overlain by 19 feet of silty sandstone and the floor rock consists of 4 feet of shale overlying 8.5 feet of sandstone. In LMC-4, the roof rock consists of 15 feet of sandstone and the floor rock is 5 feet of siltstone overlying 26 feet of sandstone. Information from Beaver Creek Coal Company GCD-4 indicates that the roof rock of the Castlegate A Seam in the area of the drill hole consists of sandstones interbedded with shales and the floor consists of shale. The results of uniaxial strength tests for samples obtained from the roof and floor rock of the Castlegate A Seam in drill hole GCD-4 are provided in Table 6-7.

#### *Drill Holes*

The applicant has provided information from several boreholes on and adjacent to the permit area. Drill holes were drilled by Beaver Creek Coal Company to garner data for coal reserves. Drill Hole logs are provided in Appendix 6-1.

#### *Stratigraphy*

The applicant has described the stratigraphy in Section 6.4 of the MRP. The description includes the area on and adjacent to the mine. The stratigraphy consists of:

#### Star Point Sandstone

The Star Point Sandstone is the oldest stratigraphic unit exposed in the lease areas. It is the basal unit of the Mesaverde Group and is approximately 440 feet thick. The formation contains the Panther, Storrs, and Spring Canyon Sandstone Members, which consist of coarsening upward littoral sequences of white to light-gray, fine- to medium-grained, tight, quartzose sandstone. The Star Point Sandstone overlies and intertongues with the marine Mancos Shale. The Star Point is the lowest cliff-forming unit over most of the east side of the Wasatch Plateau.

#### Blackhawk Formation

The Blackhawk Formation measures approximately 900 feet thick in the Gordon Creek area and consists of interbedded fluvial and marine sandstone, siltstone, and shale. The

Blackhawk Formation conformably overlies the Star Point Sandstone and the boundary between the two formations is sharp; the massive Spring Canyon Sandstone member of the Star Point Sandstone is overlain by an easily erodible, shaley sandstone.

In the lease area, the Blackhawk Formation is the principal surficial bedrock unit. The Blackhawk is disconformably overlain by the massive coarse-grained, fluvial Castlegate Sandstone.

#### Castlegate Sandstone

The Castlegate Sandstone is exposed in the central and northeastern portion of the lease block (Plate 6-1). The formation consists of a white to gray, coarse-grained to conglomeratic fluvial sandstone. Exposures of the Castlegate Sandstone typically form cliffs to steep slopes. The Castlegate Sandstone is approximately 300 feet thick in the Gordon Creek area.

#### Price River Formation

The Price River Formation occurs in the northeastern portion of the lease block (Plate 6-1). The Price River is also a fluvial deposit and contains gray to white silty sandstones with interbedded subordinate shale and conglomerate. The formation typically forms ledges and slopes. The Price River formation ranges from 600 to 1,000 feet in thickness.

#### Unconsolidated Deposits

Unconsolidated deposits composed of silt and fine-grained sand, alluvial sediments and talus debris occur along valley floors and at the base of steep slopes. The thickness of these sediments is variable. In the Horizon No. 1 Mine area, the thickest alluvial deposits occur along Beaver Creek. Based on field observations, the alluvial sediments appear to exceed 10 feet in thickness.

#### *Structure*

Figure 6-3 shows data of a dip slope from the top of the Spring Canyon Member of the Star Point Sandstone to the north-northeast. The area around the minesite is dissected by several faults. There are two graben zones, the Gordon Creek Graben and the Fish Creek Graben. These grabens run parallel and converge into N-S trending faults of the North Gordon Fault zone. The proposed mine expansion will take place in the Fish Creek Graben Zone. According to Figure 6-3, any buildup of mine water may flow out the portal.

Several igneous dikes have been reported in area mines, including the Beaver Creek Coal Mines #2 and #3. The dikes are reported to be Miocene age and are a mica peridotite. The dikes

are typically associated with faults that bisect the area and trend east-west to northwest-southeast.

### *Faults*

The area of the permit is heavily faulted (Plate 6-1). Two major fault zones affect the lease block: the North Gordon and Fish Creek fault zones (Figure 6-2). The North Gordon fault zone measures 3 miles wide and 5 miles in length and is located east of the lease. The Fish Creek fault zone averages 2 miles wide and enters the lease from the northwest.

The permit area contains essentially two major fault trends. They are the N60W trending faults (range N50-75W) associated with the Fish Creek fault zone, and the N-S trending faults associated with the North Gordon fault zone. Sympathetic faulting also occurs within the mine area. Displacements of the faults in the mine area are variable, ranging from a few feet to as much as 200 feet.

### **Findings:**

The applicant has submitted sufficient Geologic Resource Information to meet the minimum requirements if the regulations.

## **HYDROLOGIC RESOURCE INFORMATION**

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

### **Analysis:**

#### **Baseline Information**

Perennial and intermittent springs flow from sandstone units in the Price River Formation and Castlegate Sandstone and from faults and fractures. Ephemeral springs are more likely to flow from shallow, local aquifers in soils, alluvium, or colluvium. Numerous springs and seeps exist in and adjacent to the permit area, especially in the Beaver and Jump Creek area. Baseline water monitoring points are shown on Plate 7-1, and baseline data are in Appendix 7-2 and the Division's database. The operator has committed to monitor significant surface- and ground-water sources, including drainages above and below the disturbed mine site area, and all point-source discharges.

Piezometer HZ-01-06-1 was installed in November 2001 and since then water levels have been measured during the second, third, and fourth quarters, the site usually being inaccessible

during the first quarter. Results are tabulated in Table 7-1 in the Annual Reports and in the Division's database. Potentiometric surface maps have not been updated with the new data.

Monitoring points SP-1, -2, and -4 were monitored for baseline information beginning in 1989. The USGS monitored SP-9 (Jewkes Spring) during the period of 1979 through 1983, Beaver Creek Coal Company monitored it from 1985 through 1995, and Horizon has monitored it since 1996.

Beaver Creek, which bisects the federal coal lease, is considered a perennial stream, and Jewkes Creek and Beaver Creek generally flow throughout the year. Adjacent canyons flow during spring snowmelt and summer thunderstorms. The limited drainage area and high elevation of some of the canyons shortens the duration of the snowmelt runoff and limits it to very early spring.

Surface-water quality data have been collected from the permit and adjacent areas since 1989, when sample sites have been accessible. SS-7 and SS-8 along Beaver Creek have been monitored since 1992, and SS-11 in Sand Gulch and SS-12 on Beaver Creek since 1996. Prior to 1996 data were generally collected in accordance with the Division's guidelines published in 1986. Beginning in 1996, data have been collected, where feasible, in accordance with the Division's guidelines published in April 1995. The data collected from the monitored sites, together with tables outlining the parameters that have been monitored, are presented in Appendix 7-3 (page 7-37). Data are also in the Division's database.

Water rights information is in Appendix 3-5. Points of diversion are shown on Plate 7-3. The operator has indicated that the area is almost exclusively used for stock watering (page 7-29).

### **Probable Hydrologic Consequences Determination**

Only sections of the PHC that are affected by the proposed amendment are discussed.

