



Water Resources Division
Resource Management Directorate
Nunavut Regional Office
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Your file - Votre référence
2AM-DOH1323

September 13, 2018

Our file - Notre référence
CIDM#1227103

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

sent via email: licensing@nwb-oen.ca

**Re: Crown-Indigenous Relations and Northern Affairs Canada's comments on
TMAC Resources Inc.'s annual report for water licence #2AM-DOH1323 –
Doris North Gold Mine Project**

Dear Ms. Porter,

Thank you for your April 24, 2018 invitation for technical review comments on the above referenced annual report.

The Water Resources Division of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) examined the report 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 CIRNAC's mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Indian Affairs and Northern Development Act*.

CIRNAC 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@canada.ca.

Sincerely,

Sarah Forté
Water Management Specialist

C.c Justin Hack, Manager Field Operations, CIRNAC, Nunavut Regional Office (NRO)
Spencer Dewar, Director Resource Management, CIRNAC, NRO
Ian Parsons, Manager Water Resources, CIRNAC, NRO

Technical Review Memorandum

To: Ida Porter, Licensing Administrator, Nunavut Water Board

From: Sarah Forté, Water Management Specialist, Water Resources Division, CIRNAC

Date: September 14, 2018

Re: Review of 2017 Annual Report for Type A Water Licence #2AM-DOH1323

Applicant: TMAC Resources Inc.
Project: Doris North Gold Mine
Region: Kitkmeot

A. BACKGROUND

On April 24, 2018, the Nunavut Water Board (Board) requested comments on TMAC Resources Inc.'s (TMAC) 2017 Annual Report for their Type A water licence 2AM-DOH1323, which the Board had distributed on April 16, 2018. It is entitled Hope Bay Belt Project 2017 Nunavut Water Board Annual Report, and is dated March 2018.

The Hope Bay Belt Project includes a gold mine, two advanced exploration sites and surface exploration, with activities covered under water licences 2AM-DOH1323, 2BB-MAE1727, 2BB-BOS1727 and 2BE-HOP1222. The report covers the activities under all licences and was submitted with the Doris Project 2017 Aquatic Effects Monitoring Program (AEMP) Report and an updated Spill Contingency Plan.

The annual report, the AEMP report and the modified management plan have all been reviewed.

B. RESULTS OF REVIEW

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) appreciates the work TMAC put in to the 2017 Annual Report. Our general comment is that requirements are covered and the information provided is clear. The following comments and recommendations are provided for the Board's consideration.

1. Benthos density aquatic response plan

Reference:

- Doris Project 2017 Aquatic Effects Monitoring Program Report – Appendix C Aquatic Response Plan for Benthos Density, ERM Consultants Canada Ltd., March 2018
- Hope Bay Project Aquatic Effects Monitoring Plan, TMAC Resources Inc., June 2016

Comment:

In 2017, a statistically significant increase in benthos density triggered the low action level of the AEMP. This included defining the triggers for medium and high action levels. Both of these have been defined as requiring a decreasing trend in benthos density.

As discussed in the response plan, it would be possible for an increase in benthos density to be a result of eutrophication and there would be co-occurring changes such as increased nutrient or phytoplankton biomass levels. Eutrophication is an environmental effect to be avoided.

Recommendation:

CIRNAC recommends the medium and high action level triggers not be limited to decreases in benthos density. Since an increase in benthos density triggered the low action level of the AEMP, actions should also be taken if an increase in benthos density were to occur/co-occur with other possible indicators of eutrophication.

2. Evaluation of Doris Lake levels

Reference:

- Doris Project 2017 Aquatic Effects Monitoring Program, ERM Consultants Canada Ltd., March 2018
- Hope Bay Project Aquatic Effects Monitoring Plan, TMAC Resources Inc., June 2016

Comment:

There is no issue with the lake levels measured this year, however we have some concern on how it is being evaluated.

The water level on Doris Lake at the end of winter was assessed by adding winter drawdown and ice thickness. The total was compared against the -2.74 m threshold discussed during the Amendment #1 application. The report considers -2.74 m below the fall lake surface level.

If the -2.74 m threshold is applied to fall lake levels instead of average or median lake levels, it would not limit the lake level drops during the summer. This could allow for a continual decrease in lake levels over the years which would have negative environmental effects.

The AEMP does not specify what the -2.74 m threshold will be applied to, it states:

An effect due to lake drawdown will occur when:

- 1. Mining in the talik under Doris Lake takes place and seepage into the underground is confirmed; and*
- 2. The summed measurements of ice thickness and winter drawdown are greater than the threshold of -2.74m.*

Recommendation:

CIRNAC recommends that the application of the -2.74 m threshold be clarified, justified, and/or updated if necessary.

3. Waste rock volumes

Reference:

- 2017 Geochemical Monitoring of Waste Rock, Doris Mine – FINAL, SRK Consulting (Canada) Inc., March 21, 2018
- 2016 2AM-DOH1323 Type A Water Licence Annual Report Supplemental Document Doris North Project, TMAC Resources Inc., March 2017
- Waste Rock and Ore Management Plan Hope Bay Project Nunavut, TMAC Resources Inc., August 2016

Comment:

The 2016 Annual Report states there was 368 707 tonnes of waste rock at the surface on Pad T and the temporary waste rock pad at the end of the year. The Waste Rock report provided with the latest annual report states 146 977 tonnes were brought to Pad T on the surface and 3 060 tonnes were brought back underground in 2017. The numbers for years 2016 and 2017 add to a total of 512 624 tonnes on the surface.

The Waste Rock Ore Management Plan includes Table A1, with the tonnage of ore mined, ore processed and waste rock on surface each year of operation. The highest tonnage of waste rock on surface was to be 470 000 tonnes in 2018.

Recommendation:

We would like to know if there is sufficient capacity at the surface to store the extra waste rock on pads where the runoff is collected and controlled.

4. Elevations of Doris TIA

Reference:

- Appendix E. Doris Mine Annual Water and Load Balance Assessment, Doris Project 2017 Aquatic Effects Monitoring Program, SRK Consulting, February 28, 2018

Comment:

The differences between the predicted and measured elevations in the Doris TIA in 2017 are generally larger than 0.1 m and as high as around 0.5 m (Figure 2-2 of Appendix E). In Appendix E, it is stated that:

“By considering both the 2017 data set in isolation and the overall calibration fit for the period from 2010 to 2017, the data suggests that the model is capturing the underlying mechanisms of water movement within the Doris TIA catchment.

Re-calibration of the stage storage curve is not recommended based on detailed analysis of the data even though the predicted and measured elevations differ by greater than 0.1 m.”

The predictions were made based on runoffs from 2010 and 2015. An examination of Figure 2-3 of Appendix E shows that there is an apparent shift in the observed Doris TIA elevation levels and trends before and after 2015. Given that the model has mostly underestimated the Doris TIA elevation since 2015, CIRNAC believes that a model update and/or re-calibration is warranted.

Recommendation:

CIRNAC recommends the Water and Load Balance model be updated and/or re-calibrated to improve prediction accuracy.

5. Inspector contact number

Reference:

- Hope Bay Project Spill Contingency Plan, TMAC Resources Inc., December 2017

Comment:

A table of key government contacts is presented on page iii. It includes contact information for the CIRNAC inspector, which has changed since this report was produced.

Recommendation:

CIRNAC recommends that the contact numbers for the inspector be updated. Jeremy Fraser is now responsible for this file. He is based out of Iqaluit, his phone number is 867-975-4548, and his fax number is 867-975-6445.