May 29, 2025

ELECTRONIC DELIVERY

Mr. Elliott Russell
Environmental Protection Specialist
Colorado Department of Natural Resources
Division of Reclamation, Mining and Safety
Office of Mined Land Reclamation
1313 Sherman Street, Room 215
Denver, Colorado 80203

Re: Permit No. M-1980-244; Cripple Creek & Victor Gold Mining Company; Cresson Project; Technical Revision 148 – ECOSA Long Term Study Plan

Dear Mr. Russell:

The Cripple Creek and Victor Gold Mining Company (CC&V) hereby provides this Technical Revision (TR) 148 to Permit M-1980-244 for your review and consideration. This technical revision includes the ECOSA Long Term Study Plan, which outlines CC&V's approach to evaluate and develop a permanent, long-term strategy for the ECOSA.

1. Attachment 1: ECOSA Long Term Study Execution Plan

The technical revision payment fee in the amount of $1,006 will be made electronically via the DRMS webpage and confirmation will be submitted to your office via email.

Should you require further information, please do not hesitate to contact Antonio Matarrese at 719-851-4185 or Antonio.Matarrese@ccvmining.com or myself at Katie.Blake@ccvmining.com.

Sincerely,

DocuSigned by:
p.p. Antonio Matarrese
FD42D9E12B1147D...

Katie Blake
Sustainability & External Relations Manager
Cripple Creek & Victor Gold Mining Co

Ec: E. Russell - DRMS
P. Lennberg – DRMS
Z. Trujillo - DRMS
J. McBryde – Teller County
J. Gonzalez – CC&V
K. Blake – CC&V
N. Townley – CC&V
A. Matarrese – CC&V

Attachment 1

CC&V
ECOSA Long Term Study

Study Execution Plan

May 29, 2025

VERSION	DESCRIPTION	DATE	APPROVED BY
A	Initial Submission	May 29, 2025	Antonio Matarrese

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1.0 EXECUTIVE SUMMARY

The Cripple Creek & Victor Gold Mine (CC&V) East Cresson Overburden Storage Area (ECOSA) Long-Term Study focuses on developing a long-term, technically supported, and environmentally responsible strategy to prevent groundwater contamination of Grassy Valley and stop the seeps along the perimeter of the ECOSA. This study execution plan provides details on the investigatory steps, passive design alternatives to be studied (including engineered cap/cover options), identified milestones, and reporting dates to the Division of Reclamation, Mining and Safety (DRMS) to address the ECOSA seepage and to prevent groundwater contamination of Grassy Valley, and outlines the structured approach CC&V will follow to evaluate alternatives and select a preferred strategy that meets regulatory expectations and aligns with the company's broader commitment to responsible mine closure.

The study will include a trade-offs analysis that evaluates multiple alternatives through a risk-based, integrated process involving data collection, field trials, predictive modeling, long-term sustainability, and scenario-based trade-off assessments. Each alternative will be assessed across key performance areas, including hydrogeology, geochemistry, cover system performance, water management, geotechnical stability, and long-term treatment needs.

The study will progress through iterative technical evaluations to develop a shortlist of viable options. From this list, a preferred approach will be selected and refined to a level sufficient for regulatory review. The final outcome of the study will be a technically defensible strategy supported by field data and engineering analyses, enabling CC&V to submit a permit amendment to the DRMS by June 30, 2030, in accordance with the Mined Land Reclamation Board Order signed March 6, 2025.

1.1 Background

The ECOSA was initially approved for construction under Amendment 9 (2008) to Mining Permit M-1980-244 as an unlined overburden storage facility. Subsequent modifications and expansions were approved through Amendment 10 (2012), Amendment 11 (2015), and Technical Revision 121 (2020). At the time of initial permitting, the neutralizing capacity of both the overburden material placed in ECOSA and the underlying diatremal rock was determined to be adequate to effectively mitigate potential seepage impacts.

In recent years, the emergence of seepage at the toe of ECOSA and associated groundwater concerns in Grassy Valley have highlighted the need for a revised and long-term reclamation strategy. This study plan is being submitted in accordance with the Mined Land Reclamation Board Order, which requires CC&V to submit a Technical Revision by June 1, 2025, outlining a plan to investigate and develop a permanent solution to address seepage from ECOSA. A preferred remediation strategy will then be selected and submitted to the DRMS as a formal permit amendment by June 30, 2030.

The revised ECOSA long-term strategy will support CC&V's broader commitment to responsible mining and environmental protection. The study will evaluate a range of technical components—including hydrogeology, geochemistry, water management, cover systems, geotechnical stability, landform design, and water treatment—to inform the selection of a preferred option which achieves long-term environmental performance and meets regulatory expectations.

