

Response to a Proposal to Amend the Metal Mining Effluent
Regulation (MMER) for the Sisson Mine Project
Nashwaak Watershed Association Incorporated



Preamble

The long term goal of the Nashwaak Watershed Association Inc. (Nwai) is to manage the Nashwaak watershed as a healthy ecosystem that balances a variety of economic, recreational, social, and landowner interests so that it will serve the community while maintaining a healthy resource for generations to come. We strive towards this goal so that eventually:

- healthy natural areas are protected and expanded through acquisition and restoration projects;
- the Nashwaak River and its tributaries are green corridors that connect to forested upland;
- pollution sources are addressed and reduced;
- native fish species thrive and salmon return in greater numbers; and
- the Nashwaak River becomes a role model for how people, wildlife, and the river can live together in harmony.

According to the Water Classification Regulation of New Brunswick's *Clean Water Act*, the Nashwaak River meets all of the criteria of an "A Class" waterway, which would preclude any activity that results in a degradation of water quality. The fact that successive Ministers of Environment have failed to classify the Nashwaak over the past 16 years (criticized by the Provincial Ombudsman in 2014) does not alter the scientific facts of the pristine quality of the upper Nashwaak, where the proposed mine will be located. Federal, provincial, and local governments all have an ethical obligation to protect the natural environment on behalf of all citizens, current and future.

Assessment of Alternatives for Mine Waste Disposal

According to information provided by Environment and Climate Change Canada, the proponent must "identify *all potential options* for waste disposal, *including one that does not use fish frequented waters*" (emphasis added). The Nwai is not satisfied that this was done adequately. The determination of options to be "fatally flawed" was done far too early in the process to allow a genuine and meaningful assessment of alternatives, resulting in a process that only assessed one tailings management technology in two very similar locations.

Technology

The proponent supposedly assessed three alternative technologies for the management of their potentially acid-generating materials: conventional slurry tailings; thickened (paste) tailings; and filtered tailings. The first two of these possible technologies were ruled out as "fatally flawed" in the very first step of the process, on the grounds that they cannot effectively prevent the onset of acidic conditions, leaving as the only rigorously assessed option the sub-aqueous storage of conventional slurry tailings in a very large Tailings Storage Facility (TSF).

In the past 20 years, however, considerable technological advances have been made in the environmentally responsible management of mine wastes, as mining companies worldwide take seriously their long-term environmental responsibilities in light of rapidly decreasing public confidence in the mining industry. The proponent's plan for the Sisson Mine does not "objectively and rigorously consider all available options for mine waste disposal", which was one of their own stated objectives under the MMER process. If they had, the public would have seen an assessment of the following relatively new options for mine waste management and disposal:

- Cemented Paste Backfill (Ercikdi et al. 2017, Wu et al. 2014, Benzaazoua et al. 2004)
- stabilization and solidification (Nehdi & Tariq 2007)
- Central Thickened Discharge (Fitton 2017, Jewell 2010)
- Down Valley Discharge (Fitton 2017)
- evapotranspiration cover/engineered bioreactor system (Higgins 2014)
- soil cover systems (MEND 2004, INAP 2017)

The fact that new emerging technologies for environmentally-responsible management of acid generating waste materials has not even been mentioned by the proponent in their alternatives assessment suggests strongly that they are not committed to a rigorous determination of Best Available Technology (BAT) in order to develop a world-class mining facility which minimizes potentially adverse impacts on the environment.

Additionally, the proponent is planning to construct their Tailings Storage Facility using a centreline dam design, rather than a demonstrably more stable (albeit more expensive) downstream design—again demonstrating a commitment to cost reduction rather than Best Available Technology.

The proposed TSF will be unlined, which means that seepage into the groundwater will be an ongoing problem. Gowan et. al state that that:

Seepage is likely from all deposited slurried tailings, even after consolidation... For this reason many jurisdictions now require the TSF to be lined using either a natural clay or a geomembrane. However, there is no such thing as a 'leak-proof' liner, and hence no such thing as a leak-proof TSF (2010: 394).

Management of seepage is proposed to be through the use of "several" water management ponds, and an unknown number of groundwater monitoring wells and groundwater interception (pump-back) wells during operation. We must assume that additional facilities to manage seepage will need to be designed and constructed at taxpayers' expense after the mine concludes its operations.

