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State of Utah

DEPARTMENT OF NATURAL RESOURCES

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Division of Oil, Gas and Mining

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Division Director

April 9, 2020

Brian Fredrickson, President
Bronco Utah Operations, LLC
P.O. Box 527
Emery, Utah 84522

Subject: Conditional Approval of Full Extraction Revision, Bronco Utah Operations, LLC,
Emery Deep Mine, C/015/0015, Task #6122

Dear Mr. Fredrickson:

The Division of Oil, Gas and Mining (the Division) has completed its review of the Emery Deep Mine Full Extraction amendment and has recommended conditional approval. Final approval of the amendment will be granted when the following conditions have been met:

- 1) Provide two clean copies prepared for incorporation. A stamped incorporated copy will be returned to you for inclusion into your copy of the Mining and Reclamation Plan (MRP).
- 2) Along with the clean copies, also provide the State Historic Preservation Office's determination letters. Provide an executed C2 form to add these letters to Chapter X, Appendix 5-15 and Appendix 5-16 of the confidential volume of the MRP.

Please submit these copies by May 8, 2020. Once we receive these copies, final approval will be granted. If you have any questions, please call me at (385) 290-9937.

Sincerely,

Steve Christensen
Coal Program Manager

SKC/sqs
cc: John Gefferth
Kit Pappas
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April 10, 2020
Subject:

Technical Analysis and Findings

Utah Coal Regulatory Program

PID: C0150015
TaskID: 6122
Mine Name: EMERY DEEP MINE
Title: FULL EXTRACTION REVISION

General Contents

Right of Entry

Analysis:

The application meets the State of Utah R645 requirements for Right of Entry.

Plate I-1 "Surface and Coal Ownership" and Appendix 1-2 "Ownership and Leasehold Interests for Surface and Coal" list the surface ownership and coal lease ownership.

This application revises Plate I-1 to show additional lease area to the East of State Highway 10 in Sevier County, Section 36, T23S, R 5 E, and straddling Hwy 10 in Emery County Section 30, T 23 S, R 6 E. Revised Plate I-1 also activates the SITLA lease ML51745 in Section 31, T 23 S, R 6 E, where the surface is owned by Josiah Eardly.

The area to be fully extracted (planned subsidence) is in T 22 S R 6 E, Sections 29, 30, 31, 32 and 33 as shown on Plate V-5. The surface land above the full extraction panels is primarily owned by William Stansfield and Bronco Coal. The full extraction area extends into the SITLA Lease, but does not extend into the new lease area adjacent to or straddling Highway 10 as shown on Plate V-5.

Surface areas in Sections 19, 29 and 30 that are protected from pillaring and subsidence (the AVF and Creek buffer zones) are owned by Horace Petty, Trustee; J.K. Eardley; Derek Beagley; Michael L and Jodi Christensen, Black Dragon Ranch; and the Utah Department of Transportation (Hwy 10), as shown on Plate I-1.

Right of Entry and mining into federal coal was authorized in Section 5, T 23 S. R 6 E, as shown on Plate IV-2 UG Operations Plan.

The coal is owned by Bronco in all sections. A non-contiguous portion of STILA lease ML 51745 in Section 31 (outside the permit area) is also described as future mining.

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Environmental Resource Information

Historic and Archeological Resource Information

Analysis:

The amendment meets the State of Utah R645-301-411 requirements for Historic and Archeological Resource Information. Two cultural resource reports were included in the submittal. The first, UDSH project number U19MQ0244,

surveyed land to the west of the full extraction area that will not be mined using full extraction (phone conversation with John Gefferth on March 3, 2020). This survey did not uncover any cultural resources in the survey area and therefore the Division determined that No Historic Properties Affected was the appropriate finding for that undertaking. A concurrence letter from SHPO was obtained on April 3, 2020. The second report, UDSH project number U19MQ0029, surveyed the full extraction area as well as additional land to the south which is not included in this proposal. This survey uncovered 8 cultural resources in the full extraction area, 3 of which are potentially eligible for the National Register of Historic Places: 42EM5249, 42EM5252, and 42EM5254. Subsidence was determined not likely to adversely affect the characteristics of site 42EM5252 which make it eligible for the NRHP. As such, the Division concluded No Adverse Effect was the appropriate determination for this site. However, effects from subsidence were found likely to adversely affect the other two sites (42EM5249 and 42EM5254). As such, a buffer zone ranging from 275' to 425' was implemented around each of those sites. Based on these mitigative efforts, the Division concluded that No Historic Properties Affected was the appropriate determination for these two sites and that the overall determination for the undertaking was best defined as No Adverse Effect. A concurrence letter from SHPO was obtained on April 6, 2020. These letters will be sent to the operator for their inclusion into the MRP in the appropriate appendix in which their corresponding reports are found.

tmiller

Operation Plan

Subsidence Control Plan Renewable Resource

Analysis:

The application meets the State of Utah R645 requirements for Pre-subsidence Survey.