1.2 Study Objectives

The objective of the ECOSA Long-Term Study is to define a technically sound, environmentally protective, and regulatory-compliant long-term strategy to prevent groundwater contamination of Grassy Valley and stop the seeps along the perimeter of the ECOSA. The study will evaluate and assess multiple alternatives to support the development of a comprehensive reclamation approach. The outcome will include selection of a preferred strategy that supports CC&V's commitment to responsible reclamation and satisfies the requirement of the Mined Land Reclamation Board Order for submittal by June 30, 2030.

1.3 Study Definition

The ECOSA Long-Term Study is structured to identify, evaluate, and ultimately select a preferred long-term strategy that addresses ECOSA seepage. Coordination with the DRMS will include key milestones to ensure efficient progress by maintaining regulatory alignment.

The proposed schedule of DRMS coordination milestones is as follows:

- **Q2 2025 – Technical Revision Submittal**: Submission of this Study Execution Plan as a Technical Revision (TR), in accordance with the Mined Land Reclamation Board Order. This submittal defines the study scope, approach, milestones, and technical workstreams to evaluate long-term options for ECOSA.
- **Q4 2025 – Annual Interim Progress Update Meeting**: Initial check-in to review study kickoff, early technical findings, and confirm alignment on overall direction.
- **Q4 2026 – Annual Interim Progress Update Meeting**: Presentation of a high-level review of the current list of alternatives under evaluation, including key decision points, data gaps, and scenario development progress.
- **Q4 2027 Annual Interim Progress Update Meetings**: Continued progress updates focused on integration of technical findings, scenario refinement, and planning for implementation.
- **Q2 2028 – Stipulated Agreement Status Update**: Meet to discuss the status of CC&V's study, including whether all necessary data are available and studies completed and determine whether the June 30, 2030 deadline is feasible to meet.
- **Q4 2029 – Pre-Amendment Alignment Meeting**: Final interim meeting to review the selected preferred option and ensure alignment with DRMS prior to preparation and submission of the formal permit amendment.
- **June 30, 2030 – Permit Amendment Submittal**: Submission of the formal permit amendment documenting the preferred ECOSA long-term strategy, including supporting technical design, water management, and implementation plans.

2.0 ECOSA STUDY WORK PLAN

2.1 Scope of Work and Approach

The ECOSA Long-Term study will be approached through a structured, risk-based process designed to identify, evaluate, and select a technically feasible and regulatory-compliant long-term strategy. Multiple alternatives will be developed based on variations in cover system design, regrading, seepage mitigation, water management, and infrastructure transition. Each alternative will be informed by technical evaluations, modeling, and field trials conducted as part of the study scope.

The study team will assess each scenario using consistent criteria, including long-term performance, regulatory alignment, constructability, environmental risk, operational considerations, sustainability in perpetuity, etc. Through an iterative evaluation process—supported by data and findings—the list of alternatives will be narrowed to a short list of viable options. A final preferred scenario will be selected in coordination with internal stakeholders and the DRMS.

2.2 Detailed Scope of Work

2.3 Hydrogeology Modeling

This task involves developing hydrogeologic models to assess how groundwater interacts with the ECOSA facility under current and closure conditions. Key objectives include understanding how cover systems and regrading influence infiltration and subsurface flow, predicting movement of groundwater from potential sources of seepage, and evaluating risks to nearby receptors. The model will also support the design of long-term mitigation strategies and help characterize the role of surrounding hydrogeologic features, such as shallow alluvium. Understanding these dynamics is essential for informing the strategy and evaluating long-term seepage controls.

2.4 Geochemistry Modeling

Geochemical modeling will be conducted to predict the quality of water associated with ECOSA seepage under current and closure conditions. This work will support evaluation of long-term environmental performance and inform the need for seepage water management or additional mitigation. The modeling will consider interactions between seepage, cover systems, and underlying materials.

2.5 Water Balance

This task includes development of a water balance and chemical mass balance model to simulate drainage, infiltration, and seepage behavior at ECOSA. The model will incorporate updated inputs such as surface hydrology, precipitation, evaporation, and closure surface configurations. These simulations will be used to estimate how water will move through and off the facility post-closure and help quantify the potential for temporary or long-term seepage requiring management. The model results will also inform cover design, regrading, and surface water control infrastructure.

2.6 Cover System Evaluation

Technical evaluations will be completed to assess the performance of various cover system configurations applicable to ECOSA. This includes modeling and qualitative assessment of infiltration reduction, erosion resistance, vegetation potential, and overall durability. The objective is to identify a cover approach that provides long-term stability and environmental protection. This work will guide design decisions and support long-term performance predictions.

2.7 Cover Material Availability & Characterization

This task includes identifying, sampling, and characterizing potential borrow sources for construction of the ECOSA cover system. The assessment will include growth media, riprap, and other materials necessary for achieving the desired cover performance. Testing will evaluate physical, agronomic, and geochemical properties to determine suitability for use. The outcome will support material selection and inform the construction approach for the cover.

