

Environmental Protection Operations Directorate
Prairie & Northern Region
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ECCC File: 6100 000 011/001
NIRB File: 08MN053



July 11, 2023

via email at: info@nirb.ca

Cory Barker
Technical Advisor III
Nunavut Impact Review Board
29 Mitik Street
P.O. Box 1360
Cambridge Bay, NU X0B 0C0

Dear Cory Barker:

RE: 08MN053 – Baffinland Iron Mines Corporation – Mary River Iron Ore Mine – 2022 Annual Monitoring Report

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Nunavut Impact Review Board (NIRB) regarding the above-mentioned annual report.

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 preparedness and emergencies. This work includes reviewing proponent characterization of environmental effects and proposed mitigation measures. We provide advice 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. Compliance Monitoring

Reference(s)

- Comment Request for Baffinland Iron Mines Corporation's Mary River Project 2022 Annual Report (Email from NIRB, May 26, 2023)



Comment

NIRB requested Regulatory Authorities provide a summary of any compliance monitoring and/or site inspections undertaken in association with the Mary River Project. ECCC's summary related to compliance monitoring is provided below.

No authorizations from ECCC have been issued.

The Mary River Project is captured under several pieces of ECCC legislation such as subsection 36(3) of the *Fisheries Act* (FA), *Metal and Diamond Mining Effluent Regulations* (MDMER), *Canadian Environmental Protection Act* (CEPA), *Environmental Emergency Regulations* (E2 Regs), *Cross-border Movement of Hazardous Waste and Hazardous Recyclable Material Regulations* (CBX), *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations* (STSR), *Sulphur in Diesel Fuel Regulations* (SIDFR), and *Greenhouse Gas Pollution Pricing Act/Output-Based Pricing System Regulations*.

On-Site Inspections:

1. June 21 - 23, 2022

- Multi-regulation on-site inspection conducted to verify compliance under FA, MDMER, E2 Regs, CBX, and STSR at Milne Inlet Port Site, Mary River Mine Site, Tote Road, and Haul Road via helicopter and truck.
- MDMER chemistry and toxicity sampling conducted at Final Discharge Point (FDP) MS-11 – No MDMER exceedances or toxicity determined.
- No non-compliance determined from this inspection.

2. October 4-6, 2022

- Multi-regulation on-site inspection conducted to verify compliance under FA, MDMER, E2 Regs, CBX, and STSR at Milne Inlet Port Site, Mary River Mine Site, Tote Road, and Haul Road via helicopter and truck.
- MDMER chemistry and toxicity sampling not conducted during this inspection as all effluent discharges were stopped from all FDPs at the time of the inspection.
- No non-compliance determined from this inspection

MDMER:

The Project is subject to the MDMER. The purpose of the MDMER is to authorize a deposit of certain deleterious substance(s) into water frequented by fish while monitoring the environmental effects of those deposits to ensure that deleterious substances are not released in quantities or concentrations that could result in harmful effects on waters frequented by fish. To do this, certain effluent deposit conditions (concentrations, limits and parameters) apply so that regulatees are exempted and protected from the more stringent prohibition of subsection 36(3) under the *Fisheries Act*. Samples of the effluent by the Proponent must be taken and tested at the identified FDP to ensure the above conditions are met on a scheduled basis and reported. The four current FDPs are as follows:

1. FDP MS-06 Crusher Stockpile Pad Sedimentation Pond intermittently pumped during open water season via pipeline to Mary River.
2. FDP MS-08 Waste Rock Sedimentation Pond intermittently pumped during open water season to Water Treatment Plant then on tundra/land to flow naturally to Mary River Tributary then to Mary River.
3. FDP MS-07 KM106 Stockpile Surface Water Management Pond intermittently pumped during open water season on tundra/land to flow naturally 250m to Mary River.
4. FDP MS-11 KM105 Surface Water Management Pond intermittently pumped during open water season on tundra/land to flow naturally to Sheardown Lake Tributary one to West Basin of Sheardown Lake.

The MDMER requires reports to be submitted on ECCC's online database Mine Effluent Reporting System (MERS) which are reviewed by an assigned Enforcement Officer on a quarterly basis. The quarterly administrative regular report verifications are conducted to ensure that the sampling and testing has been conducted in accordance with the MDMER and to ensure the reports are submitted on time. Each Enforcement Activity includes an administrative report verification of each quarterly report which are due 45 days at the end of each quarter: 1st Quarter (due May 15), 2nd Quarter (due Aug 14), 3rd Quarter (due Nov 14) and 4th Quarter (due Feb 14), as well as an administrative report regular verification of the 2022 Annual Effluent Monitoring Summary Report (due March 31). Furthermore, an administrative report regular verification was completed on the Environmental Effects Monitoring (EEM) 2022 Annual Report (information related to effluent and water quality monitoring studies) and as part of this verification the officer submitted a copy of the report to the EEM Coordinator for review to also confirm compliance.

