

February 12, 2014

The Honourable Bernard Valcourt
Minister, Aboriginal Affairs and Northern Development Canada
EXECUTIVE OFFICES
10 Wellington Street
Gatineau, Quebec K1A 0H4

Dear Minister Valcourt,

Re: Board response to suggested modifications of Giant EA measures

The Mackenzie Valley Environmental Impact Review Board (the Review Board) has carefully considered each of the Responsible Ministers' suggested modifications to the measures of the Giant Mine Remediation Project Report of Environmental Assessment, described in your letter of December 23rd, 2013 and pursuant sub-paragraph 130(1)(b)(ii) of the *Mackenzie Valley Resource Management Act*. The Review Board has also carefully considered the Jan. 27th 2014 submissions of the Yellowknives Dene First Nation, the City of Yellowknife, Alternatives North, the North Slave Metis Alliance and the Developer, and has considered the Feb. 4th, 2014 and Feb. 6th, 2014 discussions with Responsible Ministers.

The Review Board has ensured that each measure maintains its original intent, as described in the *Report of Environmental Assessment on the Giant Mine Remediation Project*, while reflecting the considerations raised in the consult-to-modify process. The attached document provides an analysis of the considerations and specific changes that the Review Board recommends for each amended measure. The measures that the Responsible Ministers did not suggest modifying remain recommended as written in the Report of Environmental Assessment.

The recommended revisions are as follows. For clarity, these have been grouped under headings by general subject:

1. Research in emerging technologies

Measure 3: To facilitate active research in emerging technologies towards finding a permanent solution for dealing with arsenic at the Giant mine site, the Developer will fund research activity as advised by stakeholders and potentially affected Parties through the Oversight Body. The ongoing funding for this research, and the additional resources required to manage its coordination, will be negotiated and included as part of the environmental agreement specified in Measure 7 and will make best use of existing research institutions and programs. The Oversight Body will ensure through the research activity that, on a periodic basis:

1. reports on relevant emerging technologies are produced;
2. research priorities are identified
3. research funding is administered
4. results of research are made public, and
5. results of each cycle are applied to the next cycle of these steps.



Measure 4: The Oversight Body will provide the results of the research funded by the Developer to the periodic reviews of the Project described in Measure 2. If better technological options are identified through the funded research in-between these periodic 20-year reviews, these will be reported publicly by the Oversight Body to the Parties, the Developer and the Canadian public. The Developer will consider these technologies and make decisions regarding their feasibility. The Developer will make any such decisions public.

2. Quantitative Risk Assessment and Human Health Risk Assessment

Measure 5: 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:

1. explicit acceptability thresholds, determined in consultation with potentially affected communities
2. 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 nature
4. additional considerations specified in Appendix D of the Report of EA

From this, the Developer will identify any appropriate Project improvements and identify management responses to avoid or reduce the severity of predicted unacceptable risks.

Measure 10: 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:

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; and
6. Inform the broad health effects monitoring program (described in Measure 9 above).

The Developer may conduct the human health risk assessment concurrently with the quantitative risk assessment described in Measure 5. Based on the results of this human health risk assessment, and on any existing 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.



3. Oversight

Measure 7: 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 exist for the life of the Project unless otherwise agreed by the Parties to the Environmental Agreement. Every effort will be made to have the Oversight Body in place as early as possible. The negotiations will make significant progress within six months of the Ministers' environmental assessment decision or proceed to mediation. The Developer will cover any mediation costs. The environmental agreement will include a dispute resolution mechanism to ensure compliance with the agreement and a stable funding mechanism for the Oversight Body.

4. Baker Creek

Measure 11: The Developer, with meaningful participation from the Oversight Body and other parties, will thoroughly assess options for, and the environmental impacts of, diversion of 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. Within one year of the project receiving its water license, a report outlining a comparison of options including the current on-site realignment will be provided to the appropriate regulatory authorities, the Oversight Body and the public.

Once informed by the advice of the Oversight Body and regulatory authorities, the Developer will determine and implement the preferred option. In doing so, the Developer will consider the advice of the Oversight Body, regulatory authorities, and the public, and will ensure that the primary considerations in selecting an option are to:

- a) minimize the likelihood of Baker Creek flooding and entering the arsenic chambers, stopes and underground workings, and
- b) minimize the exposure of fish in Baker Creek to arsenic from existing contaminated sediments on the minesite, surface drainage from the minesite or tailings runoff.