2.8 Cover System Field Trials

Field test plots will be installed on ECOSA to evaluate performance of selected cover system configurations under site-specific conditions. These test plots will be designed with monitoring instrumentation to measure infiltration, moisture retention, and surface water runoff. The trials will also evaluate vegetation effectiveness, erosion performance, implementation techniques and constructability. Data collected from these plots will be collected for several years to validate design assumptions and guide refinement of the final cover strategy.

2.9 Seepage Management and Mitigation

This scope item focuses on evaluating how seepage at ECOSA will be managed under closure construction and post-closure conditions. As part of regrading activities, existing seepage collection areas will be disturbed or covered, and the facility will transition from active operations into closure conditions where surface and subsurface seepage behavior may change. Multiple strategies will be evaluated to manage both surface expressions and underlying groundwater conditions, including cover systems, recontouring, hydraulic controls, and system modifications. The approach must account for the potential need to treat or contain seepage for a period of time following ECOSA closure and will be informed by water balance and groundwater modeling efforts. The objective is to develop a long-term plan that mitigates seepage impacts while maintaining flexibility to implement either short- or long-term management solutions as needed.

2.9.1.1 Grassy Valley Groundwater Remediation

This task will evaluate long-term solutions to address subsurface groundwater conditions in Grassy Valley that are influenced by seepage from ECOSA. Options under consideration may include engineered barriers, hydraulic containment, and water collection and conveyance systems. The scope will also include assessing feasibility of ongoing or adaptive groundwater remediation approaches that may need to persist beyond closure construction. The objective is to develop technically defensible strategies that can be incorporated into the final plan.

2.9.1.2 Seepage Collection Management

As ECOSA transitions from active operations to closure, a revised strategy will be required to manage seepage collection infrastructure. Closure activities, including regrading and cover placement, will alter site topography and may preclude continued use of existing seepage ponds or disposal infrastructure. This task will evaluate how seepage will be handled during the closure period—when flows may still occur—and how collection systems such as the pumpback network will be adapted, decommissioned, or maintained in the post-closure period. The analysis will ensure a seamless transition between operational and closure phases while maintaining compliance and minimizing environmental risk.

2.10 Water Treatment Evaluation

This scope item includes evaluation of both temporary and potential long-term water treatment strategies to manage ECOSA seepage, depending on the final approach selected. If a low- or reduced-infiltration cover is implemented, temporary treatment may be required during the drawdown period until seepage volumes decline to levels that can be passively managed or no longer require treatment. Temporary treatment will only be necessary if the drawdown period extends beyond the active processing life of the site and seepage can no longer be routed to the VLFs. Alternatively, if long-term seepage persists and cannot be addressed through passive controls, a longer-term treatment solution may need to be considered. This task will evaluate treatment technologies, infrastructure requirements, operational logistics, and timing for each scenario. Water modeling outputs will inform estimates of treatment duration, seepage volumes, and expected water quality. The outcome will ensure the plan includes technically sound and operationally feasible treatment options to support both short- and long-term seepage management strategies.

2.11 Geotechnical Stability Analysis

Slope stability will be evaluated under final closure configurations to ensure that the ECOSA facility meets long-term geotechnical requirements. The analysis will consider both static and dynamic loading conditions and inform regrading designs. Results will confirm whether additional design modifications are needed to achieve stable landforms.

2.12 Regrading / Landform Design

Engineering designs will be developed to regrade ECOSA for closure. This includes shaping final slopes, minimizing erosion potential, and achieving desired surface water runoff patterns. The designs will also consider how to best integrate cover systems and manage material movement within the ECOSA footprint.

2.13 Stormwater Management

Surface water drainage features will be designed to manage stormwater from ECOSA under closure conditions. This includes evaluation of flow paths, erosion control measures, and conveyance to downstream infrastructure.

3.0 Conclusion

This study has been structured to evaluate and develop a long-term strategy for the ECOSA that is both technically defensible and environmentally protective. Through a risk-based approach supported by data collection, modeling, and engineering analysis, the study will assess a range of alternatives and ultimately identify a preferred strategy tailored to the unique conditions at ECOSA.

The outcome of this effort will be a fully informed solution that addresses long-term ECOSA seepage management. The selected strategy will form the basis for a revised long-term reclamation plan for ECOSA, supported by technical documentation suitable for regulatory review and permitting.

Throughout the study, CC&V will maintain alignment with the DRMS through defined check-ins and coordination milestones, ensuring that the final plan meets regulatory expectations and satisfies the commitments established in the Mined Land Reclamation Board Order. This process will enable CC&V to develop a long term strategy for the ECOSA facility and advance its broader environmental stewardship goals.