Indian and Northern Affairs Canada
Affaires indiennes et du Nord Canada

Our reference
IQALUIT-#452103

March 23, 2011

Sent by email: licensing@nunavutwaterboard.org

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
Gjoa Haven, Nunavut
X0E 1J0

Your reference
2AM-DOH0713/TR/F1

Re: Type 'A' Water Licence No. 2AM-DOH0713 – Hope Bay Mining Ltd. – Doris North Project – Kitikmeot Region – December 2010 Interim Water Management Plan

Dear Phyllis,

Thank you for your February 22, 2011 request for written representations on the above referenced submission.

A Technical Review Memorandum is provided for the Board's consideration.

Please contact David Abernethy at 867 975-4555 or email at David.Abernethy@inac-ainc.gc.ca if you have any questions about this submission.

Regards,

J. Rogers
Water Resources Manager
Operations Directorate
Nunavut Regional Office
Iqaluit, Nunavut
X0A 0H0

Encl.

c.c.: David W. Abernethy, Water Resources Regional Coordinator
P. Kusugak, Field Operations Manager

Technical Review Memorandum

TO Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board

OUR REFERENCE
File #9545-2-1.2AM.DOHA
IQALUIT-#452103

YOUR REFERENCE
2AM-DOH0713/TR/F1

FROM Jim Rogers
Manager, Water Resources
Indian and Northern Affairs Canada

DATE
March 23, 2011

SUBJECT **Type 'A' Water Licence No. 2AM-DOH0713 – Hope Bay Mining Ltd. – Doris North Project – Kitikmeot Region – December 2010 Interim Water Management Plan**

A. PROJECT DESCRIPTION

On February 22, 2011 the Nunavut Water Board (the Board) distributed Hope Bay Mining Ltd.'s (HBML) December 2010 *Interim Water Management Plan* requesting written representation from interested parties. Hope Bay Mining Ltd. submitted this plan pursuant to Part F, Item 1 of their Type 'A' Water Licence No. 2AM-DOH0713. As stated in Section 2 of the submitted plan,

> The water management plan presented in the 2007 Water Licence application by Miramar Hope Bay Mining Ltd. (MHBL) relied on the utilization of Tail Lake. Due to changes in the project timing, removal of fish from Tail Lake will not be complete until the end of the open water season in 2011. Until such time the use of Tail Lake is approved by the regulatory authorities, the facility must be excluded from the Water Management Plan. It is currently anticipated that HBML will start to incorporate the use of Tail Lake into the water management plan as per the original design in the fall of 2011 after the North Dam on Tail Lake is completed and the lake has been fished out. In the interim, management of seepage and runoff from the Doris North Mine Area is still required to prevent the release of contaminants to the downstream environment (HBML 2010, 1).

The submitted plan is specific to the Doris North Project's central mine area and land farm (hydrocarbon contaminated soils remediation) facility. The mine area falls within the larger Doris Lake drainage basin, occupying 162,000 m^2 of a 390,000 m^2 catchment area. Based on mean annual precipitation rates and no allowance for infiltration, ice entrainment, and sublimation, HBML has calculated that the maximum runoff from this catchment area to be 91,000 m^3 annually. Consistent with the 2007 Water Management Plan, upstream diversion structures will be constructed to divert non-contact runoff away from the mine area. Runoff associated with 179,000 m^2 of this undisturbed area

will be diverted to the mine area's south western edge and run off from the remaining 49,000 m^2 of undisturbed land will be directed to the mine area's south eastern edge.

Two (2) effluent containment facilities will be used to contain run-off and seepage from within the central mine area (disturbed area), the Sedimentation Pond and the Pollution Control Pond. As stated in Section 7.2.1 of the submitted plan, "Approximately 49% of the mine area (80,000 m^2) will be in contact with non-mineralized rock used to construct the pads, and will report to the Sedimentation Pond. The remaining 51% or 82,000 m^2 includes runoff from the mill area, ore stockpiles and waste rock storage area, and will report to the Pollution Control Pond" (HBML 2010, 11).

Pursuant to Part G, Item 21 of the Water Licence, effluent that collects within the Sedimentation Pond will be discharged to the tundra once monitoring data demonstrate that effluent discharge limits have been met. Effluent that does not meet this discharge criteria will be directed to the Pollution Control Pond.

The Pollution Control Pond is designed to accommodate 14,700 m^3 of effluent. This estimate is based on mean annual precipitation volumes plus a 24-hour, one in twenty-five (1:25) storm event, plus 5% of the total runoff and seepage expected to be diverted from the undisturbed areas north of the mine area; active snow removal; and the partial freezing of water that infiltrates the rock fill pads and waste rock pile. HBML is proposing the following mitigation measures if the volume of potentially contaminated runoff exceeds the Pollution Control Pond's containment capacity,

- A Reverse Osmosis Water Treatment Facility (RO Plant) will be installed to treat Pollution Control Pond effluent. Treated effluent would be directed to the Sedimentation Pond and be subsequently discharged to the tundra if effluent discharge limits are met. If effluent reporting from the RO Plant cannot meet the Sedimentation Pond's discharge limits will be returned to the Pollution Control Pond;
- In the event that the Pollution Control Pond's containment capacity is depleted, effluent will be directed to the Sedimentation Pond for storage until it can be treated and subsequently discharged onto the tundra; and,
- If the containment capacities of both the Pollution Control Pond and the Sedimentation Pond are depleted, effluent will be directed to the land farm facility for temporary storage until it can be treated and subsequently discharged.

Indian and Northern Affairs Canada (INAC) understands that any effluent that is contained within the Sedimentation Pond and Pollution Control Pond that do not meet licensed discharge criteria and is not treated through an RO Plan

will be directed to the project's tailings impoundment area once it is brought into operation.

