



Canadian Northern Economic
Development Agency

Agence canadienne de développement
économique du Nord

5019 – 52nd Street
Yellowknife, NT X1A 1T5

November 1, 2013

VIA EMAIL

Mr. Richard Edjericon
Chairperson
Mackenzie Valley Environmental Impact
Review Board
PO Box 938
200 Scotia Centre
YELLOWKNIFE NT X1A 2N7

Dear Mr. Edjericon:

**RE: Proponent's Response to Correspondence on the Report of Environmental
Assessment of the Giant Mine Remediation Project (EA-0809-001)**

Attached is correspondence from Ms. Joanna Ankersmit and Mr. Ray Case as members of the leadership team for the Proponents of the Giant Mine Remediation Project.

The Proponents have outlined their technical analysis of the measures and reasons for decision on the Mackenzie Valley Environmental Impact Review Board's (the Board), report of Assessment on the Giant Mine Remediation Project.

I would appreciate it if the Board could place this correspondence on its public registry as the information may be important and will have broad interest to the public at large.

Sincerely,

Matthew Spence
Director General
Northern Projects Management Office

CC. Vern Christensen, Executive Director Mackenzie Valley
Environmental Impact Review Board



Mr. Matthew Spence
Director General
Northern Projects Management Office
Canadian Northern Economic Development Agency
Nova Plaza, 3rd Floor, 5019 - 52nd Street
PO Box 1500
YELLOWKNIFE NWT X1A 2R3

Dear Mr. Spence:

**RE: Proponent's Response to Correspondence on the Report of
Environmental Assessment of the Giant Mine Remediation Project
(EA0809-001)**

We are writing to you in relation to the Mackenzie Valley Environmental Review Board's Report of Environmental Assessment of the Giant Mine Remediation Project, pursuant to your coordination role for Crown consultation and ministerial decision making for Northern Projects.

Specifically, we are following up on two related matters. As you may be aware, several of the parties to the Environmental Assessment have asked for the Project Team's analysis of the measures recommended by the Review Board. We are also responding to a number of letters, some of which were addressed to you, urging that the ministers with a statutory decision-making role in the environmental assessment of the Project should accept the Review Board's recommendations without any modification (all of the relevant correspondence appears on the Review Board's Registry). Some of those who wrote these letters, and several of the participants in the working group, represent Aboriginal groups with established or asserted s. 35 rights in the Project area.

We believe that the Project Team has a unique capacity to contribute necessary additional information to the analysis of the implications of certain approaches to the Project, and that it is both proper and important that this information be made available to the responsible ministers for their consideration.

The Project Team has a commitment to work in a manner that is fair, transparent, and promotes accountability. This commitment was detailed in our June 17, 2011, response (PR#301) to a North Slave Métis Alliance information request (PR#183). This response was quoted by the Review Board in its decision on page 82 of the Report.

The information in this letter and the attached table was developed, and is being conveyed to you (and by extension to the public), in a manner that demonstrates continued adherence to the commitment to work in a transparent manner. It is for these reasons that we are providing you with the Project Team's analysis of the potential impacts of the Review Board's recommendations. Please feel free to forward this letter as you consider appropriate, including seeking its posting on the Review Board Registry.

Focus of Analysis

The Project Team focussed its analysis on the potential for the Review Board's recommended measures to affect the Project in three ways. We considered whether each measure (and the measures cumulatively) had the potential to significantly expand or contract the scope of the Project; to significantly delay implementation of key Project components; or to significantly increase the cost of Project execution.

We have concluded that the potential impacts of the Review Board's recommendations are significant with respect to each of project scope, schedule and cost. Some of the key points are elaborated below in this letter. We have provided a more detailed analysis in the attached table.

Timing of Implementation

Our analysis indicates that if the responsible ministers were to accept the Review Board recommendations without modification, this would cause a significant delay to project implementation. While it is impossible to forecast this delay with precision, we anticipate that this would cause a minimum delay of three years, although, a delay of four years or longer could realistically result. For clarity, this three- to four-year delay is in addition to the two years the Project Team was already forecasting between the completion of environmental assessment and the anticipated completion of other key regulatory permitting.

The primary reason for the anticipated delay to implementation is that a large number of the Review Board's recommended measures are directly related and sequential. In several cases, the Review Board has recommended that the completion of one measure be a condition precedent to the commencement or advancement of another measure – many of which are also recommended to be made conditions-precedent to regulatory permitting. Recommended Measures 5, 7, 8, 9 and 10 create such interdependencies, and would, therefore, significantly delay project implementation.

In the context of this remediation project, any delay in implementation will have significant impacts. The first impact is that a delay leaves in place a dangerous and deteriorating status quo that will expose the community and the environment to continued or increased risk. The freeze of the underground chambers and stopes is key to reducing the risks of significant or sudden site deterioration. Although the ongoing Site Stabilization Plan has allowed the Project Team to manage some of the highest-risk aspects of the site, the longer the underground chambers remain unfrozen, the greater the potential that a significant deterioration or disturbance could reach or affect the 237,000 tonnes of arsenic trioxide. Ordinary deterioration may also move additional site components into an emergency state during this period.

Likewise, until a new water treatment facility is in place and effectively functioning, the risks to water resources persist. The construction of the new water treatment plant will make site operations more stable, resilient, and improve our ability to manage changing site conditions. Treatment of surface and ground water remains one of the greatest project challenges. The existing infrastructure is over 40 years old, and was built for a 25-year lifespan. The new water treatment plant will make the degradation or failure of our water treatment capacity significantly less likely, and will substantially enhance our capacity to deal with contaminated water in case there is a need to increase the rate at which we treat contact water. It will also permit us to remove more arsenic trioxide from the water prior to discharge.

The second implication relates to project costs. Human health and safety and the protection of the environment are the primary objectives of the Project Team. However, responsible financial management and cost control are legitimate and necessary considerations. This is especially the case when there is more than one way to achieve the overall goals. Until the remediation project is implemented, continued care and maintenance costs are required. The longer the site stays in a care and maintenance phase, the greater the cumulative costs will be. The Project currently spends approximately \$20M per year on interim care and maintenance, project management and risk contingency. Project implementation will shift spending from interim approaches to longer term (and in many cases permanent) solutions.

