



June 6, 2013

Our reference
IQALUIT-#673247

Your reference
2AM-DOH0713

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
Gjoa Haven, NU X0A 0H0

**Re: Type 'A' Water Licence Number 2AM-DOH0713 – TMAC Resources Inc. –
Doris North Gold Project – Kitikmeot Region -- Amendment and Renewal
Application**

Dear Ms. Beaulieu,

Thank you for your email of May 7, 2013, concerning TMAC Resources Inc.'s application to amend and renew the Doris North Gold Project's Type 'A' Water Licence.

A technical review memorandum is provided for the Board's consideration. Comments have been provided pursuant to the Department's mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Indian Affairs and Northern Development Act*.

Please do not hesitate to contact me by telephone at 867-975-4555 or email at david.abernethy@aandc-aadnc.gc.ca for further information.

Regards,

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Water Resources Division
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Aboriginal Affairs and Northern Development Canada
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c.c. Murray Ball, Manager of Water Resources, AANDC, Iqaluit, NU
Erik Allain, Manager of Field Operations, AANDC, Iqaluit, NU
Karen Costello, Director of Resource Management, AANDC, Iqaluit, NU

1. Executive Summary

The Doris North Project is situated on Inuit Owned Land in the Kitimeot Region of Nunavut, approximately 125 km southwest from Cambridge Bay and 75 km northwest of Umingmaktok. Effective March 12, 2013, TMAC Resources Inc. is the owner and operator of the project. Prior to this date, the project was owned and operated by Hope Bay Mining Ltd., a subsidiary of Newmont Mining Company. The project was approved for the mining and milling of an underground gold deposit, and associated activities, by the Nunavut Water Board (the “NWB” or “Board”) through a Type ‘A’ water licence that was issued on September 19, 2007. Construction of the project started in 2007 and was expected to continue through to 2013. Prior to TMAC Resources Inc.’s (the “Proponent”) acquisition, the project was in care and maintenance beginning January 31, 2012.

On May 7, 2013, the NWB distributed the Proponent’s application to amend and renew the Doris North Project’s Type ‘A’ Water Licence (scheduled to expire on September 30, 2013). Interested parties were requested to perform thorough technical assessments of the submitted application and provide written representations to the NWB. The Proponent is applying to renew the licence term for a ten year period, scheduled to commence on September 30, 2013. Suggested licence amendments reflect the current level of site construction and anticipated site occupation and activity if the project were to revert to care and maintenance.

An important component of the submitted application is the addition of a new licence section, Part M: Conditions Applying to Care and Maintenance. This section outlines general monitoring and water management requirements if the project were to revert to care and maintenance again. If the project were to be placed in care and maintenance and then return to operation or closure this section would no longer apply and the requirements for construction, production, or closure would be put into effect.

Aboriginal Affairs and Northern Development Canada (“AANDC” or the “Department”) has conducted a technical review of the submitted application. Issues that have been noted are organized into the following categories:

- General;
- Surface water;
- Water Management;
- Wastewater Management;
- Mine Design, Construction and Operation;

- Conditions Applying to Care and Maintenance; and,
- Closure Planning;

There were no significant issues related to Environmental Management, Waste Management, Ports and Roads or Geochemistry.

Recommendations have been provided to address shortcomings of the plans and related documents relative to the submitted Application. The most significant issues originate with effectiveness of water management system, closure and reclamation planning, and the need for regular information updates during care and maintenance.

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3. Background

On May 7, 2013, the NWB provided written notice of TMAC Resources Inc.'s application (the "Application") to amend and renew the Doris North Project's Type 'A' Mining and Milling water licence, No. 2AM-DOH0713. In accordance with section 55(1) of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (the "Act"), interested parties were requested to complete thorough **technical assessments** of the submitted application and make written representations on or before **June 6, 2013**. The application has been placed on the NWB online public registry.

In accordance with Rule 14 of the *NWB Rules of Practice and Procedure for Public Hearings*, the Board has decided to hold a **Technical Meeting and Pre-hearing Conference** (PHC) by audio conference on **June 14, 2013**. As stated in the distributed notice, the Board will issue a decision within ten days of the PHC. Furthermore, the NWB provided notice pursuant to section 55(2) of the Act that a **Written Hearing** is scheduled for **July 12, 2013**.

On October 10, 2012, the NWB provided notice of the Proponent's Application. Interested parties were asked to perform a completeness review of the submitted documentation and provide written representations to the Board. The department provided a completeness review memorandum on November 9, 2012.

The NWB is processing an application to assign the water licence from Hope Bay Mining Ltd. to TMAC Resources Inc. As stated in the NWB's May 7, 2013 letter,

all transactions have been completed and TMAC Resources Inc. has provided all documentation pertaining to the assignment as well as confirmation of transfer of the financial security held with the Minister of Aboriginal Affairs and Northern Development Canada as a requirement of the licence. The Board anticipates that the assignment of the Licence will be effected shortly. As the potential future licensee, TMAC Resources Inc. has indicated that they wish to continue with the application process for the renewal and amendments as submitted by Hope Bay Mining Ltd., and as such, TMAC Resources Inc. will be considered the applicant for the renewal and amendment going forward.

It is for this reason that TMAC Resources Inc. is identified as the Proponent in this technical review memorandum.

4. Review Findings

On behalf of Aboriginal Affairs and Northern Development Canada, the following recommendations are provided for the Board's consideration.

4.1 General

Issue No. 1

Application for a 10 year licence renewal to Type 'A' Water Licence No. 2AM-DOH0713

References

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

HBML 2012b. Hope Bay Mining Ltd. *Type A Water Licence Renewal and Amendment No. 4 Application Summary – Doris North Project, Nunavut*. August 10, 2012.

- 120810 2AM-DOH0713 A4 c Appendix A Application Summary ENG-IMLE

Observation

As referenced in Section 3 (Summary of Proposed Amendments) of the submitted Application Summary Document (HBML 2012b) and the licence copy marked to show past amendments and proposed changes (HBML 2012a), the Proponent is requesting a 10 year licence renewal term beginning September 30, 2013. The previous licence had a 6 year term, effective September 19, 2007 to September 30, 2013.

Recommendation

Renewing the licence term for 10 years is adequate given the proposed activities, monitoring requirements, and consistency with the terms granted to other Type 'A' water licences. AANDC would not support a longer term because of the value to perform regular public reviews of undertakings of this magnitude.

Issue No. 2

Removal of Monitoring and Follow-up Plan requirement

References

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

HBML 2013a. Hope Bay Mining Ltd. *Monitoring and Follow-up Plan. Revision 2.1*. Document No. HB-EM-ENV-MP-002. January 2013.

