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

1313 Sherman St. Room 215
Denver, CO 80203

June 12, 2020

Brian Briggs
Ouray Silver Mines Inc.
P.O. Box 564
1900 Main Street, Suite 1
Ouray, CO 81427

RE: Revenue Mine - File No. M-2012-032, Technical Revision Application (TR-11) Adequacy Review-1

Dear Mr. Briggs:

On April 17, 2020, the Division of Reclamation, Mining and Safety received your Technical Revision application for the Revenue Mine, 112d-1 Hard Rock Reclamation Permit, which is located in Ouray County. The Division is in the process of reviewing the above referenced Technical Revision (TR) in order to ensure that it adequately satisfies the requirements of the Colorado Mined Land Reclamation Act (Act) and the associated Mineral Rules and Regulations of the Colorado Mined Land Reclamation Board for Hard Rock, Metal, and Designated Mining Operations (Rules). During review of the material submitted, the Division determined that the following issue(s) of concern shall be adequately addressed before the TR can be considered for approval.

1. **Section 2.2 Pilot Passive Treatment Materials Placement**

   The volumes provided on Page 5 do not add up to the total volume stated on Page 6 of the revision. Approximately 29 Cubic Yards of material is listed on Page 5, however Page 6 states 25 Cubic Yards of material. Please clarify the total volume of material to be removed from the Pilot Passive Treatment Containers. Also, when updating the Reclamation Plan please clarify the final placement location of that material.

2. **Section 2.3 New Waste Storage Pad and Enclosure with Secondary Containment**

   While the narrative accurately depicts the structure, please provide the Division with a drawing, including dimensions, of the Waste Storage Pad and Enclosure with Secondary Containment. Please also submit a narrative describing the estimated quantity of materials to be stored within the secondary containment structure Pursuant to Rule 6.4.21(5) and (7). In the narrative please also discuss the reclamation of the Waste Storage Pad as well as the associated shipping containers. The narrative should include details including removal and disposal of the concrete pad, removal of the shipping containers and what equipment will be required to complete the reclamation.

   Please also clarify if the 200 gallon mobile diesel fuel tank is in addition to the 10,000 gallons of fuel that the site is currently authorized to store, or if it is in addition to.

3. **Section 3 Reclamation Plan Update**

Section 3 references a modified reclamation plan map labeled as Map F-1 however Map F-1 was not submitted. Please submit the revised Map F-1 and take into account all applicable items in this review that should be reflected on the revised map. Please also note that the features on the updated Reclamation Plan Map F-1 should include but is not limited to structures to remain post-reclamation, surface features such as ponds to remain post-reclamation and the final topography of all reclaimed areas. If necessary several maps may be used to convey the required information.

4. **Section 3.3 Topsoil Placement and Revegetation**

The narrative of this section proposes a revised topsoil replacement depth of 6 inches in areas to receive topsoil and ultimately be revegetated, and all other areas to be capped with waste rock. In the revised map listed in Item 3 of this review, please depict all areas to receive topsoil and the areas to be capped with waste rock. The narrative also states that the previous area to receive topsoil is 9.3 Acres however records indicate the previously proposed areas to be topsoiled at 12.43 Acres. And Table E-3indicates that the total area in Acres to receive imported topsoil is 4.74 Acres. Please clarify in a narrative and associated map the total number of acres of the areas to be capped with waste rock and areas to receive topsoil and revegetation. Please also indicate, the quantity of topsoil that already exists on site, and how much will be imported to guarantee the total amount of topsoil required for reclamation is stored on site.

5. **Map F-1a Structure Reclamation Map**

The "Demolition Work" page of the revision references the removal of structures that are not shown on Map F-1a. The structures that are listed on the Demolition Page but are not included on the map are the Tailings conveyor, Portal Cover Structure and Storage Building (Quonset, Empty). Similarly, Table L-1 lists item 9 as a Half-Culvert Removal however the half-culvert is not indicated on map F-1a. Please provide a narrative clarifying the removal of these structures, include any specialized equipment required for the removal of the structures, and update Map F-1a to reflect the location of the structures.

