Agence d'évaluation d'impact du Canada
Impact Assessment Agency of Canada

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January 13, 2022

Craig Hudson
Atlantic Mining NS Inc.
409 Billybell Way, Mooseland
Middle Musquodoboit, NS B0N 1X0

SUBJECT: Beaver Dam Mine Project – Information Requirements (Round 3)

Dear Craig Hudson:

The Impact Assessment Agency of Canada (the Agency) has completed its technical review of the Round 2 Information Requirement (IR) responses and the revised Environmental Impact Statement (EIS) and associated EIS Summary for the proposed Beaver Dam Mine Project (the Project).

The Agency has determined that additional information is required, as per the IRs attached. Due to the overlap with the material submitted for the Fifteen Mile Stream Gold Project, the Agency has reissued the IRs from Fifteen Mile Stream that relate to the deposition of tailings at the Touquoy Mine Site in Table 2 to ensure consistency in the responses between the two projects.

With the issuance of these IRs, the federal timeline within which the Minister of Environment and Climate Change must make a decision is paused as of January 13, 2022. Once Atlantic Mining NS Inc. submits responses to all the IRs, the Agency will determine if the information provided is complete and the timeline for the environmental assessment will resume. For further information, please consult the Agency document on Information Requests and Timelines: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/information-requests-timelines.html

The responses to IRs may be in a format of your choice; however, the format must be such that the responses to individual IRs can be easily identified. You may wish to discuss certain IRs with the Agency or other government experts, as necessary, to obtain clarification or additional information, prior to submission of the responses. Working directly with government experts in this manner will help to ensure that IRs are responded to satisfactorily. The Agency can assist in arranging meetings with government experts, at your request.

The Agency is still considering the need to issue additional IRs related to fish and fish habitat and the current use of lands by the Mi'kmaq of Nova Scotia. Based on input from DFO and others, concerns remain about the Project's impacts to fish and fish habitat. In particular, Atlantic Mining NS Inc. is advised to review the advice from DFO to the Agency available at the following link (https://registrydocumentsprd.blob.core.windows.net/commentsblob/project-80111/comment-56650/15-HMAR-00463%20-%20Beaver%20Dam%20Project%20-%20DFO%20Tech%20Review%20comments_Redacted.pdf).

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Key concerns raised include flow reductions, decreased water quality, sedimentation and inadequate offsetting.

Concerns also remain regarding the potential impacts to current use of lands and resources by the Mi'kmaq of Nova Scotia, particularly by members of Millbrook First Nation. Atlantic Mining NS Inc. is advised to review the advice from Millbrook First Nation to the Agency available at the following link (https://registrydocumentsprd.blob.core.windows.net/commentsblob/project-80111/comment-56713/MFN%20-%20Beaver%20Dam%20IRs%20-%20Dec172021.pdf).

Should no further IRs be issued, the Agency will prepare its draft Environmental Assessment Report based on the information provided by Atlantic Mining NS Inc., advice from Fisheries and Oceans Canada, the Mi'kmaq of Nova Scotia, and other comments received during the public comment period.

The IRs and your responses will be made public on the Canadian Impact Assessment Registry Internet site: https://iaac-aeic.gc.ca/050/evaluations/proj/80152.

Please confirm receipt of this message and contact me if you require further information.

Sincerely,

Kathryn MacCarthy, Ph.D., P.Geo.

Project Manager, Impact Assessment Agency

Atlantic Region

Cc: Suzanne Wade, Stephen Zwicker & Michael Hingston - Environment and Climate Change Canada

Christopher Burbidge & Matthew Baker - Fisheries and Oceans Canada

Shelley Ball - Natural Resources Canada

Jason Flanagan - Transport Canada

Joel Kaushansky & Beverly Ramos-Casey - Health Canada

Bridget Tutty – NS Environment and Climate Change

Attachment 1 - Beaver Dam Mine Project Information Requirements (Round 3) from the Environmental Impact Statement Review

Attachment 1: Beaver Dam Mine Project
Information Requirements (Round 3) from the Environmental Impact Statement Review:
January 12, 2022

INTRODUCTION

The Impact Assessment Agency of Canada (the Agency) is completing its technical review of the Environmental Impact Statement (EIS) and associated EIS Summary for the proposed Beaver Dam Mine Project. The Agency's review is supported by submissions from government experts, the Mi'kmaq of Nova Scotia, and the public. The Agency determined that information is required, as per the information requirements (IRs) below.

ACRONYMS AND SHORT FORMS

Agency	Impact Assessment Agency of Canada
ARD	acid rock drainage
CAAQS	Canadian Ambient Air Quality Standards
CaNP	carbonate neutralization potential
CCME	Canadian Council of Ministers of the Environment
COPC	chemical of potential concern
DAL	Dalhousie University
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EAC	Ecology Action Centre
ECCC	Environment and Climate Change Canada
ECEL	East Coast Environmental Law
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EQS	environmental quality standards
ESFW	Eastern Shore Forest Watch Association
GHG	greenhouse gas
HC	Health Canada
INAP	International Network on Acid Prevention
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office
MEND	Mine Environment Neutral Drainage
ML/ARD	metal leaching and acid rock drainage

NCNS	Native Council of Nova Scotia
NO2	nitrogen dioxide
NRCan	Natural Resources Canada
PAG	potentially acid generating
PM	particulate matter
ROM	run of mine
SC	Save Caribou
SO2	sulfur dioxide
SOCI	Species of Conservation Interest
SuNNS	Sustainable Northern Nova Scotia
TIC	total inorganic carbon
UW	University of Waterloo's Environmental Assessment Review Society
WC	watercourse

