Indigenous and Northern Affairs Canada | Affaires autochtones et du Nord Canada

Water Resources Division
Resource Management Directorate
Nunavut Regional Office
P.O. Box 100
Iqaluit, NU, X0A 0H0

Your file - Votre référence
2BB-BOS1217

March 10, 2017

Our file - Notre référence
CIDM#1137091

Ida Porter
Licensing Administrator
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B 1J0

Re: Indigenous and Northern Affairs Canada's comments on TMAC Resources Inc. renewal application for water licence #2BB-BOS1217 – Boston Advanced Exploration Project

Dear Ms. Porter,

Thank you for your February 10, 2017 invitation for technical review comments on the above referenced application.

The Water Resources Division of Indigenous and Northern Affairs Canada (INAC) examined the application and the results of our review are provided in the enclosed memorandum for the Nunavut Water Board's consideration. Comments have been provided pursuant to INAC's mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Indian Affairs and Northern Development Act*.

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

Sincerely,

Sarah Forté
Water Management Coordinator

cc. Ian Parsons, Acting Manager, Water Resources Division, INAC
Erik Allain, Manager of Field Operations, INAC

Canada

Technical Review Memorandum

To: Ida Porter, Licensing Administrator, Nunavut Water Board

From: Sarah Forté, Water Management Coordinator, Water Resources Division, INAC

Date: March 10, 2017

Re: Review of Renewal Application for Type B Water Licence 2BB-BOS1217

Applicant: TMAC Resources Inc.
Project: Boston Advanced Exploration
Region: Kitikmeot

A. BACKGROUND

On February 10, 2017, the Nunavut Water Board (NWB or Board) provided notification of TMAC Resources Inc.'s (TMAC or the licensee) submission of a renewal application for Type B water licence 2BB-BOS1217 for the Boston Advanced Exploration Project.

The licence for the Boston Advanced Exploration Project has been amended and renewed since at least 1999. The latest licence, which expires on July 31, 2017, allows for the use of water up to 100 m^3 per day and the deposit of waste. The undertaking licensed includes the operation of a 65 person camp and exploration activities including drilling and bulk sampling. The site has been in care and maintenance since 2012 and TMAC proposes to re-open the site in April-May 2017.

The NWB requested interested parties review the application and make representations by March 10, 2017.

B. RESULTS OF REVIEW

On behalf of Indigenous and Northern Affairs Canada (INAC) Water Resources, the following comments and recommendations are provided for the Board's consideration.

1. Project relation with Phase 2 water licence application

Reference:

- Application for Water Licence Renewal – Boston Advanced Exploration Project, TMAC Resources Inc., January 2017
- Application for New Water Licence - Phase 2 of the Hope Bay Project, TMAC Resources Inc., December 2016, Executive Summary

Comment:
In the application, we found no reference to a concurrent Type A application which TMAC submitted to the Board in December 2016, which involves mining at the Boston Site beginning in 2022. It appears that the infrastructure presently licensed under 2BB-BOS1217 would be used for the Type A licence when applicable.

Recommendation:
The licensee should provide an explanation of how they see this licence in relation to the Type A application and if they plan to keep both.

2. Winter track/road

Reference:

- Application for Water Licence Renewal – Boston Advanced Exploration Project, TMAC Resources Inc., January 2017, Attachment A – Summary of Activities

Comment:
In their summary of activities, the licensee states "*TMAC is planning to create overland access to the Boston site during April and May of 2017 by way of a winter track/road.*"

A winter road typically requires water use for flooding certain areas and would have to be incorporated into a renewed water licence. On the other hand, a winter track usually only involves overland passage with no impact to water.

Recommendation:
The licensee should be required to specify whether they intend to create a winter road or winter track, and if it is the former, appropriate terms and conditions should be included in a renewed water licence.

3. Lead effluent discharge concentration for landfarm and bulk fuel storage facility

Reference:

- Water Licence 2BB-BOS1217 – Boston Advanced Exploration Project, Nunavut Water Board, August 2012, Part D, Item 19
- Application for Water Licence Renewal – Boston Advanced Exploration Project, TMAC Resources Inc., January 2017, Attachment C – Compliance Status

Comment:
The August 18, 2015 Inspection report provided in Attachment C includes a letter from the Water Resources Officer authorizing TMAC to use 10 µg/L as discharge criteria for lead for the fuel storage area (BOS-5) and landfarm (BOS-6) during the care and maintenance phase.

