July 10, 2024

Attn: Mohammad Ali Shaikh
Technical Advisor
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU
X0B 1J0

Re: B2Gold Nunavut's Comment Responses for the Updated Water Management Plan Version 5

Dear Ali,

Thank you for the opportunity to respond to comments received on the Back River Project's submission of an updated Water Management Plan Version 5. Comments were received from the Kitikmeot Inuit Association (KIA), Fisheries and Oceans Canada (DFO), and Crown Indigenous Relations and Northern Affairs Canada (CIRNAC).

B2Gold Nunavut thanks all parties for their review of our submission. Should you have any questions regarding the above, please contact the undersigned at kbenoit@b2gold.com.

Sincerely,

Kristina Benoit
Manager, Environmental Permitting
B2Gold Nunavut

Enclosure: Comment Responses

Cc: Karén Kharatyan, Director Technical Services, NWB
Richard Dwyer, Manager of Licensing, NWB
Merle Keefe, Manager Environment, B2Gold Nunavut

KIA-NWB-01 Discharge Criteria
Summary B2Gold's updated water management plan applies a monitoring approach and effluent quality criteria (EQC) to the final discharge of contact water to the receiving environment that are intended for the management of runoff and snowmelt that are not expected to contain contaminants of potential concern. The water management plan must be updated to regulate discharges of contact water from the open pits to tundra as a final discharge location under the MDMER and apply the appropriate monitoring protocols and effluent quality criteria in the licence.
Detailed Review Comment B2Gold indicates that water collected in the Echo and Umwelt open pits will be discharged to tundra prior to the completion of the Primary Pond. *"In accordance with Part D, Item 9, runoff water or snowmelt collected in the Open Pits may be discharged to land. Part D, Item 9 requires the Licensee to conduct daily visual inspection for runoff/seepage, and conduct sampling, where turbidity is observed, for all construction activity during spring freshet. In addition, all surface runoff and/or discharge where flow may directly or indirectly enter a waterbody, shall be sampled weekly and not exceed criteria set by the NWB in Part D, Item 21."* Water accumulating in the open pits, even during freshet, would be considered contact water. B2Gold's referenced criteria (Part D Items 9 and 21) are inappropriate for application to contact water as they pertain to surface runoff and the drainage management systems. Water discharged from the Echo Pit prior to being directed to the Primary Pond would be considered a final discharge point and subject to MDMER. This is necessary given our understanding (substantiated by water and load balance models developed for the project) that the composition of the ore body at the Back River site (i.e., what will be in the pit and pit walls) contains arsenic, copper and other contaminants of concern that can be reasonably expected to leach into water within the pit. The presence of various nitrogen species associated with blasting may also be expected within waters collecting in the open pits. As such, discharges from the open pits directed to tundra prior to the completion of the Primary Pond should be monitored to confirm compliance with criteria outlined in Part F item 21 of the licence (i.e., MDMER effluent quality criteria and other relevant contaminants of concern at the site) as well as Part F Item 22 (confirmation that the effluent is not acutely lethal). Part F Item 16 of the licence is also triggered based on our interpretation of the wording of the licence.
Recommendation/Request Update the Water Management Plan to indicate that water collected in the open pits once development for mining has commenced is considered contact water. Discharges from the open pits to tundra must be monitored to confirm compliance with criteria outlined in Part F item 21 of the licence as well as Part F Item 22. Discharges from the open pits to tundra must also be identified as a final discharge point under the MDMER.

B2Gold should also provide a discussion as to the applicability of Part F Item 16 of the licence to discharges of contact water from the open pits to tundra.

B2Gold Nunavut Response

B2Gold Nunavut agrees to apply the discharge criteria outlined in Part F, Item 21 and 22 to the discharge of this contact water.

Within the 2020 Back River Project Type A Water Licence Amendment Application, and in the more recent Engineering Design Report Submission for the Emergency Discharge Pond (Section 3.2), it stated the pond facility is designed for retention of wastewater discharges produced by the plant site (i.e., tailings) in upset conditions where emergency discharges are necessary. This is why the Emergency Discharge Pond is fully lined and is the only fully lined pond at the Back River Project. This purpose is why there is a "120 day" notification period in advance of discharge from this pond as outlined in Part F, Item 16. This is further illustrated in Part F, Item 15, which stipulates similarly any effluent discharge from any Tailings Storage Facility and Tailings Facilities must comply with Part F, Item 16.

