

STATE OF COLORADO

DIVISION OF RECLAMATION, MINING AND SAFETY

Department of Natural Resources

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MEMORANDUM

John W. Hickenlooper
Governor

Mike King
Executive Director

Loretta Piñeda
Director

To: Stephanie Reigh

From: Tim Cazier, P.E. 

Date: April 22, 2013

Re: SR-11 Mine Drainage Design Plan – General Stormwater Comments, Permit No. M-1977-451 / AM-01

The Division of Reclamation, Mining and Safety (DRMS) engineering staff has reviewed the August 7, 2012 Drainage Design Plan (Engineered Stormwater Management Plan) for the SR-11 Mine prepared by O'Connor Design Group, 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).

1. Page ESWMP-3, Section 4.3 – Existing Stormwater Structures. The DRMS is concerned about erosion and capacity of the existing stormwater structures within subbasin Onsite 30. The satellite image from Google Earth is surprisingly sharp for this area. The Google Earth image in **Attachment A** shows significant rill and gully erosion below the toe of the east side of the waste rock pile as well as some erosion in a drainage swale flowing from the west end the waste rock pile to the retention pond. The second paragraph discusses a “rock-lined channel along the flank of the waste rock pile” and a “small drainage swale located below the toe of the waste rock”. There appears to be incised channels paralleling the inside of the existing berm on the west, and both south sides as runoff is directed to the retention pond.
 - a. Please label both the aforementioned rock-lined channel and small drainage swale on Sheet 1 of 4, Site Drainage & BMP's, Drainage Design Plan.
 - b. Please include new BMPs to reduce the rill and gully erosion observed on the east portion of the site below the waste rock pile.
 - c. Please include the existing berm and associated incised channels as BMPs, and label these individual segments on Sheet 1.

2. Page ESWMP-4, Section 7.1 – Engineering Approach and FlowMaster analyses. The second paragraph states BMPs are labeled on Sheet 1 of 4. As discussed in Comment #1, no BMPs are labeled within Subbasin Onsite 30, nor are there hydraulic analyses for any BMP in Onsite 30, except for the retention pond.
 - a. Please provide hydraulic analyses for the BMPs discussed in Comment #1. These channels need to be designed to convey the peak flow resulting from the 100-year, 24-hour design storm. For flow velocities exceeding 5.0 feet per second, appropriately sized revetment or a demonstration that the channel is non-erodible is required.
 - b. Please provide rationale for selected roughness coefficients. Note: channel roughness is seldom uniform, the DRMS requires channels be evaluated for both stability and capacity, i.e., minimum and maximum expected roughness, as well as minimum and maximum design slopes. For example, an excavated earth channel, after weathering would be expected to have a minimum $n = 0.018$ (use to evaluate stability or maximum expected velocity); and a maximum $n = 0.025$ (use to evaluate capacity). In addition, the DRMS requires channel freeboard be evaluated: channels shall be designed with a minimum of 0.5 feet of freeboard unless the velocity head ($v^2/2g$) is significant, then the minimum required freeboard is half the velocity head, or $v^2/4g$.
 - c. Please evaluate each designated channel/ditch design slopes (minimum and maximum) for both capacity and stability.
 - d. Please design all the ditches with the appropriate freeboard and provide channel design depths for construction.
3. Page ESWMP-5, section 7.3. The second paragraph states the surface soils at the site are considered Hydrologic Soils Group (HSG) B. The soil group on Figure U3 indicates the natural soil in the area defined by the Onsite 30 analyzed is “75”, Pinon-Bowdish-Progresso loams. The Soil Survey of San Miguel Area, Colorado Parts of Dolores, Montrose, and San Miguel Counties lists the Pinon-Bowdish-Progresso series HSG C and D. Furthermore, nearly all of Onsite 30 is essentially bare soil and there are no “Pinon/Juniper” stands in this area. Please revise the selected curve numbers (CN) to reflect HSG C/D, bare soil or poor herbaceous (CN = 87 – 94 for “Disturbed, mine yard, and stockpile areas), or provide documentation to substantiate the claim of HSG B and a CN = 75 and “Pinon/Juniper” cover.
4. Page ESWMP-6, Section 7.4 Stormwater Routing and Retention.
 - a. The 100-year, 24-hour runoff volume criteria used for sizing storage in the pond is acceptable. However, a spillway is necessary to pass runoff from successive storms as there is no way presented in the Retention Pond design plan to drain the pond via gravity. As such, the emergency spillway for the pond needs to be designed to convey 100-year peak flow, assuming the ponds are full (to the spillway invert elevation) at the onset of the design storm. Please provide analyses and designs to demonstrate the spillway has the capacity to pass the peak flow resulting from the 100-year, 24-hour design storm. (NOTE – The DRMS checked with the Colorado Division of Water Resources (DWR) regarding the status of the Dolores River appropriations. The DWR maintains that the Dolores River is not currently over appropriated and as such, DWR has no current

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requirement to release retained stormwater within 72 hours. This status is however subject to change.)

- b. Please provide grading plans, details, and specifications for embankment design/compaction; spillway hydraulic analyses, revetment design; and outlet works associated with the retention pond.
5. Please address the reclamation/post mining plan for the retention ponds. The DRMS strongly encourages breaching the embankment upon closure unless the landowner has a use for the ponds (e.g., stock pond) and intends to maintain them.

Drawings:

6. Please stamp and sign all five drawings pursuant to Rule 6.4.21(10)(a).

General Comments:

7. Page ESWMP-4, last paragraph. The NRCS is referenced as the “National Resource Conservation Service”. The “N” stands for “Natural”, not “National”.

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

ATTACHMENT A

