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MEMORANDUM

TO:	Mark Palmer, INAC	350047-4
FROM:	Bruce Halbert	13 December 2010
SUBJ:	**Response to MVEIRB DAR Deficiency #1** **Risks of Malfunction or Failure of the Frozen Block Method**	

The first item provided by the Review Board identifies the following two questions related to the risks and consequences of malfunction or failure of the frozen block method:

A. What are the conditions and likelihoods of failure of the frozen block method that could lead to the release of arsenic trioxide to the environment?

B. And, what are the potential worst case consequences at the Giant Mine site and in the surrounding environment (including Back Bay, Yellowknife Bay and Great Slave Lake) if such an event were to occur?

In regards to the second question, the Review Board asked that consequences be described with respect to potential impacts on water and aquatic life and human health over the short, medium and long terms. These deficiencies pertain to sections 3.3.9 and 3.5.1.2 of the Review Board's Terms of Reference for the Giant Mine Remediation Plan.

A summary of information provided in the Developer Assessment Report (DAR) and Remediation Plan has been consolidated below to reduce the necessity to read various parts of the supporting documentation.

Response Summary

As discussed in the DAR, the site in its current condition presents several risks that will remain during the development of the frozen blocks. The most potentially significant issues pertain to the stability of some of the bulk heads and certain crown pillars. Any localized failures that could occur in these areas during implementation would at most mean that the arsenic concentration in minewater would increase and that the minewater treatment plant would be operated for a longer period to remove the dissolved arsenic. It is highly unlikely that there would be uncontrolled release of arsenic to the environment from localized failures in the mine.

Once the frozen blocks are established, there is a long chain of events that would have to occur before arsenic could be released into the surrounding environment. Such a circumstance would require failure of the frozen block method to contain arsenic trioxide in the underground chambers and stopes, in combination with a failure to pump and treat the minewater (i.e. complete failure of operations and governance). In addition, several decades would be required for the frozen blocks to thaw even under climate warming conditions.

Even though a "do nothing" scenario is considered to be highly unlikely, the environmental effects of such a scenario were assessed. The consequences would be increased arsenic levels in Baker Creek and Yellowknife Bay water, increased risk of adverse effects to aquatic and terrestrial species in the lower Baker Creek watershed, and increased risk to human health of those individuals who harvest fish and wildlife from the local study area. Environmental effects would be limited however to the study area and not result in adverse consequences to the Great Slave Lake ecosystem or people living outside the local study area.

Detailed Response

A: What are the conditions and likelihoods of failure of the frozen block method that could lead to the release of arsenic trioxide to the environment?

As discussed at various points in the DAR, there are a number of existing risks at the site that will remain during implementation of the frozen block remediation system at the arsenic trioxide storage stopes and chambers.

The most potentially significant issues pertain to the stability of some of the bulk heads and certain crown pillars. However, these risks are associated with the site in its current condition (i.e., they are not caused by the Project) and the risks will be mitigated through the implementation of the Project. The remediation plan provides for stabilization of these areas to avoid loss of arsenic trioxide dust to the mine workings.

Failure to completely encapsulate the arsenic chambers and stopes within frozen blocks could lead to release of some arsenic trioxide dust to minewater. Any arsenic trioxide released to minewater would be captured in the minewater collection and treatment system and, thus, would pose no additional risk to the environment. The implications of such an event would be extended operation of the minewater treatment plant and increased chemical and sludge management costs.

The worst case (bounding) scenario is complete failure of the frozen blocks in the long term (i.e. thawing of the frozen stopes and chambers) and failure to continue to collect and treat minewater. As discussed in Section 6.2.8.2 of the DAR, there is a long chain of events that would have to occur before arsenic could be released into the surrounding environment including:

- The ineffectiveness of the thermosyphons would need to go unnoticed or unmitigated for at least the 20-year period noted above, or longer if some of the thermosyphons remain active.
- The temperature monitoring devices in the ground, which would provide a clear indication of warming long before the thaw reaches the dust, would need to be unnoticed or ignored.
- After 20 or more years of the above conditions, the dust at the top of some of the chambers would just be beginning to thaw. There would then be a potential for infiltrating precipitation to contact the dust and create dissolved arsenic. That potential would be far less than it is today, where all of the chambers and stopes are unfrozen and completely exposed to infiltration.
- Any arsenic that is dissolved would be transported downward into the mine, collected in the minewater system, and removed by the water treatment plant, just as it is today. Any significant increase in soluble arsenic reporting to the treatment plant would be noticeable both in influent analyses and in increases in water treatment costs.
- Assuming that none of the above elicits a response by the site operator and responsible authorities, the thawing would proceed. Thaw rates decline as the thawing front gets further from the ground surface. As a result, any further thawing into deeper parts of the dust would be even slower than the initial thawing discussed above.