B2Gold Nunavut reiterates our commitment to applying Part F, Item 21 and 22 discharge criteria, and to providing these results within the annual report, however, B2Gold Nunavut does not believe Part F, Item 16 is applicable. This naturally intercepted site water is mostly analogous to BRP-G (General Site Runoff) or potentially BRP-S (General Seeps from excavated/stockpiled material or quarries that does not gather in a collection system), rather than tailings effluent.

References:

Sacre-Davey. 2021. Back River Project: Emergency Discharge Pond Berm Design Report and Drawings. Prepared for Sabina Gold & Silver Corp. by Sacre-Davey Engineering Inc. June 23, 2021. Sabina Document #SBR6SDE-00-RPT-0002

KIA-NWB-02 Culverts
Summary Five culvert crossing locations are proposed at the Goose Property: one crossing through the airstrip and four crossings through the all-weather roads. The culverts on fish bearing stream will be embedded at depth and a thin layer of streambed material will be placed to promote fish passage and habitat suitability.
Detailed Review Comment It is not clear which of the five crossings are fish bearing. The standard crossing structures for fish bearing streams are either clear span bridges or open-bottom culverts, to protect fish habitat. Only circular culverts (assumed to be closed bottom) are proposed, with a thin layer of streambed material. The reason closed culverts are not used for fish-bearing streams is the high incidence of scouring of the streambed materials out of the culvert during high flows.
Recommendation/Request Identify the fish bearing stream crossings. Change the type of culvert for the fish bearing streams to open bottom.
B2Gold Nunavut Comment Response Fish-bearing status of watercourses and waterbodies at the Back River Project was summarized in detail in the Fisheries Act Authorization application for the Back River Project, for example, see Figure 5.2-1 in the Back River Project Fish Offsetting Plan (Golder 2019). The only fish-bearing watercourse crossing is 'C2", which is the Rascal Stream West crossing. An embedded, oblong culvert crossing design (twin culvert installation) was installed at the Rascal Stream West crossing location in 2023. Work was completed under an approval (Letter of Advice, dated July 15, 2022) from DFO. References: Golder. 2019. Back River Project: Fish Offsetting Plan. Prepared for Sabina Gold & Silver Corp. by Golder Associates Ltd. (Golder). June 2019. Project #1776921.

KIA-NWB-03 Fish Salvage
Summary Llama Lake will be dewatered to Goose Lake in the open water season of Year -1 in advance of open pit mining. Umwelt Lake will also be dewatered to Goose Lake in Year -1.
Detailed Review Comment There is no mention of a fish salvage plan for dewatering of two entire lakes, or if the lakes are even fish bearing.
Recommendation/Request Add the same sentence from Section 8.1.1, “In advance of dewatering, a fish-out program will be completed. For additional information related to conservation and mitigation measures to be implemented, refer to Section 9.3.”
B2Gold Nunavut Comment Response On behalf of B2Gold Nunavut, WSP Canada (WSP) prepared a fish-out plan for Llama Lake and Umwelt Lake in coordination with DFO, submitting the final version of the fish-out plan to DFO on June 13, 2023. The fish-out plan was then successfully executed by B2Gold Nunavut, WSP Canada, and local communities during the 2023 open water season. The results of the fish-out were summarized in the Fish-Out Report submitted to DFO on March 31, 2024. Dewatering of Llama and Umwelt is expected to commence in June 2025. B2Gold Nunavut is committed to engage DFO prior to, and during dewatering of the lakes, and is committed to fulfill monitoring requirements at the Back River Project, as recommended by DFO and directed by the Fisheries Act Authorization for the Project (FAA-12-HCAA-CA7-00007).