TABLE 1: INFORMATION REQUIREMENTS FOR THE BEAVER DAM MINE PROJECT – ROUND 3

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
Alternative Means of Carrying out the Project					
IR 3-01	IAAC Public ECEL ESFWA EAC KMKNO	Section 2.2 Alternative Means of Carrying out the Project	Section 2.7.4 Touquoy Mine Site Section 2.10.10.2	The EIS Guidelines require the consideration of mine waste disposal alternatives. The EIS refers to the 2007 Environmental Assessment Registration Document submitted to the Province to obtain provincial approval of the Touquoy project. However, the 2007 submission indicated that tailings would be managed in an onsite Tailings Management Facility and did not evaluate the disposal of tailings (from any mine) within the exhausted open pit. The storage of waste rock and tailings in the Touquoy pit is proposed under a new provincial environmental assessment and on September 8, 2021, the Nova Scotia Minister of Environment and Climate Change decided that the submission was insufficient and additional information is required to evaluate the potential environmental effects. The alternatives assessment for mine waste management for Beaver Dam assesses three options for tailings depositions: Touquoy Open Pit, Touquoy Tailings Management Facility, and Beaver Dam Tailings Management. The Touquoy Tailings Management Facility is ruled out as "*not considered to be favourable economically, technically or environmentally*" due to it not having the capacity to store the tailings under the approved design. The Beaver Dam Tailings Management scenario is similarly ruled out as "*not considered to be favourable economically, technically or environmentally"* as mineral processing would occur at Touquoy and it is not considered economically or environmentally feasible for tailings to be transported back to the Beaver Dam Mine Site following processing. As waste rock and tailings disposal in the Touquoy Open Pit has not been approved by the province at this time, nor are the conditions known under which it could potentially be approved, it is not certain that this is a technically feasible option. A technically, environmentally, and economically feasible alternative for mine waste disposal is required to assess the effects of the Project.	a) Update the effects assessment of Beaver Dam tailings disposal based on the outcome of the provincial environmental assessment. If the deposition of tailings in the Touquoy Open Pit is approved, update the environmental effects predictions based on the information provided to obtain approval. If deposition of the tailings in the Touquoy Open Pit is not approved, provide technically, economically and environmentally feasible alternatives for tailings management and assess the environmental effects of each feasible alternative.
Atmospheric Environment					
IR 3-02	HC	Section 6.1.1 Atmospheric Environment Section 6.2.1 Changes to the atmospheric environment	EIS Section 6.2.2 Pg. 295 PDF Appendix C-2 HHRA Section 2.5, 2.7 Pg. 17, 19, 20 PDF Appendix C-1 Air Emissions Assessment Technical Report Section 6 Pg. 17 PDF	The EIS Guidelines require a description of the results of a baseline survey of ambient air quality, including volatile organic compounds (VOCs), and associated predicted changes in air quality. Throughout the EIS, Human Health Risk Assessment (HHRA), and the Air Emissions Assessment Technical Report, the term "*total VOCs*" is used without an explanation as to which specific VOCs are included in this category. Subsequently, there is uncertainty as to how the statement that "*VOCs were concluded to be insignificant at this site, and hence are not further evaluated*..." could be determined, since neither the specific VOCs were identified and there are no specific "...*air quality criteria for total VOCs*". This information is required to assess the potential effects from changes to air quality.	a) Identify all VOCs included in the category of "total VOCs". b) Provide baseline and predicted future concentrations of individual VOCs during all project phases, as well as comparisons to applicable human health based guidelines to validate the conclusion that these substances are 'insignificant' in terms of human health risks.
IR 3-03	HC	Section 6.1.1 Atmospheric environment Section 6.2.1 Changes to the atmospheric environment	Appendix C-1 Air Emissions Assessment Technical Report Section 2, Pg. 9 PDF	The EIS Guidelines require the prediction of changes to the atmospheric environment. According to the Air Emissions Assessment Technical Report, *"[t]he operational phase is anticipated to be of longer duration (5 years) than the construction phase (1 year), and the number of vehicles, extraction rates, and material processing rates will be higher during operations than during construction*". Consequently, the operations phase "...*represents the worst case for air emissions*" and therefore only emissions for this time period were assessed. No additional scientific evidence beyond this was identified to justify the assessment of only the operations phase. This information is required to predict potential effects from changes to air quality.	a) Provide air emission estimates for all identified potential air pollutants (including metals) for all project phases (e.g., construction, operation, decommissioning, and abandonment). Different phases may involve different activities, which might warrant separate assessment. Alternatively, provide supporting evidence that the types of activities in other phases are similar to the operations phase, such that the operations phase represents the worst-case scenario.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR 3-04	HC	Section 6.2.1 Changes to the atmospheric environment	Appendix C-1 Air Emissions Assessment Technical Report Section 6.3, Pg. 17 PDF	The EIS Guidelines require the prediction of changes to the atmospheric environment. According to the Air Emissions Assessment Technical Report, *"[t]here are also no exceedances of the air quality criteria for NO2, and SO2*" at sensitive receptors along the Haul Road. However, no tables in the document could be identified which report the baseline or predicted NO2 and SO2 concentrations at the nine sensitive receptors, to verify this statement. This information is required to predict potential effects from changes to air quality.	a) Provide the supporting data to demonstrate that there are no exceedances of NO2 and SO2 (or any other chemicals of potential concern) concentrations relative to applicable criteria at sensitive receptors along the Haul Road.
IR 3-05	HC	Section 6.1.1 Atmospheric environment Section 6.2.1 Changes to the atmospheric environment	Appendix C-1 Air Emissions Assessment Technical Report Section 5.5.1, Pg. 14 PDF	The EIS Guidelines require the prediction of changes to the atmospheric environment. The Air Emissions Assessment Technical Report indicates that "*Project Only and Cumulative truck traffic scenarios were modelled*". A rationale for the exclusion of other scenarios, such as 'decommissioning' and the 'project + baseline' were not included. This information is required to predict potential effects from changes to air quality.	a) Provide rationale for why only the "Project Only and Cumulative truck traffic scenarios were modelled", and/or provide modelling for the 'decommissioning' and 'project + baseline' scenarios. If a rationale cannot be provided, conduct an air emissions evaluation of these additional scenarios.
IR 3-06	HC	Section 6.2.1 Changes to the atmospheric environment Section 6.5 Mitigation	EIS Section 6.2.8, Pg. 350 PDF	The EIS Guidelines require the prediction of changes to the atmospheric environment. According to the EIS, "*the crushed ore stockpile at the Touquoy Mine Site will be covered to minimize wind and rain erosion; stockpiles will not be covered at the Beaver Dam Mine Site and may contribute to airborne dust*". Considering the anticipated benefits in reducing airborne dust, a rationale is not provided explaining why the crushed ore stockpiles at the Beaver Dam Mine Site will not be covered. This information is required to predict potential effects from changes to air quality.	a) Provide a rationale for not covering the crushed ore stockpiles at the Beaver Dam Mine Site exist. b) Indicate if any alternative mitigation measures would be used at the Beaver Dam Mine Site to reduce airborne dust from the crushed ore stockpile. If not, identify and describe alternative mitigation measures to reduce airborne dust. c) Update the effects assessment, as necessary, based on the responses to (a) and (b).
IR 3-07	HC	Section 6.1.1 Atmospheric environment Section 6.2.1 Changes to the atmospheric environment	Appendix C-1 Air Emissions Assessment Technical Report Table 4, Pg. 35 PDF Table 5 , Pg. 36 PDF Section 3.1, Pg. 11 PDF	The EIS Guidelines require a description of the results of a baseline survey of ambient air quality. Tables 4 and 5 in the Air Emissions Assessment Technical Report provided an insufficient baseline survey of ambient air quality conditions for the Beaver Dam Mine Site, Haul Road, and Touquoy Mine Site. A complete baseline survey of ambient air quality conditions in these areas is necessary to accurately assess potential effects. Additionally, the results of a complete baseline survey would enable the Proponent to verify the specific air quality changes of the Project. Specific areas of uncertainty regarding Table 4 include: • the most recent 24-hour PM10 data for the Beaver Dam Mine Site was collected in June 2008; • there are no 24-hour PM10 data for any locations along the Haul Road; • there are no 24-hour PM10 data for the Touquoy Mine Site; • the most recent 24-hour total suspended particulates (TSP) data for the Beaver Dam Mine Site was collected in October 2014; • a single 24-hour TSP datum point for the Haul Road was collected in October 2014; • the most recent TSP data for the Touquoy Mine Site was collected in November 2017; • the use of a single 24-hour PM10 datum point collected in June 2008 on the Beaver Dam Mine site as "background" for this assessment, which includes three separate areas separated at the furthest by 31 kilometres (the distance between the Beaver Dam Mine Site to Touquoy Mine site via the Haul Road); and • the use of an average 24-hour TSP datum point as "background" for this assessment, despite its sources ranging temporally between four and thirteen years of age and spread across the Proponent's mining properties in the region (Fifteen Mile Stream and Cochrane Hill mining projects are located approximately 22 km north and 64 km northeast of the Beaver Dam Mine Site).	a) Provide a complete baseline survey of ambient air quality conditions in the areas of the Beaver Dam Mine Site, the Haul Road, and the Touquoy Mine Site using more recent data that is closer to the proposed physical geographic locations. Alternatively, provide justification for why the selected NAPS data may be considered as representative of site-specific conditions. b) Update the EIS, HHRA, and the Air Emissions Assessment Technical Report based on data collected in (a) above Identify and describe additional mitigation measures based on the updated information, if necessary.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				Specific area of uncertainty regarding Table 5 are: • the use of air quality data (24-hour PM10, 24-hour PM2.5, 1-hour NO2, 24-hour NO2, 1-hour SO2, 24-hour SO2, 1/2-hour CO, 1-hour CO, 8-hour CO) collected between 2014 -2016 via the National Air Pollution Surveillance (NAPS) monitoring stations that are not geographically close to the Beaver Dam Mine Site (refer to Ambient Air and Acid Precipitation Monitoring in Nova Scotia) being used as "background" for this assessment. These stations are located in coastal areas and may not represent climatic conditions in the interior of Nova Scotia. As a result of these uncertainties in the baseline data, there are concerns about the reliability and applicability of all the predicted air quality emissions that were subsequently modelled and used throughout the Air Emissions Assessment Technical Report, EIS, and HHRA. This information is required to accurately assess potential effects from changes to air quality	
IR 3-08	HC	Section 6.2.1 Changes to the atmospheric environment	Appendix C-1 Air Emissions Assessment Technical Report Table 6, Pg. 37 PDF	The EIS Guidelines require the prediction of changes to the atmospheric environment. In Table 6 of the Air Emissions Assessment Technical Report, the standards used are in some cases not the most stringent and/or up-to- date. More recent ambient standards, which are intended to be protective of human health, such as the Canadian Ambient Air Quality Standards (CAAQs) for NO2, SO2, and CO, and other federal and provincial standards should be adopted (e.g. Ontario Ministry of Environment). This information is required to predict potential effects from changes to air quality.	a) Compare predicted levels of project-associated air pollutants based on the most recent air quality standards (e.g., CAAQs for NO2, SO2, CO). b) Provide information about how the CAAQs' principles of 'Keeping Clean Areas Clean' and 'Continuous Improvement' will be taken into account in designing mitigation measures, monitoring, and follow-up activities.
IR 3-09	HC	Section 6.2.1 Changes to the atmospheric environment Section 6.5 Mitigation	EIS Section 6.2.8, Pg. 351 PDF	The EIS Guidelines require the consideration of measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project. Throughout the EIS, Air Emissions Assessment Technical Report, and HHRA, the reported targeted effectiveness of the dust suppression mitigation measures on the Haul Road is 80%. However, in Section 6.2.8 of the EIS, the dust suppression is reported to be comparatively higher, specifically *"...(targeting 80 to 90% effectiveness)".* Based on multiple studies completed regarding dust control mitigation, it is uncertain if the target of 80% for this current project can be achieved (refer to the note below for additional information and citations). This information is necessary to predict potential effects from changes to air quality. *Note:* The State of Utah Department of Environmental Quality's Guidelines for emission factors for paved and unpaved haul roads dust control efficiencies were as follows: • Basic watering (70% control efficiency) • Chemical suppressant and watering (85% control efficiency) • Paved road with sweeping and watering (90% control efficiency) • Paved road with vacuum sweeping and watering (95% control efficiency) Source: http://www.deq.utah.gov/Permits/air/docs/2015/01Jan/EmissionPavedUnpavedHaulRoads.pdf For another proposed mining project in British Columbia (e.g. Burnco Aggregate Project), the estimated emissions reduction due to watering on unpaved roads was assumed to be 55%, which is based on Table 6-7 of the WRAP Fugitive Dust Handbook (Countess Environmental, 2006) . Source: http://ulpeis.anl.gov/documents/dpeis/references/pdfs/Countess_Environmental_2006_WRAP_Fugitive.pdf.	a) Clarify the discrepancy concerning the targeted effectiveness of the dust suppression mitigation measures reported in Section 6.2.8 of the EIS. Further, provide evidence for the effectiveness level of the proposed dust suppression measures given the scientific literature has indicated that simple use of watering will not provide 80-90% effectiveness in reducing dust.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				Additional References: Global Road Technology. 2020. Dust Suppression in Haul Mining Roads – A Historical Perspective. https://globalroadtechnology.com/global-road-technology-dust-suppression-in-haul-mining-roads/ . Barnes, D., and Connor, B. 2014. Managing Dust on Unpaved Roads and Airports. Technical Report from Alaska University Transportation Center. Cecala, A.B., O'Brien, A.D., Schall, J., Colinet, J.F., Fox, W.R., Franta, R.J., Joy, J., Reed, W.M., Reeser, P.W., Rounds, J.R., and Schultz, M.J. 2012. Dust Control Handbook for Industrial Minerals Mining and Processing. Report of Investigations 9689. Ding, X., Xu, G., Kizil, M., Zhou, W., and Guo, X. 2018. Lignosulfonate Treating Bauxite Residue Dust Pollution: Enhancement of Mechanical Properties and Wind Erosion Behaviour. Water Air Soil Pollut. 229:214. 1-13. Guo, X. 2018. Assessing the Effectiveness of Eco-Friendly Dust Suppressants Used to Abate Dust Emission from Mine Haul Roads. Dissertation from Curtin University. James, M. 1993. The Australian Mining Industry: The Role of the Commonwealth Government, 1920-1950. Labour History. 65. 75-95. Jones, D., Sadzik, E., and Wolmarans, I. 2001. The Incorporation of Dust Palliatives as a Maintenance Option in Unsealed Road Management Systems. 20th ARRB Conference. Long, M.T. 2008. Road Dust Management Practices: A National and International Perspective. Keynote Address at the Road Dust Management Practices and Future Needs Conference. Petavratzi, E., Kingman, S., and Lowndes, I. 2005. Particulates from mining operations: A review of sources, effects and regulations. Minerals Engineering. 18. 1183-1199. Reed, W.R., and Organiscak, J.A. 2005. Evaluation of dust exposure to truck drivers following the lead haul truck. TRANSACTIONS. 147-154. Strack, A.L. 2015. A Review of Australian Mine Haul Road Design Procedures. Dissertation from the University of Southern Queensland. Society for Science & the Public. 1936. Respirators Cannot Take Place of Dust Control. The Science News-Letter. 29:779. 163-164. Thompson, R.J., and Visser, A.T. 2007. Selection, performance and economic evaluation of dust palliatives on surface mine haul roads. The Journal of The Southern African Institute of Mining and Metallurgy. 107, 435=451. Xu, G., Ding, X., Kuruppu, M., Zhou, W., and Biswas, W. 2017. Research and application of non-traditional chemical stabilisers on bauxite residue (red sand) dust control, a review. Science of the Total Environment.	
IR 3-10	HC	Section 6.2.1 Changes to the atmospheric environment	EIS Section 6.2.7, Pg. 308 PDF	The EIS Guidelines require the prediction of changes to the atmospheric environment. According to the EIS, the dust emissions from the active closure stage from *"...infrastructure demolition, site reclamation, and environmental monitoring activities will be substantially reduced relative to other Project phases*". Consequently, it is proposed that "*...effects to Air during Active Closure are considered appropriately bounded by predictions for Construction and Operation phases*..." and therefore there is no need for additional assessment activities. Without any scientific evidence validating this claim, it is not possible to confirm if this assumption is accurate. This information is necessary to predict potential effects from changes to air quality.	a) Provide a discussion, including scientific evidence, validating that the anticipated air quality effects generated during the active closure phase are similar to predictions for construction and operation phases.
IR 3-11	HC	Section 6.2.1 Changes to the atmospheric environment	EIS Section 6.2.7.2, Pg. 348 PDF	The EIS Guidelines require the prediction of changes to the atmospheric environment. According to the EIS, *"[e]missions of gaseous species from the Haul Road trucks as well as on-site operations are predicted to be well below the assessment criteria*". This statement requires clarification as no references were provided, nor were the specific "*gaseous species*" identified. Furthermore, it is unclear if this statement remains accurate given that the ambient air quality standards used were not the most up-to-date (refer to IR 3-08.	a) Provide references to validate the statement that *"[e]missions of gaseous species from the Haul Road trucks as well as on-site operations are predicted to be well below the assessment criteria*" and include those substances which are considered to be '*gaseous species*".