#### *Impacts to the Regional Aquifer System*

(The term *regional aquifer* is commonly used to describe the saturated portions of the Blackhawk Formation and Star Point Sandstone [and sometimes other strata] in the Book Cliffs and Wasatch Plateau Coal Fields. However, ground-water storage and movement in these areas is typically of a local or intermediate nature and the Division feels there is little or no basis for generally describing these as regional systems.)

HSR anticipated that the coal in the Horizon No. 1 Mine would be saturated essentially from the beginning of mining and that inflow to the mine would be in the range of 36 to 90 gpm,

the latter number representing inflow as mining expanded north of Beaver Creek. Under the anticipated future conditions, approximately 300 gpm of water might have been discharged from the mine during average operating periods (page 7-71).

The PHC states on page 7-74, "Soon after initiating mining it became evident that far more than 36 to 90 gpm was flowing into the mine. The old workings had intercepted a fault that was conveying a large volume of groundwater into the workings," perhaps the same fault encountered in the Beaver Creek Coal Company No. 3 Mine or a fault connected to it. The PHC continues,

The North Mains and a panel were extended to the north until the same water-bearing fault was encountered. When mining first encountered the fault the inflow was greater than 450 gpm. After the initial surge of groundwater, which lasted approximately 2 months, the fault produced between 200 and 300 gpm. During a period when the mine was shutdown in 2002 and 2003 the mine pumped an average of 279 gpm from the mine. During the period of shutdown the pumping data shows a slight decrease in the pumping rate over time. During the period of shutdown in 2002 the average pumping rate was 294 gpm. During the period of shutdown in 2003 the average pumping rate was 269 gpm. Thus the formation is slowly being de-watered and is producing less water with time. Upon resuming mining in the West Mains in August of 2003 the average pumping rates increased due to groundwater encountered at the mining face. Operators estimate the inflow at the face to be approximately 30 gpm ...

...based on the mining plan, mining can be expected to intercept the fault in the future. The maximum inflow to the mine can be expected to be similar to the maximum inflow rate encountered when the water bearing fault was first encountered plus whatever ground water is being produced by the mine workings in unfractured areas. Based on the highest monthly average pumping rate from March of 2002 of 473 gpm and the maximum estimated inflow based on Lines (1985) methods the maximum inflow would be approximately 560 gpm. This is considered a conservative estimate since the formation is being further de-watered as mining continues. Also an inflow of this magnitude would be expected to only last a short period of time before returning to an average inflow between 200 and 300 gpm.

Approximately 25 gpm (41 acre-feet per year) of groundwater will be removed with the mined coal based on average moisture content of 7.99 percent in the coal and maximum production of 700,000 tons per year (page 7-71). Dust suppression and similar uses will consume 6 gpm. Data in Appendix 7-9 indicate that the net loss of water by evaporation due to

mine ventilation will be approximately 6 gpm (10 acre-feet per year), so the total consumptive loss to the hydrologic system will be 37 gpm (60 acre-feet per year):

- 6 gpm for surface consumptive uses,
- 25 gpm as moisture in the coal, and
- 6 gpm as evaporative loss in the mine ventilation system.

With an average consumptive use of 37 gpm, it is likely that ground water will be discharged from the mine, approximately 300 gpm during average operating periods and exceeding 500 gpm for short periods of time after mining intercepts the water-bearing fault (page 7-72).

In November 2001, monitoring well HZ-01-06-1 was installed to provide potentiometric data for the area north of Beaver Creek. Water levels have been measured and results are tabulated in Table 7-1 in the Annual Reports and in the Division's database. The potentiometric surface dropped 85 feet between the first and second readings. It is not clear to HSR whether the drop was due to the mine de-watering the aquifer or if the initial reading was inaccurate. Circulation was lost numerous times during drilling, resulting in drilling fluid flowing into the formation, and drilling fluid flowing back into the borehole may have artificially elevated the potentiometric surface for the first reading. However, HZ-95-1 experienced a 104-foot drop in a similar time period between the fall of 1999 and spring of 2000. "Due to the rapid drop in the potentiometric surface and the magnitude of the drop at HZ-95-1", HSR feels it can be concluded that the influence of the water-bearing fault extends "at least as far north as Beaver Creek", and if the initial water level reading for HZ-01-06-1 is valid then the influence of the water-bearing fault on the potentiometric surface may extend "at least to the northern permit boundary" (page 7-75).

HSR states on page 7-75 that water-level monitoring indicates mining will depress the regional aquifer to the maximum depth of the mined entries, and that due to the large amount of water being transported by faulting, the potentiometric surface will be depressed in an area much larger than the permit area; however, when pumping ceases the potentiometric surface will return to pre-mining conditions. Beaver Creek Coal Company No. 3 Mine had previously intercepted the water-bearing fault. Inflows of approximately 400 gpm occurred when this fault was encountered (according to Roger Skaggs of the Blue Blaze Coal Company) and dropped the potentiometric surface, but when mining ceased in these old workings the potentiometric surface recovered, as shown by the water-level measurements taken prior to initiating mining at the Horizon Mine. Therefore, the impact to the regional aquifer is expected to be temporary and the potentiometric surface will return to pre-mining conditions "as soon as pumping ceases".

*Impacts to the Hydrologic System Resulting From Subsidence*

HSR refers to Gentry and Abel (1978), who apparently have concluded that topographic lows tend to be protected by upwarping of adjacent slopes during subsidence, and if this is so then “mining-induced surface fracturing should be very limited (or nonexistent) within the Beaver Creek stream channel area” (page 7-76). (Note: the Gentry and Abel document is not included in the References section.) HSR also states that as overburden is approximately 1,000 feet and coal thickness 7.5 feet, there is little potential for subsidence cracks to propagate to the surface. Also, any fracturing that does occur in the stream channel is likely to fill rapidly as a result of sedimentation (page 7-76).

Appendix 7-13 contains a copy of the US Forest Service study of the impacts of subsidence caused by full-extraction mining beneath Burnout Canyon at the Skyline Mine. The study was carried out from 1992 to 1998 by the Forestry Sciences Laboratory, Rocky Mountain Research Station in conjunction with the Manti-Lasal National Forest and Arch Coal Company/Canyon Resources LLC. The study was completed where both the Upper and Lower O’Conner Seams were extracted by longwall mining beneath the perennial stream in Burnout Canyon. The O’Conner Seams and the Hiawatha Seam are in the Blackhawk Formation and the general stratigraphy and lithology from the coal seams up to the surface are similar in both areas.

Based on the Burnout Canyon study, HSR has concluded that with 800 feet of cover or more, with panels oriented perpendicular to the stream, and with full extraction of the coal, some short-term effects occurred to the stream, but after three years the stream had reverted to a pre-mining configuration. Other conclusions are:

- There were no “measurable” significant impacts due to subsidence on stream flow, silt, or vegetation.
- There was year-to-year variability in the stream, but it was less than the year-to-year variability of the nearby control stream.
- There were temporary changes during the first year after mining in the number of pools, stream drops, and stream width, but the stream had reverted to normal by the third year after mining.

If the same conditions exist at Beaver Creek as existed at Burnout Creek, it would be reasonable to conclude that the impacts from mining beneath Beaver Creek would be similar, that is, minimal and without lasting effect.