KIA-NWB-04 Treated Sewage Effluent
Summary During the Construction Phase and Closure Phase, treated sewage effluent will be discharged to the tundra west of the Goose Plant Site. It will be land discharged to maximize attenuation distance prior to entering an outflow watercourse from Fox Lake and entering Goose Lake.
Detailed Review Comment The WMP does not mention use of any erosion and sedimentation mitigation measures to prevent deposited treated sewage effluent particulates from spreading directly to the nearest outflow watercourse during open water season storm events. Increased levels of sediments to a stream, even if treated, can be detrimental to fish health.
Recommendation/Request Include a reference to an erosion and sedimentation plan or mitigation measures (see Section 9.4.1 Sediment and Erosion Control Measures).
B2Gold Nunavut Comment Response As a product of the biological membrane treatment and filtration process, the treated STP effluent being discharged to tundra has a low sediment content. Additionally, the discharge point has been intentionally located in an area of fractured bedrock which promotes flow dispersion and is highly resistant to any erosion or sediment runoff. As an additional mitigation measure, this location was selected to allow substantial over land transit of any water prior to it reaching the nearest waterbody, which is expected to allow further attenuation of any sediment or nutrients. B2Gold Nunavut inspects this discharge point monthly to ensure erosion or sediment runoff is not occurring and samples any water entering the freshwater environment monthly per Water Licence requirements. If any erosion or sedimentation concerns are noted B2Gold Nunavut may install a diffuser or consider alternate corrective actions. B2Gold Nunavut also wishes to invite the KIA to inspect this discharge location when next on site.

KIA-NWB-05 Open Pit Closure-Fish Access
Summary The Llama, Umwelt, and Goose Main open pits will be allowed to fill, and barriers breached to allow flows to Umwelt and Goose lakes, or from Goose Lake. The freshwater cap above the saline water in Goose Main will promote formation of a meromictic lake.
Detailed Review Comment No mention is made of whether fish will have access to these pit lakes, once formed, or if they will contain viable fish habitat.
Recommendation/Request Include some details on what will happen regarding fish access and a reference to a fish habitat management plan or offsetting plan for the closure phase.
B2Gold Nunavut Comment Response The pit lakes will not be fish-bearing at closure and will not be accessible for fish. Barriers at the outlet of each pit will be constructed to allow flows to exit the pit, while restricting upstream access for fish from downstream locations. Additional details on the barrier designs will be provided in advance of closure, as part of the final Closure and Reclamation Plan for the Back River Project.

DFO-NWB-01
Comment Watercourse crossings have the potential to result in a harmful alteration, disruption, or destruction of fish habitat with associated footprint, infilling; by causing fish passage issues, and/or by causing hydraulic issues resulting in blocked debris movement, erosion, scour, and deposition. Fish passage must be maintained during certain biologically significant periods of the fish's life cycle when migration is important. This includes allowing upstream passage when certain fish species migrate to spawn in the spring or the fall and allowing young of the year fish to move from rearing areas to habitat where they can overwinter. Fish passage should be maintained for those fish that wish to pass at various times of year. DFO defines fish passage as suitable if fish are not delayed in their upstream migration for more than 3 consecutive days during a 1:10 year flow event. The document reports that "The fish-bearing crossings will be sized to keep maximum water velocities below 1.5 m/s for the average June flow such that they do not present a velocity barrier to migrating Arctic Grayling". Based on DFO's Swim Performance Online Tools (SPOT) (fishprotectiontools.ca), only 87.5% of 245 mm Arctic Grayling can swim against 1.5 m/s current for 1.6 m and that number falls to 50% for 7.3 m.
Recommendation Please provide context/rationale on why the 1.5 m/s velocity value for the average June flow was used to inform culvert design, as it appears high and high flows may impede fish passage.
B2Gold Nunavut Comment Response Watercourse crossings have the potential to result in a harmful alteration, disruption, or destruction of fish habitat with associated footprint, infilling; by causing fish passage issues, and/or by causing hydraulic issues resulting in blocked debris movement, erosion, scour, and deposition. Fish passage must be maintained during certain biologically significant periods of the fish's life cycle when migration is important. This includes allowing upstream passage when certain fish species migrate to spawn in the spring or the fall and allowing young of the year fish to move from rearing areas to habitat where they can overwinter. Fish passage should be maintained for those fish that wish to pass at various times of year.

