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Nunavut Water Board
PO Box 119
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Attention: Manager of Licencing, Phyllis Beaulieu

Dear Ms. Beaulieu,

Thank you for your letter of May 7, 2013 regarding, "*Water Licence No.2AM-DOH0713; Application for the Amendment and Renewal of a Type 'A" Water Licence: Notice of Application.*" TMAC Resources Inc. ("**TMAC**") has reviewed the following submissions and comments relating to the renewal of Type A Water Licence 2AM-DOH-0713:

- "*Type 'A' Water Licence Number 2AM-DOH0713 – TMAC Resources Inc. – Doris North Gold Project – Kitikmeot Region — Amendment and Renewal Application*," comments submitted by Aboriginal Affairs and Northern Development Canada, June 6, 2013;
- "*2AM-DOH0713 – Application for the Amendment and Renewal of a Type A Water Licence Notice of Application*," comments submitted by Environment Canada, June 6, 2013;
- "*Water Licence 2AM-DOH0713 Application for Amendment and Renewal of Type A Water Licence: Notice of Application*," comments submitted by Kitikmeot Inuit Association, June 6, 2013;

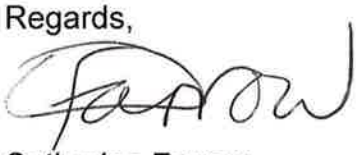
(collectively, the "**Renewal Comments**"). For ease of reference, TMAC has enclosed these submissions with this package.

We are pleased to enclose TMAC's responses to the various issues raised in these documents, attached as Appendix 1 to this letter. The issues and responses are presented in a tabular format. As technical support for some of these responses, TMAC also encloses the "*Summary of Assessment of Pollution Pond Discharge to TIA*" prepared November 30, 2011 by SRK Consulting Ltd (see Appendix 2).

Our understanding is that a Technical Meeting and Prehearing Conference ("**TM/PHC**") will be held via conference call on June 18, 2013. As the Board is aware, the Type A Water Licence expires on September 30, 2013 and time is of the essence. As per the Board's letter of May 7, 2013, TMAC looks forward to the Board's PHC decision on or before June 24, 2013, and to the written public hearing on July 12, 2013 in order to ensure that the renewal of the Type A Water Licence is obtained in a timely manner.

We would be pleased to provide any further information required by the Board in relation to this hearing and renewal. Please do not hesitate to contact me directly at mailto:cegfarrow@gmail.com or (807) 346-1668.

Regards,



Catharine Farrow
Chief Executive Officer

Number	AANDC Comment	TMAC Response
1	Renewing the license term for 10 years is adequate given the proposed activities, monitoring requirements, and consistency with the terms granted to other Type 'A' water licenses. AANDC would not support a longer term because of the value to perform regular public reviews of undertakings of this magnitude.	No comment
2	The Proponent's request to remove the requirement to maintain a Monitoring and Follow-up Plan pursuant to Part K, Item 5 of the licence is adequate as it is a summary of information included in other management and monitoring plans.	No comment
3	The Proponent should identify and explain the significance of all drainage facilities and key water bodies in the upcoming revised (final) Water Management Plan.	TMAC will include this information in the upcoming revised Final Water Management Plan. We anticipate this plan will be finalized and filed with the NWB 6 months prior to production date.
4	The major earthworks requiring annual geotechnical inspections pursuant to Part J, Item 18 of the license should be revised to include the Doris North Camp Area Diversion Berm. Geophysical and permafrost conditions should be described in the Geotechnical Engineer's inspection reports that are required annually pursuant to Part J, Item 19 of the license. Additionally, the monthly monitoring reports that are required pursuant to Part J, Item 21 of the license should document the Doris North Camp Diversion Berm's effectiveness of diverting runoff away from the camp area. As a minimum, conditions during spring freshet, major rain events, and periods of sustained precipitation should be monitored. Documented information can include flow measurements, photographs, and notes.	The Doris North Camp Area Diversion Berm is already part of annual geotechnical inspections. It was completed in 2012 and included in the 2012 Geotechnical Inspection. In our view, this monitoring is sufficient to confirm the effectiveness of this berm in diverting runoff from the camp area, and additional quarterly monitoring should not be necessary unless recommended by the Geotechnical Engineer following inspection.

5	The revised (final) Water Management Plan required pursuant to Part F, Item 1 of the license should address the following recommendations to ensure the effective management of contact runoff and underflow: - The development of a monitoring system to confirm that an acceptable percentage of mine contact runoff and groundwater (underflow) are captured; - Maximum water levels for all water collection facilities and associated monitoring activities should be established; and, - Include mitigation measures to increase the effectiveness of the underflow capture system (e.g., French drains should be considered to ensure the collection of all potentially contaminated shallow groundwater).	As noted above, TMAC will include this information in the upcoming revised Final Water Management Plan, anticipated to be submitted to the NWB 6 months prior to production.
6	The Proponent should confirm how water in the Sedimentation Pond will be managed under the Interim Water Management Plan. Clarification should be provided on whether water that meets licensed discharge criteria (Part G, Item 21) will be discharged onto the tundra.	As described in the current Interim Water Management Plan, the water from the Sedimentation Pond is directed to the tailings impoundment area. Water that meets licensed discharge criteria, may be discharged to the tundra from time to time as appropriate.
7	The Proponent should continue to provide a minimum ten days notice, rather than the proposed five days notice, to an Inspector prior to any planned discharge of water from project facilities. This duration is preferred because it allows enough time for an Inspector to travel to the site and monitor such discharges should he or she want to. If a ten day notice is not practical due to unforeseen conditions (e.g., major rain event), the Proponent should notify an Inspector.	TMAC will endeavor to give as much notice as possible but cannot guarantee in all circumstances that 10 days noticed will be possible. Should an inspector wish to visit site, TMAC will facilitate the visit.

8	Considering that the Tail Lake TIA is now receiving contact water from the Doris North camp and may receive water from containment areas that do not meet discharge criteria (SRK 2012b), the Proponent should be required, as a minimum, to update the water balance and water quantity model on an annual basis until the start of ore processing and tailings deposition as well as during any periods of care and maintenance. These updates should take into account the frequency of collected monitoring data.	TMAC will update the water balance and water quality model on an annual basis during operations once processing commences. In our view, annual updates of the water balance and water quality model should not be required during care and maintenance, as the existing water balance and quality model adequately describes site conditions.
9	Pursuant to Part J, Item 4.b. of the license, the Proponent should provide to the Board and an Inspector justification for a reduction in sampling frequency of water quality and acute lethality at monitoring stations associated with the discharge of water from the Tail Lake TIA. The Board should also confirm the appropriateness of any reduction in acute lethality testing requirements with Environment Canada before accepting the Proponent's suggested revision.	TMAC has further reviewed the sampling frequency and proposes that water quality samples be collected at TL-1, TL-2, and TL-3 on three occasions during the week prior to discharge then twice weekly thereafter. Collecting samples one week prior to discharge will ensure that TIA water can be discharged into Doris Creek during the rise of the freshet waters and during peak flow. Past hydrographs confirm that certain years can see Doris Creek waters can move from a near-frozen state to peak flow in less than 10 days. Twice weekly sampling at TL-1, TL-2, and TL-3 two weeks after discharge commences is twice the frequency measured at the discharge end-of-pipe (TL-4), thus this sampling would take a conservative approach to sampling based on end-of-pipe frequency. During C&M, only contact water from site (e.g., waste rock piles and ore pads, etc.) will report to the TIA as no waste rock or tailings will be produced and dumped into the TIA. Thus, reduced sampling frequency is proposed in Doris Creek and at end-of-pipe (sample at TL-4 only). Acute toxicity sampling during operations should occur when discharge to Doris Creek occurs. Thus, monthly toxicity testing should take place during the four months of open water (June to September). Further, if there are no toxic responses shown from this testing, an additional reduction in toxicity testing is advocated if it can be demonstrated that future TIA water quality will not change. Toxicity testing during the C&M phase will be reduced to once during the open-water season as the project would not fall within the MMER requirements and

		all modeled water quality suggests all receiving water quality criteria will be met in Doris Creek (Table 4 in SRK 2011).
10	The Proponent should explain why the water quality model predictions should not be used to increase the sampling frequency at monitoring stations TL-1, TL-2, and TL-3 when water is discharged from the Tail Lake TIA. In addition, the Proponent should explain how it came to the conclusion that the sampling frequency be increased when the measured concentration of any parameter listed under Part G, Item 28 at TL-3 exceed the concentrations indicated in the table by 25% for a single grab sample, or 20% for an annual average sample during periods of active discharge.	TMAC proposes to increase sampling frequency at TL-1, TL-2, and TL-3 based on in situ water quality results as this better reflects the actual water chemistry in Doris Creek. The trigger levels proposed (20-25%) are similar to that carried out using the water quality model in the original Type A license. All water data collected will continue to be used to calibrate annual water quality models.
11	As a minimum, the Proponent should discharge treated sewage effluent into the Tail Lake TIA once ore processing commences. Consideration should be given to commencing this practice in 2013 because the Tail Lake TIA is already receiving water from the Sedimentation Pond in accordance with the Interim Water Management Plan (SRK 2012b). Directing treated sewage effluent to this facility would limit the project footprint, thereby reducing the likelihood of impacts to downstream water bodies (i.e., Glenn Lake).	It is not currently possible to direct treated sewage effluent to Tail Lake as the infrastructure is not in place. During normal operations once ore processing commences the treated effluent will be usually directed to Tail Lake. During upset conditions TMAC needs the flexibility to send treated effluent to the tundra as is the currently permitted procedure.
12	The Interim Closure and Reclamation Plan that is required within six months of the start of ore processing pursuant to Part L, Item 4 of the licence should address potential issues associated with the underground disposal of PAG rock (i.e., oxidation).	TMAC will address this point in the Interim Closure and Reclamation Plan that will be filed within 6 months of the start of production.

13	The Interim Closure and Reclamation Plan that is required within six months of the start of ore processing pursuant to Part L, Item 4 of the license should discuss the removal of equipment and potentially hazardous materials from underground workings. The removal of these materials should be implemented through progressive and final closure activities.	TMAC will address this point in the Interim Closure and Reclamation Plan that will be filed within 6 months of the start of production.
14	The amended and renewed license should specify the monitoring requirements, particularly the frequency of monitoring activities, during care and maintenance. As a minimum, all water and hazardous material containment areas, including fuel storage facilities, should be monitored monthly during periods of care and maintenance. In addition, the frequency of collecting thermal monitoring data should not be reduced during periods of care and maintenance as the integrity of site infrastructure can depend on the availability of monitoring data. Data should be collected from all thermistors on a monthly basis to ensure that they are functioning properly.	During care and maintenance C&M the site may be closed during the 6 month winter season. In this instance, a minimum of two quarterly inspections will be conducted during this period. The site will be continuously occupied during periods of open water to conduct ongoing water management. TMAC relies on its annual geotechnical inspections to determine the appropriate frequency of thermal monitoring required.
15	The monthly monitoring reports required by Part J, Item 21 of the license should continue to be submitted even if the project reverts to a Care and Maintenance Phase. These reports are essential to monitoring potential environmental impacts that may result from the condition of site infrastructure and project activities.	The SNP is filed monthly but not all requirements of Part J, Item 21 are appropriate in C&M or construction should it recommence. The full SNP is appropriate once the site reaches operations.
16	If the project reverts to care and maintenance the Proponent should provide regular information updates to the Board and interested parties to describe: (a) the project's status; (b) how licence terms and conditions are being satisfied; (c) updates to project management plans, and, (d) events or other actions would trigger final	As the renewal application expressly requests that care and maintenance terms and conditions be included in the renewed licence, a 3 month update is not necessary. In our view, an annual update should represent the a minimum reporting requirement unless there are material changes that warrant informing the Board.

	closure. As a minimum, these updates should be provided within three months of any decision to place the project in care and maintenance and annually thereafter (e.g., with annual report submissions).	
17	As a minimum, the Proponent should compare Tail Lake TIA water quality and quantity monitoring data to predictions generated by the water quality and water quantity model once annually during periods of care and maintenance to confirm its accuracy. The Proponent should explain the proposal to compare water quality predictions to collected monitoring data from the Tail Lake TIA when significant differences are noted during care and maintenance (proposed license term and condition Part M, Item 2.b.). In particular, the Proponent should define a 'significant' difference.	TMAC agrees with the comment as this was the intent of the proposal. Significance will be based on current water license definitions.
18	As a minimum, Part G, Item 24.e. and Part M, Item 2.a.of the license should require the Proponent to visually monitor all structures associated with the Tail Lake TIA on a monthly basis when the site is not occupied (i.e., during periods of care and maintenance). Appropriately qualified individuals, the Board, and an Inspector should be immediately notified of any abnormalities.	During care and maintenance C&M the site may be closed during the 6 month winter season. In this instance, a minimum of two quarterly inspections will be conducted during this period. The site will be continuously occupied during periods of open water to conduct ongoing water management. TMAC relies on its annual geotechnical inspections to determine the appropriate frequency of thermal monitoring and any other North Dam monitoring.

