COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, Colorado 80203

May 31, 2019

Jim Harrington
Colorado Legacy Land, LLC
4601 DTC Blvd. - Suite 130
Denver, CO 80237

Re: Schwartzwalder Mine, Permit No. M-1977-300, Technical Revision No. 28 (TR-28), Adequacy Review No. 2

Mr. Harrington:

The Division of Reclamation, Mining and Safety (Division) has reviewed the materials you submitted on May 24, 2019 for Technical Revision No. 28 (TR-28), addressing the following:

Revised North Waste Rock Pile Drainage Design, Construction, and Schedule for Implementation.

The Division has identified the following adequacy items that must be addressed before an approval of TR-28 can be issued:

1) Please include the approved permit boundary on any maps/exhibits of the site (Sheets 1 and 3).

2) Please address all adequacy items identified in the enclosed letter from Tim Cazier, P.E..

This completes the Division's adequacy review of the materials submitted for TR-28. The decision date for TR-28 is currently set for **June 8, 2019.** If additional time is needed to address adequacy items identified by the Division, an extension request must be received by our Office prior to the decision date.

If you have any questions, you may contact me by telephone at 303-866-3567, ext. 8129, or by email at amy.eschberger@state.co.us.

Sincerely,

Amy Eschberger

Amy Eschberger
Environmental Protection Specialist

Encl: Preliminary Adequacy Review letter from Tim Cazier, P.E., DRMS

CC: Elizabeth Busby, Colorado Legacy Land, LLC
Paul Newman, Colorado Legacy Land, LLC
Tim Cazier, P.E., DRMS
Michael Cunningham, DRMS

COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

Date: May 30, 2019

To: Amy Eschberger

From: Tim Cazier, P.E.

RE: Schwartzwalder Mine, DRMS File No. M-1977-300;
Preliminary Adequacy Review – TR-28, Revised North Waste Rock Pile Drainage Design Engineering

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The Division of Reclamation, Mining and Safety (Division) engineering staff has reviewed the May 24, 2019 letter (from Colorado Legacy Land) and five drawings (by Alexco Water & Environment) submitted as Technical Revision No. 28 (TR-28). 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), 6.4.7, and 7.3.1.

Letter:

1. Drainage Design. The primary difference appears to be the proposal to convey runoff from the contributing area north of the North Waste Rock Pile (NWRP) to Ralston Creek in a pipe rather than an open channel. The Table 1 summary does not address runoff draining to the contact between the NWRP and native slope directly upgradient of the NWRP. This area is estimated to be on the order of five acres. Please discuss how direct runoff from this area will be conveyed past around the NWRP.
2. Hydraulic Design. No discussion is provided on the hydraulic performance of the proposed pipe. There are considerable grade changes in the vertical alignment (varying between 29% and 2%). Is this designed to function under pressure flow conditions or open channel flow? How will lodged tree branch or other debris affect flow conditions? Where would surcharge resulting from a plugged pipe go? A flow and energy gradient profile would be very helpful.

Drawings (Sheets 1 through 5):

3. Sheet 2. The HP Storm Trench Installation Detail (combined with information from the other drawings) suggests the invert of the installation trench could be more than seven feet below the existing grade (6" bedding, 30' pipe ID plus ~2" wall thickness, and 48" final backfill; or approximately 88" or 7.33 feet). This poses several questions related to constructability and maintaining the isolation of the waste rock protected by the vegetated cover:

a. What is the depth to bedrock along the proposed alignment?
b. If it is less than 7.33 feet, will blasting be required?
c. Will the excavation extend into waste rock?
d. How will the trench be maintained during and after construction to prevent water seepage from entering the waste rock?

4. Sheets 3 and 4. There are several horizontal and vertical bends in the proposed alignment. Experience suggests significant horizontal bends are ideal locations for tree branches to become lodged in the pipe. Negative changes in pipe gradients (e.g., ~ STA 1+90, Sheet 4 from 24.2% to 5.0%) are ideal locations for sediment to drop out and lead to plugging. Sharp horizontal bends can also lead to sediment deposition and potential plugging. Given these conditions, 30-inch diameter pipe and only two manholes, roughly 500 feet apart; how will the pipe be inspected and maintained before and after closure?
5. Please provide design calculations used to size the Type H riprap apron energy dissipator terminating at approximately STA. 1+95 in the lower profile on Sheet 4.
6. Sheet 5. Trash rack: The contributing area is heavily treed. The potential for tree branches and other woody debris is significant at the pipe inlet. Please provide Jefferson County Trash Rack specifications/drawing details for the trash rack referenced in upper left Section View.