



Water Resources Division
Nunavut Regional Office
Iqaluit, NU X0A 0H0

Your file - Votre référence
2AM-BOS---- & 2AM-DOH1323

February 14, 2018

Our file - Notre référence
CIDM#1211512

Karén Kharatyan
Acting Manager, Licensing
Nunavut Water Board
Gjoa Haven, NU X0B 1J0

Re: Indigenous and Northern Affairs Canada's completeness review of TMAC Resources Inc.'s new water licence application 2AM-BOS---- and amendment #2 application for water licence 2AM-DOH1323 for Phase 2 of the Hope Bay Project

Dear Mr. Kharatyan,

Thank you for the invitation sent through the Nunavut Impact Review Board on January 17, 2018 for the completeness review and initial technical assessment on the above mentioned applications. The initial deadline was January 31, 2018 and was extended to February 14, 2018.

Indigenous and Northern Affairs Canada (INAC) provides the attached preliminary completeness review for the Board's consideration. In addition INAC requests the following information:

Could the applicant provide a copy of the Excel spreadsheet that SRK used to prepare the TMAC reclamation cost estimates for Boston (P4-20) and Doris (P4-22)?

INAC will share information requests directly with the proponent or in our technical review submission.

Please do not hesitate to contact me at 867-975-3876 or sarah.forte@canada.ca for any additional information.

Regards,

Sarah Forté
Water Management Specialist

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Date:
13 February 2018

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Tony Brown

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Subject:

Update: Completeness Review of Type A Water Licence Applications for the Phase 2 Hope Bay Belt Project

Dear Ms. Forté,

Consistent with INAC's request, Arcadis has initiated the "Completeness Review" of the Phase 2 Hope Bay Belt Type "A" Water Licence Applications (NWB File No. 2AM-DOH1323 and File No. 2AM-BOS----). The current letter is provided as an update on the status of the review.

Context: Timing Constraints and Review Focus

The proposed project is a large and complex. Further, the regulatory applications and supporting documentation associated with the project are presented in numerous documents spanning a wide range of technical disciplines.

Due to a variety of factors, including constraints imposed by the regulatory process schedule, the time available to conduct the Completeness Review has been insufficient for Arcadis to develop an in-depth understanding of all aspects of the proposed project and to determine whether the associated regulatory applications are complete. Within this context, ARCADIS has focused on the following:

1. **Project Orientation** – Initial review of key documents to develop an understanding of the proposed project and its potential environmental implications.
2. **Preliminary Assessment of Completeness** – An initial determination of whether any substantive gaps currently exist in the application submissions.
3. **Status Review of Previously Identified Gaps** – Consideration of prior Information Request (IR) and Technical Review submissions from INAC to the Nunavut Impact Review Board (NIRB) and the status of any proponent commitments to address perceived deficiencies that may be relevant to the regulatory applications

4. **Technical Topics of Interest** – Identification of topics requiring significant attention during the Technical Review phase.

The following sections provide a brief overview of the items listed above.

1.0 Project Orientation

The majority of effort expended to date has focused on developing a sufficiently detailed understanding of the proposed project and its potential interactions with the environment. Towards this end, we have conducted *preliminary* reviews of the regulatory application documents summarized in Table 1. It should be noted that the documents listed in the table are related primarily to the Boston application and that reviews of other regulatory files have not yet been initiated (e.g., Doris-Madrid amendment application files). Nonetheless, Arcadis is now sufficiently oriented to begin its detailed review of the project.

In addition to the regulatory documents listed in Table 1, Arcadis has conducted preliminary reviews of selected documents and appendices from the NIRB Environmental Assessment process, as summarized in Table 2. While we acknowledge that the NIRB process is distinct from the regulatory phase, Arcadis deemed these documents to be pertinent to the current review because they contain extensive information on potential project-environment interactions. This information is also directly relevant to the regulatory approvals process.

