

C/015/015 Incoming

Bronco Utah Operations LLC

PO Box 527

#5567

Emery Utah, 84522

801-286-2301

January 23, 2018

VIA E-MAIL

Mr. Daron Haddock
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 Subsidence Monitoring Plan Revision Resubmittal
Clean Copy Task 5567**

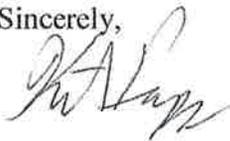
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DIV. OF OIL, GAS & MINING

Mr. Haddock:

Per your conditional approval memo dated January 12, 2018, attached find two clean copies regarding the above mentioned task. Executed C1 form, C2 form, revised pages, and Plates are included.

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

Sincerely,



Kit Pappas
Environmental Manager

Attachment Application for Coal Permit Processing

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: 015/0015

Title: e2 Phase II Subsidence Monitoring Plan Revision

Description, Include reason for application and timing required to implement:

Revise subsidence monitoring plan and update monitoring point locations resubmittal clean copy tsk 5567 1/18

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

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

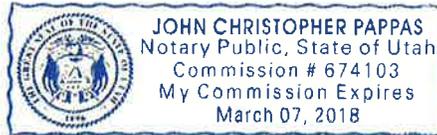
DAN R. BAKER
Print Name

Dan R. Baker, President
Sign Name, Position, Date 1/23/18

Subscribed and sworn to before me this 23 day of JANUARY, 2018

John Christopher Pappas
Notary Public

My commission Expires: 3-7, 2018
Attest: State of UTAH } ss:
County of CARBON



For Office Use Only:

Assigned Tracking Number:

Received by Oil, Gas & Mining

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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

APPENDICES

- V-1 RESOURCE RECOVERY AND PROTECTION PLAN INFORMATION
- 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

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

Revised 5/2007, 3/2008, 1/2009, 5/2009
Revised 1/2018

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CHAPTER V
GEOLOGY AND SUBSIDENCE

PLATES (cont.)

V-10	CROSS SECTION E-E', confidential binder	Map Pocket
V-11	CROSS SECTION F-F', confidential binder	Map Pocket
V-12	CROSS SECTION G-G, confidential binder	Map Pocket
V-13A	CORRELATION CHARTS IJ ZONE, confidential binder	Map Pocket
V-13B	CORRELATION CHARTS IJ ZONE, confidential binder	Map Pocket
V-14	CROSS SECTION P-P', confidential binder	Map Pocket
V-15	CROSS SECTION Q-Q', confidential binder	Map Pocket
V-16	CROSS SECTION R-R', confidential binder	Map Pocket
V-17	KI SEAM GEOLOGY, confidential binder	Map Pocket
V-18	K3 SEAM GEOLOGY, confidential binder	Map Pocket
V-19	J SEAM GEOLOGY, confidential binder	Map Pocket
V-20	UI SEAM GEOLOGY, confidential binder	Map Pocket
V-21	LI1 SEAM GEOLOGY, confidential binder	Map Pocket
V-22	LI5 SEAM GEOLOGY, confidential binder	Map Pocket
V-23	G SEAM GEOLOGY, confidential binder	Map Pocket
V-24	D SEAM GEOLOGY, confidential binder	Map Pocket
V-25	C SEAM GEOLOGY, confidential binder	Map Pocket
V-26	A SEAM GEOLOGY, confidential binder	Map Pocket

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Revised 2/2009
Revised 1/2018

The method used historically in most of the mine was room and pillar mining with some partial pillar removal. Partial pillar removal is designed not to result in subsidence. Full extraction mining (planned subsidence) did occur at Emery and will occur at Emery 2 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 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 splitting 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.

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.

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Replaced 12/2004
Revised 1/2005, 8/2006, 2/2007, 9/2008, 5/2009
Revised 1/2018

V-B.2 Subsidence Survey and Monitoring Plan

1.0 Pre-Subsidence Survey

1.1 Pre-Subsidence Surveys Conducted per R645-301-525.100

- 1.1.1 Pre-mining elevations and gradients of any irrigation ditches and pond embankments within the angle of draw will be established.
- 1.1.2 The pre-subsidence survey and Plates will be compiled or updated 6 months prior to full extraction and copies provided to the surface landowner, DOGM, and the water conservancy per R645-301-525-130.

