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18 November 2010

EC File: 4703 001 016  
NWB File: 2BB-BOS0712

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**RE: 101014 2BB-BOS0712/E8 Water and Ore/Waste Rock Management Plan**

Environment Canada (EC) has reviewed the above-mentioned information submitted to the Nunavut Water Board (NWB). The following specialist advice has been provided pursuant to the *Canadian Environmental Protection Act*, Section 36(3) of the *Fisheries Act*, the *Migratory Birds Convention Act*, and the *Species at Risk Act*.

Hope Bay Mining Ltd. (HBML) prepared a Water and Ore/Waste Rock Management Plan (WRMP) for the Boston Site, Hope Bay Project. This WRMP was received by the NWB and reviewed by EC on 21 September 2009. In October 2010, HBML submitted a memo to the NWB providing responses to these comments. Upon review of the memo, EC provides these additional comments:

ID No.	EC Comment 12-Sept-09	HBML Response 20-Oct-10	EC Comment 18-Nov-10
EC-01	EC does not consider dilution to be an acceptable method to reduce contamination concentrations. Discharge should be non-deleterious at "end of pipe", and should be demonstrably non-acutely toxic at that point.	Photos presented in Attachment 1 of Supporting Document B of the Plan illustrate the nature of the streams, which lend themselves to periodic overland flow. In July 2009, an aquatic specialist from Rescan assessed the ephemeral streams at Boston for fish habitat. At the time, the streams were not flowing and were characterized as having "no stream channelization, no substrate/stream bed, and no aquatic vegetation". On this basis, the streams were not considered fish habitat. In fact, by most definitions, they would not be considered to be streams. At the point where these flows enter the receiving environment (i.e., the Aimaokatalok Lake shoreline, where aquatic life is likely present and where these regulations are applicable),	EC encourages ongoing monitoring of contributions of the ephemeral streams to Aimaokatalok Lake, in order to continue to meet the <i>Fisheries Act</i> requirement that prohibits the deposition of deleterious substances into waters which may enter fish-bearing waters. We concur that a site visit would be useful and would appreciate the opportunity.

		<p>metals concentrations were demonstrably low and non-acutely toxic.</p> <p>HBML would like to provide an opportunity for EC to visit the site in 2011 and observe the conditions along these flow paths first hand. We believe that this would lead to an improved understanding of the conditions in this area and therefore a clearer understanding of where the MMER and Fisheries Act would be applicable.</p>	
EC-02	<p>Further details are needed on how the degree of natural attenuation of the tundra will be established. When will the capacity to remove these parameters be reached?</p>	<p>Although data are not available to determine definitively the time until capacity for attenuation of the water quality parameters by the tundra, the very low flow conditions, fine soils and relatively low source concentrations in this area suggest that it is likely to continue for a very long time. However, it is acknowledged that some additional work to establish the timing of breakthrough would be helpful. To better define the degree and capacity of attenuation of the tundra, water quality and flow sampling along a transect between the camp pad and the shore of Aimaokatalok Lake will be completed to show the changes in concentration with distance. This data can be used to estimate travel times for each of the contaminants of potential concern, and therefore how much time is available before these could reach the shoreline.</p>	<p>EC concurs that monitoring will be key to tracking the fate and behaviour of contaminants on the tundra. Will this transect sampling occur under SNP monitoring and will the data be available for review?</p>
EC-03	<p>In Section 2.8, the sensitivity analysis suggested that efforts to reduce seepage from the ore stockpiles would help protect water quality in East Bay. Are there any plans to complete this work? If so, would this work be similar to planned closure activities? Similarly, plans describing mitigation measures that would take place in the event that attenuation in the tundra decreases or if the receiving environment approaches or exceeds set targets should also be established.</p>	<p>The sensitivity analyses indicated that such measures would help to ensure that water quality is not affected over the longer term. The monitoring results have shown that there are no concerns that would trigger the implementation of seepage controls. If conditions were to change, they could include a variety of approaches, including snow removal to reduce flows from the pad area, collection and treatment of the seepage, or installation of covers as described under the closure alternatives. As noted in the introduction, HBML intends to process the ore stockpiles as soon as possible. Although it is expected that the permitting process for the processing of Boston ore stockpiles will take some time, it is not anticipated that interim reclamation efforts of the stockpiles will be required.</p>	<p>EC suggests that HBML, as a best practice, be prepared to implement seepage control measures if monitoring results indicate an increasing trend in contaminant concentrations.</p>

