



Water Resources Division
Resource Management Directorate
Nunavut Regional Office
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Your file - Votre référence
2AM-BRP1831
Our file - Notre référence
GCdocs#134913180

April 7, 2025

Richard Dwyer
Manager of Licensing
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**Re: Crown-Indigenous Relations and Northern Affairs Canada's Review of the
Aquatic Effects Management Plan for Type A Water Licence No. 2AM-BRP1831**

Dear Richard,

Thank you for the opportunity to review B2Gold Nunavut's Aquatic Effects Management Plan (AEMP) for the Back River Project Type A Water Licence No. 2AM-BRP1831.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) examined the Plan and supporting documents pursuant to its mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Crown-Indigenous Relations and Northern Affairs Act* and provides the following Technical Review Memorandum for the Board's consideration.

Please contact me or Andrew Keim by email at john.macinnis@rcaanc-cirnac.gc.ca or andrew.keim@rcaanc-cirnac.gc.ca if there are any questions or concerns.

Sincerely,

John MacInnis
Senior Environmental Assessment Specialist



Technical Review Memorandum

Date: April 7, 2025

To: Richard Dwyer, Manager of Licensing, Nunavut Water Board

From: John MacInnis, Senior Environmental Assessment Specialist, Crown-Indigenous Relations and Northern Affairs Canada

Subject: Crown-Indigenous Relations and Northern Affairs Canada's Review of the Aquatic Effects Management Plan for Type A Water Licence No. 2AM-BRP1831

Region: ☒ Kitikmeot ☐ Kivalliq ☐ Qikiqtani

A. BACKGROUND

The Back River Project (the Project) is a gold mine operation within the Kitikmeot region of southwestern Nunavut, owned by B2Gold Back River Corp. (B2Gold Nunavut). The Project consists of two main areas with an interconnecting winter ice road (WIR): the Marine Laydown Area (MLA), situated along the western shore of southern Bathurst Inlet, and the Goose Property, where the mine site is located, approximately 160 km inland of the MLA. The majority of annual resupply is shipped to the MLA during the open water season and then transported down the WIR to the Goose Property during winter.

An Aquatic Effects Management Plan (AEMP) was developed in support of the environmental impact assessment of the Project, with the purpose of monitoring changes in the aquatic environment due to the Project, assess and update predictions, and provide a framework for minimizing, managing, and mitigating adverse effects. On February 18, 2025, the Nunavut Water Board (the Board) acknowledged receipt of a revised AEMP, which was updated to:

- Satisfy Terms and Conditions and commitments made during the technical review process for the Type A Water Licence No. 2AM-BRP1831;
- Reflect changes in Project ownership, Project description (2019 Modification Package), recent changes to the Metal and Diamond Mining Effluent Regulations, and recommendations from the Aquatic Baseline Synthesis Report;
- Provide clarity on sampling design and response framework; and
- Consider the discharge of treated effluent from Echo Pit.

On March 3, 2025, the Board invited interested parties to comment on B2Gold Nunavut's updated AEMP for Type A Water Licence No. 2AM-BRP1831. CIRNAC provides the following comments and recommendations. A summary of subjects and recommendations is shown in Table 1.



Table 1: Summary of Recommendations.

Recommendation Number	Subject
R-01	Untracked Revisions and Commitments
R-02	Water Quality Predictions
R-03	Aerial Deposition in Aquatic Environments
R-04	Removal of Stream Sampling Locations
R-05	AEMP Benchmarks

B. DOCUMENTS REVIEWED AND REFERENCED

Table 2 lists the documents reviewed under the submission and referenced during the review.

Table 2: Documents reviewed and referenced.

Document Title	Author, File No., Rev., Date
Back River Project Aquatic Effects Management Plan	B2Gold Nunavut, December 2024
Back River Project Aquatic Effects Management Plan	Sabina Gold & Silver Corp., October 2017
Nunavut Water Board Water Licence No: 2AM-BRP1831 (Amendment No. 1)	Nunavut Water Board, August 2021
B2Gold Corp. Management's Discussion and Analysis	B2Gold Corp., February 19, 2025
Back River Project Hydrodynamic and Water Quality Modelling of Goose Lake Report	WSP Golder, August 2022
Back River Project Llama and Umwelt Lake Dewatering Plan	Raincoat Environmental Services Ltd., Version 1.1, April 2024
Nunavut Impact Review Board Project Certificate No. 007 (Amendment No. 1)	Nunavut Impact Review Board, August 2024
Back River Project Responses to 2022 Annual Report Comments	Sabina Gold & Silver Corp., October 2023
Back River Gold Mine Project 2023 Annual Report: Comment Response	B2Gold Nunavut, August 2024

