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CIDM#519717

June 11, 2012

Mr. Richard Edjericon
Chairperson
Mackenzie Valley Environmental Impact Review Board
Box 938
5102 – 50th Avenue
YELLOWKNIFE NT X1A 2N7

Re: Giant Mine Remediation Project (EA0809-001) – Responses to Information Requests

Dear Mr. Edjericon:

On behalf of the Giant Mine Remediation Project Team, we wish to submit the 3rd round responses to Information Requests.

Should you require any additional information or have any questions please contact the Giant Mine Remediation Project Office at 867.669.2425.

Respectfully,

Adrian Paradis
A/Manager
Giant Mine Remediation Project
Aboriginal Affairs and Northern
Development Canada

Ray Case, Ph.D.
Assistant Deputy Minister
Corporate and Strategic Planning
Environment and Natural Resources
GNWT

cc. Parties to EA0809-001

INFORMATION REQUEST RESPONSE

EA No: 0809-001 **Information Request No: RB#01**

Date Received

May 7, 2012

Linkage to Other IRs (Round II)

No applicable linkages.

Linkage to Other IRs (from Round I)

Yellowknives Dene First Nation #02
Review Board #11 (Q3 & Q4)
Alternatives North #22

Also linked to the AANDC response to the Review Board fourth deficiency statement regarding funding certainty.

Date of this Response:

June 11, 2012

Request:

Preamble:

Active site management is required forever to address risks in this project, estimated in the DAR (section 6.13.5) at a cost of $1.91 million per year. This cost will eventually exceed the initial cost of the project. Project success depends on these activities happening, and these activities depend on funding.

In its Dec. 14th, 2010 response to the deficiency statement, the Giant Team said that it expected that this project will remain a priority "based on the significant investment to date and the consistent priority given to the management of risks at the Giant mine site". The same response notes that funding is earmarked only until fiscal year 2019-2020, and that it is not possible to commit a future government definitively to funding a specific priority or project decades into the future. It acknowledges that "changing circumstances in a wide variety of areas could alter any number of the above described factors".

In its May 31st, 2011 response to Alternatives North IR#22, the developer stated it is "not currently prepared to research and investigate funding options outside of the current ongoing and well

established approach (i.e. the parliamentary budget approval process)... However, should conditions change, INAC would be open to considering the most effective and efficient funding mechanism that would maintain the integrity of the Remediation Project".

In previous information requests, the developer was unable to provide any concrete commitments by the government of Canada to provide stable long term funding required. In the Review Board's view, this is an important part of the viability of this project. The Review Board has identified its interest in this issue in the Terms of Reference, Information Requests, and technical sessions. Stable funding is a part of the perpetual care plan currently being discussed between the developer and parties.

Question:

1. In light of the above, has the Giant Team identified a stable funding mechanism? Please describe progress to date.

2. History has demonstrated that priorities, governments, countries and entire civilizations have limited lifespans. Considering this,

   a. Why does the government of Canada expect future governments in the very long term to have both the capacity and willingness to conduct the on-site management activities required to keep the arsenic safely contained?

   b. What assumptions about future scenarios is this conclusion based on?

Reference to DAR (relevant DAR Sections):

The DAR recognizes that elements of the project are to be managed in perpetuity.

- Temporal Boundaries, Section 3.4.2 – "It is recognized that the developer's activities on site will continue in some form in perpetuity" (p. 3-6).

- Summary of Post-Remediation Conditions, Section 6.1.2 – "A new Water Treatment Plant will be constructed and will be operated year-round, potentially in perpetuity" (p. 6-4).

- Section 14 – "Some forms of monitoring are expected in perpetuity, particularly around the function of the thermosyphons and the treatment of water. Consequently, a system to establish standards, deliver programs and receive and evaluate monitoring results will also exist in perpetuity" (p. 14-1).

- Technical Advisor Studies, Section 6.2.2.1 – "It was concluded that the best in situ alternative was Alternative B3, isolating the arsenic trioxide dust in its current location by creating a block of frozen dust and rock, monitoring in perpetuity and, if necessary, maintaining isolation by periodic refreezing" (p. 6-7).

- Hazardous Waste, Section 6.12.2 – "The new underground or new pit or quarry options would all require additional disturbance and would create a new source that would need to be managed in perpetuity" (p. 6-97).