2.0 Control and Subsidence Monitoring Point Installation

2.1 Control Points

- 2.1.1 A series of survey control points (base survey stations) will be established outside the theoretical angle of draw for a particular area of mining. New control points will be established as the area of mining expands using Kinematic GPS survey methods.
- 2.1.2 Control points will be set in a manner that will provide stability against monument movement and frost heave. Methods may include caps or steel bars set in concrete, steel bars embedded to refusal, or caps set in stone.
- 2.1.3 Plate V-5 depicts existing control points.

2.2 Subsidence Monitoring Points

- 2.2.1 Subsidence monitoring points will, at a minimum, be established as depicted on Plate V-5:
 - At a point coincident to the geometric center of high extraction panels
 - At periodic intervals over mains and sub mains
- 2.2.2 Subsidence monitoring points will be set in a manner that will provide stability against monument movement and frost heave. Methods may include caps or steel bars set in concrete, steel bars embedded to refusal, or caps set in stone.
- 2.2.3 Plate V-5 depicts existing and proposed subsidence monitoring points.
- 2.2.4 Plate V-5H depicts subsidence monitoring points that no longer require a survey due to lack of historical movement.

Subsidence monitoring at the Emery mine has been ongoing since the early 1980s. Monitoring points were surveyed and depicted on Plate V-5 (Subsidence Monitoring Points and Buffer Zones). The survey data is submitted via the Annual Report in spreadsheet format. The monitoring points that no longer require a survey can be found on Plate V-5H (Historical Subsidence Monitoring Points). The 2016 Annual Report contains 10 years of historical survey data which supports discontinuing monitoring of these points due to less than 0.1 feet of movement.

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3.0 Subsidence Monitoring Point Survey Protocol

3.1 Initial Pre-Mine Survey Protocol

- 3.1.1 New subsidence monitoring points shall be surveyed using Kinematic GPS survey methods that are tied to a control point that has been surveyed within 6 months prior with no movement found. The initial survey will have horizontal and vertical accuracy of at least 0.1 feet.
- 3.1.2 Initial survey of subsidence monitoring points will be completed at least three months prior to mining activities within the angle of draw.
- 3.1.3 Subsidence monitoring points will be surveyed annually thereafter.

3.2 Emery 2 Mining Survey Protocol

- 3.2.1 Subsidence monitoring points over partial pillar sections where no significant movement (± 0.5 feet) was found will be surveyed annually using Kinematic GPS survey methods. Points over advancing mains and sub mains need not be resurveyed unless there has been evidence underground (such as massive caving) that indicates subsidence may have taken place above them.
- 3.2.2 If a surveyed subsidence monitoring point demonstrates significant movement (± 0.5 feet), the Division shall be notified of the survey differences and the point resurveyed at 6-month intervals until no significant movement (± 0.5 feet) is indicated. Subsidence monitoring points where there is no longer significant movement will be surveyed annually.
- 3.2.3 Resurveys of a subsidence monitoring point that exhibits significant movement will consist of a survey with horizontal and vertical accuracy of at least 0.1 feet.
- 3.2.4 Irrigation ditches and pond embankments depicted in the pre-subsidence survey may be resurveyed after full extraction.
- 3.2.5 Survey of subsidence monitoring points will be discontinued when the operator can demonstrate negligible movement (± 0.1 feet) over a period of 5 years.

3.3 Emery Sealed Old Works Protocol

- 3.3.1 Subsidence monitoring points over sealed old works where no significant movement (± 0.5 feet) was found will be surveyed annually using Kinematic GPS survey methods.
- 3.3.2 If a surveyed subsidence monitoring point demonstrates significant movement (± 0.5 feet), the Division shall be notified of the survey differences and the point resurveyed at 6-month intervals until no significant movement (± 0.5 feet) is indicated. Subsidence monitoring points where there is no longer significant movement will be surveyed annually.
- 3.3.3 Resurveys of a subsidence monitoring point that exhibits significant movement will consist of a survey with horizontal and vertical accuracy of at least 0.1 feet.
- 3.3.4 Survey of subsidence monitoring points will be discontinued when the operator can demonstrate negligible movement (± 0.1 feet) over a period of 5 years.