C. RESULTS OF REVIEW

1. Untracked Revisions and Commitments

Comment:

Type A Water Licence No. 2AM-BRP1831, Part B, Item 16 states: "The Licensee shall review the Plans referred to in this Licence, as required by changes in operation and/or



technology, and modify the Plans accordingly. Revisions to the Plans are to be submitted in the form of an Addendum to be included with the Annual Report required by Part B, Item 2, complete with a revisions list detailing where significant content changes are made." In its review, CIRNAC was unable to locate a revision list detailing content changes that were made to the updated AEMP. The updated AEMP has significant content changes that reflect changes in operation relative to the previous iteration of the AEMP that was approved by the Board in 2017. The omission of a revision list does not appear to satisfy the requirements of Part B, Item 16.

It is also unclear to CIRNAC whether the Licensee has explicitly addressed all comments and commitments made during the regulatory review process. Part I, Item 2 states that: "The Licensee shall, on or before March 31, 2022, submit an updated Aquatic Effects Management Plan for Board approval. The update shall address all comments and commitments made during the regulatory review of the Application and include an adaptive approach to managing nutrients in Goose Lake through an adaptive response framework with action levels to be included in the AEMP. The response framework will inform the need for and the implementation of adaptive mitigation measures."

Information on the status of commitments is scattered throughout the document and is sometimes described at a high level. For example, Section 1.2 Scope and Objectives states: "This version of the AEMP was developed in consideration of commitments made during the regulatory review process. A number of these commitments were related to a review and supplementation of the baseline dataset (i.e., historical data collected up to 2016 and supplemental data collected more recently in 2017, 2018, 2021 to 2024); to meet these commitments, an Aquatic Baseline Synthesis Report was developed to report the results of the 2018 AEMP sampling program and evaluate the overall baseline dataset (data up to 2018). The updated AEMP refers to this synthesis report for baseline information. Other commitments were also addressed in this AEMP, specifically those made to the NWB and Environment and Climate Change Canada (ECCC) during the regulatory review of the Water Licence application."

It is CIRNAC's opinion that a concordance table is needed to clearly demonstrate how the Licensee has addressed all comments and commitments made during the regulatory review process, to satisfy the requirements of Part I, Item 2.

Recommendation:

(R-01) CIRNAC recommends that the Licensee provide a revision list for the updated AEMP detailing where significant content changes were made, as per Part B, Item 16, and a concordance table that outlines how all comments and commitments were addressed during the regulatory review process. The concordance table shall include references to applicable sections of document(s) where comments and commitments were addressed.



2. Water Quality Predictions

Comment:

The Management's Discussion and Analysis, released by B2Gold Corp. dated February 19, 2025, describes the following: "B2Gold successfully completed the 2024 winter ice road ("WIR") campaign in May 2024 and delivered all necessary material from the Marine Laydown Area ("MLA") to complete the construction of the Goose Project in the second quarter of 2025. The mill is now scheduled to start wet commissioning in the second quarter of 2025 with ramp up to full production in the third quarter of 2025."

The information provided above appears to suggest that the Project is transitioning into the operations phase in Q2 of 2025, but it is unclear to CIRNAC if this schedule aligns with planned dewatering activities for Umwelt and Llama Lakes, or if there have been any operational changes in the management of this water. For example, the Licensee noted that dewatering would resume during the open water season in 2025 if not completed in 2024, which could overlap with the timing of the operations phase, should it begin in Q2 of 2025. CIRNAC notes that the Licensee shall notify the Board of any changes in Project phases and/or operating plans or conditions associated with the Project at least sixty (60) days prior to any such change, as per Part B, Item 9 of 2AM-BRP1831. The Proponent should not undertake or move forward with a new phase or state without the approval of the Board, including getting approval to carry on any remaining or outstanding tasks from previous phases.

Table 2 of the document titled "Back River Project Hydrodynamic and Water Quality Modelling of Goose Lake Report" provides annual average flow rates for all hydrological inputs for model calibration and forecast periods. During the construction forecast period, $1.2 \text{ Mm}^3 \text{ year}^{-1}$ is allocated to the category "Discharge from Water Treatment Plant (WTP) (dewatering of Umwelt and Llama Lakes)", and inflow rates during operations are classified as "not active". CIRNAC notes that changes to dewatering plans could impact water quality predictions and bias future assessments.

