AGNICO EAGLE

July 24, 2015

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
Gjoa Haven, NU, X0E 1J0

Re: Response to Aboriginal Affairs and Northern Development Canada Completeness Review of Agnico Eagle Mines Application for a Type A Water Licence, No. 2AM-MEL

Dear Ms. Beaulieu,

We would like to thank Aboriginal Affairs and Northern Development (AANDC) for their respective comments and review of the Type A Water Licence for the Meliadine Gold Project (Project). We acknowledge the level of effort put into AANDC's review.

On July 16, 2015, Stéphane Robert of Agnico Eagle Mines Limited (Agnico Eagle) met with Amjad Tariq (Regulatory and Science Advisor, Water Resources Division), Ian Parson (Regional Coordinator, Water Resources Division), Karen Costello, and Scott Burgess of AANDC to review the information requests. During the meeting, AANDC acknowledged that the individuals on the Project file for the Type A Water Licence application (the Application) were not part of the environmental assessment process and lacked background knowledge of baseline conditions at the proposed Meliadine Mine.

All key documents related to the use of water and disposal of waste associated with the proposed Project are included as part of the Type A Water Licence Application (Agnico Eagle 2015[1]). However in keeping with the intent of the new Regulations, section 15 (2), *"…a document received by the Board in respect of the application does not need to be kept in the register if an Act of Parliament requires that the documents be kept in a registry maintained by the Nunavut Planning Commission or the Nunavut Impact Review Board"*. Therefore, Agnico Eagle considers any documents submitted as part of the Nunavut Planning Commission (NPC) conformity determination and Nunavut Impact Review Board (NIRB) review processes, and held on their respective ftp site/public registries, to be part of the Application. For example, Agnico Eagle has not included some of the baseline information reports submitted as part of the Final Environmental Impact Statement (FEIS) review process that may be referenced in the Application, as they are already part of the public record available to AANDC through the NIRB Public Registry. Agnico Eagle believes this position is in keeping with the spirit and objectives of the Board and its relationship with other bodies, as provided in the *Act* s.36(2) and s.36(1) in relation to the NPC conformity, and in relation to environmental screening/review of projects, respectively.

1 Agnico Eagle. 2015. Type A Water Licence Application for Mine Development of Meliadine Gold Project. Submitted to Nunavut Water Board. May 2015. 115 pg +supporting documents.

The following is a summary of requests made by AANDC and responses to those requests, based on their formal submission, dated July 13, 2015, and on clarifying discussions on July 16, 2015 between AANDC and Agnico Eagle.

Request: The Proponent should provide a Freshet Action Plan with details on mitigation techniques and timeframes to cope with possible impact during the annual freshet period.

Response: A Freshet Action Plan was developed for the Meadowbank Mine due to specific issues related to freshet at the Meadowbank Mine, and as such is considered an internal plan to the Meadowbank Mine. Based on the baseline hydrology information, water balance, and the design criteria for water management at the proposed Project, there is no evidence to suggest that water management at freshet will require additional planning. However, if required, Agnico Eagle will develop and submit a Freshet Action Plan after receipt of the Type A Water Licence. The Freshet Action Plan developed for the Meadowbank Mine will provide the internal framework for a similar plan at the proposed Project and this framework will be provide prior to the technical meeting

Request: The Proponent should provide a Groundwater Monitoring Plan for Board's consideration.

Response: A summary of baseline conditions, the effects assessment, and proposed monitoring for groundwater quantity and quality at the proposed Project is provided as Attachment 1. The intent of this information is to provide AANDC with a summary of the detailed data and assessment presented in the FEIS and Type A Water Licence Application for the Project (Agnico Eagle 2014[2]; Agnico Eagle 2015, respectively).

Request: The Proponent should provide an Acid Rock Drainage/Metal Leaching Testing and Sampling Plan.

Response: A summary of baseline conditions, the effects assessment, and proposed monitoring for geochemistry at the proposed Project is also provided in Attachment 1. The intent of the information is to provide AANDC with a summary of the detailed data and assessment provided in the FEIS and Type A Water Licence Application for the Project (Agnico Eagle 2014; Agnico Eagle 2015, respectively).

Request: Please submit to the NWB a Fuel Management Plan.

Response: The Fuel Management Plan is provided as part of the Hazardous Materials Management Plan, Section 5.3.

[2] Agnico Eagle (Agnico Eagle Mines Limited). 2014. Final Environmental Impact Statement (FEIS) – Meliadine Gold Project, Nunavut. Submitted to Nunavut Impact Review Board. April 2014.

Request: As this is not a coordinated process Agnico Eagle should submit a revised alternatives assessment to the NWB which would reflect only alternatives assessments of components affecting/possibility affecting water quantity/quality.

Response: As noted above, Agnico Eagle considers any documents submitted as part of the NPC conformity determination and NIRB review processes, and held on their respective ftp site/public registries, to be part of the Type A Water Licence Application. The alternatives assessment is available for review in Volume 2, SD 2-1 (Project Alternatives) and SD 2-2 (Tailings Alternatives Assessment Report) of the FEIS. Section 3.0 of the Screening Report- Revised Project Design, submitted as part of the Application, provides a summary of the alternatives selected based on refinements to the mine plan, including ore processing and water management. In addition, Section 2.7 of the Mine Plan, submitted as part of the Application, provides a summary of the advantages and disadvantages of the proposed dry stack tailings based on the alternatives assessment presented in the FEIS.