Table 6.13.4 of the DAR presents a summary of estimated costs for the implementation phase of the Giant Mine Remediation Project, and Table 6.13.5 presents a summary of estimated annual costs over the long-term. This latter Table identifies the estimated cost for long term operations and maintenance as $1.91 million per year. The DAR also states that INAC will seek the necessary Treasury Board approvals in order to obtain this long term funding.

Reference to the EA Terms of Reference

Section 2.3 of the Terms of Reference (Temporal Scope) – "As the contaminant will continue to exist on the site, the risk of potential contamination may exist in perpetuity. To predict impacts in the future, assumptions must be made about future events and conditions" (p. 7).

Section 3.2.2 of the Terms of Reference requires the Developer to provide: "A description of project feasibility including financial feasibility. Include discussion of funding certainty for the development and related monitoring" (p.10).

Section 3.2.4 of the Terms of Reference (Development Description) requires the Developer to provide: "Estimated capital, operating, monitoring and maintenance costs (the latter presented by year for the life of the development)" (p.13).

Summary

Aboriginal Affairs and Northern Development Canada (AANDC) remains committed to the existing funding mechanism over the short and medium term phases of the project. This mechanism has been shown to be effective and has demonstrated flexibility in addressing urgent and unforeseen risks (e.g., the Site Stabilization Plan). AANDC remains open to considering the most effective and efficient funding mechanism in order to maintain the integrity of the project. The most appropriate time to reconsider the funding mechanism is in advance of the final monitoring and maintenance phase.

AANDC expects that future governments will have the capacity and willingness over the long term to keep the arsenic at the site contained. It is expected that the Government as a stable entity that has existed since 1867 will take all measures necessary to protect the human health and safety of Canadians.

Response

Response 1

AANDC remains committed to the existing stable funding mechanism (phased approval through the Government of Canada budgetary process) to address all requirements for the remediation project over the short and medium term. This is the most appropriate funding mechanism to address the current capital intensive phases of the project – preliminary design and construction. This funding mechanism has effectively demonstrated its capacity to provide stable resources for the project. Since the late 1990s, stable funding has been provided despite the changing economic conditions that the country has experienced. In addition, this funding mechanism has shown the necessary flexibility that is required to address urgent and unforeseen risks (e.g., Baker Creek, the Site Stabilization Plan). Throughout changing conditions (e.g., political, economic), the Government of Canada has remained committed to the objective of protecting human health and safety as well as the environment through the remediation of the Giant Mine site.

However, as noted, AANDC remains open to considering the most effective and efficient funding mechanism that would maintain the integrity of the Remediation Project going forward. A potential reconsideration of the funding mechanism is likely most appropriate when the project enters the final monitoring and maintenance phase. This is the final phase of the project where it is expected that costs would be well established and stable on a year-to-year basis. In advance of this stage of the project, AANDC is willing to fully assess, consider and potentially propose a new funding mechanism to meet the particular needs of the monitoring and maintenance phase of the project.

Response 2

a. AANDC anticipates that future governments over the very long term will have both the capacity and willingness to conduct the on-site management activities required to keep the arsenic safely contained. This expectation comes from the fact that the Government of Canada is a stable entity that has provided consistent funding for the project. As such, it is expected that the Government of Canada will have the means necessary to protect Canadians from harmful and preventable events. The anticipated willingness on behalf of the future Government of Canada also relates directly to an anticipated interest in protecting the human health and safety of Canadians.

b. The future scenario mentioned above is based on two basic and highly probable assumptions. The first is that the Government of Canada as an entity will exist in the future. As previously noted, the Government of Canada is not at risk of disappearing, going bankrupt, or de-listing in the same manner as a private-sector corporation as it has existed since 1867. The second assumption is that the future Government of Canada will work to protect the health and safety of Canadians, including taking the measures necessary to prevent the harmful release of arsenic from the Giant Mine site.

INFORMATION REQUEST RESPONSE

EA No: 0809-001 **Information Request No: RB#02**

Date Received

May 7, 2012

Linkage to Other IRs (Round II)

No applicable linkages.

Linkage to Other IRs (from Round I)

No applicable linkages.

