

Coal Ownership Within and Adjacent to the Permit Area and Adjacent Area

All the holdings described below that are shown as controlled by P&M or Consol were subject to a 50/50 lease agreement between Consol and P&M (through Gulf Oil Company's acquisition of Kemmerer Coal Company) dated August 23, 1966 and amended 9/1/72 and 2/27/75 . Any reference, below, to Kemmerer should be read as P&M. This agreement was terminated by an agreement made effective 3/31/93 giving Consolidation Coal Company sole control of the Emery Coal Mine and all real property associated with it. A copy of this latest agreement is provided at the end of this appendix. The documents and lands listed below pertain only to coal ownership. Plate I-1 shows coal ownership in and adjacent to the permit area and adjacent area.

Township 22 South, Range 6 East (SLM)

Section 19	NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ E $\frac{1}{2}$ SE $\frac{1}{4}$ S $\frac{1}{2}$ NE $\frac{1}{4}$	Lease from USA (BLM) to Kemmerer and Consol dated 7/1/70 (#U-527) Utah State Offices University Club Building Salt Lake City, Utah (801) 524-5330
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Re-numbered 07/2007  
Revised 5/09

Ch I, Appl-1, pg7

File in:  
 Confidential  
 Shelf  
 Expandable  
Refer to Record No. 0027 Date 07012009  
In C 0150015, 2007, Incoming  
For additional information Confidential

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**COPY**

*C/015/015 Incoming*

#3337



**CONSOL ENERGY™**

Consolidation Coal Company &

P.O. Box 566  
Sesser, IL 62884  
(618) 625-2041

July 1, 2009

Daron Haddock  
Utah Division of Oil, Gas and Mining  
Coal Program  
1594 West North Temple, Suite 1210  
Box 145801  
Salt Lake City, Utah 84114-5801

Re: Emery Deep Mine Permit C/015/015  
Amendment to MRP (Zero Zero North amendment to add Consol controlled ZZ North panel to MRP and revise permit and adjacent area terminology, clean copy submittal task id 3099)

Dear Mr. Haddock:

Please consider this a clean copy submittal per task id 3099 to the minor revision to add additional mining area to the above mentioned permit and revise the permit terminology and plates pertaining to permit and adjacent area. Enclosed please find six (6) copies of the submittal and two (2) CD's with the submittal in pdf format. Also attached please find executed C1 and C-2 forms.

A confidential folder and CD of all confidential maps is included and should be placed in the confidential file.

If you have any questions concerning this request, please call me at (618) 625-6850.

Sincerely,

*John Gefferth*  
John Gefferth  
Environmental Engineer

CC: Karl Houskeeper – DOGM-Price Field Office  
Attachments  
JAG/jag emzznorthCNX.def3099.cln.doc

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JUL 02 2009  
DIV. OF OIL, GAS & MINING

File in: *C/015/0015 2009 Incoming*

Refer to:

Confidential CD 1  
 Shelf 1  
 Expandable

Date: *07/01/09* For additional information

APPLICATION FOR COAL PERMIT PROCESSING

**COPY**

Permit Change  New Permit  Renewal  Exploration  Bond Release  Transfer

Permittee: Consolidation Coal Company

Mine: Emery Mine

Permit Number: 015/015

Title: Zero Zero North CNX

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

Amnd to add Consol controlled Zero Zero North area to MRP, perm vs. adj, def resp tsk id3099 clean copy 7/09

**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.

Jonathan M. Pachter  
Print Name

Jonathan M. Pachter 6/25/09  
Sign Name, Position, Date General Manager, Environ. Services

Subscribed and sworn to before me this 25 day of JUNE, 2009

J. M. Young  
Notary Public  
My commission Expires: \_\_\_\_\_, 20\_\_\_\_  
Attest: State of PENNSYLVANIA } } ss:  
County of WASHINGTON

COMMONWEALTH OF PENNSYLVANIA  
Notarial Seal  
Jane M. Young, Notary Public  
Cecil Twp., Washington County  
My Commission Expires June 20, 2013  
Member, Pennsylvania Association of Notaries

<p><b>For Office Use Only:</b></p>	<p>Assigned Tracking Number:</p>	<p>Received by Oil, Gas &amp; Mining <b>RECEIVED</b> JUL 02 2009 DIV. OF OIL, GAS &amp; MINING</p>
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# APPLICATION FOR COAL PERMIT PROCESSING

## Detailed Schedule Of Changes to the Mining And Reclamation Plan COPY

**Permittee:** Consolidation Coal Company  
**Mine:** Emery Mine **Permit Number:** 015/015  
**Title:** Amnd to add Consol controlled Zero Zero North area to MRP,perm vs. adj,def id 3099 clean copy 6/09 pg1/3

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

<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter I, page 6,7 and 8
<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	
<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter I, Appendix I-1, page 7
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<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter II, page 17 and 21
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<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter IV, page 1
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter V, pages 1,4,5,6,20,26,27 and 37
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter V index page
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter V App V-5 cover page
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<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter VI, page 2
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter VI, page 2a
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter VI, page 27
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter VI, pages 27a and 27b
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<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter VIII, index page
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter VIII, pages 5,6,7,11,17, and 19
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter VIII App VIII-5 (Mt. Nebo Scientific, Zero Zero North report)
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter X index page
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter X-A, page 1
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter X-D, index
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<p><b>Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.</b></p>	<p>Received by Oil, Gas &amp; Mining</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p style="font-size: 1.5em; font-weight: bold; margin: 0;">RECEIVED</p> <p style="font-size: 1.2em; font-weight: bold; margin: 0;">JUL 02 2009</p> <p style="font-weight: bold; margin: 0;">DIV. OF OIL, GAS &amp; MINING</p> </div>
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# APPLICATION FOR COAL PERMIT PROCESSING

## Detailed Schedule Of Changes to the Mining And Reclamation Plan

COPY

**Permittee:** Consolidation Coal Company

**Mine:** Emery Mine

**Permit Number:** 015/015

**Title:** Amnd to add Consol controlled Zero Zero North area to MRP,perm vs. adj,def id 3099 clean copy 6/09 pg2/3

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.

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<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter I, Plate I-1 Ownership and Leashold Interest
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<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter III, Plate III-9 Permit Boundaries and Bonding Map (Exhibit D)
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter IV, Plate IV-2, UG Operations Plan
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<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter V, APP V-5 FIG 1, (Pre-Subsidence survey update)
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter V, Plate V-1, Presubsidence Survey-Structures and Utilities
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<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter V, Plate V-18, K3 Seam Geology (Confidential)
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<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter V, Plate V-24, D Seam Geology (Confidential)
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter V, Plate V-25, C Seam Geology (Confidential)
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<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	CH VI, Plate VI-1, Upper Ferron Sandstone potentiometric Surface (1979)
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<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	CH VI, Plate VI-4, Ground Water Monitoring Well and Surface Water Monitoring Site Location Map
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	CH VI, Plate VI-5, General Geology

<p><b>Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.</b></p>	<p>Received by Oil, Gas &amp; Mining</p> <p style="font-size: 1.5em; font-weight: bold;">RECEIVED</p> <p style="font-size: 1.2em; font-weight: bold;">JUL 02 2009</p> <p style="font-weight: bold;">DIV. OF OIL, GAS &amp; MINING</p>
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# APPLICATION FOR COAL PERMIT PROCESSING

## Detailed Schedule Of Changes to the Mining And Reclamation Plan

COPY

**Permittee:** Consolidation Coal Company

**Mine:** Emery Mine

**Permit Number:** 015/015

**Title:** Amnd to add Consol controlled Zero Zero North area to MRP, perm vs. adj, def id 3099 clean copy 6/09 pg3/3

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<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	CH VI, Plate VI-6, Historic and Planned Mining Sequence
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<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter VII, Plate VII-1, Soil Map
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter VIII, Plate VIII-1, Vegetation and Landuse Map
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter IX, Plate 10-1, Selected Wildlife Information (CONFIDENTIAL)
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter X, Plate X.A-1, Permit Area Cultural Resources (CONFIDENTIAL)
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter XI, Plate XI-1, Alluvial Valley Floor Along Upper Quitchupah Creek
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Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.

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### **Road to Borehole Pump Facility #1**

Map Code: shown on Plate II-1  
Status: existing - prior to 1975

The road to bore hole pump #1 is located approximately 3/4 of a mile north of the mine entrance and branches off of County Road 9-07. The road is used solely to access and maintain dewatering pump #1.

### **Road to Mine Discharge Sedimentation Pond #1**

Map Code: shown on Plate II-2  
Status: existing - 4th quarter 1976

This road is about 1/2 mile north of the mine entrance. It was used in the past to access sedimentation pond #1, but a culvert which was used for crossing Quitcupah Creek was washed out in a flood, thereby making the road impassable.

Upon construction of the preparation plant, the road will be constructed to access the plant waste disposal facilities. The design for rebuilding this road as a coal refuse haulage road is presented in Chapter IV.

### **County Roads**

Map Code: shown on Plates I-1 and V-2  
Status: existing - prior to 1975

There are two main county road networks which cross the adjacent area. One is a group of unimproved roads originating at the town of Emery and is used by farmers and some mine employees. The second county road, designated 9-07, originates at State Highway 10 and terminates at the mine entrance, This road is used by most mine employees and contract coal haulage trucks.

### **Utah State Highway 10**

Map Code: identified on Plate V-2  
Status: existing - prior to 1975

Approximately one (1) mile of Utah State Highway 10 crosses the northwest portion of the adjacent area.

### **Removal of Structures**

Removal of all structures is discussed in Chapter III under UMC 784.11(b).

Revised 5/09

The major components of this plan consist of overland flow diversions and sedimentation ponds which are described in Sections VI.B.1 and VI.B.2 respectively. In areas where these methods are impractical, the plan utilizes alternate sediment control methods (see Sec. VI.8.3) or requests sedimentation control exemptions for small areas (see Sec. VI.8.4).

The effectiveness of this plan is monitored by analysis of water samples routinely collected as required by NPDES permits UT 0022616. A compliance history for these permitted outfalls is given in Sec. VI.A.6.

#### **UMC 817.55**

Water is discharged into the underground workings of the Emery Mine. It is also proposed for future operations. Surface runoff adjacent to the portal area flows into the mine portal.

#### **UMC 817.57**

Within the adjacent area, there are two (2) streams which fall under the definition of part (a) of this regulation, Quitcupah Creek and Christiansen Wash.

