

NORTH SLAVE MÉTIS ALLIANCE

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November 7, 2019

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Dear Ms. Allerston,

Re: NSMA Technical Report for the Giant Mine Water Licence (MV2007L8-0031) and Land Use Permit (MV2019X0007)

The Giant Mine Remediation Project team ("GMRP") submitted a Post-Environmental Agreement ("Post-EA") package for a Water Licence ("WL" - # MV2007L8-0031) and Land Use Permit ("LUP" - #MV2019X0007) to the Mackenzie Valley Land and Water Board ("MVLWB") on April 1, 2019. This application is for remediation and long-term legacy impacts from Giant Mine.

The North Slave Metis Alliance ("NSMA") is a signatory to the 2015 Environmental Agreement ("EA") of Giant Mine and is an intervener in the Land and Water Board's review of this Water Licence and Land Use Permit. NSMA has participated actively throughout this review process, including:

- submitting our comments on the WL and LUP Application, Plans, Closure and Reclamation and Preliminary Screening documents (May 30, 2019);
- attending the July 9-12, 2019 Technical Session; and,
- attending the September 9-12, 2019 Technical Session & Closure Criteria Workshop.

With the above in mind, NSMA is pleased to submit the attached Technical Report for WL (MV2007L8-0031) and LUP (MV2019X0007) for your consideration.

We thank you for the opportunity to provide our input into the process.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Bill Enge', is written over the typed name.

William A. Enge
President

North Slave Métis Alliance Technical Report for Giant Mine Water Licence (MV2007L8-0031) and Land Use Permit (MV2019X0007)

Submitted to:
Mackenzie Valley Land and Water Board
PO BOX 2130, 4922 – 48th Street
Yellowknife, NT X1A 2P6

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Introduction

North Slave Métis Alliance (“NSMA”) represents s.35 Aboriginal-right bearing Indigenous Métis people of the Great Slave Lake area. NSMA is the only Indigenous group in the Northwest Territories that has received judicial recognition of its members’ common law Aboriginal rights as Métis. NSMA’s very *raison d’être* is to advocate for the rights of the Métis of the Great Slave Lake area. NSMA members are a distinct constituency of the contemporary Métis collective of the Great Slave Lake area, a constituency which aspires to exercise and protect its Métis practices and customs on traditional Métis lands to the north of Great Slave Lake. The historical record is clear that the community of Métis of the Great Slave Lake area hunted and trapped over a wide-ranging area in the NWT. NSMA members continue to exercise their collectively-held, unextinguished Aboriginal rights as Métis people to the north and the south, east and west of Great Slave Lake, including in the area of Lac de Gras.

NSMA is a signatory to the 2015 Environmental Agreement (“EA”) of Giant Mine and is an intervenor in the Land and Water Board’s (“Board”) review of the Water Licence (MV2007L8-0031) and Land Use Permit (MV2019X0007).

NSMA has continued its active engagement with the project through various regulatory processes over the years, with participation in the following recent stages:

- Reviewing and commenting on the Water Licence and Land Use Permit applications to the WLWB (May 30, 2019);
- Attending the July 9-12, 2019 Technical Session; and,
- Attending the September 9-12, 2019 Technical Session & Closure Criteria Workshop.

This Technical Report reflects our remaining concerns with the proposed project, and includes the following main components:

1. Baker Creek Aquatic Effects Monitoring Plan (AEMP) – Widespread Soil and Water Contamination
2. Baker Creek AEMP – Potential Contamination at Reference Sites
3. Baker Creek Monitoring Frequency
4. Yellowknife Bay Special Study – Surface Water Monitoring Frequency
5. Impacts of Threatened Effluent and Sediment on Fish and Benthic Invertebrates
6. Modelling – Freeze Optimization Program
7. Communicating Risk to the Public
8. Pit Wall Contouring
9. Onsite Revegetation

NSMA would like to acknowledge the Giant Mine Remediation Project team’s ongoing dedication to welcoming our concerns and willingness to review any issue, big or small. We are confident that active and constructive conversations will continue to take place during the upcoming regulatory process to ensure the safety of the greater Yellowknife community.

Issue 1: Baker Creek Aquatic Effects Monitoring Plan (AEMP) – Widespread Soil and Water Contamination

Overview:

Arsenic contamination from historic mining activity at Giant Mine is documented to have reached as far as 30km from the city of Yellowknife, and within 17.5km of the mine, mainly to the northwest (Palmer, 2016). The contaminated media within these areas include soil and water. Measurements from this larger area show arsenic levels as high as 646µg/L (Palmer, 2016), which is 60 times above the federal drinking water guideline of 10µg/L. The Aquatic Effects Monitoring Plan (AEMP) for Baker Creek focuses only on discharge sites to Great Slave Lake and not on contaminant issues resulting from historical mining activities in the surrounding area.

