Marcel Colomb First Nation

HEAD OFFICE
Station Main
Black Sturgeon Falls,
Manitoba R0B 0W0

LYNN LAKE OFFICE
P.O. Box 1150, Lynn Lake,
Manitoba R0B 0W0
Phone: (204) 356-2439
Fax: (204) 356-2330

HEALTH DEPARTMENT
Phone: (204) 356-2911
Fax: (204) 356-2994

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Mark Ardis
Analyst Decision Statements
National Programs Division
Impact Assessment Agency of Canada

Ashifa Jiwa
Senior Consultation Advisor,
Prairie and Northern Region
Impact Assessment Agency of Canada

Re: Marcel Colomb First Nation: Review of MacLellan Mine Plan Amendment Notice of Alteration/Notice of Change

Dear Mr. Ardis and Ms. Jiwa,

Thank you for extending the review period for Alamos Gold Inc.'s Notice of Alteration/Change for the MacLellan Mine Plan Amendment. The additional time allowed Marcel Colomb First Nation (MCFN) to conduct a thorough review of the revised mine plan, the *Analysis of Proposed Changes to the Lynn Lake Gold Project – MacLellan Mine Site*, and the *Draft Decision Statement* prepared by the Impact Assessment Agency of Canada. Based on this review, MCFN proposes two additional conditions that must be incorporated before we can support the Amendment.

1. Reporting of Mass Loads for Contaminants of Possible Concern

Understanding total contaminant flux of Contaminants of Possible Concern from the mine site is essential for assessing potential long-term impacts on the environment and downstream water users. Accordingly, MCFN requests that Alamos be required to report not only concentrations of contaminants of possible concern, but also the **mass loadings** exported from the site during all phases of the project.

Proposed Condition #1: Mass Reporting

Alamos has indicated during technical discussions that it is willing to include mass-loading calculations in its reporting framework. MCFN therefore recommends that this

commitment be formalized as a condition of project approval within the Decision Statement.

2. Seepage Concerns and the Need for Independent Oversight

Seepage from relic tailings facilities continues to affect the Lynn Lake region, and MCFN is determined to prevent a recurrence of past containment failures. While Alamos's proposed tailings and mine rock storage complex appears technically sound, substantial uncertainty remains regarding the accuracy of seepage predictions and effectiveness of the containment system.

2.1 Sources of Uncertainty in Estimating Seepage

Estimating seepage from mine tailings is difficult as it involves several interacting uncertainties:

- **Hydrological variability:** Seasonal differences in precipitation, snowmelt, and evaporation drive fluctuating infiltration rates.
- **Preferential flow paths:** Internal voids and heterogeneity within the waste rock create uneven water movement and unpredictable seepage volumes.
- **Material heterogeneity:** Variations in grain size, porosity, permeability, and moisture content influence both water flow and oxygen diffusion.
- **Modelling limitations:** Predictive models rely on empirical assumptions and limited site-specific calibration, increasing uncertainty and reducing long-term reliability.

Given these factors, seepage estimates must be interpreted with caution, as underlying uncertainties may substantially affect long-term environmental impact predictions.

2.2 Proposed Containment System

Alamos proposes a multi-stage containment structure to minimize seepage:

- An initial 1.85-km containment structure surrounding approximately three-quarters of the storage complex, with a crest elevation of 362.5 m.
- Three subsequent stages that would ultimately enclose the entire tailings facility at a final crest height of 381 m.
- The structure is comprised of a dam with an internal liner, underlain in some areas by a grout curtain.
- The structure is not watertight. Therefore, seepage that bypasses the main containment system is to be captured by an exterior collection ditch and past this, monitored via downgradient wells.

It remains unclear why the grout curtain is not proposed for the full perimeter of the structure, or why only a double row curtain, not a multiple row curtain is planned.

In response to IAAC NOC IR-14-3-b, Alamos states that grout curtain longevity can range from **10–15 years** in aggressive environments to **hundreds of years** in more stable settings. However, this raises several important questions.

If the upper bound of "hundreds of years" is achievable only under ideal conditions, then why is the significantly shorter **10–15-year** lifespan not addressed with the same level of detail? What specific site conditions at MacLellan justify confidence in a longer service life, and on what evidence does that assumption rest?

More critically, the response provides **no information** on how a grout curtain would perform in **cold or permafrost environments**, despite this being one of the most relevant factors considering the project's location in a discontinuous permafrost region. How will the curtain withstand repeated freeze–thaw cycles, and thermal fluctuations between tailings and underlying strata, and the mechanical stresses that accompany them? What assessments have been done to evaluate the likelihood of expansion and contaration due to frost cycles causing micro-cracking and increased porosity, or chemical degradation over time?

Additionally, grouting in permafrost environments presents well-documented construction and long-term performance challenges. If, during installation, the injected grout encounters ice within bedrock fractures, the integrity of the curtain becomes uncertain once that ice later melts and voids form. Moreover, cement–bentonite mixtures may not cure properly under frozen or partially frozen ground conditions. What alternative materials or rapid-setting formulations are being considered to ensure proper curing in these conditions, if any? Without such measures, the long-term stability and hydraulic effectiveness of the grout curtain cannot be assured. The tailings materials will contain sulfide materials, which with moisture will produce acid conditions. This environment can dissolve the grout cement leading to a decrease in durability.

In summary, grout curtains in cold/permafrost represent a high-risk, high-maintenance approach to deal with seepage. Their performance is improved by specialized cement mixtures, active thermal management, and multi-row configurations that increase barrier thickness, none of which are included in the current design.

2.3 Proposed Condition #2: Independent Oversight

Given the uncertainties surrounding seepage and the region's history of seepage issues, the Decision Statement must include a condition that:

- Ensures MCFN can review and comment on final designs of the tailings and containment structures.
- Grants MCFN inspectors on-site access throughout construction of all containment components.

- Requires immediate reporting of laboratory results from surface and subsurface seepage monitoring.

This oversight will allow MCFN to provide timely feedback, verify construction quality, including grout curtain continuity, and ensure transparent, best-practice implementation of seepage control measures. These requirements are essential to protecting terrestrial and aquatic environments over the long term.

Marcel Colomb First Nation supports proceeding with project licensing only if the two conditions are formally incorporated into the revised Decision Statement.

Sincerely,

<Original signed by>

OKIMAW DEHLIA HART-FRANCOIS
MARCEL COLOMB FIRST NATION

Cc: Council, Marcel Colomb First Nation
Ian Ketcheson, Vice-President, Indigenous Relations, Impact Assessment Agency of Canada, Government of Canada
Ashifa Jiwa, Senior Consultation Advisor, Prairie and Northern Region, Impact Assessment Agency of Canada, Government of Canada
Agnes Wittmann, Director, Environment Approvals Branch, Government of Manitoba
Michael Raess, Manager, Environment, Development, Alamos Gold Inc.
Ian Halket, Hydrologist, Marcel Colomb First Nation
Christian Sinclair, Advisor/Negotiator, Marcel Colomb First Nation
Bernd Christmas, Legal Counsel, Marcel Colomb First Nation