Canadian Northern Economic Development Agency | Agence canadienne de développement économique du Nord

February 28, 2023

Keith Morrison
Manager, Impact Assessment
Nunavut Impact Review Board
P.O Box 1360,
Cambridge Bay, NU X0B 0C0

Via Email: info@nirb.ca

Re: Government of Canada's Response to the Comment Request for Agnico Eagle's "Meliadine Extension" Project Proposal (NIRB File No. 11MN034)

Dear Keith Morrison,

Thank you for the opportunity to provide comments on Agnico Eagle Mines Limited (Agnico)'s Draft Commitment List for the Meliadine Extension Project Proposal as well as an update on the federal government's technical review comments. The Northern Projects Management Office is providing a consolidated submission from the following departments: Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Fisheries and Oceans Canada (DFO), Environment and Climate Change Canada (ECCC), Health Canada (HC), Natural Resources Canada (NRCan), and Transport Canada (TC).

Please refer to Appendix A for our comments on the commitment list and Appendix B for new technical comments or substantial revisions to existing comments based upon the supplemental information received from Agnico on or before January 31, 2023.

The Government of Canada notes that some departments have recently received additional information or are waiting for further information from Agnico. Review of this new information is ongoing. We look forward to providing the Nunavut Impact Review Board (NIRB or the Board) with a more fulsome update during the Pre-Hearing Conference on the status of our review comments and hearing the views of other parties. Please refer to Appendix C for a list of federal attendees.

The Government of Canada looks forward to continued participation in the Board's assessment process. If you have any questions, please contact me at 867-765-8057, or kaitlyn.bakker2@cannor.gc.ca.

Sincerely,

Bakker, Kaitlyn
Digitally signed by Bakker, Kaitlyn
Date: 2023.02.28 13:41:46 -07'00'

Katie Bakker
A/ Senior Project Manager
Northern Projects Management Office
Canadian Northern Economic Development Agency

Canada

GCDOCS # 110190201

Attachments: Appendix A: Government of Canada's Comments on Agnico Eagle's Commitment List

Appendix B: Government of Canada's New and Revised Technical Review Comments

Appendix C: Government of Canada Participants for Meliadine Extension March 16th Pre-Hearing Conference

cc: Felexce Ngwa, Crown-Indigenous Relations and Northern Affairs Canada
Jennifer Walsh, Crown-Indigenous Relations and Northern Affairs Canada
Victoria Shore, Environment and Climate Change Canada
Stephinie Mallon, Environment and Climate Change Canada
Alasdair Beattie, Fisheries and Oceans Canada
Julie Anderson, Health Canada
Adam Downing, Transport Canada
Vikash Narine, Natural Resources Canada

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The following table represents a list of commitments made for Agnico Eagle's Meliadine Extension Proposal. Rows that have been highlighted in grey indicate a commitment has been fulfilled and/or considered resolved.

Meliadine Extension – List of Commitments

No.	Stage Commitment Made	Party Responsible for Commitment	Raised in Item#	Commitment	Commitment Status / Timeline	Form of Submission	Actions Toward Resolution	Status of Resolution (According to Agnico)	Government of Canada Comments
1.	Information Requests	Agnico Eagle	CIRNAC-IR-14	Agnico Eagle commits to update the 2019 Analysis of the Risk of Temporary Mine Closure (Term and Condition No. 90 of Project Certificate No.006) in the annual report to reflect updates based on Meliadine Extension.	Following issuance of Project Certificate Amendment	Annual Report	Immediate resolution was not required for this commitment but will be completed per the agreed timeline.	Resolved	N/A
2.	Information Requests	Agnico Eagle	HC-IR-1	Agnico Eagle commits to meet with Health Canada to confirm understanding of the Meliadine Extension and associated topics received from Health Canada.	Complete Meeting held October 12, 2022	Meeting notes and PowerPoint slides	Commitment complete	Resolved	N/A
3.	Information Requests	Agnico Eagle	ECCC-IR-8	Agnico Eagle commits to address net-zero plan and carbon sinks during the NIRB technical review stage.	Complete	Technical Comment Submission	Commitment complete	Resolved	ECCC: ECCC agrees that this commitment is complete and therefore ECCC-IR-8 is resolved. ECCC's technical comments in relation to the net-zero plan and carbon sinks were captured under ECCC-TRC-05.
4.	Information Requests / Technical Comments	Agnico Eagle	NRCan-IR-19 NRCan-TRC-08	Agnico Eagle commits to evaluate models using suitable data that have been acquired from new thermistor cables installed in the vicinity of the Discovery deposit through the Type A Water Licence Amendment.	December / January	Water Licence Amendment Application	Commitment complete	Resolved	NRCan: NRCan agrees that this commitment is complete and therefore NRCan-TRC-08 is resolved.
5.	Technical Comments	Agnico Eagle	KivIA-TRC-01 KivIA-TRC-02 SDFN/NDFN-TC-01 SDFN/NDFN-TC-03 SDFN/NDFN-TC-04	Agnico Eagle commits to address many caribou topics raised by KivIA, GN, and SDFN/NDFN during the Meliadine Extension NIRB process at the Meliadine TAG including: 1 Definition of deflection 2 Caribou movement and monitoring (around windfarm, airstrip, and roads), including noise levels 3 Zone of Influence around windfarm 4 Mitigation markings of Discovery waterline	Commitment no longer applicable as the wind turbines will be shut down during caribou migration	No longer applicable	Commitment no longer applicable as the wind turbines will be shut down during caribou migration.	Resolved	N/A
6.	Technical Comments	Agnico Eagle	KivIA-IR-04 KivIA-TRC-03 GN-TRC-09 GN-TRC-10	The Windfarm Management Plan will be reviewed with the TAG and updated prior to the construction of the windfarm, if required.	Prior to construction of windfarm	Windfarm Management Plan	Immediate resolution was not required for this commitment but will be completed per the agreed timeline.	Resolved	N/A
7.	Technical Comments	Agnico Eagle	ECCC-TRC-11	Agnico Eagle agrees to conduct one more year of bird surveys prior to construction of the full footprint of the windfarm. This includes spring and fall migration and breeding bird season.	Prior to construction of windfarm	Annual Report	Immediate resolution was not required for this commitment but will be completed per the agreed timeline.	Resolved	ECCC: Based on Agnico's response to ECCC-TRC-11, commitment 7 and commitment 22, ECCC considers ECCC-TRC-11 resolved.
8.	Technical Comments	Agnico Eagle	TC-TRC-01	Should the airstrip move forward in the future, Agnico Eagle will complete consultation and file the summary report with the Minister of Transport as required by the Canadian Aviation Regulations.	Commitment no longer applicable as the airstrip is removed from the Meliadine Extension scope.	No longer applicable	Commitment no longer applicable as the airstrip is removed from the Meliadine Extension scope.	Resolved	N/A

9.	Technical Comments	Agnico Eagle	TC-TRC-02	Agnico Eagle will complete and submit the application for exemption under *Canadian Navigable Waters Act* 24 with all the required information to Transport Canada.	90 days following issuance of the Project Certificate	Transport Canada online application	Immediate resolution was not required for this commitment but will be completed per the agreed timeline.	Resolved	N/A
10.	Technical Comments / Technical Meeting	Agnico Eagle	TC-TRC-03	Agnico Eagle will review the Minor Works Order and if applicable, submit the application to Transport Canada.	Complete Agnico Eagle submitted to TC and NIRB on January 20, 2023	Transport Canada online application, if applicable	Commitment complete	Resolved	N/A
11.	Technical Comments	Agnico Eagle	CIRNAC-TRC-01	The Spill Contingency Plan, Water Management Plan, and Adpative Management Plan will be updated to include nomenclature around the Discovery waterline, specific to the mitigation measures that were included within the Spill Contingency Plan updated during the Waterline Application.	90 days following issuance of the Project Certificate	Spill Contingency Plan, Water Management Plan, and Adaptive Management Plan	Immediate resolution was not required for this commitment but will be completed per the agreed timeline.	Resolved	N/A
12.	Technical Comments	Agnico Eagle	DFO-TRC-08	Agnico Eagle will evaluate ponds in the X Watershed next year during field investigations, and will provide a list of the baseline monitoring to be collected before proceeding with new work on the site and the associated schedule.	Complete	Memorandum	Commitment complete Agnico Eagle and DFO had an in-person workshop on January 17-19, 2023 in Yellowknife to work through outstanding Technical Comments and Commitments. Agnico Eagle and DFO are working together toward resolution.	Resolved	DFO: DFO cannot provide complete Technical Comments on Agnico Eagle's "Mine Extension" Project Proposal without additional information. Significant changes were made to the 2014 initial project including an increase in number of waterbodies proposed to be drained and significant changes to in-water work and structures to be constructed. These changes will result in additional impacts on fish and fish habitat within and downstream of the project footprint. Additionally, the Fisheries Act 2019 includes the restored provisions for the protection of fish and fish habitat, which were not considered in the original project. As such, the Proponent needs to provide information on all projected impacts on fish and fish habitat in order to ensure adequate consultation on all components that might affect fish and fish habitat. DFO participated in a workshop on January 17-19, 2023 with Agnico Eagle Mines (Agnico) and the Kivalliq Inuit Association (KIA) to discuss outstanding Technical Comments submitted by DFO in October 2022. DFO is waiting on a deliverable from Agnico to address items identified in the Technical Comments to Agnico. While DFO and Agnico are working together toward resolution of outstanding commitments, until DFO has had the opportunity to review the response from Agnico received on February 27, 2023, DFO cannot consider the commitments complete. This comment applies to all DFO commitments in this table.

13.	Technical Comments	NIRB	GN-TRC-12	Agnico Eagle agrees with the proposed modification to Term and Condition No. 111	Issuance of the Project Certificate	n/a	Commitment complete NIRB to determine Term and Condition modifications	Resolved	N/A
14.	Technical Comments	Agnico Eagle	NIRB-TC-001	Agnico Eagle commits to adding the following thresholds and mitigation measures to Table C.2 of the Dust Management Plan 90 days prior to construction of the airstrip: ● Frequency: regular weekly or more frequent inspection during the late spring and summer periods ● Indicator: measured dustfall and deterioration of visibility along the airstrip ● Threshold: deterioration of visibility, safety concern, dustfall exceeding 1.58 mg/cm^2/30day at station DF-9 (located 500 m south the airstrip) □ Mitigation Measures: use water and/or calcium chloride to control the dust, grade the airstrip surface and add new granular material to the airstrip surface	Commitment no longer applicable as the airstrip is removed from the Meliadine Extension scope.	No longer applicable.	Commitment no longer applicable as the airstrip is removed from the Meliadine Extension scope.	Resolved	N/A
15.	Technical Comments	Agnico Eagle	KivIA-TC-08 KivIA-TC-09 CIRNAC-TRC-02 ECCC-TRC-07 ECCC-TRC-08 NRCan-TRC-02 NRCan-TRC-03 NRCan-TRC-04	Agnico Eagle commits to detailed discussion and evaluation of in-pit deposition through the Type A Water Licence Amendment.	Replaced by Commitments 40, 41, 42	n/a	Commitment complete	Resolved	NRCan: NRCan has provided additional comments and recommendations on commitment 15, 40 and 42 below. NRCan considers NRCan-TRC-03 and NRCan-TRC-04 resolved, while NRCan-TRC-02 is unresolved. In addition, as it is not referenced here, NRCan considers NRCan-TRC-05 unresolved.
16.	Technical Comments	Agnico Eagle	KivIA-TC-04 KivIA-TC-05	Details of the water balance and water quality predictions on surface contact water discharge quality to Meliadine Lake will be provided as part of the Type A Water Licence Amendment process.	Complete Water Balance and Water Quality Update submitted to NWB on January 13, 2023	Water Licence Amendment Application	Commitment complete	Resolved	N/A
17.	Technical Comments	Agnico Eagle	DFO-TRC-02 DFO-TRC-03 DFO-TRC-04 DFO-TRC-05	Agnico Eagle commits to continue working with the DFO through the parallel regulatory process to obtain a *Fisheries Act* Authorization and provide details in Final Fish Habitat Offsetting Plan	Complete	Memorandum	Commitment complete Agnico Eagle and DFO had an in-person workshop on January 17-19, 2023 in Yellowknife to work through outstanding Technical Comments and Commitments. Agnico Eagle and DFO are working together toward resolution.	Resolved	DFO: Please refer to DFO comments under Commitment 12 of this table.
18.	Technical Meeting	Agnico Eagle	DFO-TRC-01, 02, 03, 04, 05, 06, 07 and 08	Agnico Eagle commits to meeting DFO and KivIA in Yellowknife to resolve outstanding matters.	Complete Meeting held in Yellowknife January 17-19, 2023	Memorandum	Commitment complete Agnico Eagle and DFO had an in-person workshop on January 17-19, 2023 in Yellowknife to work through outstanding Technical Comments and Commitments. Agnico Eagle and DFO are working together toward resolution.	Resolved	DFO: Please refer to DFO comments under Commitment 12 of this table.

19.	Technical Meeting	Agnico Eagle	CIRNAC-TRC-03 NRCan-TRC-09	Agnico Eagle commits to provide a thermal analysis for TIRI2.	Complete Issued to NIRB on January 30, 2023	Water Licence Amendment Application	Commitment complete	Resolved	CIRNAC: Please refer to CIRNAC-TRC-03 for updated comment. NRCan: NRCan considers NRCan-TRC-09 resolved with recommendations and further comment (NRCan-TRC-11) below.
20.	Technical Meeting	Agnico Eagle	CIRNAC-TRC-02 ECCC-TRC-07 ECCC-TRC-08 NRCan-TRC-09	Agnico Eagle commits to discuss the key components to be evaluated of in-pit deposition of waste rock and tailings.	Complete Meeting held in Rankin Inlet on November 25, 2022	Meeting	Commitment complete	Resolved	ECCC: Based on the results of commitments 20, 40 and 42, and the workshop held with Agnico, CIRNAC, ECCC, NRCan and KIA on February 6, 2023, ECCC considers ECCC-TRC-07 and ECCC-TRC-08 resolved. CIRNAC: Please refer to CIRNAC-TRC-02 for updated comment. NRCan: NRCan considers NRCan-TRC-09 resolved with recommendations and further comment (NRCan-TRC-11) below.
21.	Technical Meeting	Agnico Eagle	ECCC-TRC-05	Agnico Eagle's and ECCC's technical experts will meet to discuss the net-zero plan and carbon sinks per the requests raised by ECCC in more detail. A summary of the discussion will be provided to the NIRB following the conclusion of the meeting.	Complete Issued to NIRB and ECCC on January 19, 2023	Meeting notes	Commitment complete	Resolved	ECCC: ECCC considers TRC-05 partially resolved by the supplementary information provided by Agnico. ECCC looks forward to working with Agnico to resolve TRC-05.
22.	Technical Meeting	Agnico Eagle	ECCC-TRC-11	Agnico Eagle will conduct post-construction mortality surveys for the full footprint of the windfarm during spring, fall, and breeding bird season for 1 year and then evaluate if further years are required.	Post-construction of windfarm	Annual Report	Immediate resolution was not required for this commitment but will be completed per the agreed timeline.	Resolved	ECCC: Based on Agnico's response to ECCC-TRC-11, commitment 7 and commitment 22, ECCC considers ECCC-TRC-11 resolved.
23.	Technical Meeting	Agnico Eagle	HC-AQ-04	Agnico Eagle will provide compiled air quality annual report results compared to the 2014 FEIS and include statistical analysis.	Complete Agnico Eagle submitted to HC and NIRB on January 17, 2023	Memorandum	Commitment complete	Resolved	HC: Air quality data from operations to date provided by Agnico Eagle support the conclusions of the air quality assessment and have reduced the uncertainty identified in HC's technical review. HC considers that this commitment has been fulfilled such that the department can complete its assessment. Please refer to updated technical comment HC-AQ-04 for more information.
24.	Technical Meeting	Agnico Eagle	Technical Meeting	Agnico Eagle commits to bring members of the Terrestrial Advisory Group to an existing / representative windfarm location.	End of January 2023	Site visit summary	A site visit to an existing windfarm has not been executed by the end of January as initially proposed; however, Agnico Eagle has proposed a date during the week of	Resolved	N/A

							February 13 for TAG members. At this time, logistics are being finalized.		
25.	Technical Meeting	Agnico Eagle	SDFN/NDFN-TC-02	Provide a schematic of the Discovery waterline and All-weather access road waterline connection.	Complete Agnico Eagle submitted to SDFN/NDFN and NIRB on January 19, 2023	Schematic and crosssection	Commitment complete	Resolved	N/A
26.	Technical Meeting	Agnico Eagle	GN-TRC-01	Agnico Eagle will provide with respect to the chronic air quality assessment in the Human Health Risk Assessment: 1) additional rationale on how and why people use the discrete receptor locations and why the selected toxicity reference values correspond to these uses; 2) details regarding the underlying assumptions which the toxicity reference value were derived; and 3) sensitivity analysis with risk estimates.	Complete Agnico Eagle submitted to GN and HC on January 19, 2023	Technical Memorandum	Commitment complete	Resolved	N/A
27.	Technical Meeting	Agnico Eagle	GN-TRC-02	Agnico Eagle will provide additional details on the assumptions used in the risk assessment, specifically: 1) when users are at the discrete receptor locations and how they use those locations; 2) duration of visits; and 3) who are the users (i.e., whether they are adults or families).	Complete Agnico Eagle submitted to GN and NIRB on December 16, 2022	Technical Memorandum	Commitment complete	Resolved	N/A
28.	Technical Meeting	Agnico Eagle	GN-TRC-04 HC-WQ-01	Agnico Eagle will provide more support for assumptions that Saline Pond B7 would not be used as a primary source of drinking water in post-closure and will provide the details of calculations used to determine risks associated with emergency use of Saline Pond B7 as a drinking water source.	Complete Agnico Eagle submitted to GN and HC on January 31, 2023	Technical Memorandum	Commitment complete	Resolved	HC: Additional details provided by Agnico Eagle regarding the assessment of health risks associated with use of Saline Pond B7 as a source of emergency drinking water have reduced the uncertainty identified in HC's technical review. HC considers that this commitment has been fulfilled such that the department can complete its assessment. Please refer to updated technical comment HC-WQ-01 for more information.
29.	Technical Meeting	Agnico Eagle	HC-CF-02	Agnico Eagle will provide additional information and/or reference material to provide clarification of soil quality data collected since the 2014 FEIS.	Complete Agnico Eagle submitted to HC and NIRB on December 16, 2022	Memorandum and past annual TEMMP reports	Commitment complete	Resolved	HC: Soil monitoring data provided by Agnico Eagle indicates that the maximum baseline arsenic concentration used for the human health risk assessment (HHRA) might not be fully representative of the local maximum concentration in soils. This remains a potential area of uncertainty and could be considered for monitoring. HC considers that this commitment has been fulfilled such that the department can complete its assessment. Please refer to updated technical comment HC-CF-02 for more information.