- 130123 2AM-DOH0713 JAN13 Monitoring and Follow-Up Plan-IAAE

Observation

As stated Part K, Item 5 of HBML 2012a, the Proponent is requesting that the Board consider eliminating the requirement to maintain a Monitoring and Follow-up Plan as it is a summary of plans and the information included in other plans (HBML 2012a).

Recommendation

The Proponent's request to remove the requirement to maintain a Monitoring and Follow-up Plan pursuant to Part K, Item 5 of the licence is adequate as it is a summary of information included other management and monitoring plans.

4.2 Surface Water

Issue No. 3

Identification of drainage facilities and key water bodies in the Final Water Management Plan

References

NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

Observation

As stated in Section 1.1 (Purpose and Scope of the Plan) of the Interim Water Management Plan, “HBML will implement this water management strategy during Care and Maintenance and until the site is either closed and reclaimed or proceeds into operation and tailings are discharged to Tail Lake. A final water management plan will be developed and implemented prior to depositing tailings into Tail Lake.” Pursuant to Part F, Item 1 of the licence, the Proponent will be required to submit a revised (final) Water Management Plan at least six months prior to the commencement of processing ore.

The Interim Water Management Plan does not fully describe existing site drainage facilities (e.g., management of water at underground workings, ditches, sedimentation berm, discharge apron, and silt fence) and key water bodies such as Doris Lake and the Tail Lake Tailings Impoundment Area (TIA). Although these features are identified in other documents (e.g., as-built construction drawings, geotechnical inspection reports) they should be identified and incorporated into the scope of the upcoming revised (final) Water Management Plan.

Recommendation

The Proponent should identify and explain the significance of all drainage facilities and key water bodies in the upcoming revised (final) Water Management Plan.

4.3 Water Management

Issue No. 4

Effectiveness of Runoff Diversion Controls

References

NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

Observation

As presented in the Interim Water Management Plan the Proponent assumes that a large up-slope area (145,444 m²) will not contribute any flow to the camp area because the water will be diverted to the southwest by the Doris North Camp Area Diversion Berm (constructed in 2012). The effectiveness of this diversion berm requires confirmation on a regular basis.

Recommendation

The major earthworks requiring annual geotechnical inspections pursuant to Part J, Item 18 of the licence should be revised to include the Doris North Camp Area Diversion Berm. Geophysical and permafrost conditions should be described in the Geotechnical Engineer's inspection reports that are required annually pursuant to Part J, Item 19 of the licence.

Additionally, the monthly monitoring reports that are required pursuant to Part J, Item 21 of the licence should document the Doris North Camp Diversion Berm's effectiveness of diverting runoff away from the camp area. As a minimum, conditions during spring freshet, major rain events, and periods of sustained precipitation should be monitored. Documented information can include flow measurements, photographs, and notes.

Issue No. 5

Effectiveness of the Pollution Control Pond and Underflow Capture System

References

NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

Observation

As referenced in Figure 1 (Water Management Areas) of the Interim Water Management Plan, mine contact runoff and underflow (active layer groundwater) from the east camp pad area (128,369 m²) are intended to be collected in the Pollution Control Pond (2,992 m³ capacity). Underflow that bypasses the Sedimentation Pond and the Pollution Control Pond should collect in two down gradient sumps (the

underflow capture system). According to the Interim Water Management Plan, water that collects within the Pollution Control Pond and the underflow capture system will be pumped to the Sedimentation Pond prior to being discharged into the Tail Lake TIA. It is possible that the Pollution Control Pond and underflow capture system will not effectively capture mine contact water (particularly during peak flows) and that this water will flow toward Doris Lake as underflow with only a small percentage being captured and diverted to the Tail Lake TIA. The underflow capture system will likely have limited cones of influence due to the active layer (i.e., 1.0 m). It seems unlikely that the underflow capture system will capture a large portion of the underflow. Furthermore, if the underflow capture system and the Pollution Control Pond water levels are higher than their surrounding groundwater (underflow) levels it is likely that underflow seepage will be diverted due to the reverse hydraulic gradient.

Recommendation

The revised (final) Water Management Plan required pursuant to Part F, Item 1 of the licence should address the following recommendations to ensure the effective management of contact runoff and underflow:

- The development of a monitoring system to confirm that an acceptable percentage of mine contact runoff and groundwater (underflow) are captured;
- Maximum water levels for all water collection facilities and associated monitoring activities should be established; and,
- Include mitigation measures to increase the effectiveness of the underflow capture system (e.g., French drains should be considered to ensure the collection of all potentially contaminated shallow groundwater)

Issue No. 6

Management of the Sedimentation Pond

References

HBML 2013a. Hope Bay Mining Ltd. *Monitoring and Follow-up Plan. Revision 2.1*. Document No. HB-EM-ENV-MP-002. January 2013.

- 130123 2AM-DOH0713 JAN13 Monitoring and Follow-Up Plan-IAAE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

Observation

Clean runoff and underflow from the west camp pad area (83,733 m²) was originally intended to be collected in the Sedimentation Pond (3,325 m³). HBML decided to fully line the pond with a geomembrane liner at the end of the 2011 open water season after no surface runoff was observed. As presented in the Interim Water Management Plan, the Sedimentation Pond will routinely receive runoff from the west camp pad area and function as a surge pond for mine contact water that collects within the Pollution Control Pond and the underflow capture system (two down gradient sumps). If warranted, the Sedimentation Pond will also receive water from the Temporary Holding Pond (Pad D), Landfarm Ponds, Quarry 1 Tank Farm, Vent Raise Tank Farm, Doris North Tank Farm (Pad R), Temporary Wash Bay, Roberts Bank Tank Farm, other small secondary containment facilities, and excess mine water (if encountered or produced). This water will subsequently be pumped to the Tail Lake TIA.

The January 2013 Monitoring and Follow-up Plan provides conflicting information with regard to the Sedimentation Pond's management. Section 8.2.1 (Construction, Operations and Closure Phases) states, "the Sedimentation Pond is used as a collection pond prior to transfer to the TIA. The Sedimentation Pond is not discharged to tundra." However, according to Table 8.2-1 (Water Quality Monitoring for the Sedimentation Pond ST1, Doris North), water will be discharged onto the tundra if discharge criteria are satisfied.

Recommendation

The Proponent should confirm how water in the Sedimentation Pond will be managed under the Interim Water Management Plan. Clarification should be provided on whether water that meets licensed discharge criteria (Part G, Item 21) will be discharged onto the tundra.

