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July 04, 2024

Cory Barker
Manager, Project Monitoring
Nunavut Impact Review Board
P.O. Box 1360
Cambridge Bay, NU
X0B 0C0

Sent by email to: info@nirb.ca

Subject: Health Canada's response to the Comment Request for Baffinland Iron Mines Corporation's Mary River Project 2023 Annual Report

Dear Cory Barker:

Thank you for your letter dated May 09, 2024, requesting comments on the Mary River 2023 Annual Monitoring Report provided by Baffinland Iron Mines Corporation.

Health Canada (HC) participates in environmental assessments as a federal authority under the *Nunavut Planning and Project Assessment Act*, S.C. 2013, c. 14 (*NuPPAA*). HC makes available specialist or expert information or knowledge in its possession to review panels and responsible authorities, among others.

The objective and scope of HC's review is to verify that the potential health impacts of the project are properly identified and to support Responsible Authorities to prevent, reduce, and mitigate the potential health impacts of project activities.

HC has reviewed the 2023 Annual Monitoring Report and has provided its comments in the attachment. These pertain to results from the Proponent's Air Quality Monitoring and Fish Health Programs.

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Should you have any questions concerning HC's response, please contact Paul Partridge at paul.partridge@hc-sc.gc.ca.

Sincerely,

David Kitchen
Regional Manager, MB/SK/NU Region
Environmental Health Programs
Regulatory Operations & Enforcement Branch
Health Canada

cc: Heather Jones-Otazo, A/Manager, Environmental Assessment and Contaminated Sites (EACS) Division, Healthy Environments and Consumer Safety Branch (HECSB), Health Canada
Paul Partridge, Impact Assessment Specialist, EHP, ROEB, Health Canada
Wendy Wilson, Senior Environmental Health Specialist, EACS, HECBS, Health Canada
Julie Anderson, A/Environmental Assessment Coordinator, EACS, HECSB, Health Canada

Mary River Project 2023 Annual Monitoring Report

Health Canada Comments

Comment Number:	HC-01
Subject/Topic:	Use of the Canadian Ambient Air Quality Standards (CAAQS)
References:	<p>Appendix G.2.1: 2023 <i>Air Quality, Dustfall, and Meteorology Report</i> (AQDMR)</p> <ul style="list-style-type: none"> Sections 2.2.1.1 and 2.2.2.1: Sulphur Dioxide (SO₂) (PDF pg., 36, 40) Sections 2.2.1.2 and 2.2.2.2: Nitrogen Dioxide (NO₂) (PDF pg., 38, 42) Tables 2.2, 2.4 (PDF pg., 39, 43) Figures 2.2, 2.4, 2.9, 2.11 (PDF pg., 40, 44, 49, 50) <p>Health Canada (2023). HC's response to the Comment Request for Baffinland Iron Mines' <i>Mary River Project 2022 Annual Monitoring Report</i> (NIRB Registry ID No. 346056)</p> <p>Health Canada. (2023). <i>Guidance for Evaluating Human Health Effects in Impact Assessment: Air Quality</i>. Appendix B: Canadian Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Objectives (NAAQOs). (PDF pg., 38-42)</p>
Comment:	<p>Ensure monitoring results are compared against current published CAAQS values to reduce potential health risks from exposure to project related emissions (e.g. SO₂ and NO₂).</p> <p>The 2023 monitoring results for sulfur dioxide (SO₂) and nitrogen dioxide (NO₂) were reportedly compared against the CAAQS, as recommended in HC's comments on the 2022 Annual Monitoring Report (AMR)(NIRB Registry ID No. 346056). However, the cited NO₂ CAAQS values were not consistent with the 2020 or 2025 published values. Use of incorrect values could lead to the misinterpretation of monitoring results and underestimate potential health risks from project emissions.</p> <p>Sections 2.2.1.2 and 2.2.2.2 of the 2023 <i>Air Quality, Dustfall and Meteorology Report</i> incorrectly lists CAAQS values for 1-hour and annual NO₂ concentrations as 113 ppb and 32 ppb. The correct 2020 CAAQS values for 1-hour and annual NO₂ are 60 ppb and 17 ppb, respectively.</p> <p>The reported annual mean concentration for NO₂ was 15.4 ppb at the Mine Site Complex (MSC) and 13.5 ppb at the Port Site Complex (PSC). Both values are below the 2020 CAAQS value for average</p>

