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# TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

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July 30, 2012

TO: Internal File

THRU: Steve Christensen, Lead *SC*

FROM: James Owen, Engineer *JO*

RE: Construction of Burma Evaporation Pond, Genwal Resources, Inc., Crandall Canyon Mine, C/015/0032, Task #4138

## SUMMARY:

On June 22, 2012, the Utah Division of Oil Gas & Mining received a response to deficiencies identified during the initial review (Task #3997) of an application for an amendment to the Mining & Reclamation Plan (MRP) of the Crandall Canyon Mine. The application seeks approval to construct an evaporation basin which is needed to dispose of the iron sludge from the Crandall mine-water treatment facility. Task #4138 provides responses to the deficiencies and seeks approval of the construction on the basin. This memo addresses the application's compliance with the engineering (R645-301-500) and bonding (R645-301-800) sections of the Utah Coal Mining Rules. The following deficiencies were identified:

**R645-601.542.100** As requested, the applicant included a commitment that reclamation of the project area will be according to and along with the approved reclamation time line found in Section 3.41.100 of the approved MRP, subject to change based on whether or not discharged mine water requires treatment. For further clarification, the Division requests that the statement be changed to the following: "Reclamation of the project area will be according to and along with the approved reclamation time line found in Section 3.41.100 of the approved MRP. In the event that discharged mine water no longer requires treatment and/or the basin is no longer receiving sludge, the reclamation timeline for the Burma basin will be adjusted as follows: Reclamation will begin after three years without receiving sludge, and reclamation will be completed within one year of commencement."

**R645-301-528.332** The applicant must include a commitment to compacting and covering the sludge material when needed as determined by Division staff during inspection to prevent the waste from becoming wind-borne.

During the initial review, the following deficiencies were identified:

- ***R645-601.542.200*** *The applicant must provide a reclamation plan, details, maps, etc for backfilling and grading and include a commitment to achieve approximate original contour (AOC) restoration at final reclamation. The applicant may include a reference to the appropriate section of the approved MRP to comply with this requirement. The reference must clearly define the reclamation plan details that will apply to the Burma Basin.*

In Chapter 3 of Appendix 7-66, the applicant includes a commitment stating that “on final reclamation, the evaporation basin area will be backfilled and graded to approximate original contour (AOC), and topsoil will be re-applied to the reclaimed area.”

- ***R645-601.542.100*** *The applicant must include a commitment to reclaim the basin according to and along with its approved reclamation timeline, subject to change based on whether or not discharged mine water requires treatment.*

In Chapter 3 of Appendix 7-66, the applicant includes a commitment stating that “reclamation of the project area will be according to and along with the approved reclamation time line found in Section 3.41.100 of the approved MRP, subject to change based on whether or not discharged mine water requires treatment.”

- ***R645-301-830.140.*** *The mine has adequate bond in place to allow for construction of the basin. However, the applicant must submit updated bond calculation spreadsheets for demolition, earthwork, revegetation, and bond calculation summary. These will be incorporated into the bonding section of the mine's MRP and will not need to be included with the Burma Basin attachment. Detailed updates to the appropriate bond calculation spreadsheets will support the unit cost assumptions and calculations made in the application, as well as address discrepancies between the applicant and the Division in terms of total estimated reclamation cost of the basin (the Division's estimation based on the provided unit costs is lower than the applicants).*

Chapter 8 of Appendix 7-66 has been revised to state that the calculations listed are a summary of the Burma bond revisions. A complete copy of the bond calculation sheets were included to be incorporated into Appendix 5-20 of the approved MRP.

**TECHNICAL ANALYSIS:**

**OPERATION PLAN**

**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:**

The basin will consist of a large, shallow evaporation pond, measuring approximately 100' wide by 200' long. It will be constructed about five feet (60") deep, although only the bottom 36" would be utilized for sludge storage/water retention, leaving the top 24" as freeboard.

