Final Submission – Regarding Baffinland Iron Mines Corporation Type A Water Licence Application for the Mary River Project

Aboriginal Affairs and Northern Development Canada

Submission to the Nunavut Water Board

March 21, 2013

EXECUTIVE SUMMARY

Aboriginal Affairs and Northern Development Canada (AANDC) has participated in the ongoing review of Baffinland Iron Mines Corporation (Baffinland or BIMC) Type A water licence application for the proposed Mary River Iron Ore Project (Mary River project). While sufficient information and has been provided to support the review of the application, further clarification is needed on how best to handle a few outstanding issues prior to the issuance of the water licence. In particular clarity is required on how best to ensure that adequate reclamation security is provided at all times during the life of the mine, that pit lake water quality will not become a legacy liability, that management plans are completed and approved before related activities are launched, and that monitoring requirements are clearly prescribed and implemented. AANDC has provided background considerations and recommendations on these and other issues in the text below.

BIMC has generally followed AANDC policy in preparing reclamation security estimates. The company has proposed to provide an annual security update based on the development of yearly operational plans. BIMC would be the first mining operation in Nunavut to provide annual security updates, an objective in keeping with AANDC policy. AANDC provides discussion and recommendations on how the practice may be applied to ensure that the overall security held for the project will be sufficient to cover full reclamation liabilities at all times in the life of the mine and the post-closure period within the constraints of the current regulatory system.

The pit lake will be one of the major legacies at the Mary River project. Water quality predictions in the water licence application indicate that pit lake discharges may not meet Metal Mines Effluent Regulations (MMER) criteria for pH after 21 years and that further degradation over time may adversely impact the downstream water. BIMC completed additional reconnaissance work in 2012 and provided an update on its waste rock characterization program indicating that the pit lake water quality risk is not as high as initially estimated, but the acid generating nature of the footwall and hanging wall material has not been sufficiently well characterized to rule out the probability of an eventual adverse impact to water quality. BIMC has committed to updating pit water quality predictions once the 2012-2014 characterization program is completed and to developing appropriate mitigation plans as part of updates to the interim mine closure and reclamation plans. Discussion is provided below on how the water licence can best ensure that effective mitigation plans for pit lake water quality will be put in place before the excavation of a pit is allowed to proceed.

The water licence application contains a large number of management plans, and additional plans were specified in the Project Certificate approved for the mine. Following review, it is apparent that some of the management plans have not yet been fully developed, and others require updating before being implemented. AANDC has provided discussion on timing of management plan updates as well as recommendations regarding licence conditions that could help to ensure that

management plans will be in place before project activities with potentially significant risks to water are allowed to proceed.

Adaptive management has been identified as a key strategy for the Mary River project. A sound monitoring program is essential for supporting that strategy. AANDC has participated in workshops with BIMC and other regulators and land owners to support the development of an AEMP framework that aims to consolidate all monitoring commitments related to freshwater made through the licensing process. Background, observations and recommendations are provided below to help clarify and effectively capture some of the monitoring commitments made through the licensing process.

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LIST OF ACRONYMS AND ABBREVIATIONS

AANDC	Aboriginal Affairs and Northern Development Canada
AEMP	Aquatic Effects Monitoring Program
ARD	Acid Rock Drainage
BIMC	Baffinland Iron Mines Corporation
CCME	Canadian Council of Ministers of the Environment
DEIS	Draft Environmental Impact Statement
DFO	Department of Fisheries and Oceans Canada
DOE	Department of Environment
EC	Environment Canada
EMP	Environmental Management Plan
FEIS	Final Environmental Impact Statement
GN	Government of Nunavut
IOL	Inuit Owned Land
IQ	Inuit Qaujimajatuqangit
ML	Metal Leaching
MMER	Metal Mines Effluent Regulations
NIRB	Nunavut Impact Review Board
NLCA	Nunavut Land Claims Agreement
NWB	Nunavut Water Board
PC	Project Certificate
PHC	Pre-Hearing Conference
QA/QC	Quality Assurance/Quality Control
QIA	Qikiqtani Inuit Association
TM	Technical Meeting

INTRODUCTION

Aboriginal Affairs and Northern Development Canada (AANDC) has participated in the ongoing review of Baffinland Iron Mines Corporation's (Baffinland or BIMC) Type A water licence application for the proposed Mary River project. On March 30, 2012, AANDC conducted a completeness review of the application in conjunction with information requests for the Final Environmental Impact Statement (FEIS) in a joint submission to the Nunavut Impact Review Board (NIRB) and Nunavut Water Board (NWB). AANDC submitted a technical review of the application to the NWB on June 22, 2012, and following the issuance of Project Certificate 005, AANDC participated in a technical meeting / pre-hearing conference (TM/PHC) in Pond Inlet on January16-17, 2013.

On January 25, 2013, the NWB distributed the Pre-Hearing Conference Decision inviting interested parties to submit additional written submissions by March 22, 2013. Out of the 26 technical comments submitted by AANDC in the Technical Review, 18 were resolved prior to the TM/PHC. Since then three more have been resolved through further discussions with Baffinland. Following the TM/PHC, Baffinland submitted a 2013 work plan (February 13, 2013), a closure cost estimate for the proposed 2013 work plan activities (March 7, 2013), proposed terms and conditions for the Type A water licence and an Aquatic Effects Monitoring Program (AEMP) framework (February 26, 2013). AANDC has reviewed these documents in the context of the current Type A water licensing application and provides relevant observations and recommendations on outstanding issues in this submission.

Comments are structured as issues and supported by observations made during the course of the application review. Issues are arranged below in the categories identified by the NWB in Section 3c of the Pre-Hearing Conference Decision.

COMMENTS ON THE TYPE A WATER LICENCE APPLICATION

The comments below are based on the Project Certificate issued for the Mary River project on December 28, 2012, and do not take into consideration the subsequent application for amendment to the Project Certificate. AANDC recommends that NWB pay close attention to licensing only such activities that have currently been assessed and that are subject to the approved Project Certificate.

