



## State of Utah

Department of  
Natural ResourcesROBERT L. MORGAN  
*Executive Director*Division of  
Oil, Gas & MiningMARY ANN WRIGHT  
*Acting Division Director*OLENE S. WALKER  
*Governor*GAYLE F. McKEACHNIE  
*Lieutenant Governor*

December 8, 2004

Gary E. Gray, Resident Agent  
Genwal Resources, Inc.  
P.O. Box 1077  
Price, Utah 84501

File in:  
C/0150032, 1004 Outgoing

Refer to:  
 Confidential  
 Shelf  
 Expandable

Date: 12/08/04 for additional information

Re: IBC modification to lease U-68082, Genwal Resources, Inc., Crandall Canyon Mine, C/015/0032, Task # 2057, Outgoing File

Dear Mr. Gray:

On October 22, 2004 the Division of Oil, Gas, and Mining (DOGM) received an application from Genwal Resources, Inc., to modify the Crandall Canyon Mine's Mine and Reclamation Plan (MRP) with an Incidental Boundary Change (IBC) adding 120-acres to federal lease UTU-68082. The lease modification is currently pending at the time of this submittal, but approval is anticipated. OSM has determined that the 120-acre IBC is not a Mining Plan Modification. The lease modification is located in the Manti-La Sal National Forest, in T15S, R7E, Section 32, W 1/2 of the NW 1/4, NW 1/4 of the SW 1/4 (USGS Rilda Canyon 7.5-minute quadrangle).

There is no surface disturbance associated with this lease modification. Access to the Hiawatha Seam, which is the only seam to be mined, will be from existing workings in the Hiawatha Seam in the Crandall Canyon #1 mine. The amendment contains no changes to the surface facilities and only minor changes to the permit area. There is an unrelated, pending amendment to add the South Crandall Canyon Extension (lease UTU-78953) to the Crandall Canyon Mine (Division Task # 2023). The two extensions would increase the permit area of the Crandall Canyon Mine from 5367.74 acres to 6,407.74 acres, a 16 percent increase. The 120-acre IBC is currently considered deficient, and incorporation is not recommended. In order for us to continue to process your application, please respond to these deficiencies by January 9, 2005.

The Division is embarking on the process of developing a 'Master' Technical Analysis that encompasses all the required disciplines outlined in the regulations, that is both current and comprehensive. As part of that effort, the accompanying Technical Analysis (TA) is a continuation of the recently submitted South Crandall Lease modification TA.

Page 2  
Gary Gray  
December 8, 2004

Subsequent permit modifications will use this same TA and eventually all sections of the TA will be modified to encompass the MRP as a whole-and not reflect specific permit modifications. Specifics of the deficiencies are described in detail in the DRAFT Technical Analysis provided on CD in a redline-strikeout format. A finalized paper-version has also been provided that includes all outstanding deficiencies in proposed amendments to the currently approved MRP.

Attached to this cover letter is a list of deficiencies pertinent to Task ID #2057, the 120-acre IBC to federal lease U-68082. Only the deficiencies identified in the attached cover letter must be addressed prior to approval of Task ID #2057.

If you have any questions, please call me at (801) 538-5286 or Gregg Galecki, permit lead at (801) 538-5260.

Sincerely,



D. Wayne Hedberg  
Permit Supervisor

an  
attachment  
cc: Price Field Office  
O:\015032.CRA\FINAL\WG2057\WG2057fin.doc

### Amendment #2057 Deficiency List

- R645-301-114.100**, Provide proof of Right of Entry into stated federal lease UTU-68082.
- R645-301-112.800**, Provide documentation of the lease modification from the BLM.
- R645-301-321**, The applicant needs to include an updated list of the current T&E vegetation species.
- R645-301-322**, The application needs to identify the 2003 raptor survey as appendix 3-16. Paragraph two on page 3-8 of the application refers the reviewer to letters from UDWR and USFWS Appendix 3-3. If the UDWR letter or appendix does not exist as noted in previous reviews, then this information should be revised accordingly.
- R645-301-522**, The Permittee must update the MRP to include any additional information that is required of the R2P2 for the 120-acre IBC modification to lease U-68082, which may include map and text changes.
- R645-301-725.100**, The Permittee needs to include in Appendix 7-64, Baseline Information for the 120-acre IBC modification to lease U-68082, the referenced annotated photographs of selected springs, seeps, and surface monitoring sites (page 2) and surface water laboratory analytical results (page 4).
- R645-301-725.100**, The Permittee needs to further identify the 120-acre IBC modification to lease U-68082 referenced in the last paragraph in Section 7.24.1 Groundwater Information, Methodology.
- R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731**, Plate 3-2, (Regional Vegetation), needs to be revised to accurately reflect the vegetative communities and stream courses that are present in the proposed 120-acre IBC modification to lease U-68082.
- R645-301-632**, Projected subsidence from mining in the 120-acre IBC modification to lease U-68082 needs to be shown on a map.
- R645-301-622**, Several maps, but in particular Plate 5-2 (BC), need to show the boundary for the 120-acre IBC modification to lease U-68082.
- R645-301-141** The Permittee must include maps of the permit and adjacent areas at a scale of 1 to 24,000 or greater and update all maps that show the permit boundaries such as Plate 5-2 (BC).
- R645-301-525.110**, The Permittee must update Map 5-5 in the 120-acre IBC modification to lease U-68082 so that areas of maximum possible subsidence are shown. Previous versions of Map 5-5 showed that information.

November 3, 2004

Gary Gray, Resident Agent  
Genwal Resources, Inc.  
P.O. Box 1077  
Price, Utah 84501

Re: ~~South Crandall Lease Revision, Genwal Resources, Inc., Crandall Canyon Mine, C/015/0032, Task ID# 2023, Outgoing File~~

Dear Mr. Gray:

~~The South Crandall Lease significant revision has been reviewed and deficiencies have been identified. The lease modification cannot be approved until all of these deficiencies are adequately addressed. Please submit your response by December 3, 2004.~~

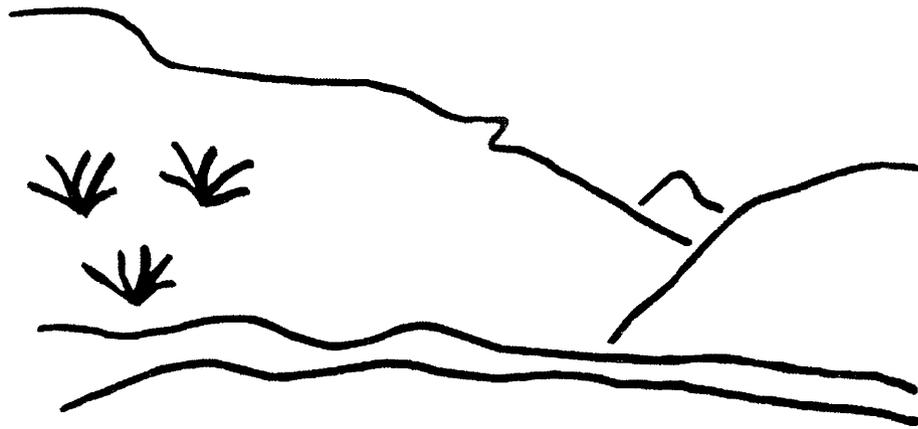
~~If you have any questions, please call me at (801) 538-5268 or Joe Helfrich at (801) 538-5290.~~

Sincerely,

~~\_\_\_\_\_~~ D. Wayne Hedberg  
~~\_\_\_\_\_~~ Permit Supervisor

an  
Enclosure  
cc: ~~Price Field Office~~  
O:\015032-CRA\FINAL\TA\TA\_2023.DOC

# State of Utah



## Utah Oil Gas and Mining

### Coal Regulatory Program

Crandall Canyon  
~~South Crandall Lease Revision~~  
C/015/0032, Task ID #2023  
Technical Analysis  
November 324, 2004

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## TECHNICAL ANALYSIS

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### TECHNICAL ANALYSIS

~~The Division ensures compliance with the Surface Mining Control and Reclamation Act of 1977 (SMCRA). When mines submit a Permit Application Package or an amendment to their Mining and Reclamation Plan, the Division reviews the proposal for conformance to the R645-Coal Mining Rules. This Technical Analysis is such a review. Regardless of these analyses, the permittee must comply with the minimum regulatory requirements as established by SMCRA.~~

~~Readers of this document must be aware that the regulatory requirements are included by reference. A complete and current copy of these regulations and a copy of the Technical Analysis and Findings Review Guide can be found at <http://ogm.utah.gov/coal>~~

~~This Technical Analysis (TA) is written as part of the permit review process. It documents the Findings that the Division has made to date regarding the application for a permit and is the basis for permitting decisions with regard to the application. The TA is broken down into logical section headings, which comprise the necessary components of an application. Each section is analyzed and specific findings are then provided which indicate whether or not the application is in compliance with the requirements.~~

~~Often the first technical review of an application finds that the application contains some deficiencies. The deficiencies are discussed in the body of the TA and are identified by a regulatory reference, which describes the minimum requirements. In this Technical Analysis we have summarized the deficiencies at the beginning of the document to aid in responding to them. Once all of the deficiencies have been adequately addressed, the TA will be considered final for the permitting action.~~

~~It may be that not every topic or regulatory requirement is discussed in this version of the TA. Generally only those sections are analyzed that pertain to a particular permitting action. TA's may have been completed previously and the revised information has not altered the original findings. Those sections that are not discussed in this document are generally considered to be in compliance.~~

Page 2  
C/015/0032  
Task ID #2023  
November 3, 2004

**TECHNICAL ANALYSIS**

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## INTRODUCTION

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### INTRODUCTION

~~On September 16, 2003 the Division received an application from Genwal Resources, Inc., (Genwal) to modify their mining and reclamation plan to include the new South Crandall Federal Lease (UTU 78953). The Division has reviewed the application and responses to deficiencies four times prior to this Draft Technical Analysis (TA). The latest response, submitted by Genwal on August 31, 2004, was assigned Task #2023.~~

~~The South Crandall Canyon area was reevaluated and was leased to Andalex in June 2003 (lease UTU 78953). This lease application encompasses 920 acres and can be located on the Rilda Canyon 7.5 minute quadrangle map in The Manti-La Sal National Forest. There is no surface disturbance associated with this lease. Access to the South Crandall Canyon Tract will be through new portals, (completed in 2004), on the south side of Crandall Canyon in fee coal (often referred to as the "Dellenbach" lease) owned by IPA and Andalex.~~

~~The Division must receive concurrence from the Forest Service for this lease modification because OSM determined that it was a Mining Plan Modification. Upon reviewing the modification plan, the Forest Service submitted comments to the Division on December 9, 2004. The comments mostly centered around issues dealing with Special Coal Lease Stipulations #9 and #17. Subsequently, the Division felt that these issues would be addressed by Bureau of Land Management in consultation with the Forest Service during preparation of the resource recovery and protection plan (R2P2). Following a joint meeting with the Forest Service and BLM on October 5, 2004, the Division concluded that the Forest Service comments could be more directly addressed in the MRP without final approval of the R2P2. Most of the deficiencies identified in the Draft TA are a result of recent discussions between the Division and the Forest Service.~~



SUMMARY OF DEFICIENCIES

SUMMARY OF DEFICIENCIES

This document presents the Division's technical review of the Mining and Reclamation Plan (MRP), including all amendments currently under review for permit C/015/0032. The following summary lists all outstanding deficiencies identified by the Division.

The deficiencies pertinent to Task ID #2057 are re-iterated in the cover letter attached to this document. Only the deficiencies identified in the cover letter must be addressed prior to approval of Task ID #2057.

Responses to these deficiencies will be evaluated for compliance with the regulatory requirements. Unresolved issues may result in denial of the proposed amendment to the MRP, or may result in other actions deemed necessary by the Division to achieve compliance with the Utah Coal Regulatory Program.

Accordingly, the Division has identified the following issues:

~~The Technical analysis of the proposed permit changes cannot be completed at this time. Additional information is requested of the Permittee to address deficiencies in the proposal. A summary of deficiencies is provided below. Additional comments and concerns may also be found within the analysis and findings made in this Draft Technical Analysis. Upon finalization of this review, any deficiencies will be evaluated for compliance with the regulatory requirements. Such deficiencies may be conditioned to the requirements of the permit issued by the Division, result in denial of the proposed permit changes, or may result in other executive or enforcement action and deemed necessary by the Division at that time to achieve compliance with the Utah Coal Regulatory Program.~~

~~Accordingly, the Permittee must address those deficiencies as found within this Draft Technical Analysis and provide the following, prior to approval, in accordance with the requirements of:~~

***Regulations***

~~**R645-301-725.100**, the Permittee needs to include in Appendix 7-64, Baseline Information for the U-68082 Lease Mod Area, the referenced annotated photographs of selected springs, seeps, and surface monitoring sites (page 2) and surface water laboratory analytical results (page 4). **R645-301-522, -523**, The Permittee needs to include a description of the type of mining that will occur in the South Crandall tract. Specifically the Division needs to know what panels will be mined with longwall equipment and what panels will be mined with continuous miners. In those panels where continuous miners are used the Permittee must indicate if first mining only or full extraction mining will occur. .... 24~~

**SUMMARY OF DEFICIENCIES**

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~~R645-301-725.100~~, the Permittee needs to further identify the IBC referenced in the last paragraph in Section 7.24.1 Groundwater Information, Methodology. ~~R645-301-522, -523~~, The Permittee needs to include any lease stipulations that could limit the amount of recoverable coal. Such lease restrictions include, but are not limited to, areas that cannot be mined, areas where first mining only can occur, areas where only single seam mining can occur (and if so what seam will be mined), areas that cannot be mined because of overburden limitations, and areas that cannot be subsided due to overburden limitations..... 24

~~R645-301-522~~, The Permittee must update the MRP to include any additional information that is required of the R2P2, which may include map and text changes. .... 24

~~R645-301-522~~, The Permittee will update the MRP to include any additional information that is required of the R2P2, which may include map and text changes. .... 26

~~R645-301-525.420~~ The Permittee must show the location of the main power lines on each subsidence map including but not limited to Plate 5-2 (BC) and Plate 5-2 (H). .... 26

~~R645-301-525.460~~ The Permittee must state the anticipated effects of subsidence on the main power line. The Division is concern about the health and safety issues, such as a fire hazard, that could arise from downed or damaged power lines. .... 26

~~R645-301-723~~, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division in concurrence with the Forest Service prior to implementation. At a minimum, the monitoring program should consist of: (1) Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12; (2) A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and (3) A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12. .... 18

~~R645-301-723~~, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will be monitored for flow and field parameters..... 18

~~R645-301-724-100, -728-310~~, the Permittee needs to rephrase the statement in Section 7.24.1, Groundwater Information, Mine Plan Area Aquifers, “Despite the conclusions of these studies the Forest Service still believes there may be a northerly component of flow recharging Little Bear Spring”. This section and the Probable Hydrologic Consequences Determination (Appendix 7-15) should more adequately address Forest Service comments and acknowledge a difference of interpretation of hydrologic studies of Little Bear Spring. Language indicating that the studies have conclusively determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon should be removed. .... 17

**SUMMARY OF DEFICIECIES**

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~~R645-301-724-100, -728-350~~, the Permittee needs to address the possibility of intercepting part of the fracture system that is believed to be the primary means of conveyance of groundwater to Little Bear Spring in Section 7.24.1, Groundwater Information, Effects of Mining Operation on Groundwater, and in the Probable Hydrologic Consequences Determination (Appendix 7-15). ..... 17

~~R645-301-727~~, the Permittee should change the text to reflect that an uninterrupted supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring. Specifically, text in Section 7.24.1, Mitigation and Control Plan, stating “Should it be necessary to develop alternate water supplies due to unexpected diminution or interruption of flows as a direct result of mining activities...” should also reference the additional protection placed on Little Bear Spring. Text in Section 7.27, Alternative Water Source Information, stating “Mitigation for potential disruption to Little Bear Spring will be accomplished ... if mining activity in the South Crandall lease tract affect the quality or quantity of the spring” should be changed to be consistent with the language of Special Coal Lease Stipulation #17. ..... 32

~~R645-301-731-211~~, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division in concurrence with the Forest Service prior to implementation. At a minimum, the monitoring program should consist of the following: (1) Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12; (2) A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and (3) A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12. .... 32

~~R645-301-731-211~~, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will be monitored for flow and field parameters. .... 32

**SUMMARY OF DEFICIENCIES**

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## GENERAL CONTENTS

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# GENERAL CONTENTS

## IDENTIFICATION OF INTERESTS

Regulatory Reference: 30 CFR 773.22; 30 CFR 778.13; R645-301-112

### Analysis:

~~Page 1-7 of the approved MRP (not submitted in Task #1698, Task #1826 or Task #1903) was identified in the deficiencies of Task #1698, #1826 and #1903. There is a statement on this page, "IPA is currently engaged in the reclamation of the Horse Canyon Mine, under permit ACT/007/013, located in Emery County, Utah..." that is incorrect. Editing and/or removal of this statement was requested in Task #1698, #1826, and #1903, since IPA no longer has connections or ties to the Horse Canyon Mine. Task #1945 is a response to Task #1903 and addresses this deficiency.~~

~~During the review of Task #1903 it was also noted that page 1-8 of the submittal lists an MSHA number (42-01715) for IPA, Horse Canyon Mine. This number was removed in the submittal of Task #1945.~~

Identification of Interests, found in section 1.12, Chapter 1 - Volume 1 of the MRP was updated with current information as part of the South Crandall Lease modification in January 2004.

### Findings:

The information provided is adequate-ly addresssesto meet the minimum requirements of the General Contents – Identification of Interestsis section of the regulations.

## PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

### Analysis:

The permit format and contents of the Crandall Canyon No. 1 Mine Mining and Reclamation Plan (MRP) was updated in May 1993 with the LBA #9 Amendment – a significant mine plan modification. All subsequent modifications have followed the appropriate format. Page 1-16 of the approved MRP was included in the application for Task #1826, but needed to be updated and submitted as part of the application for Task #1903. Task #1945 includes Page 1-16 and the date is current to cover the submitted changes.

### Findings:

## GENERAL CONTENTS

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The information provided ~~is adequate-ly~~ addresses the minimum ~~to meet the~~ requirements of the General Contents – Permit Application Format and Contents ~~is~~ section of the regulations.

### VIOLATION INFORMATION

Regulatory Reference: 30 CFR 773.15(b); 30 CFR 773.23; 30 CFR 778.14; R645-300-132; R645-301-113

#### Analysis:

Violation information has been updated with information through October 2004 with the submittal of the current application.

#### Findings

The information provided adequately addresses the minimum requirements of the General Contents – Violation Information section of the regulations.

### RIGHT OF ENTRY

Regulatory Reference: 30 CFR 778.15; R645-301-114

#### Analysis:

The 120-acre Incidental Boundary Change (IBC) is an extension of federal lease UTU-68082. A copy of the lease modification has not been provided in the MRP, although a new appendix (Appendix 1-15) is referenced as its location. This will need to be included prior to permit modification approval.

#### Findings

The information provided does not adequately address the minimum requirements of the General Contents – Right of Entry section of the regulations. Prior to approval, the following information must be supplied in accordance with:

R645-301-114.100, Provide proof of Right of Entry into stated federal lease UTU-68082.

### LEGAL DESCRIPTION AND STATUS OF UNSUITABILITY CLAIMS

Regulatory Reference: 30 CFR 778.16; 30 CFR 779.12(a); 30 CFR 779.24(a)(b)(c); R645-300-121.120; R645-301-112.800; R645-300-141; R645-301-115.

#### Analysis:

The IBC application is still waiting for documentation from the Bureau of Land Management (BLM) concerning the extension of federal lease UTU-68082.

## **GENERAL CONTENTS**

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### **Findings**

The information provided does not adequately address the minimum requirements of the General Contents – Legal Description and Status of Unsuitability Claims section of the regulations. Prior to approval, the following information must be supplied with accordance with:

R645-301-112.800, Provide documentation of the lease modification from the BLM.

### **PERMIT TERM**

Regulatory References: 30 CFR 778.17; R645-301-116.

### **Analysis:**

The current five (5) year permit term began May 13, 2003, and expires on May 13, 2008. The permit will need to be modified by DOGM to include the IBC when the application is approved.

### **Findings**

The information provided adequately addresses the minimum requirements of the General Contents – Permit Term section of the regulations.

### **PUBLIC NOTICE AND COMMENT**

Regulatory References: 30 CFR 778.21; 30 CFR 773.13; R645-300-120; R645-301-117.200.

### **Analysis:**

The addition of an Incidental Boundary Change (IBC) is not subject to public notice or comment and no public notice has been submitted.

### **Findings**

The information provided adequately addresses the minimum requirements of the General Contents – Public Notice and Comment section of the regulations.

### **PERMIT APPLICATION FORMAT AND CONTENTS**

Regulatory Reference: 30 CFR 777.11; R645-301-120.

### **Analysis:**

The Crandall Canyon No.1 Mine was significantly updated in May 1993 with the LBA #9 amendment. The MRP consists of eight (8) Volumes. The MRP has continued to be modified within the same format since 1993.

## GENERAL CONTENTS

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### Findings:

The information provided adequately addresses the requirements of the General contents – Permit Application Format and Contents section of the regulations.

**GENERAL CONTENTS**

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**ENVIRONMENTAL RESOURCE INFORMATION**

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**ENVIRONMENTAL RESOURCE INFORMATION**

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

**PERMIT AREA**

Regulatory Requirements: 30 CFR 783.12; R645-301-521.

**Analysis:**

The information in the 120-acre IBC is adequate for the Division to identify the permit area expansion. The area for the 120-acre IBC is show in Section 5.21.13 of the MRP. The 120-acre addition consists of W1/2NW1/4 and the NW1/4SW1/4 of Section 32 T. 15S., R. 7E.

**Findings**

The information provided adequately addresses the requirements of the Environmental Resource Information - Permit Area section of the regulations.

**HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.12; R645-301-411.

**Analysis:**

The application includes a cultural resource survey and inventory of the proposed 120-acre IBC modification to lease U-68082. The survey was prepared by Senco-Phenix, a private consulting firm. The survey findings indicated that there were no known cultural resources located within the proposed lease addition.

**Findings**

The information provided adequately addresses the minimum requirements of the Environmental Resource Information – Historic and Archeological Resource Information section of the regulations

**VEGETATION RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.19; R645-301-320.

**Analysis:**

The vegetation resource information is provided for in chapter three of the MRP. Text changes for the 120-acre IBC modification to lease U-68082 include pages 3-iv, 3-1, 3-7, 3-8, and 3-9. Additional appendices include 3-16 and 3-16 -A. Revised maps include plates 3-1 and 3-2. Crandall Canyon contains ten vegetative communities. Six of these occurred in areas that have been disturbed. These communities were classified as cottonwood, sagebrush, mountain shrub/grassland, mixed mountain shrub/conifer/aspens, spruce/fir/aspens, and riparian. Also, portions of the disturbed area were previously disturbed. Appendix 3-1 contains details of the original vegetation sampling.

Genwal Resources Inc. committed to take aerial color infrared photographs every five years beginning in 1995 to monitor the effects of underground mining on vegetation. Photographs were taken in 1985, 89, 94 and 2000. The 1994 and 2000 photos were chosen for comparison. The evaluation was completed by Pat Collins from Mt. Nebo Scientific and included in the 2001 annual report. The conclusions suggest that there were no noticeable impacts on vegetation as a result of mining within the angle of draw.