Request: The Proponent should provide the dates of issuance and expiry for all the permits, leases, and authorizations.

Response: An updated table is provided in Attachment 2.

Should you require any further information or questions please contact Stéphane Robert via email or by telephone.

Regards,

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Attachments: 1: Summary Information on Geochemistry and Groundwater Quantity/Quality
2: Updated Permits, Leases, and Authorizations

TECHNICAL MEMORANDUM

DATE 24 July 2015 **PROJECT No.** Doc 521-1405283

TO Stéphane Robert
Agnico Eagle Mines Limited

CC

FROM Golder Associates Ltd. **EMAIL** lyoung@golder.com

RESPONSE TO ABORIGINAL AFFAIRS AND NORTHERN DEVELOPMENT CANADA'S REVIEW OF THE MELIADINE TYPE A WATER LICENCE

On July 13, 2015, Agnico Eagle Mines Limited (Agnico Eagle) received the following information requests from Aboriginal Affairs and Northern Development Canada (AANDC) with respect to the Type A Water Licence Application (the Application) for the Meliadine Gold Project (the Project):

- the Proponent should provide a Groundwater Monitoring Plan for Board's consideration; and
- the Proponent should provide an Acid Rock Drainage/Metal Leaching Testing and Sampling Plan.

On July 16, 2015, Stéphane Robert of Agnico Eagle met with Amjad Tariq (Regulatory and Science Advisor, Water Resources Division), Ian Parson (Regional Coordinator, Water Resources Division), Karen Costello, and Scott Burgess of AANDC to review the information requests. During the meeting, AANDC acknowledged that the individuals on the file for the Application were not part of the environmental assessment process and lacked background knowledge of baseline conditions at the proposed Project.

This document provides a summary of baseline conditions, the effects assessment, and proposed monitoring for geochemistry and groundwater at the proposed Project. The intent of the information is to provide AANDC with a summary of the data and environmental assessment provided in the Final Environmental Impact Statement (FEIS) and Type A Water Licence Application for the Project (Agnico Eagle 2014; Agnico Eagle 2015, respectively) to assist with their review.

1.0 GEOCHEMISTRY

1.1 Key Baseline Results

A detailed assessment of the geochemical characteristics of the rock, tailings, and overburden in the Project area is presented in SD 6-3 Geochemistry Baseline Report (Agnico Eagle 2014).

A baseline mine waste geochemical characterization program characterized the geo-environmental properties of waste rock, ore, tailings, and overburden from the Tiriganiaq deposit. The objectives of the program were to identify chemicals of environmental interest in the framework of mine water and waste management and probable future mine contact water quality. This was accomplished through static and kinetic testing of mining wastes at various scales, including standard laboratory humidity cells, large leaching columns and larger field scale leaching tests.

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The Project site is located in the Rankin Inlet Greenstone Belt and is a low-sulphide, gold-quartz vein deposit. The principal lithological units that are likely to be disturbed by mining include turbiditic sedimentary rocks, volcanic-hosted and sediment-hosted iron formation, sericite-altered siltstones, graphitic argillite, and schistose and carbonate-altered mafic volcanic rocks.

Waste rock and ore sample selection was completed to obtain a data set that is compositionally and spatially representative of the material to be removed by mining at Tiriganiaq. Waste rock, ore, tailings, and overburden samples were subjected to a variety of static and kinetic tests to evaluate chemical and mineralogical composition, the potential to generate acid rock drainage (ARD), as well as short- and long-term metal leach potential. Acid rock drainage potential was assessed following *Guidelines for Acid Rock Drainage Prediction in the North* (INAC 1992) and MEND (2009) for waste rock and tailings. All leach test water quality results were screened against Metal Mining Effluent Regulations (MMER) for effluent quality (DFO 2006).

A summary of results for all tested materials from the Tiriganiaq deposit is presented in Table 1 with respect to the ARD and metal leaching potential. All waste rock lithologies from Tiriganiaq are non-potentially acid-generating (non-PAG) as they have excess buffering capacity, such that the overall ARD potential of stockpiled Tiriganiaq waste rock is expected to be non-PAG. Based on both the kinetic testing results completed on all waste rock types and at various scales, and the Mine Site Water Quality Predictions (Appendix G of the Water Management Plan [Agnico Eagle 2015]), leachate from the waste rock storage facilities (WRSFs) that receive Tiriganiaq waste (WRSF 1, 2, and 3) is expected to meet MMER monthly mean effluent limits. Waste rock in these WRSFs does not require means to prevent oxidation based on the low reactivity of the non-PAG rock samples from the kinetic testing results, as well as Agnico Eagle's experience at the Meadowbank Mine where the waste rock pile froze within the first year of deposition, despite containing a large proportion of potentially acid generating (PAG) iron formation waste rock.