1.0 Relevant Project Certificate Terms and Conditions

Issue 1.1: Incorporating the results of climate change studies in annual reports and management plan updates

References
NIRB Project Certificate 005, Term and Conditions No. 2 and 28

Background
The Project Certificate directs BIMC to provide any revised assessments and studies done to validate and update climate change impact predictions for the Mary River project. Since climate change is likely to impact permafrost, water quantity and water quality, future assessment results could provide important information for use in updating water licence management plans.

Recommendation
AANDC recommends that the water licence require BIMC to report the results of climate change studies in annual reports to the NWB and to incorporate the results into subsequent management plan updates.

Issue 1.2: Monitoring the effects of SO_2 and NO_2 emissions on freshwater

References
NIRB Project Certificate 005, Term and Condition No. 8

Background
The Project Certificate states that BIMC shall demonstrate that SO_2 and NO_2 emissions remain within predicted levels and in cases where exceedances occur shall conduct additional monitoring to evaluate the effectiveness of mitigative measures. Because acid rain generated from SO_2 and NO_2 emissions can impact water quality, changes in pH of nearby freshwater would be an indicator of the adequacy of emission mitigations. AANDC notes that BIMC has already established baseline data in a number of suitable freshwater monitoring locations.

Recommendation
AANDC recommends that the water licence include a requirement to monitor and report on the pH of nearby freshwater in cases where repeated exceedances of SO_2 and NO_2 emissions are observed. This monitoring should also be included in the AEMP in the category of target studies.

Issue 1.3: Monitoring and reporting of ammonium ion concentrations near extensive blasting operations

References
NIRB Project Certificate 005, Term and Condition No. 20
Conceptual Ammonium Nitrate Blasting Management Framework

Background
In Project Certificate 005, BIMC is required to monitor the effects of explosives residue and related by-products from project-related blasting activities. BIMC has committed to developing and implementing a blasting management plan which will include performance monitoring. Because ammonium ion is toxic to fish, it is important to limit, control, and mitigate the release of undetonated explosives

containing ammonium nitrate. BIMC submitted a Conceptual Ammonium Nitrate Blasting Management Framework but a final plan will not be submitted until 60 days prior to blasting activities. AANDC is satisfied with this timeframe.

Recommendation
AANDC recommends that the water licence require water sampling of ammonium and nitrate concentrations in surface water as part of blasting performance monitoring for extensive blasting programs occurring near water bodies containing valued fish species. AANDC also recommends that results of the performance monitoring program be included in the annual report to the NWB.

Issue 1.4: Management plans required under the Project Certificate

References
NIRB Project Certificate 005, Term and Condition No. 22, 28, 43
Nunavut Waters and Nunavut Surface Rights Tribunal Act

Background
In Project Certificate 005, BIMC is required to develop and implement a Sediment and Erosion Management Plan, a Groundwater Monitoring and Management Plan, and a Site Drainage and Silt Control Plan. The water licence application does include a Surface Water and Aquatic Ecosystem Management Plan that includes management practices to limit impacts to receiving waters potentially affected by project activities.

Water is defined in the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* as inland waters, whether in liquid or solid state, on or below the surface of the land. Groundwater is water located beneath the surface and is thus protected under this *Act*. As such, monitoring of groundwater is important to ensure that the quality of water and groundwater are not impacted by the deposit of waste associated with the Mary River project.

Recommendation
AANDC recommends that the water licence require inclusion of a Groundwater Monitoring and Management Plan to be submitted to NWB for approval within 60 days following issuance of the licence.

AANDC also recommends that the licence require the submission of a Sediment and Erosion Management Plan and a Site Drainage and Silt Control Plan within 60 days following issuance of the water licence and that the Surface Water and Aquatic Ecosystem Management Plan be updated for consistency.

Issue 1.5: Incorporating the results of revegetation trials in annual reports and closure and reclamation plans

References

NIRB Project Certificate 005, Term and Condition No. 39 and 40

Background
In Project Certificate 005, BIMC is required to develop a progressive revegetation program utilizing test plots for reseeding and replanting native plants. The results of test plot studies could benefit BIMC and regulators in identifying best practices for reclaiming disturbed areas.

Recommendation
AANDC recommends that the water licence require BIMC to report the results of revegetation trials in annual reports to the NWB and to incorporate the results into subsequent updates to the Mine Closure and Reclamation Plan.

2.0 Existing Type B Water Licence

Issue 2.1: Second bulk ore sampling campaign

Reference
2013 Work Plan
Water Licence 2BB-MRY1114
Mary River Project: Closure Cost Estimate for 2013 Work Plan, Powerpoint Presentation

Background
BIMC has proposed that most of the activities approved under its existing Type B licence (2BB-MRY1114) will be rolled into the proposed Type A water licence. The 2013 work plan indicates that BIMC is considering a second bulk sampling campaign that may produce up to 500,000 tonnes of ore for shipment to potential customers during the 2014 open water season. A feasibility study is in progress and a decision on whether to proceed with the campaign is expected by the end of March 2013. BIMC suggests that an addendum to the 2013 work plan may be required. It is not clear that a bulk sampling campaign would be consistent with the Type A water licence and Project Certificate if it has not been approved through the existing Type B water licence 2BB-MRY1114.

Recommendation
AANDC recommends that BIMC clarify with the NWB the approvals that would be required for the potential second bulk sampling campaign.

3.0 Additional Type B Water Licence Applications

BIMC has submitted an application for an additional Type B water licence 8BC-MRY to undertake construction of facilities proposed in the 2013 work plan that will be required for the Mary River project before a Type A water licence can be issued.

AANDC will conduct a review and submit comments to the NWB as part of the new Type B water licence application review. AANDC notes that the following activities may also require B licence approvals.

Issue 3.1: Temporary camp mid-way along the Tote Road

References
Type A Water Licence Application
Work Plan for 2013 (February 13, 2013), Section 3.3.2
Water Licence 2BB-MRY1114
Nunavut Land Claims Agreement

Background
BIMC proposes, if required, to establish a 49 person camp mid-way along the Tote Road in the later part of 2013 following issuance of the Type A water licence application. The proposed camp does not appear to have been identified in any of the Type A water licence application, the existing Type B water licence 2BB-MRY1114, or the new Type B water licence application 8BC-MRY.

