



GARY R. HERBERT  
Governor  
GREG BELL  
Lieutenant Governor

**State of Utah**  
DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER  
Executive Director

**Division of Oil, Gas and Mining**  
JOHN R. BAZA  
Division Director

**Technical Analysis and Findings**  
**Utah Coal Regulatory Program**

**PID:** C0250005  
**TaskID:** 4517  
**Mine Name:** COAL HOLLOW  
**Title:** IBC & HIGHWALL MINING ALTERNATIVE

**General Contents**

**Violation Information**

*Analysis:*

Information provided in the MRP Section 113 and Appendix 1-10 is current. The Permittee is in compliance with the requirements of R645-301-113.

pburton

**Right of Entry**

*Analysis:*

A mineral lease agreement with Richard Dame, Trustee of the Alecia Swapp Dame trust, dated 10/23/2013, provides right of entry to 85.88 acres. The lease is Exhibit 5 in the Confidential Appendix 1-2. Details of coal and surface ownership, including the IBC, are provided in Section 112.500. The Permit Area Ownership Table (p. 1-5) lists 721 acres in the permit area and 521 acres of fee coal to be mined. The surface ownership is illustrated on Dwg. 1-3. the coal ownership is illustrated on Dwg. 1-4. The permit area is illustrated on Dwg 1-1. Right of entry information found in Section 114 is complete.

pburton

**Permit Term**

*Analysis:*

Section 116 of the MRP describes three phases of mining that began in 2010 and that are anticipated to be completed in 2017. Section 116 states that there are 289 acres in Phase 1, 40 acres in Phase 2, and 89 acres in Phase 3 of the mining. Section is consistent with the three phases of mining shown on Dwg. 5-3 and is consistent with the three phases of bonding shown on Dwg B-2 included with the Reclamation Agreement.

pburton

**Maps and Plans**

Analysis:

Plate 3-7 has been revised to show the current mining sequence and Plate 3-7A has been added that shows the proposed highwall mining activities.

Findings:

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

jheffric

## Environmental Resource Information

### General

Analysis:

Sink Valley Wash runs north and south on the east of the permit area. There are several springs and agricultural ponds on the eastern boundary of the proposed permit area. The current and post mining land use is undeveloped rangeland (wildlife) and livestock pasture (grazing). Dame lands are actively flood irrigated or subirrigated. The information provided indicates a substantial area of subirrigated meadow and potentially irrigated pastureland east of the Tropic Shale Ridge in the existing permit area and IBC. The NRCS has determined that within the IBC there are 80 acres of Statewide and local Important Farmland, (2014 Incoming file, 1282014.4502.pdf)

pburton

### Permit Area

Analysis:

New maps (Ex 5-10A, Ex 5-38 and 5-38A) provided with the application extend the mining plan to 2017. Three phases of mining area described under bonding Section 830.140 of the application, corresponding to three phases of overburden removal shown on Plates 5-17, 5-18 and 5-19. The new permit boundary is also shown on Dwg 5-17, Dwg 5-18 and Dg 5-19 which are crucial to developing bonding numbers.

pburton

### Climatological Resource Information

Analysis:

The MRP addresses climatic information and the change in drainage does not affect this information. However, climate is again addressed on page 3 of Appendix 7-14. The main factor of climate at the site is a total precipitation average of 16.4 inches. Temperatures average from 15.1 degrees Fahrenheit to 82.6 degrees Fahrenheit.

khoffman

### Soils Resource Information

Analysis:

Soils within the 85.88 acre incidental boundary change (IBC) were surveyed by Bob Long in 2007. Information on soil survey pits SP-52, SP-53 and SP-54 within the IBC is found in Appendix 2-2. Soil Survey Drawing 2-1 was extended into the Dame lease area based upon Data from these pits. The Table of Contents lists Appendix 2-3, 2014 soil survey report,

pburton

### Land Use Resource Information

*Analysis:*

ACD has included a commitment in Chapter 4, Page 4-5, section 411.140 of their current MRP to conduct a cultural resource survey of the proposed 500' trench during the removal of topsoil in the event that cultural resources are discovered during the topsoil removal process that could not have been identified in the previous survey.

