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EC file: 6100 000 010
NWB file: 2AM-DOH1323

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Via e-mail: licensing@nwb-oen.ca

Attention: Phyllis Beaulieu

RE: Licence No. 2AM-DOH1323: Submission of Operational Plans for the Doris North Project.

Environment Canada (EC) has reviewed the four operational management plans submitted by TMAC Resources Inc. (the Proponent) to the Nunavut Water Board (NWB) for Licence No. 2AM-DOH1323 (the Project), as requested in the NWB's correspondence dated May 21, 2014. EC's comments are included below. EC's specialist advice is provided pursuant to the *Canadian Environmental Protection Act 1999*, the pollution prevention provisions of the *Fisheries Act*, the *Migratory Birds Convention Act*, and the *Species at Risk Act*.

Hope Bay Project Spill Contingency Plan, TMAC Resources January 2014

1. During the review of the Hope Bay Project Spill Contingency Plan (the Spill Plan), EC also reviewed elements of the document titled Hazardous Materials Management Procedures – Doris North Project (November 2005), which was prepared by Miramar Hope Bay Ltd. In particular, EC reviewed Appendices B, C, and D.
2. The Spill Plan does not contain hazard identification and risk assessment information for project activities involving the use and handling of hazardous substances. EC recommends that the Proponent undertake and incorporate hazardous substance identification and risk assessment into the Spill Plan in order to provide the required basis for accident scenario characterization and response planning.
3. The scope of the revised Spill Plan does not cover potential spills of cyanide or of ammonium nitrate, specifically spills of these products to water. Instead, the Proponent relies on the following appendices of the Final Environmental Impact Statement Hazardous Materials Management Procedures – Doris North Project (November 2005): Appendix B: International Cyanide Management Code; Appendix C: Cyanide Spill Prevention and Response; and Appendix D: Spill Procedures for Products on Site. Ideally, separate management plans should be developed for the cyanide products and the ammonium nitrate that will be used on-site, with each management plan taking into consideration site-specific factors such as

transportation, storage and handling, and response procedures for all potential accident scenarios, including spills to water. Simply referring to the International Cyanide Management Code and to a technical paper on Cyanide Spills Prevention and Response is not an adequate or acceptable replacement of a site-specific Cyanide Management Plan – especially when it is unclear if the Proponent is even a signatory to the International Cyanide Management Code.

Alternatively, if the Proponent chooses not to develop separate management plans for their cyanide products and ammonium nitrate, then the Hope Bay Project Spill Contingency Plan should be revised to address potential accident scenarios involving these two products, with special emphasis on potential spills to water since both products are soluble in water and are deleterious to fish and aquatic organisms.

4. The Spill Plan does not provide any spill scenarios, namely a worst-case scenario and alternative accident scenarios. EC recommends that proponents prepare contingency plans that reflect a consideration of potential accidents and malfunctions and that take into account site-specific conditions and sensitivities. The Canadian Standards Association publication, Emergency Preparedness and Response, CAN/CSA-Z731-03 is a useful reference for this.

EC also recommends that, for each hazardous product stored and handled on-site, proponents document and provide information on worst-case accident scenarios in a manner that is consistent with one or both of the OECD Guiding Principles for Chemical Accident Prevention, Preparedness and Response, and the MIARC 2007 Risk Management Guide for Major Industrial Accidents. [Reference 1: OECD Guiding Principles for Chemical Accident Prevention, Preparedness and Response – Guidance for Industry, Public Authorities, Communities and Other Stakeholders, Second edition, 2003; Reference 2: Major Industrial Accidents Reduction Council (MIARC), 2007, Risk Management Guide for Major Industrial Accidents, 436pp.]

5. The legend in the Spill Response & Communications SOP flowchart presented in the Spill Response – Communications Summary (no page number indicated) indicates that a “red 1” is for those items requiring “Contact within 24 hours of event if spill is deemed reportable”. The Proponent should be aware that the wording relevant to spills notification in the *Fisheries Act* states: “...shall without delay notify...”, with a follow-up written report to authorities being required by “...as soon as feasible after the occurrence, or as regulations may stipulate...”. Similarly, the wording relevant to spills notification in the Canadian Environmental Protection Act, 1999 states: “...shall as soon as possible in the circumstances...”. Although EC acknowledges that Section 6.3 External Spill Reporting correctly indicates immediate notification to the Canadian Coast Guard pursuant to the Pollutant Discharge Reporting Regulations SOR/95-351 as well as to the NT-NU 24 Hour Spill Report Line, the Legend in the Spill Response & Communications SOP flowchart should be revised as necessary.
6. The Spill Plan references the Hope Bay Oil Pollution Prevention Plan/Oil Pollution Emergency Plan (OPPP) when discussing marine-focussed spill response capacities for spills resulting from fuel tanker transfer activities. Because the Hope Bay OPPP was not reviewed, EC cannot provide comments on the adequacy of the OPPP nor on any potential preparedness and response planning gaps that may exist between the OPPP and the revised Spill Plan.