	<p>annual NO₂ concentration but exceed the 2025 CAAQS value of 12.0 ppb. While this does not affect the reported conclusions for the current year, it may prompt further consideration of future measures to reduce NO₂ emissions to improve air quality and “keep clean areas clean”.</p> <p>Results in Tables 2.2 and 2.4 indicate that the concentrations of NO₂ trend higher during the winter months and fall during the summer months. These results also indicate that the 1-hour 2020 CAAQS value for NO₂ (60 ppb) was exceeded in 8 months of the year at the MSC and 6 months of the year at the PSC, which is greater than the 6 exceedances reported at the MSC using the incorrect values. Figures 2.2, 2.4, 2.9, and 2.11 provide some insights into the distribution of monitoring results, but a lack of detail limit their ability to describe observed NO₂ emissions and their potential significance. Using the corrected CAAQS values for NO₂ to update the current analysis, including the 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations for the MSC and PSC, would provide a better representation of the project’s NO₂ emissions and potential associated human health risks.</p> <p>The AQDMR attributes the highest SO₂ and NO₂ results to emissions from diesel generators, heating systems and mine trucks, operating in and near the MSC and PSC ambient air quality monitoring station. The report also notes that signs are posted near the monitoring station to request that operators refrain from idling their diesel trucks, but it is unclear if these efforts to reduce idling are applied more broadly to the project sites. Also, there is no mention of other management or mitigation measures being employed to reduce SO₂ and NO₂ emissions (e.g., use of Tier 3 or 4 engines, regular engine maintenance and repair, etc.), to improve air quality and “keep clean areas clean”.</p> <p>Additional detail comparing the 2023 monitoring results to previous years would allow a review of the summarised trends and support the evaluation of current management and mitigation measures.</p>
Conclusion/Request:	<p>HC recommends:</p> <ol style="list-style-type: none"> 1. Comparing monitoring results against the most stringent federal, provincial, or territorial air quality standards applicable to the given area. In many cases the CAAQS will be the most stringent levels for key air pollutants, especially for longer-term projects with emissions after 2025. 2. Using the most recently published CAAQS values to update the current analysis to characterize the project’s monitored emissions and potential health risks. For NO₂, including the 3-year average

	<p>of the annual 98th percentile of the daily maximum 1-hour average concentrations for the MSC and PSC, or the 1-year average of the 98th percentile where 3 years of data are not available, to support a comparison with the CAAQS.</p> <p>3. Including additional information and details on efforts to reduce project related emissions when elevated concentrations of NO₂ are observed during monitoring. This could include details on anticipated changes or modifications to manage project related emissions and improve air quality.</p> <p>4. Adding additional detail on the comparison of monitoring results to those from previous years to future monitoring reports would further describe potential trends and help inform decisions related to management and mitigation measures.</p>
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Comment Number:	HC-02
Subject/Topic:	Reporting on non-threshold air contaminants
References:	<p>2023 Annual Monitoring Report (AMR)</p> <ul style="list-style-type: none"> • Section 4.2.6: Air Quality (PDF pg. 92) • Table 4.6: Air Quality Impact Evaluation (PDF pg., 93) <p>Appendix G.2.1: 2023 Air Quality, Dustfall, and Meteorology Report (AQDMR)</p> <ul style="list-style-type: none"> • Section 2.1.2: Continuous Monitoring for Particulate Matter at Mary River and Milne Port (PDF pg. 34-36) • Sections 2.3.3: Respirable Particulates 2.5µm in Diameter and less (PM_{2.5}) (PDF pg., 59-64) • Tables 2.9, 2.10 (PDF pg., 60, 63) • Figures 2.17, 2.19 (PDF pg., 61, 64) <p>Health Canada. (2023). <i>Guidance for Evaluating Human Health Effects in Impact Assessment: Air Quality</i>. Appendix B: Canadian Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Objectives (NAAQOs). (PDF pg., 38-42)</p>
Comment:	<p>Use of CAAQS for particulate matter (PM_{2.5}) and ongoing efforts to limit emissions of non-threshold air quality contaminants to the extent possible is recommended.</p> <p>NO₂ and PM_{2.5} (particulate matter <2.5 µm in diameter) are non-threshold air contaminants, meaning that associations with different health outcomes have been demonstrated throughout the range of concentrations. Therefore, any increase in exposure will result in an increased health risk. Using the most stringent federal, provincial, or</p>