As stated in the subsidence control plan in Chapter V, Part B (UMC 784.20), the underground pillar layout will be designed to provide a buffer zone of at least 100 ft. on either side of these streams. These buffer zones will be marked as required by UMC 817.11.

In the mine yard area, the streams are protected by berms which direct runoff, from the affected surface to two (2) sediment ponds. This drainage control, as approved by the Division, effectively protects the hydrologic balance in this area.

The drainage control plan for the permit area is presented in detail in Chapter VI.

Revised 8-31-95  
Revised 10/2002  
Revised 5/09

I.B Legal, Financial, and Compliance Information

The Emery Mine is owned by Consolidation Coal Company. Consolidation Coal Company is owned by Consol Energy Inc., a public company. Refer to Appendix I-1 for Consol's ownership structure.

**UMC 782.13, UMC 782.19**

Permit Applicant: Consolidation Coal Company  
CNX Center  
1000 Consol Energy Dr.  
Canonsburgh , PA 15317  
(724) 485-4000

Mine Operator: Consolidation Coal Company  
CNX Center  
1000 Consol Energy Dr.  
Canonsburgh, PA 15317  
(724)-485-4000

Mine Operation: Emery Mine  
P. O. Box 527  
Emery, UT 84522  
(801) 286-2301

Resident Agent: C T. Corporation System  
175 South Main St.  
Salt Lake City, UT 84111

Consolidation Coal Company is a corporation, incorporated under the laws of the State of Delaware.

Consol have not jointly operated any coal mines in the United States under any other names within the previous five years.

The Mine Safety and Health Administration identification number for the Emery Mine is 42-00079.

A list of the officers and directors of Consol is contained in Appendix III, attached to this chapter.

Revised 4-23-92  
Revised 8-31-95  
Revised 9-16-96  
Revised 10-13-03  
Revised 5/09

Ownership and leasehold interest information for both surface and coal within and adjacent to the permit area and adjacent area is contained in Appendix I-2, attached to this chapter. Plate III, as indicated previously in this chapter, shows ownership and lease boundary information at a scale of 1"=500'.

Appendix I-3 contains a detailed listing of current, previous and pending coal mining related permits in the United States held, or applied for, by Consol.

#### **UMC 782.14**

Consol, their subsidiaries and affiliates, and persons controlled by or under common control with Consol have not had any federal or state mining permits suspended or revoked nor any mining bonds or similar securities deposited in lieu of bond forfeited in the previous five (5) years.

Information on all violations received by Consol, during the past three (3) years, related to environmental requirements are contained in Appendix I-4.

#### **UMC 782.15**

Right of entry and operation is based on surface or subsurface ownership by Consol or on lease agreements. A detailed description of these documents is provided in Appendix I-2.

There will not be any surface mining of coal at the Emery Mine during the five (5) year term of this permit renewal.

#### **UMC 782.16**

The permit area and adjacent area, shown on Plate III-9 (Permit Boundaries and Bonding Map Exhibit D), including areas depicted as full extraction (planned subsidence) on Plate V-5 (Subsidence Monitoring Points and Buffer Zones) do not contain any of the following areas designated as unsuitable for mining:

- National Park System
- National Wildlife Refuge System
- National System of Trails
- National Wilderness Preservation System
- Wild and Scenic Rivers System
- National Recreation Areas
- National Forests
- Public Parks
- Public places included on the National Register of Historic Places.
- Public Buildings, Schools, Churches, Cemeteries, Community or Institutional Buildings.

The adjacent area contains one dwelling that is occupied intermittently (located in Sec. 30, Twp. 225, R6E) and several public roads (shown on Plate III). These will not be affected by the underground mining operation. Surface operations will not be conducted within 300 feet of the dwelling. Protection of land surface features is discussed in Chapter V.

Revised 8-31-95  
Revised 5/07  
Revised 5/09

**UMC 782.17**

Underground operations at the Emery Mine is an ongoing situation which does not occur in phases. The extent of the underground workings over the life of the permit is shown on Plates IV-1 and IV-2. The permit area encompasses approximately 442.5 acres and the adjacent area encompasses approximately 5,642 acres.

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 4/05  
Revised 9/06  
Revised 5/09

## CHAPTER IV      ENGINEERING DESIGNS

### IV.A            UNDERGROUND MINE PLAN

This part covers the description of the underground mining operations to be conducted at the Emery Mine.

#### IV.A.1        UNDERGROUND MINE PLAN

UMC 783.12(a), 783.24(c), 783.25(e), 783.25(h), 784.11(a), 784.23(a)

The Adjacent Area for the Emery Mine encompasses approximately 5,642 acres. The permit area for the Emery Mine encompasses approximately 442.5 acres. The boundary of the Adjacent Area and permit area is shown on the Permit Boundaries and Bonding Map (Plate III-9). The description of the Adjacent area is as follows:

Township 22 South, Range 6 East

Section 19: S/2NE/4, SE/4, E/2SW/4

Section 20: S/2NE/4, SE/4NW/4, S/2

Section 21: S/2N/2, S/2

Section 22: S/2, SW/4NW/4, portions of the following E/2SE/4NW/4, SW/4SE/4NW/4, S/2NW/4NE/4, SW/4NE/4, SW/4SW/4NE/4NE/4, W/2SE/4NE/4, S/2NE/4SE/4NE/4, SE/4SE/4NE/4

Section 23: portions of the following SW/4NW/4, NW/4SW/4

Section 27: W/2, portion of NE/4

Section 28: All

Section 29: All

Section 30: E/2, E/2NW/4, SW/4NW/4, N/2NW/4SW/4, E/2SW/4

Section 31: N/2, W/2SW/4, E/2SE/4, SW/4SE/4

Section 32: All

Section 33: W/2, NE/4

The description of the permit area is as follows:

Township 22 South, Range 6 East

Section 27: portions of NW/4, SW/4, NE/4

Section 30: portions of NE/4

Section 32: portions of NW/4, NE/4, SE/4

Section 33: portions of NW/4, NE/4, SW/4

Mining operations at the Emery Mine are conducted in the IJ Zone utilizing the room and pillar mining method. Plate IV-1 shows the layout, the present mine workings and the projected areas to be mined during the permit term. The existing workings have been marked to show the extent of underground mining operations (1) before August 3, 1977, (2) between August 3, 1977 and May 3, 1978, and (3) after May 3, 1978 up to the permit approval date of January 5, 1986. There are no surface mining operations at the Emery Mine. The projected mine workings are delineated by year for the next five year permit term. Plate IV-2 shows the same plan on a 1"=1000' map to show the extent of the projected life of mine plan in the IJ Zone. The Emery Mine operates under the General Safety Orders, Utah Coal Mines issued by the Industrial Commission of Utah and the applicable regulations issued by the Mine Health and Safety Administration (MSHA).

Access to the underground workings is through the portals shown on Plate II-1. All of the present portals are drift openings at the outcrop of the seam. These openings consist of intake, return, and belt entries. It may be necessary in the future to install ventilation raises in other areas of the property; however, these locations are not known at the present time. Future portals may consist of ramp excavations and shafts to access the coal seam. The new 4 East portal will use a ramp excavation down to the top of the IJ seam. A new set of portals will be installed for the southern main entries of the mine when production from the southern part of the mine warrants it.

Revised 8-31-95  
Revised 4/05  
Revised 3/07  
Revised 5/09

APPENDIX V-5

2007 PRE-SUBSIDENCE SURVEY  
OF THE ZERO NORTH, ZERO ZERO NORTH, 4<sup>th</sup> EAST MAINS, & 6<sup>th</sup> WEST  
AREA

Revised 5/07  
Revised 12/07  
Revised 5/09

middle Ferron Sandstone and designated by the symbol Km(m). The remaining portion of the Ferron Sandstone lying below the base of the "A" zone is called the lower Ferron Sandstone and designated by the symbol Km(l). This partitioning of the Ferron Sandstone is consistent with that of Lines and Morrissey (1983).

The uppermost continuous aquifer beneath the permit and adjacent areas occurs within the Ferron Sandstone. Potentiometric surface maps of this aquifer are presented in Plates VI-1 and VI-2 for the upper and lower Ferron Sandstone, respectively. Plate VI-1 presents data for 1979 while Plate VI-2 portrays conditions in 1985 (the earliest periods of relatively complete data in each zone).

Water rights associated with groundwater within 1 mile of the permit boundary are shown on Plate VI-3. Information concerning these water rights is contained in Appendix VI-4 and summarized in Table VI-1. Seasonal variations in water levels are discussed in Section VI.2.4.1. These fluctuations are not sufficient to result in substantial changes to the potentiometric surface maps (Plates VI-1 and VI-2) or the hydrostratigraphic cross section (Figure VI-1).

#### **VI.2.2.2 Location of Surface Water Bodies**

The location of surface water bodies for which water rights have been obtained within the permit and adjacent areas is provided on Plate VI-3. Information concerning these rights is provided in Appendix VI-4 and summarized in Table VI-1. Other water bodies in the area are noted on the base map that comprises Plate VI-3.

#### **VI.2.2.3 Locations of Monitoring Stations**

Surface water and groundwater monitoring stations associated with the Emery Mine are shown on Plate VI-4. Approximate surface elevations of the monitoring stations are indicated by the topographic lines on Plate VI-4.

Plate VI-4 contains a line depicting the "approximate area of hydrologic evaluation." This area is approximated by the Joe's Valley-Paradise Fault Zone on the west, Ivie Creek and its adjacent tributaries on the south, Muddy Creek and its adjacent tributaries on the east, and the area of influence associated with the Emery Town wells on the north. The line was drawn to encompass the long-term monitoring points shown on Plate VI-4 as well as most of the temporary monitoring points shown on Figure VI-14, Figure VI-15, and Plate VI-9. The influence of the Joe's Valley-Paradise Fault Zone on groundwater flow in the Ferron Sandstone (as noted on Plates VI-1 and VI-2) was also accounted for when drawing the line. Additional information is found in Section VI.2.8.3 regarding this line and its relationship to the "adjacent area" in the context of the potential impacts of the Emery Mine on the hydrologic balance of the region.

#### **VI.2.2.4 Location and Depth of Water Wells**

Water-supply wells and groundwater monitoring wells in the permit and adjacent areas are shown on Plate VI-4. Depths of these wells and other completion details are summarized in Table VI-2.

#### **VI.2.2.5 Surface Topography**

Surface topographic features in the permit and adjacent areas are shown on the base maps used for many of the plates in this submittal.