EC-04	Section 3.2.1 states that a small portion of the runoff is allowed to accumulate in containment ponds or other low areas on site; this runoff is then discharged onto the tundra. This section also indicates that "water accumulating in these areas is typically monitored prior to discharge". Why is not all the discharge monitored? As well, no information is included on what is done if the monitoring criteria are not met in these containment ponds or low areas. Is storage capacity an issue?	The Boston SNP monitoring stations mark the discharge locations from containment ponds and low areas at the Boston site, with the exception of the accumulation of water near the portal. Since implementation of the Boston Waste Rock Management Plan, accumulated water from the portal has been consistently pumped to BOS-2 prior to discharge, and is monitored using parameters from this SNP station. Monitoring of all SNP sites (including portal water at BOS-2) is also now consistently practiced prior to discharge to the environment. During both 2009 and 2010, water quality in the containment pond was well below the criteria defined in the Boston water licence, indicating that there is no immediate need to change the current management approach.	Is the containment pond of sufficient size to handle all potential discharge? Does HBML have a contingency plan in place if inflow exceeds storage capacity?
EC-05	In terms of the closure plans, Section 4, a thorough description of how/when the decision will be made to either move the ore into condensed stockpiles and cover or move for processing should be included.	As per the response to comment EC-03, HBML intends to process the ore stockpiles as soon as possible. The option to move ore for processing has already been selected, and the timing of implementation of this option is contingent on completion of feasibility studies and obtaining the regulatory approvals.	No additional EC comments.
EC-06	As described in Section 5.1, a survey of rinse pH and conductivity will be done every ten years. This monitoring frequency may be too low, given that lab results predicted higher metal leaching than is being observed, and that the rock materials are releasing poor quality leachate.	The high levels of Neutralization Potential (NP) in both ore and waste rock at Boston (greater than 100 Kg CaCO <sub>3</sub> /tonne) for all samples indicate that rinse pH is not likely to change for several hundred years. Therefore, a higher frequency of rinse testing is not merited. Seepage surveys (which monitor conductivity as well as numerous other parameters) are a better tool for monitoring changes the quality of leachate originating from the Boston camp area. As outlined in Section 5.2.1 of the plan, annual seepage surveys are conducted at the site.	No additional EC comments.
EC-07	In Sections 3.2.1 and 4.1, it is indicated that some of the most northeast piles of ore appear to have been placed on tundra. Mitigation plans should include the removal of these from the tundra onto a storage pad.	Further review of our site photos indicated that two of the small stockpiles were located quite close to the edge of the camp pad, in an area where the pad is relatively thin. However, they do appear to be on the pad. A more thorough inspection of the stockpiles in this area will be completed during the 2011 field season, and if any ore is on the tundra,	EC supports that a more thorough investigation be completed during the 2011 field season and if any ore is on the tundra, it be removed.

		it will be removed.	
EC-08	In Section 4.2 it states that "although some parameters in the seepage currently exceed CCME guidelines for aquatic life, there is a considerable distance between the stockpiles and receiving water, and it is likely that a risk assessment will show that these levels are within acceptable limits for a source material." Is a risk assessment planned or if not, why not?	The technical memo titled "Boston WRMP Task 2: Water and Load Balance" prepared by SRK in July 2009 and presented as Supporting Document B to the WRMP was used as the basis for evaluating potential risks to water quality from the site. The assessment concluded that even in the absence of any attenuation processes, discharges from the site would not result in any exceedances of generic water quality guidelines in either East Bay or Aimaikatalok Lake ( <i>i.e.</i> , where environmental receptors are present). However, sensitivity analyses showed that some further controls to reduce loadings from the site would help to ensure that water quality in East Bay is not affected over the longer-term. The purpose of the assessment was to provide a suitable basis for understanding closure requirements for this site. As a result of this assessment, a recommendation was made to incorporate features that would reduce the amount of arsenic loading from the site in the closure plan (Section 4 of the management plan), and only measures that considered this objective were identified as worthy of further consideration.	No additional EC comments.
EC-09	If the proponent is not prepared to implement closure measures to isolate the ore in the near future, then actions should be taken to capture, treat and properly dispose of seepage/leachate.	As per the response to comment EC-03, HBML intends to process the ore stockpiles as soon as possible	No additional EC comments.

If there are any changes in the project EC should be notified as further review may be necessary. Please do not hesitate to contact the undersigned with any questions or comments with regards to the foregoing at (867) 975-4631 or by email at [Paula.C.Smith@ec.gc.ca](mailto:Paula.C.Smith@ec.gc.ca).

Yours truly,



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