Options Analysis and Foreclosure of Alternatives

The Review Board has recommended some prescriptive measures that would foreclose development of alternative approaches that might achieve equal or better outcomes.

For example, the Project Team is concerned about the recommended measure to make the relocation of Baker Creek mandatory within five years (recommended Measure 11). The relocation of Baker Creek was not part of the project as proposed, and was not assessed in our Developer's Assessment Report. The relocation of Baker Creek may, as the Review Board recommends, be the optimal outcome following additional research and engineering.

However, the Project Team does not believe that there is ~~as yet~~ sufficient data or analysis on which to conclude that this is a sound approach. (See, for example, Fisheries and Oceans Canada's December 16, 2011, letter to the Review Board (PR#398) in response to a Board information request, in which the Department of Fisheries and Oceans Canada stated that there was insufficient information to assess the potential impacts of a North Diversion.) Yet, the adoption of recommended Measure 11 would require relocation, and foreclose all other options. Some of those foreclosed options may be preferable from an environmental standpoint, or may be significantly more effective or efficient from an engineering standpoint.

We note that recommended Measures 12 and 13 are inextricably linked to recommended Measure 11, in that they assume the relocation of Baker Creek. Those recommended Measures require consideration as a "package".

Recommended Measure 14 is a second example of a similar issue. This recommended Measure would require the use of a specific technology, an ion-exchange process, for treatment of arsenic in water. Ion exchange is capable of meeting the required parameters (see our March 13, 2013, response to a Review Board information request – PR#637 responding to PR#614). However, it is likely that a more efficient and effective technology capable of meeting or exceeding the applicable standard will become available within the life of the Project. The recommended Measure would prevent the adoption of such technology.

Environmental Agreement

The Review Board's recommended measure for an environmental agreement presents difficult issues. The Project Team has explicitly recognized the value in arm's-length monitoring or oversight (see for example, the Public Hearing Transcript, PR#579, p. 107 and following, but particularly pp. 112-115). Despite this, the Project Team is concerned about the Review Board's recommended Measure 7.

The Project Team's view is that while oversight is valuable and welcomed, the functions of oversight must focus on monitoring the provision of advice, and the facilitation of effective communications to and from all interested stakeholders. While there is a benefit in external evaluation of the effectiveness of project activities and outcomes, the Crown must remain accountable for managing the project in a manner that is consistent with government policies and subject to Parliamentary authority. This would include remaining accountable for all financial decisions related to the project. The Project Team shared its proposed approach to oversight in a letter addressed to the Chair of the Review Board shortly before the commencement of the final hearing (letter dated August 31, 2013 PR#566).

The need for this accountability in project management and decision making was recognized by the Yellowknives Dene First Nation, Alternatives North, the City of Yellowknife and the Government of the Northwest Territories. In a joint letter from each of these parties and the Project Team, all signatories endorsed the principle that:

The Giant Mine Remediation Project environmental monitoring advisory committee would not make decisions with respect to the operations of the project. Operational responsibilities and decisions would remain with the Developer (joint letter in response to Review Board IR #3, dated June 11, 2012, at p. 2; part of PR#433 at p. 11).

Despite consensus on this aforementioned foundational principle, the product of this collaboration, as referenced in Measure 7 (i.e., the discussion paper and draft environmental agreement), departed significantly from this point.

The multi-party Oversight Committee Working Group released the document titled Considerations Regarding the Establishment of an Environmental Monitoring Committee for the Giant Mine Remediation Project (May 18, 2012, PR#599). This document makes clear that it, along with the Working Group's activities, was developed on a "without prejudice" basis, meaning, that the discussions were not intended to bind any party until that party voluntarily decided to be bound. This permitted the Project Team to participate freely in discussions, and to develop a full understanding of the issues from all perspectives.

After careful analysis in late August, the Project Team concluded that the Oversight Working Group had begun to take an approach that, if pursued, would create a significant risk of compromising the required accountability for project decision making. This conclusion was based in part on reviewing the Oversight Working Group's next document titled a Draft Framework Agreement for the Giant Mine Remediation Project (August 28, 2012). In particular, the scope of issues that could be submitted for arbitration within that Draft Framework, and the scope of arbitral jurisdiction in relation to the matters in dispute, appears to go beyond the role envisioned by the Project Team.

Measure 7, if accepted, would negate the “without prejudice” nature of the Oversight Working Group’s discussions. It would place a legal obligation on the Crown to successfully conclude negotiations, and enter into a contract with parties identified by the Review Board. The Measure would require negotiation of this contract to be broadly in line with where the “without prejudice” discussions ended.

While it is possible that continued negotiations could address some of the Project Teams’ concerns with the existing Draft Framework documents, the Project Team is concerned that in saying negotiations of the final agreement must “build on” the existing drafts, Measure 7 could be interpreted to mean that future negotiations are to be additive only, or that there can be no material departure from that last draft, even with the consent of the parties to the negotiations.

A distinct issue with recommended Measure 7 is that it essentially hands each of the members of the Oversight Working Group a veto over the commencement of “major Project activities”. The recommended measure would do so by making successful conclusion of negotiations of the agreement with (at a minimum) all the members of the Oversight Working Group a condition precedent to major Project activities. This would create a wholly unbalanced negotiation environment. For every negotiation point, the Project Team (ultimately the Crown) would be forced to choose between conceding the point or delaying the Project. As a result, recommended Measure 7 would be problematic for timely decision making, particularly decisions related to addressing urgent risks.

Despite our concern with Measure 7 itself, the Project Team believes that there is sufficient common ground on which to design an oversight agreement. There is real – albeit not full – alignment between the June 11, 2012, multi-party letter and the Project Team’s August 31, 2013, letter.

Review Board Suggestions

The Review Board made 16 “suggestions” in its Report. The Project Team prioritized its analysis of the Board’s recommended measures because of the legal difference between recommended measures and suggestions. An evaluation on the suggestions that were directed to or are likely to directly affect the project is currently underway.

