



September 26, 2013

Our reference
IQALUIT-#739809

Your reference
2AM-MEA0813

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

Via email: licensing@nunavutwaterboard.org

**Re: Technical Review – Amendment Application No. 2 – Increased Water Use
Water Licence #2AM-MEA0813 – Meadowbank Gold Mine Project – Agnico-Eagle
Mines Ltd. – Kivalliq Region**

Dear Ms. Beaulieu,

Thank you for your email of September 3, 2013, concerning the Nunavut Water Board's technical review notice of the above mentioned licence amendment application.

A memorandum is provided for the Board's consideration. Comments have been provided pursuant to the Department'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 should you have any questions or require clarification.

Sincerely,

David Abernethy
Regional Coordinator

Water Resources Division
Resource Management Directorate
Aboriginal Affairs and Northern Development Canada
Iqaluit, NU X0A 0H0

Encl.

c.c.: Murray Ball, Manager of Water Resources, AANDC
Erik Allain, Manager of Field Operations, AANDC
Karen Costello, Director of Resource Management, AANDC

Memorandum

TO	Phyllis Beaulieu Manager of Licensing Nunavut Water Board	OUR REFERENCE IQALUIT-#739809
FROM	David Abernethy Water Resources Regional Coordinator Aboriginal Affairs and Northern Development Canada	YOUR REFERENCE 2AM-MEA0813 DATE September 26, 2013
SUBJECT	Technical Review – Amendment Application No. 2 – Increased Water Use Water Licence #2AM-MEA0813 – Meadowbank Gold Mine Project – Agnico- Eagle Mines Ltd. – Kivalliq Region	

A. BACKGROUND

On September 3, 2013 the Nunavut Water Board (the “NWB” or “Board”) provided notice of Agnico-Eagle Mines Ltd.’s (“AEM”) application to amend the Meadowbank Gold Mine Project’s Type ‘A’ Mining and Milling Water Licence (the “licence”; NWB, 2008) to allow increased freshwater use. This application is being processed pursuant to requirements specified in the *Nunavut Land Claims Agreement* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*. Interested parties were asked to perform a technical review of the application and provide representations by September 29, 2013.

Agnico-Eagle Mines Ltd. is requesting a freshwater consumption allowance of 1,870,000 m³ in 2013 and 1,150,000 m³ per year from 2014 to 2018. This is an increase from the 700,000 m³ annual consumption limit authorized under Part E, Item 3 of the licence and will only affect Third Portage Lake, the source water body used to support domestic, mining and milling, and associated uses. As documented in annual reports, freshwater consumption has exceeded the licensed limit, despite reduction efforts, since active mining operations began in 2010. This increase has been attributed to higher than anticipated ore processing rates and an adjustment to the initial (theoretical) water balance model resulting in a deficit of reclaim water. A higher freshwater consumption allowance is requested for 2013 than following years due to the February 2013 breakdown of the reclaim barge which resulted in a temporary reduction in reclaim water recovery from the Tailings Storage Facility (the “TSF”) for milling purposes.

The project’s current freshwater consumption rate is exceeding licence limits. If approved, AEM will be brought into compliance with licence terms and conditions.

The following documentation is included in AEM's application:

- Cover letter;
- Completed application form for water licence amendment;
- Application Support Document;
- Compliance assessment/status report;
- Water Management Plan 2012, updated March 2013. Includes:
 - Appendix A1: Maps;
 - Appendix A2: Water Balance Schematics;
 - Appendix A3: Water Balance, Monthly Values 2012-2025;
 - Appendix A4: Freshwater Usage Sensitivity Analysis;
 - Appendix B: Water Quality for the Portage Area (2012-2025);
 - Appendix B1: Water Quality Analysis;
 - Appendix C: Ammonia Management Plan;
 - Appendix C1: Environmental Field Stations – Mine Site View;
 - Appendix C2: Spill Control and Loading Procedures Plan;
 - Appendix C3: Dyno Nobel Emergency Responsibility Plan – Magazine, Plant, and Work Site; and
 - Appendix C4: MSDS for Bulk Emulsion and Presplit
 - Freshwater Consumption Executive Summary – English and Inuktitut; and
 - \$30.00 application fee

