Your file - Votre référence
2AM-DOH1323

September 18, 2015

Our file - Notre référence
IQALUIT-#948476

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
GJOA HAVEN, NU X0E 1J0

Sent via email: licensing@nwb-oen.ca

Dear Ms. Beaulieu,

Re: TMAC Resources Inc.'s Application to Amend Water Licence No. 2AM-DOH1323

Thank you for the July 31, 2015 invitation to comment on the completeness of the above mentioned water licence amendment application. A memorandum is provided for the Nunavut Water Board's consideration. Comments and recommendations have been provided pursuant to Aboriginal Affairs and Northern Development Canada'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.

Sincerely,

David Abernethy

Regional Coordinator
Water Resources Division
Resource Management Directorate
Aboriginal Affairs and Northern Development Canada
IQALUIT, NU X0A 0H0

Encl.

c.c.: Andrew Keim, A/Manager, Water Resources Division, AANDC Nunavut
Erik Allain, Manager, Field Operations Division, AANDC Nunavut
Karen Costello, Director, Resource Management, AANDC Nunavut

Memorandum

To: Phyllis Beaulieu, Nunavut Water Board

From: David Abernethy, Aboriginal Affairs and Northern Development Canada

CC: Andrew Keim (AANDC), Amjad Tariq (AANDC), Erik Allain (AANDC), and Karen Costello (AANDC)

Date: September 18, 2015

Re: Application to Amend Water Licence No. 2AM-DOH1323

Applicant: TMAC Resources Inc.
Project: Doris North Gold
Region: Kitikmeot

Comments:

A. Background

On July 31, 2015, the Nunavut Water Board (NWB) provided notification of TMAC Resources Inc.'s application to amend their type A water licence, No. 2AM-DOH1323, to allow for changes to the development of the Doris deposit. The Nunavut Impact Review Board is also concurrently reviewing an application to amend TMAC's project certificate specific to the Doris North Gold Project.

Interested parties were asked to review the application for completeness and the initial technical assessment. Furthermore, interested parties were invited to comment on the type of Technical Meeting and Pre-Hearing Conference (i.e., written, teleconference, or in-person) that should be conducted following the upcoming technical review phase.

The NWB requested that interested parties submit their written comments by September 18, 2015.

B. Results of review

On behalf of Aboriginal Affairs and Northern Development Canada's (AANDC) Water Resources Division, comments and recommendations are provided in the attached appendices for the NWB's consideration. These appendices include a memo prepared by AANDC Water Resources staff and a memo prepared by Amec Foster Wheeler on AANDC's behalf.

C. Technical Meeting and Pre-Hearing Conference

The Technical Meeting and Pre-Hearing Conference should be held in person in Cambridge Bay, NU. In person meetings are recommended because this will allow intervening parties, TMAC, and NWB staff to have opportunity to directly address issues related to the submitted water licence amendment application.

Encl. Amec Foster Wheeler memorandum
AANDC Water Resources Division memorandum

Prepared by David Abernethy

Page left intentionally blank.

Memorandum

To: David Abernethy, Regional Coordinator, Water Resources Division, AANDC

From: Chris Milley, Senior Environmental Consultant, Amec Foster Wheeler

Date: September 16, 2015

Re: **Aboriginal Affairs and Northern Development Canada Completeness review and Initial Technical Assessment of TMAC Resources Inc.'s Application to amend the Type A Water Licence, No. 2AM- DOH1323 (Amendment No. 1) for Doris North Project**

The following comments and recommendations have been prepared by AMEC Foster Wheeler (Tracy Cochrane B.Sc., M.Sc., P.Geo, John Pugh B.Sc., MEng, P.Eng, and Chris Milley B.Sc., M.Sc., MMM.) as part of AANDC's completeness review and initial technical assessment process for the above mentioned license renewal application.