19	The Proponent should submit an Interim Mine Closure and Reclamation Plan and updated cost estimate within six months of the start of ore processing as required by Part L Item 4 and Part C, Item 2 of the licence. In addition to the Interim Mine Closure and Reclamation Plan and updated closure cost estimate requirements pursuant to Part L, Item 4 and Part C, Item 2 of the Licence, the Proponent should submit revised versions of these documents within three months of any future decision to place the project under care and maintenance and, as a minimum, every three years should the mine life extend beyond the projected two years of operation and within two years of licence issuance if ore processing has not started within this time period.	An update of the C&R Plan should be required to be filed with the Board every three years and 3 months after a decision to move to permanent closure.
20	The Proponent should consult traditional land users, land owners, and other stakeholders on the proposed post-closure land use criteria. Particularly, the proposal to leave certain facilities in place and the soil quality remediation objectives should be revisited. The Proponent should demonstrate that the proposed post-closure land use objectives are consistent with the 2012 Closure and Reclamation Plan's objective to establish "…stable chemical and physical conditions that protect the environment and human health" (Section 1.4).	As part of developing C&R Plans TMAC will consult with all of its stakeholders, including in particular the landowner (Kitikmeot Inuit Association).
21	Future revisions of the project's Closure and Reclamation Plan (i.e., the Interim Mine Closure and Reclamation Plan and the Final Mine Closure and Reclamation Plan pursuant to Part L, Items 4 and 6 of the license should provide greater detail on post closure monitoring activities. The Department's Mine Site Reclamation Policy for Nunavut should be followed when developing a post closure	As part of future revisions to its C&R Plan TMAC will consider these comments.

	monitoring program. This policy states that Mine Closure and Reclamation Plans should address, a plan for post-closure monitoring of the site including a monitoring schedule and reporting frequencies. (For a monitoring program to be meaningful, it must include provision for appropriate progressive responses which trigger action whenever exceeded, including the establishment of thresholds of the identification of changes in circumstances.The Proponent should note that this policy also states, *Once the reclamation work required by the plan is deemed completed, the site will be allowed to stabilize. During this time, monitoring will be conducted by the company and verified by DIAND and other agencies as appropriate, with respect to the effectiveness of the mitigative measures, the accuracy of the environmental assessment, and any unforeseen environmental impacts, The duration of the required monitoring phase will be reviewed and confirmed at the time of closure and will depend on the risks associated with the potential impacts on the environment.During this period, the mining company will continue to be responsible for the site, including remediation of any additional environmental complications which develop. If warranted by site conditions, the monitoring period may be extended to ensure remedial measures are met.*	

21	The Proponent's updated closure cost estimate of $13,090,000 is adequate and should be incorporated into an amended and renewed licence. This recommendation is based on the following reasons: - The rationale provided for using SRK's cost estimating model (SRK 2012d); - The estimate was prepared by professional engineers (HBML 2013c); - The estimate is based on the work being completed by a third party (HBML 2013c); and, - The license requirements to revise the Closure and Reclamation Plan and Closure Cost Estimate within six and eighteen months following the commencement of ore processing activities (Part C, Item 2 Part L, Item 4 of the license) It should be noted that the department has not performed a detailed review of the submitted Closure Cost Estimate.	TMAC acknowledges AANDC's acceptance of the closure cost estimate.
Number	**KIA Comment**	**TMAC Response**
1	See KIA filing of June 6, 2013 (attached)	While the KIA Submission provides a detailed summary with respect to the Type A Water Licence public record, it does not directly comment on proposed amendments to the water license with the exception of a recommendation for a condition to be added requiring the AEMP be updated prior to operation and production of the mine. TMAC appreciates the comments raised by KIA in its review of the public record. TMAC commits to working with the KIA to address the comments that have been raised in the context of updates to its environmental management plans and the results of inspection reports. With respect to the recommendation related to the AEMP, TMAC will agree to review and update as appropriate the AEMP prior to production.

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Memo

To:	Chris Hanks	**Date:**	November 30, 2011
Company:	SRK	**From:**	Leslie Gomm and Tom Sharp
Copy to:	File, Maritz Rykaart, Bill Patterson, Michael McGurk, Kevin Mather, Angela Holzapfel	**Project #:**	1CH008.047
Subject:	Summary of Assessment of Pollution Pond Discharge to TIA		

1 Introduction

The Doris Water Balance and Water Quality Goldsim Model was run to provide an assessment of the potential discharge of water from the Pollution Pond to the TIA for a period of 5 years starting in 2012. Specifically the model was run to determine the following:

1. What is the predicted water quality in the TIA as a result of the discharge of the Pollution Pond water and specifically does it meet the discharge limits set out in Clause 26 of the current licence?
2. What is the predicted water quality in Doris Creek during discharge of water from the TIA and specifically does it meet the receiving environment standards set out in Clause 28 of the licence.

The model was run for a period of 5 years from October 2011 to November 2016 assuming the following:

- Water level elevation in the TIA on October 1, 2011 was 29.3 masl.
- The mine is on ongoing care and maintenance mode with no milling and discharge of tailings to the TIA.
- The only inflows to the TIA are that from the Pollution Pond and the TIA catchment area.
- There is discharge from the TIA during the open water season (June to October) as per the requirements of the current licence. Specifically the discharge rate from the TIA can't exceed 10% of the background flow in Doris Creek.
- The target water level in the TIA is 28.3 masl.
- The model was run assuming that all parameters behave conservatively (no degradation of nitrogen species).

As part of this assessment the model run was run assuming average precipitation and evaporation conditions: 229.3 mm annual rainfall and 220 mm annual evaporation.

2 Assumptions

The following highlight the key assumptions that have been incorporated into the model for these scenarios.

a) Initial Water Level and Lake Volume

The model run starts on October 1, 2011 at which time the lake elevation is 29.3 masl and the corresponding volume is 3,400,603 m^3. In subsequent years the discharge from the TIA is designed to lower the water level in the TIA to its natural elevation of 28.3 masl. The TIA is predicted to reach, and stabilize, at this elevation after the first two years of discharge.

b) Precipitation and Runoff

The annual precipitation used in the model run was 229.3 mm. For runoff from land area in Tail Lake catchment area, a runoff coefficient of 0.6 was applied to the annual precipitation value used in each scenario. This land runoff coefficient is based on that used by Golder in their GoldSim water balance model of the major waterbodies in the project area (Golder 2009).

c) Evaporation

A mean annual evaporation of 220 mm was used for the scenarios. This is based on the value used in the original model.

d) Pollution Pond Discharge Volume

The Pollution Pond is assumed to discharge to the TIA during the open water season (June to October) with a total annual discharge volume of 39,364 m^3 based on the information provided by SRK as part of the post-mortem assessment of the recent performance of the Pollution Pond. This assessment assumed a 1:20 precipitation year along with a 1:25 year 24-hour storm event. Furthermore it is assumed that 80% of the annual snowfall is removed from the Doris North Mine Area pads and 95% of the runoff from the undeveloped portion of the watershed north of the Doris North Mine Area is diverted. The corresponding monthly inflows to the TIA are provided in Table 1.

Table 1 Summary of Monthly Pollution Pond Inflows

Month	Discharge (m^3)
June	7,955
July	9,424
August	16,819
September	4,474
October	592

e) Pollution Pond Discharge Water Quality

The Pollution Pond discharge water quality is assumed to be characterized by the water quality sample collected from the pond on May 24, 2011 for all parameters except nitrate and nitrite (Table 2). Nitrate and Nitrite concentrations assumed in the model were from a water quality sample collected from the pond on May 29, 2011. The model was then used to predict the water quality in the TIA and Doris Creek during discharge for those parameters which had pollution pond concentrations provided.

Table 2 Pollution Pond Water Quality (mg/L) – May 24, 2011

Parameter	Concentration
Total Suspended Solids	**27**
Chloride	795
Total Cyanide	0.056
Ammonia-N	15.400
Nitrate-N	45.0
Nitrite-N	1.5
Total Aluminum	0.64
Total Antimony	0.00
Total Arsenic	0.0004
Total Barium	0.0618
Total Beryllium	0.001
Total Boron	0.194
Total Cadmium	0.00005
Total Calcium	334
Total Chromium (VI)	0.0172
Total Cobalt	0.0033
Total Copper	0.006
Total Iron	1.45
Total Lithium	0.16
Total Magnesium	20.1
Total Manganese	0.80
Total Mercury	0.0001
Total Molybdenum	0.005
Total Nickel	0.011
Total Lead	0.00022
Total Selenium	0.002
Total Silver	0.0001
Total Sodium	83.2
Total Thallium	0.0001
Total Tin	0.05
Total Titanium	0.023
Total Uranium	0.0004
Total Vanadium	0.0066
Total Zinc	0.007

3 Results

For each scenario, the model was run on monthly time step from October 1, 2011 for a period of 5 years until November 2016. Starting with a water level elevation of 29.3 masl in October 2011, the predicted water level in the TIA is predicted to return to its natural elevation of 28.3 masl after the second season of discharge (Fall 2013).

The predicted range of discharge water quality in the TIA over the 5-year period is presented in Table 3 along with the corresponding licence discharge limits. During the 5-year model period, the water quality in the TIA is predicted to be well below the limits set out in Clause 26 of the current water licence.

The predicted range of water quality in Doris Creek during periods of discharge from the TIA is presented in Table 4 along with the corresponding licence receiving water quality limits. Similarly, during the 5-year model period, the water quality in Doris Creek during periods of discharge is predicted to be well below the limits set out in Clause 28 of the current water licence.

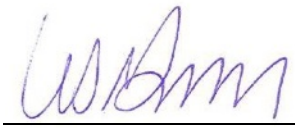
Table 3 Predicted Range of TIA Discharge Water Quality (mg/L) - 2012 to 2016

Parameter	**Maximum Average Concentration in TIA Discharge (Clause 26 of Original Licence) (mg/L)**	**Average Precipitation Conditions**	
Total Suspended Solids	15	1	2
Total Cyanide	1.00	0.001	0.004
Ammonia-N	6.00	0.01	0.77
Total Arsenic	0.50	0.0002	0.0003
Total Copper	0.30	0.001	0.001
Total Nickel	0.50	0.001	0.001
Total Lead	0.20	0.00002	0.00004
Total Zinc	0.50	0.004	0.006

Table 4 Predicted Range of Doris Creek Water Quality (mg/L) during Discharge - 2012 to 2016

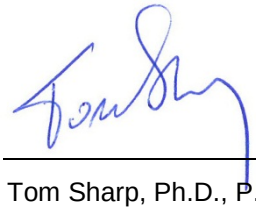
Parameter	Target Closure Concentration (Clause 28 of Original Licence) (mg/L)	Average Precipitation Conditions	
		Min	Max
Chloride	150	54	64
Free Cyanide	0.005	not predicted	
Total Cyanide	0.010	0.001	0.001
Ammonia-N	1.54 (pH 7.5 and T=20)	0.008	0.077
Nitrate-N	2.900	0.006	0.207
Nitrite-N	0.06	0.001	0.008
Total Aluminum	0.10	0.05	0.08
Total Arsenic	0.0050	0.0004	0.0005
Total Cadmium	0.000017	0.000002	0.000002
Total Chromium (VI)	0.0010	0.0002	0.0004
Total Copper	0.002	0.001	0.001
Total Iron	0.30	0.08	0.11
Total Mercury	0.000026	0.000001	0.000001
Total Molybdenum	0.073	0.0001	0.0002
Total Nickel	0.025	0.0004	0.0006
Total Lead	0.001	0.0000	0.0001
Total Selenium	0.001	0.001	0.001
Total Silver	0.0001	0.000001	0.000002
Total Thallium	0.0008	0.000003	0.000021
Total Zinc	0.03	0.0015	0.0031

Prepared by



Leslie Gomm, Ph.D., P.Eng.
Associate

Reviewed by



Tom Sharp, Ph.D., P.E.
Principal Consultant

Aboriginal Affairs and Northern Development Canada
Affaires autochtones et Développement du Nord Canada

Our reference
IQALUIT-#673247

June 6, 2013

Your reference
2AM-DOH0713

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
Gjoa Haven, NU X0A 0H0

Re: Type 'A' Water Licence Number 2AM-DOH0713 – TMAC Resources Inc. – Doris North Gold Project – Kitikmeot Region -– Amendment and Renewal Application

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Dear Ms. Beaulieu,

Thank you for your email of May 7, 2013, concerning TMAC Resources Inc.'s application to amend and renew the Doris North Gold Project's Type 'A' Water Licence.

A technical review memorandum is provided for the Board's consideration. Comments have been provided pursuant to the Department'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.

Regards,

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

c.c. Murray Ball, Manager of Water Resources, AANDC, Iqaluit, NU
Erik Allain, Manager of Field Operations, AANDC, Iqaluit, NU
Karen Costello, Director of Resource Management, AANDC, Iqaluit, NU

Canada

1. Executive Summary

The Doris North Project is situated on Inuit Owned Land in the Kitimeot Region of Nunavut, approximately 125 km southwest from Cambridge Bay and 75 km northweast of Umingmaktok. Effective March 12, 2013, TMAC Resources Inc. is the owner and operator of the project. Prior to this date, the project was owned and operated by Hope Bay Mining Ltd., a subsidiary of Newmont Mining Company. The project was approved for the mining and milling of an underground gold deposit, and associated activities, by the Nunavut Water Board (the "NWB" or "Board") through a Type 'A' water licence that was issued on September 19, 2007. Construction of the project started in 2007 and was expected to continue through to 2013. Prior to TMAC Resources Inc.'s (the "Proponent") acquisition, the project was in care and maintenance beginning January 31, 2012.

On May 7, 2013, the NWB distributed the Proponent's application to amend and renew the Doris North Project's Type 'A' Water Licence (scheduled to expire on September 30, 2013). Interested parties were requested to perform thorough technical assessments of the submitted application and provide written representations to the NWB. The Proponent is applying to renew the licence term for a ten year period, scheduled to commence on September 30, 2013. Suggested licence amendments reflect the current level of site construction and anticipated site occupation and activity if the project were to revert to care and maintenance.

An important component of the submitted application is the addition of a new licence section, Part M: Conditions Applying to Care and Maintenance. This section outlines general monitoring and water management requirements if the project were to revert to care and maintenance again. If the project were to be placed in care and maintenance and then return to operation or closure this section would no longer apply and the requirements for construction, production, or closure would be put into effect.

Aboriginal Affairs and Northern Development Canada ("AANDC" or the "Department") has conducted a technical review of the submitted application. Issues that have been noted are organized into the following categories:

- General;
- Surface water;
- Water Management;
- Wastewater Management;
- Mine Design, Construction and Operation;

- Conditions Applying to Care and Maintenance; and,
- Closure Planning;

There were no significant issues related to Environmental Management, Waste Management, Ports and Roads or Geochemistry.

Recommendations have been provided to address shortcomings of the plans and related documents relative to the submitted Application. The most significant issues originate with effectiveness of water management system, closure and reclamation planning, and the need for regular information updates during care and maintenance.

2. Table of Contents

3. Background

On May 7, 2013, the NWB provided written notice of TMAC Resources Inc.'s application (the "Application") to amend and renew the Doris North Project's Type 'A' Mining and Milling water licence, No. 2AM-DOH0713. In accordance with section 55(1) of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (the "Act"), interested parties were requested to complete thorough **technical assessments** of the submitted application and make written representations on or before **June 6, 2013**. The application has been placed on the NWB online public registry.

In accordance with Rule 14 of the *NWB Rules of Practice and Procedure for Public Hearings*, the Board has decided to hold a **Technical Meeting and Pre-hearing Conference** (PHC) by audio conference on **June 14, 2013**. As stated in the distributed notice, the Board will issue a decision within ten days of the PHC. Furthermore, the NWB provided notice pursuant to section 55(2) of the Act that a **Written Hearing** is scheduled for **July 12, 2013**.

On October 10, 2012, the NWB provided notice of the Proponent's Application. Interested parties were asked to perform a completeness review of the submitted documentation and provide written representations to the Board. The department provided a completeness review memorandum on November 9, 2012.