#### **VI.2.3 Sampling and Analysis**

All water samples collected under this MRP have been analyzed according to methods in either the "Standard Methods for the Examination of Water and Wastewater" or 40 CFR parts 136 and 434. Where feasible, these same references have been used as the basis for sample collection.

2. Ephemeral streamflow typically carries a high sediment load. This sediment will fill remaining cracks. As the cracks heal, the potential for interception of streamflow is minimized.
3. The depressions created by subsidence are sufficiently broad that changes in slope are not typically of an ample magnitude to cause ponding in anything other than local areas.

**Potential Hydrocarbon Contamination.** Diesel fuel, oils, greases, and other hydrocarbon products are stored and used at the site for a variety of purposes. Diesel and oil stored in above-ground tanks at the mine surface facilities may spill onto the ground during filling of the storage tank, leakage of the storage tank, or filling of the vehicle tank. Similarly, greases and other oils may be spilled during use in surface and underground operations.

The probable future extent of the contamination caused by diesel and oil spillage is expected to be small for three reasons. First, because the tanks are located above ground, leakage from the tanks can be readily detected and repaired. Second, spillage during filling of the storage or vehicle tanks is minimized to avoid loss of an economically valuable product. Finally, the mine has a Spill Prevention Control and Countermeasure Plan that provides inspection, training, and operation measures to minimize the extent of contamination resulting from the use of hydrocarbons at the site.

**Coal Spillage During Hauling.** Coal is hauled over County roads from the mine to State Highway 10 and future destinations. Past experience has indicated that no substantial quantities of coal have been spilled during transport. If coal is spilled, it may wash into local streams during a runoff event prior to cleanup. Possible impacts to the surface water include increases in total suspended solids and turbidity from the fine coal particulates. The probability of a spill occurring in an area sufficiently close to a stream channel to introduce coal to the stream bed is extremely small.

**Areal Extent of Probable Hydrologic Consequences.** The above discussion indicates that the probable hydrologic consequences of mining at the Emery Mine will be limited in areal extent as follows:

- Contamination from acid- and toxic-forming materials – Very limited areal extent of impact, if any.
- Increased sediment yield from disturbed areas – No impacts downstream from disturbed areas.
- Impacts to groundwater availability – Drawdown of the groundwater potentiometric surface due to mine dewatering may extend northward to an area south of the Emery Town wells, westward to the Joe's Valley-Paradise Fault Zone, eastward to the area of Muddy Creek, and southward to an area north of Ivie Creek.
- Impacts to surface water availability – Increased flow in Quitchupah Creek and immediate downstream portions of Ivie Creek.
- Increased total dissolved solids concentrations in surface and groundwater – Slight increase in TDS concentrations in Quitchupah Creek and immediate downstream portions of Ivie Creek. Temporary increase in TDS concentrations in the upper Ferron Sandstone adjacent to the mine.
- Flooding and streamflow alteration – Very limited areal extent of impact, if any.
- Potential hydrocarbon contamination – Very limited areal extent of impact, if any.
- Coal spillage during hauling – Very limited areal extent of impact, if any.

The above summary indicates that the greatest potential lateral extent of hydrologic impacts due to mining will occur as a result of drawdown of the potentiometric surface. Data presented on page VI-22 of this document indicate that drawdown due to mine dewatering had not occurred at the Emery Town wells as of November 2007. The results of groundwater modeling presented in Appendix VI-15 indicate that the potentiometric surface in the Upper Ferron sandstone may drop an additional 1.6 feet at a point 8,800 feet south of the Emery Town wells (the northern extent of the groundwater model) prior to the end of mining (drawdown obtained from model output). Impacts to water levels in the Middle and Lower Ferron Sandstone will be less. Given this minimal predicted drawdown at a point 1-2/3 miles south of the wells, the effects of drawdown are not anticipated to extend as far north as the Emery Town wells.

As indicated in Section VI.2.4.1, recharge to groundwater in the Ferron Sandstone occurs primarily along the Joe's Valley-Paradise fault zone. Hence, this fault zone serves essentially as a constant-head boundary, beyond which the drawdown effects of mine dewatering will not extend to the west.

The Ferron Sandstone outcrops west of Muddy Creek (see Plate VI-5). Although the groundwater model predicts that some drawdown will occur in this area, model predictions are of limited accuracy at the outcrops. Furthermore, natural recharge to the Ferron Sandstone due to leakage from Muddy Creek will minimize the magnitude of drawdown beyond this area. As a result, it is not anticipated that drawdown impacts of mine dewatering will extend substantially eastward of Muddy Creek.

A comparison of Plates VI-1 and VI-7 indicates that 486 feet of drawdown occurred at well R2(U) between 1979 and 2006, with 109 feet of drawdown occurring at well AA(U) between 1979 and 2006. These two wells are 8,800 feet apart from each other, indicating that the drawdown gradient between the two is 0.043 ft/ft. At this gradient, the point at which no drawdown has occurred would be 11,300 feet south of well R2(U) (i.e., 2,500 feet south of well AA(U)). This point is approximately 1 mile north of Ivie Creek. In actuality, the gradient associated with a cone of depression in the potentiometric surface is not constant, but rather decreases with distance away from the center. Thus, it is anticipated that the drawdown effects of mine dewatering will extend further to the south toward Ivie Creek than indicated by this simple calculation. However, the distance to Ivie Creek as well as natural recharge to the Ferron Sandstone due to leakage from Ivie Creek will minimize the magnitude of drawdown beyond this stream. As a result, it is not anticipated that drawdown impacts of mine dewatering will extend substantially southward of Ivie Creek.

Plate VI-4 contains a line that represents the "approximate area of hydrologic evaluation." The location of this line was chosen as outlined in Section VI.2.2.3. The above discussion indicates that this line also delineates the maximum areal extent of the "adjacent area" in the context of the potential impacts of the Emery Mine on the hydrologic balance of the region. In other words, it is not anticipated that adverse impacts to the hydrologic balance will extend beyond this line due to mining at the Emery Mine. Furthermore, from the discussion presented previously in this section, it is anticipated that all hydrologic impacts associated with mining will be temporary. With specific reference to the drawdown effects of mine dewatering, the discussion on page VI-22 indicates that the potentiometric surface of the Ferron Sandstone will gradually return to pre-mining conditions once dewatering activities cease.

## **VI.2.9 Cumulative Hydrologic Impact Assessment (CHIA)**

A Cumulative Hydrologic Impact Assessment to include the permit and adjacent areas has been prepared by the Division.

## **VI.3 OPERATION PLAN**

### **VI.3.1 General Requirements**

This permit application includes an operation plan which addresses the following:

- Groundwater and surface water protection and monitoring plans;
- Design criteria and plans;
- Performance standards; and
- A reclamation plan.

#### **VI.3.1.1 Hydrologic-Balance Protection**

**Groundwater Protection.** To protect the hydrologic balance, coal mining and reclamation operations will be conducted to handle earth materials and runoff in a manner that minimizes acidic, toxic, or other harmful infiltration to the groundwater system. Additionally, the mine will manage excavations and disturbances to prevent or control discharges of pollutants to the groundwater.

## VIII.B.2 DESCRIPTIONS OF VEGETATION MAPPING UNITS

The vegetation mapping units and/or communities were classified on the basis of the conspicuous overstory species and the relative cover of that component. In general the vegetation within the permit and adjacent area is sparse because of limited annual precipitation and desert conditions. The following are descriptions of the vegetation types and mapping units found within the permit and adjacent area.

### Riparian Meadow

The riparian meadow community is characterized by aquatic and semi-aquatic species. As such, this community is restricted to areas where water is available perennially through either surface or subsurface irrigation. The dominant species of this vegetation type within the permit and adjacent area are alkali muhly (Muhlenbergia asperifolia), beaked spikerush (Eleocharis rostellata), inland saltgrass (Distichlis stricta), and Baltic rush (Juncus balticus). Forbs play a minor role except in areas where the water table is immediately below the surface during the majority of the growing season. Total cover by plants is 40 to 50 percent and total production is approximately 173.9 grams per square meter (1152 lbs/acre) annually. Based on total productivity, this type should be one of the most important to livestock, except that the major species found here are not very palatable.

Annual Forb Community This sparsely vegetated community is found on Bluegate shale outcrops and clay slopes. The annual forb community is dominated by desert trumpet wildbuckwheat (Eriogonum inflatum), common halogeton (Halogeton glomeratus), orach (Atriplex powellii), and western stickseed (Lappula occidentalis). Shrub species, shadscale saltbrush (Atriplex confertifolia) and castle valley clover (Atriplex cuneata), are of secondary importance and most individuals are stunted and of low stature. Total vegetation cover for the annual forb community is only 6 percent. This community is of negligible importance to livestock with an estimated annual production of 20.5 grams per square meter (183 lbs/acre).

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## VIII.B.2 DESCRIPTIONS OF VEGETATION MAPPING UNITS (Cont)

### Matscale Shrubland Community

This community is found on clay flats and gentle clay slopes of the Bluegate shale. The dominant component of this community is matscale saltbush (*Atriplex corrugata*). Total cover for the matscale shrubland is 17 percent, of which annual forbs and Indian ricegrass contribute less than 1 percent. Estimated total annual production for the matscale shrubland is 78.4 grams per square meter (700 lbs/acre).

### Riparian Shrubland

The riparian shrubland community is restricted to streambanks and streambank overflow deposits along Quitcupah Creek. This community is dominated by an overstory of tamarisk (*Tamarix pentandra*). Other important species include fireweed summercypress (*Kochia scoparia*), inland saltgrass, rubber rabbitbrush (*Chrysothamnus nauseosus*) and common halogeton. Total herbaceous layer cover for this community is 20 percent. Estimated total annual production, excluding tamarisk, is 36.0 grams per square meter (322 lbs/acre). Total production is not high in this community and therefore probably of minor importance to livestock. However, the increased vertical stratification afforded by tamarisk and the density of stems provides important cover for wildlife species.

### Greasewood Shrubland

This community occurs in and along the bottoms of drainages in saline clay soils. The dominant species is greasewood (*Sarcobatus vermiculatus*). The species diversity is generally low in this community. However, other species frequently encountered include greenmolly summercypress (*Kochia americana*), fireweed summercypress, African mustard (*Malcolmia africana*), and common halogeton. The total herbaceous layer cover is approximately 24 percent. The total estimated annual production is 156.8 grams per square meter (1400 lbs/acre), the majority of which is greasewood. As such this community is of minor importance to livestock, except during winter months when little else is available. The greasewood shrubland is one of the most extensive communities.