30.	Technical Meeting	Agnico Eagle	HC-HHRA-03	Agnico Eagle will provide a map showing discrete receptor locations used in the HHERA and updated monitoring stations, as well as the Meliadine Extension footprint.	Complete Agnico Eagle submitted to the HC and NIRB on December 9, 2022	Map	Commitment complete	Resolved	HC: Agnico Eagle provided maps with the requested information regarding receptor locations, monitoring stations, and Project footprint. HC considers this commitment has been fulfilled such that the department can complete its assessment.
31.	Technical Meeting	Agnico Eagle	HC-HHRA-04	Agnico Eagle will provide additional information regarding the dose-averaging approach for the chronic air quality assessment, with respect to receptor selection, exposure dose calculation, and selection of toxicity reference values, with this information being substance-specific and scenario-specific.	Complete Agnico Eagle submitted to GN and HC on January 19, 2023	Technical Memorandum	Commitment complete	Resolved	HC: Additional details provided by Agnico Eagle regarding the assessment of potential exposure to air quality contaminants for recreational land users have reduced the uncertainty identified in HC's technical review. HC considers that this commitment has been fulfilled such that the department can complete its assessment. Please refer to updated technical comment HC-HHRA-04 for more information.
32.	Technical Meeting	Agnico Eagle	HC-AQ-02	Agnico Eagle will provide a list of substances specific to the proposed airstrip's construction and operation, and determine whether any of these substances are distinct from chemicals of potential concern (COPCs) already assessed in the existing HHRA. If new substances are identified, a qualitative update to the HHRA will be completed.	Commitment no longer applicable as the airstrip is removed from the Meliadine Extension scope.	No longer applicable	Commitment no longer applicable as the airstrip is removed from the Meliadine Extension scope.	Resolved	HC: Agnico Eagle removed the proposed airstrip's construction and operation from the project scope. HC considers this commitment resolved as it is no longer applicable.
33.	Technical Meeting	Agnico Eagle	SDFN	Agnico Eagle will provide a summary of the wind analysis for the windfarm from Agnico Eagle's 3rd Party Consultant.	Complete Agnico Eagle submitted to SDFN/NDFN and NIRB on January 13, 2023	Memorandum	Commitment complete	Resolved	N/A
34.	Technical Meeting	Agnico Eagle	GN	Agnico Eagle commits to providing a graph to showing pre-COVID employment vs. actuals to evaluate differences.	Complete Agnico Eagle submitted to the GN and NIRB on December 9, 2022	Memorandum	Commitment complete	Resolved	N/A
35.	Technical Meeting	Agnico Eagle	GN-TRC-05	Agnico Eagle commits to meet with the GN to discuss which polygon to use for the potential analysis of the post-calving range.	Complete	Email of conclusions	Agnico Eagle has provided information to the GN	Resolved	N/A
36.	Technical Meeting	Agnico Eagle	GN-TRC-08	Agnico Eagle will provide a table showing caribou observations and all-weather access road shutdowns.	Complete	Table	Agnico Eagle met with the GN on January 26 and commits to collecting information moving forward.	Resolved	N/A
37.	Technical Meeting	Agnico Eagle	GN	Agnico Eagle commits to meet with the GN in Iqaluit to resolve outstanding caribou technical comments.	Complete Agnico Eagle met with GN on January 26, 2023	Memorandum	Agnico Eagle met with the GN on January 26 to discuss caribou related topics.	Resolved	N/A

38.	Technical Meeting	Agnico Eagle	KivIA	Agnico Eagle commits to meet with the KivIA to resolve outstanding caribou technical comments.	January 31, 2023	Memorandum	Agnico Eagle reached out to the KivIA on January 16 to arrange a meeting to further discuss outstanding caribou technical comments. Agnico Eagle is waiting to hear back from the KivIA on timing to meet.	Resolved	N/A
39.	Technical Meeting	Agnico Eagle	SDFN/NDFN-TC-1	Agnico Eagle commits to providing the 2014 FEIS viewshed which excludes the wind turbines.	Complete Agnico Eagle submitted to SDFN/NDFN and NIRB on January 30, 2023	Map	Commitment complete	Resolved	N/A
40.	Technical Meeting	Agnico Eagle	NRCan, ECCC, CIRNAC	Agnico Eagle commits to providing framework for Meliadine in-pit deposition studies that follows the methodology from the Meadowbank submission to NIRB.	Complete Agnico Eagle emailed to Parties on November 26, 2022	Document	Commitment complete	Resolved	ECCC: Based on the results of commitments 20, 40 and 42, and the workshop held with Agnico, CIRNAC, ECCC, NRCan and KIA on February 6, 2023, ECCC considers ECCC-TRC-07 and ECCC-TRC-08 resolved. NRCan: NRCan has provided additional comments and recommendations on commitment 15, 40 and 42 below. NRCan considers NRCan-TRC-03 and NRCan-TRC-04 resolved, while NRCan-TRC-02 is unresolved. In addition, as it is not referenced here, NRCan considers NRCan-TRC-05 unresolved.
41.	Technical Meeting	NRCan, ECCC, CIRNAC	Agnico Eagle	NRCan, ECCC, and CIRNAC will provide a response to Agnico Eagle on the in-pit deposition methodology.	Complete All parties provided comments on or before December 5, 2022	Document	Commitment complete	Resolved	
42.	Technical Meeting	Agnico Eagle	NRCan, ECCC, CIRNAC	Agnico Eagle will provide results from the in-pit methodology for tailings in-pit deposition.	Complete. Agnico Eagle submitted to ECCC, CIRNAC, NRCan, KivIA, and NIRB on December 16, 2022	Document	Commitment complete In addition, a workshop is planned with all involved Parties on February 6 for further discussions on this topic to come to a resolution.	Resolved	ECCC: Based on the results of commitments 20, 40 and 42, and the workshop held with Agnico, CIRNAC, ECCC, NRCan and KIA on February 6, 2023, ECCC considers ECCC-TRC-07 and ECCC-TRC-08 resolved. NRCan: Please refer to NRCan comments under commitment 40.
43.	Technical Meeting	Agnico Eagle	SDFN/NDFN	Agnico Eagle will provide pre-construction imagery of the Meliadine Extension locations where the wind turbines, airstrip, waste rock storage pits and borrow pits would be located and then later, disturbed.	Complete Agnico Eagle submitted to SDFN/NDFN and NIRB on December 9, 2022	Memorandum and map	Commitment complete	Resolved	N/A
44.	Technical Comment / Technical Meeting	Agnico Eagle	DFO-TRC-01	Agnico Eagle will provide maps of which waterbodies are planned to being dewatered now as opposed to the proposal from 2014 and provide an explanation as to why they need to be dewatered now and not in 2014.	Complete	Memorandum	Commitment complete Agnico Eagle and DFO had an in-person workshop on January 17-19, 2023 in Yellowknife to work through outstanding Technical Comments and Commitments.	Resolved	DFO: Please refer to DFO comments under Commitment 12 of this table.

							Agnico Eagle and DFO are working together toward resolution.		
45.	Technical Comment / Technical Meeting	Agnico Eagle	DFO-TRC-01	Agnico Eagle will provide an approximation of the fish habitat proposed to be destroyed in 2014 and what is proposed today.	Complete	Memorandum	Commitment complete Agnico Eagle and DFO had an in-person workshop on January 17-19, 2023 in Yellowknife to work through outstanding Technical Comments and Commitments. Agnico Eagle and DFO are working together toward resolution.	Resolved	DFO: Please refer to DFO comments under Commitment 12 of this table.
46.	Technical Comment / Technical Meeting	Agnico Eagle	DFO-TRC-04	Agnico Eagle will provide an explanation as to how discovering char in 2020-2021 in lake A6 and the decision to completely dewater the lake as opposed to partially dewater as was planned in 2014 follows an adaptive management approach which gives priority to avoidance of impacts.	Complete	Memorandum	Commitment complete Agnico Eagle and DFO had an in-person workshop on January 17-19, 2023 in Yellowknife to work through outstanding Technical Comments and Commitments. Agnico Eagle and DFO are working together toward resolution.	Resolved	DFO: Please refer to DFO comments under Commitment 12 of this table.
47.	Technical Meeting	Agnico Eagle	NIRB	Agnico Eagle will provide a list of items that would be provided to the NIRB if the airstrip was going to be added in the NIRB process.	Commitment no longer applicable as the airstrip is removed from the Meliadine Extension scope.	No longer applicable	Commitment no longer applicable as the airstrip is removed from the Meliadine Extension scope.	Resolved	N/A
48.	Technical Meeting	Agnico Eagle	NIRB-TM-01	Agnico Eagle has confirmed that the airstrip will no longer be included in the Meliadine Extension Project proposal. Thus, there will be no changes with respect to air transportation relating to the project, and that the current use of the airport in Rankin Inlet will continue.	Commitment made by Agnico Eagle December 15, 2022	Letter to NIRB	Commitment complete	Resolved	N/A
49.	Technical Meeting	Agnico Eagle	GN-10, KIA-01 through KIA-03 SDFN-01 and 03	Agnico Eagle will add shut down of the wind turbines during caribou migration to the list of activities included in the work suspension protocol described in the Terrestrial Environment Management and Monitoring Plan.	Commitment made by Agnico Eagle December 15, 2022	Letter to NIRB	Commitment complete	Resolved	N/A
50.	Technical Comment / Technical Meeting	Agnico Eagle	ECCC-TRC-05	Agnico Eagle commits to provide an estimate of GHG emissions associated with the construction and decommissioning phases including methodology and assumptions used.	February 10, 2023	Memorandum	New commitment added on January 19, 2023, as agreed to between ECCC and Agnico Eagle.		ECCC: ECCC acknowledges receipt of additional information related to commitment 50 on February 9, 2023. Please see ECCC-TRC-14 below for additional comments.
51.	Technical Comment / Technical Meeting	Agnico Eagle	ECCC-TRC-05	Agnico Eagle commits to review and incorporate the guidance for mitigation measure principles and the BAT/BEP determination process in Section 3 of the draft Technical Guide as per discussions on December 22, 2022.	February 10, 2023	Memorandum	New commitment added on January 19, 2023, as agreed to between ECCC and Agnico Eagle.		ECCC: ECCC acknowledges receipt of additional information related to commitment 51 on February 9, 2023. Please see ECCC-TRC-15 below for additional comments.

52.	Technical Comment / Technical Meeting	Agnico Eagle	ECCC-TRC-05	Agnico Eagle will provide more details regarding its net-zero plan as per discussions on December 22, 2022.	Complete Agnico Eagle submitted to ECCC and NIRB on January 20, 2023	Memorandum	Commitment complete New commitment was added on January 19, 2023, as agreed to between ECCC and Agnico Eagle.	Resolved	ECCC: ECCC acknowledges completion of commitment 52 via additional information received on January 20, 2023. Based on this information ECCC considers ECCC-TRC-5.3 resolved
53.	Technical Comment / Technical Meeting	Agnico Eagle	ECCC-TRC-05	Agnico Eagle confirms to perform an assessment of the Meliadine Extension impact on carbon sinks.	Complete Agnico Eagle submitted to ECCC and NIRB on January 30, 2023	Memorandum	Commitment complete New commitment added on January 19, 2023, as agreed to between ECCC and Agnico Eagle.	Resolved	ECCC: ECCC acknowledges receipt of additional information related to commitment 53 on January 30, 2023. Please see ECCC-TRC-14 and ECCC-TRC-16 below for additional comments.

Appendix B: Government of Canada's New and Revised Technical Review Comments

Review Comment #	CIRNAC-TRC-02
Subject / Topic	In-Pit Disposal of Tailings and/or Waste Rock
References	Meliadine Extension FEIS Addendum, July 2022 Appendix D-18 – Conceptual Closure and Reclamation Plan Appendix D-21 – Mine Waste Management Plan Appendix H-06 – Hydrogeology Modelling Report Appendix H-07 – Meliadine Extension Water Balance and Water Quality Model - Technical Report CIRNAC Information Requests (CIRNAC-IR-2) (September, 2022) Agnico Responses to Information Requests (CIRNAC-IR-2) (September 26, 2022)
Summary	The Meliadine Extension FEIS Addendum identifies the disposal of waste rock and tailings in mined-out pits as a waste management option. However, minimal information has been provided on the proposed in-pit disposal methods and potential environmental implications. For example, the FEIS Addendum does not evaluate potential interactions/impacts between the mine wastes that would be stored in pits and the surface/groundwater environment. Additional information and analysis should be provided before in-pit disposal at the Meliadine Mine is authorized to proceed.
Importance of Issue to Impact Assessment	There is currently insufficient information to demonstrate that in-pit disposal of tailings and waste rock can be implemented without resulting in significant environmental impacts. Further, in the absence of any information evaluating potential interactions between the disposed mine wastes and the environment, there is uncertainty regarding whether in-pit disposal is an environmentally superior alternative to the currently approved tailings and waste rock disposal practices.
Detailed Review Comment	As part of the current assessment, Agnico is seeking approval for the following options/alternatives to complement the current mine waste management strategy: • use of exhausted pits to store tailings; and • use of exhausted pits to store waste rock. The FEIS Addendum indicates that in-pit disposal has been approved for the Meadowbank Mine and, on that basis, Agnico suggested that in-pit disposal should not be included in the scope of the current Meliadine reconsideration process. CIRNAC notes that, in the case of Meadowbank, Agnico completed a broad array of site-specific baseline studies and analyses that were considered when in-pit disposal was assessed, prior to the practice being approved. For the Meliadine Mine, there is limited evidence that similar studies have been performed. For example, the FEIS Addendum and supporting documents provide limited information regarding how in-pit disposal would be applied at the Meliadine site. In addition, the FEIS Addendum does not evaluate the potential environmental interactions and impacts associated with in-pit disposal. For instance, analyses of potential impacts to groundwater quality/quantity and surface water quality/quantity are not provided. In the absence of this information, CIRNAC is unable to determine whether in-pit disposal might result in significant adverse environmental impacts at the Meliadine Mine. To address these information gaps, CIRNAC-IR-2 recommended that Agnico: a) Describe the in-pit disposal methods, general design parameters, operating practices and limitations; b) Describe the specific circumstances that would trigger the option to use in-pit disposal; c) Describe the evaluations that would be done prior to regulatory approval of in-pit disposal (e.g., updated site-specific hydrogeological and geochemical modelling, etc.); d) Describe expected closure approaches (e.g., water and/or granular covers); and

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	e) Provide an assessment of potential environmental interactions and impacts associated with in-pit disposal. Agnico's response to CIRNAC-IR-2 provided limited additional information to address the above-noted recommendations. Instead, Agnico's response generally indicated that the requested information would be provided to the Nunavut Water Board (NWB) during the Type A Water Licence Amendment process. In the absence of the requested information, CIRNAC is unable to evaluate the environmental impacts of in-pit disposal at the Meliadine Mine. Relying exclusively on the evaluation of in-pit tailings disposal at another site (i.e., the Meadowbank Mine) is not an acceptable surrogate for site-specific evaluations of potential environmental impacts at the Meliadine Mine. For example, there are potentially substantive differences between the geochemical properties of mine wastes, groundwater regimes and surface water context of the Meadowbank and Meliadine sites, all of which have the potential to influence the impacts of in-pit disposal.
Recommendation / Request	CIRNAC recommends that Agnico provides the following information: a) Detailed descriptions of the in-pit disposal methods, quantities, design parameters, operating practices and limitations; b) Descriptions of the specific circumstances that would trigger the option to use in-pit disposal; c) Site-specific technical evaluations of hydrogeological and geochemical conditions associated with in-pit disposal. This should include updated surface and groundwater quality predictions of water in or draining from pits that are used for the disposal of tailings or waste rock; d) Conceptual closure plans for any pits filled with tailings and waste rock (e.g., water and/or granular covers); e) Assessments of potential environmental interactions and impacts associated with in-pit disposal. At minimum, interactions and impacts should be assessed quantitatively for surface water quality/quantity and groundwater quality/quantity. Predictions of operational and post-closure pit water quality should also be provided. Where necessary, appropriate mitigations are to be identified and implemented; and f) Provide evidence that in-pit disposal is an environmentally superior alternative to the currently approved tailings and waste rock disposal practices at the Meliadine Mine site.
Update (as of February 28, 2023)	During the Board's Technical Sessions in Rankin Inlet (November 23-24, 2022), multiple federal departments (including CIRNAC, ECCC and NRCan) indicated that they do not support deferral, to the NWB process, the assessment of the impacts of the In-Pit Disposal of Tailings and/or Waste Rock alternative. This issue was further discussed during a follow-up meeting (November 25, 2022) in which Agnico made Commitment #42 to address the information gaps identified by the federal departments. The scope of the commitment was described in a proposed framework which was distributed by Agnico on November 26, 2022. CIRNAC provided feedback to Agnico on their proposed framework on December 5, 2022, following which Agnico committed to providing the requested information by December 16, 2022. On December 16, 2022, Agnico submitted the following documents to the Board: • *Meliadine Mine – Meliadine Mine Extension FEIS Addendum – In-Pit Deposition Alternative (Agnico: December, 2022)*. This document presents the environmental assessment of the proposed alternative. • *Meliadine Extension In-pit Deposition Alternative Water Balance and Water Quality Model (WBWQM) (Lorax: December 16, 2022).* This document presents updated surface water modelling to identify any potentially significant environmental impacts associated with in-pit disposal of tailings and waste rock.

