STATE OF COLORADO

DIVISION OF RECLAMATION, MINING AND SAFETY
Department of Natural Resources

1313 Sherman St., Room 215
Denver, Colorado 80203
Phone: (303) 866-3567
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COLORADO DIVISION OF RECLAMATION MINING & SAFETY

April 4, 2014

Glen Williams
Cotter Corporation
P.O. Box 700
Nucla, Colorado 81424

Re: Cotter Corporation, Mineral Joe Mine, File No. M-1977-284, Drainage Design Plan- AM01

Dear Mr. Williams:

Please see the Division's Engineer comments in an attached memo dated April 3, 2014

If you need additional information please contact me at the Division of Reclamation, Mining and Safety, Grand Junction Field Office, 101 S. 3rd St., Suite 301, Grand Junction, Colorado 81501, by telephone at 970.242.5025, or by e-mail at stephanie.mitchell@state.co.us.

Sincerely,

Stephanie Mitchell
Environmental Protection Specialist

Cc: Ed Cotter, DOE
Ec: Russ Means, DRMS

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MEMORANDUM

To: Stephanie Reigh

From: Tim Cazier, P.E.

Date: April 3, 2014

Re: **Mineral Joe Mine Drainage Design –Third Adequacy Review, Permit No. M-1977-284 / AM-01**

The Division of Reclamation, Mining and Safety (DRMS) engineering staff has reviewed the October 2013 Drainage Design Plan for the Mineral Joe Mine prepared by Whetstone Associates, Inc. The following comments are posed to ensure adequate engineering analyses and design practices are implemented to eliminate or reduce to the extent practical the disturbance to the hydrologic balance expected by the mining operation with respect to water quality and quantity in accordance with Rules 3.1.6(1), 6.4.21(10) and 7.3.1. Please note, as this site is a designated mining operation (DMO), compliance with Rule 7.3.1 is applicable, thus requiring certified designs and specifications for engineered elements associated with the environmental protection plan (EPP). (*Note: the site specific technical and engineering content for this submittal is essentially the same as that submitted for the JD-6 Mine. The comments below are very similar, if not identical to comments on the JD-6 submittal, but are submitted separately as the two sites are separate permits*). Please note the original comment number sequence has been retained for tracking purposes.

Previous Comments:

1. *The hydrologic method and analyses…* No response required.
2. *Page 5, section 2.3.1. Trapezoidal channels…* Cotter's commitment to reconstruct the UDS with 3H:1V side slopes is adequate. No additional response is necessary.
3. *Page 6, Cowan's formula.* The response is adequate.
4. *Cowan's method results in higher Manning's values…* The provided response is partially adequate. Based on various meetings and telephone conversations, I believe it is understood by all what the expectations by DRMS are for providing hydraulic evaluations/analyses for both stability (low range of an appropriate Manning's n) and capacity (high range of an appropriate Manning's n) for each separate reach of channel where either the channel geometry, longitudinal slope, or design peak flow changes.