The maximum allowable grab sample concentration for lead is 1 µg/L for discharge from the landfarm and bulk fuel storage facility in the 2BB-BOS1217 licence under review. Maximum allowable grab sample concentrations for lead at equivalent facilities differ across different water licences. It is 10 µg/L in 2AM-DOH1323, 1 µg/L in 2AM-MRY1325 and 100 µg/L in 2AM-MEL1525.

The Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guideline (CWQG) for the Protection of Aquatic Life (PAL) for lead is related to water hardness. It is 1 µg/L for water hardness below 60 mg/L (as $CaCO_3$), dependant on a formula for water hardness between 60 and 180 mg/L, and 7 µg/L at hardness above 180 mg/L. Water chemistry results from BOS-5 are included in annual reports between 2012 and 2015. Water hardness ranges from 371 to 753 mg/L (as $CaCO_3$), with an average of 533 mg/L.

Recommendation:
Given the typical hardness of the water collected in the fuel storage facility, a maximum allowable grab sample concentration of 7µg/L for lead would follow the CWQG for PAL. Since there is no site specific information available, this would be an appropriate standard to use.

4. Drill site reclamation

Reference:

- Hope Bay Project Boston Camp Interim Closure Plan, SRK Consulting (Canada) Inc., January 2017
- 2BB-BOS1217 Water Licence Inspection Form, Aboriginal Affairs and Northern Development Canada, August 18, 2015
- Review of interim reclamation measures for addressing ponding at Legacy Drill Sites and Cutting Sumps under 2BB-BOS1217, TMAC Resources Inc., September 2, 2016
- Drillhole remediation inventory (Excel file), TMAC Resources Inc., August 29, 2014

Comment:
Drill site reclamation is described in Section 3.12 of the Interim Closure Plan: "*For drill hole reclamation, above ground casing will be cut at grade, and a cap will be hammered in place to seal the hole. Areas of permafrost degradation around boreholes, if present, will be covered with a 1 m thick thermal blanket and graded to ensure positive ponding*." The scheduling of these activities is described in Section 5.2: "*Closure of the Boston Camp will occur upon closure of the entire Hope Bay Project*."

The August 2015 inspection report brings to light that though "*current drilling practises have been excellent, there is a legacy of badly managed drill holes (Orbit 25 spill being the extreme case). Wetlands are forming where past drilling practises impacted the permafrost and caused subsidence (visible along the airstrip), as well as from the cutting sump adjacent to the airstrip*."

At the time of the 2015 inspection, TMAC committed to investigating interim remediation measures and provided their findings in a letter dated September 2, 2016. They concluded that there were no effective and realistically applicable remediation measures, and that long term stability had to be ensured by full remedial measures.

The “Boston Camp Cluster-Historic” tab in the drill hole remediation inventory specifies there are 112 drill holes for which the “Required Action” is “intervention required” and 51 drill holes for which the “Primary Remediation Required” is “complex remediation”. Forty-seven of the drill holes requiring complex remediation are also in the intervention required category.

As the site has been in care and maintenance, no equipment has been available to carry out the interventions (interim or permanent) to reduce the propagation of thermokarsting around problematic historical drill holes. With the licensee’s proposal to re-open the site in Spring 2017, it seems likely this situation should be changing shortly.

Recommendation:
Thermokarsting has a feedback mechanism which causes the impacted area to get progressively worse. Prompt permanent remediation will prevent further degradation so the licensee should provide a proposed schedule for reclamation of the drill holes they have inventoried as requiring intervention.

5. Fill material for reclamation of drill holes

Reference:

- Hope Bay Project Boston Camp Interim Closure Plan, SRK Consulting (Canada) Inc., January 2017, Section 3.12 & Appendix A
- Water Licence 2BB-BOS1217 – Boston Advanced Exploration Project, Nunavut Water Board, August 2012

Comment:
Throughout the reclamation plan, fill material is specified as being waste rock. The only place where this is not done is for reclamation of drill holes. In the cost estimate the volume of fill required for drill hole sites is estimated at 9 000 m^3.