The NWB is processing an application to assign the water licence from Hope Bay Mining Ltd. to TMAC Resources Inc. As stated in the NWB's May 7, 2013 letter,

> all transactions have been completed and TMAC Resources Inc. has provided all documentation pertaining to the assignment as well as confirmation of transfer of the financial security held with the Minister of Aboriginal Affairs and Northern Development Canada as a requirement of the licence. The Board anticipates that the assignment of the Licence will be effected shortly. As the potential future licensee, TMAC Resources Inc. has indicated that they wish to continue with the application process for the renewal and amendments as submitted by Hope Bay Mining Ltd., and as such, TMAC Resources Inc. will be considered the applicant for the renewal and amendment going forward.

It is for this reason that TMAC Resources Inc. is identified as the Proponent in this technical review memorandum.

4. Review Findings

On behalf of Aboriginal Affairs and Northern Development Canada, the following recommendations are provided for the Board's consideration.

4.1 General

Issue No. 1
Application for a 10 year licence renewal to Type 'A' Water Licence No. 2AM-DOH0713

References
HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

HBML 2012b. Hope Bay Mining Ltd. *Type A Water Licence Renewal and Amendment No. 4 Application Summary – Doris North Project, Nunavut*. August 10, 2012.

- 120810 2AM-DOH0713 A4 c Appendix A Application Summary ENG-IMLE

Observation
As referenced in Section 3 (Summary of Proposed Amendments) of the submitted Application Summary Document (HBML 2012b) and the licence copy marked to show past amendments and proposed changes (HBML 2012a), the Proponent is requesting a 10 year licence renewal term beginning September 30, 2013. The previous licence had a 6 year term, effective September 19, 2007 to September 30, 2013.

Recommendation
Renewing the licence term for 10 years is adequate given the proposed activities, monitoring requirements, and consistency with the terms granted to other Type 'A' water licences. AANDC would not support a longer term because of the value to perform regular public reviews of undertakings of this magnitude.

Issue No. 2
Removal of Monitoring and Follow-up Plan requirement

References
HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

HBML 2013a. Hope Bay Mining Ltd. *Monitoring and Follow-up Plan. Revision 2.1*. Document No. HB-EM-ENV-MP-002. January 2013.

- 130123 2AM-DOH0713 JAN13 Monitoring and Follow-Up Plan-IAAE

Observation
As stated Part K, Item 5 of HBML 2012a, the Proponent is requesting that the Board consider eliminating the requirement to maintain a Monitoring and Follow-up Plan as it is a summary of plans and the information included in other plans (HBML 2012a).

Recommendation
The Proponent's request to remove the requirement to maintain a Monitoring and Follow-up Plan pursuant to Part K, Item 5 of the licence is adequate as it is a summary of information included other management and monitoring plans.

4.2 Surface Water

Issue No. 3
Identification of drainage facilities and key water bodies in the Final Water Management Plan

References
NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

Observation
As stated in Section 1.1 (Purpose and Scope of the Plan) of the Interim Water Management Plan, “HBML will implement this water management strategy during Care and Maintenance and until the site is either closed and reclaimed or proceeds into operation and tailings are discharged to Tail Lake. A final water management plan will be developed and implemented prior to depositing tailings into Tail Lake.” Pursuant to Part F, Item 1 of the licence, the Proponent will be required to submit a revised (final) Water Management Plan at least six months prior to the commencement of processing ore.

The Interim Water Management Plan does not fully describe existing site drainage facilities (e.g., management of water at underground workings, ditches, sedimentation berm, discharge apron, and silt fence) and key water bodies such as Doris Lake and the Tail Lake Tailings Impoundment Area (TIA). Although these features are identified in other documents (e.g., as-built construction drawings, geotechnical inspection reports) they should be indentified and incorporated into the scope of the upcoming revised (final) Water Management Plan.

Recommendation
The Proponent should identify and explain the significance of all drainage facilities and key water bodies in the upcoming revised (final) Water Management Plan.

4.3 Water Management

Issue No. 4
Effectiveness of Runoff Diversion Controls

References
NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

Observation
As presented in the Interim Water Management Plan the Proponent assumes that a large up-slope area (145,444 m^2) will not contribute any flow to the camp area because the water will be diverted to the southwest by the Doris North Camp Area Diversion Berm (constructed in 2012). The effectiveness of this diversion berm requires confirmation on a regular basis.

Recommendation
The major earthworks requiring annual geotechnical inspections pursuant to Part J, Item 18 of the licence should be revised to include the Doris North Camp Area Diversion Berm. Geophysical and permafrost conditions should be described in the Geotechnical Engineer's inspection reports that are required annually pursuant to Part J, Item 19 of the licence.

Additionally, the monthly monitoring reports that are required pursuant to Part J, Item 21 of the licence should document the Doris North Camp Diversion Berm's effectiveness of diverting runoff away from the camp area. As a minimum, conditions during spring freshet, major rain events, and periods of sustained precipitation should be monitored. Documented information can include flow measurements, photographs, and notes.

Issue No. 5
Effectiveness of the Pollution Control Pond and Underflow Capture System

References
NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

Observation
As referenced in Figure 1 (Water Management Areas) of the Interim Water Management Plan, mine contact runoff and underflow (active layer groundwater) from the east camp pad area (128,369 m^2) are intended to be collected in the Pollution Control Pond (2,992 m^3 capacity). Underflow that bypasses the Sedimentation Pond and the Pollution Control Pond should collect in two down gradient sumps (the

underflow capture system). According to the Interim Water Management Plan, water that collects within the Pollution Control Pond and the underflow capture system will be pumped to the Sedimentation Pond prior to being discharged into the Tail Lake TIA. It is possible that the Pollution Control Pond and underflow capture system will not effectively capture mine contact water (particularly during peak flows) and that this water will flow toward Doris Lake as underflow with only a small percentage being captured and diverted to the Tail Lake TIA. The underflow capture system will likely have limited cones of influence due to the active layer (i.e., 1.0 m). It seems unlikely that the underflow capture system will capture a large portion of the underflow. Furthermore, if the underflow capture system and the Pollution Control Pond water levels are higher than their surrounding groundwater (underflow) levels it is likely that underflow seepage will be diverted due to the reverse hydraulic gradient.

Recommendation

The revised (final) Water Management Plan required pursuant to Part F, Item 1 of the licence should address the following recommendations to ensure the effective management of contact runoff and underflow:

- The development of a monitoring system to confirm that an acceptable percentage of mine contact runoff and groundwater (underflow) are captured;
- Maximum water levels for all water collection facilities and associated monitoring activities should be established; and,
- Include mitigation measures to increase the effectiveness of the underflow capture system (e.g., French drains should be considered to ensure the collection of all potentially contaminated shallow groundwater)

Issue No. 6

Management of the Sedimentation Pond

References

HBML 2013a. Hope Bay Mining Ltd*. Monitoring and Follow-up Plan. Revision 2.1*. Document No. HB-EM-ENV-MP-002. January 2013.

- 130123 2AM-DOH0713 JAN13 Monitoring and Follow-Up Plan-IAAE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

Observation

Clean runoff and underflow from the west camp pad area (83,733 m^2) was originally intended to be collected in the Sedimentation Pond (3,325 m^3). HBML decided to fully line the pond with a geomembrane liner at the end of the 2011 open water season after no surface runoff was observed. As presented in the Interim Water Management Plan, the Sedimentation Pond will routinely receive runoff from the west camp pad area and function as a surge pond for mine contact water that collects within the Pollution Control Pond and the underflow capture system (two down gradient sumps). If warranted, the Sedimentation Pond will also receive water from the Temporary Holding Pond (Pad D), Landfarm Ponds, Quarry 1 Tank Farm, Vent Raise Tank Farm, Doris North Tank Farm (Pad R), Temporary Wash Bay, Roberts Bank Tank Farm, other small secondary containment facilities, and excess mine water (if encountered or produced). This water will subsequently be pumped to the Tail Lake TIA.

The January 2013 Monitoring and Follow-up Plan provides conflicting information with regard to the Sedimentation Pond's management. Section 8.2.1 (Construction, Operations and Closure Phases) states, "the Sedimentation Pond is used as a collection pond prior to transfer to the TIA. The Sedimentation Pond is not discharged to tundra." However, according to Table 8.2-1 (Water Quality Monitoring for the Sedimentation Pond ST1, Doris North), water will be discharged onto the tundra if discharge criteria are satisfied.

Recommendation

The Proponent should confirm how water in the Sedimentation Pond will be managed under the Interim Water Management Plan. Clarification should be provided on whether water that meets licensed discharge criteria (Part G, Item 21) will be discharged onto the tundra.

Issue No. 7

Required notice before any planned discharges from facilities

References

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

Observation
The Proponent is requesting that the minimum ten days notice that must be provided to an Inspector prior to any planned discharge of water from project facilities be reduced to five days (the estimated volume proposed for discharge and location is to be included in these notices). This request is included the proposed revisions to Part G, Item 1 of the licence, as indicated in the submitted licence copy marked to show past changes and suggested revisions (HBML 2012a). The Proponent claims that, "this change would permit water to be managed in a manner that would be more responsive to current site conditions."

Recommendation
The Proponent should continue to provide a minimum ten days notice, rather than the proposed five days notice, to an Inspector prior to any planned discharge of water from project facilities. This duration is preferred because it allows enough time for an Inspector to travel to the site and monitor such discharges should he or she want to. If a ten day notice is not practical due to unforeseen conditions (e.g., major rain event), the Proponent should notify an Inspector.

Issue No. 8
Water balance and water quality model updates prior to active ore processing and during periods of care and maintenance

Reference
HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

HBML 2012b. Hope Bay Mining Ltd. *Type A Water Licence Renewal and Amendment No. 4 Application Summary – Doris North Project, Nunavut*. August 10, 2012.

- 120810 2AM-DOH0713 A4 c Appendix A Application Summary ENG-IMLE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

Observation

As presented in the submitted summary document (HBML 2012b), the Proponent wants to change to the frequency water balance and water quality model updates required by Part G, item 31 of the licence during periods of care and maintenance,

> During care and maintenance, the water balance model does not need to be updated because there is no need for a model to forecast water quality based on changing operations. HBML proposes that reporting requirement should be reduced from monthly updates to an annual data summary report. This annual report will summarize water quality data at the compliance monitoring locations and volumes of water pumped to and from Tail Lake.

This proposal is reflected in Part G, Item 31 and Part M, Item 2.c. the submitted licence copy marked to show past changes and suggested revisions (HBML 2012a).

Recommendation

Considering that the Tail Lake TIA is now receiving contact water from the Doris North camp and may receive water from containment areas that do not meet discharge criteria (SRK 2012b), the Proponent should be required, as a minimum, to update the water balance and water quantity model on an annual basis until the start of ore processing and tailings deposition as well as during any periods of care and maintenance. These updates should take into account the frequency of collected monitoring data.

Issue No. 9

Reduction in regular sampling frequency during discharge of water from the Tail Lake TIA

Reference

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

Observation

Proposed licensed monitoring program amendments are included in Schedule J (Conditions Applying to General and Aquatic Effects Monitoring), Table 2 (Monitoring Requirements) of the submitted licence copy marked to show past amendments and suggested revisions. Notable changes are proposed to the frequency of sampling water quality and conducting acute lethality testing at monitoring stations associated with the discharge of water from the Tail Lake TIA. For example, the number of samples to be collected during the two weeks prior to discharge and two weeks after discharge

commences have been reduced without any justification being provided to the Board and an Inspector pursuant to Part J, Item 4.b. of the licence.

Recommendation
Pursuant to Part J, Item 4.b. of the licence, the Proponent should provide to the Board and an Inspector justification for a reduction in sampling frequency of water quality and acute lethality at monitoring stations associated with the discharge of water from the Tail Lake TIA. The Board should also confirm the appropriateness of any reduction in acute lethality testing requirements with Environment Canada before accepting the Proponent's suggested revision.

Issue No. 10
Sampling frequency during periods of discharge from the Tail Lake TIA when water quality in Doris Creek downstream of the outflow waterfall is not within an acceptable range

Reference
HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

Observation
The Proponent is recommending a change to Part J, Item 4.a. of the licence. The current requirement is to increase the sampling frequency to once every second day at three monitoring stations (TL-1 (reclaim pump barge), TL-2 (Doris Outflow Creek, upstream), and TL-3 (Doris Outflow Creek, downstream of waterfall)) when water is discharged from the Tail Lake TIA should the measured concentration of any parameter listed under Part G, Item 28 at TL-3 deviate by more than 20% from that predicted by the water quality model. The Proponent is requesting *to increasing the sampling frequency should the measured concentration of any parameter listed under Part G, Item 28 at TL-3 exceed the concentrations indicated in the table by 25% for a single grab sample, or 20% for an annual average sample during periods of active discharge.*

Recommendation
The Proponent should explain why the water quality model predictions should not be used to increase the sampling frequency at monitoring stations TL-1, TL-2, and TL-3 when water is discharged from the Tail Lake TIA. In addition, the Proponent should explain how it came to the conclusion that the sampling frequency be increased when

the measured concentration of any parameter listed under Part G, Item 28 at TL-3 exceed the concentrations indicated in the table by 25% for a single grab sample, or 20% for an annual average sample during periods of active discharge.

4.4 Wastewater Management

Issue No. 11
Management of treated effluent from the Sewage Treatment Plant

Reference
HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

HBML 2013d. Hope Bay Mining Ltd. *2012 2AM-DOH0713 Type A Water Licence Annual Report*. March 2013.

- 130328 2AM-DOH0713 2012 Annual Report-ILAE

NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

Observation
The Proponent is requesting to remove the requirement to discharge treated effluent to the Tail Lake TIA once this facility is made operational. This is presented in Part G, Item 3.d. of the submitted licence copy that is marked to show past amendments and suggested changes (HBML 2012a). The current licence requires that treated sewage effluent be discharged to the Tail Lake TIA once it is made operational and before such time (i.e., construction) treated effluent is to be discharged through a diffuser onto a rock outcrop northwest of Doris Camp and meet the effluent quality limits specified in Part G, Item 3.b. of the licence (NWB 2007).

According to the submitted 2012 annual report, the Proponent followed the Interim Water Management Plan by discharging water from the Sedimentation Pond to the Tail Lake TIA in 2012 and is understood that this practice will continue in 2013 (HBML 2013d, SRK 2012b). It is understood that the Tail Lake TIA is now capable of receiving treated sewage effluent.

Recommendation
As a minimum, the Proponent should discharge treated sewage effluent into the Tail Lake TIA once ore processing commences. Consideration should be given to commencing this practice in 2013 because the Tail Lake TIA is already receiving water from the Sedimentation Pond in accordance with the Interim Water Management Plan (SRK 2012b). Directing treated sewage effluent to this facility would limit the project footprint, thereby reducing the likelihood of impacts to downstream water bodies (i.e., Glenn Lake).