Issue No. 7

Required notice before any planned discharges from facilities

References

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

Observation

The Proponent is requesting that the minimum ten days notice that must be provided to an Inspector prior to any planned discharge of water from project facilities be reduced to five days (the estimated volume proposed for discharge and location is to be included in these notices). This request is included the proposed revisions to Part G, Item 1 of the licence, as indicated in the submitted licence copy marked to show past changes and suggested revisions (HBML 2012a). The Proponent claims that, “this change would permit water to be managed in a manner that would be more responsive to current site conditions.”

Recommendation

The Proponent should continue to provide a minimum ten days notice, rather than the proposed five days notice, to an Inspector prior to any planned discharge of water from project facilities. This duration is preferred because it allows enough time for an Inspector to travel to the site and monitor such discharges should he or she want to. If a ten day notice is not practical due to unforeseen conditions (e.g., major rain event), the Proponent should notify an Inspector.

Issue No. 8

Water balance and water quality model updates prior to active ore processing and during periods of care and maintenance

Reference

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

HBML 2012b. Hope Bay Mining Ltd. *Type A Water Licence Renewal and Amendment No. 4 Application Summary – Doris North Project, Nunavut*. August 10, 2012.

- 120810 2AM-DOH0713 A4 c Appendix A Application Summary ENG-IMLE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

Observation

As presented in the submitted summary document (HBML 2012b), the Proponent wants to change to the frequency water balance and water quality model updates required by Part G, item 31 of the licence during periods of care and maintenance,

During care and maintenance, the water balance model does not need to be updated because there is no need for a model to forecast water quality based on changing operations. HBML proposes that reporting requirement should be reduced from monthly updates to an annual data summary report. This annual report will summarize water quality data at the compliance monitoring locations and volumes of water pumped to and from Tail Lake.

This proposal is reflected in Part G, Item 31 and Part M, Item 2.c. the submitted licence copy marked to show past changes and suggested revisions (HBML 2012a).

Recommendation

Considering that the Tail Lake TIA is now receiving contact water from the Doris North camp and may receive water from containment areas that do not meet discharge criteria (SRK 2012b), the Proponent should be required, as a minimum, to update the water balance and water quantity model on an annual basis until the start of ore processing and tailings deposition as well as during any periods of care and maintenance. These updates should take into account the frequency of collected monitoring data.

Issue No. 9

Reduction in regular sampling frequency during discharge of water from the Tail Lake TIA

Reference

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

Observation

Proposed licensed monitoring program amendments are included in Schedule J (Conditions Applying to General and Aquatic Effects Monitoring), Table 2 (Monitoring Requirements) of the submitted licence copy marked to show past amendments and suggested revisions. Notable changes are proposed to the frequency of sampling water quality and conducting acute lethality testing at monitoring stations associated with the discharge of water from the Tail Lake TIA. For example, the number of samples to be collected during the two weeks prior to discharge and two weeks after discharge

commences have been reduced without any justification being provided to the Board and an Inspector pursuant to Part J, Item 4.b. of the licence.

Recommendation

Pursuant to Part J, Item 4.b. of the licence, the Proponent should provide to the Board and an Inspector justification for a reduction in sampling frequency of water quality and acute lethality at monitoring stations associated with the discharge of water from the Tail Lake TIA. The Board should also confirm the appropriateness of any reduction in acute lethality testing requirements with Environment Canada before accepting the Proponent's suggested revision.

Issue No. 10

Sampling frequency during periods of discharge from the Tail Lake TIA when water quality in Doris Creek downstream of the outflow waterfall is not within an acceptable range

Reference

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

Observation

The Proponent is recommending a change to Part J, Item 4.a. of the licence. The current requirement is to increase the sampling frequency to once every second day at three monitoring stations (TL-1 (reclaim pump barge), TL-2 (Doris Outflow Creek, upstream), and TL-3 (Doris Outflow Creek, downstream of waterfall)) when water is discharged from the Tail Lake TIA should the measured concentration of any parameter listed under Part G, Item 28 at TL-3 deviate by more than 20% from that predicted by the water quality model. The Proponent is requesting *to increasing the sampling frequency should the measured concentration of any parameter listed under Part G, Item 28 at TL-3 exceed the concentrations indicated in the table by 25% for a single grab sample, or 20% for an annual average sample during periods of active discharge.*

Recommendation

The Proponent should explain why the water quality model predictions should not be used to increase the sampling frequency at monitoring stations TL-1, TL-2, and TL-3 when water is discharged from the Tail Lake TIA. In addition, the Proponent should explain how it came to the conclusion that the sampling frequency be increased when

the measured concentration of any parameter listed under Part G, Item 28 at TL-3 exceed the concentrations indicated in the table by 25% for a single grab sample, or 20% for an annual average sample during periods of active discharge.

4.4 Wastewater Management

Issue No. 11

Management of treated effluent from the Sewage Treatment Plant

Reference

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

HBML 2013d. Hope Bay Mining Ltd. *2012 2AM-DOH0713 Type A Water Licence Annual Report*. March 2013.

- 130328 2AM-DOH0713 2012 Annual Report-ILAE

NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

Observation

The Proponent is requesting to remove the requirement to discharge treated effluent to the Tail Lake TIA once this facility is made operational. This is presented in Part G, Item 3.d. of the submitted licence copy that is marked to show past amendments and suggested changes (HBML 2012a). The current licence requires that treated sewage effluent be discharged to the Tail Lake TIA once it is made operational and before such time (i.e., construction) treated effluent is to be discharged through a diffuser onto a rock outcrop northwest of Doris Camp and meet the effluent quality limits specified in Part G, Item 3.b. of the licence (NWB 2007).

According to the submitted 2012 annual report, the Proponent followed the Interim Water Management Plan by discharging water from the Sedimentation Pond to the Tail Lake TIA in 2012 and is understood that this practice will continue in 2013 (HBML 2013d, SRK 2012b). It is understood that the Tail Lake TIA is now capable of receiving treated sewage effluent.

Recommendation

As a minimum, the Proponent should discharge treated sewage effluent into the Tail Lake TIA once ore processing commences. Consideration should be given to commencing this practice in 2013 because the Tail Lake TIA is already receiving water from the Sedimentation Pond in accordance with the Interim Water Management Plan (SRK 2012b). Directing treated sewage effluent to this facility would limit the project footprint, thereby reducing the likelihood of impacts to downstream water bodies (i.e., Glenn Lake).