Given enormous size, and associated enormous potential problems, of the proposed Tailings Storage Facility, the NWA strongly recommends an objective, third-party "peer review" of this component of the project, to determine as neutrally and scientifically as possible whether what is being proposed is actually the Best Available Technology for this particular mine.



Location

According to ECCC, the proponent was to identify at least one option for mine waste disposal that does not use fish frequented waters. By their own admission, the proponent could not do this.

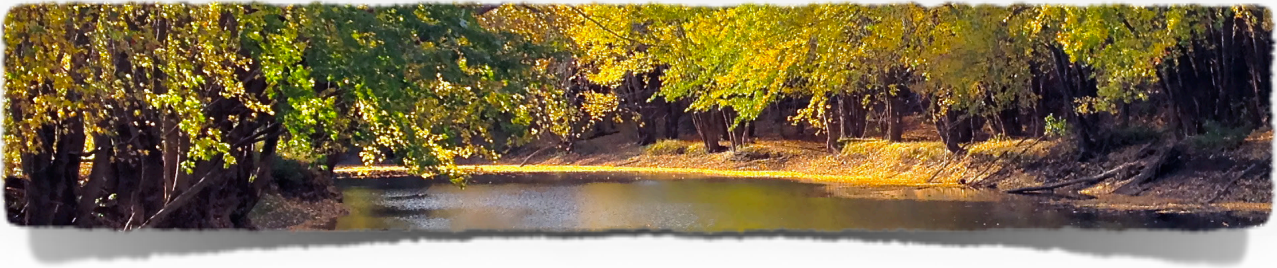
The proponent identified three “fatally flawed” locations of the five sites considered, in that those three sites covered lakes. The proponent correctly indicated that, under the Water Classification Regulation of the Clean Water Act, lakes are protected. We must emphasize, however, that the upper Nashwaak River also meets water quality standards that merit protection under this regulation. Successive New Brunswick governments have claimed that the Water Classification Regulation is legally unenforceable, but the protection of lakes on the one hand, and the exclusion of the upper Nashwaak River under the same regulation on the other, appears to be contradictory and an environmental double-standard.

Immediately ruling out two possible waste management technologies and three possible sites as “fatally flawed” has resulted in an alternatives assessment exercise that lacks the rigour and objectivity that the MMER amendment process requires, and is effectively a useless exercise. The MMER amendment process is designed to assure the taxpaying public that the mineral extraction industry takes its environmental responsibilities seriously and gives detailed consideration to technologies and locations that may be superior, if more costly. The public has been provided with a rigorous assessment of only two options that are not very different from one another, demonstrating that the alternatives assessment process has not yielded the results for which it was designed.

Loss of Fish-Bearing Habitat

Although the ECCC presentation at the public meeting in Stanley, N.B. indicated that “Sisson Partnership is proposing to use portions of Bird Brook and a tributary to West Branch Napodogan Brook for the disposal of mine waste”, in fact the project as a whole will also directly impact Sisson Brook and McBean Brook. Therefore, the public is being asked to accept the loss of four fish-bearing streams for the mine site alone, as well as a potential negative impact on the Nashwaak as a whole.

The mandate of the Nashwaak Watershed Association Inc. includes the protection of healthy natural areas, the reduction of pollution sources, and support for native fish species. More specifically, our position on resource development advocates “closed loop” projects that return the ecosystem back to the same healthy state with which they began. Given that the proposed Sisson Mine will result in the direct destruction of four fish-bearing streams, the potential degradation of the main branch of the Nashwaak itself, and the creation of a huge and permanent tailings pond containing acid-generating mine waste, the NWAI cannot support the project as proposed.



Proposed Fish Habitat Compensation Plan

The proposed plan for offsetting the loss of fish habitat uses only the project footprint itself, and does not consider the likely downstream consequences for fish-bearing habitat over a much broader area. The proponent has not provided a single credible example of any Tailings Storage Facility anywhere in the world, to say nothing of one of the largest TSFs in Canada, that has NOT resulted in the degradation of downstream water quality. The vast majority of aquatic wildlife biologists would concur with this assessment.