The tested tailings samples from the Tiriganiaq deposit have no potential to generate ARD. Based on the current mine plan, the tailings in the tailings storage facility (TSF) is therefore anticipated to be non acid-generating on an annual basis and over the mine life. The concentration of most leachate parameters from static leaching tests of whole ore tailings samples (shake flask extraction [SFE] test) meet mine effluent criteria (MMER; DFO 2006) with the exception of arsenic, which exceeds the MMER average monthly values. However, results from kinetic testing show decreased arsenic concentrations with time.

Overburden from within the Tiriganiaq pit outline is non-PAG and does not require means to prevent oxidation. Leachate concentrations in overburden are generally lower than waste rock and all meet MMER monthly mean limits with the exception of one sample which reported a marginal exceedance for zinc. As waste rock and overburden have compatible geochemical characteristics, they can be managed together in the same facility.

Table 1: Summary of Results for Waste Rock, Ore, Overburden, and Tailings from the Tiriganiaq Deposit

Rock Type	Estimated Waste Rock Tonnage[a]		Number of Samples for Static Testing	Bulk Potential by Rock Type			Bulk ARD Design-ation[d]	Median Arsenic Content (mg/kg)	Static Leach Test (SFE)		Kinetic Test Results	
	Tonna-ge (Kt)[b]	Prop-ortion[c]		Median S(T)	Bulk CaNPR-adj	Bulk NPR[b]			pH	>MMER[e]	average pH	>MMER[e]
Overburden	-	-	10	0.028	6.6	11	non-PAG	24	7.4	Zn (1)	n.a.	n.a.
Gabbro	4,856	3%	10	0.12	8.5	10	non-PAG	13	8.4	-	n.a.	n.a.
Greywacke/ Siltstone	113,694	81%	194 [g]	0.19	6.2	8.4	non-PAG	51	8.2	As (1)	7.6	-
PAD Greywacke/ Siltstone waste rock [g]	-	-	13	0.19	5.8	7.9	non-PAG	76	7.9	-	7.6	-
Iron Formation	7,514	5%	6	0.30	6.3	5.6	non-PAG	215	8.0	-	7.6	-
Mafic Volcanic	14,212	10%	43	0.23	20	25	non-PAG	16	8.0	-	8.0	-
Ore/Greywacke	-	-	3	0.49	5.7	5.3	non-PAG	260	8.0	As (1)	n.a.	n.a.
Ore/Mafic Volcanic	-	-	4	0.86	10	8.6	non-PAG	4050	8.1	As (1)	n.a.	n.a.
Ore PAD Lode 1000 [f]	-	-	1	1.1	3.7	3.6	non-PAG	9400	7.8	-	7.5	-
Ore PAD Lode 1100 [f]	-	-	1	1.7	1.2	1.3	*uncertain*	5000	8.0	-	7.7	-
Tiriganiaq Open Pit CN2 – Whole Ore Tail	-	-	1	1.2	2.5	2.7	non-PAG	4900	7.9	As (1)	7.4	As (wk 0)[g]
Tiriganiaq Underground CN1 – Whole Ore Tail	-	-	1	1.7	2.3	2.8	non-PAG	6600	8.0	As (1)	7.6	As (wk 0-2)[g]

[a] Based on the 10,000 tonnes per day (tpd) max pit scenario (Lithology_proportion_pit 10000tpd.xlsx dated June 13, 2011, D. Duquette pers. comm.)
[b] Kt = kilotonnes; S(T) = total sulphur; CaNPR-adj = carbonate net potential ratio (adjusted for mineralogy content); NPR = net potential ratio (ratio of neutralizing potential to acid potential)
[c] Proportion of total waste rock tonnage
[d] Bulk ARD potential per rock type following INAP (1992) and based on calculated bulk characteristics
[e] Metal Mining Effluent Regulations (DFO 2006) exceedance for a specific parameter (number of samples reporting exceedance)
[f] Composite samples from test pits completed at the Operations Pad
[g] Specific kinetic test weeks that exceedance occurred
- no exceedances; n.a. = not analyzed

2.0 GROUNDWATER

2.1 Key Baseline Results

The following sections establish the local hydrogeologic setting for the Project. The baseline setting is defined from published work and field investigations.

Groundwater Flow Regimes

The Project lies within the Canadian Shield in an area of continuous permafrost. In areas of continuous permafrost, there are generally two groundwater flow regimes: a shallow groundwater flow regime located in the active (seasonally thawed) layer near the ground surface, and a deep groundwater flow regime beneath permafrost.

From the late spring to early autumn, when ambient air temperatures are above 0˚C, the active layer becomes thawed. Within the active layer, the water table is expected to be a subdued replica of topography, and is expected to parallel the topographic surface. Groundwater in the active layer flows to local depressions and ponds that drain to larger lakes. The permafrost in the rock at the Project would be virtually impermeable to groundwater flow. The shallow groundwater flow regime, therefore, has little to no hydraulic connection with the groundwater regime located below the permafrost.

