Bronco Utah Operations LLC
PO Box 527
Emery Utah, 84522
435-286-2447

January 31, 2020

C/015/0015
Received 2/5/20
Task #6063

Mr. Steve Christensen
Utah Division of Oil, Gas and Mining
Coal Program
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, UT 84114-5801

RE: Bronco Utah Operations LLC
Emery Mine
DOGM Permit No. C/015/0015
Emery 2 Full Extraction Deficiency Response Task ID 5769/5936

Mr. Christensen:

Please consider these deficiency responses to the above-mentioned permit tasks, which includes an executed C1 form, C2 form, revised pages, and Plates. As you are aware, several of the deficiencies have been submitted and approved under previous permit actions. The previous submittal task id's have been identified throughout the deficiency response document.

This submittal updates a previous pre-subsidence survey on the surface south of Quitchupah Creek and requests approval to conduct full extraction mining and planned subsidence of the surface.

If you have any questions concerning this request, please contact Kit Pappas at 435-286-2027.

Sincerely,

Kit Pappas
Environmental Manager

Attachments Application for Coal Permit Processing

Deficiency List
Task id #5769
Full Extraction Revision

The members of the review team who have identified deficiencies include the following individuals:

Priscilla Burton (Pburton)
Steve Christensen (Schristensen)
Joe Helfrich (Jhelfrich)
Justin Eatchel (Jeatchel)

GENERAL CONTENTS

Right of Entry

R645-301-114.100: Please provide right of entry information for SITLA lease ML 51745 and revise text in Appendix I-2 (p. 9-10) and maps accordingly. (Pburton)

Refer to Emery Right of Way additional adjacent area minor revision, Task #5859 for revised CH I, Plate I-1(Surface and Coal Ownership), and CH I Appendix I-2. The SITLA lease has been revised to depict current status.

Refer to revised CH V, Appendix V-8 Figure 1(Pre Subsidence Survey)

Refer to revised CH I, Plate I-1(Surface and Coal Ownership)

R645-301-121.100: Surface ownership shown on Plate I-1 and Figure 1 of App. V-8 do not match. Please make the appropriate corrections so that pre-subsidence notifications are sent to the correct surface owners. (Pburton)

Refer to Emery Right of Way additional adjacent area minor revision, Task #5859 for revised CH I, Plate I-1(Surface and Coal Ownership), and CH I Appendix I-2.

Refer to Emery 2, 2nd left panel full extraction Task #5847 for CH V, Appendix V-8 Figure 1(Pre Subsidence Survey)

Refer to revised CH I, Plate I-1(Surface and Coal Ownership)

Surface and coal ownership was taken form county records.

R645-301-114.100: The Permittee must provide a description of the documents upon which they base their legal right to enter and begin coal operations within Federal Coal Lease U-5287. The description will identify the documents by type and date of execution and identify the specific lands to which the document pertains and explain the legal rights claimed by the Permittee. The text in Chapter 1 and Appendix I-2 must be revised accordingly. (Schristensen)

Refer to Emery Right of Way additional adjacent area minor revision, Task #5859 for revised CH I Appendix I-2.
Federal Lease U-5287 is leased as described in CH I Appendix I-2, pages 7-12

ENVIRONMENTAL RESOURCE INFORMATION

Historic and Archeological Resource Information

R645-301-411: Historic and Archeological information in Chapter X of the Emery Deep Mining and Reclamation Plan (MRP) needs to be updated to include the proposed full extraction areas. (Jhelfrich)

Refer to Chapter X, Appendix V-15 Emery full extraction expansion (MOAC Report 19-007), Chapter X, Appendix V-16 Emery Additional Full Extraction South West (MOAC Report 19-031), and Plate X-A-1 (Permit Area Cultural Resources) CONFIDENTIAL

These reports covers the full extraction area outlined on Plate V-5 (Subsidence Monitoring Points & Buffer Zones) as well as additional area to the south and west.

Vegetation Resource Information

R645-301-320: Vegetation information in Chapter VIII of the Emery Deep Mining and Reclamation Plan (MRP) needs to be updated to include the proposed full extraction areas. (Jhelfrich)

Refer to CH VIII, Plate VIII-1 (Vegetation and Landuse Map) updated under Emery Right of Way additional adjacent area minor revision, Task #5859.

R645-301-320: Revisions to all of the maps (non water resources) need to include the correct permit and adjacent area boundaries. Some of these maps do not include the current permit area boundaries (vegetation and fish and wildlife), some show full extraction extending beyond the adjacent area on the west boundary. Areas of mining activities and full extraction need to be clearly identified on all of the maps in the MRP. (Jhelfrich)

Correct permit and adjacent area boundaries are depicted on all pertinent Plates.

*CH VIII, Plate VIII-1 (Vegetation and Landuse Map) and CH IX, Plate 10-1 (Selected Wildlife Information) depict the current approved **permit boundary** updated under Emery 2 revision, Task #5362.*

Refer to Plate V-5 (Subsidence Monitoring and Buffer Zones) for the full extraction area approved and proposed under this revision.

Any mining projections shown beyond the adjacent area are for planning purposes only and are not permitted to mine.

Fish and Wildlife Resource Information

R645-301-322: Fish and Wildlife information in Chapter IX of the Emery Deep Mining and Reclamation Plan (MRP) needs to be updated to include the proposed full extraction areas. (Jhelfrich)

Refer to CH IX, Plate 10-1 Vegetation and Landuse Map updated under Emery Right of Way additional adjacent area minor revision, Task #5859.

R645-301-322: Revisions to all of the maps (non water resources) need to include the correct permit and adjacent area boundaries. Some of these maps do not include the current permit area boundaries (vegetation and fish and wildlife), some show full extraction extending beyond the adjacent area on the west boundary. Areas of mining activities and full extraction need to be clearly identified on all of the maps in the MRP. (Jhelfrich)

Correct permit and adjacent area boundaries are depicted on all pertinent Plates.

CH VIII, Plate VIII-1 (Vegetation and Landuse Map) and CH IX, Plate 10-1 (Selected Wildlife Information) depict the current approved permit boundary.

Refer to Plate V-5 (Subsidence Monitoring and Buffer Zones) for the full extraction area approved and proposed under this revision.

Any mining projections shown beyond the adjacent area are for planning purposes only and are not permitted to mine.

Hydrologic Baseline Information

R645-301-724.100 and -724.200: The Permittee must provide and/or demonstrate that adequate baseline data has been collected to characterize the quality and quantity of both ground and surface water within the areas proposed for full extraction mining. Sections Vl.2.4.1, Groundwater Information and Vl.2.4.2, Surface Water Information of the approved Mining and Reclamation Plan (MRP) must be revised accordingly per R645-301-724.1 00 and -724.200. (Schristensen)

Refer to Emery Right of Way additional adjacent area minor revision, Task #5859.

Probable Hydrologic Consequences Determination

R645-301-728: The Permittee must revise Section Vl.2.8, Probable Hydrologic Consequences to address potential impacts to ground and surface water resources in the proposed area of full extraction mining (T22S, R6E, Sections 30, 31 and 32). (Schristensen)

Refer to Emery Right of Way additional adjacent area minor revision, Task #5859

Maps Subsurface Water Resources

R645-301-722.100: The Permittee must revise/update Plate Vl-6, Anticipated Initial Depth of Groundwater Over Bottom of I Seam, Plate Vl-7, Upper Ferron Sandstone Potentiometric Surface (2006} and Plate Vl-8, Lower Ferron Sandstone Potentiometric Surface (2006). (Schristensen)

Refer to Emery Right of Way additional adjacent area minor revision, Task #5859

OPERATION PLAN

Subsidence Control Plan, Renewable Resource

R645-301-525.420: Figure 1 (App. V-8) should show panels in Section 31 and 32. (Pburton)

Refer to revised CH V, Appendix V-8 Figure 1(Pre Subsidence Survey)

Subsidence Control Plan, Subsidence

R645-301-525.300, -525.700: Permittee must secure a more recent and up to date County Road Repair Agreement with Emery County since the previous agreement expired on July 3, 2017. Additionally, a subsidence notification should be sent and written approval secured from the Utah Department of Transportation prior to undermining SR-10. (Jeatchel)

The County road agreement does not pertain to this submittal. It covered an area northeast of the 4th East Portal and does not need to be updated.
Subsidence agreements are not required from UDOT due to the fact that Bronco does not intend to subside SR-10 (as depicted on Plate V-5).

Subsidence Control Plan, Performance STD

R645-301-525.311: Permittee must present sufficient evidence to demonstrate that structures and zones that are protected from subsidence will remain unaffected. Perhaps altering the pillar dimensions or adopting a higher factor of safety could contribute to ensuring subsidence does not occur in sensitive areas. Regardless of what Permittee intends to adopt, the Division is not comfortable with the present subsidence control plan in light of recent events. (Jeatchel)

Bronco will follow the Mine Safety & Health Administration (MSHA) roof Control Base Plan dated April 17, 2018 and subsequent site-specific amendments regarding pillar design and safety factors.

Subsidence Control Plan, Notification

R645-301-525.700: Please confirm notification of the Emery County Water Conservancy District, the Muddy Creek Irrigation Company, Utah Department of Transportation and all surface owners. The notice must provide the information stated in R645-301-525.700, including a location where the subsidence control plan may be examined. Notification to the landowner(s) will include the pre-subsidence survey as required by R645-301-525.130 and stated in the MRP Section V-B.2 item 1.1.2. (Pburton)

Public Notice of the Proposed Mining will be conducted per the cited regulation and sent to the water conservancy district, and to all owners and occupants of surface property and structures above the underground workings.

Pre-subsidence surveys will be provided to landowners per CH V-B.2 (Subsidence Survey and Monitoring Plan).

Hydrologic Ground Water Monitoring

R645-301-731.210: The Permittee must provide a ground water monitoring plan capable of determining whether proposed full extraction mining has or has not produced impacts to the hydrologic balance. (Schristensen)

Refer to Emery Right of Way additional adjacent area minor revision, Task #5859 for revised Plate VI-4 (Ground Water Monitoring Well and Surface Water Monitoring Site Location Map) for additional well status.

Hydrologic Surface Water Monitoring

R645-301-731.220: The Permittee must provide a surface water monitoring plan capable of determining whether proposed full extraction mining has or has not produced impacts to the hydrologic balance. (Schristensen)

Refer to Emery Right of Way additional adjacent area minor revision, Task #5859

Maps, Mine Workings

R645-301-521.142, -525.420: Currently Plates V-5 and IV-2 are proposing two different mining scenarios. Permittee must change these plates to restore consistency and ensure that no contradictions exist. Additionally, please delete the word "Previously" from the "Areas to be Fully Extracted" legend item on V-5 to dispel the notion that Sections 31 and 32 have previously been approved for full extraction mining. (Jeatchel)

Refer to Emery Right of Way additional adjacent area minor revision, Task #5859 for revised Plates V-5 and IV-2.

SPECIAL CATEGORIES

Operations, Alluvial Protection of Agricultural

R645-301-525.440. Monitoring points on Plate V-5 should be shown above mining panels beneath irrigated lands in Sections 30, 31 and 32. (Pburton)

Refer to revised Plate V-5.
Subsidence monitoring points are depicted on Plate V-5 over panels where planned subsidence (full extraction) is either approved or proposed.

2nd Deficiency List
Task id #5936
Full Extraction Revision

The members of the review team who have identified deficiencies include the following individuals:

Priscilla Burton (Pburton)
Steve Christensen (Schristensen)
Todd Miller (Tmiller)
Justin Eatchel (Jeatchel)
Amanda Daniels (Adaniels)

GENERAL CONTENTS

Right of Entry

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 1-1 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. (Pburton)

The SITLA lease has been revised to depict current status.

Refer to revised CH V, Appendix V-8 Figure 1(Pre Subsidence Survey)

Refer to revised CH I, Plate I-1(Surface and Coal Ownership)

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 1-1, so that pre-subsidence notifications are sent to the correct surface owners. (Pburton)

Refer to revised CH I, Plate I-1(Surface and Coal Ownership)

Right of Entry

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)

Per discussions with DOGM and OSMRE written authorization to perform subsidence mining is not required.

Environmental Resource Information

Historic and Archeological Resource Information

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. (Tmiller)

Refer to Chapter X, Appendix V-15 Emery full extraction expansion (MOAC Report 19-007), Chapter X, Appendix V-16 Emery Additional Full Extraction South West (MOAC Report 19-031), and Plate X-A-1 (Permit Area Cultural Resources) CONFIDENTIAL

These reports covers the full extraction area outlined on Plate V-5 (Subsidence Monitoring Points & Buffer Zones) as well as additional area to the south and west.

A CD containing the report and additional data required by SHPO will be delivered to DOGM concurrent with this submittal.

Operation Plan

Subsidence Control Plan Renewable Resource

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)

Refer to revised CH V Appendix V-8 (Pre-Subsidence Survey south of Quitchupah Creek, EarthFax)

Fish and Wildlife Protection and Enhancement Plan

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)

Refer to CH VIII App VIII-6 (Burrowing Owl Study Emery 2 Full Extraction Area, Mt. Nebo 11/19

Hydrologic Ground Water Monitoring

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)

Refer to revised CH VI, Plate VI-4 (Ground Water monitoring Well & Surface Water Monitoring Site Location Map)

Maps Monitoring and Sampling Locations

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 Vl-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)

Refer to revised CH VI, Plate VI-4 (Ground Water monitoring Well & Surface Water Monitoring Site Location Map)

APPLICATION FOR COAL PERMIT PROCESSING

Permit Change ☒ New Permit ☐ Renewal ☐ Exploration ☐ Bond Release ☐ Transfer ☐

Permittee: Bronco Utah Operations LLC (BUOLLC)
Mine: Emery Mine **Permit Number:** 015/015
Title: Emery 2 Full Extraction
Description, Include reason for application and timing required to implement:
Emery 2 Full Extraction Deficiency Responses Task ID 5769/5936 01/20

Instructions: If you answer yes to any of the first eight (gray) questions, this application may require Public Notice publication.

☐ Yes ☒ No 1. Change in the size of the Permit Area? Acres: _____ Disturbed Area: _____ ☐ increase ☐ decrease.
☐ Yes ☒ No 2. Is the application submitted as a result of a Division Order? DO# _____
☐ Yes ☒ No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
☐ Yes ☒ No 4. Does the application include operations in hydrologic basins other than as currently approved?
☐ Yes ☒ No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes ☒ No 6. Does the application require or include public notice publication?
☐ Yes ☒ No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
☐ Yes ☒ No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
☐ Yes ☒ No 9. Is the application submitted as a result of a Violation? NOV # _____
☐ Yes ☒ No 10. Is the application submitted as a result of other laws or regulations or policies?
Explain: _____
☐ Yes ☒ No 11. Does the application affect the surface landowner or change the post mining land use?
☐ Yes ☒ No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
☒ Yes ☐ No 13. Does the application require or include collection and reporting of any baseline information?
☐ Yes ☒ No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes ☒ No 15. Does the application require or include soil removal, storage or placement?
☐ Yes ☒ No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
☐ Yes ☒ No 17. Does the application require or include construction, modification, or removal of surface facilities?
☐ Yes ☒ No 18. Does the application require or include water monitoring, sediment or drainage control measures?
☒ Yes ☐ No 19. Does the application require or include certified designs, maps or calculation?
☐ Yes ☒ No 20. Does the application require or include subsidence control or monitoring?
☐ Yes ☒ No 21. Have reclamation costs for bonding been provided?
☐ Yes ☒ No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
☐ Yes ☒ No 23. Does the application affect permits issued by other agencies or permits issued to other entities?

Please attach four (4) review copies of the application. If the mine is on or adjacent to Forest Service land please submit five (5) copies, thank you. (These numbers include a copy for the Price Field Office)

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

Brian R. Fredrickson — Print Name
Brian R. Fredrickson President / CEO 1-31-2020 — Sign Name, Position, Date

Subscribed and Sworn to before me this 31 day of JANUARY, 2020

Notary Public
My commission Expires: MARCH 7, 2022
Attest: State of UTAH } } ss:
County of CARBON

JOHN CHRISTOPHER PAPPAS
Notary Public - State of Utah
My Commission Expires
March 7, 2022
COMMISSION NUMBER 698870

For Office Use Only:	Assigned Tracking Number:	Received by Oil, Gas & Mining

Form DOGM- C1 (Revised March 12, 2002)

APPLICATION FOR COAL PERMIT PROCESSING
Detailed Schedule Of Changes to the Mining And Reclamation Plan

Permittee: Bronco Utah Operations LLC (BUOLLC)
Mine: Emery Mine **Permit Number:** 015/015
Title: Emery Full Extraction Expansion Deficiency Responses Task ID 5769/5936 01/20

Provide a detailed listing of all changes to the Mining and Reclamation Plan, which is required as a result of this proposed permit application. Individually list all maps and drawings that are added, replaced, or removed from the plan. Include changes to the table of contents, section of the plan, or other information as needed to specifically locate, identify and revise the existing Mining and Reclamation Plan. Include page, section and drawing number as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED
☐ Add	☒ Replace	☐ Remove	CH I page 8
☐ Add	☒ Replace	☐ Remove	CH I Appendix I-2 (Ownership & Leasehold Interests for Surface & Coal)
☐ Add	☒ Replace	☐ Remove	CH I, Plate I-1 (Surface & Coal Ownership)
☐ Add	☒ Replace	☐ Remove	CH IV Plate IV-2 (UG Operations Plan)
☐ Add	☒ Replace	☐ Remove	CH V Table of Contents page 1
☐ Add	☒ Replace	☐ Remove	CH V page 27
☐ Add	☐ Replace	☐ Remove	
☐ Add	☒ Replace	☐ Remove	CH V page 28
☐ Add	☐ Replace	☒ Remove	CH V pages 29 through 35
☐ Add	☒ Replace	☐ Remove	CH V App V-8 (Pre-subsidence Survey south of Quitchupah Creek, EF 12/2017 rev2020)
☐ Add	☒ Replace	☐ Remove	CH V Plate V-5 (Subsidence Monitoring Points and Buffer Zones)
☐ Add	☒ Replace	☐ Remove	CH VI, Plate VI-4 (Ground Water & Surface Water Monitoring Site Location Map)
☐ Add	☒ Replace	☐ Remove	CH VIII index page
☒ Add	☐ Replace	☐ Remove	CH VIII App VIII-6 (Burrowing Owl Study Emery 2 Full Extraction Area Mt. Nebo 11/19)
☐ Add	☒ Replace	☐ Remove	CH X index page
☒ Add	☐ Replace	☐ Remove	CH X Appendix 5-15, Emery Full Extract (MOAC Report 19-007)CONFIDENTIAL
☒ Add	☐ Replace	☐ Remove	CH X Appendix 5-16, Emery Full Extract SW (MOAC Report 19-031)CONFIDENTIAL
☐ Add	☒ Replace	☐ Remove	CH X Plate X-A-1 (Permit Area Cultural Resources) CONFIDENTIAL
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Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.	**Received by Oil, Gas & Mining**

UMC 782,17

Underground operations at the Emery Mine are an ongoing situation which does not occur in phases. The extent of the underground workings over the life of the permit is shown on Plate IV-2. The approved permit area encompasses approximately 444.8 acres and the additional Emery 2 expansion permit area encompasses 29 acres, for a total of 473.8 acres. The adjacent area encompasses approximately ~~5,896~~6,111 acres. A minor permit area adjustment was done due to the disturbed area survey.