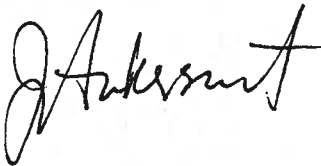
Conclusion

The attached table includes preliminary estimates of the costs and schedule implications of the recommended measures. We are challenged to provide estimates in the face of numerous unpredictable variables, many of which are outside the control of the Project Team. It is impossible to forecast these costs and schedule implications with precision. The estimates are useful only to the extent that they provide a general sense of the potential impacts of the recommended measures, both individually and cumulatively.

By its nature, this letter focuses only on concerns we have with some of the Review Board's recommendations. However, we do not want to miss the opportunity to recognize the tremendous efforts and achievements of the Board and its staff in conducting a comprehensive and fair environmental assessment.

While there is rarely absolute agreement on how to solve complex problems, we respect the efforts made by the Review Board to solve the problems that were before them. In sharing our views publicly, we hope to continue to meet the highest standards with respect to integrity, transparency and accountability.

Sincerely,



Joanna Ankersmit
Executive Director
Contaminated Sites Program
Aboriginal Affairs and Northern
Development Canada



Ray Case
Assistant Deputy Minister
Corporate and Strategic Planning
Government of the Northwest Territories

Encl.



Proponent Impact Assessment of Recommended Measures – November 1, 2013

LEGEND

	Significant concern
	Moderate concern
	No concern

Potential Impact to Project	Measure(M)	Issues of Concern	Project Impact			Proposed Approach
			Scope	Schedule	Cost	
	<p>Note: Measures 7 and 8 related to oversight are grouped together.</p> <p>M7. The Developer will negotiate a legally-binding environmental agreement with, at a minimum, the members of the Oversight Working Group, and other appropriate representative organizations, to create an independent oversight body for the Giant Mine Remediation Project. These negotiations will build on the existing discussion paper and draft environmental agreement of the Giant Oversight Working group. This oversight body will be in place before major Project activities begin on site, and will exist for the life of the Project. The environmental agreement will include a dispute resolution mechanism to ensure compliance with the agreement and a stable funding mechanism for the oversight body.</p> <p>M8. The activities of the oversight body will include:</p> <ul style="list-style-type: none">keeping track of monitoring activities by the Developer and the results of those activities, including water quality and aquatic effects monitoring, health monitoring and other monitoring;considering the adequacy of funding for the Project and ongoing research;providing advice to the Developer, regulators and government on ongoing improvements in monitoring and Project management to prevent risks and mitigate any potential impacts; <p>sharing the oversight body's conclusions with the general public and potentially affected communities in a culturally appropriate manner</p>	<ul style="list-style-type: none">The requirement that the Oversight Body be established by multi-party contract prior to the initiation of major remediation activities requires that the Project Team concede all negotiation points (which could include independence of project management) or delay the project, which could result in increased site risks and increased costs.If included, dispute resolution mechanisms for the Oversight Body such as binding arbitration have the potential to significantly and unpredictably impact the project's scope, schedule and budget.Measures 7 and 8 will negatively reduce the Project Team's control over project management and resource allocation decisions which could result in significant and unpredictable impacts on the scope, schedule and budget of the project. <p>Details</p> <ul style="list-style-type: none">The measures may require negotiations to recommence using the existing paper and the last draft agreement that was established by the Giant Mine Oversight Working Group.The Project Team previously withdrew from the negotiations because aspects of the last draft agreement could not be supported, including:<ul style="list-style-type: none">Provisions that suggested a role for the Oversight Body to be involved in project management and resource allocation decisions as opposed to project oversight (i.e., reporting on effectiveness of outcomes);Provisions that suggested that the dispute	<p>Given previous commitment made to establish an "Oversight Body", there is no direct impact on project scope.</p> <p>Potential for significant and indirect increases in project scope as parties have the capacity to expand the scope during the negotiations of the environmental agreement.</p> <p>Once established as described by the measures, the oversight issues could also expand the scope of the project during the implementation phase through the use of the dispute resolution mechanisms such as binding arbitration.</p>	<p>Potentially significant impacts on project schedule could occur based on the negotiation process to establish the Oversight Body.</p> <p>Potential, but unquantifiable, timeline impacts once the Oversight Body is established (i.e., capacity to influence project scope and schedule through the use of dispute resolution mechanisms such as binding arbitration).</p>	<p>Estimated direct cost for oversight body: ~\$350,000 to ~\$800,000/year for life of the project.</p> <p>Indirect cost risk: Potentially high, and unknown, based on the capacity for the establishment negotiations or operation of the Oversight Body to impact the scope and schedule of the project.</p> <p>[Preliminary direct cost estimate established based on previous working group discussions as well as budgets from other environmental monitoring agencies.]</p>	<p>The Project Team remains committed to establishing effective project oversight (Environmental Assessment Hearing, September 2012).</p> <p>The establishment of an effective oversight approach should be established in a manner that:</p> <ul style="list-style-type: none">Allows for negotiations on the establishment of the group to be conducted in a fair and balanced manner for all parties (i.e., (i) not beginning with previously unacceptable draft agreement that is the product of without prejudice discussions; (ii) not forcing the Project Team to choose between unanimous agreement on all negotiation points, or indefinite project delay);Allows for the development of an effective Oversight Body without directly linking its establishment to the capacity to proceed with remediation activities in a timely manner;Allows the Project Team to remain accountable for project management and financial decisions ; andGives the Oversight Body full latitude and appropriate resources to advise, monitor, challenge and critique the Project and report on the effectiveness of