We emphasize that the time available to date has been sufficient to conduct *preliminary reviews only*; comprehensive reviews of all relevant documents will therefore need to occur during subsequent stages of the regulatory approvals process (e.g., Technical Reviews).

Table 1: Regulatory Documents Subjected to Preliminary Review

Code	Regulatory Document Title
Package 1: Project Summary and Submission Outline	
P1-1	Executive Summary: Doris-Madrid
P1-2	Executive Summary: Boston
P1-3	Maps: Doris-Madrid
P1-4	Maps: Boston
Package 2: Project Description	
P2-1	Amendment No. 2 Type A Water Licence 2AM-DOH1323 (Doris & Madrid)
P2-2	Project Description Type A Water Licence Boston
Package 3: NWB Application Documents	
P3-1	NWB Amendment No. 2 Type A Water Licence Application Form (Doris & Madrid)
P3-2	NWB Type A Application Form Boston
P3-3	NWB Suppl. Inf. Guidelines Amend. No. 2 Type A Water Licence (Doris & Madrid)
P3-4	NWB Supplemental Information Guidelines Type A Water Licence Boston
Package 4: Management and Other Plans	
P4-10	Hope Bay Project Boston TMA OMS Manual
P4-11	Hope Bay Project Waste Rock, Ore and Mine Backfill Mgmt Plan
P4-12	Hope Bay Project Water and Ore/Waste Rock Mgmt Plan for Boston Site
P4-13	Hope Bay Project Hope Bay Project Non-Hazardous Waste Mgmt Plan
P4-14	Hope Bay Project Hydrocarbon Contaminated Material Mgmt Plan
P4-15	Hope Bay Project Hazardous Waste Mgmt Plan
P4-19	Hope Bay Project Boston Conceptual Closure and Reclamation Plan (CCRP)
P4-20	Hope Bay Project Boston CCRP Detailed Cost Estimate
Package 5: Engineering and Design Documents	
P5-1	Climate Change Analysis Approach Report, Hope Bay Project
P5-4	Hope Bay Project Water and Load Balance
P5-6	Geochemical Characterization of Madrid Boston Quarries, Hope Bay Project
P5-7	Geochemical Characterization of Tailings from the Madrid North, Madrid South and Boston Deposits, Hope Bay Project
P5-9	Geochemical Source Term Predictions for the Proposed Madrid-Boston Project, Hope Bay Project
P5-12	Hope Bay Project: Madrid and Boston Crown Pillar Recovery Concepts
P5-24	Hope Bay Project: Boston Water Management Design
P5-25	Geochemical Characterization of Waste Rock and Ore from the Boston Deposit, Hope Bay Project
P5-26	Boston Tailings Management Area Preliminary Design, Hope Bay Project

Table 2: Additional EIS Documents Subjected to Preliminary Review

EIS Documents Reviewed
Volume 1 – Main Volume
Volume 3 – Project Description and Alternatives (+ select appendices)
Volume 4 – Atmospheric and Terrestrial Environments (+ select appendices)
Volume 5 – Freshwater and Marine Environments (+ select appendices)
Volume 7 – Accidents and Malfunctions
Volume 8 – Environmental Management System (+ select annexes)
INAC Information Request Submissions
INAC Technical Review Submissions

2.0 Preliminary Assessment of Completeness

As indicated previously, the Proponent's applications include a large body of documents. In general, the topics addressed by those documents and the level of detail provided within them appears to be sufficient to undertake a detailed Technical Review of the applications. Specifically, our initial assessment is that there are no substantive gaps in the information that has been provided to date. We note, however, that this preliminary conclusion is based on an initial review of the documentation and that information gaps and/or technical deficiencies may be identified during subsequent stages of the application review process.