Replaced 1/2018
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4.0 Subsidence Monitoring Point Inspection Protocol

- 4.1 In Emery sealed old works areas that experience significant movement (± 0.5 feet):
 - 4.1.1 Since additional mining is not contemplated at this time within the Emery mined area depicted on Plate V-5, subsidence monitoring inspections in areas where subsidence has occurred will be completed on a quarterly basis.
 - 4.1.2 A record of this inspection will be forwarded to the Division in the Annual Report and kept at the mine.
- 4.2 In Emery 2 areas that experience significant movement:
 - 4.2.1 A mine representative will inspect monthly the surface area outlined on Plate V-5 as full extraction areas (planned subsidence) when pillar splitting begins and continue until the subsidence monitoring points indicate there is no significant movement (± 0.5 feet).
 - 4.2.2 Irrigation ditches and pond embankments depicted in the pre-subsidence survey will be visually inspected monthly when pillar splitting begins and continue for 6 months.
 - 4.2.3 A record of this inspection will be forwarded to the Division in the Annual Report and kept at the mine office.
 - 4.2.4 Survey of subsidence monitoring points will be discontinued when the operator can demonstrate negligible movement (± 0.1 feet) over a period of 5 years.

5.0 Subsidence Monitoring Reporting Protocol

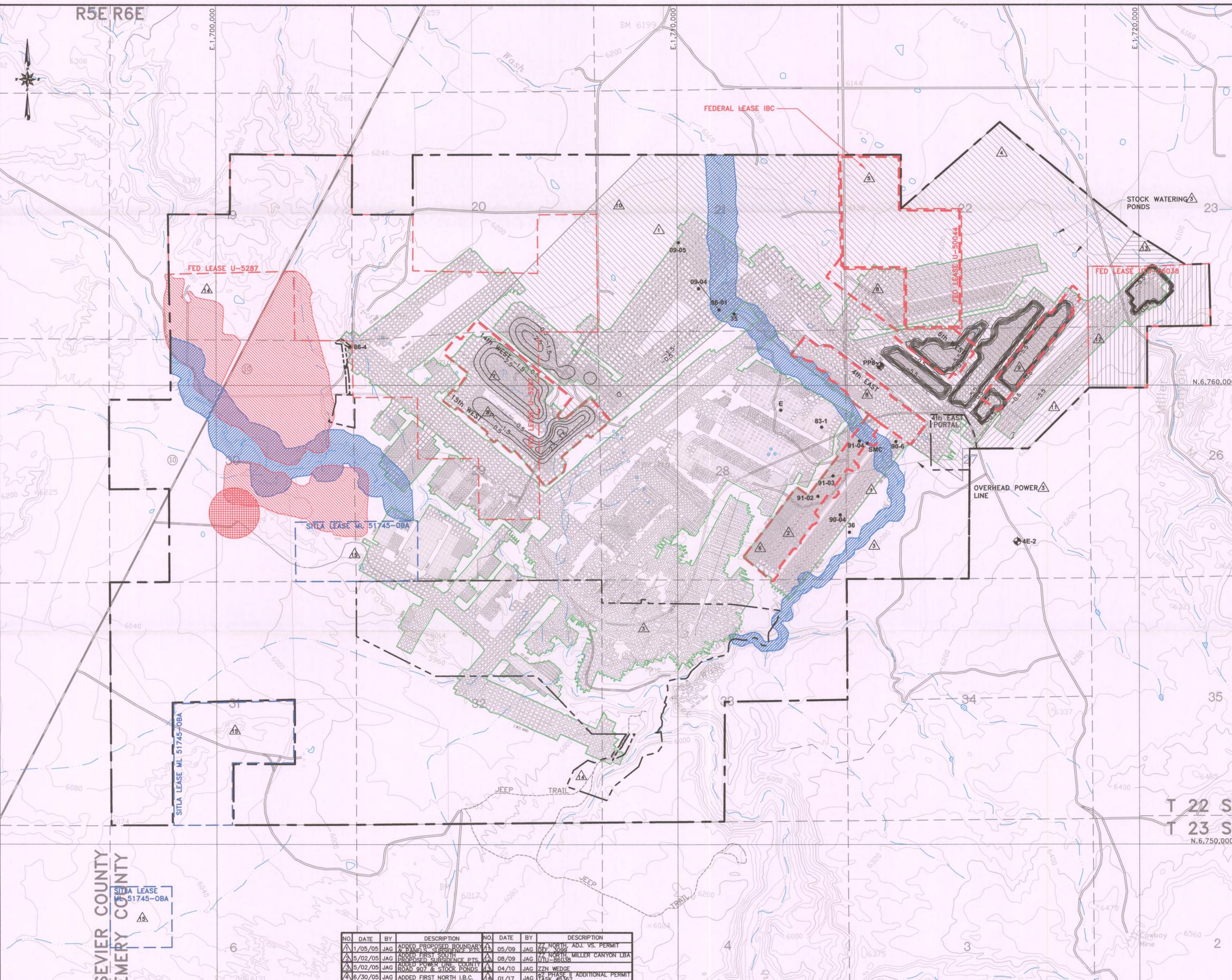
- 5.1 A subsidence monitoring report will be provided to DOGM as part of the Annual Report. Subsidence monitoring reports shall contain the following information:
 - Maps showing where pillars have been pulled
 - Maps showing surface property ownership
 - Maps showing the location of subsidence monitoring stations
 - The surface monitoring points above the areas outlined on Plate V-5 as full extraction areas (planned subsidence) that experience significant movement (± 0.5 feet) will have photographs recorded post-subsidence
 - Differential level and horizontal survey summary
 - Brief narrative explaining any "significant movement" and any action the applicant has taken to mitigate the effects of such movement or any tension or compression features visible on the surface