Taliks (unfrozen ground surrounded by permafrost) exist beneath lakes that have sufficient depth such that they do not freeze to the bottom over the winter. Taliks beneath larger lakes can extend down to the deep groundwater regime (referred to as open taliks). The elevations of these lakes provide the driving force for deep groundwater flow. The presence of thick permafrost beneath land masses results in negligible recharge to the deep groundwater flow regime from these areas. Consequently, recharge to the deep groundwater flow regime is predominantly limited to areas of taliks beneath large surface water bodies. Generally, deep groundwater will flow from higher-elevation lakes to lower-elevation lakes. To a lesser degree, groundwater beneath the permafrost is influenced by density differences due to the upward diffusion of deep seated brines (density-driven flow).

Groundwater Usage

Groundwater sources from both the active layer and from the deep groundwater below the permafrost are generally not used for drinking water in continuous permafrost regions. Due to the presence of deep permafrost, the highly saline groundwater below the permafrost, the seasonal nature of the active layer, and the availability of good quality drinking water from surface water sources, it is unlikely that groundwater near the Project site will be used as a drinking water source in the future.

Project Characterization

Data reviewed to support the baseline assessment and the development of the numerical hydrogeological model for the Project included lake elevations, bathymetry data, hydrogeologic tests, and groundwater chemistry results (Volume 7, Section 7.2 of the FEIS [Agnico Eagle 2014]).

These data indicate that the rock at the Project site below the base of the permafrost or in taliks is generally of low hydraulic conductivity, on the order of 3×10^{-9} m/s.

In the Canadian Shield, concentrations of total dissolved solids (TDS) in groundwater increase with depth, primarily in response to upward diffusion of deep-seated brines. A “Meliadine profile” of TDS with depth was developed based on six groundwater samples collected from the site and information from other projects located in the Canadian Shield. It is expected that the concentrations of the following key salinity parameters will vary

with depth at the Project site: chloride, sulphate calcium, magnesium, potassium, sodium, and strontium. The concentration of dissolved trace metals in the groundwater is low in all water samples collected at the Project site, including arsenic. The concentration of all parameters not associated with salinity (most trace metals) is expected to be constant with depth.

At the Project site, the portion of the permafrost where groundwater may be partially or wholly unfrozen due to the freezing point depression has been estimated to be at a depth of 350 to 375 m below ground surface.

Groundwater Flow

The active layer becomes thawed in the late spring to early autumn, when ambient air temperatures are above 0°C. The active layer is generally about 1.7 m thick. Groundwater velocities in the active layer are estimated to range from about 0.0025 to 0.02 m/day.

The elevations of the larger lakes with taliks extending down to the deep groundwater regime (referred to as open taliks) provide the principal driving force for deep groundwater flow. Generally, groundwater will flow from higher elevation lakes to lower elevation lakes.

A review of bathymetric data, ice thickness data, and results of thermal modelling suggests that near the Tiriganiaq deposit, only Meliadine Lake, Lake B7, and Lake D7 will have open taliks connected to the deep groundwater flow regime.

The Tiriganiaq underground mine is located in the area of a groundwater flow divide, with groundwater in the area of the planned mine flowing predominantly to Meliadine Lake East, and to a lesser extent to Meliadine Lake West. Groundwater velocities in the deep groundwater regime are very low and on the order of 0.2 to 0.3 m/y. For example, groundwater from Lake B7 would take over 5000 years to travel in a northeast direction to Meliadine Lake.

The Tiriganiaq open pits will be excavated entirely within permafrost or in closed taliks (not connected to the deep groundwater regime); therefore, groundwater seepage to the open pits is expected to be relatively small, seasonal (in the summer months only) and with relatively low TDS. Underground mining will be present below the open pits at Tiriganiaq and the deeper portion of the underground mine will be beneath the permafrost. Estimated passive groundwater inflow rates to the underground mine are provided in Table 2 (Appendix F of the Water Management Plan [Agnico Eagle 2015]).

Table 2: Estimated Rates of Passive Groundwater Inflow and Total Dissolved Solid Concentrations to the Tiriganiaq Underground Mine

Year	Estimated Passive Inflow (m^3/day)[a]	Predicted TDS Concentration (mg/L)
Year -5 to First Quarter of Year -3	0	0
Second Quarter of Year -3 to End of Year 3	420	56 000[b]
Year 4 to Year 7	526	59 000[c]

[a] based on data provided in Agnico Eagle (2014); to be re-assessed based on results from the planned 2015 and 2016 hydrogeological investigation program.

[b] based on data provided in Volume 7 of the FEIS (Agnico Eagle 2014) for years -2 to 1.

[c] based on data provided in Volume 7 of the FEIS (Agnico Eagle 2014) for years 5 to 12.

2.2 Key Outcomes of the Effects Assessment

Project activities will result in changes to the shallow and deep groundwater regimes. The effects assessment included the dewatering of B7 Lake and the impacts to the shallow and deep water groundwater were primarily a result of the dewatering of B7 Lake, the development of the underground mine at Tiriganiaq, and construction of the waste rock and tailings storage facilities. Under the proposed mine plan presented in the Type A Water Licence Application, B7 Lake will no longer be dewatered.

As the underground mine is developed, groundwater will flow into the mine. The higher TDS content water found at depth will influence underground water quality during the life of the mine and during closure activities. No primary effects pathways were identified in the FEIS, but a few minor pathways from the dewatering of lakes or exposure/impacts to open taliks were considered (Volume 7, Section 7.2 of the FEIS [Agnico Eagle 2014]).