- Again assuming no response, the thaw front would eventually reach the groundwater table. At that point arsenic would begin to dissolve into the surrounding groundwater and there would be significant increases in arsenic concentrations reporting to the minewater collection system. However, all contaminated water would still go to the water treatment plant where it would: (a) be immediately noticed and (b) be treated prior to discharge from the site.
- Again assuming no response, the above situation would continue indefinitely, with ever-increasing water treatment costs, but no uncontrolled release of arsenic into the surrounding environment.
- In order for any of the dissolved arsenic from the thaw zone to leave the site, the minewater collection system would also need to fail. Such a failure would be immediately noticeable as a significant change in flow to the water treatment plant. For this situation to be undetected, it is assumed that the water treatment plant would also need to fail or be inoperative.
- Under those highly unlikely conditions, the water table would begin to rise. This would be immediately noticeable in the water level monitoring wells. However, if the situation were to go unnoticed or unmitigated, the water table would reach the bottom of the pits. A pond would form in A2 Pit first, and shortly thereafter in A1 Pit. These ponds would continue to grow in size, and then be joined by additional ponds as each of the other pits begins to flood. The ponds in A2 and A1 Pits would continue to grow, reaching 20-40 m in depth and 100 m or more in length. The formation of ponds within the pits would be readily apparent to even the most casual observer.

If all of these conditions went unnoticed the water level in the mine would eventually reach a point where either groundwater or surface water could flow outwards. This would represent the first uncontrolled release of arsenic into the surrounding environment.

In summary, there would have to be a complete failure of operations and governance over many years for all of the above conditions to occur. The likelihood of such an occurrence is judged to be very low. Also, as discussed in Section 6.2.8.2 of the DAR, it is estimated that it would take several decades for the frozen blocks to thaw naturally even under the warmest climate change scenario.

Taking into consideration the lengthy time frame involved with this failure scenario, it is reasonable to expect that such a failure would be detected and corrective action taken before there would be uncontrolled release of arsenic to the environment. Nonetheless, the potential consequences of a comparable "do nothing" scenario were assessed in development of the remediation plan and are discussed below.

B: What are the potential worst case consequences at the Giant Mine site and in the surrounding environment (including Back Bay, Yellowknife Bay and Great Slave Lake) if such an event were to occur?

The potential consequences of arsenic releases to the environment from the Giant Mine site were assessed on three separate occasions during development of the Giant Mine remediation plan. In 2002, a Tier 2 risk assessment was completed of five discharge scenarios. This included minewater discharge loads ranging from 500 kg/y (comparable to the treated minewater discharge load to Baker Creek at that time) to 16,000 kg/y (similar to conditions experienced prior to implementation of minewater treatment when the mine was operating) (SENES 2002). The results of the assessment showed that the minewater discharge arsenic load would need to be limited to 2,000 kg/y or less to avoid unacceptable impacts on the aquatic environment in Back Bay and Yellowknife Bay and on the health of people living in the study area. By comparison, the proposed minewater treatment system with direct discharge to Yellowknife Bay will limit the discharge of arsenic to 140 kg/y.

The risk assessment work was updated in 2006 and included an assessment of the potential environmental and human health consequences of a "do nothing" scenario in addition to the expected scenario. The "do nothing" scenario was identified as a bounding scenario for the purpose of determining potential consequences if nothing was done at the Giant Mine site. The results of the *"No Remediation (Base Case)"* scenario are reported in Appendix F of Supporting Document N1 (titled *"Tier 2 Risk Assessment – Giant Mine Remediation Plan1"*). This scenario is comparable to the bounding scenario described in A above, which assumes a complete failure of the frozen block methods and a failure to maintain the ongoing pumping and treatment of minewater. The "do nothing" scenario also assumed that no remediation work was undertaken on the surface and that outflow of the flooded mine occurred at the A2 pit with discharge to Baker Creek. The assumed arsenic loads are presented in Table 1. The arsenic load for this scenario was estimated to be

1 *Tier 2 Risk Assessment – Giant Mine Remediation Plan* was submitted to the Mackenzie Valley Land and Water Board on October 18, 2007.

approximately 8.5 times the estimated current arsenic load to Back Bay. A majority of the load (i.e. 7,100 kg/y of an estimated total load of 7,720 kg/y from all sources) is associated with the release of untreated minewater from the mine workings.