It is anticipated that mining activities will continue considerably beyond the five (5) year permit term. This will require renewals at the end of each term.

UMC 782.18, UMC 800.60

Appendix I-5 contains a copy of the insurance certificate, for the Emery Mine, covering personal injury and property damage.

Revised 8-31-95
Revised 4/2005
Revised 9/2006
Revised 5/2009
Revised 8/2009
Revised 4/2010
Revised 2/2017
Revised 2/2019
Revised 1/2020

APPENDIX I-2

Ownership and Leasehold Interests for Surface and Coal

Surface Land Ownership Within and Adjacent to the Permit Area

The following information describes the surface land ownership within and adjacent to the permit. Plate I-1 shows surface land ownership in and adjacent to the permit area.

On December 16, 2015, CONSOL Mining Company LLC conveyed its interest in the surface lands at the Emery Deep Mine and Hidden Valley Mine to Bronco Utah Operations, LLC by (i) Special Warranty Deed, recorded in Emery County on December 22, 2015 at Entry 411521, and recorded in Sevier County on December 23, 2015 at Document No. 00391679, Book 0709, Page 0986 and (ii) Assignment and Assumption Agreement, recorded in Emery County on December 22, 2015 at Entry 411523. The surface interests owned, leased or controlled by Bronco Utah Operations, LLC at the Emery Deep Mine and Hidden Valley Mine are not subject to litigation.

Section 19 T22S, R6E

James Olsen
647 North Main
Spanish Fork, UT 84660
801-798-3322

United States of America (BLM)
Lease No. U-5287
Utah State Offices
440 West 200 South, Suite 500
Salt Lake City, UT 84145-0155

Utah Power and Light
PO Box 899
Salt Lake City, UT 84522
801-748-2570

Wynona P. Olsen (trustee)
3805 Highland Cove Lane
Apt D18
Salt Lake City, UT 84146

M. Christensen
Box 35
Emery, UT 84522
801-286-2348

Bronco Utah Operations LLC
Emery Mine
PO Box 527
Emery, UT 84522
(801) 286-2447

Derek Beagley
PO Box 106
Emery, UT 84522

Julian Bowman
PO Box 141
Huntington, UT 84528-0141

Chuck A. & Cheryl A. Harris
4204 South Bennion Road
Taylorsville, UT 84129

Inserted 12/2007
Revised 9/2009, 12/2013, 3/2016, 02/2017
Replaced 02/2019

Surface Land Ownership Within and Adjacent to the Permit Area

The following information describes the surface land ownership within and adjacent to the permit. Plate I-1 shows surface land ownership in and adjacent to the permit area.

Section 20 T22S, R6E

Emery County
Emery County Courthouse
Castle Dale, UT 84513

Osburn Bret and Lori Lynn Carter
PO Box 24
Emery, UT 84522

Kenneth L. & Earlene Christensen
PO Box 552
Emery, UT 84522

Osburn Bret Carter & J.R. Lawrence
PO Box 24
Emery, UT 84522

Utah Power and Light
P.O. Box 899
Salt Lake City, UT 84110
801-748-2570
Utah Power and Light

Eric Andersen ETAL
PO Box 587
Emery, UT 84522

Michael L. & Jodi Christensen
PO 14
Emery, UT 84522

Kent & Abbie Christensen
PO Box 5
Emery, UT 84522

Section 21 T22S, R6E

Wayne & Delise Staley
482 North 2 W.
Emery, UT 84522
801-286-2213

John & Vicki Byars
PO Box 575
Emery, UT 84522

Bronco Utah Operations LLC.
Emery Mine
PO Box 527
Emery, UT 84522
801-286-2447

Osburn Bret and Lori Lynn Carter
PO Box 24
Emery, UT 84522

Gayle Jorgensen Trustee
3663 Bountiful Boulevard
Bountiful, UT 84010-3313

Morris & Ronnie Sorensen
PO Box 104
Emery, UT 84522-0104

Richard R. Benson & Genevieve Bensen
PO Box 104
Ferron, UT 84523

Inserted 12/2007
Revised 9/2009, 12/2013, 03/2016, 02/2017
Replaced 02/2019

Surface Land Ownership Within and Adjacent to the Permit Area

The following information describes the surface land ownership within and adjacent to the permit. Plate I-1 shows surface land ownership in and adjacent to the permit area.

Section 22 T22S, R6E

Bronco Utah Operations LLC
Emery Mine
PO Box 527
Emery, UT 84522
801-286-2447

John & Vicki Byars
PO Box 575
Emery, UT 84522

Kenneth L. & Earlene Christiansen
PO Box 552
Emery, UT 8452

D.U. Company, Inc.
53 West Angelo Avenue
Salt Lake City, UT 84115

Section 23 T22S, R6E

Bronco Utah Operations LLC
Emery Mine
PO Box 527
Emery, UT 84522
801-286-2447

Section 26 T22S, R6E

United States of America BLM

Clark J. Thomas
PO Box 861
St. George, UT 84771

Section 27 T22S, R6E

Bronco Utah Operations LLC.
Emery Mine
PO Box 527
Emery, UT 84522
801-286-2447

Section 28 T22S, R6E

Wayne & Delise Staley
PO Box 83
Emery, UT 84522
801-286-2213

Bronco Utah Operations LLC.
Emery Mine
PO Box 527
Emery, UT 84522
801-286-2447

Jesse L. Megan Allan
PO Box 43
Emery, UT 84522

Section 29 T22S, R6E

Emery County
Emery County Courthouse
Castle Dale, UT 84513

Rainbow Glass
PO Box 340
Orangeville, UT 84537

Bronco Utah Operations LLC
Emery Mine
PO Box 527
Emery, UT 84522
801-286-2447

Osburn Bret Carter
PO Box 24
Emery, UT 84522

Jesse L. Megan Allan
PO Box 43
Emery, UT 84522

William Boyd Stansfield Jr.
PO Box 553
Emery, UT 84522

Surface Land Ownership Within and Adjacent to the Permit Area

The following information describes the surface land ownership within and adjacent to the permit. Plate I-1 shows surface land ownership in and adjacent to the permit area.

Section 30 T22S, R6E

Josiah K. Eardley
2433 South Highway 10
Price, UT 84501

Bronco Utah Operations LLC
Emery Mine
PO Box 527
Emery, UT 84522
801-286-2301

Emery County
Emery County Courthouse
Castle Dale, UT 84513

Horace Petty Trustee
PO Box 144
Orangeville, UT 84537

Michael L. Christensen
PO Box 14
Emery, UT 84522

William Boyd Stansfield Jr.
PO Box 553
Emery, UT 84522

Derek Beagley
PO Box 106
Emery, UT 84522

Section 31 T22S, R6E

Bronco Utah Operations LLC
Emery Mine
PO Box 527
Emery, UT 84522
801-286-2301

Josiah K. & Etta Marie Eardley
2433 South Highway 10
Price, UT 84501

William Boyd Stansfield Jr.
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Section 32 T22S, R6E

Bronco Utah Operations LLC
Emery Mine
PO Box 527
Emery, UT 84522
801-286-2447

William Boyd Stansfield Jr.
PO Box 553
Emery, UT 84522

Inserted 12/2007
Revised 9/2009, 12/2013, 03/2016, 02/2017
Replaced 02/2019

Surface Land Ownership Within and Adjacent to the Permit Area

The following information describes the surface land ownership within and adjacent to the permit. Plate I-1 shows surface land ownership in and adjacent to the permit area.

Section 33 T22S, R6E

Bronco Utah Operations LLC
Emery Mine
PO Box 527
Emery, UT 84522
801-286-2447

Section 34 T22S, R6E

Bronco Utah Operations LLC
Emery Mine
PO Box 527
Emery, UT 84522
801-286-2447

United States of America (BLM)

~~Section 25 T22S, R5E~~

~~Rex Addley~~
~~Emery, UT 84522~~
~~801-286-2250~~

~~George Lewis~~
~~75 East 3rd South~~
~~Salt Lake City, UT 84111~~
~~Phone Unknown~~

~~Robert Lewis~~
~~107 W. 2 S.~~
~~Emery, UT 84522~~
~~801-286-2424~~

~~United States of America (BLM)~~

Section 36 T22S, R5E

William Boyd Stansfield Jr.
PO Box 553
Emery, UT 84522

Bronco Utah Operations LLC
Emery Mine
PO Box 527
Emery, UT 84522
801-286-2447

Section 5 T23S, R6E

United States of America BLM

William Boyd Stansfield Jr.
PO Box 553
Emery, UT 84522

Coal Ownership Within and Adjacent to the Permit Area

The following information describes the coal ownership within and adjacent to the permit. Plate I-1 shows coal ownership in and adjacent to the permit area.

On December 16, 2015, CONSOL Mining Company LLC conveyed and assigned its interest in the below holdings (except Federal Coal Leases UTU-5287, UTU-50044, UTU86038 and Federal Logical Mining Unit UTU-73335, the "Federal Leases") to Bronco Utah Operations, LLC by Special Warranty Deed and Assignment and Assumption Agreement, recorded in Emery County on December 22, 2015 at Entry 411521 and 411523, respectively. On December 16, 2015, CONSOL Mining Company LLC assigned the Federal Leases to Bronco Utah Reserves, Inc. by Assignment and Assumption Agreement, recorded in Emery County on December 22, 2015 at Entry 411524. By Sublease Agreement dated December 16, 2015 Bronco Utah Reserves, Inc. subleased its interest in the Federal Leases to Bronco Utah Operations, LLC. Bronco Utah Operations, LLC is the successor in interest to Kemmerer and Consol, and references to Kemmerer and Consol below should be read as Bronco Utah Operations LLC for periods of time after December 16, 2015. The documents and lands listed below pertain only to coal ownership and are not subject to litigation. Plate I-1 shows coal ownership in and adjacent to the permit area.

Bronco currently holds Federal Coal Lease U-5287 in good standing (executed on June 25, 1984). Mining in U-5287 will not occur until 2020 at the earliest. Bronco submitted an R2P2/LMU modification for the Emery 2 expansion and BLM approved it in February 2017. A copy was sent to DOGM by BLM.

Township 22 South, Range 6 East (SLM)

Section 19	NE¼SW¼ NW¼SE¼ E½SE¼ S½NE¼	Lease from USA (BLM) to Kemmerer and Consol dated 7/1/70 (#U-527) Utah State Offices University Club Building Salt Lake City, UT 801-524-5330
	SE¼SW¼	Deed from Emery County to Kemmerer Coal Co. dated 5/14/68
	SW¼SE¼	Deed from L.M. and S.M. Pratt to Kemmerer Coal Co. dated 6/22/49
	N½NE¼ NW¼	United States of America Not Leased
	W½SW¼	Emery County 95 E. Main Castledale, UT 84513 801-748-2474

Replaced/reordered 09/2009
Revised 03/2016, 02/2017
Replaced 02/2019

Coal Ownership Within and Adjacent to the Permit Area

The following information describes the coal ownership within and adjacent to the permit. Plate I-1 shows coal ownership in and adjacent to the permit area.

Section 20	NW¼SW¼ S½S½ NE¼SE¼	Lease from United States of America (BLM) to Kemmerer and Consol dated 7/1/70 (#U-5287)
	NE¼ E½NW¼ NE¼SW¼ NW¼SE¼	Deed from San Rafael Fuel Co. to Kemmerer Coal Co. dated 10/1/58
	W½NW¼	United States of America Not Leased
Section 21	W½ SE¼ NE¼NE¼ W½NE¼	Deed from San Rafael Fuel Co. to Kemmerer Coal Co.
	SE¼NE¼	Deed from L.M. and S.M. Pratt to Kemmerer Coal Co.
Section 22	NW¼NW¼	Deed from San Rafael Fuel Co. to Kemmerer Coal Co. dated 10/1/58
	SW¼SW¼ SE¼NE¼	San Rafael Fuel Co. to Kemmerer Coal Co. dated 10/1/58
	SW¼NW¼ N½SW¼ SE¼SW¼	Lease from United States of America (BLM) to Consol dated 7/1/83 (#U-50044)
	W½SE¼ E½NW¼ W½NE¼ NE¼NE¼	Deed from I. Browing to Kemmerer Coal Co. dated 8/23/66
Section 23	**S**W¼NW¼	Deed from I. Browning to Kemmerer Coal Co. dated 8/23/66
	NW¼SW¼	Deed from San Rafael Fuel Co. to Kemmerer Coal Co. dated 10/1/58
	S½SW¼	Lease from USA (BLM) to Consol dated October 1, 2009 (UTU 86038)
Section 26	NW¼NW¼	Lease from USA (BLM) to Consol dated October 1, 2009 (UTU 86038)

Revised/reordered 09/2009
Revised 03/2016
Replaced 02/2019

Coal Ownership Within and Adjacent to the Permit Area

The following information describes the coal ownership within and adjacent to the permit. Plate I-1 shows coal ownership in and adjacent to the permit area.

Section 27	S½NW¼ SW¼NE¼	Deed from San Rafael Coal Co. to Kemmerer Coal Co. dated 10/1/58
	N½NE¼	Deed from L.M. and S.M. Pratt to Kemmerer Coal Co. dated 6/22/49
	S½NE¼	Deed from Kemmerer Coal Co.
Section 28	NW¼	Deed from San Rafael Coal Co. to Kemmerer Coal Co. dated 10/1/58
	NE¼	Deed from San Rafael Fuel Co. to Kemmerer Coal Co. dated 10/1/58
	S½	Deed from San Rafael Fuel Co. to Kemmerer Coal Co. dated 10/1/58
Section 29	NW¼NW¼ E½NW¼ W½NE¼ NW¼SE¼	Lease from United States of America (BLM) to Kemmerer and Consol dated 7/1/70 (#U-5287)
Beginning 20 rods South of the NW corner of the SW Quarter of Section 29, thence South 60 rods, thence East 80 rods, thence North 20 rods, thence Northwesterly to the place of the beginning.		Lease from John and Carolyn Lewis to Consol and Kemmerer dated 11/12/80 1163 E. 25th Street Idaho Falls, ID 83401 208-522-3646
SW¼NW¼, beginning at the NW corner of SW¼, thence E 80 rods, thence S 76 rods, thence Northwesterly to the place of the beginning.		Lease from George Olsen to Consolidation Coal Co. dated 12/17/80 15 E. Center Orangeville, UT 810-748-2522
	SE¼NE¼	Lease from R.D. Jensen and D.R. Close to Consolidation Coal Co. dated 12/17/80 520 E. 1 N. Cleveland, UT 84518 801-653-2252

Revised/reordered 09/2009
Replaced 02/2019

Coal Ownership Within and Adjacent to the Permit Area

The following information describes the coal ownership within and adjacent to the permit. Plate I-1 shows coal ownership in and adjacent to the permit area.

	NE¼NE¼ E½SE¼ SW¼SE¼ NE¼SW¼	Deed from San Rafael Fuel Co. to Kemmerer Coal Co. dated 10/1/58
	SW ¼SW¼ SE ¼ SW ¼	State of Utah SITLA ML 51745-OBA Lease revised and relinquished this ¼ by Consolidation Coal.
Section 30	S½NE¼ E½NW¼ NW¼SE¼ SW¼SE¼ SE¼SW¼	Deed from Emery County to Kemmerer Coal Co. dated 5/14/68
	N½NE¼ SW¼NW¼ NE¼SW¼	Deed from L.M. and S.M. Pratt to Kemmerer Coal Co. dated 6/22/49
	NW¼NW¼	Private ownership, Ralph Lewis 4053 S. 850 W. Bountiful, UT 84010 801-292-1204
	SW¼SW¼ S½NW¼SW¼	Lease from George Lewis to Consolidation Coal Co. dated 8/30/82
	NE¼SE¼	Lease from John and Carolyn Lewis to Consolidation Coal Co. dated 11/12/80
	SE¼SE¼	State of Utah SITLA ML 51745-OBA
	N½NW¼SW¼	Lease from Robert Lewis to Consolidation Coal Co. dated 10/3/74 107 W. 2 S. Emery, UT 84522 801-286-2424
Section 31	W½NE¼ E½NW¼ NW¼NW¼	Deed from Emery County to Kemmerer Coal Co. dated 5/14/68
	SW¼NW¼ W½SW¼ SW¼SE¼	See Note A.
	E½NE¼	Deed from San Rafael Fuel Co. to Kemmerer Coal Co. dated 10/1/58

Revised/reordered 09/2009
Revised 03/2016
Replaced 02/2019

Coal Ownership Within and Adjacent to the Permit Area

The following information describes the coal ownership within and adjacent to the permit. Plate I-1 shows coal ownership in and adjacent to the permit area.