DFO-NWB-02
Comment In section 6.5 the document states “there are five proposed culvert crossing locations at the Goose Property: one crossing through the airstrip and four crossing through the all-weather roads”. In section 8.1.7 of the document the document states “a culvert crossing denoted as the Goose Airstrip Culvert (C3), will facilitate drainage through the Goose Airstrip to Goose Lake via the Goose Main Diversion Berm. Three additional culvert crossings along the haul road, including the Goose Neck Culvert (C5) south of Llama Pit, the Echo Culvert (C4), and the Gander Pond Culvert (C2), northwest of the Goose Airstrip. It is unclear if culverts have already been built. In addition, DFO is required to ensure that the proponent is following the fish passage requirement for culverts in fish bearing crossings. Table 6.5.1. Goose Property Culvert Characteristic -Design Storm does not include the length of the proposed culverts.
Recommendation Please confirm which of the five proposed culvert crossings (C1, C2, C3, C4, or C5) are fish bearing and non-fish bearing and if they have already been installed. Please provide culvert length and diameters (if as-built deviated from table).
B2Gold Nunavut Comment Response The fish-bearing status of watercourses and waterbodies at the Back River Project was summarized in the Fisheries Act Authorization application for the Back River Project, for example, see Figure 5.2-1 in the Back River Project Fish Offsetting Plan (Golder 2019). The only fish-bearing watercourse crossing is ‘C2”, which is the Rascal Stream West crossing. Of the five crossings, crossing C3 (airstrip) has been removed from the Water Management Plan, in replace of the diversion and fishway to direct all flows through Rascal Stream West. Crossing C1 (Goose Main Pit) has not been installed, with plans to install this crossing prior to the development of the Goose Main Pit during later stages of the mine plan. Remaining crossings have been installed as part of the early works phase at the Back River Project. Information on engineering and construction details for the three crossings installed to-date have been previously submitted to NIRB. Dimension for each crossing are as follows: C1 – Not constructed. Design dimensions will be provided when Goose Main Pit is developed during later stages of the mine plan. C2 – Rascal Stream West Construction Summary Report is pending finalization. B2Gold Nunavut will submit when available.

C3 – Removed.

C4 – non-fish bearing; Diameter: 65cm, Length: Approximately 35-40m

C5 – non-fish bearing; Diameter: 70cm; Length: 35m

References:

Golder. 2019. Back River Project: Fish Offsetting Plan. Prepared for Sabina Gold & Silver Corp. by Golder Associates Ltd. (Golder). June 2019. Project #1776921.

DFO-NWB-03
Comment The proponent's proposed water withdrawal will occur within Zone 2 of the Nunavut Restricted Activity Period Timing Windows for the protection of Fish and Fish Habitat (Projects Near Water - Nunavut Restricted Activity Timing Windows for the Protection of Fish and Fish Habitat (dfo-mpo.gc.ca)). Although other protective measures are proposed to be followed (e.g., use of fish screens, limiting of water withdrawal volumes), a request for review should still be submitted. In addition, the document discusses water intake construction which will require a request for review once the design plans have been finalized.
Recommendation DFO recommends the proponent complete and submit a request for review form for water withdrawal activities (https://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/request-review-demande-d-examen-004-eng.html) as the application meets the criteria for a site specific review (e.g., will occur during the restricted activity period), as described on DFO's website (https://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/request-review-demande-d-examen-003-eng.html). DFO recommends the proponent confirm a request for review will be submitted for the construction of water intake structures.
B2Gold Nunavut Comment Response B2Gold Nunavut is committed to the implementation of mitigation measures to avoid and mitigate residual effects to fish and fish habitat during the construction of the Winter Ice Road for the Back River Project, including those listed in the approval (Letter of Advice, dated December 20, 2018) issued to B2Gold Nunavut for the annual construction of the Winter Ice Road.