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				This information is necessary to predict potential effects from changes to air quality.	b) Provide evidence that the above-mentioned statement is still accurate based on the current ambient air quality standards (refer to IR 3-08).
IR 3-12	HC	Section 6.2.1 Changes to the atmospheric environment	IR Response II package CEAA-2-31 Pg. 257, 274, 281, 288 PDF EIS Section 2.10.11 Table 2.10-1, Pg. 192 PDF	The EIS Guidelines require the prediction of changes to the atmospheric environment. In Table 2.10-2 of the EIS, ore blasting, as opposed to ore crushing, is listed as the preferred method of ore extraction. In response to CEAA-2-31, isopleths showing predicted air emissions have been provided at the property boundary of the Beaver Dam Mine Site. With respect to particulate matter (i.e., PM2.5, PM10), the majority of these emissions are predicted around the point where the Haul Road meets the property boundary. This location has also been used as the Maximum Point of Impingement (MPOI) to represent traditional land users: *"[i]t should be noted that the property boundary conditions along the haul road were applied to serve as a proxy to represent areas of traditional land and resource use (recreational practice areas) outside of the PA [Project Area*]". However, it is unclear why there are few or no predicted emissions for particulate matter (i.e., PM2.5, PM10) from site activities at the Beaver Dam Mine Site property boundary (e.g., such as blasting at the open pit). This information is necessary to predict potential effects from changes to air quality.	a) Provide rationale for the lack of apparent particulate matter air emissions from Beaver Dam Mine Site activities (e.g., blasting activities in the open pit). b) Confirm that the MPOI air receptor location is appropriate for all predicted air substances (e.g., PM2.5, NO2 etc.). If not, update the HHRA to reflect changes to the MPOI for specific air substances.
IR 3-13	IAAC ECEL Public DAL	Part 2, Section 6.2.1 Changes to the atmospheric environment	Section 6.4.7 Project Activities/Interactions with Greenhouse Gas Table 6.4-3 Table 6.4-4 Section 6.4.8 Mitigation	The EIS Guidelines require the EIS to detail changes in greenhouse gas (GHG) emission levels from each phase of the Project (construction, operation, active closure and post-closure). Environment and Climate Change Canada's guidance document Strategic Assessment of Climate Change (Revised October 2020) states that proponents must provide information on the impact of the project on carbon sinks. This includes land areas directly impacted by the project by ecosystem type (e.g. forests, wetlands, built-up land) over the course of the project lifetime and a description of the activities that would result in an impact on these carbon sinks. Emissions from land use change (e.g., land clearing including deforestation, wetland removal etc.) are examples of direct GHG emissions. The Agency notes that the Strategic Assessment of Climate Change document is applicable to *Impact Assessment Act* projects only, but is meant in this instance to be used as a reference on direct versus indirect GHG emissions. For the Beaver Dam Mine Site, Table 6.4-3 details project activities and interactions that may result in GHG emissions, and Table 6.4-4 details project activities and interactions that may result in GHG emissions for the Haul Roads. Section 6.4.7 of the EIS identifies that the primary source of GHG emissions for all phases of the Project for the Beaver Dam Mine Site and the Haul Roads as stationary and mobile fuel combustion sources. Section 6.4.7 of the EIS notes that GHG emissions from rock blasting activities were considered as part of the GHG emission estimates. No information was provided as to whether land use change activities (land clearing including deforestation and wetland removal) were considered as part of the GHG emission estimates for the Project, as detailed in Tables 6.4-3 and 6.4-4. Section 6.4.8 of the EIS states that the mitigation measures to reduce the effects of greenhouse gases would include: limiting engine idling, where practical; implement fuel efficiencies, where practical; implement preventative maintenance plans for all mobile and stationary equipment; and use renewable energy where reasonable. None of these mitigation measures are firm commitments nor would they substantially reduce the GHG's emitted. No discussion of offsets are provided in the EIS. This information is needed to assess direct GHG emissions related to the Project.	a) Provide an estimate of the resultant GHG emissions from land use change from Project construction, operation, active closure and post-closure activities. Ensure estimates consider Environment and Climate Change Canada's guidance on direct emissions from land use change. b) Update the effects assessment, mitigation measures and conclusions, as applicable, to incorporate this additional information.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
Noise					
IR 3-14	HC	Section 6.2.1 Changes to the atmospheric environment Section 3.2.2 Operation	EIS Section 6.1.1.2, Pg. 262 PDF EIS Section 6.1.7.1 Table 6.1-5, Pg. 280 PDF Appendix B-1 Section 3.1, Pg. 5 PDF EIS Section 6.1.6.1.4, Pg. 272 PDF EIS Section 6.1.7.3.2, Pg. 286 – 287 PDF	The EIS Guidelines require the prediction of changes in ambient noise levels. The EIS states that the "*[d]uration of Construction Phase [was] reduced to less than 1 year (previously 1 to 2 years)*". Construction activities at three different locations are described (Beaver Dam Mine Site, Haul Road, Touquoy Mine Site). Section 3.1 (Pg. 5 PDF) of Appendix B-1 states that "*[b]ased on the model scenarios, assuming concurrent construction of the Haul Road and Beaver Dam Mine Site facilities...*". It is unclear if these activities will be concurrent or all completed within one year. A construction schedule would be helpful to validate this assumption, that all construction activities will not exceed one calendar year, and that the predictions are appropriate. If construction activities are determined to exceed one year, long-term construction evaluation should be considered which would include the calculation of change in [highly annoyed] %HA as per HC (2017). The EIS indicates that for operational noise, the Nova Scotia Pit and Quarry Guidelines (NSEL 1999) will be used to determine noise compliance. HC recommends the use of its Noise Guidance (HC, 2017) for the assessment of potential impacts to human health from noise during operations. This information is required to assess effects from changes to noise levels. *References:* Health Canada. 2017. Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise. Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. http://www.canada.ca/en/health-canada/services/publications/healthy-living/guidance-evaluating-human-health-impacts-noise.html. International Organization for Standardization (ISO). 1996. ISO 9613-2:1996. Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation. Available at: https://www.iso.org/standard/20649.html.	a) Provide the construction schedule and confirm whether construction activities will last more than one calendar year. If yes, evaluate potential noise impacts from long-term construction activities by calculating the predicted changes in %HA, as per HC guidance (HC, 2017). b) Utilize Health Canada guidance (HC, 2017) to calculate change in %HA for the operations phase, including appropriate adjustments to account for tonal, impulsive, highly impulsive noises etc. (see ISO 1996-1:2016). c) Update the environmental effects assessment on noise to consider the effects of concentrate haulage traffic and update the proposed mitigation, follow-up monitoring and conclusions, as appropriate.
IR 3-15	HC	Section 3.2.2 Operation	EIS Section 6.1.7.4.1, Pg. 288 PDF EIS Section 6.1.7.3, Pg. 285 PDF Appendix B-2 Section 3.1, Pg. 12 PDF Appendix B-2 Section 3, Table 3.2, Pg. 5 - 6 PDF	The EIS Guidelines require the prediction of changes in ambient noise levels. Details on the selection of ore crushing options and their noise impacts, including information presented in technical tables, are unclear. Option B, which involves blasting and processing of rock in the open pit, was stated as being the preferred option. However, with respect to Option A (jaw crusher at crusher pad), it is unclear if activities will occur below the current ground surface. If not, little sound attenuation would be likely. In addition, depending on the depth of the mine pit, noise levels would be expected to vary based on activity and proximity to human receptor locations. Finally, it is unclear which values were presented in Table 3.2 of Appendix B-2, given that it was stated that both Options A and B were included in this table. Because of the different processing techniques, it would be helpful to separate each proposed option (Option A or Option B) and associated noise levels. This information is required to assess effects from changes to noise levels.	a) If the jaw crusher option (Option A) is selected for the noise assessment, provide additional information about the location and duration when crushing activities are expected to occur, along with associated noise levels at the property boundary and nearest human receptor locations. b) Provide future noise levels at the nearest receptor locations for both options separately evaluate potential health-related impacts associated with each scenario. c) Clarify which values were presented in Table 3.2 of Appendix B-2, given that it was stated that both Options A and B were included in this table.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR 3-16	HC	Section 3.2.2 Operation	EIS Section 6.1.7.1, Pg. 280-283 PDF Appendix B-2 Section 3, Pg. 281 PDF	The EIS Guidelines require the prediction of changes in ambient noise levels. Despite blasting noise being anticipated during the construction and operation phases in the EIS and Appendix B, it has not been assessed for potential effects on human health. If highly impulsive noises or high energy impulsive noises (e.g. blasting) during construction and/or operations phases (as applicable) are greater than predicted and/or result in public complaints, additional monitoring and mitigation should be considered. For example, advance notice should be provided to nearby human receptors prior to the generation of any impulsive, highly impulsive, or high energy impulsive sounds. This information is required to assess effects from changes to noise levels. *Reference:* Health Canada. 2017. Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise. Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. http://www.canada.ca/en/health-canada/services/publications/healthy-living/guidance-evaluating-human-health-impacts-noise.html.	a) Evaluate blasting noise in the EIS and technical supporting documents during construction and operations phases. See HC guidance on the evaluation of blasting noise (HC, 2017). b) Consider additional mitigation measures based on the assessment above.
IR 3-17	HC	Section 6.1.1 Atmospheric Environment Section 6.1.10 Aboriginal peoples Section 6.5 Mitigation	EIS Section 6.1.4.1, Pg. 267 PDF EIS Section 6.1.6.3, Pg. 280 PDF EIS Section 6.1.6.1.4 , Pg. 272 PDF EIS Section 6.1.7.1, Pg. 280 – 283 PDF Appendix B-2 Section 6.3.4, Pg. 17 PDF	The EIS Guidelines require the prediction of noise impacts on the Mi'kmaq of Nova Scotia. Potential human receptors at the property boundary (to be representative of traditional land users) have not been considered in the noise assessment. Although traditional land uses may occur close to the project area, an evaluation of noise-related health impacts at the property boundary on traditional land users does not appear to have been described in the EIS or Appendix B-1 or B-2. This is despite the Proponent indicating in the EIS and Appendix B-2 that traditional land uses may occur close to the project area. All potentially sensitive receptors should be evaluated, including traditional land use areas (see HC, 2017). This information is required to predict the impact of noise on the Mi'kmaq of NS.	a) Include potential human receptors at the Beaver Dam Mine Site property boundary, along the Haul Road, and at the Touquoy Site in the calculations of the change in %HA. b) If future project-related noise is predicted to exceed applicable guideline values at the property boundary and traditional land use is expected in proximity to the property boundary, identify and describe additional mitigation to be protective of these receptors, particularly in the event of public complaints.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR 3-18	HC	Section 3.2.2 Operation	EIS Section 6.1.6.3 Pg. 273-274 PDF	The EIS Guidelines require the prediction of changes in ambient noise levels. It is unclear how changes to the Touquoy Mine site (e.g., off-site truck traffic changes), as part of the Beaver Dam Mine Project, have been captured in the noise assessment. The EIS states that *"[a]n estimated worst case facility sound level measurement for a 1-hour period was estimated for each receptor near Touquoy Mine Site*" as part of the previous provincial environmental assessment for the Touquoy Mine Site. It is unclear from the description whether this included off-site truck traffic along the Haul Road. It would be helpful to provide information as to what project-related noise sources were evaluated in the noise assessment for the Touquoy Mine Site. For example, whether off-site project-related truck traffic was included in the original Touquoy EIS and if so, whether increases due to the Beaver Dam Mine Project were included. This information is required to assess effects from changes to noise levels.	a) Identify and evaluate all noise sources associated with the Beaver Dam Mine Project, including activities at the Beaver Dam Mine Site, and transportation of the ore along the Haul Road. In addition, if activities at the Touquoy Mine Site are expected to result in noise levels that are higher than what is currently authorized under existing provincial permits to operate, any additional noise from vehicles and ore processing at the Touquoy Mine Site should also be included in the noise assessment. b) Evaluate cumulative noise impacts, including all current and reasonably foreseeable projects, such as the proposed expansion at the Touquoy facility, Fifteen Mile Stream Gold Project, and Cochrane Hill Gold Project, in addition to any other non-mining-related projects.
Geology and Geochemistry					
IR 3-19	NRCan EAC ESFW KMKNO	Part 6, Section 6.1.2 Geology and Geochemistry Section 6.1.4 Groundwater and surface water	Appendix E.2 Section 3 And Section 4 Appendix E.3 Section 2 Appendix E.4 Section 2 and 3	The EIS Guidelines require the Proponent to complete a geochemical characterization of the expected mine materials to predict metal leaching associated with both acid rock drainage and neutral mine drainage. The Mining Environment Neutral Drainage (MEND) (2009) guidance document is recommended to predict ML/ARD, the long-term rates of ML/ARD, estimates of the potential time to onset of ML/ARD, and the quantity and quality of leachate from samples of tailings, waste rock, and ore. This information feeds the water quality model predictions and informs effective waste management plans and segregation of non-potentially acid generating (NAG) and potentially acid generating (PAG) waste. Elevated ARD risk associated with the Meguma Group is well documented in Nova Scotia (Province of Nova Scotia, 2017; Trudell and White 2013; White and Goodwin, 2011; Fox et al., 1997). The following are noted areas that the testing program did not meet MEND (2009) guidelines, or where clarification and/or further evaluation is required. • Mine rock tonnage estimates are not provided; therefore, it cannot be confirmed that sufficient samples were collected per lithology. • Appendix E.3 Figure 3-1 (page 3-2) presents sampled drill collar locations in plan view. Based on this information, the spatial distribution of mine rock samples in relation to the pit outline, deposit geology, or mineralized zones cannot be confirmed. • Low grade ore, ore, historical tailings and waste rock and associated pore water (surface and at depth), and tailings and process water were not evaluated for ARD/ML potential through any geochemical testing. This to be a significant data gap to support material management at both the Beaver Dam and Touquoy mine sites. • Appendix E.3 Section 3.2.1 states that CaNP is calculated from total inorganic carbon (TIC) content but Table 4-4 reports "Total C". Total carbon measurements include graphite, which is observed in the Meguma Supergroup; the presence of graphite can cause CaNP to be overestimated if it is calculated from total carbon. • Table 1 in Appendix 4-2 does not include fizz ratings for all samples. • Carbonate neutralization potential and total sulphur should be used to more conservatively evaluate ARD potential, rather than the modified neutralization potential and sulphide sulphur. The neutralization potential includes less reactive silicate minerals,	a) Provide tonnage estimates for each waste rock and low-grade ore lithology and a comparison to the number of samples collected. Describe how any data gaps in terms of underrepresented lithologies based on tonnage or insufficient spatial distribution would be addressed. b) Provide cross sections or images from the LeapfrogTM block model that show the location of all low-grade ore and waste rock samples collected to date. c) Provide a detailed plan to complete geochemical testing for low-grade ore, ore, historical tailings and waste rock and associated process water, and tailings and process water. d) Confirm the method used to measure the carbon content of mine rock and discuss the potential presence of graphite based on regional geology, core logging and mineralogical observations. e) Update Appendix 4-2 Table 1 to include fizz ratings for all samples.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				and is less efficient as a tool for operational testing and segregation of mine rock. Due to a lack of sulphate minerals, any detected sulphate is likely due to oxidation of the drill core or test sample while in storage. • Acidic loading rates and timing to onset of ARD are still estimated based on Cochrane Hill samples, despite HC4 and HC6 achieving acidic leachate (pH<4.5) at approximately week 80 of testing per Figure 3-1 (page 4). • The Touquoy Mine Site is used as a proxy for the performance of mine rock at Beaver Dam. Although the mine rock lithologies are similar between the two sites, the mineral emplacement and resulting mineralogy may differ sufficiently to increase the risk of ARD/ML and affects to fish and fish habitat. A more fulsome evaluation of mine rock is recommended to ensure that the full range of ARD/ML potential has been captured, and minimize risk associated with an unexpected volume of PAG and metal leaching material, or mis-use of these materials for construction per IR 3-20. • Should the requested timing to onset of acid generation, acidic loading rates, and associated assumptions in the water quality model differ substantially from those previously used, the water quality model and associated assumptions within it will need to be updated. The updated model should consider the historical tailings placement in the PAG stockpile and implications for acid generation and contact water quality per IR 3-21. KMKNO also raised concerns related to the timing and onset of acid rock drainage. This information is needed to evaluate changes on groundwater and surface water and subsequently effects to fish and fish habitat. *References:* Fox, D., C. Robinson, and M. Zentilli. 1997. Pyrrhotite and associated sulphides and their relationship to acid rock drainage in the Halifax Formation, Meguma Group, Nova Scotia. Atlantic Geology, 33: 87-103.Nova Scotia, 2017. Acid Rock Drainage. https://novascotia.ca/natr/meb/hazard-assessment/acid-rock-drainage.asp. Last updated 2017-12-10. Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. MEND Report 1.20.1. Mining Environment Neutral Drainage Program, Natural Resources Canada. December 2009. White, C.E. and T.A. Goodwin. 2011. Lithogeochemistry, petrology, and the acid-generating potential of the Goldenville and Halifax groups and associated granitoid rocks in the metropolitan Halifax regional Municipality, Nova Scotia, Canada. Atlantic Geology, 47:158-184.	f) Re-evaluate the ARD potential of all mine rock samples using total sulphur to calculate acid potential and carbonate neutralization potential. Provide updated results for each lithology and a discussion of how this more conservative approach affects the interpretation of ARD potential. g) Provide an updated estimate for the timing to onset of acidic conditions and updated acidic loading rates for mine rock based on results reported in Appendix E.4 and for historical mine waste materials based on testing per part c of this IR. h) Compare the updated timing to onset of acid rock drainage and metal loading rates to those used as source terms for the water quality model and discuss implications for changes in ARD/ML management and effluent predictions. i) Provide a comprehensive evaluation to support the use of Touquoy as an analogue site. The review should be supported by regional geology, field observations, and site-specific mineralogy and geochemical test results from both sites. j) Provide updated water quality model results for all facilities and site effluent during all phases of mine life and post-closure. The updated model should consider all new data requested herein.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR 3-20	NRCan ESFW	Part 6, Section 6.1.2 Geology and Geochemistry Section 6.1.4 Groundwater and surface water Part 6.5 Mitigation	Appendix E.2 Section 3 And Section 4.1.1.3 Appendix E.3 Section 4.1.2.3 Appendix E.4 Section 2 and 3 Appendix 5 Section 2	The EIS Guidelines require the Proponent to complete a geochemical characterization of the expected mine materials to predict metal leaching associated with both acid rock drainage and neutral mine drainage. In Appendix E.3 Section 4.1.1.3, arsenic is identified at elevated solid phase concentrations in all lithologies. QEMSCAN testing of a composite field bin sample from Fifteen Mile Stream reports arsenopyrite hosting up to 99.4% of the arsenic, with the remaining 0.6% in gersdorffite. Haysom et al (1997) tested various samples from the Goldenville and Halifax Groups (Beaverbank Formation) and identified that arsenic mineral phases extend throughout the solid solution series between arsenopyrite, cobaltite, and gersdorffite, with glaucodot also observed in a sample from the Goldenville Formation. Cobalt and gersdorffite have been further identified in other parts of the province (Welt et al, 2020). The presence of these minerals poses a significant risk for metal leaching due to their high reactivity relative to pyrrhotite, arsenopyrite, and pyrite (Chopard et al, 2015; MEND 2004). Further, as documented by Kennedy and Drage (2017), elevated arsenic concentrations are observed in the metamorphic bedrock aquifers of the Meguma Group, demonstrating elevated arsenic mobility under natural conditions. The Proponent notes that the arsenic loading rates do not correlate with the arsenic content in the solid phase (Appendix E.3 Section 4.1.2.3, page 4-22). Per Appendix E.4 Figure 3-5a (page 8), with the exception of HC5, the higher arsenic loading rates under neutral drainage conditions are observed in the humidity cell test samples containing median sulphur content, which are all non-potentially acid generating and represent material that would likely be identified for construction use. No method is provided in Appendix E.5 to identify non-PAG arsenic-leaching material that would be unsuitable for construction use. The conceptual model for metal leaching needs to be refined, with support from more detailed mineralogy studies on samples of varying arsenic content from all lithologies. This is required to minimize the risk associated with metal leaching from the long-term exposure of waste rock used for construction or in the waste rock facility, and to support refinement of the approach to material segregation and waste rock management planning, and better identify water treatment requirements. This information is needed to evaluate changes to groundwater and surface water and subsequently effects to fish and fish habitat. *References:* Chopard, A., M. Benzaazoua, B. Plante, H. Bouzahzah, and P. Marion. 2015. Kinetic tests to evaluate the relative oxidation rates of various sulfides and sulfosalts. 10th International Conference on Acid Rock Drainage & IMWA Annual Conference. Santiago, Chile. Haysom, S.J., R.J. Horne, and G. Pe-Piper. 1997. The opaque mineralogy of metasedimentary rocks of the Meguma Group, Beaverbank-Rawdon area, Nova Scotia. Atlantic Geology 33: 105-120. Kennedy, G.W. and J.M. Drage. 2017. An arsenic in well water risk map for Nova Scotia based on observed patterns of well water concentrations of arsenic in bedrock aquifers. Nova Scotia Natural Resources, Geoscience and Mines Branch. Open File Report ME 2017-003. MEND 2004. Review of Water Quality Issues in Neutral pH Drainage: Examples and Emerging Priorities for the Mining Industry in Canada. MEND Report 10.1. Mine Environment Neutral Drainage Program, Natural Resources Canada. November 2004. Welt, N., E. Adlakha, J. Hanley, M. Kerr, G. Baldwin, N. McNeil, and R. Parsons. 2020. Characterization of Co-Ni-bearing polymetallic vein occurrences, Meguma Terrane, Nova Scotia. Prospectors and Developers Association of Canada, March 2020.	a) Provide a comprehensive discussion of the mineral phases hosting arsenic and the conceptual model for arsenic leaching. Include a summary of data gaps that need to be addressed for a fulsome understanding of the controls on arsenic leaching, and a plan to address these gaps as the project advances. b) Provide a discussion on potential practical methods for identifying arsenic-leaching waste during operations. This approach should be included in updates to the ARD/ML Management Plan to support material segregation, as well as future updates to the block model identifying 3D solids of PAG and metal leaching material, and estimation of material volumes.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR 3-21	NRCan EAC	Part 6, Section 6.1.2 Geology and Geochemistry Section 6.1.4 Groundwater and surface water Part 6.5 Mitigation	EIS Section 2.7.2.3.2 Appendix E.5 Section 4 Appendix A.2a Section 12.3 Appendix E.9 Section 1.1.4 Appendix P.2 Appendix 1	The EIS Guidelines require the Proponent to consider measures to mitigate any significant adverse environmental effects of the Project. Further, the Proponent is encouraged to use an approach based on the avoidance and reduction of effects at the source. The Proponent states (Project Description Section 2.7.2.3.2; page 2.23) that PAG waste rock will be stored in a separate stockpile. In the ML/ARD Management Plan (Appendix E.5 Section 4.1.2; page 4-2), it is stated that PAG rock will be handled through one or more of the following strategies: strategic placement of PAG material, blending, encapsulation, and use of a cover system. Lastly, Appendix A.2a Section 12.3 (page 12) recommends that stockpiles be developed from the bottom up. International Network on Acid Prevention (INAP 2020), a global best practice report, states that bottom-up construction more effectively manages ARD/ML risk than traditional end tipping, emphasizing the reduced effectiveness of methods such as encapsulation if constructed by end-tipping. Further, reliance on engineered covers for the long-term management of PAG waste rock should consider the risk of climate change and degradation of the cover system over the long-term and thus is not considered a suitable stand-alone strategy for management PAG waste. The Proponent further states (Project Description Section 2.7.2.3.2; page 2.23) that "*During construction, historic tailings and waste rock designated as PAG will be either temporarily or permanently stored in the PAG area depending on final quantities*". In Appendix 1 and Appendix P.2 1, Figure 3 indicates the location of historic waste whereas Figure 4 does not; presumably the material is intended to be removed between the periods noted by each figure, namely Q4 2022 and Q2 2023. The timing and duration of the placement of historic mine materials lacks clarity, especially given the high risk that this unknown volume of material has to impact fish and fish habitat. Appendix E.9 Section 1.1.4 (page 1-4) indicates that a containment cell will be considered for storage of historic waste, if necessary, based on the Industrial Approval Application with the Nova Scotia Department of Environment and Climate Change. Due to the high reactivity of historical gold mine tailings in Nova Scotia, especially those presently found in wetlands, as well as their demonstrated ability to quickly produce ARD/ML upon excavation and exposure to the atmosphere (DeSisto *et. al.*, 2016; DeSisto *et. al.*, 2017), all historical tailings, waste rock, and till impacted by previous mining activities should be stored in a lined cell within the PAG stockpile footprint. The lined cell would ensure that all contact water is captured and treated to avoid discharge to the environment, as it is anticipated that the pore water draining from these rapidly oxidizing materials will contain high concentrations of sulfate and metalloids, particularly arsenic. Further, the lined containment cell would prevent historic tailings from being washed into and mixing with PAG mine rock, which could accelerate the onset of ARD through consumption of the buffering capacity of the PAG mine rock. IR 3-19 notes a significant data gap in the evaluation of the ARD/ML potential of the historic mining materials, including pore water quality. This data gap must be addressed to fully inform the long-term management of this material to minimize impacts to fish and fish habitat, particularly the design of the containment cell and water treatment. This information is needed to evaluate changes to groundwater and surface water and subsequently effects on fish and fish habitat. *References:* Desisto, S.L., H.E. Jamieson., and M.B. Parsons. 2016. Subsurface variations in arsenic mineralogy and geochemistry following long-term weathering of gold mine tailings. Applied Geochemistry 73 (2016) 81-97. http://dx.doi.org/10.1016/j.apgeochem.2016.07.013 DeSisto, S.L., H.E. Jamieson, and M.B. Parsons. 2017. Arsenic mobility in weathered gold mine tailings under a low-organic soil cover. Environmental Earth Sciences (2017) 76: 773. https://doi.org/10.1007/s12665-017-7041-7 INAP (International Network on Acid Prevention) 2020. *Rock Placement Strategies to Enhance Operational and Closure Performance of Mine Rock Stockpiles. Phase 1 Work Program – Review, Assessment & Summary of Improved Construction Methods.* Prepared for INAP by Earth Systems & OKane Consultants. https://www.inap.com.au/research/#rockPlacementStrategies	a) Identify the preferred method for construction of the PAG stockpile. If the stockpile will not be constructed through a bottom-up approach, provide justification for the intended approach and detail mitigation measures that will be implemented to reduce ARD/ML risk in post-closure, including in consideration of climate change. b) Provide additional clarity on the storage of historic tailings and waste rock in the PAG stockpile, particularly the time periods during which historic mining wastes will be stored in the PAG stockpile and where the historic mine materials will be placed within the PAG stockpile. Additionally, provide mitigation measures to ensure the handling of these wastes will not impact fish and fish habitat. This should be supported by geochemical testing of these materials per IR 3-19 above.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR 3-22	NRCan ESFW	Section 2.2 Alternative means to carry out the project; mine waste disposal	Appendix F.6. Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Beaver Dam Tailings in Touquoy Open Pit	The EIS Guidelines require the identification and consideration of the effects of alternative means of carrying out the Project that are technically and economically feasible. The Touquoy open pit is proposed for the management of both historic mine waste and tailings generated from the processing of Beaver Dam ore, all of which could leach acidity, arsenic and other contaminants. While the management of mine waste in an open pit is an encouraged practice because it eliminates long-term reliance on monitoring dam stability or cover performance for above ground facilities (see MEND 2.36.1b), the Touquoy open pit may require some engineering (i.e. installment of clay barriers on the contours of the pit) to limit groundwater contamination to a reasonable level. It appears upon review of the EIS, that the open pit will be backfilled as is with no planned engineering measures to limit groundwater contamination and, ultimately, surface water and sediments. Further, IR 3-19, testing has not been completed to date on the historic mine waste, anticipated tailings to be generated, or how these materials react when mixed. The reactivity of these wastes should be determined to support appropriate waste management, including if the historic wastes require management in a separate cell. This information is needed to evaluate changes to groundwater and surface water and subsequently fish and fish habitat.	a) Provide a discussion on alternative controls (i.e. mitigation measures) that will be implemented in the Touquoy open pit to limit groundwater, surface water and sediment contamination to a reasonable level. Provide details on how the historic mine waste will be managed within the pit.
IR 3-23	NRCan	Part 2, Section 6: Effects Assessment: 6.1.3 Topography and soil	2.7.2.4 Historic Tailings and Waste Rock Section 6.5.4.2.2 Local Soil Quality Appendices E.6, E.7, E.8, and E.9	The EIS Guidelines require the Proponent to assess the suitability of topsoil and overburden for use in the rehabilitation of disturbed areas. As outlined in CEAA-2-40, a detailed, systematic survey of soil geochemistry at the Beaver Dam site is important for identifying areas contaminated by historical mining activity, selecting appropriate materials for reclamation efforts, and establishing geochemical baselines for future environmental monitoring activities. Environmental Site Assessments carried out from 2019-2021 (Appendices E.6, E.7, and E.8) include geochemical data for 96 soil samples, which were compared to the Tier 1 Environmental Quality Standards (EQS) from Nova Scotia's *Contaminated Sites Regulations*. Seventy three of 96 soil samples exceeded the Tier 1 EQS for arsenic (Table 6.5-3). A subset of samples from non-impacted areas were subsequently used to calculate an upper threshold (95th percentile) value of 228 mg/kg arsenic, considered to represent naturally mineralized soils that are not impacted by historical mining activities (Appendix E.8, Table 9). In Section 6.5.4.2.2 (p. 6-138), the EIS states that "…*existing topsoil and overburden are considered suitable for use in reclamation*" without any further explanation of how soils with arsenic concentrations greater than the Tier 1 EQS (31 mg/kg), but less than the estimated upper limit of background (228 mg/kg), will be managed on site This information is needed to evaluate changes to groundwater and surface water and subsequently effects on fish and fish habitat.	a) Specify how the calculated upper background limit for arsenic in topsoil and overburden (Appendix E.8, Table 9) at the Beaver Dam Mine Site would be used during construction and eventual remediation activities. Discuss if additional soil sampling would take place during construction to refine this background estimate, and how this information would be used to manage topsoil and overburden on site. b) Describe how background data for arsenic concentrations would be used to identify and manage the estimated 350,000 tonnes of till materials affected by historic tailings and historic mine operations.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
Groundwater and Surface Water					
IR 3-24	NCNS	Part 2, Section 6.1.4 Groundwater and Surface water	Figure 2.6-1, Section 2.6.2 Beaver Dam Deposit (Resource) Appendix F.5 Hydrogeologic Modelling Report	The EIS Guidelines require an appropriate hydrogeologic model for the project area including a detailed conceptual model, which discusses the hydrostratigraphy and groundwater flow systems; the rationale for the selected model will be provided; a sensitivity analysis will be performed to test model sensitivity to climatic variations (e.g. recharge) and hydrogeologic parameters (e.g. hydraulic conductivity). Figure 2.6-1 in the EIS provides a detailed bedrock geology map of the project area. However, this did not seem to be used as an input for the hydrogeologic model presented in Appendix F.5. The bedrock geology presented is different in terms of the location of the argillaceous rock units and the location of the Mud Lake and Cameron Flowage Faults. The best and most accurate data should be used for the hydrogeologic model. Based on the different bedrock maps provided in Section 2.6.2 and Appendix F.5, the generally coarser-grained Tangier and Taylor's Head Formation lithologies were not included in the southeastern part of the model domain and the Mud Lake Fault was not considered to converge with the Cameron Flowage Fault. Not including these in the hydrogeologic model could result in an underestimation of the hydraulic conductivity and possible connection between the open pit and the Killag River. Hydraulic conductivity testing was focused in the area of the open pit and so other areas of the model domain were not tested. Where uncertainty exists due to a lack of hydraulic conductivity testing, a sensitivity analysis should be performed to consider the implications to groundwater levels and flow should the Tangier and Taylor's Head formation have a higher hydraulic conductivity and if the Mud Lake and Cameron Flowage Faults converge. Appendix F.5 shows no-flow conditions (areas outside the model interest) surrounding the core model Neumann (Type 2 boundary) cells, but it does not describe the Dirichlet (Type 1 - constant flux) boundary conditions (or other possible mixed boundary conditions that would be necessary at the northwest and southeast model domain edges to control/ensure flow through the system and within the northeast and southwest no-flow boundaries. While Appendix F.5 describes the use of the MODFLOW River package cells within the model, it does not describe any use of the MODFLOW Lake package cells, which may have better represented surface-water/groundwater interactions in some locations, or the rationale for using one over the other. It appears that, notwithstanding the presence of River and Drain boundary cells in Figure 5.2 of Appendix F.5, one averaged hydraulic conductivity value was applied to the entire overburden model layer (Layer 1). Thus, the effects of drumlins on recharge were unlikely represented. In Appendix F.5 general "averaged" descriptions are given of the overburden (till and drumlins, combined), shallow bedrock, and deep bedrock hydraulic conductivity values present (or assumed) within the model domain. While the breakdown of the bedrock hydrostratigraphic unit into multiple layers appears reasonable, the data has not been presented for verification as it is broken down, apparently, as represented in Figures 5.3 to 5.14 of Appendix F.5. This information is required to assess the effect of the Project on groundwater and therefore fish and fish habitat.	a) Revise the groundwater model to use the bedrock geology with the best and most accurate data on the locations of the argillaceous unit and Mud Lake and Cameron Flowage Faults. Provide the rationale as to why this information is accurate. b) Conduct a sensitivity analysis to consider the effects on groundwater elevations and flow should the Tangier and Taylor's Head formations have a higher hydraulic conductivity than the argillites and if the Mud Lake and Cameron Flowage Faults converge, if the response to part a shows that this is accurate. c) Describe the Dirichlet (Type 1 – constant flux) boundary conditions or other mixed boundary conditions used at the model edges. d) Provide the rationale for not using Lake package cells, or update the model to use them where applicable. Explain the effect on the model predictions when using Lake verses River boundary conditions. e) Revise the overburden layer to reflect the surface geology including drumlins or provide evidence that the hydraulic conductivity of different surficial geology units in the model domain are the same. f) Provide scientific evidence for the assumed thickness of the bedrock hydrostratigraphic units (upper, intermediate and lower).