4.5 Mine Design, Construction, and Operation

Issue No. 12

Discussion of mitigating risk of Potentially Acid Generating (“PAG”) rock concerns.

References

AMEC 2005. AMEC Earth & Environmental, a division of AMEC Americas Ltd. *Preliminary Mine Closure and Reclamation Plan. Doris North Project – Hope Bay Belt. Nunavut, Canada.* Prepared for Miramar Hope Bay Ltd. Document No. VM00259A. October 2005.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713.* Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan.* Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

Observation

The 2012 Closure and Reclamation Plan does not address the theoretical issues discussed in the superseded 2005 Preliminary Mine Closure and Reclamation Plan

(Sections 6.1.3 and 7.2) concerning potential issues associated with the underground disposal of PAG rock (i.e., oxidation). The 2005 plan discusses the following mitigation measures:

- The underground workings “never being force flooded”
- Permafrost being a major factor in oxidation of exposed PAG rock underground; and,
- The risk of permafrost breakdown inducing natural flooding of the underground also mitigate the oxidation risk (though the scenario of the admittedly unlikely event of loss of permafrost in an extreme global warming event extending the talik under Doris Lake to impact the underground workings).

Recommendation

The Interim Closure and Reclamation Plan that is required within six months of the start of ore processing pursuant to Part L, Item 4 of the licence should address potential issues associated with the underground disposal of PAG rock (i.e., oxidation).

Issue No. 13

Clarification on the removal of potentially hazardous materials from the underground workings

References

AMEC 2005. AMEC Earth & Environmental, a division of AMEC Americas Ltd. *Preliminary Mine Closure and Reclamation Plan. Doris North Project – Hope Bay Belt. Nunavut, Canada.* Prepared for Miramar Hope Bay Ltd. Document No. VM00259A. October 2005.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan.* Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

Observation

The 2012 Closure and Reclamation Plan includes the removal of all underground utilities and installations, sealing the entrance of the underground portal with a 15.0 m thick rockfill plug, and sealing the vent raise with a 0.5 m concrete plug. Unlike the superseded 2005 Closure and Reclamation Plan, the 2012 Plan does not confirm that all equipment and potentially hazardous materials will be removed from the underground mine workings, including hydrocarbon products, explosives, vehicle batteries, glycol, transformer fluids, antifreeze, etc.

Recommendation

The Interim Closure and Reclamation Plan that is required within six months of the start of ore processing pursuant to Part L, Item 4 of the licence should discuss the removal of equipment and potentially hazardous materials from underground workings. The removal of these materials should be implemented through progressive and final closure activities.

4.6 Conditions Applying to Care and Maintenance

Issue No. 14

Monitoring requirements during period of care and maintenance

References

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

Observation

Within HBML 2012a, monitoring requirements that only apply when the site is occupied are recommended throughout (e.g., Part G, Item 24; Part I, Item 7; Part J, Item 12; Part J, Item 16; Part J, Item 21). Schedule 'A' (Definitions) suggests that the term 'occupied' be defined as, "two or more site personnel attending at Doris North camp for seven or more consecutive nights." This terminology provides uncertainty on how monitoring activities will be implemented should the Proponent decide to not occupy the site or when the Proponent decides to place the project under care and maintenance.

Furthermore, the Proponent is requesting that the frequency of thermal monitoring data collection be reduced during periods of care and maintenance as referenced in Part M, Item 2.d. and 2.e..If approved, thermistors at the airstrip would be monitored annually rather than monthly and any additional thermistors located between the Tail Lake TIA and Doris Lake and between Doris Lake and the underground workings would not be monitored during periods of care and maintenance.

Recommendation

The amended and renewed licence should specify the monitoring requirements, particularly the frequency of monitoring activities, during care and maintenance. As a minimum, all water and hazardous material containment areas, including fuel storage

facilities, should be monitored monthly during periods of care and maintenance. In addition, the frequency of collecting thermal monitoring data should not be reduced during periods of care and maintenance as the integrity of site infrastructure can depend on the availability of monitoring data. Data should be collected from all thermistors on a monthly basis to ensure that they are functioning properly.

Issue No. 15

Monthly monitoring reporting requirements

References

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

Observation

As stated in Part M, Item 2.g. of HBML 2012b, the Proponent is requesting the following licence terms and condition during periods of care and maintenance:

The requirements set out in Part J, Item 21 shall not apply. A data summary report of all monitoring data shall be submitted annually. No update to the water balance model shall be required. The Tailings Impoundment Area shall be visually inspected weekly for TSS when camp is occupied. Prior to discharge from the Tailings Impoundment Area, water quality sample results shall be provided in writing to the inspector.

Part J, Item 21 of the licence (NWB 2007) requires the Proponent to submit monthly monitoring reports that include the following information:

- a. All data and information required by Part J and generated by the Monitoring Program in the Tables of Schedule J;
- b. Copies of results required by NIRB Project Certificate Item 10;
- c. An assessment of data to identify areas of non-compliance with regulated discharge parameters referred to in Part G;
- d. A summary of monthly operational assessments of the water balance and water quality model; and,
- e. Results of daily visual assessments of suspended sediment along the perimeter of the Tailings Impoundment Area shoreline during construction, operations, and closure.

The submission of monthly monitoring reports allows interested parties to stay regularly informed on project activities. While the scale of activities is diminished during Care and Maintenance Phases the submission of these reports is warranted due to the project's scale. Examples of information that would be provided are the results of winter inspections, all site water management activities, and progressive reclamation measures.

Recommendation

The monthly monitoring reports required by Part J, Item 21 of the licence should continue to be submitted even if the project reverts to a Care and Maintenance Phase. These reports are essential to monitoring potential environmental impacts that may result from the condition of site infrastructure and project activities.

Issue No. 16

Regular information updates during periods of care and maintenance

References

- N/A

Observation

During periods of care and maintenance the Board and interested parties should be regularly informed of the project's status and what measures will be followed to protect the environment from project related activities. The Proponent should also confirm that they have the capacity (i.e., adequate personnel) to manage water within the project area, particularly during periods of high flow (e.g., spring freshet, major rain events, and periods of sustained precipitation).

Recommendation

If the project reverts to care and maintenance the Proponent should provide regular information updates to the Board and interested parties to describe: (a) the project's status; (b) how licence terms and conditions are being satisfied; (c) updates to project management plans, and, (d) events or other actions would trigger final closure. As a minimum, these updates should be provided within three months of any decision to place the project in care and maintenance and annually thereafter (e.g., with annual report submissions).