DFO-NWB-04
Comment The document outlines that circular corrugated steel pipe culverts are proposed, and to be designed with a diameter of 1.2 m or 2.5 m. The fish-bearing culverts will be embedded at depth and a thin layer of streambed material will be placed to promote fish passage and habitat suitability. Closed bottom culverts in fish-bearing watercourses require significant consideration during the design to maintain fish passage due to the alteration of natural bed composition, transport, and can increase water velocity, low water depths, and can become perched during periods of low flow. Open bottom culverts allow natural stream process to occur through the crossing and are well suited for fish and other organism passage.
Recommendation DFO recommends the proponent to use open bottom box culverts or provide rationale of why open bottom culverts were not used.
B2Gold Nunavut Comment Response Rascal Stream West Construction Summary Report is pending finalization. B2Gold Nunavut will submit when available.

CIRNAC R-01 (A and B) Emergency Discharge Pond
Comment The Water Management Plan Addendum states, "During construction the emergency dump pond (Sabina 2021) may also be used to manage contact water, runoff or snowmelt. Effluent from the Emergency Discharge Pond, runoff water or snowmelt at freshet may be discharged to land if effluent discharge criteria defined in the Type A Water Licence are met." The Emergency Discharge Pond Design Report does not appear to consider inputs from runoff water or snowmelt. Should an emergency occur and there is a requirement to discharge chemicals from the plant to the Emergency Discharge Pond, there are concerns regarding: a) storage issues could occur if runoff/snowmelt water in the Pond does not meet effluent discharge criteria. This may be difficult to anticipate due to the changing the amount snowmelt/runoff during freshet each season. b) the discharge of runoff water or snowmelt could potentially undermine the intended purpose of the Pond and lead to environmental impacts in receiving environments; and c) Lack of clarity on actions/mitigation measures B2Gold may take should the water in the Emergency Discharge Pond not meet the applicable discharge criteria as stated in the approved water licence.
Recommendation (R-01A) CIRNAC recommends that B2Gold Nunavut clearly reference the discharge criteria in the approved Water Licence and Water Management Plan to determine if it is applicable to the water in the Emergency Discharge Pond. (R-01B) CIRNAC recommends that B2Gold Nunavut provide details on if the Emergency Discharge Pond is acceptable for storing the runoff/snowmelt water while taking into consideration the original purpose of the Emergency Discharge Pond.
B2Gold Nunavut Comment Response B2Gold Nunavut confirms that the discharge criteria outlined in Part F, Item 21 and 22 will be applied to any discharge to land from the Emergency Discharge Pond. To ensure the Emergency Discharge Pond is available in the event of a plant emergency, use of this pond for temporary storage of other contact water, runoff, or snowmelt will cease and all water be vacated prior to plant start-up, either through compliant discharge to tundra or by placement in another suitable water management facility. Within the 2020 Back River Project Type A Water Licence Amendment Application, and in the more recent Engineering Design Report Submission for the Emergency Discharge Pond (Section 3.2), it stated the pond facility is designed for retention of wastewater discharges produced by the plant site (i.e., tailings) in upset

conditions where emergency discharges are necessary. This is why the Emergency Discharge Pond is fully lined and is the only fully lined pond at the Back River Project. This purpose is why there is a “120 day” notification period in advance of discharge from this pond as outlined in Part F, Item 16. This is further illustrated in Part F, Item 15, which stipulates similarly any effluent discharge from any Tailings Storage Facility and Tailings Facilities must comply with Part F, Item 16.

B2Gold Nunavut reiterates our commitment to applying Part F, Item 21 and 22 discharge criteria, and to providing these results within the annual report, however, B2Gold Nunavut does not believe Part F, Item 16 is applicable. This naturally intercepted site water is mostly analogous to BRP-G (General Site Runoff) or potentially BRP-S (General Seeps from excavated/stockpiled material or quarries that does not gather in a collection system), rather than tailings effluent.