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	• *In-Pit Tailings Disposal Study for the Meliadine Extension (Agnico: December 16, 2022. Prepared by Ardent Innovation Inc. and Lorax Environmental Services Ltd.).* This document presents an assessment of thermal and hydrogeological impacts associated with in-pit disposal of tailings and waste rock. Subsequently, CIRNAC reviewed these documents and submitted a technical memo (*Meliadine Mine Extension Environmental Assessment – Supplemental Studies for Proposed In-Pit Disposal Alternative*) to Agnico on January 16, highlighting eight aspects warranting clarification. To this end, Agnico convened a one day workshop in Ottawa on February 6, 2023, to discuss these outstanding concerns. This workshop was attended by representatives from Agnico (4 reps), CIRNAC (6 reps), NRCan (2 reps), ECCC (2 reps), KivIA (2 reps), and NWB (2 reps). Concerns discussed during the meeting relate to the following topics: Pit Filling Concept, Source Terms used in WBWQM, Contaminant Loadings from Terrestrial Tailings and Waste Rock, Modelling Based on Partial Pit Flooding; Full Mixing of Pit Lakes; Modelling Uncertainty; Water Treatment Requirements; and Storage of Water in Pits. During the meeting, Agnico committed to providing additional information during the NIRB as well as the NWB processes. The workshop details are presented in *Agnico's Meeting Notes: In-pit Deposition and Other Technical Comments-Meliadine Extension Proposal (dated February 6, 2023)*. As promised during the February 6 meeting, Agnico provided a technical memorandum titled *Meliadine Extension WBWQM-In-pit deposition Sensitivity(Lorax Environmental Services Ltd.)* on February 21, 2023. The information provided by Agnico during the February 6 meeting and additional documents has provided more clarity on the *In-Pit Disposal of Tailings and/or Waste Rock* alternative. This information will be considered in CIRNAC's ongoing review of the amendment.

Review Comment #	CIRNAC-TRC-03
Subject / Topic	Temporary Storage of Saline and Surface Contact Water in Pits
References	Meliadine Extension FEIS Addendum, July 2022 (S2.5.3) Appendix D-35 – Water Management Plan Appendix H-07 – Meliadine Extension Water Balance and Water Quality Model – Technical Report CIRNAC Information Requests (CIRNAC-IR-3) (September 2022) Agnico Responses to Information Requests (CIRNAC-IR-3) (September 26, 2022)
Summary	Section 2.5.3 of the Meliadine Extension FEIS Addendum clearly indicates that exhausted open pits may be used as an alternative for temporary saline and surface contact water storage. However, minimal information has been provided on the proposed use of the pits for temporary water storage. In addition, insufficient information has been provided on the potential environmental implications of the practice.
Importance of Issue to Impact Assessment	There is currently insufficient information to demonstrate that storage of contact water in pits will occur without resulting in significant environmental impacts. Furthermore, there is uncertainty regarding whether the storage of contact water in pits is an environmentally superior alternative when compared to the currently approved water management practices (i.e., storage of saline and surface contact water in ponds).
Detailed Review Comment	Section 2.5.3 of the FEIS Addendum clearly indicates that exhausted open pits may be used as an alternative for temporary saline an surface contact water storage. However, other than identifying the pits that are being considered for water storage (i.e., TIR02, WES04 and WES05 see Fig 2.5-3), the FEIS Addendum and supporting documents do not contain any information on the alternative. For example: • The FEIS Addendum does not evaluate potential environmental interactions and impacts associated with temporary storage of contact water in pits; • The Water Balance and Water Quality Model (Appendix H-07) does not account for storage of water in pits; and • The Water Management Plan (Appendix D-35) does not describe how water stored in pits will be managed.

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Review Comment #	CIRNAC-TRC-03
	In summary, the FEIS Addendum and supporting documents present insufficient information to assess the environmental implications of storing water in pits. To address these information gaps, CIRNAC-IR-3 requested that Agnico: a) Describe the approaches that will be used to store contact water in pits including general design parameters, operating practices and limitations (e.g., volumes stored, storage duration, any required treatment, eventual discharge to the environment); b) Describe the specific circumstances that would trigger the option to store contact water in pits; c) Describe the evaluations that would be done prior to regulatory approval of in-pit storage of contact water (e.g., updated site-specific hydrogeological and geochemical modelling); and d) Provide an assessment of potential environmental interactions and impacts associated with storing contact water in pits. Agnico's response to CIRNAC-IR-3 provided limited additional information to address requests noted above. For instance, in the case of item a), Agnico indicated that the requested information would be addressed during the Type A Water Licence Amendment process with the NWB. With regard to item b), Agnico referred to documentation that has already been provided in the FEIS submission. For item c), Agnico states they will provide 60 days notice prior to initiating water storage in pits, but there is no indication that further studies will be performed. Finally, Agnico's response to item d) refers only to permafrost interactions and impacts, with no reference to other impact mechanisms (e.g., geochemical and/or hydrological interactions). In the absence of detailed responses to the requests presented in CIRNAC-IR-3, CIRNAC is unable to evaluate the environmental impacts of storing saline and surface contact water in pits.
Recommendation / Request	CIRNAC recommends that Agnico provide comprehensive responses to each of the following: a) Describe the approaches that will be used to store contact water in pits including general design parameters, operating practices and limitations (e.g., volumes stored, storage duration, any required treatment, eventual discharge to the environment); b) Describe the specific circumstances that would trigger the option to store contact water in pits; c) Describe the evaluations that would be done prior to regulatory approval of in-pit storage of contact water (e.g., updated site-specific hydrogeological and geochemical modelling); d) Provide an assessment of potential environmental interactions and impacts associated with storing contact water in pits. At minimum, interactions and impacts should be assessed quantitatively for surface water quality/quantity and groundwater quality/quantity; and e) Provide evidence that contact water storage in mined-out pits is an environmentally superior alternative when compared to the currently approved water management practices.
Update (as of February 28, 2023)	As mentioned in previously (see TRC #2 updates), Agnico provided additional information and clarifications prior to, and during, the February 6th meeting. CIRNAC considers this information adequate for environmental assessment (EA) purposes and looks forward to reviewing the additional information which Agnico has committed to provide during the NWB process.

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Review Comment #	CIRNAC-TRC-04
Subject / Topic	Minimizing Discharges to Meliadine Lake
References	Meliadine Extension FEIS Addendum, July 2022 Appendix D-01 – Adaptive Management Plan for Water Management Appendix H-07 – Meliadine Expansion Water Balance and Water Quality Model - Technical Report Agnico response to CIRNAC TRC-05 from the Waterline Review Process CIRNAC Information Requests (CIRNAC-IR-6) (September, 2022) Agnico Responses to Information Requests (CIRNAC-IR-6) (September 26, 2022)
Summary	The FEIS Addendum for the Meliadine Extension indicates that discharges to Meliadine Lake will be more than 300% greater than discharges that were predicted during the most recent Environmental Assessment (EA) process for the site (i.e., the EA for the Meliadine Waterline). Additional information is required to demonstrate that this increase aligns with Agnico's commitment to minimize discharges to Meliadine Lake.
Importance of Issue to Impact Assessment	The FEIS Addendum for the Meliadine Extension indicates that discharges to Meliadine Lake will be significantly greater than previously predicted. Further information on the causes of these increases is necessary to understand the potential incremental impacts associated with the Meliadine Extension.
Detailed Review Comment	During the NIRB review of Agnico's proposal for the "Saline Effluent Discharge to the Marine Environment", Agnico developed an Adaptive Management Plan (AMP) for Water Management. The AMP was submitted as Appendix D-01 to the FEIS Addendum for the Meliadine Extension. The first guiding principle of the AMP is as follows: *1. Water discharges to Meliadine Lake will be minimized or eliminated (per commitment made during the waterline application and reflected in Term and Condition 25a, per Project Certificate No.006 – Amendment 002).* At the time of the Waterline EA, Agnico indicated that discharges to Meliadine Lake would be significantly lower than had been predicted during the original approval of the Meliadine Mine (per the 2014 FEIS). Specifically, the Waterline EA indicated that the maximum volume of water requiring discharge to Meliadine Lake would be 4,034 m^3/day if the waterline was approved (see Agnico response to CIRNAC TRC-05 from the Waterline Review process). Assuming water is also discharged via the waterline at a maximum rate of 20,000 m^3/day, discharges to Meliadine Lake were therefore predicted to represent only 17% of all discharges (with the remaining 83% being discharged to Itivia Harbour). In contrast, the FEIS Addendum for the Meliadine Extension Project (Appendix H-07 S.5.1.4) states: *The maximum predicted annual discharge volume to Meliadine Lake translates to a daily maximum discharge rate of 17,200 m^3/day assuming that the EWTP discharges continuously over the full discharge window of 151 days between June 2 and October 30.* Under this scenario, discharges to Meliadine Lake would be more than 300% greater than predicted at the time of the Waterline EA. In addition, the proportion of discharges to Meliadine Lake would also increase to 46% (with the remaining 54% being discharged to Itivia Harbour). Based on our review of the FEIS Addendum for the Proposed Project, CIRNAC is unable to identify the rationale for the substantive increases in the volume of discharges to Meliadine Lake relative to the volumes that were predicted at the time the Waterline EA was approved. In addition, CIRNAC has not identified information to confirm that discharges to Meliadine Lake will be minimized under the Meliadine Extension proposal. To address these information gaps, CIRNAC-IR-6 requested that Agnico: a) Confirm the maximum discharge volumes to Meliadine Lake, as presented in the Waterline FEIS and the Meliadine Extension FEIS;

Review Comment #	CIRNAC-TRC-04
	b) Present the rationale for any differences in the volumes reported under a); and c) Indicate what steps will be taken to fulfill the commitment to minimize or eliminate discharges to Meliadine Lake (e.g., ongoing grouting to limit saline water inflows to the mine). Agnico's response to CIRNAC-IR-6 provided limited additional information to address the requests noted above. For instance, in the case of item a), Agnico cited the maximum discharge volumes associated with the 2014 FEIS, not the Waterline FEIS. Regarding item b), Agnico's stated rationale is insufficient to explain the more than 300% increase in discharges to Meliadine Lake under the Meliadine Expansion FEIS relative to the Waterline FEIS. Finally, for item c), given the predicted 300% increase in discharges to Meliadine Lake under the Meliadine Extension FEIS relative to the Waterline FEIS, CIRNAC does not support Agnico's position that discussions regarding the steps Agnico will take to fulfill their commitment to minimize discharges to Meliadine Lake should be deferred to the Type A Water Licence Amendment process with the NWB.
Recommendation / Request	CIRNAC recommends that Agnico[1]: a) Confirm the maximum discharge volumes to Meliadine Lake, as presented in the Waterline FEIS and the Meliadine Extension FEIS; b) Present the rationale for any differences in the volumes reported under a); and c) Indicate what steps will be taken to fulfill the commitment to minimize or eliminate discharges to Meliadine Lake (e.g., ongoing grouting to limit saline water inflows to the mine).
Update (as of February 28, 2023)	Agnico has provided additional clarification and information that will be considered in CIRNAC's ongoing review of the Meliadine Extension application.

Review Comment #	CIRNAC-TRC-06
Subject / Topic	Post-Closure Arsenic Loadings from SP B7 to Tiri Pit Lake
References	Meliadine Extension FEIS Addendum, July 2022 Appendix H-07 – Meliadine Extension Water Balance and Water Quality Model - Technical Report CIRNAC Information Requests (CIRNAC-IR-8 and CIRNAC-IR-9) (September, 2022) Agnico Responses to Information Requests (CIRNAC-IR-8 and CIRNAC-IR-9) (September 26, 2022)
Summary	During the post-closure phase, concentrations of arsenic in some water bodies are elevated relative to baseline conditions. Additional information is required to demonstrate that elevated arsenic concentrations will remain below impact threshold concentrations.
Importance of Issue to Impact Assessment	There is currently insufficient information to demonstrate that arsenic concentrations will remain below impact thresholds in all areas of all water bodies during the post-closure phase. As a result, CIRNAC is unable to confirm that significant adverse impacts will not occur.
Detailed Review Comment	As shown in Figure 6-19 from Appendix H-07 of the FEIS Addendum (reproduced below), arsenic concentrations in SP B7 are predicted to be consistently above the Aquatic Effects Management Plan (AEMP) guideline of 0.025 mg/L.

[1] The same recommendations were included in CIRNAC-IR-6. Agnico's response to the IR did not provide sufficient information for CIRNAC to evaluate the incremental environmental impacts associated with the Meliadine Extension. As a result, the recommendations are repeated in the current TRC. If there is uncertainty regarding the intent of the recommendations, Agnico is encouraged to contact CIRNAC for clarification.

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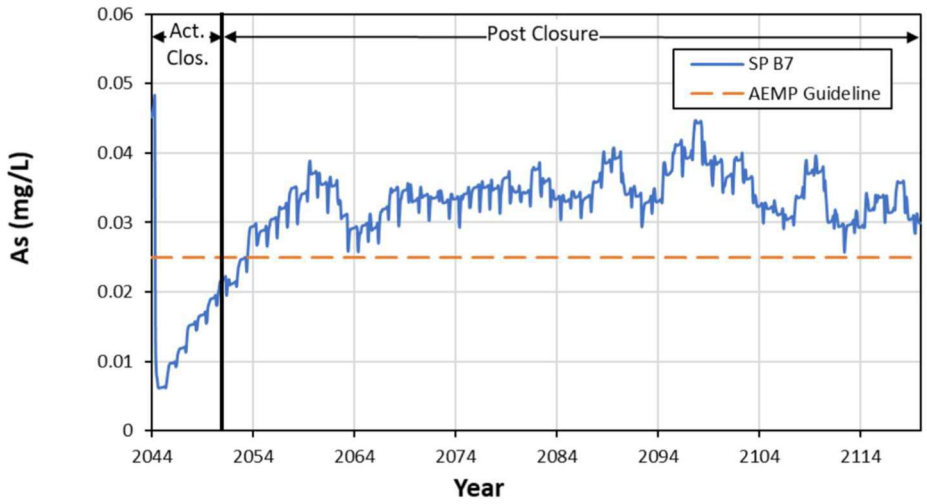
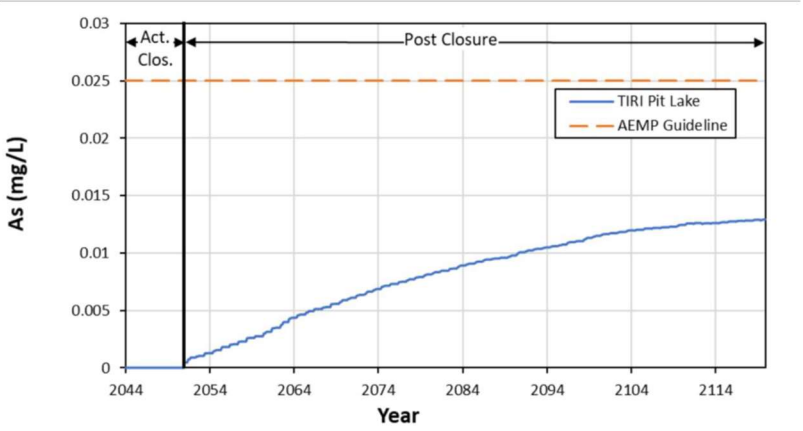
Review Comment #	CIRNAC-TRC-06



Agnico has indicated that the guideline will not apply to SP B7 because the waterbody will be designated under Schedule 2 of the MDMER. CIRNAC defers to ECCC and DFO on the Schedule 2 designation and any Fisheries Act implications associated with the elevated arsenic concentrations in SP B7.

CIRNAC notes that water draining from SP B7 will flow into the Tiri Pit Lake during post-closure. In this regard, Figure 6-31 from Appendix H-07 (reproduced below) presents the predicted arsenic concentrations in the Tiri Pit Lake throughout post-closure.



When considering the predicted arsenic concentrations presented in the above figure, CIRNAC notes the following:

- Agnico's response to CIRNAC-IR-9 b) indicates that water quality predictions presented in the FEIS Addendum are based on complete mixing in pit lakes and that no stratification or initial dilution zone considerations have been incorporated into model predictions. Consequently, some areas of the Tiri Pit Lake will have arsenic concentrations above the values shown in the above figure. For instance, drainage from SP B7 will create locally elevated arsenic concentrations within the Tiri Pit Lake near the point of discharge. The spatial extents of the elevated arsenic concentrations are not presented in the FEIS Addendum. Therefore, it is unclear whether some areas of the Tiri Pit Lake will have arsenic concentrations above the AEMP guideline.