If off-site diversion is selected, the Developer will seek required regulatory approvals to implement the diversion within five years of receiving its initial water license.

Measure 12: To prevent significant adverse impacts on Great Slave Lake from contaminated surface waters in the existing or former channel of Baker Creek, should it be re-routed to avoid the mine site, 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 Guidance on the Site-Specific Application of Water Quality Guidelines in Canada*.

Measure 13: 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 existing or former channel of Baker Creek, should it be re-routed to avoid the mine site, excluding Reach 0:



- a) Water quality changes due to discharge from Baker Creek will not reduce benthic invertebrate and plankton abundance or diversity;
- b) Water quality changes due to discharge from Baker Creek will not harm fish health, abundance or diversity;
- c) Water quality changes due to discharge from Baker Creek will not adversely affect areas used as drinking water sources,
- d) Water quality changes due to discharge from Baker Creek will not adversely affect any traditional or recreational users; and,
- e) There is no increase in arsenic levels in Great Slave Lake due to discharge from Baker Creek beyond the parameters described in Measure 12.

5. Water quality and treatment plant effluent

Measure 15: 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 at 200 meters from 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;
 - d) There is no increase in arsenic levels in Yellowknife Bay water at 200 meters from the outfall; and,
 - e) There is no increase in arsenic levels in Yellowknife Bay sediments at 500 meters from the outfall.

The Review Board looks forward to the timely completion of this process. If you have any questions regarding these recommended revisions please feel free to contact Alan Ehrlich at our office at (aehrlich@reviewboard.ca or (867) 766-7056).

Sincerely,



Richard Edjericon
Chairperson

Attachment

cc. Mr. Willard Hagen, Chairperson, Mackenzie Valley Land and Water Board

Attachment:
Recommended Revisions to Measures
Giant EA Consult-to-Modify Process
February 12th, 2014

Introduction

This document provides the Review Board's responses to each of the proposed ministerial modifications to the Review Board's measures of the Giant Report of Environmental Assessment. For each set of suggested modifications, it shows:

- The Review Board's measure
- The ministers' suggested modifications
- The Review Board's analysis of the suggested modifications
- The revisions the Review Board is recommending in response

All measures are shown in **bold**. Ministerial suggested modifications are shown in **red**. The Review Board's revisions, considering the ministers' suggested modifications and submissions from the parties, are shown in **blue**.

1. Research in emerging technologies (M#3, M#4)

The Board's original measures are as follows:

Measure 3: 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 basis:

- 1. produce reports on relevant emerging technologies;**
- 2. identify research priorities**
- 3. administer research funding**
- 4. ensure the results of research are made public, and**
- 5. apply results of each cycle to the next cycle of these steps.**

Measure 4: 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 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.

The ministers' suggested modifications are included in red below:

Measure 3: 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.~~ **fund research activity as advised by stakeholders and potentially affected Parties through the Oversight Body.** The ongoing funding for this research ~~agency activity, and a process for its coordination,~~ will be negotiated and included as part of the environmental agreement specified in Measure 7 **and will make best use of existing research institutions and programs.** ~~This body will,~~ **The Oversight Body will ensure through the research activity that,** on a periodic basis:

1. ~~produce reports on relevant emerging technologies~~ **are produced;**
2. ~~identify research priorities~~ **are identified**
3. ~~administer research funding~~ **is administered**
4. ~~ensure the results of research are made public, and~~
5. ~~apply results of each cycle~~ **are applied** to the next cycle of these steps.

Measure 4: The ~~research agency~~ **Oversight Body** will provide the results of the research **funded by the Developer** to the periodic reviews of the Project described in Measure 2. If better technological options are identified **through the funded research** in-between these periodic 20-year reviews, ~~the research agency will report these~~ **these will be reported publicly by the Oversight Body** to the Parties, ~~the public and the Developer and the Canadian public.~~ The Developer will consider these technologies and make decisions regarding their feasibility. The Developer will make any such decisions public.