Developer's conclusion:

Baker Creek is the primary focus of the Aquatic Effects Monitoring Plan, to “understand water quality in Baker Creek Bay and describe if it could be harmful to the benthic invertebrates and fish in the bay”. The AEMP includes two special studies: the Yellowknife Bay Special Study and the Reference Area Reconnaissance Special Study.

The Developer has restated on numerous occasions, for example in their Proponent Responses on June 25, 2019: “off-site contamination relates only to legacy impacts from historical mining activities, and any future project-related impacts that occurred off-site would be within the scope of the Water Licence” (ORS Proponent Response to NSMA – Jess Hurtubise #3 for the Post-EA Package).

NSMA's Conclusion:

NSMA is conscious of the enormity of the GMRP and its closure plan. As the Proponent explained in its responses on June 25, 2019, certain tasks, such as remediation of the entire Giant Site and certain off-site contaminated areas due to legacy activities might lead to more environmental impact than benefit through clean-up. However, as we stated in our ORS Comment #4 (Post-EA Package), NSMA believes off-site contamination should be considered under the Water Licence due to the potential risks to the public. An important albeit unofficial factor in successful remediation of the site is community trust in the safety of the site, which cannot occur if areas of contamination are ignored based on administrative boundaries.

Recommendations:

If addressing all soil contamination is too broad in scope, perhaps smaller-scale and more targeted assessments can be undertaken instead (for example, on key bodies of water in the vicinity of Giant Mine). NSMA does request the Board continue to consider off-site contamination throughout the Water Licence process. NSMA recommends additional monitoring studies on local lakes and on the aquatic biota inhabiting lakes within 30km of Yellowknife, particularly in lakes which are used for recreational activities such as fishing and swimming. Monitoring studies designed for this area should focus on the variability in water chemistry, and

the longterm fate of arsenic and other elements in these lakes and soils, their effect on biota, and their health risks to local people. That being said, the Board should consider requiring an implementation plan for risk communication to the public about the affected areas and how contamination may affect recreational activities.

Issue 2: Baker Creek AEMP - Potential Contamination of Reference Sites

Overview:

The Baker Creek AEMP includes an assessment of benthic invertebrates at reference sites for comparison with Baker Creek. However, the reference sites may be within the 17km radius that was influenced by historical mining practices, as described in Issue 1 above. Hence, the contaminated sites in this radius could be adding arsenic to the AEMP reference sites. That being said, if the purpose of the Baker Creek AEMP is solely to compare water quality results to Yellowknife Bay, then these reference sites might be appropriate. The AEMP does not explicitly state the purpose of comparison.

Developer's Conclusion:

The Developer selected locations within the Yellowknife River system (mouth, first two upstream islands, and Tartan Rapids) and the Horseshoe Island Bay as reference locations for Baker Creep AEMP monitoring. These reference areas are consistent with the previous Environmental Effects Monitoring programs. They were selected based on a multitude of characteristics, including flowing water, suitable areas for benthos surveys, varying depths, and local habitat types (AEMP, Section 6.3.1). But, the Developer acknowledges the possibility of contamination in this area: "Sediment chemistry data suggest that the Yellowknife River and farther out of Yellowknife Bay toward Horseshoe Island Bay are largely uncontaminated by the Site though some effects may still be possible." (AEMP, Section 5.4).

NSMA's Conclusion:

NSMA is concerned about comparing water quality, toxicity, and benthic invertebrate and fish health of contaminated locations to reference sites that might also be contaminated by legacy mining. If the goal of monitoring these parameters is to compare values to the Yellowknife Bay (rather than to an uncontaminated area), this comparison would be appropriate. The current version of the AEMP is unclear in regards to this goal.

Recommendations:

If the Proponent seeks to compare water quality, toxicity, and benthic invertebrate and fish health of contaminated locations in Baker Creek to reference points in Yellowknife Bay (i.e. reference sites also contaminated by Giant Mine activities), NSMA recommends that this be clarified in the AEMP. If the goal of this monitoring is to compare the aforementioned parameters to uncontaminated locations to assess improvements in water quality and overall aquatic organism

health, NSMA strongly recommends re-evaluating the reference locations within the 17km radius and potentially selecting new locations outside of this zone.