In 2022, BIMC submitted all required MDMER reports:

1. First Quarter:

- Report submitted on time.
- FDP MS-06: Administrative verification not conducted as no effluent was discharged through this FDP during Q1 therefore no compliance issues
- FDP-MS-08: Administrative verification not conducted as no effluent was discharged through this FDP during Q1 therefore no compliance issues
- FDP MS-07: Administrative verification not conducted as no effluent was discharged through this FDP during Q1 therefore no compliance issues
- FDP MS-11: Administrative verification not conducted as no effluent was discharged through this FDP during Q1 therefore no compliance issues
- No non-compliance was determined

2. Second Quarter:

- Report submitted on time.
- FDP MS-06: Effluent was discharged in Q2.
- The following non-compliance was determined:

- i. 4(1) MDMER - Deposit of a deleterious substance (Suspended Solids) concentration (59.8mg/l) exceeding the maximum authorized concentration (30.0mg/l) – MDMER – Warning Letter Issued.
- ii. 4(1)(a) – Suspended Solids monthly (June 2022) mean concentration (22.58mg/l) exceedance in excess of the maximum authorized monthly mean concentration (15.0mg/L) in a grab sample. Also reported as Spill Report 2022-233 – Warning Letter Issued.
- FDP MS-08: Effluent was discharged in Q2 no non-compliance was determined.
- FDP-MS-7: Administrative verification not conducted as no effluent was discharged through this FDP during Q2 therefore no compliance issues.
- FDP-MS-11: Effluent was discharged in Q2.
- The following non-compliance was determined:
 - i. 4(1) MDMER - Deposit of a deleterious substance (Suspended Solids) concentration (45.7mg/l) exceeding the maximum authorized concentration (30.0mg/l) – MDMER– Warning Letter Issued.
 - ii. 4(1) MDMER - Deposit of a deleterious substance (Suspended Solids) concentration (39.0mg/l) exceeding the maximum authorized concentration (30.0mg/l) – MDMER– Warning Letter Issued.
 - iii. 4(1)(a) – Suspended Solids monthly (June 2022) mean concentration (24.82mg/l) exceedance in excess of the maximum authorized monthly mean concentration (15.0mg/L) in a grab sample. Also reported as Spill Report 2022-279 – Warning Letter Issued.

3. Third Quarter:

- Report submitted on time.
- FDP MS-06: Effluent was discharged in Q3 no non-compliance was determined.
- FDP-MS-08: Effluent was discharged in Q3 no non-compliance was determined.
- FDP MS-07: Effluent was discharged in Q3 no non-compliance was determined.
- FDP MS-11: Effluent was discharged in Q3.
- The following non-compliance was determined:
 - i. 14(2)(c) - 2022 3rd Quarter FDP MS-11 Acute Lethality Sample collected not less than 15 days apart - No Enforcement Action Taken.

4. Fourth Quarter:

- Report submitted on time.
- FDP MS-06: Administrative verification not conducted as no effluent was discharged through this FDP during Q4 therefore no compliance issues.
- FDP-MS-08: Administrative verification not conducted as no effluent was discharged through this FDP during Q4 therefore no compliance issues.
- FDP MS-07: Administrative verification not conducted as no effluent was discharged through this FDP during Q4 therefore no compliance issues.
- FDP MS-11: Administrative verification not conducted as no effluent was discharged through this FDP during Q4 therefore no compliance issues.

- No non-compliance was determined.
5. 2022 Annual Effluent Monitoring Report:
- Report was submitted on time and no compliance issues noted.
6. 2022 Annual EEM Report:
- Report was submitted on time and no compliance issues noted.

SIDFR:

The following non-compliance was determined:

- 5(4) – Every person who intends to produce or import diesel fuel shall submit to the Minister a report that contains the information set out in Schedule 2 no later than five days before the day on which the person produces or imports diesel fuel for the first time – the Proponent submitted the schedule 2 report 143 days after the first import of diesel contrary to paragraph 5(4) of the *Sulfur in Diesel Fuel Regulations*. This report was to be submitted no later than five days before the day on which the person produces or imports diesel fuel the first time. – File Closed - Warning Letter Issued under SIDFR.
- 5(2)(a) - For the purposes of the report referred to in subsection (1), the concentration of sulphur in diesel fuel shall be calculated using (a) the method referred to in section 4 – the Proponent did not submit the required notice at least 60 days before using the method contrary to paragraph 5(2)(a) of the *Sulfur in Diesel Fuel Regulations*– File Closed - Warning Letter Issued under SIDFR.