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Replaced 1/2018

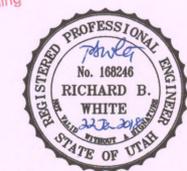


LEGEND

- PERMIT AREA BOUNDARY
- ADJACENT AREA FOR NON-WATER RESOURCES, FOR THE AREA OF HYDROLOGIC EVALUATION, SEE PLATE VI-4
- AVF BUFFER ZONES (NO FULL EXTRACTION)
- STREAM BUFFER ZONES (NO FULL EXTRACTION)
- STRUCTURAL BUFFER ZONES (NO FULL EXTRACTION)
- 85-2 SUBSIDENCE MONITORING POINT (CURRENTLY BEING MONITORED)
- 4E-2 SURVEYED CONTROL POINT
- PREVIOUSLY APPROVED FULL EXTRACTION
- EMERY PREVIOUSLY MINED OLD WORKS
- PREVIOUSLY APPROVED AREA TO BE FULLY EXTRACTED
- PREDICTED DEPTH OF SUBSIDENCE ISOPACHS (FT.)

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NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
1	05/05	JAG	ADDED PROPOSED BOUNDARY	1	05/09	JAG	17 NORTH ADJ. VS. PERMIT
2	05/02	JAG	ADDED FIRST SOUTH SUBSIDENCE PTS.	2	08/09	JAG	17 NORTH MILLER CANYON LBA
3	05/02	JAG	ADDED POWER LINE	3	04/10	JAG	ZZN WEDGE
4	06/30	JAG	ADDED FIRST NORTH I.B.C.	4	01/17	JAG	PHASE II ADDITIONAL PERMIT
5	02/07	JAG	1ST NORTH FED LEASE IBC FULL EXTRACTION	5	01/18	JAG	PHASE II SUBSIDENCE MONITORING PLAN REVISION
6	09/05	JAG	1ST SOUTH FULL EXTRACTION				
7	04/07	JAG	14TH WEST FULL EXTRACTION				
8	07/07	JAG	15TH WEST 6TH WEST AND 4TH EAST FULL EXTRACTION				
9	03/08	JAG	ADDITIONAL FULL EXTRACTION				
10	09/08	JAG	LIFE OF MINE FULL EXTRACTION				

SEVIER COUNTY
EMERY COUNTY

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

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

EXTERNAL REFERENCE:
 S:\UC1665\REF-CURRENT\REF-USDSMAP.DWG
 S:\UC1665\REF-CURRENT\REF-WORKS-EM2.DWG
 S:\UC1665\REF-CURRENT\REF-SECTION.DWG
 S:\UC1665\REF-CURRENT\REF-COORDS.DWG
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 S:\UC1665\REF-CURRENT\REF-HATCH-WEDGE.DWG
 S:\UC1665\REF-CURRENT\REF-EMERY_FINAL_PERMIT-62P2-FEB 17

0' 1000'
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 CONTOUR INTERVAL = 40'