The currently licensed activities do not include quarries or borrow sources, and the licensee has not requested any change to this effect in the scope of work.

Recommendation:
The licensee should specify what material they propose to use as fill for drill hole sites, and if it is not waste rock available on site, where they intend to source this material.

6. Capacity of Doris Landfill for accepting reclamation debris

Reference:

- Hope Bay Project Boston Camp Interim Closure Plan, SRK Consulting (Canada) Inc., January 2017, Appendix A

Comment:
The cost reclamation estimate is calculated on the basis of all debris from site, including the accommodation complex, maintenance shop complex, crusher enclosure, water treatment facilities, tank farm and vent raise, being hauled to the Doris Landfill for permanent disposal.

Recommendation:
The licensee should confirm the Doris Landfill has the capacity to accept all debris from reclamation of the Boston Site, as well as material from the Doris Site.

7. Interim care and maintenance in Interim Closure Plan cost estimate

Reference:

- Hope Bay Project Boston Camp Interim Closure Plan, SRK Consulting (Canada) Inc., January 2017, Appendix A, Section 2.4.1
- *Nunavut Water Regulations*, 10(1)c

Comment:
The licensee "*considered that an Interim Care and Maintenance cost category as recommended by the RECLAIM model is not warranted*", because "*Boston Camp has no ongoing water management requirements or structures requiring continuous maintenance*."

Site inspections and monitoring will be required during an interim care and maintenance period, as demonstrated by the fact that TMAC and SRK have been conducting regular site inspections since 2012 when the Boston camp was put in care and maintenance.

The *Nunavut Water Regulations* state that the cost of ongoing measures that may remain to be taken after the abandonment of the undertaking should be considered in fixing the amount of security required. It is therefore relevant to add these costs to the estimate.

Recommendation:
The licensee should revise the reclamation cost estimated provided to include an 18 month period of interim care and maintenance. This new estimate should be used when setting security requirements for any renewed licence.

8. Landfarm at capacity

Reference:

- Landfarm Management and Monitoring Plan, TMAC Resources Inc., January 2017
- 2014 NWB Annual Report for water licence 2BB-BOS1217, TMAC Resources Inc., March 2015

Comment:
The Boston land treatment area (LTA) has a capacity of 450 m^3 of material and a 600 m^2 footprint. In its 2014 Annual Report, the licensee "*confirms that the Boston Landfarm is full to capacity and that no further additions are allowed.*"

This does not come across in the Landfarm Management Plan. In it, "*new hydrocarbon contaminated materials should when possible be transported directly to the Doris Mine*", and if this is not possible, "*the material must be transported to, and temporally stored in the Boston LTA*." It is only in the contingency section where the possibility of capacity exceedance is discussed and "*a temporary lined facility may be required to store the excess material*."

Though the plan refers to transport of contaminated material from Boston to the Doris Site several times, we did not find a description of how this would be done.

Recommendation:
The licensee should be required to explain how they will move material from the Boston landfarm to Doris and to provide more detail on the temporary lined facility they propose to use until they have removed the material presently in the landfarm.

9. Landfarm water management

Reference:

- Landfarm Management and Monitoring Plan, TMAC Resources Inc., January 2017, Section 2.2
- Water and Ore/Waste Rock Management Plan for the Boston Site, SRK Consulting (Canada) Inc., January 2017, Table 2.4

Comment:
The Landfarm Management Plan describes that the landfarm does not have a sump and precipitation collects in the lowest areas. It continues by stating: "*This pooled water will be removed to a temporary holding tank or the containment pond, if required, for treatment through the oil adsorption treatment system*."

The two containment ponds on site are described in Table 2.4 of the Water and Ore/Waste Rock Management Plan; one is unlined and the other is lined, however the liner is described as needing repair.

Recommendation:
The licensee should be required to repair the lined containment pond before using it to store pooled landfarm water that does not meet discharge criteria.