The 2013 work plan states that water for the camp mid-way along the tote road will be trucked from the Mine Site or Milne Port and that all sewage and camp waste will be transported to the Mine Site or Milne Inlet for disposal. The disposal of greywater and the storage of fuel on site were not discussed and may not be accounted for in the Type A water licence application.

Recommendation
AANDC recommends that, once all authorizations such as land lease(s) are in place, BIMC provide details of this camp in a water licence application should the camp be required.

Issue 3.2: A new Type B licence is anticipated to allow for an ice road

References
Preliminary Technical Meeting
Proposed Terms and Conditions for Baffinland's Type A Water Licence

Background
QIA raised an issue that the winter road proposed was not included in the Type A water licence application. BIMC stated that it is not required because the volume of water used will not trigger a water licence but the NWB confirmed that any water use requires a water licence in Nunavut. The winter road does not seem to fall within the scope of the existing Type B water licence and it was not included in the Type A application. Thus, it is recommended that a new application be submitted for the use of water to construct a winter road.

Recommendation
AANDC recommends that BIMC submit a new water licence application for the use of water to construct a winter road for approval in advance of its proposed construction.

4.0 Term of Type A Water Licence

Issue 1.1: The term of the water licence should ensure timely technical review

References
EC Technical Review Comments No. 5.0
AANDC Technical Review Comments No. 17
Technical Meeting / Pre Hearing Conference
Baffinland's Pre-Hearing Conference Decision Items for Follow-up – Final Submission (March 7, 2013)

Background
BIMC requested a 25 year licence term in the Type A water licence application. Environment Canada recommended, in a June 22, 2012, Technical Review, that a shorter term of 10-12 years be considered to provide a clear opportunity to verify the environmental assessment predictions and the suitability of licence conditions. AANDC supports the recommendation for a licence term of 10-12 years to provide an opportunity to revisit licence conditions related to technical aspects of water and waste impacts and to accommodate public concerns expressed at the technical meeting about the need for periodic technical review through licence renewal.

Recommendation
AANDC recommends that the term of the Type A water licence not exceed 12 years.

5.0 Type and Amount of Security

Issue 5.1: Ensuring adequate overall reclamation security

References
Preliminary Mine Closure and Reclamation Plan, Table 12-1
Nunavut Waters and Nunavut Surface Rights Tribunal Act
Indian and Northern Affairs Canada *Mine Site Reclamation Policy for Nunavut*
Mine Site Reclamation Guidelines for the Northwest Territories

Background
The reclamation cost estimate for the Type A water licence, provided in the Preliminary Mine Closure and Reclamation Plan of the water licence application, was prepared using the RECLAIM method in accordance with the *Mine Site Reclamation Policy for Nunavut*. The total cost for Inuit Owned Land (IOL) and

Crown Land are $411,234,800 and $107,476,408 respectively. The costs are further broken down into land and water liabilities for IOL and Crown lands. A desktop review of the estimate conducted by AANDC identified a number of minor omissions (see previous submissions), but AANDC is satisfied that the overall amount, (i.e. the sum of land and water security for both Crown land and Inuit owned land) is adequate to address the potential environmental liabilities for the mining project as a whole when considered as an initial assessment, assuming that the reclamation costs will be further developed, refined and re-calculated in the creation of the Interim Mine Closure and Reclamation Plan and updates to the same, and that the new cost estimates will be reflected in the quantity of security required under the licence as they are accepted by the NWB.

AANDC recognizes and agrees with the NWB "holistic" approach to security (i.e. it is difficult to distinguish between purely land and water impacts) and therefore rejects in principle the split presented in the BIMC reclamation cost estimate between land and water. AANDC understands that NWB has the jurisdiction to require a global security amount sufficient to reclaim all sites affected and impacts created by the mining project. AANDC recognizes that such a global security amount held under the water licence would overlap with financial security also held under land leases associated with the same project, creating the potential for over-bonding. Such over-bonding could be avoided if NWB were to recognize the security held under land instruments as a demonstration of the financial responsibility of BIMC, and discount from the required "holistic" security the amount of security held under land leases. AANDC proposes that NWB apply such discounts only if the NWB is satisfied on the evidence that (a) the land leases are in fact enforceable contracts and provide equivalent protection to that which could be held under the water licence, and (b) that the security is in fact being held, and will be held in a robust form which provides equivalent protection to that required under section 12 of the *Northwest Territories Water Regulations* as contemplated by AANDC's *Mine Site Reclamation Policy for Nunavut*. In other words, if BIMC (or land owners) prove to NWB that equivalent security protection is in place, the NWB may not need to require the full amount under the water licence in order to ensure the financial responsibility of BIMC. While security held under land leases would not be available to the Minister for use in accordance with sections 76, 87 and 89 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*, AANDC is confident that it could cooperate with the security-holding landowner in the event of a security-funded reclamation. Alternatively, AANDC also notes that BIMC and landowners would be subject to the compliance and enforcement role of inspectors under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*.

The *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and *Mine Site Reclamation Guidelines for the Northwest Territories* provide some guidance on the type of security that AANDC can accept for water licences in Nunavut. Further clarity is provided with respect to new mines on page nine of the *Mine Reclamation Policy for Nunavut*.

Recommendations

AANDC recommends that the NWB accept the overall "holistic" amount of security for the Type A water licence of $518,711,208.00 as an initial estimate of the total security requirement for the proposed project, subject to periodic review through the life of the mine. The NWB is encouraged to minimize over-bonding by discounting from the overall security the amounts held under Crown and Inuit land leases that the NWB is satisfied, by evidence, meets the conditions identified above, namely that:

(a) the land leases are in fact enforceable contracts and provide equivalent protection to that which could be held under the water licence; and
(b) that the security is in fact being held, and will be held in a robust form which provides equivalent protection to that required under section 12 of the *Northwest Territories Water Regulations* as contemplated by AANDC's *Mine Site Reclamation Policy for Nunavut*. In other words, if BIMC (or land owners) prove to NWB that equivalent security protection is in place, the NWB may not need to require the full amount under the water licence in order to ensure the financial responsibility of BIMC.