B. RESULTS OF REVIEW

It is not anticipated that the increased freshwater consumption rate will cause significant impacts to Third Portage Lake's local aquatic ecosystem. According to sect. 3.2 of the AEM Application Support Document (AEM, 2013a), the total volume that would be withdrawn for active freshwater consumption requirements throughout the life of mine (2010-2018) will not exceed 2.5% of the lake's estimated volume. Furthermore, as stated in sect.4.1 of the Application Support Document, the lake's water levels will be monitored on a monthly basis in accordance with the Water Quality and Flow Monitoring Plan (AEM, 2009a) and if changes to these levels or changes in erosion or flow between Third Portage Lake and Second Portage Lake are observed, "AEM will initiate a review of the water balance in Third Portage Lake to determine if freshwater use by the mine is a significant contributor, or if declines are due to changes in natural factors." It is noted that the current Water Quality and Flow Monitoring Plan does not include monitoring provisions for lake water levels but according to the Application Support Document, it will be updated in 2013. The water resources division of AANDC, after carefully considering the application submitted by AEM, supports the amendment for the increased water use.

The supporting documentation for the amendment notes that water from Third Portage Lake will be used to fill the Portage Pit and Goose Pit areas and water from Wally Lake will be used to fill the Vault Pit area as part of planned closure activities. As described in sect. 4.3.1.5 of the Water Management Plan 2012 (SNC Lavalin, 2013) that was submitted with the application, the pits will gradually flood during spring freshets. Engineered structures will be built to control the flow rate and the annual volumes will not exceed source water body spring freshet volumes to ensure that their water levels will not be reduced. This plan states that more detailed information regarding pit flooding will be provided as part of an upcoming licence amendment and renewal application. The department will provide comment on planned closure activities during that process.

On behalf of Aboriginal Affairs and Northern Development Canada, the following comments/ recommendations are provided for the Board's consideration,

1. Water Balance and Water Quality Modeling Reporting Requirements

Water balance and water quality modeling reporting information for the year 2012 is presented in the Water Management Plan 2012 and briefly summarized in the 2012 Annual Report (AEM, 2013b). The Water Treatment and Mass Balance technical note included in Appendix B of the Water Management Plan 2012 forecasts the concentration of selected parameters in the Portage Area, including the TSF North and South Cells and the Portage and Goose Pits. The forecasts from 2012 until closure essentially predict whether the remaining TSF reclaim water will require treatment prior to being transferred to the Portage and Goose Pits at closure.

The Water Management Plan 2012 provides greater detail with respect to water balance and water quality modeling than the previous 2009 Updated Water Management Plan (AEM, 2009b), or the 2010 and 2011 site wide water balance update reports (Golder, 2010 and Golder, 2011). The 2009 Water Management Plan does not compare predicted water quality results with monitored outcomes and the 2010 and 2011 site wide water balance update reports do not address water quality (only quantity).

Recommendation: Going forward, AEM should ensure that annual water balance and water quality modeling reports submitted pursuant to Part E, Item 6 of the licence¹ compare predicted and measured water quantity and water quality

¹ Part E, Item 6: The Licensee shall submit a Water Balance and Water Quality Modeling Report to the Board for review, biannually for a period of two years following the commencement of operations and annually thereafter. The report shall include a comparison of predicted and measured parameters.

parameters. Comparisons should be structured in accordance with water sources and pathways associated with project activities. In addition, upcoming modeling reports should be expanded to include the Vault Area. Continued comparison of predicted and monitored parameters is necessary to optimize closure planning (i.e., flooding of pit lakes). These modeling reports can be submitted as either stand-alone documents or incorporated into updated Water Management Plans.