### Mixed Desert Shrubland

The mixed desert shrub community is found on soils ranging from sandy, well-drained soils to saline clay soils. The species comprising this community have a relatively low moisture requirement and are somewhat salt tolerant. The conspicuous feature of this community is the shrub species dominated by shadscale saltbush. Prickly pear cactus (*Opuntia polyacantha*), rubber rabbitbrush, and big sagebrush (*Artemisia tridentata*) are sub-dominant shrub elements. Important understory species include hiliaria galleta grass (*Hilaria jamesii*), Indian ricegrass (*Oryzopsis hymenoides*), western stickseed, and nodding wildbuckwheat (*Eriogonum cernuum*). Total cover was 10 percent. Estimated total production was approximately 38.5 grams per square meter (340 lbs/acre). This community is not an important type for livestock. Mixed desert shrubland is another one of the most extensive communities in the permit and adjacent area.

Revised5/09

## VIII.B.2 DESCRIPTION OF VEGETATION MAPPING UNITS (Cont)

### Pinyon-Juniper Woodland

This woodland type occurs on rocky slopes and is restricted to a small portion of the permit area. The substrate is rocky and soils are relatively thin, sandy veneers. The dominant species is Utah juniper (Juniperus osteosperma) with pinyon pine (Pinus edulis) as a secondary codominant. The understory component of this community is sparse, composed of scattered shrubs, perennial grasses, and various forbs. Important understory species include hiliaria galleta grass, mountain pepperweed (Ledidium montanum), roughseed cryptantha (Cryptantha flavoculata), western stickseed, and nodding wild buckwheat. The dominance of Utah juniper suggests this community is at the lower elevational limits for the pinyon-juniper woodland type. This is supported by the scattered character of this type within the permit and adjacent area which interdigitates and intergrades extensively with the mixed desert shrub type. Total estimated annual production is 18.4 grams per square meter (165 lbs/acre). Livestock utilize this vegetation type for grazing, as well as for shade protection and rubbing posts.

### Cottonwood Woodlands

This community is restricted to the northwest corner of the permit area along Quitchupah Creek. Black cottonwood (Populus fremontii) is the dominant species. This community provides cover and nest sites for the local avifauna and probably cover for large game. No sampling was conducted in this vegetation mapping unit.

### Rock Outcrop Talus

This community is largely non-vegetated and is composed primarily of sandstone cliffs and associated talus along Christiansen Wash and Quitchupah Creek. A few of the species in this area include skunkbush sumac (Rhus trilobata), harriman yucca (Yucca harriamaniae), desert princesplume (Stanleya pinnata), thickstem wildcabbage (Caulanthus crassicaulis), and scattered perennial grasses. No sampling data were collected in this vegetation mapping unit.

### Pasture Land/Hayland

These agricultural areas are supported by surface irrigation. No sampling data was collected for this vegetation mapping unit.

### Disturbed Lands - Consol

These disturbed lands - Consol were disturbed prior to August 3, 1977 and are currently associated with our current mining operations. No sampling data was collected for this vegetation mapping unit.

### Disturbed Lands - Other

These disturbed lands - other are not associated with our mining operations. No sampling data was collected for this vegetation mapping unit.

### Summary

A summary of sample sizes and numbers for all sites within each of the vegetation mapping units follows as TABLE VIII-1.

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### VIII.B.3 SPECIES LIST

The following comprehensive species list includes species encountered during the various sampling procedures and any other species observed within the permit and adjacent area.

Scientific Name	Common Name	Family
TREES		
<i>Juniperus osteosperma</i>	Utah Juniper	Cupressaceae
<i>Pinus edulis</i>	Pinyon Pine	Pinaceae
<i>Populus fremontir</i>	Black Cottonwood	Salicaceae
SHRUBS		
<i>Amelanchier utahensis</i>	Utah Serviceberry	Rosaceae
<i>Artemisia spinescens</i>	Bud Sagewort	Compositae
<i>Artemisia tridentata</i>	Big Sagebrush	Compositae
<i>Atriplex canescens</i>	Fourwing Saltbush	Chenopodiaceae
<i>Atriplex confertifolia</i>	Shadscale Saltbush	Chenopodiaceae
<i>Atriplex corrugata</i>	Mat Saltbush	Chenopodiaceae
<i>Atriplex cuneata</i>	Castle Valley Clover	Chenopodiaceae
<i>Cercocarpus intricatus</i>	Littleleaf Mountainmahogany	Rosaceae
<i>Chrysothamnus nauseosus</i>	Rubber Rabbitbrush	Compositae
<i>Chrysothamnus parryi</i>	Parry Rabbitbrush	Compositae
<i>Chrysothamnus viscidiflorus</i>	Douglas Rabbitbrush	Compositae
<i>Ephedra viridus</i>	Green Mormontea	Ephedraceae
<i>Forsellesia meionandra</i>	Greasebush	Celastraceae
<i>Rhus trilobata</i>	Skunkbush Sumac	Anacardiaceae
<i>Salix exigua</i>	Coyote Willow	Salicaceae
<i>Sarcobatus vermiculatus</i>	Black Greasewood	Chenopodiaceae
<i>Tamarix pentandra</i>	Saltcedar Tamarisk	Tamaricaceae
<i>Tetradymia spinosa</i>	Cottonthorn Horsebrus	Compositae
<i>Yucca harriamaniae</i>	Harriman Yucca	Liliaceae

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VIII.B.4 THREATENED AND/OR ENDANGERED SPECIES

A total of 14 threatened and/or endangered species or subspecies have been reported for Emery County, Utah. EMRIA Report No. 16.

Utah's Federally (USF & WS) Listed Threatened (T), Endangered (E), and Candidate (C) Plant Species (as of 01/03/01)

Endangered Species:

Wright fishhook cactus (Sclerocactus Wrightiae), is reported from the area. However, of all the specimens examined within the permit and adjacent area, none were determined to be this species.

Threatened Species:

Last Chance Townsendia (Townsendia Aprica) has been reported to occur within the vicinity. This species was not observed within the permit and adjacent area.

The complete list of Threatened (T), Endangered (E) and Candidate © as of 01/03/01 for Emery County is as follows:

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Dicot Plants:		
Jones Cycladenia	Cycladenia humilis var jonesii	T
Maguire Daisy	Erigeron maguirei	T
Last Chance Townsendia	Townsendia aprica	T
Barneby Reed-mustard	Schoenocrambe barnebyi	E
San Rafael Cactus	Pediocactus despainii	E
Winkler Pincushion Cactus	Pediocactus winkleri	T
Wright Fishhook Cactus	Sclerocactus wrightiae	E
Fishes:		
Humpback Chub	Gila cypha	E
Bonytail	Gila elegans	E
Colorado Pikeminnow	Ptychocheilus lucius	E
Razorback Sucker	Xyrauchen texanus	E
Birds:		
Bald Eagle – Breeding	Haliaeetus leucocephalus	T
Mexican Spotted Owl	Strix occidentalis lucida	T
Mammals:		
Black-Footed Ferret- Unconfirmed	Mustela nigripes	E extirpated

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The herbaceous productivity was more similar. The forb species productivity was 54.77 grams per square meter for the vegetation sample sites area and 69.97 grams per square meter for the reference area. In the vegetation sample sites the forb productivity was equally split between the annual and perennial species. In the reference area, annual forb species contributed 97 percent of the total for the forb component. Species composition was similar with 80 percent of the top ten species common to the vegetation sample sites and reference areas.

While the vegetation sample sites and reference area data are different, they are both representative of this shrubland type. The vegetation sample site area data are characteristic of the more moist bottomland drainages and the reference area characteristic of drier alluvial deposits. These data are still useful in the evaluation of reclaimed areas by calculating correction factors as described earlier.

### Mixed Desert Shrub Community

The mixed desert shrub community was the second most extensive native vegetation type found on the permit and adjacent area. The species composition was similar with 70 percent of the top ten species common to the vegetation sample sites and reference areas. Total cover was very similar with 10.1 percent in the vegetation sample sites area and 10.6 percent in the reference area. The estimated total annual productivity was 38.49 and 41.96 grams per square meter for the vegetation sample sites and reference areas, respectively.

### Pinyon-Juniper Woodland

The pinyon-juniper type is restricted in distribution to rocky upland areas. This community, within the permit and adjacent area, represents a lower elevational extension of this community. As such, this community is marginal and intergrades extensively with the mixed desert shrub community. The pinyon-juniper community was either too small or inaccessible within the permit and adjacent area in which to establish a reference enclosure. Therefore, the reference area is located in a small pinyon-juniper community adjacent to the permit area. Given the limitations of this community, the vegetation sample sites and reference areas are similar. There was a 30 percent overlap in the top ten ranked species between the reference and affected area. The total herbaceous cover was similar with 6.3 and 7.0 percent for the vegetation sample sites and reference areas, respectively. Total production for the affected area was 18.44 grams per square meter and 18.28 grams per square meter for the reference area.

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CHAPTER VIII VEGETATION

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VIII-1	BIOLOGICAL IMPACTS AT THE 4 <sup>TH</sup> EAST PORTAL AREA 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 4 <sup>th</sup> East, 6 <sup>th</sup> West, & 14 <sup>th</sup> /15 <sup>th</sup> 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, June 2009

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VIII-1	VEGETATION & LAND USE MAP
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Revised 05/2007  
Revised 1/09  
Revised 6/09

## **CHAPTER V GEOLOGY AND SUBSIDENCE**

### **V.A GEOLOGY**

This part of Chapter V describes the geology of the general area, the project area geology and the coal bearing units, with particular emphasis on the I zone where mining is currently taking place. Also included are reserve estimates and information on strata adjacent to the mixable seams. Additional information relating to Federal Lease U5287, and the Resource Recovery and Protection Plan (R2P2) are contained in Appendix V-I. Geologic data and maps presented in this chapter shall be considered confidential and should be treated according to 786.15(b) and Federal Regulation 43CFR3481.3.

### **UMC 783.13, UMC 783.14 UMC 783.25**

#### **V.A.1 GENERAL AREA GEOLOGY**

Figure V-1 shows the formations and members in the region of the study area. In the permit and adjacent area three geologic units are important: Quarternary colluvium and alluvium, the Bluegate Shale member of the Mancos Shale, and the upper portion of the Ferron Sandstone member of the Mancos Shale.

Quarternary colluvium and alluvium occurs on toe slopes, along the drainage, and on the high terraces. The colluvium is a boulders, loamy sand below sandstone outcrops and a silty clay below shale hills. The Quarternary alluvium and terrace deposits are crudely stratified, poorly sorted sands and gravels.

