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December 23, 2016

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Your file - Votre référence
2AM-MRY1325

Our file - Notre référence
CIDM#1121024

**Re: 2AM-MRY1325, 2BE-MRY1421, 8BC-MRY1416 – Mary River Project –
Baffinland Iron Mines Corporation – Review of updated plans submitted with
the 2015 Annual Report**

Dear Ms. Kogvek,

On November 8, 2016, you sent out the 2015 Annual Report Review for the above referenced licences, which indicated that intervenor comments would be considered by the Nunavut Water Board regarding the necessity re-approving several management plans.

Indigenous and Northern Affairs Canada (INAC) has conducted a technical review of the nine management plans discussed in the Annual Report Review and the results of our review are presented in the attached memorandum for the Nunavut Water Board's consideration.

Comments have been provided pursuant to INAC's mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Indian Affairs and Northern Development Act*.

INAC appreciates the opportunity to participate in this review. If there are any questions or concerns, please contact me at (867) 975-3876 or by e-mail at sarah.forte@aandc-aadnc.gc.ca.

Sincerely,

Sarah Forté
Water Management Coordinator

Technical Review Memorandum

To: Valerie Kogvek, Licensing Administrator Assistant, Nunavut Water Board

CC: Jim Millard, Environmental Manager, Baffinland Iron Mines Corporation

From: Sarah Forté, Water Management Coordinator, Water Resources Division, INAC
Amjad Tariq, Regulatory and Science Advisor, Water Resources Division, INAC

Date: December 23, 2016

Re: Review of updated plans submitted with Baffinland Iron Mines Corporation's
2015 Annual Report for Type A Water Licence #2AM-MRY1325 and Type B
Water Licences #8BC-MRY1416 and #2BE-MRY1421

Applicant: Baffinland Iron Mines Corporation
Project: Mary River Project
Region: Qikiqtani

A. BACKGROUND

The Nunavut Water Board (NWB or Board) completed a review of Baffinland Iron Mines Corporation's (the licensee or Baffinland) 2015 Annual Report, dated March 2016. This was distributed on November 8, 2016 and entitled Mary River Project 2015 Annual Report Review.

The Mary River Project is an iron mine with activities covered under water licences 2AM-MRY1325 and 2BE-MRY1421. A construction licence for the same project, 8BC-MRY1416, was cancelled in Spring 2016. The annual report covers all three licences. One of the annual reporting requirements is to update any management plans that require modifications. A folder with 12 updated plans was provided by Baffinland with their 2015 Annual Report. The Report Review discussed nine of these plans:

1. Surface Water and Aquatic Ecosystem Management Plan;
2. Emergency Response Plan;
3. Spill Contingency Plan;
4. Fresh Water Supply, Sewage and Wastewater Management Plan;
5. Hazardous Materials and Hazardous Waste Management Plan;
6. Sampling Program – Quality Assurance and Quality Control Plan;
7. Waste Management Plan;
8. Interim Closure and Reclamation Plan; and
9. Aquatic Effects Monitoring Plan.

On November 10, 2016 we wrote back to the NWB informing them that Indigenous and Northern Affairs Canada (INAC or the Department) intended to review the plans listed above and would submit comments by December 23, 2016.

B. RESULTS OF REVIEW

INAC supports the recommendations made by the Board in their Report Review. We would like to underline that reporting on each water licence separately is necessary for the Water Resources Officers to follow compliance of the different licences and would be important for determining if a licence could be cancelled. The cancellation of licence 8BC-MRY1416 was an exception because all components were incorporated into an amended Type A licence, 2AM-MRY1325.

The following comments and recommendations on nine modified management plans are provided for the Board's consideration.

1. Surface Water and Aquatic Ecosystem Management Plan

The modifications of the Surface Water and Aquatic Systems Management Plan are principally updates necessary for the 2016 Work Plan. Our first two comments are regarding modifications, and the third is on something that hasn't changed since the last revision, but which would help to clarify the Plan.