Issue 3: Baker Creek Monitoring Frequency

Overview:

The Baker Creek AEMP identifies that water will be monitored annually (AEMP, Section 6.4), as per the frequency required by the Surveillance Network Program (SNP) and in consideration of the Metal and Diamond Mining Effluent Regulations (MDMER) requirements. According to Table 1-1 of the Proposed SNP (Version 1, January 2019), Baker Creek stations 43-5 and 43-11 will have water quality tested twice monthly and monthly, respectively, during open water seasons. However, seasonal changes in temperature, precipitation, snowmelt, and water circulation patterns may alter water quality measurements.

NSMA's Conclusion:

Quarterly sampling would be more appropriate in capturing the changes in contaminant concentrations due to freshet and under ice cover, which can alter seasonally and alter influences on benthic invertebrates, fish, and water users. In addition, the extent of the effluent plume may differ seasonally.

Recommendations:

NSMA requests that water sampling be conducted quarterly to capture the influences of seasonal trends in metal and metalloid concentrations in both Baker Creek and reference areas. Also, NSMA requests that the extent of the plume be measured monthly during all open water conditions during the first year of the program to assess whether seasonal trends may influence the extent of the plume into Yellowknife Bay.

Issue 4: Yellowknife Bay Special Study - Surface Water Monitoring Frequency

Overview:

The Yellowknife Bay Special Study (AEMP – Section 7.8) indicates that surface water samples will be collected four times during the year at various locations (8) in Yellowknife Bay.

NMSA's Conclusion:

Given that these data will provide baseline/existing conditions of water quality in Yellowknife Bay prior to the relocation of the proposed effluent outfall, NSMA does not believe the proposed

monitoring frequency is sufficient for adequate representation of surface water quality baseline levels.

Recommendations:

NSMA recommends that, prior to post-development monitoring, water samples be collected monthly to establish any variability within seasons.

Issue 5: Impacts of Treated Effluent and Sediment on Fish and Benthic Invertebrates

Overview:

A recent investigation undertaken for the Environmental Effects Monitoring (EEM) program in Baker Creek identified that contaminants present in both treated effluent and sediment were likely responsible for confirmed effects on fish and benthic invertebrate communities (Golder 2017). This recent investigation is acknowledged in the Baker Creek AEMP (Section 4.2).

NSMA's Conclusion:

Based on the information listed in the Overview, fish and benthic community monitoring in Baker Creek should occur more frequently than every 3-years to ensure adequate assessment of their health and confirm decreasing contaminant and metal concentrations.

Recommendations:

NSMA requests that fish and benthic invertebrate communities be monitored annually rather than every three years in order to ensure accurate trends in fish and benthic invertebrate health. Furthermore, NSMA believes further studies should be undertaken to assess effects of contaminants in water and sediment in Baker Creek on fish and benthic invertebrates, in follow up to Golder's (2017) statement on the matter.

Issue 6: Modelling – Freeze Optimization Program

Overview:

The modelling for the freeze optimization program used a 6.1°C average increase in temperature over the next 100 years to determine the potential effects and risks of the arsenic capsule thawing (Closure and Reclamation Plan, Section 5.0.5 – “Climate Consideration”). The 6.1°C increase is based on an 8.4°C increase during winter and a 3.9°C increase during the summer months representing a localized prediction. These values were calculated and supplied by the University of Alaska Fairbanks Scenarios Network for Alaska and Arctic Planning (SNAP). This prediction seems to agree with the range of values found in Canada's Changing Climate Report 2019 (Bush

et al. 2019), which projected a median change in surface air temperature of 7.8°C and 75th percentile change in air surface temperature of 8.4°C for all three northern territories combined.

Developer's Conclusion:

The Developer stated potential impacts from the uncertainty of climate change on the freeze, noting the possibility of decreased temperature gradient that drives the thermosiphons, fewer thermosiphon operating days due to shorter winters, and warmer summers leading to quicker ground thaw (CRP, Table 5.2-3: Freeze Program Uncertainties"). The Developer states the predicted temperature increases obtained through the SNAP research sufficiently defines the degree to which climate change may impact the freeze process (i.e. the temperature gradient that the Project might have to work within over the next 100years).

NSMA's Conclusion:

While the predicted climate change numbers used in modelling for the freeze optimization study appear to be within the correct range according to present climate change models, the unpredictability of climate change impact leads to our concern about accuracy of the model. Often climate change predictions change frequently based on scenarios that appear most likely based on carbon targets, International agreements, and shifting energy demands.

Recommendations:

NSMA recommends that the optimization study be updated annually or every two years, as new climate predictions become available. Furthermore, as contamination from the capsule (if the arsenic trioxide is not adequately contained) could represent the highest risk to the environment and users of the environment, NSMA requests the Board consider requiring implementation of an action plan such that if climate models are not accurately predicting measured changes, a plan is in place to efficiently manage risks to the surrounding environment.