This submittal updates the 2017 pre-subsidence survey of proposed full extraction of areas in T22S, R6E, Sections 29, 30, 31, 32 and 33 with additional information on surface subsidence South of Quitcupah Creek. The 2017 pre-subsidence survey was incorporated (January 24, 2019) into the MRP as Appendix V-8. It updates the 1980 survey found in Appendix V-3.

The mining panels and subsidence monitoring locations are shown on Appendix V-8 Figure 1.

Appendix V-8 provides a pre-subsidence survey of 360 acres of irrigated lands in Sections 31 and 32 and part of Section 30, conducted in December 2017. It is an update to the 1980 pre-subsidence survey in Appendix V-3. The App. V-8 pre-subsidence survey describes the installation of above ground pivots in Sections 31 and 32 to replace Features 32, 33 and 10 shown on Figure 1 of Appendix V-8. The pivots are supplied by underground waterlines (Features 44 and 127). Ponds (Features 6, 15, 41, 44) and irrigation ditches (Features 1, 2, 24) were dry. The subsidence survey states that the ditches have been abandoned.

Appendix V-8 survey confirmed the existence of two grassy areas (Features 23 and 25) that are topographic lows which receive surface water from the surroundings. Both locations are within Section 32 (full-extraction area). Both locations are grazed.

Appendix V-8 pre-subsidence survey identified two sinkhole features in Section 30 and 31, as Features 130 and 126, respectively. The pre-subsidence survey states that these features could not be caused by the old works, because of their distance (2,550 ft) from the mine panels, but does not speculate as to their occurrence. The Division notes that the sinkhole features are in line with irrigation ditches passing over Chipeta Badland soil type and Chipeta/Persayo soil type (Carbon Emery Soil Survey map, USDA Soil Conservation Service, 1970). These soils contain approximately 10% gypsum in the subsurface and lie over gypsum bearing shale. Therefore, the sink hole features may be the result of subsurface drainage flushing calcium and magnesium salts from the gypsum soil and bedrock below, over time resulting in unstable cavities in the shale.

In December 2018 and January 2019, the Division and the Permittee investigated several new sinkholes in farmland located in T 22 S, R 6 E, in the S/2 SE1/4 of Section 31, that were reported by William Stansfield. The sinkhole locations are identified in the legend of Figure 1 (App V-8) as fluorescent green dots (shown on the lower left of the Figure).

An Addendum to Appendix V-8 contains a memo from Richard White, P.E. Mr White identifies the sinkholes as feature #132. (This number is not mapped on Figure 1). White's report states that although there is shallow cover (450 ft), the

sink holes are quite distant from the angle of draw of current and old works. White concludes that the sink holes are due to piping created by subsurface flow in recently graded soils. Flow direction is illustrated in Figure 2. A sink hole image is shown in Figure 3 of the V-8 Addendum. (Inspection reports # 6312 dated December 11, 2018, report #6340 dated January 23, 2019 and #6347 dated January 31, 2019 provide additional images.)

An NRCS investigation of the sink holes was made at the request of Mr. Stansfield.* The NRCS report by Anthony Sieber is found in the Division files (Incoming 2019 document 03212019.pdf). The NRCS report identifies six sink holes in line with overland surface flow in Section 31. Google maps imagery also identifies erosion from the surface flow. Mr. Sieber states that draw down of the Ferron Sandstone aquifer has resulted in irreversible compaction of the Ferron Sandstone resulting in subsurface subsidence. Mr. Sieber states that the subsidence does not seem to be directly related to mining, tunneling or blasting. He states that the aquifer has been impacted by irrigation, livestock, domestic use and mining. (The mining and reclamation plan Chapter 6, pgs VI-6, VI-7, and VI-8 confirms that there has been a draw down in the aquifer.) Mr. Sieber concludes that overland flows have eroded fine particles from the surface soil creating piping and connecting the surface drainage to the subsurface subsidence. Left unchecked, Mr Sieber states, fissuring will develop and sinkholes will widen.

Mr. White and Mr. Sieber agree that surface flow and piping are creating the sink holes. Mr. White disagrees with one facet of the NRCS account, stating that the consolidated Mancos Shale rock overlying the Ferron Sandstone aquifer would not compress. Mr. White's analysis does not discuss fracturing of the Mancos Shale above the compressed aquifer.

Although Map 65 of the 1970 Soil Survey of the Carbon Emery area suggests that gypsum bearing soils are located in the vicinity of the sink holes: Chipeta/Persayo (CPB), Ravola Loam (RIB), Killpack Clay Loam (KIB), Billings Silty Loam (BIB and BSB). The NRCS report discounts the effect of gypsum dissolution as an aggravating circumstance in the loss of fine particles, based upon recent soil sampling (personal communication with W. Urie, 5/20/2019).