Potential Impact to Project	Measure(M)	Issues of Concern	Project Impact			Proposed Approach
			Scope	Schedule	Cost	
		<p>resolution mechanism could lead to arbitral processes directly affecting project management and resource allocation, with potential effects on independence, scope, schedule and cost; and</p> <ul style="list-style-type: none">○ Negotiation dynamics created by M7 and M8 could force the Project Team into choosing between acceding to all the demands of the parties negotiating the oversight agreement or delaying the project - potentially indefinitely.• The Governments of Canada and the NWT are accountable and must retain decision-making authority over project management and resource allocation to exercise such accountability. Funding levels for the Project are the prerogative of Parliament and the Legislative Assembly of the NWT, and any attempt to usurp this authority is inappropriate.				project outcomes.
	<p>M5. In order to mitigate significant adverse impacts that are otherwise likely, the Developer will commission an independent quantitative risk assessment to be completed before the Project receives regulatory approvals. This will include:</p> <ol style="list-style-type: none">1. explicit acceptability thresholds, determined in consultation with potentially affected communities2. an examination of risks from a holistic perspective, integrating the combined environmental, social, health and financial consequences.3. possible events of a worst-case/ low frequency high consequence nature4. additional considerations specified in Appendix D of the Report of EA. <p>From this, the Developer will identify any appropriate Project improvements and identify management responses to avoid or reduce the severity of predicted unacceptable risks.</p>	<ul style="list-style-type: none">• Linkages to regulatory approvals and sequencing (implicit and explicit) of risk and health assessment measures (i.e., Measures 5 & 10) could create significant delays to project implementation. <p><u>Details</u></p> <ul style="list-style-type: none">• Confirmation is required to determine whether the reference to health risks is linked to the requirement for Human Health Studies described in Measures 9 and 10. If the health studies need to be completed prior to the quantitative risk assessment, the sequencing of these measures could cause significant delays.• If the risk assessment and human health studies measures are linked with the requirement to develop an environmental agreement (M7 & M8 – Oversight Body), which is required to be completed prior to receiving regulatory approvals, project implementation could be delayed even further. This could occur if a party to the Oversight negotiations brings M5, M9 or M10 issues to the Oversight negotiation table.	Increase of scope.	<p>If M5, M7, M8, M9 and M10 are accepted as is and are linked and sequenced, the overall delay to the project is estimated to be 3 to 4 years.</p> <p>If the measures are not linked, the delay could be approximately 1 year.</p>	<p>If the measures are linked and sequenced estimated costs could increase by ~\$60M to ~\$100M as a result of the delay (~\$20 to ~22.5M/year for site care and maintenance, project management and risk contingency).</p> <p>If not linked and sequenced with other measures, the cost to implement the measure is estimated to be between ~\$350,000 and ~\$550,000 for the risk assessment between ~\$20M and ~\$22.5M for one year of care and maintenance, project management and risk contingency.</p> <p>[Preliminary cost estimates</p>	<p>If determined that additional quantitative risk assessment work is required, it should be completed in a manner that:</p> <ul style="list-style-type: none">• Allows for an understanding of the explicit or implicit linkages and sequencing between measures and the implications for scope, schedule and costs; and• Allows for an understanding of the implications of linking the completion of the quantitative risk assessment to regulatory approvals and the resulting impact on the on the project’s schedule; and• Allows for an understanding of the applicable technical and non-technical parameters of the additional work, including a definition of “independent” and how independence will be determined.



Potential Impact to Project	Measure(M)	Issues of Concern	Project Impact			Proposed Approach
			Scope	Schedule	Cost	
		<ul style="list-style-type: none">Clarity is also required on the definition of the term “independent” and how independence is determined in order to fully understand what the measure requires.			based on Project’s Phased Work Plan and risk contingency.]	
	<p>M10. The Developer will commission a comprehensive quantitative human health risk assessment by an independent, qualified human health risk assessor selected in collaboration with Health Canada, the Yellowknives Dene, the City of Yellowknife, and the Developer. This human health risk assessment will be completed before the Project receives regulatory approvals. It will:</p> <ol style="list-style-type: none">1. Include a critical review of the 2006 Tier II human health risk assessment and the previous screening reports;2. Consider additional exposures and thresholds (as specified in Appendix F of the Report of EA);3. Decide whether a Tier III risk assessment is appropriate;4. Provide a plain language explanation of the results in terms that are understandable to the general public, and communicate this to potentially affected communities in a culturally appropriate manner;5. Provide interpretation of results and related guidance; and6. Inform the broad health effects monitoring program (described in Measure 9 above). <p>Based on the results of this human health risk assessment, and on the results of the health effects monitoring program (described in Measure 9 above), the Developer will, if necessary in response to this information, identify, design and implement appropriate design improvements and identify appropriate management responses to avoid or reduce the severity of any predicted unacceptable health risks.</p>	<ul style="list-style-type: none">If the human health risk assessment is linked or sequenced with other measures (e.g., M5, M7, M8, M9) or is linked to regulatory approvals, there could be significant impacts on the project scope, schedule and cost. <p><u>Details</u></p> <ul style="list-style-type: none">A collaborative decision on selecting the assessor creates the risk of a potentially significant delay.If parties to the Oversight negotiations (M7 & M8) bring M10 issues to the Oversight negotiation table, this would effectively mean that consent by all parties would be required to advance M10. This could take much longer than a year.If full agreement (e.g., with each of the City, YKDFN and Health Canada) is required on study design, this could result in a lengthy process and significant delays to project implementation.Clarity is also required on the definition of the term “independent” and how independence is determined in order to fully understand what the measure requires.	Conducting a human health risk assessment of this nature is an increase in project scope.	<p>Select independent assessor and prepare terms of reference in collaboration with the YKDFN, City of Yellowknife and Health Canada (6 months).</p> <p>Hire and familiarize assessor (6 months).</p> <p>Conduct assessment (18 months).</p> <p>Total = 3 to 4 years (if linked with M5, M7, M8 and M9).</p> <p>Also see M9 below.</p>	<p>Preliminary estimate is between ~\$1M and ~\$2M for initial health risk assessment.</p> <p>If the measures are linked and sequenced costs could increase by ~\$60M to ~\$100M as a result of the delay (~\$20 to ~22.5M/year for site care and maintenance, project management and risk contingency).</p> <p>Cost through life of project unknown.</p> <p>[Preliminary cost estimate established based on input from risk assessment consultants.]</p>	<p>The Project Team recognises the value in understanding human health risks.</p> <p>If required, the Project Team could update the comprehensive quantitative human health risk assessment that was completed in 2006 (and reviewed by the Independent Peer Review Panel) and ensure that the updated risk assessment takes into account any new site data and any changes in the ecotoxicological database. This update would be made public.</p> <p>If it is determined that a new comprehensive quantitative human health risk assessment is required, this should be pursued in a manner that:</p> <ul style="list-style-type: none">Allows for an understanding of the explicit or implicit linkages and sequencing among all the measures (i.e., M5, M7, M8 and M9) and their implications on scope, schedule and cost;Allows for an understanding of the schedule implications of linking the completion of the measure to regulatory approvals; andAllows for a full understanding of the applicable technical and non-technical parameters of the additional work, including a clear definition of “independent” and how independence will be determined.