Date of this Response:

June 11, 2012

Request:

Preamble:

In the Technical Session of October 28, 2011, the developer described a contingency of diverting Baker Creek around the mine site to the north. As stated in the preamble to the Review Board's Round 2 IR#2 (issued on Dec. 1st, 2011):

- During the Technical sessions, the developer stated that "one of the greatest site risks at Giant Mine is Baker Creek" (Day 2, p207), and confirmed that the developer would "be willing to pursue relocating it if the creek were to pose an unacceptable long-term risk to arsenic containment" (Day2, p208)
- In the technical session, the Board's technical advisor on risk assessment noted 1) that the projects' design tolerances mean there was a five percent probability of failure to contain Baker Creek during the first 25 years; and 2) this was characterized a s a "staggering" risk considering the implications of failure during that period. (Day 4, p262).
- In response, the developer stated that it acknowledges the risk, that is not comfortable with the risk, and that is why the Giant Team has started looking at the north diversion of Baker Creek as a contingency (Day 4, p262).

In the same document, Review Board stated "because of the risks associated with Baker Creek it is important that the Review Board understand the options and trade-offs as they relate to project design and implementation".

In the Feb. 17th, 2012 response, the developer stated that is not currently pursuing the North Diversion as a contingency for flooding risks. It stated that it still considers Baker Creek a high risk, but is conducting a review of short-term risk mitigation strategies. The Review Board has yet to receive this review.

Cost has been a factor identified by the Giant Team regarding the possible North Diversion of Baker Creek.

Question:

1) Based on your existing studies of the North Diversion channel please provide a rough estimate of the cost of construction. Please include both the design that allows fish passage and the design providing flood conveyance only (as described in the Technical Session of October 18th 2011).

2) Please estimate the annual cost of water treatment based on the expected difference in water volumes with and without Baker Creek passing through the mine site.

3) The Giant Team has identified risks posed by the creek prior to establishing frozen conditions (i.e. in the first 25-30 years of the project). In the very long term, if the site is not actively managed due to circumstances beyond the Giant Team's control and arsenic chambers thaw, would risks from Baker Creek to arsenic containment be similar to the initial risks?

Reference to DAR (relevant DAR Sections):

DAR Section 6.9.2 Method Selection, Alternatives and Preferred Alternative

Reference to the EA Terms of Reference

ToR s.3.2.5 Accidents and Malfunctions

Summary

The North Diversion was an alternative that was considered during development of the Preliminary Design for Baker Creek, and has only ever been evaluated at a conceptual level without any substantive cost estimates. A very rough cost estimate has been prepared in response to this information request, but it is not possible at this time to assign a cost to all of the work elements that would be required to implement the North Diversion.

The Baker Creek channel itself represents only a portion of the potential mine infiltration component, and the existing remediation design includes measures to reduce seepages to the underground. If Baker Creek were diverted off-site, the existing channel would remain as a local drainage path, likely without the planned measures to reduce seepage. Moving Baker Creek off-site would only reduce mine infiltration by about 10% at most, which represents a mine inflow reduction of approximately 16,000 m^3,

or 4% of the predicted post-freeze annual mine water treatment volume. This would represent insignificant savings in operational costs for mine water treatment.

In the very long term, after the on-site re-alignment of Baker Creek is complete, it is expected that the risk of the creek flooding the underground, through any of the currently identified failure mechanisms will be greatly reduced from present day conditions. Additionally, the completion of ground freezing around the arsenic chambers and stopes will provide a high level of assurance against the release of arsenic trioxide dust from inside the chamber and stopes in the event of mine flooding. Finally, the passive freezing system will continue to counteract any thawing of the frozen ground even in the very unlikely event of a complete failure of future site management.

Response 1

The North Diversion was an alternative that was considered during development of the Preliminary Design for Baker Creek. It originated from the Giant Mine Remediation Project Team (Project Team) asking itself the question "is this even possible?" and as such has only ever been evaluated at a conceptual level.

Given the very limited amount of engineering that has gone into consideration of the North Diversion, it is only possible to provide a very rough cost estimate. This estimate is based on the following:

1. The estimated amount of material that would have to be moved in order to construct the North Diversion
2. The estimated unit cost of moving material based on recent tender prices for rock excavation and haul
3. The estimated cost for a diversion dam and control structure on upper Baker Creek

This partial, conceptual level evaluation to construct the North Diversion for the flood conveyance and fish habitat alternatives results in the following cost estimates:

Alternative:	**Flood Conveyance Only**	**Flood Conveyance and Fish Passage**
Excavation Quantity:	80,000 m3	1,320,000 m3
Unit Cost:	$40/m3	$40/m3
Excavation Cost:	$3,200,000	$52,800,000
Diversion Structure Cost:	$3,250,000	$3,250,000
Total Cost	$6,450,000	$56,050,000