The application also contains a report from Environmental Industrial Services about the vegetation in the riparian area. Included is a vegetation survey of north-facing slopes done in 1996 by Patrick Collins of Mt. Nebo Scientific. The current mining and reclamation plan contains vegetation information gathered in 1980 including the riparian area. One of the dominant grasses in the 1994 sampling of the riparian area was downy brome, but this grass was not present in any areas, including the previously disturbed area, before the mine was reopened. It is unlikely this grass would have invaded on its own without some disturbance.

There are 7 threatened or endangered and candidate plant species identified in the U. S. Fish and Wildlife Service October 2004 listing for Emery County. They include,

<u>Barneby Reed-mustard</u>	<u><i>Schoenocrambe barnebyi</i></u>	<u>E</u>
<u>Jones Cycladenia</u>	<u><i>Cycladenia humilis</i> var. <i>jonesii</i></u>	<u>T</u>
<u>Last Chance Townsendia</u>	<u><i>Townsendia aprica</i></u>	<u>T</u>
<u>Maguire Daisy</u>	<u><i>Erigeron maguirei</i></u>	<u>T</u>
<u>San Rafael Cactus</u>	<u><i>Pediocactus despainii</i></u>	<u>E</u>
<u>Winkler Cactus</u>	<u><i>Pediocactus winkleri</i></u>	<u>T</u>
<u>Wright Fishhook Cactus</u>	<u><i>Sclerocactus wrightiae</i></u>	<u>E</u>

Several more sensitive species are listed for the Manti La Sal National Forest:

- Chatterley Onion *Allium geyeri chatterleyi*
- Sweet-flowered rock jasmine *Androsace chamaejasme carinata*
- Link Trail columbine *Aquilegia flavescens rubicunda*
- Bicknell Milkvetch *Astragalus consobrinus*
- Creutzfeldt-flower cryptanth *Cryptantha creutzfeldtii*
- Pinnate spring-parsley *Cymopterus beckii*
- Abajo daisy *Erigeron abajoensis*

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- Carrington daisy *Erigeron carringtonae*
- Kachina daisy *Erigeron kachinensis*
- LaSal daisy *Erigeron mancus*
- Canyonlands lomatium *Lomatium latilobum*
- Canyon sweetvetch *Hedysarum occidentale* var. *canone*
- Arizona willow *Salix arizonica*
- Musinea groundsel *Senecio musiniensis*
- Maguire campion *Silene petersonii*

The application should be updated to include these current listings.

There are no threatened or endangered plant species known for the area according to information from Bob Thompson of the Forest Service, and no threatened or endangered plant species were encountered in the vegetation survey. However, at least two sensitive species have been found in the general vicinity. Canyon sweetvetch (*Hedysarum occidentale* var. *canone*) is present in Huntington Canyon near the turnoff to Crandall Canyon. Intermountain bitterweed (*Hymenoxys helenioides*) has been collected in Carbon and Emery Counties in mountain brush, sagebrush, aspen, and meadow communities between 8800 and 10,700 feet elevation. The permit area probably contains suitable habitat for this species, but it is unlikely to be adversely affected.

A reference area has been established in a mountain shrub/grassland community on a south-facing slope above the mine, and one in a spruce/fir/aspen community on the north-facing slope. The South Crandall lease area is primarily in riparian and spruce/fir/aspen communities.

Adequate numbers of samples were taken for the riparian and spruce/fir/aspen areas. However, the required sample size for the naturally-disturbed areas is 19.5 although only 12 samples were taken. Not meeting the minimum sample size is not a problem unless the applicant proposes to use the baseline information as a success standard for final bond release.

Since baseline information will be used as the revegetation success standard for the riparian areas, the application includes raw data for the riparian area sampling. This data is needed when comparing for final bond release to make a pooled standard deviation. Depending on the sampling distribution of the data, it might also be necessary to transform it, and the raw data would be needed for this purpose.

Woody plant density information is in reports from Mt. Nebo Scientific in Appendices 3-11 and 3-14. Measured woody plant densities were 11224 and 11989 per acre for the riparian and non-riparian areas respectively.

The MRP contains productivity information for the different plant communities and for the spruce/fir/aspen reference area. This information is commonly gathered using Natural Resources Conservation Service methods.

The location of the spruce/fir/aspen reference area is shown on Plate 2-4.

### **Findings**

The information provided does not adequately address the minimum requirements of the Environmental Resource Information – Vegetation Resource Information section of the regulations. Prior to approval the following information must be provided in accordance with:

**R645-301-321**; The applicant needs to include an updated list of the current T&E vegetation species.

## **FISH AND WILDLIFE RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 784.21: R645-301-322.

### **Analysis:**

Fish and wildlife information is presented in Section 3.22 and in Appendixes 3-2 and 3-3. Updates to chapter three for lease addition UTU-78953, include appendixes 3-16 and 3-17, and plates 3-1, 3-2 and 4-1. The MRP also contains results from several studies, including macroinvertebrate studies done in 1980 and 1994; fish and stream investigations performed in 1982, 1983, 1994, and 1995; several raptor surveys; and a survey for all birds in the area of the current portal development. A 2003 raptor survey is included in the new lease addition as appendix 3-16. It is identified in the table of contents but not in the application. A 2004 raptor survey is also included in the application and is properly identified as appendix 3-16-A.

The current disturbed areas contain some habitat for big game animals. Primary summer ranges are on the plateaus, and most winter range areas are at lower elevations than the mine. Both the South Crandall lease and 120-acre IBC modification to U-68082 applications contain mostly summer range for deer and elk with some moose winter range along the north lease boundary. Both additions to the permit area includes critical value summer deer and elk and high value winter moose habitats.

Most of the permit area does not contain good cliff nesting habitat, but there are a few areas with golden eagle nests. A pair of eagles nested in a cliff above the mine in 1995. Raptor nests are shown on Plate 3-1A and on a map submitted as an addendum to Appendix 3-3. The map in the addendum contains results from the 1996 survey. The 2003 and 2004 raptor surveys are included as appendixes 3-16 and 3-16-A for the new lease area. The surveys indicate that there are no active nests within ½ mile of both the South Crandall lease and 120-acre IBC modification to U-68082 areas.

Appendix 3-3 contains a 1980 report that discusses accipiters in Crandall Canyon. The report has evidence of past nesting and hunting activity, but no birds have been found in more

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recent searches. However, Crandall Canyon and similar canyons in the Huntington Creek area should be considered good accipiter habitat.

A list of twenty-two bird species identified by the Fish and Wildlife Service as migratory birds of high federal interest is in Appendix 3-3. Section 3.22.21 lists seven of these species that have the potential of migrating within the region where the mine is located.

Table 5 in Appendix 3-3 has a list of reptile and amphibian species which may be found in the area according to published information. Reptiles are found throughout the permit area, but amphibians are only associated with water. The application says baseline studies in the spring of 1994 did not encounter any threatened or endangered reptiles or amphibians. More detail of this work is in an addendum to Appendix 3-2. The MRP contains studies of macroinvertebrates and fish populations in Crandall Creek from 1994. In response to comments from the Forest Service, the permittee has committed to inventory macroinvertebrate populations in the creek every three years.

Appendix 3-2 and Section 3.22.1 discuss the importance of Crandall Creek as fish habitat. One of the recommendations in a 1982 report from Walter Donaldson, regional fish manager for the Division of Wildlife Resources, was to occasionally blow up beaver dams as they tend to accumulate silt and deter upstream trout movement. However, April 1, 1996, correspondence from the Forest Service says beaver dams are rarely barriers to fish passage. Cutthroat trout spawn during high water periods in the spring when they can swim over the dams. In March 8, 1996, correspondence to the Division, Wildlife Resources said, for its size, Crandall Creek contains a significant population of resident fish and provides a significant spawning ground/nursery.

In three years of surveys, the Division of Wildlife Resources has not found fish above a beaver pond just above the mine. However, the Forest Service in February 5, 1997, correspondence said the surveys done in 1995 were taken in late June and August and do not give any kind of picture of the function of the higher reaches of the creek for the cutthroat population. The correspondence also says the culvert would cause a significant loss of habitat and will affect the population's ability to access headwaters.

Appendix 3-10 is a memorandum from Marvin Boyer and Pete Cavalli of the Division of Wildlife Resources concerning a fish population survey done in 1996 with some data from 1994 and 1995 surveys. This document says the data strongly suggest that the middle reach of Crandall Creek, the area near the mine, is an important spawning and nursery area. It also says preliminary results of sampling for genetic study indicate the fish are a pure strain of Colorado River cutthroat trout.

**Threatened or Endangered Species**

There are 9 threatened or endangered and candidate wildlife species identified in a U. S. Fish and Wildlife Service October 2003 listing for Emery County. They include,

Bonytail <sup>4,10</sup>	<i>Gila elegans</i>	E
Colorado Pikeminnow <sup>4,10</sup>	<i>Ptychocheilus lucius</i>	E
Humpback Chub <sup>4,10</sup>	<i>Gila cypha</i>	E
Razorback Sucker <sup>4,10</sup>	<i>Xyrauchen texanus</i>	E
Bald Eagle <sup>1</sup>	<i>Haliaeetus leucocephalus</i>	T
Mexican Spotted Owl <sup>1,4</sup>	<i>Strix occidentalis lucida</i>	T
Western Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	C
Black-footed Ferret <sup>6</sup>	<i>Mustela nigripes</i>	E
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	E

<sup>1</sup> Nests in this county of Utah.

<sup>4</sup> Critical habitat designated in this county.

<sup>6</sup> Historical range.

<sup>9</sup> Candidate species have no legal protection under the Endangered Species Act. However, these species are under active consideration by the Service for addition to the Federal List of Endangered and Threatened Species and may be proposed or listed during the development of the proposed project.

<sup>10</sup> Water depletions from any portion of the occupied drainage basin are considered to adversely affect or adversely modify the critical habitat of the endangered fish species, and must be evaluated with regard to the criteria described in the pertinent fish recovery programs.

Of the 9 species, only one, the bald eagle, could potentially occur in the permit area. However, the occurrence is most likely to be migration through the area rather than nesting or roosting.

In addition to the species discussed in the application, there is also a potential to affect the threatened and endangered fish of the upper Colorado River basin through surface water depletion.

The application needs to include an updated list of the current T&E wildlife species for the 120-acre IBC modification to lease U-68082. The application lists those species that may occur in Emery County and it contains a separate list of those species that are known or suspected of being in the Manti La Sal National Forest.

The MRP lists five sensitive species potentially present in the mine's area of influence. As discussed above, the Division of Wildlife Resources has recently (1997) preliminarily

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identified Colorado River cutthroat trout from Crandall Creek through genetic tests. However, the tests are not conclusive. If the fish in Crandall Creek are Colorado River cutthroats, it is very significant because this would be the only known population of Colorado River cutthroat trout in the Wasatch Plateau. It would indicate there is a barrier to fish passage that keeps Yellowstone cutthroats from coming up Crandall Creek from the Huntington River. Neither the South Crandall lease or the 120-acre IBC modification would affect the fish populations in the Crandall canyon watershed.

Another sensitive species, the goshawk, was found near the old portals in 1980. This information is contained in a wildlife inventory report for the original application. It is almost certain other goshawks nest in the permit area. The current raptor survey confirms that there are no goshawks nesting within the proposed South lease addition.

### Findings:

The information provided does not adequately address the minimum requirements of the Environmental Resource Information – Fish and Wildlife Resource Information section of the regulations. Prior to approval the following information must be provided in accordance with:

R645-301-322, the application needs to identify the 2003 raptor survey as appendix 3-16. Paragraph two on page 3-8 of the application refers the reviewer to letters from UDWR and USFWS Appendix 3-3. If the UDWR letter or appendix does not exist as noted in previous reviews, then this information should be revised accordingly.

## GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

### **Analysis:**

There is geologic information in the current MRP for the permit and adjacent areas, including the South Crandall Canyon Extension (with the 40-acre SITLA-PacifiCorp sub lease) and IBC modification to lease U-68082. Geologic information was added with the submittal for the South Crandall Canyon Extension, but other than information from adjacent mine workings, geologic data for the IBC modification to lease U-68082 area are sparse: the nearest borehole, DH-2, is located roughly one-half mile north of the IBC boundary.

~~There is geologic information for the permit and adjacent areas in the current MRP, including the proposed South Crandall Canyon Tract. Additional geologic information on the South Crandall Canyon Tract has been added. Maps showing geologic information have been updated to include the South Crandall Canyon Tract, including the 40-acre SITLA-PacifiCorp sub lease.~~

*Test borings and coal sampling; coal seams, overburden, and strata*

Drill hole and geological information for the South Crandall Canyon Tract has been added on pages 6-5 and 6-5a. HC-4, the only borehole in the South Crandall Canyon tract, provides information on coal seam thicknesses (driller's log in Appendix 6-6).

The lowest coal seam in the Blackhawk Formation is the Hiawatha, characteristically on or just above the Star Point Sandstone. This seam has been mined in the Cottonwood/Wilberg, Deer Creek, Des-Bee-Dove, Huntington #4, and Genwal #1 Mines. The Hiawatha Seam thins to less than 5 feet in the north end of the Cottonwood/Wilberg Mine, but then thickens again to the north. The Hiawatha Seam reaches a thickness of 12 feet in the Crandall Canyon permit area, located mainly north and west of the #1 Mine portal. For the Hiawatha Seam in the South Crandall Canyon Tract and IBC modification to lease U-68082, thickness of the coal seam and cover are shown with contour lines on Plate 5-2 (H), along with the Hiawatha to Blind Canyon interburden thicknesses are noted at the borehole locations. Hiawatha Seam thickness and cover for the Crandall Canyon #1 Mine area are on Plates 6-3 and 6-6.

The Blind Canyon Seam lies approximately 40 to 100 feet above the Hiawatha Seam. The Blind Canyon Seam has been mined in the Deer Creek, Huntington #4, and Des-Bee-Dove Mines, but is too thin to mine economically at the Cottonwood/Wilberg Mines. The Permittee states in Section 6.22.2 that the thickness of the Blind Canyon Seam is, respectively, 59 and 40 inches at in-mine drill holes DH-1 and DH-2 (although Plates 5-2 (H) and (BC) indicate a thickness of 56 inches at both drill holes) and 54 and 40 inches in surface drill-holes DH-3 and DH-4. On Plate 6-4, the Permittee has mapped a relatively small area (60 acres according to the text but the map shows approximately 150 acres) where the Blind Canyon Seam has a thickness of 5 feet or more. The Permittee concludes that the Blind Canyon Seam does not contain sufficient coal (approximately 418,000 tons) for economic mining in the vicinity of the #1 Mine.

~~The Blind Canyon Seam is too thin for economic recovery from the Crandall Canyon #1 Mine, but this seam will be mined in the South Crandall Canyon Tract.~~ The Blind Canyon Seam will be mined in the South Crandall Canyon Extension, where it is thicker. For the Blind Canyon Seam in the South Crandall Canyon tract, thickness of the coal seam and cover are shown on Plate 5-2 (BC), along with the Hiawatha to Blind Canyon interburden thickness. Plate 5-2 (BC) shows that the seam is just less than 5 feet thick at HC-4 but thickens to the west. Blind Canyon Seam thickness for the Crandall Canyon #1 Mine area is on Plate 6-4.

The Bear Canyon Seam is too thin to mine economically in both the Crandall Canyon #1 Mine and the South Crandall Canyon Tract. Plate 6-5 is the Bear Canyon Seam thickness isopach map for the #1 Mine area. The Bear Canyon Seam is only 2 feet thick in borehole HC-4 (Appendix 6-6), the only borehole in the South Crandall Canyon Tract.

There is little or no thickness information for the Blind Canyon and Bear Canyon Seams for areas in or adjacent to the IBC modification to lease U-68082: the small size of the IBC area and the absence of access through adjacent workings indicate recovery of coal from these seams, even if thick coal were present, would probably not be economic. Although Plates 6-4 (Blind Canyon Seam Thickness) and 6-5 (Bear Canyon Seam Thickness) cover the area of this lease

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modification, these plates have not been updated to show the lease modification boundary. Plate 6-7, Hiawatha Structure, also does not show the boundary.

Test Borings and Coal Sampling information (section 6.22.1, pages 6-4 and 6-5) for the ~~Crandall Canyon #1 Mine and South Crandall lease~~ includes coal quality for both the Hiawatha and Blind Canyon Seams. Borehole HC-4 is the source of information for the South Crandall lease. Section 6.22.2 on page 6-5 includes information on coal reserves and on the nature, depth, and thickness of coal seams, rider seams, overburden, and interburden. Appendices 6-1, 6-5, and 6-6 contain additional geologic information. Drill-hole locations are shown on Plates 5-2 (BC) and 5-2 (H). Reference is made in several places to Plate 5-2, which can be understood to cover 5-2 (H) and 5-2 (BC).

~~The Permittee states in the last paragraph on page 6-5a that the thickness of the Blind Canyon Seam is, respectively, 59 and 40 inches at in-mine drill holes DH-1 and DH-2 (these drill holes and coal thicknesses are not shown on Plate 6-4; Plates 5-2 (H) and (BC) indicate a thickness of 56 inches at both drill holes) and 54 and 40 inches in surface drill holes DH-3 and DH-4. The Permittee has mapped a relatively small area (the text states 60 acres, Plate 6-4 shows approximately 150 acres) where the Blind Canyon Seam has a thickness of 5 feet or more, and indicates the seam is fairly continuous across the property. The Permittee concludes that the Blind Canyon Seam does not contain sufficient coal (approximately 418,000 tons) for economic mining in the vicinity of the #1 Mine. The Blind Canyon Seam will be mined in the South Crandall Canyon Tract, where it is thicker.~~

~~Drill hole locations for the South Crandall Canyon Tract are shown on Plates 5-2 (BC) and 5-2 (H). Reference is made in several places to Plate 5-2, which can be understood to cover 5-2 (H) and 5-2 (BC).~~

The first paragraph on page 6-6 refers to the State leases only, so the information regarding the coal seams in the State leases is sufficient.

*Acid- and toxic-forming materials*

For the Crandall Canyon #1 Mine, acid- and toxic-forming characteristics for strata immediately over and under the Hiawatha and Blind Canyon Seams in the #1 Mine area are discussed on pages 6-8 and 6-9. Analysis results for the Hiawatha coal also are discussed on page 6-9. The Permittee has not provided analyses for acid- and toxic-forming characteristics for the Blind Canyon Seam, in either the #1 Mine area or the South Crandall Canyon Tract. The Permittee states on page 6-9 of the proposed amendment that there is currently no access to unweathered Blind Canyon materials (the cores taken in 1981 at HC-4 are apparently not available for analysis); however, coal and adjacent strata will be analyzed when the rock tunnels reach the Blind Canyon Seam.

*Engineering properties - clays and soft rock*

According to section 6.24.34 on page 6-9, strata immediately above and below the “seam to be mined” do not contain clays or soft rock. Those statements are based on information in Appendices 6-1 and 6-5 and apply to the Hiawatha Seam only.

The lithology log of HC-4 in Appendix 6-6 shows the thickness of the claystone and shale immediately above and below the Blind Canyon Seam. There is currently no access to unweathered materials for analysis. Engineering properties will be determined after rock tunnels are constructed to the Blind Canyon Seam. The Blind Canyon Seam is not thick enough to allow the leaving of thick layers of coal on the roof and floor, and soft rock in the roof and floor increases the probability that there will be waste rock that will need to be disposed of.

*Geologic information pertaining to hydrology (Little Bear Spring in particular)*

Because of concerns from the US Forest Service that full extraction mining would occur where overburden thickness was less than 600 feet, and that this might affect the perennial nature of the stream in Little Bear Canyon above Little Bear Spring, Genwall Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs in the canyon, and Appendix 7-63 has been added.

Location coordinates of seep and springs and field quality and quantity data are tabulated in Appendix 7-63. The Hiawatha and Blind Canyon Seam maps show the relation of the streams, springs, and seeps to the projected workings and where there is 600 feet of cover above the seam. The Geology map shows the location of seeps and springs in relation to the contact between the Price River and Blackhawk Formations.

Little Bear Spring is located adjacent to the South Crandall Canyon Tract, and Castle Valley Special Service District (CVSSD) has great concerns about protecting this important water supply from mining related damage. Information on how geology may affect the occurrence, availability, movement, quantity and quality of potentially impacted surface and ground water in the South Crandall Canyon Tract and adjacent areas was studied extensively before the South Crandall Canyon lease was issued. Using these studies, the BLM and the Manti-La Sal National Forest concluded that mining in the South Crandall Canyon Tract has a low potential to disrupt Little Bear Spring, and they signed a FONSI in February 2003. Copies of the reports prepared from these studies are included in the proposed amendment as appendices to Chapter 7, and the appendices number and title are listed on page 6-7a.

**Findings:**

The information provided ~~is adequately addresses the minimum to meet the requirements~~ of the Environment Resource Information – Geologic Resource Information is section of the regulations.

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## HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

### Analysis:

#### Sampling and Analysis

The existing MRP includes the monitoring of fourteen springs, five stream locations, eleven groundwater wells (only two of which have not been either sealed off or destroyed), and two UPDES sites. The permittee has added four spring and six stream monitoring locations for the South Crandall Lease area to their existing water monitoring program. No additional monitoring locations are to be included for the 120-acre IBC modification to U-68082 area. As stated in Section 7.2 Sampling and Analysis of the mines existing M&RP, "all water samples are collected and analyzed according to methods in either the "Standard Methods for the Examination of Water and Waste Water" or the 40 CFR parts 136 and 434".

#### Baseline Information

A description of the hydrologic and geologic characteristics of the Crandall Canyon Mine permit area, the South Crandall lease area and the additional 40-acre sublease area (part of the South Lease) , and the 120-acre IBC modification to U-68082 Lease Modification areas are included in ~~has been added to~~ Section 7.24.1 Groundwater Information and Section 7.24.2 Surface Water Information. ~~Geologic characteristics of the lease area have also been included in Chapter 6.~~ Spring and seep surveys were conducted in and adjacent to the permit area in 1985, 1987, 1989, and 1993. Baseline spring and seep information is provided in Appendices 7-16 through 7-20. Baseline surface flow information provided from a USGS gaging station located at the mouth of Crandall Canyon Creek from 1978 through 1984 is presented in Appendix 7-2 and provided from Parshall flumes and instantaneous stream flow measurements from Crandall Canyon, Blind Canyon, Horse Canyon, and Indian Creek are presented in Appendix 7-23. Baseline information of the premining groundwater and surface water features within and adjacent to the South Crandall lease area and the U-68082 Lease Modification area ~~are~~ included as in Appendix 7-58 and 7-64, respectively.