1.1 Groundwater monitoring

Reference:

- Surface Water and Aquatic Ecosystem Management Plan (BAF-PH1-830-P16-0026 Rev 4), March 17, 2016
- Surface Water and Aquatic Ecosystem Management Plan (BAF-PH1-830-P16-0026 Rev 3), March 17, 2015

Comment:

Section 9.3.2 in both revisions of the Plan is entitled Groundwater Monitoring. The wording has changed significantly between the two revisions. Revision 3 states: *"Shallow groundwater monitoring stations shall be installed downstream of Project select infrastructure (i.e., landfill, landfarm, etc.) where environmental risks have been identified."* and *"The groundwater monitoring network will be established and monitors installed in late August of 2015."*

In Revision 4, the first of those two sentences has been changed to: *"Upon resource availability, and where conditions permit, shallow groundwater monitoring stations shall be installed downstream of Project select infrastructure (i.e., landfill, landfarm, etc.)"*

where environmental risks have been identified.” No mention was made of the groundwater monitoring network to be established and monitors to be installed in 2015.

The modifications imply that groundwater monitoring will be conditional on availability of resources. This seems inappropriate given that groundwater monitoring is a Term and Condition in the Project Certificate. The Term and Condition is listed as No. 23 in Concordance Table A-3: The Proponent shall develop and implement a Groundwater Monitoring and Management Plan to monitor, prevent and mitigate the potential effects of the Project on groundwater within the Project area.

Recommendation:

INAC recommends that the licensee develop a groundwater monitoring plan as required by the Project Certificate and describe it in the appropriate section of their Surface Water and Aquatic Ecosystem Management Plan.

1.2 Fugitive dust from crushers

Reference:

- Surface Water and Aquatic Ecosystem Management Plan (BAF-PH1-830-P16-0026 Rev 4), March 17, 2016
- Surface Water and Aquatic Ecosystem Management Plan (BAF-PH1-830-P16-0026 Rev 3), March 17, 2015

Comment:

Section 7.3 of Revision 3 states that “*crushers are installed inside buildings*” and enclosures and dust collectors will be used to limit fugitive dust emissions from material handling equipment. References to measures taken to reduce dust emissions are removed from Section 7.3 of Revision 4. They seem to have been replaced with a discussion of measures to control elevated suspended solids in water, including silt fences and curtains, temporary sumps, and flocculation. No buildings around the crushers were seen on site.

The modifications are a weakening of proposed management measures because the control measures for suspended sediment in water address a problem which could have been prevented or diminished by controlling dust emissions before they reached water bodies.

Recommendation:

INAC recommends that the licensee keep measures for controlling dust emissions at the source in the Surface Water and Aquatic Ecosystems Management Plan to reduce the dust entering water bodies and the need for suspended sediment control measures.

1.3 Maps of catchment areas and monitoring stations

Reference:

- Surface Water and Aquatic Ecosystem Management Plan (BAF-PH1-830-P16-0026 Rev 4), March 17, 2016

Comment:

A map with the location of the hydrometric monitoring stations would help the reader understand the information discussed in Section 5.3, where data for specific stations is presented. When the catchments of different stations are discussed, the block flow diagrams in Appendix C are referenced, but it would help the reader if they were also located on a map. The maps in Appendix D show the location of water quality monitoring stations, but water quantity (hydrometric) stations are not shown.

On page 28, in Table 5.3, the Catchment Area row is missing data and Figure 5.6 referred to in Section 5.3.3 is missing.

2. Emergency Response Plan

The changes noted in Revision 1 of the Emergency Response Plan are principally the addition of tasks in the description of roles and responsibilities in Section 3. These improve the Plan. The Department has a single comment.

2.1 INAC contact information

Reference:

- Emergency Response Plan (BAF-PH1-830-P16-0002 Rev 1), February 9, 2016

Comment:

The Emergency Response Plan includes contact information for INAC in several sections. We would like to clarify which are the best numbers to reach the appropriate Departmental personnel.

- (p. 7) Table A includes two different boxes with contact information for INAC. In both, INAC is referred to as Indian and Northern Affairs Canada and the current Departmental name is Indigenous and Northern Canada. One box is for the Nunavut Regional Office, and would be better labelled Field Operations Division. The address is correct, the telephone number should be (867) 975-4295 (Field Operations Manager) and the fax number should be (867) 975-6445.
- (p. 36, Section 5.2) The number for the INAC (and no longer AANDC) Water Resources Officer is (867) 975-4517. The numbers for INAC (and no longer AANDC) Field Operations (Manager) are (867) 975-4295 for the landline and (867) 222-8458 for the mobile.

- (p. 41, Section 8.2) The number for the INAC (and no longer AANDC) Water Resources Officer is (867) 975-4517.