ECCC Files Regarding Reported 2022 Spills:

- 2022-198 – Lead agency Crown-Indigenous and Northern Affairs Canada (CIRNAC) – Freshet Sediment Release to Sheardown Lake Tributary - File closed – No Enforcement Action Taken under *Fisheries Act* 36(3)
- 2022-205 – Lead Agency CIRNAC – Freshet Sediment Release to Camp Lake Tributary - File closed – No Enforcement Action Taken under *Fisheries Act* 36(3)
- 2022-229 – Lead Agency CIRNAC – Freshet Sediment Release to KM 63 waterbody that flows to Phillips Creek - File closed – No Enforcement Action Taken under *Fisheries Act* 36(3)
- 2022-237 – Lead Agency CIRNAC – Freshet Sediment Release to Camp Lake - File closed – No Enforcement Action Taken under *Fisheries Act* 36(3)
- 2022-340 – Lead Agency CIRNAC – Freshet Sediment Release to water crossings CV-154-A, CV-112, CV-106, CV-093, CV-060, CV-223, and CV-001 - File closed – No Enforcement Action Taken under *Fisheries Act* 36(3)
- 2022-361 – Lead Agency CIRNAC – Freshet Sediment Release to Phillips Creek - File closed – No Enforcement Action Taken under *Fisheries Act* 36(3)

- 2022-233 – Lead Agency CIRNAC – Suspended Solids Exceedance – File Closed - Warning Letter Issued under MDMER
- 2022-279 – Lead Agency CIRNAC – Suspended Solids Exceedance – File Closed - Warning Letter Issued under MDMER
- 2022-283 – Lead Agency CIRNAC – Erosion of Roadway and Embankment on Camp Lake Shoreline - File closed – No Enforcement Action Taken under *Fisheries Act* 36(3)
- 2022-364 – Lead Agency CIRNAC – Suspended Solids Dam Seepage From KM 105 Surface Water Pond – File Closed – Warning Letter Issued under *Fisheries Act* 36(3)
- 2022-450 – Lead Agency CIRNAC – Hydraulic Oil Release to KM 32 Lake – File Closed – No Enforcement Action Taken under *Fisheries Act* 36(3)
- 2022-588 – Lead Agency CIRNAC – Sewage Discharge to Mary River – File Closed - No Enforcement Action Taken under *Fisheries Act* 36(3)

ECCC Recommendation(s)

N/A – for information only.

2. Unit inconsistencies for NO₂ concentrations

Reference(s)

- Mary River Project, 2022 NIRB Annual Report, Appendix G.2.1 2022 Air Quality, Dustfall, and Meteorology Report (Nunami Stantec Limited; April 21, 2023)

Comment

Table 1.1, Standards and Objectives for Ambient Air Quality correctly indicates the NO₂ 1-hour 2020 Canadian Ambient Air Quality Standards (CAAQS) of 113 µg/m³ as converted from 60 parts per billion (ppb). Table 2.2 and Figure 2.2 imply that the NO₂ 1-hour 2020 CAAQS is exceeded for seven of the months, and Table 2.4 and Figure 2.4 imply that the NO₂ 1-hour 2020 CAAQS is exceeded for six of the months. However, the text in sections 2.2.1.2 and 2.2.2.2 indicate that this CAAQS is exceeded for only two and three occurrences respectively, with the highest values of 122.0 and 131.4 ppb. It appears that this text, the tables, and the vertical axes of the figures should be labelled in µg/m³ rather than ppb.

ECCC Recommendation(s)

ECCC recommends that the text in sections 2.2.1.2 and 2.2.2.2, Tables 2.2 and 2.4, and Figures 2.2 and 2.4 be checked to ensure that the NO₂ concentrations are indicated in the correct units.

3. Error in Figure 2.4

Reference(s)

- Mary River Project, 2022 NIRB Annual Report, Appendix G.2.1 2022 Air Quality, Dustfall, and Meteorology Report (Nunami Stantec Limited; April 21, 2023)

Comment

Table 2.4 'Hourly Summary of NO₂ Concentrations for PSC Ambient Air Quality Monitoring Station (ppb)' have monthly maximum values of NO₂ which are consistent with the annual average. However, Figure 2.4 has a value for November that is inconsistent with Table 2.4.

ECCC Recommendation(s)

ECCC recommends that Figure 2.4 be corrected to remove the November spike in maximum values.