Appendix 7-58 identifies and shows the locations of seeps, springs, surface water, and drainages that have been monitored within and adjacent to the lease area since 1980. Little Bear Spring and Little Bear Canyon Creek have been monitored since 1957 and 1970, respectively. The tabulated baseline data presents discharge, flow, and field parameter (including temperature, pH, and conductivity) data available for each monitoring site. Major ion, trace metal, and nutrient water quality data collected by Genwal in June and August, 2003, are also presented for the four springs and six surface water monitoring sites to be included in the Genwal water monitoring program for the South Crandall lease area and the additional 40-acre

~~sublease area (portion of the South Lease area). Summary of Hydrologic Baseline Information, South Crandall Lease Area. Appendix 7-58 identifies and shows the locations of seeps, springs, surface water, and drainages that have been monitored within and adjacent to the lease area since 1980. Little Bear Spring and Little Bear Canyon Creek have been monitored since 1957 and 1970, respectively. The tabulated baseline data presents discharge, flow, and field parameter (including temperature, pH, and conductivity) data available for each monitoring site. Major ion, trace metal, and nutrient water quality data collected by Genwal in June and August, 2003, are also presented for the four springs and six surface water monitoring sites to be included in the Genwal water monitoring program for the South Crandall lease area and the additional 40-acre sublease area.~~

Supplemental hydrologic information has been added as Appendices 7-52 through 7-57, and 7-59 through 7-62 to address the complex hydrogeology of Little Bear Spring. Little Bear Spring is an important municipal water source and is located approximately 600 feet south of the South Crandall Lease Area in Little Bear Canyon. These appendices are scientific studies that describe, among other things, the groundwater systems encountered in the Crandall Canyon mine, their relation to Little Bear Spring, and the potential source of water for the spring. The Division agrees with the Permittee's assessment that the studies indicate that Little Bear Spring is recharged primarily through surface water and alluvial groundwater losses in Mill Fork Canyon.

However, the Forest Service has commented that the hydrologic studies have not **conclusively** determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon and that there is also a component of flow reaching the spring from the north and west. The Forest Service bases their comment on earlier studies of the spring (pre-1998) suggesting a north and west source area that was not eliminated as a possibility in later studies. The Division and the Forest Service agree that the Permittee has inadequately addressed the Forest Service comment by stating in Section 7.24.1, Groundwater Information, Mine Plan Area Aquifers, "Despite the conclusions of these studies the Forest Service still believes there may be a northerly component of flow recharging Little Bear Spring". The Division requests the Permittee rephrase this statement to more adequately address the Forest Service comment and acknowledge a difference of interpretation of the studies. Language indicating that the studies have **conclusively** determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon should be removed. In addition, the possibility of intercepting part of the fracture system that is believed to be the primary means of conveyance of groundwater to Little Bear Spring should be addressed in Section 7.24.1, Groundwater Information, Effects of Mining Operation on Groundwater.

Baseline information of the premining groundwater and surface water features within and adjacent to the proposed 120-acre IBC modification to U-68082 addition is included as Appendix 7-64, Baseline Information for the 120-acre IBC modification to U-68082 Lease Mod Area. Appendix 7-64 identifies and shows the locations of seeps, springs, surface water, and drainages that have been monitored within and adjacent to the lease area since 1985. Baseline monitoring of the seeps and springs was collected during June and October 1985, June and

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September/October 1993, and May 2004. ~~No-Name~~ Shingle Creek was monitored during May, June, and July of 2004. The tabulated baseline data presents discharge, flow, and field parameter (including temperature, pH, and conductivity) data available for each monitoring site.

Appendix 7-64 references annotated photographs of selected springs, seeps, and surface monitoring sites (page 2) and surface water laboratory analytical results (page 4) that are not included in the baseline data report.

In Section 7.24.1 Groundwater Information, Methodology, the last paragraph references a seep and spring survey conducted in the area around the IBC area. This IBC needs to be identified further to avoid confusion with the 120-acre IBC ~~for the~~ modification to ~~-lease U-68082 Lease Modification.~~

The listing of water rights in and adjacent to the permit boundary, as obtained from the Utah Division of Water Rights, has been updated on the groundwater and surface water rights maps (Plates 7-14 and 7-15, respectively), the tabulated listing of surface water rights (Table 7-6), and the supporting water rights information (Appendix 7-1).

### **Modeling**

A conceptual recharge model of Little Bear Spring is presented as Appendix 7-55, Investigation of the Potential for Little Bear Spring Recharge in Mill Fork Canyon, Emery County, Utah. The model uses information obtained from studies presented in other appendices including two isotopic studies, an in-mine slug tests, a resistivity study, hydrogeologic information, and historical flow data. In addition, a dye tracing study and three electromagnetic (AquaTrack) studies of the Little Bear Spring recharge system are presented in the appendices. Combined, these studies make a compelling argument that the primary source of recharge to Little Bear Spring is through surface water and alluvial groundwater losses in Mill Fork Canyon.

No hydrogeologic modeling is provided for the U-68082 Lease Modification area.

### **Probable Hydrologic Consequences Determination**

The Probable Hydrologic Consequences Determination (PHC) (Appendix 7-15) has been updated to include reference to the 120-acre modification to lease U-68082 ~~lease mod area~~ and the hydrologic, geologic, baseline, and supplemental information provided for the South Crandall lease area and the additional 40-acre sublease area of the South Crandall lease. No new information describing the probable hydrologic consequences of mining within the U-68082 Lease Modification area is presented except to mention that the drainages in the U-68082 lease modification ~~area~~ are all ephemeral or intermittent. Updates in the PHC center around the recharge source to Little Bear Spring and the potential impacts of the proposed mine workings on the spring. Studies indicate that fractures in the Star Point Sandstone act as a conduit to provide surface and alluvial water from Mill Fork Canyon to Little Bear Spring. Because this

fracture system lies outside of the South Crandall Lease permit boundary, and a regional Star Point aquifer does not likely contribute to the fracture system, then it is considered extremely unlikely that the proposed mining activities will impact the spring. In addition, the Star Point Formation will not be undermined by the proposed mining in the South Crandall Lease Area area or the 120-acre IBC modification to lease U-68082 because the coal seams proposed for mining are stratigraphically above the Star Point Formation.

As stated above (Hydrologic Resource Information, Baseline Information) the Forest Service has commented that the hydrologic studies have not **conclusively** determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon and that there is also a component of flow reaching the spring from the north and west. The Division requests that the Permittee adequately address the Forest Service comment and acknowledge a difference of interpretation of the studies. Language indicating that the studies have **conclusively** determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon should be removed. In addition, the possibility of intercepting part of the fracture system that is believed to be the primary means of conveyance of groundwater to Little Bear Spring should be addressed.

### **Groundwater Monitoring Plan**

The existing groundwater monitoring plan has been updated to include the monitoring of four springs located within and adjacent to the South Crandall lease area as shown on Plate 7-18. These sites include: Little Bear Spring, a municipal water source, that discharges water from fractures within the Star Point Sandstone and is located approximately 600 feet outside of the lease area; site LB-2 that discharges from the Castlegate Sandstone at the south end of the lease area; site LB-5A that discharges from a sandstone channel in the Blackhawk Formation overlying mining operations at the south end of the lease area; and site SP-79 that discharges from the Star Point Sandstone at the northeast portion of the lease area. All of the spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the M&RP.

In order to address Special Coal Lease Stipulation #9 and conduct mining in Little Bear Canyon beyond Spring LB-7, the Forest Service and the Division have agreed that monitoring programs should be developed by the Permittee and in place at least two years prior to mining in that area. The monitoring programs should be approved by the Division in concurrence with the Forest Service prior to implementation.

In the event of multiple seam mining beyond spring site LB-7 in Little Bear Canyon, a monitoring program should be developed that, at a minimum, consists of the following:

- Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12;
- A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and

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- A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.

In the event of single seam mining beyond spring site LB-7 in Little Bear Canyon, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan. The springs will be monitored for flow and field parameters.

According to Map 7-12, Seep and Spring Locations, and Appendix 7-64, Baseline Information for the 120-acre modification to lease U-68082-~~Lease Mod Area~~, eight seeps and springs have been inventoried within the 120-acre addition as part of the 1985 inventory. Three of these seeps and springs (SP-15, SP-22, and SP-23) are located in the Blackhawk Formation within the potential subsidence area of the 120-acre addition. The baseline data indicates that none of these three springs and seeps are considered significant. In addition, spring SP-22 is the only spring of the three with measurable flow in May 2004 and is located approximately 400 feet above the Hiawatha coal seam (greater than sixty times the estimated coal seam thickness of five feet). Springs SP-15 and SP-22 appear to be located at the east boundary of the potential subsidence area. Based on the low flow reported for the springs in the area, because the springs do not appear to discharge from a significant groundwater system, and the low likelihood that the groundwater discharging to at the springs would be diverted to the mine workings through mine-induced fractures, no additional groundwater monitoring is recommended.

**Surface-Water Monitoring Plan**

The existing surface water monitoring plan has been updated to include the monitoring of four creeks with six monitoring sites located within and adjacent to the South Crandall lease area as shown on Plate 7-18. The creeks to be monitored include: the intermittent Little Bear Canyon Creek, the ephemeral drainage in SW ¼ of Section 4, T16S R7E (Section 4 Creek), the ephemeral drainage located along the west permit boundary along the border of Sections 5 and 6 T16S R7E, and the intermittent creek in Section 5, T16S R7E that drains into Crandall Creek downstream of the Genwal surface facilities (Section 5 Creek). Both Little Bear Canyon Creek and Section 4 Creeks will be monitored approximately 100 feet above their confluence with Huntington Creek, the drainage along the west permit boundary will be monitored at station IBC-1 above the confluence with Crandall Creek, ~~and~~ Section 5 Creek will be monitored above the confluence with Crandall Creek and at two stations located at the confluence of the drainages upper left and right forks. All of the creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the M&RP.

No-Name Canyon Shingle Creek is an intermittent creek that branches into a right and left fork at the east boundary of the 120-acre IBC modification to lease U-68082-~~Lease Modification area~~. The right and left forks are steep with an estimated 2:1 gradient. Monitoring during spring runoff in May 2004 is reported in Appendix 7-64 and shows the right and left forks of No-Name Creek flowing at 1.69 gpm and 24.4 gpm, respectively. Flow near the confluence of No-Name Creek with Huntington Creek was measured at 17.8 gpm the same day indicating that No-Name

Creek is likely a losing stream. As reported in Appendix 7-64, field observations and the meager spring discharge at the time of surface monitoring indicate that much of the measured flow in No-Name Creek is due to surface runoff from spring snowmelt. Because No-Name Creek is intermittent, and only a portion of the upper reaches of the right and left forks flows within the potential subsidence area, no additional surface water monitoring is recommended.

### **Baseline Cumulative Impact Area Information**

The Division is updating the East Mountain CHIA to incorporate the expansion of the Crandall Canyon Mine into the South Crandall Canyon Lease Tract and the U-68082 Lease Modification area. Hydrogeologic information provided by the amendments is adequate for the Division to complete this update.

### **Findings:**

Hydrologic Resource Information is not sufficient ~~does not adequately address the minimum to meet the requirements of the Coal Mining Rules Environmental Resource Information – Hydrologic Resource Information section of the regulations. Prior to approval the following information must be provided in accordance with:~~ ~~Before the proposed amendment can be approved, the Permittee needs to provide the following information:~~

**R645-301-724-100, -728-310**, the Permittee needs to rephrase the statement in Section 7.24.1, Groundwater Information, Mine Plan Area Aquifers, “Despite the conclusions of these studies the Forest Service still believes there may be a northerly component of flow recharging Little Bear Spring”. This section and the Probable Hydrologic Consequences Determination (Appendix 7-15) should more adequately address Forest Service comments and acknowledge a difference of interpretation of hydrologic studies of Little Bear Spring. Language indicating that the studies have conclusively determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon should be removed.

**R645-301-724-100, -728-350**, the Permittee needs to address the possibility of intercepting part of the fracture system that is believed to be the primary means of conveyance of groundwater to Little Bear Spring in Section 7.24.1, Groundwater Information, Effects of Mining Operation on Groundwater, and in the Probable Hydrologic Consequences Determination (Appendix 7-15).

**R645-301-723**, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division in concurrence with the Forest Service prior to implementation. At a minimum, the monitoring program should consist of: (1) Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12; (2) A map

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identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and (3) A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.

**R645-301-723**, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will be monitored for flow and field parameters.

**R645-301-725.100**, the Permittee needs to include in Appendix 7-64, Baseline Information for the 120-acre IBC modification to lease U-68082 Lease Mod Area, the referenced annotated photographs of selected springs, seeps, and surface monitoring sites (page 2) and surface water laboratory analytical results (page 4).

**R645-301-725.100**, the Permittee needs to further identify the IBC referenced in the last paragraph in Section 7.24.1 Groundwater Information, Methodology.

**MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

**Analysis:**

**Affected Area Boundary Maps**

The affected area boundary maps are inadequate to meet all of the requirements of the R645 regulations. Genwal Resources did not submit maps at an adequate scale. R645-301-141 requires that maps of the affected area/permit boundaries are at a scale of 1 to 24,000 or larger.

Genwal Resources submitted maps at a scale of 1 inch equals 25,000 feet, which is a scale of 1 to 30,000.

~~The proposed affected area boundaries will not change with this submittal.~~

**Archeological Site Maps**

The archeological site map provided for in appendix 4-1A of the MRP does not include the South Crandall lease addition. However Appendix 4-9 of the application includes a letter and a map of the lease area from Gary Gray to Jim Dykman. This information was provided to the SHPO on September 9, 2003.

**Coal Resource and Geologic Information Maps**

Plate 6-1, the geology map, and Plate 5-2 (H), the mine plan for the Hiawatha Seam, have been updated to include the IBC modification to lease U-68082 and the South Crandall Canyon Extension.

The Hiawatha Seam thickness isopach (Plate 6-3), current Blind Canyon Seam thickness isopach (Plate 6-4), Bear Canyon Seam thickness isopach (Plate 6-5), Hiawatha Seam overburden thickness isopach (Plate 6-6), and structure contour map of the top of the Hiawatha Seam (Plate 6-7) do not include the South Crandall Canyon Tract. These maps do cover the 120-acre IBC modification to lease U-68082 but have not been updated to show the lease modification boundary. The boundary for the IBC modification to lease U-68082 needs to be added to several maps, but in particular Plate 5-2 (BC).

Hiawatha and Blind Canyon Seam thickness isopachs for the South Crandall Canyon Tract are on Plates 5-2 (H) and 5-2 (BC), and information on interburden is also listed on these maps. Overburden thickness contour lines are is shown on Plates 5-2 (H) and 5-2 (BC). Taking into consideration the inherent inaccuracy in the large contour interval needed to map the overburden thickness because of the steep topography, the difference between the Hiawatha and Bear Canyon overburden thicknesses is not significant, so overburden thickness contours are the same on Plates 5-2 (BC) and 5-2 (H). Plate 5-2 (H) in effect replaces Plates 6-3 and 6-6 for the west side of the Crandall Canyon Mine permit area. Plate 5-2 (BC) replaces Plate 6-4 for the west side, although neither 6-4 nor 5-2 (BC) indicates thickness of the Blind Canyon Seam in the IBC modification.

Subsidence projections for the South Crandall Canyon Tract are on Plates 5-2 (H) and 5-2 (BC). There is no projected extent of subsidence for the 120-acre IBC modification to lease U-68082. Projected subsidence from mining in the IBC needs to be shown on Plate 6-2, Plate 5-2(H), or another appropriate map.

The coal outcrop and strike and dip of the coal seams in the South Crandall lease are also on these plates 5-2 (H) and 5-2 (BC). Appendix 6-7 contains a generalized geologic cross-section that parallels the strike of the Mill Fork graben and goes from Rilda Canyon and Mill Fork through the Huntington #4 Mine and Little Bear Spring to Huntington Canyon. Because of concerns from the US Forest Service that full extraction mining in Little Bear Canyon would occur where overburden thickness was less than 600 feet, and that this might affect the perennial nature of the stream in Little Bear Canyon above Little Bear Spring, Genwall Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs in the canyon. The Geology map in Appendix 7-63 shows the seeps and springs locations, which are based on surveying and geopositioning, in relation to the contact between the Price River and Blackhawk Formations. The Hiawatha and Blind Canyon Seam maps in Appendix 7-63 show the relation of the streams, springs, and seeps to the projected workings and a contour line indicating where there is 600 feet of cover above the seam.

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Because of concerns from the US Forest Service that full extraction mining in Little Bear Canyon would occur where overburden thickness was less than 600 feet, and that this might affect the perennial nature of the stream in Little Bear Canyon above Little Bear Spring, Genwall Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs in the canyon. The Geology map in Appendix 7-63 shows the seeps and springs locations, which are based on surveying and geopositioning, in relation to the contact between the Price River and Blackhawk Formations. The Hiawatha and Blind Canyon Seam maps in Appendix 7-63 show the relation of the streams, springs, and seeps to the projected workings and a contour line indicating where there is 600 feet of cover above the seam.

**Cultural Resource Maps**

The cultural resource map provided for in appendix 4-1A of the MRP did not include the South Crandall lease addition. However Appendix 4-9 of the application includes a letter and a map of the lease area from Gary Gray to Jim Dykman. This information was provided to the SHPO on September 9, 2003.

**~~Existing Structures and Facilities Maps~~**

~~The Permittee did not need to update the existing structures and facilities maps. Plate 1-1, Crandall Canyon Mine Lease Map, shows that the area is mountainous and that only structure that exists is a U.S.F.S. trail. Plate 4-3, Crandall Canyon Mine Oil & Gas Development, does not show any activity in the South Crandall lease area.~~

**~~Existing Surface Configuration Maps~~**

~~The existing surface configuration is shown on several maps including Plate 1-1, Crandall Canyon Mine Lease Map. The existing surface configuration maps concentrated on the disturbed area. Since the disturbed area did not change, the Permittee did not need to update those maps.~~

**Mine Workings Maps**

Mine workings are shown on Plates 5-2 (H) and 5-2 (BC), along with projections of mining in the South Crandall Canyon Extension and IBC modification to lease U-68082. No mine workings exist within the South Crandall lease.

Map 5-1, Old Works Plate, shows the locations of the old workings in and around the Crandall Canyon Mine.

### Monitoring and Sampling Location Maps

Genwall Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs related to this contact in Little Bear Canyon. Locations of seeps and springs are on the Hiawatha and Blind Canyon Seam maps in Appendix 7-63. In addition to Little Bear Spring, Genwall monitors two other springs in this canyon, LB-2 and LB-5A. Plates 7-12 and 7-18 have been updated with the correct identification and locations of the seeps and springs in Little Bear Canyon.

Drill-hole locations are shown on Plates 5-2 (BC) and 5-2 (H). There are no new water-monitoring points in the South Crandall lease, but the location of Little Bear Spring is on several maps.

Plate 7-12 shows the seep and spring locations for the Crandall Canyon mine and surrounding area. The baseline seep and spring locations for the South Crandall lease area and the additional 40-acre sublease area associated with the South Crandall lease, and the 120-acre IBC modification to lease U-68082 Lease Modification area are shown on this plate as well as in ~~Appendix Appendices 7-58 and 7-64, respectively. In addition, Plate 7-12 shows the locations of the spring monitoring sites as identified in Section 7.31.21, Groundwater Monitoring Plan, and Table 7-10. Little Bear Spring (LB-11) has been identified as a monitoring site on Plate 7-12.~~ Surface and groundwater monitoring locations for the South Crandall lease area and the associated additional 40-acre sublease area are shown on an updated map in Plate 7-18. No additional hydrologic monitoring or sampling locations for the U-68082 Lease Modification area are needed to update Plate 7-18.

In order to clarify the locations of significant springs in relation to the geology and longwall mining projections in Little Bear Canyon watershed, topographic maps of the watershed have been provided (Appendix 7-63) that show the following:

- Surveyed locations and identity of all springs;
- The Hiawatha and Blind Canyon seam outcrop contours;
- The Blind Canyon seam 600-foot overburden contour;
- The Hiawatha and Blind Canyon seam mining projections; and
- Surface geology.

~~In addition, any changes of the identity and/or locations of the springs should be accurately represented in the text and Plates 7-12 and 7-18.~~

In order to address Special Coal Lease Stipulation #9 and conduct mining in Little Bear Canyon beyond Spring LB-7, the Forest Service and the Division have agreed that a monitoring programs should be developed by the Permittee and in place at least two years prior to mining in

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that area. Depending upon the monitoring program developed, additional maps or an update of existing maps will be provided by the Permittee as part of the monitoring plan.

**Permit Area Boundary Maps**

The permit area boundary maps submitted as part of the 120-acre IBC modification to lease U-68082 are inadequate to meet all of the requirements of the R645 regulations. Genwal Resources did not update all of the Plate 5-2, BC, Crandall Canyon #1 Mine and South Crandall Mine Plan.

**Subsurface Water Resource Maps**

~~Plate 7-13, Potentiometric Surface of Spring Canyon Member, Star Point Sandstone, is referenced in Section 7.24.1, Groundwater Information, Effects of Mining Operation on Groundwater, of the existing and revised M&RP. The plate should not be removed from the M&RP, nor does it need to be updated to include the South Crandall lease area, as stated in the Division's first Technical Analysis, dated December 2, 2003 (Task ID #1698). No subsurface water resource map is included for the South Crandall lease area, or the additional 40-acre sublease area, or the U-68082 Lease Modification area.~~

Plate 7-14, Groundwater Rights, has been updated to include the South Crandall lease area and the associated additional 40-acre sublease area, and the U-68082 Lease Modification area.

**Surface Water Resource Maps**

Plate 7-15, Surface Water Rights, has been updated to include the South Crandall lease area and the associated additional 40-acre sublease area, and the U-68082 Lease Modification area

~~Plate 7-16, Stream and Monitoring Stations, is referenced in Section 7.24.1, Groundwater Information, Mine Plan Area Surface Hydrology, of the existing and revised M&RP. The plate should not be removed from the M&RP, nor does it need to be updated to include the South Crandall lease area, as stated in the Division's first Technical Analysis, dated December 2, 2003 (Task ID #1698).~~

**Well Maps**

~~No water monitoring wells are proposed for the South Crandall lease area, or the additional 40-acre sublease area, or the U-68082 Lease Modification area.~~

### Vegetation and Wildlife Maps

The application includes wildlife and vegetation maps for the proposed 120 acre lease addition. They are identified as plates 3-1 and 3-2. Plate 3-2, (Regional Vegetation), needs to be revised to accurately reflect the vegetative communities and stream courses that are present in the canyon where the proposed IBC is located. Additional vegetative communities observed in the proposed lease addition were conifer, Pinyon Juniper Mountain Brush, Sagebrush, and riparian. Both forks of the canyon exhibited intermittent flow. Plates 3-1 and 3-2 appear to show perennial flow in the canyon and proposed lease area.

#### **Findings:**

The information provided in the current MRP is not adequate to meet the requirements of this section of the regulations, prior to approval the following information must be provided in accordance with;

R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731, Plate 3-2, (Regional Vegetation), needs to be revised to accurately reflect the vegetative communities and stream courses that are present in the 120-acre IBC modification to lease U-68082.

#### **Findings:**

The information provided is not adequate to meet the requirements of this section of the regulations. The information provided does not adequately address the minimum requirements of the Environmental Resource Information – Maps, Plans, and Cross Sections of Resource Information section of the regulations. Prior to approval the following information must be provided in accordance with:

R645-301-632, Projected subsidence from mining in the 120-acre IBC modification to lease U-68082 needs to be shown on a map.

R645-301-622, Several maps, but in particular Plate 5-2 (BC), need to show the boundary for the 120-acre IBC modification to lease U-68082.

R645-301-141 The Permittee must include maps of the permit and adjacent areas at a scale of 1 to 24,000 or greater and update all maps that show the permit boundaries such as Plate 5-2 BC.

