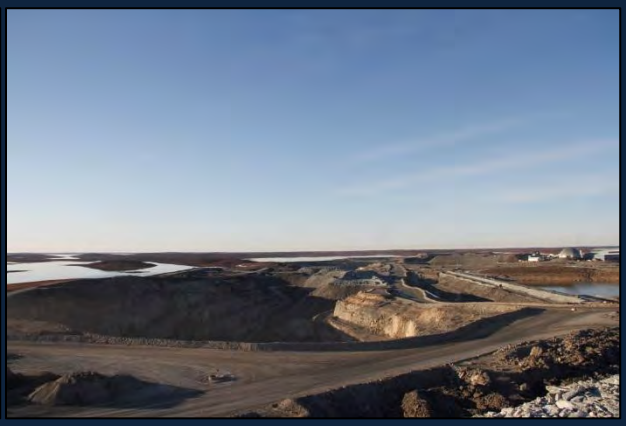
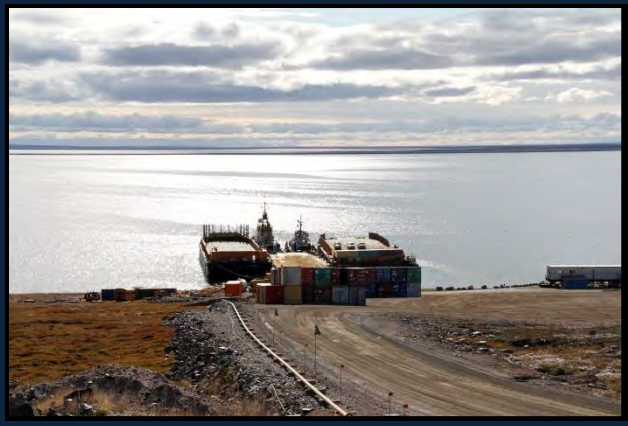
2014 - 2015 Annual Monitoring Report

for Agnico Eagle Mines Ltd.'s Meadowbank Gold Project


Nunavut Impact Review Board
File No. 03MN107
October 2015

Report Title:	The Nunavut Impact Review Board's 2014 – 2015 Annual Monitoring Report for the Meadowbank Gold Project (NIRB File No. 03MN107)
Project:	Meadowbank Gold Project
Project Location:	Kivalliq Region, Nunavut
Project Owner:	Agnico Eagle Mines Ltd. P.O. Box 540 Baker Lake, NU X0C 0A0
Monitoring Officer:	Sophia Granchinho, M.Sc., EP
Monitoring Period:	October 2014 – September 2015
Date Issued:	October 2015
Cover photos:	1) Processing facility 2) Portage Pit 3) Baker Lake Docking Facility 4) Haul truck at the Meadowbank Mine Site

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LIST OF ACRONYMS

AANDC	Aboriginal Affairs and Northern Development Canada
AEM	Agnico Eagle Mines Ltd.
ARD	Acid Rock Drainage
AWAR	All-weather private access road
CREMP	Core Receiving Environment Monitoring Program
dBA	A-weighted decibels
DFO	Fisheries and Oceans Canada
EC	Environment Canada
FEIS	Final Environmental Impact Statement
GN	Government of Nunavut
GN-DoE	Government of Nunavut, Department of Environment
HC	Health Canada
INAC	Indian and Northern Affairs Canada
KIA	Kivalliq Inuit Association
km	kilometre
MMER	Metal Mining Effluent Regulations
mL	million litre
MW	Monitoring well
NIRB	Nunavut Impact Review Board
NLCA	Nunavut Land Claims Agreement
NWB	Nunavut Water Board
PEAMP	Post-environmental assessment monitoring program
PM	Particulate matter
TC	Transport Canada
TK	Traditional Knowledge
TSS	Total suspended solids
VEC	Valued Ecosystemic Component
VSEC	Valued Socio-economic Component
WSLRA	Wildlife Screening Level Risk Assessment
WTP	Water Treatment Plant

1.0 INTRODUCTION

On December 30, 2006 pursuant to Section 12.5.12 of the Nunavut Land Claims Agreement (NLCA), the Nunavut Impact Review Board (NIRB or Board) issued Project Certificate No. 004 (Project Certificate) for the Meadowbank Gold Project (the Project), allowing the Project to proceed in accordance with the Terms and Conditions issued therein. The NIRB is responsible for the monitoring of this Project as per Sections 12.7.1 and 12.7.2 of the NLCA, and the Project Certificate. In November 2009, the NIRB formally amended the Project Certificate to include an amendment to Condition 32 pursuant to NLCA 12.8.2 and an approval to change the name of the assignee from Cumberland Resources Ltd. to Agnico Eagle Mines Ltd. (NIRB 2009).

This report provides findings that resulted from the Board's monitoring program for this Project from October 2014 to September 2015.

1.1. PROJECT HISTORY AND CURRENT STATUS

In early 2007, Agnico Eagle Mines Ltd. – Meadowbank Division (AEM or the Proponent) acquired Cumberland Resources Ltd.'s assets which included the Meadowbank Gold Mine. Construction of an all-weather private access road (AWAR) from the hamlet of Baker Lake to the Meadowbank mine site was completed in 2008 and the road opened to mine-related transportation in March 2008. The Meadowbank Gold Mine entered the operations phase of the project in February 2010 and is currently entering its sixth year of operations.

