



Your file - Votre référence
2AM-MEL1631

July 28, 2016

Our file - Notre référence
IQALUIT-#1082042

Licensing Department
Nunavut Water Board
GJOA HAVEN, NU X0E 1J0

Sent via email: licensing@nwb-oen.ca

**Re: Indigenous and Northern Affairs Canada's Review of Management Plans for
Agnico Eagle Mines Limited's Meliadine Gold Project, Part B, Item 13 of Type 'A'
Water Licence No. 2AM-MEL1631**

To Whom It May Concern,

Thank you for the Nunavut Water Board's June 27, 2016 notice of the following management plans that Agnico Eagle Mines Ltd. submitted pursuant to Part B, Item 13 of Licence No. 2AM-MEL1631:

1. Mine Waste Management Plan, Version 2, June 2016
2. Water Management Plan, Version 2, June 2016
3. Environmental Management and Monitoring Plan, Version 5, 2016
4. Aquatic Effect Monitoring Program (AEMP) Design Plan, Version 1, June 2016

A memorandum is provided for the Nunavut Water Board's consideration. Comments and recommendations have been provided pursuant to Indigenous and Northern Affairs Canada's mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Indian Affairs and Northern Development Act*.

Please do not hesitate to contact me by telephone at 867-975-4555 or email at David.Abernethy@aandc-aadnc.gc.ca for further information.

Sincerely,

David Abernethy
Regional Coordinator
Water Resources Division
Resource Management Directorate
Indigenous and Northern Affairs Canada
IQALUIT, NU X0A 0H0

Encl.

Cc. Manon Turmel, Agnico Eagle Mines Ltd.

Memorandum

To: Ida Porter, Licensing Administrator, Nunavut Water Board

From: Amjad Tariq, Regulatory and Science Advisor, Water Resources Division,
Indigenous and Northern Affairs Canada (INAC)

Date: July 27, 2016

Re: **Indigenous and Northern Affairs Canada's Review of Management Plans for Agnico Eagle Mines Limited's Meliadine Gold Project, Part B, Item 13 of Type 'A' Water Licence No. 2AM-MEL1631**

Licence: 2AM-MEL1631
Licensee: Agnico Eagle Mines Ltd
Project: Meliadine Gold Mine
Region: Kivalliq

BACKGROUND

On June 27, 2016, the Nunavut Water Board (Board or NWB) requested that interested parties review the management plans submitted by Agnico Eagle Mines Limited for its Meliadine Gold Mine project as a requirement of Part B, Item 13 of the Water Licence 2AM-MEL1631.

Interested parties were asked to provide comments by July 27, 2016.

RESULT OF REVIEW

The following documents for Meliadine gold project have been reviewed.

5. Mine Waste Management Plan, Version 2, June 2016
6. Water Management Plan, Version 2, June 2016
7. Environmental Management and Monitoring Plan, Version 5, 2016
8. Aquatic Effect Monitoring Program (AEMP) Design Plan, Version 1, June 2016

The following comments and recommendations have been prepared.

1. Mine Waste Management Plan, Version 2, June 2016

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| Regulatory Authority: | Nunavut Water Board | No. INAC 1 |
| General Issue: | Chemical stability of tailings storage facility (TSF) and waste rock storage facilities (WRSFs) | |
| References: | <ul style="list-style-type: none"> • Mine Waste Management Plan, Version 2, June 2016 Section 4.1 General Description of Waste Rock and Overburden Management Page 24, pdf page 25 • ¹Golder Associates 2014, SD 6-3 Geochemical Characterization of Waste Rock, Ore, Tailings and Overburden, Meliadine Gold Project, Nunavut, Canada. A Technical Report Submitted to Agnico Eagle Mines Ltd. (hereinafter referred to as 'Golder Report') Section 7.0 Mine Waste Management Considerations Section 8.0 Recommendations Page no. 75-76, pdf page 84-85. | |
| Issue/Concern or Information Deficiency: | The Licensee should re-evaluate the geochemical characterization program results because the mining plan is considered to be finalized. | |
| Rationale: | <p>In section 4.1 of the Mine Waste Management Plan, the Licensee states that,</p> <p>'The geochemical characterization of the waste rock, ore, tailings and overburden was submitted as SD 6-3 Geochemical Characterization of Waste Rock, Ore, Tailings and Overburden Meliadine Gold Project, Nunavut (2014).'</p> <p>Section 7.0 of the Golder Report states that,</p> <p>'The mine waste management considerations are subject to re-evaluation upon completion of additional studies, further sampling, and/or modification/finalization of the mining plan and mine waste management plans.'</p> <p>Section 8.0 of the Golder Report states that,</p> <p>'Upon modification or finalization of the mine plan, the geochemical characterization program results should be re-evaluated according to the chosen mining technique, development sequence and new pit outlines. Field cells should continue to be monitored (leached and leachate analyzed) during frost-free months to verify rock leaching rates under site conditions.'</p> <p>INAC is concerned that the geochemical characterization program needs to be re-evaluated to fully characterize the mine waste.</p> | |
| Recommendation: | In order to assess the chemical stability of TSF and WRSFs, the Licensee should provide re-evaluation of geochemical characterization program test results for waste rock and tailings in light of the Licensee's consultant | |