Part F, Item 1 of the Water Licence states,

The Licensee shall submit to the Board for review by May 1, 2008, a revised Water Management Plan. The revised Plan shall include the following:

a) A requirement to continuously monitor Doris Lake levels and outflow during the two (2) years of mining and beyond to confirm water balance model predictions;

b) Requirements for on-going monitoring and calibration of the water quality model;

c) A strategy to monitor and remove where necessary snow accumulation in the Pollution Control Pond, roads, ditches, and drainage channels; and,

d) The Plan shall consider the monitoring requirements set out in Parts J and K.

HBML noted in their January 12, 2011 letter that accompanied this plan that Part F, Item 1 a) and b) of the Water Licence (see above) are considered to be not applicable to the proposed Interim Water Management Plan. However, "following construction of the North Dam at Tail Lake and in advance of commencing any diversion of run-off to the tailings impoundment area, HBML will submit an updated Water Management Plan to the Board for approval which will fully address all of the specific criteria listed in Part F, Item 1 of the Water Licence" (HBML 2011).

B. RESULTS OF REVIEW

On behalf of the INAC Water Resources Division the following comments/ recommendations are provided to the Board.

1. General

The Interim Water Management Plan proposed by HBML appears reasonable but is missing information and explanations to determine if potential environmental effects and potential environmental liabilities will be minimized until the use of Tail Lake is approved. .INAC Water Resources Division believes that HBML should implement Part F, Item 1 a) and b) of the Water Licence to gather sufficient baseline information.

2. Operation of Pollution Control and Sedimentation Ponds

Greater clarification on how effluent from the Pollution Control and Sedimentation Ponds will be managed by operating a reverse osmosis water treatment facility (RO Plan) should be provided. Specifically, the INAC Water Resources Divisions questions if and why treated water will be directed to the Sedimentation Pond other than to dilute the concentrations of parameters of concern in the sediment pond. Also, the plan does not clearly indicate that the remaining water with high concentration will be handled. Returning the sludge/ return water from the RO Plant to the pollution control pond would increase the total load and concentrations within the pond making treatment more difficult although increasing the storage space. HBML should perhaps indicate the risks involved in Option 1 and the probability of that option being implemented.

3. The Pollution Control Pond's Retention Capacity

The INAC Water Resources Division questions the climate estimates used to determine the volume of water that the Pollution Control Pond must be capable of managing during design events. Section 4.1 design rainfall events have been exceeded more than once atKugluktuk. INAC was unable to access the more recent Golder reports and, during the previous technical hearings, the project operator was reminded to consider the July 2007 rainstorm at Kugluktuk. HBML should review their climate data and clarify their design retention capacities of both the Pollution Control Pond and Sedimentation Ponds.

4. Referenced Draft 2009 Golder Report

In my review I noted that the December 2009 Golder report titled, "Doris Project Area 2008 Hydrology Baseline Update," referenced in the submitted plan is a draft version. This report should be finalized taking into account the comments provided in Item No. 3 (above) and HBML should ensure that accurate climate data are used in the design of their project's Sedimentation and Pollution Control Ponds. Also, whenever possible, future HBML submissions should not reference draft reports/ plans.

5. Reverse Osmosis Water Treatment Facility (RO Plant)

HBML should describe the conditions that would necessitate the installation of a RO Plant, such as a specified volume of effluent within the Pollution Control Pond and/or maximum freeboard level. The plan should also include general

design specifications of the RO Plant such as treatment capacity, membrane type, filtration size, plant specific operationsand the time required to commission a facility.

6. Scope of Water Management Plan

The submitted plan is specific to the Doris North Project's central mine area and, to a limited extent, the project's land farm facility. Although HBML has stated that their plan will be updated to include provisions concerning the tailings impoundment area before it is commissioned, not all water management provisions specific to the project have been included in the submitted plan. Examples include,

- Water usage (e.g., potable water, water for construction purposes/ mine development, and dust control);
- Storm water management, especially for areas with a higher risk of contamination such as the fuel transfer station, fuel storage facilities, and land farm facility;
- Sewage treatment and disposal; and,
- The Aquatic Effects Monitoring Program.

The INAC Water Resources Division recommends that future amendments to this plan address all known water management provisions associated with the project and reference all applicable management plans and reporting requirements associated with the Water Licence.

7. Amendment No. 2 to the Water Licence

Pending the Minister of Indian Affairs and Northern Development's approval of the Board's Amendment No. 2 to the Water Licence issued February 15, 2011, water management practices applicable to the expansion of the Roberts Bay fuel storage and containment facility; expansion to the project's all-weather airstrip and construction of a bypass road; and, revised location of the cyanide and reagent storage facility, should be included in a revised plan.

c.c.: J. Rogers, Water Resources Manager
P. Kusugak, Field Operations Manager

– REFERENCES –

Hope Bay Mining Ltd. *Doris North Project Interim Water Management*. Prepared by SRK Engineering Consultants and Engineers, Project Number 1CH008.038. North Vancouver: 2010.

Hope Bay Mining Ltd. *Re: 2AM-DOH0713 – Interim Water Management Plan*. Letter from Chris Hanks, Director of Environment and Social Responsibility. North Vancouver: January 12, 2011.

Miramar Hope Bay Ltd. *Water Management Plan – Doris North Project, Nunavut*. North Vancouver: April 2007.

Nunavut Water Board. *Water Licence No. 2AM-DOH0713.* Gjoa Haven: September 19, 2007.

Nunavut Water Board. *Water Licence No. 2AM-DOH0713 – Amendment No. 1.* Gjoa Haven: August 4, *2010*.

Nunavut Water Board. *Water Licence No. 2AM-DOH0713 – Amendment No. 2.* Gjoa Haven: February 15, 2011.