Table 1: Summary of Arsenic Loads for No Remediation (Base Case) Scenario

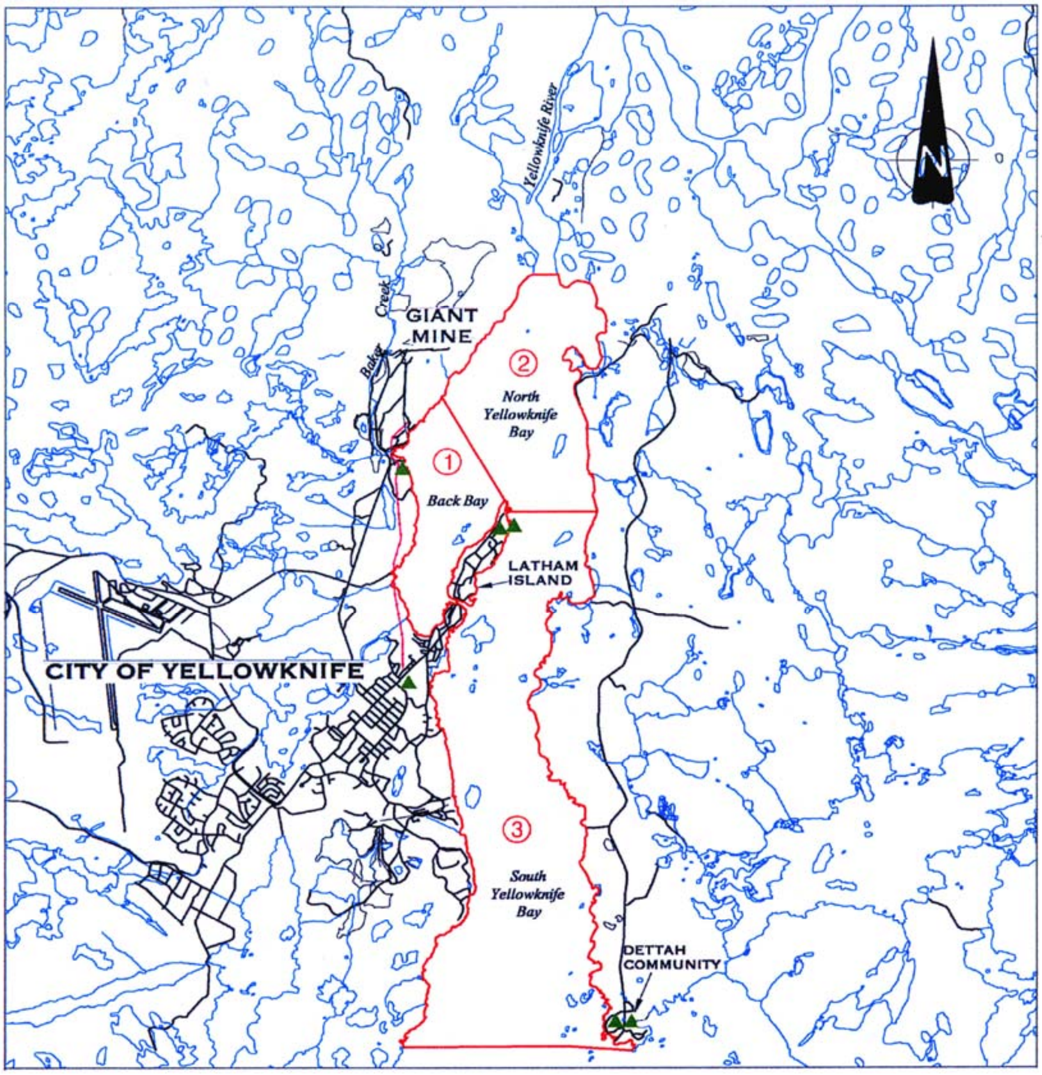
	Current	Future	
From treatment plant to Baker Creek	290		kg/y
Upstream load to Baker Creek	220	220	kg/y
Tributary load to Baker Creek	70	70	kg/y
Surface load to Baker Creek	220	220	kg/y
Underground mine to Baker Creek		7100	kg/y
Surface load to Yellowknife Bay	110	110	kg/y
Total to Baker Creek	800	7610	
Total to Yellowknife Bay	110	110	
Total	910	7720	

A copy of Supporting Document N1 is attached to this response. A summary of the key findings from that assessment is provided below.