4.5 Mine Design, Construction, and Operation

Issue No. 12
Discussion of mitigating risk of Potentially Acid Generating ("PAG") rock concerns.

References
AMEC 2005. AMEC Earth & Environmental, a division of AMEC Americas Ltd. *Preliminary Mine Closure and Reclamation Plan. Doris North Project – Hope Bay Belt. Nunavut,* Canada. Prepared for Miramar Hope Bay Ltd. Document No. VM00259A. October 2005.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan.* Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

Observation
The 2012 Closure and Reclamation Plan does not address the theoretical issues discussed in the superseded 2005 Preliminary Mine Closure and Reclamation Plan

(Sections 6.1.3 and 7.2) concerning potential issues associated with the underground disposal of PAG rock (i.e., oxidation). The 2005 plan discusses the following mitigation measures:

- The underground workings "never being force flooded"
- Permafrost being a major factor in oxidation of exposed PAG rock underground; and,
- The risk of permafrost breakdown inducing natural flooding of the underground also mitigate the oxidation risk (though the scenario of the admittedly unlikely event of loss of permafrost in an extreme global warming event extending the talik under Doris Lake to impact the underground workings).

Recommendation
The Interim Closure and Reclamation Plan that is required within six months of the start of ore processing pursuant to Part L, Item 4 of the licence should address potential issues associated with the underground disposal of PAG rock (i.e., oxidation).

Issue No. 13
Clarification on the removal of potentially hazardous materials from the underground workings

References
AMEC 2005. AMEC Earth & Environmental, a division of AMEC Americas Ltd. *Preliminary Mine Closure and Reclamation Plan. Doris North Project – Hope Bay Belt. Nunavut,* Canada. Prepared for Miramar Hope Bay Ltd. Document No. VM00259A. October 2005.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan.* Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

Observation
The 2012 Closure and Reclamation Plan includes the removal of all underground utilities and installations, sealing the entrance of the underground portal with a 15.0 m thick rockfill plug, and sealing the vent raise with a 0.5 m concrete plug. Unlike the superseded 2005 Closure and Reclamation Plan, the 2012 Plan does not confirm that all equipment and potentially hazardous materials will be removed from the underground mine workings, including hydrocarbon products, explosives, vehicle batteries, glycol, transformer fluids, antifreeze, etc.

Recommendation
The Interim Closure and Reclamation Plan that is required within six months of the start of ore processing pursuant to Part L, Item 4 of the licence should discuss the removal of equipment and potentially hazardous materials from underground workings. The removal of these materials should be implemented through progressive and final closure activities.

4.6 Conditions Applying to Care and Maintenance

Issue No. 14
Monitoring requirements during period of care and maintenance

References
HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

Observation
Within HBML 2012a, monitoring requirements that only apply when the site is occupied are recommended throughout (e.g., Part G, Item 24; Part I, Item 7; Part J, Item 12; Part J, Item 16; Part J, Item 21). Schedule ‘A’ (Definitions) suggests that the term ‘occupied’ be defined as, “two or more site personnel attending at Doris North camp for seven or more consecutive nights.” This terminology provides uncertainty on how monitoring activities will be implemented should the Proponent decide to not occupy the site or when the Proponent decides to place the project under care and maintenance.

Furthermore, the Proponent is requesting that the frequency of thermal monitoring data collection be reduced during periods of care and maintenance as referenced in Part M, Item 2.d. and 2.e..If approved, thermistors at the airstrip would be monitored annually rather than monthly and any additional thermistors located between the Tail Lake TIA and Doris Lake and between Doris Lake and the underground workings would not be monitored during periods of care and maintenance.

Recommendation
The amended and renewed licence should specify the monitoring requirements, particularly the frequency of monitoring activities, during care and maintenance. As a minimum, all water and hazardous material containment areas, including fuel storage

facilities, should be monitored monthly during periods of care and maintenance. In addition, the frequency of collecting thermal monitoring data should not be reduced during periods of care and maintenance as the integrity of site infrastructure can depend on the availability of monitoring data. Data should be collected from all thermistors on a monthly basis to ensure that they are functioning properly.

Issue No. 15
Monthly monitoring reporting requirements

References
HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

Observation
As stated in Part M, Item 2.g. of HBML 2012b, the Proponent is requesting the following licence terms and condition during periods of care and maintenance:

> The requirements set out in Part J, Item 21 shall not apply. A data summary report of all monitoring data shall be submitted annually. No update to the water balance model shall be required. The Tailings Impoundment Area shall be visually inspected weekly for TSS when camp is occupied. Prior to discharge from the Tailings Impoundment Area, water quality sample results shall be provided in writing to the inspector.

Part J, Item 21 of the licence (NWB 2007) requires the Proponent to submit monthly monitoring reports that include the following information:

a. All data and information required by Part J and generated by the Monitoring Program in the Tables of Schedule J;
b. Copies of results required by NIRB Project Certificate Item 10;
c. An assessment of data to identify areas of non-compliance with regulated discharge parameters referred to in Part G;
d. A summary of monthly operational assessments of the water balance and water quality model; and,
e. Results of daily visual assessments of suspended sediment along the perimeter of the Tailings Impoundment Area shoreline during construction, operations, and closure.

The submission of monthly monitoring reports allows interested parties to stay regularly informed on project activities. While the scale of activities is diminished during Care and Maintenance Phases the submission of these reports is warranted due to the project's scale. Examples of information that would be provided are the results of winter inspections, all site water management activities, and progressive reclamation measures.

Recommendation
The monthly monitoring reports required by Part J, Item 21 of the licence should continue to be submitted even if the project reverts to a Care and Maintenance Phase. These reports are essential to monitoring potential environmental impacts that may result from the condition of site infrastructure and project activities.

Issue No. 16
Regular information updates during periods of care and maintenance

References
- N/A

Observation
During periods of care and maintenance the Board and interested parties should be regularly informed of the project's status and what measures will be followed to protect the environment from project related activities. The Proponent should also confirm that they have the capacity (i.e., adequate personnel) to manage water within the project area, particularly during periods of high flow (e.g., spring freshet, major rain events, and periods of sustained precipitation).

Recommendation
If the project reverts to care and maintenance the Proponent should provide regular information updates to the Board and interested parties to describe: (a) the project's status; (b) how licence terms and conditions are being satisfied; (c) updates to project management plans, and, (d) events or other actions would trigger final closure. As a minimum, these updates should be provided within three months of any decision to place the project in care and maintenance and annually thereafter (e.g., with annual report submissions).

Issue No. 17
Analysis of Tail Lake TIA water quality and quantity during care and maintenance

References
HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

HBML 2012b. Hope Bay Mining Ltd. *Type A Water Licence Renewal and Amendment No. 4 Application Summary – Doris North Project, Nunavut*. August 10, 2012.

- 120810 2AM-DOH0713 A4 c Appendix A Application Summary ENG-IMLE

Observation
As stated in Section 3 (Summary of Proposed Amendments) of the submitted Application Summary (HBML 2012b),

> During care and maintenance, the water balance model does not need to be updated because there is no need for a model to forecast water quality based on changing operations. HBML proposes that the reporting requirement should be reduced from monthly updates to an annual summary report. The annual report will summarize water quality data at the compliance monitoring locations and volumes of water pumped to and from Tail Lake.

The proposed licence term and condition, Part M, Item 2.b. reiterates this position and adds, “water quality predictions shall be compared to actual data, if the observed data differs significantly from previous care and maintenance predictions.”

It is not known why water quality predictions will only be compared to collected monitoring data when significant differences are noted and what would constitute a significant difference.

Recommendation
As a minimum, the Proponent should compare Tail Lake TIA water quality and quantity monitoring data to predictions generated by the water quality and water quantity model once annually during periods of care and maintenance to confirm its accuracy. The Proponent should explain the proposal to compare water quality predictions to collected monitoring data from the Tail Lake TIA when significant differences are noted during care and maintenance (proposed licence term and condition Part M, Item 2.b.). In particular, the Proponent should define a ‘significant’ difference.

Issue No. 18
Inspection of Tail Lake TIA during care and maintenance

References
HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

Observation
Pursuant to Part G, Item 24.e. of the licence, the Proponent is required to "carry out as a minimum, weekly inspections to identify and remediate where necessary, areas of concern including issues of seepage, cracking, and ponding for all structures associated with the TIA including the North and South Dams, Emergency Dump Catch Basins, pipeline(s), pumps, mill tailings discharge points and other associated structures. The records shall be kept for review upon request of an Inspector" (HBML 2012a). The submitted licence copy marked to show past amendments and suggested changes recommends that these inspections only apply to periods when the site is occupied (refer to Part G, Item 24.e. and Part M, Item 2.a. of the marked licence).

Ensuring that the Tail Lake TIA continues to operate to engineering standards is critical regardless of project phase (i.e., construction, care and maintenance, operation, closure). This infrastructure should be regularly inspected if the project is placed in care and maintenance.

Recommendation
As a minimum, Part G, Item 24.e. and Part M, Item 2.a.of the licence should require the Proponent to visually monitor all structures associated with the Tail Lake TIA on a monthly basis when the site is not occupied (i.e., during periods of care and maintenance). Appropriately qualified individuals, the Board, and an Inspector should be immediately notified of any abnormalities.

4.7 Closure Planning

Issue No. 19
Updates to the Closure and Reclamation Plan and Closure Cost Estimate

References
NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan.* Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

SRK 2012c. SRK Consulting (Canada) Inc. *Hope Bay Project Closure and Reclamation Cost Estimate – 2012 Update, NWB Licenses 2AM-DOH0713, 2BB-BOS1217, and 2BE-HOP1222.* Report prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 31, 2012.
121231 2AM-DOH0713 Hope Bay Closure Cost Estimate 2012 Update-ILAE

Observation
Pursuant to Part L, Items 4 and 6 of the licence, the Proponent is required to submit an Interim Mine Closure and Reclamation Plan and Final Mine Closure and Reclamation Plan, within six and eighteen months of the start of ore processing, respectively, in accordance with AANDC's 2007 *Mine Site Reclamation Guidelines for the Northwest Territories* and consistent with AANDC's 2002 *Mine Site Reclamation Policy for Nunavut* (NWB 2007).

Part C, Item 2 of the licence states, "the Licensee shall submit to the Board for approval, within six months of the start of ore processing and again following eighteen months of ore processing, an updated estimate of the total mine closure restoration liability using the current version of RECLAIM, its equivalent, or other similar method approved by the Board in accordance with the principles of AANDC's *Mine Site Reclamation Policy for Nunavut, 2000*" (NWB 2007).

On September 14, 2013 the NWB distributed the Proponent's August 2012 Closure and Reclamation Plan to interested parties for review. A Closure Cost Estimate in the amount of $7,523,000 was included as an appendix to this plan. As stated in the Proponent's August 23, 2012 cover letter that accompanied the Closure and Reclamation Plan, "the Doris North Project was placed in care and maintenance on

January 31, 2012 and no ore processing had occurred on site prior to that date. HBML has therefore prepared this revised Closure and Reclamation Plan to present the current closure obligations at the site, how they will be met, and a plan for closing all facilities." On January 15, 2013, the NWB distributed another revised closure cost estimate (dated December 31, 2013) in the amount of $13,090,000.

Recommendation
The Proponent should submit an Interim Mine Closure and Reclamation Plan and updated cost estimate within six months of the start of ore processing as required by Part L Item 4 and Part C, Item 2 of the licence.

In addition to the Interim Mine Closure and Reclamation Plan and updated closure cost estimate requirements pursuant to Part L, Item 4 and Part C, Item 2 of the Licence, the Proponent should submit revised versions of these documents within three months of any future decision to place the project under care and maintenance and, as a minimum, every three years should the mine life extend beyond the projected two years of operation and within two years of licence issuance if ore processing has not started within this time period.

Issue No. 20
Clarification of post closure land use objectives

References
HBML 2012c. Hope Bay Mining Ltd. *Re: Renewal and Amendment Information Requests*. Memo to Phyllis Beaulieu, Nunavut Water Board, from Chris Hanks, HBML. Dated November 27, 2012.

- 121127 2AM-DOH0713 A4 HBML Response to Information Requests Table-IMLE

HBML 2013c. Hope Bay Mining Ltd. *Re: 2AM-DOH0713 HBML Response to the Closure Plan Comments*. Memo to Phyllis Beaulieu, Nunavut Water Board, from Chris Hanks, HBML. Dated February 14, 2013.

- 130214 2AM-DOH0713 Closure Plan Comment Responses-IAAE

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan.* Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

Observation
The 2012 Closure and Reclamation Plan does not provide a targeted post-closure land use for the site. An industrial land use classification can be inferred by the proposal to leave certain facilities in place, such as roads, bulk fuel storage facilities, airstrip, the Roberts Bay jetty, and rock pads for future industrial land use (Sections 1.4 and 2.0). Additionally, the proposed soil quality remediation objectives are consistent with the requirements for Industrial Use Land as defined by the Canadian Council for Ministry of Environment Guidelines (the "CCME") for Coarse Grained Soils.

Leaving the above-mentioned facilities in place may result in adverse environmental liabilities being incurred by landowners and stakeholders (e.g., water management in secondary containment areas and culverts, corrosion of metal structures, etc.). Details on how this infrastructure would be transferred to new owners for future use have not been provided. Furthermore, an industrial soil quality remediation objective could allow less stringent cleanup standards for the remediation of petroleum hydrocarbon and metal impacted soils.

Recommendation
The Proponent should consult traditional land users, land owners, and other stakeholders on the proposed post-closure land use criteria. Particularly, the proposal to leave certain facilities in place and the soil quality remediation objectives should be revisited. The Proponent should demonstrate that the proposed post-closure land use objectives are consistent with the 2012 Closure and Reclamation Plan's objective to establish "…stable chemical and physical conditions that protect the environment and human health" (Section 1.4).

Issue No. 21
Post-closure monitoring and maintenance program needs more clarity.

References
AANDC 2002. Aboriginal Affairs and Northern Development Canada. *Mine Site Reclamation Policy for Nunavut*. ISBN 0-662-32073-5. Ottawa: Minister of Public Works and Government Services Canada. 2002.

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan.* Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

Observation

The post closure monitoring activities identified in the 2012 Closure and Reclamation Plan are brief and the implementation schedule is inconsistent. Section 4 of this document states monitoring activities will be conducted "… every two years for ten years." However, bullets presented above this statement provide inconsistent timeframes for seep sampling (annual), vegetation monitoring (Years 1, 3, 7, and 10), inspection of ore and waste rock covers (regular), and engineering inspections (three consecutive years).