*Findings*

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

jhefric

## **Land Use Resource Information**

*Analysis:*

Grazing lands supported by numerous seeps and springs exist in the proposed IBC area ash shown in Dwg 7-7 and described in Section 321.100. At the time of permit issuance, the Division estimated that there was 261 acres of meadow and pasture and that there was 69 subirrigated meadow acres.

Drawing 7-1 shows the total number of seeps and springs in the permit area available for grazing animals. Drawing 7-7 and Plate 5 show the ponds and ditches developed to support agriculture. Both Pugh and Dame own pastureland or subirrigated meadow lands within the permit area that have been leased to Alton Coal Development (Dwg. 3-1 and 7-7). These subirrigated lands are grazed to produce cattle, but are not cultivated to produce crops (Appendix 7-1, pg. 48). Pasture lands extend further south in Sink Valley, but these lands in Section 32 have not been mapped.

Pasture lands in the west and central portions of the permit area, dominated by introduced grass species, rely on precipitation and stored soil moisture for growth (average approximately 16 in/yr) and not on irrigation or subirrigation (App. 7-7, pg. 12; App. 7-1, pg. 48). On the east side of the permit area, Dame retains water for flood irrigation by the active water rights on Pond 29-3 and 29-5 (Dwg 7-7). Much of the Dame property is subirrigated and apparently needs no supplemental irrigation.

Most spring and surface-diversion rights in the W/2 of Sec. 29, E/2 of Sec 30, and W/2 of Sec. 32, T. 39 S., R. 5 W., along Sink Valley Wash around and downstream of the Swapp Ranch, either cover both stockwatering and irrigation or are for irrigation only. Ponds are used for stockwatering and irrigation systems (App. 7-7, pg. 14).

Within the permit area there is one spring (SP-7) with a domestic water right (Pugh, water right 85-215), located right along the fence between Pugh's and Dame's properties (Dwg. 7-3). Adjacent to the permit area, there are two springs (SP-3 and SP-10B) with a domestic water right: Sorensen, water right 85-373 and Johnson, water right 85-1011, respectively.

pburton

## **Prime Farmland**

*Analysis:*

The NRCS determined that 80 acres of the 85.88 acre IBC are considered Farmlands of Statewide and Local Importance (Chap. 2, p. 2-1, 2-2.). The NRCS letter of determination is found in Section 1, App. 2-1 and also in the Division files, Incoming, 1282014.4502.pdf.

Dame holds water rights from springs to irrigate 93 acres. Much of the Dame property is subirrigated and no supplemental irrigation system has been noted. Table 2, App. 7-7 indicates depth to ground water in soil pits was between one and six feet on the eastern side of the permit area allowing for sub-irrigation of Dame's meadows and pastures. Both subirrigated and flood irrigated areas are outlined on Plate 7-7.

Pond 29-3 on Richard Dame's property is fed by groundwater from an alluvial spring. Surface water collects downstream in pond 29-5, also on the Dame property (pg. 14, Sec. 4.2, App. 7-7). App. 7-7 Sec. 4.1 relates that ponds 29-1 and 29-2, as well as the ponds 29-6, 29-4, 29-7, 29-8, 29-9 [that function as a series of overflow ponds down the Sink Valley drainage] and pond 32-1 are all on Sorenson property.

A discussion of the infrared imagery taken in July 15, 2006 and November 15, 2007 is provided in Section 8.1 of the Peterson Report included as an Appendix to Chapter 7. The Division has compared the infrared imagery in Plates 3 and 4 and concludes that adequate soil moisture is present during the growing season to provide subirrigation for pasture in R. 5 W. T. 39 S. Sections 20 and 29. The growing season at this 6,900 ft. elevation averages 110 frost free days, with the last frost occurring on or about June 5 and the first frost occurring on or about September 24, according to Kevin Heaton, USU Extension Service (personal communication on 10/15/2009).

East of the permit area, the flows from Right Hand Wash, Swapp Canyon Creek, and Sink Valley Wash provide the Sorensens with the water rights to irrigate approximately 143 acres in the W ½ of Sections 29 and 32 and stockwater for 300 units. (App. 7-3, Water Rights). Ex. 4-1 illustrates the permit area and defines ninety acres of crop land to the east of the permit boundary.