6. **Appendix 2, Exhibit E- Updated Reclamation Plan**

   a. In the introduction section of Appendix 2, Exhibit E- Updated Reclamation Plan there are discrepancies in the number of acreages stated. The total permit acreage listed on Page E-1 indicates the inclusion of 38.23 Acres in Governor's Basin, however in the review process of AM-01 the acres associated with Governor's Basin were removed from the application and therefore not part of the Permit Area. Similarly, there is .46 Acres listed for Shafts, however the Monongahela Vent Raise and Secondary Escapeway is not listed. The total number of Acres included in the Permit Area is in conflict with records held by the Division. Our records indicate the total Permit Area is 50.3 Acres. Please clarify the total number of Acres in the Permit Area to include the 960 Incline Vent Raise, the Yellow Rose Raise and Secondary Escapeway and the Monongahela Vent Raise and Secondary Escapeway.

   b. Section 3.1 proposes the constructed slopes of the Tailings Storage Facilities (TSF) to be a 2H: 1V and capped with a minimum of 6 inches of topsoil. Please clarify what the final slope of the reclaimed TSF's will be. If the proposed final slopes of any reclaimed area are steeper than 3H: 1V, please provide appropriate justification such as a revised Geotechnical Stability Exhibit or any other required information to demonstrate the appropriate Factor of Safety will be achieved

in compliance with the enclosed MLRB's Slope Stability / Geotechnical Analysis policy for the generalized, single test strength measurements for non-critical structures.

c. The reclamation measures for the shafts detailed in Section 3.2 of the revised Reclamation plan indicate that the area around the shaft will be excavated 4-6 feet down, cut off the casing and removing the associated concrete pad, installing a steel plate and concrete plug, backfilling with overburden and topsoil and revegetated. Please clarify how the removed section of the shaft casing and associated concrete pad will be disposed of. If offsite disposal is proposed please indicate the facility and distance to the facility that the material will be disposed at. Please also indicate the required amount of overburden and topsoil required to backfill over the top of the concrete plug, as well as the source of that material. In association with the narrative with the above listed details, please provide a final reclamation configuration map of the reclaimed shaft areas.

d. Section 3.3 "Dismantle Buildings and Structures at Portal Area" discusses the demolition of structures, associated foundations and removal of contents for structures to remain post-reclamation. Please indicate the final disposal location for all items to be removed from the site, the estimated total volume (by material type) and if any materials require disposal in a specialized hazardous materials disposal site please indicate the location and haulage distance to that facility.

e. Section 3.5 "Backfill Ponds and Collection Ditches" indicates that the Sediment Pond #1 will remain as a post-reclamation feature and will be graded to blend in with surrounding contours during general regrading of the site. Please clarify the estimated amount of material in Cubic Yards to be moved to achieve the blending portion of the reclamation of Sediment Pond #1. If any material will be required from a different area to achieve the final reclamation configuration please indicate the volume and source of that material.

   Similarly, please indicate which collection ditches on site will be backfilled and graded as well as the associated amount of material in Cubic Yards to be moved to backfill the ditches. If any material will be required from a different area to achieve the final reclamation configuration please indicate the volume and source of that material.

f. In addition to Item 5 of this review, please clarify the existence of the half-culvert structures located on site. File review of AM-01 indicate a half-culvert design was used for collection ditches, however there is no discussion of the half-culverts in the narrative of this revision.

g. Section 12 "Governor Basin" of the reclamation plan is inferred to be in reference to the reclamation of the Permit Area surrounding the Monongahela Vent Raise and Secondary Escapeway. It is stated that the Governor Basin structure will be removed as part of the reclamation of that area. Please provide a more detailed narrative discussing the demolition and removal of all associated structures, reclamation measures to seal the shaft, any backfilling and grading required as well as provide a list of equipment required to complete the reclamation. It is also stated that because the waste rock piles that surround this structure are part of joint US Forest Service/OSMI non-time critical cleanup project. Please provide more details on how the cleanup project relates to the mining related disturbances within the Permit Area. In addition to the narrative please submit an accompanying Reclamation Plan Map of the associated area showing the final configuration of the reclaimed area.

h. Table L-2 indicates the total cost for structure removal and demolition of facilities to be $32,000.00 however the Cost Summary Page of the Reclamation Cost Estimate included in the

revision totals $108,596.30 to Demolish and dispose of buildings and debris. Please clarify this discrepancy.

i. The Reclamation Cost Estimate included in this revision specifies in the Bulldozer Work section that the total volume of topsoil to be spread is 14,901 Cubic Yards, however the narrative states the required volume of topsoil to be 4,001 Cubic Yards. Please clarify, in addition to Item 4 of this review, the volume of topsoil required for reclamation and the equipment needed for the handling and placement of the topsoil.

As part of this revision the Division will be conducting a reclamation cost estimate update in an effort to ensure the Financial Warranty for the site adequately reflects the current costs of fulfilling the requirements of the approved Reclamation Plan, the Act and the Rules. Some details of that estimate will be derived from your response to this review, however some items still need to be specified. Please clarify the following items to ensure the most accurate reclamation cost estimate update possible.

I. Do any of the structures listed in Section 3.3 of the revision require a crane for removal during reclamation or can the tasks be accomplished with a CAT 365C hydraulic Excavator or equivalent?

II. Can the steel portal doors be removed with a cutting torch and CAT 365C Hydraulic Excavator or is specialized equipment required?