Recommendation

Future revisions of the project's Closure and Reclamation Plan (i.e., the Interim Mine Closure and Reclamation Plan and the Final Mine Closure and Reclamation Plan pursuant to Part L, Items 4 and 6 of the licence should provide greater detail on post-closure monitoring activities. The Department's Mine Site Reclamation Policy for Nunavut should be followed when developing a post closure monitoring program. This policy states that Mine Closure and Reclamation Plans should address,

> a plan for post-closure monitoring of the site including a monitoring schedule and reporting frequencies. (For a monitoring program to be meaningful, it must include provision for appropriate progressive responses which trigger action whenever exceeded, including the establishment of thresholds of the identification of changes in circumstances.

The Proponent should note that this policy also states,

> Once the reclamation work required by the plan is deemed completed, the site will be allowed to stabilize. During this time, monitoring will be conducted by the company and verified by DIAND and other agencies as appropriate, with respect to the effectiveness of the mitigative measures, the accuracy of the environmental assessment, and any unforeseen environmental impacts, The duration of the required monitoring phase will be reviewed and confirmed at the time of closure and will depend on the risks associated with the potential impacts on the environment.
>
> During this period, the mining company will continue to be responsible for the site, including remediation of any additional environmental complications which develop. If warranted by site conditions, the monitoring period may be extended to ensure remedial measures are met.

Issue No. 22

Acceptance of proposed closure cost estimate and updates

References

HBML 2013c. Hope Bay Mining Ltd. *Re: 2AM-DOH0713 HBML Response to the Closure Plan Comments*. Memo to Phyllis Beaulieu, Nunavut Water Board, from Chris Hanks, HBML. Dated February 14, 2013.

- 130214 2AM-DOH0713 Closure Plan Comment Responses-IAAE

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan.* Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

SRK 2012c. SRK Consulting (Canada) Inc. *Hope Bay Project Closure and Reclamation Cost Estimate – 2012 Update, NWB Licenses 2AM-DOH0713, 2BB-BOS1217, and 2BE-HOP1222.* Report prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 31, 2012.

- 121231 2AM-DOH0713 Hope Bay Closure Cost Estimate 2012 Update-ILAE

SRK 2012d. SRK Consulting (Canada) Inc. *Hope Bay Project – Comparison Between RECLAIM and SRK Cost Estimating Models NWB Licenses 2AM-DOH0713, 2BB-BOS1217, and 2BE-HOP1222*. Memo to Chris Hanks, HBML, from SRK. December 31, 2012.

- 121231 2AM-DOH0713 Hope Bay Closure Costing Model Comparison RECLAIM vs SRK Model-ILAE

Observation

On September 14, 2012, the NWB distributed a revised Closure Cost Estimate (dated August 2012) and a Closure and Reclamation Plan that were prepared by SRK Consulting (Canada) Inc. (“SRK”) on behalf of the Proponent. The Closure Cost Estimate (SRK 2012a) was in the amount of $7,523,000 and was derived from a spreadsheet model developed by SRK. The department reviewed these submissions and provided comments for the Board’s consideration on October 14, 2012. The Proponent responded to these comments on February 14, 2013 (HBML 2013c).

On January 15, 2013, the NWB distributed another revised Closure Cost Estimate (dated December 31, 2012) in the amount of $13,090,000 (SRK 2012c). As stated in Section 2 (Hope Bay Liability Cost Estimate) of the December 2012 cost estimate, “The updated Closure and Reclamation cost is higher than the previously submitted estimates, mainly because the owner’s costs and some of the unit rates were updated, while the mobilization – demobilization costs were refined to better suit the specifics of this project. An important cost component not previously accounted for is the water management for the Doris North area.”

The December 31, 2012 comparison of the RECLAIM and SRK cost estimating models (SRK 2012d) provides a good description for the basis of the revised cost estimate and how the spreadsheet model used by SRK meets or exceeds the methodology of the standard RECLAIM 6.1 model.

Recommendation

The Proponent's updated closure cost estimate of $13,090,000 is adequate and should be incorporated into an amended and renewed licence. This recommendation is based on the following reasons:

- The rationale provided for using SRK's cost estimating model (SRK 2012d);
- The estimate was prepared by professional engineers (HBML 2013c);
- The estimate is based on the work being completed by a third party (HBML 2013c); and,
- The licence requirements to revise the Closure and Reclamation Plan and Closure Cost Estimate within six and eighteen months following the commencement of ore processing activities (Part C, Item 2 and Part L, Item 4 of the licence)

It should be noted that the department has not performed a detailed review of the submitted Closure Cost Estimate.

5. Recommendation Summary

Reproduced below are the Department's recommendations as result of this technical review. Recommendations have been organized into the following categories:

- General;
- Surface water;
- Water Management;
- Wastewater Management;
- Mine Design, Construction, and Operation;
- Conditions Applying to Care and Maintenance; and,
- Closure Planning;

5.1 General

Recommendation No. 1
Renewing the licence term for 10 years is adequate given the proposed activities, monitoring requirements, and consistency with the terms granted to other Type 'A' water licences. AANDC would not support a longer term because of the value to perform regular public reviews of undertakings of this magnitude.

Recommendation No. 2
The Proponent's request to remove the requirement to maintain a Monitoring and Follow-up Plan pursuant to Part K, Item 5 of the licence is adequate as it is a summary of information included in other management and monitoring plans.

5.2 Surface Water

Recommendation No. 3
The Proponent should identify and explain the significance of all drainage facilities and key water bodies in the upcoming revised (final) Water Management Plan.

5.3 Water Management

Recommendation No. 4
The major earthworks requiring annual geotechnical inspections pursuant to Part J, Item 18 of the licence should be revised to include the Doris North Camp Area Diversion Berm. Geophysical and permafrost conditions should be described in the Geotechnical Engineer's inspection reports that are required annually pursuant to Part J, Item 19 of the licence.

Additionally, the monthly monitoring reports that are required pursuant to Part J, Item 21 of the licence should document the Doris North Camp Diversion Berm's effectiveness of diverting runoff away from the camp area. As a minimum, conditions during spring freshet, major rain events, and periods of sustained precipitation should be monitored. Documented information can include flow measurements, photographs, and notes.

Recommendation No. 5
The revised (final) Water Management Plan required pursuant to Part F, Item 1 of the licence should address the following recommendations to ensure the effective management of contact runoff and underflow:

- The development of a monitoring system to confirm that an acceptable percentage of mine contact runoff and groundwater (underflow) are captured;
- Maximum water levels for all water collection facilities and associated monitoring activities should be established; and,
- Include mitigation measures to increase the effectiveness of the underflow capture system (e.g., French drains should be considered to ensure the collection of all potentially contaminated shallow groundwater)

Recommendation No. 6
The Proponent should confirm how water in the Sedimentation Pond will be managed under the Interim Water Management Plan. Clarification should be provided on whether water that meets licensed discharge criteria (Part G, Item 21) will be discharged onto the tundra.

Recommendation No. 7
The Proponent should continue to provide a minimum ten days notice, rather than the proposed five days notice, to an Inspector prior to any planned discharge of water from project facilities. This duration is preferred because it allows enough time for an Inspector to travel to the site and monitor such discharges should he or she want to. If a

ten day notice is not practical due to unforeseen conditions (e.g., major rain event), the Proponent should notify an Inspector.

Recommendation No. 8
Considering that the Tail Lake TIA is now receiving contact water from the Doris North camp and may receive water from containment areas that do not meet discharge criteria (SRK 2012b), the Proponent should be required, as a minimum, to update the water balance and water quantity model on an annual basis until the start of ore processing and tailings deposition as well as during any periods of care and maintenance. These updates should take into account the frequency of collected monitoring data.

Recommendation No. 9
Pursuant to Part J, Item 4.b. of the licence, the Proponent should provide to the Board and an Inspector justification for a reduction in sampling frequency of water quality and acute lethality at monitoring stations associated with the discharge of water from the Tail Lake TIA. The Board should also confirm the appropriateness of any reduction in acute lethality testing requirements with Environment Canada before accepting the Proponent's suggested revision.

Recommendation No. 10
The Proponent should explain why the water quality model predictions should not be used to increase the sampling frequency at monitoring stations TL-1, TL-2, and TL-3 when water is discharged from the Tail Lake TIA. In addition, the Proponent should explain how it came to the conclusion that the sampling frequency be increased when the measured concentration of any parameter listed under Part G, Item 28 at TL-3 exceed the concentrations indicated in the table by 25% for a single grab sample, or 20% for an annual average sample during periods of active discharge.

5.4 Wastewater Management

Recommendation No. 11
As a minimum, the Proponent should discharge treated sewage effluent into the Tail Lake TIA once ore processing commences. Consideration should be given to commencing this practice in 2013 because the Tail Lake TIA is already receiving water from the Sedimentation Pond in accordance with the Interim Water Management Plan (SRK 2012b). Directing treated sewage effluent to this facility would limit the project footprint, thereby reducing the likelihood of impacts to downstream water bodies (i.e., Glenn Lake).

5.5 Mine Design, Construction, and Operation

Recommendation No. 12
The Interim Closure and Reclamation Plan that is required within six months of the start of ore processing pursuant to Part L, Item 4 of the licence should address potential issues associated with the underground disposal of PAG rock (i.e., oxidation).

Recommendation No. 13
The Interim Closure and Reclamation Plan that is required within six months of the start of ore processing pursuant to Part L, Item 4 of the licence should discuss the removal of equipment and potentially hazardous materials from underground workings. The removal of these materials should be implemented through progressive and final closure activities.

5.6 Conditions Applying to Care and Maintenance

Recommendation No. 14
The amended and renewed licence should specify the monitoring requirements, particularly the frequency of monitoring activities, during care and maintenance. As a minimum, all water and hazardous material containment areas, including fuel storage facilities, should be monitored monthly during periods of care and maintenance. In addition, the frequency of collecting thermal monitoring data should not be reduced during periods of care and maintenance as the integrity of site infrastructure can depend on the availability of monitoring data. Data should be collected from all thermistors on a monthly basis to ensure that they are functioning properly.

Recommendation No. 15
The monthly monitoring reports required by Part J, Item 21 of the licence should continue to be submitted even if the project reverts to a Care and Maintenance Phase. These reports are essential to monitoring potential environmental impacts that may result from the condition of site infrastructure and project activities.

Recommendation No. 16
If the project reverts to care and maintenance the Proponent should provide regular information updates to the Board and interested parties to describe: (a) the project's status; (b) how licence terms and conditions are being satisfied; (c) updates to project management plans, and, (d) events or other actions would trigger final closure. As a minimum, these updates should be provided within three months of any decision to

place the project in care and maintenance and annually thereafter (e.g., with annual report submissions).

Recommendation No. 17
As a minimum, the Proponent should compare Tail Lake TIA water quality and quantity monitoring data to predictions generated by the water quality and water quantity model once annually during periods of care and maintenance to confirm its accuracy. The Proponent should explain the proposal to compare water quality predictions to collected monitoring data from the Tail Lake TIA when significant differences are noted during care and maintenance (proposed licence term and condition Part M, Item 2.b.). In particular, the Proponent should define a 'significant' difference.

Recommendation No. 18
As a minimum, Part G, Item 24.e. and Part M, Item 2.a.of the licence should require the Proponent to visually monitor all structures associated with the Tail Lake TIA on a monthly basis when the site is not occupied (i.e., during periods of care and maintenance). Appropriately qualified individuals, the Board, and an Inspector should be immediately notified of any abnormalities.

5.7 Closure Planning

Recommendation No. 19
The Proponent should submit an Interim Mine Closure and Reclamation Plan and updated cost estimate within six months of the start of ore processing as required by Part L Item 4 and Part C, Item 2 of the licence.

In addition to the Interim Mine Closure and Reclamation Plan and updated closure cost estimate requirements pursuant to Part L, Item 4 and Part C, Item 2 of the Licence, the Proponent should submit revised versions of these documents within three months of any future decision to place the project under care and maintenance and, as a minimum, every three years should the mine life extend beyond the projected two years of operation and within two years of licence issuance if ore processing has not started within this time period.

Recommendation No. 20
The Proponent should consult traditional land users, land owners, and other stakeholders on the proposed post-closure land use criteria. Particularly, the proposal to leave certain facilities in place and the soil quality remediation objectives should be revisited. The Proponent should demonstrate that the proposed post-closure land use

objectives are consistent with the 2012 Closure and Reclamation Plan's objective to establish "…stable chemical and physical conditions that protect the environment and human health" (Section 1.4).

Recommendation No. 21

Future revisions of the project's Closure and Reclamation Plan (i.e., the Interim Mine Closure and Reclamation Plan and the Final Mine Closure and Reclamation Plan pursuant to Part L, Items 4 and 6 of the licence should provide greater detail on post-closure monitoring activities. The Department's Mine Site Reclamation Policy for Nunavut should be followed when developing a post closure monitoring program. This policy states that Mine Closure and Reclamation Plans should address,

> a plan for post-closure monitoring of the site including a monitoring schedule and reporting frequencies. (For a monitoring program to be meaningful, it must include provision for appropriate progressive responses which trigger action whenever exceeded, including the establishment of thresholds of the identification of changes in circumstances.

The Proponent should note that this policy also states,

> Once the reclamation work required by the plan is deemed completed, the site will be allowed to stabilize. During this time, monitoring will be conducted by the company and verified by DIAND and other agencies as appropriate, with respect to the effectiveness of the mitigative measures, the accuracy of the environmental assessment, and any unforeseen environmental impacts, The duration of the required monitoring phase will be reviewed and confirmed at the time of closure and will depend on the risks associated with the potential impacts on the environment.
>
> During this period, the mining company will continue to be responsible for the site, including remediation of any additional environmental complications which develop. If warranted by site conditions, the monitoring period may be extended to ensure remedial measures are met.

Recommendation No. 22

The Proponent's updated closure cost estimate of $13,090,000 is adequate and should be incorporated into an amended and renewed licence. This recommendation is based on the following reasons:

- The rationale provided for using SRK's cost estimating model (SRK 2012d);
- The estimate was prepared by professional engineers (HBML 2013c);
- The estimate is based on the work being completed by a third party (HBML 2013c); and,
- The licence requirements to revise the Closure and Reclamation Plan and Closure Cost Estimate within six and eighteen months following the commencement of ore processing activities (Part C, Item 2 and Part L, Item 4 of the licence)

It should be noted that the department has not performed a detailed review of the submitted Closure Cost Estimate.