The Type A Water Licence (2AM-MEA0815) required for the Project was issued by the Nunavut Water Board (NWB) in June of 2008. This licence was amended in May 2010 to allow for an expansion to the Baker Lake fuel tank farm facility which included 2 additional 10 million litre (mL) fuel tanks to a combined total of six 10 mL fuel tanks.

In 2008 the NIRB received a request by the Hamlet and Hunters and Trappers Organization of Baker Lake and the Proponent to allow public usage of the AWAR. Following a technical review of the request and a public hearing, the NIRB formally approved the amendment to the project in November 2009 and issued an amended Meadowbank Gold Mine Project Certificate (NIRB 2009).

An expansion to the Meadowbank airstrip was screened by the NIRB in September 2010 with the NIRB having issued a 12.4.4(a) recommendation to the then-Minister of Indian and Northern Affairs Canada (INAC, now Aboriginal Affairs and Northern Development Canada or AANDC) indicating that the proposed project could proceed subject to additional project specific terms and conditions, and additionally, that the NIRB would expand its Part 7 NLCA monitoring program for the Meadowbank Project to apply to the airstrip expansion (NIRB File No. 10XN039). On January 27, 2013 AEM submitted an application to the NWB to allow for the expanded airstrip. The request indicated a revision to the original 2010 request (NIRB File No. 10XN039) which substantially reduced the impact to Third Portage Lake and included construction of the expansion during the winter season. On April 4, 2013 the NWB approved

the proposed modification and the airport extension was completed April 6, 2013 (AEM 2014a).

On July 14, 2011 the NIRB issued *Appendix D – Meadowbank Monitoring Program* to AEM in accordance with the Project Certificate (NIRB 2011). The Meadowbank monitoring program includes responsibilities for AEM, the NIRB, and several authorizing agencies and government departments.

During the 2014 year, AEM continued mining activities in both the Portage and Bay Goose pits and started in Vault Pit. Dewatering of the Vault Pit was completed in June and thereafter became the Vault Attenuation Pond. By the beginning of 2015, mining activities ceased in the Bay Goose Pit. Additional activities included construction/modification occurring near the main mine site area and the Vault area and construction of Central Dike Phase 4 and Saddle Dam 3, 4 and 5.

In July 2014, AEM applied for a renewal licence to its Type A Water Licence (No. 2AM-MEA0815) as the previous licence were to expire in May 2015. On August 5, 2015 the NWB granted AEM's request to renew and amend Water Licence No. 2AM-MEA0815 and issued the amended Licence No.: 2AM-MEA1525 for a 10 year licence.

In July 2014 AEM applied to Fisheries and Oceans Canada (DFO) for a *Paragraph 35(2) (b) Fisheries Act Authorization (Normal Circumstances)*. AEM proposed to expand its current Vault pit operations into Phaser Lake, with a closure date in 2017. The NIRB continues to assess the application for an expansion to the Vault pit.

The NIRB staff held an open house and community information sessions in Baker Lake and Chesterfield Inlet from September 9, 2015 to September 11, 2015 to update, discuss with, and receive feedback from community members on the NIRB's monitoring program for the Meadowbank Gold Mine. In addition, the presentation included an overview of the proposed Vault Pit Expansion proposal and the NIRB's 12.8.2 reconsideration process. This is further discussion in Appendix I.

1.2. PROJECT COMPONENTS

The Meadowbank Gold Project as operated by AEM consists of an open pit gold mine located approximately 70 kilometres (km) north of the hamlet of Baker Lake on Inuit-owned surface lands. The mine site is comprised of: camp facilities; active mine areas including Bay-Goose pit (mining ended early 2015), Portage pits and Vault pit; waste rock facility; landfill; landfarm remediation site; tailings storage facility and Portage attenuation pond; airstrip; waste and hazardous materials storage area; incinerator; fuel storage area; air monitoring station; dust monitoring station and weather station. In addition to mining infrastructure and activities, ancillary Project infrastructure is located approximately 2 km east of the hamlet of Baker Lake and consists of barge unloading facilities, a laydown storage and marshalling area, a 60 mL fuel tank farm, associated interconnecting roads and a 110 km AWAR from the Hamlet of Baker Lake to the Meadowbank mine site. Supplies are shipped from locations within Canada via sealift to Baker Lake where they are offloaded at AEM's marshalling area and transported to the Meadowbank site via haul trucks along the 110 km AWAR (AEM 2014b).

The original Project proponent and owner, Cumberland Resources Inc., estimated in 2006 that the Meadowbank project comprised of a total proven and probable gold reserves of 2.7 million ounces (NIRB 2006). In its 2014 Mineral Reserve and Resource Data report, AEM indicated that Meadowbank had proven and probable gold reserves of 1.2 million ounces (AEM 2014b). AEM indicated in its annual report that operations were still scheduled to be completed by 2017 with re-flooding of mine pits to be completed by 2025 (AEM 2015a)

2.0 MONITORING ACTIVITIES

2.1. REPORTING REQUIREMENTS

2.1.1. General Reporting Requirements

During the 2014 – 2015 monitoring period, the Proponent demonstrated a general compliance with reporting requirements imposed through commitments resulting from the NIRB's Review of the Project, including those contained in related reports, plans, and the NIRB's Project Certificate. The Proponent has provided the following items as required by the terms and conditions contained within the Project Certificate for the current monitoring period of October 2014 through September 2015:

- AEM's 2014 Annual Report to the NWB, NIRB, DFO, AANDC and Kivalliq Inuit Association (KIA) which included:
    - 2015 Mine Plan for production lease KVPL08D280 (2014)
    - Updated Mine Waste Rock and Tailings Management Report & Plan (2015)
    - Water Management Report and Plan, version 1 (2015)
    - Final Core Receiving Environmental Monitoring Program (CREMP) (2014)
    - Baker Lake Bulk Fuel Storage Facility: Environmental Performance Monitoring Plan, Version 3 (2014)
    - Meadowbank Bulk Fuel Storage Facility: Environmental Performance Monitoring Plan, Version 2 (2014)
    - Operation, Maintenance and Surveillance Manual: Dewatering Dikes, version 4 (2015)
    - Groundwater Monitoring Plan, version 4 (2014)
    - Incinerator Waste Management Plan, version 5 (2014)
    - Oil Handling Facility Oil Pollution Emergency Plan, version 5 (2014)
    - Quality Assurance / Quality Control Plan, Version 2 (2014)
    - Tailings Storage Facility Operation, Maintenance and Surveillance Manual, Version 4 (2015)
    - Landfarm Design and Management Plan, version 3 (2013)
    - Air Quality and Dustfall Monitoring Plan, version 2 (2013)
    - Meteorological Monitoring Plan, version 1 (2013)
    - Noise Monitoring and Abatement Plan, version 2 (2014)
    - Vault Lake Fishout Work Plan, version 1 (2013)
    - Emergency Response Plan, version 6 (2013)
    - Hazardous Materials Management Plan, version 3 (2013)
    - Oil Pollution Emergency Response Plan, version 6 (2013)
    - Spill Contingency Plan, version 4 (2013)

- Operational acid rock drainage/metal leaching Testing and Sampling Plan, version 2 (2013)
- Landfill Design and Management Plan, version 2 (2013)
- Wildlife Protection and Response Plan, version 3 (2013)
- Ammonia Management Plan, version 1 (2013)
- Operation and Maintenance Manual: Sewage Treatment Plant, version 4 (2013)
- All Weather Private Access Road Transportation Management Plan, version 3 (2014)
- Blast Monitoring Report for the Protection of Nearby Fish Habitat (2013)
- Aquatic Effects Management Program, version 3 (2013)
- Interim Closure and Reclamation Plan (2014)
- Updated Habitat Compensation Monitoring Plan submitted in response to comments on the 2013 Annual Report on August 15, 2014, version 3 (2014)

The NIRB has not received the following report, which remains outstanding:

- Updated Access and Air Traffic Management Plan (last version provided in 2005) – no updated version for mine site access and/or air traffic provided since 2005

2.1.2. Annual Report as per Project Certificate Appendix D

Appendix D of the Project Certificate is designed to provide direction to the Proponent, the NIRB's Monitoring Officer, government departments and authorizing agencies with regard to the monitoring program established for the project pursuant to Section 12.7 of the NLCA. Appendix D also outlines the Proponent's responsibilities to establish a monitoring program, the requirement of the NIRB's Monitoring Officer to support the production and interpretation of various monitoring reports, and also outlines the NIRB's requirements of various authorizing agencies in reporting compliance monitoring activities. As outlined in Appendix D, the Proponent is required to submit an annual report that provides an updated status of Project operations, an overview of the site and its operation during the reporting period, as well as a discussion of the observations made as a result of, or illustrated through, the monitoring program (NIRB 2011).

On April 22, 2015 the NIRB received AEM's *Meadowbank Gold Project 2014 Annual Report* (2014 Annual Report). On June 2, 2015 the NIRB distributed the report to interested parties with a request that they provide comments relating to effects and compliance monitoring as well as other areas of expertise or mandated responsibility. On or before July 3, 2015 the NIRB received comments from the following parties:

- Government of Nunavut
- Aboriginal Affairs and Northern Development Canada
- Environment Canada
- Fisheries and Oceans Canada
- Transport Canada

Comments received by parties identified specific areas that may require further attention and/or discussion; these are addressed throughout the remainder of this report and are considered in the

recommendations set forth by the Board under separate cover, for subsequent action, attention, or remedial activity by the Proponent.

2.2. COMPLIANCE MONITORING

Compliance monitoring involves an assessment undertaken by regulators and other agencies to establish whether or not a project is being carried out within the legislation, regulations, instruments, commitments and agreements as such are applicable to certain project activities, and further, is a requirement of the NIRB's Appendix D to the Meadowbank Project Certificate.

2.2.1. Compliance with the NIRB Screening Decision Reports

2.2.1.1. **Screening Decision Report 10XN039**

One of the requirements in the Board's Screening Decision Report for NIRB File No. 10XN039 related to the expansion of the Meadowbank airstrip was for AEM to undertake efforts to communicate its plans to expand the airstrip with the community of Baker Lake. AEM provided a summary of its consultation process in its January 7, 2014 responses to the Board's recommendations (AEM 2014c).

2.2.1.2. **Screening Decision Report 11EN010**

One of the recommendations of the NIRB's April 21, 2011 Screening Decision Report for AEM's "Pipe Dream Winter Road and Mining Exploration" project (File No. 11EN010; now referred to as "Amaruq") is that AEM include a summary of activities undertaken within its annual report for the Meadowbank Gold Project (File No. 03MN107). On April 13, 2015 AEM submitted its 2014 Annual Report for this file.

2.2.2. Compliance with the NIRB Project Certificate

Within its 2014 Annual Report, AEM provided a summary of exploration activities undertaken as permitted by the Board within its final hearing report.

