



GARY R. HERBERT
Governor

SPENCER J. COX
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

July 18, 2019

Rick Parkins
Bronco Utah Operations, LLC
P.O. Box 527
Emery Utah 84522

Subject: Full Extraction Revision, Bronco Utah Operations, LLC, Emery Deep Mine, C/015/0015, Task #5936

Dear Mr. Parkins:

The Division has reviewed your application. The Division has identified deficiencies that must be addressed before final approval can be granted. The deficiencies are listed as an attachment to this letter.

The deficiencies authors are identified so that your staff can communicate directly with that individual should questions arise. The plans as submitted are denied. Please resubmit the entire application.

If you have any questions, please call me at (801) 538-5350.

Sincerely,

Steve Christensen
Permit Supervisor

SKC/sqs
O:\015015.EME\WG5936 FULL EXT\Deficiencies.doc



GARY R. HERBERT

Governor

SPENCER J. COX
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: C0150015
TaskID: 5936
Mine Name: EMERY DEEP MINE
Title: FULL EXTRACTION REVISION

Summary

In this application, Bronco Utah Operations, LLC, provides a response to deficiencies written on full extraction Task 5769 (November 2018) and includes a Confidential Cultural Resources Survey for adjacent area (Chap X, Appendix 5-15). The full extraction area is shown on revised Plate V-5. A 2017 pre-subsidence survey of proposed full extraction of areas in T22S, R6E, Sections 29, 30, 31, 32 and 33 was incorporated (January 24, 2019) into the MRP as Appendix V-8. It updates the 1980 survey found in Appendix V-3.

pburton

General Contents

Right of Entry

Analysis:

The application does not meet the R645-301-114 requirements for Right of Entry, because conflicting information is portrayed on Plate I-1 from that described in Appendix 1-2 with regard to SITLA lease ML 51745 in Sections 29 and 30. The SITLA lease ML 51745 is depicted as relinquished in Sections 29 and 30 on Plate I-1 (incorporated February 10, 2017). However, Appendix 1-2 describes only the SE1/4SW1/4 of Sec 29 as the relinquished portion of STILA lease ML 51745 within the permit area. Appendix 1-2 cites Plate 1-1 as a reference. Plate I-1 must be updated accordingly.

The area to be fully extracted (planned subsidence) is in Sections 29, 30, 31, 32 and 33 as shown on Plate V-5. The surface land is owned by William Stansfield in Section, 29, 30 and portions of Section 31. The remainder of the surface of the planned subsidence area is owned by Bronco Coal (Sections 31, 32 and 33).

A recent check of the Emery County plat maps online show that those 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). A surface ownership change in Section 29, Plot 6-115-8 from Rainbow Ranch to Black Dragon Ranch must be made in the narrative (Chap 1, p. 3) and on Surface Ownership Plate 1-1. Note: ownership shown very faintly on Appendix V-8 Figure 1 (incorporated January 2018) is no longer accurate.

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.

Deficiencies Details:

The application does not meet the R645-301-114, Right of Entry requirements. The following deficiency must be addressed prior to final approval:

R645-301-114.100, Appendix 1-2 states only the SE1/4SW1/4 of Sec 29 is the relinquished portion of STILA lease ML 51745. Appendix 1-2 references Plate 1-1, therefore, please revise Plate I-1 to indicate this same information and provide the right of entry document allowing re-entry to the previously relinquished area of SITLA Lease ML 51745.

R645-301-121.100, Please change the ownership of Section 29, plot 6-115-8, from Rainbow Ranch to Black Dragon Ranch in the narrative (Chap 1, p. 3) and on Plate I-1, so that pre-subsidence notifications are sent to the correct surface owners.

pburton

Right of Entry

Analysis:

The amendment does not meet the State of Utah R645-301-114 requirements for Right of Entry. In the cover letter included with this amendment the Permittee writes that "surface owner agreements will be obtained prior to any full extraction within a given tract not controlled by Bronco." However, these agreements must be in place and submitted to the Division prior to approval of the amendment. This written consent must be provided from each of the potentially-affected landowners. The written consent must clearly demonstrate that the Permittee is authorized to conduct subsidence mining under all lands potentially affected by this proposal.