3. Spill Contingency Plan

Only minor changes to the text were noticed in Revision 2 of the Spill Contingency Plan. The Department has the following comments:

3.1 Spill kit inventories

Reference:

- Spill Contingency Plan (BAF-PH1-830-P16-0036 Rev 2), March 7, 2016
- Spill Contingency Plan (BAF-PH1-830-P16-0036 Rev 1), March 16, 2015

Comment:

Appendix B in both revisions of the Spill Contingency Plan is entitled “Emergency Spill Kit Supplies and Locations and Emergency Response Truck Inventory”. Revision 1 includes a list of supplies for the different spill kits as well as the 2015 spill response supplies of the Emergency Response Truck. Maps indicating spill kit locations as well as pictures of the Emergency Response Truck complete the appendix in Revision 1.

The maps in Revision 2 are higher quality and label the spill kits at different locations, and the pictures of the Emergency Response Truck are still included. However, the list of supplies for the spill kits and the Emergency Response Truck are no longer in the documents.

Recommendation:

INAC recommends that the licensee keep the list of supplies for spill kits and the Emergency Response Truck in the revised Spill Contingency Plan to facilitate verification of appropriate supplies.

3.2 Missing references

Reference:

- Spill Contingency Plan (BAF-PH1-830-P16-0036 Rev 2), March 7, 2016

Comment:

A few missing references were noticed.

- (p. 2) Item 5 of the Index of Major Changes/Modifications Table 5-1 for fuel inventories which is Table 6-1 in the text.
- (p. 22) There is a referencing error in the first paragraph of Section 6.1.
- (p. 28) There is a referencing error in the first paragraph of Section 6.2.

4. Fresh Water Supply, Sewage and Wastewater Management Plan

Changes made for Revision 4 of the Fresh Water Supply, Sewage and Wastewater Management Plan include references to the amended Type A licence and its discharge criteria, updates to descriptions of current site infrastructure and a rearrangement of discharge criteria table locations between sections. A newly developed Oily Water Separator Manual was added as Appendix G, MMER sampling and reporting requirements memo was added as Appendix H, and Oily water treatment plant O & M manuals were added as Appendix I. Maps with locations of the monitoring stations were added to Appendix B and they are helpful. The Department finds the most recent version an improvement and has the following comments.

4.1 Determination of low flow years

Reference:

- Fresh Water Supply, Sewage and Wastewater Management Plan (BAF-PH1-830-P16-0010 Rev 4), March 29, 2016

Comment:

Table 4-2 on page 17 lists the maximum daily water use volumes authorized for dust suppression for 15 different sources along the Tote Road. The use of six of these sources is restricted to June and July during low flow years. The management plan does not describe how and by whom determination of low flow years will be made, and how this information will be shared.

The data presented in the Surface Water and Aquatic Ecosystems Management Plan suggests that 2015 may have been a low flow year, but it is not clear if a call was made and if it was considered when sourcing water from locations with restricted authorizations along the Tote Road.

Recommendation:

INAC recommends that the licensee include in the Fresh Water Supply, Sewage and Wastewater Management Plan a description of whom will make the determination of low flow years, when they will take the decision and how they will transmit this information to those sourcing water along the Tote Road.

4.2 Ammonia criteria for wastewater treatment plant

Reference:

- Fresh Water Supply, Sewage and Wastewater Management Plan (BAF-PH1-830-P16-0010 Rev 4), March 29, 2016

Comment:

The Polishing Waste Stabilization Ponds (PWSP) Effluent Discharge Plan is included as Appendix F. It is a Technical Memorandum written by AMEC dated March 27, 2012. In it, discharge criteria of PWSP effluent are listed in Table 1 for both the Mary River and Milne Inlet sites. Though the initial licence 2AM-MRY1325 did not have criteria for ammonia for sewage treatment facilities discharging to the freshwater receiving environment (Mary River site), the amended licence now does. The maximum concentration of any grab sample is 4.0 mg/L NH₃-N.

Given the change in design criteria, the memo no longer indicates if the proposed polishing treatment system can meet the criteria.

Recommendation:

INAC recommends that the licensee update the PWSP Effluent Discharge Plan to confirm that the methodology proposed will allow them to meet design criteria in line with water licence 2AM-MRY1325 amendment #1.

4.3 Missing references

Reference:

- Fresh Water Supply, Sewage and Wastewater Management Plan (BAF-PH1-830-P16-0010 Rev 4), March 29, 2016

Comment:

A few missing references and scrambled characters were noticed.