Documents Reviewed:

The Following Documents were reviewed:

Package 1: Project Summary and Submission Outline
P1-1 Plain Language Summary (translated)
P1-2 Maps

Package 2: Project Description
P2-1 Project Description with Executive Summary (translated)

Package 3: NIRB and NWB Application Documents
P3-1 NIRB Amendment Application Documents
P3-2 NWB Amendment Application Documents
P3-3 BPC Conformity Determination

Package 4: Environmental Effects Assessment
P4-1 Environmental Effects Assessment

Package 5: Management and Other Plans
P5-2 Interim Closure and Reclamation Plan
P5-3 Water Management Plan
P5-4 Waster Rock and Ore Management Plan

Package 6: Engineering and Design Documents
P6-23 Groundwater inflow and Quality Model
P6-5 Reclamation and Security
P6-6 Roberts Bay Discharge Systems: Water Management Options
P6-7 Roberts Bay Discharge Systems: Surface Infrastructure
P6-8 Roberts Bay Discharge System: Pump and Pipe Requirements
P6-10 Site-Wide Water and Load balance
P6-12 Tailings Geochemistry
P6-13 Tailings Management System
P6-14 Waste Rock and Ore Geochemistry, Static Testing
P6-15 Waste Rock and Ore Geochemistry, Kinetic Testing

Package 7: Proponent Information

The comments and recommendations are summarized as follows:

Contents

1. Water Quality

Regulatory Authority:	NWB	Information Request No.	AANDC 1
Information Request From:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Water Quality		
References:	P2-1, Project Description with Executive Summary		
Issue/Concern or Information Deficiency:	On-site laboratory removed from scope of application		
Rationale:	Existing water license includes commitment to build an on-site laboratory. Page v of Executive Summary states that "The revisions that TMAC is requesting to TIA water management (which include treatment, if needed) will ensure that discharge meets required criteria and as such, the on-site laboratory previously proposed by Miramar Hope Bay and described in the Project Certificate is no longer necessary." It is not clear how the improved water quality predictions with the revised Tailings Impoundment Area (TIA) plan will lead to the removal of the on-site laboratory as on-going water quality monitoring will be required.		
Information Request:	Provide clarification or the methodology and rationale on how the improved water predictions can be verified if on-site water quality monitoring laboratory is not required.		

Regulatory Authority:	NWB	Information Request No.	AANDC 2
Information Request From:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Water Quality		
References:	P6-10, Site-Wide Water and Load Balance		
Issue/Concern or Information Deficiency:	Supporting document not included in the application		
Rationale:	Basis for process water source terms referenced in Section 4.2.4, P6-10 and for exposed tailings sources terms referenced in Section 4.2.6, P6-10 is in a supporting document not included in application. As a result there is insufficient information upon which to base an informed decision.		
Information Request:	Please provide "Geochemical Characterization of Tailings from the Doris Deposits, Hope Bay", dated April 2015 by SRK.		

Regulatory Authority:	NWB	Information Request No.	AANDC 3
Information Request From:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Water Quality		
References:	P6-10, Site-Wide Water and Load Balance		
Issue/Concern or Information Deficiency:	Supporting document not included in the application		
Rationale:	Basis for some groundwater quality assumptions referenced in Section 4.2.3, P6-10, is provided in a supporting document not included in the application. As a result there is insufficient information upon which to base an informed decision.		
Information Request:	Please provide "Hydrogeological Modeling of the Proposed Doris Mine, Hope Bay Project", dated May 2015 by SRK.		

Regulatory Authority:	NWB	Information Request No.	AANDC 4
Information Request From:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Water Quality		
References:	P6-14, Waste Rock and Ore Geochemistry, Static Testing		
Issue/Concern or Information Deficiency:	Supporting document not included in the application		
Rationale:	Report makes several conclusions (e.g., kinetic test results) by referring to a supporting document not included in the application. As a result there is insufficient information upon which to base an informed decision.		
Information Request:	Please provide "Static Testing and Mineralogical Characterization of Waste Rock and Ore from the Doris Deposit, Hope Bay - Supporting Data", dated May 2015 by SRK.		

Regulatory Authority:	NWB	Information Request No.	AANDC 5
Information Request From:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Mine Water Quality and Water Treatment Plan		
References:	P6-10, Site-Wide Water Balance, P5-3, Water Management Plan		
Issue/Concern or Information Deficiency:	Lack of discussion describing potential loadings from mine water that has come in contact with underground mine workings (i.e., potential for acid rock drainage and metal leaching).		
Rationale:	There is no discussion regarding potential metal loadings from the exposed mine working to generate acid rock drainage and metal leaching. A source term for this mechanism is not readily apparent in Section 4.2, P5-10. In Section 2.2, P5-3, it states that "additional treatment of contact water is expected", where contact water refers to water in contact with ore and waste rock. As per item 8, additional details regarding the treatment system are requested. As a result there is insufficient information upon which to base an informed decision.		
Information Request:	Please provide the study describing the groundwater inflow predictions to the mine, including inflows from Doris Lake and groundwater.		