## OPERATION PLAN

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# OPERATION PLAN

## COAL RECOVERY

Regulatory Reference: 30 CFR 817.59; R645-301-522.

### Analysis:

Appendix 5-24, Resource and Recovery Protection Plan Approval Letter, was not included in the amendment. The Division uses the R2P2 when evaluating the coal recovery plan. In addition to the approval letter the Permittee needs to state in the amendment what they are doing to maximize coal recovery.

The Permittee plans to mine both seams in the South Crandall Canyon Lease Extension, as shown on Plate 5-2(H) and Plate 5-2 (BC). The Permittee has developed a mine plan that will recover as much coal as is economically possible. There is no or little thickness data for the Blind Canyon and Bear Canyon Seams in or adjacent to the IBC modification to lease U-68082, and these seams will not be mined there. The nearest borehole, DH-2, is located roughly one-half mile north of the lease modification. The Division sees the small size of the area and the absence of access through adjacent workings as indicators that recovery of coal from these seams, even if thick coal were present, would probably not be economic.

Mining projections on Plate 5-2 (H) show one east-west oriented longwall panel in the Hiawatha Seam, extending into the south end of the IBC area. The Permittee states that recovery of Hiawatha coal in the IBC is speculative.

The Division is required to analyze the mine plan to ensure maximum use and conservation of coal. On mines with federal leases, such as Crandall Canyon, the BLM also does the same analyses in their resource recovery protection plan (R2P2). The Division allows the permittee to include the R2P2 and BLM findings in the permit application of amendments so that the information and studies do not have to be duplicated. In addition, the BLM's findings are often used by the Division when they do their analysis.

The Division reviewed the mine plan and found that there was not enough data to complete the analysis. The missing items include:

- A description of the type of mining that will occur in the South Crandall tract. Specifically the Division needs to know what panels will be mined with longwall equipment and what panels will be mined with continuous miners. In those panels where continuous miners are used the Permittee must indicate if first mining only or full extraction mining will occur.

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- The Permittee must state any lease stipulations that could limit the amount of recoverable coal. Such lease restrictions include, but are not limited to, areas that cannot be mined, areas where first mining only can occur, areas where only single seam mining can occur (and if so what seam will be mined), areas that cannot be mined because of overburden limitations, and areas that cannot be subsided due to overburden limitations.

The information in the Genwal Resources submittal for the 120-acre IBC modification to lease U-68082 is adequate to meet the minimum requirements for the coal recovery regulations. Genwal Resources added the 120 acres in order to recover a small amount of coal in the 1<sup>st</sup> Right Panel. They permitted additional areas because of the possibility of additional mining to the north.

The coal to the north is low ( 5 feet or less). The Permittee determined that a drilling program would be inadequate to determine if the area is mineable. They will do exploration with a continuous miner. If mining is feasible Genwal Resources will develop additional panels to the north.

The coal in the 120-acre IBC modification to lease U-68082 is bounded on the north and to the east by outcrops. The only practical access to the coal is through the Genwal Mine. The coal in the 120-acre IBC modification to lease U-68082 is marginal due to the seam thinness. The addition of the 120-acre IBC modification to lease U-68082 will allow the Permittee the ability to recover coal that would otherwise be sterilized.

The Division considers the additional of the 120-acre IBC a tool for the Permittee to maximize the economic recovery of the coal resources.

### Findings:

The information provided in the amendment does not adequately address the minimum to meet the requirements of the Operation Plan – Coal Recovery is section of the regulations. It should be noted that the Bureau of Land Management will issue the approval of the R2P2 to the applicant and provide a copy to the Division. Prior to approval the following information must be provided in accordance with: The applicant should include a copy in the final approved copy of the application.

**R645-301-522, -523,** The Permittee needs to include a description of the type of mining that will occur in the South Crandall tract. Specifically the Division needs to know what panels will be mined with longwall equipment and what panels will be mined with continuous miners. In those panels where continuous miners are used the Permittee must indicate if first mining only or full extraction mining will occur.

**R645-301-522, -523,** The Permittee needs to include any lease stipulations that could limit the amount of recoverable coal. Such lease restrictions include, but are not

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limited to, areas that cannot be mined, areas where first mining only can occur, areas where only single seam mining can occur (and if so what seam will be mined), areas that cannot be mined because of overburden limitations, and areas that cannot be subsided due to overburden limitations.

**R645-301-522**, The Permittee must update the MRP to include any additional information that is required of the R2P2 for the South Crandall Lease R2P2, which may include map and text changes.

**R645-301-522**, The Permittee must update the MRP to include any additional information that is required of the R2P2 for the IBC Modification to Lease U-68082 , which may include map and text changes.

## SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

### Analysis:

#### Renewable Resources Survey

The renewable resources in the area consist of grazing, timber and water. The Permittee stated in the South Crandall amendment that some of the renewable resources in the area were surface and groundwater. The Permittee has designed the mine plan to prevent damage to those resources particularly Little Bear Spring.

#### Subsidence Control Plan

The updated subsidence plan includes the following information about the South Crandall lease:

- In most of the South Crandall lease, the Hiawatha and Blind Canyon seams will be extracted with by longwall methods. Those areas where full extraction is not permitted by the lease agreement are: 1) Areas under Little Bear Stream with less than 600 feet of overburden, 2) areas within 1,000 feet of the southeast corner of the lease in order to protect the Mill Fork Graben and 3) areas within 1,000 feet of the southern boundary of the lease in order to protect the possible water-bearing fracture system.
- Map 5-2 BC and Map5-2H have been updated to show the area of maximum possible subsidence.
- The subsidence monitoring program for the South Crandall ~~Lease~~lease is similar to that of the other areas. The area will have initial survey points established. The area will be aerial surveyed and surface inspections will be done.

## OPERATION PLAN

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- Effects of planned subsidence are anticipated to be a lowering of the surface and temporary tensional fractures at the margins of the subsidence areas.
- Mitigation for any disruption to the Little Bear Spring will be done through construction of a water treatment plant, which will provide replacement water for the spring.

The Permittee did not include information about the main power line for the site and the potential effects of subsidence. Without that information, the Division cannot determine the effects that subsidence will have on surface facilities. The Division needs the following specific information:

- The Permittee must show the location of the main power line on all subsidence maps including but not limited to Plate 5-2 (BC) and Plate 5-2 (H).
- The Permittee must describe the anticipated effects that subsidence will have on the main power lines. The Division acknowledges that power line belongs to the Permittee and that they would be financially responsible for any damage. The Division does have general health and safety concerns about downed or damaged power lines. In particular, the possibility of a fire hazard should be addressed.

The updated subsidence plan that was submitted as part of the 120-acre IBC modification to lease U-68082 is inadequate to meet the minimum requirements for the subsidence control plan as required by the regulations. Map 5-5 does not show the extent of the maximum subsidence limits. The maximum subsidence limits needs to be included on the subsidence map for the 120-acre IBC modification to lease U-68082.

The Permittee was able to meet part of the subsidence control plan requirements in connection with the 120-acre IBC because they included the following:

- All mining in the 120-acre IBC will be done in the Hiawatha Seam. The purpose of the 120-acre addition is to allow the Permittee to mine coal that would otherwise be inaccessible.
- Map 5-2 (H) shows the location of the mining that will occur in the 120-acre IBC.
- Map 5-5, Subsidence Control Point Location, shows that no new subsidence control points were added for the 120-acre IBC. The area has two existing monitoring points. Because of the small area the Division believes that additional monitoring points are not needed.

### **Performance Standards For Subsidence Control**

The Permittee is required to keep all performance standards for subsidence controls.

### **Notification**

## OPERATION PLAN

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The Permittee is required to notify the water conservancy district, and all surface owners 6 months before undermining an area. The Division will inspect the Permittee's records to determine if notification was given during quarterly complete inspections.

### Findings:

The information ~~in the South Crandall amendment~~ provided does not adequately meet the minimum requirements of theis Operation Plan - Subsidence Control Plan section of the regulations. Prior to approval the following information must be provided in accordance with ~~Before approval, the Permittee must provide the following in accordance with:~~

**R645-301-525.420** The Permittee must show the location of the main power lines on each subsidence map including but not limited to Plate 5-2 (BC) and Plate 5-2 (H).

**R645-301-525.460** The Permittee must state the anticipated effects of subsidence on the main power line. The Division is concern about the health and safety issues, such as a fire hazard, that could arise from downed or damaged power lines.

**R645-301-522525,** The Permittee will update the MRP to include any additional information that is required of the R2P2 for the South Crandall Lease, which may include map and text changes.

**R645-301-525,** The Permittee will update the MRP to include any additional information that is required of the R2P2 for the IBC Modification to Lease U-68082, which may include map and text changes.

**R645-301-525.110,** The Permittee must update Map 5-5 in the 120-acre IBC so that areas of maximum possible subsidence are shown. Previous versions of Map 5-5 showed that information.

## FISH AND WILDLIFE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

### Analysis:

#### Protection and Enhancement Plan

The only impacts to fish and wildlife would be those to habitat loss as a result of subsidence.

## OPERATION PLAN

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Crandall Creek is considered important fish habitat, and all riparian habitat is considered critical wildlife habitat. The MRP contains correspondence from the Division of Wildlife Resources discussing a wildlife protection and mitigation plan that has been developed through several months of negotiations between the permittee, Wildlife Resources, the Forest Service, Water Rights, and the Division. This plan is intended to protect the Colorado River cutthroat trout population and to mitigate for the loss of fisheries and riparian habitat.

### Major points of the plan included:

1. Certain modifications would be made to Crandall Creek above the mine.
2. All the fish in the area of the culvert would be captured and transplanted to a secure and suitable temporary location. Some of these fish will be put back into Crandall Creek above the mine.
3. Alterations would be made to another stream to isolate it from other fish populations. This stream would be treated to eliminate all fish, and Colorado River cutthroats would be transplanted to it.
4. In Scad Valley, a sheep corral would be eliminated and two or three new corrals constructed. Some roads would be reclaimed to try to improve the quality of spawning habitat in this area.

Unfortunately, it is possible that moving the sheep corral and reclaiming certain roads may not result in improved stream habitat in Scad Valley Creek and would not fulfill the requirements of R645-301-333 and R645-301-358. The Forest Service and Wildlife Resources intend to monitor this section of stream to see if the project is successful.

### **Endangered and Threatened Species**

Of the 16 vegetative and wildlife species, one, the bald eagle, could potentially occur in the permit area. However, the occurrence is most likely to be migration through the area rather than nesting or roosting. Most threatened or endangered species that could occur in Emery County occur at lower elevations than the mine and have no habitat in the proposed permit area expansion.

There have been no confirmed sightings of Black-Footed Ferrets in Emery County in several years.

The mine has potential, through water depletions, of adversely affecting four listed threatened and endangered fish species of the upper Colorado River drainage. The Fish and Wildlife Service requires mitigation when water depletions exceed 100 acre-feet annually. Page

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## OPERATION PLAN

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7-12 and appendix 3-18 of the application describe the use of water for mining operations. The information on page 7-12 indicates that approximately 150 gpm, (242 acre/ft/yr), are used in water consumption for mining activities. This was an estimate based on experience at other mines. The most recent submittal dated July 7, 2004 includes calculations in appendix 3-18 that define the actual amount of water used in the mining process and water that is discharged into Crandall Creek. The calculations in appendix 3-18 indicate that 79.4-acre feet per year of water are used in mining processes and approximately 800 acre feet per year of water are discharged into Crandall Creek annually. According to these calculations, the mine would provide a net gain of 729.6 acre-feet per year of water to Crandall Creek. According to the Mayo age dating studies, this mine water is old and would not be intercepting the water associated with the springs located above the mine workings.

### **Bald and Golden Eagles**

The bald eagle could potentially occur in the permit area. However, the occurrence is most likely to be migration through the area rather than nesting or roosting. Bald eagles are common in the area during the winter and could occasionally fly through or roost in the proposed lease addition to the permit area. The raptor survey conducted in the spring of 2003 indicated that there were no golden eagle nests in the proposed lease area. The proposed mining in this lease area both the South Crandall lease and 120-acre IBC modification to lease U68082 areas would have negligible effects on these birds.

### **Wetlands and Habitats of Unusually High Value for Fish and Wildlife**

~~The springs and riparian areas within the proposed lease area would be considered habitats of high value for fish and wildlife, particularly the springs and riparian areas within Little Bear Canyon. Special Coal Lease Stipulation #9 was written, according to the Forest Service, to protect the spring and riparian areas from subsidence in areas with less than 600 feet of overburden. In order to address Stipulation #9 and conduct mining in Little Bear Canyon beyond spring LB-7, the Forest Service and the Division have agreed that monitoring programs should be developed by the Permittee and in place at least two years prior to mining in that area. The monitoring programs will be designed to monitor springs and riparian areas that could potentially be affected by mining in Little Bear Canyon and will be approved by the Division in concurrence with the Forest Service prior to implementation. Requirements of the monitoring program are presented in the Hydrologic Resource Information Section and the Hydrologic Information Section of the Operation Plan of this TA.~~

The springs and riparian areas within the proposed 120-acre IBC modification to lease U-68082 addition would be considered habitats of high value for fish and wildlife. However, since no surface disturbance is anticipated by this permitting action the only effects on habitat would possibly be from subsidence. Any impacts on fish and wildlife habitat due to subsidence would be negligible.

### **Findings:**

The information provided adequately addresses the minimum requirements of the Operation Plan – Fish and Wildlife section of the regulations.

## **VEGETATION**

Regulatory Reference: R645-301-330, -301-331, -301-332.

### **Analysis:**

Vegetation should not be affected by the addition of the 120 -acre parcel. Genwal Resources Inc. is committed to taking aerial color infrared photographs every five years beginning in 1995 to monitor the effects of underground mining on vegetation.

### **Findings:**

The information provided ~~is adequately addresses to meet~~ the minimum requirements of the Operation Plan - Vegetation section of the regulations.

## **HYDROLOGIC INFORMATION**

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

### **Analysis:**

#### **Groundwater Monitoring**

The existing groundwater monitoring plan has been updated to include the monitoring of four springs located within and adjacent to the South Crandall lease area and the associated additional 40-acre sublease area as shown on Plate 7-18. These sites include: Little Bear Spring, a municipal water source, that discharges water from fractures within the Star Point Sandstone and is located approximately 600 feet outside of the lease area; site LB-2 that discharges from the Castlegate Sandstone at the south end of the lease area; site LB-5A that discharges from a sandstone channel in the Blackhawk Formation overlying mining operations at the south end of the lease area; and site SP-79 that discharges from the Star Point Sandstone at the northeast portion of the South Crandall lease area and the associated additional 40-acre sublease areas ~~lease area~~. All of the spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the M&RP.

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**OPERATION PLAN**

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As a stipulation of the lease agreement (Special Coal Lease Stipulation #17), the Permittee has committed to mitigate for potential disruption to Little Bear Spring. Stipulation #17 states "In order to adequately protect flow from Little Bear Spring, the Leasee must enter into a written agreement with Castle Valley Special Services District (CVSSD) to assure an uninterrupted supply of culinary water equivalent to historical flows from the spring. The agreement must be in place prior to mining." A water treatment plant is to be constructed under the provisions of an agreement between Genwal, Pacificorp, and the Castle Valley Special Service District. A copy of the agreement that meets the requirements of Special Coal Lease Stipulation #17 is included as Appendix 7-51. However, in order to clarify that the intent of Stipulation #17 is met, the text in the MRP should reflect that an uninterrupted supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring. Specifically, text in Section 7.24.1, Mitigation and Control Plan, stating "Should it be necessary to develop alternate water supplies due to unexpected diminution or interruption of flows as a direct result of mining activities..." should also reference the additional protection placed on Little Bear Spring. Text in Section 7.27, Alternative Water Source Information, stating "Mitigation for potential disruption to Little Bear Spring will be accomplished ... if mining activity in the South Crandall lease tract affect the quality or quantity of the spring" should be changed to be consistent with the language of Stipulation #17.

In order to address Special Coal Lease Stipulation #9 and conduct mining in Little Bear Canyon beyond Spring LB-7, the Forest Service and the Division have agreed that monitoring programs should be developed by the Permittee and in place at least two years prior to mining in that area. The monitoring programs should be approved by the Division in concurrence with the Forest Service prior to implementation.

In the event of multiple seam mining beyond spring site LB-7 in Little Bear Canyon, a monitoring program should be developed that, at a minimum, consists of the following:

- Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12;
- A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and
- A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.

In the event of single seam mining beyond spring site LB-7 in Little Bear Canyon, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan. The springs will be monitored for flow and field parameters.

No additional spring, seep, or well monitoring is needed to adequately represent the groundwater hydrology potentially affected by the additional mining due to the U-68082 Lease Modification.

### **Surface Water Monitoring**

The existing surface water monitoring plan has been updated to include the monitoring of four creeks with six monitoring sites located within and adjacent to the South Crandall Lease Area and the additional 40-acre sublease areas as shown on Plate 7-18. The creeks to be monitored include: the intermittent Little Bear Canyon Creek, the ephemeral drainage in SW ¼ of Section 4, T16S R7E (Section 4 Creek), the ephemeral drainage located along the west permit boundary along the border of Sections 5 and 6, T16S R7E, and the intermittent creek in Section 5, T16S R7E that drains into Crandall Creek downstream of the Genwal surface facilities (Section 5 Creek). Both Little Bear Canyon Creek and Section 4 Creeks will be monitored approximately 100 feet above their confluence with Huntington Creek. The drainage along the west permit boundary will be monitored at station IBC-1 above the confluence with Crandall Creek, and Section 5 Creek will be monitored above the confluence with Crandall Creek and at two stations located at the confluence of the drainages upper left and right forks. All of the creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the M&RP.

No additional stream monitoring sites are needed to adequately represent the surface water hydrology potentially affected by the additional mining due to the U 68082 Lease Modification.

### **~~Acid and Toxic Forming Materials and Underground Development Waste~~**

~~The existing M&RP has not been updated for the South Crandall Lease Area, or the additional 40-acre sublease area, or the U68082 Lease Modification area. If waste rock is generated, the mine has committed to a program of testing the waste rock for acid or toxic-forming materials. If such materials are identified, then the waste rock will be contained prior to proper disposal.~~

### **Transfer of Wells**

Transfer of wells is not currently considered. Any future transfers will be in accordance with DOGM approval.

### **~~Discharges Into An Underground Mine~~**

~~There are no planned discharges into underground mines for the South Crandall Lease Area, or the additional 40-acre sublease area, or the U 68082 Lease Modification area.~~

### **~~Gravity Discharges From Underground Mines~~**

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**OPERATION PLAN**

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~~There are no gravity discharges currently planned from the South Crandall Lease Area<sub>2</sub> or the additional 40-acre sublease area, or the U-68082 Lease Modification area. No mention specifically regarding discharge from the South Crandall Lease Area lease area is made. The mine must obtain a NPDES permit for any water discharge from the lease area.~~

**~~Water Quality Standards And Effluent Limitations~~**

~~No new disturbed surface areas are proposed for the South Crandall Lease Area<sub>2</sub> or the additional 40-acre sublease area, or the U-68082 Lease Modification area.~~

**~~Diversions: General~~**

~~No new disturbed surface areas are proposed for the South Crandall Lease Area, the additional 40-acre sublease area, or the U-68082 Lease Modification area. Area or the additional 40-acre sublease area.~~

**~~Diversions: Perennial and Intermittent Streams~~**

~~No new disturbed surface areas are proposed for the South Crandall Lease Area or the additional 40-acre sublease area.~~

**~~Diversions: Miscellaneous Flows~~**

~~No new disturbed surface areas are proposed for the South Crandall Lease Area<sub>2</sub> or the additional 40-acre sublease area, or the U-68082 Lease Modification area.~~

**~~Stream Buffer Zones~~**

~~No underground mining within 100 feet of a perennial stream is proposed for the South Crandall Lease Area<sub>2</sub> or the additional 40-acre sublease area, or the U-68082 Lease Modification area.~~

**~~Sediment Control Measures~~**

~~No new disturbed surface areas are proposed for the South Crandall Lease area<sub>2</sub> or the additional 40-acre sublease area, or the U-68082 Lease Modification area.~~

**~~Siltation Structures: General~~**

~~No new disturbed surface areas are proposed for the South Crandall Lease Area<sub>2</sub> or the additional 40-acre sublease area, or the U-68082 Lease Modification area.~~

**~~Siltation Structures: Sedimentation Ponds~~**

~~No new disturbed surface areas are proposed for the South Crandall Lease Area<sub>2</sub> or the additional 40-acre sublease area<sub>2</sub>, or the U-68082 Lease Modification area.~~

**~~Siltation Structures: Other Treatment Facilities~~**

~~No new disturbed surface areas are proposed for the South Crandall Lease Area<sub>2</sub> or the additional 40-acre sublease area<sub>2</sub>, or the U-68082 Lease Modification area.~~

**~~Siltation Structures: Exemptions~~**

~~No new disturbed surface areas are proposed for the South Crandall Lease Area<sub>2</sub> or the additional 40-acre sublease area<sub>2</sub>, or the U-68082 Lease Modification area.~~

**~~Discharge Structures~~**

~~No new disturbed surface areas are proposed for the South Crandall Lease Area<sub>2</sub> or the additional 40-acre sublease area<sub>2</sub>, or the U-68082 Lease Modification area.~~

**~~Impoundments~~**

~~No new disturbed surface areas are proposed for the South Crandall Lease Area<sub>2</sub> or the additional 40-acre sublease area<sub>2</sub>, or the U-68082 Lease Modification area.~~

**~~Ponds, Impoundments, Banks, Dams, and Embankments~~**

~~No new disturbed surface areas are proposed for the South Crandall Lease Area<sub>2</sub> or the additional 40-acre sublease area<sub>2</sub>, or the U-68082 Lease Modification area.~~

**Findings:**

~~The information in the South Crandall amendment provided does not meet adequately address the minimum requirements of the Operation Plan -is Hydrologic Information section of the regulations. Prior to approval the following information must be provided in accordance with Before approval, the Permittee must provide the following in accordance with:~~

**R645-301-727**, the Permittee should change the text to reflect that an uninterrupted supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring. Specifically, text in

## **OPERATION PLAN**

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Section 7.24.1, Mitigation and Control Plan, stating “Should it be necessary to develop alternate water supplies due to unexpected diminution or interruption of flows as a direct result of mining activities...” should also reference the additional protection placed on Little Bear Spring. Text in Section 7.27, Alternative Water Source Information, stating “Mitigation for potential disruption to Little Bear Spring will be accomplished ... if mining activity in the South Crandall lease tract affect the quality or quantity of the spring” should be changed to be consistent with the language of Special Coal Lease Stipulation #17.

**R645-301-731-211**, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division in concurrence with the Forest Service prior to implementation. At a minimum, the monitoring program should consist of the following: (1) Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12; (2) A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and (3) A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.

**R645-301-731-211**, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will be monitored for flow and field parameters.

## **MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS**

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

### **Analysis:**

### **Findings:**

The information provided adequately addresses the minimum requirements of the Operation Plan – Maps, Plans, and Cross Sections of Mining Operations section of the regulations.

## **RECLAMATION PLAN**

## GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

## PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES

Regulatory Reference: 30 CFR Sec. 817.97; R645-301-333, -301-342, -301-358.