Issue No. 17

Analysis of Tail Lake TIA water quality and quantity during care and maintenance

References

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

HBML 2012b. Hope Bay Mining Ltd. *Type A Water Licence Renewal and Amendment No. 4 Application Summary – Doris North Project, Nunavut*. August 10, 2012.

- 120810 2AM-DOH0713 A4 c Appendix A Application Summary ENG-IMLE

Observation

As stated in Section 3 (Summary of Proposed Amendments) of the submitted Application Summary (HBML 2012b),

During care and maintenance, the water balance model does not need to be updated because there is no need for a model to forecast water quality based on changing operations. HBML proposes that the reporting requirement should be reduced from monthly updates to an annual summary report. The annual report will summarize water quality data at the compliance monitoring locations and volumes of water pumped to and from Tail Lake.

The proposed licence term and condition, Part M, Item 2.b. reiterates this position and adds, “water quality predictions shall be compared to actual data, if the observed data differs significantly from previous care and maintenance predictions.”

It is not known why water quality predictions will only be compared to collected monitoring data when significant differences are noted and what would constitute a significant difference.

Recommendation

As a minimum, the Proponent should compare Tail Lake TIA water quality and quantity monitoring data to predictions generated by the water quality and water quantity model once annually during periods of care and maintenance to confirm its accuracy. The Proponent should explain the proposal to compare water quality predictions to collected monitoring data from the Tail Lake TIA when significant differences are noted during care and maintenance (proposed licence term and condition Part M, Item 2.b.). In particular, the Proponent should define a ‘significant’ difference.

Issue No. 18

Inspection of Tail Lake TIA during care and maintenance

References

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

Observation

Pursuant to Part G, Item 24.e. of the licence, the Proponent is required to “carry out as a minimum, weekly inspections to identify and remediate where necessary, areas of concern including issues of seepage, cracking, and ponding for all structures associated with the TIA including the North and South Dams, Emergency Dump Catch Basins, pipeline(s), pumps, mill tailings discharge points and other associated structures. The records shall be kept for review upon request of an Inspector” (HBML 2012a). The submitted licence copy marked to show past amendments and suggested changes recommends that these inspections only apply to periods when the site is occupied (refer to Part G, Item 24.e. and Part M, Item 2.a. of the marked licence).

Ensuring that the Tail Lake TIA continues to operate to engineering standards is critical regardless of project phase (i.e., construction, care and maintenance, operation, closure). This infrastructure should be regularly inspected if the project is placed in care and maintenance.

Recommendation

As a minimum, Part G, Item 24.e. and Part M, Item 2.a. of the licence should require the Proponent to visually monitor all structures associated with the Tail Lake TIA on a monthly basis when the site is not occupied (i.e., during periods of care and maintenance). Appropriately qualified individuals, the Board, and an Inspector should be immediately notified of any abnormalities.

4.7 Closure Planning

Issue No. 19

Updates to the Closure and Reclamation Plan and Closure Cost Estimate

References

NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

SRK 2012c. SRK Consulting (Canada) Inc. *Hope Bay Project Closure and Reclamation Cost Estimate – 2012 Update, NWB Licenses 2AM-DOH0713, 2BB-BOS1217, and 2BE-HOP1222*. Report prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 31, 2012.

121231 2AM-DOH0713 Hope Bay Closure Cost Estimate 2012 Update-ILAE

Observation

Pursuant to Part L, Items 4 and 6 of the licence, the Proponent is required to submit an Interim Mine Closure and Reclamation Plan and Final Mine Closure and Reclamation Plan, within six and eighteen months of the start of ore processing, respectively, in accordance with AANDC's 2007 *Mine Site Reclamation Guidelines for the Northwest Territories* and consistent with AANDC's 2002 *Mine Site Reclamation Policy for Nunavut* (NWB 2007).

Part C, Item 2 of the licence states, "the Licensee shall submit to the Board for approval, within six months of the start of ore processing and again following eighteen months of ore processing, an updated estimate of the total mine closure restoration liability using the current version of RECLAIM, its equivalent, or other similar method approved by the Board in accordance with the principles of AANDC's *Mine Site Reclamation Policy for Nunavut, 2000*" (NWB 2007).

On September 14, 2013 the NWB distributed the Proponent's August 2012 Closure and Reclamation Plan to interested parties for review. A Closure Cost Estimate in the amount of \$7,523,000 was included as an appendix to this plan. As stated in the Proponent's August 23, 2012 cover letter that accompanied the Closure and Reclamation Plan, "the Doris North Project was placed in care and maintenance on

January 31, 2012 and no ore processing had occurred on site prior to that date. HBML has therefore prepared this revised Closure and Reclamation Plan to present the current closure obligations at the site, how they will be met, and a plan for closing all facilities.” On January 15, 2013, the NWB distributed another revised closure cost estimate (dated December 31, 2013) in the amount of \$13,090,000.

Recommendation

The Proponent should submit an Interim Mine Closure and Reclamation Plan and updated cost estimate within six months of the start of ore processing as required by Part L Item 4 and Part C, Item 2 of the licence.

In addition to the Interim Mine Closure and Reclamation Plan and updated closure cost estimate requirements pursuant to Part L, Item 4 and Part C, Item 2 of the Licence, the Proponent should submit revised versions of these documents within three months of any future decision to place the project under care and maintenance and, as a minimum, every three years should the mine life extend beyond the projected two years of operation and within two years of licence issuance if ore processing has not started within this time period.

Issue No. 20

Clarification of post closure land use objectives

References

HBML 2012c. Hope Bay Mining Ltd. *Re: Renewal and Amendment Information Requests*. Memo to Phyllis Beaulieu, Nunavut Water Board, from Chris Hanks, HBML. Dated November 27, 2012.

- 121127 2AM-DOH0713 A4 HBML Response to Information Requests Table-IMLE

HBML 2013c. Hope Bay Mining Ltd. *Re: 2AM-DOH0713 HBML Response to the Closure Plan Comments*. Memo to Phyllis Beaulieu, Nunavut Water Board, from Chris Hanks, HBML. Dated February 14, 2013.

- 130214 2AM-DOH0713 Closure Plan Comment Responses-IAAE

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

Observation

The 2012 Closure and Reclamation Plan does not provide a targeted post-closure land use for the site. An industrial land use classification can be inferred by the proposal to leave certain facilities in place, such as roads, bulk fuel storage facilities, airstrip, the Roberts Bay jetty, and rock pads for future industrial land use (Sections 1.4 and 2.0). Additionally, the proposed soil quality remediation objectives are consistent with the requirements for Industrial Use Land as defined by the Canadian Council for Ministry of Environment Guidelines (the “CCME”) for Coarse Grained Soils.