The Natural Resources Conservation Service evaluated the soils of the permit area for prime farmland status in the fall of 2006. The NRCS concluded that there were no prime farmland soils in the permit area, however soils on slopes less than 14 percent could qualify as Soils of Statewide Importance, if irrigated (Appendix 2-1, Tab 6 and M:0250005\2006\Incoming\0011.pdf).

The MRP indicates that the terrain is suitable for irrigation, but that irrigation is not required to produce meadowlands and pasture. When available, irrigation doubles yield. Water quality data indicate that there may be enough water to flood irrigate; that the quality of water from shallow alluvial groundwater is sufficient to raise alfalfa or other grasses for hay crops and pasture. Groundwater from the deeper portions of Sink Valley to the east in Section 32 are part of a larger, more continuous groundwater system” that is of better quality than the shallow groundwater (Pg. 7-8 Chapter 7.)

The Division has completed the required consultation with the NRCS (R645-302-313) and is in agreement with their determination that 80 acres of Statewide and Local Important Farmland are within the IBC, Dames lease, permit area.

pburton

## Hydro Baseline Information

### Analysis:

The Dame lease is included within the existing MRP's baseline information. In addition, the Coal Hollow Mines operational monitoring locations include many of the sights within the Dame Lease area so a good foundation of data exists for the area.

khoffman

## Hydro Baseline Cumulative Impact Area

### Analysis:

The Dame lease is within the original baseline cumulative impact area of the MRP.

khoffman

## Hydro Probable Consequences Determination

### Analysis:

The amendment includes Appendix 7-14 PHC of Coal Mining in the 85.88-acre New Dame Lease IBC at the Alton Coal Development, LLC Coal Hollow Mine (Dame PHC). The Dame PHC describes the geology of the area, from top to bottom, as the Quaternary Deposits (alluvium), Tropic Shale, and Dakota Formation. The alluvium contains the groundwater of the area while the Tropic Shale acts as a confining layer. The Dakota Formation contains the economic coal seam.

The Dame PHC is important as the Dame Lease contains substantially different groundwater characteristics than the existing Coal Hollow Mine. The differentiating characteristic of the Dame Lease is the presence of artesian flow as described on page 7 of the Dame PHC:

“By this mechanism, artesian flow conditions are created in the deep, coarse-grained alluvial groundwater systems present in portions of Sink Valley. Artesian flow conditions are not present in regions further to the west where only thin, predominantly fine-grained alluvial deposits are present. Within those portions of Sink Valley where the deeper, coarse-grained sediments support artesian groundwater flow conditions, flowing artesian wells are present (including wells near the new Dame Lease IBC including Y-I02,Y-61, C5-130, and the Coal Hollow Mine water production well). Springs and seeps are also supported by discharge from the alluvial groundwater system (including monitored springs near the new

Dame Lease IBC area including SP-8, SP-14, SP-16, SP-19, SP-20, SP-22, SP-23, and Sorensen Spring)”

This area is displayed on Figure 16 of Appendix 7-1 of the MRP. In addition, the Dame Lease has documented the flowing of groundwater (Drawing 7-13), and the presence of surface ponds and irrigation ditches (Drawing 7-7).

The Dame PHC determines “Appreciable adverse impacts to the hydrologic balance either on or off the permit area are not expected to occur as a result of the proposed highwall mining at the Coal Hollow Mine (including the 85.88 acre new Dame Lease IBC).” This determination is supported by evidence that surface disturbance is not anticipated and that subsidence will be prevented. In addition, the considerable thickness of low-permeability Tropic Shale bedrock could likely stop hydraulic communication with the permeable overlying alluvial groundwater system.

The Dame PHC does acknowledge that it is possible groundwater will enter the highwall mining holes. The Dame PHC describes that groundwater at Y-36 and Y-48 may be in hydraulic communication with overlying alluvial groundwater. It also describes that if highwall mining holes intersect an open borehole or improperly abandoned well there would be potential for flow from the overlying groundwater.