7. Section 5: Spill Response Actions (Page 19) indicates “Unique shore types (tundra coasts)” as “... a consideration in spill contingency planning given the remote Arctic location of the Project.” In addition to documenting environmental baseline data in advance of a project, EC recommends that proponents undertake environmental sensitivity mapping (which would likely include local land use and Traditional Knowledge), especially in and around nearby water bodies and water courses that have potential to be affected by a spill incident. EC’s established characterization criteria contained within the Arctic SCAT (Shoreline Clean-up Assessment Technique) Manual is a useful guide for this. [Reference 3: Environment Canada, Emergency Prevention, Preparedness and Response – A Program of the Arctic Council, The Arctic SCAT Manual – A Field Guide to the Documentation of Oiled Shorelines in Arctic Regions, 2004].
8. Section 5: Spill Response Actions, Operational Considerations (Page 19) does not indicate spilled petroleum products beneath ice. The characterization of likely accident scenarios and associated response methods and strategies would greatly benefit Section 5 Spill Response Actions.
9. The Spill Plan only briefly covers Spill Response Training in Section 7 (Page 31). EC encourages proponents to include a description of any environmental emergency response training regimes (including refresher training) for their response personnel within their Emergency Response Plan or their Spill Plan.
10. Section 2 Applicable Legislation, Licensing and Guidelines (Page 5) indicates: “There are no qualifying substances in qualifying quantities requiring an emergency response plan under the E2 regulations.” EC takes this opportunity to remind the Proponent that ammonium nitrate is a listed substance under the Environmental Emergency Regulations and an E2 Plan would therefore be required for ammonium nitrate (at or above 81% in liquid form, and at or above 60% in solid form) stored and used on-site in quantities in excess of 20 tonnes respectively. There may also be other listed substances (i.e. forms of cyanide such as hydrogen cyanide, and hydrochloric acid) required on-site that may be stored or handled in excess of threshold quantities, thereby eventually requiring E2 Plans. EC recommends that the Proponent refer to Appendix 1 of EC’s Implementation Guidelines for the Environmental Emergency Regulations 2011 for complete information.
11. EC recommends that Section 5.2 Impacts to Semi-Aquatic and Aquatic Wildlife (Page 21) make reference to a requirement for EC migratory bird handling permits for oiled birds, as well as to EC’s Birds and Oil – CWS Response Plan Guidance (June 2012) for guidance on the treatment and handling of oiled birds.
12. EC notes that in the Final Environmental Impact Statement - Appendix D: Spill Procedures for Products on Site, there are a number of tables that contain no information for spills of hazardous products on/to water, namely: Sulphuric and Hydrochloric Acid, Activate Carbon and Hydrogen Peroxide. EC recommends that the respective tables be completed with the required information specific to spills on/to water.

Doris North Mine Closure and Reclamation Plan, TMAC Resources, March 2014

13. In addition to the reference materials listed in Section 8, EC recommends that the Proponent also consult the recent document Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (November 2013, MVLWB/AANDC).

<http://mvlwb.com/resources/policy-and-guidelines>

EC recommends that the Doris North Mine Closure and Reclamation Plan (the Project Closure Plan) be consistent with the Closure and Reclamation Plan Template provided in these recent guidelines.

14. As per Section 2.2 (Goal of the Closure and Reclamation Plan) of the MVLWB/AANDC guidelines, EC recommends including the following items in Section 1.4 (Closure Objectives) of the Project Closure Plan:

- A stated goal of “return the mine site and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with human activities”; and
- The additional closure objective/principle of “no long-term active care requirements”.

15. Section 3 (Facility Closure and Reclamation Strategies) of the Project Closure Plan references the 2007 Northwest Territories Mine Site Reclamation Guidelines (INAC 2007) with respect to Project closure and reclamation strategies. EC recommends that the Proponent also ensures that the selected closure and reclamation strategies are in line with the Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (November 2013, MVLWB/AANDC).

16. EC recommends that the Proponent distinguish between and include detailed information on:

- Permanent Closure and Reclamation;
- Progressive Reclamation; and
- Temporary Closure, in alignment with the Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (November 2013, MVLWB/AANDC).

17. Regarding Section 4.1.9 (Collection and Disposal of Hazardous Waste) of the Project Closure Plan, EC recommends using appropriate secondary containment to prevent hazardous waste from entering waterways.