It is anticipated that cleanout sludge-water from the Crandall water treatment facility will be hauled to the site about 10 eight-hour days (two working weeks) every two months, at two truckloads per day, and 4000 gallons per truckload. This works out to be about 64,200 cu. ft. per year hauled to the site for disposal. The iron cleanout "sludge" material has typically been analyzed at about 50/0 solids and 95% water by weight, and even less by volume, perhaps 2-3% solids. Therefore, after evaporation of the water, the actual volume of solids left to accumulate in the basin is expected to average about 2400 cu ft. per year. Spread out to dry over the 20,000 square foot bottom of the evaporation basin, the rate of solids accumulation in the basin is expected to be less than 1.5 inches per year or less.

The iron sludge that is meant to be stored in the basin has been tested in the lab for RCRA metals, and has been found to be non-toxic, non-hazardous and non-acid forming (results included in the application within Attachment 10) Also, the chemicals used in the water treatment (coagulant and flocculent) are all NSF-60 certified (results included in the application within Attachment 12)

A stability analysis for the construction of this earthen berm is included in Attachment 11.

**The safety factor for the proposed embankment was calculated at 12.03 for dry conditions and 10.53 for saturated conditions.**

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## SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

### Analysis:

The sludge being dried in the basin is defined as "noncoal mine waste" as per R645-528.331. As per R645-301-528.332, the permittee is required to ensure that leachate and drainage from the noncoal mine waste area does not degrade surface or underground water, routinely compact and cover to prevent combustion and wind-borne waste, and when the disposal is completed, a minimum of two feet of soil cover will be placed over the site, slopes, stabilized, and revegetation accomplished.

### Findings:

Contents and information provided are not sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules. The following deficiency was identified:

**R645-301-528.332** The applicant must include a commitment to compacting and covering the sludge material when needed as determined by Division staff during inspection to prevent the waste from becoming wind-borne.

## 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:

All required maps, plans, and cross sections of the basin are included within the application in Attachment 1 of Appendix 66. Drawings are appropriately certified.

### Findings:

Contents and information provided are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

## RECLAMATION PLAN

### BACKFILLING, GRADING, and APPROXIMATE ORIGINAL CONTOURS

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

#### Analysis:

The applicant states that the dried sludge material will be left in place and buried on-site as part of the final reclamation process. The material would be buried under 48" of inert earthen material during reclamation, top-soiled and re-vegetated.

The application includes details of final reclamation and includes a commitment that the basin will be backfilled and graded to ultimately achieve approximate original contours (AOC).

Cubic yardages for backfilling and grading estimates are included in the application.

#### Findings:

Contents and information provided are not sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules. The following deficiencies were identified:

**R645-601.542.100** As requested, the applicant included a commitment that reclamation of the project area will be according to and along with the approved reclamation time line found in Section 3.41.100 of the approved MRP, subject to change based on whether or not discharged mine water requires treatment. For further clarification, the Division requests that the statement be changed to the following:

“Reclamation of the project area will be according to and along with the approved reclamation time line found in Section 3.41.100 of the approved MRP. In the event that discharged mine water no longer requires treatment and/or the basin is no longer receiving sludge, the timeline for the Burma basin will be adjusted as follows: Reclamation will begin after three years without receiving sludge, and reclamation will be completed within one year of commencement.”

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**BONDING AND INSURANCE REQUIREMENTS**

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.

**Analysis:**

Division records indicate that the Crandall mine currently has surety bond posted in the amount of ~ \$2,327,000.

Updated bond calculation spreadsheets were provided with the response application. Updated costs were provided in terms of Demolition, backfilling & grading, and re-vegetation. Burma basin unit cost estimates were provided as line items for each of the areas listed above. With the Burma basin included (as demolition area #52) the new direct cost subtotals are as follows:

Demolition and Removal	\$772,145.67
Backfilling and Grading	\$552,982.72
Revegetation	\$62,735.00

The total estimated bond after including indirect costs is \$1,759,811.39. This number was correctly escalated 5 years at 1.2% leaving a total mine bond amount of \$1,867,964.39. The difference between bond amount and posted bond is therefore \$54,000.00 or 2.38%. The calculations are correct and the amount of bond posted is determined to be adequate.

**Findings:**

Contents and information provided are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

**RECOMMENDATIONS:**

Approval should be denied until deficiencies are addressed.