Environmental Protection Operations Directorate
Prairie & Northern Region
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ECCC File: 6100 000 052/002
NWB File: 2AM-BRP1831

April 3, 2025

via email at: licensing@nwb-oen.ca

Richard Dwyer
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0

Dear Richard Dwyer:

RE: 2AM-BRP1831 – B2Gold Back River Corp. – Hope Bay – Aquatic Effects Management Plan

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Nunavut Water Board (NWB) by B2Gold Back River Corp. regarding the above-mentioned Aquatic Effects Management Plan.

ECCC provides expert information and knowledge to project assessments on subjects within the department's mandate, including climate change, air quality, water quality, biodiversity, environmental emergencies preparedness and responses. This work includes reviewing proponent characterization of environmental effects and proposed mitigation measures. We provide advice to decision-makers regarding a proponent's characterization of environmental effects, the efficacy of their proposed mitigation activities, and may suggest additional mitigation measures. Any comments received from ECCC in this context does not relieve the proponent of its obligations to respect all applicable federal legislation

The following comments are provided:

1. **Topic: Site Contact Water Discharge**

   Reference(s)
   - Section 2.2: Discharges to the Receiving Environment
   - Section 3.2: Stressors of Concern and Transport Pathways

Comment

Section 2.2 lists discharges to the receiving environment, including “dewatering of open pit contact water to Goose Lake (likely via tundra discharge), with or without treatment.” Section 3.2 provides more detail, stating, “Effluent from water management facilities, such as the emergency discharge pond (Sabina 2021) used to manage contact water, runoff or snowmelt (e.g. runoff or snowmelt to the Open Pits) may also be discharge to land if effluent quality criteria defined in the Type A Water Licence are met.” No additional details are provided on the location of this discharge, the flow path, and the potential for this discharge to enter surface waters. This information is needed to clarify if any subsequent impacts to Goose Lake are adequately captured through Aquatic Effects Management Plan (AEMP) monitoring.

ECCC Recommendation(s)

ECCC recommends that the Proponent include additional details on the location of site contact water discharge to land, on the expected flow path, and on the potential for discharge water to enter surface waters.

2. Topic: Mixing Zone

Reference(s)

- Section 3.5: Summary of Water Quality Predictions

Comment

Section 3.5 states, “the modelling results indicate that concentrations of water quality parameters in Goose Lake are predicted to remain below applicable water quality guidelines and objectives at the edge of the mixing zone during closure, with the exception of phosphorus.” No additional details are provided regarding the extent of the mixing zone, the location where benchmarks are expected to be met within Goose Lake, and how this relates to the proposed AEMP monitoring locations. Additional details are recommended to clarify the extent of the mixing zone.

ECCC Recommendation(s)

ECCC recommends that the Proponent clarify the extent of the mixing zone by including the distance from discharge and the locations that are being considered for benchmarking within Goose Lake. This information should be related to the proposed AEMP monitoring stations.

3. **Topic: Propeller Lake Sampling**

Reference(s)

- Section 4.2.2: Sampling Areas
- Table 4.2-1: Waterbodies and Sampling Stations Included in the AEMP

Comment

Two separate monitoring areas are identified for Propeller Lake (South Basin and North Basin) and the Proponent states that, “Given the relatively large size of Propeller Lake, it is possible that the north basin can be used as a within-lake reference area for the south basin.” In Table 4.2-1 the North Basin is included as an exposure area but then is also listed as a “within lake reference” in the “type of area” column. The table and the associated text indicating that the North Basin would “possibly” be used as a within lake reference creates confusion. Monitoring stations should be clearly identified as either reference or exposure and remain consistent throughout the sampling program. Caution should be applied when assessing potential in-lake reference areas since the North Basin of Propeller Lake is still downstream of the discharge and therefore has the potential to be impacted by mining activities. ECCC notes that the 2017 version of the AEMP had the Propeller Lake North Basin explicitly listed as a far-field exposure station.

ECCC Recommendation(s)

ECCC recommends that North Basin of Propeller Lake is retained as a far-field exposure station, and that the AEMP is updated accordingly.

4. **Topic: Sampling Frequency and Design**

Reference(s)

- Section 4.2.4: Sampling Design and Frequency

Comment

Section 4.2.4 includes several descriptions of the proposed surface water quality monitoring. However, contradicting descriptions of details pertaining to timing and sampling exceptions are provided, resulting in a lack of clarity on the monitoring plan. The previous version of the AEMP included tables (2017 version – Tables 4.3-3 & 4.3-4) that clearly outlined the monitoring program frequency. The updated version of the AEMP removed the tables in favor of a written description that is not clear and consistent.