Water and Sediment Quality

The assessment of the effects of arsenic levels in water and sediments in the receiving environment was undertaken in yearly time steps beginning in 1950 (to account for historic inputs) through to 2100 (to look at long-term effects on Baker Creek and Yellowknife Bay). The modelled receiving water bodies are identified on Figure 1. A summary of the mean predicted arsenic concentrations in Baker Creek, Back Bay, North Yellowknife Bay and South Yellowknife Bay for Year 2010 is presented in Table 2. It was assumed that the overflow of untreated minewater from the A2 pit to Baker Creek would commence in 2005. As the long-term water quality predictions are very similar to the predictions for Year 2010, only the results from Year 2010 are discussed here.

Figure 1: Modelled Segments in Yellowknife Bay, Giant Mine Remediation Project



The predicted arsenic concentrations in water and sediments decrease markedly with distance from Baker Creek. The simulation of arsenic levels in these media considered freshwater flows, exchange between lake segments and exchange between the water column and sediments. The effects of historic arsenic releases from the site in the modelled segments were also considered. Hence, the predicted levels reflect the effects of both historic arsenic loads and the potential future arsenic loads for the "do-nothing" scenario.

The predicted arsenic levels in Baker Creek, Back Bay and North Yellowknife Bay for the "do-nothing" scenario exceed the Canadian surface water quality guideline of 5 µg/L for the protection of aquatic life (CCME 1999). However, the predicted arsenic levels in North and South Yellowknife Bay are below the Canadian drinking water guideline of 10 µg/L (Health Canada 2008). By comparison, the baseline arsenic level in the Yellowknife River measures approximately 0.3 µg/L.

With respect to sediments, the predicted arsenic levels in all four segments are greater than Canadian sediment quality guidelines (i.e. Lowest Effect Level of 5.9 (µg/g dry weight) and Probable Effect Level of 17 (µg/g dry weight)); however, the arsenic levels in all four segments currently exceed the guideline due to historic releases to the environment (see Table 2.3-2 of Supporting Document N1) and the arsenic levels are predicted to decrease over time even in the "do nothing" scenario (see Figures F.1-5 through F.1-8 in Supporting Document N2). In other words, the "do nothing" scenario is not expected to have a negative effect on sediment quality.

Table 2: Predicted Arsenic Concentration in Study Area Segments in Year 2010 for the No Remediation (Base Case) Scenario

Modelled Segment	Mean Arsenic Concentrations in Water Column (µg/L)	Mean Arsenic Concentrations in Sediments (µg/g dw)
Baker Creek	1240	2220
Back Bay	18.3	760
North Yellowknife Bay	7.1	170
South Yellowknife Bay	1.9	26.3

Risks to Aquatic Species

The potential consequences to aquatic plants and fish were assessed by comparing the arsenic levels in the water column in each segment to toxicity benchmark values. The results of the ecological risk assessment are summarized in Table 3. The screening index values are the calculated ratios of the predicted sediment concentrations to the respective benchmark toxicity reference values, which are shown at the top of each column. A screening index value greater than 1 indicates that the predicted concentration exceeds the benchmark.

Table 3: Predicted Risks to Aquatic Species in 2010 for the No Remediation (Base Case) Scenario

Aquatic Species	Aquatic Plants	Benthic Invertebrates	Predatory Fish	Bottom-feeding Fish*
Benchmark Toxicity Values (mg/L)	0.32	0.34	0.19	0.18
Screening Index Values				
Modeled Segment	**Mean**	**Mean**	**Mean**	**Mean**
Baker Creek	**3.9**	**3.6**	**8.9**	**10.3**
Back Bay	0.06	0.05	0.13	0.15
N Yellowknife Bay	0.02	0.02	0.05	0.06
S Yellowknife Bay	0.01	0.01	0.01	0.02

Note: Screening Index (SI) values are calculated as the ratio of the predicted arsenic concentrations to the benchmark toxicity values. SI values in bold exceed the respective benchmark value.