¹ Golder Associates Ltd. 2014, D 6-3 Geochemical Characterization of Waste Rock, Ore, Tailings and Overburden, Meliadine Gold Project, Nunavut, A Technical Report submitted to Agnico Eagle Mines, April 2014, IQA-#953932

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| | (Golder Associates) recommendation referenced above. |
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| Regulatory Authority: | Nunavut Water Board | No. INAC 2 |
| General Issue: | Tailings Dust Management | |
| References: | <ul style="list-style-type: none"> Mine Waste Management Plan Section 5.3 Tailings Physical and Geotechnical Properties Page 31, pdf page 32 Section 7. Dust Management associated with Mine Waste Management Page 38, pdf page 39 | |
| Issue/Concern or Information Deficiency: | The tailings are fine (81% silt sized), therefore, dry stacking of tailings without control measures can produce more severe wind-blown dust emissions during operation. Dry stacking of tailings need additional measures (chemical dust suppressants, etc.) to control dust emission. | |
| Rationale: | <p>In section 5.3, the Licensee states that,</p> <p>‘The index and gradation analysis tests indicated that the tailings are inorganic silt with low plasticity and low compressibility and consist of 17% sand, 81% silt, and 2% clay size particles. Tailings have the gradation curve of 98% passing 150 µm, 83% passing 75 µm, 40% passing 20 µm, and 5% passing 3 µm.’</p> <p>In Section 7, the Licensee states that,</p> <p>‘Dry stacked tailings will be placed in lifts and spread with a dozer and then compacted. The surface compaction of the lifts will significantly reduce the potential for wind erosion of the tailings surface. Dust related to TSF operation during the winter season will be further managed by limiting the exposed surface area of the tailings. In the summer period, dust from the tailings storage facility (TSF) will be controlled by spraying water and/or other approved chemical dust suppressants if problematic.’</p> <p>INAC is concerned that the tailings are fine (81% silt size), therefore, the possibility of wind-blown tailings dust emission is very high and can contaminate the environment (water and land).</p> <p>The common practices (compaction and water spray) seem inadequate to suppress wind-blown dust during operation since the tailings particles are very fine.</p> | |
| Recommendation: | <p>The Licensee should provide details on environmentally safe dust suppressants (reported in Section 7 of the Mine Waste Management Plan) that can be used to prevent tailings dust emission in light of tailings gradation analysis test results. Because the tailings are fine, spraying water alone will likely not be a sufficient means of preventing dust emission.</p> <p>In addition, the Licensee should provide details on how it will monitor the emission of tailings dust from the TSF. If not already established, monitoring stations should be considered.</p> | |

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| Regulatory Authority: | Nunavut Water Board | No. INAC 3 |
| General Issue: | Closure Cover systems for Waste Rock Storage Facilities and Tailings Storage Facility | |
| References: | <ul style="list-style-type: none"> • Mine Waste Management Plan Section 8.1 - Closure and Reclamation of WRSFs Page 40, pdf page 41 Section 8.2 Closure and Reclamation of TSF Page 41, pdf page 42 • Golder Associates 2014 SD 6-3 Geochemical Characterization of Waste Rock, Ore, Tailings and Overburden, Meliadine Gold Project, Nunavut, Canada. A Technical Report Submitted to Agnico Eagle Mines Ltd. (Golder's Report) Section 8.0 Recommendations Page no. 76, pdf page 85 | |
| Issue/Concern or Information Deficiency: | Licensee should demonstrate by re-evaluating geochemical testing program the requirement for cover systems for waste rock storage facilities and (WRSFs) tailings storage facility (TSF) | |
| Rationale: | <p>In section 8.1 of the Mine Waste Management Plan, the Licensee states that,</p> <p>‘Kinetic tests completed on all waste rock types and at various scales show that drainage water quality is expected to meet Metal Mining Effluent Regulations monthly mean effluent limits, including results for arsenic. Therefore, a closure cover system is not proposed for the WRSFs.’</p> <p>In section 8.2 of the Mine Waste Management Plan, the Licensee states that,</p> <p>‘Results of geochemical characterization indicate that the tailings produced at the Project are non-potentially acid generating (NPAG) and metal leaching (ML) is not predicted to be an issue as there will be limited seepage from the tailings pore water at closure.’</p> <p>Section 8.0 of the Golder Report states that,</p> <p>‘Upon modification or finalization of the mine plan, the geochemical characterization program results should be re-evaluated according to the chosen mining technique, development sequence and new pit outlines. Field cells should continue to be monitored (leached and leachate analyzed) during frost-free months to verify rock leaching rates under site conditions.’</p> <p>INAC is concerned that without re-evaluation of the project's geochemical characterization program recommended by the Golder Associates, how can it be concluded that closure cover systems are not required for WRSFs and TSF.</p> | |

