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Technical Review Submission to the Nunavut Water Board

Agnico Eagle Mines Limited's Meadowbank Gold "In-Pit Tailings Disposal Modification" Project Proposal

Aug 3, 2018

DFO File No.: 03-HCAA-CA7-00191
NWB File No.: 2AM-MEA1525

Canada

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Executive Summary

The Agnico Eagle Mines Ltd. Meadowbank Modification - In-Pit Tailings Disposal Project (the Project) is a modification to a currently operating Meadowbank Gold Mine owned by Agnico Eagle Mines Ltd. (Agnico or the Proponent) within the Kivalliq region of Nunavut and north of Baker Lake. The Project proposes to dispose tailings in three pits: Portage Pit A, Portage Pit E and Goose Pit (also previously known as Bay-Goose Pit).

The Fisheries Protection Program of Fisheries and Oceans Canada (The Program or DFO-FPP) is responsible on behalf of the department for regulatory review of proposed developments occurring in or near Canadian fisheries waters. The Program has reviewed application and supporting documents related to The Project, in regard to the departmental mandate under the *Fisheries Act,* to maintain the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries, including marine mammals and their habitat. DFO-FPP's primary focus in reviewing proposed developments in and around fisheries waters is to ensure that works, undertakings and activities are conducted in compliance with the applicable provisions of the *Fisheries Act*.

The fisheries protection provisions of the Fisheries Act (2013), specifically subsection 35(1), state that "*No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery or to fish that support such a fishery*." However, under paragraph 35(2)(b) of the *Fisheries Act*, the Minister of Fisheries and Oceans may issue an authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in serious harm to fish. Serious harm to fish is defined in Section 2 of this Act as the death of fish, or permanent alteration to or destruction of fish habitat.

DFO-FPP is providing the following technical review submission in response to the Nunavut Water Board correspondence dated July 3, 2018, requesting intervenors submit technical comments related to the Project for their consideration by August 3, 2018. The technical comments are categorized under the following general topics: Fish Habitat and Fisheries Offsetting.

<u>Fish Habitat and Fisheries Offsetting</u>
Agnico's proposed changes involve In-Pit tailings disposal in Portage Pit A, Portage Pit E, and Goose Pit which has the potential to impact the water quality, hydrology, limnology within these pits closure/ post-closure. After review of the Proponent's responses, DFO-FPP has noted remaining uncertainty respecting the method of tailings cover, and whether the conditions within the pit (at closure and post-closure) will be suitable to support fish and fish habitat.

DFO-FPP notes that the proposed modifications change the intended use of the Goose Pit and the Portage Pit from the original approved plan and *Fisheries Act* authorization under section 35(2) of the *Fisheries Act*. These proposed modifications may impact the compensation measures that are described in Agnico's No Net Loss Plan (NNLP) dated October 2012.

1 Introduction

This Information Request submission summarizes Fisheries and Oceans Canada (DFO) – Fisheries Protection Program's (FPP) assessment and recommendations concerning the proposed Meadowbank Gold - In-Pit Tailings Disposal Project (the Project). The purpose of this submission is to provide expert advice to the Nunavut Water Review Board (NWB) regarding the identification of potential environmental impacts associated with the project proposed.

As directed by the NWB in their letter dated July 3, 2018, this submission focuses on detailed analysis of the Type "A" Water Licence No.: 2AM-MEA1525 regarding modifications to tailings management under the licence. The objective is to assess the updated plans in support of the water licence, presented by the Proponent in support of the Project proposal, and reflects DFO-FPP's mandate.

2 Mandate, Relevant Legislation and Policy

The *Constitution Act* (1982) provides the Federal Government with exclusive authority for coastal and inland fisheries within Canada's territorial boundaries. DFO exercises this power through, the administration of the *Fisheries Act* and some aspects of the *Species at Risk Act*. Under the *Fisheries Act*, DFO is responsible for the management, protection and conservation of fish (which include marine mammals as defined by the *Fisheries Act*) and their habitats. The Minister of Fisheries, Oceans and the Canadian Coast Guard is one of the competent ministers under the *Species at Risk Act* (SARA).