	NW¼SE¼ NE¼SW¼ SE¼SW¼	State of Utah SITLA ML 51745-OBA
	E½SE¼	Deed from L.M. and S.M. Pratt to Kemmerer Coal Co. dated 6/22/49
Section 32	NW¼ E½	Deed from San Rafael Fuel Co. to Kemmerer Coal Co. dated 10/1/58
	SW¼	Deed from L.M. and S.M. Pratt to Kemmerer Coal Co. dated 6/22/49
Section 33	All	Deed from San Rafael Fuel Co. to Kemmerer Coal Co. dated 10/1/58
Section 34	N½	Deed from San Rafael Fuel Co. to Kemmerer Coal Co. dated 10/1/58
	S½	United States of America Not Leased
	Township 22 South, Range 5 East (SLM)	
Section 25	E½E½	United States of America Not Leased
Section 36	All	Utah State, not leased
	Township 23 South, Range 5 East (SLM)	
Section 1	All	United States of America Not Leased
	Township 23 South, Range 6 East (SLM)	
Section 6	N½W¼ NW¼NE¼	See Note A.
	NE¼NE¼	Deed from L.M. and S.M. Pratt to Kemmerer Coal Co. dated 6/22/49

Revised/reordered 09/2009
Revised 03/2016
Inserted 02/2019

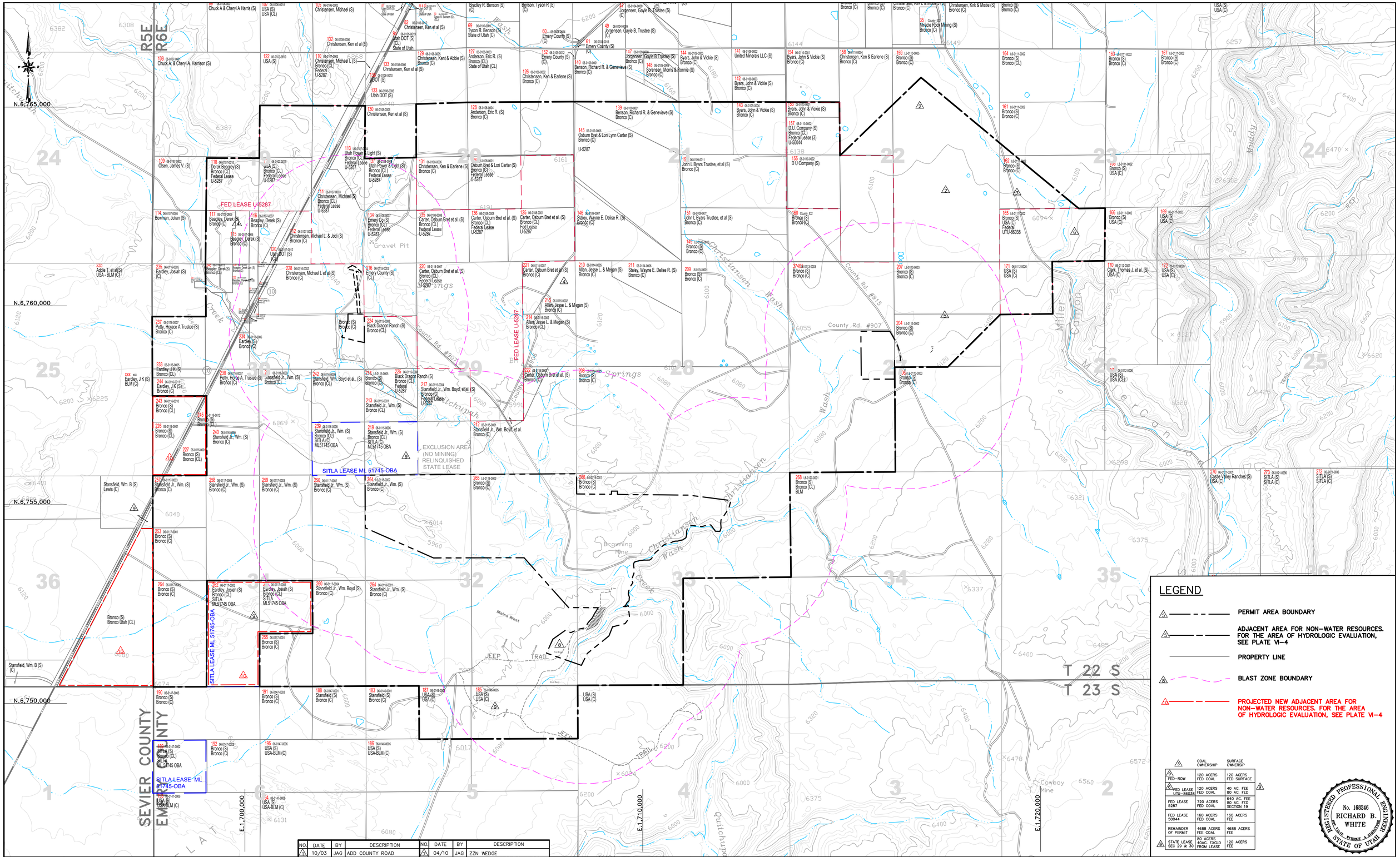
Coal Ownership Within and Adjacent to the Permit Area

The following information describes the coal ownership within and adjacent to the permit. Plate I-1 shows coal ownership in and adjacent to the permit area.

Section 5	NW¼NW¼	Deed from L.M. and S.M. Pratt to Kemmerer Coal Co. dated 6/22/49
	N1/2NE1/4 NE1/4NW1/4	United States of America (BM) Bronco Utah Operations LLC has right to enter and mine via signed DR and FONSI dated 2/6/2019 regarding DOI-BLM-UT-G020-2018-0051-EA
	S1/2N1/2 S1/2	United States of America (BLM) Not Leased
Section 4	W½	United States of America (BLM) Not Leased
	E½	United States of America (BLM) Not Leased

Note A: The Kemmerer Coal Company, **and its successors Consol and Bronco Utah Operations**, have been paying taxes on these lands for a number of years. However, during the title investigations, the deed from Ira Browning to Kemmerer was found to be missing, but these lands are not included in the Browning estates. Therefore, it is Bronco-Consol-Kemmerer's contention that these coal lands do indeed belong to Bronco Utah Operations LLC.

Revised/reordered 09/2009
Revised 03/2016
Inserted 02/2019



	COAL OWNERSHIP	SURFACE OWNERSIP
3 FED-ROW	120 ACERS FED COAL	120 ACERS FED SURFACE
4 FED LEASE UTU-86038	120 ACERS FED COAL	40 AC. FEE 80 AC. FED
FED LEASE 5287	720 ACERS FED COAL	640 AC. FED 80 AC. FED SECTION 19
FED LEASE 50044	160 ACERS FED COAL	160 ACERS FEE
REMAINDER OF PERMIT	4688 ACERS FEE COAL	4688 ACERS FEE
5 STATE LEASE SEC 29 & 30	80 ACERS 40AC. EXCLD FROM LEASE	120 ACERS FEE

NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
1	10/03	JAG	ADD COUNTY ROAD	7	04/10	JAG	ZZN WEDGE
2	04/05	JAG	ADDED FIRST NORTH I.B.C.	8	02/17	JAG	62 PHASE II ADDITIONAL PERMIT TASK #5362
3	01/07	JAG	1st NORTH FED LEASE I.B.C. FULL EXTRACTION	9	03/19	JAG	RIGHT OF WAY EXPANSION
4	03/08	JAG	UPDATED SURFACE CONTROL	10	01/20	JAG	FULL EXTRACTION TASK #5762, #5436
5	05/09	JAG	ZZ NORTH, ALL VX. PERMIT DF. 5099				
6	08/09	JAG	ZZ NORTH, MILLER CANYON LBA UTU-86038				

BARR

BASE MAP:
U.S.G.S. 7.5 MINUTE QUADRANGLE'S: EMERY WEST 1968, EMERY EAST 1968, PHOTO REVISED 1978, MESA BUTTE 1968, PHOTO REVISED 1978, WALKER FLATE 1968, PHOTO REVISED 1978.

COORDINATE SYSTEM:
STATE PLANE COORDINATES, NAD 83 CONUS
ZONE 4302–UTAH, CENTRAL – US FEET
VERTICAL DATUM – NAVD 88–US FEET

EXTERNAL REFERENCE:
G:\UC1665\05\REF\MINE WORKINGS\REPLACEMENT08-19-16
G:\UC1665\05\REF\EMERY FINAL PERMIT=e2P2-OCT 17
G:\UC982\XREF-CURRENT\XREF-HATCH-ZZNLBA.DWG
G:\UC982\XREF-CURRENT\XREF-14THWESTEX.DWG
G:\UC982\XREF-CURRENT\XREF-LOM.DWG
G:\UC982\XREF-CURRENT\XREF-SECTION.DWG
G:\UC982\XREF-CURRENT\XREF-HATCH-ZZNW.DWG
G:\UC982\XREF-CURRENT\XREF-WORKS-EWZ.DWG
G:\UC982\XREF-CURRENT\XREF-WALKER FLATE 1968
MESA BUTTE 1968, PHOTO REVISED 1978
EMERY EAST 1968, PHOTO REVISED 1978
U.S.G.S. 7.5 MINUTE QUADRANGLE'S: EMERY WEST 1968

SCALE: 1" = 1000'
CONTOUR INTERVAL = 40'

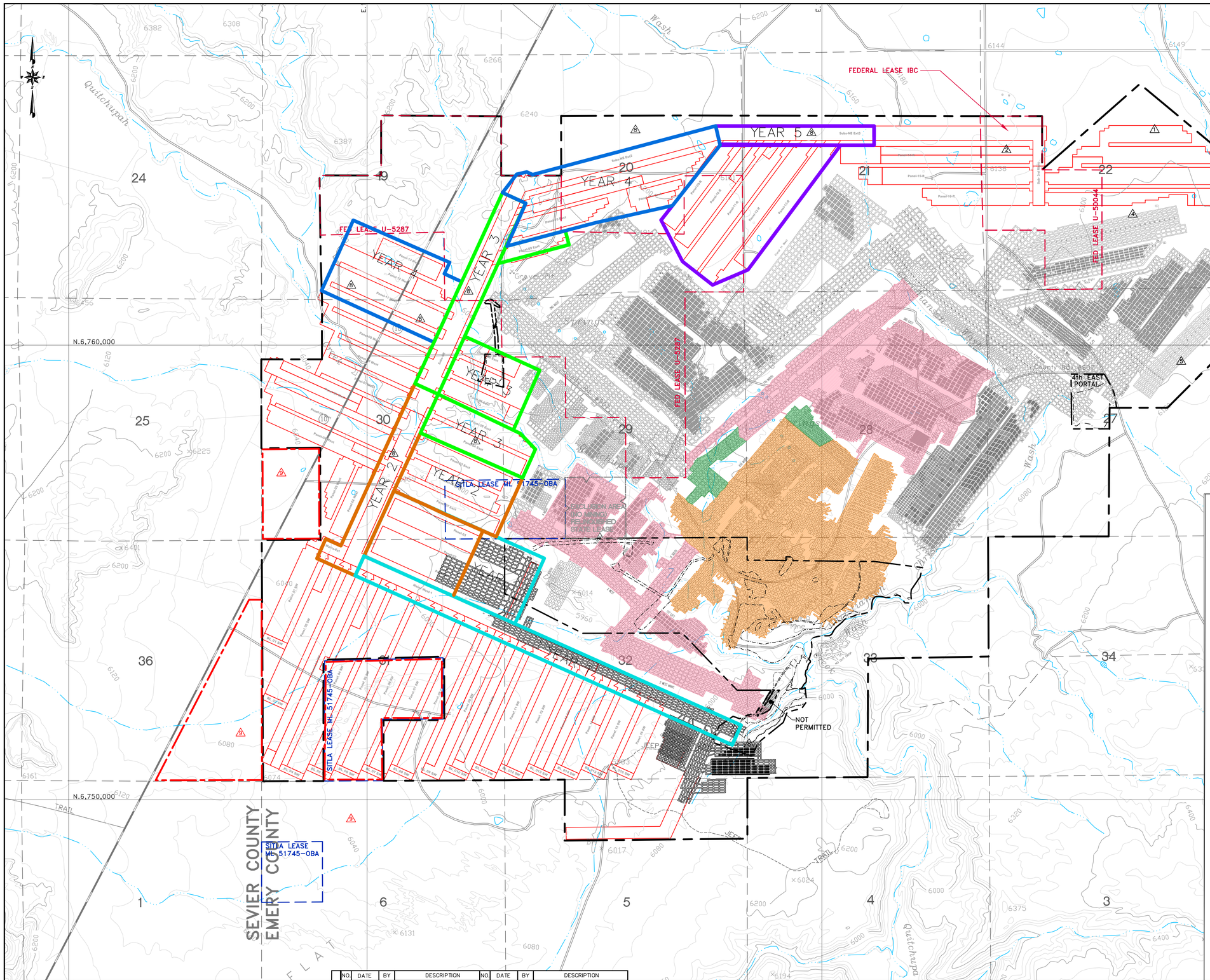
DRAWN BY: JBL | CHECKED BY: JAG | ORIGINAL DATE: 1/03
APPROVED BY: JAG | DWG DATA: G:\UC1665\05\PHASE II DWG

EMERY MINE
EMERY COUNTY, UTAH

PERMIT NO.
ACT015/015

BRONCO UTAH OPERATIONS, LLC
P.O. BOX 1
PRICE, UT 84501

PLATE I-1
SURFACE AND COAL OWNERSHIP



LEGEND

- PERMIT AREA BOUNDARY
- ADJACENT AREA FOR NON-WATER RESOURCES. FOR THE AREA OF HYDROLOGIC EVALUATION, SEE PLATE VI-4
- DISTURBED AREA BOUNDARY
- PROJECTED ADJACENT AREA
- PRIOR TO AUG. 3, 1977
- MAY. 3, 1977 TO AUG 3, 1977
- MAY 3, 1978 TO JAN. 5, 1986
- EXCLUSION AREA (NO MINING) RELINQUISHED STATE LEASE
- FORCASTED PANEL YEAR 1
- FORCASTED PANEL YEAR 2
- FORCASTED PANEL YEAR 3
- FORCASTED PANEL YEAR 4
- FORCASTED PANEL YEAR 5

REGISTERED PROFESSIONAL ENGINEER
No. 168246
RICHARD B. WHITE
STATE OF UTAH
NOT VALID WITHOUT A SIGNATURE

BASE MAP:
U.S.G.S. 7.5 MINUTE QUADRANGLE'S, EMERY WEST 1968, EMERY EAST 1968, PHOTO REVISED 1978, MESA BUTTE 1968, PHOTO REVISED 1978, WALKER FLATE 1968, PHOTO REVISED 1978.

COORDINATE SYSTEM:
STATE PLANE COORDINATES:
NAD 83 CONUS
ZONE 4302-UTAH, CENTRAL - US FEET
VERTICAL DATUM - NAVD 88-US FEET

EXTERNAL REFERENCE:
G:\UC982\XREF-CURRENT\XREF-USGSMAP.DWG
G:\UC982\XREF-CURRENT\XREF-SECTION.DWG
G:\UC982\XREF-CURRENT\XREF-WORKS-ZZNLBA.DWG
G:\UC1665\05\XREF\EMERY FINAL PERMIT-e2P2-FEB 17

REVISIONS

NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
1	6/30/05	JAG	ADDED FIRST NORTH I.B.C.	6	08/09	JAG	ZZ NORTH, MILLER CANYON LBA (UTU-86038)
2	12/12/06	JAG	1st NORTH FED LEASE IBC. FULL EXTRACTION	7	04/10	JAG	ZZN WEDGE
3	04/7	JAG	UPDATE MINING PLAN	8	02/17	JAG	e2 PHASE II ADDITIONAL PERMIT TASK #5768
4	09/08	JAG	LIFE OF MINE FULL EXTRACTION	9	01/20	JAG	FULL EXTRACTION TASK #5769, 5936
5	05/09	JAG	ADD ADJ. VS. PERMIT DEF. 3099				

0' 1000'
SCALE: 1" = 1000'
CONTOUR INTERVAL = 40'

DRAWN BY: JBL
CHECKED BY: JAG
ORIGINAL DATE: 1/03
RE-DRAWN DATE: 12/05
APPROVED BY: JAG
DWG DATA: G:\UC1665\05\PHASE II DWGS

EMERY MINE
EMERY COUNTY, UTAH
PERMIT NO.
ACT015/015

BRONCO UTAH OPERATIONS, LLC
P.O. BOX 527
PRICE, UT 84522

PLATE IV-2
UG OPERATIONS PLAN

CHAPTER V

GEOLOGY AND SUBSIDENCE

PARTS

V.A GEOLOGY
- V.A.1 GENERAL AREA GEOLOGY
- V.A.2 MINE PLAN AREA GEOLOGY
- V.A.3 GEOLOGY OF COAL BEDS AND ADJACENT UNITS
- V.A.4 I-ZONE ROOF & FLOOR CHARACTERISTICS (1ST North IBC)
- V.A.4 I-ZONE ROOF AND FLOOR CHARACTERISTICS
- V.A.5 ACID, ALKALINE, OR TOXIC POTENTIAL
- V.A.6 PYRITE, MARCASITE, AND SULFUR CONTENT
- V.A.7 COAL RESERVE INFORMATION
- V.A.8 BIBLIOGRAPHY

V.B SUBSIDENCE
- V.B.1 SUBSIDENCE CONTROL, MONITORING AND MITIGATION
- V.B.2 BIBLIOGRAPHY

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V-2 DRILL HOLE LOGS FOR CROSS SECTIONS
V-3 1980 PRE-SUBSIDENCE SURVEY
V-4 2007 PRE-SUBSIDENCE SURVEY OF THE 14TH AND 15TH WEST PANELS
V-5 2007 PRE-SUBSIDENCE SURVEY OF THE 4th E, 6th W, Zero North, ZZ North Panels
V-6 SUBSIDENCE MITIGATION AGREEMENTS
Emery County Road subsidence mitigation agreement
PacifiCorp powerline subsidence mitigation agreement
V-7 2008 PRE-SUBSIDENCE SURVEY Life of Mine panels
V-8 2017 PRE-SUBSIDENCE SURVEY South of Buffer Zone +erosion hole addendum

PLATES

V-1 STRUCTURES AND UTILITIES ..... Vol. 2 Map Pocket
V-2 ROADWAYS..... Vol. 2 Map Pocket
V-3 HYDROLOGY..... Vol. 2 Map Pocket
V-4 VEGETATION ..... Vol. 2 Map Pocket
V-5 SUBSIDENCE MONITORING POINTS
AND BUFFER ZONES ..... Vol. 2 Map Pocket
V-5H HISTORICAL SUBSIDENCE MONITORING POINTS ..... Vol. 2 Map Pocket
V-6 AREA DRILL HOLE, CROSS SECTION AND
GEOCHEMICAL TEST HOLE LOCATIONS ..... Vol. 2 Map Pocket
V-7 CROSS SECTION A-A' ..... Vol. 2 Map Pocket
V-8 CROSS SECTION C-C'. ..... Vol. 2 Map Pocket
V-9 CROSS SECTION D-D' ..... Vol. 2 Map Pocket

The method used historically in most of the mine was room and pillar mining with some partial pillar extraction~~removal~~. Partial pillar extraction~~removal~~ is designed not to result in subsidence. Full extraction mining (planned subsidence) did occur above the ~~at~~sealed Emery Mine old works and will occur above~~at~~ the Emery 2 mine plan in areas previously approved and designated full extraction as noted on Plate V-5. If the ~~new~~ Emery 2 mine plan contemplates full extraction in areas other than those depicted as full extraction on Plate V-5, Bronco will submit a revision with the required pre-subsidence survey data. As a result, any subsidence outside these areas would fall into the unplanned subsidence category. ~~CH V, Figure 1 shows the partial pillar splitting diagram employed underground. This layout is the result of past experience as well as Federal and State regulations pertaining to roof control and ventilation.~~ All pillar design~~,~~ or pillar splitting (whether partial pillar extraction or full extraction) will be approved by MSHA.~~ A pillar split diagram specific to full extraction is provided in CH V, Figure 2. Full extraction pillar splitting will result in subsidence.~~

Maximum subsidence at the Emery Mine will be approximately 50% of the extraction height. Given the current mining horizon, this would relate to 3 feet of subsidence in areas of 6-foot extraction to 5 feet of subsidence in areas of 10-foot extraction. The predicted angle of draw will range from approximately 5 degrees at 150 feet of cover, 12 degrees at 350 feet of cover, and 15 degrees at 750 feet of cover or greater.~~ Please refer to Plate V-5 (Subsidence Monitoring Points and Buffer Zones) for estimated subsidence depth isopachs.~~

Bronco~~Consol~~ intends to prevent subsidence from affecting Quitchupah Creek, Christiansen Wash, and the alluvial valley floor area on the west side of the adjacent area (Refer to Plate V-5). There will be no full extraction within the designated buffer zones. An intermittently occupied dwelling in Section 30 will also be protected from subsidence. As of the date of this writing, a subsidence waiver has not been obtained on this dwelling. At such time as a waiver is obtained, the Division shall be notified and the buffer around this dwelling will be removed. Other than these features, the presubsidence survey and our knowledge of the permit area confirms there are no structures overlying present or future underground workings for which mitigation of subsidence effects would be overly difficult.