Issue 5.2: Ensuring adequate reclamation security is held at all times for all project stages

References

Preliminary Mine Closure and Reclamation Plan, Table 12-1
Proposed Terms and Conditions for Baffinland's Type A Water Licence – Working Document
Mary River Project: Closure Cost Estimate for 2013 Workplan, Powerpoint Presentation
Indian and Northern Affairs Canada *Mine Site Reclamation Policy for Nunavut*
2013 Work Plan Closure Cost Summary

Background

In Proposed Terms and Conditions for Baffinland's Type A Water Licence – Working Document, submitted to the NWB on February 26, 2013, BIMC proposes to submit annual estimates of anticipated mine restoration liability, and that the estimates would then be used by NWB to determine what further or other amounts of security would be required under the licence on an annual basis. BIMC has circulated a work plan for 2013 that has been used to estimate the mine restoration liability for 2013, in the form of a closure cost estimate, and proposed that $51,546,669.00 be the initial security requirement under the Type A water licence. AANDC has conducted a desktop review of the closure cost estimate, which was prepared generally in accordance with the *Mine Site Reclamation Policy for Nunavut* using the RECLAIM method. AANDC identified some shortcomings in the estimate, detailed in the following paragraphs, and cautions that while the notion of annual security estimates and adjustments is an objective clearly identified in the Mine Site Reclamation Policy

for Nunavut, the approach has not been previously applied in the territory and a number of considerations must be addressed in determining how best to apply it in practice.

One of the assumptions used in the estimate is, “if an activity spans multiple years of construction, the cost for its reclamation is evenly distributed across all years that it is scheduled to take place” (slide 16). This approach is at odds with the *Mine Site Reclamation Policy for Nunavut*, which states that “total financial security for final reclamation required at any time during the life of the mine should be equal to the total outstanding reclamation liability…calculated at the beginning of the work year, to be sufficient to cover the highest liability over that time period.” (p.6). In other words, if the environmental risk posed by a particular activity is greater in the initial years, so the security should also be greater in the initial years, rather than increased in equal increments over time. This point is made to clarify future applications of the annual estimation process rather than over concern about particular costs in the 2013 estimate, where this does not appear to be a significant issue. The amount of security held for the project should provide the capacity to fully reclaim the mine at any particular time.

The 2013 cost closure estimate applied the RECLAIM model, as recommended in the *Mine Site Reclamation Policy for Nunavut*, including the use by default of “net present value” in determining how much security must be set aside for reclamation work to be done in the future, after mine closure (slide 17). AANDC cautions that “net present value” is a financial tool that assumes security will increase over time through accumulating interest, and is used to argue that fewer funds are therefore required up front to prepare for work to be done in the future. This approach is generally applied to quantify security required only for post-closure scenarios. The approach has significant limitations when trying to ensure the availability of large amounts of money or over long time periods, particularly when the security may be held by the Government of Canada without a mechanism for earning interest. In the case of the 2013 estimate, based on the 2013 work plan, long term liabilities are not a significant factor, and this point is made more to clarify future estimates associated with this water licence application.

AANDC notes a significant difference in the estimated project management costs between the RECLAIM estimate and a previous estimate prepared for BIMC using a different methodology. AANDC accepts that the project management percentage incorporated in the RECLAIM method is out of date and that a higher rate would be more appropriate for work to be conducted in north Baffin, but notes that the overall amount of security identified through the two different approaches for the same work is in this case virtually identical.

AANDC notes that the estimate includes $403,870.00 credit for progressive reclamation scheduled to be conducted in 2013 (reclamation of existing fuel bladder farm). Preferred practice is to provide credit for progressive reclamation only after the work has been completed and inspected.

Another concern with the security estimate for 2013 is that it is focused exclusively on the work to be performed in 2013, and does not address the overall life of the mine and potential cumulative and legacy impacts. A particular example is the need for BIMC to define the mitigation options and security amounts that will be required to manage water quality in the future pit lake at the time (after mine closure) when it will fill and run over the top, and to be able to ensure that such security is adequate to provide mitigation forward from any given time in the life of the mine, should the mine unexpectedly cease operations. Such security arrangements for potentially significant environmental legacies of the mine should be delineated as early as possible in the licensing phase, before the mining activities that may create the legacies are initiated, and the necessary security included in annual reclamation costing estimates.

AANDC recognizes that more detailed modeling and identification and approval of mitigation options must be completed before the pit lake water quality security requirements are finalized. AANDC is willing to accept that such work be completed as updates to the Interim Mine Closure and Reclamation Plan (see section below on pit lake water quality), but only if the NWB is prepared to stipulate in the water licence that mining operations be prohibited from opening a pit until the NWB is satisfied that legacy and cumulative mitigation options and security requirements related to pit lake water quality have been satisfactorily delineated and incorporated into the Interim Mine Closure and Reclamation Plan, the reclamation security estimate for the mine, and annual security estimating procedures. In general, annual security estimates should always be made in the context of the overall reclamation plan and security estimate for the life of the mine.

A final consideration in deciding whether to accept the notion of annual updates to security requirements is the capacity of regulators to deal with the increased frequency of review. The NWB and other interveners may not have the administrative capacity to review and process annual estimates and adjustments without drawing more heavily on the public purse, or private landowner purse, as the case may be. There may be a tradeoff between the benefit to the company of more precise security calculations at any given time and the cost of a greater regulatory burden. An alternative would be the application of a precautionary approach where a larger amount of security would be invested at the start of the project and reviews would be required less frequently.

Despite concerns about some of the assumptions and the failure to include life-of-mine considerations in the 2013 “cost closure estimate” for the Mary River project, AANDC recognizes that these factors do not have a significant effect on the estimated amount of security for the activities to be conducted within the first year of the proposed water licence. AANDC also recognizes that overall a conservative approach was used in preparing the estimate and considers the amount proposed, without allowing the discount proposed for reclamation work to be conducted in 2013, to be an adequate representation of anticipated overall reclamation liabilities to the end of 2013, based on the work plan presented.