In general, DFO-FPP undertakes the review of proposed project in and around fisheries waters to ensure that works, activities and undertakings are conducted in such a way that the proponents are in compliance with the applicable provisions of the *Fisheries Act.*

The mandate of DFO-FPP is to maintain the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries. Sub-section 35 (1) of the *Fisheries Act* states that "No person shall carry on any work, undertaking or activity that results in *serious harm to fish* that are part of a commercial, recreational, or Aboriginal fishery or to fish that support such a fishery."

Fisheries and Oceans Canada interprets *serious harm to fish* as:

- the **death of fish**;
- a **permanent alteration** to fish habitat of a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes;

- the **destruction of fish habitat** of a spatial scale, duration, or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of these life processes.

However, under Paragraph 35 (2) (b) of the *Fisheries Act*, the Minister of Fisheries, Oceans and the Canadian Coast Guard may issue an authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in serious harm to fish. The above are subject to the consideration of the four factors in Section 6 of the *Fisheries Act*:

1. The contribution of the relevant fish to the ongoing productivity of commercial, recreational or Aboriginal fisheries;

2. Fisheries management objectives;

3. Whether there are measures and standards to avoid, mitigate or offset serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or that support such a fishery; and

4. The public interest.

DFO-FPP is guided by the “Fisheries Protection Policy Statement (2013)”, which is intended to provide guidance to Canadians and ensure compliance with the *Fisheries Act*. The *Fisheries Protection Policy Statement* addresses key threats to the productivity and sustainability of our fisheries, through standards and guidelines to avoid, mitigate, and offset impacts to fisheries.

The “Fisheries Productivity Investment Policy: A Proponent’s Guide to Offsetting (2013)” provides guidance on undertaking effective measures to offset serious harm to fish that are part of or that support a commercial, recreational or Aboriginal fishery, consistent with the fisheries protection provisions of the *Fisheries Act*. The objective of offsetting is to counterbalance unavoidable *serious harm to fish* and the loss of fisheries productivity resulting from a project. For more information, see: http://www.dfo-mpo.gc.ca/pnw-ppe/pol/index-eng.html.

3 Technical Review Comments

3.1 Fish Habitat and Fisheries Offsetting

Review Comment Number	3.1 Fish Habitat and Fisheries Offsetting
Subject/Topic	Habitat structure and function, accounting of habitat gains and losses as they relate to compensation / offsetting measures, contingency measures related to concerns about water quality and fish use of flooded in-pit areas.
References	*Note: All references to IR's refer to the IR's and IR responses provided as part of the NIRB's process.* • Agnico Eagle Mines Limited – Meadowbank Division In-Pit Deposition Information Request Responses, p. 7-8 (ECCC#3a), p. 9-10 (ECCC #4), p. 13-16 (IR DFO 3.1, 3.2); • Azimuth. 2010. Appendix F5 - Aquatic Effects Monitoring Program-Habitat Compensation Monitoring -2009, March 2010. Section 3.2.2 (p. 16-17) and Section 4 (p.31-32); PRI: 289333, Note: found under Meadowbank Gold Project (application no: 124588) • Appendix C- Meadowbank No Net Loss Plan (AEM 2012), Section 6, p. 61-69; PRI: 288916, Note: found under Meadowbank Gold Project (application no: 124588) • No Net Loss Habitat Report: Section 2.1 Species Habitat preferences (p. 2-1 to 2-11) Table 2.1 (p. 2-6); Section 2.2 Overview of Habitat Requirements of Lacustrine Fish in Project Lakes (p. 2-11 to 2-14); PRI: 281600, Note: found under Meadowbank Gold Project (application no: 124588) • Technical Memorandum Re: Updated NNL Calculations for Habitat Gains in Second and Third Portage Lakes Section 1.4, p.3; PRI: 315726 • Technical Note: Environmental Impact Study Review – Meadowbank In Pit Tailings Deposition, Section 5.4, p.13-14; Table 7 Appendix 1; PRI: 315712 • Final Environmental Impact Statement, Section 4.13.4.2, p. 70-71; PRI: 281512; Note: found under Meadowbank Gold Project (application no: 124588) • ECCC final written submission to NIRB, ECCC#3 Mitigation: Capping of Tailings Technical Memorandum Re: Updated NNL Calculations for Habitat Gains in Second and Third Portage Lakes.
Summary	1) Habitat Structure and Function: In the Proponent's responses to DFO IRs, the Proponent indicate that there will be no capping of tailings with materials other than water (IR DFO 3.1.1, and reference to IR ECCC#4). The tailings deposition will result in a habitat categorized by the Proponent as Type 7, which is 'fine substrate >4m in depth' (IR DFO 3.1.2). The Proponent has predicted that water quality is going to be suitable for aquatic life, with lake trout, whitefish and