Based on a statement from Von Schonfeldt and others (1980) that uniform subsidence “rarely causes problems to renewable resources such as aquifers, streams, and ranch lands.” HSR concludes that, “It is also not anticipated that subsidence will significantly affect springs within

the permit and adjacent areas”, and that “Since second mining will occur uniformly across the permit area except in buffer zones, the resulting subsidence should also be uniform, minimizing the potential impacts to overlying springs” (page 7-75). (Note: the Von Schonfeldt document is not included in the References section.)

HSR states on page 7-76, “As noted in the Cumulative Hydrologic Impact Assessment, mining in the area adjacent to the proposed Horizon permit area has not resulted in hydrologic impacts due to subsidence “, and that “Given the lack of extensive aquifer systems in lithologic units that overlie the coal within the permit and adjacent areas, it is not anticipated that groundwater will be significantly affected by subsidence. Thus, subsidence caused as a result of mining by Hidden Splendor Resources, Inc. should not cause significant surface or groundwater impacts within the permit or adjacent areas.”

#### *Potential Hydrocarbon Contamination*

In addition to the existing discussion on containment of spills, HSR has added a statement that there is no intention of abandoning equipment underground. Should it be necessary to abandon any equipment underground, HSR commits to drain all petroleum products from the equipment, and show locations of abandoned equipment on a mine map that will be submitted to the Division.

#### *Flooding Potential of Downstream Areas and Streamflow Alteration*

Flooding potential is discussed on pages 7-78 and 7-79 (Note: page 7-78 is missing from the hard copies). All disturbed-area runoff will flow through the sedimentation pond or other sediment-control device. Sediment-control devices will minimize flooding impacts to downstream areas because the sediment-control devices are designed to be stable, minimizing the potential for breaches that could cause downstream flooding; sediment is retained on-site, so bottom elevations of stream channels downstream from the disturbed areas are not artificially raised and the hydraulic capacity of the stream channels is not altered; and flow routing through the sediment control devices reduces peak flows from the disturbed areas, precluding flooding impacts to downstream areas. Following reclamation, stream channels will be returned to a stable state, minimizing detrimental effects that may result from flooding.

There has been no reported discharge from the sedimentation pond (UTG040019-001) since May 2000. Reported discharge from the mine directly to Gordon Creek (UTG040019-002) has averaged 200 to 300 gpm since January 2000. The MRP does not discuss flooding potential and streamflow alteration from this discharge that does not pass through the sedimentation pond or other sediment control device.

The plan does not address the effects of subsidence at the edges of the graben and at the permit area boundaries. Mining at Horizon will be done in a graben, and activation of the bounding faults by subsidence needs to be considered. Creation of scarps across Beaver Creek

would create ponding on the downstream side of the permit and headcutting on the upstream side. Erosion would eventually cut through the downstream scarp, removing topsoil, forming a gully, and increasing sedimentation downstream outside the permit area. The MRP does not contain a map showing projected limits of subsidence. Neither do maps show the relationship of the planned mine workings and projected subsidence to the faults bounding the graben.

The Division concludes that the possible interaction of the planned coal mining and subsidence with Beaver Creek at the graben's bounding faults needs to be addressed in the PHC. Also, monitoring of stream and adjacent environments is being recommended.

There is a related discussion in the Subsidence Control section on possible changes to the stream gradient within the permit area. Subsidence would cause crests and troughs that would change the stream gradient and establish high points and low points in the stream channel. HSR states they will protect Beaver Creek by orienting the panels perpendicular to the stream and using full extraction mining. It is not made clear why placing the panels perpendicular to the stream would minimize damage. The Division's conclusion is that more information is needed on the subsidence protection plan for Beaver Creek.

### **Groundwater Monitoring Plan**

Seeps and springs in the permit and adjacent areas are shown on Plate 7-1.

The mine operators conducted surveys for watercourses, seeps, and springs in the federal lease and surrounding areas. Areas evaluated included Sand Gulch, Coal Canyon, and several unnamed drainages that contribute to Jump Creek. Flow and temperature for each seep or spring are summarized in Appendix 7-2. These data were gathered to provide baseline information in anticipation of future mining.

In November 2001, monitoring well HZ-01-06-1 was installed to provide potentiometric data for the area north of Beaver Creek. Water levels have been measured in the second, third, and fourth quarters and results are tabulated in Table 7-1 in the Annual Reports and in the Division's database. The potentiometric surface dropped 85 feet between the first and second readings.

### **Surface-Water Monitoring Plan**

Surface water resources and locations from which samples have been collected in the permit and adjacent areas are shown on Plate 7-1.

For clarity, creek and drainage names that are used in the submittal are:

PREVIOUS NAME	NEW NAME
Gordon Creek	North Fork Gordon Creek
North Fork Gordon Creek	Jewkes Creek
Right Fork North Fork Gordon Creek	Portal Canyon Creek
Right Middle Fork North Fork Gordon Creek	Spring Two Canyon Creek

The “Previous Names” are local or familiar names and may be used in existing sections of the MRP. The “New Names” correspond to names used by the USGS on their 7.5-minute Quads.

Baseline hydrology was based on review of literature and available data obtained from the USGS, the US Forest Service, the State of Utah, Beaver Creek Coal Company, Blue Blaze Coal Company, and mine permit applications for the surrounding mines. Field reconnaissance was performed to confirm the location and characteristics of surface watercourses, springs, and seeps.

The three principal surface water courses in and adjacent to the mine permit area are Beaver Creek to the north of the permit area, Jewkes Creek through the center of the property, and North Fork Gordon Creek to the south of the property. Streamflow within the permit and adjacent areas is typical of the region, with maximum streamflow occurring in late spring and early summer as a result of snow melt runoff. Flows decrease significantly during the autumn and winter months. Both Jewkes Creek and Beaver Creek have experienced periods of no-flow, primarily in the winter and late summer months.

Small seeps and springs maintain the flow in Beaver Creek, which is considered to be perennial in spite of frequent no-flow periods, mainly in winter and late summer. Downstream decreases in flow have been observed in Beaver Creek between the upstream monitoring station SS-7 and the downstream station SS-8. This is most prevalent during the low-flow season; however, even during periods of high flow, higher discharge rates are occasionally observed at SS-7 as compared with SS-8.

The USGS formerly maintained gauging station 09312700 near the mouth of Beaver Creek, approximately 9 miles northeast of the permit area. During the 29-year period of record from October 1960 to October 1989, the minimum annual discharge was 254 acre-feet during water year 1981, and the maximum annual discharge was 9,950 acre-feet in water year 1983, only two years later (Appendix 7-7). The average annual discharge of Beaver Creek at the USGS monitoring station was 3,310 acre-feet. HSR determined the coefficient of variation for the station to be 74 percent, indicating high variability of flow.

Jewkes Creek is an intermittent stream that drains an area slightly greater than 1 square-mile. Portal Canyon Creek, a small drainage that discharges into Jewkes Creek from the northeast, contains the mine facilities and surface operations. Jewkes Creek empties into North Fork Gordon Creek. Flow data in Appendix 7-3 indicate that Jewkes Creek occasionally ceases flowing at station SS-3 even though it continues to flow at low rates upstream at station SS-5. This lost surface flow probably continues through the streambed sediments and contributes baseflow to the North Fork Gordon Creek.

North Fork Gordon Creek flows next to County Road 290 southeast of the permit area. The elevation of the creek is lower than the Hiawatha coal seam. Proposed mining operations will occur north of the creek and should not significantly affect the quantity or quality of the flow in North Fork Gordon Creek.