Potential Impact to Project	Measure(M)	Issues of Concern	Project Impact			Proposed Approach
			Scope	Schedule	Cost	
	M11. Within five years of receiving its water license, the Developer will divert Baker Creek to a north diversion route previously considered by the Developer, or another route that avoids the mine site and is determined appropriate by the Developer.	<p>Note: Measures 11, 12, and 13 are all linked. Measure 12 is contingent on 11 and will impact Measure 13.</p> <ul style="list-style-type: none">• The prescriptive nature of the measure requires the pursuit of an approach that has not been fully investigated and precludes the consideration of all other potentially viable options.• The relocation of Baker Creek was not part of the proposed project, was not considered with the Developer’s Assessment Report (DAR), and may not be the optimal solution to the issues.• The Mackenzie Valley Land and Water Board or other authorities could determine that the diversion of Baker Creek requires additional MVRMA process as it was not a part of the Project Team’s proposal.• The relocation of Baker Creek would have significant implications on the project’s scope, schedule and budget (irrespective of whether additional MVRMA process is required). <p>Details</p> <ul style="list-style-type: none">• The diversion of Baker Creek has been insufficiently studied to determine whether it is a responsible approach. The Project Team does not have the evidence to support this recommendation, and believes that the evidence is not yet available. The potential environmental impacts or risks of diverting Baker Creek are unknown, even if this option is technically feasible.• Given that diversion of the creek was not part of the project description, nor was it considered in the DAR or fully assessed during this environmental assessment process, there is a significant risk of substantial delays in implementing the remediation project should this rerouting be subject to its own environmental assessment process.• From a technical standpoint contaminant loading could also be an issue. The new outfall location is close to the City water intake. Flooding could increase the contaminant loading.	The diversion of Baker Creek is a significant change in scope.	The potential implications on schedule are currently unknown and could vary widely depending on a number of factors (e.g., additional MVRMA process).	<p>Increased cost is estimated between ~\$25M and ~\$45M to implement the realignment of Baker creek.</p> <p>Additional increase in cost unknown if deemed outside of scope of EA and a new EA is required.</p> <p>[Preliminary cost estimate established based on input from engineering consultants.]</p>	<ul style="list-style-type: none">• As a result of the lack of available information on the potential environmental risks or impacts that would be caused by the diversion of Baker Creek, the Project Team recommends that a detailed options analysis be conducted that at a minimum would compare leaving Baker Creek on the mine site, diverting Baker Creek off the mine site to a route previously considered by the Project Team, and any other reasonable options.• The Project Team would then report publicly on the results of the detailed options analysis and seek input from the public and the parties on selecting the most appropriate approach.



Potential Impact to Project	Measure(M)	Issues of Concern	Project Impact			Proposed Approach
			Scope	Schedule	Cost	
	M12. To prevent significant adverse impacts on Great Slave Lake from contaminated surface waters in the former channel of Baker Creek, the Developer will ensure that water quality at the outlet of Baker creek channel will meet site-specific water quality objectives based on the CCME <i>Guidance on the Site-Specific Application of Water Quality Guidelines in Canada</i> .	<p>Note: Measures 11, 12, and 13 are all linked. Measure 12 is contingent on 11 and will impact Measure 13.</p> <ul style="list-style-type: none">Based on the manner in which Measure 11 is addressed and implemented, there are significant potential implications on scope, schedule and budget for the requirements to meet this measure.The full implications on scope, schedule and budget will not be fully understand until a variety of activities are completed including addressing Measure 11 as these will have a significant impact on the management of water on the site. As a result of the uncertainty related to water management that will not be fully understood until further study, there is a concern about a requirement to meet a specific standard.Irrespective of how this Measure is pursued and how the linkages to Measure 11 and Measure 12 are managed and linked with Measure 13, the nature of this measure may result in future compliance issues for the Project Team as the standard may be difficult to achieve (i.e., variety of potential contaminant sources upstream and on-site, requirements to treat extremely high volumes of water).The only proven management option that would allow this measure to be met would require filling in the existing Baker Creek channel after it has be rerouted. However, this approach would not account for a variety of unknown water management issues, including potential future requirements that would be determined by the water licencing process.	Until the impacts and linkages of Measures 11, 12, and 13 are fully understood, the impacts of this Measure on scope are unknown, but are expected to be significant.	Until the impacts and linkages of Measures 11, 12, and 13 are fully understood, the impacts of this Measure on the schedule are unknown, but are expected to be significant.	<p>Until the impacts and linkages of Measures 11, 12, and 13 are fully understood, the impacts of this Measure on costs are unknown, but are expected to be significant.</p> <p>If closure of existing Baker Creek channel is required, preliminary cost estimate is between ~\$7.5M and ~\$12.5M for closure alone. (Note: The cost for the Baker Creek relocation is identified in M11.)</p> <p>[Preliminary cost estimate established based on input from engineering consultants.]</p>	<p>The Project Team acknowledges the importance of preventing significant adverse impacts on Great Slave Lake from contaminated surface waters from Baker Creek.</p> <p>The Project Team believes the appropriate way to meet this requirement is through the establishment of risk based water quality criteria for the water quality at the outlet of Baker Creek. This risk based approach would include those water quality objectives outlined in Measure 13.</p> <p>Attainment of water quality criteria and the objectives set out in Measure 13 would be a key aspect of the detailed options analysis looking at routing of Baker Creek as described in the Proposed Approach Column for Measure 11.</p>