These potentials for groundwater impacts are described as by the PHC author as being temporary as any draining of groundwater would deplete the quantity of water present in the alluvial groundwater system. The Dame PHC also says impacts could be minimized by backfilling mining holes with low-permeability materials and avoiding mining where historic borehole locations are present. Last, highwall mining holes excavated within the new Dame Lease will slope downward so unless a large volume of water were intercepted (enough to fill the entire void of the highwall hole), then gravity mine water discharge would not occur.

The Dame PHC then discusses utilizing the monitoring data to detect or quantify potential mining-related impacts and it is necessary to evaluate all factors relevant to prevailing hydrologic conditions in particular climatic variability. In addition, other factors such as grazing practices, land use and range conditions should be evaluated.

The Dame PHC also examines impacts to surface water quality but because there will not be surface disturbances in the Dame Lease these are minimized.

The Dame PHC only addresses highwall mining and does not address in any form strip mining or underground mining in the Dame Lease area. In addition, Appendix 1-2 Exhibit 5 in the right of entry expresses: "However, Mining Operations involve only the coal that can be mined by the underground or auger method of coal mining. No surface mining may take place on the Leased premises." For these reasons the amendment must expressly state that only highwall mining is permitted in the Dame Lease. Section 112.500 addresses this by stating that the Dame Lease (IBC) will only be mined by high wall mining.

khoffman

## Hydro GroundWater Monitoring Plan

*Analysis:*

The MRP groundwater baseline monitoring plan was sufficient to establish baseline monitoring data in the original MRP.

khoffman

## Hydro SurfaceWater Monitoring Plan

*Analysis:*

The MRP surface water baseline monitoring plan was sufficient to establish baseline monitoring data in the original MRP.

khoffman

## Maps Monitoring and Sampling Locations

*Analysis:*

Baseline monitoring locations are shown on Drawing 7-2.

khoffman

## Maps Surface and Subsurface Manmade Features

*Analysis:*

Subsurface water rights are shown on Drawing 7-3, seeps and springs are shown on Drawing 7-1, well locations are shown on Drawing 7-12, and potentiometric levels in the alluvial groundwater system are shown in Drawing 7-13.

khoffman

## **Maps Surface Water Resource**

*Analysis:*

Surface water rights are shown on Drawing 7-3. Ponds and irrigation areas are shown on Drawing 7-7.

khoffman

## **Maps Vegetation Reference Area**

*Analysis:*

The meadow reference area is within the IBC permit area. A commitment in the plan on page 3-1 states that the reference area will be relocated in 2014 in consultation with the Division.

pburton

## **Operation Plan**

### **Air Pollution Control Plan**

*Analysis:*

Section 422 Utah Bureau of Air Quality Section 422 of the MRP states that an NOI was filed with UDAQ on August 22, 2013 to include the highwall miner on the list of equipment in the Approval Order DAQE-AN0140470002-10. The Permittee is in compliance with R645-301-422.

pburton

### **Subsidence Control Plan Performance STD**

*Analysis:*

As defined by the R645 Coal Mining Rules, highwall mining or auger mining is not underground mining and therefore, underground mining rules (R645-301-525.400 through 700) do not apply. Auger mining is subject to compliance with R645-302-245.300, Subsidence Protection, which requires that auger mining be conducted in accordance with the requirements of R645-301-525.210 and 525.230 to prevent material damage to water supplies and public buildings.

Section 525 of the application states that the mining method as described in App. 5-8 will have non yielding barriers and abutments and no subsidence is projected. Section 525 also states that in accordance with the Dame lease agreement, the Permittee will be responsible for damage to permanently used structures designated as such before mining by the Lessor; and, the Permittee has the option of a pre-mining survey of those designated structures (Article 7 Section 7.03). The nearby structures are shown in relation to the permit boundary on Drawings 1-5 and 1-6. The application is in compliance with R645 Coal Surface Mining Rules.

pburton

### **Fish and Wildlife Protection and Enhancement Plan**

*Analysis:*

Page 3-86 has been revised to include a narrative describing how the habitat will be restored, (piping water from the designated water replacement well to the impacted springs), in the event of water diminution to vegetation and how springs SP-8, SP-14, SP-20, SP-22, SP-40 and wells C4, C2, C3, C5, and Y-61 will be protected. This includes the monitoring regimen discussed with Ken Hoffman.