18. EC notes that the Project includes a Burn Pan Area (see Section 4.4) and recommends that the Proponent manage this area in accordance with the Environmental Guideline for the Burning and Incineration of Solid Waste (Government of Nunavut, 2012):

19. Section 4.5.3 (Treated Sewage Discharge Areas) discusses management of areas where vegetation has died and permafrost has degraded. In addition to the measures outlined in the plan (i.e., backfilling and re-vegetation upon closure), EC recommends implementing progressive reclamation measures over the course of the entire project in order to minimize damage to permafrost and vegetation.
20. Following decommissioning of the Tank Farm (see Section 4.6.3), EC recommends testing the soil for hydrocarbons.
21. EC recommends that water quality in the Sedimentation Pond and the Pollution Control Ponds be tested and meet established criteria prior to breaching the ponds. Sludge from these ponds should be managed appropriately.
22. Section 7 (Schedule) of the Project Closure Plan provides minimal detail regarding the Proponent's planned schedule of activities. EC recommends inclusion of a component-specific schedule that depicts operations, closure dates, and expected start and end times for selected closure activities. This schedule would include any progressive reclamation, initiation, and completion of research (including pilot studies), timeframes for meeting closure criteria and monitoring and reporting phases.
23. EC notes an absence of detail with respect to contingency planning. As required by Part L. 6.g of the water licence, contingency measures must be provided for all reclamation components, including action thresholds that are linked to the monitoring programs. EC recommends that the Project Closure Plan includes a contingency plan to outline how each selected closure activity will be modified if it is unsuccessful in meeting closure criteria and objectives.
24. EC recommends that plans for post-closure monitoring of the underground mine workings be developed
25. In section 4.7.1 (North Dam), the proponent states that: "The North Dam will be breached once the water quality in Tail Lake returns to levels below the Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Aquatic Life (anticipated at 7 years after process plant closure). The water level in Tail Lake will be lowered to (or below) the natural water level to facilitate the dam breach. The breach will be 20 m wide, cut to the original ground elevation (of 28.3 masl) with 4H:1V side slopes. The cut in the dam will be clad in rip-rap for erosion protection."

Tail Lake is a Tailings Impoundment Area (TIA) listed in Schedule 2 of the Metal Mining Effluent Regulations, and it was supposed to be a subaqueous tailings disposal site to keep reactive tailings under water. The proponent indicates that the North Dam will be breached in 7 years with the water level to be lowered to or below the natural water level, to allow the Tail Lake to draw down.

It is not clear to EC how the drainage of the Tail Lake below the natural water level will still be able to keep the tailings submerged and prevent exposure of the tailings

that may generate acidic drainage and metal leaching. The Proponent needs to demonstrate that there will be sufficient water cover to prevent movement of tailings through wave action and ice scour from occurring. EC requests that the proponent clarify how they will ensure that the reactive tailings are not exposed in order to prevent Acid Rock Discharge / Metal Leachate (ARD/ML).

26. Furthermore, proposed modifications to the mine plan would see the full capacity of Tail Lake used for disposal of tailings. The change in plans needs to be addressed in water quality modeling, operational plans and closure planning. EC acknowledges that the closure plan reflects currently permitted activities, but identifies that extensive revisions will be needed with the proposed project modifications.

Doris North Landfarm Management and Monitoring Plan, March 2014

27. While there is likely no groundwater present on site due to its northern location, the potential for ground water contamination (or lack thereof due to absence of groundwater) was not acknowledged or discussed in the Doris North Landfarm Management and Monitoring Plan (the Landfarm Plan).

Doris North Wastewater Treatment Management Plan, March 2014

28. Section 2.7.1 (Effluent Discharge) on Page 15 refers to an “old tundra discharge point”. Is there a station name/number assigned to this location?
29. As per Section 2.7.2 (Sludge Dewatering, Destruction, and Use), under normal operations the sludge is incinerated in accordance with the Incinerator Management Plan (HBML 2012), or buried in the overburden pile when the pile is not frozen. EC suggests that the Proponent investigate options to replace the incineration of dewatered sludge with alternative practices which could then conserve material for future reclamation activities.
30. Following a review of Table 2 (Table of Concordance with Type A Water Licence), EC recommends the following additions/changes to the Wastewater Treatment Management Plan (the Wastewater Plan):
- The Wastewater Plan (Section 2.3) should clearly state that all sewage and greywater will be collected and treated in the Wastewater Treatment Plan (as per Part G. 3. a of the WL); and
 - Ensure the plan (Section 3.1) includes:
 - Recording of flow measurements and any use of water as per Part J. 12;
 - Location/method of sludge disposal as per Part J. 12. F;
 - Visually monitor and record observations on a daily basis during periods of discharge onto the tundra as per Part J. 20; and
 - Prevention of erosion or thaw activity due to tundra discharge.
31. Section 3 (Wastewater Treatment Plant Monitoring and Reporting) does not specify whether the wastewater effluent will be retained pending confirmation that the effluent meets the water licence criteria. EC recommends that the Proponent adopt the best practice of confirming that the effluent meets the discharge criteria prior to discharging to the receiving environment.

32. Section 3.2.1 (Off-Specification Effluent Quality) discusses various measures that will be taken in the event that the effluent does not meet discharge limits, however, there is no mention of how the effluent will be managed. EC requests that the Proponent describe the protocol that will be followed for effluent management in the event of off-specification effluent quality.
33. The Proponent is encouraged to investigate options to improve the quality of final effluent by controlling inputs into the wastewater system through diverting hazardous chemicals.

For further clarification on any aspect of this submission, please contact Michael I. Mohammed at (867)-975-4981 or michael.mohammed@ec.gc.ca.

Sincerely,



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