Deficiencies Details:

The amendment does not meet the State of Utah R645-301-114 requirements for Right of Entry. The following deficiency must be addressed prior to final approval:

R645-301-114.200: The Permittee must demonstrate that they have obtained written authorization to perform subsidence mining under all lands potentially affected by this amendment.

tmiller

Environmental Resource Information

Historic and Archeological Resource Information

Analysis:

The amendment does not meet the State of Utah R645-301-411 requirements for Historic and Archeological Resource Information. A report titled "Cultural Resource Inventory of Bronco Utah Operation's Emery 2 Mine Subsidence Expansion, Emery and Sevier Counties, Utah" (MOAC Report No. 19-007) by Jody Patterson of Montgomery Archaeological Consultants, Inc. and dated May 15, 2019 was included in the amendment. This survey identified 18 new cultural resource sites, 7 of which are recommended as eligible for the National Register of Historic Places. Three of these eligible sites (42EM5249, 42EM5252, and 42EM5254) are located within the limits of potential subsidence. This report along with all relevant data was sent to the BLM to be reviewed by their archeologist who would subsequently consult with the Utah SHPO to seek concurrence. As of July 18, 2019, this consultation has not occurred due to questions from the BLM regarding a potential adverse effect to an identified historic property. Until these questions are resolved and consultation and concurrence from SHPO is obtained, the amendment does not meet the requirements of R645-301-411.

Deficiencies Details:

The amendment does not meet the State of Utah R645-301-411 requirements for Historic and Archeological Resource Information. The following deficiency must be addressed prior to final approval:

R645-301-411.142: The Permittee must provide evidence of clearance by the SHPO.

Vegetation Resource Information

Analysis:

The amendment meets the State of Utah R645-301-320 requirements for Vegetation Information. Plate VIII-1 has been updated under the Right of Way amendment (Task #5859) in March of 2019 and reflects the current permit boundary.

tmiller

Fish and Wildlife Resource Information

Analysis:

The amendment meets the State of Utah R645-301-320 requirements for Fish and Wildlife Information. Plate VIII-1 has been updated under the Right of Way amendment (Task #5859) in March of 2019 and reflects the current permit boundary. Confidential Plate 10-1 also reflects the current permit boundary.

tmiller

Hydro Baseline Information

Analysis:

The application meets the State of Utah R645 requirements for Hydrologic Baseline Information.

Full extraction mining is proposed in portions of T22S, R6E, Sections 30, 31, and 32. The Permittee has updated MRP Section VI.2.4.1, Groundwater Information, Section VI.2.4.2, Surface Water Information, and added Appendix VI-23 "Baseline Investigations of Unnamed Ephemeral Washes Locations in Section 30 and 31" to include additional hydrologic baseline information.

Groundwater

The Blue Gate member of the Mancos Shale (above the formation from which coal is mined) has been historically monitored for variations of water level with 7 monitoring wells, although some have been removed from the monitoring program. As part of expanding the baseline knowledge of the area proposed for full extraction mining the permittee has re-habilitated the AA wells (Dec 2018). Water quality monitoring in the Blue Gate member indicates high salinity water with a near-neutral pH. TDS is generally in the range of 15,000 to 24,0000 mg/L.

The Ferron Sandstone member (from which coal is mined) of the Mancos Shale has also been monitored historically for water levels. Plates VI-7 and VI-8 have been updated to present the potentiometric surface of the upper and lower Ferron Sandstone respectively.

In December 2018 the Bryant well and the AA monitoring wells were rehabilitated to provide more complete data for the areas proposed for full extraction mining.

From additions made to the MRP and the rehabilitation of the AA and Bryant wells, baseline groundwater information has been sufficiently defined in the proposed full extraction area.