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR 3-25	ECCC KMKNO Public ESFW	Part 2, Section 6.1.4 Groundwater and surface water Part 2, Section 7.2.2 Changes to groundwater and surface water	Appendix G.2 Beaver Dam Mine: Killag River and Moose River Water Quality Predictions and Aquatic Effects Assessment – Reassessment of Killag River based on February 2021 Update (GHD modelling Provided February 12, 2021); Reassessment of Moose River based on March 2021 Update (Stantec modelling of March 11, 2021) Section 6.7.9.1 Water Treatment and Project Discharges	The EIS Guidelines require the provision of predicted changes to surface water as a result of the Project being carried out. KMKNO identified the following inconsistencies within the EIS where contradictory statements are made with respect to water treatment: • In Section 6.7.8.2.3 of the EIS under the headings EOM Predictions – Killag River on page 6-293 and PC Predictions – Killag River on page 6-294, there is a statement that "*at the near-field mixing zone there are no exceedances of either CCME, NSE Tier 1 criteria*". The EOM predictions show exceedances of CCME FWAL and NSE Tier 1 criteria for both aluminum and iron, although they are below the proposed site-specific criteria. • Section 6.7.9.1 of the EIS, states that "*there are no exceedances of either CCME, NSE Tier 1 criteria… there are no anticipated effects to surface waters as a result of discharges from the Project to the Killag River and so water treatment is not likely to be required*." However, the predictive water quality assessments demonstrate a need for treatment during the construction, operations and post-closure phases. In addition, other statements within the EIS and appendices provide the following contradictory statements with respect to water treatment: o Treatment is expected to be required during construction. o Treatment for nitrite is expected to be required at Beaver Dam during operation due to predicted exceedances of criteria at the edge of the mixing zone. o Treatment for arsenic is expected to be required at Beaver Dam during operation to meet MDMER discharge limits. o Post-closure, without treatment, there may be exceedances of CCME guidelines for cobalt, zinc, aluminum, and iron in the near field and far field receiving water at Beaver Dam, and treatment is proposed. In addition, water quality predictions have been made on annual and monthly averages. There is a concern that spikes of elevated contaminants in receiving waters may happen periodically. Some of these surface water contaminants may accumulate in sediments further creating long term risks. This is especially a concern as no sediment quality modelling is planned. Based on these statements, it is unclear when water would be treated (during construction, operations, and/or post-closure) and for which contaminants of concern the water will be treated. Based on IR 3-19, the potential for acid generation and metals leaching during operations may be underestimated. DFO's advice to the Agency has also identified several areas of uncertainty associated with surface water quality and quantity predictions. Due to the uncertainties in the modelling and aquatic effects assessment, there is insufficient rationale to conclude that water treatment is unnecessary in the operations phase. Additional information is required to support this conclusion. This information is required to ensure an adequate prediction of effects to surface water quality.	a) Explain the discrepancies identified with respect to water treatment. Clarify during which project phases water treatment will occur and for which contaminants of concern the water will be treated. b) Provide a rationale to support the conclusion that no water treatment is required during the operations phase. c) Provide a plan for water treatment during all phases, as required, to address uncertainties with the predictions. The plan should include monitoring parameters and frequency; conditions under which treatment would be required; and how a treatment system would be deployed effectively and efficiently to address concerns with water quality.
Fish and Fish Habitat					
The Agency is still considering the need to issue additional IRs related to fish and fish habitat; however, based on advice from DFO and others, concerns remain about the Project's potential impacts to fish and fish habitat. Key concerns raised include flow reductions, decreased water quality, sedimentation and inadequate offsetting. Should no further IRs be issued, the Agency will prepare its draft Environmental Assessment Report based on the information provided by Atlantic Mining NS Inc., advice from Fisheries and Oceans Canada and the Mi'kmaq of Nova Scotia, and comments received during the public comment period.				