III. What specific equipment will be required to conduct the backfill of the underground storage room and the mill facility openings?

IV. For all areas to be revegetated please clarify the method of seeding. Please note that for slopes 2H: 1V or steeper, drill seeding is not recommended, broadcast or hydro-seeding may be more applicable in those situations. In addition the resulting Reclamation Cost Estimate will include a secondary mobilization for revegetation equipment for a secondary seeding task based on the estimated failure rate and need for a secondary seed application.

V. Pocking (surface roughening) is mentioned in the reclamation plan, please estimate the total area to be roughened, distribution of pocks, equipment used to create pocking and the estimated volume of material to be handled during this task. Note that drill seeding is not practical in areas where pocking is implemented.

VI. What method is proposed for the application of mulch on revegetated areas?

VII. In the structures to remain post-reclamation, the removal of equipment/items within the structures is proposed. Please specify the equipment and or items required to remove the contents from all structures that are to remain post reclamation.

VIII. Table L-2, Task 1 indicates a cost associated with the removal of the Diesel storage and filing station, however it is stated that it is a steel tank on skids. Please clarify if the cost is associated with the removal or disposal of the tanks. If it is for the disposal please clarify the disposal location.

IX. Do the connex boxes associated with Tasks 9 and 16 of Table L-2 require a crane for removal?

Please submit your responses as soon as possible in order to allow the Division sufficient time for review. Please note that the Decision Date for TR-11 is set at Thursday June 18, 2020. Should you need more time to adequately address the above listed items please request an extension to the Decision Date, in writing prior to the current Decision Date. The Division will continue to review your revision and contact you if additional information is required. In the meantime, if you have any questions or require additional information please don't hesitate to contact me at the Division's Grand Junction Field office, by phone at 303-866-3567 Ext. 8187 or by email at lucas.west@state.co.us.

Sincerely,

Lucas J. West
Environmental Protection Specialist

Cc: Travis Marshall, Senior Environmental Protection Specialist
Amy Yeldell, Environmental Protection Specialist

Encl: MLRB Slope Stability / Geotechnical Analysis Policy

be inspected at least once every two years, or more frequently if deemed necessary.

20.7.5 – Notices of Intent

The Board directs the Division to inspect all operations for which a NOI has been submitted to and approved by the Division in accordance with section 34-32-113 and 34-32.5-113, C.R.S. as set forth below.

20.7.5.1 – Pre-operational Inspections. The Division shall evaluate whether to conduct a pre-operational inspection of any new NOI operation or any modification to an existing NOI operation on a case by case basis. The Division shall conduct a pre-operational inspection of any new NOI or any modifications to an existing NOI operation at which historic or pre-law features are to be disturbed or re-established. When sites are on land managed by a federal agency, a joint inspection with the federal agency is advised. The Division may determine not to conduct an inspection of any NOI operation which the Division determines to have minimal disturbance area or no potential to impact either the environment or the prevailing hydrological balance, provided that the NOI includes photographic documentation of pre-activity conditions.

20.7.5.2 – Potential for Environmental Impact. The Division shall inspect any active NOI operation that the Division determines to have no potential to affect the prevailing hydrological balance or have any other environmental impacts at least once every four years. The Division shall inspect any active NOI operation that may affect the prevailing hydrological balance or have any other environmental impacts as the Division deems necessary, but no less than once every four years.

20.7.5.3 – NOI Operations in Reclamation. The Division shall inspect all active NOI operations that are in any phase of reclamation: (a) once during the first year following the Division's receipt of notice of reclamation to ensure reclamation is progressing; and (b) once during the fourth year of reclamation to evaluate whether additional tasks must be accomplished to achieve final reclamation release. The Division may adjust the frequency of inspections as the Division deems necessary to ensure adequate monitoring of operations that are either sensitive areas or that may require particular environmental protection measures.

20.7.5.4 – Abandoned NOI Operations. Any active NOI operation for which an annual report is not submitted for two consecutive years shall be considered abandoned. The Division shall inspect an NOI operation that is considered abandoned for the purpose of ensuring that the financial warranty is sufficient to complete reclamation.

30.0 – Factors of Safety for Slope Stability/Geotechnical Analyses

30.1 – Definitions.

Factor of Safety – Ratio of forces resisting movement to those driving movement.

Slope Failure – the movement (sliding or collapsing) of rock and/or soil in response to gravitational stresses, often under the influence of a rainfall or seismic activity.

Slope Stability – the resistance of inclined surface to failure by sliding or collapsing.

Slope Stability Analysis – performed to assess the safe design of a human-made or natural slopes (e.g. open-pit mining, excavations, embankments, road cuts, etc.) and the equilibrium conditions.