Recommendations
AANDC recommends that the NWB increase the proposed initial payment of $51,546,669.00 holistic or global security for the mine activities for 2013 by the $403,870.00 estimated for reclamation of the Milne Inlet fuel bladder farm to a total of $51,950,539.00.

AANDC recommends that the proposed annual closure cost estimates determined after 2013 should be based on the life-of-mine closure plan that accounts for potential cumulative and legacy liabilities, that ensures full reclamation costs associated with planned mining activities are delineated and incorporated in annual estimates before such activities begin, and that the full reclamation exposure at any point in the life of the mine is adequately covered.

Annual security estimates should be provided to the NWB at least 90 days prior to the start of the time period to be covered. This will allow a 60 day NWB review and approval window, and a 30 day payment window, so that the security may be approved and provided to security holders before the planned activities begin.

In addition to the annual closure cost estimates, AANDC recommends that BIMC be required to provide a fully updated reclamation cost review for the entire project as part of regular updates to the Interim Mine Closure and Reclamation Plan (see section below on closure and reclamation) to be prepared at least once every three years and stamped by a professional engineer and signed by the company Chief Executive Officer. It is anticipated that annual closure cost estimates would be developed by comparing the expected mine condition and activities over the upcoming year to the planned condition and activities used to develop the more rigorous third-year review, and accounting for cumulative and legacy factors.

6.0 Water Quality

Issue 6.1: Pit lake water quality mitigation

References
AANDC DEIS Technical Review Comments No. 68
AANDC FEIS Information Request No. 9
Commitment No. 244
AANDC Type ‘A’ Water Licence Application Technical Review Comments No. 3
AANDC Letter to Baffinland (December 11, 2012), Issue No. 1
Mine Site Reclamation Policy for Nunavut

Background

The *Mine Site Reclamation Policy for Nunavut* specifies that “[t]he direct closure impact of all components of a mine site should be addressed as an integral part of the design criteria during the detailed engineering phase of the project…” (p.5) and

"[p]lanning for closure, before development occurs, provides the opportunity to develop a flexible and cost-effective design, which helps ensure mine reclamation takes place and the responsibility for costs is borne by industry" (p.7) and "[t]he plan should describe detailed measures for the reclamation, closure and decommissioning of the mine including but not necessarily limited to…open pits…" (p.8). In keeping with this policy, throughout the environmental assessment and water licensing process for the Mary River project, AANDC has highlighted the need to clarify mitigation options and plans for the ultimate water quality of the lake that will be created through excavation of a pit during the mining project, and that, based on evidence presented by BIMC in the FEIS, may not meet water quality guidelines for pH and dissolved metals. BIMC initially proposed a mitigation approach relying on passive fill of the pit over a period estimated to be between 85 and 145 years, to be followed by batch treatment of the lake water over several decades if required. AANDC raised a concern that such a long timeline after the closure of the mine is not reasonable as it effectively passes the issue to future generations without a mechanism to provide the capacity to carry out the work so far into the future. At the technical meeting in Pond Inlet, BIMC proposed an alternative mitigation of accelerated fill, where the pit would be filled over four years post-closure by pumping water from Mary Lake. The NWB clarified that this option could not be included in the water licence for the project without first being screened by NIRB. As we approach the final hearing, how the issue will be included in the water licence has not yet been effectively addressed.

AANDC met with BIMC on January 17, 2012, at which time BIMC proposed the following course of action: "When the Interim Mine Closure and Reclamation Plan is updated, the plan will report on all additional geochemical and other relevant data that will influence closure planning of the open pit. Appropriate mitigation measures as well as contingency options will be identified in the updated Interim Mine Closure and Reclamation Plan and security bonding adjusted accordingly." AANDC recognizes that 2012 drilling results shared by BIMC have indicated the risk of compromised water quality in the pit lake is not as high as initially estimated, but the acid generating nature of the footwall and hanging wall material has not been sufficiently well characterized to rule out the probability of the impact to water quality occurring. BIMC also advised that the excavation of the pit will not occur until approximately year 10 of the proposed mining operations. AANDC observes that modeling options, such as the CE-QUAL-W2 model supported by the U.S. Army Corp. of Engineers, could be used to provide superior predictions of the pit water quality than the mass balance approach used by the proponent in preparing the water licence application, once the understanding of the acid generating characteristics of the future pit walls is further advanced. Accepting that more analysis will be required to clarify the risk, and more time will be required to secure the assessment and regulatory approval of the accelerated fill mitigation option, AANDC is nonetheless concerned that security requirements for the potential pit lake mitigation should be clarified as early in the mine life as may be feasible. Clear conditions should be developed in the water licence to ensure that pit development

will be prohibited until the necessary mitigation and security arrangements are in place.

Recommendation
AANDC recommends that the licence stipulate that mitigation options for pit lake water quality be designed to satisfy the definition of a walk-away closure plan (i.e. the site will demonstrate chemical and physical stability that satisfies closure objectives and will not require long term monitoring or maintenance) that would be completed within no more than 25 years following mine closure or abandonment.

AANDC recommends that the water licence prohibit the creation of a mine pit until all of the following conditions are met: (a) the acid generating and metal leaching projections for the hanging and foot walls are updated; (b) an improved modeling prediction of pit lake water quality has been conducted; (c) mitigation options based on updated pit lake water quality predictions have been developed and reviewed and approved by the Nunavut Planning Commission, the Nunavut Impact Review Board and the Nunavut Water Board as may be required; (d) the pit lake water quality mitigations have been included in an update to the Interim Mine Closure and Reclamation Plan; (e) a schedule of associated reclamation security requirements has been developed; and (f) the updated closure plan and security schedule has been reviewed and approved by the NWB. Financial security for pit lake water mitigation should be adequate to provide reclamation capacity at all times during the creation of the pit and to provide monitoring as may be required until the NWB is satisfied that the risk to pit lake water quality has been addressed.

AANDC also recommends that the Waste Rock Management Plan be revised as more acid generation and metal leaching information is made available.