Issue 7: Communicating Risk to the Public

Overview:

The Closure and Reclamation Plan states that the goal of the program is to minimize public and worker health and safety risks, minimize the release of contaminants from the site to the surrounding environment, remediate the site in a manner that instills public confidence, and implement an approach that is cost-effective and robust over the long term (Section 1.2). A fence around high arsenic concentrations in bedrock, forest, and wetlands is proposed on site (CRP, Table 3.4-1), notably around the primary roaster stack.

Developer's Conclusion:

The Developer "recognizes that the presence of highly contaminated soils in the bedrock/forest/wetland terrain may have changed the risk profile of the Site from that presented in

the DAR [Developer's Assessment Report]" (GMPR Response to Reviewer Comments on June 25, 2019, Contaminated Soils Response). They deemed the increase in total volume of remediated soil to approximately 1.3M m³ to be a positive modification to the DAR and that fencing highly contaminated areas like at the roaster to be the best solution in mitigating risks to the public. Remediation of all these contaminated soils would, according to the Developer, cause more damage to the ecosystem. The GMRP acknowledges that "the risks associated with the legacy of the Giant Mine extend beyond the scope of the GMRP" (GMPR Response to Reviewer Comments on June 25, 2019, Contaminated Soils Response).

NSMA's Conclusion:

The majority of conversations revolving around risk communication on site is currently taking place in the development of the Perpetual Care Plan. NSMA is concerned about risk communication and management only taking place during the PCP development and will not be available during the water licencing stage. We believe clear measures need to be in place to ensure public safety around these contaminated areas, which were identified as not requiring remediative response through the water licence.

Recommendations:

NSMA requests that engagement take place to review: 1) the specific location of fencing on-site; 2) potential contaminated off-site locations that would most likely pose a risk to the public in future use of the site; 3) signage on fencing warning the public about the risks of contamination within the fenced area; 4) public awareness and education programs to ensure residents of Yellowknife are aware of the risks on site. This information should then be reported in the Design Report.

Issue 8: Pit Wall Contouring

Overview:

During the Reviewer Comment period for the Giant Mine Remediation Project Post-Environmental Assessment Information Package (MV2007L8-0031) in May 2019, NSMA stated its request to prevent any broadening of the Giant Mine footprint by preventing further blasting of the pit walls for contouring. The Developer proposed the contouring of pit walls A1 and A2 in Section 5.3.5.3 ("Remnant Pit High Wall Re-contouring") to "mitigate the risk of instability in these slopes" as well as have borrow material.

Developer's Conclusion:

In their Proponent Response, the Developer stated that the Project's key objective is "reduced risk to the public associated with historically mined pit walls, such as the risk of fatality from an uncontrolled rock fall" (June 25, 2019). According to the Developer, the current state of the highwalls at A1 and A2 are a safety hazard and require re-contouring. A current ratio of 2H:1V and 5H:1V cutbacks is planned within the CRP.

The Developer affirmed that further borrow design is ongoing. Discussions regarding borrow design and source of borrow material have been taking place between NSMA and the Developer during informal conversations since June. The Developer plans to engage on borrow source development in late 2019, at which time the Giant Mine Remediation Project will consider concerns.

NSMA's Conclusion:

NSMA appreciates and acknowledges the efforts the Developer has provided to us as well as other parties in regards to concerns on further modifications to pit walls. It is our understanding that the GMRP is currently considering new locations for borrow material (that are not pit walls) as well as the possibility of different re-contouring methods that are not as extensive as those first proposed in the CRP, while still keeping safety as a top priority.

Recommendations:

Given that engagement for borrow will only begin in Dec 2019, after the Intervenor period for the Water Licence process, NSMA requests that the Board require the Developer to summarize the new considerations for pit wall re-contouring, potential new borrow material sites, and if a preferred course of action has been selected.

Issue 9: Onsite Revegetation

Overview:

During Reviewer Comment period in May 2019, NSMA stated its recommendation for the Proponent to consider areas of possible revegetation to prevent further landscape changes and loss of habitat (Post-EA Package, NSMA Comment #1). Table 4-4 of the Post EA Information Package states that "where soils are removed down to bedrock, fill materials will not be replaced to minimize issues with erosion and sedimentation as well as pooling of runoff water". The NSMA is concerned this will lead to landscape changes and loss of wildlife habitat, as well as impact the long-term aesthetic of the site.