**Findings:**

**R645-301-728.333**, The PHC must include a discussion of what impact the discharge at UTG040019-002, which does not pass through the sedimentation pond or other sediment control device, will have on the potential for flooding and streamflow alteration.

**R645-301-525.100, -525.130, -525.300, -728.333**, The PHC must address the possible effects that subsidence will create at the bounding faults of the graben and resultant potential impacts both on and off the permit area.

**MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION**

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

**Analysis:**

Page 6-2 with Figure 6-1, the Location Map, is missing.

**Affected Area Boundary Maps**

By definition, the affected area boundary not only contains the permitted area but additional subareas where it is anticipated that additional permits will be sought. HSR did not indicate that they planned to seek additional acreage; therefore, the Division considers the affected area boundary map to be the same as the permit area boundary map. See Plate 1-1, Permit Boundary.

### **Existing Structures and Facilities Maps**

The term existing structures and facilities is defined as a structure or facility used in connection with or to facilitate coal mining and reclamation operations for which construction began prior to January 21, 1981. HSR has not proposed to use any existing structures or facilities in connection with the permit boundary extension.

### **Existing Surface Configuration Maps**

The existing surface configuration for the permit area is shown on several maps including Plate 1-1. The topographic lines on Plate 1-1 appear to be from a USGS topographic map with contour intervals of 80 feet. Because the permit extension does not include any additional surface disturbance, the topography on Plate 1-1 is considered adequate to show the existing surface configuration.

HSR did not change the disturbed area boundaries. Therefore, the existing maps are adequate.

### **Mine Workings Maps**

The mine workings for the Castlegate A Seam and the Hiawatha Seam are shown on Plate 3-9 and Plate 3-10 respectively. Several mines existed near the Horizon Mine. The Division must be given the resources HSR used to determine where the old mine workings were located.

### **Coal Resource and Geologic Information Maps**

The streams are not shown on Plate 6-1. Perhaps the drawing layer was turned off or was in a color that doesn't show on the black-and-white print.

### **Monitoring and Sampling Location Maps**

Monitoring and sampling locations are shown on Plate 7-1.

### **Permit Area Boundary Maps**

HSR shows the permit boundaries on Plate 1-1. The Division has found Plate 1-1 to be deficient and addressed those deficiencies in the Permit Area Section of the TA.

### **Subsurface Water Resource Maps**

Piezometer HZ-01-06-1 was installed in November 2001 and water levels have been measured in the second, third, and fourth quarters. Results are tabulated in Table 7-1 in the Annual Reports and in the Division's database. Potentiometric surface maps have not been updated with the new data.

### **Surface Water Resource Maps**

Surface water resources and locations from which samples have been collected in the permit and adjacent areas are shown on Plate 7-1.

### **Findings:**

The information in this section of the proposed amendment is not adequate to meet the requirements of this section of the regulations. Before approval, HSR must provide the following in accordance with:

**R645-301-122 and R645-301-131**, HSR must state the references and sources that were used to determine the location of the old mine workings.

**R645-301-722.200**, HSR must add information from piezometer HZ-01-06-1 to the potentiometric surface maps and update the contours.

**R645-301-121.220**, Page 6-2 with Figure 6-1, the Location Map, must be restored to the plan.

**R645-301-724.310**, Streams need to be shown on Plate 6-1.

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Task ID #1933

September 21, 2004

**ENVIRONMENTAL RESOURCE INFORMATION**

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## OPERATION PLAN

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# OPERATION PLAN

## MINING OPERATIONS AND FACILITIES

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

### Analysis:

The information reviewed in this section is general information about the mining operations and facilities. Specific details of the mining and reclamation plan have been discussed in other section of the TA. The general items discussed in this section of the submittal are:

- A narrative description of the type and method of coal mining procedures and proposed engineering techniques.

HSR did not propose any changes to the mining methods. They will continue to use room-and-pillar methods with the same type of equipment as already approved.

- Annual and total production of coal, by tonnage, and the major equipment to be used for all aspects of those operations.

HSR did not propose to change the amount of production. They project production between 700,000 tons per year to 1,500,000 tons per year. They anticipate production to occur between 2004 and 2015.

- A narrative explaining the construction, modification and use of new surface facilities.

Only minor proposed modifications to surface facilities are associated in this proposed amendment. Those issues have been addressed in other sections of the TA.

In Chapter 3, some of HSR's text modifications are not clear and concise. For example:

- In the first paragraph of Section 3.2.3.7 the wording indicates that one portal will be used for ingress and egress, and for the beltway and for ventilation.

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- The first paragraph of Section 3.3 reads “... The feeder breaker will reduce the coal to an appropriate size, after which the coal will be fed onto a conveyor to be carried to the coal from the storage pile onto coal trucks.”
- The last sentence in Section 3.3.1 reads “Horizon projects mining on the lands during the term of this Mine Permit Application.”

### **Findings:**

The information in this section of the proposed amendment is not adequate to meet the requirements of this section of the Regulations. Before approval, HSR must provide the following in accordance with:

**R645-301-121.200**, HSR must correct grammatical problems in the text of the proposed amendment, such as incomplete sentences and problems as outlined above, that are unclear or confusing.

### **EXISTING STRUCTURES:**

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

### **Analysis:**

Existing Structure means a structure or facility used in connection with or to facilitate coal mining and reclamation operations for which construction began prior to January 21, 1981. There are no existing structures involved with the permit boundary extension.

### **Findings:**

The information in the PAP is adequate to meet the minimum requirements of this section of the regulations.

### **RELOCATION OR USE OF PUBLIC ROADS**

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

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### Analysis:

HSR did not propose to relocate any public road in connection with the permit boundary extension. Neither did HSR change how they use public roads.

### Findings:

The information in the PAP is adequate to meet the minimum requirements of this section of the regulations.

## COAL RECOVERY

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

### Analysis:

The Division must make a finding that HSR will maximize coal recovery. When the federal government owns the coal reserves, the BLM develops a Resource Recovery and Protection Plan (R2P2.) before they approve the mine plan. The Division uses the R2P2 in the coal recovery analyzes. HSR did not include the R2P2.

HSR must either include a copy of the R2P2 or a summary of the BLM's findings on coal recovery or supply the Division with the same data that was given to the BLM.

### Findings:

The information in this section of the proposed amendment is not adequate to meet the requirements of this section of the Regulations. Before approval, HSR must provide the following in accordance with:

**R645-301-522**, HSR must give the Division additional information on maximizing economic coal recovery. HSR can either provide the Division with a copy of the R2P2, a summary of the R2P2 and approval letter from the BLM, or the same information given to the BLM.

## SUBSIDENCE CONTROL PLAN

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

**Analysis:**

**Renewable Resources Survey**

The renewable resources identified in the MRP are:

- Water resources including Beaver Creek (perennial stream), various springs, and groundwater.
- Vegetation resources including grazing and wildlife habitat and timber.

Because the permit boundary contained renewable resources, HSR submitted a subsidence control plan.

**Subsidence Control Plan**

The subsidence control plan must contain the following:

- A description of the method of coal removal, including the size, sequence, and timing for the development of underground workings.