7.0 Waste Management

Issue 7.1: Disposal of dredging material on land does not appear to be in the water licence application

Reference
Department of Fisheries and Oceans Canada (DFO) Technical Review Comments No. 4.2
Technical Meeting and Pre-Hearing Conference

Background
Dredging is proposed in the area of the freight dock and the ore dock to facilitate ship docking and maneuvering. DFO requested BIMC to provide the methodology for the proposed dredging and to identify the location where the dredged materials will be disposed. BIMC confirmed at the TM/PHC that dredging material will be disposed on land. However, the disposal of dredging material on land is not addressed in the Type A water licence application. If dredging material will be

disposed on land, the Waste Management Plan should include information on location, method of disposal and any mitigation measures.

Recommendation
AANDC recommends that the water licence include a requirement for BIMC to update the Waste Management Plan to include land disposal of dredging waste, and that the updated plan be reviewed and approved by the NWB before dredging will be permitted at Milne Inlet or Steensby Inlet.

8.0 Management Plans

Issue 8.1: Submission and approval of management plans

References
Type A Water Licence Application
AANDC Information Requests for the FEIS and Completeness Review of the Type A Water Licence Application, Annex 1(March 30, 2012)
AANDC Technical Review Comments No. 21
AANDC letter to Baffinland, Issue No. 2 (December 11, 2012)
AANDC Technical Meeting/Pre-Hearing Conference Presentation
Proposed Terms and Conditions for Baffinland's Type A Water Licence (February 26, 2013)

Background
AANDC provided comments in the March 30, 2012, completeness review and the June 22, 2012, technical review pertaining to the revision and submission of management plans to the NWB prior to issuance of the water licence. In BIMC's response to the June 22 submission, a number of commitments were made to revise plans through plan updates to be submitted, in most cases, 60 days prior to construction. Additional timelines were provided on December 21, 2012, including a commitment to complete a framework for the AEMP during the licence application period.

As stated at the Preliminary Technical Meeting, AANDC prefers that plans and revisions to plans be submitted prior to issuance of a water licence, where technically feasible. While AANDC is supportive of the NWB's decision to allow updates to management plans following issuance of the water licence in some cases where additional technical information or engineering design work is required, past experience dictates that activities that are the focus of such management plans and that pose a significant risk to water should not be allowed to proceed until the plans have been reviewed and approved.

The Proposed Terms and Conditions for Baffinland's Type A Water Licence indicates that the Waste Management Plan, Hazardous Materials and Hazardous Waste Management Plan, and Fresh Water Supply, Sewage and Wastewater

Management Plan, Surface Water and Aquatic Ecosystems Management Plan will be submitted 60 days after issuance of the licence and that the Emergency Response and Spill Contingency Plan, Environmental Monitoring Plan will be submitted within 30 days of the approval of the water licence. AANDC is satisfied with this approach for these plans.

BIMC proposes to submit an Interim Abandonment and Reclamation Plan 30 days prior to start of mine operation, which is anticipated to begin with pre-stripping in mid-2014. It is not clear whether the Interim Abandonment and Reclamation Plan would differ from the Interim Mine Closure and Reclamation Plan. AANDC has recommended the Interim Mine Closure and Reclamation Plan be submitted a minimum 90 days before pre-stripping to allow time for review before pre-stripping begins (see section on closure and reclamation below).

Recommendation
AANDC recommends the water licence include the following requirements: (a) plans and any subsequent updates to each plan should be circulated for comments by interested parties prior to NWB approval; (b) activities potentially posing significant risk to water, such as mine pit operations, discharge of effluent into the receiving environment, landfarm construction and storage of significant quantities of hazardous waste should not be permitted until associated management plans have been approved; (c) updates to plans should incorporate relevant monitoring programs outlined in the AEMP framework, such as the commitment to include all potential contaminants of concern identified in the FEIS (i.e., cadmium, selenium, and mercury) in other surface water sampling initiatives (see Issue 9.1); and (d) that the water licence require BIMC to provide plan updates in accordance with the timelines that the NWB will establish in considering commitments and interventions made during the application process.

9.0 Monitoring

Issue 9.1: Monitoring requirements in the management plans should be consistent with the consolidated monitoring program proposed in the AEMP Framework.

References
Environmental Monitoring Plan
Surface Water and Aquatic Ecosystem Management Plan
AEMP Framework
AANDC Technical Review Comment No.'s 17-23
AANDC letter to Baffinland, Issue No. 2 (December 11, 2012)
AANDC Technical Meeting/Pre-Hearing Conference Presentation

Background
In the January 17, 2013, meeting in Pond Inlet, BIMC committed that inconsistencies in monitoring commitments between management plans would be clarified in the

AEMP and subsequent updates to the management plans. AANDC is largely satisfied with the clarifications developed in the February 2013 AEMP framework. BIMC committed to updating the Environmental Monitoring Plan (EMP) within 30 days after issuance of the water licence and updating other relevant management plans within 30-60 days after issuance of the water licence. Because the management plans will be in effect before the AEMP is completely finalized, it is important that the monitoring components within management plans be updated to be consistent with the monitoring program within the AEMP framework document.

Recommendation
AANDC recommends that the monitoring requirements for all management plans be updated following issuance of the water licence in accordance with the AEMP framework to ensure that monitoring is consistent between all plans.

Issue 9.2: Monitoring of effluent discharged to the marine environment

References
AEMP Framework

Background
At Milne Port, all site drainage as well as treated sewage and oily water effluent are channeled to a central ditch that discharges to Milne Inlet and at Steensby surface drainage, including discharges from the ore stockpile, will be directed toward Steensby Inlet while treated sewage and oily water treatment effluent will be discharged via a marine outfall at a 35 m depth. The water licence application does not include monitoring provisions or discharge criteria for the Milne ditch effluent nor for the Steensby outfall effluent, which would be regulated by either the *Fisheries Act* or the *Arctic Waters Pollution Prevention Act* once the effluent reaches the marine environment. As an agency with inspection authority under the *Arctic Waters Pollution Prevention Act*, AANDC would like to see discharge criteria and monitoring requirements established for both Milne and Steensby Inlets. AANDC recognizes that it is within the jurisdiction of the NWB to make recommendations regarding project undertakings that may affect the marine environment.