Developer's Conclusion:

In its response (June 25, 2019), the Developer stated "Active stabilization using vegetation is planned for possible locations like steep slopes near the Townsite to prevent erosion of new material into Yellowknife Bay, or remediation of fine grained borrow sources. Species have not been chosen but native species will be chosen and input from affected parties considered. Active stabilization is planned at borrow locations where there are remaining exposed fine-grained sediments to prevent erosion of material with vegetation being the preferred method."

NSMA's Conclusion:

Revegetation of the Giant Mine site will play a crucial role in shaping potential future use of the site as well as the general aesthetics of the area. A reoccurring theme that has come up throughout the Water Licence review and other Giant Mine engagements, such as Quantitative Risk Assessment and now the Perpetual Care Plan, is the historical and anticipated feelings for the Giant Mine site – how Yellowknife residents will feel about the site once remediation is completed. The Developer has been clear in stating their interest in understanding the NSMA's current feelings towards the site, how (or if) remediation will foster trust in occupying or using the site, and do they feel like safety protocols are in place in the event of an emergency. Part of that perception will come with the overall look of the site post-closure, including the tactics for revegetation.

Engagement with Indigenous organizations and local communities on course of action for revegetation have taken place in other mine closure plans, such as the Environmental Assessment and Closure Plan for Diavik. Just this past fall (2019), NSMA provided input on preferred areas for revegetation on the Diavik site through community engagement as well as through the Diavik Traditional Knowledge Panel. NSMA members have extensive knowledge in regards to native species of the area and should be asked to provide input on the proposed revegetation site, be it to help with habitat reconstruction or aesthetics of the site.

Recommendation:

NSMA recommends that the Board require the Developer hold an engagement period with signatories on the possible locations for revegetation as well as proposed revegetation species.

Summary of Recommendations

- NSMA recommends additional monitoring studies on local lakes and on the aquatic biota that live in lakes within 30km of Yellowknife, notably if these lakes are used for recreational activities such as fishing and swimming. The Board should consider requiring an implementation plan for risk communication to the public about this affected area and how contamination affects recreational activities.
- NSMA asks that the Proponent clarify whether the Baker Creek AEMP seeks to compare water quality, toxicity, and benthic invertebrate and fish health of contaminated locations in Baker Creek to reference points in Yellowknife Bay (also contaminated); if not, new reference points should be identified.
- NSMA requests that water sampling be conducted and that the extent of the plume be measured monthly during all open water conditions during the first year of the program.
- NSMA recommends that, prior to post-development monitoring, water samples be collected monthly to establish any variability within seasons.
- NSMA requests that fish and benthic invertebrate communities be monitored annually rather than every three years in order to ensure accurate trends in fish and benthic invertebrate health are documented. NSMA also believes further studies should be undertaken to assess effects of contaminants in water and sediment in Baker Creek on fish and benthic invertebrates.
- NSMA recommends that the optimization study be updated annually or every two years, as new climate predictions become available. NSMA also requests the Board consider requiring implementation of an action plan such that if climate models are not accurately predicting measured changes, a plan is in place to efficiently manage risks to the surrounding environment.
- NSMA requests that engagement take place to review: 1) the specific location of fencing on-site; 2) potential contaminated off-site locations that would most likely pose a risk to the public in future use of the site; 3) signage on fencing warning the public about the risks of contamination within the fenced area; 4) public awareness and education programs to ensure residents of Yellowknife are aware of the risks on site. This information should then be reported in the Design Report.
- NSMA requests that the Board require the Developer to summarize the new considerations for pit wall re-contouring, potential new borrow material sites, and if a preferred course of action has been selected.
- NSMA recommends that the Board require the Developer hold an engagement period with signatories on the possible locations for revegetation as well as proposed revegetation species.

References

Bush, E., Lemmen, D.S. (editors) 2019. Canada's Changing Climate Report. Government of Canada, Ottawa, ON 444p.

Enge v. Canada, 2017 FC 932, para. 102

Enge v. Canada, 2017 FC 932, para. 197

Enge. v. Mandeville, 2013 NWTSC 33, paras. 191-192, 218, 233; *Enge v. Canada*, 2017 FC 932, para. 20

Golder. 2017. Giant Mine Environmental Effects Monitoring Phase 5 Final Interpretative Report. Prepared for Indigenous and Northern Affairs Canada – Giant Mine Remediation Project, Yellowknife, NWT, Canada. 108p. + appendices.

Palmer, M.J., Galloway, J.M., Jamieson, H.E., Patterson, R.T., Falck, H. and Kokelj, S.V. 2016. The concentration of arsenic in lake waters of the Yellowknife area. NWT Open File 2015-06.