Surface Water

Appendix VI-23 has been added to the MRP to define 2 previously unnamed tributaries to Quitcupah Creek in the area proposed for full extraction mining. These 2 washes are now referred to as UNT-1 and UNT-2 as defined in Figure 1 of Appendix VI-23. These channels have been characterized as ephemeral streams through a field survey of the tributaries in November 2018. In both tributaries there were reaches of undefinable channels and a lack of any evidence of groundwater inflows into each channel help support this conclusion. Appendix VI-23 also provides photographic, vegetative and field observations along the length of each tributary.

adaniels

Probable Hydrologic Consequences Determination

Analysis:

The application meets the State of Utah R645 requirements for Probable Hydrologic Consequences Determination.

Section VI.2.8 of the MRP has been updated to address the probably hydrologic consequences of the proposed full extraction mining.

As coal is mined in the Ferron Sandstone member of the Mancos Shale ground water will continue to be encountered and flow patterns will continue to be altered (as evident through observed drawdown) as currently seen with mining and with mining that has occurred historically. The Permittee has performed several analyses of this drawdown including mass balance modeling and MODFLO modeling as described in Section VI.2.8. This modeling presented in the PHC and monitoring that has occurred in the mining area indicate that post-mining water levels will gradually return to pre-mining conditions once pumping of the underground mine workings cease.

The MRP indicates that any surface water impacts from the proposed full extraction mining area will be minimal. Also, with the definition of the tributaries of Quitchupah Creek being ephemeral in nature (reported in Appendix VI-23 of the MRP), with no observable groundwater inflow to the creeks it is not expected that subsidence in this area would impact surface water. Groundwater discharge from the proposed mining activities will report through their currently permitted UPDES outfalls as is their current practice.

adaniels

Maps Archeological Site Maps

Analysis:

The amendment meets the State of Utah R645-301-411 requirements for Archeological Site Maps. Confidential Plate X.A-1 is updated in this amendment to include cultural resource sites reported in the "Cultural Resource Inventory of Bronco Utah Operation's Emery 2 Mine Subsidence Expansion, Emery and Sevier Counties, Utah" report (MOAC Report No. 19-007) by Montgomery Archaeological Consultants, Inc. dated May 15, 2019, included in this amendment.

tmiller

Maps Subsurface Water Resources

Analysis:

The application meets the State of Utah R645 requirements for Maps Subsurface Water Resources.

Plates VI-6 and VI-7, titled "Anticipated Initial Depth of Groundwater Over Bottom of I Seam" and "Upper Ferron Sandstone Potentiometric Surface (2018)" respectively were updated using the current monitoring data.

adaniels

Operation Plan

Subsidence Control Plan Renewable Resource

Analysis:

The application does not meet the requirements of R645-301-525 pre-subsidence survey, because the investigation of the sink holes located in T22S, R6E, Sec 31 S/2 SE1/4 of Section 31 must be provided as an addendum to appendix V-8.

The panels and monitoring locations in Sections 31 and 32 are shown on Appendix V-8 Figure 1.

Appendix V-8 provides a 2017 pre-subsidence survey of 360 acres of irrigated lands in Sections 31 and 32 and part of Section 30. It is an update to the 1980 pre-subsidence survey in Appendix V-3. The 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). The pre-subsidence survey describes dry irrigation ditches (Features 2, 1, 24). The survey was conducted in December 2017, when one would expect the ditches to be dry, but the fact that ponds (Features 6, 15, 41, 44) were also dry, supports the abandonment of the ditches.

The 2017 pre-subsidence 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.

The pre-subsidence survey identified two new 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.

Subsequent to the 2017 pre-subsidence survey, the landowner, the Division and the Permittee have investigated other sinkholes in farmland located in T 22 S, R 6 E, Section 31, in the S/2 SE1/4 of Section 31. Inspection reports # 6312 dated December 11, 2018, report #6340 dated January 23, 2019 and #6347 dated January 31, 2019 describe these sink holes. Inspection report #6340 includes an Earthfax Engineering summary dated 1/10/2019 describing mining in relation to the location of the sink holes (Internal File\01312019). This report states that the closest mine works to the location of the sinkholes is 0.86 miles away and was mined in 1981. At the location of the sinkholes, the depth of cover is 450 ft above the coal seam, most of that cover is Mancos Shale.