2.2.2.1. **Compliance Achievements**

a. <u>Acid rock drainage/metal leaching – Condition 15</u>

15. "Cumberland shall within two (2) years of commencing operations re-evaluate the characterization of mine waste materials, including the Vault area, for acid generating potential, metal leaching and non metal constituents to confirm FEIS predictions, and re-evaluate rock disposal practices by conducting systematic sampling of the waste rock and tailings in order to incorporate preventive and control measures into the Waste Management Plan to enhance tailing management during operations and closure. The results of the re-evaluations shall be provided to the NWB and NIRB's Monitoring Officer."

Within its 2014 Annual Report, AEM provided an overview discussion on the re-evaluation conducted on the mine waste materials including the Vault pit waste rock materials. Further, AEM addressed the Board's 2014 request to provide a comparison of its results

with the final environmental impact statement (FEIS) predictions, a summary of how it re-evaluated rock disposal practices and further details on the preventative and control measures provided in the Waste Management Plan (AEM 2015a).

2.2.2.2. **AEM Responses to the Board's 2014 Recommendations**

On November 19, 2014 the Board made a number of recommendations as a result of its 2013 – 2014 monitoring efforts including the 2014 site visit (NIRB 2014). The following provides an overview of AEM's responses to the Board's recommendations as provided to the NIRB on December 18, 2014.

a. Spills – Condition 26

26. Cumberland shall ensure that spills, if any, are cleaned up immediately and that the site is kept clean of debris, including wind-blown debris.

During the 2014 site visit, the Monitoring Officer observed that spill pads and drip pans were not in use during refueling of vehicles. The Board recommended that AEM employ the use of additional standard spill containment equipment such as rip pans at all re-fuelling stations in additions to the standard spill kits AEM has available on site.

In response to the Board's recommendation, AEM noted that it has an approved Spill Contingency Plan in place in accordance with its NWB Type A water licence. AEM further noted that transport, transfer and storage of materials are performed by trained personnel using secondary containment, with well-maintained equipment and containers. Refuelling stations in Baker Lake and at the mine site are equipped with High-density polyethylene (HDPE) lined areas to contain any leaks or spills while refueling and there are specialized fittings for bulk fuel transfer to avoid large spills. Furthermore, AEM noted that it has taken in consideration the Board's comments regarding the use of secondary containment and will continue to adhere to the practices outlined in the Spill Contingency Plan. The NIRB is satisfied with this response.

b. Gathering of Traditional Knowledge and Community Consultation – Conditions 39 & 40

39. "Within three (3) months of contracting with a shipping company to transport cargo to the Project through Chesterfield Inlet and prior to the commencement of shipping, Cumberland shall advertise and hold a community information meeting in Chesterfield Inlet to fully discuss the shipping program for the Project. Thereafter, Cumberland shall annually advertise and hold a community information meeting in Chesterfield Inlet to report on the Project and to hear from Chesterfield Inlet residents and respond to concerns. A consultation report shall be submitted to NIRB's Monitoring Officer within one month of the meeting."

40. "Cumberland shall gather Traditional Knowledge from the local HTOs and conduct a minimum of a one-day workshop with residents of Chesterfield Inlet to more fully gather Traditional Knowledge about the marine mammals, cabins, hunting, and other local activities in the Inlet. Cumberland shall report to KivIA and NIRB's

Monitoring Officer annually on the Traditional Knowledge gathered including any operational changes that resulted from concerns shared at the workshop."

In its review of the 2012 and 2013 Annual Reports, Board found that no additional Traditional Knowledge (TK) workshops or information was collected from residents of Chesterfield Inlet on marine mammals, cabins, hunting and other local activities in the inlet. The NIRB noted that TK may change and evolve over time and that as such; it was and is important that AEM continue to collect and report on TK regarding wildlife and local activities to accurately understand traditional land use and potential impacts of the project on various components of the environment. The Board requested in 2014 that AEM undertake additional workshops in Chesterfield Inlet and Baker Lake in order to annually gather Traditional Knowledge at both the community level and from the Chesterfield Inlet and Baker Lake HTOs.

AEM responded that it held an Inuit Qaujimajatuqangit (IQ) workshop in Chesterfield Inlet on January 26 and 27, 2010. The workshop was reportedly focused on gathering information on traditional use and traditional environmental knowledge of Chesterfield Inlet residents, as well as project-specific effects and mitigation recommendations including search and rescue operations and safety. AEM added that there was no change in the TK reported to AEM during meetings held in 2012 and 2014, and that as a result it concluded that no operational changes were necessary (AEM, 2014c). As AEM did not provide specific TK collected during the 2012 and 2014 meetings, it is difficult for the NIRB to assess the soundness of AEM's conclusion that operational changes were not necessary. This is further discussed in Section 2.2.2.4 of this report.

c. Participation in Surveys – Conditions 51 & 54

51 "Cumberland shall engage the HTOs in the development, implementation and reporting of creel surveys within waterbodies affected by the Project to the GN, DFO and local HTO."

54 "Cumberland shall provide an updated Terrestrial Ecosystem Management Plan to the GN, EC and INAC, within three (3) months of the issuance of the Project Certificate including: e. Details of a comprehensive hunter harvest survey to determine the effect on ungulate populations resulting from increased human access caused by the all-weather private access road, including establishing preconstruction baseline harvesting data, to be developed in consultation with local HTOs, the GN-DOE and the Nunavut Wildlife Management Board…"

The Board noted concern about the declines in participation reported in hunter harvest and the creel surveys in 2013 and recommended that AEM increase its efforts to participate in other regional population level studies carried out by the HTO, Government of Nunavut (GN) or other agencies to better understand Project related effects on caribou and creel populations around the local and regional study areas. The Board further recommended that additional information regarding its efforts and relevant results of further studies be provided within AEM's 2014 Annual Report.