The Bluegate Shale outcrops west of Christiansen Wash and west of Quitchupah Creek south of the mine office. It is a saline, bluish gray, silty mudstone or siltstone. It is nodular and irregularly bedded. Thin sandstone beds occur within the Bluegate Shale. Where the Bluegate Shale is exposed at the surface it forms barren shale hills.

The Ferron Sandstone outcrops along Qultchupah Creek and Christiansen Wash. The Ferron Sandstone averages 400 feet in thickness and consists of an upper and lower unit. The upper Ferron comprises lenticular beds of fine to coarse sandstone, and lenses and intercalated beds of shale, siltstone, and coal. The lithologies indicate fluctuations of a non-marine coastal swamp environment at the edge of the Cretaceous Sea. The coal seam now being mined (I zone) occurs in the Upper Ferron. The lower unit of the Ferron is a calcareous, yellow-gray, medium- to fine-grained, locally cross-bedded marine sandstone. A minor amount of erosion after Ferron deposition is indicated by the disconformable contact between the Ferron Sandstone and the Bluegate Shale.

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### **V.A.3 GEOLOGY OF COAL BEDS AND ADJACENT UNITS**

The present owners began their exploration activity in the Emery coal field in the mid 1960s. At the end of 1980, 833 holes had been drilled in the Emery field about 150 of these are within the present permit and adjacent area limits. All holes, except the first 100, have been electrically logged.

The major target for the holes within the permit and adjacent area has been the I zone. The seams of this zone were cored at most of the drill sites.

#### **K Seam (Plates V-17, V-18)**

The K seam is the uppermost of the defined coal seam within the permit application area. The seam averages about 6 feet thick, and a maximum detected thickness of 8.5 feet was penetrated in drill hole FC-80 (Section 29, T22S, R6E). Generally, the K seam consists of two splits (A1 and K3) separated by shale partings. The seam splits into progressively thinner coal layers separated by shales partings toward the edges of its extent.

In the southwestern part of the adjacent area the K seam is about 100 feet below the top of the Ferron. In the northwestern part of the permit area the K seam is at or near the top of the Ferron (the Ferron thins northward). This K-Ferron top interval contains thick sandstones toward the southwest. These thin and disappear northward so that the K seam in the northwestern part is overlain by shales and siltstones of the Bluegate.

#### **The K-I Zone Interval**

The interval between the K seam and the seams of the I zone below ranges from about 10 feet in Section 31, T22S, R6E, to 57 feet in drill hole FC-275 (NW¼, Section 29, T22S, R6E).

The thin part of the interval is composed of shale. The thicker part to the north contains 20-30 foot layers of sandstone. The increase in thickness to the north is sudden, occurring along a northeast- southwest trending line running through the southern part of Section 29, T22S, R6E.

#### **The I Zone (Plates V-19, V-20, V-21, V-22)**

The I zone is the targeted commercial horizon for the present permit application area. Various coal layers of this zone will be extracted during the permit life.

In the present mine area, the zone consists, from base upwards, of an 8-10 foot layer of coal (Lower I-5), a 0.1-0.2 foot clay parting (First Slip), a 3-4 foot layer of coal (Lower III), another thin clayey layer (Second Slip), a third layer of coal 3-4 feet thick (Upper I), and topped off by a 3-4 foot layer of inter bedded coal and shale (J). The

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clayey material corresponding to the Second Slip can be recognized readily in E-logs from holes away from the mine area. The First Slip commonly cannot be recognized in the absence of a detailed core description; in such cases; the combined LI1-LI5 is referred to as the Lower I.

A distance away from the presently active mine, the First Slip (or a shale layer in similar stratigraphic position) thickens rapidly as the coal below the interval (the LI5) begins to thin and become shales. Present plans are to ramp upward from the LI5 and to begin mining the Combined UI and LI1.

About  $\frac{1}{4}$  to  $\frac{1}{2}$  miles southwest of the present mine works, the LI1-LI5 interval again thins and becomes undetectable allowing the presence of a thick mass of Lower I in and around Section 31, T22S, R6E. Plans are to ramp back down from the UI-LI1 mining interval into the Lower I once this region is reached.

The LI5 commonly becomes thin and shaley once the LI1-LI5 parting becomes thicker than about 2 feet. In the northeastern portion of the mine, the LI5 is the preferred mining horizon due to its sufficient Seam thickness and high quality. In the areas where the LI5 will be mined, the LI-LI1 horizon will not be mined due to the thin interval between the two mining horizons.

The parting between the UI and LI1 has a fairly constant thickness of 0-1 feet over most of the permit application area. This interval rapidly increases to more than 20 feet along a line trending through the southern part of Sections 31 and 32, T22S, R6E. Mining of the combined UI-LI1 will end where the interval is more than 1 foot.

### **The I-G Interval**

The material immediately beneath the I zone generally is a soft clayey or silty material about 6 inches to 1 foot thick underlain by sandy siltstone or sandstone. Standard mining practice is to leave a foot or so of coal in the floor to avoid operating the machinery in that material.

The I-G interval has an average thickness of about 70-80 feet but attains a maximum measured thickness of near 100 feet along a rather diffuse trend extending north-south through the central part of the permit and adjacent area.

Generally, the thinner parts of this interval are composed predominantly of shale and siltstone. The thicker parts contain one or more thick sandstone beds.

### **The G Seam (Plate V-23)**

The G seam is a thin (5-foot average, 7-foot maximum) high sulfur, moderately extensive seam lying between the I zone above and the CD zone below.

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Thin outcrops of the G seam are present in cliff walls bounding Muddy and Quitchupah Creeks to the east. The seam is only 2-3 feet thick along these canyons: drill hole data indicate that the seam thickens to the west and is about 5-6 feet thick over most of the permit and adjacent area.

No mining of the G seam is contemplated because of the generally high sulfur and ash content and rather close stratigraphic distance from the preferred I zone.

### **The G-CD Interval**

This interval has quite a variable thickness. Two lobes of near 60 feet thickness extend north from the southern border of the adjacent area. These are separated and bounded by areas where the thickness averages about 20 feet. The thin areas are approximately in the same location as the thick areas of the I-G interval.

As is common, the thinner areas are composed mainly of siltstone and shale while the thick areas contain one or more massive sandstone bodies.

### **The CD Zone (Plates V-24, V-25)**

The CD coal bearing zone is a complex of inter bedded lenticular coal beds, shale, clay siltstone and thin sandstone. Total thickness of the zone averages about 12-13 feet. Commonly two coaly benches 3-5 feet thick separated by a 2-3 foot shale parting can be recognized. Average ash content of the full zone is about 30% and ash content of the more coaly parts ranges from 15-25%.

No mining of the CD zone is contemplated because of the very high ash content and because of the rather thin interval between the CD and the underlying A seam.

### **The CD-A Interval**

This interval, as presently defined, ranges from 20-65 feet along the southern border of the adjacent area, but increases rapidly to over 100 feet a short distance north of there. This rapid thickening is associated with the northward thinning and disappearance of the A seam.

### **The A Seam (Plate V-26)**

The main body of the A seam extends from Quitchupah Creek to just south of Ivie Creek. A single seam up to 13 feet thick exists in that region. Within the permit and adjacent area, this lens of the a seam ranges in thickness of 0 feet along the Quitchupah to about 12 feet in the southwestern corner.

This lens of the A seam will be developed at a future date. Mining of the A seam is not part of this application.

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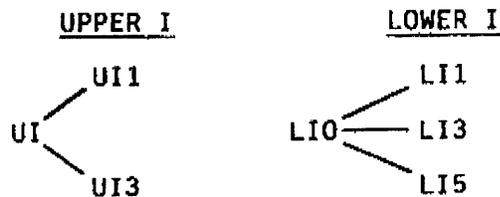
## V.A.7 COAL RESERVE INFORMATION

Table V-2 shows the reserves for the mine permit and adjacent area and federal Lease U-5287. Reserves are reported for all of the seams and have been calculated for the reserve basis, mineable reserves and recoverable reserves as defined in 43CFR3480.0-5. The coal reserve base has been calculated using a minimum thickness of 48 inches regardless of depth. Mineable Reserves are calculated using the following criteria:

- Minimum Mining Height = 5.0 ft.
- Maximum Mining Height = 10.0 ft.
- A Minimum of 2 Foot Combined Roof and Floor Coal is Left in Place.

For the purposes of calculating reserves, the I-Zone is correlated and defined into various horizons. There are seven different seam codes used to describe the various splits within the I-Zone. These seam codes are:

These seven splits are redefined as six seams for the determination of the coal reserve base. The rules used to define each seam are:



- UILIO - This designation is used where the Upper I and Lower I form a single seam. The parting between the LI1 and LI5 is less than 1.0 ft. and the parting between the Upper I and Lower I is less than 1.0 ft.
- UILII - This designation is used where the parting between the Upper I and Lower I is generally less than 1.0 ft. and the LI1-LI5 parting is greater than 1.0 ft.
- LIO - This designation is used where the parting between the Upper I and Lower I is greater than 1.0 ft. and the LI1-LI5 parting is less than 1.0 ft.
- LI1 - The LI1 seam designation is used where the Upper I – Lower I parting is generally greater than 1.0 ft. and the LI1-LI5 parting is greater than 1.0 ft.
- LI5 - This designation is used where the LI1-LI5 parting is greater than 1.0 ft.
- UI - This designation is used where the Upper I – Lower I parting is generally greater than 1.0 ft.

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## **V.B      SUBSIDENCE**

This part of Chapter V covers all of the issues associated with subsidence. Other chapters refer to this part when information concerning subsidence is required.

A comprehensive presubsidence survey of the adjacent area and permit area was done by Valley Engineering, Inc. and is appended to this part. Subsequent updated pre-subsidence surveys will be completed for all future panels where full extraction (planned subsidence) is contemplated. The reports will be submitted to DOGM six months prior to initiating full extraction.

### **V.B.1   Subsidence Control, Monitoring and Mitigation**

#### **UMC 783.24 (d), (e), (h)**

Plates V-1, V-2, and V-3, of Appendix V-3 (Presubsidence Survey) show the manmade features within and adjacent to the permit area, which are not associated with the mining operation. Each feature or structure is coded on the maps and described in the narrative. Plates II-1, II-2, IV-3, and IV-18, show the manmade structures associated with the mining operation. Each structure is coded on the maps and described in the narrative of Chapter II. The designs for the various structures are detailed in Chapters IV and VI.

