P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

Kugluktuk

Bathurst Inlet
Kingaok

Bay Chimo
Umingmaktok

Cambridge Bay
Ikaluktutiak

Gjoa Haven
Okhoktok

Taloyoak

Kugaaruk

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.

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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.

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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".

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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.

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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?*

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

- 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.

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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.

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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."*

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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.

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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.

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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).

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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.

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

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