The results for Baker Creek show that all aquatic species would potentially be at risk of adverse effects due to the elevated arsenic levels in the water column. Elevated arsenic levels in Baker Creek sediments would also pose risks to benthic invertebrates and other species exposed to the sediments. By contrast, none of the aquatic species present in Back Bay, North Yellowknife Bay or South Yellowknife Bay would be adversely affected at the predicted arsenic levels in the water columns of these areas. However, the predicted arsenic levels in the sediments of Back Bay and North Yellowknife Bay would be expected to affect the health of benthic communities in these water bodies.

Risks to Terrestrial Species

The potential effects on terrestrial species were evaluated by comparing the intake of arsenic by various terrestrial receptors to lowest observable adverse effects level (LOAEL) toxicity values. An exceedance of a LOAEL benchmark indicates the possibility of an adverse effect. All terrestrial species were assumed to spend time in the lower reaches of Baker Creek and/or on the Giant Mine site and to be exposed to arsenic present in the terrestrial environment (soils, terrestrial vegetation) and in the aquatic environment (water, sediments and aquatic biota) while onsite. The terrestrial species considered in the assessment included bear, caribou, ducks, grouse, hare, mink, moose, muskrat and wolf. Ducks were also considered to be present in Back Bay and Yellowknife Bay and to be exposed to arsenic in water, sediments and aquatic biota in these water bodies.

The assessment showed that arsenic in the terrestrial environment contributes to the majority of the estimated intake by caribou, grouse, hare and wolf; whereas the aquatic pathways are relatively minor. Estimated arsenic intakes by caribou and wolf (which were assumed to roam along Baker Creek and obtain their drinking water and food from the downstream watershed for the portion of the year that they are in the study area) were found to be well below the respective toxicity reference values. It was concluded that these species are not expected to be adversely affected. Exposure estimates for grouse and hare (which were assumed to obtain all their drinking water and vegetation from the Baker Creek watershed area downstream of the Giant Mine sire) were shown to be potentially greater than the LOAEL toxicity reference values for these species.

The aquatic pathways dominate the arsenic intakes by mink, moose and muskrat, whereas both the aquatic and terrestrial pathways are important for bear. The predicted arsenic intake levels for each of these species indicate that they could potentially be adversely impacted. Ducks present in the Baker Creek watershed were predicted to be exposed to elevated arsenic levels but species present on Back Bay and Yellowknife Bay were found to not be at risk of adverse effects.

Risks to People

The assessment of risks to people in the study area for the "*No Remediation (Base Case)*" scenario was conducted in the same manner as the human health risk assessment for the Giant Mine Remediation Project. Specifically, the risk assessment evaluated potential adverse effects of arsenic to members of the public at the Giant Mine town site, Latham Island (N'Dilo Community), Dettah and the City of Yellowknife (Figure 1 shows the locations of the later three communities relative to the Giant Mine site). Potential exposure pathways included consumption of drinking water, ingestion of traditional foods (plants and animals harvested from the study area), ingestion of fish (caught from Back Bay and Yellowknife Bay), consumption of store bought foods and the inadvertent ingestion of soil. Dietary intakes were based on a survey of Aboriginal communities in the local study area. Soil ingestion rates were based on work undertaken by Health Canada as discussed in Supporting Document N1.

The contribution of each pathway to the total daily intake estimates are provided in Table 4. The pathways contributions are expressed as daily intake rates in mg/(kg d) (top half of each table) and as a percent of the mean daily intakes (bottom half of each table). The assessment was carried out within a probabilistic framework to explicitly take into account uncertainties in many of the model input parameters. In a probabilistic analysis, model simulations are carried out several hundred times using a range of input values for many of the model input parameters to obtain a range of possible outcomes (results). The results are then evaluated to obtain summary statistics such as those presented on the tables, which include the 5th percentile, median (50th percentile), mean and 95th percentile values.