The three above noted features will be protected by establishing buffer zones which in turn are created by leaving coal pillars of adequate size beneath these areas. The dimensions of the buffer zone will be determined by the overburden depth and the angle of draw. With respect to Quitchupah Creek and Christiansen Wash, the buffer zone will include an additional standoff distance of 100 feet on either side, as required by UMC 817.57.~~ The pillar dimensions are based on established geotechnical information and a factor of safety for long-term pillar stability. The partial pillar splitting design data can be found at CH V Pages 28a, 28b, and 28c. A pillar split plan sketch can be found at CH V Page 28 and Figure V-1 on CH V Page 28d. As can be seen from the following design data, this partial pillar splitting plan will not result in subsidence and is considered unplanned subsidence per the MRP.~~

Chapter V pages V-28 through V-35 have been removed. These pages included pillar stabilit~~u~~y design pertaining to the sealed Emery old works and are not pertinent to the Emery 2 mine plan.

Reserved

Chapter V pages 28 through 35 have been removed as they do not pertain to any future mining area.

Inserted 01/2020

CHAPTER V

APPENDIX V-8
Pre-Subsidence Survey
South of Quitchupah Creek
Including Stansfield erosion hole addendum

Inserted 01/2019
Revised 01/2020

Pre-Subsidence Survey Prior to Full Extraction, Emery 2 Portal, South of Quitchupah Creek

Bronco Utah Operations, LLC
Emery County, Utah

December 2017
January 2020

EarthFax Engineering Group, LLC.

Engineers / Scientists
www.earthfax.com

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CHAPTER 2 – SURVEY AREA OBSERVATIONS 3

2.1 GENERAL AREA DESCRIPTION 3

2.2 INDIVIDUAL FEATURE DESCRIPTIONS 4

CHAPTER 3 – CONCLUSIONS 16

CHAPTER 4 – REFERENCES 17

FIGURES

Figure 1 – Pre-Subsidence Survey Prior to Full Extraction, Emery 2, South of Quitchupah Creek

ATTACHMENTS

Attachment A – Site Photographs

PRE-SUBSIDENCE SURVEY PRIOR TO FULL EXTRACTION, EMERY 2 PORTAL, SOUTH OF QUITCHUPAH CREEK

CHAPTER 1

INTRODUCTION

The purpose of this report is to present baseline surface conditions prior to full extraction operations from the Emery 2 portal of the Bronco Utah Operations, LLC. (Bronco) Emery Mine, Emery County, Utah. The areas covered in this report include the following:

- Boxcut
- Mains
- Sub-Panel-01
- Panel-01 through Panel-03
- Panel-04-Rt through Panel-07-Rt
- The southern ¾ of Panel-13-Rt
- The area south of the Emery 2 Mains south to the Adjacent Area Boundary, excluding the southern portion of the Sitla Lease ML 51745-0BA (refer to Plate V-5).

In 1980, CONSOL commissioned a pre-subsidence survey covering the entire mine permit area. Three subsequent pre-subsidence surveys were commissioned; two in 2007 and one in 2008 to update the condition of surface features identified in 1980 prior to proposed full extraction of underlying panels. This pre-subsidence survey covers the southern portion of the mine plan, south of Quitchupah Creek, accessed through the Emery 2 portals (refer to Plate V-5).

This document is intended to be part of a Subsidence Control Plan as required in Section R645-301-525.100 of the Utah Administrative Code. Recording initial surface conditions will

facilitate locating and mitigating areas determined to be adversely affected by future subsidence. As part of the pre-subsidence survey, the locations and conditions of the following features were recorded:

- Structures (e.g. buildings, corrals, and roads)
- Fences
- Utilities (e.g. power, water lines, irrigation pivots, and water wells)
- Surface drainages (e.g. natural channels, irrigation ditches, and ponds)

This report references the original Pre-subsidence Survey performed prior to mining operations in 1980 (Valley Engineering, 1980). The feature numbers given in this document correspond to those described in the 1980 report. These features were surveyed in the field in November 2017, and any differences and/or changes from the conditions noted during the 1980 survey are noted both in the text and figures of this document. This report supersedes the Valley Engineering survey where conflicts exist.

CHAPTER 2
SURVEY AREA OBSERVATIONS

2.1 GENERAL AREA DESCRIPTION

This pre-subsidence survey covers approximately 1,265 acres of primarily undeveloped land, of which approximately 360 acres are irrigated fields or grazing pastures. The ground surface is generally flat with some small, steep hills formed by eroded washes and resistant bedrock outcrops. A perennial stream named Quitchupah Creek is generally outside of, but parallel to the eastern border of the survey area and drains in a general southeasterly direction. This stream receives irrigation return flow from surrounding agricultural land via a complex network of irrigation ditches, piping, and storage ponds.

Structures within the survey area include a ranch house, outbuildings, and corrals located near the southern farm lands, all of which are in dilapidated condition and appear to be decades old. A double wide manufactured home, in good condition, sits near the western edge of the northern farm lands and serves as the primary residence of the landowner controlling most of the property in the survey area. A large metal shed and fuel tanks, all in fair condition, sit nearby. A wooden shed, ranch house, and outhouse, all in dilapidated condition, are also present. A large corral and silo, both in good condition, are situated on the northern edge of the northern farm lands. On the southern edge of these same farm lands are two abandoned cabins. With the exception of the manufactured home, metal shed, and the corrals and silo located north of the northern farm lands, nearly all other structures are constructed of unfinished or rough cut timbers, cider block, or adobe, are in dilapidated condition, and appear to have been present for decades. There are several fences in the area in various states of repair. Most of the fences are constructed with barbed wire strung between posts made from natural rough cut tree limbs. Some fences use finished lumber fence posts or metal tee-stakes and tubing. There is one gravel-surfaced road, one semi-improved dirt road, and numerous unimproved dirt roads in the survey

area. The gravel-surfaced road is in good condition, and the dirt roads range from good to poor condition.

Utilities within the survey area include overhead power lines; a pressurized irrigation system that has been partially constructed and will be expanded during the spring and summer of 2018 that consists of buried water lines, buried power lines, and pivots; a city waterline feeding the manufactured home; and two water wells, both of which are believed to be abandoned. Bronco has entered into, or will enter into prior to full extraction, a Power Line Repair Agreement with Rocky Mountain Power to mitigate subsidence damage to power lines within the full extraction area.

All of the features (structures, fences, roads, drainages, utilities, etc.) located during the pre-subsidence survey are shown on Figure 1. Photographs of each feature evaluated during this survey are provided in Attachment A. Latitude and Longitude data provided on these photographs are georeferenced by the field camera and are considered to be generally approximate.

2.2 INDIVIDUAL FEATURE DESCRIPTIONS

Each numbered feature on Figure 1, within the current survey area, is described below. The numbers for each feature are identical to those used in the 1980 Pre-Subsidence Survey. Site Photographs are found in the back of this report.

Feature 1. Ranch House, Buildings, and Corrals. The description of this feature has been updated from the Valley Engineering (1980) report. The ranch house, buildings, and corrals all appear to be several decades old and are in dilapidated condition. The rough cut wood walls of the ranch house are intact, however, the adobe walls are beginning to crumble. The walls in a framed wood extension, built onto the eastern side of ranch house, have failed and the roof in

that section of the house has collapsed. One corner of the cinder block building has collapsed. The remaining buildings and corrals are constructed of rough wood logs and rough cut boards. The wood roofs on these building are failing. The corrals are unusable and have mostly fallen to the ground. There are several types of fences in the area; the most common was barbed wire or wire mesh on the bottom with barbed wire above the mesh. Fence posts were mainly steel or rough cut tree limbs.

Feature 2. Irrigation Ditch and Bridge. The description of this feature has been updated from the Valley Engineering (1980) report. The bridge is approximately 120 yards west of the ranch buildings (Feature 1). The earthen ditch, which flows from north to south, is approximately 2½ to 3 feet wide and 1-1½ feet deep and did not contain any water. The ditch widens to 3 to 4 feet where it crosses underneath the road leading to the ranch and then narrows to its normal width. The northern portion of the 15 foot wide bridge is constructed of 7 feet of railroad ties placed perpendicular to the ditch. The southern 8 foot portion of the bridge consists of two parallel 12" diameter CMP pipes covered in soil. The bridge, though usable, is in poor condition.

Feature 3. Ranch Fence Line. The description of this feature has been updated from the Valley Engineering (1980) report. This fence line is located west of the ditch in Feature 2. The fence posts are natural rough cut tree limbs. The fencing fabric consists of wire mesh and two strands of barbed wire above the mesh. It is approximately 4 feet from the ground to the upper barbed wire strand. The fence is in fair condition. A metal gate in the fence line controls access to the ranch house (Feature 1). South of this location, the fence line becomes a 4-strand barb wire fence, constructed of natural wood posts with intermittent steel t-posts. This section of fence is also in fair condition.

Feature 4. Ranch Access Road. The description of this feature has been updated from the Valley Engineering (1980) report. Most of this single lane road is surfaced with natural clay

material; however in some areas, gravel has been placed to improve the road's condition. Mounds of soil on either side of the road indicate it has been bladed numerous times to remove rutting formed from vehicle travel when the surface of the road was saturated from precipitation.

Feature 5. Utility Power Lines. This feature is essentially unchanged from how it is described in the Valley Engineering (1980) report, which states the following: "These power lines are located approximately 200 yards to the west of the ranch buildings (Feature 1). The poles run north and south and are approximately 40 feet high." It appears that several of the poles have been replaced since the 1980 survey. The poles are in good condition.

Feature 6. Pond. The description of this feature has been updated from the Valley Engineering (1980) report. The pond, cut into a small hill on its northwestern corner and diked on the surrounding edges, is roughly square in shape and measures approximately 75 feet x 75 feet x 5 feet deep. A black plastic liner is exposed at numerous locations around the dike. Exposure to the elements has severely degraded the liner and it is no longer functional. An erosion channel has formed on the slope at the northwest corner of the pond. The pond is dry and it appears that it has been quite some time since it has held water. A fence, constructed of natural rough cut tree limbs, surrounds the pond. The fencing material consists of wire mesh with one strand of barb wire at the top. The fence is in dilapidated condition.

Feature 8. Well. The description of this feature has been updated from the Valley Engineering (1980) report. This well is located approximately 20 yards north of the stock pond (Feature 6). A 6 foot by 8 foot wide wood shed set on a concrete slab surrounds the well casing. The well appears to be abandoned. Piping extending from the well head has been disconnected. The overhead power line from the nearby power pole has been cut. A portion of this line dangles from the power pole.

Feature 9. Farm Lands. The description of this feature has been updated from the Valley Engineering (1980) report. These lands are part of the ranch (Feature 1) and are located to the south and east of the ranch buildings. The area is fenced on all four sides with a center fence dividing the upper third from the lower two thirds. Although the field was historically planted with hay and grasses, it appears that the area has not been actively farmed for numerous years. A 12 foot by 16 foot by 10 inch thick concrete pad for a new irrigation pivot is installed on the southwestern corner of the farm lands.

Feature 10. Irrigation Ditch. The description of this feature has been updated from the Valley Engineering (1980) report. This earthen ditch is located approximately 50 to 75 yards north of the stock pond (Feature 6). The ditch, at the photo location, is cut through a small rise in the terrain and its banks are approximately 6 to 7 feet tall. Both upstream and downstream from the photograph, the ditch shallows to about 1.5 feet in depth. The irrigation ditch is dry. Underground irrigation piping and pivots are being installed in the farm land that this ditch feeds with water. After completion of the pressurized irrigation system, this ditch will likely be abandoned.

Feature 11. Unimproved Dirt Road. The description of this feature remains unchanged from that described in the Valley Engineering (1980) report, which states the following: "This two-track, single lane dirt road is a typical example of the many dirt roads that are in the survey area. Most of the roads, including this one, have natural clay surfaces, while a few have some shale as part of the surface material."

Feature 15. Pond. The description of this feature has been updated from the Valley Engineering (1980) report. The pond, constructed of earthen berms, is roughly circular in shape with a diameter of approximately 100 feet. The floor of the pond slopes from northwest to southeast. The deepest part of the pond is approximately 3 feet in depth. The east bank has been breached. Sagebrush and native plants are growing in the pond at the approximate plant density

as the surrounding area outside the pond. The pond is dry and its current condition indicates that it has been quite some time since it has been used.

Feature 17. Barbed Wire Fence. The description of this feature has been updated from the Valley Engineering (1980) report. This feature no longer exists. It was removed for expansion of the farm land (Feature 32). Many additional barbed wire fences exist throughout the survey area and are described in other features listed in this report.

Feature 22. Dry Wash. The description of this feature has been updated from the Valley Engineering (1980) report. This wash is typical of the many larger washes in the area. The average depth of the wash is approximately 20 feet deep and its width is approximately 20 to 30 feet in width.

Feature 23. Grassy Area. The description of this feature has been updated from the Valley Engineering (1980) report. This area is in a surface depression that is approximately 3 to 4 feet below the surrounding terrain. It is bordered by sagebrush on all sides. During rainy periods, this low lying area collects enough water to support grasses. Water exits the east end of this area, draining into several dry washes.

Feature 24. Irrigation Ditch Junction. The description of this feature remains essentially unchanged from that described in the Valley Engineering (1980) report, which states the following: "In this area, a small earthen ditch divides to become two smaller ditches each about 1½ feet to 2 feet wide and 6 inches to 12 inches deep." This irrigation ditch junction is dry. Underground irrigation piping and pivots are being installed in the farm land that these irrigation ditches feed with water. After completion of the pressurized irrigation system, these ditches will likely be abandoned.

Feature 25. Grassy Area. The title and description of this feature have been updated from the Valley Engineering (1980) report. Although the Valley Engineering report identified this area as "wetlands" and listed three possible water sources, "from a small natural creek, from irritations ditches, and possibly some natural springs", no active water sources were identified. This grassy area has been heavily grazed over the summer. Alkaline salt deposits in a low lying area immediately east of the grassy area provides evidence that drainage flows from west to east.

Feature 26. PVC Pipe Water Depth Gauge. The title of and description of this feature have been updated from the Valley Engineering (1980) report. There are two PVC pipe water depth gauges located in the large wash just to the southwestern corner of the settlement pond. Each PVC pipe water depth gauge consists of a 5 foot long by 2 inch diameter PVC pipe with thread caps installed on both ends and attached vertically to a sawed 4 inch square wood post buried in the earth. The lower end of the pipe is mounted approximately 6 inches above soil level. The caps have drilled holes to allow entry of water into the pipe. As water enters the holes in the PVC pipe, a square wood board located inside the PVC pipe, marked with feet and inches, becomes saturated below the top of water. Peak water levels are then read by removing the wood board from the PVC pipe and taking a direct reading. A roof bolt installed in the soil near the north gauge likely serves as a reference elevation.

Feature 27. Area Roads. The description of this feature has been updated from the Valley Engineering (1980) report. The first photo shows where the road crosses Quitchupah Creek. Erosion and lack of maintenance have led to steep muddy banks in this area, making the road essentially impassable at this location. The second photo looks north along another portion of the same road located approximately 2,800 feet south of the Quitchupah Creek crossing. A deep wash, just south of this location, cuts across the road. There are many cattle hoof print marks covering the road in this photo, indicating its lack of recent vehicular use. This single lane double track road, at one time, was passable across the southern half of the permit area, but the

Quitchupah Creek crossing and several large washes cutting through the road make the road untravelable.

Feature 32. Irrigation Ditch and Farm Land. The description of this feature has been updated from the Valley Engineering (1980) report. The farm land has been expanded in size to the north and east. The freshly plowed ground has been regraded, eliminating portions of the ditch on the west and south side of this farm land. Underground irrigation piping and an irrigation pivot have been installed in the center of this farm land. A 16 foot by 12 foot by 10 inch thick concrete slab foundation installed in 2017, as evidenced by names and a date scratched into the concrete surface on a corner of the pad, and underground power conduits have been installed in preparation for another pivot on the eastern border of this farm land. A six strand barb wire fence with rough cut 4x6 inch timbers extends east/west along the northern margin of this farm land. This fence intersects the Highway 10 right-of-way fence at its western edge. This fence is in good shape.