30.2 – Declaration of Purpose

The Division of Reclamation, Mining and Safety Minerals Program (Division) issues this memorandum to promote the orderly development of the state's natural resources while considering the industry's "standard of care" relative to Factors of Safety with the intent to:

i. Protect and promote the safety and general welfare of the people of Colorado,
ii. Ensure reclamation of lands affected by mining to beneficial use, and
iii. Aid in the protection of aquatic resources and wildlife.

30.3 – Background

In the past, the Division has typically accepted a factor of safety (FS) greater than 1.0 for slope stability analyses to demonstrate "that such structures shall not be damaged by activities occurring at the mining operation" pursuant to Rules pertaining to permanent man-made structures and geotechnical stability: Construction Materials Rules 6.3.12(b) and 6.4.19(b) and 6.5 and Hard Rock Rules 6.3.12(b), 6.4.20(b) and 6.5. This practice was based on the oversimplified concept that a slope with a FS > 1.0 is stable. This is technically true **IF** there is a *comprehensive and complete* understanding of all the geologic, hydraulic, land use, and other conditions that influence the forces and stresses determining whether or not the slope in question can or will fail. However, this is very rarely possible or feasible, particularly in a mining application. An FS must account for uncertainties (geologic setting, groundwater conditions, mining parameters, etc.), and the selection of an appropriate FS for slope stability should consider the following factors:

1. Magnitude of damages (potential risk to human safety, environmental impact and property damage),
2. Reliability of geologic information such as the proximity to faults, orientation of jointing, and subsurface soil and water data,

3. Changes in soil properties due to mine operations and variability in subsurface material,
4. Accuracy (or approximations used) in developing design/ analysis methods,
5. Additional considerations if relevant: Construction tolerances, Relative change in probability of failure by changing the factor of safety, and Relative cost of increasing or decreasing the factor of safety.

The Division engineering staff has researched the standard of care for factors of safety accepted by the industry, including literature searches, regulatory agency requirements/guidelines, and departments of transportation standards. In order to be consistent with other Colorado State agencies, we also considered FS standards used by the Colorado Department of Transportation (CDOT) and the Colorado Geological Survey (CGS). CDOT uses the AASHTO minimum FS of 1.3 for construction slopes near roadways and utilities. CGS uses a minimum FS of 1.5 for residential areas when using "generalized" strength values, or 1.3 for analyses when good quality site-specific soil parameters are known. It should be noted that most industry standards assume a permanent slope configuration, ignoring the temporary conditions that are frequently observed in the mining industry.

30.4 – Guidance for Stability Criteria and Use of Minimum Factors of Safety

The permittee should either follow the criteria in Table 1 for all stability analyses submitted to the Division; or, alternatively, the permittee may submit stability analyses based on site-specific engineering analysis performed in consideration of good practices as specified in relevant industry guidelines and/or professional standards and reviewed by the Division on a case-by-case basis.

Slope stability analyses for existing facilities may also be reviewed on a case-by-case basis, subject to the criteria described herein.

Table 1. Recommended Minimum Factors of Safety for Slope Stability Analyses for Operations and Reclamation

Type of Structure/Consequence of Failure	Generalized, Assumed, or Single Test Strength Measurements	Strength Measurements Resulting from Multiple Tests(1)
Non-Critical Structures (e.g., fences) No imminent danger to human life, minor repair costs, and minor environmental impact if slope fails	1.3 (1.15)(2)	1.25 (1.1) (2)

Table 1. Recommended Minimum Factors of Safety for Slope Stability Analyses for Operations and Reclamation

Critical Structures (e.g., residences, utilities, dams, pipelines, irrigation canals, public roads, etc.) Potential human safety risk, major environmental impact, and major repair costs if slope fails (includes Environmental Protection Facilities/EPFs, such as tailings facilities, heap leach pads, process effluent ponds, milling facilities, overburden/waste rock storage facilities, and hazardous/toxic material storage facilities, etc.)	1.5 (1.3) (2)	1.3 (1.15) (2)

(1) The number of tests required to provide a high degree of confidence in the strength parameters used depends on the variability of the material being tested and the extent of disturbance.

(2) Numbers without parentheses apply for analyses using static conditions. Those within parentheses apply to analyses using seismic parameters. Based on site specific conditions, seismic analyses may be required and parameters selected shall be consistent with the risk and duration of the condition being considered.

* The values presented in Table 1 are not intended to supersede standards required by other agencies.

40.0 – Reserved.

50.0 – Reserved.

60.0 – Reserved.

70.0 – Board Administrative Procedures.

70.1 – Rotation of Board Chair

The position of Chair of the Board shall rotate among all members with the exception of the Department Executive Director or the Executive Director's designee and the member appointed by the State Conservation Board. Each Board member shall serve as Chair of the Board for a term of six months, beginning in April and October annually.

70.2 – Authority of Board Chair