

Mackenzie Valley Land and Water Board

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Attn: Ms. Shannon Allerston, Regulatory Officer
sallerston@mvlwb.com

March 20, 2020

Giant Mine Remediation Project – GMOB Closing Statement

Dear Ms. Allerston:

This letter provides closing statements from the Giant Mine Oversight Board (GMOB) relating to the proposed Giant Mine Remediation Project.

The Giant Mine Remediation Project Team (GMRPT) has applied to the Mackenzie Valley Land and Water Board (MVLWB) for a land use permit and water licence for the remediation of the Giant Mine site. The Giant Mine Oversight Board (GMOB) is a registered intervenor in the MVLWB permitting and licencing process; GMOB's participation in the process to date has included: submitting initial comments on the GMRPT's application; attending two technical sessions; providing a written intervention; and presenting to the MVLWB at the public hearing.

During the public hearing, GMOB provided a number of recommendations for the MVLWB's consideration, and listened carefully to the presentations and recommendations of the other parties. GMOB feels that the following recommendations it provided have been addressed in the draft Water Licence:

- Recommendation 2 - additional engagement around filling the pits;
- Recommendation 3 - updates to the Engagement Plan;
- Recommendations 4 and 5 - incorporating the results of the Quantitative Risk Assessment;
- Recommendations 8 and 9 - Construction Plan communication;
- Recommendations 10 and 11 - additional rationale regarding run-off (or contact) water management;
- Recommendation 12 - Effluent Quality Criteria for the Effluent Treatment Plant;

- Recommendation 15 - AEMP design;
- Recommendation 18 - Design Plan contents;
- Recommendations 21 and 22 - approval of the Site Wide Management and Monitoring Plans; and
- Recommendation 23 - Table of Contents for a Post-Closure Monitoring and Maintenance Plan.

GMOB is using the opportunity provided through these Closing Arguments to clarify or reiterate some of the recommendations provided in our Intervention that we feel have not been incorporated into the draft Water Licence. GMOB's Closing Arguments include the following topics:

- Extraction strategy for removal of arsenic impacted material placed into the pits and Chamber 15;
- Final site usage scenarios and communication;
- Including engagement outcomes in Construction Plans;
- Effluent Quality Criteria (EQC) for sulphate and chloride in the new water treatment plant (WTP);
- Aquatic monitoring summaries and the Aquatic Effects Monitoring Program (AEMP);
- Explicit consideration of greenhouse gas (GHG) emissions in project planning;
- Approval of the submitted Closure and Reclamation Plan (CRP);
- Approval of the submitted Site Wide Monitoring and Management Plans; and
- Licence Term.

Extraction Strategy for Arsenic Impacted Materials (GMOB Recommendation #1)

Recommendation #1 in GMOB's intervention is concerned with ensuring reversibility of any remediation conducted specific to heavily impacted arsenic waste material. This includes demolition debris placed into the frozen zones of the pits and chambers. GMOB recommended that material disposed of in these locations should be fully documented as to type, quantity, location and placement of the materials and that a conceptual extraction strategy should be developed for these materials.

In its response to interventions, the GMRPT agreed to update the Waste Management Plan and document the type, quantity, location and placement of arsenic impacted materials in Chamber 15 and B1 pit. The GMRPT proposed that the Reclamation Completion Report would be the appropriate place to provide the documentation. However, the GMRPT did not agree with GMOB's recommendation to develop an extraction strategy for the arsenic impacted materials on the basis that any extraction strategy could be directly informed by a future treatment technology.

GMOB is not certain that the intent of the extraction strategy was fully understood, and provides the following clarification. GMOB was intending that the extraction strategy would be conceptual, and would be specifically for the material placed during remediation into the frozen portion of any of the pits or chambers. GMOB expects that an appropriate level of detail could be provided with only a few pages of text and/or diagrams.