#### **UMC 784.16 (a)(I)(iv)**

Past underground mining has taken place beneath three structures in this category. They are Pond #1 (mine discharge sedimentation pond), Pond #4 (reverse osmosis discharge collection pond), and Pond #5 (preparation plant area sedimentation pond). A small amount of subsidence would not have a significant effect on these ponds.

Pond #1, the largest, is an incised structure with heavily rip-rapped berms and concrete inlet/outlet structures\*

Pond #1 is the only impoundment containing an appreciable amount of water and it is a large distance from any public or private structure. Any discharge would be to an unnamed tributary of Quitchupah Creek. All three impoundments overlie mains and submains entries with relatively shallow overburden depths (less than 200 ft) and thus subsidence is not likely. The potential for downstream material damage due to subsidence is very low.

#### **UMC 784.20**

Appendix V-3 contains a presubsidence survey, performed by Valley Engineering, Inc. in 1980. Since that time, no structures have been added or removed. This document is therefore still used as baseline information.

Since the presubsidence survey shows that subsidence could cause material damage to structures and renewable resource lands, the following information is included for Parts (a),(b),(c), and (d) of this regulation.

The mining method used in most of the mine is room and pillar with partial pillar removal. Full extraction mining (planned subsidence) will occur at Emery in areas designated full extraction as noted on Plate V-5. As a result, any subsidence outside of these areas would fall into the unplanned category. Figure 1 pg. 28 shows the partial pillar splitting diagram employed underground. This layout is the result of past experience as well as state and federal 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 Figure 2 (page 29).

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 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 that there aren't any 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 ft. 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 Page 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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Revised 8/05  
Revised 2/07  
Revised 9/08  
Revised 5/09

9. Resurveys of a point should consist of a vertical traverse having a closure of at least 0.50 feet. If significant movement is detected, ( $\pm 5'$ ), a horizontal survey to that point will also be performed to check horizontal movement. The horizontal check survey may consist of a "side shot" where angles and distance are double checked, and need not be a closed traverse.
10. Monitoring points will consist of a concrete base and brass cap installed according to Figure V-8.

Plate V-5 shows the existing and future monitoring points for the permit and adjacent area.

Consol will provide 3 copies of a subsidence monitoring report to DOGM within one month after completion of any subsidence monitoring field survey conducted pursuant to the approved subsidence control plan. Subsidence monitoring reports shall contain the following information:

1. Mine maps showing where pillars have been pulled and the month and year that such pillars were removed or partially removed.
  2. Maps showing the location of survey monitoring stations and tension cracks and/or compression features visible on the surface.
  - 2a. The subsidence monitoring points above the areas outlined on Plate V-5 as full extraction areas (planned subsidence) will have photographs recorded both pre subsidence and post subsidence.
  3. The differential level and horizontal survey summary.
  4. 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.
11. Consol will establish pre-mining elevations and gradients of any irrigation ditches and pond embankments within the angle of draw. Consol will monitor these areas by visual inspection and post -subsidence ground survey, to establish the effects of subsidence. Mitigation of these effects will be carried out per the following section.
12. Consol will provide the Division a quarterly subsidence mitigation report that describes the surface mitigation projects and their status broke down by surface land owner.
13. Consol will update the existing Pre subsidence survey and Plates six (6) months prior to full extraction and provide copies to the surface land owner, DOGM, and the water conservancy, per R645-301-525-130.

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Revised 3/07  
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## CHAPTER V

### GEOLOGY AND SUBSIDENCE

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## X.A CULTURAL RESOURCES

This part presents the archeological, historical, and paleontological information in and adjacent to the permit and adjacent area. This information is contained in four (4) survey reports which are appended to this part.

The first, referred to herein as "Chapter 5.0", was prepared by AERC in October of 1980. The second, referred to herein as "Appendix 5-1", was prepared by AERC in July of 1981. The third, referred to herein as "Appendix 5-2", was prepared by Michael S. Berry, Utah Division of State History, in March of 1975. The fourth survey report, Appendix 5-3, was completed by AERC in October, 1988. The site forms are attached in a fifth section, referred to as "Appendix 5-4". The fifth survey report, Appendix 5-5, was completed by Montgomery Archaeological Consultants in May of 2002. This report covers 40 acres surrounding and including the 4th East Portal Site. The sixth referenced survey report, Appendix 5-6, covers the 4th East Powerline Corridor and was completed by Montgomery Archaeological Consultants in August of 2002. One site identified as historically significant was marked in the field and will be avoided as recommended by Montgomery. The seventh survey, referred to as "Appendix 5-7" was conducted by Montgomery Archaeological Consultants in March 2003. This survey was conducted to extend the inventoried areas of the 4th East Portal site. The survey covered an additional 40 acres to the east of "Appendix 5-5" original survey area. This extended area identified one new archaeological site "42Em2961". This new site will be avoided and a fence has been erected by the consultant along the site boundary .

These survey reports have not been edited or revised for this repermit application; they were originally prepared for the March 23, 1981 permit application (approved as ACT/015/015 on January 7, 1986) and subsequent revisions and are included herein in their entirety.

### UMC 783.12(b)

The attached investigations describe all of the known archeological sites in the permit area. No cultural and historic resources listed on the National Register of Historic Places occur in the permit area. A compendium is included which consolidates information on all of the sites.

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PART D: LAND USE

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## PART X.D LAND USE

### UMC 783.22

#### LAND USE INFORMATION

##### X.D.1 REGIONAL LAND USE

Regionally, land use in the vicinity of the Emery Mine includes five types. These are forestland, agriculture, pinyon-juniper rangeland, open rangeland, and urban areas. The closest town is Emery which has a population of approximately 220 people, most of whom are involved in ranching, limited agriculture, or employed at the Emery Mine (BLM, 1979).

Present day agriculture consists of alfalfa and improved pastureland. The adjacent open and fenced rangeland is used for livestock grazing. There is limited recreational use because of the open land (BLM, 1979).

##### X.D.2 LAND USE

Permit and adjacent area land use is divided into several categories, including pastureland, irrigated farmland and pasture, wildlife habitat, rangeland and lands disturbed by mining and gravel pits. These land uses occur in several combinations throughout the area.

##### X.D.3 LAND USE IN SURFACE OPERATIONS AREA

Refer to Plate VIII-1 Vegetation & Land Use Map for the location of the following three land uses:

- Grazing/Wildlife Habitat
- Industrial (Coal Mining)
- Roads

The dual land use of grazing/wildlife habitat comprise 415.7 acres, industrial (coal mining) affected prior to August 1977 comprise 19.5 acres and roads account for 5.8 acres of the total 441 acres of surface operations.

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**CHAPTER X**

**PART A: CULTURAL RESOURCES**

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See: Chapter XII, Appendix XII-3, Cultural Resource Report (MOAC Report No. 05-177, May 23, 2005), for 1<sup>st</sup> North IBC Archeology SEE CONFIDENTIAL BINDER

See: Chapter XIII, Appendix XIII-3, Class 3 Cultural Resource Report (MOAC Report 07-33, February 13, 2007) for First Federal Lease IBC Archeology. SEE CONFIDENTIAL BINDER

5-8 ARCHEOLOGICAL EVALUATION- MONTGOMERY ARCHAEOLOGY CONSULTANTS, Zero North and Zero Zero North (MOAC 07-323) SEE CONFIDENTIAL BINDER

5-9 ARCHEOLOGICAL EVALUATION- MONTGOMERY ARCHAEOLOGY CONSULTANTS, Life of Mine Panels (MOAC 08-135) spring 2008, site treatment plan. The treatment plan for eligible site 42Em3924 will be completed at least 6 months prior to subsidence, with a follow up visit only to the site within 12 months after subsidence. SEE CONFIDENTIAL BINDER

**FIGURES**

X-1 1<sup>st</sup> SOUTH FULL EXTRACTION ARCHEOLOGY SITES SEE CONFIDENTIAL BINDER

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Revised 6/09

# APPLICATION FOR COAL PERMIT PROCESSING

Permit Change  New Permit  Renewal  Exploration  Bond Release  Transfer

**Permittee:** Consolidation Coal Company

**Mine:** Emery Mine

**Permit Number:** 015/015

**Title:** Zero Zero North CNX

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

Amnd to add Consol controlled Zero Zero North area to MRP, perm vs. adj, def resp tsk id3099 clean copy 7/09

**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 checked="" type="checkbox"/> Yes <input 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 checked="" type="checkbox"/> No | 15. Does the application require or include soil removal, storage or placement?   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 16. Does the application require or include vegetation monitoring, removal or revegetation activities?  |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 17. Does the application require or include construction, modification, or removal of surface facilities?   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 18. Does the application require or include water monitoring, sediment or drainage control measures?  |
| <input checked="" 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.

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Sign Name, Position, Date

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

\_\_\_\_\_  
Notary Public

My commission Expires: \_\_\_\_\_, 20\_\_\_\_ }

Attest: State of \_\_\_\_\_ } } ss:  
County of \_\_\_\_\_

**For Office Use Only:**

**Assigned Tracking  
Number:**

**Received by Oil, Gas & Mining**

**RECEIVED**

**JUL 02 2009**

**DIV. OF OIL, GAS & MINING**

**CHAPTER VIII**

**APPENDIX VIII-5**

*Vegetation, Wildlife  
& Sensitive Species  
of the  
Zero Zero North Area  
2009*

*Emery Mine, Utah*



**The Zero Zero North Area**

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June 2009

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# INTRODUCTION

Emery Mine is located in Emery County, south-central, Utah. Expansion of underground coal mining activities have been planned in an area known as Emery Mine's Zero Zero North (ZZ North). The ZZ North area consists of 74 acres of surface land. In planning phases for the new mining activities, it was recognized that there is the possibility for impacts to the ground surface from subsidence caused by these activities. Consequently, studies have been conducted of the plant communities and wildlife habitats, as well as sensitive species that may occur in the area. Results of the studies have been provided in this report.

## METHODS

Vegetation mapping was completed in the ZZ North area by using aerial photographs in the field, walking the area, and mapping the plant communities encountered at that time. Other data were recorded while accomplishing this task such as listing the dominant plant species in each plant community, conducting sensitive species surveys and recording pertinent qualitative field data.

Wildlife habitat information was obtained by using the State of Utah, Division of Wildlife Resources (DWR) geographic information system (GIS) database and maps.