HSR has committed to conduct all mining operations using room-and-pillar methods. When possible HSR will extract pillars during retreat mining. The size, sequence, and timing for the Horizon Mine are shown on Plate 3-3.

- A map of underground workings that describes the location and extent of areas in which planned-subsidence mining methods will be used and which includes all areas where measures will be taken to prevent or minimize subsidence and subsidence related damage and where appropriate, to correct subsidence-related material damage.

HSR did not show the subsidence area on any maps. HSR mentions in Section 3.4.8.5 that subsidence was anticipated outside the permit boundary. They use a 35-degree angle of draw but do not state why that number was used.

The only subsidence protection addressed in the proposed amendment is for Beaver Creek. HSR states they will protect Beaver Creek by orienting the panels perpendicular to the stream and using full extraction mining. It is not made clear why placing the panels perpendicular to the stream would minimize damage. Subsidence would cause crests and troughs that would change the stream gradient and establish high points and low points in the stream channel. HSR must give the Division more information on the subsidence protection plan for Beaver Creek.

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HSR must also address how they will protect the roads within the permit boundary that will be affected by subsidence.

- A description of the physical conditions, such as depth of cover, seam thickness, and lithology, which affect the likelihood or extent of subsidence and subsidence-related damage.

The Division has addressed these requirements in the geology sections of the TA.

- A description of monitoring, if any, needed to determine the commencement and degree of subsidence so that, when appropriate, other measures can be taken to prevent, reduce, or correct material damage.

HSR describes the monitoring program in Section 3.4.8.5 of the MRP. The plan calls for placing survey monuments outside the subsidence zone and placing monitoring points within the subsidence zone. HSR has committed to take readings at each station once a year until two years after cessation.

The survey monuments and monitoring points are shown on Plate 3-3. The plan calls for placing six monitoring station in the subsidence zone. The Division has found the number and location of the monitoring stations unsatisfactory. At a minimum HSR must: 1) Establish a monitoring program that will establish the angle of draw for the area; 2) Subside a monitoring station every year that retreat mining occurs; and 3) Conduct a land survey over each panel no sooner than six months after the panel was mined out but no more that one year after. The land survey must include critical areas such as areas of maximum tension and compression.

- A description of monitoring, if any, needed to determine the commencement and degree of subsidence so that, when appropriate, other measures can be taken to prevent, reduce, or correct material damage.

HSR did not propose any additional monitoring methods.

- Except for those areas where planned subsidence is projected to be used, a detailed description of the subsidence control measures that will be taken to prevent or minimize subsidence and subsidence-related damage, including, but not limited to: backstowing or backfilling of voids; leaving support pillars of coal; leaving areas in which no coal is removed, including a description of the overlying area to be protected by leaving the coal in place; and taking measures on the surface to prevent material damage or lessening of the value or reasonably foreseeable use of the surface.

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HSR did not show the areas where subsidence would occur on Plate 3-3. HSR did not show on the maps or state in the text any subsidence protected areas.

- A description of the anticipated effects of planned subsidence, if any.

HRS states in Section 3.2 that they do not anticipate any damage to Beaver Creek because of subsidence. The main surface subsidence features would be cracks that would self heal.

- A description of the measures to be taken to mitigate or remedy any subsidence-related material damage to, or diminution in value or reasonably foreseeable use of the land, or structures or facilities to the extent required under State law.

In Section 3.4.8.2 of the MRP, HSR addresses two types of subsidence mitigation. For surface cracks and depressions, they have committed to filling in fractures. For damage to larger areas HSR has committed to grade and plant the areas and intensify monitoring.

HSR did not specifically address water lose due to subsidence. They talk about ground-water loses that could occur if water entered the mine. The proposed remediation methods included sealing underground cracks, lining the streambed, and additional monitoring. HSR also has committed to replace water after mining is completed. HSR needs to address specific methods to replace the loss of State-appropriated water. HSR needs to remove the comment from the MRP about waiting until after mining ceases before they replace lost water.

- Other information specified by the Division as necessary to demonstrate that the operation will be conducted in accordance with the performance standards for subsidence control.

HSR must state if the roads in the subsidence area are public or private. They must also address remediation for subsidence damage to the roads.

### **Performance Standards For Subsidence Control**

HSR must maintain the subsidence performance standards

### **Notification**

In the proposed amendment, HSR has removed the commitment to notify property owners six months prior to undermining their property. R645-301- 525.700 requires the permittee to notify, at least six months prior to mining, the water conservancy district, if any, in which the mine is located and all owners and occupants of surface property and structures above

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the underground workings. The notification will include, at a minimum, identification of specific areas in which mining will take place, dates that specific areas will be undermined, and the location or locations where the operator's subsidence control plan may be examined. HSR does not need to have that commitment in the MRP. However, they are required to observe that regulation.

### Findings:

The information in this section of the proposed amendment is not adequate to meet the requirements of this section of the Regulations. Before approval, HSR must provide the following in accordance with:

**R645-301-525.290**, HSR must provide the following information in the proposed amendment: 1) The references used to determine a 35 degree angle of draw; 2) A map with the subsidence area boundaries; 3) The reasons why orienting the panels perpendicular to Beaver Creek would minimize subsidence damage, and 4) The protection and mitigation plans for the roads within the subsidence zone.

**R645-301-525.440**, At a minimum HSR must: 1) Establish a subsidence monitoring program that will establish the angle of draw for the area; 2) Subside a monitoring station every year that retreat mining occurs; and 3) Conduct a land survey over each panel no sooner than six months after the panel was mined out but no more than one year after. The land survey must include critical areas such as areas of maximum tension and compression.

**R645-301-525.490**, HSR must address the specific methods that they will use to replace the loss of State-appropriated water. In addition, HSR must remove the comment from the MRP about waiting until after mining ceases before they replace lost water.

## 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

A description of the wildlife mitigation and management plan is provided for in Chapter 10 of the current operation and reclamation plan. The plan addresses the protection of wildlife

and vegetation in the current disturbed area but does not include the portion of Beaver Creek and associated riparian areas that are located within the proposed lease area. Because there will be no surface disturbance, the only potential impact would be habitat loss resulting from subsidence. The current plan (Chapter 10, Plate 10-1) identifies the proposed lease area as critical summer habitat for deer and elk. The 2001 raptor survey included in the proposed amendment does not show the existence of any raptor nests in the proposed lease area. However the portion of Beaver Creek and associated riparian areas that extends through the proposed lease area from southwest to northeast would be considered high-value and or crucial habitats, as well as any springs in the area. The proposed amendment indicates that these areas will be undermined and uniformly subsided. Therefore the proposed amendment needs to include a Protection and Enhancement plan for these habitat areas that may be impacted by subsidence. The following criteria are suggested for inclusion in the plan:

- A monitoring schedule for the macroinvertebrates in Beaver Creek,
- Color infrared aerial photo monitoring of the riparian and meadow areas associated with Beaver Creek once every three years,
- Channel characteristics, Cross Sections, Longitudinal profiles, and
- Riparian Surveys as described in the Skyline Mine Subsidence Study.

The plan should be developed in cooperation with the Division of Wildlife Resources and the Division of Oil, Gas and Mining.