2. TSF Reclaim and Vault Attenuation Pond Treatment Options

Reclaim water from the TSF and water from Third Portage Lake will be used in re-flooding Portage and Goose Pits during mine site reclamation. The Water Treatment and Mass Balance technical note (in appendix B of the Water Management Plan 2012) identifies total cyanide, nitrate, copper, chloride, iron, and ammonia as parameters that may represent long-term contamination risks in the event that the pits may be breached without prior treatment. In particular, the technical note (section 5.2) highlights the need to control cyanide, copper, and iron concentrations:

“Results of the water quality mass balance indicate that copper and iron may require treatment either at the Reclaim Pond or prior to discharge into the Portage and Goose Pits. However, before such treatment measures are initiated an evaluation of improving the cyanide destruction process at the mill should be undertaken to ensure (1) that the efficiency of the cyanide destruction system is maximized; and (2) that a separate water treatment operation for copper and iron is necessary.”

It should be noted that the August 28, 2007 technical note included with AEM’s original Type ‘A’ Water Licence application (AEM, 2007) states that pit water quality will satisfy the Metal Mining Effluent Regulations and Nunavut Drinking Water Quality Guidelines prior to any breaching of perimeter dikes (treatment may be required). These discharge criteria should be further evaluated during the upcoming licence amendment and renewal application as the department understands that additional information on pit re-flooding measures will be provided at this time and the planned discharge criteria warrants additional scrutiny to ensure that the local aquatic ecosystem is adequately protected.

Recommendation: Future water balance and water quality modeling reports and/or Water Management Plan updates should detail what measures are being implemented to ensure that the water quality of the re-flooded Portage, Goose, and Vault Pits will be acceptable to the local aquatic ecosystem prior to the breaching of perimeter dikes. Recommendations provided in the Water

Treatment and Mass Balance technical note (SNC Lavalin, 2013) should be addressed. In particular,

- There should be regular (at least monthly) monitoring of all inflows and outflows of the North and South Cell TSF Reclaim Ponds for parameters of concern (i.e., total cyanide, nitrate, copper, chloride, iron, ammonia, and nitrate) in addition to the current set of chemical analyses.
- In addition to the parameters identified above, AANDC recommends that the concentrations of thiocyanate and weak acid dissociable cyanide should be monitored from the North and South Cell TSF Reclaim Ponds as they are formed through the gold recovery process and should be monitored.
- Water treatment practices for cyanide destruction at the mill should be improved, and, if necessary, additional treatment should be considered for other parameters of concern (e.g., copper and iron) prior to transferring reclaim water to the Portage and Goose Pits.

3. Reconciliation of Licence Requirements and AEM Management Planning and Reporting Procedures: Water Management Plan Updates and Water Balance and Water Quality Modeling Reporting Requirements

The submitted Water Management Plan 2012 is an update to the 2009 Updated Water Management Plan. This plan partially addresses Part F, Item 16 of the licence² which required a revision to the 2007 Mine Waste and Water Management Plan (MMC, 2007a) within six months of licence approval. On July 29, 2009 (AEM, 2009c), AEM notified the NWB that the 2007 Mine Waste and Water Management Plan had been revised as two separate documents: the 2009 Updated Water Management Plan that accompanied this notification and a Mine Waste Management Plan that was subsequently issued in October 2009 (AEM, 2009d).

² Part F, Item 16: The Licensee shall submit to the Board for approval, within six months of licence approval, a revised Mine Waste and Water Management Plan to include:

- a) Detailed Ammonia Management Plan;
- b) Integration of the Waste and Water Management Plan submitted under Water Licence #8BC-TEH0809, Part D, Item 1;
- c) Field testing program for closure cover depth of the Tailings Storage Facility and Waste Rock Storage Facilities with consideration for climate change; and
- d) A protocol for distinguishing seepage through facilities

The Water Management Plan 2012 appears to satisfy Part E, Item 6 of the licence³ as it provides a detailed water balance and water quality modeling report.