GMOB is not convinced by the GMRPT's suggestion that an extraction method would be informed by the future treatment technology. This could be a consideration for the arsenic

trioxide dust that is already underground, but GMOB does not see how the future treatment technology would significantly influence the extraction of demolition material from the pits or chambers.

As described more fully in its intervention, part of GMOB's role is to manage a research program toward a permanent solution for dealing with the arsenic dust and heavily impacted materials (such as roaster demolition waste) at Giant. To this end, GMOB is concerned that any remediation related to these materials be reversible. Placement of the wastes should be done in a way that will permit removal in a safe and cost-effective fashion without incurring unacceptable occupational or environmental risks. GMOB holds the view that an analysis of reversibility should be conducted when planning for material placement, and an explanation provided as to how the placement method would be reversible.

GMOB continues to recommend that a conceptual extraction strategy for materials placed into the pits or chambers during remediation be included as part of the Reclamation Completion Report. Additionally, the water licence should require an analysis demonstrating how the GMRPT considered reversibility and/or future extraction of the materials be included in this report.

Final Site Scenarios and Communication (GMOB Recommendations #6 and #7)

GMOB remains concerned regarding the level of understanding around acceptable future uses for the site. The Core Industrial Area will be fenced to restrict access, but GMOB understands there will be a relatively large portion of the site, on the order of 800 to 850 ha, that will not have physical access controls and some locations within this unfenced portion will have elevated concentrations of arsenic. The HHERA considered a limited usage scenario for these areas of 2 days a week for 10 weeks of the year over the summer. By extension, it is understood by GMOB that any scenarios involving exposures of longer duration could result in elevated risks.

GMOB recommended that additional engagement be conducted to ensure that parties fully understand these assumptions. The GMRPT responded to the GMOB recommendation by noting that extensive engagement had already occurred, and that the risk assessment assumptions were appropriate. While GMOB acknowledges that this topic was part of the overall engagement strategy, GMOB is not confident that the parties fully understand the permanent implications of this important decision.

In their interventions and during the public hearing Alternatives North, the City of Yellowknife, the North Slave Metis Alliance and the Yellowknives Dene First Nation identified future land use or communicating risk related to land use as areas of concern. This suggests to GMOB that the final condition of the site and acceptable site usage has not been clearly communicated by the GMRPT. According to the MVLWB Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories, the Closure Goal serves to articulate the final condition for the site. The GMRPT has identified goals for the Closure and Reclamation but, based upon what GMOB heard at the public hearing, these goals and the work that has gone into supporting them has not been well understood by the public at large.

The MVLWB has provided directives related to updates to the Closure and Reclamation Plan and the Engagement Plan in the draft water licence. GMOB believes that including additional plain language discussion or clarification regarding the final condition of the site end use in both documents would be of long term benefit to the project.

Construction Plan Engagement (GMOB Recommendation #8)

GMOB's recommendation #8 was that the GMRPT should proactively engage with members of the public potentially affected by remediation activities to identify methods for reducing impacts during construction and include a summary of how concerns had been addressed in the final Construction Plans. The GMRP responded that the Construction Plans were not the appropriate place for communications requirements, and that these should be placed in the relevant site wide monitoring and management plans.

GMOB is not certain that the intent of this recommendation was understood by the GMRP Team. GMOB was not suggesting that communications requirements be placed into the Construction Plans. Rather, GMOB was suggesting that the outcomes of any communications and engagement that influenced the construction program be documented.

An example of this scenario is the remediation plan for the marina area. The initial proposal would have seen access to this area stopped for a number of years. After some discussion with user groups, it appears that the remediation of this location can be scheduled such that access to some form of boat launch will be maintained for most of the remediation period. GMOB feels that including a brief summary of the engagement outcomes and how the concerns are being addressed in the Construction Plan itself would provide a useful and transparent record regarding how project decisions were responsive to public input.