- (p. 44) Missing reference above Table 12-2.
- (p. 180, or 8 of the OWS Manual) Missing reference in third paragraph of Section 5.1.
- (p. 375) Many of the characters in Table 2 appear as boxes, making it hard to understand.

5. Hazardous Materials and Hazardous Waste Management Plan

Changes made for Revision 4 of the Hazardous Materials and Hazardous Waste Management Plan include a general tightening up of the text and further detail provided Section 3.1 on the storage and handling of ammonium nitrate (AN) and emulsion. The Dyno Nobel Emergency Response Assistance Plan has been added as Appendix C. The Department finds the most recent version an improvement and has the following comment.

5.1 Missing references

Reference:

- Hazardous Materials and Hazardous Waste Management Plan (BAF-PH1-830-P16-0011 Rev 4), March 7, 2016

Comment:

A few missing references and unclear statements were noticed.

- (p. 2) The title of the table Index of Major Changes/Modifications refers to Revision 3, yet the document is Revision 4. The changes for both revisions appear to have been combined, which makes it difficult to follow which changes apply to this latest version.
- (p. 2) Item 13 of the Index of Major Changes/Modifications refers to Appendix A for the 2016 Work Plan and in the document it is Appendix B.
- (p. 33) The last paragraph of Section 6.1 about the landfarm refers to the Landfill Maintenance and Operations Manual, instead of the Landfarm Operation, Maintenance and Monitoring Manual included in Appendix D.

6. Sampling Program – Quality Assurance and Quality Control Plan

As noted in the index of major changes/modifications on page 2, there were major revisions to the whole Sampling Program - Quality Assurance and Quality Control Plan. These changes included adding sections common to most management plans, Baffinland Policies and Environmental Responsibilities, as well as more descriptions in almost all the other sections. The updated Revision 1 is an important improvement over Revision 0 as the added descriptions will make sampling procedures more consistent and improve their quality. Of particular note are new sections on sediment sample collection, benthic invertebrate sampling, and sample labelling. A few incorrect references and an unclear statement were noticed.

6.1 Incorrect references

Reference:

- Sampling Program – Quality Assurance and Quality Control Plan (BAF-PH1-830-P16-0001 Rev 1), March 14, 2016

Comment:

A few missing references and unclear statements were noticed.

- The incorrect date is used when referring to Water Licence No. 2AM-MRY1325 Amendment No. 1. Whenever it appears in the text, it is dated July 31, 2014. The date of issuance is July 21, 2015. This is found on pages 16, 17 (twice), 19, 20, 21 (twice) and 25.

- (p. 24) The first paragraph of Section 7 states “*Except equipment blanks, ten percent of all samples will comprise QA/QC samples*”. The same information is restated in Table 2 for field blanks, travel blanks and field duplicates. If possible, it would be helpful if the distribution of the QA/QC sample types was better defined to ensure it was optimal.

7. Waste Management Plan

Changes made for Revision 4 of the Waste Management Plan include a general tightening up of the text and removal of some sections that applied during the construction phase. The Department finds the most recent version an improvement and has the following comments.

7.1 Handling of concrete wastes

Reference:

- Waste Management Plan (BAF-PH1-830-P16-0028 Rev 4), March 7, 2016
- Waste Management Plan (BAF-PH1-830-P16-0028 Rev 3), March 20, 2015

Comment:

Revision 3 of the Plan had a section titled “Unset Concrete and Concrete Wash Water from Mixing and Transportation of Concrete” (4.4.5) which was removed from the description of waste handling by category in Revision 4. The section described a pond and detailed handling methods for concrete waste.

INAC recognises that most of the construction on site has been completed, but Work Plans still include the construction of facilities with concrete floors such as the truck wash station.

Recommendation:

The Department recommends that the licensee keep a description of concrete waste handling methods, including unset concrete and concrete wash water, in the Waste Management Plan.

7.2 Missing references

Reference:

- Waste Management Plan (BAF-PH1-830-P16-0028 Rev 4), March 7, 2016

Comment:

A few missing references, typos and unclear statements were noticed.

- (p. 2) In the index of major changes for revision 4, the relevant section number is missing for item 13.
- (p. 8) In the title of Table 1-1, “solid” is misspelled.
- (p. 18) In the row for “human wastes” of Table 3-2, the general management method is “*Human waste that cannot be treated by onsite WWTP will be stored in closed top drums in the hazardous waste storage areas until final disposal.*” This raises two questions: Why are the polishing waste stabilization ponds, referred to in the Fresh Water, Sewage and Wastewater Management Plan, not included in the management strategy for this Plan? and Under what conditions would untreatable human wastes be generated?
- (p. 29) The last sentence of Section 3.7 refers to Table 4-3, which is not included in the document.