6. Works Cited

AMEC 2005. AMEC Earth & Environmental, a division of AMEC Americas Ltd. *Preliminary Mine Closure and Reclamation Plan. Doris North Project – Hope Bay Belt. Nunavut,* Canada. Prepared for Miramar Hope Bay Ltd. Document No. VM00259A. October 2005.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

AANDC 2002. Aboriginal Affairs and Northern Development Canada. *Mine Site Reclamation Policy for Nunavut*. ISBN 0-662-32073-5. Ottawa: Minister of Public Works and Government Services Canada. 2002.

HBML 2012a. Hope Bay Mining Ltd. *Appendix F – Type A Water Licence 2AM-DOH0713 (Marked to Show Past Amendments and Suggested Changes)*. Document No. 11871.77733.CJK.6718169.1. August 10, 2012.

- 120810 2AM-DOH0713 A4 h Appendix F Licence Blackline-IMLE

HBML 2012b. Hope Bay Mining Ltd. *Type A Water Licence Renewal and Amendment No. 4 Application Summary – Doris North Project, Nunavut*. August 10, 2012.

- 120810 2AM-DOH0713 A4 c Appendix A Application Summary ENG-IMLE

HBML 2012c. Hope Bay Mining Ltd. *Re: Renewal and Amendment Information Requests*. Memo to Phyllis Beaulieu, Nunavut Water Board, from Chris Hanks, HBML. Dated November 27, 2012.

- 121127 2AM-DOH0713 A4 HBML Response to Information Requests Table-IMLE

HBML 2013a. Hope Bay Mining Ltd*. Monitoring and Follow-up Plan. Revision 2.1*. Document No. HB-EM-ENV-MP-002. January 2013.

- 130123 2AM-DOH0713 JAN13 Monitoring and Follow-Up Plan-IAAE

HBML 2013b. Hope Bay Mining Ltd. *Re: 2AM-DOH0713, 2BE-HOP1222, and 2BB-BOS12172– Updated Security Estimates*, Memo to Phyllis Beaulieu, Nunavut Water Board, from Chris Hanks, HBML. January 14, 2013.

- 121231 2AM-DOH0713 Hope Bay Closure Cost Estimate 2012 Update-ILAE

HBML 2013c. Hope Bay Mining Ltd. *Re: 2AM-DOH0713 HBML Response to the Closure Plan Comments*. Memo to Phyllis Beaulieu, Nunavut Water Board, from Chris Hanks, HBML. Dated February 14, 2013.

- 130214 2AM-DOH0713 Closure Plan Comment Responses-IAAE

HBML 2013d. Hope Bay Mining Ltd. *2012 2AM-DOH0713 Type A Water Licence Annual Report*. March 2013.

- 130328 2AM-DOH0713 2012 Annual Report-ILAE

NWB 2007. *Nunavut Water Board Licence No. 2AM-DOH0713*. Granted to Hope Bay Mining Ltd. September 19, 2007.

- 070919 2AM-DOH0713 Licence Final Issued-OCHE

SRK 2012a. SRK Consulting (Canada) Inc. *Doris North Closure and Reclamation Plan.* Prepared for Hope Bay Mining Ltd. Document No. 1CH008065. August 2012.

- 120823 2AM-DOH0713 Closure and Reclamation Plan-IMLE

SRK 2012b. SRK Consulting (Canada) Inc. *Doris North Project Interim Water Management Plan. Revision 5*. Prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 2012.

- 121210 2AM-DOH0713 DEC12 Interim Water Management Plan-ILAE

SRK 2012c. SRK Consulting (Canada) Inc. *Hope Bay Project Closure and Reclamation Cost Estimate – 2012 Update, NWB Licenses 2AM-DOH0713, 2BB-BOS1217, and 2BE-HOP1222.* Report prepared for Hope Bay Mining Ltd. Document No. 1CH008.069. December 31, 2012.

- 121231 2AM-DOH0713 Hope Bay Closure Cost Estimate 2012 Update-ILAE

SRK 2012d. SRK Consulting (Canada) Inc. *Hope Bay Project – Comparison Between RECLAIM and SRK Cost Estimating Models NWB Licenses 2AM-DOH0713, 2BB-BOS1217, and 2BE-HOP1222*. Memo to Chris Hanks, HBML, from SRK. December 31, 2012.

- 121231 2AM-DOH0713 Hope Bay Closure Costing Model Comparison RECLAIM vs SRK Model-ILAE

Environment Canada Environnement Canada

Environmental Protection Operations Directorate
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Yellowknife NT X1A 2P7

June 6, 2013

EC file: 4703 003 013
NWB file: 2AM-DOH0713

Phyllis Beaulieu, Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven NU X0B 1J0

Via e-mail: licensing@nunavutwaterboard.org

Attention: Ms. Beaulieu

RE: 2AM-DOH0713 Application for the Amendment and Renewal of a Type A Water Licence: Notice of Application

Environment Canada (EC) has reviewed the documents for the Renewal and Amendment 4 Application submitted by Hope Bay Mining Ltd. (HBML) to the Nunavut Water Board (NWB). The following 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.*

HBML submitted the Amendment 4 application to amend and renew the Type A Water Licence 2AM-DOH0713. The application requested:

- A renewal of the current Type A Water Licence for a ten-year period commencing in 2013;
- Minor amendments to the site monitoring and reporting requirements during the care and maintenance phase of the project by inserting a Part M Care and Maintenance section to the Type A Water Licence; and
- Various administrative revisions to the Type A Water Licence to consolidate all previous approved amendments and to reflect the current state of construction at Doris North.

EC has no comments at this time on the Renewal and Amendment 4 Application submitted by HBML. Should you require further information, please do not hesitate to contact me at 867-669-4746 or Jane.Fitzgerald@ec.gc.ca.

Sincerely,

Jane Fitzgerald
Environmental Assessment Coordinator

cc: Yongshu Fan, Senior Environmental Assessment Coordinator, Environmental Assessment and Marine Programs-PNR North, EC

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Phyllis Beaulieu
Manager of Licencing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B1J0

June 6th, 2013

Re: Water Licence No.2AM-DOH0713; Application for the Amendment and Renewal of Type 'A" Water Licence: Notice of Application

Dear Phyllis Beaulieu, KIA has completed its review of posted documents on the NWB ftp site with our specialists. In doing so the KIA is now providing its representations to the NWB Board in accordance with subsection 55(l) of the Nunavut Waters and Nunavut Surface Rights Tribunal Act. In doing so the KIA actively exercises its rights as owners of Inuit Owned Land (IOL) on behalf of its beneficiaries under sections 58 to 60 of the Act. Also as owners of IOL, the KIA actively maintains its rights to water compensation under Article 20, Part 3 of the Nunavut Lands Claims Agreement (NLCA).

The following are our comments on posted documents reviewed by our engineering, fish, and aquatic and wildlife specialists.

AANDC Inspection Report, July 9 and 10, 2012; [January 31, 2013]

Reviewed: No Comment

AANDC Inspection Report, March 20, 2012; [April 30, 2013]

The intent of the inspector's reports is to record observations made during inspections with respect to Non-compliance or Non-conformity with the issued Water Licence or the Nunavut Water and Nunavut Surface Rights Tribunals Act.

The March 20 2012 inspection was confined to the Doris Camp and was made with knowledge of the intent of the proponent to enter into Care and Maintenance for the Project.

The major potential water management issues, the wastewater treatment plant and water treatment plant were both operating as intended and no problems were identified.
The inspector identified issues relating to partially cleared snow and condition of berms, and with storage, secondary containment and drip control for hydrocarbons.

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Four issues were documented as known or suspected violations of the Water Licence or Act and the Inspector requested a remedial plan for these within 30 days.

Comment – Issues reflect concerns with routine maintenance and camp hygiene but any effects would be confined to the immediate area of the activity.

Water Licence Inspection – Temporary Closure – Hope Bay Mining Ltd. For Water Licence 2AM-DOH0713, 2BE-HOP1222, 2BB-BOS1217; October 2 and 3, 2012

This was a quarterly inspection of all camps, Doris, Boston and Windy, in the Hope Bay Belt by the AANDC inspector. Much of it was focussed on the decision to place the project into Care and Maintenance that was made on January 31, 2012 and associated requirements. The inspection was thorough and detailed.

No obvious contraventions or noncompliance with current authorizations were noted for the Doris and Boston camps and rehabilitation work at Windy Camp was ongoing. The inspector expressed concern with delayed responses to previous concerns, especially to delays in preparation of a Care and Maintenance Plan. The Inspector cautioned that an Inspector Direction could be issued if the C&M Plan was not provided by Dec. 31, 2012, or if it was not sufficient when issued.

Hope Bay Mining Ltd., Waste Water Treatment Management Plan, HB-WM-OPS-MP-004; October 2012 (Rev 3)

This plan addresses treatment and disposal of camp sewage according to Water Licence conditions and includes an operator's manual for the treatment system and Material Safety Data Sheets for several reagents. Treatment is accomplished by 2 "Sanitherrn" Membrane Biological Reactor Units with the total capacity to treat sewage from 360 people – various inspection reports from 2012 indicate that the system also worked well with lower effluent loading rates when the camp was in Care and Maintenance mode and, at one point, one unit was shut down. Section 2.4 notes that a smaller unit, or a different form of treatment used, if the camp population was sufficiently small. When the TIA is completed, the discharge location would be switched from the tundra at Site ST-8 to the TIA. Sewage sludge is partially dewatered and then incinerated, with options for future composting, disposal as overburden or use at reclamation sites (2.5.2).

Discharge quality is monitored at the point of discharge (St-8) and 1 km downstream at a presumed point of entry to Glenn Lake (ST-9). There is no provision in place to confirm the flow path of effluent or the actual presence of effluent at ST-9 and so overall environmental impact cannot be confirmed. These are of low environmental significance however, but see the comment under Revised Monitoring and Follow-up Plan for Water Licence, January 24th, 2013 regarding a lower effluent bacterial limit.

Section 2.9.1 off specification Effluent Quality - the report describes a program to follow up if effluent quality does not meet discharge limits. We note that the remote location and lab analysis times could mean that 2-3 weeks could pass before the need for corrective action was identified.

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Recommendation – the operator should work with the manufacturer to determine if there are warning or monitoring systems available that would allow a more rapid response time - this is not a high priority item, however, as the effluent is to be discharged to the TIA in the long term.

Recommendation – the WWTMP does not contain any requirements for decommissioning of the tundra disposal system or inspection and remediation of the tundra after effluent is discharged to the TIA. The proponent should develop a WWTP Closure Plan to ensure that any necessary tundra remediation occurs to address erosion of tundra or loss of permafrost.

Hope Bay Mining Ltd., Spill Contingency Plan, HB-ER-ENV-MP-001, October 2012 (Rev 5)

Reviewed with the following comments:

- Recommend including an index of acronyms used somewhere in the introductory sections after the table of contents.
- On page iii, the table summarizing the size of the reportable spills should be approved by Environment Canada (EC). In KIA's engineering consultants previous review of the Hope Bay Spill Contingency Plan (BGC, 2011), there was a discrepancy noted, which was supposed to have been addressed by EC. NWB should confirm that these values are acceptable.
- In Section 1.2, page 2, 2nd and 3rd paragraphs, the period at the end of the paragraphs are missing so it is not clear if any text is missing as well.
- Section 1.3, page 1 gives the Hope Bay Operator information. Are these contact details up to date with respect to TMAC Resources Inc. takeover of the properties?
- Section 2, page 5 summarizes "Applicable Legislation, Licensing and Guidelines". The NWB should ensure that these requirements are acceptable for use on IOL, as well as the Roberts Bay facility which is on Crown Land.
- Section 5.1, page 20 describes containment and cleanup of fuel spills on land. Liquids spilled on land will likely seep into the soil and rest on the base of the active layer (i.e. top of permafrost). These spill sites should be assessed as soon as possible for the extent of subsurface contamination after the surface spill is cleaned up. Remediation of subsurface contamination is necessary to prevent migration of contaminants along the permafrost interface and to remove any free product.
- On page 25, under the heading "Dispersion", second line, typo, change "they" to "the".

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Emergency Response Plan, Hope Bay Mining Ltd., Care & Maintenance; October 2012

In general, there are no specific comments regarding the technical content of the document itself. However, the following are some general comments that should be considered:

- The document needs a glossary and definitions section up front to define all the acronyms being used. For example there is no definition for "HSLP", which is the issuing department.
- The Kitikmeot Inuit Association is not mentioned anywhere in this document. There should be reference to the KIA as the land owner and a possible party that may respond in an emergency. The KIA should be given the opportunity to review the Emergency Response Plan (ERP) on an annual basis.
- The word "emergency" is misspelled several times throughout the document, e.g. page 19, 23, 25. A spell check is recommended to catch any other typos.
- Typo on page 24, 5th line from the top, should be "known".
- On page 37, Appendix C- Spill Response- First Responder, the image seems to be a scanned version with some gray highlighting that obscures the text, making it difficult to read. It should be replaced with an original that is clear and legible.

AANDC October Inspection Report Response for Water Licence 2AM-DOH0713; October 2012

A number of outstanding documents were noted in this report, which is required by inspectors. These noted documents are/were required to avoid non-compliance. These include, but are not limited to:

- A plan to address remedial action at the land farm (page 4)
- Results from cutting deposit area at the Patch Lake site in July 2012 (page 15)
- An explanation of how the sewage treatment is/was shut down, as it was unclear as to how this would be done given that 10 days were needed to clear the system (page 10)
- A plan for onsite monitoring of TMAC facilities (a complete, standalone care and maintenance program for the site as requested by inspectors) (page 15)

A follow up memorandum by the proponent, which lists each of the information requests found within this document, and how each was addressed, who the information was supplied to, and when the information was supplied would be helpful for evaluating the current state of compliance and any outstanding documentation that may be required during future inspections and should a state of care and maintenance be required again in the future.

Also, a potential concern worth noting and keeping updated on is related to the flow monitoring and timing of discharge from Tail Lake to Doris Creek (TL-3). It was noted in

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the AANDC inspection of Tail Lake Dam (North Dam) that water levels remain higher than originally anticipated by the proponent (page 12).

Under Part G (30) of the NWB Class A Water License (2AM-DOH0713), the Licensee shall ensure that the flow from the Tailings Impoundment Area into Doris Creek at monitoring station TL-4 does not exceed 10% of the background flow in Doris Creek as measured at monitoring station TL-2 at the time of discharge.

Tailings pond discharges will result in changes to stream flow in Doris Creek outflow during certain periods of the year. Doris Creek provides important habitat to several fish species (Arctic char, lake trout, lake whitefish, cisco and ninespine stickleback) that require protection. Stream flow and water temperature are two important elements that need to be monitored, as they have the potential to adversely impact fish rearing and upstream fish migration during spawning season.