GMOB notes that the Board has included a requirement in Schedule 3, Condition 3 of the draft water licence to include a description of any engagement activities taken to inform the Construction Schedule. There is also a requirement in draft Schedule 3, Condition 1 to include a discussion of any engagement activities taken to inform the development of the design plan. In combination, GMOB feels that these requirements address the intent of GMOB's recommendation #8.

GMOB further notes that the Schedule 3, Condition 1 also includes the requirement to include a summary of the Independent Peer Review Panel's opinion regarding the closure approach. GMOB believes this is important information that will greatly benefit the parties when reviewing the design plans, and fully supports this requirement. The scope of this discussion should include providing a rationale for any decisions that do not align with the opinion of the Independent Peer Review Panel.

Water Treatment Plant Chloride and Sulphate Effluent Quality Criteria (GMOB Recommendation 13)

The GMRPT has proposed chloride and sulphate Effluent Quality Criteria (EQC) for the existing Effluent Treatment Plant (ETP), but has recommended that chloride and sulphate EQC not be established for the new Water Treatment Plant (WTP). The rationale provided by the GMRPT for not setting chloride and sulphate EQC for the WTP is based in part on its

argument that the discharge volume from the WTP will be low; the assimilative capacity in the receiving environment is large; chloride and sulphate concentrations at the edge of the mixing zone are predicted to be well below Water Quality Objectives (WQO); and the proposed WTP process does not include the capacity for salt removal. In lieu of setting these EQC, the GMRPT proposes to monitor and report Total Dissolved Solids (TDS) and its constituents through the Surveillance Network Program (SNP) and Aquatic Effects Monitoring Program (AEMP). Toxicity testing will be routinely conducted to ensure that toxic effluent is not discharged, and comparisons will be made annually to model predictions. During the public hearing, the GMRPT also noted that there remains some uncertainty regarding the concentrations of chloride and sulphide in the mine pool water that will form the influent to the WTP.

GMOB has considered the rationale provided by the GMRPT for not setting chloride and sulphate EQC for the WTP. GMOB maintains that it would be appropriate to establish EQC for these parameters. Chloride and sulphate are routinely monitored at other operations in the NWT, chloride has been a cause of environmental concern for at least one operation, and the loadings of these parameters to the receiving environment will be affected by project activities.

The Effluent Quality Criteria Report submitted with the GMRP application outlines a three step screening process for determining which parameters require EQC. Tables 5.4, 5.6 and 5.7 in the EQC Report show that chloride and sulphate are "screened in" through all three of steps. For other parameters, this outcome was sufficient to warrant an EQC.

The GMRPT did not propose EQC for chloride and sulphate based on the following rationale provided in the EQC report:

- Predicted concentrations for these parameters at the edge of the mixing zone are well below chronic aquatic life WQOs and available acute guidelines, so water quality beyond the edge of the mixing zone will allow for current and future water uses; and
- The new WTP will not treat for ions (including chloride and sulphate).

The EQC screening process used by the GMRPT used is similar to that used for facilities licenced by the MVLWB, and provides a transparent basis for identifying parameters of potential concern (POPC). In GMOB's opinion, the consistency of the process is compromised when additional screening steps are introduced for selected parameters in order to remove them from the EQC list, and GMOB is concerned that this may set a precedent for such actions at other northern operations.

GMOB further notes that a key advantage of having parameters as EQC instead of simply as monitored parameters is that they remain front of mind when water quality data is regularly reviewed. The GMRPT has identified uncertainty regarding the concentrations of chloride and sulphate in the mine pool, so it seems that these parameters should be monitored more closely until such time as greater certainty is achieved.

Schedule 4, Condition 2 of the Draft Licence circulated by the Board includes a requirement for the GMRPT to develop a specific chloride and sulphate management and monitoring plan for the Water Treatment Plant, including frequency of monitoring and specific Actions Levels and response plans. Given the uncertainty regarding chloride and sulphate concentrations in

the mine pool and Water Treatment Plant effluent, the results of the chloride and sulphate monitoring should be summarized and included explicitly in the Annual Water Licence report.