	<p>territorial air quality standards applicable to the given area is recommended, but they should not be considered as “pollute up-to” levels and the Proponent is encouraged to strive for continuous improvement.</p> <p>Section 2.1.2 of the 2023 <i>Air Quality, Dustfall, and Meteorology Report</i> indicates that concentration data for PM_{2.5} is collected and compared to the CAAQS, but that information was not included in the report. Reported results are only compared against project standards for 24-hour (30 µg/m³) and annual average (10 µg/m³) concentrations, both of which are less stringent than the 2020 CAAQS for 24-hour (27 µg/m³) and annual average (8.8 µg/m³) concentrations of PM_{2.5}. Additionally, the report doesn’t present the annual 98th percentile of daily 24-hour average concentrations for comparison to the CAAQS.</p>
Conclusion/Request:	<ol style="list-style-type: none"> 1. HC recommends including the comparisons of PM_{2.5} measurement data to the CAAQS (referred to in the Report), along with the annual 98th percentile of the daily 24-hour average concentrations for the MSC and PSC, in the 2023 Annual Monitoring Report. 2. HC supports implementing all economically and technologically feasible mitigation measures to limit emissions of non-threshold air contaminants to the extent possible.

Comment Number:	HC-03
Subject/Topic:	Inappropriate guideline used to assess mercury levels in fish tissues
References:	<p>2023 Annual Monitoring Report (AMR)</p> <ul style="list-style-type: none"> • Section 4.6.10: Marine Environment (PDF pg. 288-347) <ul style="list-style-type: none"> ○ Table 4.22 Marine Environment Impact Evaluation (PDF pg. 292) ○ PC T&C No.76 (PDF pg., 295-298) ○ PC T&C No. 83(a) (PDF pg., 314-319) • Section 4.6.11: Marine Wildlife (PDF pg., 349-442) <ul style="list-style-type: none"> ○ PC T&C No. 113 (PDF pg., 407-412) ○ PC T&C No. 114 (PDF pg., 413) <p>Appendix G.6.8: 2023 <i>Marine Environmental Effects Monitoring Report</i> (MEEMP), Chapter 7.0: Fish Health and Tissue Chemistry</p> <ul style="list-style-type: none"> • Section 7.3.4: Guideline Comparison (PDF pg., 22) <p>Health Canada (2023). HC’s response to the Comment Request for Baffinland Iron Mines’ Mary River Project 2022 Annual Monitoring Report (NIRB Registry ID No. 346056)</p>

<p>Comment:</p>	<p>Use of the provisional tolerable daily index (pTDI) values and consumption patterns consistent with subsistence harvesting by local Inuit communities to assess mercury in country foods, and specifically fish tissues.</p> <p>HC's comments on the 2022 AMR noted elevated concentrations of methylmercury (MeHg) and inorganic mercury were present under baseline conditions for some country foods described in the Phase 2 Development Proposal. Given the elevated baseline, assessing mercury monitoring data should be done using an approach that is protective of human health.</p> <p>In Sections 4.6.10 and 4.6.11 and Appendix G.6.8 of the 2023 AMR, all fish tissues sampled for mercury concentrations were compared to a guideline of 0.5 mg/kg wet weight. <u>This guideline value is applicable to commercial foods only.</u> For species consumed by local communities, it is more appropriate to use the pTDI value of 0.47 µg of MeHg per kg body weight per day (kg-bw/day) for adults and 0.2 µg MeHg per kg-bw/day for women of childbearing age and young children up to 12 years of age (Health Canada, 2007) to assess potential risks to local consumers based on consumption patterns informed by community consultation.</p> <p>The exception may be monitoring related to the potential development of a commercial fishery in the Milne Inlet Eclipse Sound area, as required by Project Certificate Term and Condition 114; however, the 2023 AMR indicates that monitoring for this condition is not applicable, as no commercial fishery has been developed.</p> <p><u><i>Health Canada. 2007. Human Health Risk Assessment of Mercury in Fish and Health Benefits of Fish Consumption.</i></u></p>
<p>Conclusion/Request:</p>	<p>HC recommends:</p> <ol style="list-style-type: none"> 1. Using the pTDI values and local consumption patterns to assess potential human health risks from mercury in country foods, and specifically fish tissues, in future project reporting as an approach that is protective of human health. 2. Describing the limitations and risks of comparing monitoring results to HC's guideline value for commercial foods (i.e., 0.5 mg/kg wet weight) in the MEEMP's guideline comparison (Chapter 7, Section 7.3.4).