5. *Page 7, section 2.3.4*:
    a. *Please provide criteria for the referenced evaluation…* The provided response is inadequate. The response cites the Urban Drainage and Flood Control Manual stating that stable conditions are met if the velocity is 7 ft/s **or** the Froude No. is 0.8. This is incorrect. The referenced manual requires the velocity ≤ 7 ft/s **and** Froude No. ≤ 0.8. Please also note that the Urban Drainage Manual criteria cited are for grass-lined channels. The Urban Drainage does not address channel design for earth-lined channels. The summary of results on pages 36-37, in Table 20 show all but two channel segments with Fr > 0.8 and most greater than 1.0. The DRMS requires channel protection for channel velocities that exceed five feet per second under design flow conditions. Alternatively, if the Operator wishes to pursue the "cobble and boulder substrate" material as stable, then analyses based on incipient motion, tractive force, and critical shear stress should be provided along with appropriate laboratory test showing channel substrate gradation. There are several published methods that can be used to evaluate this approach. The DRMS would require at least three of these methods demonstrate stable channels (for each reach with a different 100-year peak design flow and/or channel slope) and that a consistent channel geometry is, or will be present. Please provide the requisite designs and analyses.
    b. *Please clarify … "channel protection"…* The provided response is inadequate. Based on the DRMS Comment 5a above and the results shown in Table 20 of the DDP (pp. 36-37), only section LDS-E-P3 has a Froude No. less than 0.8. Please re-evaluate the Table 20 channel sections based on Comment 5a and respond to the original comment related to "if revetment is to be placed in existing channels, how will the reduction in conveyance capacity be addressed?"
    c. *The fourth bullet states…* The response is adequate.
    d. *There is no reference to design drawings…* The response is adequate.
    e. *The last paragraph discusses using "gravel mulch"…* The response is adequate.
6. *Page 11, Figure 1.* The response is adequate.
7. *Page 13, Figure 2.* The response is adequate.
8. *Page 16, Table 10.* No response required
9. *Page 16, Section 4.5.1.* The response is adequate.
10. *Page 24, Section 5.2 and Channel Geometry Tables…*
    a. *Please confirm channels have a minimum design/constructed depth…* The provided response is inadequate. The original comment to provide a summary of minimum constructed channel depths does not appear to have been met. A review of the revised Tables 12 and 13 shows a significant variation in channel conveyance (i.e., area with 0.5 ft of freeboard) for those sections surveyed. Comparing MDS conveyance data shows a factor of ~4 between MDS-P1 and MDS-P3, and comparing LDS-N-P5 with LDS-N-P6 shows a factor of 8 in conveyance with 0.5 feet of freeboard. In addition, the local longitudinal slope varies from 3.56% to 13.76% in the MDS and 4.07% to 12.76% in the LDS-N. Given this large variability in the hydraulic parameters, the DRMS believes the

potential for insufficient channel capacity exists and therefore requires the MDS, LDS-N, and LSD-E channels be upgraded or reconstructed with a consistent geometry in a similar fashion to that now proposed for the UDS. Please provide the requisite analyses, signed drawings, and consider Comment 5a above in your response.

b. *Please provide stability analysis results...* The provided response is inadequate. Please provide the requisite analyses discussed in Comment 5a above in your response.

11. *Page 26, SWRP spillway...*

a. *The expected depth to erosion resistant material...* The provided response is partially adequate. The reconfiguration of the spillway is acceptable. However, based on the response to Comment 11.c, to use a pump to drain the SWRP, the DRMS considers the spillway size and/or revetment protection to be inadequate. As there is no gravity outlet to drain the SWRP, the spillway must be sized to pass the 100-year, 24-hour peak flow (12.56 cfs) assuming the SWRP is full to the spillway invert at the onset of the design storm. Given the size of the SWRP, the DRMS expects attenuation in the full pond to be negligible. Please design the spillway and spillway chute to pass the unattenuated design peak flow.

b. *Based on Figures 4 and 5...* The response is adequate.

c. *There is no way presented in the SWRP design plan...* The response is adequate.

d. *Please address the reclamation/post mining plan for the SWRP.* The response is adequate.

12. *Page 30, Section 6.1.* The response is adequate.

13. *Page 36, Attachment 3.* The response is adequate.

New Comments:

14. Plate 2: Plate 2 shows six check/drop structures (drop face) proposed for the Upper Diversion Channel. Please provide the following:

a. Specifications or reference to specifications for the "D_{84} Grain Size of 16"",

b. Riprap or "D_{84} Grain Size of 16"" sizing analyses for the proposed revetment.

15. Plate 6: Some explanation of the rock apron is required. Please provide the following:

a. Dimensioned thickness of the rock apron and "D50 = 75"" material,

b. Specifications or reference to specifications for the "D50 = 75"" material,

c. Specifications or reference to specifications for the rock apron revetment, and

d. How is the "D50 = 75"" material proposed for the spillway crest prevented from migrating into the presumably larger material in the rock apron.

If either you or the applicants have any questions regarding the comments above, please call me at (303) 866-3567, extension 8169.