The potential effects on groundwater quality and quantity from the Project refinements, outlined in Section 3.0 of the Screening Report- Revised Project Design submitted as part of the Application (Agnico Eagle 2015), will be lower or remain unchanged from the FEIS. One key change to the project design is that B7 Lake, which is expected to have an open talik beneath it, will no longer be used as a TSF. Therefore, dewatering of Lake B7 is no longer required and there are no longer any environmental effects related to the dewatering and/or the storage of tailings in B7 Lake.

Lake Dewatering

There are four lakes requiring dewatering under the proposed Project (A54, H17, H19, H20). All of the Project lakes that will be dewatered have closed taliks beneath them. Therefore, groundwater flow from these lakes to other nearby lakes does not currently occur. Consequently, dewatering of these lakes will not affect the deep groundwater regime.

Collection Pond 1

The operating water level of Collection Pond 1 (CP1) (Lake H17) will vary from the current water level in Lake H17: it will be approximately 2 m higher during spring freshet. This has the potential to produce an open talik beneath CP1, potentially allowing contact water in the pond to seep into the deep groundwater regime. However, water levels will be drawn down to the lowest level possible each fall to allow for the storage of spring freshet flows the following year. This will result in CP1 being completely frozen during the winter. Therefore, an open talik will not form beneath CP1, and deep groundwater quality will be unaffected.

Tailings Storage Facility

The tailings management design has been refined from thickened tailings slurry with sub-aqueous storage in the TSF as presented in the FEIS, to concentrated tailings with an on-land dry stack TSF. As the TSF is no longer located in a dewatered headwater lake that is expected to have an open talik (B7 Lake), and the lower water content of the tailings will result in a shorter time required to freeze the pad below the TSF and freeze the tailings, deep groundwater flow and quality will not be affected. Seepage and runoff from the TSF will be collected in water diversion channels and diverted to collection ponds. No water will be discharged directly to the environment. Refer to the Water Management Plan (Agnico Eagle 2015) for further details.

Open Pits

Large open pits will alter the thermal regime of the ground and may produce open taliks where none existed before. However, the Tiriganiaq open pits will develop static groundwater levels that will reproduce the current

regional groundwater flow conditions. Therefore, any changes to the regional groundwater flow directions are expected to be negligible.

Tiriganiaq Underground Mine

Most of the site is underlain by permafrost, which will prevent the downward movement of contaminants to the deep regional groundwater regime. None of the open pits penetrate through the permafrost. The underground mine at Tiriganiaq is the only mine working that will penetrate through the permafrost. During mining, the groundwater collected in the underground will be treated prior to discharge; at closure the underground mine will be flooded.

Groundwater Inflows

The creation of the underground mine will induce groundwater to flow toward the mine from all directions. Although temporary changes to groundwater flow directions will occur, no measureable effects are anticipated in the receiving environment. However, a quantitative analysis of groundwater inflow rates and associated TDS mass loading rates to the underground mine was completed, and the predicted TDS concentrations were found to be similar to those found during water sampling beneath the permafrost in the area of the proposed underground mine.

Faults

Faults running through or near the underground mine have been found to have a similar hydraulic conductivity to that of the surrounding un-faulted bedrock. The faults have no effect on groundwater flow.

Backfilling

During mining below the permafrost, progressive backfilling of underground openings with cemented paste backfill (primary stopes) or uncemented rockfill (secondary stopes) will occur. Prior to curing of the cement, groundwater that is flowing into the underground mine will flow along or through the backfill from which metals may be leached. During this period of cement curing, the groundwater flowing into the underground mine will be collected and treated, as required. At closure and post-closure, the cemented backfill will be fully cured and will have a low potential to affect groundwater quality.

Mine Flooding

The underground workings will be flooded at closure by natural groundwater inflows over approximately 6.1 years. The estimated total flooding volume of the underground workings is approximately 1.34 million cubic metres m^3 (M-m^3). As a result of the mine design presented in the FEIS, cyanide and arsenic from the TSF in B7 Lake was identified as a potential source of contamination in the flooded water. The current mine plan no longer has the TSF above an open talik, and it is expected that the flooded underground workings will contain a lower chemical load than described in the FEIS (Section 7.2.3.3) (Agnico Eagle 2014). The numerical hydrogeological model predicts that the post-closure travel time from the underground mine to Meliadine Lake will be between 500 to 1000 years and the discharge rate would be about 3 m^3/day. This groundwater discharge rate represents less than 0.002% of the average daily discharge from Meliadine Lake. Therefore, this pathway is considered minor.

2.3 Monitoring Plan

This section describes, in broad terms, the type of groundwater monitoring that will be implemented for the Project. Monitoring will occur at the onset of development to determine the response of the environment to the disturbance by mining. The open pits will be excavated entirely within permafrost or in closed taliks (not connected to the deep groundwater regime); therefore, groundwater seepage to the open pits is expected to be relatively small, seasonal (in the summer months only), and with relatively low TDS. Consequently much of the groundwater monitoring will be focused on the underground development at Tiriganiaq, which extends below the permafrost to the deep groundwater regime.