The proponent has identified the direct loss of a total of 366 “fish habitat units”, each of which corresponds to 100m² of surface area. The only indirect losses acknowledged by the proponent are 178 “fish habitat units” relating to flow reduction, rather than possible water contamination through spills, seepage, or problems with water treatment. Using a 3:1 ratio, these 544 “fish habitat units” yield a total of 1632 units for compensation.

To compensate for the loss of fish habitat, the company proposes to remove a culvert that it claims affects fish passage into Nashwaak Lake. They have admitted publicly that they have not actually done any kind of study to determine if the culvert in question is actually a barrier to fish passage. It is our

opinion that DFO must insist that a scientific study of barriers to fish passage into Nashwaak Lake needs to be conducted, or its habitat offsetting plan has no credibility.

The company estimates that the opening up of Nashwaak Lake would generate an offsetting credit of 2859 fish habitat units, stating that it is more than five times what is required for the Sisson Project. However, given that the Sisson Project threatens the viability of the entire upper Nashwaak River because of potential problems with seepage into groundwater, acid-generating dust in snow melt, possible technical or human error in the water treatment plant, and of course a partial or complete collapse of the TSF itself, it is clear that an exponentially larger area of fish habitat must be considered for habitat offsetting.

Water Treatment

In their review of water treatment associated with the Sisson Mine, done on behalf of the New Brunswick Department of Energy and Mines, AMEC identified several problems in the costing and methods of water treatment proposed by the company (AMEC 2015). AMEC determined that a variety of costs seem to have been under-estimated, including the capital cost of the Reclaim Water Clarification Plant, as well as the annual operating cost of the Ferric Co-Precipitation Plant. Several discrepancies were noted in the ongoing water treatment costs associated with closure and reclamation, and AMEC also noted that the proposed water treatment technology has been known to fail and may not be feasible for this project.

The proponent itself admits that water treatment may be required “in perpetuity”, although the total life span of the mine is only 27 years. It also admits that the mine tailings will be stored sub-aqueously in an enormous tailings pond “in perpetuity”.

This means that, during operation, technical or human error associated with water treatment may result in the discharge of untreated waste water into tributaries of the Nashwaak River; post-closure, those risks will certainly be increased without permanent, ongoing staff working on-site to monitor seepage, water quality, and the mechanical integrity of the water treatment plant itself. The NWAI cannot accept any resource development project that leaves in its wake a potential environmental problem for future generations of New Brunswickers to manage.



Financial Securities Plan and Bonding

During the only public meeting at which representatives of the Sisson Partnership were present, in Stanley, N.B. in March 2018, the proponent admitted that it had not provided its Financial Securities Plan to the Department of Environment and Local Government. Condition #16 of the “Conditions of Environmental Impact Assessment Approval, Sisson Mine Project” clearly states that this Financial Securities Plan is required within six months of EIA approval.

Needless to say, it is extremely disappointing that both the Sisson Partnership and DELG have allowed this violation of the EIA Conditions of Approval in this very early stage of the approvals process. New Brunswickers have a right to know exactly how the proponent plans to provide adequate funding in a timely manner for reclamation and water treatment costs; the fact that the FSP has not been forthcoming makes it much harder for citizens to trust the proponent to operate its mine correctly, and also to trust the New Brunswick government to insist on its own conditions and to provide adequate oversight.

It is impossible for the public to provide fully informed consent as part of the MMER amendment process without seeing the Financial Securities Plan. If reclamation and post-closure bonding are inadequate, that will have a direct impact on how effectively the Tailings Storage Facility can be maintained, how well seepage from the TSF can be detected and corrected, and how well and for how long the water treatment plant can be operated. If any of these systems fail during the long afterlife of the Sisson Mine, it will have a direct and serious impact on fish-bearing habitat all along the upper Nashwaak River. The NWAI, therefore, cannot recommend that DFO allow an amendment to the MMER until the Financial Securities Plan has been released to the public.

Corporate Structure and Instability of Commodity Prices

Hunter Dickinson Inc. (HDI), the parent company of the Sisson partnership, has a history of questionable and unprofitable mining ventures that, when combined with instability in global tungsten and molybdenum prices, creates a situation in which the citizens of New Brunswick are being asked to accept a proposed mine that may pose an environmental risk. HDI has been associated with numerous mines that have not proven to be profitable in the long-run, and HDI-associated companies frequently operate at a loss. The Sisson Mine is proposed for an ore deposit of very low quality (0.067% for WO₃, 0.021% for Mb) compared to other mines around the world, generating a large amount of mining waste for a relatively small amount of product, which will contribute further to the economic marginality of this venture. Additionally, the global price of these minerals is not robust and stable enough to guarantee the financial viability of the mine.