References:

Sacre-Davey. 2021. Back River Project: Emergency Discharge Pond Berm Design Report and Drawings. Prepared for Sabina Gold & Silver Corp. by Sacre-Davey Engineering Inc. June 23, 2021. Sabina Document #SBR6SDE-00-RPT-0002

CIRNAC R-02 Design Report and Drawings
Comment The Emergency Discharge Pond Design Report and Drawings was submitted to the Board for review in 2021. After receiving input from regulators, including CIRNAC, the Board, on September 2, 2021, the Board indicated that the report met the requirements of Part D, Item 3 of the approved water licence. Part D, Item 11 of the approved water licence states the Licensee shall submit a Construction Summary Report within 90 days of completing construction. CIRNAC notes that it is not evident if B2Gold Nunavut has begun or completed construction of the Emergency Discharge Pond.
Recommendation (R-02) CIRNAC recommends that B2Gold Nunavut clarify if the Emergency Discharge Pond has undergone or has completed construction and to provide a Construction Summary Report to the Board within the next 90 days.
B2Gold Nunavut Comment Response A final engineering inspection is pending. Once completed, a construction summary report will be submitted to the NWB within 90 days.

CIRNAC R-03 Revisions to the Water Management Plan to Include Emergency Dump Pond
Comment Table 5.2-3 and Table 8.1-1 within the Water Management Plan Addendum states that these tables were updated to indicate the mine development sequence during construction, including: “Management of runoff or snowmelt water in Open Pits at freshet.” There were no revisions providing the construction of the Emergency Dump Pond. The document only had revisions for the open pit water management.
Recommendation (R-03) CIRNAC recommends B2Gold Nunavut provide further information regarding the construction of the Emergency Dump Pond to the Board.
B2Gold Nunavut Comment Response A final engineering inspection is pending. Once completed, a construction summary report will be submitted to the NWB within 90 days.

CIRNAC R-04 (A and B) Open Pits Discharge Criteria and Definitions

Comment

Section 8.1.3 of the Water Management Plan states, "The development of Echo and Umwelt Open Pit will commence during the Construction Phase. Water will be collected in the Echo and Umwelt Open Pit using sumps and pumped to the Primary Pond to be stored until ready for reclaim use in the Process Plant. In accordance with Part D, Item 9, runoff water or snowmelt collected in the Open Pits may be discharged to land. Part D, Item 9 requires the Licensee to conduct daily visual inspection for runoff/seepage, and conduct sampling, where turbidity is observed, for all construction activity during spring freshet. In addition, all surface runoff and/or discharge where flow may directly or indirectly enter a waterbody, shall be sampled weekly and not exceed criteria set by the NWB in Part D, Item 21."

Part D, Item 9 of the approved water licence states, "The Licensee shall conduct daily visual inspections for runoff/seepage, and conduct sampling, where turbidity is observed, for all construction activity during spring freshet and during and after remarkable rainfall events."

CIRNAC notes that Part D, Item 9 does not explicitly state that water collected in the open pits can be discharged to land.

Part D, Item 21 of the approved water licence states, "All Project related surface runoff and/or discharge from drainage management systems, where flow may directly or indirectly enter a Water body, shall be sampled Weekly and not exceed the following Effluent quality limits:

Parameter	Maximum Average Concentration	Maximum Authorized Concentration in a Grab Sample
Total suspended solids (TSS) (mg/L)	50.0	100.0
Oil and Grease	No Visible Sheen	No Visible Sheen
pH	Between 6.0 and 9.5	Between 6.0 and 9.5

CIRNAC is concerned that should runoff/snowmelt interact with the open pit, it can become "contact water" and the water quality could potentially change before it is discharged onto the land and receiving waterbodies.

The approved water licence defines contact water as, "…any water that may be physically or chemically affected by mining activities, including runoff and seepage from WRSA, Ore Stockpiles and other mine facilities." Contact water does not appear to qualify into Part D, Item 21.

Recommendation

(R-04A) CIRNAC recommends B2Gold Nunavut to confirm the management of the runoff/snowmelt water from the open pit and clarify if it is "contact water" that will be discharged to the land.

(R-04B) CIRNAC recommends B2Gold Nunavut revise the Water Management Plan to address these concerns accordingly and as per applicable terms of the approved water licence.

B2Gold Nunavut Comment Response

B2Gold Nunavut agrees to manage this water as contact water and apply the more extensive discharge criteria outlined in Part F, Item 21 and 22 of the Licence when discharging. B2Gold Nunavut will include this information with the next Water Management Plan update which will be completed on or before the 2024 Annual Report submission date.