The NRCS/USDA also produced a report on the localized subsidence (Incoming 2019 document 03212019.pdf). The NRCS report concludes that draw down of the Ferron Sandstone aquifer through a variety of anthropomorphic means is responsible for lowering the potentiometric surface and reducing the hydrostatic pressure within the pore spaces of the aquifer, causing permanent compaction. (The mining and reclamation plan Chapter 6, pgs VI-6, VI-7, and VI-8 confirm that there has been a draw down in the aquifer.) The NRCS report further states that erosion of fine particles from the surface soil has connected surface drainage to subsurface subsidence. These tunneled areas are subject to fissuring. The report discounts the gypsum content of the soils as an aggravating circumstance in the dissolution, based upon recent soil sampling (personal communication with W. Urie, 5/20/2019). However, Map 65 of the 1970 soil survey of the Carbon Emery area suggests the following 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 gypsum may have dissolved since the date of that survey.

Deficiencies Details:

The application does not meet the requirements of R645-301-525, Pre-subsidence survey. The following deficiency must be addressed prior to final approval:

R645-301-525, The investigation of the sink holes located in T22S, R6E, Sec 31 S/2 SE1/4 of Section 31 (Earthfax report) must be provided as an addendum to Appendix V-8.

pburton

Subsidence Control Plan Subsidence

Analysis:

The application meets the State of Utah R645 requirements for Subsidence Control Plans.

The application satisfies the State of Utah requirements for R645-301-525.300 thru -525.480. A previous deficiency highlighted the necessity of including a County Road Repair Agreement with Emery County as well as securing approval from UDOT to undermine portions of SR-10. However, the Permittee has clarified in the most recent response that this submittal does not pertain to those areas, and there is no intention of subsidence mining beneath SR-10 nor County Road 907. Plate V-5 confirm this because the public roads in question are outside of the angle of draw for the proposed areas to be fully extracted.

jeatchel

Subsidence Control Plan Performance STD

Analysis:

The application meets the State of Utah requirements for Subsidence Control Plan Performance Standards.

The application satisfies the requirements of R645-301-525.300 thru -525.400 because narrative in Chapter V Page 27 explains the distinction between partial pillar extraction and full extraction, and where within the mine each method will be employed. Full pillar extraction falls under the category of planned subsidence, and will typically subside the surface by 50% of the extraction height. Certain surface features will be protected from subsidence by only employing first mining methods and/or establishing buffer zones where subsidence mining must remain a certain distance away depending on the draw angle. Draw angles vary from 5% to 15% depending on mining depth. Three features are protected from subsidence by establishing a buffer zone and only performing first mining. These features include Quitchupah Creek, Christiansen Wash, and an intermittently occupied dwelling in Section 30. The buffer zone surrounding the dwelling in Section 30 may be removed pending a subsidence waiver from the owner of said dwelling at some future date. Outside of the buffer zones, the surfaces above full extraction areas were visually assessed by a pre-subsidence survey conducted by Earthfax Engineering Group in November 2017. This survey documents the condition of 131 surface features in the southern portion of the mine plan south of Quitchupah Creek to facilitate mitigation of areas determined to be adversely affected by future subsidence. The pre-subsidence survey may be found in Appendix 5-8 of the approved Mining and Reclamation Plan. Chapter V Page 27 also clarifies that all pillar extraction (partial or full) will be approved by MSHA.