Chapter 3, Appendix 3-5, page 14 has been revised to include a commitment to complete 344 additional acres of habitat improvement for sage grouse between August 1, 2014 and January 31, 2015.

Chapter 3, page 3-86 has been revised to include a commitment to monitor the vegetation in the 85.88 acre parcel in accordance with the current monitoring regimen for vegetation (annually). Chapter 3, Appendix 3-5, Page 21 has been revised to include bird surveys from June through March avoiding disturbance in April and May.

Chapter 3, Page 3-7, the last sentence includes the word surface before disturbance.

Chapter 3, Page 3-34, Kirk Nicholes, representing ACD, has concurred with DOGM staff that the actual acreage credited to ACD was 428 acres of the 885 acre corridor treatment area as stated in the letter from DOGM to ACD dated 5/16/2012.

Chapter 3, Page 3-34 has been revised to include a schedule and commitment to complete the additional work requested by the BLM as noted in the BLM correspondence to DOGM dated 3/3/2014.

Page 3-44, Sage-Grouse Work, Sentence #4 was clarified by ACD representative Kirk Nicholes noting that the highwall mining techniques would minimize impacts to wildlife species as compared to those in surface mining. Also noting that the area would be reclaimed in 2017 according to the reclamation timetable.

Page 3-45 of the MRP has been revised to include a commitment to monitor and collect noise level data from the mining equipment that will be used to implement the proposed highwall mining activities.

**Findings:**

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

*Deficiencies Details:*

jhefric

## **Topsoil and Subsoil**

*Analysis:*

The additional 85.88 acres in the IBC Dame lease will be highwall mined, with no disturbance to the surface soils. The plan for live haul of soil from surface disturbed areas (mining trenches, pits, roadways remains unchanged. Section 231.100 of the MRP refers to Dwg 2-2 for topsoil handling plans. The progressive topsoil removal plan is shown on Dwg 2-2 for the surface mining scenario and on Dwg 2-2A for the trench mining scenario. The soil will be removed following guidance shown on Dwg 2-1 for each soil map unit.

pburton

## **Hydrologic Ground Water Monitoring**

*Analysis:*

The MRP addresses a groundwater monitoring and proposes monitoring springs SP-8, SP-14, SP-20, SP-22, SP-40; wells C4, C2, C3, C5, and Y-61; and surface water locations SW-6 and SW-9 all on a quarterly basis. In addition, the springs and wells listed above will be monitored for flow or water level weekly starting one month prior to undermining and continuing until one month after undermining at which time they will be monitored monthly for six months before returning back to their normal monitoring schedule. In addition, the Permittee will monitor daily water flowing from the high wall mine holes. Details of this accelerated monitoring are located on page 7-61 of the amendment.

khoffman

## **Hydrologic Gravity Discharge From Underground Mine**

*Analysis:*

The Dame PHC describes, although unlikely, the potential for gravity discharge from the highwall mining holes. However, if it does the Division is requiring a daily flow measurement as part of the groundwater monitoring plan.

khoffman

## Maps Affected Area

*Analysis:*

Two mining methods have been proposed. Under the surface mining method the affected area is shown on Dwg 5-2 disturbance sequence and 5-16 overburden removal map and the reclaimed area is shown on Dwg 5-38 reclamation sequence. For the highwall mining method, the pertinent maps are Dwg 5-2A, 5-16A, and 5-38A. Due to this ambiguity, a commitment in the plan on p. 5-81 states that an as-built of the reclamation sequence map (Dwg. 5-38 and/or 5-38A) will be filed with the annual report each year to tract the acres of open pit and trench; the acres backfilled; the acres covered with subsoil; the acres fully reclaimed (topsoiled and seeded); Revisions to the reclamation timetable, if any. The map should be accompanied by a C1C2 form to allow replacement of the existing Dwg. 5-38 or 5-38A in the MRP.

pburton

## Maps Mine Workings

*Analysis:*

Plates 5-16 and 5-16A show the area of overburden removed in the past year, 2013. Overburden removal in the northeast corner of Section 30, will be removed in 2015 in the pit mining scenario and in 2016 under the auger mining scenario.