### **Endangered and Threatened Species**

Chapter 10, Section 10.3.3.1 page 10-25 and Table 10-1 address this section of the regulations. The text on page 10-25 and Table 10-1 needs to be updated to reflect the current status of threatened, endangered, and candidate species. A current list of species for Carbon County has been e-mailed to the applicant for inclusion in their proposed amendment and MRP. The list of Threatened, Endangered and Candidate species that may occur in Carbon County are Graham Beardtongue, Uintah Basin Hookless Cactus, Bonytail Chub, Colorado Pike Minnow, Humpback Chub, Razorback Sucker, Bald Eagle, Mexican Spotted Owl, Western Yellow-billed Cuckoo, and the Black-Footed Ferret. Of these species listed, only one, the Bald Eagle, may occur in the proposed lease area. Most threatened or endangered species that could occur in Carbon County occur at lower elevations than the mine and have no habitat in the proposed permit area extension. There have been no confirmed sightings of Black-Footed Ferrets in Carbon County in several years. However, the mine has potential, through water depletions, of adversely affecting four listed threatened and endangered fish species of the upper Colorado River drainage. They include the Bonytail Chub, Colorado Pike Minnow, Humpback Chub, and Razorback Sucker. The Fish and Wildlife Service requires mitigation when water depletions exceed 100 acre-feet annually. Chapter 7 Section 7.3.2 PHC Determinations, page 7-71 lists the

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criteria and volumes used to calculate an estimated consumption of 60 acre-feet of water per year.

### **Bald and Golden Eagles**

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

### **Wetlands and Habitats of Unusually High Value for Fish and Wildlife**

Beaver Creek, a perennial stream, and several springs that lie within the proposed permit area extension are identified on Plate 7-1. The portion of Beaver Creek and associated riparian areas that extend through the proposed lease area from southwest to northeast would be considered high-value and/or crucial habitats, as well as any springs in the area. The proposed amendment indicates that these areas will be undermined and may be subsided. Therefore, the proposed amendment needs to include a Protection and Enhancement plan for these habitat areas in the event they are impacted by subsidence. Suggested criteria are noted in the Protection and Enhancement Plan section of this document.

### **Findings:**

The information contained in this section of the proposed amendment is not adequate to meet the requirements of the regulations. Prior to approval the applicant needs to provide the following in accordance with:

**R645-301-322, -301-333**, The portion of Beaver Creek and associated riparian areas that extend through the proposed lease area from southwest to northeast would be considered high-value and/or crucial habitats, as well as any springs in the area. The proposed amendment indicates that these areas will be undermined and uniformly subsided. Therefore the proposed amendment needs to develop a protection and enhancement plan for these habitat areas that may be impacted by subsidence. Additional comments are provided in the Protection and Enhancement Plan section of this document. The plan should be developed in cooperation with the Division of Wildlife Resources and the Division of Oil, Gas and Mining.

**R645-301-322**, The text on page 10-25 and Table 10-1 of the MRP needs to be updated to reflect the current status of Threatened, Endangered and Candidate species.

## **ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES**

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

### **Analysis:**

#### **Road Classification System**

HSR will not construct any new roads as part of the permit boundary extension.

#### **Other Transportation Facilities**

HSR has removed one drop point from the conveyor system and added a crushing and screening unit to the conveyor system.

### **Findings:**

The information in the PAP is adequate to meet the minimum requirements of this section of the regulations.

## **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:**

HSR will not change the approved methods for disposal of noncoal mine waste or coalmine waste. No new refuse piles or impoundments will be constructed as part of the permit boundary extension. HSR will not generate any excess spoil.

### **Findings:**

The information in the PAP is adequate to meet the minimum requirements of this section of the regulations.

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### 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:

##### General

Steve and Pete Stamitakis stated in their letter to the Division (received August 20, 2004) that monitoring had not been done “since Horizon left”; it isn’t clear what date or event this refers to, but some of the monitoring was not done in 2000. There have also been quarters when there was no access for some monitoring sites because of snow cover. Data in the Division’s database indicate that the monitoring plan described in the MRP has basically been followed and reporting to the Division is up-to-date.

##### Groundwater Monitoring

The Ground Water Monitoring Plan is in Chapter 7. Operational and reclamation ground-water monitoring parameters are supposed to be in Table 7-2, but there is no Table 7-2 in the plan. Monitoring points SP-1, -2, and -4 were monitored for baseline information beginning in 1989. The USGS monitored SP-9 (Jewkes Spring) during the period of 1979 through 1983, Beaver Creek Coal Company monitored it from 1985 through 1995, and Horizon has monitored it since 1996.

In November 2001, monitoring well HZ-01-06-1 was installed to provide potentiometric data for the area north of Beaver Creek. Water levels have been measured in the second, third, and fourth quarters and results are tabulated in Table 7-1 in the Annual Reports and in the Division’s database. The potentiometric surface dropped 85 feet between the first and second readings. It is not clear to HSR as to whether the drop was due to the mine de-watering the aquifer or if the initial reading was inaccurate. Circulation was lost numerous times during drilling, resulting in drilling fluid flowing into the formation, and drilling fluid flowing back into the borehole may have artificially elevated the potentiometric surface for the first reading. However, HZ-95-1 experienced a 104-foot drop in a similar time period between the fall of 1999 and spring of 2000.

On page 7-74 it states:

Soon after initiating mining it became evident that far more than 36 to 90 gpm was flowing into the mine. The old workings had intercepted a fault that was

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conveying a large volume of groundwater into the workings. This fault may be the same fault encountered in the Beaver Creek Coal Company No. 3 Mine or a fault connected to it. The North Mains and a panel were extended to the north until the same water bearing fault was encountered. When mining first encountered the fault the inflow was greater than 450 gpm. After the initial surge of groundwater, which lasted approximately 2 months, the fault produced between 200 and 300 gpm. During a period when the mine was shutdown in 2002 and 2003 the mine pumped an average of 279 gpm from the mine. During the period of shutdown the pumping data shows a slight decrease in the pumping rate over time. During the period of shutdown in 2002 the average pumping rate was 294 gpm. During the period of shutdown in 2003 the average pumping rate was 269 gpm. Thus the formation is slowly being de-watered and is producing less water with time. Upon resuming mining in the West Mains in August of 2003 the average pumping rates increased due to groundwater encountered at the mining face....

And on page 7-75:

...Due to the rapid drop in the potentiometric surface and the magnitude of the drop at HZ-95-1 it could be concluded that the influence of the water-bearing fault extends at least as far north as Beaver Creek. If the initial water level reading for HZ-01-06-1 is valid then it can be concluded that the influence of the water-bearing fault on the potentiometric surface extends at least to the northern permit boundary.

Groundwater monitoring during operation of the mine will be conducted in accordance with R645-301-723 and will consist of:

- Collection of flow and water-quality data from springs SP-1, -2, -4, -9, 2-6-W (Homestead Spring) and GV-70;
- Collection of flow and water-quality data from sustained inflows to the mine and mine water discharge quantities (temporary or permanent); and
- Collection of water-level data from the HZ monitoring wells.

### **Surface Water Monitoring**

Surface-water quality data have been collected from the permit and adjacent areas since 1989, when sample sites have been accessible. SS-7 and SS-8 along Beaver Creek have been monitored since 1992, and SS-11 in Sand Gulch and SS-12 on Beaver Creek since 1996. Prior to 1996 these data were generally collected in accordance with the Division's guidelines published

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in 1986. Beginning in 1996, data have been collected, where feasible, in accordance with the Division's guidelines published in April 1995. The data collected from the monitored sites, together with tables outlining the parameters that have been monitored, are presented in Appendix 7-3 (page 7-37). Data are also in the Division's database.