Therefore, if water needs to be discharged from Tail Lake to Doris Creek at a rate exceeding the 10% of background, consideration should be given to the timing of discharge to ensure Arctic char, as a Valued Ecosystem Component (VEC), is not impacted. Maintaining awareness of this issue will be important in the ongoing review of this project.

Draft Inspection Report Waste Water Shut down response received; November 19, 2012

This report was prepared in response to a request from the AANDC inspector following his October 2012 inspection of the site. It describes the procedures followed for the winter shut down of the plant. It is noted that 20,000 L of untreated residual wastewater was transferred to the WWTP holding tank for overwinter storage.

No issues were identified in KIA's consultant's review.

Revised Quality Assurance and Quality Control Plan for Water Licence 2AM-DOH0713, 2BB-BOS1217, and 2BE-HOP1222; November 29, 2012

This plan is intended to meet the needs of the Surveillance Network Program for the mine as outlined in the Water Licence.

Section 3.3.1 p.6

Add "When collecting a series of stream samples, the sampler should work in a direction from downstream to upstream, so that disturbance of upstream sediments does not alter downstream results."

Section 4.0 Quality Control Samples, p.10 - this section provides good advice on collection of replicates, blanks and split samples but provides no guidance on interpretation of these results.

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Recommendation - Please provide guidance on interpretation of QA/QC samples including acceptable limits of variance, rationale for discarding sample results and interpretation of variance in sample results.

Appendix B Figure B1 appears to miss-identify SNP Site ST-8 as a site in the middle of the camp (bottom right photo) when ST-8 is the discharge point for treated sewage effluent to the tundra (top left photo).

Recommendation - Please confirm the location of SNP site ST-8.

Interim Water Management Plan; December 17, 2012

Section 3.3.1 – the design basis for water management is a 1:20 wet year with a 1 in 25 year 24 hour storm. This would not appear to be conservative given a warming climate and predictions for increased precipitation but this is partially balanced by the conservative assumption of a runoff coefficient of 1 (which would overestimate the runoff volume for management) and observations of flow behaviour during a large storm (p.8).

Recommendation – The proponent should demonstrate that the design basis for water quantity management is adequate for the predicted climate and water balances.

No other issues.

Hope Bay Project Closure and Reclamation Cost Estimate – 2012 Update for Water Licence 2AM-DOH0713, 2BB-BOS1217, and 2BE-HOP1222; January 14, 2013

In general, the cost estimate appears detailed and well supported in terms of quantities, unit rates and productivity assumptions. The available period for review does not allow for a detailed audit of the cost estimate. However, some general comments should be addressed by TMAC Resources Inc., as follows:

- The updated cost estimate should be tied to a particular closure and reclamation plan. Is there a plan that goes with this?
- Further to the above comment, there should be an introductory section that explains the basis of the cost estimates presented, including description of site facilities, investigations/testing carried out and assumptions made. Also, there should be a summary of the progressive reclamation work that has already been carried out.*
- On page 1, Section 1, Introduction, it was noted that the cost estimate was developed using a spreadsheet model developed by SRK for the annual updating of closure liability cost estimates required under the US regulations. Is this model accepted by Canadian regulators? How would this compare with the RECLAIM model cost estimate advocated by AANDC?*

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- Further to the above comment, TMAC should comment on how the progressive reclamation costs compared with the original estimates. This would include some discussion on unit rates and productivity and how these were factored into the present cost estimate.
- The totals on the summary cost tables, presented in Section 3, Tables 1-3 are not in agreement with the totals (i.e. direct, indirect and total) presented on the detailed spreadsheets. This may be due to changes made on the master spreadsheet not being properly linked to the summary tables. TMAC should clarify and update as required.
- There is no allowance in the estimate for any significant excavation, hauling, treatment/disposal of hydrocarbon contaminated soils. For example, Appendix A, Table 2 (Boston Closure Cost Estimate), Maintenance Shop Complex. For the Primary Tank Farm, a line item exists for loading hydrocarbon contaminated soil into containers for transport, but zero quantities were assigned. This item may be a significant cost item. Has TMAC carried out sufficient site characterization to determine that no subsurface hydrocarbon contamination exists? What are the stated volumes based on? It KIA's engineering consultant's experience that even if subsurface investigations were carried out to assess the extent of contamination, the actual soil volumes that need to be removed can be many multiples of the theoretical volume. These comments would apply to all sites and would typically include tank farms, fuel storage sites, mechanical shops and power plants. The contingency amounts assumed in the cost estimate would likely not be sufficient to cover the potential costs associated with remediating a significant hydrocarbon contaminated area.
- It is noted that where ore stockpiles exist on surface, TMAC proposes to gather them together in one location on surface and cover them with an HDPE liner and waste rock cover. Is this measure considered a temporary measure until ore processing resumes, or a permanent closure measure?

*Note: The document entitled "Hope Bay Project- Comparison Between RECLAIM and SRK Cost Estimating Models, NWB Licenses 2AM-DOH0713, 2BB-BOS1217 and 2BE-HOP1222", prepared by SRK Consulting (Canada) Inc., dated December 31, 2012 addresses the comment related to the use of the SRK model versus the RECLAIM model. However the question remains whether AANDC and the NWB have accepted the SRK model. This document also partially addresses the comments related to the basis of the cost estimate; however more details on the actual site facilities and the progressive reclamation are not included in this document and should be addressed by TMAC.

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Revised Monitoring and Follow-Up Plan for Water Licence 2AM-DOH0713; January 24, 2013

KIA's engineering consultant understands that this Plan incorporated comments by AANDC and was deemed acceptable by AANDC as a Plan during the C&M phase of the Hope Bay Project. Our engineering consultant's review has identified no issues of concern with respect to the Plan details, although a few items for clarification were noted that the KIA will follow-up with TMAC Resources Inc.

Page 12, Section 2.2.2, Care and Maintenance Phase, Doris North Project,
The Plan notes that the air quality monitoring program will only be conducted seasonally when the camp is open. This would seem reasonable only if there is no wind-borne dust issues associated with the project. These would be associated with areas of exposed soil, roads or stockpiles subject to wind effects year-round. The KIA should request TMAC provide evidence that this is not a concern while the camp is seasonally closed.

Page 88, Section 15, Tailings and Site Geotechnical Monitoring, Section 15.1,
Background and Rationale, third paragraph, re: Appendix A, "*...monitoring thermistors as long as they are operational and monitoring seepage conditions to ensure design criteria are met.*" If thermistors are no longer operational, they should be replaced so monitoring of the thermal regime in the dam and foundation continues. Maintaining frozen conditions in the dam and foundation, at temperatures provided in the design criteria, is integral to the overall stability and safety of the dam. If there is <u>any</u> seepage detected on the downstream side of the dam, there should be cause for concern as seepage can thermally erode the frozen dam's water retention capacity. TMAC should ensure that their inspectors are trained and aware of the dam design criteria and thermal considerations.

Page 91, Section 15.2.1, Construction, Operations and Closure Phases, Doris North.
This section lists the types monitoring being carried out, which includes visual inspection and thermal, deformation and climatic instrumentation. Is this information being provided to the KIA by TMAC on a regular basis?

Page 91, Section 15.2.1, 6th paragraph.
Have the Operation, Maintenance and Surveillance and the Emergency Preparedness Plans been prepared yet? The KIA should have the opportunity for review and input on these before operations commence.

Page 114, Section 21, Seasonal Closure Preparation Requirements, Section 21.2, Program Summary, 3rd bullet point from top of page.
TMAC indicates that it has left gasoline drums in accessible locations, for use by winter crews or passing hunters. Although it is noted that these drums are supposed to be placed within a containment enclosure, the possibility exists for uncontrolled spills and releases by

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unknown third parties. How does TMAC monitor or control the use of these facilities to identify if and when such a spill occurs? There may be a significant amount of time that passes between when a spill has occurred and when it is detected by TMAC staff.

KIA's wildlife consultant has provided the following comments on the revised Monitoring and Follow-up Plan which KIA will follow-up with TMAC Resources Inc.

Page I, Table E-1: Previously reviewed documents noted the use of motion triggered cameras to monitor wildlife in and around the project site. This is not mentioned in the subsequent Table E-1. Please clarify when camera monitoring was implemented, where, for what purpose, and how long it will continue.

There appears to be a greater emphasis on systematic monitoring of birds (use of prism plots and aerial surveys for waterfowl and raptors) than for mammals. While monitoring birds are important to avoid contravention of wildlife Acts, the lack of systematic monitoring of large mammals at this project site limits the ability for adaptive management of site specific issues for species of great importance to local communities.

Page viii, Table E-2 and Page xi, Table E-3: These tables show that wildlife monitoring is only required during the baseline phase. Due to anticipated impacts on large mammal VECs, the possibility of issues occurring that were not anticipated during the EIS, and uncertainty about the efficacy of mitigation, the requirements for monitoring during active exploration, closure, and care and maintenance phases should be revisited for certain VECs (grizzly bear and caribou). In particular, the care and maintenance phase represents a period where previous deterrents (human presence, loud noise, and mechanical disturbances) are no longer present or as prevalent, and when large mammals may become more attracted to site and remaining infrastructure (*e.g*, for denning, escape from wind, water source). Different risks can occur during this phase (*e.g.*, interaction with contaminants). While mitigation is indicated to be implemented for wildlife during all phases, monitoring is still required to determine if the mitigation is working during each phase, which will typically promote different attraction versus avoidance responses from VECs and render mitigation more or less effective.

Page 19-20: Section 4.2 – Suggest that you add to the statement at the beginning of this section..."based on findings of the environmental assessment (MHBL, 2005), comments and recommendations of stakeholders, the VECs and project phases requiring monitoring, were decided."

Page 19-20: The statement: *"Interactions with other wildlife species (e.g., muskox, wolves, foxes, hares, ground squirrels, and marine mammals) are monitored to develop preventive mitigation of potential direct mine-related incidents that could, if not managed, lead to injury or mortality."*

This statement seems misleading given that only incidental observations will be noted for species other than birds, and that active exploration, care and maintenance, and closure phases are excluded as phases requiring monitoring in Tables E-2 and E-3.

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Page 21: This reviewer agrees that continued project-specific aerial surveys for caribou is cost intensive and not historically effective due to a variety of preventable (poor survey designs, alterations in survey designs mid-stream, and improper statistical analyses) and non-preventable issues (weather flight restrictions/visibility, over-inflation of zero data). This section notes that TMAC has been developing a memorandum of understanding with the GN Department of Environment (GN DoE) to participate in the regional caribou monitoring program proposed by the GN DoE in place of local caribou monitoring specific to Hope Bay, and that this agreement is currently awaiting signature by the GN. It would be pertinent to include the amount or effort which the proponent proposes to contribute to this government program, details on the program itself, and a short review of the ways in which this regional program will provide superior information on the timing and movement patterns of caribou through the region and within the area specific to evaluating impacts of the Hope Bay Project. At present, insufficient information has been provided on the contribution of the proponent to the GN DoE monitoring, the regional monitoring program itself, and the ways in which this regional monitoring will address impacts of Hope Bay. These details should be provided for review by external reviewers such as the KIA, and a meeting between the GN DoE, Rescan, the KIA, the proponent, and other stakeholders is suggested to discuss the best use of resources towards a future, regional monitoring program for caribou. Given the number of proposed projects in the vicinity, it is important that the regional monitoring program be thoroughly reviewed, fairly compensated by relevant proponents, and be able to address project specific and cumulative impacts on caribou. Early in the design stage of this regional caribou monitoring program, statistical methods that will be used to analyze data should also be strongly considered such that time, effort, and money is not wasted on results with low statistical power.

Page 23: There is a missing value- please report the number of prism plots selected in the Doris North compliance monitoring area.

Page 24: Section 4.2.2 states: *"During C&M, HBML will not complete the wildlife monitoring program. The program is intended to assess the impacts of project activities on wildlife. These surveys are conducted via helicopter. Due to the limited activity that will occur during C&M, HBML has determined that the most disruptive activity that could take place is the use of helicopters to conduct the wildlife monitoring program. For example, a hovering helicopter near a raptor nest will result in greater stress to that animal than the maintenance activities that will take place in the immediate project footprint."*

Is helicopter disturbance not a concern during other phases of project development then, particularly where helicopters are surveying species in control areas outside of the zone of influence of the project?

Section 4.2.2 also states: *"HBML has installed motion and heat triggered wildlife cameras to capture presence of wildlife in and around the project footprint. These cameras have been installed in various locations on the project footprint at Doris and Boston, and near the footprint. Incidental wildlife sightings will continue to be recorded and reported quarterly. The annual wildlife monitoring report will be limited to the footprint changes (habitat monitoring), camera monitoring results and the incidental sightings and mitigation activities."*

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It is suggested that cameras be installed that either provide photos uploaded via satellites to a remote location that can be checked daily or at least weekly (i.e. ERM Office), or be checked frequently by the on-site wildlife manager. This ensures that information from images can provide prompt feedback for adaptively managing potential detrimental effects. The other reason for this is to ensure that cameras are operating properly, not knocked over by wildlife curious about the vertical structures they are mounted on, and that the visibility through the camera lenses is not impeded by dust, fog, or snow (all frequent occurrences in tundra camera monitoring programs).

Page 24-36, Table 6.2-2 and 6.2-3: Again, due to the natural elevation of arsenic in the area, it is strongly recommended that arsenic speciation analyses be conducted at least annually, rather than simply monitoring changes in measures of total arsenic. For this metalloid, changes in the predominant form that it is found in can make a large difference in toxicity. A large proportion of baseline arsenic at gold rich sites is typically found as arsenopyrite (fool's gold). Arsenopyrite, in this form, is bound such that it is not readily bioavailable and relatively non-toxic. As this arsenopyrite gets converted to more carcinogenic forms (which can occur with changes in pH, water hardness, and concentrations of other metals and ammonia), toxicity problems then arise. However, it is important to understand that this can occur with no change in the measured levels of total arsenic concentrations. The same concentration of total arsenic would be measured from the arsenopyrite as would be measured when this arsenopyrite is converted to carcinogenic/toxic forms; the conversion of forms here, rather than the total concentration, is the bigger concern. If both total arsenic concentrations increase alongside a conversion of arsenic towards more toxic forms, the toxicity is greatly increased.

KIA's aquatic consultant has provided the following comments on the revised Monitoring and Follow-up Plan which KIA will follow-up with TMAC Resources Inc.