Leaving the above-mentioned facilities in place may result in adverse environmental liabilities being incurred by landowners and stakeholders (e.g., water management in secondary containment areas and culverts, corrosion of metal structures, etc.). Details on how this infrastructure would be transferred to new owners for future use have not been provided. Furthermore, an industrial soil quality remediation objective could allow less stringent cleanup standards for the remediation of petroleum hydrocarbon and metal impacted soils.

Recommendation

The Proponent should consult traditional land users, land owners, and other stakeholders on the proposed post-closure land use criteria. Particularly, the proposal to leave certain facilities in place and the soil quality remediation objectives should be revisited. The Proponent should demonstrate that the proposed post-closure land use objectives are consistent with the 2012 Closure and Reclamation Plan's objective to establish “...stable chemical and physical conditions that protect the environment and human health” (Section 1.4).

Issue No. 21

Post-closure monitoring and maintenance program needs more clarity.

References

AANDC 2002. Aboriginal Affairs and Northern Development Canada. *Mine Site Reclamation Policy for Nunavut*. ISBN 0-662-32073-5. Ottawa: Minister of Public Works and Government Services Canada. 2002.

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

Observation

The post closure monitoring activities identified in the 2012 Closure and Reclamation Plan are brief and the implementation schedule is inconsistent. Section 4 of this document states monitoring activities will be conducted "... every two years for ten years." However, bullets presented above this statement provide inconsistent timeframes for seep sampling (annual), vegetation monitoring (Years 1, 3, 7, and 10), inspection of ore and waste rock covers (regular), and engineering inspections (three consecutive years).

Recommendation

Future revisions of the project's Closure and Reclamation Plan (i.e., the Interim Mine Closure and Reclamation Plan and the Final Mine Closure and Reclamation Plan pursuant to Part L, Items 4 and 6 of the licence should provide greater detail on post-closure monitoring activities. The Department's Mine Site Reclamation Policy for Nunavut should be followed when developing a post closure monitoring program. This policy states that Mine Closure and Reclamation Plans should address,

a plan for post-closure monitoring of the site including a monitoring schedule and reporting frequencies. (For a monitoring program to be meaningful, it must include provision for appropriate progressive responses which trigger action whenever exceeded, including the establishment of thresholds of the identification of changes in circumstances.

The Proponent should note that this policy also states,

Once the reclamation work required by the plan is deemed completed, the site will be allowed to stabilize. During this time, monitoring will be conducted by the company and verified by DIAND and other agencies as appropriate, with respect to the effectiveness of the mitigative measures, the accuracy of the environmental assessment, and any unforeseen environmental impacts, The duration of the required monitoring phase will be reviewed and confirmed at the time of closure and will depend on the risks associated with the potential impacts on the environment.

During this period, the mining company will continue to be responsible for the site, including remediation of any additional environmental complications which develop. If warranted by site conditions, the monitoring period may be extended to ensure remedial measures are met.

Issue No. 22

Acceptance of proposed closure cost estimate and updates

References

HBML 2013c. Hope Bay Mining Ltd. *Re: 2AM-DOH0713 HBML Response to the Closure Plan Comments*. Memo to Phyllis Beaulieu, Nunavut Water Board, from Chris Hanks, HBML. Dated February 14, 2013.

- 130214 2AM-DOH0713 Closure Plan Comment Responses-IAAE

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

SRK 2012c. SRK Consulting (Canada) Inc. *Hope Bay Project Closure and Reclamation Cost Estimate – 2012 Update, NWB Licenses 2AM-DOH0713, 2BB-BOS1217, and 2BE-HOP1222*. Report prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 31, 2012.

- 121231 2AM-DOH0713 Hope Bay Closure Cost Estimate 2012 Update-ILAE

SRK 2012d. SRK Consulting (Canada) Inc. *Hope Bay Project – Comparison Between RECLAIM and SRK Cost Estimating Models NWB Licenses 2AM-DOH0713, 2BB-BOS1217, and 2BE-HOP1222*. Memo to Chris Hanks, HBML, from SRK. December 31, 2012.

- 121231 2AM-DOH0713 Hope Bay Closure Costing Model Comparison RECLAIM vs SRK Model-ILAE

Observation

On September 14, 2012, the NWB distributed a revised Closure Cost Estimate (dated August 2012) and a Closure and Reclamation Plan that were prepared by SRK Consulting (Canada) Inc. (“SRK”) on behalf of the Proponent. The Closure Cost Estimate (SRK 2012a) was in the amount of \$7,523,000 and was derived from a spreadsheet model developed by SRK. The department reviewed these submissions and provided comments for the Board’s consideration on October 14, 2012. The Proponent responded to these comments on February 14, 2013 (HBML 2013c).

On January 15, 2013, the NWB distributed another revised Closure Cost Estimate (dated December 31, 2012) in the amount of \$13,090,000 (SRK 2012c). As stated in Section 2 (Hope Bay Liability Cost Estimate) of the December 2012 cost estimate, “The updated Closure and Reclamation cost is higher than the previously submitted estimates, mainly because the owner’s costs and some of the unit rates were updated, while the mobilization – demobilization costs were refined to better suit the specifics of this project. An important cost component not previously accounted for is the water management for the Doris North area.”

The December 31, 2012 comparison of the RECLAIM and SRK cost estimating models (SRK 2012d) provides a good description for the basis of the revised cost estimate and how the spreadsheet model used by SRK meets or exceeds the methodology of the standard RECLAIM 6.1 model.

Recommendation

The Proponent's updated closure cost estimate of \$13,090,000 is adequate and should be incorporated into an amended and renewed licence. This recommendation is based on the following reasons:

- The rationale provided for using SRK's cost estimating model (SRK 2012d);
- The estimate was prepared by professional engineers (HBML 2013c);
- The estimate is based on the work being completed by a third party (HBML 2013c); and,
- The licence requirements to revise the Closure and Reclamation Plan and Closure Cost Estimate within six and eighteen months following the commencement of ore processing activities (Part C, Item 2 and Part L, Item 4 of the licence)

It should be noted that the department has not performed a detailed review of the submitted Closure Cost Estimate.

5. Recommendation Summary

Reproduced below are the Department's recommendations as result of this technical review. Recommendations have been organized into the following categories:

- General;
- Surface water;
- Water Management;
- Wastewater Management;
- Mine Design, Construction, and Operation;
- Conditions Applying to Care and Maintenance; and,
- Closure Planning;

5.1 General

Recommendation No. 1

Renewing the licence term for 10 years is adequate given the proposed activities, monitoring requirements, and consistency with the terms granted to other Type 'A' water licences. AANDC would not support a longer term because of the value to perform regular public reviews of undertakings of this magnitude.