4. Migration of contaminants in groundwater next to landfill

Reference(s)

- Mary River Project, 2022 NIRB Annual Report, Appendix G.3.1 (NWB Appendix E.12.1) 2022 Groundwater Monitoring Program Report (Knight Piésold Consulting; March 27, 2023)
- Mary River Project, 2022 NIRB Annual Report, Appendix G.3.3 (NWB Appendix E.12.3) Groundwater Conceptual Level Contaminant Model (Knight Piésold Consulting; March 28, 2023)
- Mary River Project, 2022 NIRB Annual Report, Appendix G.4.1 (NWB Appendix E.9.1) 2022 Core Receiving Environment Monitoring Program Report (Minnow Environmental Inc.; March 2023)

Comment

The 2022 Groundwater Monitoring Program involved soil sampling, leachate collection from test pits in the landfill, installation of eight monitoring standpipes, hydraulic tests, water level measurements and groundwater sampling.

Section 5.1 of the report states that leachate within the landfill facility had elevated dissolved parameter concentrations "relative to upgradient water quality results and when compared to guidelines" for chloride, fluoride, sulphate, boron, iron, manganese and zinc. Downgradient standpipes also had elevated dissolved parameter concentrations for chloride, sulphate, boron, cadmium, copper, manganese, nickel, uranium and zinc at MS-LF-GW1 and sulphate and boron at MS-LF-GW3". Additionally, "dissolved sulphate concentration at MS-LF-GW1 is exhibiting a continuous increasing trend since 2017."

The migration of contaminants in landfill leachate is evoked in Section 4.2.1 of the Core Receiving Environment Monitoring Program Report: "Increasing trends in concentrations of sulphate (2018 to 2022) and dissolved uranium (2018 to 2021) were recently shown for groundwater adjacent to Sheardown Lake, suggesting that a nearby landfill was a possible

source of these parameters to Sheardown Lake NW via shallow groundwater flow pathways. Concentrations of chloride, sulphate, and dissolved uranium have also increased in surface water at Sheardown Lake NW over the mine operational period from 2015 to 2022.”

Development of a conceptual contaminant transport model is outlined in a memorandum which concludes there is currently insufficient data to populate the model and “additional data can be collected during the 2023 summer season, and a completed contaminant transport model can be provided at the end of 2023.” Understanding potential migration of landfill leachate to Sheardown Lake will be critical to understanding any impacts and assessing effective measures to mitigate those impacts.

ECCC Recommendation(s)

ECCC recommends the Proponent:

- confirm they intend to collect sufficient additional groundwater data in 2023 to complete the contaminant transport model, and
- discuss potential mitigation measures should the model find landfill leachate is impacting Sheardown Lake.

5. Groundwater flow direction at Hazardous Waste Berm

Reference(s)

- Mary River Project, 2022 NIRB Annual Report, Appendix G.3.1 (NWB Appendix E.12.1) 2022 Groundwater Monitoring Program Report (Knight Piésold Consulting; March 27, 2023)
- Mary River Project, 2022 NIRB Annual Report, Appendix G.2.4.1 (NWB Appendix C.2.1) 1st 2022 Geotechnical Inspection Report (Wood; August 21, 2022)

Comment

Groundwater flow direction at the Hazardous Waste Berm (HWB) Facility is described in Section 3.1.2 of the Report as “in the north to northeast direction with a shallow horizontal hydraulic gradient of 0.002 m/m.” Groundwater elevations for the area are presented and contoured in Figure 3.2.

In Figure 3.2, the contours do not always match the data, specifically MS-HWB-GW8 has a groundwater elevation of 172.97 metres above sea level (masl) and is right next to the 173.3 masl contour, over 75 meters from a 173.0 masl contour (not drawn on the map). As well, it is unclear why the contours curl to the southeast to create a trough in the groundwater table between MS-HWB-GW-REF2 and MS-HWB-GW9.

It is difficult to determine groundwater flow direction at the HWB facility given the shallow gradients. However, this information is critical when trying to position standpipes and sample groundwater downgradient of potential sources of contamination.

Section 6.2 of the report recommends “two additional groundwater monitoring locations ... in the area of MS-HWB-GW7 to investigate if another source other than the HWB Facility is

affecting the groundwater quality” and MS-HWB-GW7 is defined as downgradient. It is not clear which HWB is being considered as the potential source because in Figure 3.2, MS-HWB-GW7 is located cross-gradient from HWB1, which is identified as having potential liner damage in Section 2.2a) of the Geotechnical Inspection Report.

ECCC Recommendation(s)

ECCC recommends the Proponent measure groundwater depths and re-evaluate groundwater flow directions at the HWB Facility before siting additional groundwater monitoring locations. ECCC recommends the Proponent specify which of the six berms at the HWB Facility they are considering as potential sources.

