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ECCC File: 6100 000 115/002  
NWB File: 2AM-BRP1831



November 13, 2020

via email at: [licensing@nwb-oen.ca](mailto:licensing@nwb-oen.ca)

Stephanie Autut  
Executive Director  
Nunavut Water Board  
P.O. Box 119  
Gjoa Haven, NU X0B 1J0

Dear Stephanie Autut:

**RE: Licence #2AM-BRP1831 – Sabina Gold & Silver Corp. – Back River Project –  
Amendment Application Completeness Check**

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Nunavut Water Board (NWB) regarding the above-mentioned completeness check and is providing comments for the NWB consideration.

ECCC's specialist advice is based on our mandate pursuant to the *Canadian Environmental Protection Act* and the pollution prevention provisions of the *Fisheries Act*.

With regards to the format of a Technical Meeting and/or Pre-Hearing Conference, ECCC would encourage the Board to explore opportunities to hold the hearings in a virtual format, capturing the lessons learned from previous virtual hearings during the pandemic. This would reduce the need and cost/effort of travel and perhaps allow for a larger section of expert involvement.

The following comments are provided:

**1. Topic – Clarification of Saline Water Management**

Reference(s)

- Water Management Plan
  - Appendix C – Saline Water Management Plan
  - Appendix E – Water and Load Balance

Comment

Groundwater is anticipated to be encountered in the Llama Open Pit and the Umwelt Underground Mine, which will require management via the saline water management pond



on the surface of the mine site. Table 4.5-1 of the Saline Water Management provides a summary of saline water management activities for the project. These management activities include:

- Year -1: Saline Water Pond is constructed;
- Year 1: Saline water from Umwelt Underground Mine and Llama Open pit is pumped to the saline water pond;
- Year 3: Saline water from the Saline Water Pond will be pumped to the bottom of Umwelt Reservoir to create a meromictic Pond;
- Year 4: Decommissioning of the Saline Water Pond; and
- Year 10+: Saline Water is pumped from the Umwelt Reservoir into the Umwelt Underground Mine.

ECCC notes that there is a large gap in the overall saline water management plan, which does not describe management of groundwater encountered in the Umwelt Underground Mine after the decommissioning of the Saline Water Pond. Based on the flow diagram provided in the Water and Load Balance in Appendix D, it can be assumed that groundwater will be pumped to the Umwelt Reservoir; however, this should be explicitly described. Further, in section 8.2.3 of the Water Management Plan, the report states that, “groundwater accumulating in the underground workings will be pumped to the Saline Water Pond during the operational LOM (life of mine).” This statement is contradictory to statements throughout the Water Management Plan that indicate that the Saline Water Management Pond will be decommissioned in Mine Year 4.

#### ECCC Recommendation(s)

ECCC recommends the Proponent provide a description of management of groundwater in Umwelt Underground Mine after the decommissioning of the Saline Water Pond in Mine Year 4.

## **2. Topic – Goose Property Groundwater Inflows**

#### Reference(s)

- Water Management Plan
  - Appendix C – Saline Water Management Plan
  - Appendix E – Water and Load Balance

#### Comment

The 2020 Modification proposes the extension of the Umwelt Underground Mine from a previously approved depth of 650m to an extended depth of 900m with mining in the underground commencing in Year 1 and extending into Year 9 of operations. The Saline Water Management Plan states that Sabina has scaled the quantity and quality of groundwater inflows to match the new mine schedule, however no additional description of how this groundwater scaling was completed has been provided. In addition, no direct comparison has been provided on how groundwater quality or quantity will change between the previously approved project and the new modification.

Tables 4.1-1 and 4.1-2 of the Saline Water Management Plan (Appendix C) present the expected inflows and concentrations for the groundwater inflows in the 2020 modification, however, these differ from the inflows presented in Table 3-11 of Appendix E (Water and Load Balance) and the concentrations of TDS and chloride presented in Table 4-3 of Appendix E. There are also additional inconsistencies on the years of groundwater inflows listed. The Saline Water Management Plan presents predicted concentrations and volumes of inflows from year 1 to 5 for Llama Open Pit and for year 1 to 10 for Umwelt Underground Mine, while the Water and Load Balance provides predicted groundwater inflows and concentrations from year 1 to 5 for the Llama Open pit but only for year 1 to 7 for the Umwelt Underground Mine (Table 3-11).

Overall, due to the inconsistencies above, the Water Management Plan does not present a clear understanding of the potential implications of the Umwelt Underground Mine progressing further underground, potentially encountering increased volumes of groundwater, with higher TDS and chloride, requiring management on the surface of the mine.

#### ECCC Recommendations

ECCC recommends the proponent provide the following:

- Present a clear description of how groundwater scaling for the new mine schedule was completed;
- Provide clarification on the contradictory groundwater quality and quantity values used throughout the Water Management Plan and in the Water and Load Balance;
- Provide a comparison and discussion of predicted groundwater quantity and quality for the new mine schedule, as compared to the previously approved mine plan, including overall quality and quantity of saline water to be stored in the Umwelt Reservoir as compared to previous predictions; and
- Based on the responses to the above, discuss any implications for operational capacity, closure, and establishment of stratification within Umwelt Reservoir.