Recommendation No. 2

The Proponent's request to remove the requirement to maintain a Monitoring and Follow-up Plan pursuant to Part K, Item 5 of the licence is adequate as it is a summary of information included in other management and monitoring plans.

5.2 Surface Water

Recommendation No. 3

The Proponent should identify and explain the significance of all drainage facilities and key water bodies in the upcoming revised (final) Water Management Plan.

5.3 Water Management

Recommendation No. 4

The major earthworks requiring annual geotechnical inspections pursuant to Part J, Item 18 of the licence should be revised to include the Doris North Camp Area Diversion Berm. Geophysical and permafrost conditions should be described in the Geotechnical Engineer's inspection reports that are required annually pursuant to Part J, Item 19 of the licence.

Additionally, the monthly monitoring reports that are required pursuant to Part J, Item 21 of the licence should document the Doris North Camp Diversion Berm's effectiveness of diverting runoff away from the camp area. As a minimum, conditions during spring freshet, major rain events, and periods of sustained precipitation should be monitored. Documented information can include flow measurements, photographs, and notes.

Recommendation No. 5

The revised (final) Water Management Plan required pursuant to Part F, Item 1 of the licence should address the following recommendations to ensure the effective management of contact runoff and underflow:

- The development of a monitoring system to confirm that an acceptable percentage of mine contact runoff and groundwater (underflow) are captured;
- Maximum water levels for all water collection facilities and associated monitoring activities should be established; and,
- Include mitigation measures to increase the effectiveness of the underflow capture system (e.g., French drains should be considered to ensure the collection of all potentially contaminated shallow groundwater)

Recommendation No. 6

The Proponent should confirm how water in the Sedimentation Pond will be managed under the Interim Water Management Plan. Clarification should be provided on whether water that meets licensed discharge criteria (Part G, Item 21) will be discharged onto the tundra.

Recommendation No. 7

The Proponent should continue to provide a minimum ten days notice, rather than the proposed five days notice, to an Inspector prior to any planned discharge of water from project facilities. This duration is preferred because it allows enough time for an Inspector to travel to the site and monitor such discharges should he or she want to. If a

ten day notice is not practical due to unforeseen conditions (e.g., major rain event), the Proponent should notify an Inspector.

Recommendation No. 8

Considering that the Tail Lake TIA is now receiving contact water from the Doris North camp and may receive water from containment areas that do not meet discharge criteria (SRK 2012b), the Proponent should be required, as a minimum, to update the water balance and water quantity model on an annual basis until the start of ore processing and tailings deposition as well as during any periods of care and maintenance. These updates should take into account the frequency of collected monitoring data.

Recommendation No. 9

Pursuant to Part J, Item 4.b. of the licence, the Proponent should provide to the Board and an Inspector justification for a reduction in sampling frequency of water quality and acute lethality at monitoring stations associated with the discharge of water from the Tail Lake TIA. The Board should also confirm the appropriateness of any reduction in acute lethality testing requirements with Environment Canada before accepting the Proponent's suggested revision.

Recommendation No. 10

The Proponent should explain why the water quality model predictions should not be used to increase the sampling frequency at monitoring stations TL-1, TL-2, and TL-3 when water is discharged from the Tail Lake TIA. In addition, the Proponent should explain how it came to the conclusion that the sampling frequency be increased when the measured concentration of any parameter listed under Part G, Item 28 at TL-3 exceed the concentrations indicated in the table by 25% for a single grab sample, or 20% for an annual average sample during periods of active discharge.

5.4 Wastewater Management

Recommendation No. 11

As a minimum, the Proponent should discharge treated sewage effluent into the Tail Lake TIA once ore processing commences. Consideration should be given to commencing this practice in 2013 because the Tail Lake TIA is already receiving water from the Sedimentation Pond in accordance with the Interim Water Management Plan (SRK 2012b). Directing treated sewage effluent to this facility would limit the project footprint, thereby reducing the likelihood of impacts to downstream water bodies (i.e., Glenn Lake).

5.5 Mine Design, Construction, and Operation

Recommendation No. 12

The Interim Closure and Reclamation Plan that is required within six months of the start of ore processing pursuant to Part L, Item 4 of the licence should address potential issues associated with the underground disposal of PAG rock (i.e., oxidation).

Recommendation No. 13

The Interim Closure and Reclamation Plan that is required within six months of the start of ore processing pursuant to Part L, Item 4 of the licence should discuss the removal of equipment and potentially hazardous materials from underground workings. The removal of these materials should be implemented through progressive and final closure activities.

5.6 Conditions Applying to Care and Maintenance

Recommendation No. 14

The amended and renewed licence should specify the monitoring requirements, particularly the frequency of monitoring activities, during care and maintenance. As a minimum, all water and hazardous material containment areas, including fuel storage facilities, should be monitored monthly during periods of care and maintenance. In addition, the frequency of collecting thermal monitoring data should not be reduced during periods of care and maintenance as the integrity of site infrastructure can depend on the availability of monitoring data. Data should be collected from all thermistors on a monthly basis to ensure that they are functioning properly.

Recommendation No. 15

The monthly monitoring reports required by Part J, Item 21 of the licence should continue to be submitted even if the project reverts to a Care and Maintenance Phase. These reports are essential to monitoring potential environmental impacts that may result from the condition of site infrastructure and project activities.

Recommendation No. 16

If the project reverts to care and maintenance the Proponent should provide regular information updates to the Board and interested parties to describe: (a) the project's status; (b) how licence terms and conditions are being satisfied; (c) updates to project management plans, and, (d) events or other actions would trigger final closure. As a minimum, these updates should be provided within three months of any decision to

place the project in care and maintenance and annually thereafter (e.g., with annual report submissions).

Recommendation No. 17

As a minimum, the Proponent should compare Tail Lake TIA water quality and quantity monitoring data to predictions generated by the water quality and water quantity model once annually during periods of care and maintenance to confirm its accuracy. The Proponent should explain the proposal to compare water quality predictions to collected monitoring data from the Tail Lake TIA when significant differences are noted during care and maintenance (proposed licence term and condition Part M, Item 2.b.). In particular, the Proponent should define a 'significant' difference.