AEM responded to the Board's recommendation indicated that it will continue to work with hunters and increase its communication with the HTO related to the Hunter Harvest Study. In addition, AEM entered into a memorandum of understanding (MOU) with the GN to continue contributions in support of the regional GN caribou monitoring program. AEM further noted that it would continue to work closely with the GN and other researchers to ensure the data collected by AEM continues to contribute to the regional understanding of wildlife. Further discussion on the Hunter Harvest Study is provided in Section 2.3.1.4 of this report.

d. Provision of Updated Information – Condition 56

56. Cumberland shall plan, construct, and operate the mine in such a way that caribou migration paths through the Project, including in the narrows west of Helicopter Island, are protected. Maps of caribou migration corridors shall be developed in consultation with Elders and local HTOs, including Chesterfield Inlet and placed in site offices and upgraded as new information on corridors becomes available. Information on caribou migration corridors shall be reported to the GN, KivIA and NIRB's Monitoring Officer annually.

It was noted during the 2014 site visit that maps of caribou migration paths posted at the mine site were outdated (2011) and did not include information collected from consultation with Elders and local HTOs. The Board recommended that updated maps be presented at the site and that AEM provide details to clarify whether and how information collected from consultation with Elders and local HTOs has been incorporated into the updated mapping. AEM indicated in its response that it would post updated caribou migration maps at the site and would continue to meet with the HTO on annual basis to review site wide monitoring. AEM further noted that the GN Wildlife Biologist independently consults with the Hunters and Elders to construct and finalize the migration maps. Further discussion on the caribou migration maps is provided in Section 2.2.2.4 of this report.

e. Socio-economic monitoring program – Condition 64

64. Cumberland shall work with the GN and INAC to develop the terms of reference for a socio-economic monitoring program for the Meadowbank Project, including the carrying out of monitoring and research activities in a manner which will provide project specific data which will be useful in cumulative effects monitoring (upon request of Government or NPC) and consulting and cooperating with agencies undertaking such programs. Cumberland shall submit draft terms of reference for the socio-economic monitoring program to the Meadowbank SEMC for review and comment within six (6) months of the issuance of a Project Certificate, with a copy to NIRB's Monitoring Officer.

During the review of AEM's 2013 Annual Report, the GN and AANDC acknowledged AEM's participation on the Kivalliq Socio-Economic Monitoring Committee, but both parties indicated that participation in the committee may not fulfill requirements of Condition 64. The NIRB noted that AEM could have provided a more comprehensive project-specific data with the development of a project specific monitoring program as envisioned by this Condition and the Board recommended that AEM provide the NIRB with

a progress report on the development of a project-specific socio-economic monitoring program.

In its response, AEM indicated that it has made progress on developing a socio-economic monitoring program as per the requirements of Condition 64 and is collecting data to be submitted as part of the overall socio-economic monitoring committee plan but no actual progress report was provided to the NIRB.

The Board further recommended that future reporting on socio-economic data include a breakdown of the types of positions held by Inuit beneficiaries and non-Inuit Nunavummiut at the Meadowbank site; include percentages of the most common reasons reported for employee voluntary termination; report on its pre-apprenticeship program, including: enrollment numbers; successful completion rates; and how many successful participants found employment with AEM or, if known, other opportunities. AEM in its response noted that the requested information would be provided in the 2014 annual report. The NIRB is satisfied with this response.

f. Air Quality Monitoring – Condition 71

71. "Cumberland shall, in consultation with EC, install and fund an atmospheric monitoring station to focus on particulates of concern generated at the mine site. The results of air quality monitoring are to be reported annually to NIRB."

Following the review of AEM's AWAR Dustfall Study Report, the NIRB noted that AEM concluded that there was less dust present along the AWAR than predicted in the FEIS and that there were no observed impact to water quality along the AWAR. However, the NIRB was hesitant to accept with confidence, the results and conclusions of the program given the limitations of the sampling collection program in 2013; the results having been compromised as a result of disturbance to sampling canisters. The Board recommended that AEM provide study results which corroborate the conclusions within the 2013 report, and that it undertake additional sampling in the 2014 year and run additional analyses with the data collected.

In its response to the Board's recommendation, AEM noted that it completed a full dustfall monitoring study in 2014. AEM further noted that since the majority of samples collected in 2013 were compromised due to adverse field conditions, AEM did not make any conclusions about the dustfall in the 2013 AWAR Dustfall Study Report but instead indicated that the study would be repeated using more robust sampling techniques in 2014. Further discussion on AEM's response and conclusions concerning the dustfall monitoring program from the 2014 Annual Report is available in Section 2.3.1.3.

g. On-site incinerators – Condition 72

72. On-site incinerators shall comply with Canadian Council of Ministers of Environment and Canada-Wide Standards for dioxins and furan emissions, and Canada-wide Standards for mercury emissions, and Cumberland shall conduct annual stack testing to demonstrate that the on-site incinerators are operating in compliance with these standards. The results of stack testing shall be contained in an annual monitoring report submitted to GN, EC and NIRB's Monitoring Officer.