The hydrogeological conditions will be monitored for changes throughout each phase of the Project. During each phase of the Project, groundwater monitoring will include the following on a daily to annual basis:

- implementation of established quality assurance/quality control measures for data acquisition, groundwater sampling, and analysis;
- measurement of groundwater inflow to the open pits and underground mine;
- seepage mapping in the open pits and underground mine;
- collection of groundwater samples in sumps in the open pits and the underground mine;
- pressure measurements from ports at designated depths and respective water levels in the existing Westbay well;
- collection of groundwater samples from ports in the existing Westbay well;
- water sample analysis for major ions and other parameters of interest;
- review and compilation of relevant permafrost, soils quality, surface water quality, and hydrology reports and information; and
- data and information assessment and completion of a groundwater monitoring report including recommendations for the mine management team.

Groundwater monitoring during the first two years of underground mine development at Tiriganiaq will be conducted using the existing Westbay monitoring well, which was completed within the deep groundwater regime. Baseline chemistry data for the Westbay was established during four groundwater sampling rounds (annually from 2011 to 2014). Groundwater quality monitoring will occur annually during the first two years of underground mine development. Groundwater level monitoring will mostly occur daily and will be evaluated on a weekly basis (transducers and dataloggers will be installed for this purpose) during the initial development of the Underground mine, and it is expected that the frequency of these measurements will be scaled down over the last few years of the underground mine development.

Groundwater inflow quantity will be measured on a weekly basis in the sumps in the underground mine and the open pits. Water quality samples from the sumps will be collected monthly. For the underground mine, separate flow meters will be installed on several levels of the mine to assess inflow variability. In the open pits, monthly sump pump rates will be monitored and additional sumps or weirs may be installed to monitor individual seepages. Seepage mapping of the groundwater inflows in the underground mine and open pits will be undertaken on an annual basis. Any high inflow zones, if present, will be mapped and sampled.

The need for additional Westbay wells will be evaluated as the Project proceeds.

The monitoring program will focus on providing data required to update the groundwater modelling results presented in the FEIS, specifically:

- to assess ongoing effects of underground mine development on groundwater movement and water quality;
- to assess preferential pathways for groundwater flow;
- to predict long-term groundwater movement and water quality; and
- to provide details to the mine operations team for adaptive management of groundwater flows and pit water quality.

Modifications to the monitoring program will be based on a comparison of the monitored information to the predicted values. The intervals between monitoring events will likely be increased (i.e., less frequently sampled) if the observed values or changes are less than predicted. If the observed values or changes are greater than predicted, the monitoring will continue as deemed necessary.

The groundwater monitoring program described above is summarized in Table 3.

Table 3: Proposed Groundwater Monitoring Program

Monitored Feature	Type of Monitoring Program	Timing of Monitoring	Monitoring Results
Groundwater level	monitoring Westbay well	weekly	Hydraulic head profiles with depth in the underground mine
Groundwater quality	monitoring Westbay well	Annually for first 2 years	variations in groundwater quality in well
Groundwater inflow quantity	flow meters for total inflow and inflow at separate levels in underground mine; monitoring of sump pumping rates in the open pits	weekly	water inflow quantity to the underground mine and open pits
Groundwater inflow quality	water sampling of underground and open pit sumps	monthly	water inflow quality to the underground mine and open pits
Groundwater inflow quality and quantity	Seepage mapping of underground and open pits (quality and quantity)	Annually, as deemed necessary	Assess water quantity and quality of preferential pathways, if any, for groundwater flow

Closure

We trust the above meets your needs, however, please contact the undersigned should you have any questions and/or concerns.

Jennifer Cole, M.Sc., P.Geol (NT/NU)
Geochemist

Valerie Bertrand, M.A.Sc., P.Geol (NT/NU)
Associate, Senior Geochemist

Christine Bieber
Senior Hydrogeologist

Don Chorley
Principal, Senior Hydrogeologist

References

Agnico Eagle (Agnico Eagle Mines Limited). 2014. Final Environmental Impact Statement (FEIS) – Meliadine Gold Project, Nunavut. Submitted to Nunavut Impact Review Board. April 2014.

Agnico Eagle. 2015. Type A Water Licence Application for Mine Development of Meliadine Gold Project. Submitted to Nunavut Water Board. May 2015. 115 pg +supporting documents.

DFO (Fisheries and Oceans Canada). 2006. Regulations Amending the Metal Mining Effluent Regulations (MMER). Department of the Environment, Extract Canada Gazette, Part II Volume 140 No 21. October 18, 2006. Registration SOR/2006-239.

INAC (Indian and Northern Affairs Canada). 1992. Guideline for Acid Rock Drainage Prediction in the North. Northern Mine Environment Neutral Drainage Studies No. 1. Indian and Northern Affairs Canada. September 1992.