Potential Impact to Project	Measure(M)	Issues of Concern	Project Impact			Proposed Approach
			Scope	Schedule	Cost	
	<p>M13. The Developer will design and, with the applicable regulators, manage the Project to ensure that, with respect to arsenic and any other contaminants of potential concern, the following water quality objectives are achieved in the vicinity of the outlet of the former Baker Creek channel, excluding Reach 0:</p> <ul style="list-style-type: none">a) Water quality changes due to discharge from the former channel of Baker Creek will not reduce benthic invertebrate and plankton abundance or diversity;b) Water quality changes due to discharge from the former channel of Baker Creek will not harm fish health, abundance or diversity;c) Water quality changes due to discharge from the former channel of Baker Creek will not adversely affect areas used as drinking water sources,d) Water quality changes due to discharge from the former channel of Baker Creek will not adversely affect any traditional or recreational users; and, <p>There is no increase in arsenic levels in Great Slave Lake due to discharge from the former channel of Baker Creek beyond the parameters described in Measure 12.</p>	<p>Note: Measures 11, 12, and 13 are all linked. Measure 13 is contingent on the final determination on Measure 11 and 12.</p> <ul style="list-style-type: none">Based on the manner in which Measures 11 and 12 are addressed and implemented, there is the potential for significant implications on scope, schedule and budget on meeting this measure.Given that Measure 12 and 13 are directly linked (last paragraph of M13), the previously anticipated compliance challenges related to Measure 12 would then apply to Measure 13.The full implications of Measure 13 on scope, schedule and budget will not be fully understood until the implementation of Measures 11 and 12.	Until the impacts and linkages of Measures 11, 12, and 13 are fully understood, the impacts of this Measure on scope are unknown, but are expected to be significant.	Until the impacts and linkages of Measures 11, 12, and 13 are fully understood, the impacts of this Measure on the schedule are unknown, but are expected to be significant.	Until the impacts and linkages of Measures 11, 12, and 13 are fully understood, the impacts of this Measure on costs are unknown, but are expected to be significant.	<p>Consideration needs to be given to the proposed approaches outlined for Measures 11 and 12.</p> <p>The Project Team would benefit from clarification on the meaning of the final paragraph of the measure, and the consequential effects on M11 and M12.</p>
	<p>M9. The Developer will work with other federal and territorial departments as necessary to design and implement a broad health effects monitoring program in N'dilo, Dettah and Yellowknife focusing on arsenic and any other contaminants in people which might result from this Project. This will include studies of baseline health effects of these contaminants and ongoing periodic monitoring. This will be designed with input from:</p> <ul style="list-style-type: none">Health Canada, GNWT Health and Social Services and the Yellowknife medical community; andThe Yellowknives Dene and other potentially affected communities. <p>The organization conducting the monitoring will</p>	<ul style="list-style-type: none">Conducting human health effects monitoring on people in Dettah, N'dilo and Yellowknife is outside of the scope of the Project as proposed.Completion of primary research on human health should not be a prerequisite to application and approval of regulatory authorizations of the remediation project.This measure is linked to the human health risk assessment in Measure 10 and is also linked to the quantitative risk assessment in Measure 5 (see Note 133 in Appendix D to the Report of EA). As previously noted, these measures should not be linked as they will have a significant impact on the project schedule (potential delay of 3-4 years).	This would be an increase in scope.	<p>Initial study is estimated to require approximately 1-2 years.</p> <p>As noted, results from M7, M8, M9 and M10 are required to complete M5. As previously described, this has the likely potential to cause a delay of 2.5 to 3.5 years.</p>	<p>Cost of initial study is estimated at ~\$800k - ~\$1.6M as well as ~\$200k - ~\$400k/year for the following 5 years and ~\$100k - ~\$200k/year for another 10 years.</p> <p>Potential total cost of approximately ~\$2.8M to ~\$5.6M.</p> <p>[Preliminary cost estimate established based on input from risk assessment consultants.]</p>	<p>The Project Team is fully prepared to work with the named agencies and communities on studies of baseline health effects of these contaminants and ongoing periodic monitoring.</p> <p>However, the Project Team is not capable of making commitments on behalf of other organizations.</p> <p>The Project Team suggests that project specific human-health protective monitoring focus on detection of contaminants in the environment as the key monitoring approach.</p>



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	provide regular plain language explanations of the monitoring results in terms that are understandable to lay people, and communicate this to potentially affected communities in a culturally appropriate manner.					The Project Team also notes that baseline studies and monitoring will take a number of years to provide informative results and thus will not be available for use in the quantitative human health risk assessment identified in Measure 10.
	M15. The Developer and regulators will design and manage the Project so that, with respect to arsenic and any other contaminants of potential concern: 1. Water quality at the outfall will meet the Health Canada Guidelines for Canadian Drinking Water Quality; and, 2. The following water quality objectives in the receiving environment are met: a) Water quality changes due to effluent discharge will not reduce benthic invertebrate and plankton abundance or diversity beyond 200 metres of the outfall; b) Water quality changes due to effluent discharge will not harm fish health, abundance or diversity; c) Water quality changes due to effluent discharge will not adversely affect areas used as drinking water sources; and, d) There is no increase in arsenic levels in Yellowknife Bay water or sediments beyond 200 metres of the outfall.	<ul style="list-style-type: none">• The language in this measure: “any other contaminants of potential concern” allows for a very broad and undefined parameter of what could be considered a contaminant of potential concern.• The measure would also make the Giant Project legally accountable for treatment of contaminants of potential concern even if they bear no connection to either Giant Mine or the Remediation Project.• M15(2)(d) is problematic because of use of the categorical term “no increase in arsenic levels.” This is not achievable. The Project Team is not capable of guaranteeing that there will not be measureable, but insignificant, increases in arsenic beyond 200m from the outfall. The project site is not the only existing or potential source of arsenic entering Yellowknife Bay.• The measure presents a significant cost and compliance risk for the Project Team.	This measure has the potential to increase scope.	No anticipated schedule impact.	If standard applied to entire site would be difficult and very costly to meet.	<ul style="list-style-type: none">• The Project Team would benefit from clarification of specific terms in the measure including “any other contaminant of potential concern”.• The Project Team believes it would be appropriate to limit the measure to ensure that the Team is accountable only for contaminants arising from Giant Mine and the Remediation Project.• If this measure is pursued, it is recommended that it is done in a manner that fully recognizes the nature of the site including the other potential sources of arsenic that could enter Yellowknife Bay.
	M3. To facilitate active research in emerging technologies towards finding a permanent solution for dealing with arsenic at the Giant mine site, the Developer will create a multi-stakeholder research agency with potentially affected Parties. The ongoing funding for this research agency will be negotiated and included as part of the environmental agreement specified in Measure 7. This body will, on a periodic	<ul style="list-style-type: none">• The prescriptive nature of the measure precludes the consideration of other efficient and cost-effective alternatives, such as delivery through an existing external research agency.• The establishment and ongoing funding of a research agency is outside of the scope of the Remediation Project and beyond the existing	An increase in scope.	No anticipated schedule impact.	Preliminary costs estimated between ~\$900k/year and ~\$1.1M/year to establish and maintain a research agency (fixed costs estimated between ~800k/year to ~\$1M/year and assumed research funding at	<ul style="list-style-type: none">• The Project Team sees the value of ongoing research, and has already committed to completing a review of emergent technologies every 10 years and making these reports publicly available.