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
Migratory Birds and their Habitat					
IR 3-26	ECCC	Section 6.1.7 Migratory Birds Section 6.1.8 Species at Risk	Section 6.12.4 Figure 6.13-1A	The EIS Guidelines require the Proponent to provide baseline information to assess the impact on migratory birds, species at risk and their habitat. The Beaver Dam Mine Site Project Development Area has been adjusted to facilitate micro-siting of Project infrastructure, and now includes a western expansion and a southeastern expansion. Bird surveys (point counts) were conducted on July 3 and July 13, 2019, in the southeast expansion area, but it is not clear whether each of the ten point count locations were surveyed on those two occasions, or if only a subset was surveyed on July 3rd and the rest on July 13th. Breeding bird surveys are usually conducted no later than early July in the Maritimes. Bird survey data is required for the entire Project Development Area to adequately evaluate the potential effects and cumulative effects of the Project on migratory birds, including migratory bird species at risk and species of conservation interest, and to develop mitigation and monitoring plans. This information is required to assess the effects of the project on migratory birds and their habitat as well as species at risk.	a) Clarify whether all point count survey points in the southeast expansion were surveyed on both July 3rd and July 13th. b) Describe potential effects (direct and cumulative) to migratory bird SAR and SOCI as a result of the western expansion area and provide any updates to the mitigation and monitoring plans.
Accidents and Malfunctions					
IR 3-27	ECCC (CEAA-2-16)	Part 6, Section 6.7.1 Effects of Potential Accidents or Malfunctions	Section 6.18.3.3 Settling Pond Failure, Table 6.18-4 Fish and Fish Habitat	The EIS Guidelines require the Proponent to assess the impact of accidents and malfunctions. The response to CEAA-2-16 states that "*in the event of an unlikely malfunction and breach of the north or east ponds, an assessment of the sedimentation of habitats would be completed, and if necessary localized remediation of lake and stream habitats could be undertaken to remove the deposited solids. Although short term impacts to biota and habitats are expected, recovery of the system would be expected*". The response states that "*in the case of fine sediments … the entire plume is expected to move through the system to Sheet Harbour where the mobilized solids are expected to have a negligible effect on the harbour's sediments*". The model therefore estimates that 9,691,000 kg of fine silt will be deposited to the marine environment at Sheet Harbour as a result of the unlikely failure of the East Pond. There is a lack of evidence to support this conclusion. This information is required to evaluate the impacts of the release of sediment due to an accident or malfunction.	a) Provide evidence to support the conclusion that short term effects of biota and habitats are expected rather than longer term effects and the recovery of the system would be expected. b) Provide the transport distance to Sheet Harbour. c) Provide evidence to support the conclusion that the deposit of this amount of fine silt would have a negligible effect on the harbour's sediments.
Human Health					
IR 3-28	HC	Section 6.3.4 Aboriginal peoples	Section 2.3, Appendix C-2 HHRA Pg. 13 PDF Section 6.2.6.1.2 Temporal Bouderies Pg. 303 PDF Section 6.5.6.1.2 Temporal Bouderies Pg. 403 PDF Section 6.6.6.1.2 Temporal Bouderies Pg. 442 PDF	The EIS Guidelines require a complete HHRA examining all exposure pathways for pollutants of concern to adequately characterize potential risks to human health. Insufficient rationale and scientific evidence is provided to validate the temporal boundaries of the HHRA. According to the EIS, there are several phases of the Project, including construction, operations, active closure, and post- closure. Sections of the EIS related to air quality, surface water quality and quantity, and ground water quality and quantity all indicate that their assessment temporal boundaries are inclusive of one or more of the above-mentioned phases. However, the temporal boundaries of the HHRA only examine the operational phase because it is "...*the time period associated with maximum emission releases*". Aside from this explanation, no additional rationale or scientific evidence is provided to validate this proposed sole phase of assessment. This information is necessary to determine the potential health effects associated with the Project.	a) Update the HHRA to include all project phases, or provide further discussion on the rationale for the exclusion of any these project phases. In particular, the construction phase may involve different activities than the operational phase, which might warrant separate assessment.
IR 3-29	HC	Section 6.1.10 Aboriginal	Section 7.2, Appendix C-2 HHRA	The EIS Guidelines require a complete HHRA examining all exposure pathways for pollutants of concern to adequately characterize potential risks to human health.	a) Update the HHRA based on Health Canada's

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
		peoples Section 6.3.4 Aboriginal peoples	Pg. 65 PDF	Outdated HC Toxicological Reference Values (TRVs) have been utilized in Table 7-3 of the HHRA. HC (2021) has published updated guidance on TRVs, including changes to the TRVs for cadmium and lead. HC notes that the TRV for lead is provisional and lead is considered a non-threshold contaminant (i.e., there is no safe level of exposure – for example lead, PM2.5, NO2). Lead levels should be kept as low as reasonably achievable. This information is necessary to determine the potential health effects associated with the Project. *Reference:* Health Canada. 2021. Federal Contaminated Site Risk Assessment in Canada: Toxicological Reference Values (TRVs) – Version 3.0, Health Canada, Ottawa, Ontario. https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/contaminated-sites/federal-contaminated-site-risk-assessment-canada-part-health-canada-toxicological-reference-values-trvs-chemical-specific-factors-version-2-0.html.	2021 TRVs for cadmium and lead to confirm if this would change the findings of the assessment. b) Include a discussion on the health risks associated with exposure to non-threshold contaminants (e.g., lead, PM2.5, NO2).
IR 3-30	HC	Section 6.1.10 Aboriginal peoples Section 6.3.4 Aboriginal peoples Section 6.2.2 Changes to groundwater and surface water	Section 2.8, Appendix C-2 HHRA Pg. 21 PDF	The EIS Guidelines require a complete HHRA examining all exposure pathways for pollutants of concern to adequately characterize potential risks to human health. Consideration of sediment and surface water (as a drinking water source) have not been included in the conceptual site model presented in the HHRA. Sediment may be impacted from mine water discharge at the Beaver Dam and Touquoy Mine Sites and have the potential to directly (e.g., incidental ingestion or dermal contact) or indirectly (e.g., consumption of country foods) impact human receptors. Additionally, there was no discussion of whether surface water was used as a drinking water source, and whether there is an expectation by Mi'kmaq of Nova Scotia land users to consume surface water when they are in the vicinity of the project site (i.e., Beaver Dam Mine Site, Haul Road, Touquoy Mine Site). This information is necessary to determine the potential health effects associated with the Project.	a) Provide a rationale for the exclusion of the sediment and surface water (as a drinking water source) in the conceptual site model pathways. Alternatively, update the HHRA to include these pathways.
IR 3-31	HC	Section 6.1.10 Aboriginal peoples Section 6.3.4 Aboriginal peoples Section 6.5 Mitigation	Section 8.1, Appendix C-2 HHRA Pg. 70 PDF	The EIS Guidelines require a complete HHRA examining all exposure pathways for pollutants of concern to adequately characterize potential risks to human health. Although a cumulative effects assessment has been included in the HHRA, it is limited to potential impacts from the Haul Road with "*10 years of dust deposition (i.e., 5 years related to operations of the Beaver Dam Mine Project, and an additional 5 years for cumulative effects associated with transport of mined materials from the proposed Fifteen Mile Stream and Cochrane Hill Mine Projects to Touquoy mine pit for processing*)". Potential impacts to human health from all project activities (e.g., impacts to surface water or air quality from all proposed mine site activities) have not been included. This information is necessary to determine the potential health effects associated with the Project.	a) Update the HHRA cumulative effects assessment to include potential impacts to human health from all current and reasonably foreseeable activities in the vicinity of the project, including Touquoy, Fifteen Mile Stream, Cochrane Hill, in addition to the Beaver Dam Mine and associated haul roads. In addition, provide a detailed evaluation of these potential effects, as well as a discussion of the potential impacts to human health from the different projects in the various locations and the timing of activities from these projects. b) Update the proposed mitigation and follow-up monitoring plans for air quality, noise, drinking water, and country foods based on this assessment.
IR 3-32	HC	Section 6.1.6 Fish and fish habitat	Section 9, Appendix C-2 HHRA Pg. 82 PDF	The EIS Guidelines require a complete HHRA examining all exposure pathways for pollutants of concern to adequately characterize potential risks to human health.	a) Provide scientific evidence explaining how the fish populations and water quality conditions of Scraggy Lake can be used as a surrogate for predicting fish bio-