Threatened, endangered and candidate species lists were compiled previously in the area by conferring with U.S. Fish & Wildlife Service, Salt Lake City, Utah, the State of Utah, Natural Heritage Program, reviewing files located at *Mt. Nebo Scientific, Inc.* and by examining voucher specimens at the herbarium at Brigham Young University. Following the initial research work, know locations for specific plant species were visited to review their habitats and to evaluate the current phenologic status of the given species so that proper timing to conduct the field surveys could be ascertained. If any federally listed threatened, endangered or otherwise sensitive species were found at the study site, notification would then be made to the State of Utah, Division of Oil, Gas & Mining (DOG M) so that appropriate avoidance or mitigation measures can be formulated in a timely manner.

## RESULTS

### *The Plant Communities*

The plant communities located within the ZZ North area have been mapped and added to the Emery Mine's Mining and Reclamation Plan (MRP) *Vegetation and Landuse Map*. A small-scale copy of this map has been included in the report. To facilitate a review of the area on a larger scale map, refer to Plate VIII-1 of the MRP.

The following plant communities were mapped within the ZZ North area of the Emery Mine:

- Shadscale
- Sagebrush
- Greasewood
- Pasture Land

A brief description for the plant communities follows.

### Shadscale

A shadscale plant community occupied much of the ZZ North area (Figure 1). As the community name suggests, this community was dominated by shadscale (*Atriplex confertifolia*), but several other species of shrubs, forbs, and grasses were often common in this community such as broom snakeweed (*Gutierrezia sarothrae*), mat saltbush (*Atriplex corrugata*), cryptanth (*Cryptantha* spp.), Indian ricegrass (*Stipa hymenoides*), galleta (*Hilaria jamesii*) and blue grama (*Bouteloua gracilis*).

### Sagebrush

There were some relatively small areas that were dominated by sagebrush (*Artemisia tridentata* var. *wyomingensis*). These areas were primarily located within small pockets inside the shadscale communities (Figure 2). Other species associated with this community were greasewood, shadscale, broom snakeweed, galleta and rubber rabbitbrush (*Chrysothamnus nauseosus*).

### Greasewood

Greasewood communities were also common in the study area (Figure 3). This community is known for its relatively low species diversity with the dominant plant species here represented almost exclusively by greasewood (*Sarcobatus vermiculatus*), and to a lesser extent, Torrey's

seepweed (*Suaeda torreyana*). Some shadscale and galleta plants were also located in and around this community.

### Pasture Land

Some of the area has been converted from native plant communities to pasture lands for use by domestic livestock. Some of the pasture lands in the Emery Mine permit area were once irrigated, but are currently being utilized as unirrigated, dry-land pastures (Figures 3 and 4).

Native species common in these areas were greasewood, saltgrass (*Distichlis spicata*) and galleta. Due to disturbance by landowners and cattle, some “weedy”, exotic species such as gumweed (*Grindelia squarrosa*), field bindweed (*Convolvulus arvensis*), thistles (*Cirsium* spp.) and houndstongue (*Cynoglossum officinale*) can also be found in these areas.

### Wildlife Habitat

A geographic information system (GIS) database that provides information from the State of Utah, Division of Wildlife Resources (DWR) suggested the study area is not critical habitat for pronghorn, elk, mule deer, or rocky mountain bighorn sheep. No other critical wildlife habitat is known for the area. Important wildlife habitat types have been mapped for the entire Emery Mine permit area including ZZ North (refer to *Selected Wildlife Information*, Plate 10-1 of the MRP).

## Raptors

In 2001, state biologists from DWR along with representatives from Consol visited the nearby Emery Mine areas. At that meeting it was suggested that there was a low probability of raptor occurrence in the general area [refer to: "*Biological Impacts at the 4th East Portal Area at the Emery Deep Mine*", Mt. Nebo Scientific, Inc. (2002)]. Since that time Consol has participated in some of the annual raptor surveys conducted by DWR and all coal operators in the area.

## Threatened, Endangered & Sensitive Species

There are several federally listed plant and animal species that are known to occur in Emery County, Utah. There is the possibility that some of these species could occur in the area. The most likely plant communities for such occurrences would be in the shadscale community and possibly portions of the pasture land. A sensitive species survey was conducted in the ZZ North area in the springtime ranging from late-April through mid-May 2009.

Table 1 lists the federally listed plant and animal species known to occur in Emery County. The table also provides information regarding the potential for each species to occur in the ZZ North and field surveys that have been conducted in the area. Table 1 also provides habitat information and the possibility of impacts to each species as a result of the proposed new mining.

**Table 1: Federally listed threatened, endangered & candidate species in Emery County, Utah and notes regarding field studies, potential habitats and impacts to them in the ZZ North area at the Emery Mine.**

Scientific Name	Common Name	Status*	Site-Specific Notes
<b>PLANTS</b>			
<i>Pediocactus winkleri</i>	Winkler Footcactus	T	<p>A field survey was conducted for this species in late-April through mid-May 2009. Neither the plant nor its specific habitat were found in the ZZ North area.</p> <p>Therefore, subsidence caused by underground mining is not expected to impact this species.</p>
<i>Pediocactus despainii</i>	Despain Footcactus	E	<p>A field survey was conducted for this species in late-April through mid-May 2009. Neither the plant nor its specific habitat were found in the ZZ North area.</p> <p>Therefore, subsidence caused by underground mining is not expected to impact this species.</p>
<i>Schoenocrambe barnebyi</i>	Barneby's schoenocrambe	E	<p>Although this plant can be found in mixed shadscale communities, some of which are found in the ZZ North area, it is usually found within the Chinle Formation, which is not found at the surface of this area.</p> <p>This plant was included, however, in the 2009 field surveys that were conducted for other species that were more likely to occur in the ZZ North area.</p> <p>The plant nor its specific habitat were found in the area, so subsidence caused by mining activities is not expected to impact this plant species.</p>
<i>Sclerocactus wrightiae</i>	Wright Fishhook Cactus	E	<p>A field survey was conducted for this species in late-April through mid-May 2009. Neither the plant nor its habitat were found in the ZZ North area.</p> <p>Therefore, subsidence caused by underground mining is not expected to impact this species.</p>
<i>Townsendia aprica</i>	Last Chance Townsendia	T	<p>A field survey was conducted for this species in late-April through mid-May. Neither the plant nor its specific habitat were found in the ZZ North area.</p> <p>Therefore, subsidence caused by underground mining is not expected to impact this species.</p>

**Table 1: Federally listed threatened, endangered & candidate species in Emery County, Utah and notes regarding field studies, potential habitats and impacts to them in the ZZ North area at the Emery Mine.**

<i>Erigeron maguirei</i>	Maguire Daisy	T	<p>In the past this species was only known to be located in the San Rafael Swell where it can be found in somewhat moist, shady bottoms formed by eroded sandstone cliffs such as the Navajo Ss Formation. Recently, however, it has also be found on mesa tops of Wingate and Chinle Formations.</p> <p>None of the above habitats are located in the ZZ North area, so subsidence from underground mining activities is not expected to impact this plant species.</p>
<i>Cycladenia humilis var. jonesii</i>	Jones Cycladenia	T	<p>This species is primarily located on gypsiferous, saline soils of the Cutler, Curtis and Summerville Formations, none of which have outcrops in the ZZ North area.</p> <p>Therefore, subsidence caused by underground mining is not expected to impact this species.</p>
<b>FISH &amp; WILDLIFE</b>			
<i>Gila cypha</i>	Humpback chub	E	<p>Humpback chub in Utah are now confined to a few white-water areas in the Colorado, Green, and White Rivers.</p> <p>These rivers do not occur in the study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system.</p> <p>Therefore, subsidence caused by underground mining is not expected to impact this species.</p>
<i>Gila elegans</i>	Bonytail	E	<p>The bonytail is a very rare minnow originally native to the Colorado River system.</p> <p>These rivers do not occur in the study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system.</p> <p>Therefore, subsidence caused by underground mining is not expected to impact this species.</p>

**Table 1: Federally listed threatened, endangered & candidate species in Emery County, Utah and notes regarding field studies, potential habitats and impacts to them in the ZZ North area at the Emery Mine.**

<i>Mustela nigripes</i>	Black-footed Ferret	Ex	<p>Black-footed ferret habitat is primarily prairie grasslands. The ferret has a diet consisting of almost 90% prairie dogs. Prairie dog populations do occur <i>near</i> the ZZ North area, and there are a few scattered prairie dog burrows in the ZZ North area, but there are no well-developed or populated "towns" nor prairie grasslands there. It is very unlikely that ferrets occur in the immediate area.</p> <p>Therefore, subsidence caused by underground mining is not expected to impact this species.</p>
<i>Ptychocheilus lucius</i>	Colorado Pikeminnow	E	<p>The Colorado pikeminnow is a fish that prefers medium to large rivers. With the loss of habitat they are now restricted to the upper Colorado River system.</p> <p>These rivers do not occur in the study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system.</p> <p>Therefore, subsidence caused by underground mining is not expected to impact this species.</p>
<i>Xyrauchen texanus</i>	Razorback Sucker	E	<p>This species prefers slow backwater habitats and impoundments in the Colorado River system.</p> <p>These rivers do not occur in the study area. The drainage control measures of the site limit impacts to the downstream drainage of the Colorado River system.</p> <p>Therefore, subsidence caused by underground mining is not expected to impact this species.</p>

**Table 1: Federally listed threatened, endangered & candidate species in Emery County, Utah and notes regarding field studies, potential habitats and impacts to them in the ZZ North area at the Emery Mine.**

Coccyzus americanus	Yellow-billed Cuckoo	C	<p>DWR database information states that historically, cuckoos were probably common to uncommon summer residents in Utah and across the Great Basin. The current distribution of yellow-billed cuckoos in Utah is poorly understood, though they appear to be an extremely rare breeder in lowland riparian habitats statewide. DWR information also states that currently, the range of the cuckoo is limited to disjunct fragments of riparian habitats from northern Utah, western Colorado, southwestern Wyoming, and southeastern Idaho southward into northwestern Mexico and westward into southern Nevada and California.</p> <p>Although the possibility exists that historically this species could be seen in Emery County, it is highly unlikely that it occurs within the Emery Mine permit area due to the limited habitat for this species.</p> <p>Therefore, subsidence caused by underground mining is not expected to impact this species.</p>
Strix occidentalis lucida	Mexican Spotted Owl	T	<p>In Utah the Mexican spotted owl is rare, but when it occurs it is sometimes in various forest types, but more commonly in steep rocky canyons, nesting in caves or cliffs of steep walled canyons. This habitat does not exist in the mine area with the possible exception of the adjacent Miller Canyon sandstone outcrop areas. DWR distribution maps do not show the owl in the mine area.</p> <p>Therefore, subsidence caused by underground mining is not expected to impact this species.</p>
Lynx canadensis	Canada Lynx	T	<p>Lynx usually occur in mature forests having dense undergrowth. They can also be found in more open forests, rocky areas or tundra.</p> <p>This habitat is not found within the Emery Mine permit area.</p> <p>Therefore, subsidence caused by underground mining is not expected to impact this species.</p>

\* Status

- C = Candidate
- E = Endangered
- T = Threatened
- Ex = Extirpated

## Summary for Sensitive Species

The two most likely federally listed plant species that could occur in the ZZ North area were probably San Rafael cactus [*Pediocactus despainii* (Figure 5)] and Wright fishhook cactus [*Sclerocactus wrightiae* Figure 6)]. Another species with a somewhat lesser possibility to occur in the area was Last Chance townsendia (*Townsendia aprica*). Consequently, the field surveys for sensitive plants were focused on these species.