Recommendation No. 18

As a minimum, Part G, Item 24.e. and Part M, Item 2.a. of the licence should require the Proponent to visually monitor all structures associated with the Tail Lake TIA on a monthly basis when the site is not occupied (i.e., during periods of care and maintenance). Appropriately qualified individuals, the Board, and an Inspector should be immediately notified of any abnormalities.

5.7 Closure Planning

Recommendation No. 19

The Proponent should submit an Interim Mine Closure and Reclamation Plan and updated cost estimate within six months of the start of ore processing as required by Part L Item 4 and Part C, Item 2 of the licence.

In addition to the Interim Mine Closure and Reclamation Plan and updated closure cost estimate requirements pursuant to Part L, Item 4 and Part C, Item 2 of the Licence, the Proponent should submit revised versions of these documents within three months of any future decision to place the project under care and maintenance and, as a minimum, every three years should the mine life extend beyond the projected two years of operation and within two years of licence issuance if ore processing has not started within this time period.

Recommendation No. 20

The Proponent should consult traditional land users, land owners, and other stakeholders on the proposed post-closure land use criteria. Particularly, the proposal to leave certain facilities in place and the soil quality remediation objectives should be revisited. The Proponent should demonstrate that the proposed post-closure land use

objectives are consistent with the 2012 Closure and Reclamation Plan's objective to establish "...stable chemical and physical conditions that protect the environment and human health" (Section 1.4).

Recommendation No. 21

Future revisions of the project's Closure and Reclamation Plan (i.e., the Interim Mine Closure and Reclamation Plan and the Final Mine Closure and Reclamation Plan pursuant to Part L, Items 4 and 6 of the licence should provide greater detail on post-closure monitoring activities. The Department's Mine Site Reclamation Policy for Nunavut should be followed when developing a post closure monitoring program. This policy states that Mine Closure and Reclamation Plans should address,

a plan for post-closure monitoring of the site including a monitoring schedule and reporting frequencies. (For a monitoring program to be meaningful, it must include provision for appropriate progressive responses which trigger action whenever exceeded, including the establishment of thresholds of the identification of changes in circumstances.

The Proponent should note that this policy also states,

Once the reclamation work required by the plan is deemed completed, the site will be allowed to stabilize. During this time, monitoring will be conducted by the company and verified by DIAND and other agencies as appropriate, with respect to the effectiveness of the mitigative measures, the accuracy of the environmental assessment, and any unforeseen environmental impacts, The duration of the required monitoring phase will be reviewed and confirmed at the time of closure and will depend on the risks associated with the potential impacts on the environment.

During this period, the mining company will continue to be responsible for the site, including remediation of any additional environmental complications which develop. If warranted by site conditions, the monitoring period may be extended to ensure remedial measures are met.

Recommendation No. 22

The Proponent's updated closure cost estimate of \$13,090,000 is adequate and should be incorporated into an amended and renewed licence. This recommendation is based on the following reasons:

- The rationale provided for using SRK's cost estimating model (SRK 2012d);
- The estimate was prepared by professional engineers (HBML 2013c);
- The estimate is based on the work being completed by a third party (HBML 2013c); and,
- The licence requirements to revise the Closure and Reclamation Plan and Closure Cost Estimate within six and eighteen months following the commencement of ore processing activities (Part C, Item 2 and Part L, Item 4 of the licence)

It should be noted that the department has not performed a detailed review of the submitted Closure Cost Estimate.

6. Works Cited

AMEC 2005. AMEC Earth & Environmental, a division of AMEC Americas Ltd. *Preliminary Mine Closure and Reclamation Plan. Doris North Project – Hope Bay Belt. Nunavut, Canada.* Prepared for Miramar Hope Bay Ltd. Document No. VM00259A. October 2005.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

AANDC 2002. Aboriginal Affairs and Northern Development Canada. *Mine Site Reclamation Policy for Nunavut.* ISBN 0-662-32073-5. Ottawa: Minister of Public Works and Government Services Canada. 2002.

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes).* Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

HBML 2012b. Hope Bay Mining Ltd. *Type A Water Licence Renewal and Amendment No. 4 Application Summary – Doris North Project, Nunavut.* August 10, 2012.

- 120810 2AM-DOH0713 A4 c Appendix A Application Summary ENG-IMLE

HBML 2012c. Hope Bay Mining Ltd. *Re: Renewal and Amendment Information Requests.* Memo to Phyllis Beaulieu, Nunavut Water Board, from Chris Hanks, HBML. Dated November 27, 2012.

- 121127 2AM-DOH0713 A4 HBML Response to Information Requests Table-IMLE

HBML 2013a. Hope Bay Mining Ltd. *Monitoring and Follow-up Plan. Revision 2.1.* Document No. HB-EM-ENV-MP-002. January 2013.

- 130123 2AM-DOH0713 JAN13 Monitoring and Follow-Up Plan-IAAE

HBML 2013b. Hope Bay Mining Ltd. *Re: 2AM-DOH0713, 2BE-HOP1222, and 2BB-BOS12172– Updated Security Estimates,* Memo to Phyllis Beaulieu, Nunavut Water Board, from Chris Hanks, HBML. January 14, 2013.

- 121231 2AM-DOH0713 Hope Bay Closure Cost Estimate 2012 Update-ILAE

HBML 2013c. Hope Bay Mining Ltd. *Re: 2AM-DOH0713 HBML Response to the Closure Plan Comments*. Memo to Phyllis Beaulieu, Nunavut Water Board, from Chris Hanks, HBML. Dated February 14, 2013.

- 130214 2AM-DOH0713 Closure Plan Comment Responses-IAAE

HBML 2013d. Hope Bay Mining Ltd. *2012 2AM-DOH0713 Type A Water Licence Annual Report*. March 2013.

- 130328 2AM-DOH0713 2012 Annual Report-ILAE

NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

SRK 2012c. SRK Consulting (Canada) Inc. *Hope Bay Project Closure and Reclamation Cost Estimate – 2012 Update, NWB Licenses 2AM-DOH0713, 2BB-BOS1217, and 2BE-HOP1222*. Report prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 31, 2012.

- 121231 2AM-DOH0713 Hope Bay Closure Cost Estimate 2012 Update-ILAE

SRK 2012d. SRK Consulting (Canada) Inc. *Hope Bay Project – Comparison Between RECLAIM and SRK Cost Estimating Models NWB Licenses 2AM-DOH0713, 2BB-BOS1217, and 2BE-HOP1222*. Memo to Chris Hanks, HBML, from SRK. December 31, 2012.

- 121231 2AM-DOH0713 Hope Bay Closure Costing Model Comparison RECLAIM vs SRK Model-ILAE