Environment and Climate Change Canada
Environnement et Changement climatique Canada

Environmental Protection Operations
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EC file: 6100 000 011 /035
NWB File: 2AM-MRY1325

Sean Joseph
Technical Advisor
Nunavut Water Board

Via email: licensing@nunavutwaterboard.org

RE: 2AM-MRY1323 Aquatic Effects Monitoring Plan, BAF-PH1-830-P16-0039, rev 2.

Attention: Mr. Joseph,

Environment and Climate Change Canada (ECCC) has reviewed the above-mentioned Aquatic Effects Monitoring Plan, comments can be found in the attached table. ECCC's specialist advice is provided based on our mandate in context of the *Canadian Environmental Protection Act* and the pollution prevention provisions of the *Fisheries Act*. The Proponent must ensure that they remain in compliance with legislation during all phases and in all undertakings related to the project.

Should you require further information, please do not hesitate to contact Mark Dahl at (204) 983-4815 or via email at mark.dahl@canada.ca.

Sincerely,

Margaret Fairbairn,
Manager, Environmental Assessment and Marine Programs
Prairie and Northern Region

cc: Georgina Williston, Head, Environmental Assessment North (NT and NU).
Mark Dahl, Environmental Assessment Coordinator, PNR.
ECCC Review Team

Attachments: 2AM-MRY1323 - Environment Canada Technical Review Comments Regarding Baffinland Iron Mines Corporation Mary River Project, Aquatic Effects Monitoring, Plan, BAF-PH1-830-P16-0039, rev 2.

ECCC comments regarding Baffinland Iron Mines Corporation Mary River Project, Aquatic Effects Monitoring Plan, BAF-PH1-830-P16-0039, rev 2.			
Comment Number	**Topic / Reference**	**Comment**	**Recommendation**
1	Figures (throughout document)	The low resolution of some of the figures provided in the document makes it difficult to read text and discern map details.	The quality of the figures and maps in the Plan should be enhanced to make the details clear to the reader.
2	Final Discharge points (Section 4.1.2)	The document indicates that mine effluent will be discharged into the Mary River at three locations: east pond discharge, run-of-mine and crusher stockpile discharge, and the main ore stockpile discharge. However, the discharge locations are not well described nor are they shown on a map so it is difficult to determine if the locations of the discharge points into the Mary River were considered when selecting sampling locations.	ECCC recommends that sampling locations in the Mary River be clearly identified and located such that impacts resulting from each individual discharge point can be identified and assessed.
3	Reference Areas	The Plan indicates that a number of reference areas including lakes, tributaries, and upstream locations have been identified. However, the proponent does not indicate which reference areas will be used for which receiving environments.	Please provide a table that specifies what type of sampling will be done at each sampling location and the corresponding reference location. The study design should identify how reference area data will be used in comparisons to exposure site data.
4	Water Quality Monitoring (Section 4.2.2)	Minnow Consulting has recommended that the AEMP should reduce the number of water quality monitoring stations to three in each of Camp, Sheardown NW, and Sheardown SE Lakes, and to four in Mary Lake. This reduction is recommended by Minnow based in their assessment of the baseline data that which suggests that the lakes are well mixed making additional sampling stations redundant. ECCC notes that many of these sampling locations were added to the program based on a power analysis completed in 2014 by Knight Piesold Consulting.	ECCC requests additional rationale for the removal of sampling stations given that the power analysis completed in 2014 identified the need for additional sampling stations in Mary Lake and Sheardown Lake. ECCC recommends that the number of sampling locations be maintained until sufficient data is collected to ensure that these water bodies are well mixed and are not being impacted by the project.
5	Water Quality Monitoring (Section 4.2.2)	Minnow Consulting has recommended that the AEMP discontinue water quality monitoring at stations L1-09 (Camp Lake Tributary), D1-05 (Sheardown Lake Tributary 1) and G0-09A, G0-09B, and C0-01 on the Mary River. The reason for discontinuation of sampling at these locations is redundancy (L1-09 and C0-01), with the rationale that a single reference sampling location in the Mary River is adequate (G0-09A and G0-09B), and that an upstream sampling location is not necessary (D1-05). ECCC notes that many of these sampling locations were added to the program based on a power analysis completed in 2014 by Knight Piesold Consulting.	ECCC requests additional rationale for the removal of sampling stations given that the power analysis completed in 2014 identified the need for additional sampling stations in these areas. ECCC recommends that stream water quality sampling locations be maintained until sufficient data is acquired to determine if there are any potential impacts to these water bodies. In addition, the removal of the upstream reference sampling locations may be inappropriate as an accurate understanding of the reference (upstream) conditions is essential to determine if impacts are occurring in the receiving environment.

6	Sediment Quality Study Design (Section 4.2.3)	Based on recommendations from Minnow Consulting, all sediment quality monitoring in streams and lakes has been removed from the sediment monitoring program. According to the rationale provided this is due to the limited depositional habitat and minimal accumulation of fine sediments.	ECCC recommends maintaining periodic sediment quality monitoring in rivers and streams that are directly receiving discharge. At a minimum this should tie in with the frequency required under the MMER EEM (every 3 years).
7	Fish (Section 4.2.5)	Minnow Consulting has recommended that the fish sampling program be modified to reduce the non-lethal adult Arctic Char sample size to 50 per study lake instead of 100.	A sample size of 100 fish is required under the Environmental Effects Monitoring of the Metal Mining Effluent Regulations. Fish sampling for the EEM and AEMP programs should be harmonized to reduce any duplication of effort without reducing the sample size.
8	Sediment Benchmarks - Sheardown Lake NW (Table 5.3)	The table presents a number of interim AEMP benchmarks for Sheardown Lake SE, which are based on either the sediment quality guideline, 97.5% of the baseline data or 3x the MDL. However, there are some suggested benchmarks that need further clarification.	Please provide further rationale for the following suggested benchmarks: Cadmium 97.5% measured baseline = <0.5 mg/kg, CCME guideline is 0.6 mg/kg. Suggested benchmark = 1.5 mg/kg Arsenic, Chromium, Copper, Iron, Manganese, Nickel, Phosphorus – the Plan states that the benchmarks for these metals are based on 97.5% of the baseline but the numbers do not correspond to numbers listed in table for Sheardown Lake NW 97.5% baseline.
9	Benthic Macroinvertebrate Indicators (Section 5.3.5)	A number of BMI metrics are listed for inclusion in the CREMP, including: abundance, composition, Shannon's Evenness, Simpson's Diversity Index and Richness. Environment Canada had previously commented that that the Bray Curtis Index be added as an indicator to which the proponent had agreed to, however it is not included on the list.	ECCC recommends that the Bray Curtis Index be added as an indicator for benthic macroinvertebrates.