10. Current water management procedures

Reference:

- Water and Ore/Waste Rock Management Plan for the Boston Site, SRK Consulting (Canada) Inc., January 2017, Section 3.2.
- Application for Water Licence Renewal – Boston Advanced Exploration Project, TMAC Resources Inc., January 2017, Attachment A – Summary of Activities
- Water Licence 2BB-BOS1217 – Boston Advanced Exploration Project, Nunavut Water Board, August 2012, Part J, Item 3

Comment:

The Water and Ore/Waste Rock Management Plan describes current water management procedures. They are minimal given that the site is currently under care and maintenance and consist of infrequent pumping for discharge onto the tundra at several locations where water accumulates. "*Water accumulating in these areas is typically monitored prior to discharge.*"

The licensee plans to re-open this site and anticipates "*expanding on past underground and surface drilling programs at Boston*." The Plan does not describe what water management will be necessary for these renewed activities. To continue underground drilling, mine water will likely have to be dealt with, as suggested by the licence requirement to measure its volume and the possibility of underground workings in a talik area because of the site's proximity to a large lake.

The only lined containment facility on site has a damaged liner, as mentioned in comment 9, and there does not appear to be anywhere on site to store non-compliant water.

Recommendation:

The licensee should be required to provide an updated Water and Ore/Waste Rock Management Plan within 60 days of licence issuance that describes how water will be managed on site for the proposed and licensed activities. It should include an estimate of the quantity of mine water that could be pumped, an estimate of the mine water quality and how that water will be managed on the surface. Any information relevant to water management for the surface drilling should also be included.

Wording regarding the monitoring of accumulated water in the fuel storage area and landfarm should be modified to reflect licence requirement for sampling prior to discharge.

11. Monitoring seeps and ephemeral streams

Reference:

- Water and Ore/Waste Rock Management Plan for the Boston Site, SRK Consulting (Canada) Inc., January 2017, Section 3.2.
- Water Licence 2BB-BOS1217 – Boston Advanced Exploration Project, Nunavut Water Board, August 2012, Part J, Item 12

Comment:

Waste rock was used to construct the roadways, the airstrip and the pads on site. Prior to 2008, ore extracted during the 1996-1997 bulk sample program was used for repairs to site. An estimated 13 400 tonnes of ore was used as surface dressing over the majority of the site including the airstrip.

Historical field and laboratory tests showed that the majority of the waste rock and ore are non-acid generating, however seepage monitoring indicates that metal leaching is a concern. "*Concentrations of arsenic, and to a lesser extent, nickel and selenium may be somewhat elevated in comparison to CCME guidelines for aquatic life*."

Presently, the licence requires sampling of seepage and runoff from the existing waste rock/ore storage locations, identified as monitoring station BOS-8. The Waste Rock and Ore/Waste Rock Management Plan describe that the licensee is also sampling ephemeral streams identified as EPH A2, EPH B2, EPH C2, EPH D2, and EPH E2.

Section 5.2.1 of the Water and Ore/Waste Rock Management Plan mentions seep surveys including at the south end of the airstrip, however the location is not shown on Figure 2.4 with other water quality monitoring sites, nor is the site mentioned in Table 2.4 with the list of sampling sites. Monitoring water quality of seepage and/or ephemeral runoff around the airstrip would help determine the effects of metal leaching from airstrip materials. The discussion on potential effects focuses on the impact of runoff from the camp pad into East Bay of Aimaokatalok Lake and it might be relevant to look at the impact of runoff from the airstrip into Stickleback Lake.

Recommendation:

A renewed licence should include additional Surveillance Network Program stations at ephemeral streams around the camp pad and seeps or ephemeral streams along the airstrip to monitor metal concentrations in the water since part of the construction materials used in infrastructure construction is leaching metal.

12. Monitoring water use

Reference:

- Quality Assurance and Quality Control Plan, TMAC Resources Inc., January 2017, Module C, Table C1

Comment:

Table C1 of the Quality Assurance and Quality Control Plan describes the sample stations, sampling frequency and analytical parameters for the Surveillance Network Program (SNP) set out in the water licence. In this table, the sampling frequency for measuring water intake from all sources at drill sites is "*daily during periods of discharge*".

Additionally, monthly quantities of mine water pumped from the underground are not included in the Table C1 list, though it is required in Part J, Item 3 of the licence. While it is understood that there would be no mine water pumped during care and maintenance, as the licensee proposes to re-open the camp to initiate further work, it may become necessary to pump mine water.

Recommendation:

Table C1 of the Quality Assurance and Quality Control Plan should be modified to indicate water intake from drill sites is measured daily during pumping and mine water pumping should be monitored monthly.