Analysis and response

This measure ensures that as technology evolves over time, ongoing research would be directed at recognizing applicable emerging technologies for the Giant remediation. It also ensures that this would have stakeholder input and be funded by the government. The ministers' suggested modifications achieve this in a way that avoids the creation and expense of an additional agency, through the involvement of the Oversight Body (required by Measure 7). This is consistent with the intent of the original measure.

The Board notes that additional resources are required to match the additional responsibilities this places on the Oversight Body. The Review Board therefore recommends adding the following wording (in blue) to the ministers' suggested modifications:

Measure 3: To facilitate active research in emerging technologies towards finding a permanent solution for dealing with arsenic at the Giant mine site, the Developer will **fund research activity as advised by stakeholders and potentially affected Parties through the**

Oversight Body. The ongoing funding for this research activity, and additional resources required to manage a process for its coordination, will be negotiated and included as part of the environmental agreement specified in Measure 7 and will make best use of existing research institutions and programs. The Oversight Body will ensure through the research activity that, on a periodic basis:

1. reports on relevant emerging technologies are produced;
2. research priorities are identified
3. research funding is administered
4. results of research are made public, and
5. results of each cycle are applied to the next cycle of these steps.

The Review Board is satisfied that the ministers' suggested modifications to Measure 4 correspond to the above change in Measure 3 in a manner that is consistent with the measure's original intent.

Measure 4: The Oversight Body will provide the results of the research funded by the Developer to the periodic reviews of the Project described in Measure 2. If better technological options are identified through the funded research in-between these periodic 20-year reviews, these will be reported publicly by the Oversight Body to the Parties, the Developer and the Canadian public. The Developer will consider these technologies and make decisions regarding their feasibility. The Developer will make any such decisions public.

2. Quantitative Risk Assessment and Human Health Risk Assessment (M#5, M#10)

The Board's original measures are as follows:

Measure 5: 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:

1. explicit acceptability thresholds, determined in consultation with potentially affected communities
2. 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 nature
4. additional considerations specified in Appendix D of the Report of EA

From this, the Developer will identify any appropriate Project improvements and identify management responses to avoid or reduce the severity of predicted unacceptable risks.

Measure 10: 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:

- 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; and**
- 6. Inform the broad health effects monitoring program (described in Measure 9 above).**

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.

The ministers' suggested modifications are included in red below:

Measure 5: 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.~~ A preliminary report, including the study design, will be completed prior to receiving regulatory approvals. The final report will be completed and submitted to regulators and the Oversight Body within two years after the Project receives regulatory approvals. This will include:

- 1. explicit acceptability thresholds, determined in consultation with potentially affected communities**
- 2. 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 nature**
- 4. additional considerations specified in Appendix D of the Report of EA**

From this, the Developer will identify any appropriate Project improvements and identify management responses to avoid or reduce the severity of predicted unacceptable risks.

Measure 10: 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.~~ A preliminary report, including the study design, will be completed prior to receiving regulatory approvals. The final report will be completed and submitted to regulators and the Oversight Body within two years after the Project receives regulatory approvals. It will:

- 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; and**
- 6. Inform the broad health effects monitoring program (described in Measure 9 above).**

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.

Analysis and response

The Developer expressed concern that if these two studies had to be done sequentially, it could cause certain problems regarding timing and sequencing. The Responsible Ministers indicated that the modifications to these measures are intended to address these issues while requiring the Developer to demonstrate a commitment to the studies.

The Board did not intend to require that these studies be done sequentially. However, the original measures are intended to ensure that the design of the project that receives approval includes design improvements identified by these studies. If the studies are not complete prior to receiving approvals, this important part of the measures' original intention will not be met.

To address the underlying concern while maintaining the intent of the original measure, the Board recommends the original measures with the following revision, shown in blue, instead of the ministers' suggested modifications:

Measure 5: 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:

- 1. explicit acceptability thresholds, determined in consultation with potentially affected communities**
- 2. 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 nature**
- 4. additional considerations specified in Appendix D of the Report of EA**

From this, the Developer will identify any appropriate Project improvements and identify management responses to avoid or reduce the severity of predicted unacceptable risks.

Measure 10: 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:

- 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; and**
- 6. Inform the broad health effects monitoring program (described in Measure 9 above).**

The Developer may conduct the human health risk assessment concurrently with the quantitative risk assessment described in Measure 5. Based on the results of this human health risk assessment, and on any existing 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.