3.0 Status Review of Previously Identified Gaps

As noted above, Arcadis has reviewed documentation submitted during the NIRB Information Request and Technical Review processes to identify the current status of any concerns and/or information gaps that were previously identified. INAC facilitated this process by providing a copy of its internal issues tracking table. Based on a review of the available information, our observations are as follows:

1. Arcadis concurs with all of the previously identified Information Requests and Technical Review comments issued by INAC during the NIRB process;
2. Progress has been made in addressing the gaps identified in INAC's submissions. Specifically, Arcadis is not aware of any substantive unresolved INAC information requests from the NIRB process that are also relevant to the NWB applications.

Overall, the proactive resolution of INAC's requests during the NIRB process appears to have resulted in more complete regulatory applications with fewer information gaps.

4.0 Technical Topics of Interest

During the process of reviewing the applications and supporting documentation for completeness, Arcadis has flagged the following two technical topics that we intend to pursue further during the Technical Review stage. These topics have been selected based on our experiences related to the assessment and regulation of environmental impacts from northern mining developments.

1. **Water Quality Predictions** – The overall environmental performance of the project will depend, in large part, on the quality of effluent being discharged from the sites. Scrutiny is therefore required to confirm the accuracy of water quality predictions with an emphasis on metal loadings. To illustrate, the applications indicate that contact and process waters will require treatment in order to meet anticipated effluent criteria. Ferric co-precipitation is identified as a key component of the treatment processes with dissolved arsenic concentrations in the effluent reported to be 0.01 mg/L (Document P5-4, Table 7-2). We consider this effluent quality to be highly optimistic for a field application of ferric co-precipitation and anticipate that some form of tertiary treatment would be needed to reach 0.01 mg/L in the treated effluent. This and other topics related to water quality source terms will be a key focus of Arcadis during subsequent stages of the review.
2. **Closure Planning and Long-Term Care** – Consistent with the current stage of the project designs, closure planning for the sites is at a conceptual stage. While this is consistent with common practice, Arcadis is of the view that additional emphasis should be placed on closure planning during the approvals stage. For example, while we commend the proponent for proposing to construct a geosynthetic liner on the Boston TMA to limit the amount of infiltration, the geochemical source term (i.e., dry stack tailings) will remain in place far longer than the anticipated design life of the cover. While load balance modelling accounts for some degree of liner failure within the foreseeable future, in the absence of ongoing maintenance and/or capital replacement, more extensive failures are likely to occur over the long-term. It is, therefore, appropriate to: a) evaluate the environmental implications of more substantive cover failures; and b) to ensure that the long-term strategy for the management of the site includes adequate provisions for on-going care and maintenance, if deemed necessary based on the extent of environmental impacts that would otherwise occur.

5.0 Synopsis

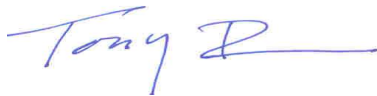
In summary:

1. Working within the constraints of the regulatory process schedule, Arcadis has conducted preliminary reviews of numerous documents to develop an understanding of the proposed undertakings;
2. Detailed reviews of those documents and others will be necessary to identify potential information gaps in the project applications. Such reviews cannot be performed prior to the "Completeness Review" deadline specified by the NWB. As a result, there is a potential that information gaps will be identified during the Technical Review phase.
3. Notwithstanding the previous point, based on our preliminary review, the level of detail provided in the regulatory applications appears to be sufficient to undertake a detailed Technical Review. Specifically, our initial assessment is that there are no substantive gaps in the information that has been provided to date.
4. Arcadis concurs with all of the previously identified Information Requests and Technical Review comments issued by INAC during the NIRB process. Progress made in the resolution of those requests has reduced the number of outstanding issues needing resolution during the regulatory process.
5. During the Technical Review phase, Arcadis proposes to place an emphasis on the following aspects of the application: a) the accuracy of water quality predictions; and b) closure planning / long-term care.

We trust that this update meets your expectations. Feel free to contact me if any additional information is required.

Sincerely,

ARCADIS Canada

A handwritten signature in blue ink, appearing to read "Tony B", with a long horizontal flourish extending to the right.

Tony Brown, M.Sc., P.Eng.