It is important to note that in addition to these basic construction costs, this alternative would also include the following related costs that have not been estimated:

a) Costs to collect baseline data on the affected watercourses (off the Giant Mine property) and prepare habitat compensation studies in support of a Fisheries Act Authorization
b) Costs to conduct an Environmental Assessment specifically for the North Diversion
c) Engineering costs to produce detailed design drawings

d) Care and Maintenance costs to maintain the current Baker Creek channel during construction (which is expected to be a much larger construction project than the proposed on site re-alignment of Baker Creek)
e) Costs for dyking across the existing Trapper Creek channel, to prevent backflow into the Baker Creek watershed
f) Costs for engineering and construction of new bridges at the Vee Lake Road and Northwest Territories Highway 4
g) Costs for channel and floodplain substrates, floodplain topsoil and plantings, and instream fish habitat features

For comparison purposes, the total channel length to be constructed for the flood-only alternative would be 2,000 m and the total length of channel to be constructed for the lowest excavation volume fish passage alternative would be 4,150 m. This compares to a total channel length of 2,775 m, including approximately 1,200 m along new alignments, in the existing Developers Assessment Report (DAR) and closure plan. The greater length of new diversion is an indicator of incremental costs for uncosted channel, floodplain and fish habitat features.

Response 2

It is important to recognize that the Baker Creek channel itself represents only a portion of the potential mine infiltration component, with other significant contributions coming from direct precipitation and runoff to mine pits and other openings to surface, and due to infiltration from other surface water drainage features (e.g., ditches, swales and sumps). The existing remediation designs for surface water drainage and Baker Creek include measures to enhance surface water drainage and to install impermeable liners in areas above shallow underground mine features, and also realign Baker Creek away from some potential seepage areas (e.g., existing Reach 3 at C1 Pit).

It must also be recognized that, should Baker Creek be diverted off-site, the existing channel would still remain as a local drainage path and the planned realignments and impermeable linings would likely not be constructed as presently proposed in the DAR. Though discharges and water levels would be greatly reduced, especially during freshet, the existing substrates could remain saturated and still potentially contribute to mine infiltration.

As a conservative estimate, moving Baker Creek off site would only reduce mine infiltration by about 10% at most, when comparing the scenario of leaving the existing Baker Creek channel as a local drainage channel, to the scenario of implementing the existing preliminary engineering design. This would represent a mine inflow reduction of approximately 16,000 m^3, or 4% of the predicted post-freeze annual mine water treatment volume. This would represent insignificant savings in operational costs for mine water treatment.

Response 3

In winter 2011, the Project Team identified the risk of Baker Creek overtopping its banks near the C1 pit diversion and flooding the underground workings as the single highest risk on site. Work was

undertaken in summer 2011 to partially mitigate this risk by raising the height of the dyke between the pit and the creek. The analysis to evaluate the effectiveness of the work has demonstrated that the creek is now capable of passing the 1 in 500-year flood flow, on top of a 2 m thick ice accumulation, with 0.5 m of freeboard. Similar improvements were also implemented at B1 Pit, where 0.0 m of freeboard is provided, and the dyke may be raised in 2012.

Other existing risks of spill to the underground mine are related to surface and underground mine instability, including areas where seepage has been observed between Baker Creek and the B1 and C1 Pits and other areas where shallow stopes are present under the creek. Some of these risks are not fully quantified, and field data collection to contribute to stability assessments has been recommended for 2012.

The on-site re-alignment of the creek will be designed to convey the 1 in 500-year flood flow, with additional allocations for ice accumulation (2 m) and freeboard (1 m), but at a distance farther away from the C1 and A2 Pits. These actions will reduce the risk of mine instability failures resulting in flow into the underground mine. As such, after the closure effort is complete, it is expected that the risk of Baker Creek flooding the underground, through any of the currently identified failure mechanisms (overtopping, bank slope failure, collapse of underground) will be greatly reduced from existing conditions.

Furthermore, once the ground freezing is completed, even complete flooding of the mine (through any mechanism) will not lead to release of arsenic trioxide dust from inside the chamber and stopes. As has been pointed out in the DAR and in several responses to earlier information requests, the passive freezing system will continue to counteract any thawing of the frozen ground even in the very unlikely event of a complete failure of future site management.