### Analysis:

For those areas disturbed by mining activities, high value habitats (pinyon-juniper, agricultural and riparian areas) will be restored; in many cases, they will be enhanced beyond their premining condition. The goals are to create a diversified cover and/or habitat that will support a wide range of species while restoring to a premining condition and, where feasible, enhancing habitat. On September 21, 1993, representatives from Genwal, the Division, and Wildlife Resources met on-site to discuss wildlife habitat enhancement for reclamation. Subsequently, Wildlife Resources wrote Genwal a letter with enhancement suggestions. This letter has been incorporated in the plan, and Genwal commits to use the recommendations. They include making several rock piles and placing modified utility poles with attached nesting boxes near the perimeter of the disturbed area. These measures were felt by Wildlife Resources to be the most practical means of enhancing wildlife habitat in this area. Combined with the revegetation plan, these methods can be considered the best technology currently available.

### Findings:

The information provided adequately addresses the minimum requirements of the Reclamation Plan – Protection of Fish, Wildlife, and Related Environmental Values section of the regulations.

## REVEGETATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

### Analysis:

## OPERATION PLAN

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### Revegetation: General Requirements

It should be noted that there is no surface disturbance associated with the South Crandall lease area, the additional 40-acre sublease area, or the 120-acre IBC modification to lease U-86082. However for those areas disturbed by mining activities topsoil will be redistributed within 30 days of completion of grading in late September or early October. Soil amendments will be applied if necessary before the end of October. Seeding will commence as soon as the seedbed is finished in the late fall. Tree planting will be done in conjunction with seeding or in the following spring as soon as the soil is workable.

The Permittee commits to inoculating the soil with microorganisms prior to seeding. Some research indicates this is a necessary step for establishing certain species although there has been successful revegetation in some areas with essentially sterile soil and no attempt to inoculate. The Permittee and the Division should look at current findings at the time of reclamation to determine the best methods.

The application contains a seed/planting mix for riparian and one for non-riparian areas. The seed mix for non-riparian areas was developed primarily for the south-facing slope where existing disturbances are located. The north-facing slope has a very different vegetation community, but many of the species in the existing seed/planting mixture are appropriate for the north-facing slopes. Also, the application contains a plan to transplant woody plants of species more suited to the north-facing slopes.

The seed/planting mix for riparian areas includes a mixture of species suitable for both upland and riparian areas. Willows, dogwoods or roses would be planted at one-foot intervals along the stream. In response to comments from the Forest Service, the Permittee has committed to plant horsetail plugs about every two feet. Additional trees and shrubs would be planted farther away from the creek.

The seeding and planting mixes in the plan fulfill regulatory requirements for introduced species, diversity, seasonality, and the postmining land use. Three introduced species are included, and they are all highly desirable. They should not be overly competitive or displace native species in the area. Small burnet and yellow sweet clover are fairly short-lived species that will probably not be present after the ten-year extended responsibility period. The seed and planting mixes are expected to provide successful revegetation if proper reclamation methods are used.

The entire area of disturbance will be hydromulched with long fiber wood mulch. Tackifying agents will be added to the hydromulch, and the application shows tackifier application rates for varying slopes.

The Permittee and the Division investigated the use of various mulches, particularly for the steep north-facing hillside. There are many types of hydromulch available, and the Permittee intends to use one with coarse, long fibers. This type of mulch is preferred over a mat because mats often have erosion under them.

## OPERATION PLAN

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It is anticipated that mulch technology will change over the next several years until the site is reclaimed. The Permittee will need to use the best technology currently available to control erosion and sedimentation, particularly in the area near the stream.

No irrigation is anticipated. The Permittee commits to avoid using persistent pesticides and to prevent personnel-caused fires. However, a contingency irrigation plan is recommended for transplants. Dry conditions could necessitate watering transplants for the first one or two summers.

Musk thistle is a very serious problem at mid- to high elevations in Utah. Although this noxious weed is not widespread in Huntington Canyon, it has been found at the Crandall Canyon Mine. Disturbed and newly seeded areas are very prone to noxious weed invasion. The Permittee should plan now for noxious weed control during reclamation as it will almost certainly be necessary.

On January 1, 1994, the Forest Service issued a closure order for any straw or hay that is not certified to be free of noxious weeds. This includes transportation across Forest Service lands. The applicant is not planning to use straw or hay mulch in reclamation, but any straw or hay bales that are used for sediment control will need to be certified.

### **Revegetation: Standards For Success**

A vegetation reference area has been established in the mountain shrub/grassland community above the mine portals for comparison with vegetation on reclaimed areas that had this community before mining. Another reference area has been established to compare to areas with spruce/fir/aspen communities. This reference area is south of the portal development area.

Woody plant density standards have been established for three areas of the mine. For areas to be compared with the mountain shrub/grassland reference area, the standard for woody species density has been set at 1336 shrubs per acre. This is based on reference area data. The standard for north-facing slopes has been set at 4000 per acre based on baseline information in the plan and consultation with Wildlife Resources. The riparian area has about 11,224 shrubs and trees per acre, and shrubs and trees will be planted in this area at the rate of about 3000 per acre. It is expected that these will multiply through the extended responsibility period, and the success standard has been set at 6000 per acre.

There are some differences between the disturbed and reference area spruce/fir/aspen communities, but they are primarily in species composition rather than the total amount of cover. The current reference area has 75.25% total living cover, and the disturbed area has 78.75%. These values are not statistically different at the 90% confidence level. The proposed disturbed

## OPERATION PLAN

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area has statistically more overstory than the reference area, but understory cover values are statistically the same for both areas. Also, the woody species density is higher in the reference area.

Despite the differences between the proposed disturbed and reference areas, there are several similarities, including location, community type, soils, aspect, and total cover. The actual species present and the amount of cover from overstory vary, but these will vary even more significantly when comparing reclaimed and reference areas. Additionally, the woody plant density success standards are established in consultation with Wildlife Resources rather than being based strictly on baseline information in the plan. For these reasons, the reference area is considered an acceptable revegetation success standard for spruce/fir/aspen areas.

Portions of the north-facing slope have been affected by natural soil movement and have less vegetation than adjacent areas. The Division could accept a different revegetation success standard for these areas rather than comparing them to the spruce/fir/aspen reference area. However, the permittee has not included a separate standard in the MRP even though the report from the permittee's consultant discusses using another standard. A revegetation reference area was not proposed, and the number of samples taken in these areas is not sufficient to allow the baseline method to be used.

In order to meet the erosion control performance standards in the areas that have had soil movement, it will probably be necessary to establish nearly as much vegetation as in spruce/fir/aspen areas. The main question is whether establishing this much vegetation is feasible. The various revegetation and stabilization techniques that are planned should allow more vegetation to become established than currently exists. If, in the future, the permittee desires to propose a reference area revegetation success standard in a similar area, the Division could compare it to the area now proposed to be disturbed. If there is some possibility a different success standard may be proposed in the future, the areas with soil movement should be mapped now.

The approved MRP includes diversity standards for all disturbed areas. The standards currently in the plan are minimum and maximum relative cover values for grasses, shrubs, and broadleaf forbs in the three major disturbed vegetation types. In addition, the MRP states that no one species will make up more than 60% of the cover in its respective vegetation class except that individual species of shrubs and trees will make up no more than 80% of the density for this class. The approved MRP gives a monitoring schedule and methodologies for checking success of revegetation. In the disturbed spruce/fir/aspen areas, the standard will be 3-15% relative cover from broadleaf forbs, at least 15% cover from trees and shrubs, and the balance from grasses. This leaves a lot of latitude between grasses and woody plants since woody plants are expected to eventually dominate the area. Until then, grasses are expected to dominate the cover.

The riparian area should be dominated by woody species. The standard is 5-10% relative cover from broadleaf forbs, 40-85% relative cover from trees and shrubs, and 10-50% relative cover from grasses and grasslike plants.

## OPERATION PLAN

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For both riparian and spruce/fir/aspen areas, as in the other areas, no one species will make up more than 60% of the cover in its respective vegetation class except that individual species of trees and shrubs will make up no more than 80% of the density for this class.

The diversity standards for south-facing slopes are based on Natural Resource Conservation Service range site potential plant community data. For riparian areas and north-facing slopes, the standards are based on professional judgment by a soil scientist and botanist with the Forest Service and a Division biologist. The standards allow some flexibility but ensure a reasonably diverse plant community.

R645-301-353.140 requires that the vegetative cover be capable of stabilizing the soil surface from erosion. The permittee intends to use the Erosion Condition Classification System to compare reclaimed areas with adjacent undisturbed areas. This method was developed by the Office of Surface Mining, and, while it is a qualitative judgment, it provides a reasonably good estimate of how stable a site is. Even if vegetative cover is equal to that of the reference area, the reclaimed area may not be stable. R645-301-356.250 says that for areas previously disturbed by mining that were not reclaimed and that are remined or redisturbed, at a minimum, the vegetative ground cover will be not less than the ground cover existing before redisturbance and will be adequate to control erosion. The vegetative ground cover existing before redisturbance was 50.3%. Relatively little of this cover was from plants that would be considered weeds. This figure has been established as the vegetative cover standard for success for the areas previously disturbed by mining.

### **Findings:**

The information provided adequately addresses the minimum requirements of the Reclamation Plan - Revegetation section of the regulations.

## CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

### **Analysis:**

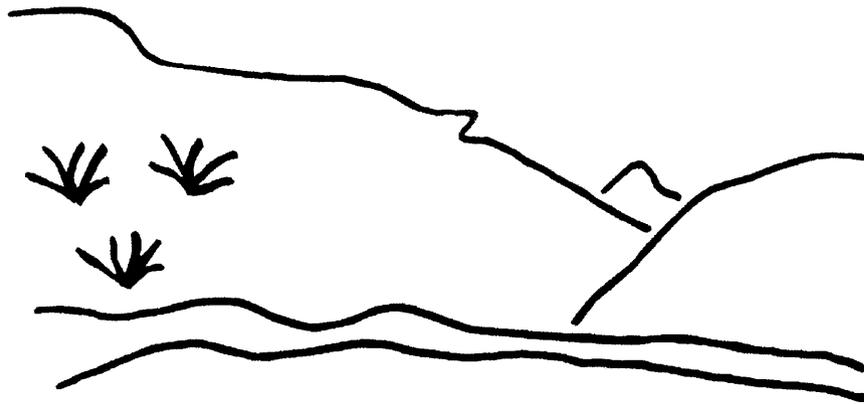
The Division is updating the East Mountain CHIA to incorporate the expansion of the Crandall Canyon Mine into the South Crandall Canyon Lease Tract and the U-68082 Lease Modification area.

### **Findings:**

The submittal contains sufficient hydrogeologic information for the Division to incorporate the expansion of the Crandall Canyon Mine into the South Crandall Canyon Lease Tract into update the East Mountain CHIA.

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# State of Utah



## Utah Oil Gas and Mining

### Coal Regulatory Program

Crandall Canyon  
C/015/0032  
Technical Analysis  
December 8, 2004

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## TECHNICAL ANALYSIS DESCRIPTION

The Division ensures that coal mining and reclamation operations in the State of Utah are consistent with the Coal Mining Reclamation Act of 1979 (Utah Code Annotated 40-10) and the Surface Mining Control and Reclamation Act of 1977 (Public Law 95-87). The Utah R645 Coal Mining Rules are the procedures to implement the Act. The Division reviews each permit or application for permit change, renewal, transfer, assignment, or sale of permit right for conformance to the R645-Coal Mining Rules. The Applicant/Permittee must comply with all the minimum regulatory requirements as established by the R645 Coal Mining Rules.

The regulatory requirements for obtaining a Utah Coal Mining Permit are included in the section headings of the Technical Analysis (TA) for reference. A complete and current copy of the coal rules can be found at <http://ogm.utah.gov>

The Division writes a TA as part of the review process. The TA is organized into section headings following the organization of the R645-Coal Mining Rules. The Division analyzes each section and writes findings to indicate whether or not the application is in compliance with the requirements of that section of the R645-Coal Mining Rules.

When review of an application results in findings of noncompliance with the R645-Coal Mining Rules, the Division discusses the deficiencies in the analysis sections and cites regulatory references for the deficiencies in the findings sections of the Draft TA. The regulatory references cited describe the minimum requirements for meeting the R645-Coal Mining Rules and obtaining a permit.

The Draft TA includes a summary list of deficiencies at the beginning of the document. The Applicant/Permittee will receive the summary list of deficiencies and a redline/strikeout version of the Draft TA at the completion of the review. As the Applicant/Permittee resolves the listed deficiencies, the Division modifies the Draft TA, until a Final TA with no deficiencies is written. Approval is based upon the Final TA. The Permittee will receive an electronic version of the Final TA.

The Final TA is the starting point for review of subsequent applications for permit change, renewal, transfer, assignment, or sale of permit right. The Division modifies the analysis and findings in the Final TA to reflect the changes in the application.



**SUMMARY OF DEFICIENCIES**

**SUMMARY OF DEFICIENCIES**

This document presents the Division’s technical review of the Mining and Reclamation Plan (MRP), including all amendments currently under review for permit C/015/0032. The following summary lists all outstanding deficiencies identified by the Division.

The deficiencies pertinent to Task ID #2057 are re-iterated in the cover letter attached to this document. Only the deficiencies identified in the cover letter must be addressed prior to approval of Task ID #2057.

Responses to these deficiencies will be evaluated for compliance with the regulatory requirements. Unresolved issues may result in denial of the proposed amendment to the MRP, or may result in other actions deemed necessary by the Division to achieve compliance with the Utah Coal Regulatory Program.

Accordingly, the Division has identified the following issues:

*Regulations*

- R645-301-112.800**, Provide documentation of the lease modification from the BLM..... 8
- R645-301-114.100**, Provide proof of Right of Entry into stated federal lease UTU-68082. .... 8
- R645-301-141**, The Permittee must include maps of the permit and adjacent areas at a scale of 1 to 24,000 or greater and update all maps that show the permit boundaries such as Plate 5-2 (BC)..... 30
- R645-301-321**, The applicant needs to include an updated list of the current T&E vegetation species. .... 14
- R645-301-322**, the application needs to identify the 2003 raptor survey as appendix 3-16. Paragraph two on page 3-8 of the application refers the reviewer to letters from UDWR and USFWS Appendix 3-3. If the UDWR letter or appendix does not exist as noted in previous reviews, then this information should be revised accordingly..... 17
- R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731**, Plate 3-2, (Regional Vegetation), needs to be revised to accurately reflect the vegetative communities and stream courses that are present in the 120-acre IBC modification to lease U-68082..... 30
- R645-301-522, -523**, The Permittee needs to include a description of the type of mining that will occur in the South Crandall tract. Specifically the Division needs to know what panels will be mined with longwall equipment and what panels will be mined with continuous miners. In

**SUMMARY OF DEFICIENCIES**

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those panels where continuous miners are used the Permittee must indicate if first mining only or full extraction mining will occur. .... 32

**R645-301-522, -523**, The Permittee needs to include any lease stipulations that could limit the amount of recoverable coal. Such lease restrictions include, but are not limited to, areas that cannot be mined, areas where first mining only can occur, areas where only single seam mining can occur (and if so what seam will be mined), areas that cannot be mined because of overburden limitations, and areas that cannot be subsided due to overburden limitations..... 32

**R645-301-522**, The Permittee must update the MRP to include any additional information that is required of the R2P2 for the IBC Modification to Lease U-68082, which may include map and text changes..... 33

**R645-301-522**, The Permittee must update the MRP to include any additional information that is required of the R2P2 for the South Crandall Lease , which may include map and text changes. .... 33

**R645-301-525**, The Permittee will update the MRP to include any additional information that is required of the R2P2 for the IBC Modification to Lease U-68082, which may include map and text changes..... 35

**R645-301-525**, The Permittee will update the MRP to include any additional information that is required of the R2P2 for the South Crandall Lease, which may include map and text changes. .... 35

**R645-301-525.110**, The Permittee must update Map 5-5 in the 120-acre IBC so that areas of maximum possible subsidence are shown. Previous versions of Map 5-5 showed that information..... 35

**R645-301-525.420**, The Permittee must show the location of the main power lines on each subsidence map including but not limited to Plate 5-2 (BC) and Plate 5-2 (H). .... 35

**R645-301-525.460**, The Permittee must state the anticipated effects of subsidence on the main power line. The Division is concern about the health and safety issues, such as a fire hazard, that could arise from downed or damaged power lines. .... 35

**R645-301-622**, Several maps, but in particular Plate 5-2 (BC), need to show the boundary for the 120-acre IBC modification to lease U-68082. .... 30

**R645-301-632**, Projected subsidence from mining in the 120-acre IBC modification to lease U-68082 needs to be shown on a map. .... 30

**R645-301-723**, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division in concurrence with the Forest Service prior to implementation. At a minimum, the monitoring program should consist of: (1) Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A,

**SUMMARY OF DEFICIENCIES**

- and LB-12; (2) A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and (3) A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12. .... 25
- R645-301-723**, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will be monitored for flow and field parameters..... 26
- R645-301-724-100, -728-310**, the Permittee needs to rephrase the statement in Section 7.24.1, Groundwater Information, Mine Plan Area Aquifers, “Despite the conclusions of these studies the Forest Service still believes there may be a northerly component of flow recharging Little Bear Spring”. This section and the Probable Hydrologic Consequences Determination (Appendix 7-15) should more adequately address Forest Service comments and acknowledge a difference of interpretation of hydrologic studies of Little Bear Spring. Language indicating that the studies have conclusively determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon should be removed..... 25
- R645-301-725.100**, the Permittee needs to further identify the IBC referenced in the last paragraph in Section 7.24.1 Groundwater Information, Methodology..... 26
- R645-301-725.100**, the Permittee needs to include in Appendix 7-64, Baseline Information for the 120-acre IBC modification to lease U-68082, the referenced annotated photographs of selected springs, seeps, and surface monitoring sites (page 2) and surface water laboratory analytical results (page 4)..... 26
- R645-301-727**, the Permittee should change the text to reflect that an uninterrupted supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring. Specifically, text in Section 7.24.1, Mitigation and Control Plan, stating “Should it be necessary to develop alternate water supplies due to unexpected diminution or interruption of flows as a direct result of mining activities...” should also reference the additional protection placed on Little Bear Spring. Text in Section 7.27, Alternative Water Source Information, stating “Mitigation for potential disruption to Little Bear Spring will be accomplished ... if mining activity in the South Crandall lease tract affect the quality or quantity of the spring” should be changed to be consistent with the language of Special Coal Lease Stipulation #17. .... 40
- R645-301-731-211**, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division in concurrence with the Forest Service prior to implementation. At a minimum, the monitoring program should consist of the following: (1) Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12; (2) A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and

**SUMMARY OF DEFICIENCIES**

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(3) A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12..... 40

**R645-301-731-211**, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will be monitored for flow and field parameters..... 40

**GENERAL CONTENTS**

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**GENERAL CONTENTS**

**IDENTIFICATION OF INTERESTS**

Regulatory Reference: 30 CFR 773.22; 30 CFR 778.13; R645-301-112

**Analysis:**

Identification of Interests, found in section 1.12, Chapter 1 - Volume 1 of the MRP was updated with current information as part of the South Crandall Lease modification in January 2004.

**Findings:**

The information provided adequately addresses the minimum requirements of the General Contents – Identification of Interests section of the regulations.

**PERMIT APPLICATION FORMAT AND CONTENTS**

Regulatory Reference: 30 CFR 777.11; R645-301-120.

**Analysis:**

The permit format and contents of the Crandall Canyon No. 1 Mine Mining and Reclamation Plan (MRP) was updated in May 1993 with the LBA #9 Amendment – a significant mine plan modification. All subsequent modifications have followed the appropriate format.

**Findings:**

The information provided adequately addresses the minimum requirements of the General Contents – Permit Application Format and Contents section of the regulations.

**VIOLATION INFORMATION**

Regulatory Reference: 30 CFR 773.15(b); 30 CFR 773.23; 30 CFR 778.14; R645-300-132; R645-301-113

**Analysis:**

Violation information has been updated with information through October 2004 with the submittal of the current application.

**Findings:**

The information provided adequately addresses the minimum requirements of the General Contents – Violation Information section of the regulations.

**RIGHT OF ENTRY**

Regulatory Reference: 30 CFR 778.15; R645-301-114

**Analysis:**

The 120-acre Incidental Boundary Change (IBC) is an extension of federal lease UTU-68082. A copy of the lease modification has not been provided in the MRP, although a new appendix (Appendix 1-15) is referenced as its location. This will need to be included prior to permit modification approval.

**Findings:**

The information provided does not adequately address the minimum requirements of the General Contents – Right of Entry section of the regulations. Prior to approval, the following information must be supplied in accordance with:

**R645-301-114.100**, Provide proof of Right of Entry into stated federal lease UTU-68082.

**LEGAL DESCRIPTION AND STATUS OF UNSUITABILITY CLAIMS**

Regulatory Reference: 30 CFR 778.16; 30 CFR 779.12(a); 30 CFR 779.24(a)(b)(c); R645-300-121.120; R645-301-112.800; R645-300-141; R645-301-115.

**Analysis:**

The IBC application is still waiting for documentation from the Bureau of Land Management (BLM) concerning the extension of federal lease UTU-68082.

**Findings:**

The information provided does not adequately address the minimum requirements of the General Contents – Legal Description and Status of Unsuitability Claims section of the regulations. Prior to approval, the following information must be supplied in accordance with:

**R645-301-112.800**, Provide documentation of the lease modification from the BLM.

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## GENERAL CONTENTS

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### PERMIT TERM

Regulatory References: 30 CFR 778.17; R645-301-116.

#### Analysis:

The current five (5) year permit term began May 13, 2003, and expires on May 13, 2008. The permit will need to be modified by DOGM to include the IBC when the application is approved.

#### Findings:

The information provided adequately addresses the minimum requirements of the General Contents – Permit Term section of the regulations.

### PUBLIC NOTICE AND COMMENT

Regulatory References: 30 CFR 778.21; 30 CFR 773.13; R645-300-120; R645-301-117.200.

#### Analysis:

The addition of an Incidental Boundary Change (IBC) is not subject to public notice or comment and no public notice has been submitted.

#### Findings:

The information provided adequately addresses the minimum requirements of the General Contents – Public Notice and Comment section of the regulations.

### PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

#### Analysis:

The Crandall Canyon No.1 Mine was significantly updated in May 1993 with the LBA #9 amendment. The MRP consists of eight (8) Volumes. The MRP has continued to be modified within the same format since 1993.

#### Findings:

The information provided adequately addresses the minimum requirements of the General contents – Permit Application Format and Contents section of the regulations.



**ENVIRONMENTAL RESOURCE INFORMATION**

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**ENVIRONMENTAL RESOURCE INFORMATION**

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

**PERMIT AREA**

Regulatory Requirements: 30 CFR 783.12; R645-301-521.

**Analysis:**

The information in the 120-acre IBC is adequate for the Division to identify the permit area expansion. The area for the 120-acre IBC is show in Section 5.21.13 of the MRP. The 120-acre addition consists of W1/2NW1/4 and the NW1/4SW1/4 of Section 32 T. 15S., R. 7E.

**Findings:**

The information provided adequately addresses the minimum requirements of the Environmental Resource Information - Permit Area section of the regulations.

**HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.12; R645-301-411.

**Analysis:**

The application includes a cultural resource survey and inventory of the proposed 120-acre IBC modification to lease U-68082. The survey was prepared by Senco-Phenix, a private consulting firm. The survey findings indicated that there were no known cultural resources located within the proposed lease addition.

**Findings:**

The information provided adequately addresses the minimum requirements of the Environmental Resource Information – Historic and Archeological Resource Information section of the regulations.

**VEGETATION RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.19; R645-301-320.

**Analysis:**

The vegetation resource information is provided for in chapter three of the MRP. Text changes for the 120-acre IBC modification to lease U-68082 include pages 3-iv, 3-1, 3-7, 3-8, and 3-9. Additional appendices include 3-16 and 3-16 -A. Revised maps include plates 3-1 and 3-2. Crandall Canyon contains ten vegetative communities. Six of these occurred in areas that have been disturbed. These communities were classified as cottonwood, sagebrush, mountain shrub/grassland, mixed mountain shrub/conifer/aspen, spruce/fir/aspen, and riparian. Also, portions of the disturbed area were previously disturbed. Appendix 3-1 contains details of the original vegetation sampling.

Genwal Resources Inc. committed to take aerial color infrared photographs every five years beginning in 1995 to monitor the effects of underground mining on vegetation. Photographs were taken in 1985, 89, 94 and 2000. The 1994 and 2000 photos were chosen for comparison. The evaluation was completed by Pat Collins from Mt. Nebo Scientific and included in the 2001 annual report. The conclusions suggest that there were no noticeable impacts on vegetation as a result of mining within the angle of draw.

The application also contains a report from Environmental Industrial Services about the vegetation in the riparian area. Included is a vegetation survey of north-facing slopes done in 1996 by Patrick Collins of Mt. Nebo Scientific. The current mining and reclamation plan contains vegetation information gathered in 1980 including the riparian area. One of the dominant grasses in the 1994 sampling of the riparian area was downy brome, but this grass was not present in any areas, including the previously disturbed area, before the mine was reopened. It is unlikely this grass would have invaded on its own without some disturbance.

There are 7 threatened or endangered and candidate plant species identified in the U. S. Fish and Wildlife Service October 2004 listing for Emery County. They include,

Barneby Reed-mustard	<i>Schoenocrambe barnebyi</i>	E
Jones Cycladenia	<i>Cycladenia humilis var. jonesii</i>	T
Last Chance Townsendia	<i>Townsendia aprica</i>	T
Maguire Daisy	<i>Erigeron maguirei</i>	T
San Rafael Cactus	<i>Pediocactus despainii</i>	E
Winkler Cactus	<i>Pediocactus winkleri</i>	T
Wright Fishhook Cactus	<i>Sclerocactus wrightiae</i>	E

Several more sensitive species are listed for the Manti La Sal National Forest:

- Chatterley Onion *Allium geyeri chatterleyi*
- Sweet-flowered rock jasmine *Androsace chamaejasme carinata*
- Link Trail columbine *Aquilegia flavescens rubicunda*
- Bicknell Milkvetch *Astragalus consobrinus*
- Creutzfeldt-flower cryptanth *Cryptantha creutzfeldtii*
- Pinnate spring-parsley *Cymopterus beckii*

**ENVIRONMENTAL RESOURCE INFORMATION**

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- Abajo daisy *Erigeron abajoensis*
- Carrington daisy *Erigeron carringtonae*
- Kachina daisy *Erigeron kachinensis*
- LaSal daisy *Erigeron mancus*
- Canyonlands lomatium *Lomatium latilobum*
- Canyon sweetvetch *Hedysarum occidentale* var. *canone*
- Arizona willow *Salix arizonica*
- Musinea groundsel *Senecio musiniensis*
- Maguire campion *Silene petersonii*

The application should be updated to include these current listings.

There are no threatened or endangered plant species known for the area according to information from Bob Thompson of the Forest Service, and no threatened or endangered plant species were encountered in the vegetation survey. However, at least two sensitive species have been found in the general vicinity. Canyon sweetvetch (*Hedysarum occidentale* var. *canone*) is present in Huntington Canyon near the turnoff to Crandall Canyon. Intermountain bitterweed (*Hymenoxys helenioides*) has been collected in Carbon and Emery Counties in mountain brush, sagebrush, aspen, and meadow communities between 8800 and 10,700 feet elevation. The permit area probably contains suitable habitat for this species, but it is unlikely to be adversely affected.

A reference area has been established in a mountain shrub/grassland community on a south-facing slope above the mine, and one in a spruce/fir/aspen community on the north-facing slope. The South Crandall lease area is primarily in riparian and spruce/fir/aspen communities.

Adequate numbers of samples were taken for the riparian and spruce/fir/aspen areas. However, the required sample size for the naturally-disturbed areas is 19.5 although only 12 samples were taken. Not meeting the minimum sample size is not a problem unless the applicant proposes to use the baseline information as a success standard for final bond release.

Since baseline information will be used as the revegetation success standard for the riparian areas, the application includes raw data for the riparian area sampling. This data is needed when comparing for final bond release to make a pooled standard deviation. Depending on the sampling distribution of the data, it might also be necessary to transform it, and the raw data would be needed for this purpose.

Woody plant density information is in reports from Mt. Nebo Scientific in Appendices 3-11 and 3-14. Measured woody plant densities were 11224 and 11989 per acre for the riparian and non-riparian areas respectively.

The MRP contains productivity information for the different plant communities and for the spruce/fir/aspen reference area. This information is commonly gathered using Natural Resources Conservation Service methods.

The location of the spruce/fir/aspen reference area is shown on Plate 2-4.

**Findings:**

The information provided does not adequately address the minimum requirements of the Environmental Resource Information – Vegetation Resource Information section of the regulations. Prior to approval the following information must be provided in accordance with:

**R645-301-321**, The applicant needs to include an updated list of the current T&E vegetation species.

**FISH AND WILDLIFE RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 784.21; R645-301-322.

**Analysis:**

Fish and wildlife information is presented in Section 3.22 and in Appendixes 3-2 and 3-3. Updates to chapter three for lease addition UTU-78953, include appendixes 3-16 and 3-17, and plates 3-1, 3-2 and 4-1. The MRP also contains results from several studies, including macroinvertebrate studies done in 1980 and 1994; fish and stream investigations performed in 1982, 1983, 1994, and 1995; several raptor surveys; and a survey for all birds in the area of the current portal development. A 2003 raptor survey is included in the new lease addition as appendix 3-16. It is identified in the table of contents but not in the application. A 2004 raptor survey is also included in the application and is properly identified as appendix 3-16-A.

The current disturbed areas contain some habitat for big game animals. Primary summer ranges are on the plateaus, and most winter range areas are at lower elevations than the mine. Both the South Crandall lease and 120-acre IBC modification to U-68082 applications contain mostly summer range for deer and elk with some moose winter range along the north lease boundary. Both additions to the permit area include critical value summer deer and elk and high value winter moose habitats.

Most of the permit area does not contain good cliff nesting habitat, but there are a few areas with golden eagle nests. A pair of eagles nested in a cliff above the mine in 1995. Raptor nests are shown on Plate 3-1A and on a map submitted as an addendum to Appendix 3-3. The map in the addendum contains results from the 1996 survey. The 2003 and 2004 raptor surveys are included as appendixes 3-16 and 3-16-A for the new lease area. The surveys indicate that there are no active nests within ½ mile of both the South Crandall lease area and the 120-acre IBC modification to U-68082 area.

Appendix 3-3 contains a 1980 report that discusses accipiters in Crandall Canyon. The report has evidence of past nesting and hunting activity, but no birds have been found in more

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**ENVIRONMENTAL RESOURCE INFORMATION**

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recent searches. However, Crandall Canyon and similar canyons in the Huntington Creek area should be considered good accipiter habitat.

A list of twenty-two bird species identified by the Fish and Wildlife Service as migratory birds of high federal interest is in Appendix 3-3. Section 3.22.21 lists seven of these species that have the potential of migrating within the region where the mine is located.

Table 5 in Appendix 3-3 has a list of reptile and amphibian species which may be found in the area according to published information. Reptiles are found throughout the permit area, but amphibians are only associated with water. The application says baseline studies in the spring of 1994 did not encounter any threatened or endangered reptiles or amphibians. More detail of this work is in an addendum to Appendix 3-2. The MRP contains studies of macroinvertebrates and fish populations in Crandall Creek from 1994. In response to comments from the Forest Service, the permittee has committed to inventory macroinvertebrate populations in the creek every three years.

Appendix 3-2 and Section 3.22.1 discuss the importance of Crandall Creek as fish habitat. One of the recommendations in a 1982 report from Walter Donaldson, regional fish manager for the Division of Wildlife Resources, was to occasionally blow up beaver dams as they tend to accumulate silt and deter upstream trout movement. However, April 1, 1996, correspondence from the Forest Service says beaver dams are rarely barriers to fish passage. Cutthroat trout spawn during high water periods in the spring when they can swim over the dams. In March 8, 1996, correspondence to the Division, Wildlife Resources said, for its size, Crandall Creek contains a significant population of resident fish and provides a significant spawning ground/nursery.

In three years of surveys, the Division of Wildlife Resources has not found fish above a beaver pond just above the mine. However, the Forest Service in February 5, 1997, correspondence said the surveys done in 1995 were taken in late June and August and do not give any kind of picture of the function of the higher reaches of the creek for the cutthroat population. The correspondence also says the culvert would cause a significant loss of habitat and will affect the population's ability to access headwaters.

Appendix 3-10 is a memorandum from Marvin Boyer and Pete Cavalli of the Division of Wildlife Resources concerning a fish population survey done in 1996 with some data from 1994 and 1995 surveys. This document says the data strongly suggest that the middle reach of Crandall Creek, the area near the mine, is an important spawning and nursery area. It also says preliminary results of sampling for genetic study indicate the fish are a pure strain of Colorado River cutthroat trout.

### **Threatened or Endangered Species**

There are 9 threatened or endangered and candidate wildlife species identified in a U. S. Fish and Wildlife Service October 2003 listing for Emery County. They include,

Bonytail <sup>4,10</sup>	<i>Gila elegans</i>	E
Colorado Pikeminnow <sup>4,10</sup>	<i>Ptychocheilus lucius</i>	E
Humpback Chub <sup>4,10</sup>	<i>Gila cypha</i>	E
Razorback Sucker <sup>4,10</sup>	<i>Xyrauchen texanus</i>	E
Bald Eagle <sup>1</sup>	<i>Haliaeetus leucocephalus</i>	T
Mexican Spotted Owl <sup>1,4</sup>	<i>Strix occidentalis lucida</i>	T
Western Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	C
Black-footed Ferret <sup>6</sup>	<i>Mustela nigripes</i>	E
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	E

<sup>1</sup> Nests in this county of Utah.

<sup>4</sup> Critical habitat designated in this county.

<sup>6</sup> Historical range.

<sup>9</sup> Candidate species have no legal protection under the Endangered Species Act. However, these species are under active consideration by the Service for addition to the Federal List of Endangered and Threatened Species and may be proposed or listed during the development of the proposed project.

<sup>10</sup> Water depletions from *any* portion of the occupied drainage basin are considered to adversely affect or adversely modify the critical habitat of the endangered fish species, and must be evaluated with regard to the criteria described in the pertinent fish recovery programs.

Of the 9 species, only one, the bald eagle, could potentially occur in the permit area. However, the occurrence is most likely to be migration through the area rather than nesting or roosting.

In addition to the species discussed in the application, there is also a potential to affect the threatened and endangered fish of the upper Colorado River basin through surface water depletion.

The application needs to include an updated list of the current T&E wildlife species for the 120-acre IBC modification to lease U-68082. The application lists those species that may occur in Emery County and it contains a separate list of those species that are known or suspected of being in the Manti La Sal National Forest.

The MRP lists five sensitive species potentially present in the mine's area of influence. As discussed above, the Division of Wildlife Resources has recently (1997) preliminarily identified Colorado River cutthroat trout from Crandall Creek through genetic tests. However, the tests are not conclusive. If the fish in Crandall Creek are Colorado River cutthroats, it is very significant because this would be the only known population of Colorado River cutthroat trout in

## ENVIRONMENTAL RESOURCE INFORMATION

the Wasatch Plateau. It would indicate there is a barrier to fish passage that keeps Yellowstone cutthroats from coming up Crandall Creek from the Huntington River. Neither the South Crandall lease or the 120-acre IBC modification would affect the fish populations in the Crandall Canyon watershed.

Another sensitive species, the goshawk, was found near the old portals in 1980. This information is contained in a wildlife inventory report for the original application. It is almost certain other goshawks nest in the permit area. The current raptor survey confirms that there are no goshawks nesting within the proposed South lease addition.

### Findings:

The information provided does not adequately address the minimum requirements of the Environmental Resource Information – Fish and Wildlife Resource Information section of the regulations. Prior to approval the following information must be provided in accordance with:

- R645-301-322**, the application needs to identify the 2003 raptor survey as appendix 3-16. Paragraph two on page 3-8 of the application refers the reviewer to letters from UDWR and USFWS Appendix 3-3. If the UDWR letter or appendix does not exist as noted in previous reviews, then this information should be revised accordingly.

## GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

### Analysis:

There is geologic information in the current MRP for the permit and adjacent areas, including the South Crandall Canyon Extension (with the 40-acre SITLA-PacifiCorp sub lease) and IBC modification to lease U-68082. Geologic information was added with the submittal for the South Crandall Canyon Extension, but other than information from adjacent mine workings, geologic data for the IBC modification to lease U-68082 area are sparse: the nearest borehole, DH-2, is located roughly one-half mile north of the IBC boundary.

#### *Test borings and coal sampling; coal seams, overburden, and strata*

Drill hole and geological information for the South Crandall Canyon Tract has been added on pages 6-5 and 6-5a. HC-4, the only borehole in the South Crandall Canyon tract, provides information on coal seam thicknesses (driller's log in Appendix 6-6).

The lowest coal seam in the Blackhawk Formation is the Hiawatha, characteristically on or just above the Star Point Sandstone. This seam has been mined in the Cottonwood/Wilberg, Deer Creek, Des-Bee-Dove, Huntington #4, and Genwal #1 Mines. The Hiawatha Seam thins to

less than 5 feet in the north end of the Cottonwood/Wilberg Mine, but then thickens again to the north. The Hiawatha Seam reaches a thickness of 12 feet in the Crandall Canyon permit area, located mainly north and west of the #1 Mine portal. For the Hiawatha Seam in the South Crandall Canyon Tract and IBC modification to lease U-68082, thickness of the coal seam and cover are shown with contour lines on Plate 5-2 (H). Hiawatha to Blind Canyon interburden thicknesses are noted at the borehole locations. Hiawatha Seam thickness and cover for the Crandall Canyon #1 Mine area are on Plates 6-3 and 6-6.

The Blind Canyon Seam lies approximately 40 to 100 feet above the Hiawatha Seam. The Blind Canyon Seam has been mined in the Deer Creek, Huntington #4, and Des-Bee-Dove Mines, but is too thin to mine economically at the Cottonwood/Wilberg Mines. The Permittee states in Section 6.22.2 that the thickness of the Blind Canyon Seam is, respectively, 59 and 40 inches at in-mine drill holes DH-1 and DH-2 (although Plates 5-2 (H) and (BC) indicate a thickness of 56 inches at both drill holes) and 54 and 40 inches in surface drill-holes DH-3 and DH-4. On Plate 6-4, the Permittee has mapped a relatively small area (60 acres according to the text but the map shows approximately 150 acres) where the Blind Canyon Seam has a thickness of 5 feet or more. The Permittee concludes that the Blind Canyon Seam does not contain sufficient coal (approximately 418,000 tons) for economic mining in the vicinity of the #1 Mine.

The Blind Canyon Seam will be mined in the South Crandall Canyon Extension, where it is thicker. For the Blind Canyon Seam in the South Crandall Canyon tract, thickness of the coal seam and cover are shown on Plate 5-2 (BC), along with the Hiawatha to Blind Canyon interburden thickness. Plate 5-2 (BC) shows that the seam is just less than 5 feet thick at HC-4 but thickens to the west. Blind Canyon Seam thickness for the Crandall Canyon #1 Mine area is on Plate 6-4.

The Bear Canyon Seam is too thin to mine economically in both the Crandall Canyon #1 Mine and the South Crandall Canyon Tract. Plate 6-5 is the Bear Canyon Seam thickness isopach map for the #1 Mine area. The Bear Canyon Seam is only 2 feet thick in borehole HC-4 (Appendix 6-6), the only borehole in the South Crandall Canyon Tract.

There is little or no thickness information for the Blind Canyon and Bear Canyon Seams for areas in or adjacent to the IBC modification to lease U-68082: the small size of the IBC area and the absence of access through adjacent workings indicate recovery of coal from these seams, even if thick coal were present, would probably not be economic. Although Plates 6-4 (Blind Canyon Seam Thickness) and 6-5 (Bear Canyon Seam Thickness) cover the area of this lease modification, these plates have not been updated to show the lease modification boundary. Plate 6-7, Hiawatha Structure, also does not show the boundary.

Test Borings and Coal Sampling information (section 6.22.1, pages 6-4 and 6-5) includes coal quality for both the Hiawatha and Blind Canyon Seams. Borehole HC-4 is the source of information for the South Crandall lease. Section 6.22.2 on page 6-5 includes information on coal reserves and on the nature, depth, and thickness of coal seams, rider seams, overburden, and interburden. Appendices 6-1, 6-5, and 6-6 contain additional geologic information. Drill-hole

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locations are shown on Plates 5-2 (BC) and 5-2 (H). Reference is made in several places to Plate 5-2, which can be understood to cover 5-2 (H) and 5-2 (BC).

The first paragraph on page 6-6 refers to the State leases only, so the information regarding the coal seams in the State leases is sufficient.

*Acid- and toxic-forming materials*

For the Crandall Canyon #1 Mine, acid- and toxic-forming characteristics for strata immediately over and under the Hiawatha and Blind Canyon Seams in the #1 Mine area are discussed on pages 6-8 and 6-9. Analysis results for the Hiawatha coal also are discussed on page 6-9. The Permittee has not provided analyses for acid- and toxic-forming characteristics for the Blind Canyon Seam, in either the #1 Mine area or the South Crandall Canyon Tract. The Permittee states on page 6-9 of the proposed amendment that there is currently no access to unweathered Blind Canyon materials (the cores taken in 1981 at HC-4 are apparently not available for analysis); however, coal and adjacent strata will be analyzed when the rock tunnels reach the Blind Canyon Seam.

*Engineering properties - clays and soft rock*

According to section 6.24.34 on page 6-9, strata immediately above and below the "seam to be mined" do not contain clays or soft rock. Those statements are based on information in Appendices 6-1 and 6-5 and apply to the Hiawatha Seam only.

The lithology log of HC-4 in Appendix 6-6 shows the thickness of the claystone and shale immediately above and below the Blind Canyon Seam. There is currently no access to unweathered materials for analysis. Engineering properties will be determined after rock tunnels are constructed to the Blind Canyon Seam. The Blind Canyon Seam is not thick enough to allow the leaving of thick layers of coal on the roof and floor, and soft rock in the roof and floor increases the probability that there will be waste rock that will need to be disposed of.

*Geologic information pertaining to hydrology (Little Bear Spring in particular)*

Because of concerns from the US Forest Service that full extraction mining would occur where overburden thickness was less than 600 feet, and that this might affect the perennial nature of the stream in Little Bear Canyon above Little Bear Spring, Genwal Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs in the canyon, and Appendix 7-63 has been added.

Location coordinates of seep and springs and field quality and quantity data are tabulated in Appendix 7-63. The Hiawatha and Blind Canyon Seam maps show the relation of the streams, springs, and seeps to the projected workings and where there is 600 feet of cover above the seam. The Geology map shows the location of seeps and springs in relation to the contact between the Price River and Blackhawk Formations.

Little Bear Spring is located adjacent to the South Crandall Canyon Tract, and Castle Valley Special Service District (CVSSD) has great concerns about protecting this important water supply from mining related damage. Information on how geology may affect the occurrence, availability, movement, quantity and quality of potentially impacted surface and ground water in the South Crandall Canyon Tract and adjacent areas was studied extensively before the South Crandall Canyon lease was issued. Using these studies, the BLM and the Manti-La Sal National Forest concluded that mining in the South Crandall Canyon Tract has a low potential to disrupt Little Bear Spring, and they signed a FONSI in February 2003. Copies of the reports prepared from these studies are included in the proposed amendment as appendices to Chapter 7, and the appendices number and title are listed on page 6-7a.

**Findings:**

The information provided adequately addresses the minimum requirements of the Environment Resource Information – Geologic Resource Information section of the regulations.

**HYDROLOGIC RESOURCE INFORMATION**

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

**Analysis:**

**Sampling and Analysis**

The existing MRP includes the monitoring of fourteen springs, five stream locations, eleven groundwater wells (only two of which have not been either sealed off or destroyed), and two UPDES sites. The permittee has added four spring and six stream monitoring locations for the South Crandall Lease area to their existing water monitoring program. No additional monitoring locations are to be included for the 120-acre IBC modification to U-68082 area. As stated in Section 7.2 Sampling and Analysis of the mines existing MRP, “all water samples are collected and analyzed according to methods in either the “Standard Methods for the Examination of Water and Waste Water” or the 40 CFR parts 136 and 434”.

**Baseline Information**

A description of the hydrologic and geologic characteristics of the Crandall Canyon Mine permit area, the South Crandall lease area and the additional 40-acre sublease area (part of the South Lease) , and the 120-acre IBC modification to U-68082 areas are included in Section 7.24.1 Groundwater Information and Section 7.24.2 Surface Water Information. Spring and seep surveys were conducted in and adjacent to the permit area in 1985, 1987, 1989, and 1993. Baseline spring and seep information is provided in Appendices 7-16 through 7-20. Baseline surface flow information provided from a USGS gaging station located at the mouth of Crandall Canyon Creek from 1978 through 1984 is presented in Appendix 7-2 and provided from

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Parshall flumes and instantaneous stream flow measurements from Crandall Canyon, Blind Canyon, Horse Canyon, and Indian Creek are presented in Appendix 7-23. Baseline information of the premining groundwater and surface water features within and adjacent to the South Crandall lease area and the U-68082 Lease Modification area are included in Appendix 7-58 and 7-64, respectively.

Appendix 7-58 identifies and shows the locations of seeps, springs, surface water, and drainages that have been monitored within and adjacent to the lease area since 1980. Little Bear Spring and Little Bear Canyon Creek have been monitored since 1957 and 1970, respectively. The tabulated baseline data presents discharge, flow, and field parameter (including temperature, pH, and conductivity) data available for each monitoring site. Major ion, trace metal, and nutrient water quality data collected by Genwal in June and August, 2003, are also presented for the four springs and six surface water monitoring sites to be included in the Genwal water monitoring program for the South Crandall lease area and the additional 40-acre sublease area (portion of the South Lease area).

Supplemental hydrologic information has been added as Appendices 7-52 through 7-57, and 7-59 through 7-62 to address the complex hydrogeology of Little Bear Spring. Little Bear Spring is an important municipal water source and is located approximately 600 feet south of the South Crandall Lease Area in Little Bear Canyon. These appendices are scientific studies that describe, among other things, the groundwater systems encountered in the Crandall Canyon mine, their relation to Little Bear Spring, and the potential source of water for the spring. The Division agrees with the Permittee's assessment that the studies indicate that Little Bear Spring is recharged primarily through surface water and alluvial groundwater losses in Mill Fork Canyon.