	burbot expected to freely access the pit lake area, including in-pit tailings areas (IR DFO 3.2.1). Water quality is also predicted to be suitable for primary and secondary producers and benthos to thrive and establish (IR DFO 3.2.2). 2) Accounting of Habitat Gains and Losses: The Proponent states that based on PHREEQC modeling the magnitude of the impacts of in-pit storage deposition will diminish over time once pit flooding is completed (IR DFO 3.2.3). They refer back to Table 7: Predicted Impacts to Fish and Fish Habitat (Closure and Post-Closure) in the Technical Note: Environmental Impact Study Review – Meadowbank In Pit Tailings Deposition. 3) Contingency Measures: The Proponent asserts in their response to IR DFO 3.1.2 that the areas of tailings deposition will slightly improve fish occupancy as compared to deeper pit areas that were modelled in the 2012 No Net Loss Plan, and that areas will be viable habitat once fish are reintroduced (IR DFO 3.1.2a). The Proponent also states that it is expected that habitat will be functional shortly after fish are reintroduced; however they acknowledge that there is uncertainty respecting the potential delays (in timing) related to the functioning of habitat. The Proponent also states that their habitat gains to habitat loss ratio as part of their Meadowbank Mine No Net Loss Plan is sufficient to account for the uncertainty in functioning of fish habitat. Regarding the potential delays in fish habitat becoming functional and consideration of habitat compensation, the Proponent also directs DFO-FPP to Section 6 – No Net Loss Contingency Options (page 61) for a list of other habitat compensation options with type and location that remain contingencies for the Meadowbank Mine authorizations.
Importance of issue to the impact assessment process	It is important for DFO-FPP to have a complete understanding of the habitat conditions at closure, and whether they will be appropriate for fish and other aquatic life; this applies to both *serious harm* to fish as well as proposed habitat compensation/offsetting measures.
Detailed Review Comment **1. Gap/Issue** **2. Disagreement with EIS conclusion** **3. Reasons for disagreement with EIS conclusion**	1) Habitat Structure and Function: The Proponent's responses to DFO's IR 3.1.1 and 3.1.2: DFO-FPP understands that there will be no capping of tailings with materials other than water and that the tailings deposition will result in a habitat categorized by the Proponent as a Type 7, which is 'fine substrate >4m in depth'. However, the Proponent has not provided adequate evidence of how Habitat Type 7 (comprised of fines) will be beneficial for fish and benthic organisms beyond a comparison to Habitat Type 9 (associated with East Dike and Bay-Goose Dike) that is comprised of coarse substrates. In addition, DFO-FPP notes there is limited details respecting how fish and

aquatic life may interact with/ utilize the different substrates; i.e. details on how different habitat (e.g. fine vs. coarse granular cover) are used by biota.

The Proponent has asserted that tailings areas will slightly improve fish occupancy as compared to deeper pit areas (as originally modelled in the 2012 offsetting plan), and that habitat in Portage Pit lake is predicted to provide habitat once fish are introduced into the area. The Proponent provided supporting information referring to data collected "*along East Dike and Bay-Goose dike (which is categorized as Habitat 9, coarse substrate >4m in depth) where lake trout and whitefish occupancy has been documented since 2009, immediately following construction (Azimuth 2010).*"

However, DFO-FPP notes that the information provided by the Proponent illustrating that fish occupancy occurred "*immediately following construction*" (Azimuth 2010) refers to fish presence in and around the vicinity of the East Dike, which is composed of a different substrate (course substrate; >4m in depth) and is a different type of work (e.g. dike face composed of rock substrate) than a reflooded pit with uncovered tailings as habitat structure. DFO-FPP notes that in the Azimuth (2010) report it is also stated that lack of information on rock types and sizes used to construct the East dike constrains interpretation of some monitoring components (p. 16-17). Further, in Azimuth (2010) it is also stated that the monitoring strategy evaluating HCF (habitat compensation feature) function focused on capability rather than actual use (p. 31-32). DFO-FPP notes that comparison of East Dike and Bay-Goose dike (Habitat 9) to in-pit tailings (Habitat 7) is not an appropriate comparison given the differences in the physical structure, depth, and initial design intent (e.g. salmonid spawning). DFO also notes that fish presence alone does not clearly indicate how the habitat is being used, which impacts assessment of effectiveness of habitat structure and subsequent accounting of habitat losses and gains.