Upon review of AEM's available 2013 Incinerator Daily Report Logbook, the NIRB noted that the incinerator temperature in the secondary chamber was below the recommended 1000 ºC minimum temperature on several occasions (AEM 2014d). This was also noted to be an issue in 2011 and 2012. It has been previously noted by Environment Canada (EC) that the incinerator temperatures in the secondary chamber should be above 1000 ºC to ensure complete combustion and to minimize the formation and release of contaminants. It was further noted that a number of entries into its Daily Report Logbook were also missing, with no data entered as to burn temperatures recorded. The Board requested that AEM provide an explanation for the incinerator having not achieved recommended temperatures in the secondary chamber on various occasions in 2013 and that it provides a note of any discussions it has had with EC or other regulators regarding these occasions. AEM indicated in its response to the NIRB that instances whereby the secondary chamber did not reach the recommended temperatures were generally attributable to mechanical issues with burners not working properly (same issue as in in 2012) which altered the operational procedures and resulted in the operators not recording data on a few occasions. This gap in information was brought to the attention of the site services department and AEM noted that it will improve this in the future. Further, it added that following several attempts to repair and adjust the burner, AEM requested that a burner manufacturer representative be send to site to provide training to the operators and site services department to complete some maintenance and adjustment on the burner during the summer of 2014. AEM also indicated that corrective actions would be put in place to ensure the temperature set point in the secondary chamber would always reached the average recommended temperature and an alarm on the sites services computer would be set up when the temperature of the secondary chamber falls below 1000ºC. Further discussion on AEM's on-site incinerators is available in Section 2.2.2.4 of this report. With respect to the Board's request to provide a note on any discussion it had with regulatory authorities regarding the incinerator not achieving the recommended temperatures in the secondary chamber, AEM noted that it provided responses to EC's comments regarding some of the incinerator comments in 2012; however, AEM noted that it continued to work with the incinerator manufacturer and their representatives in 2013 and 2014 to solve the problems.

The Board also requested in 2014 that EC provide comments on the information contained within AEM's 2013 Incinerator Daily Report Logbook. EC's response is further discussed in Section 2.2.2.3.

h. Suppression of surface dust – Condition 74

74. "Cumberland shall employ environmentally protective techniques to suppress any surface dust."

This condition has been included as a recommendation by the Board in each of its annually issued recommendations to the Proponent since 2008. During each of the NIRB's site visits from 2011-2015 the Monitoring Officer noted that no dust suppressant techniques were being applied to the AWAR from Baker Lake (gatehouse) to the Meadowbank site, but that AEM did use calcium chloride and water as a dust suppressant at the mine site itself. In 2014, the Board reminded that AEM's Access and Air Traffic Management Plan (2005) indicated that dust control measures on the roads, including the AWAR, would include regularly watering during the dry periods and the application of calcium chloride if

necessary. The Board requested that AEM provide a plan of action for dust suppression along the AWAR during dry periods to be undertaken during 2014 and all remaining years of Project life.

In response to the Board's recommendation, AEM indicated that it has completed a series of dustfall studies to quantitatively asses the accuracy of the FEIS predictions regarding impacts of dust on wildlife and wildlife habitat around the mine site and along the AWAR. AEM noted that the results are consistent with the FEIS predictions and will continue to conduct monitoring studies along the AWAR (see discussion on Air Quality Monitoring in this report). AEM further noted that Condition 74 is not specified in the "All Weather Road" section of the Project Certificate and believes that the Access and Air Traffic Management Plan was intended to apply to on-site haul and service roads. AEM further noted that the Air Quality and Noise Management Plan indicated that dust suppressants are to be applied to "haul and service roads during dry weather to mitigate fugitive dust" (AEM 2005). Further discussion on AEM's conclusions concerning the suppression of surface dust is available in Section 2.2.2.4 and discussion on AEM's 2014 results is provided in Section 2.3.1.3 of this report.

i. Accidents and Malfunctions – Condition 75

75. "Cumberland shall provide a complete list of possible accidents and malfunctions for the Project. It must consider the all-weather road, shipping spills, cyanide and other hazardous material spills, and pitwall/dikes/dam failure, and include an assessment of the accident risk and mitigation developed in consultation with Elders and potentially affected communities."

In the review of AEM's 2013 annual report, the NIRB noted that it was unclear in the submitted management plans whether, and how, the plans were developed in consultation with Elders and potentially affected communities. The Board recommended that AEM provide further discussion as to how various management plans relating to accident risk and mitigation have been developed in consultation with Elders and potentially affected communities. In its response to the Board's recommendation, AEM noted that it would provide the requested information within the 2014 Annual Report. Further discussion on the assessment of the accident risk and mitigation developed in consultation with Elders is provided in Section 2.2.2.4 of this report.

j. Appendix D and the Annual Report

Following the NIRB's review of AEM's 2013 Annual Report, the NIRB found that the discussion and analysis within the its post-environmental assessment monitoring program (PEAMP) could have been more comprehensive, particularly as related to observed effects, accuracy of predictions and monitoring protocol and mitigation measures. Furthermore, given the current presentation of data, it was difficult for the NIRB to ascertain whether trends of effects over time may be resulting from, or associated with, the Meadowbank Project. The Board provided three recommendations related to the PEAMP.

In its first recommendation, the Board clarified that as a part of its reporting on the PEAMP, references are to be made with respect to observed impacts over time. The Board requested

that the Proponent include in future reporting, a measurement of the effects of the project as well as information used to reach any relevant conclusions. In its response to the Board's recommendation, AEM noted that it believes this was accomplished in the PEAMP and that the objectives of the NIRB Project Certificate Appendix D have been met. AEM further noted that in all cases a detailed description of monitoring and measurements of effects overtime were provided in other sections of the annual report.