CIRNAC notes the Licensee appears to suggest some uncertainty in the water quality of Goose Lake in the updated AEMP. For instance, in Section 3.5, the Licensee states: "During the Construction and Operations phases, accumulated surface water runoff and snowmelt in open pits may be discharged to land to allow for mining to continue. This dewatering discharge will be treated to meet MDMER limits (Schedule 4, Table 1) and Type A Water licence limits (2AM-BRP1831 Amendment 1 Part F, Items 21 and 22), and discharged to land such that it is expected that the flow will ultimately reach Goose Lake. Although this discharge is expected to be limited in quantity, it is possible that the water quality in Goose Lake will be affected." CIRNAC understands that the Licensee intends to apply discharge criteria to accumulated surface water runoff and snowmelt in open pits. CIRNAC is of the view that this water should be referred to as "contact water" in the AEMP and be considered as contact water in the model, as a conservative approach to avoid underestimating potential impacts of water quality in Goose Lake.



Recommendation:

(R-02) CIRNAC recommends that the Licensee:

- Clarify the expected timing of the transition to the operations phase;
- Confirm whether any changes have occurred or are planned in the management of water in Umwelt and Llama Lakes intended for discharge into Goose Lake;
- Provide a timeline for submitting an updated model to improve predictions of Goose Lake water quality, considering potential changes to dewatering plans and discharge activities.

3. Aerial Deposition in Aquatic Environments

Comment:

Section 3.2 of the AEMP describes stressors of concerns and transport pathways. CIRNAC notes that aerial deposition (e.g., blasting and use of explosives) is not explicitly considered as an interaction pathway in Table 3.2-1 but was included in the previous iteration of the AEMP (2017).

The Licensee does not appear to consider aerial deposition in its assessment of potential effects in Goose Lake and Propeller Lake. For example, Section 4.2.3 states: “Effects in Propeller Lake will be assessed in consideration of those identified in Goose Lake (i.e., if there are no Project-related effects in Goose Lake, then no effects would be expected in Propeller Lake located downstream of Goose Lake). Should water quality in Goose Lake indicate the potential for effects in Propeller Lake, then the baseline data collected in Propeller Lake will be reviewed and an appropriate study design will be proposed for this lake.”

CIRNAC is of the view that, while there is a hydrological connection between Goose Lake and Propeller Lake, aerial deposition could contribute to spatial differences in concentrations in each lake and should be considered a relevant pathway for Project effects on receiving aquatic environments.

Recommendation:

(R-03) CIRNAC recommends that the Licensee:

- Update Table 3.2-1 in the AEMP to include aerial deposition as a potential transport pathway;
- Confirm if any aerial deposition studies have been conducted and, if so, provide a summary of findings and how they were incorporated into the AEMP; and
- If aerial deposition studies have not been completed, assess the potential contribution of aerial deposition to water quality in both lakes, considering spatial variations in contaminant deposition that may not be captured by hydrological connections alone.



4. Removal of Stream Sampling Locations

Comment:

The Licensee noted that stream sampling was removed from this version of the AEMP because (1) water quality monitoring in lakes is sufficient to track changes, and (2) the hydrodynamic model can predict water quality at multiple points in the lake and identify where guidelines and objectives will be met.

CIRNAC is of the view that this rationale is not sufficient for justifying the removal of stream sampling. Comparisons of baseline monitoring data is required to confirm the representativeness of water quality in lakes and streams.

Recommendation:

(R-04) CIRNAC recommends that the Licensee conduct a comparative analysis to assess the representativeness of lake and stream water quality data. This analysis shall include both graphical representations and statistical comparisons to determine whether continued stream monitoring is warranted.

5. AEMP Benchmarks

Comment:

Section 5.1.4 of AEMP describes benchmarks that will be used to compare water quality data. The Licensee describes that: "If parameter concentrations naturally exceeded water quality guidelines under baseline conditions, then the AEMP benchmark will be based on the baseline mean plus two standard deviations. When the AEMP benchmark is based on baseline mean plus two standard deviations, a comparison will also be made to water quality guidelines." The Licensee did not provide a justification for using this method.

CIRNAC notes that applying this method to a dataset that has high variability (i.e., large standard deviation) would result in a high benchmark. AEMP benchmarks of this nature may trigger exceedances only when very high concentrations are measured.

Recommendation:

(R-05) CIRNAC recommends that the Licensee provide a clear justification for using this method to establish benchmarks.