Feature 33. Irrigation Ditch. The description of this feature has been updated from the Valley Engineering (1980) report. A section of this feature is located within a buffer zone, depicted on Figure 1 and Plate V-5, where subsidence is not anticipated. The section of this irrigation ditch that traversed the farm land (Feature 32) has been eliminated. This ditch used to traverse the farm land (Feature 32) and continue on to feed the farm lands (Feature 9) located approximately ½ mile southeast of this location. It is our understanding that the farm lands identified in Features 9 and 32 will be watered with pressurized underground piping and pivot irrigation systems. The photo shows where the ditch was cut through at the north end of the farm land (Feature 32).

Feature 34. Culinary Well. The description of this feature has been updated from the Valley Engineering (1980) report. This feature is located within a buffer zone, depicted on Figure 1 and Plate V-5, where subsidence is not anticipated. The well, shown on Plate VI-4 as

the Lewis Well, formerly provided water for a ranch house and buildings (Feature 35) located to the north. Water is currently provided to this ranch house by Emery Town municipal water. The concrete slab poured around the well casing and which supports the small well house covering the well casing has experienced differential settlement of several inches. The slab slopes from north to south. The worst settlement has occurred at the well casing. The concrete slab surrounding the casing has cracked, separated, and dropped in elevation approximately 4 inches.

Feature 35. Ranch House and Buildings. The description of this feature has been updated from the Valley Engineering (1980) report. This feature is located within a buffer zone, depicted on Figure 1 and Plate V-5, where subsidence is not anticipated. The ranch house and buildings consists of five structures:

- A double wide manufactured home installed after the 1980 report. This home is installed on a concrete foundation that is intact with only two small cracks that are typical of cracks found in most residential home foundations. Overall, the home appears to be in good condition.
- Metal shed on a concrete slab. The metal shed is in good condition. The concrete slab is in fair condition with some cracking observed. Four elevated fuel tanks are located on the east side of the shed.
- Wood outhouse constructed of natural rough cut logs. This structure appears to be in fair condition.
- Ranch house constructed of rough sawn logs and adobe brick. The adobe walls have fallen down, exposing the north end of the house to outside elements. It is dilapidated and unlivable. A concrete structure located near the ranch house appears to be an old septic tank.
- Wood building constructed of natural rough cut logs. Intermittently placed sandstone rocks serve as a foundation for the structure. The structure is in dilapidated condition.

Feature 36. Utility Power Line. The description of this feature has been updated from the Valley Engineering (1980) report. A portion of this feature is located within a buffer zone, depicted on Figure 1 and Plate V-5, where subsidence is not anticipated. The electrical power line is a single line that supplies electricity to the ranch house and buildings (Feature 35). The poles are typical power line poles, approximately 35 feet tall and in good condition. The eastern most pole in this line, which also forms a part of the north/south power line (Feature 5) that this line ties into, leans to the south and west.

Feature 37. Feed Pens and Fence Line. The description of this feature has been updated from the Valley Engineering (1980) report. The feed pens are constructed of painted steel, are semi-portable, and are in good condition. The fence in the background of the photograph is a barbed wire fence with natural cut log posts. A portion of the fence is located within a buffer zone, depicted on Figure 1 and Plate V-5, where subsidence is not anticipated. The fence is fairly new and in excellent condition.

Feature 39. Log Cabins. The title and description of this feature have been updated from the Valley Engineering (1980) report. The corrals mentioned in the 1980 report have been removed. There are two log cabins at this location. The cabins are made of rough cut wood logs and are founded on wood or stacked rocks. Both cabins are in dilapidated condition.

Feature 40. Section Corner Marker. This feature description remains essentially the same as described in the Valley Engineering (1980) report, which states the following: "The marker is a metal cap attached to a short steel pipe. It marks the corners of Sections 29, 30, 31, and 32 of Range 6 East, Township 22 South. The marker was established in 1978." In addition to the 1980 description, there is a vertical rough cut square wood post installed approximately 1 inch south of the marker. The letters "WC" are stamped into the metal cap just beneath the "UNLAWFUL TO DISTURB" marking. The "WC", an abbreviation for Witness Corner, indicates that this marker is not installed at the exact location of the Section Corner, but is rather

an offset to the section corner. The east/west line separating Sections 30 & 29 from Sections 31 & 32 has an arrow at its west end, indicating that the actual corner is located west of this location. A check of the Public Land Survey System reveals that the actual section corner is located approximately 132 feet west. This Witness Corner was likely set because the actual Section Corner would rest in the bottom of the pond, described as Feature 41.

Feature 41. Pond. The description of this feature has been updated from the Valley Engineering (1980) report. The pond was constructed by installing an approximately 8 foot tall berm between two small hills. The berm is approximately 250 feet long and approximately 6 feet wide at its crest. The berm is located approximately 100 yards north of the section corner marker (Feature 40). A 25 foot long by 3 foot deep path has been worn through the western end of the berm. Water flows out of the pond via a 16" PVC riser. The pond was dry at the time of the survey.

Feature 43. Corrals and Grain Silo. The description of this feature has been updated from the Valley Engineering (1980) report. This feature is located within a buffer zone, depicted on Figure 1 and Plate V-5, where subsidence is not anticipated. The corrals and feeding areas are constructed of rough cut lumber, timber posts, and railroad ties and are in good condition. The gates to the corrals are made of steel pipes and are in good condition. The galvanized steel grain silo, located approximately 180 yards west of the southwestern corner of the corrals, rests on a concrete pad and is in good condition.

Feature 44. Pond, Livestock Waterer, and Water Line Air Vent. The title and description of this feature have been updated from the Valley Engineering (1980) report. The small pond observed in the area is still intact. However, the two corrals identified in the Valley Engineering report have been removed. The circular pond has a diameter of approximately 100 feet and is currently dry. A stock watering device (MiraFount 3465) installed on a 16 foot square unformed concrete pad is located roughly a 100 yards southwest of the pond. A 15" diameter corrugated

metal pipe valve box is located approximately 4 feet west of the concrete pad. A nearby water line air vent (Wade Rain PRVC 300) is installed on the underground water line feeding the farm land (Feature 32) irrigation pivot.

Feature 119. Quarter Section Corner Marker. This feature description remains the same as described in the Valley Engineering (1980) report, which states the following: "This marker is located in Range 6 East Township 22 South. It is a typical marker with a metal cap on top of a short steel pipe. This quarter section corner marker indicates the dividing point between Section 32 and 5."

Feature 120. Steel Pipes. This feature description remains essentially the same as described in the Valley Engineering (1980) report, which states the following: "These pipes are approximately 6 inches in diameter with steel caps. The pipes extend about 2½ feet to 3 feet out of the ground. There were three pipes found in this area. The purpose of these pipes is unknown." Two additions to the above description are added in this document: the steel caps are threaded and only two of the three pipes were found.

Feature 121. Section Corner Marker. This feature description remains essentially the same as described in the Valley Engineering (1980) report, which states the following: "This corner marker is located in Range 6 East Township 22 South/Township 23 South. The marker is a short steel pipe with a metal cap. It marks the intersection of Sections 32 and 33 of Township 22 S and Sections 4 and 5 of Township 23 S.". One addition to the above description is added in this document: Four pieces of rebar are installed in the ground at the north, south, east, and west quadrants. Each is approximately 15 feet away from the section corner. The rebar pieces were likely installed to anchor enhanced survey markings over the section corner for reference during an aerial survey.

Feature 126. Sinkhole. This feature was not identified in the Valley Engineering (1980) report. The sinkhole measures approximately 10 foot long by 2 foot wide by 8 feet deep. The length of the opening trends northeast/southwest. No obvious water sources feed this feature.

Feature 127. Sprinkler Pivot Foundation. This feature was constructed after the Valley Engineering (1980) report was written. The current landowner is in the process of converting from an open ditch irrigation system to a more efficient pressurized irrigation system consisting of underground buried pipe and irrigation pivots. Newly constructed pivots, pivots under construction, miscellaneous piping and piping supplies, and evidence of recent trenching were encountered in numerous farm land locations within the pre-subsidence survey area.

Feature 128. Water Line Air Vent. This feature was constructed after the Valley Engineering (1980) report was written. A water line air vent (Wade Rain PRVC 300) is installed on an underground water line. It is protected from livestock damage by metal tee posts and heavy gauge galvanized wire mesh. The current landowner is in the process of converting from an open ditch irrigation system to a more efficient pressurized irrigation system consisting of underground buried pipe and irrigation pivots. Newly constructed pivots, pivots under construction, miscellaneous piping and piping supplies, and evidence of recent trenching were encountered in numerous locations near this feature.

Feature 129. Underground Electrical Feed. This feature was constructed after the Valley Engineering (1980) report was written. Power in the utility power line (Feature 5) was tapped by installing a transformer and branch power lines on the existing pole to feed a new a power pole to the east. Power routed to the eastern pole runs down the pole, through a meter, and then enters an underground electrical conduit. A scar in the vegetation that extends west toward a new irrigation pivot suggests that power is feed to the pivot from this location.

Feature 130. Irrigation Ditch Sinkhole. This feature was disco vered by the current land owner, William Boyd Stansfield Jr., after the Valley Engineering (1980) report was written. The closest underground mining activity to this location, 2 West Submains, is located 2,665 feet away. At that distance, it is not possible that historic mining activity caused this feature to form. In addition, future mining activity is very unlikely to affect this feature, because it is located within a buffer zone, depicted on Figure 1 and Plate V-5, where subsidence is not anticipated. Per Mr. Stansfield, a sinkhole opened up across the ditch line in 2015 while the ditch contained flowing irrigation water. The hole measured approximately 5 feet in diameter with an unknown depth. The entire ditch (trapezoidal in shape, measuring roughly 4 feet wide at the top, 1.5 feet wide at the bed, and 2 feet tall) of flowing irrigation water disappeared into this hole and did not surface, he attempted to plug off the hole by installing up to 15 cubic yards of soil into the opening. It became saturated and disappeared into the hole. After turning water out of this ditch, he placed enough soil in the hole to fill it to the surface and installed a 16 inch diameter by 15 feet long length of HDPE piping to cross over the sinkhole. Since that time water has flowed through the 16 inch HDPE pipe, however, he has not exceeded approximately one half of the quantity of water in the ditch that was flowing on the day the sinkhole opened up.

Feature 131. Mine Discharge Pond No. 1. This feature was constructed after the Valley Engineering (1980) report was written. The rectangular pond measures approximately 800 feet x 130 feet x 11 feet deep. This pond is described on Plate VI-14 of the mine reclamation plan.

CHAPTER 3
CONCLUSIONS

This report summarizes pre-subsidence surface conditions for the following areas at Bronco's Emery Mine, Emery County, Utah, that will be accessed through the Emery 2 portal:

- Boxcut
- Mains
- Sub-Panel-01
- Panel-01 through Panel-03
- Panel-04-Rt through Panel-07-Rt
- The southern ¾ of Panel-13-Rt
- The area south of the Mains up to the Permit Boundary, excluding the southern portion of the Sitla Lease ML 51745-0BA

Surface features were inspected and surveyed in November 2017 prior to full extraction. Although the damage due to subsidence is generally expected to be limited, the greatest potential for adverse effects would likely be disturbances to surface drainages, ponds, roads, and utilities. A planned barrier with minimal coal extraction rates underlying the ranch house and buildings (Feature 35) will minimize potential subsidence impacts for this feature. By detailing pre-subsidence conditions in this report, it will be easier to both identify and mitigate negative impacts caused by future subsidence.

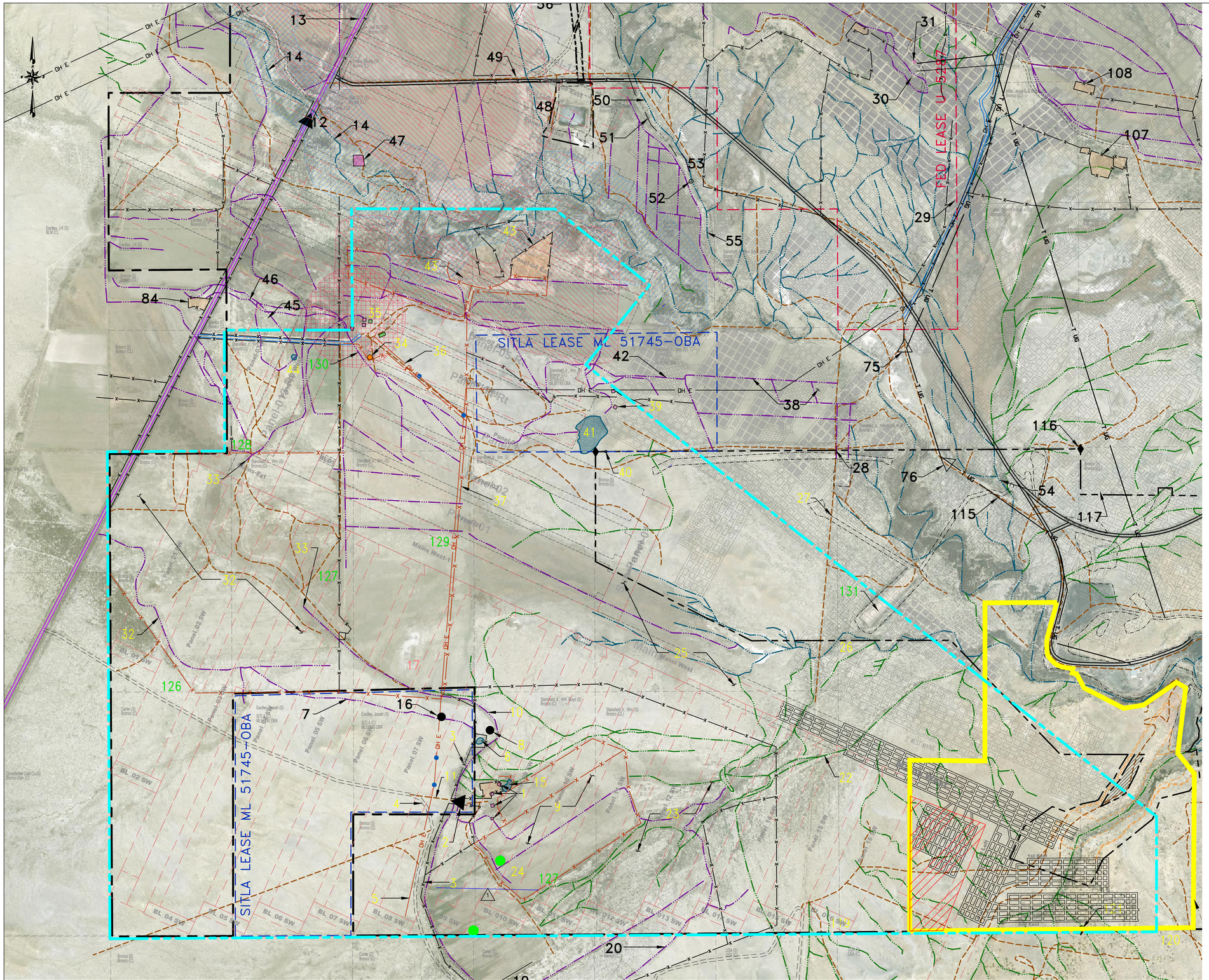
CHAPTER 4

REFERENCES

Consolidation Coal Company, 1990. Emery Mine Permit Act 015/015 Renewal. Chapter VI Volume 1 Section VI.A.3. Submitted to Division of Oil, Gas, and Mining September 9, 1990.

Valley Engineering, Inc., 1980. Consolidation Coal Company, Emery Mine, Presubsidence Survey, Structure and Renewable Resources Descriptions. Division of Oil, Gas, and Mining, Emery Permit 015/015. Chapter V, Vol. 2 of 3.

FIGURE 1



LEGEND

- PROPERTY OWNERSHIP
- PERMIT AREA BOUNDARY
- ADJACENT AREA FOR NON-WATER RESOURCES. FOR THE AREA OF HYDROLOGIC EVALUATION, SEE PLATE VI-4
- PROJECTED MINE WORKINGS
- 2019 EMERY MINE WORKINGS
- SEALED EMERY MINE OLD WORKS
- AVF BUFFER ZONES
- STREAM BUFFER ZONES (NO FULL EXTRACTION)
- STRUCTURAL BUFFER ZONES

LEGEND–VALLEY ENGINEERING PRE–SUBSIDENCE SURVEY (1980)

- SECONDARY, HARD SURFACE
- LIGHT DUTY ROAD, HARD OR IMPROVED SURFACE
- UNIMPROVED SURFACE
- T UG — UNDERGROUND TELEPHONE LINE
- DH E — OVERHEAD POWER LINE
- JEEP TRAILS
- NATURAL STREAMS
- DRY WASHES
- IRRIGATION DITCHES
- FENCE LINE
- POND
- CORRAL AREA
- CATTLE GUARD
- BRIDGE
- WELLS
- BUILDINGS
- 52 — FEATURE

LEGEND–EARTHFAX ENGINEERING PRE–SUBSIDENCE SURVEY (2017)

- SURVEY AREA BOUNDARY
- PAVED COUNTY ROAD (MAPPED 2017)
- FENCE LINE (SURVEYED 2017)
- DH E — OVERHEAD POWER LINE (SURVEYED 2017)
- 25 — FEATURE (MAPPED 1980/UPDATED 2017)
- 128 — FEATURE (MAPPED 2017)
- 17 — FEATURE REMOVED
- BUILDINGS (MAPPED 2017)
- WELL (MAPPED 1980/SURVEYED 2017)
- NON–VERTICAL POWER POLE (SURVEYED 2017)
- STANSFIELD EROSION HOLES (2019)

NOTES:

1. IN 1980, VALLEY ENGINEERING WAS COMMISSIONED TO PERFORM A PRE–SUBSIDENCE SURVEY COVERING THE ENTIRE EMERY MINE PERMIT AREA. FEATURES SUCH AS: ROADS, FENCES, STREAMS, IRRIGATION DITCHES, BRIDGES, WELLS, AND OTHER ITEMS WERE RECORDED IN THE FIELD AND DEPICTED ON HAND DRAWN MYLAR MAPS. FOR THIS UPDATE, THE INFORMATION CONTAINED ON THE 1980 MAPS WAS DIGITIZED AND OVERLAIN ON THE AERIAL IMAGE. THE ALIGNMENT AND LOCATION OF SOME FEATURES DO NOT EXACTLY MATCH THE UNDERLYING AERIAL BECAUSE OF THE INHERENT IMPRECISION IN HAND DRAWINGS AND MINOR INACCURACIES INTRODUCED DURING THE DIGITIZING PROCESS. THE ALIGNMENT AND LOCATION OF THESE FEATURES WERE NOT UPDATED TO REFLECT THE AERIAL IMAGE, BUT WERE LEFT WHERE THEY WERE ORIGINALLY MAPPED TO MAINTAIN THE INTEGRITY OF THE 1980 PRE–SUBSIDENCE SURVEY.
2. FEATURES MAPPED IN 1980 AND THAT WERE NOT PRESENT IN 2017 HAVE BEEN REMOVED FROM THE MAP.
3. YELLOW HALO TEXT IDENTIFIES FEATURES THAT WERE MAPPED IN THE 1980 PRE–SUBSIDENCE SURVEY BUT WHOSE DESCRIPTIONS HAVE BEEN UPDATED TO REFLECT CURRENT CONDITIONS.
4. GREEN HALO TEXT IDENTIFIES FEATURES THAT WERE ADDED SINCE THE 1980 PRE–SUBSIDENCE SURVEY.