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Table 2.3 Other Meliadine Project Licenses, Permits, Authorizations, and Agreements

Licence Number	Explanation	Issued By	Issued Date	Expiry Date
Land Use Permits, Leases and Authorizations from Kivalliq Inuit Association (KIA)				
KVL302C268	Nunavut Tunngavik Inc. (NTI) parcel drilling including Tiriganiaq	KIA		2016-07-01
KVCL102J168	Commercial lease for IOL – Meliadine West site including exploration camp, fuel and bulk sample	KIA	2002-07-01	2017-06-30
KVRW98F149	Meliadine right-of-way	KIA		2016-04-30
KVCA07Q08	Tiriganiaq esker quarry permit	KIA		2015-09-15
KVCA11Q01	Permanent road quarry permit	KIA	2012-04-19	2016-04-19
KVRW11F02	Permanent right-of-way land use permit	KIA	2012-04-19	2018-04-19
	Meliadine Phase 1 All-weather Access Road (AWAR) water compensation agreement	KIA	2012-04-19	
KVL308C07	Meliadine East exploration land use permit RI01	KIA		2017-06-13
Land Use Leases and Authorizations from Aboriginal Affairs and Northern Development Canada (AANDC)				
N2014C007	PB1, geotechnical drilling permit	AANDC		2016-09-16
N2013C002	CWM claims drilling	AANDC		2016-05-23
Land Use Leases from Government of Nunavut (GN)				
	Land use lease for Itivia laydown area in Rankin Inlet – land use lease from Nunavut Airports	GN Department of Community and Government Services	2011-07-01	2021-06-30
Water Use Licenses – Type B – Nunavut Water Board (NWB)				
2BB-MEL1424	Type B water license – Meliadine West exploration	NWB	2009-07-31	2024-07-21
2BE-MEL1318	Type B water license – Meliadine East exploration project	NWB	2008-06-17	2018-10-31
2BW-MEL1215	Type B water license – Construction of Phase 1 AWAR	NWB	2012-03-12	2025-05-08
Other Licenses/Permits				
03 004014R-M	Baseline data collection	Nunavut Research Institute (NRI)		2015-12-31
	Nunavut archaeological permit	GN Department of Culture, Language, Elders and Youth (CLEY)		Under renewal for 2015
	WCB program authorization	Nunavut Workers Compensation Board (WCB)		2015-12-31

Permit/Approval Legislation	Administering Agency	Project Activity
Project Certificate Nunavut Land Claims Agreement (NLCA) (Article 12)	Nunavut Impact Rewiew Board	Project approval. Issued Project Certificate No. 006 on February 26th 2015.

Permit/Approval Legislation	Administering Agency	Project Activity
Inuit Impact and Benefit Agreement NLCA (Article 26)	KIA	Project commencement
Mineral Production Lease	Nunavut Tunngavik Inc.	Required for mineral production
Inuit Water Rights Compensation Agreement NLCA (Article 20)	KIA	May be required
Water Licence *Nunavut Waters and Nunavut Surface Rights Tribunal Act*	NWB	Required for water use and waste disposal
Class 1/Class 2 Archaeology Permit *Nunavut Archaeological and Paleontological Sites Regulations*	CLEY	Required to conduct archaeology research and to mitigate archaeological sites to allow development to occur
IOL – Commercial Land Use Lease or Right of Way NLCA	KIA	Long-term land tenure required for land use on IOL; land required for infrastructure, roads and activities associated with construction, operations, and closure phases
IOL – Quarry Lease/Permit NLCA	KIA	Required for quarrying of material on IOL during construction, operation and closure
Crown Land – Lease/Land Use Permit *Territorial Lands Act* *Territorial Land Use Regulations*	AANDC	Required for quarrying of material on Crown land during construction, operation and closure
Approval and/or Exemption *Navigation Protection Act (NPA)* (sections 5, 22 and 23)	Transport Canada	Construction of works in navigable waters. Prescriptions of Sections 22 and 23 of the NPA will be followed as necessary.
Fisheries Authorization for Harmful Alteration, Disruption or Destruction (HADD) of Fish or Fish Habitat *Fisheries Act* (section 35)	Fisheries and Oceans Canada (DFO)	Required if HADD cannot be avoided; if HADD can be avoided, DFO may provide a letter of advice outlining best management practices
Licence for a Factory and Magazine *Explosives Act and Regulations*	Natural Resources Canada	Required for construction of explosives factories and magazine(s) and storage of explosives
Permit to Store Detonators *Explosives Use Act* *Mine Health and Safety Act and Regulations*	Nunavut Mine Health and Safety WCB	Required to store detonators in a magazine
Explosive Use Permit *Explosives Use Act* *Mine Health and Safety Act* and *Regulations*	Nunavut Mine Health and Safety WCB	A permit is required to use explosives unless used in accordance with the regulations
Spill Contingency Plan Approval *Environmental Protection Act* *Spill Contingency Planning and Reporting Regulations*	DoE	A Spill Contingency Plan must be filed with the Chief Environmental Protection Officer to store fuel in an above-ground facility with a 20,000 L capacity or greater
Assorted Scientific Research Permits *Scientist Act* *Wildlife Act*	NRI	Required to conduct some of the environmental monitoring activities