*Sieber, A.T. 2019. Stansfield Ranch Sinkhole Geological Investigation. File Code 011-02-2019. U.S. Natural Resources Conservation Service. Salt Lake City, Utah.

pburton

Fish and Wildlife Protection and Enhancement Plan

Analysis:

The amendment meets the State of Utah R645-301-333 requirements for Fish and Wildlife Protection and Enhancement Plan. A burrowing owl study was completed by Mt. Nebo Scientific in the fall of 2019 and a copy of the report was included in this submittal. No owls were observed during that survey. Plate V-5 of the amendment indicates planned subsidence under multiple areas designated on Confidential Plate 10-1 as active prairie dog towns. Following consultation with the U.S. Fish and Wildlife Service and the Utah DWR, it was determined that annual monitoring for burrowing owls, including an assessment of the impacts of subsidence on individual burrows following subsidence events, would be the best plan moving forward. This monitoring requirement does not need to include a commitment to perform mitigation in the event burrowing owls are detected in the subsidence zone as a result of the monitoring. The Permittee has agreed to this plan and its details can be found in Chapter VIII, Section VIII.B.4, page 17a.

tmiller

Hydrologic Ground Water Monitoring

Analysis:

The application meets the State of Utah R645 requirements for Ground Water Monitoring.

The Permittee submitted an amendment to update the mine plan to include full extraction mining. As part of this amendment the water monitoring plan was updated. The last outstanding issue with the water monitoring program was to update Table VI-17 to include monitoring of the Bryant Well. This was completed as part of the application received by the Division on March 26, 2020. This amendment was previously reviewed under Task IDs 5769, 5936, and 6063.

adaniels

Special Categories

Operations Alluvial Essential Hydrologic Functions

Analysis:

The application meets the State of Utah R645 requirements for Alluvial Valley Floor: Performance Standards.

The AVF buffer zones and stream buffer zones identified on Plate V-5 encompass flood irrigated lands in Range 6, Township 22 S, Section 19 & 30, as outlined on Plate 1, Chap XI.

Mining beneath the Quitchupah stream buffer zone and the AVF buffer zone will be room and pillar mining with no full extraction and no partial extraction, as described in Section IV.A.1. Plate XI-1 shows historic mine panels in the grandfathered AVF area. To the North and West of the SITLA lease is an active flood irrigation area as shown on Plate XI-1. The full extraction stops short of the irrigated area to the NW in Sec 19.

Monitoring of irrigation ditches is described in Chap V page 37 and 38.

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Operations Alluvial Protection of Agricultural

Analysis:

The application meets the State of Utah R645 requirements for Subsidence Control Plan: Monitoring.

The term “renewable resource lands” is defined by R645-100. It includes agricultural lands, croplands, and grazing lands. Prime Farmlands and Farmlands of Statewide Importance were mapped South of Emery Town in Sections 19, 30, 31, and 32. (Prime Farmland is designated by the State Soil Survey Staff and is mapped in Utah Agricultural Experiment Station Research Report No. 76, “Important Farmlands of Parts of Carbon, Emery Grand and Sevier Counties.”)

The area to be fully extracted (planned subsidence) is in Sections 29, 30, 31, 32 and 33 (Plate V-5). Plate V-5 shows the area of full extraction panels and subsidence monitoring points. Monitoring locations are located on irrigated prime farmlands in Sections 31 and 32. Monitoring of flood irrigated lands, irrigation ditches and pond embankments will be monitored for 6 months (Chap V, p. 37- 38).

Depth of coal is approximately 600 – 900 feet below the surface in Section 31 (Plate V-10). At this depth, the angle of draw is reported to be 15 degrees. Subsidence within the angle of draw is estimated to be 50% of the depth of the removed coal or approximately 5 feet in a 10 ft. seam (Chap. V, p. 27). Aerial imagery from Google Earth shows Sections 29, 30 and 31 contain irrigated lands. Irrigated pastureland in Section 31 is also shown on Plate VIII-1 Vegetation and Land Use.

The surface land above the full extraction panels is primarily owned by William Stansfield and Bronco Coal. The full extraction area extends into the SITLA Lease, but does not extend into the new lease area adjacent to or straddling Highway 10.

Mitigation for subsidence is described on Chap V, p. 39.

A dwelling in Section 30 (Feature #35 on Figure 1, App. V-8), archaeological features in Sec 30 (Feature #39) and 31 (feature #1), Quitchupah Creek and the Alluvial Valley Floor will be protected from subsidence with buffer zones (Chap. V, p. 27 and Plate V-5). Surface areas in Sections 19, 29 and 30 that are protected from pillaring and subsidence (the AVF and Creek buffer zones) are owned by Horace Petty, Trustee; J.K. Eardley; Derek Beagley; Michael L and Jodi Christensen, Black Dragon Ranch; and the Utah Department of Transportation (Hwy 10), as shown on Plate I-1.

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