EarthFax

BASE MAP:

COORDINATE SYSTEM:
STATE PLANE COORDINATES.
NAD 83 CONUS
ZONE 4302–UTAH, CENTRAL – US FEET
VERTICAL DATUM – NAVD 88–US FEET

EXTERNAL REFERENCE:
G:\UC1665\05\REF\EMERY FINAL PERMIT–e2P2–OCT17.DWG
G:\UC1665\05\REF\EMERY MINE TMING–E2–FEB2018.DWG
G:\UC1665\02\2017 PRE–SUBSURVEY\DWG\BRONCO UTAH.DWG
G:\UC1665\05\REF\WORKINGS CURRENT.DWG
G:\UC1665\02\2017PRE–SUBSURVEY\DWG\XREF–OWNER–NEW
G:\UC1665\05\REF\EMERY FINAL PERMIT–e2P2–OCT17
G:\UC1665\05\REF\REPPI–MINE WORKINGS REPLACEMENT
G:\UC1665\05\REF\ACAD–EMERY–MINE–TMING–12–2018.DWG

REVISIONS							
NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
1	1/6/2020	DJL	STANSFIELD EROSION HOLES				

0' 500'
SCALE: 1" = 500'

DRAWN BY: KDS
CHECKED BY: JAG
ORIGINAL DATE: 12/17
RE–DRAWN DATE: 12/18
APPROVED BY: JAG
DWG DATA: G:\UC1665\02 EMERY MINE SUBSIDENCE REPORTS\ 2017 PRE–SUBSIDENCE SURVEY\DWG\FIG–1SUB SURVEY DEC14–18.DWG

EMERY MINE
EMERY COUNTY, UTAH

PERMIT NO.
ACT015/015

BRONCO UTAH OPERATIONS, LLC
P.O. BOX 527
PRICE, UT 84522

APPENDIX V–8, FIGURE 1
PRE–SUBSIDENCE SURVEY PRIOR TO FULL EXTRACTION
EMERY 2, SOUTH OF QUITCHUPAH CREEK

ATTACHMENT A

Site Photographs

Feature 1. Ranch House, Buildings, and Corrals. Feature overview, looking east.

Feature 1. Ranch House, Buildings, and Corrals. Corrals.

Feature 1. Ranch House, Buildings, and Corrals. Corrals.

Feature 1. Ranch House, Buildings, and Corrals. Corrals.

Feature 1. Ranch House, Buildings, and Corrals. Ranch House.

Feature 1. Ranch House, Buildings, and Corrals. Ranch House.

Feature 1. Ranch House, Buildings, and Corrals. Ranch House.

Feature 1. Ranch House, Buildings, and Corrals. Buildings.

Feature 1. Ranch House, Buildings, and Corrals. Buildings. Cinder block building in foreground.

Feature 1. Ranch House, Buildings, and Corrals. Buildings.

Feature 2. Irrigation Ditch and Bridge. Looking east.

Feature 3. Ranch Fence Line. Looking north along gated entrance to Feature 1.

Feature 3. Ranch Fence Line. Looking north.

Feature 4. Ranch Access Road. Looking east.

Feature 4. Ranch Access Road. Photo is taken farther east at split to Feature 11.

Feature 5. Utility Power Lines. Looking north.

Feature 5. Utility Power Lines. Looking south.

Feature 6. Pond. A well (Feature 8.) is in the background.

Feature 6. Pond. Bank erosion at far corner of pond.

Feature 6. Pond. Disintegrated pond liner.

Feature 8. Well. Power line from pole to pump-house is disconnected.

Feature 8. Well. Piping is disconnected from wellhead.

Feature 9. Farm Lands.

Feature 9. Farm Lands.

Feature 9. Farm Lands. Piping supplies for future sprinkler pivot lying on ground.

Feature 10. Irrigation Ditch. Looking west.

Feature 11. Unimproved Dirt Road. Looking east. This road loads to the ranch house, buildings, and corrals identified as Feature 1.

Feature 15. Pond. Breached berm in foreground.

Feature 22. Dry Wash. Looking east.

Feature 23. Grassy Area. Looking east.

Feature 23. Grassy Area. Looking west.

Feature 24. Irrigation Ditch Junction.

Feature 25. Grassy Area. Looking east.

Feature 25. Grassy Area. Looking west.

Feature 26. PVC Pipe Water Depth Gauge.

Feature 26. PVC Pipe Water Depth Gauge. *Rotate photo clockwise.*

Feature 26. PVC Pipe Water Depth Gauge. *Rotate photo clockwise*. Graduated scale located in PVC tube.

Feature 26. PVC Pipe Water Depth Gauge. *Rotate photo clockwise.* Close up photo of graduated scale.

Feature 27. Area Roads. Looking south. Road is impassable and bisected by Quitchupah Creek.

Feature 27. Area Roads. Looking north. Road disappears south of this location.

Feature 32. Irrigation Ditch and Farm Land. Ditch replaced with pivot sprinklers.

Feature 32. Irrigation Ditch and Farm Land. Foundation for pivot sprinklers.

Feature 32. Irrigation Ditch and Farm Land. Southern edge of farmland. Return irrigation ditch in foreground. Field has been regraded, eliminating need for irrigation ditch, background.

Feature 32. Irrigation Ditch and Farm Land. Underground water line feeding pivot sprinklers.

Feature 33. Irrigation Ditch. Photo taken at north end of farm land (Feature 32.). The farm land was expanded and regraded, eliminating need for irrigation ditch.

Feature 34. Culinary Well.

Feature 34. Culinary Well. Concrete pad surrounding wellhead is cracked and separated from rest of pad.

Feature 34. Culinary Well.

Feature 34. Culinary Well. Concrete pad near conduit is cracked and offset.

Feature 34. Culinary Well. Looking north. Concrete pad is cracked and offset.

Feature 34. Culinary Well. The corner of the cracked concrete pad surrounds the wellhead located in the well house.

Feature 35. Ranch House and Buildings. Overview looking east.

Feature 35. Ranch House and Buildings. Overview looking northeast.

Feature 35. Ranch House and Buildings. Overview looking north.

Feature 35. Ranch House and Buildings. Manufactured home looking east.

Feature 35. Ranch House and Buildings. Manufactured home looking west.

Feature 35. Ranch House and Buildings. Manufactured home. Small cracks in foundation.

Feature 35. Ranch House and Buildings. Manufactured home. Small foundation cracks, close-up.

Feature 35. Ranch House and Buildings. Manufactured home. Looking north.

Feature 35. Ranch House and Buildings. Metal shed. Looking northeast.

Feature 35. Ranch House and Buildings. Metal shed. Looking outside through overhead door. Cracks in concrete floor.

Feature 35. Ranch House and Buildings. Outhouse.

Feature 35. Ranch House and Buildings. Metal shed (right) and ranch house (left).

Feature 35. Ranch House and Buildings. Front view of ranch house.

Feature 35. Ranch House and Buildings. Side view of ranch house. Adobe wall crumbled. Sagging roof.

Feature 35. Ranch House and Buildings. Rear view of ranch house. Adobe walls have crumbled.

Feature 35. Ranch House and Buildings. Wood building.

Feature 35. Ranch House and Buildings. Wood building. View of foundation.

Feature 35. Ranch House and Buildings. Wood building.

Feature 35. Ranch House and Buildings. Inside view of wood building.

Feature 35. Ranch House and Buildings. Concrete structure. This may be an old septic tank.

Feature 35. Ranch House and Buildings. Elevated fuel tanks located on east side of metal shed.

Feature 36. Utility Power Line. Looking southeast.

Feature 36. Utility Power Line. Looking northwest. Top of pole in foreground leans slightly left.

Feature 37. Feed Pens and Fence Line. Looking north.

Feature 39. Log Cabins. Overview looking south. Cabin 1 in foreground.

Feature 39. Log Cabins. Looking east along power line. Top of pole in foreground leans to left.

Feature 39. Log Cabins. Cabin 1 looking south.

Feature 39. Log Cabins. Inside view of cabin 1.

Feature 39. Log Cabins. Concrete structure outside cabin 1. Likely a septic tank.

Feature 39. Log Cabins. Cabin 2 founded on rock pieces.

Feature 40. Section Corner Marker. Top view of maker. Top of photo to north.

Feature 40. Section Corner Marker. Looking east.

Feature 41. Pond. Looking southwest at face of earthen dam. This dam situated between two small hills forms the north side of the pond.

Feature 41. Pond. Water exits this pond through a 16" PVC riser near the dam.

Feature 43. Corrals and Grain Silo. Looking north from center of corral.

Feature 43. Corrals and Grain Silo. Looking east from center of corral.

Feature 43. Corrals and Grain Silo. Looking west from center of corral.

Feature 43. Corrals and Grain Silo. Looking south at grain silo.

Feature 44. Pond, Livestock Waterer, and Water Line Air Vent. Pond.

Feature 44. Pond, Livestock Waterer, and Water Line Air Vent. Livestock waterer on concrete slab.

Feature 44. Pond, Livestock Waterer, and Water Line Air Vent. Water line air vent.

Feature 119. Quarter Section Corner Marker. Top view of maker. Top of photo to north.

Feature 119. Quarter Section Corner Marker. Looking east.

Feature 120. Steel Pipes. Top view of 1st pipe.

Feature 120. Steel Pipes. Side view of 1st pipe.

Feature 120. Steel Pipes. Side view of 2nd pipe.

Feature 121. Section Corner Marker. Top view of maker. Top of photo to north.

Feature 121. Section Corner Marker. Looking east.

Feature 126. Sinkhole. Looking east.

Feature 126. Sinkhole. Top view. Minimum depth is 8 foot.

Feature 127. Sprinkler Pivot Foundation. 1st location.

Feature 127. Sprinkler Pivot Foundation. 2nd location.

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Feature 129. Underground Electrical Feed. Looking north. Underground electrical conduit stub-up is attached to pole at right.

Feature 129. Underground Electrical Feed. Looking west. Disturbed soil where underground electrical line was recently installed to feed a future sprinkler pivot.

Feature 130. Irrigation Ditch Sinkhole. Looking southeast at HDPE pipe installed over sinkhole.

Feature 131. Mine Discharge Pond No. 1. Looking northeast at empty pond.

CHAPTER V

APPENDIX V-8 Addendum
Stansfield Erosion Hole Report

John A. Gefferth

From: Rich White <rich@rbwhitepe.com>
Sent: Thursday, January 10, 2019 10:58 AM
To: John A. Gefferth
Subject: Re: FW: Stansfield Holes

John:

Based on my re view, I offer the following:

- The current (Emery 2 portal) mine works closest to the sink holes are located approximately 0.74 mile to the northeast. The old mine works (Emery portal) closest to the sink holes are located about 0.82 mile to the northeast. Plate VI-6 indicates that this old area was mined in 1981.
- At the location of the current (Emery 2 portal) mine works, Plate V-20 indicates that the elevation of the top of the I seam is about 5750 feet. Data from Google Earth indicate that the surface elevation above the western extent of these mine works is about 5960 feet, indicating a cover depth of about 200 feet.
- Plate V-20 indicates that the top of the I seam at the location of the sink holes is at an elevation of about 5550 feet. Data from Google Earth indicates that the ground surface at the sink holes is at an elevation of about 6000 feet. Thus, the depth of cover at the sink holes is about 450 feet.
- The drillhole log from the "AA" wells indicates that the cover over the coal consists of approximately 120 feet of sandstone, with interfingered thin lenses of shale, overlain by shale. The cover at the sink holes is approximately 200 feet thicker than at the "AA" wells. Plate 2 from USGS Water Supply Paper 2195 indicates that the thickness of the Ferron Sandstone increases slightly to the west between the "AA" wells the the sink hole location, suggesting that the majority of the increased cover between these two locations is likely composed predominantly of shale from the Blue Gate Member of the Mancos Shale.
- A comparison of data on Plate VI-1 (1979 Kmf(u) potentiometric surface) with the recently revised Plate VI-7 (2018 Kmf(u) potentiometric surface) indicates that groundwater is currently about 160 lower in the area of the sink holes than it was before substantial groundwater drawdown in that area.

In order for the sink holes to have occurred due to subsidence effects from mining (without full extraction) nearly 3/4 mile away it would have been necessary for the angle of draw to exceed 80%. Such a condition is highly improbable.

Subsidence from groundwater withdrawal occurs when unconsolidated sediments experience compaction due to the release of water from compressible silts and clays. This rarely occurs in consolidated rock since the physical properties of the matrix are generally not affected by the presence of water. Therefore, it is also highly improbably that groundwater drawdown due to pumping from the mine would have created the sink holes.

Please let me know if you have any questions.

Rich

On 1/10/2019 9:32 AM, John A. Gefferth wrote:

John A. Gefferth

Senior Mining Environmental Consultant
Salt Lake City, UT office: 801.333.8425

cell: 314.304.8328
JGefferth@barr.com
www.barr.com

resourceful. naturally. BARR

If you no longer wish to receive marketing e-mails from Barr, respond to communications@barr.com and we will be happy to honor your request.

From: Kit Pappas <jpappas@broncoutah.com>
Sent: Thursday, January 10, 2019 9:21 AM
To: John A. Gefferth <JGefferth@barr.com>
Subject: Stansfield Holes

John,

The Red Pushpin is in the approximate location of the holes.

Thanks,

Kit

John C. (Kit) Pappas
Environmental Manager
Bronco Utah Operations, LLC
(o) 435-286-2027
(m) 435-650-7339
jpappas@broncoutah.com

Bronco UTAH OPERATIONS, LLC

--
Richard B. White, PE, PLLC
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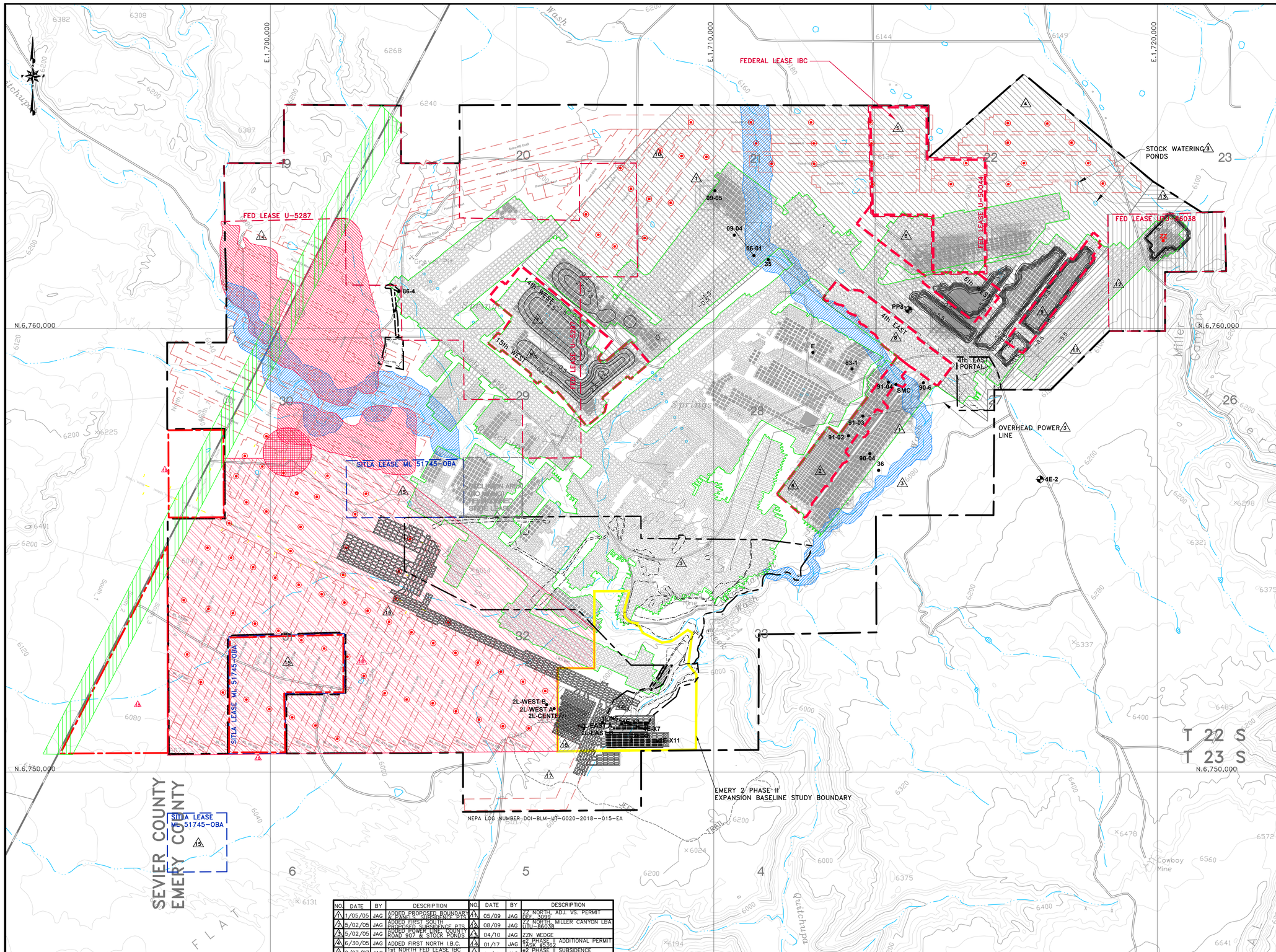
Draper, UT 84020
801-673-6647
rbwhitepe.com