Plate V-5 illustrates the mine workings in relation to surface features and clarifies where the areas of full extraction will occur. The buffer zones mentioned above are indicated with alternating hatch patterns. Also depicted on Plate V-5 are the locations of subsidence monitoring points in relation to the proposed full extraction panels and mains and sub mains. Monitoring points will be surveyed using kinematic GPS survey methods at least three months prior to full extraction mining activities within the angle of draw. Subsidence monitoring points will be resurveyed annually after mining has occurred, and will continue until subsequent surveys can demonstrate negligible movement (+/- 0.1 feet) over a period of 5 years. The results of the subsidence monitoring surveys will be provided to the Utah Division of Oil, Gas, and Mining yearly as part of the Annual Report.

jeatchel

Subsidence Control Plan Notification

Analysis:

The application meets the requirements of R645-301-525.700, Public Notice of Proposed Mining, because the Permittee has confirmed in the cover letter that notification of the Emery Water Conservancy District and the surface landowners (including Utah Department of Transportation) will be made within six months of mining (2019 Incoming 05242019.5936.doc). The notice will provide the information stated in R645-301-525.700, including a location where the subsidence control plan may be examined.

Notification to the land owner will include the pre-subsidence survey as stated in the MRP Section V-B.2 item 1.1.2.

pburton

Fish and Wildlife Protection and Enhancement Plan

Analysis:

The amendment does not meet the State of Utah R645-301-333 requirements for a Fish and Wildlife Protection and Enhancement Plan. Chapter VIII, Section VIII.B.4, page 17a of the MRP states that "a burrowing owl survey will be conducted prior to full extraction mining in areas where planned subsidence is contemplated per Ch. V, Plate V-5." In previous actions by the mine these surveys were conducted in the Miller Tract section of the permit area which resulted in the discovery of active burrowing owl nesting sites. Following consultation with DWR and the U.S. Fish and Wildlife Service, a protection and enhancement plan was implemented which included the installation of seven artificial burrows in and around the proposed subsidence area. These reports can be found in Confidential Volume 2 of the MRP. Confidential Plate 10-1 indicates the Miller Tract area as both active prairie dog and burrowing owl habitats. The same map also shows active prairie dog habitat in the now-proposed full extraction area of the current application. Plate V-5 of the amendment indicates planned subsidence under multiple areas designated on Confidential Plate 10-1 as active prairie dog towns. Due to the high likelihood of burrowing owls inhabiting this prairie dog habitat, the Division, following consultation with DWR, requires that burrowing owl surveys be conducted, according to protocol, in this area prior to approval. Depending on the results of these surveys, mitigation similar to that of the Miller Tract project may be required.

Deficiencies Details:

The amendment does not meet the State of Utah R645-301-333 requirements for a Fish and Wildlife Protection and Enhancement Plan. The following deficiency must be addressed prior to final approval:

R645-301-333: The Permittee must conduct a burrowing owl survey following Division-approved protocols. Depending on the results of this survey, mitigation may be required of the Permittee.

tmiller

Hydrologic Ground Water Monitoring

Analysis:

The application does not meet the State of Utah R645 requirement for Ground Water Monitoring.

The Permittee updated their Ground Water Monitoring Plan in 2019 to reflect the addition of the rehabilitated AA wells and USGS2-1 well located in Section 32 and Section 6 respectively of the proposed full extraction mining area. Well T1 was also added to the monitoring program.

The Bryant well (section 31) was also rehabilitated but was not added to the operational monitoring plan. This well may have been unintentionally left out of the monitoring plan (Table VI-17) and should be added to provide a more thorough groundwater monitoring program for the proposed mining area.

Deficiencies Details:

The amendment does not meet the State of Utah R645 requirements for Ground Water Monitoring. The following deficiency must be addressed prior to final approval:

R645-301-731.210: The Permittee must provide an updated monitoring plan to include monitoring of the Bryant Well.

adaniels

Hydro Surface Water Monitoring

Analysis:

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

The Permittee has updated the MRP to include a report in Appendix VI-23 characterizing the two previously unnamed ephemeral washes in Sections 30, 31, and 32. (Hereafter called UNT-1 and UNT-2, see Figure 1 of Appendix VI-23). These channels have been characterized as ephemeral streams through a field survey of the tributaries in November 2018. In both tributaries there were reaches of undefinable channels and a lack of any evidence of groundwater inflows into each channel. Appendix VI-23 also provides photographic, vegetative and field observations along the length of each tributary. As is common in the region surrounding this area, these washes are highly erodible and only flow in response to storms or extreme snow melt. Monitoring of these washes would not provide meaningful data. The Permittee will continue to monitor along Quitcupah Creek (of which UNT-1 and UNT-2 are tributaries) and Christiansen Wash.

adaniels

Maps Mine Workings

Analysis:

The application satisfies the State of Utah R645 requirements for Mine Workings Maps.

The application meets the requirements for R645-301-521.142 and -525.420 because an attached Plate V-5 shows all areas of the mine where first mining and full extraction and are planned. Also depicted on Plate V-5 are areas of first mining in the BLM right-of-way to the south, as well as areas where full extraction was previously approved in older areas of the mine. A previous deficiency required that the language in the legend be changed to clarify where full extraction was previously approved versus areas that are currently proposed for full extraction.

jeatchel

Maps Monitoring and Sampling Locations

Analysis:

The application does not meet the State of Utah R645 requirement for Maps Monitoring and Sampling Locations.

Plate VI-4 of the MRP has not been update to indicate the rehabilitated wells that have been re-activated and added to the water monitoring program are now "active" monitoring sites. Specifically wells USGS 2-1, Well T1, and Bryant Well. This plate must be updated.

Deficiencies Details:

The amendment does not meet the State of Utah R645 requirements for Maps Monitoring and Sampling Locations. The following deficiency must be addressed prior to final approval:

R645-301-722.300 The Permittee must update Plate VI-4, "Ground Water Monitoring Well and Surface Water Monitoring Site Location Map" to provide the correct status of wells that have been activated and should no longer by labeled as "inactive" or "abandoned".

adaniels

Special Categories

Operations Alluvial Essential Hydrologic Functions

Analysis:

The application meets the Alluvial Valley Floor (AVF) performance standard requirements of R645-302-324, because 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.

pburton

Operations Alluvial Protection of Agricultural

Analysis:

The application meets the requirements of R645-301-525.440 protection of agricultural lands, because there are monitoring locations above irrigated prime farmlands in Sections 31 and 32.

R645-301-525.110 requires a map showing the location of renewable resource lands and the narrative describing the potential for material damage or diminished value of the renewable resource lands. The term renewable resource lands is defined by R645-100, includes agricultural lands, croplands, and grazing lands. R645-301-525.420 requires a map of the underground workings showing the extent of the planned subsidence.

The area to be fully extracted (planned subsidence) is in Sections 30, 31, 32 and 33. Plate V-5 shows the panels and subsidence monitoring points in Sections 31 and 32. Depth of coal in Sections 31 is approximately 600 – 900 feet below the surface (Plate V-10). Subsidence is expected to be approximately 50% of the depth of the removed coal or approximately 5 feet in a 10 ft. seam. The angle of draw would be 15 degrees at this depth (Chap. V, p. 29).

Aerial imagery from Google Earth shows Sections 30 and 31 contain irrigated lands. Irrigated pastureland in Section 31 is also shown on Plate VIII-1 Vegetation and Land Use. Panels shown West of the highway in Section 30 will be removed from Figure 1 and Plate V-5 (personal communication with John Gefferth, 11/15/2018).

The area of full extraction shown on Plate V-5 is beneath prime farmlands in Sections 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." Prime Farmlands and Farmlands of Statewide Importance were mapped South of Emery Town in Section 19, 30, 31, and 32.]

Subsidence monitoring is described in Chap V, p. 37- 38 for the Emery2 mine. This plan describes monitoring irrigation ditches and pond embankments for 6 months. This monitoring would apply to flood irrigated lands in Sections 19, 29 & 30. However, since irrigation ditches are being replaced by center pivots in Section s 31 and 32, this monitoring plan should be updated after installation is completed.

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

pburton