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Review Comment #	CIRNAC-TRC-06
	• Arsenic concentrations in the Tiri Pit Lake trend upwards throughout the post-closure phase and it appears that equilibrium has yet to be reached by the end of the model run. • Long-term modelling performed by Agnico for other mine sites (e.g., the Whale Tail Pit Project) concluded that water quality predictions are accurate within one order of magnitude. The current FEIS Addendum does not specify the assumed level of accuracy of predictions. Therefore, it is unclear to CIRNAC whether the information presented in the above figure represents the upper bound of potential arsenic concentrations in Tiri Pit Lake.
Recommendation / Request	CIRNAC recommends that Agnico[2]: a) Extend the duration of water quality modelling until results demonstrate that maximum concentrations within surface water receivers have been achieved; b) Indicate the spatial extent of areas within the Tiri Pit Lake and other surface water receivers that are predicted to exceed any AEMP criteria during post-closure; c) Indicate the approximate accuracy of the water quality modelling presented in the FEIS Addendum. If the accuracy is better than the "order of magnitude" estimates presented by Agnico in other assessments, please describe how the accuracy was improved; and d) Describe the sensitivity analyses that have been performed to confirm that post-closure arsenic concentrations in the Tiri Pit Lake and other water bodies will not be substantively greater than predicted.
Update (as of February 28, 2023)	Following the Board's Technical Sessions in Rankin Inlet (November 23-24, 2022), CIRNAC has reviewed additional information submitted by Agnico in December 2022 and February, 2023, and equally participated in the February 6th workshop during which this issue was further discussed. Based on the information gathered through these interactions, CIRNAC does not have further environmental assessment-related concerns.

Review Comment #	CIRNAC-TRC-07
Subject / Topic	Post-Closure Seepage Quality from Reclaimed Areas
References	Meliadine Extension FEIS Addendum, July 2022 Appendix H-07 – Meliadine Extension Water Balance and Water Quality Model - Technical Report CIRNAC Information Requests (CIRNAC-IR-10) (September, 2022) Agnico Responses to Information Requests (CIRNAC-IR-10) (September 26, 2022)
Summary	Agnico's post-closure water quality modelling assumes that reclaimed areas of the site will not result in chemical loadings to the environment that are higher than background. Evidence supporting this assumption is required.
Importance of Issue to Impact Assessment	Even after closure, reclaimed areas of mine sites have the potential to leach metals into the environment at concentrations that are above background. Exclusion of these sources from water quality modelling could result in an under-prediction of potential environmental impacts.
Detailed Review Comment	The Water Balance and Water Quality Model (Appendix H-07, Table 4-9) states: *All mine facilities areas, ore pads, and disturbed areas will be reclaimed at the end of operations. These areas will revert to background water quality at closure.*

[2] Similar recommendations were presented in CIRNAC-IR-8 and CIRNAC-IR-9. Agnico provided incomplete responses to those recommendations and/or indicated that the recommendations should be addressed during the Type A Water Licence Amendment process with the NWB. However, given that the FEIS Addendum presents water quality predictions that are substantively different from those presented in earlier Environmental Assessments, CIRNAC is of the opinion that they should be considered in the current EA process. In addition, CIRNAC notes that NIRB's letter to Agnico (September 9, 2022) stated that the topics should be addressed during the NIRB Technical Review process.

Review Comment #	CIRNAC-TRC-07
	In their response to CIRNAC-IR-10, Agnico confirmed that water quality modelling presented in the FEIS Addendum assumes that source terms of all mine facilities will revert to background runoff concentrations during the post-closure. Regardless of the effectiveness of environmental controls during operations and the effectiveness of reclamation, CIRNAC differs from Agnico's position that reclaimed areas of the site will not result in chemical loadings that are higher than background. For example, atmospheric dispersion of dust from ore, waste rock and tailings would typically be expected to result in some deposition of metals throughout the site at concentrations that are above background. Other materials will also serve as a source term of potential metal loading (e.g., roads and pads constructed from waste rock). These sources have the potential to leach metals into the receiving environment at concentrations that are higher than background.
Recommendation / Request	CIRNAC recommends that Agnico: a) Provide evidence from other mine sites that seepage from reclaimed areas will revert to background water quality at closure.[3] b) In the absence of such evidence, an appropriate source-term should be developed for reclaimed areas of the site and water quality models should be updated.
Update (as of February 28, 2023)	Following the NIRB Technical Sessions in Rankin Inlet (November 23-24, 2022), CIRNAC has reviewed additional information submitted by Agnico in December 2022 and February, 2023, and equally participated in the February 6th workshop during which this issue was further discussed. CIRNAC notes that Agnico committed to revising the source terms to be representative of reclaimed areas and provide additional information during the NIRB process. This additional information will be considered in CIRNAC's ongoing review of the Meliadine Extension proposal.

Review Comment #	DFO-TRC-01
Subject / Topic	FEIS Addendum - Scope
References	FEIS Addendum
Summary	In order to assess the potential impacts on fish and fish habitat under the *Fisheries Act* 2019, DFO will need to reconsider the components necessary to allow work to be conducted on the Meliadine site and not only the proposed new components as suggested by Agnico.
Importance of Issue to Impact Assessment	DFO's ability to undertake the regulatory responsibility and conduct a Fisheries Act Authorization process in a timely manner will be impacted by the absence of information.
Detailed Review Comment	As stated by Agnico (Section 13 of the FEIS Addendum) "*Agnico Eagle is committed to protect the environment, as well as public and worker health and safety by conducting operations in an environmentally sound manner while pursuing continuous improvement of its environmental performance.*" and DFO expects that mine operations and plans may change in light of new environmental information. For example, the discovery of Arctic Char in Lake A6, the importance of Arctic Grayling spawning in near Lake A5 and A6, and the increased range of Ninespine Stickleback in waterbodies on the peninsula demonstrate that additional care has to be taken to protect fish resources and re-evaluate connectivity between waterbodies.

[3] In response to the same recommendation in CIRNAC-IR-10, Agnico stated that the topic should be discussed during the Water Licence Amendment process with NWB. However, given that the FEIS Addendum presents water quality predictions that are substantively different from those presented in earlier Environmental Assessments, CIRNAC is of the opinion that they should be considered in the current EA process. In addition, CIRNAC notes that NIRB's letter to Agnico (September 9, 2022) stated that the topic should be addressed during the NIRB Technical Review process.

Review Comment #	DFO-TRC-01
	In order to assess the potential impacts on fish and fish habitat under the *Fisheries Act* 2019, DFO will need to reconsider the components necessary to allow work to be conducted on the Meliadine site and not only the proposed new components as suggested by Agnico. The Proponent will ultimately require a Fisheries Act Authorization for work, undertaking and activities that will impact fish and fish habitat whether it was covered under the 2014 Board process or not. This will trigger the duty to consult provision of the *Fisheries Act*. The Government of Canada relies on the Board's process to discharge its duty to consult under section 35 of the Constitution Act, 1982. As such, the Government of Canada supports a reconsideration process that enables Indigenous peoples to meaningfully participate and ensures adequate consultation on all components that might affect fish and fish habitat. If the current Reconsideration process does not include elements upon which DFO need to consult, DFO's ability to undertake its regulatory responsibilities and issue a Fisheries Act Authorization in a timely manner will be impacted.
Recommendation / Request	With respect to the disposition of this issue, DFO recommends the Proponent: 1. Address all potential impacts to fish and fish habitat , including those within the footprint of the 2014 FEIS through the NIRB Reconsideration process for transparency and to avoid additional time during the regulatory/ Fisheries Act Authorization process. 2. Identify where the 2014 plan differs from the newly proposed project and where adaptive management approaches have been or may be taken in the Meliadine Extension that differ from Management Plans that were developed in 2014, and where new information discovered in the Aquatic Effects Monitoring Program and additional sampling events is reflected in modified operations.
Update (as of February, 2023)	Resolution of DFO-TRC-01 is contingent on specific information from Agnico. While DFO and Agnico are working together toward resolution of outstanding commitments, DFO does not consider the comment resolved. DFO has requested that Agnico provide details on: • Justification regarding the decision to dewater **Lake A6**. This should include evidence that a real risk exists to the underground mine (leaks, safety, etc.) - which will need a strong justification as it was not deemed at risk in 2014. This data will be passed to an expert for advice. • Justification regarding the destruction of **B4 and B7** for use as saline and contact water storage. What capacity for those ponds? How much water is anticipated to be stored? What is the treatment capacity? What is the goal for discharging to Meliadine Lake based on conversation with KIA? What is the saline effluent discharge capacity? • Justification regarding the full dewatering of **B6 and B5**. How is this situation different than B3-2 or B45? Why is the risk of leak justifying dewatering of B5 and 6 but not B3-2 nor B45? Why can't we not build a water tight dike on B5 and preserve that part of the lake?

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Review Comment #	DFO-TRC-02
Subject / Topic	Baseline Assessment
References	• FEIS Addendum • Information Request Response, Appendix 3, Conceptual Fish Offsetting Plan, Table 4.4-1,
Summary	DFO's ability to undertake its review and regulatory responsibility under the Fisheries Act in a timely manner will be impacted by the absence of baseline aquatic information.
Importance of Issue to Impact Assessment	DFO's ability to assess the potential effects on fish and fish habitat for the impact assessment from the proposed works will be impacted by the absence of information. The lack of baseline information may result in additional consultation and extended regulatory review period.
Detailed Review Comment	The absence of details and specific information on potential effects of the project amendments relative to the project proposed in 2014 and the changes on the landscape from 2014 to 2022 indicate that DFO must take a precautionary approach during the review and the subsequent regulatory phase. The cumulative effects of small changes in flow and timing of runoff, impact the potential for small-bodied fish to move upstream to ponds safe from predators and move downstream to overwintering habitat. There is a lack of information provided with regard to the potential impact on streams, channels between waterbodies, and seasonally inundated areas. Table 2.2-1 in the FEIS Addendum lists "Potentially Affected Waterbodies and Associated Mitigations" but does not identify channels connecting the waterbodies to other fish bearing waterbodies. Table 2.2-2 and 2.2-3 identify the geographic coordinates of waterbodies and watercourses (respectively), but does not indicate mitigation measures. Following the Information Requests, Agnico provided an updated table, Table 4.4-1, (App 3, Conceptual Fish Offsetting Plan), but the table does not identify all the connections between waterbodies that provide seasonal fish habitat and allow for fish movement to many of the waterbodies that are isolated in late summer.
Recommendation / Request	With respect to the disposition of this issue, DFO recommends the Proponent: 1. Provide additional baseline information on fish use and habitat, as well as revised impact assessments based on the increased duration of the project are required for DFO to conduct a thorough review of the potential impacts and determine what Harmful Alteration, Disruption, or Destruction of Fish Habitat is likely to occur.
Update (as of February, 2023)	Agnico has agreed to provide additional baseline fish and fish habitat assessments. Resolution of DFO-TRC-02 is contingent on receiving the specific information from Agnico after field work has been conducted in the summer of 2023. While DFO and Agnico are working together toward resolution of outstanding commitments, DFO does not consider the comment resolved, but is satisfied with the commitment.

Review Comment #	DFO-TRC-03
Subject / Topic	Hydrology

References	• FEIS Addendum
	  ○ Section 2.3.4
	  ○ Section 7.
	• Appendix D26 and D35.

Summary	The operations at the mine to date and proposed works change the direction and volume of flows on the site, including snowmelt. Although many of these changes may appear small, cumulatively they can have an impact on Fish and Fish Habitat, especially when changes to seasonally used habitat result in limits to migration, fish stranding, or temporal limits to the use of that habitat.

Review Comment #	DFO-TRC-03
Importance of Issue to Impact Assessment	DFO's ability to assess the potential effects on fish and fish habitat for the impact assessment from the proposed works will be impacted by the absence of information.
Detailed Review Comment	Although the Pathway and potential effects were reviewed in the 2014 FEIS, with the mine operation phase increase of more than 10 years, changes to the re-direction of water between Sub-basins, and permanent changes to Sub-watershed area; DFO requires details and an assessment on how the changes to outflows from the Watersheds will change the seasonal water balance of the watersheds and overall fish-use over the extended time period. Although Agnico notes in Agnico's response to DFO-IR-2 and DFO-IR-4 that the effects to fish and fish habitat have not changed in the LSA from the 2014 FEIS, the type of work and duration has changed (for example, the dewatering of Pond A53 in 2014 versus the proposed infill of Pond A53 in the 2022 proposal). These changes result in additional duration of impacts, leading to longer duration of effects in Meliadine, increased impacts to total area fisheries, and changes to potential recovery and area reclamation. In response to DFO-IR-6, Question 1, Agnico stated that "*Potential effects and residual effects for the Meliadine Extension are the same as those presented in the 2014 FEIS.*" But on page 251 of the FEIS Addendum, Agnico states "*As a result, the Meliadine Extension will have an overall small reduction in flows, and negligible effects on the water levels in Meliadine Lake*". In Section 7.1.1 of the Addendum, Agnico has determined that these changes are "Negligible" without providing the detailed assessment for DFO to complete a review of the potential effects on each fish-bearing waterbody and watercourse. Heim et al. (2019)[4] state the importance of considering stream-lake connections during fish assessments, and the importance of shallow seasonal fish habitats. The changes to hydrology in Watersheds A, B, I, J, CH, W, and X will affect how fish seasonally use specific areas of Meliadine Lake, and how the increased loss of access may impact the fish population dynamics of Meliadine Lake, as well as fish movement into the waterbodies of the sub-watersheds from Meliadine Lake. Changes to local abundance and distribution of small-bodied fish, food, water depths, and water temperature can result in changes to migratory pattern and habitat use of species important to local community use including Arctic Char and Lake Trout.
Recommendation / Request	With respect to the disposition of this issue, DFO recommends the Proponent: 1. Describe how Agnico has calculated the impact from changes in flow from diversions and reduced upstream drainage area on the seasonal streams and the diffuse channel habitats between lakes and the potential impacts on fish and fish habitat? 2. *(FEIS Addendum Sect 7.3 pg 245)* Although Agnico indicates that the magnitude of the effect is not predicted to change between the 2014 assessment and the 2022 addendum, there are identified changes in the impact to drainage area size, changes to berms, and an increase in the duration of the project. a. Discuss how the change in the contributing watershed area will impact downstream ponds and lakes and change where/when water enters Meliadine Lake (e.g. Watersheds A, B, I, J, CH, W, and X). i. Changes in overall annual discharge are not reflective of all the potential impacts to the aquatic ecosystem. Please describe the changes of flow in relation to monthly and seasonal discharge and relate those changes to potential effects on

[4] Heim, K. C., C. D. Arp, M. S. Whitman, and M. S. Wipfli. 2019. The complementary role of lentic and lotic habitats for Arctic grayling in a complex stream-lake network in Arctic Alaska. Ecology of Freshwater Fish 28(2):209–221.

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Review Comment #	DFO-TRC-03
	fish movement in and out of the watersheds, as well as temporal changes in ice-development, flow peaks, and dry periods. b. Discuss how these changes, per basin, in water contribution to Meliadine Lake will result in changes to nutrient input, changes to temperature, and changes to small-bodies fish production in areas of Meliadine Lake. ii. Will changes to the water diversion point/flow path, drainage area, and point of entry into Meliadine Lake result in changes to local aquatic ecology at the location in Meliadine Lake? Please discuss these flow changes in terms of fish use, including small-bodied fish use of seasonally inundated areas. 3. The 2014 FEIS assessed the water balance in the A Watershed in Section 7.3, primarily reporting on changes to lake water levels and the outlet to Meliadine. c. What will the change of quantity of flow/mean monthly discharge/daily discharge be at each waterbody in the A Watershed from the infilling of lakes/ponds and diversion of water to contact ponds and how many additional seasons will these drainages be changed? 4. Can Agnico describe if water from the Lake B45 Sub-Watershed still to be diverted through Pond P3, into Pond P2 (now identified as B41) into B2? If not, how will that change flows into and out of Lake B2? 5. With the change in pit size, waste rock storage area, and watershed drainage direction/area from the 2014 FEIS to the FEIS addendum proposal, what will be the overall change in available fish habitat on the site at post-closure. Please describe it in terms of area (pond/lake size & stream length) over time.
Update (as of February, 2023)	As of February 24, 2023, DFO is waiting on additional information to be provided by Agnico, including missing information on changes in surface water flow as a result of changes in the FEIS Addendum relative to what was reviewed in the 2014 FEIS. Fisheries and Oceans Canada had a workshop on January 17-19, 2023 with Agnico Eagle Mines. DFO is waiting on a deliverable from Agnico to address items identified in the Technical Comments to Agnico. While DFO and Agnico are working together toward resolution of outstanding commitments, DFO does not consider the commitment complete.

Review Comment #	DFO-TRC-04
Subject / Topic	Fish and Fish Habitat
References	• FEIS Addendum, ○ Section 7; ○ Appendix D26; ○ Appendix G7 • Table 4.4-1, App 3, Conceptual Fish Offsetting Plan • Page 708 of Volume 7 of the 2014 FEIS
Summary	Information missing on fish use and migratory changes in the A Watershed.
Importance of Issue to Impact Assessment	DFO's ability to assess the potential effects on fish and fish habitat for the impact assessment from the proposed works will be impacted by the absence of information.
Detailed Review Comment	The proposed changes to Watershed A include increased footprints of impact on waterbodies that contribute to Lake A1 and resulting potential changes to water levels at the outlet of Lake A1, changes to the discharge, including timing and duration of flows from A1 and resultant changes to incoming and out migration of fish and changes in the flow of nutrients.