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	<p>basis:</p> <ol style="list-style-type: none">1. produce reports on relevant emerging technologies;2. identify research priorities3. administer research funding4. ensure the results of research are made public, and <p>apply results of each cycle to the next cycle of these steps.</p>	<p>parameters of the funding provided by the Federal Contaminated Sites Action Plan. As such, a new source of funding will need to be identified.</p> <ul style="list-style-type: none">• Given the linkage to M7, and the issues identified with M7 and M8, there is a significant risk that the Oversight Body could assume effective control over management and resource allocation decisions that could have a significant impact on the scope and cost of the measure.			<p>~\$100k/year).</p> <p>If an existing external body was used, preliminary costs were estimated at ~\$100K annually.</p> <p>Cost estimates are uncertain due to the potential leverage provided to the parties by M7 and M8 and the Oversight Body's role in identifying research priorities and making financial decisions.</p> <p>Note: A new source of funds will need to be identified.</p> <p>[Preliminary cost estimates established based on ranged assumptions of scientific level of effort.]</p>	<ul style="list-style-type: none">• The Project Team suggests that consideration be given to whether the measure provides the most efficient and effective method of delivery, or whether an alternative delivery vehicle such as an existing external body would be more appropriate [e.g., external research agencies that manage research initiatives/programs across Canada, such as Innoventures Canada, NSERC, GNWT (agencies within) or the Canadian High Arctic Research Station].
	<p>M14. The Developer will add an ion exchange process to its proposed water treatment process to produce water treatment plant effluent that at least meets Health Canada drinking water standards (containing no more than 10 µg/L of arsenic), to be released using a near shore outfall immediately offshore of the Giant mine site instead of through the proposed diffuser. The Developer will achieve this concentration without adding lake water to dilute effluent in the treatment plant.</p>	<ul style="list-style-type: none">• The Measure prescribes the use of a specific technology and therefore eliminates the current and future use of other technologies that could have the capacity to meet or exceed the Health Canada drinking water standards (containing no more than 10 µg/L of arsenic).	Minor change in scope.	No change in schedule by completing this measure.	<p>Increase in cost is estimated to be between ~\$12M and ~\$20M (Net Present Value for total).</p> <p>Unknown foregone opportunity for savings if an appropriate alternative technology were identified.</p> <p>[Preliminary cost estimate established based on input from engineering consultants.]</p>	<ul style="list-style-type: none">• The Project Team suggests the measure should not foreclose the potential use of technologies that could meet or exceed the applicable standards.
	<p>M24. The Developer will physically prevent all-terrain vehicle access to the tailings cap and B1 pit cover to prevent the surface from being eroded or otherwise compromised. The Developer will monitor the effectiveness of this prevention, and will take any additional management measures as necessary to</p>	<ul style="list-style-type: none">• If a physical barrier (i.e. a fence) is required this will create a new and significant cost to the project. The measure will also require consultation & land use and access discussions with the City, GNWT and YKDFN.	Minor scope change.	No schedule issue.	<p>Preliminary estimated cost of fencing is between ~\$1.5M and ~\$2M as well as some maintenance.</p> <p>[Preliminary cost estimate</p>	<ul style="list-style-type: none">• The Project Team understands and accepts the need to prevent degradation of the tailings cap and B1 pit cover.• However, the Project Team is of

Potential Impact to Project	Measure(M)	Issues of Concern	Project Impact			Proposed Approach
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	prevent all-terrain vehicle access.				established based on input from engineering consultants.]	<p>the view that the only feasible ways to physically prevent ATV access would require prevention of all use and access to these areas.</p> <ul style="list-style-type: none">• The Project Team believes the integrity of the cap can be maintained through design features, such as establishing a coarse rock layer under the vegetative layer, and identification of suitable land uses for the site.• Therefore the Project Team believes that the desired outcomes can be achieved with less interference with the GNWT’s administration of its lands, and with less interference with public access to public lands.
	M25. : The Developer will work cooperatively with responsible regulatory authorities and interested Parties in the development and submission of an Air Quality Management Plan which incorporates an ongoing air quality monitoring program. This ongoing monitoring program will include all previously identified on-site air quality monitoring stations and one off-site air quality monitoring station near Niven Lake. At a minimum, ambient concentrations of NO2 and PM2.5 will be monitored at the Niven lake site. Total suspended particulate and metal concentrations will be monitoring at the on-site locations. This air quality monitoring program will identify action levels and trigger additional management and mitigation activities, if required.	<ul style="list-style-type: none">• Land access to Yellowknife City land (i.e., Niven Lake monitoring site) to test emissions could be an issue.• The Project Team’s contribution to NO2 and PM2.5 are only created through power usage, and would only be marginally influenced during times of intensive power usage at the remediation site.	Minor scope change.	No schedule issue.	<p>Preliminary cost estimate is between ~\$40k/year and ~\$60k/year for additional NO2 monitoring site.</p> <p>[Preliminary cost estimate established based on input from engineering consultants.]</p>	<ul style="list-style-type: none">• The Project Team recommends that this measure be conditional on the City of Yellowknife making suitable land available for air monitoring.• In addition, it is recommended that the measure recognize that the Project Team’s contribution to NO2 and PM2.5 is both time-limited and activity driven. The Project Team believes monitoring at Niven Lake should be conducted only when it is contributing to emissions during periods of intensive power use by the Giant Mine Remediation Project.