June 11, 2012

Mr. Richard Edjericon
Chairperson
Mackenzie Valley Environmental Impact Review Board
Box 938
5102-50th Avenue
Yellowknife, NWT X1A 2N7

Dear Mr. Edjericon

On behalf of the Developer, Yellowknives Dene First Nation, Alternatives North and the City of Yellowknife, we wish to submit our response to Review Board **Information Request # 3: Independent monitoring.**

On May 7, 2012 the Mackenzie Valley Environmental Impact Review Board issued Review Board IR #3 to the Developer, the Yellowknives Dene First Nation and Alternatives North. The IR relates to ToR 3.6: Monitoring, Evaluation and Management and DAR 14.1.6, p14-5.

In its request, the Board noted that, "Considering the history of the site and its proximity to N'Dilo, Dettah and Yellowknife, and the requirement for active management of the site forever, **public trust is a fundamental part of community acceptance for this project**. The Review Board is interested in progress towards an agreement on an oversight mechanism to address this issue."

The Review Board asked the following questions of the Developer, the Yellowknives Dene First Nation and Alternatives North:

1) Please describe the current areas of agreement and disagreement in the ongoing discussions regarding oversight.

2) Please describe your rationale for the areas where there is disagreement.

Response:

On March 6-7, 2012, Alternatives North (AN) and the Yellowknives Dene First Nation (YKDFN) jointly hosted a workshop to explore definitions and concepts for arms length oversight of the Giant Mine Remediation Project. One outcome of the workshop was agreement to strike a small working group with representation from Aboriginal Affairs and Northern Development Canada, the Government of the Northwest Territories, the City of Yellowknife, YKDFN and AN to further discuss the context and process for the possible establishment of an arms-length oversight body.

The working group met by telephone and in person from March through May 2012. It quickly determined that there was sufficient common ground regarding the need for an arms-length environmental oversight body to continue exploratory discussions.

The working group then focused its attention on guiding principles, functions, structure and an establishment process for such a committee, again without prejudice to future decisions by the parties regarding its possible establishment. The working group followed a consensus-based approach throughout its deliberations.

The working group has concluded that it is in the individual and collective best interests of the parties to the working group and the general public that a Giant Mine Remediation Project environmental monitoring committee be established prior to the initiation of the Project. The Committee would be representative of the public, advisory in nature and would monitor implementation of the environmental aspects of the Giant Mine Remediation Project.

Specifically, the environmental monitoring advisory committee would be mandated to:

- provide independent advice on environmental matters related to the Project;
- ensure that its advice regarding the remediation and perpetual care of the Giant Mine site assists the proponents in proceeding in a manner which minimizes environmental harm and risks, maximizes environmental benefits and opportunities and builds public confidence in the project; and
- establish and maintain effective communications among all parties and with the general public regarding the remediation and perpetual care of the Giant Mine site, to build a broad understanding of the activities underway and planned, and consequently to enable public confidence in the Project.

The functions of the environmental monitoring advisory committee would include:

- enabling effective communications among the parties and the public including annual reporting by, and financial accountability of, the environmental monitoring advisory committee;
- parallel to monitoring Project implementation, encouraging research to further explore environmentally safe and secure, cost-effective treatment options that could obviate the need for perpetual care and maintenance of the arsenic trioxide stored underground at the Giant Mine;
- maintaining "institutional and societal memory" related to the Project;
- reviewing the design of environmental monitoring programs and environmental management plans, including perpetual care plans, and the outcomes or results of those programs and plans (i.e. taking on some of the independent review and community interface functions envisioned in the proponents' plans for an Environmental Management System);
- monitoring commitments made by Canada and the GNWT during the environmental assessment that are not contained in regulatory instruments; and
- creating and maintaining public confidence in the Project through open, effective and unbiased communications and the provision of independent advice to support sound environmental management.

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.

The Developer, the YKDFN, AN and the City of Yellowknife generally concur with the recommendation of the working group and have directed it to pursue discussions on an agreement to establish the committee. The YKDFN note that it is important to recognize that while the agreement of the parties to continue their discussions should not be seen as accommodating YKDFN concerns, it is a positive step forward.

Discussions are to focus in particular on areas which in the view of one or more of the parties require further consideration, including:

- membership selection and appointment process;
- the research framework;
- the term of the committee and linkage to the phases of the Project;
- the budget for the committee;
- timing of committee establishment, and
- the nature of the agreement which would create the committee.

The working group will report back to the parties and will update the Review Board on the progress of the discussions and any outstanding issues prior to the July 11, 2012 deadline for technical submissions.

Should you require any additional information or have any questions please contact the undersigned.

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