LEGEND

- PERMIT AREA BOUNDARY
- ADJACENT AREA FOR NON-WATER RESOURCES. FOR THE AREA OF HYDROLOGIC EVALUATION, SEE PLATE VI-4
- ADDITIONAL ADJACENT AREA
- AVF BUFFFER ZONES (NO FULL EXTRACTION)
- STREAM BUFFER ZONES (NO FULL EXTRACTION)
- STRUCTURAL BUFFER ZONE (NO FULL EXTRACTION)
- HIGHWAY 10 BUFFER ZONE (NO FULL EXTRACTION)
- PROPOSED AREA TO BE FULLY EXTRACTED
- 85-2 SUBSIDENCE MONITORING POINT (CURRENTLY BEING MONITORED)
- SUBSIDENCE MONITORING POINT (PROPOSED)
- 4E-2 SURVEYED CONTROL POINT
- PREVIOUSLY APPROVED FULL EXTRACTION
- SEALED EMERY MINE OLD WORKS
- 2ND LEFT — PREVIOUSLY APPROVED AREA TO BE FULLY EXTRACTED
- PREDICTED DEPTH OF SUBIDENCE ISOPACHS (FT.)
- PROJECTED MINE WORKINGS

REGISTERED PROFESSIONAL ENGINEER No. 168246 RICHARD B. WHITE STATE OF UTAH
NOT VALID WITHOUT A SIGNATURE

NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
1	1/05/05	JAG	ADDED PROPOSED BOUNDARY & PANEL SUBSIDENCE PTS.	15	05/09	JAG	7Z NORTH ADJ. VS. PERMIT REF. 2099
2	5/02/05	JAG	ADDED FIRST SOUTH PROPOSED SUBSIDENCE PTS.	16	08/09	JAG	7Z NORTH MILLER CANYON LBA UTU-86038
3	5/02/05	JAG	ADDED POWER LINE, COUNTY ROAD 907 & STOCK PONDS	17	04/10	JAG	ZZN WEDGE
4	6/30/05	JAG	ADDED FIRST NORTH I.B.C.	18	01/17	JAG	6Z PHASE II ADDITIONAL PERMIT TASK #5362
5	2/07/07	JAG	1st NORTH FED LEASE IBC FULL EXTRACTION	19	01/18	JAG	6Z PHASE II SUBSIDENCE MONITORING PLAN REVISION TASK #5567
6	09/05	JAG	1st SOUTH FULL EXTRACTION				
7	04/07	JAG	14th WEST FULL EXTRACTION PLAN	20	01/19	JAG	2ND LEFT FULL EXTRACTION
8	07/07	JAG	15th WEST, 6th WEST, AND 4th EAST FULL EXTRACTION	21	03/19	JAG	RIGHT OF WAY EXPANSION
9	03/08	JAG	ADDITIONAL FULL EXTRACTION	18	12/19	JAG	FULL EXT. TASK #5769, TASK #5936
10	09/08	JAG	LIFE OF MINE FULL EXTRACTION				

REVISIONS

BASE MAP:
U.S.G.S. 7.5 MINUTE QUADRANGLE'S: EMERY WEST 1968, EMERY EAST 1968, PHOTO REVISED 1978.
MESA BUTTE 1968, PHOTO REVISED 1978.
WALKER FLATE 1968, PHOTO REVISED 1978.

COORDINATE SYSTEM:
STATE PLANE COORDINATES:
NAD 83 CONUS
ZONE 4302-UTAH, CENTRAL - US FEET
VERTICAL DATUM - NAVD 88-US FEET

EXTERNAL REFERENCE:
G:\UC982\XREF-CURRENT\XREF-USGSMAP.DWG
G:\UC982\XREF-CURRENT\XREF-WORKS-EM2.DWG
G:\UC982\XREF-CURRENT\XREF-SECTION.DWG
G:\UC982\XREF-CURRENT\XREF-HATCH-ZZNW.DWG
G:\UC982\XREF-CURRENT\XREF-LOM.DWG
G:\UC982\XREF-CURRENT\XREF-14THWESTEX.DWG
G:\UC982\XREF-CURRENT\XREF-HATCH-ZZNLBA.DWG
G:\UC1665\05\XREF\EMERY FINAL PERMIT-e2P2-OCT 17
G:\UC1665\05\XREF\MINE WORKINGSREPLACEMENT08-19-16

0' 1000'
SCALE: 1" = 1000'
CONTOUR INTERVAL = 40'

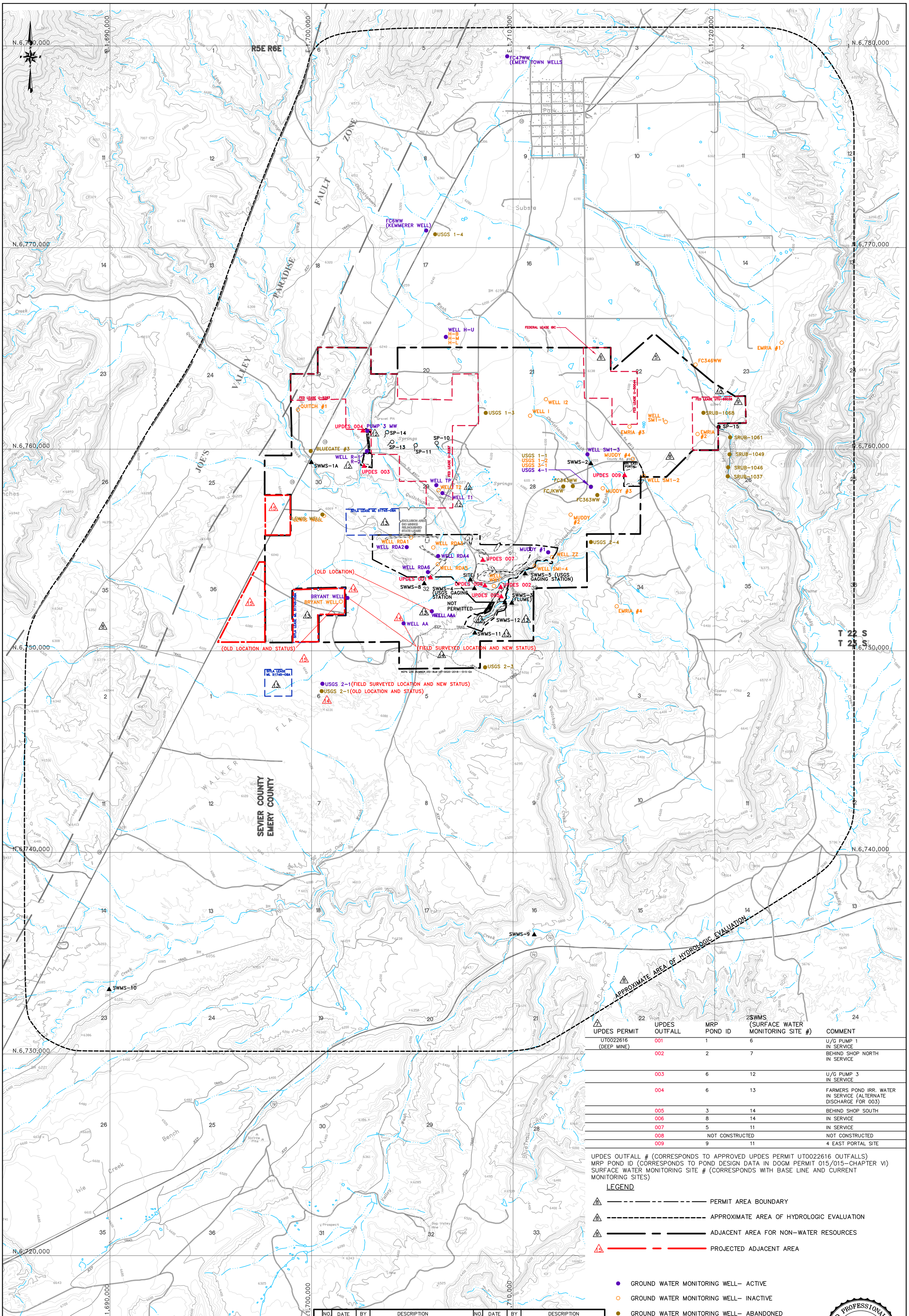
DRAWN BY: JBL
CHECKED BY: JAG
ORIGINAL DATE: 1/03
RE-DRAWN DATE: 03/19
APPROVED BY: JAG
DWG DATA: G:\UC1665\05\PHASE II DWG

EMERY MINE
EMERY COUNTY, UTAH

PERMIT NO.
ACT015/015

BRONCO UTAH OPERATIONS, LLC
P.O. BOX 1
PRICE, UT 84501

PLATE V-5
SUBSIDENCE MONITORING POINTS AND BUFFER ZONES



UPDES PERMIT	UPDES OUTFALL	MRP POND ID	SWMS (SURFACE WATER MONITORING SITE #)	COMMENT
UT0022616 (DEEP MINE)	001	1	6	U/G PUMP 1 IN SERVICE
	002	2	7	BEHIND SHOP NORTH IN SERVICE
	003	6	12	U/G PUMP 3 IN SERVICE
	004	6	13	FARMERS POND IRR. WATER IN SERVICE (ALTERNATE DISCHARGE FOR 003)
	005	3	14	BEHIND SHOP SOUTH
	006	8	14	IN SERVICE
	007	5	11	IN SERVICE
	008	NOT CONSTRUCTED		NOT CONSTRUCTED
	009	9	11	4 EAST PORTAL SITE

UPDES OUTFALL # (CORRESPONDS TO APPROVED UPDES PERMIT UT0022616 OUTFALLS)
MRP POND ID (CORRESPONDS TO POND DESIGN DATA IN DOGM PERMIT 015/015–CHAPTER VI)
SURFACE WATER MONITORING SITE # (CORRESPONDS WITH BASE LINE AND CURRENT MONITORING SITES)

LEGEND

- PERMIT AREA BOUNDARY
- APPROXIMATE AREA OF HYDROLOGIC EVALUATION
- ADJACENT AREA FOR NON–WATER RESOURCES
- PROJECTED ADJACENT AREA
- GROUND WATER MONITORING WELL– ACTIVE
- GROUND WATER MONITORING WELL– INACTIVE
- GROUND WATER MONITORING WELL– ABANDONED
- MONITORED IRRIGATION SEEP
- MONITORED SPRING
- SURFACE WATER MONITORING SITE
- UPDES DISCHARGE POINT

REGISTERED PROFESSIONAL ENGINEER No. 168246 RICHARD B. WHITE STATE OF UTAH

BASE MAP:
U.S.G.S 7.5 MINUTE QUADRANGLE'S. EMERY WEST 1968. EMERY EAST 1968, PHOTO REVISED 1978. MESA BUTTE 1968, PHOTO REVISED 1978. WALKER FLATE 1968, PHOTO REVISED 1978.

COORDINATE SYSTEM:
STATE PLANE COORDINATES. NAD 83 CONUS
ZONE 4302–UTAH, CENTRAL – US FEET
VERTICAL DATUM – NAVD 88–US FEET

EXTERNAL REFERENCE:
G:\UC982\XREFS–CURRENT\XREF–USGSMAP.DWG
G:\UC982\XREFS–CURRENT\XREF–SECTION.DWG
G:\UC1665\05\XREF\EMERY FINAL PERMIT–e2P2–MAR 19

REVISIONS

NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
2	8/1/89	RJD	ADDITION OF NPDES 0	9	08/09	JAG	ZZ NORTH, MILLER CANYON LBA UTU–86038
3	8/7/90	RJD	ADDITION OF SW SITES 14 & 15	10	04/10	JAG	ZZN WEDGE
4	9/95		AMENDED PERMIT BOUNDARY TO EXCLUDE EXPIRED STATE LEASE	11	09/11	JAG	REVISE GROUNDWATER MONITOR PLAN, ABATE NOV 10088
5	6/30/05	JAG	ADDED FIRST NORTH I.B.C.	12	07/16	JAG	REVISE GW MONITOR PLAN
6	12/12/06	JAG	1st NORTH FED LEASE IBC, FULL EXTRACTION	13	02/17	JAG	e2 PHASE II ADDITIONAL PERMIT REVISE GW MON TASK #5362
7	03/08	JAG	UPDATE MAP (OLD VI–3)	14	03/19	JAG	RIGHT OF WAY EXPANSION
8	05/09	JAG	ZZ NORTH, ADJ. VS. PERMIT, HYDRO BOUNDARY DEE 3099	15	01/20	JAG	FULL EXTRACTION TASK 5769, 5936

0' 2000'
SCALE: 1" = 2000'
CONTOUR INTERVAL = 40'

DRAWN BY: KDS
CHECKED BY: JAG
ORIGINAL DATE: 1/81
RE–DRAWN DATE: 3/19
APPROVED BY: JAG
DWG DATA: G:\UC982\14–HYDROLOGY REWRITE \CHAPVI–PLATES\PLATE VI–4.DWG

EMERY MINE
EMERY COUNTY, UTAH
PERMIT NO. ACT015/015

BRONCO UTAH OPERATIONS, LLC
P.O. BOX 527
PRICE, UT 84522

PLATE VI–4
GROUND WATER MONITORING WELL AND SURFACE WATER MONITORING SITE LOCATION MAP

CHAPTER VIII VEGETATION

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Mt. Nebo Scientific, Inc., May 2002

VIII-2 THREATENED, ENDANGERED, and Sensitive Species Survey Report, JBR Environmental Consultants, Inc., August 2002

VIII-3 Vegetation of the 4th East, 6th West, & 14th/15th West Areas Report Mt. Nebo Scientific, April 2007 (includes T&E and sensitive species)

VIII-4 Biological Resources of the Full Extraction Pillar Splitting, Life of Mine Surface Area Report Mt. Nebo Scientific, November 2008

VIII-5 Biological Resources of the Zero Zero North Area, Mt. Nebo Scientific, 6/09

VIII-6 Burrowing Owl Study Emery 2 Full Extraction Area Mt. Nebo Scientific 11/19

PLATES

VIII-1 VEGETATION & LAND USE MAP

Revised 05/2007
Revised 1/2009
Revised 6/2009
Revised 01/2020

CHAPTER VIII

APPENDIX VIII-6
Burrowing Owl Study
Emery 2 Full Extraction Area
Mt. Nebo Scientific 11/2019

Inserted 01/2020

BURROWING OWL SURVEY

at the

Emery 2 Full Extraction Area

Emery Mine, Utah

2019

Image courtesy of www.naturespicsonline.com

Prepared by

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(801) 489-6937

by

Patrick D. Collins, Ph.D.

BRONCO UTAH OPERATIONS, LLC
P.O. Box 527
Emery, Utah 84522

November 2019

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MAP A - Burrowing Owl Survey Area . . . . . ATTACHMENT

INTRODUCTION

Sensitive Species Surveys

The Emery Mine is a coal mine located in south-central Utah. The mine has plans to expand their underground operations in the Emery 2 Area into what they call the *Full Extraction Area*. This mining will probably result in subsidence to the ground surface. Consequently, this subsidence could impact known local prairie-dog towns (Fig. 1). Moreover, white-tailed prairie-dog (*Cynomys leucurus*) holes are sometimes used by burrowing owls (*Athene cunicularia*), a Utah sensitive species (Fig 2).

Figure 1: Prairie-dog burrow at the study site

Burrowing owls have been listed on Utah's Sensitive Species list as a "*wildlife species of concern*". The State of Utah, Division of Wildlife Resources (DWR) states that species of concern "*are those species for which there is credible scientific evidence to substantiate a threat to continued population viability. It is anticipated that wildlife species of concern designations will identify species for which conservation actions are needed, and that timely and appropriate conservation actions implemented on their behalf will preclude the need to list these species under the provisions of the federal Endangered Species Act*".

Figure 2: White-tailed prairie-dog.
© Photo by Dona Hilkey

Field investigations were first conducted to survey for active prairie-dog towns and, if found, follow up

surveys for burrowing owls were planned and conducted in the Emery 2 Full Extraction Area of the Emery Mine in 2019.

Burrowing Owls in Utah

Burrowing owls (Figure 3) can be found in annual and perennial grasslands as well as deserts and shrub-lands such as those areas near the Emery Mine site. In the salt deserts of Utah they are most often associated with prairie-dog towns where they use their burrows for protection, shelter and nesting. They typically prefer areas where the vegetative canopy cover is less than 30 percent.

Figure 3: Burrowing Owl. Image courtesy of www.naturespicsonline.com

Most of the burrowing owls here migrate away from Utah in November. Research suggests that owls nesting in Utah migrate toward Baja, California and return to Utah in March (DWR Wildlife Notebook Series No. 11). Soon after they return to Utah, the male birds begin to select burrows as potential nests. Although other animal burrows are utilized (i.e. yellow-bellied marmots, badgers, rock squirrels), the owls often choose prairie-dog holes for their nesting activities.

After a burrow for nesting has been selected, courtship for the owls begins. Often, just prior to egg-laying, the male owl often collects pieces of dry cow or horse dung and places them on the entrance mound (DWR Wildlife Notebook Series No. 11). The female then spreads the dung from the entrance and lines the burrow to mask their scent as a defense mechanism from predators.

Unless the nest is destroyed during the breeding season, the female generally lays only one

clutch. The female lies on the eggs for 21-28 days while the male does the food hunting for them. The female acts as the sole incubator of the eggs. The young birds hatch at different times and as a consequence, the age of their young may vary by as much as two weeks.

Twenty-one days after hatching, the young owls are active on the ground, running and exercising their wings prior to taking flight. At eight weeks of age, the young owls are practicing prey capture by chasing insects and jumping on dead or dying insects brought to them by their parents. Shortly after this stage, the young will begin hunting on their own (DWR Wildlife Notebook Series No. 11).

METHODS

Prairie Dog Towns

The Full Extraction Area was first surveyed for prairie-dog towns. The active towns were used as locations to then survey for burrowing owls.

Protocol Field Surveys

Survey methods followed those recommended by the Colorado Division of Wildlife Resources (Klute 2008). This reference suggests timing of surveys should be conducted for burrowing owl activities between March 15th and October 31st. Even though burrowing owls are active throughout the day, peak activity has been noted in the mornings and evenings which are the most favorable periods of survey (Conway and Simon 2003).