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| Recommendation: | <ul style="list-style-type: none"> • In order to prove that a closure cover system is not required for the WRSFs, the Licensee should re-evaluate characterization program test results for waste rock (further sampling and testing). • In order to prove that a closure cover system is not required for the TSF, Licensee should re-evaluate characterization program test result for tailings (further sampling and testing). |

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| Regulatory Authority: | Nunavut Water Board | No. INAC 4 |
| General Issue: | Waste Rock Sampling Frequency for Geochemical Monitoring | |
| References: | <ul style="list-style-type: none"> • Mine Waste Management Plan Section 9.1 Monitoring Activities for WRSFs Page 42, pdf page 43 Section 9.1.2 General Monitoring Program for WRSF Page 43, pdf page 44 | |
| Issue/Concern or Information Deficiency: | The basis of the planned frequency of sampling waste rock for geochemical monitoring has not been provided. | |
| Rationale: | <p>In Table 9.1, the Licensee has mentioned that waste rock geochemical monitoring will be done by taking eight samples per 100,000 tonnes of mine material.</p> <p>In Section 9.1.2, the Licensee states that,</p> <p>‘Waste rock samples will be taken from the production blast holes to analyze the percentage of sulphur and carbon. The results from these analyses will be used to differentiate NPAG and PAG based on the derived NPR. To validate the classification method of NPAG/PAG based on NPR, additional samples will be taken evenly at a rate of one sample per 100,000 tonnes of mined material. The collected samples will be sent to an accredited commercial laboratory for ARD and ML using the ABA (the modified Sobek method) and SFE analyses.’</p> <p>INAC is concerned that the planned frequency of sampling waste rock has not been justified by the Licensee.</p> | |
| Recommendation: | The Licensee should explain the basis for its planned frequency of sampling waste rock. Reference to applicable standards / guidelines should also be provided. | |

2. Water Management Plan, Version 2, June 2016

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| Regulatory Authority: | Nunavut Water Board | No. INAC 5 |
| General Issue: | Water treatment associated with Tailings Storage Facility and Waste Rock Storage Facilities | |
| References: | <ul style="list-style-type: none"> Section 4.4.3- Water Management for Tailings Storage Facility (TSF) Page 26, pdf page 39 Section 4.4.4- Water Management for Waste Rock Storage Facilities (WRSFs) Page 26, pdf page 39 | |
| Issue/Concern or Information Deficiency: | The details on water treatment technology (water treatment plant-WTP) for WRSFs and TSF are not available. | |
| Rationale: | <p>In section 4.4.3, the Licensee states that,</p> <ul style="list-style-type: none"> 'Seepage water and runoff from the TSF within the catchment of Pond H17 will be diverted to CP1 via Channel 1 (Figure 3.5); The seepage water and runoff from the TSF within the catchment of Lake B7 will be diverted and collected in CP3 via Channel 3 (Figure 3.6); and The collected water in CP3 will be pumped to the area of the partially drained Pond H13, and then be diverted to CP1 via Channel1, where the contact water will be treated by the WTP prior to discharging to outside environment.' <p>In Section 4.4.4, the Licensee states that,</p> <ul style="list-style-type: none"> 'The collected water in CP4, CP5, and CP6 will be pumped to CP1, where the contact water will be treated by the WTP prior to discharging to outside environment.' <p>The Licensee has made a commitment to treat the collected water containing contaminants from different sources by a water treatment plant (WTP) before discharging it to the environment but the details on the treatment system (s) have not been provided.</p> | |
| Recommendation: | The Licensee should provide details on water treatment technologies for WRSFs and TSF. The discharge water will contain different contaminants therefore; contaminant removal efficiency of the treatment plant for different contaminants should also be explained by the Licensee in detail. | |