Although federally listed threatened, endangered and candidate wildlife species are probably not present within the permit boundaries of the Emery Mine, two sensitive species may be present including the burrowing owl [*Athene cunicularia* (Figure 7)] and white-tailed prairie-dog [*Cynomys leucurus* (Figure 8)]. Habitats for these species were surveyed in the ZZ North area. A few prairie-dog burrows were found in the study area but not enough to form well-developed towns or colonies, so additional field surveys were not conducted for either prairie-dogs and burrowing owls. However, in areas adjacent to ZZ North, surveys were conducted by Mt. Nebo Scientific for these two species in 2008 which resulted in verification of their presence in the area known as the "Miller Tract" of the Emery Mine.

To summarize the findings of the sensitive species surveys, no threatened, endangered, rare, endemic or sensitive plant species were found in the ZZ North area. For sensitive wildlife species, because they exist adjacent to this area, there is the possibility that the white-tailed

prairie-dogs and burrowing owls occasionally visit the area, but no significant numbers of burrows (which both species use as habitat) were found in the ZZ North area.

## Color Photographs

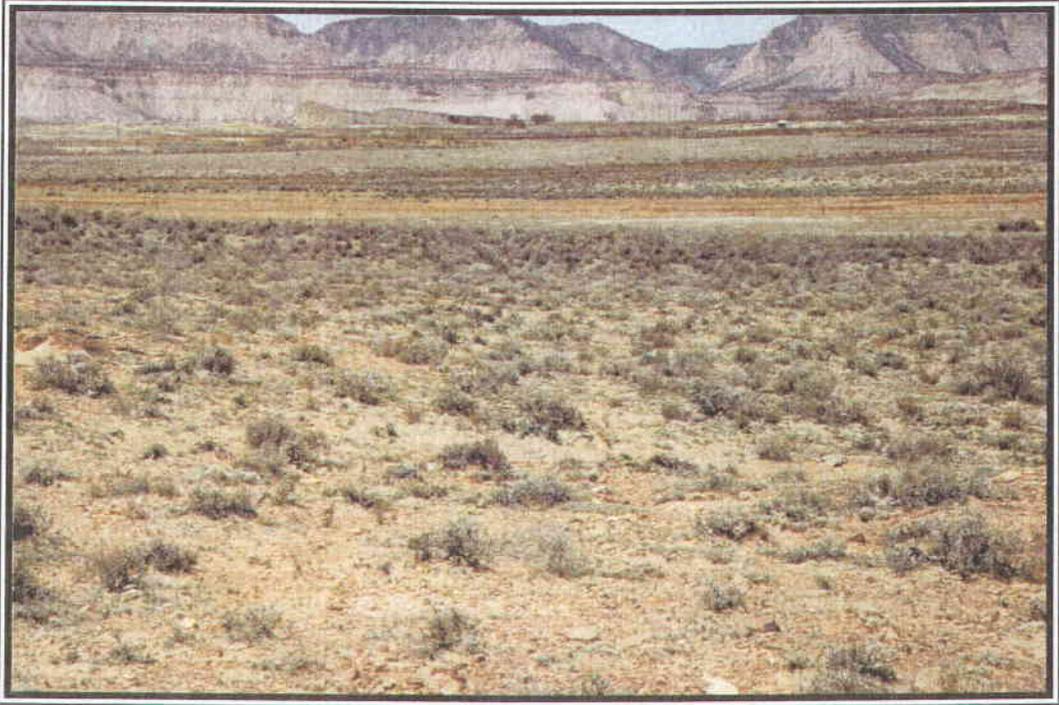


Figure 1: Shadscale Community



Figure 2: Sagebrush Community



Figure 3: Greasewood Community (Pasture Land /Dry in background)

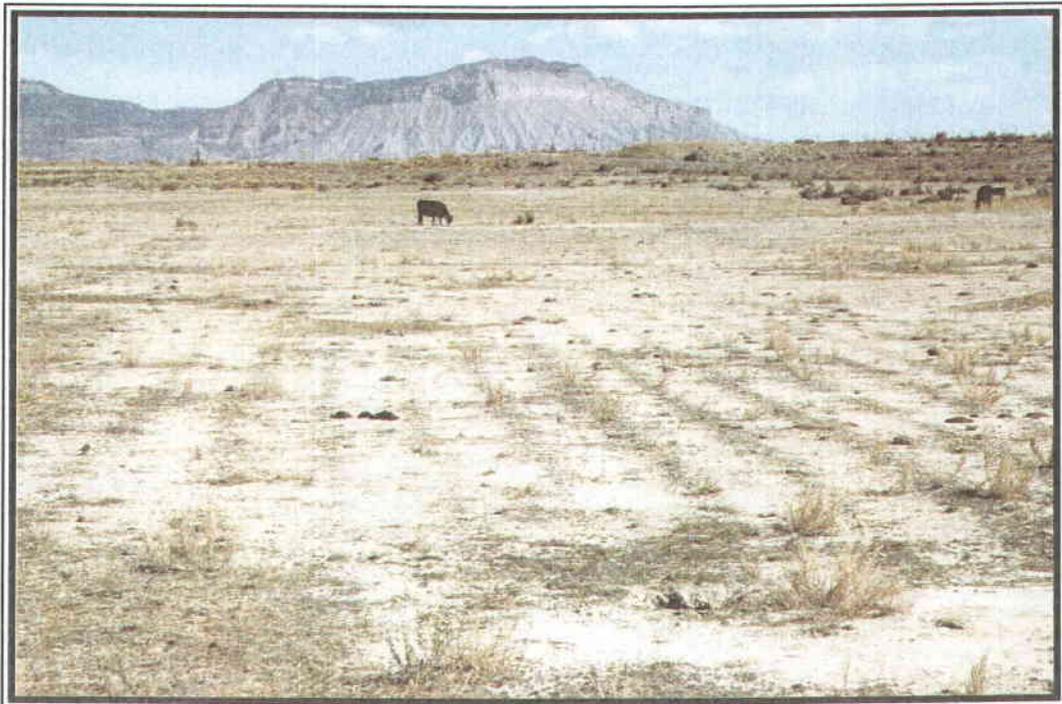


Figure 4: Pasture Land (dry; typical)



Figure 5: San Rafael Cactus

Photo by Patrick Collins

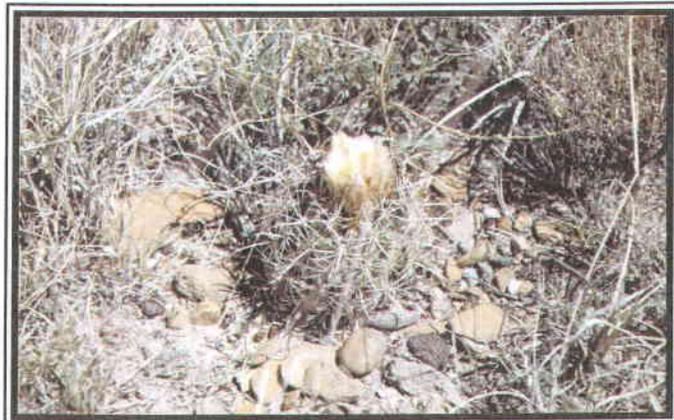


Figure 6: Wright Fishhook Cactus

Photo by Patrick Collins

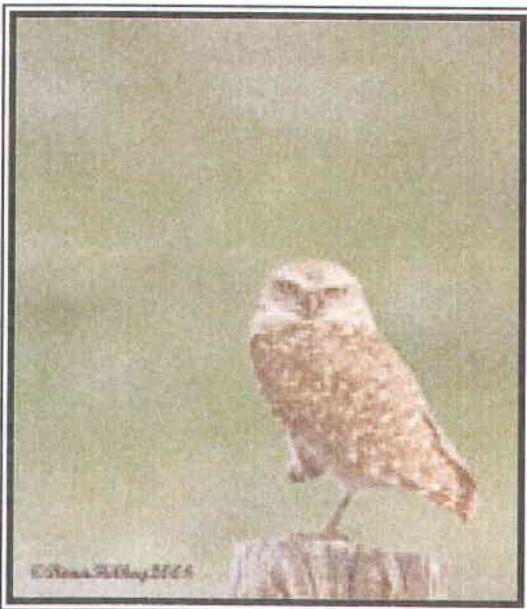


Figure 7: Burrowing Owl

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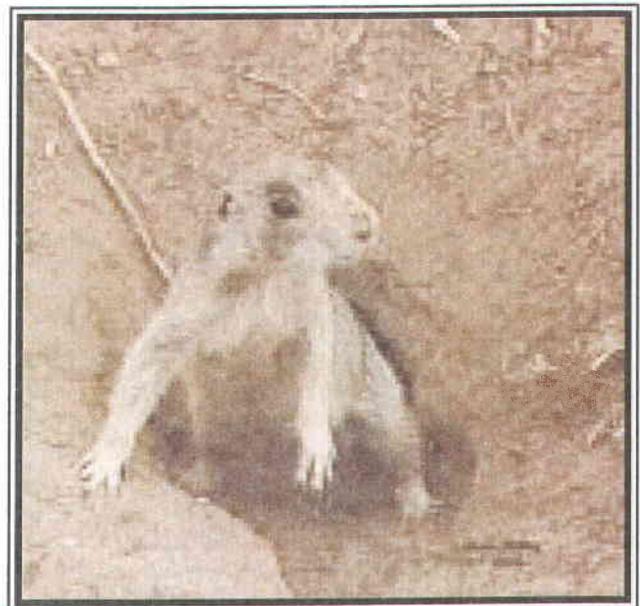


Figure 8: White-tailed Prairie-dog

© Photo by Dona Hilkey