DFO-FPP also reminds the Proponent (see also IR DFO 3.2) that in the Final Environmental Impact Statement (FEIS) for the Meadowbank Gold Project under sec. 4.13.4.2, Lake Bottom Substrates & Fish Habitat (p.70-71) they have stated that: "*In general, coarse, heterogeneous sediment mixtures have a higher habitat value because of greater diversity and structure…* and…*Sediment comprised of an even mixture of fine substrates with little or no complexity is very common, but has lesser value than heterogeneous substrate. Fine substrate habitat is used for feeding by some species and*

does not provide good, direct habitat for most other life history needs for most species." DFO-FPP also refers to ECCC Final Written Response (ECCC#3 Mitigation: Capping of Tailings) which refers the potential for contaminants to enter the food web, and potential conditions where a rock cover on tailings would be beneficial. DFO-FPP echoes the comments by ECCC given the importance of water quality being suitable for fish species and the impacts to offsetting, further adding that a heterogeneous cover may provide habitat types that result in increased use by aquatic organisms, further benefitting offsetting approaches, in addition to limiting direct interaction between organisms and uncovered tailings.

2) Accounting of Habitat Gains and Losses:
As noted in the previous section 1) Habitat Structure and Function, DFO-FPP indicated that the supporting evidence provided does not allow for an adequate assessment of the intended functioning of the habitat structure provided by the in-pit tailings materials, and that uncertainty regarding the timing of fish usage and occupancy remains. Though the Proponent indicates that it is expected that habitat will function shortly after fish are reintroduced, the Proponent also acknowledges uncertainty with regards to the potential delays related to the functioning of habitat. Also, in the Proponent's response to IR DFO 3.2.3, the Proponent states that based on PHREEQC modeling the magnitude the impacts of in-pit storage deposition will diminish over time once pit flooding is completed. DFO-FPP notes that the Proponent does not provide adequate details regarding magnitude and timing of impacts, and their relation to life stages.

DFO-FPP notes that uncertainty remains regarding the functionality of new habitat structure (i.e. Habitat Type 7) and the time lags associated with use of the new habitat structure. The Proponent asserts in their response to IR DFO 3.1.2a that their ratio of gains and losses under their existing No Net Loss Plan (2012) as part of their existing *Fisheries Act* authorization for the Meadowbank Mine-site are sufficient to account for the uncertainty in the functioning of fish habitat. However, DFO-FPP reminds the Proponent that any compensation/offsetting that was developed to account for losses under their existing *Fisheries Act* authorization, was specific to the Harmful Alteration, Disruption and Destruction (HADD) of habitat within that authorization, and was specific to the conditions of the No Net Loss Plans associated with it (i.e. cannot/ does not account for future *serious harm*). As such, any changes to the level of serious harm (referred to as HADD under the previous *Fisheries Act*) resulting from the proposed In-pit Tailings Disposal Modification proposal, or from