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| Regulatory Authority: | Nunavut Water Board | No. INAC 6 |
| General Issue: | Underground Water Management | |
| References: | <ul style="list-style-type: none"> Section 4.4.7.2- Underground Water Management Page 28-29, pdf page 41-42 | |
| Issue/Concern or Information Deficiency: | Licensee should provide the Groundwater Management Plan for the Nunavut Water Board's consideration and approval. | |
| Rationale: | <p>In section 4.4.7.2, the Licensee states that,</p> <p>‘Contact water in the underground mine will be collected within underground sumps and treated to remove total suspended solids (TSS) by the underground TSS removal plant. A proportion of the treated water will be recirculated as make-up water for underground drilling. Underground drilling water requirements are estimated to range from approximately 300 m³/day in Year -5, to a maximum of 1,500 m³/day in Year 1.’</p> <p>‘In Year -3 (i.e., 2017), following the completion of the investigation, the long-term groundwater management strategy for the Project will be finalized and submitted to the NWB for approval.’</p> <p>‘An interim Groundwater Management Plan is required for the first two to three years of groundwater inflows to allow for implementation of the long-term groundwater management strategy. The Groundwater Management Plan will be provided to the Nunavut Water Board, as stated in Section E, Item 14.’</p> | |
| Recommendation: | Licensee should provide an interim Groundwater Management Plan for Board's consideration and approval. | |

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| Regulatory Authority: | Nunavut Water Board | No. INAC 7 |
| General Issue: | Water Treatment Plant (site water and underground water) | |
| References: | <ul style="list-style-type: none"> Section 8.4- Water Treatment Plant Page 46, pdf page 59 | |
| Issue/Concern or Information Deficiency: | The provided water treatment plant (WTP) is capable of removing total suspended solids (TSS) only. The details on water treatment technology (s) for removal of the other contaminants of concern and treatment plant contaminant removal efficiencies are not available. | |
| Rationale: | <p>In section 8.4, the Licensee states that,</p> <p>‘Based on the anticipated water quality and water quantity, the WTP will be used to treat total suspended solids (TSS) in contact water..... Based on the maximum flow rate required each year, it was determined that the WTP (Actiflo® system model ACP-600R) will have a capacity of 520 m³/h (nominal flow) at Year -4 and will be increased with a second ACP-600R to reach a capacity of 1,040 m³/h at Year 3.’</p> | |

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| | INAC is concerned that WTP is designed to remove on TSS only and may not be able to remove the other contaminants of concern if present in elevated concentration. |
| Recommendation: | INAC recommends that the Licensee provide details on water treatment technologies for removal of contaminants below the permissible concentrations for the parameters required in Table 1 and Table 2 of Water Licence 2AM-MEL1631. |

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| Regulatory Authority: | Nunavut Water Board | No. INAC 8 |
| General Issue: | Water Quality Monitoring Program | |
| References: | <ul style="list-style-type: none"> Section 9.1- Water Quality Monitoring Page 47, pdf page 60 | |
| Issue/Concern or Information Deficiency: | Water quality monitoring parameters and groups required by Water Licence 2AM-MEL1631 have not been included in water quality monitoring table 9.1 of the water management plan. | |
| Rationale: | Monitoring groups and parameters required in Water Licence Schedule I, Table 1 and Table 2 should be included in Table 9.1 of the water management plan. | |
| Recommendation: | The Licensee should include water licence monitoring groups and parameters required by Water Licence 2AM-MEL1631 in Table 9.1 of the Water Management Plan. | |

3. Environmental Management and Protection Plan, Version 5, 2016

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| Regulatory Authority: | Nunavut Water Board | No. INAC 9 |
| General Issue: | Water Quality Monitoring Program | |
| References: | <ul style="list-style-type: none"> Table 4-1 Page 22, pdf page 31 | |
| Issue/Concern or Information Deficiency: | <p>The Licensee has provided references to the Water Management Plan but the required monitoring parameters/sampling groups are not available in the Water Management Plan. These references are corresponding to regulated monitoring at monitoring stations MEL-D-1 to TBD and MEL-SR-1-TBD, respectively, as follows:</p> <p>‘As defined in the Water Management Plan referred to in Part D, Item 12.’</p> <p>‘As defined in the Water Management Plan, Version 2 referred to in Part D, Item 18 and Part I, Item 11’.</p> | |

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| Rationale: | The referenced monitoring parameters /sampling group should be available in the revised Water Management Plan and Environmental Management and Protection Plan. |
| Recommendation: | The Licensee should include water monitoring parameters/sampling groups for monitoring stations MEL-D-1 to TBD and MEL-SR-1-TBD in the revised Water Management Plan and Table 4-1 of the Environmental Management and Protection Plan. |