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
		Section 6.3.1 Fish and fish habitat		There is a lack of scientific rationale concerning the fish samples and surface water data used as surrogates for the calculation of site-specific bio-concentration factors. The HHRA indicates that "*...due to a lack of detected fish tissue and surface water data from Cameron Flowage/Killag River*", fish tissue samples will be collected at Scraggy Lake. Subsequently, they will be used as a surrogate to calculate site-specific bio-concentration factors for the Cameron Flowage/Killag River. A scientific rationale was not provided for how fish populations and water quality conditions at Scraggy Lake are similar enough to those of Cameron Flowage/Killag River to be used as a surrogate when predicting surface water quality or fish bio-concentration factors. This information is necessary to determine the potential health effects associated with the Project.	concentration factors for the Cameron Flowage/Killag River, as well as an explanation about why there is a lack of available fish tissue data from the Cameron Flowage/Killag River.
IR 3-33	HC	Section 6.1.10 Aboriginal peoples Section 6.3.4 Aboriginal peoples	Section 6.14.7.1 Project Interactions with Mi'kmaq Traditional Use/Rights Pg. 1080 PDF	The EIS Guidelines require an assessment of any changes to environmental quality (e.g. air, water, soil) or the sensory environment (e.g. noise, light, visual landscape), or perceived disturbance of the environment (e.g. fear of contamination of water or country foods) that could detract from the use of the area or lead to avoidance of the area by the Mi'kmaq of Nova Scotia Temporal (post-closure) and spatial (Beaver Dam Mine and Touquoy Mine Sites) boundaries were not fully considered in the country foods assessment. The post-closure scenario was not included in the HHRA. Section 6.14.7.1 of the EIS states that *"[o]nce the construction, operation, and active closure phases are complete (i.e., eight years), access will be re- established within the Beaver Dam Mine Site for Millbrook First Nation and the broader Mi'kmaq of Nova Scotia community members*". As there will be unrestricted access to the mine site during the post- closure period, this time frame should be assessed in the country foods assessment. Additionally, the Touquoy Mine Site was not included in the country foods assessment. As waste rock from the Beaver Dam Site will be transported to Touquoy for final deposition within the Touquoy pit, potential impacts from pit water, upon filling, should be included in the country foods assessment. The original environmental assessment of the Touquoy Mine Site (provincial environmental assessment) does not appear to have evaluated the additional impacts from waste materials from the Beaver Dam Mine Site on the future quality and quantity of country foods in the vicinity of the Touquoy Mine Site. This information is necessary to determine the potential changes to current use of the lands for traditional purposes by the Mi'kmaq people of Nova Scotia associated with the Project.	a) Update the country foods assessment to include the post-closure period (refer to IR 3-28) at both the Beaver Dam Mine and Touquoy Mine Sites. Alternatively, provide scientific evidence for excluding a country foods assessment during these project phases (i.e., post-closure) and at all relevant locations (i.e., Touquoy Mine Site, Beaver Dam Mine Site).
IR 3-34	HC	Section 6.1.10 Aboriginal peoples Section 6.3.4 Aboriginal peoples	Section 3.2, Appendix C-2 HHRA Pg. 23 PDF	The EIS Guidelines require a complete HHRA examining all exposure pathways for pollutants of concern to adequately characterize potential risks to human health. It is unclear whether the baseline country foods data collected is representative of country foods at all project locations. In Figure 3-1 of the HHRA – Appendix C-2, baseline soil and vegetation samples only appear to be collected near the Haul Road. As mentioned in comment HC-CF-2, there may be potential exposure to contaminants in country foods and soil at either the Beaver Dam or Touquoy Mine Sites in the post-closure phase, when those areas may become fully accessible to the Mi'kmaq of Nova Scotia for traditional land use purposes. Additionally, it is not clear if there will be partial access to the mine site during construction and operations (i.e., it is not clear if fencing will surround the entire mine site). No rationale appears to be provided for the exclusion of baseline country foods monitoring around the Beaver Dam and Touquoy Mine Sites. Contaminant concentrations in vegetation/soil, as well as game/fish, that are representative of baseline conditions, should be used to predict potential impacts to human health from the consumption of country foods This information is necessary to determine the potential health effects associated with the Project.	a) Provide rationale as to how the baseline data collected from the Haul Road may be used as surrogate baseline data for the Beaver Dam and Touquoy Mine Sites (given that the Touquoy Site is to be used to pocess ore from the Beaver Dam Mine Project). Alternatively, collect onsite baseline contaminant concentrations in country foods (vegetation/fish/game species) consumed by the Mi'kmaq of Nova Scotia, as well as soil near all project sites (i.e., Beaver Dam Mine Site, Touquoy Mine Site, Haul Road). Update the assessment of potential project impacts to human health via consumption of country foods considering the baseline levels and exposure situations that may be experienced at key receptor locations during each project phase (see IR 3-33).

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					Include maps of sample locations and expected receptor locations for clarity.
IR 3-35	HC	Section 6.1.10 Aboriginal peoples Section 6.3.4 Aboriginal peoples	Appendix C-2 HHRA Section 6.1.1, Pg. 40 PDF Section 6.1.3, Pg. 45-46 PDF Section 6.1.4, Pg. 46-47 PDF Section 6.1.5, Pg. 47-48 PDF	The EIS Guidelines require a complete Human Health Risk Assessment examining all exposure pathways for pollutants of concern to adequately characterize potential risks to human health. 'Baseline' and 'project + baseline' scenarios have not been included for all country foods. Unlike the case of berries and leafy vegetation (Tables 6-3 and 6-4), estimated COPC concentrations were not presented for fish in the 'project alone' or 'project + baseline' scenarios (Section 6.1.4). Furthermore, predicted concentrations of 'baseline', 'project alone', or 'project + baseline' COPC concentrations in game meat, have not been presented in Section 6.1.5 of the HHRA. This information is necessary to determine the potential health effects associated with the Project.	a) Update the country foods assessment to include all project scenario (i.e., 'baseline', 'project alone', and 'project + baseline') predictions for all country foods (i.e., fish and game meat), or provide rationale for excluding these results.
IR 3-36	HC	Section 6.1.10 Aboriginal peoples Section 6.3.4 Aboriginal peoples	Appendix C-2 HHRA Section 6, Pg. 38-57 PDF	The EIS Guidelines require a complete HHRA examining all exposure pathways for pollutants of concern to adequately characterize potential risks to human health. Aquatic species and terrestrial organ meats do not appear to have been considered in the country foods assessment when estimating dietary exposures, which may underestimate health risks. According to the First Nations Food, Nutrition and Environment Study for the Atlantic (2017), local terrestrial (organ meats) and aquatic species are likely consumed by First Nation populations in the area. This information is necessary to determine the potential health effects associated with the Project. *Reference:* First Nations Food, Nutrition and Environment Study (FNFNES). 2017, Results from Eel Ground First Nation, New Brunswick; Atlantic AFN Regions (New Brunswick/Prince Edward Island and Nova Scotia/Newfoundland): University of Ottawa and Assembly of First Nations: http://www.fnfnes.ca/docs/Atlantic_Regional_Report_Eng_Jan_25.pdf.	a) Update the country foods assessment to include freshwater species and any terrestrial organ meat consumed that may be impacted by project-related activities, or provide rationale for excluding any of these country foods from the assessment.
IR 3-37	HC	Section 6.2.2 Changes to groundwater and surface water	IR Response II package	The EIS Guidelines require the prediction of changes in groundwater quality associated with the Project. There is uncertainty concerning the Project's potential impact on nearby potable groundwater sources. In its response to CEAA 2-34 in the October 2021 Round II Information Request Responses, the Proponent states that "*[g]iven the distance to the nearest water well, it is highly improbable that any potable groundwater resources will be affected by the mine site*". Moreover, the Proponent reports in the same document that "*R2 is located approximately 5km southwest of the Beaver Dam Mine Site and is outside the predicted groundwater area of influence of the Beaver Dam Mine Site*". A review of the supporting evidence concerning the "*predicted groundwater area of influence of the Beaver Dam Mine Site ("Section 7, PDF page 40 of Appendix F.5 in the Updated 2021 EIS [AMNS 2021]*") did not provide a clear explanation and/or series of maps validating this claim. This information is required to assess the impacts on potable groundwater sources.	a) Provide additional information and/or maps delineating the Beaver Dam Mine Site's *"...predicted groundwater area of influence..."* to determine whether potable groundwater supplies may be impacted.
IR 3-38	HC	Section 6.2.2 Changes to groundwater and surface water	CEAA-2-34, Pg. 395 PDF	The EIS Guidelines require the prediction of changes in surface water quality associated with the Project. According to the HHRA, *"[f]uture surface water predictions were not available for some COPCs (barium, beryllium, boron, chromium, strontium, vanadium)*". Consequently, it was noted that *"[t]his could affect the recreational swimming exposures and fish consumption risks for these COPCs*". A rationale was not provided explaining this information gap. This information is required to assess the impacts on surface water quality.	a) Explain why surface water predictions were not available for barium, beryllium, boron, chromium, strontium, and vanadium.
Mi'kmaq of Nova Scotia					
The Agency is still considering the need to issue additional IRs related to the current use of lands by the Mi'kmaq of Nova Scotia, particularly by members of Millbrook First Nation; however, concerns remain about the Project's potential impacts in this area. Should no further IRs be issued, the Agency will prepare its draft Environmental Assessment Report based on the information provided by Atlantic Mining NS Inc. and input received from the Mi'kmaq of Nova Scotia.					

TABLE 2: INFORMATION REQUIREMENTS ON THE DISPOSAL OF TAILINGS AT TOUQUOY ISSUED FOR THE FIFTEEN MILE STREAM PROJECT RE-ISSUED FOR THE BEAVER DAM PROJECT

Geology and Geochemistry					
IR 3-39	NRCan ECCC EAC KMKNO	Part 2, 6.1.4 Groundwater and surface water Part 2, 6.2.2 Changes to groundwater and surface water	Section 5.9 Residual Effects and Significance Appendix E.1 – Sediment Baseline Analytical Results	The EIS Guidelines require the Proponent to present baseline information, including sediment quality analysis for key sites likely to receive mine effluents. The residual effects section of the EIS states that there will be a change in soil and sediment quality via migration of contaminants from dust deposition and runoff events, including metals leachate/acid rock drainage (ML/ARD) interactions and a change in soil and sediment quality as a result of slope destabilization and road widening activities associated with Haul Road construction. However, sediment contamination predictions were not considered. Omitting sediment predictions in the receiving environment of both Beaver Dam and Touquoy and downstream means the metal mass balance is incomplete and therefore, the predictions to water quality cannot be verified. Predicting future sediment quality through modelling would remove some uncertainty associated the predictions of effects associated with possible sediment contamination. KMKNO also commented on this uncertainty, at it was noted that acid may begin to generate after 18 to 25 years. The predictions of sediment contamination and its potential effects are necessary to determine potential changes to water quality.	a) Provide information on suspended solids, partitioning coefficient of Contaminants of Potential Concern (COPC) and settling rates for particles used to predict sediment accumulation of COPC. b) Provide associated predictions of sediment contamination in the receiving environment of both Beaver Dam and Touquoy and downstream during construction, operation, closure, and post-closure. c) Provide sediment quality modelling to help quantify impacts to sediment based on the baseline sediment quality dataset. d) Use these predictions to determine if mitigation measures associated with the effluent (stand-by modular treatment), tailings and potentially acid generating waste rock management are the best available technology and techniques economically feasible.
IR 3-40	NRCan IAAC	Part 2, Section 6.1.2 Geology and geochemistry Part 2, Section 6.2.2 Changes to groundwater and surface water	Appendix E.3 – Beaver Dam Project : Geochemical	The EIS Guidelines require an assessment of changes to water quality attributed to acid rock drainage and metal leaching associated with the storage of waste rock, ore, low grade ore, tailings, overburden and potential construction material – specifically referencing quantity and quality of effluent to be released from the site into the receiving waters. Appendix E.3 provides the Geochemical Source Term Update, without the supporting data to verify the scaling factors. Although Section 22 of Appendix E.3 of the EIS states "*As with the previous model, the Beaver Dam pit wall runoff predictions rely heavily on the data humidity cell and pit sump data available for the Touquoy mine for model calibration purposes*", the associated data nor the previous model were presented for verification. Further, no information was provided on how the field bin data was used in source term development and water quality modelling. This information is needed to fully evaluate effects on surface water and subsequently fish and fish habitat.	a) Provide a comparison of the source term model output with site monitoring data (i.e., seepage and/or runoff from waste storage facilities) and field bin data to support the verification of scaling factors.
IR 3-41	ECCC Public	Part 2, 6.14 Groundwater and surface water	Section 6.5 Geology, Soils and Sediment Section 6.5.7.4 Potential Project Interactions, Touquoy Mine Site	The EIS Guidelines require sediment quality analysis for key sites likely to received mine effluents. Sediment quality is an important aspect of a healthy ecosystem especially in supporting fish health in the receiving environment. The Proponent conducted baseline sediment studies but has not modelled or predicted impacts to sediments nor is any monitoring program planned to evaluate sediment quality. While water quality modelling and monitoring programs give good information related to the health of the aquatic environment, continuous loadings of elevated COPCs may be deposited to sediments over time, which may then act as an ongoing source of contamination in the benthic environment, which can affect fish health. Section 65.7.4 of the EIS states "*There are no effects to geology, soil, and sediment anticipated to be caused by the processing of ore and the management of tailings (exhausted pit) from the Project at the Touquoy Mine Site*." However, supporting evidence for this statement was not provided. COPCs in sediments in streams and rivers can be remobilized over time or during high flow events to create risks to downstream aquatic receptors. Without these predictions, it is difficult to evaluate the significance of risks to sediment quality.	a) Complete an assessment of potential effects to sediment quality or provide rationale as to why this is not required. b) Provide details on any monitoring or follow-up that is proposed to confirm predictions related to the Project's effects on sediment quality. c) Provide supporting evidence for the assertion that the processing and storing of the Beaver Dam tailings at Touquoy will not affect sediment quality at Touquoy.