This is directly relevant to the MMER amendment process because of the potential adverse impact on downstream fish habitat. The monitoring and maintenance of the extremely large TSF, wells and pump-back facilities to detect and correct seepage, and effective water treatment must all be done to a world-class standard to protect fish habitat and the environment generally. Financial instability compromises all of these processes, leaving the environment vulnerable and New Brunswick taxpayers potentially responsible for dealing with resulting environmental problems.

Lack of TSF Failure Modelling

Condition #26 of the “Conditions of EIA Approval” stipulates that “the proponent must provide TSF Failure Modelling conducted by a qualified third party for the final engineered design and for each approved lift of the TSF structure”. This condition has not been met, and it is unreasonable for DFO to expect the public to approve an MMER amendment without seeing modelling of a catastrophic failure of the TSF.

Numerous tailings dam accidents have occurred globally over the past several decades, all of which have resulted in environmental destruction, as well as the loss of human life (Ercidki et al. 2017: 7-8). The WISE Uranium Project lists a total of 111 major tailings dam failures since 1960, 10 of which have occurred since the 2014 Mount Polley Disaster (<http://www.wise-uranium.org/mdaf.html>). These are facts that clearly undermine the proponent’s estimate of a TSF failure as 1-in-1 million to 1-in-10 million. TSF failures demonstrably do occur at rates far higher than the proponent is willing to admit. This is especially true given the volatility of the global prices of commodities like tungsten: a drop in global tungsten prices may very easily lead to the periodic or permanent closure of the Sisson Mine, with the company in liquidation, and insufficient funds available for site maintenance.

Therefore, the NWA cannot endorse DFO granting an MMER amendment in the absence of objective, third-party TSF Failure Modelling, given that a serious TSF failure would result in the irreversible environmental degradation of the entire Nashwaak River.

Social Licence to Operate

The mining industry worldwide has recognized that it suffers from widespread distrust by the public, and as a result forward-thinking mining companies have embraced the concept of “social licence to operate” (Owen & Kemp 2013). As part of the larger concept of corporate social responsibility, social licence to operate is every bit as important to the success of any mineral extraction project as any financial, geological, or technological aspect. The Sisson Partnership must demonstrate very high levels of genuine consultation and ongoing accountability to various stakeholders, such as indigenous communities, recreational users, downstream landowners, and the general public. This is especially the case as the proposed mine site is located on Crown land: Crown lands are common property resources for all New Brunswickers and Canadians to share, and we rely upon our various governments to manage them well on our behalf. Citizens are co-owners of Crown lands, and governments are trustees (Toner 2014). Mining companies are neither, which means that a clear and unequivocal public mandate is required for any resource extraction project. The enormous scope of the Sisson Mine makes the issue of social licence to operate even more pressing.

It was obvious at the MMER public meeting in Stanley, N.B. that the Sisson Partnership has not achieved social licence to operate. To the best of our knowledge, this was the very first time that representatives of the company had





made themselves available to the general public to answer questions and address concerns. It was clear that residents of the Nashwaak watershed have a great many concerns about the proposed mine, the various government approvals processes, and transparency from the proponent on a range of issues. It was also clear that they value the Nashwaak as a pristine river system more highly than economic development at any cost.

New Brunswickers deserve better. We should not be forced to choose between economic development and environmental stewardship. For better or worse, this MMER process has become the main context in which the public is able to express its serious concerns about the Sisson Mine. As a result, DFO must seriously consider whether the Sisson Partnership has truly achieved the uncoerced, informed consent of the people of New Brunswick before allowing an MMER amendment.