### **Water-Quality Standards And Effluent Limitations**

Temporary mine discharge quantities will be reported monthly and submitted to the Division with quarterly monitoring data. Reports will contain the period of pumping and the daily flow rate. A continuous flow meter was installed in 2001 and has been used to report mine discharge since that time (page 7-30).

Language in the MRP regarding the UPDES permits is confusing. In places it discusses a mine discharge permit that was rejected but will be reapplied for in the future, and that mine discharge will be routed through the sedimentation pond in the interim. There is no copy of the UPDES permit in the MRP. The Division's database indicates the sedimentation pond discharged once, in 1999, and the mine has been discharging directly to Gordon Creek since 2001.

### **Diversions: Perennial and Intermittent Streams**

There are no new diversions of perennial or intermittent streams

### **Diversions: Miscellaneous Flows**

There are no diversions of miscellaneous flows.

### **Stream Buffer Zones**

Under R643-301- 731.610, no land within 100 feet of a perennial stream or an intermittent stream will be disturbed by coal mining and reclamation operations, unless the Division specifically authorizes coal mining and reclamation operations closer to, or through, such a stream. The Division may authorize such activities only upon finding that:

- 731.611. Coal mining and reclamation operations will not cause or contribute to the violation of applicable Utah or federal water quality standards and will not adversely affect the water quantity and quality or other environmental resources of the stream; and
- 731.612. If there will be a temporary or permanent stream channel diversion, it will comply with R645-301-742.300.

No diversion of Beaver Creek or other streams to the north is planned, so 731.612 does not apply for this Permit Boundary Expansion. Diversion culverts in Jewkes Creek and Portal Canyon have been approved in previous permit reviews.

Mining is planned beneath Beaver Creek, a perennial stream. HSR believes that no damage will occur to Beaver Creek with the planned mining. There are no plans for a buffer zone. Subsidence protection is planned for Beaver Creek by orienting the panels perpendicular to the stream and using full extraction pillaring (page 3-2). There will be no surface mining activity in the Beaver Creek watershed, so no stream buffer zone is needed along Beaver Creek to protect structures from surface activity.

HSR states in the PHC (Section 7.3.2) that retreat mining results in uniform downwarping and lowering of strata above the mined interval. This uniform downward movement is generally not accompanied by a significant degree of fracturing. As a result, the original attitude and integrity of the strata are maintained. Little impact on the perched aquifers of the overburden is expected to result from downwarping.

Appendix 7-13 contains a copy of the US Forest Service study of the impacts of subsidence caused by full extraction mining beneath Burnout Canyon at the Skyline Mine. The study was carried out from 1992 to 1998 by the Logan Forestry Sciences Laboratory, Rocky Mountain Research Station in conjunction with the Manti-Lasal National Forest and Arch Coal Company/Canyon Resources LLC. The study was completed over an area of the mine where both the Upper and Lower O'Conner Seams were extracted by longwall mining beneath the perennial stream in Burnout Canyon. The O'Conner Seams and the Hiawatha Seam are in the Blackhawk Formation and the general stratigraphy and lithology at the Skyline and Horizon Mines are similar.

Based on the Burnout Canyon study, HSR has concluded that with 800 feet of cover or more, with panels oriented perpendicular to the stream, and with full extraction of the coal, some short-term effects occurred to the stream but after three years the stream had reverted to a pre-mining configuration. Other conclusions are:

- There were no “measurable” significant impacts due to subsidence on stream flow, silt, or vegetation.
- There was year-to-year variability in the stream, but it was less than the year-to-year variability of the nearby control stream.
- There were temporary changes during the first year after mining in the number of pools, stream drops, and stream width, but the stream had reverted to normal by the third year after mining.

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If the same conditions exist at Beaver Creek as existed at Burnout Creek, it would be reasonable to conclude that the impacts from mining beneath Beaver Creek would be the same, would be minimal and without lasting effect.

There is no overburden isopach map in the MRP. Table 6-2 lists depths to the top of the Hiawatha Seam as measured in five bore holes: depths range from 215 feet to 1,149 feet, and only two of the five are greater than 800 feet, so an average based on these data indicate the overburden is thinner than 800 feet. However, boreholes LMC-1 and HZ-95-1 are located adjacent to Beaver Creek and indicate the Hiawatha overburden thickness in the graben is at least 800 feet beneath the creek. The cross section on Plate 6-2 also indicates a thickness greater than 800 feet. Therefore, the conclusions from Burnout Creek, which relate to overburden being over 800 feet thick, would indicate that subsidence will cause only minor and temporary impacts to Beaver Creek.

The plan does not address the effects of subsidence at the edges of the graben and at the permit area boundaries.

One factor that is different from the Skyline Mine and Burnout Canyon is that mining at Horizon will be done in a graben, and activation of the bounding faults by subsidence needs to be considered. Creation of scarps across Beaver Creek would create ponding on the downstream side of the permit and headcutting on the upstream side. Erosion would eventually cut through the downstream scarp, removing topsoil, forming a gully, and increasing sedimentation downstream outside the permit area. The MRP does not contain a map showing projected limits of subsidence. Neither do maps show the relationship of the planned mine workings and projected subsidence to the faults bounding the graben.

The Division concludes that, within the purview of R643-301- 731.610, the possible interaction of the planned coal mining and subsidence with Beaver Creek at the graben's bounding faults needs to be addressed. Also, monitoring of stream and adjacent environments is being recommended.

HSR notes in Section 3.3.2.2 that no surface structures exist within the zone of potential subsidence. There are, however, private unpaved roads adjacent to Beaver Creek, in Sand Gulch, and in an unnamed side canyon to Jump Creek that could be affected by subsidence. Surface owners Steve and Pete Stamatakis have expressed concern over damage to their property from subsidence. Subsidence of roads is allowed by the Coal Mining Rules, but it is reasonably foreseeable that damage to these roads from subsidence could result in diminished use, so HSR needs to add a discussion of the potential damage to these roads, and formulate a plan to repair any damage to these roads that might be sufficient to result in impairment, loss of use, or material damage.

### **Sediment Control Measures**

There is no new surface disturbance. There is no new or modified sedimentation pond or any other new or modified sediment control measure.

### **Water Replacement**

On page 3-28 is the statement:

...Should a substantial inflow of groundwater occur, mitigation measures may include: attempts to seal off the inflow, increased monitoring efforts, lining of the stream bed through the affected area if it is determined to be surface water, and replacement of lost water if the groundwater does not rebound after mining is completed as indicated by monitoring.

An extended mitigation plan will be enacted should a measurable impact occur to surface water due to mining activity. The mitigation plan will be correlated with Water Rights and UDOGM [the Division].

Under R645-301-525.480 and R645-301-731.530, there needs to be plan in the MRP, before any damage actually occurs, to repair damage to surface facilities and promptly replace state-appropriated water supplies. Mitigation of impacts to water supplies cannot be put off until "after mining is completed."