The above clarifies that there is no expectation that the health effects monitoring program described in Measure 9 must be complete before meeting the requirements of Measure 10, but that any results available at that time should be considered.

For clarity, the above measures relate to the impacts of the proposed project, including its cumulative effects. Also, footnote #133 in of the Report of EA (Appendix D) is revised to read, in its entirety, “including inference of causality and pathologies deduced from any available health studies”.

3. Oversight (M#7)

The Board’s original measure on oversight is as follows:

Measure 7: 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.

The ministers’ suggested modification is to as follows:

Measure 7: 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.~~ Every effort will be made to have the Oversight Body in place as early as possible. However, the existing Oversight Working Group and its members could fulfill all Oversight Body duties in the interim. The environmental agreement will include a dispute resolution mechanism to ensure compliance with the agreement and a stable funding mechanism for the oversight body.

Analysis and response

The ministers’ suggested modifications to Measure 7 remove the timeline from the original measure. Parties have made it clear that it is important to include a timeline, to encourage timely

completion of the negotiations. The Board agrees, has considered alternatives proposed by the parties, including requiring a mediator if negotiations are not concluded after a reasonable period of time, and has recommended appropriate wording below.

The parties disagree with the ministers' suggested modification that would allow the Oversight Working Group to perform the duties of the Oversight Body until negotiations are successfully completed. Parties point out that the Oversight Working Group lacks the mandate, independence and resources to do so. The Board accepts this view and recommends that this sentence be removed from the measure.

The ministerial suggested modification removes the reference to the Oversight Body existing for the life of the project. This is inconsistent with the measures' original intention, and the Review Board recommends adding a sentence to indicate this, while allowing due flexibility to the negotiators of the environmental agreement.

Measure 7: 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 exist for the life of the Project unless otherwise agreed by the Parties to the Environmental Agreement. Every effort will be made to have the Oversight Body in place as early as possible. However, the existing Oversight Working Group and its members could fulfill all Oversight Body duties in the interim. The negotiations will make significant progress within six months of the Ministers' environmental assessment decision or proceed to mediation. The Developer will cover any mediation costs. The environmental agreement will include a dispute resolution mechanism to ensure compliance with the agreement and a stable funding mechanism for the oversight body.

4. Baker Creek (M#11, M#12, M#13)

The original Measure 11 reads as follows:

Measure 11: 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.

The ministers' suggested modifications, measure 11 reads:

Measure 11: The Developer will thoroughly assess options for, and the environmental impacts of, diversion of 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. Within one year of the project receiving its water license, a report outlining

a comparison of options including the current on-site realignment, will be provided to the appropriate regulatory authorities, the Oversight Body and the public.

Once informed by the advice of the Oversight Body and regulatory authorities, the Developer will determine the final alignment for Baker Creek. If off-site diversion is selected, the Developer will seek required regulatory approvals to implement the diversion within 5 years of receiving its initial water license.

Analysis and response

The ministers' suggested modification involves an assessment of options for Baker Creek, including that described in the original measure.

For clarity, in the environmental assessment the Board has considered the North Diversion. It examined the Developer's submission on the rationale for the diversion in the Developer's Assessment Report (PE#139 p6-86¹). It discussed the specific route of such a diversion in technical sessions (PR#353 p62), examined a map of the specific route (PR#349 p13), issued information requests on the diversion to the Developer and to the Department of Fisheries and Oceans (PR#378 IR#3 and #8), considered the costs of the "fish-friendly" and "flood only" alternatives, the ecological role of the creek and the feasibility of creating suitable habitat off-site, and a comparison of habitat on site vs. on a diversion channel, upstream arsenic loads and additional loads on site (PR#139 p8-14).

The north diversion was included not as a part of the original scope of development, but as a mitigation to address identified significant adverse impacts. The Board concludes that the diversion is not likely to be a cause of significant adverse impacts, and otherwise would not have been included in the original measure. In the Review Board's view, the North Diversion has been adequately assessed from the perspective of part five of the *Mackenzie Valley Resource Management Act*.