2. Water Management and Treatment

Regulatory Authority:	NWB	Information Request No.	AANDC 6
Information Request From:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Water Management & Treatment		
References:	P4, Identification of Potential Environmental Effects and Proposed Mitigation, Executive Summary		
Issue/Concern or Information Deficiency:	Potential effects from additional water losses from Doris Lake into the underground mine		
Rationale:	Water losses from Doris Lake are, as stated in the Executive Summary, "predicted to result in serious harm to fisheries and an Offset Plan and DFO Authorization will be obtained"; however, that statement contradicts the following statement in Section 2.5.3: "it is anticipated that the drawdown of water from Doris Lake will not result in adverse effects on fish and fish habitat as natural variability in water level and ice thickness is similar to maximum predicted drawdown depth.		
Information Request:	Please provide information describing how estimated losses from the lake are determined, and the fate of the lake as a result of these losses.		

Regulatory Authority:	NWB	Information Request No.	AANDC 7
Information Request From:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Water Management & Treatment		
References:	P6-7, Roberts Bay Discharge System: Surface Infrastructure, Section 4		
Issue/Concern or Information Deficiency:	No sensitivity analyses reported (e.g. wet and dry years)		
Rationale:	It would be helpful to see sensitivity analyses reported for the hydrologic modelling. The report discussion is primarily based on average flows and reported conservative assumptions, but the basis for these assumptions are not demonstrated in detail. As a result there is insufficient information upon which to base an informed decision.		
Information Request:	Please provide an analysis of the hydrological effects on the design in wet and dry years and show how the system can handle the differing conditions.		

Regulatory Authority:	NWB	Information Request No.	AANDC 8
Information Request From:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Water Management & Treatment		
References:	Multiple documents including P5-2, Water Management Plan		
Issue/Concern or Information Deficiency:	Details of proposed treatment plant and/or management plan if fail discharge guidelines		
Rationale:	A commitment is made to treat water before discharge if required, however no details are provided that might describe this contingency measure and/or what would trigger this type of action (beyond guideline failures, which may not provide sufficient warning to have a new treatment system in place). Depending on the type of treatment that may be needed, there could be a significant lead time. It is understood that current predictions are that no treatment will be needed beyond the existing management plans, however little rationalization is provided. In addition, the description of the interaction between the two different water sources that may require treatment (underground mine and tailings impoundment area) is limited.		
Information Request:	Please provide further details regarding water treatment plans and a description of the management processes that will be in place to help ensure that sufficient early warning signals are built into the environmental management system such that the need for treatment, if required, can be pro-actively identified and installed before water quality criteria failures.		

3. Report Presentation

Regulatory Authority:	NWB	Information Request No.	AANDC 9
Information Request From:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Report Presentation		
References:	P5-4, Waste Rock and Ore Management Plan		
Issue/Concern or Information Deficiency:	Possible section missing		
Rationale:	A title page is provided for Module B, but there is no additional information provided. As a result there is insufficient information upon which to base an informed decision.		
Information Request:	Please provide the contents for Module B or indicate if this title page should be removed from the document.		

4. Groundwater Management

Regulatory Authority:	NWB	Information Request No.	AANDC 10
Information Request From:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Report Presentation		
References:	P5-4 Waste Rock and Ore Management Plan & P5-2 Interim Closure and Reclamation Plan		
Issue/Concern or Information Deficiency:	Potential effects to groundwater and water bodies (e.g., Doris Lake) from the backfilling of materials impacted by ANFO and hydrocarbon spills.		
Rationale:	According to sections 2.3 and 2.5 of the Waste Rock and Ore Management Plan, material contaminated by ANFO and any fuel or lubricant spills will be hauled to the waste rock storage pile where it will be eventually used as backfill in the mine. However, section 1.4 of the Interim Closure and Reclamation Plan states that "no hydrocarbon contaminated soils will be disposed of underground." The backfilling of material impacted by ANFO or hydrocarbon substances can negatively impact the quality of groundwater and nearby water bodies.		
Information Request:	Please explain why materials impacted by ANFO and hydrocarbon substances will not be remediated on surface (e.g., land farm) or removed to a hazardous waste management facility.		