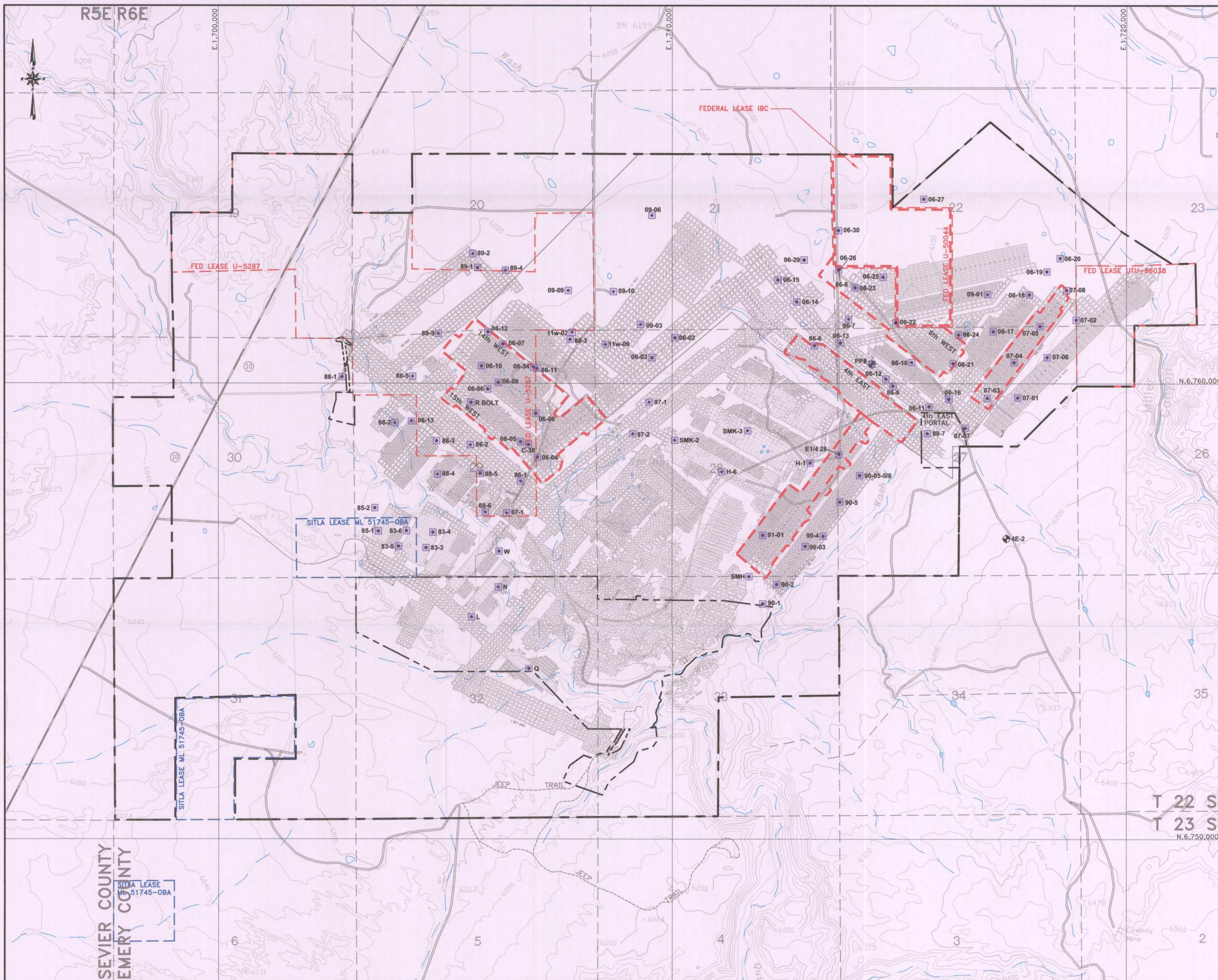
DRAWN BY: SWF
 CHECKED BY: JAG
 ORIGINAL DATE: 1/03
 RE-DRAWN DATE: 12/05

APPROVED BY: JAG
 DWG DATA: G:\UC1665\05\PHASE II DWG

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

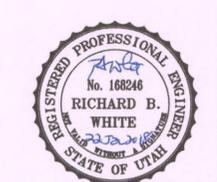
BRONCO UTAH OPERATIONS, LLC
 P.O. BOX 1
 PRICE, UT 84501

PLATE V-5
 SUBSIDENCE MONITORING
 POINTS AND BUFFER ZONES



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SEVIER COUNTY
EMERY COUNTY

SITLA LEASE ML 51745-OBA

NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
1	01/18	JAG	NEW PLATE TASK #5567				

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

DRAWN BY: SWF
CHECKED BY: JAG
APPROVED BY: JAG
DWG DATA: G:\UC1665\05\PHASE II DWG

ORIGINAL DATE: 12/17
RE-DRAWN DATE:
EMERY MINE
EMERY COUNTY, UTAH
PERMIT NO.
ACT015/015

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

PLATE V-5H
HISTORICAL SUBSIDENCE MONITORING POINTS