However, the Forest Service has commented that the hydrologic studies have not **conclusively** determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon and that there is also a component of flow reaching the spring from the north and west. The Forest Service bases their comment on earlier studies of the spring (pre-1998) suggesting a north and west source area that was not eliminated as a possibility in later studies. The Division and the Forest Service agree that the Permittee has inadequately addressed the Forest Service comment by stating in Section 7.24.1, Groundwater Information, Mine Plan Area Aquifers, "Despite the conclusions of these studies the Forest Service still believes there may be a northerly component of flow recharging Little Bear Spring". The Division requests the Permittee rephrase this statement to more adequately address the Forest Service comment and acknowledge a difference of interpretation of the studies. Language indicating that the studies have **conclusively** determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon should be removed. In addition, the possibility of intercepting part of the fracture system that is believed to be the primary means of conveyance of groundwater to Little Bear Spring should be addressed in Section 7.24.1, Groundwater Information, Effects of Mining Operation on Groundwater.

Baseline information of the premining groundwater and surface water features within and adjacent to the proposed 120-acre IBC modification to U-68082 is included as Appendix 7-

64, Baseline Information for the 120-acre IBC modification to U-68082. Appendix 7-64 identifies and shows the locations of seeps, springs, surface water, and drainages that have been monitored within and adjacent to the lease area since 1985. Baseline monitoring of the seeps and springs was collected during June and October 1985, June and September/October 1993, and May 2004. Shingle Creek was monitored during May, June, and July of 2004. The tabulated baseline data presents discharge, flow, and field parameter (including temperature, pH, and conductivity) data available for each monitoring site.

Appendix 7-64 references annotated photographs of selected springs, seeps, and surface monitoring sites (page 2) and surface water laboratory analytical results (page 4) that are not included in the baseline data report.

In Section 7.24.1 Groundwater Information, Methodology, the last paragraph references a seep and spring survey conducted in the area around the IBC area. This IBC needs to be identified further to avoid confusion with the 120-acre IBC modification to lease U-68082.

The listing of water rights in and adjacent to the permit boundary, as obtained from the Utah Division of Water Rights, has been updated on the groundwater and surface water rights maps (Plates 7-14 and 7-15, respectively), the tabulated listing of surface water rights (Table 7-6), and the supporting water rights information (Appendix 7-1).

### **Modeling**

A conceptual recharge model of Little Bear Spring is presented as Appendix 7-55, Investigation of the Potential for Little Bear Spring Recharge in Mill Fork Canyon, Emery County, Utah. The model uses information obtained from studies presented in other appendices including two isotopic studies, an in-mine slug test, a resistivity study, hydrogeologic information, and historical flow data. In addition, a dye tracing study and three electromagnetic (AquaTrack) studies of the Little Bear Spring recharge system are presented in the appendices. Combined, these studies make a compelling argument that the primary source of recharge to Little Bear Spring is through surface water and alluvial groundwater losses in Mill Fork Canyon.

### **Probable Hydrologic Consequences Determination**

The Probable Hydrologic Consequences Determination (PHC) (Appendix 7-15) has been updated to include reference to the 120-acre modification to lease U-68082 and the hydrologic, geologic, baseline, and supplemental information provided for the South Crandall lease area and the additional 40-acre sublease area of the South Crandall lease. No new information describing the probable hydrologic consequences of mining within the U-68082 Lease Modification area is presented except to mention that the drainages in the U-68082 lease modification are all ephemeral or intermittent. Updates in the PHC center around the recharge source to Little Bear Spring and the potential impacts of the proposed mine workings on the spring. Studies indicate that fractures in the Star Point Sandstone act as a conduit to provide surface and alluvial water from Mill Fork Canyon to Little Bear Spring. Because this fracture system lies outside of the South Crandall Lease permit boundary, and a regional Star Point

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aquifer does not likely contribute to the fracture system, then it is considered extremely unlikely that the proposed mining activities will impact the spring. In addition, the Star Point Formation will not be undermined by the proposed mining in the South Crandall Lease area or the 120-acre IBC modification to lease U-68082 because the coal seams proposed for mining are stratigraphically above the Star Point Formation.

As stated above (Hydrologic Resource Information, Baseline Information) the Forest Service has commented that the hydrologic studies have not **conclusively** determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon and that there is also a component of flow reaching the spring from the north and west. The Division requests that the Permittee adequately address the Forest Service comment and acknowledge a difference of interpretation of the studies. Language indicating that the studies have **conclusively** determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon should be removed. In addition, the possibility of intercepting part of the fracture system that is believed to be the primary means of conveyance of groundwater to Little Bear Spring should be addressed.

### **Groundwater Monitoring Plan**

The existing groundwater monitoring plan has been updated to include the monitoring of four springs located within and adjacent to the South Crandall lease area as shown on Plate 7-18. These sites include: Little Bear Spring, a municipal water source, that discharges water from fractures within the Star Point Sandstone and is located approximately 600 feet outside of the lease area; site LB-2 that discharges from the Castlegate Sandstone at the south end of the lease area; site LB-5A that discharges from a sandstone channel in the Blackhawk Formation overlying mining operations at the south end of the lease area; and site SP-79 that discharges from the Star Point Sandstone at the northeast portion of the lease area. All of the spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the MRP.

In order to address Special Coal Lease Stipulation #9 and conduct mining in Little Bear Canyon beyond Spring LB-7, the Forest Service and the Division have agreed that monitoring programs should be developed by the Permittee and in place at least two years prior to mining in that area. The monitoring programs should be approved by the Division in concurrence with the Forest Service prior to implementation.

In the event of multiple seam mining beyond spring site LB-7 in Little Bear Canyon, a monitoring program should be developed that, at a minimum, consists of the following:

- Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12;
- A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and
- A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.

In the event of single seam mining beyond spring site LB-7 in Little Bear Canyon, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan. The springs will be monitored for flow and field parameters.

According to Map 7-12, Seep and Spring Locations, and Appendix 7-64, Baseline Information for the 120-acre modification to lease U-68082, eight seeps and springs have been inventoried within the 120-acre addition as part of the 1985 inventory. Three of these seeps and springs (SP-15, SP-22, and SP-23) are located in the Blackhawk Formation within the potential subsidence area of the 120-acre addition. The baseline data indicates that none of these three springs and seeps are considered significant. In addition, spring SP-22 is the only spring of the three with measurable flow in May 2004 and is located approximately 400 feet above the Hiawatha coal seam (greater than sixty times the estimated coal seam thickness of five feet). Springs SP-15 and SP-22 appear to be located at the east boundary of the potential subsidence area. Based on the low flow reported for the springs in the area, because the springs do not appear to discharge from a significant groundwater system, and the low likelihood that the groundwater discharging at the springs would be diverted to the mine workings through mine-induced fractures, no additional groundwater monitoring is recommended.

### **Surface-Water Monitoring Plan**

The existing surface water monitoring plan has been updated to include the monitoring of four creeks with six monitoring sites located within and adjacent to the South Crandall lease area as shown on Plate 7-18. The creeks to be monitored include: the intermittent Little Bear Canyon Creek, the ephemeral drainage in SW  $\frac{1}{4}$  of Section 4, T16S R7E (Section 4 Creek), the ephemeral drainage located along the west permit boundary along the border of Sections 5 and 6, T16S R7E, and the intermittent creek in Section 5, T16S R7E that drains into Crandall Creek downstream of the Genwal surface facilities (Section 5 Creek). Both Little Bear Canyon Creek and Section 4 Creek will be monitored approximately 100 feet above their confluence with Huntington Creek, the drainage along the west permit boundary will be monitored at station IBC-1 above the confluence with Crandall Creek. Section 5 Creek will be monitored above the confluence with Crandall Creek and at two stations located at the confluence of the drainages upper left and right forks. All of the creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the MRP.

Shingle Creek is an intermittent creek that branches into a right and left fork at the east boundary of the 120-acre IBC modification to lease U-68082. The right and left forks are steep with an estimated 2:1 gradient. Monitoring during spring runoff in May 2004 is reported in Appendix 7-64 and shows the right and left forks of No-Name Creek flowing at 1.69 gpm and 24.4 gpm, respectively. Flow near the confluence of No-Name Creek with Huntington Creek was measured at 17.8 gpm the same day indicating that No-Name Creek is likely a losing stream. As reported in Appendix 7-64, field observations and the meager spring discharge at the time of surface monitoring indicate that much of the measured flow in No-Name Creek is due to surface runoff from spring snowmelt. Because No-Name Creek is intermittent, and only a portion of the

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upper reaches of the right and left forks flows within the potential subsidence area, no additional surface water monitoring is recommended.

**Baseline Cumulative Impact Area Information**

The Division is updating the East Mountain CHIA to incorporate the expansion of the Crandall Canyon Mine into the South Crandall Canyon Lease Tract and the U-68082 Lease Modification area. Hydrogeologic information provided by the amendments is adequate for the Division to complete this update.

**Findings:**

Hydrologic Resource Information does not adequately address the minimum requirements of the Environmental Resource Information – Hydrologic Resource Information section of the regulations. Prior to approval the following information must be provided in accordance with:

**R645-301-724-100, -728-310**, the Permittee needs to rephrase the statement in Section 7.24.1, Groundwater Information, Mine Plan Area Aquifers, “Despite the conclusions of these studies the Forest Service still believes there may be a northerly component of flow recharging Little Bear Spring”. This section and the Probable Hydrologic Consequences Determination (Appendix 7-15) should more adequately address Forest Service comments and acknowledge a difference of interpretation of hydrologic studies of Little Bear Spring. Language indicating that the studies have conclusively determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon should be removed.

**R645-301-724-100, -728-350**, the Permittee needs to address the possibility of intercepting part of the fracture system that is believed to be the primary means of conveyance of groundwater to Little Bear Spring in Section 7.24.1, Groundwater Information, Effects of Mining Operation on Groundwater, and in the Probable Hydrologic Consequences Determination (Appendix 7-15).

**R645-301-723**, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division in concurrence with the Forest Service prior to implementation. At a minimum, the monitoring program should consist of: (1) Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12; (2) A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and (3) A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.

**R645-301-723**, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will be monitored for flow and field parameters.

**R645-301-725.100**, the Permittee needs to include in Appendix 7-64, Baseline Information for the 120-acre IBC modification to lease U-68082, the referenced annotated photographs of selected springs, seeps, and surface monitoring sites (page 2) and surface water laboratory analytical results (page 4).

**R645-301-725.100**, the Permittee needs to further identify the IBC referenced in the last paragraph in Section 7.24.1 Groundwater Information, Methodology.

## **MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

### **Analysis:**

#### **Affected Area Boundary Maps**

The affected area boundary maps are inadequate to meet all of the requirements of the R645 regulations. Genwal Resources did not submit maps at an adequate scale. R645-301-141 requires that maps of the affected area/permit boundaries are at a scale of 1 to 24,000 or larger.

Genwal Resources submitted maps at a scale of 1 inch equals 25,000 feet, which is a scale of 1 to 30,000.

#### **Archeological Site Maps**

The archeological site map provided for in appendix 4-1A of the MRP does not include the South Crandall lease addition. However Appendix 4-9 of the application includes a letter and a map of the lease area from Gary Gray to Jim Dykman. This information was provided to the SHPO on September 9, 2003.

#### **Coal Resource and Geologic Information Maps**

Plate 6-1, the geology map, and Plate 5-2 (H), the mine plan for the Hiawatha Seam, have been updated to include the IBC modification to lease U-68082 and the South Crandall Canyon Extension.

The current Blind Canyon Seam thickness isopach (Plate 6-4), Bear Canyon Seam thickness isopach (Plate 6-5), Hiawatha Seam overburden thickness isopach (Plate 6-6), and structure contour map of the top of the Hiawatha Seam (Plate 6-7) do not include the South

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Crandall Canyon Tract. These maps do cover the 120-acre IBC modification to lease U-68082 but have not been updated to show the lease modification boundary. The boundary for the IBC modification to lease U-68082 needs to be added to several maps, but in particular Plate 5-2 (BC).

Hiawatha and Blind Canyon Seam thickness isopachs for the South Crandall Canyon Tract are on Plates 5-2 (H) and 5-2 (BC), and information on interburden is also listed on these maps. Overburden thickness contour lines are on Plates 5-2 (H) and 5-2 (BC): taking into consideration the inherent inaccuracy in the large contour interval needed to map the overburden thickness because of the steep topography, the difference between the Hiawatha and Bear Canyon overburden thicknesses is not significant, so overburden thickness contours are the same on Plates 5-2 (BC) and 5-2 (H). Plate 5-2 (H) in effect replaces Plates 6-3 and 6-6 for the west side of the Crandall Canyon Mine permit area. Plate 5-2 (BC) replaces Plate 6-4 for the west side, although neither 6-4 nor 5-2 (BC) indicates thickness of the Blind Canyon Seam in the IBC modification.

Subsidence projections for the South Crandall Canyon Tract are on Plates 5-2 (H) and 5-2 (BC). There is no projected extent of subsidence for the 120-acre IBC modification to lease U-68082. Projected subsidence from mining in the IBC needs to be shown on Plate 6-2, Plate 5-2(H), or another appropriate map.

The coal outcrop and strike and dip of the coal seams are on Plates 5-2 (H) and 5-2 (BC). Appendix 6-7 contains a generalized geologic cross-section that parallels the strike of the Mill Fork graben and goes from Rilda Canyon and Mill Fork through the Huntington #4 Mine and Little Bear Spring to Huntington Canyon. Because of concerns from the US Forest Service that full extraction mining in Little Bear Canyon would occur where overburden thickness was less than 600 feet, and that this might affect the perennial nature of the stream in Little Bear Canyon above Little Bear Spring, Genwall Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs in the canyon. The Geology map in Appendix 7-63 shows the seeps and springs locations, which are based on surveying and geopositioning, in relation to the contact between the Price River and Blackhawk Formations. The Hiawatha and Blind Canyon Seam maps in Appendix 7-63 show the relation of the streams, springs, and seeps to the projected workings and a contour line indicating where there is 600 feet of cover above the seam.

Because of concerns from the US Forest Service that full extraction mining in Little Bear Canyon would occur where overburden thickness was less than 600 feet, and that this might affect the perennial nature of the stream in Little Bear Canyon above Little Bear Spring, Genwall Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs in the canyon. The Geology map in Appendix 7-63 shows the seeps and springs locations, which are based on surveying and geopositioning, in relation to the contact between the Price River and Blackhawk Formations. The Hiawatha and Blind Canyon Seam maps in Appendix 7-63 show the relation of the streams, springs, and seeps to the projected workings and a contour line indicating where there is 600 feet of cover above the seam.

### **Cultural Resource Maps**

The cultural resource map provided for in appendix 4-1A of the MRP did not include the South Crandall lease addition. However Appendix 4-9 of the application includes a letter and a map of the lease area from Gary Gray to Jim Dykman. This information was provided to the SHPO on September 9, 2003.

### **Mine Workings Maps**

Mine workings are shown on Plates 5-2 (H) and 5-2 (BC), along with projections of mining in the South Crandall Canyon Extension and IBC modification to lease U-68082. Map 5-1, Old Works Plate, shows the locations of the old workings in and around the Crandall Canyon Mine.

### **Monitoring and Sampling Location Maps**

Genwal Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs related to this contact in Little Bear Canyon. Locations of seeps and springs are on the Hiawatha and Blind Canyon Seam maps in Appendix 7-63. In addition to Little Bear Spring, Genwal monitors two other springs in this canyon, LB-2 and LB-5A. Plates 7-12 and 7-18 have been updated with the correct identification and locations of the seeps and springs in Little Bear Canyon.

Drill-hole locations are shown on Plates 5-2 (BC) and 5-2 (H). There are no new water-monitoring points in the South Crandall lease, but the location of Little Bear Spring is on several maps.

Plate 7-12 shows the seep and spring locations for the Crandall Canyon mine and surrounding area. The baseline seep and spring locations for the South Crandall lease area and the additional 40-acre sublease area associated with the South Crandall lease, and the 120-acre IBC modification to lease U-68082 area are shown on this plate as well as in Appendices 7-58 and 7-64, respectively. Surface and groundwater monitoring locations for the South Crandall lease area and the associated additional 40-acre sublease area are shown on an updated map in Plate 7-18. No additional hydrologic monitoring or sampling locations for the U-68082 Lease Modification area are needed to update Plate 7-18.

In order to clarify the locations of significant springs in relation to the geology and longwall mining projections in Little Bear Canyon watershed, topographic maps of the watershed have been provided (Appendix 7-63) that show the following:

- Surveyed locations and identity of all springs;
- The Hiawatha and Blind Canyon seam outcrop contours;
- The Blind Canyon seam 600-foot overburden contour;
- The Hiawatha and Blind Canyon seam mining projections; and

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**ENVIRONMENTAL RESOURCE INFORMATION**

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- Surface geology.

In order to address Special Coal Lease Stipulation #9 and conduct mining in Little Bear Canyon beyond Spring LB-7, the Forest Service and the Division have agreed that a monitoring programs should be developed by the Permittee and in place at least two years prior to mining in that area. Depending upon the monitoring program developed, additional maps or an update of existing maps will be provided by the Permittee as part of the monitoring plan.

**Permit Area Boundary Maps**

The permit area boundary maps submitted as part of the 120-acre IBC modification to lease U-68082 are inadequate to meet all of the requirements of the R645 regulations. Genwal Resources did not update all of the Plate 5-2 (BC), Crandall Canyon #1 Mine and South Crandall Mine Plan.

**Subsurface Water Resource Maps**

Plate 7-14, Groundwater Rights, has been updated to include the South Crandall lease area, the associated additional 40-acre sublease area, and the U-68082 Lease Modification area.

**Surface Water Resource Maps**

Plate 7-15, Surface Water Rights, has been updated to include the South Crandall lease area, the associated additional 40-acre sublease area, and the U-68082 Lease Modification area

**Vegetation and Wildlife Maps**

The application includes wildlife and vegetation maps for the proposed 120-acre lease addition. They are identified as plates 3-1 and 3-2. Plate 3-2, (Regional Vegetation), needs to be revised to accurately reflect the vegetative communities and stream courses that are present in the canyon where the proposed IBC is located. Additional vegetative communities observed in the proposed lease addition were conifer, Pinyon Juniper Mountain Brush, Sagebrush, and riparian. Both forks of the canyon exhibited intermittent flow. Plates 3-1 and 3-2 appear to show perennial flow in the canyon and proposed lease area.

**Findings:**

The information provided in the current MRP is not adequate to meet the requirements of this section of the regulations, prior to approval the following information must be provided in accordance with:

**R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731**, Plate 3-2, (Regional Vegetation), needs to be revised to accurately reflect the vegetative communities and stream courses that are present in the 120-acre IBC modification to lease U-68082.

The information provided does not adequately address the minimum requirements of the Environmental Resource Information – Maps, Plans, and Cross Sections of Resource Information section of the regulations. Prior to approval the following information must be provided in accordance with:

**R645-301-632**, Projected subsidence from mining in the 120-acre IBC modification to lease U-68082 needs to be shown on a map.

**R645-301-622**, Several maps, but in particular Plate 5-2 (BC), need to show the boundary for the 120-acre IBC modification to lease U-68082.

**R645-301-141**, The Permittee must include maps of the permit and adjacent areas at a scale of 1 to 24,000 or greater and update all maps that show the permit boundaries such as Plate 5-2 (BC).

OPERATION PLAN

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## OPERATION PLAN

### COAL RECOVERY

Regulatory Reference: 30 CFR 817.59; R645-301-522.

#### Analysis:

Appendix 5-24, Resource and Recovery Protection Plan Approval Letter, was not included in the amendment. The Division uses the R2P2 when evaluating the coal recovery plan. In addition to the approval letter the Permittee needs to state in the amendment what they are doing to maximize coal recovery.

The Permittee plans to mine both seams in the South Crandall Canyon Lease Extension, as shown on Plate 5-2 (H) and Plate 5-2 (BC). The Permittee has developed a mine plan that will recover as much coal as is economically possible. There is no or little thickness data for the Blind Canyon and Bear Canyon Seams in or adjacent to the IBC modification to lease U-68082, and these seams will not be mined there. The nearest borehole, DH-2, is located roughly one-half mile north of the lease modification. The Division sees the small size of the area and the absence of access through adjacent workings as indicators that recovery of coal from these seams, even if thick coal were present, would probably not be economic.

Mining projections on Plate 5-2 (H) show one east-west oriented longwall panel in the Hiawatha Seam, extending into the south end of the IBC area. The Permittee states that recovery of Hiawatha coal in the IBC is speculative.

The Division is required to analyze the mine plan to ensure maximum use and conservation of coal. On mines with federal leases, such as Crandall Canyon, the BLM also does the same analyses in their resource recovery protection plan (R2P2). The Division allows the permittee to include the R2P2 and BLM findings in the permit application of amendments so that the information and studies do not have to be duplicated. In addition, the BLM's findings are often used by the Division when they do their analysis.

The Division reviewed the mine plan and found that there was not enough data to complete the analysis. The missing items include:

- A description of the type of mining that will occur in the South Crandall tract. Specifically the Division needs to know what panels will be mined with longwall equipment and what panels will be mined with continuous miners. In those panels where continuous miners are used the Permittee must indicate if first mining only or full extraction mining will occur.
- The Permittee must state any lease stipulations that could limit the amount of recoverable coal. Such lease restrictions include, but are not limited to, areas that cannot be mined, areas where first mining only can occur, areas where only single seam mining can occur

(and if so what seam will be mined), areas that cannot be mined because of overburden limitations, and areas that cannot be subsided due to overburden limitations.

The information in the Genwal Resources submittal for the 120-acre IBC modification to lease U-68082 is adequate to meet the minimum requirements for the coal recovery regulations. Genwal Resources added the 120 acres in order to recover a small amount of coal in the 1<sup>st</sup> Right Panel. They permitted additional areas because of the possibility of additional mining to the north.

The coal to the north is low ( 5 feet or less). The Permittee determined that a drilling program would be inadequate to determine if the area is mineable. They will do exploration with a continuous miner. If mining is feasible Genwal Resources will develop additional panels to the north.

The coal in the 120-acre IBC modification to lease U-68082 is bounded on the north and to the east by outcrops. The only practical access to the coal is through the Genwal Mine. The coal in the 120-acre IBC modification to lease U-68082 is marginal due to the seam thinness. The addition of the 120-acre IBC modification to lease U-68082 will allow the Permittee the ability to recover coal that would otherwise be sterilized.

The Division considers the additional of the 120-acre IBC a tool for the Permittee to maximize the economic recovery of the coal resources.

#### **Findings:**

The information provided does not adequately address the minimum requirements of the Operation Plan – Coal Recovery section of the regulations. It should be noted that the Bureau of Land Management will issue the approval of the R2P2 to the applicant and provide a copy to the Division. Prior to approval the following information must be provided in accordance with:

**R645-301-522, -523,** The Permittee needs to include a description of the type of mining that will occur in the South Crandall tract. Specifically the Division needs to know what panels will be mined with longwall equipment and what panels will be mined with continuous miners. In those panels where continuous miners are used the Permittee must indicate if first mining only or full extraction mining will occur.