Aquatic Effects Monitoring Program (GMOB Recommendation #16)

The GMRPT will be undertaking several aquatic monitoring programs during the remediation including Environmental Effects Monitoring (EEM) pursuant to the Metal and Diamond Mining Effluent Regulations; *Fisheries Act* Authorization monitoring; a Surveillance Network Program (SNP) and an Aquatic Effects Monitoring Program (AEMP) pursuant to the water licence; and likely some form of community based monitoring. GMOB's recommendation was that the overall aquatic monitoring for the project should measure improvements to the aquatic environment as well as potential impacts, and that a summary of the results of all the different programs should be included with the AEMP annual reports. The GMRPT agreed with the concept of providing a brief summary of the results of the various aquatic in a central location, but proposed that this location would change as the project progressed:

- Early Remediation - Annual AEMP Report;
- Late Remediation - Annual Water Licence Report; and
- Post-Closure - Performance Assessment Report (PAR).

GMOB is not clear why the location of the reporting needs to change with time and suggests that the Annual AEMP Report would be a suitable location through all phases of the project. GMOB expects that an AEMP will be required for the project for as long as effluent is discharged to Yellowknife Bay, which is for the foreseeable future under the current project plan. This means that the AEMP Annual Report will be a consistent long term requirement for the project. As much as possible, information should be reported in the same location year over year to provide continuity and make it simpler to locate required information when required.

A key element of AEMPs compared to other monitoring programs is that adaptive management is a requirement. This means that the AEMP should respond to observed results and change as required. Typically, adaptive management is applied to observed negative changes but it could also apply to positive changes. The GMRPT has indicated that the AEMP will be set up to monitor for negative changes, but GMOB maintains that the AEMP could also be adjusted in response to positive changes measured through other programs. Providing a linkage between the AEMP and the other monitoring programs, i.e. by including a summary of the results in the AEMP Annual Reports, could help to make such changes more apparent and kept in mind when interpreting AEMP results and planning for future AEMP programs.

Schedule 6, Condition 3 a) in the draft water licence requires the AEMP Annual Report to include a summary of any relevant results from other aquatic monitoring programs such as the Surveillance Network Program. GMOB supports this requirement and agrees that SNP data will provide information useful to the AEMP. However, GMOB notes that information from other studies with a biological component such as Fisheries Act Monitoring or Community Based Monitoring will provide information on how the ecosystem is responding

to changes, and it will be important that insights gained through these studies are also included.

Greenhouse Gas Considerations (GMOB Recommendation #17)

Reduction of greenhouse gas (GHG) emissions is generally agreed as a globally important environmental concern. However, explicit consideration of GHG emissions and reduction was not evident to GMOB within the GMRPT water licence application package or supporting documents. This led to GMOB's recommendation that future decisions related to closure options and activities should include an assessment of emissions. GMOB did not intend that this would be applied retroactively to project decisions that have already been made, rather that this would be an appropriate consideration going forward.

The GMRPT disagreed, indicating that the remaining closure option reviews do not require an assessment of GHG emissions, that an assessment of GHG emissions would not be a useful criterion to drive design priorities and that GHG emissions are not within the mandate of the MVLWB. The GMRPT response also indicated that the primary generator of GHG emissions during the remediation would be from heavy equipment fuel use, and that commitments related to efficient borrow use would reduce GHG emissions.

GMOB provided additional clarity regarding this recommendation when presenting at the public hearing. GMOB's recommendation was not intended to make GHG emissions a primary design driver and acknowledges that other factors such as health and safety or engineering requirements may factor more strongly into final decisions. Rather, the intent of GMOB's recommendation was that an assessment of GHG emissions be included as an explicit consideration, amongst the other considerations, when evaluating and selecting options as the project proceeds.