Conclusions

To conclude, the Nashwaak Watershed Association Incorporated must recommend AGAINST granting an amendment under Schedule 2 of the Metal Mining Effluent Regulation of the *Fisheries Act*. Our concerns include:

- the upper Nashwaak River meets the standards of an A Class waterway under the Water Classification Regulation of the *Clean Water Act*, and therefore activities should not be allowed that degrade water quality
- alternate technologies for the storage and treatment of mining waste have not been considered in an objective and rigorous manner, and two alternative technologies were determined to be “fatally flawed” far too early in the process
- the options assessment process by the proponent is flawed by virtue of the fact that only two, very similar options were assessed in detail
- an objective third-party “peer review” of the proposed technologies and procedures for waste management needs to be conducted to guarantee that they represent the Best Available Technology for this particular mine
- any loss of fish-bearing habitat is a serious matter that runs counter to our policy of “closed loop” projects
- the offsetting plan for the loss of fish-bearing habitat does not consider any downstream effects of the mine, such as seepage or problems with water treatment

- the offsetting plan for the loss of fish habitat proposes to correct a problem that has not been demonstrated to exist (i.e., fish passage into Nashwaak Lake)
- an independent study of fish passage problems into Nashwaak Lake must be conducted before DFO can reasonably accept the proponent's fish habitat compensation plan
- an independent review of the proposed water treatment and reclamation plans have determined them to be underfunded and technologically problematic
- the Financial Securities Plan was not provided to DELG to meet with one of the EIA Conditions of Approval ; without the FSP, New Brunswickers cannot assess the validity of the proponent's water treatment and reclamation plans
- the proponent has not provided TSF Failure Modelling, without which New Brunswickers cannot assess the complete possible impact of the mine on fish-bearing habitat
- the proponent has not demonstrated that it has achieved social licence to operate, which shows that there remains a lack of trust between the proponent and the public



References Cited

- AMEC 2015. Review of Reclamation and Water Treatment Costs, Sisson Brook Mine, New Brunswick: Final Report. Prepared for New Brunswick Department of Energy and Mines.
- Benzaazoua, M., Perez, P., Belem, T., and M. Fall. Proceedings of the 8th Minefill Symposium, Beijing, China, 2004, 180-92.
- Ercidki, B., Cihangir, F., Kesimal, A., and H. Deveci. 2017. Practical Importance of Tailings for Cemented Paste Backfill. In E. Yilmaz & M. Fall (eds.), *Paste Tailings Management*. Springer International Publishing.
- Higgins, J. 2014. An Alternative to Water-Covered Mine Tailings Areas. *Environmental Science and Engineering Magazine* (September/October 2014): 44-7.
- Gowan, M., Lee, M., and D.J. Williams. 2010. Co-Disposal Techniques that may Minimize Risks Associated with Storage and Management of Potentially Acid Generating Wastes. In A.B. Fourie & R.J. Jewell (eds.), *Mine Waste 2010*, 389-404. Perth: Australian Centre for Geomechanics.
- International Network for Acid Protection (INAP) 2017. Global Cover System Design: Technical Guidance Document.
- Jewell, R. 2010. The Evolution of Paste and Thickened Tailings. *Australian Centre for Geomechanics Newsletter* 35: 1-3.
- MEND 2004. Design, Construction, and Performance Monitoring of Cover Systems for Waste Rock and Tailings.
- Nehdi, M. and A. Tariq. 2007. Stabilization of Sulphidic Mine Tailings for Prevention of Metal Release and Acid Drainage Using Cementitious Materials: A Review. *Journal of Environmental Engineering Science* 6: 423-36.
- Owen, J. and D. Kemp. 2013. Social Licence and Mining: A Critical Perspective. *Resources Policy* 38(1): 29-35.
- Toner, P.G. 2014. Public Property and the Public Trust in New Brunswick. *Journal of New Brunswick Studies* 5: 9-14.
- Wu, A.X., Miao, X.X., Wang, H.J., Jiao, H.Z., and Y.M. Wang. 2014. The Application of the Cemented Thickened/Paste Tailings Backfill with Large Flow Capacity in Chinese Iron Mines. In Y. Potvin & A.G. Grice (eds.), *Mine Fill 2014*, 473-80. Perth: Australian Centre for Geomechanics.
- Yilmaz, E. 2011. Advances in Reducing Large Volumes of Environmentally Harmful Mine Waste Rocks and Tailings. *Gospodarka Surowcami Mineralnymi* 27(2): 89-112.



THE
Nashwaak Watershed
ASSOCIATION