The assessment of human exposure to arsenic levels in the aquatic, atmospheric and terrestrial environments in the Yellowknife study area determined that exposure levels are potentially high for some individuals. The most exposed individuals were the adult and child receptors living at the Giant Mine town site and on Latham Island (N'Dilo) respectively. Fish and market foods are the major contributors to exposure for these receptors. The main sources of arsenic exposure for individuals living in Dettah were caribou, market foods and fish. For the Yellowknife residents, market foods were the main source of arsenic followed by fish. The estimated total arsenic intakes for these individuals were higher than the range reported for other Canadians.

Table 4: Estimated Daily Total Arsenic Intakes by Pathway for each Receptor for No Remediation (Base Case) Scenario in 2010

Receptor	Total (mg/kg/d)				Mean Intake (mg/kg/d)												
					Water	Inhalation	Vegetation	Fish	Meat						Soil	Medicinal	Market
	5th	Mean	Median	95th					Moose	Caribou	Hare	Grouse	Mallard	Total		Tea	Foods
1a.Townsite - adult	5.6E-04	1.6E-03	1.3E-03	**3.5E-03**	6.3E-06	8.8E-07	1.5E-04	6.0E-04	6.1E-06	5.8E-05	3.2E-07	2.0E-05	1.2E-04	2.0E-04	5.7E-05	NA	5.6E-04
1c.Townsite - child	1.1E-03	**2.8E-03**	**2.4E-03**	**5.9E-03**	6.9E-06	1.8E-06	2.3E-04	8.9E-04	9.5E-06	9.1E-05	5.0E-07	2.9E-05	1.9E-04	3.2E-04	2.7E-04	NA	1.1E-03
2a.N'Dilo - adult	6.3E-04	**2.1E-03**	1.6E-03	**5.4E-03**	6.1E-06	9.1E-07	2.7E-05	1.3E-03	2.4E-05	3.7E-04	8.4E-07	5.8E-05	2.0E-05	4.7E-04	7.9E-06	1.1E-05	2.8E-04
2c.N'Dilo - child	1.1E-03	**3.5E-03**	**2.5E-03**	**9.0E-03**	6.9E-06	1.7E-06	4.2E-05	**2.1E-03**	4.0E-05	5.9E-04	1.4E-06	9.1E-05	3.3E-05	7.5E-04	3.9E-05	NA	5.2E-04
3a.Yellowknife - adult	3.2E-04	9.0E-04	7.7E-04	2.0E-03	5.9E-06	9.0E-07	2.4E-05	2.3E-04	6.2E-06	5.8E-05	3.0E-07	2.0E-05	2.0E-06	8.6E-05	3.4E-06	NA	5.5E-04
3c.Yellowknife - child	7.1E-04	1.6E-03	1.5E-03	**3.1E-03**	6.9E-06	1.7E-06	3.7E-05	3.5E-04	1.0E-05	9.2E-05	4.7E-07	3.0E-05	3.4E-06	1.4E-04	1.6E-05	NA	1.1E-03
4a.Dettah - adult	3.7E-04	8.6E-04	6.5E-04	**2.1E-03**	6.1E-06	9.1E-07	1.8E-05	1.3E-04	7.2E-06	3.5E-04	8.1E-07	5.7E-05	1.3E-06	4.1E-04	1.7E-06	2.2E-06	2.8E-04
4c.Dettah - child	6.7E-04	1.4E-03	1.1E-03	**3.4E-03**	6.9E-06	1.7E-06	2.7E-05	2.2E-04	1.2E-05	5.6E-04	1.4E-06	8.9E-05	2.2E-06	6.6E-04	8.4E-06	NA	5.2E-04