As noted in GMOB's intervention, the Government of Canada has made commitments related to reducing GHG emissions. It also requires private proponents and other governments to document, assess and mitigate their GHG emissions. The GNWT has recently issued a legislative mandate containing a number of strong commitments regarding climate change mitigation and adaptation. While GHG emissions may not be directly within the MVLWB mandate, GMOB expects that federal and territorial projects will "do their part" towards reducing and mitigating GHG emissions to contribute to national and regional GHG reduction and mitigation efforts.

Approval of the Closure and Reclamation Plan (GMOB Recommendation #19)

GMOB and several other parties including Alternatives North, the City of Yellowknife and the Yellowknives Dene First Nation expressed concerns regarding the lack of detail in the Closure and Reclamation Plan. The MVLWB's Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories outline the expected level of detail for a Final Closure Plan, and GMOB was concerned about approving the plan upon licence issuance without this information. GMOB proposed that elements of the plan could be approved now, while other parts should wait until additional details became available.

The draft water licence includes a requirement to provide an updated Closure and Reclamation Plan within 6 months of licence issuance, and annually thereafter. This approach provides a standard review mechanism as additional information is developed and addresses GMOB's concerns regarding the blanket approval of the Closure and Reclamation Plan. Updating the Closure and Reclamation Plan on an annual basis will also provide a centralized location for closure information, which will facilitate review and regulation as the project proceeds.

Site Wide Management and Monitoring Plans (GMOB Recommendations #21 and #22)

GMOB's intervention included recommendations related to the blanket approval of the Site Wide Management and Monitoring Plans upon issuance of the licence. The plans include components related to all three phases of the project (care and maintenance, active remediation and post-closure), but details related to Phase 2 and 3 are not fully developed. GMOB's primary concern is that it is difficult to effectively regulate an activity when the full scope of the activity is not known. GMOB recommendations 21 and 22 were intended to provide a mechanism for allowing the project to continue carrying out current care and maintenance activities without approving future activities where additional detail is required.

The draft water licence includes specific definitions for the first two phases of the project, and requires that the Site Wide Management and Monitoring Plans be updated prior to the start of Phase 2. This approach is consistent with GMOB's recommendation, and GMOB supports this approach as a pragmatic way to regulate project activities given the remaining uncertainty.

Licence Term (GMOB Recommendation #24)

GMOB's intervention recommended that the length of the licence term should be on the order of 12 to 15 years, to align with active remediation at the site. During the Public Hearing, a number of parties provided comments on what they considered an appropriate term length. Alternative North does not support a 20-year term, the NSMA recommended a 5 to 7-year term and the YKDFN recommended a 5 to 7-year term.

After hearing from the other parties, GMOB supports a shorter term length, on the order of 10 years. GMOB remains concerned about the remaining level of uncertainty for several of the project components and believes that it is difficult to draft appropriate licence terms for activities that have not been fully developed. As such, there is a risk that the licence term proposed by the GMRPT would not enable effective regulation of the Project.

GMOB's intervention also identified the regulatory benefit of a shorter term and renewal process as providing a "check-in" on the progress of the project. Such a check-in would benefit all parties as it would provide an opportunity to modify sections of the licence that were not effectively regulating the project activities; provide the GMRPT with an opportunity to incorporate any modifications that might be required as designs become more finalized; provide reviewers with an opportunity to address any concerns regarding how licenced activities are being carried out.; be consistent with the planned transition for remediation to post-remediation; and better align with federal funding commitments.

The GMRPT expressed concern regarding the resources that would be required for a licence renewal. GMOB acknowledges these concerns, but notes that if all is going well with a project, the licence renewal process can be very focussed and may not require a public hearing.

In closing, GMOB wishes to thank the MVLWB for overseeing a comprehensive licencing process, and looks forward to participating in upcoming reviews. GMOB will provide explicit comments on the Draft Water Licence using the Online Review System.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kathleen Racher".

Dr. Kathleen Racher
Chair, Giant Mine Oversight Board