ECCC Recommendation(s)

ECCC recommends that the Proponent provide a table that clearly outlines the proposed surface water quality monitoring frequency.

5. Topic: Changes to Monitoring Frequency and Design

Reference(s)

- Section 4.2.4: Sampling Design and Frequency

Comment

The updated version of the AEMP includes reductions in monitoring as compared to the 2017 version but does not provide a rationale for the changes. The 2017 version indicated that all surface water quality monitoring stations were to be sampled annually, while the current version proposes reductions in frequency and changes to sampling based on the previous years monitoring. ECCC notes that AEMP's should not change on an annual basis as they are intended to provide consistent data collection to allow for clear interpretation of results and to assess potential impacts to aquatic life. Inconsistent monitoring may lead to gaps in the dataset that result in a reduced ability to interpret results and assess potential effects. The AEMP should clearly outline what is to be monitored by including the sampling frequency and timing for all stations. Any reductions in sampling should be based on monitoring results and be supported by a clear rationale rather than be assumed in the monitoring program.

ECCC Recommendation(s)

ECCC recommends that the Proponent clearly outline all changes to monitoring frequency and design as compared to the 2017 AEMP. All changes to the monitoring program should be accompanied by supporting rationale.

6. Topic: Discontinuation of Stream Sampling

Reference(s)

- Section 4.2.4: Sampling Design and Frequency

Comment

The presented version of the AEMP proposed the discontinuation of stream water quality sampling. In the 2017 version, stream monitoring was to be completed twice per year, with the first annual samples to be collected one to two weeks after freshet (mid-late June) and the second to be collected in August. The rationale provided for removing this monitoring is that water quality monitoring in lakes is sufficient to characterize changes and that these locations were initially chosen for consistency with modelling locations and to be used as compliance points. However, this rationale does not address the implications of removing the June freshet sampling. Removal of the June stream sampling may result in water quality data gaps during spring freshet, when increased runoff is expected.

ECCC Recommendation(s)

ECCC recommends the Proponent expand their rationale for removing stream monitoring to specifically address the June freshet sampling period. The rationale should acknowledge potential information gaps that may be introduced by not sampling the stream during freshet.

7. **Topic: Fish Health Monitoring Frequency**

Reference(s)

- Section 4.2.4: Sampling Design and Frequency

Comment

Section 4.2.4 states that fish tissue chemistry will be completed every six years. ECCC notes that this represents a change in monitoring frequency from the 2017 AEMP, which proposed fish health and fish tissue monitoring on a three-year timeline. No rationale has been provided for this change.

ECCC Recommendation(s)

ECCC recommends that the Proponent provide supporting rationale for the proposed change in monitoring frequency for fish health and fish tissue.

8. **Topic: Water Quality Benchmarks**

Reference(s)

- Section 5.1.4: Data Analysis and Interpretation

Comment

The plan states that water quality data will be compared to AEMP benchmarks, and that these will be based on the current applicable federal aquatic life guidelines for the protection of aquatic life, drinking water quality guidelines, and approved site-specific water quality objectives for the Project. However, a table outlining which guidelines will be used for which parameters has not been included in the AEMP. In some cases, multiple guidelines exist for a single parameter but the AEMP does not provide a description on how guidelines will be selected in these cases. ECCC specifically notes that in cases where both Federal Environmental Quality Guidelines (FEQG) and CCME guidelines exist, the FEQG should be used, as these reflect the most recent science in their development. In addition, some guidelines incorporate information on toxicity modifying factors to calculate a value with increased site-specificity. Inclusion of a table outlining the values and sources for all AEMP benchmarks would increase clarity on what the water quality data is being evaluated against.

ECCC Recommendation(s)

ECCC recommends that:

- The Proponent provide a table summarizing the AEMP benchmarks selected for the site. This should incorporate recently updated guidelines, including the FEQGs, as well as clearly outline the relevant toxicity modifying factors.
- In cases where multiple guidelines exist, rationale should be provided on how the guideline was selected.