Recommendation

Consideration should be given to amending Part E, Item 6 and Part F, Item 16 of the licence to reconcile differences between licence requirements and AEM's management planning procedures. Although no approval document can be found on the NWB public registry it is understood that AEM's separation of the 2007 Mine Waste and Water Management Plan into two stand-alone plans was accepted by the Board. On November 2, 2009 the NWB distributed these plans to interested parties for review (NWB, 2009) and based on a review of the written representations posted on the NWB public registry no interveners were opposed to this separation. Having two stand-alone plans appears to be a sensible approach as it allows for a distinction between water use as it relates to consumption and effluent quality as presented in the Water Management Plan from the management of waste streams (i.e., tailings, waste rock, sewage, and solid waste) as presented in the Waste Management Plan.

4. Adaptive management procedures outlined in the Water Quality and Flow Monitoring Plan

Part E, Item 7 of the licence⁴ makes it necessary for AEM to recalibrate the Water Balance and Water Quality Model in accordance with procedures outlined in the August 2007 Water Quality and Flow Monitoring Plan (MMC, 2007b) and at a minimum of once every two years following the commencement of operations. The August 2007 Water Quality and Flow Monitoring Plan was revised through a May 2009 plan update (AEM, 2009a). The May 2009 plan includes an adaptive management section that makes it necessary for the Water Balance and Water

³ Part E, Item 6: The Licensee shall submit a Water Balance and Water Quality Modeling Report to the Board for review, biannually for a period of two years following the commencement of operations and annually thereafter. The report shall include a comparison of predicted and measured parameters.

⁴ Part E, Item 7: The Water Balance and Water Quality Model shall be re-calibrated as necessary in accordance with the action plan outlined in section 3.2.5.2 of the Water Quality and Flow Monitoring Plan (Aug. 2007) and at a minimum of once every two years following the commencement of operations. The results and implications of the re-calibrated model shall be reported to the Board.

Quality Model to be updated when source parameters do not conform to model assumptions.

Comment

The August 6, 2013 AANDC completeness review memo (AANDC, 2013) incorrectly stated that the May 2009 Water Quality and Flow Monitoring Plan does not provide details that would necessitate a recalibration of the Water Balance and Water Quality Model. Further review indicates that this plan includes an adaptive management section that provides adequate criteria for initiating model recalibrations.

Recommendation

Similar to item 3 (above), as AEM has revised the August 2007 Water Quality and Flow Monitoring Plan through a May 2009 update, reconciling the difference between the Part E, Item 7 licence condition (i.e., references an outdated plan) and the type of plan that must be maintained (i.e., Water Quality and Flow Monitoring Plan) should be considered when amending the licence.

C. REFERENCES

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- Agnico-Eagle Mines Ltd. (AEM), 2009b. *Meadowbank Gold Project: Updated Water Management Plan*. July 2009.
- Agnico-Eagle Mines Ltd. (AEM), 2009c. *Re: Meadowbank Water License 2AM-MEA0815 Part F, Item 16*. Email from Mr. Stéphane Robert of AEM to Mr. Richard Dwyer of the Nunavut Water Board. July 29, 2009.
- Agnico-Eagle Mines Ltd. (AEM), 2009d. *Meadowbank Gold Project: Mine Waste Management Plan*. October 2009.
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Nunavut Water Board (NWB), 2009. *Subject: Submission of Part F, Item 16 Updated Water Management Plan, Part F, Item 16 Mine Waste Management Plan*. Email from Mr. Richard Dwyer of the NWB, to Mr. Stéphane Robert of Agnico-Eagle Mines Ltd. and the NWB's Kivalliq Distribution List.

SNC Lavalin, 2013. *Meadowbank Gold Project Water Treatment and Mass Balance*. File No. 610756-0000-40ER-0002-01. Prepared for Agnico-Eagle Mines Ltd. March 2013.