AANDC also notes that irrespective of the location of the outfall, the effluent discharge infrastructure conveying waste to the marine environment uses water and could potentially deposit waste should there be a failure of the work. AANDC submits that the Board consider whether this brings the effluent discharge and associated infrastructure directly under the Board's jurisdiction pursuant to section 11 and subsection 12(1)(b) of the *Nunavut Waters and Nunavut Surface Rights tribunal Act*.

Recommendation
AANDC recommends that the water licence include a requirement to establish discharge criteria and a monitoring schedule for effluent to the marine environment from the ditch at Milne Inlet. AANDC also requests that the NWB recommend or

require that discharge criteria and a monitoring schedule be established for effluent to the marine environment through the proposed marine outfall at Steensby Inlet.

Issue 9.3: Distinct monitoring stations for pit lake and waste rock stockpiles

References
Environmental Monitoring Plan, Section 4, Table 4-11
AANDC Technical Review Comment No. 18
Baffinand Response to Technical Review Comments on the Type A Water Licence Application
AANDC Technical Meeting / Pre-Hearing Conference Presentation
AEMP Framework, Section 4, Table 2
Pre-Hearing Conference Decision for Follow Up – Final Submission (March 7, 2013)

Background
The EMP proposes monitoring of the East Pond which will receive both waste rock pile runoff and effluent from pit dewatering. AANDC requested that a separate monitoring station for the pit be included in the plan to facilitate a better understand of the acid generating potential of the future pit walls. BIMC has committed that a separate monitoring station would be applicable to future revisions of the Closure and Reclamation Plan as the open pit begins to develop (>10 year timeframe) and that in the meanwhile seepage water in the active mining area would be regularly monitored and the information used to inform acid generating and metal leaching estimates.

Recommendation
AANDC recommends that the commitment to maintain separate water quality monitoring stations for the pit and the waste rock stockpile be captured as a water licence requirement.

10.0 Closure and Reclamation

Issue 10.1: Updating closure and reclamation plans

Reference:
Preliminary Mine Closure and Reclamation Plan
2013 Work Plan (February 13, 2013)
Pre-Hearing Conference Decision Items for Follow Up – Final Submission (March 7, 2013)

Background
Attachment 10 of the Type A water licence application included a Preliminary Mine Closure and Reclamation Plan and a closure and reclamation cost estimate for the mining project as a whole. A proposed work plan for 2013 and an associated closure cost estimate for the work plan were submitted on February 13 and March 7,

2013, respectively. The reclamation cost estimate for 2013 does not appear to take the larger closure and reclamation plan into consideration. In particular, the 2013 plan does not provide a detailed care and maintenance plan as a contingency should operations cease at any point during the year, and the security does not address legacy issues, as previously mentioned. While AANDC is satisfied that the work plan and closure cost estimate for 2013, taken together, provide sufficient information and capacity to deal with any closure scenario that may arise in the next year, there will be a need to provide more information and to better demonstrate an alignment between the annual plans and the overall life-of-mine closure and reclamation plan in future annual submissions.

AANDC had initially proposed that BIMC be required to submit an updated closure and reclamation plan and security estimate for review and approval at intervals not to exceed five years. After further considering the unpredictability of contractor costs and inflation rates, AANDC no longer supports the five year interval as a suitable review period, and would prefer a three year interval.

Recommendation
AANDC recommends that irrespective of the proposed annual work plans and closure cost estimates, BIMC be required under the water licence: (a) to provide, at least once every three years and prior to the start of new project phases (i.e. construction, operation, closure, post-closure), a fully updated interim reclamation and closure plan with cost estimates for the entire project; (b) to include detailed care and maintenance provisions in the plan to provide clear contingencies should the site be abandoned at any time; (c) to have the plan prepared and stamped by a professional engineer in good standing; and (d) to have the plan signed by the company Chief Executive Officer.

11.0 Studies to be undertaken

Issue 11.1: Stratification in future pit lake

References
Errata and Clarification Document for the Application of the Type A Water Licence for the Mary River Project, Attachment 4 (March 9, 2012)
AANDC Technical Review Comments No. 6
AANDC Technical Meeting/Pre-Hearing Conference Presentation
Summary of Meeting with NRCan

Background
In the Errata and Clarification document (March 9, 2012), BIMC stated that water column stratification is not expected to be a problem affecting water quality in the future pit lake. Given the depth of the proposed pit lake, its relatively small surface area, and short ice-free periods, it is not clear whether wind energy will provide sufficient energy to mix the lake to the bottom. If the pit lake becomes stratified

without completely mixing each year, poor water quality can develop at depth. Subsequent mixing may eventually occur, for example after a prolonged period of strong winds, releasing degraded water to downstream fishery resources.

BIMC has committed to researching stratification effects in deep lakes in northern climates, and to incorporating the research into updates to the Interim Mine Closure and Reclamation Plan. AANDC is satisfied with this commitment.

Recommendation
AANDC recommends that the water licence require BIMC to conduct a study on the effect of stratification on the quality of water released from deep lakes in northern climates.

Issue 11.2: Open burning impacts to nearby water bodies

References
AANDC Technical Review Comments No. 10
Baffinland's Response to Technical Review Comments on the Type A Water Licence Application (October 12, 2012)
AANDC Technical Meeting/Pre-Hearing Conference Presentation

Background
AANDC notes that the current authorization for open burning at the Milne Inlet and Mary River sites is approved for the exploration phase under the Type B water licence. It is anticipated that a larger quantity of material (i.e. wood and cardboard) may be burned during the construction and operation phases. AANDC requested BIMC to submit a quality assurance and quality control (QA/QC) plan for open burning activities including provisions to document the type and quantity of material burned and to monitor and report on surface water and sediment quality of potentially affected water bodies. BIMC committed to incorporating open burning QA/QC provisions into the Waste Management Plan and indicated that surface water and sediment quality will be monitored according to the Surface Water and Aquatic Ecosystems Management Plan. AANDC is satisfied with this general approach, however, the Surface Water and Aquatic Ecosystems Management Plan does not include sampling for by-products associated with incomplete combustion of materials such as dioxins, furans, polycyclic aromatic hydrocarbons and mercury. BIMC indicated that baseline studies of freshwater have been conducted that included such parameters.