Groundwater and Surface Water					
IR 3-42	IAAC KMKNO EAC ESFWA SC	Part 2, Section 6.1.4 Groundwater and surface water	Appendix F.6 Groundwater Flow and Solute Transport Modelling	The EIS Guidelines require an appropriate hydrogeologic model for the Project Area, which discusses the hydrostratigraphy and groundwater flow systems. Appendix F.6 provides an updated model of the Touquoy Mine Site where tailings from Beaver Dam are to be deposited. The modelled output differs significantly from the values provided in the 2019 EIS. However, insufficient information was provided to determine exactly what values were changed to obtain a different result. KMKNO also commented on insufficient information for the groundwater model. For example, Section 3.2 of Appendix F.6 of the EIS provides conceptual model boundaries and indicates that natural hydrologic and hydrogeologic boundaries such as watershed boundaries and surface water bodies were used to define the lateral extent of the conceptual model. However, the values assigned to these model boundaries were not provided. In particular, the changes made to the groundwater model with respect to Moose River and other surface water bodies to obtain a better calibration with observed drawdown and reduction in baseflow observed at Moose River and other surface waterbodies should be explained, as also identified in comments submitted by KMKNO. Figure 4.4 in Appendix F.6 illustrates the locations where surface water boundary conditions were assigned. However, the values assigned to these surface water boundaries were not provided. Section 3.3.1 of Appendix F.6 of the EIS provides the conceptual model for overburden hydrostratigraphic units including identifying four overburden units (stony till, silt till, organics and silty drumlin). This section states that the stony till unit is assumed to be 4 metres thick but does not provide evidence to substantiate this assumption. No thickness is provided for the other three overburden units. Figure 4.2 in Appendix F.6 of the EIS states that weathered fractured bedrock is 10 metres thick; however, this is not related to rock quality designations for boreholes and there is no discussion as to whether or not this varies between the five identified bedrock units. This information is needed to ensure that the Touquoy groundwater model can reliably evaluate changes in groundwater and subsequent effects on surface water and fish and fish habitat.	a) Provide the values of all model boundary conditions including the type of condition applied (e.g. constant head, constant flux, river, drain, etc.). b) Provide the values assigned to the constant head and river boundary conditions for the surface water bodies and the methodology used to select the values. Provide the changes, if any, to the values assigned to Moose River and other surface waterbodies to obtain a better calibration with observed drawdown in groundwater and reduction in baseflow observed at Moose River and other surface waterbodies that could be affected. c) Provide the evidence to support the thickness of the four overburden units. d) Provide rock quality designations for the five identified bedrock units to support the assumption that fractured bedrock extends 10 metres.
IR 3-43	IAAC KMKNO ESFW	Part 2, Section 6.1.4 Groundwater and surface water	Appendix F.6 Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Fifteen Mile Stream Tailings in Touquoy Open Pit Section 6.6.4.2.2 Touquoy Gold Mine Site Baseline Conditions	The EIS Guidelines require an appropriate hydrogeologic model for the Project Area, which discusses the hydrostratigraphy and groundwater flow systems. Section 3.3.1 of Appendix F.6 states that the hydraulic conductivities of till is estimated to range from $3x10^{-7}$ to $1x10^{-5}$ metres per second; however, no information is provided as to how these values were estimated, which of the four identified till units were tested, and what screen intervals were tested (e.g., was fractured bedrock screened in addition to overburden). Similarly, in Section 3.3.2 of Appendix F.6 of the EIS, ten hydrostratigraphic units are described for bedrock and a range of hydraulic conductivities were provided. However, it is unclear if all bedrock units were tested for hydraulic conductivity and no information is provided regarding the type of testing. Figure 3.1 in Appendix F.6 of the EIS illustrates the range in hydraulic conductivity estimates based on packer tests and slug tests, but there is no indication of where these tests were located at the site and what unit was tested. Section 6.6.4.2.2 of the EIS provides hydraulic conductivity estimates of various hydrostratigraphic units. However, the calibrated modelled values are not within the same order of magnitude of the field estimated values provided in Section 6.6.4.2.2 of the EIS. KMKNO also commented on hydraulic conductivity zones within the model and a lack of appropriate labelling for reviewers. This information is needed to ensure that the Touquoy groundwater model can reliably evaluate changes in groundwater and subsequent effects on surface water and fish and fish habitat.	a) Provide details on how the hydraulic conductivity was estimated including which overburden and bedrock units were tested, and the screen interval tested. If not all overburden and bedrock units were tested for hydraulic conductivity or if all tests were conducted with screened sections in both overburden and bedrock, provide a rationale for not testing all identified units. Discuss the uncertainty that this would have on the modelled results. b) Provide the locations that were tested for hydraulic conductivity in overburden and bedrock. c) Revise the Touquoy groundwater model to reflect hydraulic conductivities estimated from field data or provide a rationale for using values that are different by orders of magnitude.

IR 3-44	IAAC KMKNO ESFWA	Part 2, Section 6.1.4 Groundwater and surface water	Appendix F.6 Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Fifteen Mile Stream Tailings in Touquoy Open Pit Appendix E.3 Geochemical Source Term Update	The EIS Guidelines require an appropriate hydrogeologic model for the project area, which discusses the hydrostratigraphy and groundwater flow systems; a sensitivity analysis will be performed to test model sensitivity to climatic variations (e.g., recharge) and hydrogeologic parameters (e.g., hydraulic conductivity). Section 4.3.5 of Appendix F.6 of the EIS states that the extent of the Touquoy pit was modelled as of August 2019. However, Appendix F.6 (the Touquoy groundwater model) was updated in 2021. It is unclear if the pit is modelled at the extent that was mined in 2019 or if it was updated to reflect the extent that was mined in 2021. If the model does accurately reflect groundwater levels and baseflow in 2020 and 2021, it provides more confidence in the predictive ability of the model. Figure 4.5 of Appendix F.6 illustrates the locations of the calibration targets. This shows that all the calibration targets are immediately adjacent to the mine site features with no wells located in the study area. This lack of distributed data can result in a poor correlation with regional groundwater levels resulting in poor predictive capabilities of the model. Table 4.6 of Appendix F.6 provides calibrated model parameters. Although there are fourteen different hydrostratigraphic units identified, the expected range is the same for all overburden units and the same for all bedrock units. The upper and lower expected ranges do not seem to be based on site specific data relating to the actual hydrostratigraphic units. Vertical anisotropy seems to have been assigned via PEST rather than due to any geological properties identified. Site-specific observations and data must be provided to support the reasonableness of the vertical anisotropy. Figure 4.7 of Appendix F.6 illustrates the calibration sensitivity to parameter estimates. However, it does not indicate the number of calibration targets (monitoring wells or surface water monitoring locations) in each identified hydrostratigraphic unit. Figure 5.4 of Appendix F.6 illustrates the drawdown at the end of Fifteen Mile Stream Operations at the Touquoy Mine Site. This should be clarified to indicate why the model was not run to simulate the end of Beaver Dam operations. The drawdown contours are very tight and parallel to Moose River. This may indicate that the river and constant head boundary conditions assigned are influencing the drawdown more in the model than they may in nature. This can result in an over prediction in the amount of baseflow that will flow into Moose River at the end of operations. Table 5.3 and 5.4 in Appendix F.6 provides the source term concentrations used to predict mass loadings to Moose River from groundwater. Section 5.4.1 of Appendix F.6 states that the solute transport model assumes that Beaver Dam tailings would have the same characteristics as Touquoy based on the similarity in the source rock and that the tailings would be produced in the same mill. However, Appendix E.3 provides source terms for tailings at the Beaver Dam Mine Site which would provide a more accurate result. As per IR 3-19 IRs this should be revised to use data from the Beaver Dam Mine Site rather than Cochrane Hill. The source term concentrations provided in Table 5.3 and 5.4 of Appendix F.6 are not consistent with those calculated for Beaver Dam tailings in Appendix E.3 of the EIS. The contaminant transport model should be updated to use the source terms derived for the Beaver Dam Mine Site. KMKNO also commented on the predicted groundwater concentrations and how they relate to Moose River. Section 5.4.2.1 of Appendix F.6 of the EIS states that Figures 5.11 and 5.12 illustrate that predicted concentrations are below detection limits; however, the solute transport model does not predict concentrations of individual metals instead provides a relative concentration. This relative concentration should be applied to the contaminants of concern which have concentrations above the detection limit. This information is needed to ensure that the Touquoy groundwater model can reliably evaluate changes in groundwater and subsequent effects on surface water and fish and fish habitat.	a) Provide the modelled results simulating the pit extent for 2020 and 2021 and the calibration to observed groundwater levels and baseflow. b) Provide the rationale for not having calibration targets (monitoring wells, river gauges) more distributed throughout the model domain. Discuss how this lack of data will affect the accuracy of modelled predictions. c) Provide site-specific data to support the expected ranges for the calibration targets including groundwater recharge, evapotranspiration, hydraulic conductivity, and vertical anisotropy. d) Provide the number of calibration targets in each of the hydrostratigraphic units in Figure 4.6 of Appendix F.6. e) Clarify if the model was run to simulate drawdown at the end of Fifteen Mile Stream operations. Revise to model the drawdown at the end of Beaver Dam operations. f) Describe how Moose River was modelled and if the boundary condition set is influencing the drawdown contours. Discuss the potential for over-predicting the groundwater contribution to at the end of operations. g) Update the contaminant transport model to use the source terms calculated in Appendix E.3. h) Apply the predicted relative concentration to demonstrate the concentrations anticipated into Moose River for individual COPC.
IR 3-45	IAAC ECCC ESFW	Part 2, Section 6.1.4 Groundwater and Surface water Part 2, Section 6.2.2 Changes to groundwater and surface water	Section 6.6.7.3 Touquoy Mine Site Section 6.6.8 Mitigation	The EIS Guidelines require a description of changes to groundwater quality associated with the storage or release of any mine effluents or drainage including surface runoff. Table 6.6-9 of Section 66.7.3 of the EIS provides the potential groundwater interactions with project activities at the Touquoy Mine Site. The simulated concentrations are given for the south-western property line. However, it is unclear if the calculations take into consideration the existing concentrations of the COPCs in the receiving waters when determining the concentration. Table 6.6-9 should be revised to contain the concentration of each parameter in the receiving water predevelopment (or a range of concentrations), concentration in receiving water from the most recent sampling during mine operations, predicted concentration of effluent at the outfall, predicted concentration of effluent 100 metres from the outfall and predicted concentration at the south-western property boundary.	a) Revise Table 6.6-9 of Section 6.6.7.3 of the EIS to provide the concentration of each parameter in the receiving water predevelopment (or a range of concentrations), concentration in receiving water from the most recent sampling during mine operations, predicted concentration of effluent at the outfall, predicted concentration of effluent 100 m from the outfall and predicted concentration at the

				Section 6.6.8 of the EIS states "*The Touquoy Mine Site is currently operational, mitigation measures for the Touquoy Gold Project can be found in the 2007 Focus Report (CRA 2007b), Industrial Approval and Touquoy Mine Site in annual monitoring reports*." However, based on the Environmental Assessment Registration Document (EARD) for the Touquoy Expansion submitted to the province, Touquoy has increasing concentrations of contaminants which in some cases are reaching threshold levels. The EARD documents four monitoring wells (TMW-3A, TMW-4A, TMW-6A, TMW-14A) with concentrations above predicted levels for the following parameters (Appendix SD 19A 2020 Annual Report, Table 12 page 3.28): cadmium, copper, manganese, nickel, silver, zinc. Page 4.3 of the same document states that increasing trends are observed in several monitoring wells which has triggered increased surveillance. Copper reached Threshold 2 action level; cobalt, copper, total ammonia, and sulfate exceeded Threshold 1 and/or 2 levels at the TMF; and increasing trends are also observed for cobalt, chloride, copper, arsenic, ammonia. Page 4.5 states that although water quality associated with sulphate does not exceed any water quality guidelines, it may indicate the potential for other water quality parameters associated with the waste rock runoff or seepage to migrate toward watercourse #4. Based on this information, it would seem that mitigation measures above what was proposed during the 2007 Focus report are required at the Touquoy Mine Site. Furthermore, the addition of tailings from the Beaver Dam Mine Site to the Touquoy Mine Site may further contribute to the observed increasing concentrations. This information is needed to determine if the mitigations proposed are sufficient to prevent long-term adverse effects on groundwater quality and quantity.	south-western property boundary of the Touquoy Mine Site. b) Describe any mitigations that will be employed to treat the effluent at the Touquoy Mine Site above what was described in the 2007 Focus Report as a result of the increasing trends observed on site and concentrations reaching threshold levels.
IR 3-46	IAAC KMKNO NCNS Westwood ESFW	Part 2, Section 6.2.2 Changes to groundwater and surface water	Appendix F.8, Section 6.0 Effluent Water Quantity and Quality Appendix F.6 Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Fifteen Mile Stream Tailings in Touquoy Open Pit	The EIS Guidelines require the presentation of changes to water quality attributed to acid rock drainage and metal leaching associated with the storage of waste rock, ore, low grade ore, tailings, overburden and potential construction material. Section 6.0 of Appendix F.8 of the EIS describes the potential tailings deposition scenarios considered which are as follows: • "*Base Scenario: The tailings deposited in the Touquoy pit from processing the ore concentrate from the Beaver Dam deposit only* • *Cumulative Effects Scenario: The tailings deposited in the Touquoy pit from processing the Beaver Dam ore with ore from the Touquoy mine project, and ore concentrates from the Fifteen Mile Stream and Cochrane Hill mine projects.*" Based on the minimum three-year delay expected for Cochrane Hill; it is unlikely that Cochrane Hill concentrate will be blended with Beaver Dam concentrate. In addition, pending regulatory approval, the Touquoy tailings may be deposited in the Touquoy pit prior to the Beaver Dam tailings or Fifteen Mile Stream ore concentrate. The scenarios should be revised to reflect the current plans of Atlantic Mining Nova Scotia and break down the effect of adding tailings or concentrate from each of the mines when they could be reasonably predicted to be deposited temporally. The groundwater flow model in Appendix F.6 does not consider that the hydraulic conductivity around the pit would be increased due to increased blasting fractures. Based on Google Earth the edge of the pit is only 50 metres from Moose River on its western side. Therefore an increase in hydraulic conductivity could significantly increase the speed at which mine contact water reaches Moose River during the period when the pit is being filled with Beaver Dam tailings and post-closure. Therefore, the model and the assimilative capacity modelling may both underestimate the input of mine water to Moose River. KMKNO also expressed concerns related to a potential contamination of Moose River given its proximity to the Touquoy Pit. Section 9.1 of Appendix F.8 of the EIS provides the Cormix model assumptions. The model inputs use the same average flow in Moose River when considering the higher flow condition and lower flow condition, only the climate normal effluent flow is changed. Section 8.0 of Appendix F.8 states the pit effluent and the river flow are driven by the same meteorological factors. Therefore, it is unclear why the higher flow condition would not assume a higher flow in Moose River and vice versa with the lower flow condition. An Assimilative Capacity Study of Moose River was submitted for both this Project and for the Fifteen Mile Stream Project, which is also undergoing a CEAA 2012 assessment. The modelled inputs vary between the two studies, without an explanation provided. In the Fifteen Mile submission, for the higher flow condition, the climate normal effluent flow in in Moose River in April was 45.6 L/s; however, the same input parameter for Beaver Dam submission was 48.5 L/s. Similarly there is a discrepancy between the for the higher flow condition, the climate normal effluent flow in in Moose River in April was 48.6 L/s; however, the same input parameter for Beaver Dam submission was 44.2 L/s. There is also a discrepancy between the values provided for effluent flow and dilution ratio provided in Table 9 in the Beaver Dam and Fifteen Mile EIS submissions.	a) Describe additional potential tailings deposition scenarios: • Beaver Dam tailings only; • Touquoy tailings plus Beaver Dam tailings; • Touquoy and Beaver Dam tailings plus Fifteen Mile Stream concentrate; and • Touquoy and Beaver Dam tailings plus Fifteen Mile Stream and Cochrane Hill concentrate. b) Calculate the additional loading of contaminants that may occur if the blasting of the pit increases the hydraulic conductivity causing a hydraulic connection between the pit and Moose River. c) Provide the rationale for using the same average flow in Moose River when assessing the higher and lower flow condition. d) Explain the discrepancies between the modelled input values, effluent flow and dilution ratios for the Assimilative Capacity Study of Moose River submitted for Fifteen Mile Stream and Beaver Dam. e) Assess the mixing model using summer and winter temperatures for the pit water and Moose River, in addition to the average condition of 10 °C to assess the effects of differences in temperature to the mixing model.