Table 2.4 Claims and Leases Details – Meliadine Gold Project

	Name	Status	Recorded	CLSR No.	Lease No.	Area (ha)	Anniversary Day
F14839	NAT	LEASE		81347	3728	1,021	2018-10-20
F00526	NAT 2	LEASE		83022	3838	1,043	2020-10-18
F00527	NAT 3	LEASE		82126	3839	1,038	2020-10-18
F14842	NAT 4	LEASE		83023	3840	1,001	2020-10-18
F14841	NAT 5	LEASE		83024	3841	1,021	2020-10-18
F17843	NAT 6	LEASE		83025	3842	758	2020-10-18
F18140	NAT 7	LEASE		84522	3925	989	2021-03-09
F18141	NAT 8	LEASE		84523	4078	1,017	2021-03-01
F18142	NAT 9	LEASE		84495	4079	1,047	2021-03-01
F18143	NAT 10	LEASE		82125	3878	841	2021-03-01
F18144	NAT 11	LEASE		84506	4080	1,006	2021-03-01
F18145	NAT 12	LEASE		84486	4081	989	2021-03-01
F18146	NAT 13	LEASE		84496	4082	920	2021-03-01
F18147	NAT 14	LEASE		84524	4083	753	2021-03-01
F18148	NAT 15	LEASE		84519	4084	878	2021-03-01
F18149	NAT 16	LEASE		85649	4085	1,021	2021-03-01
F18150	NAT 17	LEASE		85671	4086	1,027	2021-03-01
F18151	NAT 18	LEASE		84525	4087	1,004	2021-03-01
F18181	NAT 19	LEASE		84520	4088	1,007	2021-03-01
F18182	NAT 20	LEASE		84521	4089	964	2021-03-01
F18184	NAT 26	LEASE		84115	3886	975	2021-03-09
F18190	NAT 27	LEASE		84020	3885	1,025	2021-03-09
F19038	NAT 28	LEASE		85983	4259	994	2021-10-17
F19039	NAT 29	LEASE		85366	4260	1,055	2021-10-17
F19040	NAT 30	LEASE		85650	4261	1,034	2021-10-17
F19048	NAT 31	LEASE		85657	4256	449	2021-10-17
F19042	NAT 32	LEASE		85670	4257	999	2021-10-17
F19043	NAT 33	LEASE		85484	4258	932	2021-10-17
F19044	NAT 34	LEASE		88378	4593	817	2022-09-26
F19045	NAT 35	LEASE		88379	4594	514	2022-09-26
F19046	NAT 36	LEASE		88380	4595	851	2022-09-26
F19047	NAT 37	LEASE		88993	4596	980	2022-09-26
F19049	NAT 38	LEASE		88377	4597	525	2022-09-26
F19620	NAT 40	LEASE		88994	4598	708	2022-09-26
F19621	NAT 41	LEASE		88381	4599	756	2022-09-26
F29192	NAT 51	LEASE		86060	4561	734	2023-10-25
F29193	NAT 52	LEASE		86060	4562	824	2023-10-25

	Name	Status	Recorded	CLSR No.	Lease No.	Area (ha)	Anniversary Day
F29194	NAT 53	LEASE		86060	4563	853	2023-10-25
F29195	NAT 54	LEASE		86061	4564	1,023	2023-10-25
F29196	NAT 55	LEASE		86061	4565	1,099	2023-10-25
F29197	NAT 56	LEASE		86061	4566	1,019	2023-10-25
F29198	NAT 57	LEASE		86061	4567	1,011	2023-10-25
F29199	NAT 58	LEASE		86061	4568	1,004	2023-10-25
F29200	NAT 59	LEASE		86061	4569	715	2023-10-25
F44575	NAT 75	LEASE		88384	4879	298	2028-01-29
F44578	NAT 78	LEASE		89212	4686	702	2024-11-12
F44579	NAT 79	LEASE		88669	4687	729	2024-11-12
F44580	NAT 80	LEASE		88670	4685	631	2024-11-12
F51714	NAT 81	LEASE		88995	4874	678	2027-11-12
F51715	NAT 82	LEASE		89213	4875	145	2027-11-12
F51716	NAT 83	LEASE		89214	4876	775	2027-11-12
F51717	NAT 84	LEASE		89315	4877	584	2027-11-12
F43244	NAT 85	LEASE		88382	4880	28	2028-01-29
F51724	NAT 86	LEASE		88996	4878	205	2028-01-29
F64729	CWM 7	LEASE		92616	5282	1,045	2030-09-09
F64730	CWM 8	LEASE		92616	5283	1,053	2030-09-09
F64731	CWM 9	LEASE		92616	5284	1,035	2030-09-09
F64732	CWM 10	LEASE		92616	5285	1,051	2030-09-09
F64733	CWM 11	LEASE		92616	5286	1,047	2030-09-09
F64734	CWM 12	LEASE		92616	5287	1,038	2030-09-09
					Total	**51,286**	**Expired date**
F69575	CWM 13	CLAIM	2006-04-19			109	2016-04-19
F69576	CWM 14	CLAIM	2006-04-19			109	2016-04-19
F69574	PB1	CLAIM	2006-12-29			669	2016-12-19
					Total	**887**	
					Grand Total	**52,173**	

Note: grandfathered leases and claims include NAT 8 to NAT 41 inclusive. Data from AANDC Iqaluit office.