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Review Comment #	DFO-TRC-04
Recommendation / Request	With respect to the disposition of this issue, DFO recommends the Proponent: 1. Lake A6, was not initially proposed to be completely dewatered, but the changes in the extension include the complete loss of Lake A6 and all water contribution to the A sub-watersheds from above Lake A1. a. Describe the differences between the partial dewatering and the complete dewatering of Lake A6 and the impact to fish populations in Lake A6 and impacts of a fish-out? b. Describe the physical and ecological differences between A6 being partially dewatered (lowered by 1.5m from baseline in 2014 FEIS) and completely dewatered (FEIS Addendum); Include a description on the loss of resident aquatic organisms, changes to physical structure and fish habitat; changes to soil regimes; and impacts to bank stability. 2. Page 708 of volume 7 of the 2014 FEIS stated that "No Arctic Char were captured in upper Peninsula waterbodies". Fish sampling in 2020 found Arctic Char in Lake A6, which implies that all downstream waterbodies contain Arctic Char, at least seasonally. Given the discovery of Arctic Char in Lake A6: a. Describe the potential impacts of the complete loss of Lake A6 relative to the partial loss of A6 on Arctic Char and how the Arctic Char population in A6, A5, A4, A3, and A1 may have contributed to the population in Meliadine Lake. 3. It was proposed in the 2014 FEIS that flows from A6 and A7 would be diverted around mine infrastructure and contribute to Lake A1 with part of the diversion channel designed to provide fish habitat. With the loss of the contribution (discharge) of Lake A6 to the downstream A sub-watershed: a. Describe how the change of flows (monthly/seasonally) from Lake A1 to Meliadine impact the use of Lake A1 by migratory fish including Arctic Char and Arctic Grayling and how will habitat change in the bay of Meliadine Lake where flows from the A sub-basin discharge. b. What was the contribution of fish from the A sub-watershed to Meliadine Lake and how will the diversion of flows away from Lake A1 impact fish populations, distribution, and movement in Meliadine Lake? c. The A Watershed outlet is in a shallow bay of Meliadine Lake. What is the habitat and fish use in that Bay and how will fish use of the bay on Meliadine Lake be changed over time/seasonally with the additional diversion of flows proposed in the FEIS Addendum? d. How will the loss of known Arctic Grayling spawning and Arctic Char use of Lake A1 impact fish populations in Meliadine Lake. e. Will changes to flow downstream of Lake A6 impact the ability for Arctic Char to migrate upstream into the A Drainage and migrate out? Will changes to flow downstream of Lake A8 impact the ability for Arctic Grayling to migrate upstream into the A sub-watershed (at A1) and migrate out? f. Pond A7 was only sampled for 1 event in August 2011 and only with Minnow Traps (Table 4.4-1, App 3, Conceptual Fish Offsetting Plan). This lack of effort is insufficient to show the absence of any large-bodied fish, and given the presence of Arctic Grayling upstream and Arctic Grayling and Arctic Char downstream, it is assumed that Pond A7 is a Arctic Grayling bearing waterbody. The FEIS Addendum should reflect that, as should the proposed changes that include dewatering Pond A7 and Lake A6. 4. What does implications of the loss of Lake A6 and A7 have on potential recovery of the fishery (population and timeline) in the A Watershed compared to the previously proposed disconnection? 5. Does Arctic Grayling recruitment in Lake A8, A7, A6, and A5 contribute to the Arctic Grayling Population in Meliadine Lake through Lake A1?

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Review Comment #	DFO-TRC-04
	6. Ponds/Lakes A49, A45, and A44 are noted in Table 4.4-1, App 3, Conceptual Fish Offsetting Plan with the impact being an Alteration, but the site layout indicates these waterbodies will be dewatered and there will be no connection to downstream fisheries, which means this habitat is completely destroyed not altered. a. What is the change in the downstream flow (in monthly mean discharge and depth in stream) from what was assessed in the 2014 FEIS? 7. There is no fish sampling information for Pond A46 in summary Table 4.4-1, App 3, Conceptual Fish Offsetting Plan . What sampling was completed and can Agnico provide details on the fish population and connection to other waterbodies? 8. A50 is assumed to provide habitat for ARGR because this pond is on flow path between A5 and A6. And this flow path has been noted as important ARGR spawning habitat. a. What is the area of Stream A51-A53, Stream A5-A50, and Stream A50-A6 and how was this habitat and fish use of this area accounted during the Arctic Grayling spawning surveys of Stream A5-A6. b. With an increased pit footprint over Ponds A52 and A53, how will the changes to the sub-watershed impact the Arctic Grayling population in A5 and downstream in Meliadine Lake. 9. Pond A53 was not proposed to be dewatered in the 2014 FEIS but is dewatered in the FEIS Addendum. a. How will the change in drainage area impact downstream flows (add cumulative effects from other dewatering in the A Watershed)? b. Would Pond A53 have supported an aquatic ecosystem during the mine operations?
Update (as of February, 2023)	As of February 24, 2023, DFO is waiting on additional information to be provided by Agnico, including missing information on changes in surface water flows in the A watershed as a result of proposed mine operation changes in the FEIS Addendum relative to what was reviewed in the 2014 FEIS, including the complete dewatering of Lake A6, diversion of upstream watershed, and potential effects on fish and fish habitat. Fisheries and Oceans Canada had a workshop on January 17-19, 2023 with Agnico Eagle Mines. DFO is waiting on a deliverable from Agnico to address items identified in the Technical Comments to Agnico. While DFO and Agnico are working together toward resolution of outstanding commitments, DFO does not consider the commitment complete and can not assess the potential impacts of changes of flow on fish and fish habitat.

Review Comment #	DFO-TRC-05
Subject / Topic	Fish and Fish Habitat
References	• FEIS Addendum, ○ Section 7; ○ Appendix D26; & ○ Appendix G7; • Table 4.4-1, App 3, Conceptual Fish Offsetting Plan
Summary	Information missing on fish use and migratory changes in the B Watershed
Importance of Issue to Impact Assessment	DFO's ability to assess the potential effects on fish and fish habitat for the impact assessment from the proposed works will be impacted by the absence of information.
Detailed Review Comment	The proposed changes to Watershed B include increased footprints on waterbodies that contribute to Lake B2 and resulting potential changes to water levels at the outlet of Lake B2, changes to the discharge, including timing and duration of flows from B2 and resultant changes to incoming and out migration of fish and changes in the flow of nutrients.

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Review Comment #	DFO-TRC-05
Recommendation / Request	With respect to the disposition of this issue, DFO recommends the Proponent: 1. Lake B59 containing Arctic Grayling, was proposed to be bermed off from mine works in the 2014 FEIS but the proposal in the 2022 Extension indicates that the lake will be dewatered. Table 4.4-1, App 3, Conceptual Fish Offsetting Plan indicates that it will be an *Alteration* of habitat, but it is a complete destruction/loss of habitat as indicated in Figure 1.1-4 of the FEIS Addendum. c. What is the Arctic Grayling population of Lake A59 and how does that population contribute downstream to Lake B46 and the lower B sub-watershed. d. What is the change in the downstream flow from B59 (in monthly mean discharge and depth in stream) from what was assessed in the 2014 FEIS? How will the loss of contributing flow impact the ability for downstream fish to reach areas where they spawn? The reduction of flow will change the quantity and timing of discharge in the lower B Sub-watershed, how will this impact fish movement in B46, B45, P2/B41, and B2 when they are connected. 2. In the 2014 FEIS, Pond B34 was left undisturbed (except for flow changes) to be later connected to Meliadine Lake through Pond B5 (Tiriganiaq Pit 2) at closure. The FEIS Addendum Site Layout (Figure 1.1-4) and the Table 4.4-1, App 3, Conceptual Fish Offsetting Plan show Pond 34 covered by a waste rock storage facility. a. Please describe how the loss of Pond B34 and the basin will impact flows at mine closure and how long it will require for reclamation.
Update (as of February, 2023)	As of February 24, 2023, DFO is waiting on additional information to be provided by Agnico, including missing baseline data and missing information on changes in surface water flows in the B watershed as a result of proposed mine operation changes in the FEIS Addendum relative to what was reviewed in the 2014 FEIS, including the additional impacts from changes in waterbodies being dewatered, the diversion of upstream watersheds, and justification of the destruction of Lakes B4, B5, B6, and B7. Fisheries and Oceans Canada had a workshop on January 17-19, 2023 with Agnico Eagle Mines. DFO is waiting on a deliverable from Agnico to address items identified in the Technical Comments to Agnico. While DFO and Agnico are working together toward resolution of outstanding commitments, DFO does not consider the commitment complete and can not assess the potential impacts of changes of flow on fish and fish habitat.

Review Comment #	DFO-TRC-06
Subject / Topic	Fish and Fish Habitat

References	• FEIS Addendum,
	  ○ Section 7;
	  ○ Appendix D26; &
	  ○ Appendix G7;
	• Table 4.4-1, App 3, Conceptual Fish Offsetting Plan

Summary	Information missing on fish use and migratory changes in the J Watershed.
Importance of Issue to Impact Assessment	DFO's ability to assess the potential effects on fish and fish habitat for the impact assessment from the proposed works will be impacted by the absence of information.
Detailed Review Comment	The proposed changes to Watershed J include increased footprints on waterbodies that contribute to Lake J1 and resulting potential changes to water levels at the outlet of Lake J1, changes to the discharge, including timing and duration of flows from J1 and resultant changes to incoming and out migration of fish and changes in the flow of nutrients. In the 2014 FEIS Pond J8 remained contributing to Lake J1, while Ponds J2 to J7 were just dewatered and remained contributing to the J Watershed.

Review Comment #	DFO-TRC-06
Recommendation / Request	With respect to the disposition of this issue, DFO recommends the Proponent: 3. What is the change in outflow from J1 in terms of seasonal and monthly average flows? 4. According to Addendum Appendix 3 Conceptual Fish Offsetting Plan Table 4.1-1, Lake J1 had a small amount of sampling in 2009 and 2012. 5. The stream J0-J1 (Lake J1 to Meliadine Lake) was subject to one small sampling event in 2004 and over 100 Ninespine Stickleback were captured. The fish presence and sampling event is not identified in Table 4.4-1, App 3 of the Conceptual Fish Offsetting Plan, nor has any other sampling been identified. Stream J0-J1 will have changes in flow from upstream work proposed in the FEIS Addendum. Please describe the impact of the changes to the upstream watershed on the outflow of Lake J1 and Stream J0-J1, as well as potential changes to fish use of the stream and small bay where the J watershed outlets. b. Is the inflow from the J watershed to Meliadine Lake an important contribution of nutrient, temperature, and flow of the bay in Meliadine Lake where it is located? c. Has fish use been sampled in the bay and will changes in seasonal flow to the bay change fish use of the bay?
Update (as of February, 2023)	As of February 24, 2023, DFO is waiting on additional information to be provided by Agnico, including missing baseline and information on changes in surface water flows in the J watershed as a result of proposed mine operation changes in the FEIS Addendum relative to what was reviewed in the 2014 FEIS. Fisheries and Oceans Canada had a workshop on January 17-19, 2023 with Agnico Eagle Mines. DFO is waiting on a deliverable from Agnico to address items identified in the Technical Comments to Agnico. While DFO and Agnico are working together toward resolution of outstanding commitments, DFO does not consider the commitment complete and can not assess the potential impacts of the changes on fish and fish habitat.

Review Comment #	DFO-TRC-07
Subject / Topic	Fish and Fish Habitat
References	• FEIS Addendum, ○ Section 7; ○ Appendix D26; & ○ Appendix G7; • Table 4.4-1, App 3, Conceptual Fish Offsetting Plan
Summary	Information missing on fish Use and migratory changes in the I Watershed.
Importance of Issue to Impact Assessment	DFO's ability to assess the potential effects on fish and fish habitat for the impact assessment from the proposed works will be impacted by the absence of information.
Detailed Review Comment	Lake I1 was subject to a potential loss in annual water from the proposed activities in the 2014 FEIS. The FEIS Addendum indicates that Lake I1 will be completely destroyed by a pit. According to Addendum Appendix 3 Conceptual Fish Offsetting Plan Table 4.1-1, Pond I was only sampled in 2012 with a Fyke Net. Other waterbodies sampled with fyke nets were also sampled with other gear types. One fyke net sampling event is not sufficient to identify fish use of the I Watershed.
Recommendation / Request	With respect to the disposition of this issue, DFO recommends the Proponent: 1. Was the channel between Lake I1 and Meliadine Lake (I0-I1) sampled for habitat and fish? 2. Is there seasonal fish use of Lake I1 and Channel to Lake I1? 3. Is Lake I1 seasonally connected to Lake J8 (even occasionally)?

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Review Comment #	DFO-TRC-07
Update (as of February, 2023)	As of February 24, 2023, DFO is waiting on additional information to be provided by Agnico, including missing baseline data on fish use in and downstream of Lake I1. Resolution of DFO-TRC-07 is contingent on receiving the specific information from Agnico after field work has been conducted in the summer of 2023. While DFO and Agnico are working together toward resolution of outstanding commitments, DFO does not consider the comment resolved, but is satisfied with the commitment.

Review Comment #	DFO-TRC-08
Subject / Topic	Fish and Fish Habitat
References	• FEIS Addendum, ○ Section 7; ○ Appendix D26; & ○ Appendix G7; • Table 4.4-1, App 3, Conceptual Fish Offsetting Plan Volume 7 of the 2014 FEIS
Summary	Information missing on fish Use and migratory changes in the CH, X, and W Watersheds.
Importance of Issue to Impact Assessment	DFO's ability to assess the potential effects on fish and fish habitat for the impact assessment from the proposed works will be impacted by the absence of information.
Detailed Review Comment	The developments around the Discovery Pit in the FEIS Addendum include infrastructure farther west than identified in the 2014 FEIS. This infrastructure impacts ponds and streams that flow to Chicken Head Lake (CH6), Lake CH5, Ponds in the X watershed, and Lake W1. In Table 4.1-1 of the Addendum Appendix 3 Conceptual Fish Offsetting Plan, there is very little information on the aquatic environment in those waterbodies.
Recommendation / Request	With respect to the disposition of this issue, DFO recommends the Proponent: 1. On page 7-168, Section 7.3.3.7.2.1 of the 2014 FEIS, Agnico stated: "The Discovery Pit also overlaps slightly on the X watershed (approximately 0.020 km^2) and effects are expected to be negligible and are not discussed further". In the FEIS Addendum, Figure 1.1-5 shows the mine infrastructure extending farther into the X Watershed than described in the 2014 FEIS, including the destruction of some unnamed ponds. There is no fisheries information on the X Watershed. a. DFO recommends that Agnico conduct a fish and fish habitat assessment of ponds that will be affected by the mine in the X Watershed and an assessment of the change in flow and downstream impacts. 2. In the FEIS Addendum, Chicken Head Lake (CH6) has mine infrastructure over drainages and ponds that flow into Chicken Head Lake from the west. Chicken Head Lake has a population of Arctic Grayling and Lake Trout that may move downstream through the CH series of lakes to Meliadine Lake. b. What fish use these unnamed waterbodies, how do those fish and the flows support Chicken Head Lake, and how will the mine infrastructure affect flows and fish habitat in the CH, X, and W watersheds? c. Where do the Arctic Grayling from Chicken Head Lake spawn? 3. Waste rock storage facility 9 appears to be farther north than previously assessed areas, partially in an area draining to the W Watershed. There is no available information in Volume 7 of the 2014 FEIS nor in the FEIS Addendum of fish use and habitat in the W Watershed. d. DFO recommends that Agnico describe what fish community exists in the W Watershed, particularly Lake W1, which appears to be affected by WRSF9. Further Agnico should conduct a fish and fish habitat assessment of the change in flow and downstream impacts in the W Watershed.

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Review Comment #	DFO-TRC-08
Update (as of February, 2023)	As of February 24, 2023, DFO is waiting on additional information to be provided by Agnico, including missing baseline data on fish use in the X and CH watersheds. It is also our understanding that Agnico has removed all proposed activities in the W Watershed. Resolution of DFO-TRC-08 is contingent on receiving the specific information from Agnico after field work has been conducted in the summer of 2023. DFO and Agnico are working together toward resolution of outstanding comments, and DFO is satisfied with the commitment to collect additional data over the 2023 season.

Review Comment #	DFO-TRC-09
Subject / Topic	Borrow Pits

References	• FEIS Addendum,
	  ○ Section 7;
	  ○ Appendix D26; &
	  ○ Appendix G7;
	• Appendix D8

Summary	Information is missing on potential effects of borrow pits on water balances and impacts on fish and fish habitat.
Importance of Issue to Impact Assessment	DFO's ability to assess the potential effects on fish and fish habitat for the impact assessment from the proposed works will be impacted by the absence of information.
Detailed Review Comment	Although Appendix D8 states that: "*Best management practices will employ the following general mitigation measures for the quarries and borrow pits*", the creation of borrow pits can change local drainage patterns and impact seasonally used fish habitat.
Recommendation / Request	With respect to the disposition of this issue, DFO recommends the Proponent: 1. Borrow Pit PFZ-GB22 appears to be on seasonal fish habitat adjacent to Lake C10. Does the construction of the borrow pit impact the Water Balance that was assessed in the 2014 FEIS (Section 7.3.3.6.2.3), and if so, by how much? What are the potential impacts to fish and fish habitat? 2. Borrow Pits D-GB1, D-GB2, D-GB3, D-GB3, D-GB16, and D-GB17 appear to impact fish habitat. Does the construction of the borrow pit impact the Water Balance that was assessed in the 2014 FEIS (Section 7.3.3.6.2.3), and if so, by how much? What are the potential impacts to fish and fish habitat? 3. Borrow Pit NW-GB16 appears to impact fish habitat on Lake D7 and Pond E4. Does the construction of the borrow pit impact the Water Balance that was assessed in the 2014 FEIS, and if so, by how much? What are the potential impacts to fish and fish habitat?
Update (as of February, 2023)	DFO considers this comment resolved and will work with Agnico through the Water Licencing process and DFO's regulatory process to assess details of borrow pit management as it relates to fish and fish habitat.