	modifications to the accounting in the existing No Net Loss Plans, will require separate offsetting and consideration by DFO. DFO-FPP will require the Proponent to re-evaluate compensation / offsetting. 3) Contingency Measures: Regarding the IR DFO 3.1.2 request for details regarding potential delays in fish habitat becoming functional and if other habitat compensation was considered, the Proponent refers to Section 6: NNL Contingency Options (p. 61 of the No Net Loss Plan; AEM 2012). DFO-FPP notes that contingency options 1-6 are from the 2012 No Net Loss Plan, and were developed prior to the proposed in-pit deposition approaches, and that options 1-6 do not mention use of a mixed-substrate / coarse material to cover tailings. DFO-FPP reiterates that the Technical Memorandum Re: Updated No Net Loss (NNL) indicates that a mixed-substrate top layer option was included to minimize large areas of fine substrate basis and to maximize available habitat units (see summary IR DFO 3.1). DFO-FPP notes the Proponent has provided information on the benefits of on a heterogenous substrate (i.e. not limited only to a silt substrate) to fish species life processes and life stages (see example from the Final Environmental Impact Statement (FEIS) for the Meadowbank Gold Project under sec. 4.13.4.2, Lake Bottom Substrates & Fish Habitat (p.70-71) noted above). DFO-FPP notes that offsetting gains are dependent on the assumption that water quality will suitable for fish and fish habitat, and that if conditions are not suitable, contingency offsetting options will need to be implemented. The examples provided as contingency options (Options 1-6) may need to be updated to reflect these concerns, and to ensure they are adequate to fully offset additional serious harm to fish resulting from the proposed In-pit Tailings Disposal Modification.
Recommendation:	Given the uncertainty related to fish use of flooded in-pit tailings areas with regards to suitability of the substrate, and potential delays in use of the tailings substrate: 1) DFO-FPP recommends the Proponent : a) Provide additional information to support the prediction that 'Habitat 7' will provide viable / suitable habitat once fish are reintroduced, similar to 'Habitat 9, in the absence of a granular cap. b) Provide details respecting how differences in physical features of the substrate (i.e. tailings vs. coarse granular cover / capping materials) impact habitat use; this is including but not limited to

	the interaction(s) fish and aquatic life may have with different substrates. 2) DFO-FPP recommends the Proponent : a) Continue to work with DFO-FPP to update the accounting of habitat gains and losses, and associated offsetting resulting from any additional serious harm from the proposed In-pit Tailings Disposal Modification proposal, or from modifications to the accounting in the existing No Net Loss Plans. Updated accounting should account for the uncertainty that remains regarding the functionality of new habitat structure (i.e. Habitat Type 7) and the time lags associated with use of the new habitat structure. DFO-FPP also notes that any modifications to the accounting within the existing NNLP requires additional consideration by DFO. b) Provide updated rationale for how predicted impacts of in-pit storage deposition will "diminish over time" as per Table 7: Predicted Impacts to Fish and Fish Habitat (Closure and Post-Closure) in the Technical Note: Environmental Impact Study Review – Meadowbank In Pit Tailings Deposition. The rationale should include, but not be limited to, an assessment of the magnitude of impacts as they relate to life stages of fish and benthic organisms. 3) DFO-FPP recommends that the Proponent: Provide updated contingency offsetting options to address the potential risk that water quality may not be suitable for the reintroduction or establishment of fish at closure.

4 Summary of Recommendations

Fish Habitat and Fisheries Offsetting
Given the uncertainty related to fish use of flooded in-pit tailings areas with regards to suitability of the substrate, and potential delays in use of the tailings substrate: 1) DFO-FPP recommends the Proponent : c) Provide additional information to support the prediction that 'Habitat 7' will provide viable / suitable habitat once fish are reintroduced, similar to 'Habitat 9, in the absence of a granular cap. d) Provide details respecting how differences in physical features of the substrate (i.e. tailings vs. coarse granular cover / capping materials) impact habitat use; this is including but not limited to the interaction(s) fish and aquatic life may have with different substrates.

2) DFO-FPP recommends that the Proponent:

a) Continue to work with DFO-FPP to update the accounting of habitat gains and losses, and associated offsetting resulting from any additional *serious harm* from the proposed In-pit Tailings Disposal Modification proposal, or from modifications to the accounting in the existing No Net Loss Plans. Updated accounting should account for the uncertainty that remains regarding the functionality of new habitat structure (i.e. Habitat Type 7) and the time lags associated with use of the new habitat structure. DFO-FPP also notes that any modifications to the accounting within the existing NNLP requires additional consideration by DFO.

b) Provide updated rationale for how predicted impacts of in-pit storage deposition will "diminish over time" as per Table 7: Predicted Impacts to Fish and Fish Habitat (Closure and Post-Closure) in the Technical Note: Environmental Impact Study Review – Meadowbank In Pit Tailings Deposition. The rationale should include, but not be limited to, an assessment of the magnitude of impacts as they relate to life stages of fish and benthic organisms.

3) DFO-FPP recommends that the Proponent:

Provide updated contingency offsetting options to address the potential risk that water quality may not be suitable for the reintroduction or establishment of fish at closure.