6. Groundwater monitoring program assessment

Reference(s)

- Mary River Project, 2022 NIRB Annual Report, Appendix G.3.2 (NWB Appendix E.12.2) Groundwater Monitoring Program Assessment (Knight Piésold Consulting; March 28, 2023)

Comment

The Assessment provided “a comprehensive review of its mine site groundwater monitoring program at the Mary River Project.” Areas evaluated in Table 3.1 included facilities found only on the mine site, however several similar facilities exist at the Milne Port site as well, such as tank farm, landfarm, snow stockpile, HWB and polishing waste stabilization pond, but these were not evaluated. It is not clear why the facilities at the Milne Port site were not considered.

ECCC Recommendation(s)

ECCC recommends the Proponent clarify why groundwater monitoring is not warranted at any Milne Port facility locations.

7. Managing total suspended sediment in runoff and effluent

Reference(s)

- Mary River Project, 2022 NIRB Annual Report, Main Body Section 4.6.5 (2022 QIA and NWB Annual Report for Operations, Sections 6.1, 7.3.4, 7.3.5, 7.3.6)

Comment

Controlling erosion and sedimentation on site during freshet continues to be challenging. In 2022, ten of the reported spills were sediment releases, with three of these resulting from unauthorized releases at two facilities. Water management pond capacity appears to be an issue, since releases at the Mine Site Crusher Facility and KM105 Surface Water Management Pond were initiated “due to the timing of pond melt, recent heavy snow accumulation and limited remaining capacity in the pond”.

Corrective actions are outlined for the Crusher Facility, “Baffinland plans to construct a new surface water management pond downstream of the Crusher Facility to collect runoff from a large portion of the mine infrastructure area including the existing Crusher Facility.” It is not clear what actions will be taken for the KM105 Pond.

Elevated concentrations of suspended sediment degrade water quality and controlling releases are particularly important around the mine site as sediment will likely have high metal concentrations.

ECCC Recommendation(s)

ECCC encourages the Proponent to continue implementing its Long Term Water Management Plan around the mine site and recommends the Proponent clarify how capacity will be managed at the KM105 surface water management pond to avoid release of water that does not meet effluent quality criteria.

8. Reporting Requirements

Reference(s)

- Mary River Project, 2022 NIRB Annual Report, Terrestrial Environment Mitigation and Monitoring Plan

Comment

As per section 3.2.2 Migratory Bird Mortality Reporting Procedure, the Proponent is to provide notice of “mortality of migratory bird (or birds)” to ECCC once the incident has been investigated.

ECCC appreciates the Proponent’s reporting of avian incidents to our Wildlife Enforcement in a timely manner. As a reminder, ECCC notes that all incidences involving migratory birds and avian species at risk should be reported directly to ECCC’s Canadian Wildlife Service and not Wildlife Enforcement.

ECCC Recommendation(s)

ECCC requests that the Proponent report all avian mortalities to ECCC, via cwsnorth-scfjord@ec.gc.ca, as indicated in the mitigation and monitoring plan and in a detailed and timely manner. The Proponent should ensure that this contact information is updated and all relevant monitors are notified to ensure reports are submitted to the correct groups.

9. Inconsistent Bird Breeding Windows

Reference(s)

- Mary River Project, 2022 NIRB Annual Report, Terrestrial Environment Mitigation and Monitoring Plan
- Mary River Project, 2022 NIRB Annual Report, Main Body Section 4.6.9

Comment

In section 3.2.2.3 Nest Management of the Terrestrial Environment Mitigation and Monitoring Plan, the Proponent indicates that the nesting season is from May 26 to August 18.

In section 4.6.9 Birds (PC Terms and Conditions 65 through 75) of the 2022 Annual Report Main Body, the Proponent indicates that the nesting season is between mid-May and late August.

The bird nesting season is inconsistent between the two documents.

The Project is located within nesting zone N10 which has a nesting window from late May to mid-August.

ECCC Recommendation(s)

ECCC recommends the Proponent utilize the nesting window from late May to mid-August when applying mitigations. The Proponent should ensure future documents are updated to reflect these mitigations and ensure consistency in the breeding windows.

If you need more information, please contact Melissa Pinto at (867) 445-5384 or Melissa.Pinto@ec.gc.ca.

Sincerely,

[original signed by]

Melissa Pinto
Senior Environmental Assessment Officer

cc: Eva Walker, Acting Head, Environmental Assessment North (NT and NU)
Richard Dwyer, Manager of Licensing, Nunavut Water Board