				Temperature effects at the effluent discharge point and within the mixing zone, including downstream watercourse impacts, were not clearly identified in the EIS. The assumption that both the effluent and receiver would have the same temperature of 10 °C and the same density of 1000.5 kg/m^3 does not seem to be supported by data. The temperature of the water would be expected to be at or below freezing in winter and the temperature in the pit in summer would be expected to be warmer than in Moose River given that there is likely some contribution of groundwater to the baseflow of Moose River that would moderate the temperature. The drawdown of the water table caused by the mine pit dewatering would potentially cause an increase in the surface water temperature. Appendix B.6 of the EIS covered operations effluent effects, but did not assess stream effects related to baseflow, or water temperature, which can increase with decreases in baseflow, thus increasing the potential for cold-water species habitat destruction. Appendix A of Appendix F.8 provides water quality parameters and statistics data. However, only data from 2016-2017 is included. More recent data since the mine began operations is available. This appendix and the CORMIX model should be updated with the more recent data. This information is required assess the potential effect on surface water quality.	f) Assess stream effects related to baseflow changes, water temperature fluctuations and the associated impacts to fish and fish habitat. g) Update Appendix A of Appendix F.8 of the EIS with more recent available data. Update the CORMIX model to reflect the more recent data.
IR 3-47	IAAC ECEL	Part 1, Section 3.1 Designated project	Appendix F.7 – Section 3.0 Conceptual Tailings Deposition Plan and 3.1 Normal Operation (Spring, Summer, and Fall)	The EIS Guidelines state that the scope of the EIS includes changes to processes and infrastructure at the Touquoy Mine site related to the Beaver Dam project, including: storage of tailings in the Touquoy Mine pit and related water management. Section 3.0 of Appendix F.7 of the EIS states that the Touquoy pit has a volume of 8.962 million cubic metres and that the expected volume of tailings from the Beaver Dam is 6.03 million cubic metres. However, the volume of tailings expected to be deposited in the Touquoy pit from the Touquoy mine, Fifteen Mile Stream mine, and Cochrane Hill mine is not provided. In addition, the amount of water the pit is expected to accommodate is not provided. This information is required to determine the amount of tailings to be stored in the Touquoy pit from the Touquoy, Fifteen Mile Stream, and Cochrane Hill mines and to understand the current status of the water management at the Touquoy site.	a) Provide the volume of tailings that is proposed to be deposited in the Touquoy pit from the Touquoy, Fifteen Mile Stream and Cochrane Hill mines, as well as the volume of water the pit is expected to accommodate.
IR 3-48	IAAC	Part 2, Section 6.1.4 Groundwater and surface water	Appendix F.7, Section 6.0 Model Sensitivity and Limitations Appendix F.6 Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Fifteen Mile Stream Tailings in Touquoy Open Pit	The EIS Guidelines require an appropriate hydrogeologic model for the project area including a detailed conceptual model, which discusses the hydrostratigraphy and groundwater flow systems; the rationale for the selected model will be provided; a sensitivity analysis will be performed to test model sensitivity to climatic variations (e.g., recharge) and hydrogeologic parameters (e.g., hydraulic conductivity). Section 6.0 of Appendix F.7 of the EIS uses a groundwater contribution provided from the groundwater model. However, the value used does not reflect the value provided in the updated Appendix F.6. Appendix F.7 should be revised to contain up-to-date assumptions so that the results can be considered representative of actual site conditions. This information is required to ensure accurate baseline groundwater contribution values are provided.	a) Clarify why different groundwater contribution values were used in the water balance and quality model versus the groundwater flow and solute transport model. b) Explain how these differences could impact the conclusions and mitigation measures.
IR 3-49	ECCC KMKNO ECEL	Part 2, Section 6.1.4 Groundwater and surface water	Appendix F.8 Beaver Dam Gold Project Assimilative Capacity Study of Moose River – Touquoy Pit Discharge (pg. 4)	The EIS Guidelines require an assessment of how the Project could affect surface water quality. The Canadian Council of Ministers of the Environment (CCME) (2003) which defines the mixing zone as, "*an area contiguous with a point source (effluent) where the effluent mixes with ambient water and where concentrations of some substances may not comply with water quality guidelines or objectives.*" The dimensions of the mixing zone at the discharge watercourse should be tied back to a risk-based selection in the watercourses, vs an arbitrary assignment of 100 metres. The mixing zone/dispersion of effluent analysis was not described in detail in the EIS. Typically, the proposed location of the discharge pipe, diffuser arrangements, and plume analysis using 2D or 3D modelling (including effects of vary discharge volumes, concentrations and understanding temperature effect) would be clearly stated, whereas they are not within the EIS. CCME (2003) states that "*Conditions within the mixing zone should not result in bioconcentration of POPC to levels that are harmful to organisms, aquatic-dependent wildlife, or human health. Also, accumulation of toxic substances in water or sediment to toxic levels should not occur in the mixing zone*." It is unclear whether the quality of the effluent would enable the mixing zone to achieve the conditions cited in CCME (2003). This information is required to ensure an adequate prediction of effects to fish and fish habitat and adherence to CCME guidelines.	a) Explain how the effluent quality will be at such a level that the two conditions cited in CCME (2003) will consistently be met in the mixing zones for both Beaver Dam and Touquoy. b) Provide a mixing zone/dispersion of effluent analysis using a model that includes the effects of varying discharge volumes, concentrations and temperatures.

				Reference: Canadian Council of Ministers of the Environment (CCME). 2003. *Canadian Water Quality Guidelines for the Protection of Aquatic Life: Guidance on the Site-Specific Application of water quality guidelines in Canada: Procedures for deriving numerical water quality objectives*. In: Canadian Environmental Quality Guidelines. Winnipeg	
IR 3-50	ECCC ESFWA	Part 2, Section 6.1 Project setting and baseline conditions	Section 6.7.4.1.2 Touquoy Mine Site, Existing Conditions (pg. 6-228)	The EIS Guidelines require the presentation of baseline information in sufficient detail to determine how the Project could affect surface water. The EIS states "*The use of the Touquoy Mine Site for the processing of Beaver Dam ore and deposition of the associated tailings will occur after ore extraction from the Touquoy open pit has ceased. As such, the baseline conditions for the Touquoy Mine Site for the Project operations will be the conditions expected near the end of the Touquoy ore processing operations."* However, Section 6.7.5.2.3 of the EIS states *"the surface water quality in Moose River is not anticipated to be adversely affected by the operation of the Touquoy Mine Site. Therefore, the baseline conditions in Moose River for the Project at the Touquoy Mine Site are anticipated to be similar to the existing conditions*." From this, it is understood that existing conditions will be used as baseline conditions in evaluating potential effects to Moose River from this Project. This leads to some uncertainty based on discussions in other sections of the EIS that use the results from the 2017 baseline surface water quality results as baseline. This information is required to adequately identify the surface water baseline.	a) Confirm which baseline data set is considered existing conditions for Moose River for the environmental effects assessment of relevant valued components. b) Explain any differences in how baseline data has been selected across valued components, as applicable. c) Provide a rationale to support the statement that "*the surface water quality in Moose River is not anticipated to be adversely affected by the operation of the Touquoy Mine Site.*" and confirm how mitigation will be adjusted based on Environmental Effects Monitoring (EEM)/monitoring results collected during future operations.
IR 3-51	ECCC	Part 2, Section 6.1.4 Groundwater and Surface Water Part 2, Section 6.2.2 Changes to groundwater and surface water	Section 6.7.7.3.3 Touquoy Mine (pg. 6-268)	The EIS Guidelines require the predictions of changes in surface water quality associated with any mine effluent releases or surface runoff. The EIS states "*Water quality in Scraggy Lake and WC4 were evaluated qualitatively, as the Beaver Dam ore processing and deposition to the exhausted pit are not expected to change the water quality in the TMF [Tailings Management Facility], nor downstream*." It is unclear why Beaver Dam ore processing will not change downstream water quality. This information is required to determine if downstream water quality will be effected by the Beaver Dam ore processing and deposition.	a) Provide the rational to support the assertion that Beaver Dam ore processing will not change downstream water quality.
IR 3-52	ECCC	Part 2, Section 6.1 Project setting and baseline conditions Part 2, Section 6.2.2 Changes to groundwater and surface water	Section 6.7.5.2.3 Touquoy Mine Site Section 6.6.3.3 Surface Water Quality Section 6.6.3.3.2 Touquoy Mine Site (pg. 289)	The EIS Guidelines require the presentation of baseline information in sufficient detail to determine how the Project could affect surface water quality associated with any mine effluent releases or surface runoff. The EIS discusses the 2017 groundwater and surface water monitoring report (Stantec 2018a); however this report is missing so the accuracy of the baseline data presented for Touquoy cannot be verified. All groundwater and surface water modelling and the subsequent effects assessment are based on establishing solid baseline conditions. This information is required to verify the baseline water quality predictions.	a) Provide the following report: Stantec Consulting Ltd. (Stantec). 2018a. 2017 Annual Report - Surface Water and Groundwater Monitoring. Prepared for Atlantic Mining Nova Scotia Inc.
Cumulative Effects					
IR 3-53	KMKNO Public	Part 2, Section 6.7.3. Cumulative Effects assessment	Section 8.4.3.1 Current and Past Projects	The EIS Guidelines require the identification and assessment of the Project's cumulative effects. The assessment of cumulative effects is qualitative, with limited information on the other projects and activities (past, present and reasonably foreseeable). The lack of detail on the projects and activities, and their environmental effects limits the ability to adequately characterize the cumulative environmental effects. The EIS should use quantitative data, when available, to assess cumulative effects. Some projects in the area that are considered in the cumulative effects assessment, such as the Fifteen Mile Stream, Touquoy, and Cochrane Hill mines, are owned by the Proponent. Other projects identified in the cumulative effects assessment have undergone, or are currently undergoing the federal or provincial EA process. Comprehensive information about these projects and activities, particularly those owned by the Proponent, should be considered in the cumulative effects assessment.	a) Provide quantitative data and analysis for other past, present and reasonably foreseeable projects and activities in the study areas (where available) to substantiate the conclusions in the cumulative effects assessment in the EIS.

				This information is necessary to determine the cumulative effects associated with the Project.	
IR 3-54	KMKNO IAAC	Part 2, Section 6.73 Cumulative effects assessment	Appendix F.8 Beaver Dam Gold Project Assimilative Capacity of Moose River Pit Discharge	The EIS Guidelines require an assessment of the Project's cumulative effects on surface water and fish and fish habitat. The *Assimilative Capacity of Moose River Discharge Report* (Appendix F.8 of the EIS) conducted modelling for the cumulative scenario, which predicted concentrations at the end of the 100 metre mixing zone in the receiving environment of Moose River. A different report entitled "*Assimilative Capacity Study of Moose River – Touquoy Pit Discharge*" was submitted as Appendix I.5 for the Fifteen Mile Stream project. The predictions made in both reports included releases from the Project combined with releases from Fifteen Mile Stream, Cochrane Hill, and Touquoy mine sites. This model predicted that a full mixing dilution is not achieved until 120 m from the outfall. "*Six parameters of potential concern have predicted concentrations above the NSE Tier 1 EQS or the CCME limits: aluminum, arsenic, cobalt, copper, nitrate and cyanide*". The report submitted for Fifteen Mile Stream (Appendix I.5 of the Fifteen Mile Stream EIS) states that water treatment will be required for arsenic and ammonia; however, the report submitted for the Beaver Dam EIS (Appendix F.8), states that based on the predicted concentrations cyanide and cobalt would also require treatment. This information is required to determine the cumulative effects on surface water and fish and fish habitat.	a) Explain why two different reports were submitted to analyze the assimilative capacity at Touquoy in the Beaver Dam and Fifteen Mile Stream EIS submission. Given that the predictions for treatment differ, consider water treatment for all four contaminants of concern: ammonia, arsenic, cobalt and cyanide.