The Board's second recommendation related to this topic was to request that AEM continue to provide tables in future annual reports as presented in its 2013 discussion of the PEAMP. The Board also requested that AEM further include columns identifying project related effects or measurement values as predicted within the FEIS for each valued ecosystemic component (VEC) or valued socio-economic component, as well as observed measurement values and/or effects as noted in the previous and current monitoring years. In its response, AEM noted that it believes this was accomplished in the PEAMP and that the objectives of the Project Certificate Appendix D were met.

In the third recommendation, the Board requested that AEM provide a summary description of any changes between proposed monitoring measures as included within its FEIS and the measures it has actually employed within its evaluation of the effectiveness of project monitoring procedures and plans. In its response, AEM noted that it will continue to work closely with applicable agencies and reviewers to develop and update monitoring plans that reflect changes to the mine planning and further ensure the plans are effective and meet the conditions of AEM's authorizations, licenses and permits. The rationale for improvements and changes in monitoring procedures and plans are discussed with the relevant regulatory bodies (i.e. reviewed by the NWB as a condition of the Type A License and is a condition of the DFO authorizations) and the changes made to monitoring plans are described in the document control section of the revised plans. Further discussion on AEM's response and conclusions concerning its PEAMP from the 2013 Annual Report is available in Section 2.3.3.1.

k. Noise Quality Monitoring

In 2013, the Board requested that AEM provide a discussion regarding the potential impacts of noise to human health at site (NIRB 2013). AEM anticipated that project-related noise levels would decrease with increasing distance from noise monitoring stations at site, and noted that it would continue to conduct annual monitoring at stations located at various distances from the mine footprint area. Within its 2013 Annual Report AEM noted that noise related health impacts to on-site workers would be under the purview of the Health and Safety department and should not be discussed under the environmental monitoring program.

Within its comment submission regarding AEM's 2013 Annual Report, the GN noted that it disagreed with AEM's conclusion that the Project did not exceed the threshold in Section 4.4.2.2 of the Terrestrial Ecosystem Management Plan (TEMP), specifically that mine related activities would not preclude caribou and muskoxen from using suitable habitats beyond 500 metres (m) of mine buildings, facilities and roads. The GN further noted that the presence of caribou within this 500 m buffer is not indicative of the Project having had

no noise-related effect on wildlife and recommended that AEM further investigate mine related disturbance. AEM responded to the GN's comments on noise related effects on wildlife and noted that its noise target levels are based on recommendations made by EC's "Environmental Code of Practice for Metal Mines". It further noted that as no equilibrium sound pressure levels (Leq) in 2013 exceeded target sound levels of 55 decibels (dBA) during the daytime and 45 dBA during the nighttime, that mine activities did not preclude caribou from using suitable habitat near the mine site.

The Board's first recommendation related to noise quality monitoring requested that AEM confirm which agency or government department oversees its noise related health impacts on-site, particularly as related to Condition 62 of the NIRB Project Certificate, and what, if any, monitoring and reporting of these impacts are required. In its response, AEM noted that it is required to comply with two sets of regulations "General Safety Regulations (RRNWT 1990, c. S-1) Section 30 and 31, Schedule A" and the "Mine Health and Safety Regulations, R-125-95 Section 9.19-9.26, Schedule 5" regarding the noise related health impact on-site which are enforced under the Mine's Act by the mine's inspector which is a representative of the Workers Safety and Compensation Commission.

In its second recommendation, the Board encouraged AEM and the GN to work together to investigate mine related disturbance on caribou and wildlife and report back to the NIRB on the progress of these discussions. The Board further requested that any additional investigation into noise monitoring should be included within its annual reports to the NIRB. In its response, AEM noted that it believes that it is fulfilling the noise and wildlife monitoring requirements as described in the Noise Monitoring and Abatement Plan and Terrestrial Ecosystem Management Plan, with few exceedances of established thresholds. AEM also noted that it will have further communications with the GN in 2015 to better understand their concerns regarding mine related disturbance on caribou and wildlife.

l. General Clarification

The NIRB noted in its review of the 2013 Annual Report that Table 7.1 did not include the unit numbers for quantities of spills that were report. The Board requested that AEM provide an updated table and that in future years, AEM ensure that similar tables presented within its annual reporting include quantitative measurements or other essential details to enable clear understanding of materials presented. An updated table with the correct units were provided by AEM in response to the Board's recommendation. AEM noted that this was a clerical error and will ensure that future reports would have the correct units of measurements included in the tables.

The NIRB also noted potential discrepancies and ambiguity within AEM's 2013 Annual Report as to which of the four monitoring locations were used for noise sampling and the Board requested that AEM clarify within its future annual reporting which sampling sites are included as reference sites only, which are active sampling sites, and which were not included in data collection. The Board further requested that discussion within its PEAMP should also provide a clear description of results, ensuring that any anomalies or changes to the monitoring program are identified. AEM, in its response noted that it believes the Board's recommendation is accomplished in the PEAMP and that the objectives of the

Project Certificate Appendix D are met. AEM indicated that it has taken note of NIRB's recommendations and will discuss ways to improve the presentation of information, without creating redundancy in the annual report.