Review Comment #	DFO-TRC-10
Subject / Topic	Road Location and Construction
References	• FEIS Addendum, Section 7; • Appendix D26; • Appendix G7; • Appendix B-2, Table B-5; #6; • Appendix D30 - Road Management Plan
Summary	Information is required to review the potential effects of new road infrastructure on the

Review Comment #	DFO-TRC-10
Importance of Issue to Impact Assessment	DFO's ability to assess the potential effects on fish and fish habitat for the impact assessment from the proposed works will be impacted by the absence of information.
Detailed Review Comment	Without information on road locations, watercourse crossings, and construction details, DFO can not assess whether road infrastructure will affect the seasonal migration and movement of fish to necessary habitats, including shallow seasonal habitats that are important for fish rearing and feeding. The seasonal channels between fish bearing ponds are considered fish habitat. In Agnico's September response to the Information Request DFO-IR-7, Agnico stated: "*New access roads to the Tiriganiaq-Wolf mining area, airstrip, and to wind turbine locations will be constructed.* ○ *It is anticipated that two roads will be constructed to the Tiriganiaq-Wolf deposit, one to the north of Lake D7 and one to the south.* ○ *The road north of Lake D7 will have a few watercourse crossings (D6 to D22, and D6 to D5). For these few watercourse crossings, culverts will be required*."
Recommendation / Request	With respect to the disposition of this issue, DFO recommends the Proponent: 1. The Road Management Plan does not include details, comments, or mitigation measures on fish passage accommodation at watercourse crossings. a. Describe what the channels (including seasonally inundated flow paths) that are being crossed by the new proposed roads, including to the airstrip and windfarm; describe the types of channels and fish presence upstream and down; and describe what mitigations have been designed for fish passage. 2. It is stated in the FEIS Addendum that constructed road bases will remain the same width but the surface may be widened. b. Will this require an increase in existing culvert length and/or redesign of crossings?
Update (as of February, 2023)	As of February 24, 2023, DFO is waiting on additional information to be provided by Agnico, including a list of watercourse crossings and details. Resolution of DFO-TRC-10 is contingent on receiving the specific information from Agnico. While DFO and Agnico are working together toward resolution of outstanding commitments, DFO does not consider the commitment complete and can not assess the potential impacts of the changes on fish and fish habitat.

***NEW* Review Comment #**	ECCC-TRC-14
Subject / Topic	Land-use change emissions
References	• Commitment No. 50 – GHG estimates for construction and decommissioning document # 342900 • Commitment No. 53 (Re: Carbon sinks) document # 342709 and 342710 • ECCC-TRC-5 – Effects of Meliadine Extension on Climate Change
Summary	The previous comment (ECCC-TRC-5) is not fully addressed: Emissions related to land-use change are not estimated and are not included in the Project's emissions.
Detailed Review Comment	There are emissions from land-use change as a result from the proposed project. Direct emissions include land-use change emissions, according to the draft Technical Guide Related to the Strategic Assessment of Climate Change.

NEW Review Comment #	ECCC-TRC-14
Recommendation / Request	ECCC recommends the proponent provide an estimate of land-use change emissions following the methodology in the draft Technical Guide Related to the Strategic Assessment of Climate Change. These emissions should be included in the Project's direct emissions during the construction phase.

NEW Review Comment #	ECCC-TRC-15
Subject / Topic	GHG Intensity
References	• Commitment No. 51 – BAT/BEP determination document # 342899
Summary	Project intensity is claimed to be 50% lower than the world average without supporting details.
Detailed Review Comment	While the Project may be of lower emission intensity than the world average, it is difficult to verify this claim without additional details.
Recommendation / Request	ECCC recommends the Proponent provide further detail to substantiate their claim that the proposed Project emission intensity is 50% lower than the world average. This should include the source of the world average and the comparison between the world average and the Project's expected intensity, as well as the methodology behind the calculation. ECCC also recommends that the Proponent demonstrates with more detail how factors such as efficient planning, efficiency projects, and company culture contribute to the Project's expected emissions intensity.

NEW Review Comment #	ECCC-TRC-16
Subject / Topic	Total Carbon Sink Impact Estimate
References	• Commitment No. 53 (Re: Carbon sinks) document # 342709 and 342710
Summary	In Section 3.3, the total carbon sink impact is said to be 1,195 t C in the calculation and 1,241 t C in the text after.
Detailed Review Comment	This seems to be a typo as the latter number is not mentioned elsewhere in the document, but the two numbers in Section 3.3 do not match.
Recommendation / Request	ECCC recommends the Proponent review the two disparaging values for total carbon sink impact estimation in Section 3.3 and either correct it or explain divergence in the estimates.

Review Comment #	HC-AQ-04
Subject / Topic	Existing Condition Reports
References	Meliadine Extension FEIS Addendum Section 5.2.3 – Existing Environment PDF pg. 123-124 Section 10.2.4 – Ecological Health, Existing Environment PDF pg. 449 Appendix G Existing Conditions Reports PDF pg. (entire document) Appendix D2 – Air Quality Monitoring Plan Section 2.2.4 - Monitoring Parameters PDF pg. 14
Summary	Insufficient information is provided regarding air emissions
Detailed Review Comment	It is indicated on PDF pg. 449 of the Meliadine Extension FEIS Addendum that Appendix G provides existing condition reports used to support the Extension application. However, data for air quality is not included as part of this appendix, and only a qualitative discussion of existing air quality was provided in the Meliadine Extension FEIS Addendum (e.g., Section 5.2.3, PDF pg. 123-124). Transparent presentation of the existing conditions data used to derive conclusions is recommended to support the technical review.
Recommendation / Request	With respect to the disposition of this issue, HC recommends the Proponent: 1. Provide existing air quality data (including concentrations of volatile organic compounds, polycyclic aromatic hydrocarbons, trace metals, carbon monoxide, TSP, $PM_{2.5}$, PM_{10}, DPM) covering the period of 2016 – present (i.e., existing conditions). 2. Describe how data from existing conditions were used to inform the assessment and conclusions related to air quality.
Update (as of February 28, 2023)	The data and discussion presented in the *Commitment 23 Technical Memorandum* provide evidence supporting the Proponent's conclusion that the measured concentrations of air quality contaminants (dustfall, particulate matter [$PM_{2.5}$, PM_{10}], total suspended particles [TSP], SO_2, and NO_2) from the existing project have been below the 2014 predictions and territorial guideline levels. HC noted that the Canadian Ambient Air Quality Standards (CAAQS) were not among the guidelines included for comparison for $PM_{2.5}$, SO_2, and NO_2. HC suggests that future air quality monitoring reports incorporate comparison of measured air quality contaminants with the corresponding 2025 CAAQS. It was also noted that missing data for $PM_{2.5}$, PM_{10}, and TSP limited the ability to identify trends over time or make robust comparisons to the 2014 predictions. Strategies for avoiding data loss or missing samples should be considered in future monitoring. Despite the low concentrations of air quality contaminants reported in the Air Quality Monitoring Reports, HC emphasizes the importance of reducing air emissions as much as possible, especially for non-threshold substances such as $PM_{2.5}$ and NO_2.

Review Comment #	HC-WQ-01
Subject / Topic	Arsenic in freshwater
References	Meliadine Extension FEIS Addendum Section 10.3.7.7 - Surface Water Quality Section 7.4.3.1 - Surface Water and Sediment Quality Table 7.4-2 Table 7.4-8

Review Comment #	HC-WQ-01
	Appendix H12 Supporting Files for the Human Health and Ecological Risk Assessment Table H-12-G-1
Summary	Clarification is required to confirm if consultation with traditional land users has informed the assessment of arsenic in surface water quality
Detailed Review Comment	The maximum concentration of arsenic predicted during operations at the end-of-pipe located in Meliadine Lake (31 µg/L) exceeds the Maximum Allowable Concentration (MAC) for drinking water (10 µg/L), as presented in Table 7.4-2 of the Meliadine Extension FEIS Addendum. The surface water quality screening for the HHRA was conducted based on predicted concentrations at the edge of the 100 m mixing zone in Meliadine Lake, but it is unclear whether local harvesters are able (and likely) to access drinking water within the mixing zone. If so, there might exist potential for a greater exposure to arsenic than what is predicted by the HHRA. Likewise, the maximum concentration of arsenic in the Tiri Pit Lake is predicted to exceed the MAC during the post-closure period (Table 7.4-8). It is also unclear whether consultation with local communities indicates the potential for consumption of water from the Tiri Pit Lake during post-closure.
Recommendation / Request	With respect to the disposition of this issue, HC recommends the Proponent: 1. Clarify whether consultation with local harvesters supports the exclusion of the 100 m mixing zone for water quality screening in Meliadine Lake. 2. Describe the outcomes of any consultation activities regarding post-closure use of pit lakes for drinking water, and the communication plan for potential risks of arsenic in drinking water for local harvesters as part of the site closure at the end of the mine life.
Update (as of February 28, 2023)	With regard to the recommendation above, the Proponent provided additional information to HC in its November 8, 2022, *Response to Technical Comments*, as well as during a technical meeting between HC, the Government of Nunavut (GN), and the Proponent on November 24, 2022. As a result of these discussions, Commitment 28 was made to provide additional details to both HC and the GN to confirm the rationale and assumptions used to assess potential human health risks of arsenic in local surface waters post-closure. The response to Commitment 28 outlined the rationale and supporting information from the community regarding Saline Pond B7 being an unlikely source of drinking water post-closure with the exception of an emergency use scenario. An alternative analysis assessed a 14-day use scenario for all age groups (rather than adults only) and found hazard quotients (HQs) less than 1 for cobalt and manganese, but HQs between 3 and 5 for arsenic. Detailed calculations and inputs were not provided for this alternative assessment, but HQ values above 1 suggest there might be value in further refining of the assessment and/or considering mitigation or management approaches. HC also notes that HQ values exceeding 1 support HC's previous recommendation to conduct a multi-media risk assessment for arsenic to characterize potential human health risks under baseline conditions. Both 7-day and 14-day emergency use scenarios for Saline Pond B7 used a target incremental lifetime cancer risk (ILCR) value of 3 in 100,000, based on the maximum acceptable concentration (MAC) of 10 µg/L, which is associated with an estimated lifetime range of risk of excess internal organ cancers of 3 to 39 in 100,000. HC recommends that a target ILCR of 1 in 100,000 be used, as the MAC should not be considered a "pollute up to" value. HC acknowledges that all risk estimates presented in Table C28-2 are less than 1 in 100,000 so the interpretation would not change in this specific exposure scenario. In the section of Commitment 28 entitled "Conclusion of the alternative analysis", it is indicated that Section 10.3.7.8 of the *FEIS Addendum* identified arsenic in water as a residual effect. HC takes this to mean Section 10.3.7.7 (Surface Water Quality) rather than Section 10.3.7.8 (Fish Tissue Quality).

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Review Comment #	HC-CF-02
Subject / Topic	Contamination of country foods via soil
References	Meliadine Extension FEIS Addendum Section 10.3.7.6 - Country Foods Quality PDF pg. 542 Appendix H- Supporting Files for the Human Health and Ecological Risk Assessment Appendix H-12-F – Soil Screening – Human Health PDF pg. 271-283
Summary	Insufficient rationale to support conclusion of incomplete country foods exposure pathways
Detailed Review Comment	A rationale was provided in Section 10.3.7.6 (PDF pg. 542) of the Meliadine Extension FEIS Addendum for not further assessing country foods pathways because there were no COPCs identified in soils. However, as noted in HC-HHRA-06, baseline and predicted concentrations of several COPCs in soil significantly exceeded their respective guideline values (Appendix H-12-F).
Recommendation / Request	With respect to the disposition of this issue, HC recommends the Proponent: 1. Provide additional information in the rationale or relevant data to support the conclusion that a complete country foods exposure pathway is not present.
Update (as of February 28, 2023)	With regard to the recommendation above, the Proponent provided additional information to HC in its November 8, 2022, *Response to Technical Comments*, as well as during a technical meeting between HC, the Government of Nunavut (GN), and Agnico on November 24, 2022. To confirm that no changes in soil quality have been observed during the mine life to date, HC requested the Proponent provide soil quality data collected since the 2014 FEIS. Accordingly, the Proponent provided the 2008, 2017, and 2019 Terrestrial Effects Monitoring and Mitigation Program reports to HC in fulfillment of Commitment 29. Based on sampling locations shown on maps within each of the reports, it appears that the 2008 baseline sampling locations match most closely with 2017 and 2019 ongoing monitoring sites around the all-weather access road (AWAR). There were no statistically significant differences in soil concentrations of arsenic among the three years of sampling. However, in 2017 seven samples exceeded the 2008 maximum used for the human health risk assessment (59.9 mg/kg) and five of these also exceeded the baseline + 10% criterion (65.89 mg/kg). In 2019, four samples exceeded the 2008 maximum, and all of these also exceeded the baseline + 10% criterion. As a result, there is some uncertainty whether the human health risk assessment screening approach used was conservative and protective of human receptors. In an email to HC on January 10, 2023, the Proponent confirmed that the 2017 and 2019 soil monitoring data were not used as part of the 2022 FEIS Addendum. HC had previously recommended a multi-media assessment be conducted for arsenic, given the potential for human exposure via water, soil, and country foods due to naturally elevated levels in the region (Technical Comment HC-HHRA-06). The information provided in Commitment 29 suggests that this assessment may still be warranted and could help to inform community outreach initiatives and closure mitigation and/or institutional controls during site closure. As such, to resolve the uncertainty in total potential human health risks due to arsenic exposure, HC would suggest monitoring arsenic in soils and other relevant media over the mine life, and implementing mitigation or adaptive management if monitoring shows increasing concentrations over time.

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Review Comment #	HC-HHRA-04
Subject / Topic	Exposure Assessment
References	Meliadine Extension FEIS Addendum Section 10.3.7.4 - Air Quality PDF pg. 537
Summary	Clarification is required related to assumptions regarding recreational user exposure
Detailed Review Comment	On PDF pg. 537 of the Meliadine Extension FEIS Addendum, it is indicated that a recreational user is assumed "...to spend 30 days per year at a cabin location...". However, neither a rationale nor a reference was provided to validate this 30-day exposure period. Furthermore, it is unclear whether the dose-averaging approach considers the impacts of continuous exposure over a relatively short period in comparison to intermittent exposure over a more extended duration (i.e., 30-day continuous stay versus occasional stays during weekends over the course of the spring/summer).
Recommendation / Request	With respect to the disposition of this issue, HC recommends the Proponent: 1. Provide a rationale validating the assumed exposure period of 30 days for a recreational user at a cabin location. 2. Provide clarification as to whether the dose-averaging approach considers the impacts of continuous exposure in comparison to intermittent exposure.
Update (as of February 28, 2023)	The Technical Memorandum provided in fulfillment of Commitment 31 compared a 30-day continuous exposure period scenario with an intermittent 30-day exposure over the course of the year as a means to demonstrate that dose-averaging would not affect the conclusions of the HHRA. HC is satisfied with the Proponent's comparison and conclusion that there is not unacceptable risk both with and without dose-averaging. HC notes for future assessments that the screening index/hazard quotient approach may not fully address the human health effects of non-threshold contaminants like NO_2 and $PM_{2.5}$. HC would also reiterate that the CAAQS should not be considered as "pollute-up-to" levels and suggests that the Proponent strive to implement mitigation measures in order to keep NO_2 and $PM_{2.5}$ levels as low as possible. HC notes the World Health Organization (WHO) Global Air Quality Guidelines for NO_2 and $PM_{2.5}$ (annual and 24-h) are useful references to calculate the hazard quotients, and the WHO guidelines have been set at the lowest exposure level of an air pollutant above which the WHO is confident that there is an increase in adverse health effects. In addition to the calculated hazard quotients, HC would suggest including a qualitative discussion on the Project's contribution toward predicted exceedances of CAAQS within the local airshed (including an acknowledgement of the non-threshold nature of these contaminants).