Plates 5-38 and 5-38A illustrate final reclamation status of the site and do not reflect compliance with the backfilling and grading rules, which pertain to the timing of rough backfilling and grading. The Permittee will comply with the backfilling and grading rule R645-301-553 to back fill and grade pits within 60 days of coal removal or within 1,500 linear feet.

The active pit location shown on Dwg.5-19, does not reflect either reclamation scenario illustrated on Dwg 5-38 or 5-38A, but remains as the worst case scenario for bonding purposes.

pburton

## Maps Monitoring and Sampling Locations

*Analysis:*

Water monitoring locations are shown on Drawing 7-10.

khoffman

## Reclamation Plan

### General Requirements

*Analysis:*

Chapter 3, Page 3-57A has been updated to include the reclamation timetable noted on plate 5-38A and additional text noting that the reclamation of the highwall mining will proceed in the same manner as described for open pit mining.

*Findings:*

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

jhelfric

## Revegetation Timing

### Analysis:

Section 341.100 Reclamation Timetable was the subject of DO-13 which was approved January 24, 2014. This amendment includes the wording changes made to Section 341.100 approved by DO #13.

The reclamation timetable is illustrated on Dwg. 5-38 and 5-38A. This amendment states that the alternate highwall scenario will reduce the area of surface disturbance and thus the area to be reclaimed as shown Dwg 5-38A.

pburton

## Special Categories

### Auger Mining

#### Analysis:

The Coal Hollow Mine application was approved and a Decision Document was signed on October 19, 2009. The permit was issued on November 8, 2010. The mining plan sequence has been amended several times since. The last approval for a mining sequence change was in April 19, 2013, Task 4323.

This incidental boundary change (IBC) application for 85.88 acres of fee coal continues the pit sequence of mining from South to North and West to East as described in April 2013 for the existing permit area, but also adds an auger mining scenario in the IBC that would develop highwall mining from pit 11 (Dwg 5-10A) or more likely from existing pit 9 (Dwg 5-10B, as received in response to NOV 10135 on February 4, 2014 and reviewed as Task 4505). The latter alternative would eliminate pits 10 - 15.

Highwall mining (as described in Task 4502) will eliminate pits 12-15 and 16 - 24. Pit 25 has been stripped of topsoil. Drawing 5-10 updated in March 2013 shows the as-built size and location of pits 25-28. (Although not shown on Dwg 5-10A, Pit 25 development is likely.) The highwall mining plan will replace the remaining pits with a trench of the dimensions shown in Dwg. 5-41. The working area of the trench will be 150 wide, but the total surface disturbance for the trench will be 510 ft wide due to set backs from the face. The length of the trench is shown as 2,500 ft. long. Backfilling and grading of 1500 linear feet will apply (R645-301-553).

The highwall mining method is described in Section 528.200 and Section 553. The panel detail for highwall or auger mining is shown in Drawings 5-42, 5-43, 5-44 for varying depths of overburden. Panels would be developed on the east and west face of the trench as shown in Dwg 5-10A. A comparison of coal recovery under the highwall scenario with the recovery under pit development is provided in Dwg 5-9 and 5-9A.

pburton

### Auger Mining

#### Analysis:

Page 7-61 states:

"In accordance with R645-302.245.230 all holes discharging water will be sealed within 72 hours after completion with impervious and noncombustible material. However, in the approved Ground Control Plan for CHM, MSHA requires the adjacent hole remain open for monitoring of the web. Thus, if an adjacent hole is discharging water and needs to be kept open for web monitoring then the discharge will be tested to determine if it contains acid or toxic-forming material and approval to keep this hole open for web monitoring will be requested from the Division in accordance with R645-302.245.230."

This language is in compliance with R645-302.230 and meets the intent of the regulation.

khoffman

**CHIA**

**CHIA**

*Analysis:*

The permit boundary for the CHIA will need to be updated in Plates 1 through 3 before approval and the amended CHIA language will need to be incorporated into the current CHIA.

**khoffman**