**R645-301-522, -523,** The Permittee needs to include any lease stipulations that could limit the amount of recoverable coal. Such lease restrictions include, but are not limited to, areas that cannot be mined, areas where first mining only can occur, areas where only single seam mining can occur (and if so what seam will be mined), areas that cannot be mined because of overburden limitations, and areas that cannot be subsided due to overburden limitations.

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## OPERATION PLAN

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**R645-301-522**, The Permittee must update the MRP to include any additional information that is required of the R2P2 for the South Crandall Lease , which may include map and text changes.

**R645-301-522**, The Permittee must update the MRP to include any additional information that is required of the R2P2 for the IBC Modification to Lease U-68082, which may include map and text changes.

## SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

### Analysis:

#### Renewable Resources Survey

The renewable resources in the area consist of grazing, timber and water. The Permittee stated in the South Crandall amendment that some of the renewable resources in the area were surface and groundwater. The Permittee has designed the mine plan to prevent damage to those resources particularly Little Bear Spring.

#### Subsidence Control Plan

The updated subsidence plan includes the following information about the South Crandall lease:

- In most of the South Crandall lease, the Hiawatha and Blind Canyon seams will be extracted with by longwall methods. Those areas where full extraction is not permitted by the lease agreement are: 1) Areas under Little Bear Stream with less than 600 feet of overburden, 2) areas within 1,000 feet of the southeast corner of the lease in order to protect the Mill Fork Graben and 3) areas within 1,000 feet of the southern boundary of the lease in order to protect the possible water-bearing fracture system.
- Map 5-2 BC and Map5-2H have been updated to show the area of maximum possible subsidence.
- The subsidence monitoring program for the South Crandall lease is similar to that of the other areas. The area will have initial survey points established. The area will be aerial surveyed and surface inspections will be done.
- Effects of planned subsidence are anticipated to be a lowering of the surface and temporary tensional fractures at the margins of the subsidence areas.
- Mitigation for any disruption to the Little Bear Spring will be done through construction of a water treatment plant, which will provide replacement water for the spring.

The Permittee did not include information about the main power line for the site and the potential effects of subsidence. Without that information, the Division cannot determine the

effects that subsidence will have on surface facilities. The Division needs the following specific information:

- The Permittee must show the location of the main power line on all subsidence maps including but not limited to Plate 5-2 (BC) and Plate 5-2 (H).
- The Permittee must describe the anticipated effects that subsidence will have on the main power lines. The Division acknowledges that power line belongs to the Permittee and that they would be financially responsible for any damage. The Division does have general health and safety concerns about downed or damaged power lines. In particular, the possibility of a fire hazard should be addressed.

The updated subsidence plan that was submitted as part of the 120-acre IBC modification to lease U-68082 is inadequate to meet the minimum requirements for the subsidence control plan as required by the regulations. Map 5-5 does not show the extent of the maximum subsidence limits. The maximum subsidence limits needs to be included on the subsidence map for the 120-acre IBC modification to lease U-68082.

The Permittee was able to meet part of the subsidence control plan requirements in connection with the 120-acre IBC because they included the following:

- All mining in the 120-acre IBC will be done in the Hiawatha Seam. The purpose of the 120-acre addition is to allow the Permittee to mine coal that would otherwise be inaccessible.
- Map 5-2 (H) shows the location of the mining that will occur in the 120-acre IBC.
- Map 5-5, Subsidence Control Point Location, shows that no new subsidence control points were added for the 120-acre IBC. The area has two existing monitoring points. Because of the small area the Division believes that additional monitoring points are not needed.

### **Performance Standards For Subsidence Control**

The Permittee is required to keep all performance standards for subsidence controls.

### **Notification**

The Permittee is required to notify the water conservancy district, and all surface owners 6 months before undermining an area. The Division will inspect the Permittee's records to determine if notification was given during quarterly complete inspections.

### **Findings:**

The information provided does not adequately meet the minimum requirements of the Operation Plan - Subsidence Control Plan section of the regulations. Prior to approval the following information must be provided in accordance with:

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**R645-301-525.420**, The Permittee must show the location of the main power lines on each subsidence map including but not limited to Plate 5-2 (BC) and Plate 5-2 (H).

**R645-301-525.460**, The Permittee must state the anticipated effects of subsidence on the main power line. The Division is concern about the health and safety issues, such as a fire hazard, that could arise from downed or damaged power lines.

**R645-301-525**, The Permittee will update the MRP to include any additional information that is required of the R2P2 for the South Crandall Lease, which may include map and text changes.

**R645-301-525**, The Permittee will update the MRP to include any additional information that is required of the R2P2 for the IBC Modification to Lease U-68082, which may include map and text changes.

**R645-301-525.110**, The Permittee must update Map 5-5 in the 120-acre IBC so that areas of maximum possible subsidence are shown. Previous versions of Map 5-5 showed that information.

## FISH AND WILDLIFE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

### Analysis:

#### Protection and Enhancement Plan

The only impacts to fish and wildlife would be those to habitat loss as a result of subsidence.

Crandall Creek is considered important fish habitat, and all riparian habitat is considered critical wildlife habitat. The MRP contains correspondence from the Division of Wildlife Resources discussing a wildlife protection and mitigation plan that has been developed through several months of negotiations between the permittee, Wildlife Resources, the Forest Service, Water Rights, and the Division. This plan is intended to protect the Colorado River cutthroat trout population and to mitigate for the loss of fisheries and riparian habitat.

Major points of the plan included:

1. Certain modifications would be made to Crandall Creek above the mine.

## OPERATION PLAN

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2. All the fish in the area of the culvert would be captured and transplanted to a secure and suitable temporary location. Some of these fish will be put back into Crandall Creek above the mine.
3. Alterations would be made to another stream to isolate it from other fish populations. This stream would be treated to eliminate all fish, and Colorado River cutthroats would be transplanted to it.
4. In Scad Valley, a sheep corral would be eliminated and two or three new corrals constructed. Some roads would be reclaimed to try to improve the quality of spawning habitat in this area.

Unfortunately, it is possible that moving the sheep corral and reclaiming certain roads may not result in improved stream habitat in Scad Valley Creek and would not fulfill the requirements of R645-301-333 and R645-301-358. The Forest Service and Wildlife Resources intend to monitor this section of stream to see if the project is successful.

### **Endangered and Threatened Species**

Of the 16 vegetative and wildlife species, one, the bald eagle, could potentially occur in the permit area. However, the occurrence is most likely to be migration through the area rather than nesting or roosting. Most threatened or endangered species that could occur in Emery County occur at lower elevations than the mine and have no habitat in the proposed permit area expansion.

There have been no confirmed sightings of Black-Footed Ferrets in Emery County in several years.

The mine has potential, through water depletions, of adversely affecting four listed threatened and endangered fish species of the upper Colorado River drainage. The Fish and Wildlife Service requires mitigation when water depletions exceed 100 acre-feet annually. Page 7-12 and appendix 3-18 of the application describe the use of water for mining operations. The information on page 7-12 indicates that approximately 150 gpm, (242 acre/ft/yr), are used in water consumption for mining activities. This was an estimate based on experience at other mines. The most recent submittal dated July 7, 2004 includes calculations in appendix 3-18 that define the actual amount of water used in the mining process and water that is discharged into Crandall Creek. The calculations in appendix 3-18 indicate that 79.4-acre feet per year of water are used in mining processes and approximately 800 acre feet per year of water are discharged into Crandall Creek annually. According to these calculations, the mine would provide a net gain of 729.6 acre-feet per year of water to Crandall Creek. According to the Mayo age dating studies, this mine water is old and would not be intercepting the water associated with the springs located above the mine workings.

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**OPERATION PLAN**

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**Bald and Golden Eagles**

The bald eagle could potentially occur in the permit area. However, the occurrence is most likely to be migration through the area rather than nesting or roosting. Bald eagles are common in the area during the winter and could occasionally fly through or roost in the proposed lease addition to the permit area. The raptor survey conducted in the spring of 2003 indicated that there were no golden eagle nests in the proposed lease area. The proposed mining in both the South Crandall lease and 120-acre IBC modification to lease U68082 areas would have negligible effects on these birds.

**Wetlands and Habitats of Unusually High Value for Fish and Wildlife**

The springs and riparian areas within the proposed 120-acre IBC modification to lease U-68082 addition would be considered habitats of high value for fish and wildlife. However, since no surface disturbance is anticipated by this permitting action the only effects on habitat would possibly be from subsidence. Any impacts on fish and wildlife habitat due to subsidence would be negligible.

**Findings:**

The information provided adequately addresses the minimum requirements of the Operation Plan – Fish and Wildlife section of the regulations.

**VEGETATION**

Regulatory Reference: R645-301-330, -301-331, -301-332.

**Analysis:**

Vegetation should not be affected by the addition of the 120 -acre parcel. Genwal Resources Inc. is committed to taking aerial color infrared photographs every five years beginning in 1995 to monitor the effects of underground mining on vegetation.

**Findings:**

The information provided adequately addresses the minimum requirements of the Operation Plan - Vegetation section of the regulations.

**HYDROLOGIC INFORMATION**

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

## Analysis:

### Groundwater Monitoring

The existing groundwater monitoring plan has been updated to include the monitoring of four springs located within and adjacent to the South Crandall lease area and the associated additional 40-acre sublease area as shown on Plate 7-18. These sites include: Little Bear Spring, a municipal water source, that discharges water from fractures within the Star Point Sandstone and is located approximately 600 feet outside of the lease area; site LB-2 that discharges from the Castlegate Sandstone at the south end of the lease area; site LB-5A that discharges from a sandstone channel in the Blackhawk Formation overlying mining operations at the south end of the lease area; and site SP-79 that discharges from the Star Point Sandstone at the northeast portion of the South Crandall lease area and the associated 40-acre sublease area. All of the spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the MRP.

As a stipulation of the lease agreement (Special Coal Lease Stipulation #17), the Permittee has committed to mitigate for potential disruption to Little Bear Spring. Stipulation #17 states "In order to adequately protect flow from Little Bear Spring, the Leasee must enter into a written agreement with Castle Valley Special Services District (CVSSD) to assure an uninterrupted supply of culinary water equivalent to historical flows from the spring. The agreement must be in place prior to mining." A water treatment plant is to be constructed under the provisions of an agreement between Genwal, Pacificorp, and the Castle Valley Special Service District. A copy of the agreement that meets the requirements of Special Coal Lease Stipulation #17 is included as Appendix 7-51. However, in order to clarify that the intent of Stipulation #17 is met, the text in the MRP should reflect that an uninterrupted supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring. Specifically, text in Section 7.24.1, Mitigation and Control Plan, stating "Should it be necessary to develop alternate water supplies due to unexpected diminution or interruption of flows as a direct result of mining activities..." should also reference the additional protection placed on Little Bear Spring. Text in Section 7.27, Alternative Water Source Information, stating "Mitigation for potential disruption to Little Bear Spring will be accomplished ... if mining activity in the South Crandall lease tract affect the quality or quantity of the spring" should be changed to be consistent with the language of Stipulation #17.

In order to address Special Coal Lease Stipulation #9 and conduct mining in Little Bear Canyon beyond Spring LB-7, the Forest Service and the Division have agreed that monitoring programs should be developed by the Permittee and in place at least two years prior to mining in that area. The monitoring programs should be approved by the Division in concurrence with the Forest Service prior to implementation.

In the event of multiple seam mining beyond spring site LB-7 in Little Bear Canyon, a monitoring program should be developed that, at a minimum, consists of the following:

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## OPERATION PLAN

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- Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12;
- A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and
- A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.

In the event of single seam mining beyond spring site LB-7 in Little Bear Canyon, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan. The springs will be monitored for flow and field parameters.

### Surface Water Monitoring

The existing surface water monitoring plan has been updated to include the monitoring of four creeks with six monitoring sites located within and adjacent to the South Crandall Lease and the additional 40-acre sublease areas as shown on Plate 7-18. The creeks to be monitored include: the intermittent Little Bear Canyon Creek, the ephemeral drainage in SW ¼ of Section 4, T16S R7E (Section 4 Creek), the ephemeral drainage located along the west permit boundary along the border of Sections 5 and 6, T16S R7E, and the intermittent creek in Section 5, T16S R7E that drains into Crandall Creek downstream of the Genwal surface facilities (Section 5 Creek). Both Little Bear Canyon Creek and Section 4 Creek will be monitored approximately 100 feet above their confluence with Huntington Creek. The drainage along the west permit boundary will be monitored at station IBC-1 above the confluence with Crandall Creek. Section 5 Creek will be monitored above the confluence with Crandall Creek and at two stations located at the confluence of the drainages upper left and right forks. All of the creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the MRP.

### Transfer of Wells

Transfer of wells is not currently considered. Any future transfers will be in accordance with DOGM approval.

### Findings:

The information provided does not adequately address the minimum requirements of the Operation Plan - Hydrologic Information section of the regulations. Prior to approval the following information must be provided in accordance with:

**R645-301-727**, the Permittee should change the text to reflect that an uninterrupted supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring. Specifically, text in Section 7.24.1, Mitigation and Control Plan, stating “Should it be necessary to develop alternate water supplies due to unexpected diminution or interruption of flows as a direct result of mining activities...” should also reference the additional

protection placed on Little Bear Spring. Text in Section 7.27, Alternative Water Source Information, stating "Mitigation for potential disruption to Little Bear Spring will be accomplished ... if mining activity in the South Crandall lease tract affect the quality or quantity of the spring" should be changed to be consistent with the language of Special Coal Lease Stipulation #17.

**R645-301-731-211**, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division in concurrence with the Forest Service prior to implementation. At a minimum, the monitoring program should consist of the following: (1) Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12; (2) A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and (3) A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.

**R645-301-731-211**, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will be monitored for flow and field parameters.

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RECLAMATION PLAN

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## RECLAMATION PLAN

### GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

### PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES

Regulatory Reference: 30 CFR Sec. 817.97; R645-301-333, -301-342, -301-358.

#### Analysis:

For those areas disturbed by mining activities, high value habitats (pinyon-juniper, agricultural and riparian areas) will be restored; in many cases, they will be enhanced beyond their premining condition. The goals are to create a diversified cover and/or habitat that will support a wide range of species while restoring to a premining condition and, where feasible, enhancing habitat. On September 21, 1993, representatives from Genwal, the Division, and Wildlife Resources met on-site to discuss wildlife habitat enhancement for reclamation. Subsequently, Wildlife Resources wrote Genwal a letter with enhancement suggestions. This letter has been incorporated in the plan, and Genwal commits to use the recommendations. They include making several rock piles and placing modified utility poles with attached nesting boxes near the perimeter of the disturbed area. These measures were felt by Wildlife Resources to be the most practical means of enhancing wildlife habitat in this area. Combined with the revegetation plan, these methods can be considered the best technology currently available.

#### Findings:

The information provided adequately addresses the minimum requirements of the Reclamation Plan – Protection of Fish, Wildlife, and Related Environmental Values section of the regulations.

### REVEGETATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

**Analysis:**

**Revegetation: General Requirements**

It should be noted that there is no surface disturbance associated with the South Crandall lease area, the additional 40-acre sublease area, or the 120-acre IBC modification to lease U-86082. However, for those areas disturbed by mining activities topsoil will be redistributed within 30 days of completion of grading in late September or early October. Soil amendments will be applied if necessary before the end of October. Seeding will commence as soon as the seedbed is finished in the late fall. Tree planting will be done in conjunction with seeding or in the following spring as soon as the soil is workable.

The Permittee commits to inoculating the soil with microorganisms prior to seeding. Some research indicates this is a necessary step for establishing certain species although there has been successful revegetation in some areas with essentially sterile soil and no attempt to inoculate. The Permittee and the Division should look at current findings at the time of reclamation to determine the best methods.

The application contains a seed/planting mix for riparian and one for non-riparian areas. The seed mix for non-riparian areas was developed primarily for the south-facing slope where existing disturbances are located. The north-facing slope has a very different vegetation community, but many of the species in the existing seed/planting mixture are appropriate for the north-facing slopes. Also, the application contains a plan to transplant woody plants of species more suited to the north-facing slopes.

The seed/planting mix for riparian areas includes a mixture of species suitable for both upland and riparian areas. Willows, dogwoods or roses would be planted at one-foot intervals along the stream. In response to comments from the Forest Service, the Permittee has committed to plant horsetail plugs about every two feet. Additional trees and shrubs would be planted farther away from the creek.

The seeding and planting mixes in the plan fulfill regulatory requirements for introduced species, diversity, seasonality, and the postmining land use. Three introduced species are included, and they are all highly desirable. They should not be overly competitive or displace native species in the area. Small burnet and yellow sweet clover are fairly short-lived species that will probably not be present after the ten-year extended responsibility period. The seed and planting mixes are expected to provide successful revegetation if proper reclamation methods are used.

The entire area of disturbance will be hydromulched with long fiber wood mulch. Tackifying agents will be added to the hydromulch, and the application shows tackifier application rates for varying slopes.

The Permittee and the Division investigated the use of various mulches, particularly for the steep north-facing hillside. There are many types of hydromulch available, and the Permittee

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intends to use one with coarse, long fibers. This type of mulch is preferred over a mat because mats often have erosion under them.

It is anticipated that mulch technology will change over the next several years until the site is reclaimed. The Permittee will need to use the best technology currently available to control erosion and sedimentation, particularly in the area near the stream.

No irrigation is anticipated. The Permittee commits to avoid using persistent pesticides and to prevent personnel-caused fires. However, a contingency irrigation plan is recommended for transplants. Dry conditions could necessitate watering transplants for the first one or two summers.

Musk thistle is a very serious problem at mid- to high elevations in Utah. Although this noxious weed is not widespread in Huntington Canyon, it has been found at the Crandall Canyon Mine. Disturbed and newly seeded areas are very prone to noxious weed invasion. The Permittee should plan now for noxious weed control during reclamation as it will almost certainly be necessary.

On January 1, 1994, the Forest Service issued a closure order for any straw or hay that is not certified to be free of noxious weeds. This includes transportation across Forest Service lands. The applicant is not planning to use straw or hay mulch in reclamation, but any straw or hay bales that are used for sediment control will need to be certified.

### **Revegetation: Standards For Success**

A vegetation reference area has been established in the mountain shrub/grassland community above the mine portals for comparison with vegetation on reclaimed areas that had this community before mining. Another reference area has been established to compare to areas with spruce/fir/aspens communities. This reference area is south of the portal development area.

Woody plant density standards have been established for three areas of the mine. For areas to be compared with the mountain shrub/grassland reference area, the standard for woody species density has been set at 1336 shrubs per acre. This is based on reference area data. The standard for north-facing slopes has been set at 4000 per acre based on baseline information in the plan and consultation with Wildlife Resources. The riparian area has about 11,224 shrubs and trees per acre, and shrubs and trees will be planted in this area at the rate of about 3000 per acre. It is expected that these will multiply through the extended responsibility period, and the success standard has been set at 6000 per acre.

There are some differences between the disturbed and reference area spruce/fir/aspens communities, but they are primarily in species composition rather than the total amount of cover. The current reference area has 75.25% total living cover, and the disturbed area has 78.75%.

These values are not statistically different at the 90% confidence level. The proposed disturbed area has statistically more overstory than the reference area, but understory cover

values are statistically the same for both areas. Also, the woody species density is higher in the reference area.

Despite the differences between the proposed disturbed and reference areas, there are several similarities, including location, community type, soils, aspect, and total cover. The actual species present and the amount of cover from overstory vary, but these will vary even more significantly when comparing reclaimed and reference areas. Additionally, the woody plant density success standards are established in consultation with Wildlife Resources rather than being based strictly on baseline information in the plan. For these reasons, the reference area is considered an acceptable revegetation success standard for spruce/fir/aspen areas.

Portions of the north-facing slope have been affected by natural soil movement and have less vegetation than adjacent areas. The Division could accept a different revegetation success standard for these areas rather than comparing them to the spruce/fir/aspen reference area. However, the permittee has not included a separate standard in the MRP even though the report from the permittee's consultant discusses using another standard. A revegetation reference area was not proposed, and the number of samples taken in these areas is not sufficient to allow the baseline method to be used.

In order to meet the erosion control performance standards in the areas that have had soil movement, it will probably be necessary to establish nearly as much vegetation as in spruce/fir/aspen areas. The main question is whether establishing this much vegetation is feasible. The various revegetation and stabilization techniques that are planned should allow more vegetation to become established than currently exists. If, in the future, the permittee desires to propose a reference area revegetation success standard in a similar area, the Division could compare it to the area now proposed to be disturbed. If there is some possibility a different success standard may be proposed in the future, the areas with soil movement should be mapped now.

The approved MRP includes diversity standards for all disturbed areas. The standards currently in the plan are minimum and maximum relative cover values for grasses, shrubs, and broadleaf forbs in the three major disturbed vegetation types. In addition, the MRP states that no one species will make up more than 60% of the cover in its respective vegetation class except that individual species of shrubs and trees will make up no more than 80% of the density for this class. The approved MRP gives a monitoring schedule and methodologies for checking success of revegetation. In the disturbed spruce/fir/aspen areas, the standard will be 3-15% relative cover from broadleaf forbs, at least 15% cover from trees and shrubs, and the balance from grasses. This leaves a lot of latitude between grasses and woody plants since woody plants are expected to eventually dominate the area. Until then, grasses are expected to dominate the cover.

The riparian area should be dominated by woody species. The standard is 5-10% relative cover from broadleaf forbs, 40-85% relative cover from trees and shrubs, and 10-50% relative cover from grasses and grasslike plants.

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For both riparian and spruce/fir/aspen areas, as in the other areas, no one species will make up more than 60% of the cover in its respective vegetation class except that individual species of trees and shrubs will make up no more than 80% of the density for this class.

The diversity standards for south-facing slopes are based on Natural Resource Conservation Service range site potential plant community data. For riparian areas and north-facing slopes, the standards are based on professional judgment by a soil scientist and botanist with the Forest Service and a Division biologist. The standards allow some flexibility but ensure a reasonably diverse plant community.

R645-301-353.140 requires that the vegetative cover be capable of stabilizing the soil surface from erosion. The permittee intends to use the Erosion Condition Classification System to compare reclaimed areas with adjacent undisturbed areas. This method was developed by the Office of Surface Mining, and, while it is a qualitative judgment, it provides a reasonably good estimate of how stable a site is. Even if vegetative cover is equal to that of the reference area, the reclaimed area may not be stable. R645-301-356.250 says that for areas previously disturbed by mining that were not reclaimed and that are remined or redisturbed, at a minimum, the vegetative ground cover will be not less than the ground cover existing before redisturbance and will be adequate to control erosion. The vegetative ground cover existing before redisturbance was 50.3%. Relatively little of this cover was from plants that would be considered weeds. This figure has been established as the vegetative cover standard for success for the areas previously disturbed by mining.

**Findings:**

The information provided adequately addresses the minimum requirements of the Reclamation Plan - Revegetation section of the regulations.



## **CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)**

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

### **Analysis:**

The Division is updating the East Mountain CHIA to incorporate the expansion of the Crandall Canyon Mine into the South Crandall Canyon Lease Tract and the U-68082 Lease Modification area.

### **Findings:**

The submittal contains sufficient hydrogeologic information for the Division to update the East Mountain CHIA.

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