The Board recognizes the responsible ministers' interest in more thoroughly evaluating the relevant alternatives. To maintain the Board's intent, it is necessary that the reasons for the original measure (described in section 9.2, 9.4 and 9.5 of the Report of Environmental Assessment) remain the primary considerations in the selection of the best option. It is also important to the Board that any assessment of option for Baker Creek have the meaningful involvement of the Oversight Body and other parties. These revisions to the measure are recommended as follows:

Measure 11: The Developer, with meaningful participation from the Oversight Body and other parties, will thoroughly assess options for, and the environmental impacts of, diversion of Baker Creek to a north diversion route previously considered by the

¹ References are to Public Registry numbers of documents. See Appendix B (p197) of the *Report of Environmental Assessment on the Giant Mine Remediation Project* for the full index.

Developer, or another route that avoids the mine site and is determined appropriate by the Developer. **Within one year of the project receiving its water license, a report outlining a comparison of options including the current on-site realignment will be provided to the appropriate regulatory authorities, the Oversight Body and the public.**

Once informed by the advice of the Oversight Body and regulatory authorities, the Developer will determine and implement the preferred option ~~the final alignment for Baker Creek~~. In doing so, the Developer will consider the advice of the Oversight Body, regulatory authorities, and the public, and will ensure that the primary considerations in selecting an option are to:

- a) **minimize the likelihood of Baker Creek flooding and entering the arsenic chambers, stopes and underground workings, and**
- b) **minimize the exposure of fish in Baker Creek to arsenic from existing contaminated sediments on the minesite, surface drainage from the minesite or tailings runoff.**

If off-site diversion is selected, the Developer will seek required regulatory approvals to implement the diversion within 5 years of receiving its initial water license.

Other modifications suggested by the minister regarding Baker creek are in Measures 12 and 13, to reflect the possibility that the creek might not be moved. Measure 12 originally said:

Measure 12: 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 *Guidance on the Site-Specific Application of Water Quality Guidelines in Canada*.

With the ministers' suggested modifications, the measure reads:

Measure 12: To prevent significant adverse impacts on Great Slave Lake from contaminated surface waters in the **existing or former channel of Baker Creek, **should it be re-routed to avoid the mine site**, 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 *Guidance on the Site-Specific Application of Water Quality Guidelines in Canada*.**

Measure 13 originally read:

Measure 13: 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:

- 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,
- e) 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.

With the ministers' suggested modifications, Measure 13 reads:

Measure 13: 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 **existing or former channel of Baker Creek, **should it be re-routed to avoid the mine site**, excluding Reach 0:**

- 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,
- e) 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.

Analysis and response

The modifications to Measures 12 and 13 ensure that the Board's expectations for water quality at the mouth of the current channel of Baker Creek are met, regardless of whether or not the creek is moved. These are necessary to maintain the Board's intent in light of the suggested modifications to measure 11, and are useful additions. The Board supports the ministers' suggested modifications.

5. Water quality and treatment plant effluent (M#15)

The original measure 15 read as follows:

Measure 15: 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.**

Measure 15 with the ministers' suggested modifications says:

Measure 15: 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~~ **at 500 meters from** 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~~ **at 500 meters from** the outfall.**

Analysis and Response

The Board's intention was to set a duly conservative location at which water quality objectives would be met. For benthic invertebrates and plankton, and for arsenic levels in Yellowknife Bay water, the Board is of the opinion that the more conservative distance of 200 meters, as specified in the original measure, is appropriate, and recommends the revisions below. As the Yellowknives Dene First Nation has pointed out, this is less likely to rely on dilution in Great Slave Lake.

For arsenic levels in sediments in Yellowknife Bay, the Review Board finds that the ministers' suggested modification is acceptable and is appropriately conservative. The modified measure will still protect water to the standard intended by the Review Board.

Regarding the change in wording from "beyond" to "at", in points 2a and 2d, the Board's intent was relate the measure to the water treatment plant outfall. The word "beyond" would include any possible other input to Great Slave Lake from any other sources. The ministers' suggested modification of this specific wording clarifies the Board's intent and is an improvement.

For clarity, this measure is not intended to limit the application of any Aquatic Effects Monitoring Program or response framework that may be required.

Measure 15: 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~~ **at 500 200 meters from** 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 ~~beyond 200 metres of~~ **at 500 200 meters from** the outfall; and,
 - e) There is no increase in arsenic levels in Yellowknife Bay sediments ~~beyond 200 metres of~~ **at 500 meters from** the outfall.