8. Interim Closure and Reclamation Plan

The NWB Report Review states that Revision 4 of this plan has been approved by the Board, and it is not clear which of the two documents labelled Revision 4 has been approved.

8.1 Naming of different versions

Reference:

- Interim Closure and Reclamation Plan (BAF-PH1-830-P16-0012 Rev 4), March 31, 2016
- Interim Closure and Reclamation Plan (BAF-PH1-830-P16-0012 Rev 4), October 31, 2015

Comment:

There significant revisions between the two versions of the Interim Closure and Reclamation Plan (ICRP) labelled Revision 4. The March 2016 version greatly expands discussion of predicted effects, methodology for assessing effects and monitoring of effects. This is included in Section 5.2 and developed in detail in Section 11. More than half of the effects discussed are of socio-economic nature.

Recommendation:

INAC recommends that the licensee use different revision numbers for different versions of the ICRP. Presently there are two significantly different versions with the same title that must be distinguished by their publication date.

While discussing and monitoring socio-economic effects of the Mary River Project is important, it is not in the mandate of the NWB. Including the information in this ICRP unnecessarily burdens an already complex document and takes away from the discussion of reclamation measures for the site. We recommend that the discussion of socio-economic effects be moved to an Appendix or another document where they are more relevant.

8.2 Recommendations from previous INAC submissions

Reference:

- Interim Closure and Reclamation Plan (BAF-PH1-830-P16-0012 Rev 4), March 31, 2016
- Review of Baffinland Iron Mines Corporation's Interim Closure and Reclamation Plan for Type A Water Licence #2AM-MRY1325, INAC, January 4, 2016

Comment:

The Department has reviewed the ICRP and submitted comments to the Board on several occasions; September 15, 2014, June 26, 2015 and January 4, 2016. The comments and recommendations in these memoranda remain relevant and have not been acknowledged or addressed. The comments are compiled in Table 1.

Table 1 INAC comments from previously submitted technical memoranda

Comment # in Jan. 2016 Memo	Date initially submitted	Title	Continued relevance
1	June 26, 2015	Long-term mine closure activity timeline	Yes.
2	June 26, 2015	Accelerated open pit filling	Yes.
3	June 26, 2015	Mary River option for accelerated pit filling	Yes.
4	June 26, 2015	Aesthetic closure objective	Yes.
5	June 26, 2015	Waste rock stockpile cover thickness	Yes.
6	June 26, 2015	Timing of post-closure Surveillance Network Program (SNP) Monitoring	This was a comment.
7	Sept. 15, 2014	Ultimate Project closure and reclamation cost	Yes.
8	Jan. 4, 2016	Railway construction	Yes.
9	Jan. 4, 2016	Closure activities planned for landfarm	Yes.
10	Jan. 4, 2016	Closure activities planned for site wide railway	Yes.

The biggest concern INAC has is regarding the pit filling. Options for accelerated pit filling are discussed in the ICRP, but none are adopted. In this case, the predicted time

required for the pit to fill is 85-150 years, which would require monitoring for over century and is not an ideal walk-away reclamation scenario. The timeline presented in Figure 13-1 has 3 years of closure and 5 years of post-closure work. It is not clear how this is possible with either a natural or accelerated pit scenarios, yet several places in the text suggest monitoring and management of pit water once it has filled. An example is the discussion of possibly adjusting the pH of pit water in Section 11.2.3.2.

The Department understands that mining has not yet progressed to a stage where a pit has developed, but believes that a solid reclamation plan is necessary prior to pit formation so that the steps are taken to optimize ease of closure.

Recommendation:

INAC recommends that the Board not approve this revised ICRP until the licensee has addressed the comments and recommendations included in the previous review, dated January 4, 2016. On December 23, 2016, Baffinland informed us they would be addressing our comments into Revision 5 of this document.

9. Aquatic Effects Monitoring Plan

INAC submitted a memorandum entitled Review of Baffinland Iron Mines Corporation's Aquatic Effects Monitoring Plan for Type A Water Licence #2AM-MRY1325 on May 25, 2016. It includes five comments and recommendations on Revision 2 of the Aquatic Effects Monitoring Plan (April 2016) which we encourage the Board to consider.