Review Comment #	NRCan-TRC-02
Subject / Topic	Groundwater - Assessment of tailings and waste rock disposal in exhausted pits (Agnico response to Commitment 42)
References	Meliadine Mine – Meliadine Extension FEIS Addendum – In-pit Deposition Alternative, Agnico Dec. 2022 (Agnico, 2022b). In-pit tailings disposal study for the Meliadine Extension. Ardent Innovation Inc. and Lorax Environmental Services Ltd. Dec. 2022. (Ardent and Lorax, 2022). Technical Memorandum. Meliadine Extension In-pit Deposition Alternative WBWQM. Lorax Environmental Services Ltd., 16 December 2022. (Lorax, 2022) Government of Canada's Technical Review Comments, Oct 24, 2022 (GoC, 2022a). Meliadine Extension, Response to technical comments, Agnico, 8 November 2022. (Agnico, 2022a)

Review Comment #	NRCan-TRC-02
	Summary of Hydrogeology Existing Conditions, Meliadine Extension. Golder Associates Ltd., December 2021. (Golder, 2021a) Hydrogeology Modelling Report, Meliadine Extension. Golder Associates Ltd., December 2021. (Golder, 2021b).
Summary	Agnico provided additional documentation in response to technical review comments and recommendations by NRCan (and other parties) regarding the in-pit mine waste disposal plans (Commitment 42). NRCan is providing a review of the additional documentation and associated analysis focusing on aspects related to groundwater flow.
Detailed Review Comment	The Proponent commits to detailed discussion and evaluation of in- pit deposition through the Type A Water Licence Amendment. Replaced by Commitments # 40, 41, 42.
Recommendation / Request	The analysis of in-pit disposal for the NIRB is a preliminary analysis; it does not replace the more detailed evaluation that should be required at the NWB Type A Water License Amendment. This commitment should remain and is not considered replaced by Commitments # 40, 41 and 42. The report provided for Meadowbank (Environmental Impact Study Review – Meadowbank In Pit Tailings Deposition, SNC-Lavalin, Feb. 15, 2018) did not replace the NWB process; it was strictly for the NIRB process. Results from the NIRB process can contribute to the NWB process.
Update (as of February 28, 2023)	The Proponent plans to use mined out pits for disposal of waste rock and tailings. This is an important modification to the approved project. The Proponent's justification and impact assessment was largely based on their experience with Meadowbank. However, little analysis specific to the Meliadine extension was provided in the FEIS addendum. NRCan and other parties met with Agnico in November 2022 regarding their concerns and agreed that additional documentation would be provided (see references) that would provide information on the Meadowbank In-Pit tailings deposition and a framework for the in-pit disposal for Meliadine extension, and documentation of thermal and groundwater modelling to support the design and impact assessment as a response to commitment 42. The In-pit disposal study (Ardent and Lorax, 2022) includes thermal analyses to assess the development and timing of open taliks for various thermal scenarios and hydrogeological analyses to assess groundwater travel times and seepage fluxes to receptors. The first step of the hydrogeological analyses used Darcy's law to estimate groundwater travel times and flow rates from the six pits (WES01, WES04, WES05, WN01, PUM01 and PUM03) that have been identified for in-pit tailings storage and for one pit (Discovery) proposed for waste rock storage. Where a pit is intersected by a fault, two flowpaths were considered, one flowpath in competent bedrock, and the other along a trace of the fault to Meliadine Lake. Seepage flux was greatest for pit WES05 along a fault flowpath (1.07 m3/d) which produced the fastest travel time (14 years). The second step of the hydrogeological analyses used numerical modelling of groundwater flow and transport for pit WES05 to verify flux and travel time estimates (results are comparable), determine breakthrough curves (concentration versus time at various locations) and simulate loading rates to Meliadine Lake. Finally, generic transport modelling results were scaled to 9 Potential Contaminants Of Concern (PCOC) to estimate short and long term loading to Meliadine Lake. The hydrogeological analysis was not performed as recommended in NRCan-TRC-02. Specifically, NRCan recommended the use of the (numerical) hydrogeology model. Instead, the analysis in Ardent and Lorax (2022) used Darcy 's law with several simplifying assumptions to provide simple "back-of-the-envelope" (or likely spreadsheet, in this case) calculations of seepage fluxes and travel times. Nonetheless, the seepage fluxes estimates appear plausible and agreed with those calculated using a 2D cross-sectional hydrogeology model for WES05 with comparable parameters. The combined estimated seepage flux from the six pits is approximately 500 m3/yr which is less than 0.0006% of the annual baseline runoff from Meliadine Lake (Ardent and Lorax, 2022). Consequently, even uncertainty related to the hydraulic conductivity estimates or to the use of simplifying assumptions would not change the conclusion that seepage flux through the pit lakes is a very small proportion of annual runoff from Meliadine Lake. Similarly, flow through the waste rock at the Discovery pit is estimated to

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Review Comment #	NRCan-TRC-02
	be <0.02% of annual runoff from Lake CH6. This review has not assessed the estimated water quality of the pore waters in contact with the tailings or waste rock. The In-pit disposal study (Ardent and Lorax, 2022) includes a conceptual model of groundwater flow during baseline (Figure 4-1) and post-closure (Figure 4-2) conditions. Unfortunately, these and previous versions of this site's conceptual model are incomplete because they only include two open taliks along each groundwater flow system: one at the highest elevation where lake or tailings water recharges to groundwater, and another at the lowest elevation where groundwater discharges to Meliadine Lake. In the actual flow system, there are several open talik lakes along groundwater flowpaths, and some lakes occupy intermediate elevations (Figure 1 in Golder 2021a). As discussed in NRCan's December 2022 comments on the Agnico response to commitment No 40 (GoC, 2022b), the conceptual model and the hydrogeological reports do not address lakes of intermediate elevation. Lakes of intermediate elevation likely have different groundwater flow patterns. Groundwater flow is likely upward into the lake on the upgradient side of the lake (higher groundwater head) and likely downward on the downgradient side of the lake (lower groundwater head). For example, Lake B5 (which includes part of the WN01 pit) has an elevation of 58 m, is downflow of Lake B7 (63 m) and upflow of Lake B4 (57 m) and, ultimately, Meliadine Lake (51 m). Surface water infiltrating Lake B7 becomes groundwater that may flow back up into Lake B5. The significance of this potential flowpath is that lakes of intermediate elevation can also receive groundwater inflow and do not necessarily show the "all downward" flowpath shown in the conceptual model. Similarly, the assessment of groundwater flow from the Discovery pit to Lake CH6 implicitly recognizes this process since Lake CH6 is an open talik lake of intermediate elevation between lakes UN11 and UN01. Fortunately, the numerical hydrogeology model (Golder 2021b) should implicitly solve for groundwater flowpaths within open taliks at intermediate elevations. The ranking of pit suitability is not a useful concept since it won't be used to select pits to fill. Furthermore, the measure used to rank the pits is neither meaningful nor effective since both the numerator and denominator are primarily controlled by hydraulic conductivity (K). The numerator (travel time) is proportional to 1/K and the denominator (seepage loss) is proportional to K so the ratio is proportional to 1/K2. Lower K values produce higher scores. The In-pit alternative WBWQM (water balance and water quality model, Lorax 2022) assesses the potential effects on water quantity and quality of in-pit deposition of waste rock and tailings under the RCP4.5 climate scenario for the Meliadine Extension. This review will only address the minor groundwater issues related to this model application. For the modelling of the pits to be filled with waste rock, the long-term transport of contaminants from the waste rock pore water to the overlying pit lake occurs by diffusion only and is calculated using Fick's Law. If groundwater flows upward into a pit (as described in the paragraph above), there may also be an upward advective flux into the pit lake. For the modelling of the pits to be filled with tailings, the geochemical loading is (Lorax 2022) "driven by tailings consolidation" and the diffusive flux is ignored. Therefore, it is not clear to what extent upward groundwater flow through the tailings might impact advective fluxes and geochemical loading during or after consolidation. NRCan-TRC-02 suggested that groundwater assessment should include "consideration whether there is a need for a barrier/cover between tailings or waste rock and pit lakes or underlying rock". (GoC, 2022a) There is no mention or consideration within the documentation (Agnico, 2022b, Ardent and Lorax, 2022, and Lorax, 2022) of the possibility of using any barriers to reduce contaminant fluxes from the in-pit disposal. Although the current analysis suggests that contaminant transport to Meliadine Lake will be delayed and greatly diluted in Meliadine Lake, the lack of discussion of any measures to reduce contaminant transport suggest a "dilution is the solution" approach and attitude. There is obviously greater flow and more rapid travel times in faults so some strategic grouting could reduce long term contaminant fluxes from the site to the environment. Furthermore, the possibility of advective flow through the waste rock and tailings of intermediate elevation pits with open taliks (as discussed in the above

Review Comment #	NRCan-TRC-02
	paragraphs) could be a process that transports contaminants to the pit lakes overlying in-pit disposal. Table 3 in the Environmental Impact Matrices in Appendix 1 of Agnico (2022b) indicates that the only effects pathway related to groundwater quality is to deep regional groundwater underlying the pits and that the mitigation is "downward contaminant transport limited to diffusion". First, this statement is factually incorrect as the assessment (Ardent and Lorax, 2022) has calculated the advective transport, with a minimal role for diffusion. Second, there are no mitigation measures discussed (such as barriers, as noted above). Third, the pathway to the overlying pit lakes discussed in the WBWQM (Lorax, 2022) has a greater effect on water quality (than the existing effect pathway to Meliadine Lake) so an additional "effect pathway" to the overlying pit lakes is warranted. Finally, the potential influence of advective fluxes between infilled waste rock or tailings and the overlying pit lake should be considered in the "Environmental Design Features and Mitigation". NRCan agrees that the hydrogeological analysis conducted demonstrates that groundwater fluxes through the proposed in-pit tailings and waste rock storage facilities will be a small proportion of annual runoff in Meliadine Lake and Lake CH6 and therefore groundwater flow from these facilities does not appear to pose a risk to their water quality given the estimated water quality of the in-pit pore water of tailings and waste rock (note that this review has not assessed the estimated water quality). NRCan recommends that the Proponent update their conceptual model of permafrost and groundwater flow conditions to include open talik lakes (or pit lakes) with intermediate elevations and that the updated conceptual model be considered in assessments concerning groundwater flow into and out of open talik lakes or pits. NRCan recommends that the Proponent discuss the potential impact of groundwater inflow through the waste rock and tailings into the pit lakes (discussed above) on the long-term loadings and concentrations in the WBWQM (Lorax, 2022). NRCan recommends the future use of the 3-D hydrogeology model to address hydrogeological issues since the model should be considered, used and updated as a tool in support of water management. Although some questions may be answered with simpler "back of the envelope" calculations, use of the calibrated hydrogeology model will require fewer simplifications and assumptions, provide more accurate and reliable analyses, and ensure greater public and government confidence in groundwater assessments. NRCan recommends that the Proponent discuss the possible benefits and problems of using protective barriers (or measures) between tailings or waste rock and pit lakes or underlying rock to minimize contaminant fluxes to the surrounding environment. A decision not to employ any protective barriers or measures should be justified. NRCan recommends adding an additional effect pathway to the Environmental Assessment Impact Matrices in Table 3 of Appendix 1 (Agnico, 2022b) and editing the existing entry. The new entry should address the effect pathway from in-pit disposal of waste rock and tailings to the overlying pit lakes.

Review Comment #	NRCan-TRC-03
Subject / Topic	Groundwater – Assessment of closure and post-closure phases
References	Government of Canada's Technical Review Comments, Oct 24, 2022 (GoC, 2022a). Meliadine Extension, Response to technical comments, Agnico, 8 November 2022. (Agnico, 2022a)

Review Comment #	NRCan-TRC-03
	Hydrogeology Modelling Report, Meliadine Extension. Golder Associates Ltd., December 2021. (Golder, 2021b).
Summary	Agnico agreed to update hydrogeology modelling with closure and post-closure phases as part of the Type A Water License Amendment with the NWB
Detailed Review Comment	Although NRCan-TRC-03 is listed in Commitment No. 15, it is not specifically related to in-pit disposal and is not addressed in Commitment No. 42.
Recommendation / Request	NRCan recommended that hydrogeology modelling should include closure and post-closure phases and indicate the steady-state groundwater levels.
Update (as of February 28, 2023)	Agnico replied that the hydrogeology modelling will be updated for closure and post-closure phases as part of the Type A Water License Amendment with the NWB. They also expect the open pits to develop static water levels that will reproduce the current regional groundwater flow conditions so that any changes to the regional groundwater flow directions are expected to be negligible. NRCan notes that the time required to return to steady state conditions has not been calculated and would be useful to inform groundwater monitoring. NRCan recommends that the hydrogeology model be updated to include the closure and post-closure phases and to determine the time to return to steady state conditions as part of the Type A Water License Amendment with the NWB.

Review Comment #	NRCan-TRC-04
Subject / Topic	Groundwater - Effect of saline water storage in B7
References	Government of Canada's Technical Review Comments, Oct 24, 2022 (GoC, 2022a). Meliadine Extension, Response to technical comments, Agnico, 8 November 2022. (Agnico, 2022a) Hydrogeology Modelling Report, Meliadine Extension. Golder Associates Ltd., December 2021. (Golder, 2021b). Post, V., Kooi, H. and Simmons, C., 2007. Using hydraulic head measurements in variable-density ground water flow analyses. Ground Water, 45(6): 664-671. (Post et. al., 2007)
Summary	Groundwater density can affect groundwater flow and model results.
Detailed Review Comment	Although NRCan-TRC-04 is listed in Commitment No. 15, it is not specifically related to in-pit disposal and is not addressed in Commitment No. 42. Density variations with depth can affect the calculation of vertical hydraulic gradients and require corrections for density (buoyancy) (Post et. al., 2007, Golder, 2021a).
Recommendation / Request	NRCan provided the following comment in response to the Agnico response to commitment No 40 - In-pit deposition alternative for Mel Extension, Nov. 26, 2022 (GoC, 2022b) "NRCan-TRC-04 was not addressed in the Technical meeting due to lack of time and does not appear in the Dec. 1st, 2022 list of commitments. It concerns the effect of infiltrating saline water from saline pond B7. NRCan re-iterates that the infiltration of saline water over an operation period of 18 years under conditions of high vertical hydraulic gradients will change the density of groundwater in the open talik beneath B7 which may have long-lasting impacts on the groundwater flow and vertical hydraulic gradients in downflow open taliks of intermediate elevation. NRCan recognizes that addressing this issue will require updating the boundary conditions for saline pond B7 in the hydrogeological model and ensuring that the model takes groundwater density into consideration. In view of not further delaying the assessment of in-pit disposal for the NIRB, NRCan recommends that this issue be evaluated as part of the Type A Water License Amendment with the Nunavut Water Board (NWB) as indicated by Agnico's response to NRCan-IR-13."

Review Comment #	NRCan-TRC-04
Update (as of February 28, 2023)	NRCan recommends that the hydrogeology model be updated to include density effects as part of the Type A Water License Amendment with the NWB. The potential effects of saline water infiltration into the open talik beneath SP B7 should be evaluated at that time.

Review Comment #	NRCan-TRC-05
Subject / Topic	Groundwater - Groundwater flow basin near the Discovery underground mine
References	Meliadine Extension, Response to Information Requests. Agnico, 26 September 2022. (Agnico, 2022c) Government of Canada's Technical Review Comments, Oct 24, 2022 (GoC, 2022a). In-pit tailings disposal study for the Meliadine Extension. Ardent Innovation Inc. and Lorax Environmental Services Ltd. Dec. 2022. (Ardent and Lorax, 2022).
Summary	Groundwater flow directions near the Discovery mine are not clearly delineated.
Detailed Review Comment	The purpose of this technical comment was to draw attention to the possibility that the proponent's conceptual understanding of groundwater flowpaths near the Discovery mine may have been mistaken. The groundwater flow direction (arrow) was directed southwest towards Meliadine Lake (Figure NRCan-8-1, Agnico, 2022c). However, the regional groundwater flow near the Discovery mine may ultimately discharge to LakeUN01 which is closer and at the same elevation as Meliadine Lake. This possibility had not been mentioned in the previous documentation.
Recommendation / Request	NRCan recommended that if in-pit disposal of waste rock is contemplated at Discovery, then the same hydrogeological analysis for the Discovery pit/underground should also be provided and NRCan-TRC-05 would be addressed since the particle tracking needed to define flowpaths and flow times would also identify the groundwater receptor(s) downflow of the Discovery pit and underground.
Update (as of February 28, 2023)	The recent assessment that groundwater travels times from the Discovery pit to Lake CH6 has just been estimated at approximately 300 years (Ardent and Lorax, 2022) would suggest some recognition that groundwater flow could be directed towards the southeast in the direction of Lake CH6 and UN01. NRCan requests a more detailed map of hydraulic heads in the vicinity of Discovery (Lakes CH6 and UN01) based on the hydrogeology model results for baseline conditions (sufficiently detailed to consider groundwater flowpaths in the southeast corner of the modelling domain).

Review Comment #	NRCan-TRC-06
Subject / Topic	Groundwater - Inclusion of grouting in hydrogeology model and groundwater inflow estimates
References	Government of Canada's Technical Review Comments, Oct 24, 2022 (GoC, 2022a). Meliadine Extension, Response to technical comments, Agnico, 8 November 2022. (Agnico, 2022a)
Summary	The waterline and temporary storage can provide additional mitigation measures in case of additional saline groundwater inflow.
Detailed Review Comment	Because the most recent hydrogeology model specifically includes the reduction of inflows by grouting, NRCan was concerned that the potential for mitigating excessive groundwater inflows would be reduced in the GWMP.
Recommendation / Request	Additional capacity to convey water to Itivia Harbour by the waterline and to temporarily store saline water in pits provide additional means to manage greater than expected saline groundwater inflows.
Update (as of February 28, 2023)	NRCan has no further comments related to grouting effects on saline groundwater management.

Review Comment #	NRCan-TRC-09
Subject / Topic	Agnico response to Commitment 19 (Thermal modelling of temporary water storage in pits)
References	NRCan-TRC-09; CIRNAC-TRC-03 Technical Memorandum – Meliadine Mine Crown Pillar Modelling Study Summary, WSP Jan. 26 2023 submitted to Agnico for response to Commitment 19
Summary	Agnico provided a response to NRCan-TRC-09 and CIRNAC-TRC-03 (Commitment 19) to conduct thermal modelling to justify the conclusions regarding impacts associated with temporary water storage in pits. NRCan is providing a review and assessment of the information provided by Agnico.
Detailed Review Comment	In the FEIS addendum little information was provided to support the Proponent's conclusions regarding impacts on surrounding permafrost associated with temporary water storage in pits which was important in the case of Tiri02 pit for example as mining would be extended underground following the need for pit water storage (NRCan-TRC-09).
Recommendation / Request	NRCan recommended that more detailed quantitative analysis be conducted as part of the water licensing stage to: determine the extent of permafrost degradation; assess impacts related to mine safety associated with pit wall and underground mine stability: assess impacts on groundwater flow pathways. This would help inform decisions regarding appropriate water levels and storage periods in the pit and finalization of water management plans to ensure impacts on mine safety and groundwater flow are minimized.
Update (as of February 28, 2023)	Agnico provided a technical memorandum that summarizes the thermal modelling that was conducted. Two dimensional transient simulations were conducted using a commercial finite element modelling software that has been utilized widely by others conducting similar modelling. Thermal modelling was done for the areas beneath the TIRi02 and SP4 open pits to evaluate the minimum crown pillar thickness below the pits required to maintain a frozen zone between temporary pit lakes and the underground mine. Assumptions have been described and input parameters including thermal properties and pond temperatures have been provided. Values provided appear to be reasonable and/or conservative. The likelihood of saline porewater has also been considered and based on data collected at the mine site, the freezing point depression for determining the extent of the cryopeg (partially unfrozen zone) is between -2.9 and -3.4°C. Sensitivity analysis has been done which includes variation of pond temperature and consideration of a pond not being present in the winter. The overall approach is conservative and suitable for this stage of design. The results of the 2021 modelling study (Table 1 Technical Memo and accompanying presentation) indicate that after 3 years, portions of the crown pillar between Tiri02 pit bottom and underground development 50 m below the pit would remain at temperatures below -3.4°C with no ground water flow connection. However, if mining was extend for 3 years, crown pillar temperatures would be a minimum -1.5°C which would be above the assumed freezing point depression and allow ground water flow between the pit base and the underground mine 50 m below the pit. NRCan notes that based on the results (Table 1 Technical Memo) an underground mine located at 75 m below the pit bottom would have a frozen zone 24m thick above it with no groundwater flow pathway between the pit bottom and the deeper underground development. Results of the updated 2022 study for the SP4 pit (Table 2 technical memo and accompanying presentation) indicate that for the base case and sensitivity analysis, minimum temperatures between the pit bottom and L75 underground development (25 m below pit base) would be above the assumed freezing point depression of -2.9°C, during the operation of L75 for scenarios where the pond is present through out the year. For scenarios that consider no pond in winter, temperatures between the pit base and L75 would be at or below -2.9°C. NRCan notes

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	that underground workings at least 50 m below the pit base (L100) will likely have a frozen layer between it and the pit base (Technical Memo presentation slides). NRCan's conclusion for SP4 is that the no pond in winter scenario could be a preferred option to ensure that temperatures within the crown pillar remain below -2.9°C with underground development 50 m below the pit (L75). NRCan agrees that the Proponent has provided sufficient information for this stage of the design and assessment process to inform decisions regarding operation of temporary water storage ponds in pits and the underground mine's design. NRCan would suggest that any new information collected by the Proponent that facilitates refinement of parameters utilized in the modelling (e.g. thermal properties, freezing point depression and water storage needs) be utilized to update thermal modelling as design progresses and inform decisions regarding operation of temporary water storage ponds and underground mining operations. NRCan recommends that as design progresses, the Proponent refine thermal modelling as appropriate to incorporate any new data acquired to inform final decisions regarding operation of temporary water storage ponds and underground mining operations.