Receptor	Total (mg/kg/d)				Breakdown by Pathway (%)												
					Water	Inhalation	Vegetation	Fish	Meat						Soil	Medicinal	Market
	5th	Mean	Median	95th					Moose	Caribou	Hare	Grouse	Mallard	Total		Tea	Foods
1a.Townsite - adult	5.6E-04	1.6E-03	1.3E-03	**3.5E-03**	0.5%	<0.1%	11%	45%	0.5%	4%	<0.1%	1.5%	9.0%	15%	4.3%	NA	42%
1c.Townsite - child	1.1E-03	**2.8E-03**	**2.4E-03**	**5.9E-03**	0.3%	<0.1%	10%	37%	0.4%	4%	<0.1%	1.2%	7.8%	13%	11.5%	NA	45%
2a.N'Dilo - adult	6.3E-04	**2.1E-03**	1.6E-03	**5.4E-03**	0.4%	<0.1%	2%	82%	1.5%	24%	<0.1%	3.7%	1.3%	30%	0.5%	0.7%	18%
2c.N'Dilo - child	1.1E-03	**3.5E-03**	**2.5E-03**	**9.0E-03**	0.3%	<0.1%	2%	82%	1.6%	23%	<0.1%	3.6%	1.3%	29%	1.5%	NA	21%
3a.Yellowknife - adult	3.2E-04	9.0E-04	7.7E-04	2.0E-03	0.8%	0.1%	3%	29%	0.8%	7%	<0.1%	2.6%	0.3%	11%	0.4%	NA	71%
3c.Yellowknife - child	7.1E-04	1.6E-03	1.5E-03	**3.1E-03**	0.5%	0.1%	3%	24%	0.7%	6%	<0.1%	2.1%	0.2%	9%	1.1%	NA	74%
4a.Dettah - adult	3.7E-04	8.6E-04	6.5E-04	**2.1E-03**	0.9%	0.1%	3%	20%	1.1%	53%	0.1%	8.7%	0.2%	63%	0.3%	0.3%	43%
4c.Dettah - child	6.7E-04	1.4E-03	1.1E-03	**3.4E-03**	0.6%	0.2%	2%	20%	1.1%	50%	0.1%	8.0%	0.2%	60%	0.8%	NA	48%

Note: Total arsenic includes toxic organic and inorganic arsenic.

Values that are shaded and in bold exceed the Health Canada TRV.

As inorganic arsenic is known to have carcinogenic effects, risk from arsenic exposure is commonly expressed as the incremental incidence of developing cancer for a lifetime of exposure. For this assessment, a "composite person" was used to capture the exposure over a lifetime (70 years) spanning a person's childhood and adult years. Table 5 shows the lifetime risk levels for cancer calculated for the "*No Remediation (Base Case)"* scenario. The risk estimates summarized in the table include all major oral exposure pathways including ingestion of water, food and contaminated soil. The highest risk estimate is for residents on Latham Island, at 2.8 in 1000. The lowest risk estimate is persons living in Dettah at 1.1 in 1000. By comparison, the cancer risk for the overall Canadian population varies between 1.4 in 10,000 and 1.1 in 1000 (per Section 6.3.7 of Supporting Document N1). Accordingly, the risk levels associated with a "do nothing" (worst case failure scenario) would place residents in the Yellowknife study area at increased risk.

Table 5: Estimated Mean Lifetime Carcinogenic Risk for No Remediation Scenario

Receptor Location	Incremental Cancer Risk
Giant Mine Town site	2.1×10^{-3}
Latham Island	2.8×10^{-3}
City of Yellowknife Resident	1.2×10^{-3}
Dettah Community Resident	1.1×10^{-3}

Note: Cancer risk calculated for a composite individual encompassing 11 years as a child and 59 years as an adult.

Summary

In summary, failure of the frozen block method to contain arsenic trioxide in the underground chambers and stopes in combination with failure to pump and treat minewater (i.e. complete failure of operations and governance) could conceivably result in gradual release of arsenic to the environment. The consequences of such an event would be increased arsenic levels in Baker Creek and Yellowknife Bay water, increased risk of adverse effects to aquatic and terrestrial species in the lower Baker Creek watershed, and increased risk to human health of those individuals who live off the land (i.e. harvest fish and game from the study area). Environmental effects would be expected to be limited to the study area and not result in adverse consequences to the Great Slave Lake ecosystem or people living outside the immediate study area.

It should be emphasized that the preceding discussion presents the worst case "do nothing" scenario for the site which assumes no action is taken to address any environmental concerns that are detected. Such a scenario is considered to be highly improbable.

References

CCME (Canadian Council of Ministers of the Environment) 1999. *Canadian Water Quality Guidelines*. Prepared by the Task Force on Water Quality Guidelines of the Canadian Council of Ministers of the Environment. Includes updates to the original.

Health Canada 2008. *Guidelines for Drinking Water Quality Summary Table*. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water.

SENES Consultants Limited, 2002. *Tier 2 Risk Assessment for Management of Arsenic Trioxide, Giant Mine*. Prepared for Department of Indian Affairs and Northern Development. December.