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	M26: In conjunction with Measure 10 above, the Developer will consider the results of the comprehensive human health risk assessment, and consult with the YKDFN and City of Yellowknife when determining suitable end uses of the site, to ensure that those proposed uses do not pose a health risk to people, including toddlers	<ul style="list-style-type: none">The Project Team is neither responsible for, nor capable of, determining the future uses of the remediation site. The Project as proposed is to clean the site to industrial standards and leave the land suitable for others to determine its end use. That determination will be led by the GNWT as “land owner”, and affected by regulators and potential users.The wording of the measure, particularly the reference to “toddlers”, could be misread as implying a requirement to remediate beyond an industrial land use standard.	Unknown.	Unknown.	Unknown but potentially expensive.	<ul style="list-style-type: none">As the Project Team does not have the legal authority to determine the end use of the site, the Project Team can only commit to providing all relevant information to the appropriate decision-making agencies (e.g., GNWT & City of Yellowknife), including the results of health studies, needed to ensure that the proposed end uses of the site do not pose a health risk.The Project Team would welcome the clarification of this measure to reduce the risk of its misinterpretation on the issue of the applicable remediation standard.
	M1: To prevent the significant adverse impacts on environment and the significant public concern from the proposed perpetual timeframe, the Project will proceed only as an interim solution, for a maximum of 100 years.	No issues.				
	M2: Every 20 years after the beginning of Project implementation, the Developer will commission an independent review of the Project to evaluate its effectiveness to date, and to decide if a better approach can be identified. This will: 1. consider results of the ongoing research 2. be participatory in nature 3. follow the requirements of procedural fairness and be transparent in nature. If the periodic review identifies a better approach that is feasible and cost-effective, the Developer will further study it, and make the study and its results of the study public.	No issues.				
	M4: The research agency will provide the results of the research to the periodic reviews of the Project described in Measure 2. If better technological options are identified in-between these periodic 20-year reviews, the research agency will report these	No issues.				



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	publically to the Parties, the public and the Developer. The Developer will consider these technologies and make decisions regarding their feasibility. The Developer will make any such decisions public.					
	M6: The Developer will: <ul style="list-style-type: none">investigate long-term funding options for the ongoing maintenance of this Project and for contingencies, including a trust fund with multi-year up front funding,involve stakeholders and the public in discussions on funding options; and, make public a detailed report within three years that describes its consideration of funding options, providing stakeholders with the opportunity to comment on the report.	No issues.				
	M16: Before construction, the Developer will model re-suspension of arsenic from sediments and resulting bioavailability in the vicinity of the outfall. If the modelling results indicate that the outfall may resuspend arsenic from sediments, the Developer will modify the outfall design until operation does not cause resuspension of arsenic from sediment.	No issues.				
	M17: Before operating the outfall, the Developer will design and implement a comprehensive aquatic effects monitoring programme that is sufficient to determine if the water quality objectives listed in Measure 15 are being met. This programme will: <ol style="list-style-type: none">at a minimum, be able to identify any accumulation of arsenic over time in the water, sediment or fish in the receiving environment;include appropriate monitoring locations near N'dilo, in Back Bay and in Yellowknife Bay, with a focus on areas in the vicinity of the outfall and areas used by people;include the establishment of a baseline for aquatic effects in Back Bay before beginning Project construction and installation of the outfall;be developed according to AANDC <i>Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories, June 2009</i>, with corresponding action levels and management response framework.	No issues.				



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	M18: Prior to preparing chambers and stopes for freezing, the Developer will conduct a comprehensive quantitative risk assessment evaluating both wet and dry methods for the initial freezing design, with respect to current risks and implications for future removal. This will include an evaluation of potential effects of the proposed freezing and wetting method on the thawing or frozen excavations, and potential impacts of ongoing design changes prior to implementing the Project. The Developer will release a plain language report to the public describing its considerations and the resulting design.	No issues.				
	M19: Considering the results of the risk assessment described in Measure 18, the Developer will not adopt any method of freezing that significantly reduces opportunities for future arsenic removal or other remediation by future technologies.	No issues.				
	M20: The Developer will conduct all major demolition and construction activities with the potential to release large amounts of dust or contaminants into the air when wind directions will minimize the chances of dust and contaminants blowing into the City of Yellowknife, Dettah and N'dilo.	No issues.				
	M21: The Developer will collect dust and contaminant level data from soil and vegetation in the vicinity of major reclamation activities before and after major demolition or construction activities to serve as a baseline for any related adaptive management activities that may follow.	No issues.				
	M22: The Developer will conduct a study to determine appropriate depth of the tailings cap and B1 pit cover, in consultation with Environment Canada and responsible regulators, to verify that the depth proposed will ensure the tailings cap and B1 pit cover are not compromised by vegetation growth. The Developer will provide a report of this study to the Mackenzie Valley Land and Water Board before it issues a water license for the Project.	No issues.				
	M23: The Developer will work cooperatively with responsible regulatory authorities and interested Parties in the development and submission of a Tailings Monitoring and Management Plan prior to receiving regulatory approvals. This plan will not only	No issues.				

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	identify potential issues for the management of tailings but will also identify mitigation measures to prevent problems related to the tailings cap failure, and will include consideration of the B1 pit cover as applicable.					