9. Topic: Baseline Exceedances of Water Quality Guidelines

Reference(s)

- Section 5.1.4: Data Analysis and Interpretation

Comment

The plan states, “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.” The plan does not identify which parameters were identified that naturally exceed water quality guidelines or provide rationale for the proposed benchmark of baseline mean plus two standard deviations. In addition, the resulting numerical values for these parameters have not been provided. ECCC notes that the approach of baseline mean plus two standard deviations may not be appropriate depending on the baseline dataset and it is possible that resulting values may not be protective of aquatic life.

ECCC Recommendation(s)

ECCC recommends the Proponent:

- Clearly identify which parameters naturally exceed water quality guidelines under baseline conditions.
- Provide justification for the proposed approach of baseline mean plus two standard deviations.
- Provide a summary of the resulting numeric values for each parameter.

10. Topic: Establishment of Normal Range Concentrations

Reference(s)

- Section 5.1.4: Data Analysis and Interpretation

Comment

The analysis and interpretation of lake water quality data proposes that water quality data from the lake exposures will be evaluated by comparison to AEMP benchmarks, and normal ranges. In discussion of the normal ranges, it is stated that baseline data from 2010 to 2018 has been pooled for Goose Lake, that additional data was collected in 2021, 2022, and 2024 to address uncertainty, and that, if appropriate, normal ranges may be updated with future AEMP reference data as they become available to further characterize natural variability. However, the normal ranges for each parameter have not been provided. Compilation of normal ranges is also discussed in relation to other aspects of AEMP monitoring (e.g. sediment quality, benthos) but the resulting values have also not been presented.

It is unclear based on the information provided whether the establishment of the normal ranges based on the baseline data collection has been completed. If baseline normal range values are established, they should be presented with the AEMP study design or their location within another plan explicitly referenced.

ECCC Recommendation(s)

ECCC recommends that the baseline water quality data normal ranges are summarized in the AEMP.

11. Topic: Identification of Parameters of Interest

Reference(s)

- Section 5.1.4: Data Analysis and Interpretation

Comment

Section 5.1.4 described identification of parameters of interest and states that, “parameters with mean/median values that exceed the normal range will be identified as “parameters of interest” and further evaluated in the Before After Control Impact (BACI) analysis. Parameters with mean/median concentrations below the upper limit of their normal range will not be evaluated further”. ECCC notes that depending on the dataset, the mean and median values may differ. It should be made clear whether the mean or median is intended to be used for comparison to normal range.

ECCC Recommendation(s)

ECCC recommends the Proponent clarify whether the mean or median is intended to be used for comparison to the normal range.

12. Topic: Proposed Low Action Levels

Reference(s)

- Table 6.3-1: Proposed Low Action Levels for the Toxicological Impairment and Nutrient Enrichment Hypothesis

Comment

Table 6.3-1 provides proposed low action levels for components of the AEMP. For water quality, the action level includes, “statistically significant BACI effect on concentration in the exposure area, with the average concentration above the normal range” and “average concentration above the AEMP benchmark.”

As worded, the low action level requires the average concentration to exceed the AEMP benchmark prior to any action being taken. ECCC notes that a low action level exceeding a benchmark is not sufficiently conservative and is not consistent with action level frameworks at other mining operations in the Northwest Territories and Nunavut. Low action levels for water quality are typically set as a percentage of the AEMP benchmark (e.g. 70%) to trigger action in advance of a benchmark exceedance to ultimately avoid exceedances of AEMP benchmarks. ECCC notes that the previous version of the AEMP stated the intention to establish action levels based on a percentage of the AEMP benchmark, but this has not been carried through to this version.

In addition, the use of “average” has not been further defined, so it is unclear what this term refers to for purposes of analysis against action levels. For example, this could be a lake-wide average, monthly average, or seasonal average. If the calculated average concentration exceeds the benchmark this implies that there would have been numerous individual exceedances of the benchmark, suggesting potential risk to aquatic life.

ECCC Recommendation(s)

ECCC recommends:

- The Proponent establish low action levels to trigger action in advance of exceeding AEMP benchmarks.
- If an average value is used in the action level, the dataset used to calculate the average should be defined.

If you need more information, please contact Jordan Hollman at Jordan.Hollman@ec.gc.ca.

Sincerely,

Hollman, Jordan

Digitally signed by Hollman, Jordan
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Jordan Hollman
Senior Environmental Assessment Officer

cc: Eva Walker, Head, Environmental Assessment North (NT and NU)