Section 1.3, p.4 provides four intentions of the monitoring and follow up program, these include:

1. Performance compliance
2. Data collection to facilitate good management
3. Check validity of assumptions made during design
4. Check validity of predictions made during the environmental assessment process.

In KIA's aquatic consultant's experience, the monitoring program proposed may meet objective 1 but may not be adequate to meet the other three objectives. More detailed review of the supporting documentation listed on p. 5, in particular Rescan (2010a) is required to confirm the approach taken but, at this stage, we recommend that the proponent consider the following changes:

1. Table E-1 the monitoring plan includes measurements of ambient dust and local dust fall within the project area during the construction phase in summer and monthly at the meteorology site (Table 2.2-1) but a more comprehensive program may be warranted, pending review of results of the existing program. Dust accumulation has been documented at distance from the Ekati mine and, while we respect that the scale and

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nature of the Hope Bay operation is less intensive than that of Ekati, the interaction of dust with caribou is of concern to the Inuit and should be addressed by a program that includes measuring dust fall and contaminant levels in summer dust fall and snow at distance from the mine.

The proposed air quality mitigation (Section 2.3.1, p. 13) is effective and feasible.

Adaptive Management is proposed (Section 2.4 p. 14) "in the event that substantial negative impacts to air quality are detected". Adaptive Management should be informed by action levels that trigger mitigation well in advance of the detection of any "substantial negative effects".

Recommendation – The proponent defines what they mean by "substantial negative effects" and provide details of triggers that would implement mitigation in time to prevent their occurrence.

2. Table E-1 the KIA should review the GN MoU regarding caribou monitoring to determine if participation by the proponent in a regional program in addition to why tracking incidental sittings is considered sufficient. I recommend that Heather Bears review this aspect.

3. Table E-1 the Aquatic Effects Monitoring Program appears to be focused only on meeting EEM regulations and appears incomplete. Measuring water quality at biological stations every three years is inadequate, there is no point in monitoring periphyton during construction with no follow up and there is no requirement for monitoring fish population. The NWB needs to decide if this is adequate and, if not, request the development of a more comprehensive AEMP for the Water Licence.

4. Table E-1 Waste Water Treatment – Treated effluent quality should be sampled weekly, not monthly.

5. Table E1 Water Intake Monitoring - the camp water source is known to support excessive growth of cyanobacteria and these are a) potentially toxic and b) can impart taste and odour problems, to the water. Monthly monitoring is normally not sufficient to manage this threat but Table 12 in the 2012 Annual Report shows relatively consistent cyanobacterial cell counts (23,700-125,000 cells / 100 ml) and so the threat is interpreted as constant.

   Recommendation – That cyanotoxins be sampled in source water and treated drinking water to confirm the magnitude of the problem and any health threat to camp workers.

6. Table E-2 Waste Water Treatment Boston Camp – Treated effluent quality should be sampled weekly, not monthly when operating.

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7. Table E-3 Waste Water Treatment Windy Camp – Treated effluent quality should be sampled weekly, not monthly when discharging.

8. Section 9.2.1 p.57 Sewage at Doris North states that treated sewage effluent is passed through a UV disinfection unit prior to discharge to the tundra, with a licence limit of 10,000 cfu (Table 9.2.1). This limit appears high – other Nunavut mine operators are achieving licence limits of 1000 or below with UV disinfection. There are no barriers to human or wildlife contact with effluent after discharge and so lower limits are recommended to reduce the risk of human or wildlife contact with pathogens. I recognize that Table 16 in the 2012 Annual report shows that fecal coliform was reduced to 2 or <1 cfu/100 ml at ST-9 (ephemeral channel at Glenn Lake, ~1km away), down gradient but I also caution that the flow path and the actual presence of treated effluent at the sample point would need to be confirmed to know that these counts represented treated effluent – they could also represent natural drainage. Section 9.3 Adaptive Management is acceptable.

   Recommendation – Lower the effluent limit to 1000 fecal coliform/100 ml.

2012 Hope Bay Baseline Study Annual Summary – 2AM-DOH0712/2BB-BOS1217; January 25, 2013

In this summary, it is noted that remote cameras were set up to monitor wildlife use of infrastructure and their entering/exiting of areas of existing infrastructure. Please supply information on the number of cameras used, locations of motion triggered camera monitoring, the timing and length of camera monitoring, and protocols for ensuring that cameras are operational and their visibility is not impeded (dust build up, snow, due to being knocked over by an animal, *etc.*). Feedback on camera monitoring from 2012 can be used to optimize monitoring in 2013.

Notification of Doris North Camp Re-opening; March 19, 2013

The new owner, TMAC Resources, informs the NWB and AANDC Inspector of the plan to reopen the camp after the winter closure and to discharge water. The new owner will manage water in accordance with the October 2012 (rev.3) Wastewater Treatment Management Plan, the December 2012 Interim Water Management Plan and the terms of the current Water Licence. The letter provides an accurate summary of the major water management responsibilities.

Reviewed: No comment

Monthly monitoring reports (2012, Jan/Feb/Mar 2013)

In general, it was noted by KIA's wildlife consultant that there were no recorded incidents of large mammals (caribou, grizzly bears, etc.) using the largely unoccupied sites during the care and maintenance phase. This seems unusual based on a site visit where a great deal of

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grizzly bear evidence was seen (e.g., grizzly bear chews on sewage piping, prints entering site, etc.).

All wildlife monitoring in 2012 (with the exception of birds) appears to have occurred using motion triggered cameras. How often were these camera images analyzed for inclusion into monitoring reports? If camera images are not frequently checked, and if cameras are not placed in the correct locations to detect potentially deleterious interactions between wildlife and the site, these monitoring data will not serve to do what monitoring data are meant to do: i.e., to identify problems and correct them. Monthly monitoring reports should include descriptions of motion triggered wildlife camera data images.

It was also noted during a site visit that songbirds were using material from coco matting for nest construction. This may bring birds, particularly hatchlings and fledglings, into close contact with contaminants absorbed within the matting. Likewise, contaminated gravel may be consumed by birds for use in their gizzard for breaking down food. The potential for these effects should be considered and monitoring adjusted appropriately around contaminated coco matting and gravel, particularly where contamination has occurring during the nest building/pre-nesting season.

January, 2012

- 7 minor spills of anti-freeze and petroleum products reported and addressed.

February 2012

- 8 minor spills of anti-freeze and petroleum products reported and addressed.

March, 2012

- 7 environmental incidents were reported. 5 were minor spills that were addressed, a wolf was scared away and AANDC reported poor incineration procedures.

April, 2012

- 3 minor spills were recorded and one major (5000L diesel) spill due to a faulty valve. The major spill occurred within a containment berm with no environmental consequence.

May, 2012

- 3 minor spills reported and addressed.

June, 2012

- 2 minor spills reported and addressed.

July, 2012

- 2 minor spills reported and addressed.

August, 2012

- One spill of diesel fuel of 430L within a lined and bermed refueling area attributed to operator error (no spotter). Cleaned up and addressed.

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September, 2012

- Minor metals criteria exceedances in TL2 (Doris Creek) but were within natural levels. Five environmental incidents of varying magnitude. All were dealt with appropriately.

October, 2012

- No serious issues – one non-compliant sewage effluent sample (12.1 vs. 10 mg/L Oil and Grease) of no significant environmental consequence. Camp was closed at end of October.

November, 2012

- No issues - camp was closed

December, 2011

- See prior comments on the need to emphasize spill prevention and to have clearly articulated and stronger consequences for those not following spill prevention protocols.
- Since the fire that occurred was within the building storing the fire-fighting equipment, it may be reasonable to store fire-fighting equipment in two separate locations far enough apart that a fire near one location would not prevent use of fire-fighting equipment from another location.

June 2012

- Reviewed: No comments

July 2012

- Sampling station ST-8b was taken out of service on November 5, 2011 due to insufficient flow. What flow rate is considered insufficient for future evaluation of whether or not a sampling station should be taken out of service?

Sept 2012

- Reviewed: No comments

Jan 2013

- Reviewed: No comments

Feb 2013

- See prior comments on the need to emphasize spill prevention and to have clearly articulated and stronger consequences for not following spill prevention protocols.

Mar 2013

- Reviewed: No comments

Overall Summary – No serious issues reported but more diligence needed on spills prevention

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2012 Annual Report

KIA's wildlife consultant has provided the following comments on the 2012 Annual Report

Page 34: Total levels of metals are measured and reported, but these results can be deceiving. Metal speciation - the change in the dominant form(s) that the metal is present in - can affect metal toxicity and bioavailability. If total levels of a metal increase as well as the proportion of the most toxic metal species, the problem can be greatly amplified. This is often a problem with regards to arsenic at gold mines. Total metal measurements do not give any information about the species profile of that metal. It is suggested that a metal speciation analysis be performed at least once a year to look for changes over time in the dominant forms of metals found in various water bodies. This is particularly important for arsenic in Roberts Lake (Page 69). There is a growing acknowledgement in the scientific literature that even slight increases in arsenic can have biological health impacts if the predominant species of arsenic changes from a benign form to a toxic form, even if total levels do not change. Changes in metal species can occur due to changes in pH, hardness, and concentrations of other metals in the water that compete for binding sites.

Page 54: Table 36 suggests that, in 2012, thermister requirements should be re-evaluated based on the areas, and that formal monitoring should continue at least once per year. This seems to contradict suggestions later in the table that suggest careful employment and use/monitoring of thermisters. For instance, for sediments and pollution control ponds in Table 36, careful tracking of thermisters and sump water quality and flow data are recommended. Please clarify which thermisters are up for evaluation as per usefulness, and which could be scaled back to monitoring once per year (versus those that would be more heavily relied upon), and provide justification.

Page 60-68: As previously noted by the KIA, a relatively high number of small to medium sized spills occurred at this Project site. With re-opening the mine under new management, it is suggested that there be an increased emphasis on spill prevention training. In addition, relaying spill prevention protocols, enforcement, and strong consequences for not following protocols should be relayed to employees and contractors.

Page 69: *"Total Arsenic concentrations in the sediments from Little Roberts Lake increased in 2012 from baseline concentrations. No BACI was possible due to a lack of reference data; however, there was a generally increasing trend in the concentration of total Arsenic in the sediments collected from the corresponding reference lake. Therefore, there was no evidence that 2013 project activities increased total arsenic in the sediments from Little Roberts Bay."*

This logic is faulty. The report states that no BACI (before-after-control-impact) comparison could be done due to lack of reference data. First, why is there no reference data? This report then compares "after" measurements of arsenic between Little Roberts Lake and a Reference Lake. If this reference lake was not suitable for use in the "before" project impact monitoring, how can it be deemed suitable for measuring arsenic post/during project operation ("after") and for comparison with levels in Little Roberts Lake? Without proper BACI data, a lack of a project impact cannot be soundly concluded, as this is the whole point of BACI data (to determine, soundly, whether it was the project that was causing the changes).

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An increase in Little Roberts Lake could be a very serious issue, particularly if the project has contributed to some of these increases and the dominant form that this arsenic is found in has shifted from predominantly arsenopyrite (fool's gold) or arsenobetaine (another relatively benign form or arsenic) to more soluble and bio-available forms of arsenic (e.g., the highly carcinogenic forms, such as MMAA, DMAA). If the increase in arsenic in both Little Roberts Lake and the Reference Lake are "natural" increases, we could deduce this using a speciation analysis to look at the various forms of arsenic present in both water bodies. If this increase was natural, we'd expect to see a very similar profile of the relative proportions of arsenic species present in both Little Roberts Lake and Reference Lake. If the increase in Little Roberts Lake is due to mining activity, we would expect a shift in arsenic species present. Due to the lack of data for a full BACI analysis, it is suggested that a second arsenic speciation comparison be conducted between Little Roberts Lake and the Reference Lake.

Page 78: In June, a caribou was found entangled in traffic markers and had to eventually be destroyed. Please provide a photo of the type of traffic marker that was associated with this incident. It is suggested that this type of marker not be used in the future and a marker that will not cause this entanglement be selected. This reviewer has also noted that caribou at other project sites tend to walk over/across orange, temporary tundra fencing, and can trip or entangle their legs in it. It may prevent future incidents to avoid the use of construction fencing during caribou migration periods.

KIA's aquatic consultant has provided the following comments on the 2012 Annual Report

The report confirms compliance with the licence with the following exceptions

p. 18 2 noncompliance events for discharge from the sewage treatment plant
Low pH (5.97 vs. limit of 6.0) on February 2, 2012
Exceedance of Oil and Grease limit by (12.1 vs. limit of 10) on October 1

p. 24 TSS of 37 mg/L at TL4 (Tail Lake discharge) exceeded the criterion of 30 mg/L and was attributed to the disposal of sediment laden snow and rocks on the ice of Tail Lake in the winter and subsequent mobilization during freshet and melt.
No result for Radium 226 in August and September due to sample preservation error. Previous samples showed no exceedances.
Occasional metals concentrations exceeding discharge criteria, but which were below natural background levels.
Occasional field parameters not sampled because of unsafe ice or equipment malfunctions.

None of these represented a significant threat to the neither environment nor evidence of non-diligence.

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A total of 36 spills were reported, the majority of which were small volumes of antifreeze and petroleum products. Although none of these represented a significant environmental threat, we note that the mine was under C&M for much of the year.

Recommendation - The high incidence of spills in a non-operational mine suggests that greater attention to prevention is warranted

The summary of AEMP results confirms solid interpretation and no project effects on the aquatic or marine environment.

The annual report summarized the responses to concerns raised by AANDC inspectors during site visits on March 20, July 9-10, and October 2-3. KIA's aquatic consultant noted the large numbers of responses and concerns (31) arising from the October 2-3 visit.

Recommendation - The high incidence of reportable incidents in a nonoperational mine suggests that greater attention to prevention is warranted.

2012 Aquatics Effects Monitoring Program Report

The AEMP report is thorough, well-illustrated and documented and well argued with appropriate comparisons of observed effects at the site with reference values (control/impact and before/after or BACI). No significant project effects were documented on the aquatic environment which is not surprising and the mine was not in production in 2012 and so any changes were only associated with construction and maintenance activities. The AEMP design is, appropriately, focused on the requirements of the EEM (Environmental Effects Monitoring requirements of the federal Metal Mining Effluent Regulations (MMER) and should be reviewed as part of the implementation of renewed Water Licence.

Recommendation – Review and revise the AEMP as a Condition of the renewed Water Licence, prior to operation and production at the mine.

If the NWB Board or you have any questions concerning the comments submitted for the renewal the Type A Water Licence for the Hope Bay Project please contact me at your convenience.

Thank you

John Roesch

John Roesch, P.Eng.

Senior Hope Bay Project Officer
KIA Department of Lands and Environment