Review Comment #	NRCan-TRC-10
Subject / Topic	In-pit backfill
References	Commitment No. 42 - In-pit disposal alternative - Meliadine Extension
Summary	Mine Environment Neutral Drainage: Best practice for in-pit disposal
Detailed Review Comment	NRCan manages the Mine Environment Neutral Drainage (MEND) program, a pan-Canadian initiative involving experts in mine waste management. The MEND program objective is to provide reviews and guidance on topics of importance in mine waste management. The MEND program has provided two successive reviews of 12 case studies of in-pit disposal practice of acid rock drainage and metal leaching waste rock and tailings in 1995 (MEND report 2.36.1- Review of In-pit Disposal Practices for the Prevention of Acid Drainage – Case Studies) and an update in 2015 (MEND report 2.36.1b- In-Pit Disposal of Reactive Mine Wastes: Approaches, Update and Case Study Results). The reports highlight that in-pit disposal has been, in general, very positive in demonstrating long-term isolation demanded by companies, regulators and the public. For instance, the Canadian Nuclear Safety Commission (CNSC) who regulates uranium mines and milling encourage, to the extent practicable, the use of open pits for the management of tailings and waste rock. All three uranium mills in northern Saskatchewan use exhausted open pits for the management of tailings and waste rock. While the benefits of in-pit disposal are many – the following aspects may have site specific importance: • The isolation of solid mine wastes in an anoxic environment has been shown to inhibit acid generation and the release of soluble metals and other contaminants; • The reduction or elimination for the need to maintain engineered structures on surface, which inevitably erode over decades and for which the necessary maintenance over centuries is not guaranteed; • Improved social and regulatory acceptance of mining activities by restoring land forms and function; and, in some cases, • The permanent isolation of hazardous substances resulting from emergencies and normal processing.

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	Like every management option, there are constraints with in-pit disposal as reported by MEND 2.31.1b- Engineering Design and Construction Phase IV Composite Soil Cover - Acid Waste Rock Study Heath Steele Mines: • A pit needs to be locally available and the use of the pit should not "sterilize" remaining mineral resources. • Often, the amount of waste rock and tailings produced may not fit into the available opening; • Terminal water levels in a back-filled pit as well as local hydrogeological conditions greatly influence the selection of in-pit disposal options. There were cases where in-pit disposal of acid rock drainage waste rock was initially selected but, after a detailed modelling evaluation, was rejected in favour of surface storage; and • In-pit disposal can be very costly in instances where significant material and pit engineering may be required to isolate mobile contaminants (i.e., pervious or impervious surround).
Recommendation / Request	In-pit disposal of mine waste with acid and metal drainage potential is encouraged in other jurisdictions (e.g., the CNSC and the province of Quebec). In the event that the proponent proposes the disposal of mine waste in their numerous exhausted open pits, NRCan recommends that the proposal be reviewed through the appropriate regulatory process with input from the public and that the proposal includes the following steps: - Characterization of acid rock drainage and metal leaching of tailings and waste rock separately and/or in co-disposal (depends on the proposal) under flooded conditions. This information may not be available as waste are currently managed on surface. - Use the waste characterisation as input to environmental dispersion models (i.e. hydrogeological, hydrological linked to surface water and sediment quality) to determine if in-pit disposal requires any additional mitigation measures such as impervious surround. The proponent may provide a comparison of modelling results with a scenario of surface management with an engineered cover or other techniques. In doing so, the modelling should adequately account for erosion of the cover, which over centuries and changing climate could be important if one cannot rely on institutional control for cover maintenance and adequate financial guarantees.

NEW Review Comment #	NRCan-TRC-11
Subject / Topic	Permafrost - Agnico response to Commitment 42 (In-pit deposition alternative and disposal study)
References	NRCan-TRC-02 NRCan-TRC-03, NRCan-TRC-09 Technical Memorandum. Meliadine Mine – Meliadine Extension FEIS Addendum – In-pit Deposition Alternative, Agnico Dec. 2022 Technical Memorandum. In-pit tailings disposal study for the Meliadine Extension. Ardent Innovation Inc. and Lorax Environmental Services Ltd. Dec. 2022. Technical Note – Environmental Impact Study Review – Meadowbank In-Pit Tailings Deposition, SNC-Lavalin, Feb. 15, 2018 Meliadine Extension Response to Commitment No. 40, Agnico, Nov. 26, 2022 Meliadine Extension Project Proposal – List of Commitments Dec. 1, 2022
Summary	Agnico provided additional documentation in response to technical review comments and recommendations by NRCan (and other parties) regarding the in-pit mine waste disposal plans (Commitment 42). NRCan is providing a review of the additional documentation and associated analysis focusing on the permafrost and thermal modelling aspects.

NEW Review Comment #	NRCan-TRC-11
Detailed Review Comment	The Proponent plans to use mined out pits for disposal of waste rock and tailings. This is an important modification to the approved project. The Proponent's justification and impact assessment was largely based on their experience with Meadowbank. However, little analysis specific to the Meliadine extension was provided in the FEIS addendum. NRCan and other parties met with Agnico in November 2022 regarding their concerns and agreed that additional documentation would be provided (see references) that would provide information on the Meadowbank In-Pit tailings deposition and a framework for the in-pit disposal for Meliadine extension, and documentation of thermal and groundwater modelling to support the design and impact assessment as a response to commitment 42. The documentation provided in Dec. 2022 provided results of thermal modelling for various deposition scenarios (warm vs cold tailings) and for wet and dry covers in order to determine if an open talik would develop beneath the pits and the time for this to occur. The analysis is required to determine whether there will be groundwater pathways between the tailings in the pit and the deeper groundwater system. The analysis (Ardent & Lorax Tech Memo) was conducted for two (WN01 and WES05) of the six pits being considered for in-pit disposal of tailings to represent a pit within an existing talik (WN01) and one in permafrost (WES05). Additional analysis was conducted with respect to groundwater to determine seepage fluxes and travel times between pits and Meliadine Lake. The results of the analysis were utilized to rank the six pits with respect to their suitability for in-pit tailings disposal. The approach for thermal analysis, input parameters and boundary conditions for the various scenarios have been clearly outlined (Ardent & Lorax Tech Memo). There were two phases to the modelling (sec. 3, Ardent & Lorax Tech. Memo): (1) steady-state thermal modelling to determine critical lake size required for open talik formation and to calibrate the thermal model; (2) transient modelling to investigate ground thermal response and potential talik formation for the various scenarios. To account for porewater salinity a freezing point depression of -3.4°C has been utilized which is conservative. A commercial software which is widely used was utilized for the thermal modelling. The Proponent has utilized an acceptable approach and in NRCan's view it is generally appropriate for this stage of the project design. The results from the WES05 Phase 1 modelling indicate that an open talik will form beneath a water filled pit. The transient modelling for the various scenarios (Table 5-1 Agnico Tech. Memo; sec. 3.5, 3.8 Ardent & Lorax Tech. Memo) indicate that an open talik will form in about 62 years after pit closure for warm (+1°C) tailings with both water and dry covers. For cold (-1°C) tailings an open talik will form 390 years after closure for a water cover but an open talik will not form for a dry cover. A dry cover is not an option for WN01 which is located in an existing talik underlying Lake B5 so the modelling only considered scenarios with a water cover. Although some freezing occurs beneath the pit following excavation and during cold tailings disposal, an open talik will still form beneath a water cover in 5 to 20 years after closure for warm and cold tailings deposition respectively (Table 5-1 Agnico Tech. Memo; sec. 3.6 Ardent & Lorax Tech. Memo). The conclusion reached from this analysis (sec. 3.8, Ardent & Lorax Tech. Memo) is that permafrost is best preserved with cold tailings deposition and a dry cover for pits that are initially in permafrost. If a water cover is required then deposition of cold tailings will slow the rate of thaw but an open talik will still form. NRCan agrees with this conclusion based on the information presented. NRCan notes that the potential for talik formation beneath a water cover along with the results regarding relatively short travel times, due to the hydraulic gradient and presence of a fault (sec. 4, 5 Ardent & Lorax Tech. Memo) has resulted in WES05 having the lowest ranking of the candidate sites (Table 5-1, Ardent & Lorax Tech. Memo). However the ranking could change depending on how facilities are operated and closed (sec. 5, 6 Ardent & Lorax Tech. Memo) including tailings deposition scenarios that promote heat loss to delay talik formation

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	and use of dry covers. For WES05, a slow deposition of tailings and a dry cover for example could eliminate seepage and make this a preferred operation. WN01 which is in an existing talik and for which after a short freezing period, an open talik will exist again within 20 years, also received a low ranking. Uncertainties and limitations for the thermal analysis have been described (sec. 3.7 Ardent & Lorax Tech. Memo). This includes limitations of available subsurface data and uncertainties regarding spatial variations in porewater salinity and initial subsurface temperature conditions. NRCan would suggest that refinements can be made to the analysis as required if updated information becomes available as design progresses. NRCan would note that the Proponent appears to have been conservative with respect to porewater salinity (and the freezing point depression) and that reduced salinity could result in delay or lack of open talik formation for some scenarios depending on values for freezing point depression as well as other site specific conditions. There are uncertainties regarding spatial complexity of subsurface temperatures and accurate delineation of existing taliks due to intersection of taliks beneath lakes. In addition, the current deep ground thermal regime and permafrost thickness is a product of surface temperature changes induced by past events such as the last glaciation and post-glacial period. NRCan agrees that these are limitations and suggests that some additional refinement of the modelling and sensitivity analysis in addition to a conservative approach as design progresses may help to address these limitations. Operational details regarding pit deposition were not fully known when the analysis was conducted and refinements can be made as operational details become available as design progresses. NRCan notes an additional limitation to the modelling is that there is no consideration of climate change. The Ardent & Lorax Tech. Memo indicates (sec. 3.1) that climate warming effects over the decades following closure would have an effect on the ground thermal regime but consideration of these effects was outside the scope for pre-feasibility analysis. NRCan agrees that climate warming would have an impact on both ground and water temperatures and talik formation, especially given the time periods considered in the analysis. Analysis of ground temperature time series for sites with similar ground temperatures in the western, eastern, and high Arctic acquired by the Geological Survey of Canada for example indicate warming at the depth of zero annual amplitude of 0.4 to 0.7°C per decade (Smith et al. 2019; 2022). NRCan notes that climate change appears to have been considered in other analysis related to the response to Commitment 42 with respect to assessment of potential effects on water quantity and quality for closure and post closure phase (pg. 9, Agnico Tech. Memo). NRCan would suggest that as design and plans for in-pit tailings disposal advance that climate change be considered in refinement of the analysis to inform operational and closure plans. Additional references cited: Smith SL, Duchesne C, Lewkowicz AG Tracking changes in permafrost thermal state in Northern Canada. In: Bilodeau J-P, Nadeau DF, Fortier D, Conciatori D (eds) Cold Regions Engineering 2019, Proceedings of the 18th International Conference on Cold Regions Engineering and the 8th Canadian Permafrost Conference, Quebec, Quebec, Canada, August 18-22 2019. American Society of Civil Engineers, pp 670-677. doi:10.1061/9780784482599 Smith SL, Romanovsky VE, Isaksen K, Nyland KE, Kholodov AL, Shiklomanov NI, Streletskiy DA, Drozdov DS, Malkova GV, Christiansen HH (2022) [Arctic] Permafrost [in "State of the Climate in 2021"]. Bulletin of the American Meteorological Society 103 (8):S286-S290. doi:10.1175/BAMS-D-22-0082.1
Recommendation / Request	NRCan agrees that the thermal analysis conducted is appropriate for this stage of the process and design. NRCan offers the following recommendations for the Proponent's consideration as

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	design and operational and closure plans advance to inform final design and plans for in-pit disposal: • Refine thermal modelling as design progresses to address limitations and uncertainties (outlined in sec. 3.7, Ardent & Lorax Tech. Memo) regarding operation details (such as tailings temperature and deposition scenarios) through inclusion of further information as it becomes available. • Refine thermal modelling as design progresses to address limitations and uncertainties (outlined in sec. 3.7, Ardent & Lorax Tech. Memo) regarding subsurface conditions through inclusion of any new information acquired regarding for example, porewater salinity, ground temperatures and thermal properties. • Include climate change in the thermal modelling as design progresses to refine assessments regarding potential and timing of open talik formation.

Government of Canada Meliadine Extension 2023 Pre-Hearing Conference Participant List

Lead Spokesperson
Alternate/As Needed

Department	Participant	Title	Expertise/Authority/ Team Name	Email Address	Role
Fisheries and Oceans Canada	**José Audet-Lecouffe**	Senior Biologist	Fish and Fish Habitat Protection Program	jose.audet-lecouffe@dfo- mpo.gc.ca	**Dept. lead spokesperson**
	Alasdair Beattie	Team Lead	Fish and Fish Habitat Protection Program	alasdair.beattie@dfo-mpo.gc.ca	**Alternate spokesperson**
	Paul Harper	Biologist	Fish and Fish Habitat Protection Program	paul.harper@dfo-mpo.gc.ca	Technical expert
Natural Resources Canada	**Vikash Narine**	Environmental Assessment Officer	Impact Assessment Division	Vikash.narine@nrcan-rncan.gc.ca	**Dept. lead spokesperson**
	Pierre-Olivier Émond	Manager	Impact Assessment and Indigenous Consultation	pierre-olivier.emond@nrcan-rncan.gc.ca	Attendee
	Peter Unger	Team Leader	Impact Assessment Division	peter.unger@nrcan-rncan.gc.ca	Attendee
Environment and Climate Change Canada	**Stephinie Mallon**	Environmental Assessment Officer	Environmental Assessment	Stephinie.Mallon@ec.gc.ca	**Dept. lead spokesperson**
Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)	**Amal Roy**	Sr. Environmental Assessment Specialist	Environmental Assessment	amal.roy@rcaanc-cirnac.gc.ca	**GOC lead spokesperson**
	Richard Bingley	Environmental Assessment Coordinator	Environmental Assessment	richard.bingley2@rcaanc-cirnac.gc.ca	Attendee
	Felexce Ngwa	Manager Impact Assessment	Environmental Assessment	felexce.ngwa@rcaanc- cirnac.gc.ca	**Alternate spokesperson**

Canada

	Vincent Okonkwo	Senior Environmental Assessment Specialist	Impact Assessment	vincent.okonkwo@rcaanc-cirnac.gc.ca	Attendee
	Kim Pawley	Environmental Assessment Manager	Land Use Planning and Conservation/ Environmental Assessment	Kim.pawley@rcaanc-cirnac.gc.ca	Attendee
	Jennifer Walsh	Senior Environmental Policy Analyst	Environmental Assessment	jennifer.walsh@rcaanc-cirnac.gc.ca	Attendee
	Michael Staniewski	Environmental Policy Analyst	Environmental Assessment	Michael.staniewski@rcaanc-cirnac.gc.ca	Attendee
Arcadis Canada Inc. (on behalf of CIRNAC)	Tony Brown	Environmental Engineer/ Management	Environmental Assessment	tony.brown.canada@gmail.com	Technical expert
Transport Canada	**Adam Downing**	Regional Senior Environmental Supervisor	Environmental Assessment	Adam.downing@tc.gc.ca	**Dept. lead spokesperson**
Health Canada	**Julie Anderson**	Impact Assessment Specialist	Human health in environmental assessment	julie.c.anderson@hc-sc.gc.ca	**Dept. lead spokesperson**
	Joel Kaushansky	Impact Assessment Specialist	Human health in environmental assessment	joel.kaushansky@hc-sc.gc.ca	**Alternate Dept. spokesperson**
	Ninon Lyrette	Sr. Environmental Health Specialist	Human health in environmental assessment	ninon.lyrette@hc-sc.gc.ca	Attendee
Canadian Northern Economic	**Adrian Paradis**	Senior Project Manager	Northern Projects Environmental Assessment	Adrian.paradis@cannor.gc.ca	**Dept. lead spokesperson**

Canada

Development Agency, Northern Projects Management Office	**Natalie D'Souza**	A/Project Manager	Northern Projects Environmental Assessment	natalie.dsouza@cannor.gc.ca	Attendee
Department of Justice	**Simon Gruda-Dolbec**	Legal Counsel	Legal Counsel	Simon.gruda-dolbec@justice.gc.ca	**Dept. lead spokesperson**

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