Morning and evening protocol surveys were being conducted in 2019 within the study area. Four (4) observation stations were chosen for optimal views of the active prairie-dog towns. Binoculars and a spotting scope were used to monitor the towns. Additionally, two (2) call-broadcast recordings were played for 10 minutes each at each station. All appropriate parameters and data were recorded for the surveys on data sheets.

The survey plans included visiting the study area on three separate occasions for the active

protocol surveys. One morning and two evening surveys were planned for at the study site. The morning surveys were to be conducted from ½ hour before until two hours after sunrise, whereas the evening surveys were conducted beginning *at least* two hours before until ½ hour after sunset.

Passive Field Surveys

Although the above protocol for morning and evening visits was followed for the formal surveys, owls are also active throughout the day. Consequently, surveys were also conducted outside the above-mentioned morning and evening survey periods. These periods were called "passive surveys" in this report. Survey times and results from all surveys at the Full Extraction Area at the Emery Mine have been included in the RESULTS section of this report.

RESULTS

On-site Burrowing Owl Studies

Listed below are the survey data and a brief summary of results for the burrowing studies conducted at the Emery Mine Full Extraction Area. Greater detail can be found in the field data sheets included in this report.

1. Field surveys (July 30, 2019).
    a. A field visit was first conducted at the site with *Emery Mine* representatives (Kit Pappas and Brad Parrish) and *Mt. Nebo Scientific, Inc.* (Patrick Collins). The purpose of this visit was to identify the surface boundary of the Full Extraction Area then locate and mark the active prairie-dog colonies within the area with a GPS unit so that burrowing owls survey plans and methods could be designed.

2. Field surveys (September 24, 2019)
    a. A morning burrowing owl survey was conducted.
        i. No owls were observed.
    b. A passive survey was conducted later.
        i. No owls were observed.

3. Field surveys (September 25, 2019)
    a. A passive burrowing owl survey was conducted in the afternoon .
        i. No owls were observed.

4. Field surveys (October 2, 2019)
    a. A passive burrowing owl survey was conducted in the afternoon.
        i. No owls were observed.
    b. An evening burrowing owl survey was conducted.
        i. No owls were observed.

5. Field surveys (October 16, 2019)
    a. A passive burrowing owl survey was conducted in the afternoon.
        i. No owls were observed.
    b. An evening burrowing owl survey was conducted.
        i. No owls were observed.

SUMMARY

Burrowing owl, a Utah sensitive species, are known to be present in Emery County, Utah. In fact, previous surveys near the Emery Mine have been conducting and burrowing owls have been observed (Collins 2008, 2011). The surveys conducted in the Emery 2 Full Extraction Area at the Emery Mine site in September and October 2019 described in this report did not find burrowing owls present.

LITERATURE CITED

Collins, P.D. 2011. Burrowing owl studies at the Emery Mine. Professional Report prepared of Consol Energy. Sesser, IL. by Mt. Nebo Scientific, Inc., Springville, UT.

Collins, P.D. 2008. Burrowing owl survey, Miller Tract, Emery Mine site. Professional Report Collins, P.D. 2010. Burrowing owl studies at the Emery Mine. Professional Report prepared of Consol Energy. Sesser, IL. by Mt. Nebo Scientific, Inc., Springville, UT.

Conway, C. J. and J. C. Simon. 2003. Comparison of detection probability associated with Burrowing Owl survey methods. Journal of Wildlife Management 67:501-511.

Klute, David. 2008. Colorado Division of Wildlife Resources. Recommended survey protocol and actions to protect nesting burrowing owls. Denver, CO.

Utah Division of Wildlife Resources. Wildlife Notebook Series No. 11. Salt Lake City, UT.

DATA SHEET
(3 Survey Periods)

SPECIES: Burrowing Owl (*Athene cunicularia*)

SURVEY DATE & TIME:
1) 24 September 2019
6:40 am - 9:50 am (extended protocol survey)

2) 24 September 2019
3:30 pm - 4:45 pm (passive survey)

3) 25 September 2019
10:00 am - 1:00 pm (passive survey)

SITE/NEST NUMBERS: EMPD01, EMPD02, EMPD03, EMPD04

OBSERVER(S): P.D. Collins

LOCATION STUDY SITE: Burrow site numbers and coordinates

GPS NAME	COORDINATES (UTM NAD 27)	TOWN NO. (MAP A)	PHOTOS
EMPD01	12S 0474854m E, 4301790m N.	No. 1	Figure 4
EMPD02	12S 0475000m E, 4301896m N	No. 2	Figure 5
EMPD03	12S 0474933m E, 4301237m N.	No. 3	Figure 6
EMPD04	12S 0475250m E, 4300591m N.	No. 4	Figure 7

LOCATION OF OBSERVATION OF BURROWS (as well as comments which would be applicable e.g. observability of burrows, view of burrows from above/same level/or below, estimated distance to burrows):

Four (4) observation stations were used

GPS NAME	COORDINATES (UTM NAD 27)	STATION (MAP A)
EMStaA	12S 0474923m E. 4301729m N.	A
EMStaB	12S 0474889m E. 4301327m N.	B
EMStaC	12S 0475282m E. 4300567m N	C
EMStaD	12S 0474935m E. 4301898m N	D

OPTICS USED FOR OBSERVATIONS (binoculars/scope):

Binoculars: Swarovski CL, 18X25 and Swarovski EL, 10X42, 6.3°
Spotting Scope: Swarovski EL, 20-60X zoom

DISTANCE AND VISUAL LINE OF SIGHT FROM BURROWS TO PROPOSED DISTURBANCE:

Rotated to each observation point every 20-25 minutes.
All burrows could be seen from each observation point varying the line-of-site distances from burrows from 200 ft to 850 ft.

WEATHER CONDITIONS DURING OBSERVATIONS:

1) September 24, 2019 - Protocol (morning) survey: 39° to 60° F; clear skies, calm.

2) September 24, 2019 - Passive (afternoon) survey: 78-79° clear skies, breezes at ~10 mph from the WSW.

3) September 25, 2019 - Passive (mid-day) survey: 55-65°; clear skies, calm.

NEST DESCRIPTION (including condition, location, elevation, as well as applicable comments):

Active prairie dog towns (burrow clusters) were the focus of observations some were located quite close to each other where as others were 25 ft to 50 ft apart.

TOWN NO. (MAP A)	ELEVATION (above sea level)	NATIVE PLANT COMMUNITY	CURRENT PLANT COMMUNITY
No. 01	6,005 ft	Greasewood	Weedy Pasture
No. 02	6,005 ft	Greasewood	Weedy Pasture
No. 03	6,019 ft	Greasewood	Alfalfa
No. 04	6,027 ft	Gardner Saltbush	Gardner Saltbush

ACTIVITY/STATUS

All prairie dog towns appeared active with prairie dogs, some of which were seen during the survey, with the exception of No. 4. These burrows were open but did not appear to be active. No burrowing owls were observed during these survey periods.

ADDITIONAL COMMENTS:

OPINION AND JUSTIFICATIONS OF BIOLOGIST ON SITE AS TO IMPACT OF THE PROPOSED ACTIVITY ON HABITAT:

Subsidence is expected in this area as a result of the proposed underground mining activities.

DATA SHEET

(2 Survey Periods)

SPECIES: Burrowing Owl (*Athene cunicularia*)

SURVEY DATE & TIME: 1) 2 October 2019
3:40 pm - 5:05 pm (passive survey)

2) 2 October 2019
5:05 pm - 7:40 pm (protocol survey)
(sunset: local 6:46 pm; regional 7:06 pm)

SITE/NEST NUMBERS: EMPD01, EMPD02, EMPD03, EMPD04

OBSERVER(S): P.D. Collins

LOCATION STUDY SITE: Burrow site numbers and coordinates

GPS NAME	COORDINATES (UTM NAD 27)	TOWN NO. (MAP A)	PHOTOS
EMPD01	12S 0474854m E, 4301790m N.	No. 1	Figure 4
EMPD02	12S 0475000m E, 4301896m N	No. 2	Figure 5
EMPD03	12S 0474933m E, 4301237m N.	No. 3	Figure 6
EMPD04	12S 0475250m E, 4300591m N.	No. 4	Figure 7
EMPD05	12S 0475289m E, 4300760m N.	No. 5	(No Photo)

LOCATION OF OBSERVATION OF BURROWS (as well as comments which would be applicable e.g. observability of burrows, view of burrows from above/same level/or below, estimated distance to burrows):

Four (4) observation stations were used

GPS NAME	COORDINATES (UTM NAD 27)	STATION (MAP A)
EMStaA	12S 0474923m E. 4301729m N.	A
EMStaB	12S 0474889m E. 4301327m N.	B
EMStaC	12S 0475282m E. 4300567m N	C
EMStaD	12S 0474935m E. 4301898m N	D

OPTICS USED FOR OBSERVATIONS (binoculars/scope):

Binoculars: Swarovski CL, 18X25 and Swarovski EL, 10X42, 6.3°
Spotting Scope: Swarovski EL, 20-60X zoom

DISTANCE AND VISUAL LINE OF SIGHT FROM BURROWS TO PROPOSED DISTURBANCE:

Rotated to each observation point every 20-25 minutes.
All burrows could be seen from each observation point varying the line-of-site distances from burrows from 200 ft to 850 ft.

WEATHER CONDITIONS DURING OBSERVATIONS:

1) Passive study range: 66°-67° clear skies, light breezes from the south at about 5-6 mph

2) Evening study range: 66° dropping to 58° F; clear skies, light breezes from the south at about 5-6 mph.

NEST DESCRIPTION (including condition, location, elevation, as well as applicable comments):

Active prairie dog towns (burrow clusters) were the focus of observations some were located quite close to each other where as others were 25 ft to 50 ft apart.

TOWN NO. (MAP A)	ELEVATION (above sea level)	NATIVE PLANT COMMUNITY	CURRENT PLANT COMMUNITY
No. 01	6,005 ft	Greasewood	Weedy Pasture
No. 02	6,005 ft	Greasewood	Weedy Pasture
No. 03	6,019 ft	Greasewood	Alfalfa
No. 04	6,027 ft	Gardner Saltbush	Gardner Saltbush
No. 05	6,040 ft	Mat Saltbush	Mat Saltbush

ACTIVITY/STATUS

All prairie dog towns appeared active with prairie dogs, some of which were seen during the survey, with the exception of No. 4. These burrows were open but did not appear to be active. No burrowing owls were observed during these survey periods.

ADDITIONAL COMMENTS:

Another active prairie dog town was found (No. 5) just north of No. 4. These burrows were added to the survey.

OPINION AND JUSTIFICATIONS OF BIOLOGIST ON SITE AS TO IMPACT OF THE PROPOSED ACTIVITY ON HABITAT:

Subsidence is expected in this area as a result of the proposed underground mining activities.

DATA SHEET
(2 Survey Periods)

SPECIES: Burrowing Owl (*Athene cunicularia*)

SURVEY DATE & TIME:
1) 16 October 2019
1:45 pm - 4:45 pm (passive survey)

2) 16 October 2019
4:45 pm - 7:15 pm (protocol survey)
(sunset: regional 6:45 pm)

SITE/NEST NUMBERS: EMPD01, EMPD02, EMPD03, EMPD04, EMPD05

OBSERVER(S): P.D. Collins

LOCATION STUDY SITE: Burrow site numbers and coordinates

GPS NAME	COORDINATES (UTM NAD 27)	TOWN NO. (MAP A)	PHOTOS
EMPD01	12S 0474854m E, 4301790m N.	No. 1	Figure 4
EMPD02	12S 0475000m E, 4301896m N	No. 2	Figure 5
EMPD03	12S 0474933m E, 4301237m N.	No. 3	Figure 6
EMPD04	12S 0475250m E, 4300591m N.	No. 4	Figure 7
EMPD05	12S 0475289m E, 4300760m N.	No. 5	(No Photo)

LOCATION OF OBSERVATION OF BURROWS (as well as comments which would be applicable e.g. observability of burrows, view of burrows from above/same level/or below, estimated distance to burrows):

Four (4) observation stations were used

GPS NAME	COORDINATES (UTM NAD 27)	STATION (MAP A)
EMStaA	12S 0474923m E. 4301729m N.	A
EMStaB	12S 0474889m E. 4301327m N.	B
EMStaC	12S 0475282m E. 4300567m N	C
EMStaD	12S 0474935m E. 4301898m N	D

OPTICS USED FOR OBSERVATIONS (binoculars/scope):

Binoculars: Swarovski CL, 18X25 and Swarovski EL, 10X42, 6.3°
Spotting Scope: Swarovski EL, 20-60X zoom

DISTANCE AND VISUAL LINE OF SIGHT FROM BURROWS TO PROPOSED DISTURBANCE:

Rotated to each observation point every 20-25 minutes.
All burrows could be seen from each observation point varying the line-of-site distances from burrows from 200 ft to 850 ft.

WEATHER CONDITIONS DURING OBSERVATIONS:

1) Afternoon passive survey range: 65° - 69° F; high clouds, light breezes from the south.
2) Evening survey range: 69° dropping to 55° F; high clouds, light breezes from the south.

NEST DESCRIPTION (including condition, location, elevation, as well as applicable comments):

Active prairie dog towns (burrow clusters) were the focus of observations some were located quite close to each other where as others were 25 ft to 50 ft apart.

TOWN NO. (MAP A)	ELEVATION (above sea level)	NATIVE PLANT COMMUNITY	CURRENT PLANT COMMUNITY
No. 01	6,005 ft	Greasewood	Weedy Pasture
No. 02	6,005 ft	Greasewood	Weedy Pasture
No. 03	6,019 ft	Greasewood	Alfalfa
No. 04	6,027 ft	Gardner Saltbush	Gardner Saltbush
No. 05	6,040 ft	Mat Saltbush	Mat Saltbush

ACTIVITY/STATUS

All prairie dog towns appeared active with prairie dogs, some of which were seen during the survey, with the exception of No. 4. These burrows were open but did not appear to be active. No burrowing owls were observed during these survey periods. .

ADDITIONAL COMMENTS:

OPINION AND JUSTIFICATIONS OF BIOLOGIST ON SITE AS TO IMPACT OF THE PROPOSED ACTIVITY ON HABITAT:

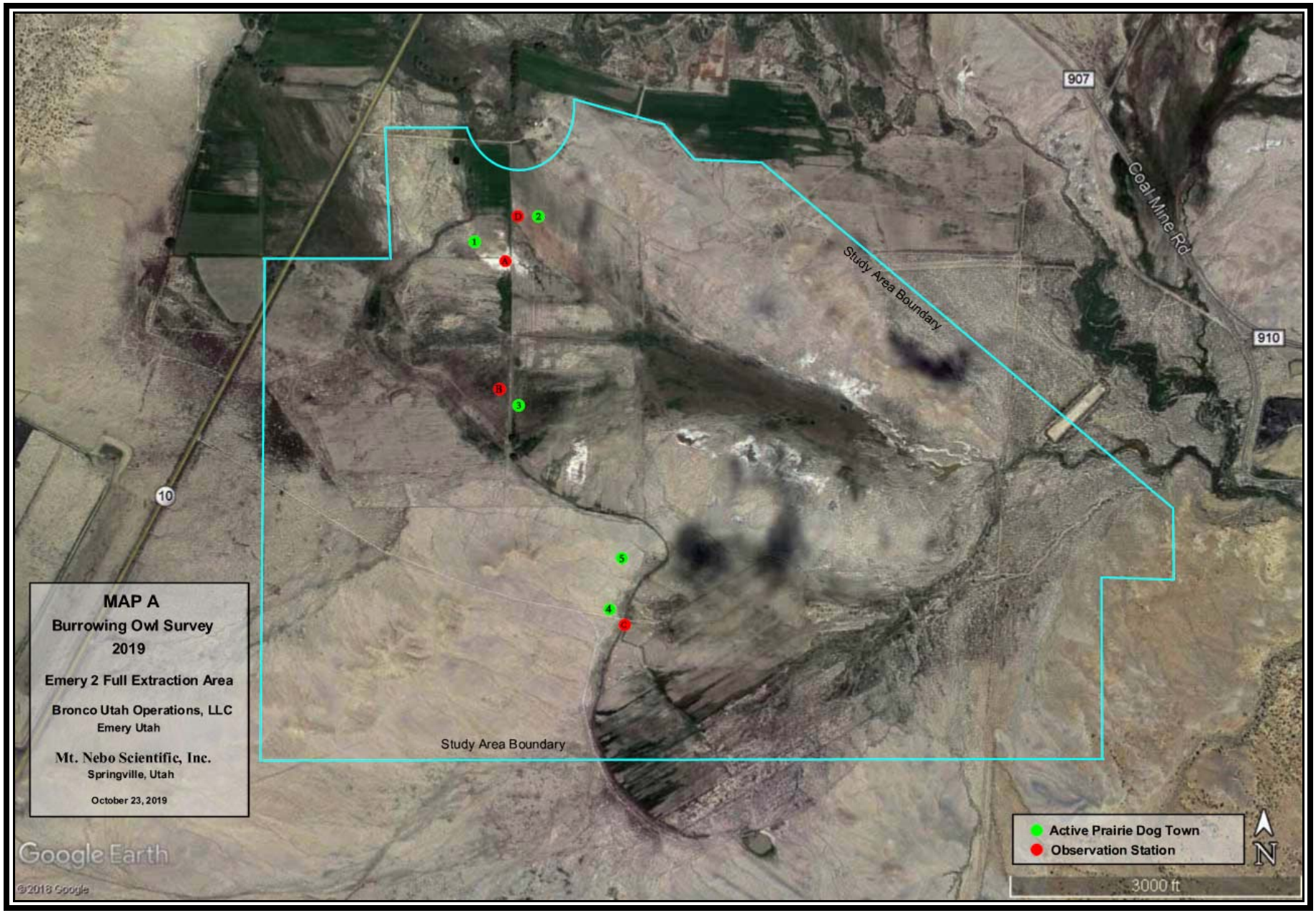
Subsidence is expected in this area as a result of the proposed underground mining activities.

Figure 4: Prairie Dog Town No. 1

Figure 5: Prairie Dog Town No. 2

Figure 6: Prairie Dog Town No. 3

Figure 7: Prairie Dog Town No. 4



MAP A
Burrowing Owl Survey
2019

Emery 2 Full Extraction Area

Bronco Utah Operations, LLC
Emery Utah

Mt. Nebo Scientific, Inc.
Springville, Utah

October 23, 2019