Memorandum

Our File / Notre référence
IQALUIT-#948982

To: Phyllis Beaulieu, Manager of Licensing, Nunavut Water Board

From: Amjad Tariq, Regulatory and Science Advisor, AANDC and
David Abernethy, Water Resources Regional Coordinator, AANDC

Date: September 18, 2015

Re: Aboriginal Affairs and Northern Development Canada Completeness review and Initial Technical Assessment of TMAC Resources Inc.'s Application to amend the Type A Water Licence, No. 2AM-DOH1323 (Amendment No. 1) for Doris North Project

The following comments and recommendations have been prepared as a part of the completeness review and initial technical assessment process for the above mentioned licence renewal application. The following documents were reviewed.

Documents Reviewed:
Nunavut Water Board (NWB 2AM-DOH1323) Amendment Application No. 1

Madrid Advanced Exploration Project

It is recommended that documentation provided in TMAC Resources Inc.'s application for a new type B water licence specific to the Madrid Advanced Exploration Project (2BB-MAE----) be included in the scope of the type A water licence amendment application because of the planned use of Doris Project facilities to process ore, dispose tailings, and manage contact water (including saline groundwater). The two projects should not be considered separately.

The comments and recommendations are summarized in the tables below. In addition to the specific comments, it is suggested that the following plans be made available to the Board to assist in the general review of the Application:

- Freshet Action Plan
- Groundwater Monitoring Plan
- Fuel Management Plan
- Hazardous Materials Management Plan
- Road Management Plan
- Explosive Management Plan
- Risk Management and Emergency Response Plan
- Spill Contingency Plan
- Aquatic Effect Monitoring Plan
- QA/QC Plan
- Sewage Treatment and Management Plan

Contents

1. Water Management Plan

Regulatory Authority:	NWB	Information Request No.	AANDC 11
Information Request from:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Water Management Plan		
References:	A 5.1 Water Management During Operations Package 5, Part 6 Page 7 (pdf page 27)		
Issue/Concern or Information Deficiency:	Water quality criteria for any potential discharge into the marine environment is included within the Water Licence.		
Rationale:	The proponent states, 'During operations, mill effluent, surface runoff water, precipitation and contact water accumulating in the sediment control pond, pollution control pond (PCP) 1, landfill sump and Pad U (PCP 2) will be pumped to the TIA.', and, 'Excess water will be pumped from the TIA to the Marine Outfall Mixing Box located in the mill building, and then be pumped via a pipeline along existing corridors to the Roberts Bay Discharge System.' In order to discharge the effluent into the marine environment, water quality criteria should be the part of the Water Licence. In this regard, the proponent has used CCME water quality guidelines for marine aquatic life to evaluate the water quality requirements for the proposed discharge.		
Information Request:	Please provide proposed effluent discharge criteria for marine disposal both with respect to the CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life as well as the Metal Mining Effluent Regulations.		

2. Waste Rock and Ore Management Plan

Regulatory Authority:	NWB	Information Request No.	AANDC 12
Information Request from:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Waste Rock and Ore Management Plan		
References:	2.1.Metal Leaching and Acid Rock Drainage (ML/ARD) Potential-Waste Rock (Waste Classification) Package 5, Part 6 Page 5 (pdf page 41)		
Issue/Concern or Information Deficiency:	Concern that the volume of the excavated material (waste rock) will be much larger than the available volume of the cavities for the underground disposal.		
Rationale:	The proponent states: 'Mine planning indicates there is sufficient capacity to place all waste rock underground at closure.' However, a large quantity of waste rock can be sent back in to the cavities as backfill but all the waste rock may not be sent underground.		
Information Request:	Please provide an explanation how all the waste rock can be placed underground as backfill at closure taking into consideration that the volume of excavated material will be much larger than the volume of the underground cavities.		