Recommendation
AANDC recommends that the water licence require the application of a QA/QC plan for open burning to document the quantity and frequency of materials burned and to detect potential cumulative impacts to surface water and sediment quality of nearby water bodies.

12.0 Other Issues

Since the TM/PHC in January, 2013, BIMC has distributed new documentation to interested parties associated with the Type A water licence application including the work plan for 2013, the 2013 work plan closure cost summary, the AEMP Framework, and Proposed Terms and Conditions for Baffinland's Type A Water Licence. While no formal review was requested by the NWB, AANDC conducted a review of these documents in the context of the current Type A licence application. Considerations from reviewing the 2013 work plan and closure cost summary are incorporated in previous sections. Preliminary comments on the AEMP and on the proposed terms and conditions are presented below for the NWB's consideration.

Issue 12.1: Observations regarding the AEMP Framework

- Section 4.2 states that Baffinland has committed to maintaining a hydrometric network as the project moves forward. AANDC recommends that this commitment be incorporated into the water licence to ensure water flow and water quantity are monitored throughout the life of the project.
- Section 4.7: Waste management monitoring should include a section for open burning monitoring since BIMC proposed open burning as a method of waste disposal. Monitoring should include but not be limited to types and quantities of waste that are burned, date and time (from start to finish) of burn, and weather conditions at time of burn.
- Section 5.8: AANDC notes that while a plan to incorporate Inuit Qaujimajatuqangit (IQ) was provided in the AEMP framework, IQ has not yet been incorporated into the AEMP framework per se (methodology, research, benchmark selection, annual reporting, presentation of information, etc.).
- Section 8.0: the annual reporting section of the AEMP is vague. AANDC recommends that the reporting requirements should include a presentation of data and a description of methods used for any analysis of data (such as evaluation against reference sites, trend analysis, statistical methods).
- AANDC also recommends that data management practices be coordinated with any initiatives to create a regional water quality database in support of water resource management.

Issue 12.2: Observations regarding the Proposed Terms and Conditions for Baffinland's Type A Water Licence

- Part A, Item 1, Railway: This section includes a reference to airstrips along the railway. It is not clear whether the airstrips along the railway were proposed in the water licence application.
- Part B, Item 18 states that the Licensee shall implement the management plans. AANDC notes that only approved management plans should be implemented.
- Part D, Item 2 provides a list of facilities for which the licensee shall submit construction drawings. AANDC suggests the addition of another bullet "any other construction on site".

- Part D, Item 11: Criteria to distinguish acid-generating rock from and non-acid-generating rock is located in the plan but AANDC is of the opinion that it should be included in the water licence.
- Part D, Item 15 states that all quarries shall be located at a minimum distance of 31m from water bodies. According to PC 005, quarries with acid-generating rock and rock with metal leaching potential shall be located at a minimum distance of 100m from the original high water mark of water bodies.
- Several of the proposed terms and conditions require the licensee to comply with plans to be submitted (Part D, Item 16, 41, 42; Part E, Item 5; Part F, Item 2, 21, 41, 52). It should be made clear that plans need to be approved by the NWB, and that time will be required for plan review.
- Part D, Item 21 states that lake and stream crossings, including ice bridges, shall be constructed of water, ice, or snow. The use of water to create ice bridges was not in the Type A water licence application and as such, a Type B application is recommended (refer to Issue 3.2 above).
- Part D, Item 38 states that temporary storage tanks shall be located at a distance of 31m from the ordinary high water mark of any adjacent water bodies. AANDC would like to see a 100m buffer between bulk fuel tank farms and adjacent water bodies.
- Part E, Item 7 states that the drawdown of natural water bodies will not exceed limits to be established in the Fresh Water Supply, Sewage and Wastewater Management Plan. AANDC is of the opinion that drawdown limits should be included in the water licence.
- Part F, Item 3 identifies criteria for treated sewage effluent which excludes plant start-up periods. Start-up criteria should be included in the water licence or effluent should be contained until it meets discharge effluent quality criteria in Table F-1.
- Part F, Item 9 states that release of runoff to the receiving environment may be permitted if the runoff quality meets the contact water quality discharge criteria. In addition to this, AANDC recommends that the Inspector be notified prior to any discharge.
- Part F, Items 11 and 12 states that treated effluent meeting effluent discharge criteria shall be discharged to Milne and Steensby Inlet respectively. Discharge should not occur until an Inspector has been notified and it is demonstrated that effluent meets effluent discharge criteria (refer to Issue 9.2).
- Part F, Item 26 states that “to the extent possible, the Licensee shall sort waste at the source”. AANDC recommends the statement “to the extent possible” be omitted from this term and condition to ensure that waste is always sorted according to the Waste Management Plan.
- Part F, Item 29 states that the licensee shall comply with Government of Nunavut guidelines for open burning of solid waste. The licensee should also comply with any terms and conditions provided in the water licence by the NWB.
- Part F, Items 33 and 36 states that ashes and dewatered sludge shall be disposed of in the landfill if they meet disposal criteria in the Waste Management Plans. Criteria should be included in the water licence and referenced in the term and condition.

- Part F, Item 38 states that the Landfill Design and Operations remains valid under this licence. The landfill design and operations is specific to the Type B water licence and may require updating prior to approval for the Type A water licence.
- Part F, Item 44 states that the licensee shall backhaul and dispose of hazardous wastes at licensed hazardous waste treatment facilities. This term and condition should indicate that hazardous waste will be backhauled annually to ensure that hazardous waste does not accumulate within the project area.
- Part F, Item 55 states that waste rock with ARD/ML potential shall be disposed of in the waste rock stockpile area. AANDC suggests that the term and condition also specify that the waste rock stockpile shall be located 100m from the high water mark of any water bodies.
- Part G, Item 1 states that the explosives management plan is the basis of this water licence. The meaning of this statement is unclear.
- Part J, Item 15 states that the AEMP Framework is approved with this Licence. Please see AANDC comments above regarding the AEMP framework.