### **Findings:**

The information contained in this section of the proposed amendment is not adequate to meet the requirements of the regulations. Prior to approval the applicant needs to provide the following in accordance with:

**R645-301-731.211**, Table 7-2 must be included in the plan.

**R645-301-623.300**, HSR needs to provide an overburden thickness isopach map.

**R645-301-731.222.2**, HSR needs to include a copy of the current UPDES permit in the MRP.

**R645-301-525.120, -525.480, -525.500**, HSR needs to add a discussion of the potential for damage to the private unpaved roads adjacent to Beaver Creek, in Sand Gulch, and in an unnamed side canyon to Jump Creek that could be affected by

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subsidence, and formulate a plan to repair any damage that results in impairment, loss of use, or material damage to these roads.

**R645-301-525.480, -525, -731.530**, HSR needs to add a plan to promptly replace contaminated, diminished, or interrupted water supplies.

## SUPPORT FACILITIES AND UTILITY INSTALLATIONS

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

### Analysis:

In addition to the permit boundary extension, HSR is proposing minor modifications to the conveyor system and installation of a crushing and screening plant and substation. In addition HSR is removing the proposed office, bathhouse, and shop from the MRP.

The conveyor system was modified by decreasing the drop points from three to two.

### Findings:

The information in the PAP is adequate to meet the minimum requirements of this section of the regulations.

## USE OF EXPLOSIVES

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

### Analysis:

HSR will not conduct any surface blasting as part of the permit boundary extension or modification of the surface facilities.

### Findings:

The information in the PAP is adequate to meet the minimum requirements of this section of the regulations.

## **MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS**

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

### **Analysis:**

#### **Affected Area Maps**

As mentioned in the environmental section of this TA, HSR does not indicate they are seeking any additional leases outside the permit area. Therefore, the permit area is the same as the affected area. Plate 1-1, Permit Boundary, shows the affected and permitted boundaries.

#### **Mining Facilities Maps**

HSR is proposing minor modifications to the surface facilities. The conveyor system will be modified, the crushing and screening plant installed, and some proposed buildings removed from the MRP. HSR must update the maps and plates that show the surface facilities.

#### **Mine Workings Maps**

HSR has shown the old mine workings on Plate 3-9 - Old Workings Castlegate A Seam and Plate 3-10 - Old Workings Hiawatha Seam. As discussed previously in this TA, the Division must be given the resources HSR used to determine where the old mine workings were located.

#### **Monitoring and Sampling Location Maps**

Monitoring and sampling locations are shown on Plate 7-1.

#### **Certification Requirements**

HSR has met the minimum certification requirements.

### **Findings:**

The information contained in this section of the proposed amendment is not adequate to meet the requirements of the regulations. Prior to approval the applicant needs to provide the following in accordance with:

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**R645-301-525.240, -623.300, -724.310**, HSR needs to show the relationship of the existing and projected mine workings and projected angle-of-draw to the bounding faults of the graben on Plate 3-3 or another appropriate map.



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## 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:**

No surface disturbance other than minimal subsidence is anticipated. The postmining land use for the area included in this proposed amendment will remain the same as pre-mining and mining conditions, i.e., grazing, logging, mining, mining reclamation activities, recreation, and wildlife habitat.

### **Findings:**

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

## PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES

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

### **Analysis:**

No surface disturbance is anticipated other than minimal subsidence. Beaver Creek and several springs lie within the proposed permit area extension. The applicant is currently monitoring Beaver Creek and certain springs and wells in the proposed addition to the permit area (Plate7-1). The applicant has proposed to mine beneath the reach of Beaver Creek that extends through the lease area. Subsidence will be monitored during mining and for a period of two years following final cessation of mining practices. The subsidence monitoring points are identified on Plate 3-3 of the proposed amendment. The applicant has been requested to develop and implement a protection and enhancement plan under the Fish and Wildlife Information section of this TA.

**Findings:**

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

**APPROXIMATE ORIGINAL CONTOUR RESTORATION**

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

**Analysis:**

The changes to the surface facilities do not affect the backfilling and grading plan, which contains the requirements for achieving the approximate original contour requirements. No surface disturbance will occur in the addition to the permit area.

**Findings:**

The information in the PAP is adequate to meet the minimum regulatory requirements for this section of the regulations.

**BACKFILLING AND GRADING**

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

**Analysis:**

No additional surfaces areas will be disturbed in the permit addition. The minor changes to the surface facilities will not change the backfilling and grading plan.

**Findings:**

The information in the PAP is adequate to meet the minimum regulatory requirements for this section of the regulations.

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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:

There are no new mine openings associated with the proposed amendment.

#### Findings:

The information in the PAP is adequate to meet the minimum regulatory requirements for this section of the regulations.

### 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:

The permit area extension and the minor changes to the surface facilities do not involve changes to the road system. Although minor changes to the conveyor system have been proposed, the reclamation plan remains the same: all surface facilities will be removed during reclamation.

#### Findings:

The information in the PAP is adequate to meet the minimum regulatory requirements for this section of the regulations.

### 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:**

**Hydrologic Reclamation Plan**

The proposed extension of the permit area does not affect the hydrologic reclamation plan in the current MRP.

**Findings:**

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

**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:**

No surface disturbance is anticipated in the permit extension other than minimal subsidence. Mining practices would have a minimal effect on the vegetation resources. Potential impacts to vegetation caused by subsidence during active mining operations may be mitigated by implementing contemporaneous reclamation practices as described in Section 3.5.1 of the reclamation plan.

**Findings:**

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

**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:**

**Revegetation: General Requirements**

The general requirements for revegetation are provided for in Section 3.5 of the reclamation plan. No surface disturbance is anticipated in the permit extension other than

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minimal subsidence. Mining practices would have a minimal effect on the vegetation resources. Potential impacts to vegetation caused by subsidence during active mining operations may be mitigated by implementing contemporaneous reclamation practices as described in Section 3.5.1 of the reclamation plan.

### **Revegetation: Timing**

The approximate schedule for reclamation activities is outlined in Table 3-4 of Section 3.5.7.1 of the reclamation plan.

### **Revegetation: Mulching and Other Soil Stabilizing Practice**

Section 3.5.4.3 of the reclamation portion of the plan and proposal describes the mulching and other stabilizing practices to be implemented during reclamation.

### **Revegetation: Standards For Success**

The standards for success are provided for in Section 3.5.6 of the reclamation plan.

### **Findings:**

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

## **BONDING AND INSURANCE REQUIREMENTS**

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

### **Analysis:**

#### **Determination of Bond Amount**

The proposed amendment involves minor changes to the surface facilities. To keep the bond current, HSR must submit updated reclamation cost estimates. The Division will review the bond calculations as part of bonding process. Once the Division approves the bond calculations, HSR will then submit the bond calculations as part of the proposed amendment.

**Findings:**

The information in this section of the proposed amendment is not adequate to meet the requirements of this section of the Regulations. Before approval, HSR must provide the following in accordance with:

**R645-301-830.140**, HSR must submit updated reclamation cost estimates that include the proposed modifications to the surface facilities.

## **CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)**

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

### **Analysis:**

The CHIA was updated when the south part of Federal Lease UTU-74804 was added to the permit in 2001. That revision included assessment of the entire federal lease UTU-74804. The Division will review the CHIA and update it as needed for this significant revision, but major changes are not anticipated.

### **Findings:**

The Division will update the CHIA as needed for this permit extension, a significant revision to the mine plan.

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