3. Tailings Management Plan

Regulatory Authority:	NWB	Information Request No.	AANDC 13
Information Request from:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Tailings Management Plan		
References:	2.2 New Tailings Storage Requirements Package 6, Part 7 Page 4 (pdf page 104) Geochemical Characterization of Tailings from the Doris Deposits, Hope Bay 5 Summary and Conclusions Package 6, Part 7 Page 30 (pdf page 91		
Issue/Concern or Information Deficiency:	Concern that the strategy proposed by the proponent will accumulate a large volume of potentially acid generating (PAG) material and detoxified tailings underground. The detoxified tailings with acidic pH and elevated concentration of Cd, Co, Cu, Fe, Mn, Ni, Pb, and Zn can contaminate underground water.		
Rationale:	About 6% (i.e. 150,000 tonnes or 116,000 m3) of the tailings are comprised of detoxified cyanide leach tailings, and this tailings stream will be sent underground where it will be mixed with underground waste rock for use as structural mine backfill.' The proponent states, that 'The detoxified tailings also showed a propensity for leaching of several metals in the humidity cell tests. In addition to arsenic, neutral pH metal leaching of ammonia, cadmium, copper, iron, selenium and silver was reported in the Doris North detoxified tailings, and cadmium and selenium in the Doris Central detoxified tailings. Acidic conditions developed in the Doris Central detoxified tailings after 202 weeks of testing. At acidic pH, increased metal leaching of Cd, Co, Cu, Fe, Mn, Ni, Pb, and Zn was noted.' The potential leaching of contaminates under low pH conditions can be a significant source of underground water contamination.		
Information Request:	Please provide an analysis of the combined impact of detoxified tailings and backfilled PAG waste rock on groundwater.		

Regulatory Authority:	NWB	Information Request No.	AANDC 14
Information Request from:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Tailings Management Plan		
References:	Tailings Management Strategies Alternatives Assessment 2.1 Tailings Make-up Package 6, Part 8 Page 1 (pdf page 11)		
Issue/Concern or Information Deficiency:	Concern that the strategy proposed by the proponent will accumulate a large volume of potentially acid generating (PAG) material and detoxified tailings underground. The detoxified tailings with acidic pH and elevated concentration of Cd, Co, Cu, Fe, Mn, Ni, Pb, and Zn can contaminate underground water.		
Rationale:	The proponent states, that 'This containment would be in the form of a thermal cover that would ensure that the tailings surface remain perpetually frozen, or a synthetic cover such as a High Density Polyethylene (HDPE) or Geosynthetic Clay Liner (GCL). Preliminary thermal modeling suggests that a thermal cover constructed from quarry rock would have to be in the order of 4 to 5 m thick.'		
Information Request:	Please provide a detailed design of the final cover system (s) to deal with potential acid generation and metal leaching processes. Measures to control surface and underground water contamination due to potential precipitation and possible temperature rise should also be documented.		

4. Interim Closure and Reclamation Plan

Regulatory Authority:	NWB	Information Request No.	AANDC 15
Information Request from:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Interim Closure and Reclamation Plan		
References:	Appendix A. Cost Estimate Page 3 (pdf page 11)		
Issue/Concern or Information Deficiency:	Concern about the assumed percentages for the cost estimate.		
Rationale:	The proponent has assumed the following percentages in the cost estimates without supporting justification: • re-slope to 3H:1V (30%), • grade top for positive drainage (60%), and • install erosion protection measures (10%)		
Information Request:	Please provide the basis for the assumed percentages.		

5. Madrid Advanced Exploration

Regulatory Authority:	NWB	Information Request No.	AANDC 16
Information Request From:	Aboriginal Affairs and Northern Development Canada		
Information Request for:	TMAC Resources Inc.		
General Issue:	Madrid Advanced Exploration		
References:	Application for a new type B water licence, No. 2BB-MAE----		
Issue/Concern or Information Deficiency:	Impact of Madrid Advanced Exploration Project to Doris North Facilities		
Rationale:	According to the submitted application for a new type B water licence specific to the Madrid Advanced Exploration Program, the Doris North mill will be used to process two 50,000 tonne bulk ore samples from the Madrid North and Madrid South deposits and the tailings impoundment area will be used to manage the resultant tailings and all contact water that does not meet discharge criteria (including saline groundwater). The design of the Doris North facilities should take into consideration the impact of the Madrid Advanced Exploration Program if it is licensed by the Nunavut Water Board.		
Information Request:	Explain whether the proposed amendment to the Doris North Gold Project's type A water licence considers the impact of developing the Madrid Advanced Exploration Project.		