### **3. Topic – Umwelt Reservoir**

#### Reference(s)

- Back River 2020 Modification Package
- Water Management Plan
  - Appendix E – Water and Load Balance
  - Appendix F – Assessment of Stratification for Llama Reservoir

#### Comment

In the currently approved mine plan, Umwelt mined out pit serves as a tailings facility, and the mined out Llama pit serves as saline water management, ultimately becoming a meromictic lake upon closure. However, the 2020 Modification Package proposes Umwelt open pit to serve as mine water management and Llama open pit to serve as a tailings

facility. This difference in mine waste and water management is only briefly mentioned in Table 3.1-1 of the modification package and no analysis of any potential implications of this proposed change is discussed. As per the Water and Load Balance (Appendix F), a stratification assessment was conducted for Llama Reservoir in 2015, but it is not clear whether this assessment is also applicable to Umwelt Reservoir. In relation to stratification of the Umwelt Reservoir, the Proponent has only stated that, “for the purpose of this water and load balance, the Umwelt Reservoir is stratified.” A number of variables including the characteristics of the pit, estimated salinity, and ratio of fresh to saline water can influence establishment of meromixis. Analysis should be conducted to confirm that the results of the Llama Reservoir Stratification assessment are also applicable to Umwelt Reservoir stratification potential.

#### ECCC Recommendations

ECCC recommends the Proponent provide the following:

- Provide a discussion of why the end use of Umwelt Pit and Llama Pit were changed; and
- Provide an analysis of the potential for stratification within Umwelt Reservoir including whether the assumptions and results of the assessment of stratification for Llama Reservoir are applicable to Umwelt Reservoir.

#### **4. Topic – Updated Water and Load Balance**

##### Reference(s)

- Water Management Plan
  - Appendix E – Water and Load Balance

##### Comment

The water and load balance has been updated to account for the 2020 Modification Request. However, the report does not state how the assumptions or inputs to the water quality model have changed to include the modification, nor is there a description of how the updates to the model have changed the model outcomes for predicted water quality from the original water quality predictions. A summary table or summary description of the changes to the inputs, assumptions, and outputs should be provided to facilitate understanding how the overall water and load balance for the site will change due to the modification.

#### ECCC Recommendations

ECCC recommends the Proponent provide a comparison and discussion of changes to the water quality modelling that were incorporated into the 2020 Modification Package, including a comparison of changes to the assumptions, inputs, and outputs from the original water quality predictions.

#### **5. Topic – Water Quality Prediction Results**

##### Reference(s)

- Water and Load Balance – Section 7 (Water Quality Results)

○ Appendix D: Water Quality Prediction Results

Comment

The Water and Load Balance presents graphical results of the monthly water quality averages for a small subset of parameters (ammonia, chloride, sulphate, arsenic, and copper) for nodes PN03, PN04, and Goose Reservoir. For all other water quality parameters for all the nodes, the reviewer is referred to Appendix D.

Appendix D of the Water and Load Balance presents water quality predictions with and without treatment at the various assessment nodes for the project. ECCC notes that many of the values reported in these tables are unrealistically high, potentially indicating errors in the Water and Load Balance (for example, maximum selenium in Umwelt Pond of 1,742,000 mg/L). In addition, values listed in Appendix D do not correspond with the data and figures presented in Figures 4 through 18 of the Water and Load Balance. For example, Figure 7 (Chloride Prediction at PN04) indicates the highest average chloride concentration to be around 80 mg/L; however, Appendix D lists the maximum chloride concentration at PN04 at 0.0517 mg/L. Further, parameter concentrations that would be expected to be different with/without treatment are the same. For example, copper (expected to require treatment) at PN03, which is modelled with and without treatment, is 0.005814 mg/L in Appendix D. Finally, the only data that is presented in Appendix D for each node is the post-closure and maximum. It is unclear what is meant by post-closure, or what the range of predicted concentrations may be since no further summary statistics are provided. Overall, given the number of inconsistencies and abnormal values presented in Appendix D, it is difficult to interpret the information presented in the Water and Load Balance.

ECCC Recommendations

ECCC recommends the proponent provide the following:

- Provide an update to Appendix D of the Water and Load Balance addressing errors and inconsistencies in the data; and
- Provide a discussion on the validity of the conclusions presented in the Water and Load Balance based on the inconsistencies presented in Appendix D.

If you need more information, please contact Orlagh O'Sullivan at (431) 276-4506 or [Orlagh.OSullivan@Canada.ca](mailto:Orlagh.OSullivan@Canada.ca).

Sincerely,



Margaret Fairbairn  
A/ Regional Director, Prairie and Northern Region

cc: Brian Asher, Acting Head, Environmental Assessment North (NT and NU)