Relating to the AWAR, Condition 32(c) of the Project Certificate requires that the Proponent post signs in English and Inuktitut at the gate, each major bridge crossing, and at every 10 kilometres along the road, stating that unauthorized public use of the road is prohibited. The Monitoring Officer observed during the 2014 site visit that no signage was present on the sea-can at the bridge crossing located at approximately kilometre 23. The Board reminded AEM that signs should be posted at each major bridge crossing. AEM noted in its response that it will order new signage to identify the sea can at kilometre 23 and will make sure that signs are posted at each major bridge crossing.

2.2.2.3. **Authorizing Agency Responses to the Board's 2014 Recommendations**

a. <u>On-site Incinerators – Condition 72</u>

In 2014, the Board requested that EC provide comments on the information contained within AEM's 2013 Incinerator Daily Report Logbook, including whether it agreed to the continuation of biennial incinerator stack testing, given the reported instances of lower than optimal secondary chamber burn temperatures and the number of daily log insertions that were missed within AEM's 2013 Incinerator Daily Report Logbook.

In its response to the Board's recommendation, EC noted that the Canada-wide Standards (CWS) for Dioxins and Furans and the CWS for Mercury Emissions states that "where five years' data has been accumulated with all results reported below the Level of Quantification (emission standard), the stack testing frequency may be revised to a biennial schedule" so long as all subsequent test results remain below the emission standards. No indication or discussion was provided by EC on whether it agrees to the continuation of biennial incinerator stack testing given the reported exceedances that was observed in the 2014 stack testing.

EC further noted that the EC Technical Document for Batch Waste Incineration recommends that temperature in the incinerator secondary chamber remain above 1000ºC to ensure complete combustion. From the Proponent's Daily Report Logbook, for nearly one third of the burn cycles the secondary chamber temperature was reported as less than 1000ºC. EC indicated that the Proponent should be more vigilant to ensure that sufficient temperatures are maintained to minimize the release of contaminants to the environment.

b. <u>Monitoring of country foods – Condition 67</u>

67. "Cumberland shall develop and implement a program to monitor contaminant levels in country foods in consultation with HC…"

In 2012, the Board invited Health Canada (HC) to provide comments on the wildlife screening level risk assessment (WSLRA) and the preliminary quantitative risk assessment reports prepared by AEM in order to meet the requirements of Condition 67, and to indicate whether or not additional information may be required with respect to the monitoring program. HC indicated that it was unable to provide comments on the WSLRA report as it

did not possess the relevant expertise in the areas of modeling emissions and deposition, environmental transport, fate and/or contaminant uptake by plants or wildlife (country foods) and suggested that another department may have the expertise necessary to review the WSLRA.

The Board recommended that AEM and authorizing agencies, including the GN, EC, and HC, confirm whether each has the necessary expertise and/or jurisdiction to comment on AEM's wildlife screening level risk assessment. HC responded to the recommendation maintaining that HC is not in possession of the expertise as previously noted since the WSLRA report provided updated assessment of risk to resident birds and mammals during operation of the mine and HC's review is limited to areas of risks to human health

2.2.2.4. **Conditions Requiring Attention**

The NIRB notes that AEM is not in full compliance with the following Terms and Conditions of the Meadowbank Project Certificate, and that recommendations from the Board have been provided to the Proponent under separate cover.

a. Traditional Knowledge and Consultation – Conditions 39 & 40

AEM noted in its 2014 Annual Report that it held meetings in the community of Chesterfield Inlet in 2014 to discuss different topics within the community including shipping, marine mammals, wildlife and general information (AEM, 2014c) as per the requirement of Condition 39.

Condition 40 requires that AEM report annually to the NIRB and the KIA on TK gathered from local HTO and workshop held in Chesterfield Inlet. In its 2014 Annual Report, AEM noted that there was no change in the information reported to AEM in 2014 from that collected during an TK workshop held in 2010, however the NIRB found no information was provided in AEM's 2012, 2013 or 2014 Annual Reports regarding any additional TK collected from residents of Chesterfield Inlet on marine mammals, cabins, hunting and other local activities in the Inlet (AEM 2013a, AEM 2014a, AEM 2015a). While the NIRB acknowledges that within the June 25, 2014 meeting minutes there was discussion about the potential impacts of shipping to belugas and migration, the concerns raised were related to the proposed Meliadine project at the time and not related to the Meadowbank project. The NIRB notes that TK may change and evolve over time and that as such, it is important that AEM continue to collect and report on TK regarding wildlife and local activities to accurately understand traditional land use and potential impacts of the project on various components of the environment. Considering that the Project is now well into its operations phase and that marine mammals, hunting, and other local activities may have changed throughout the Project life thus far, determining changes to local knowledge and concerns is essential. This was a concern that was brought up by the Board in 2014 (Section 2.2.2.2) and does not appear to have been addressed.

The NIRB further notes that a document was provided by the Baker Lake Hunters and Trappers Organization on September 14, 2015 which summarizes comments raised by community members during at separate meeting noting traditional knowledge evidence of

the Meadowbank Gold Mine Marine shipping impacts on marine mammals in Chesterfield Inlet. The summary provides evidence that local activities have changed, TK have evolved and impacts are observed on marine mammals since the Project has been approved.

b. Provision of Updated Information – Condition 56

During the NIRB's 2015 site visit to the Meadowbank site, the Monitoring Officer observed only one map outlining caribou migration corridors on one bulletin board (near the door to the gymnasium). The NIRB staff did not observe maps posted in higher traffic areas such as the bulletin board outside of the check-in office where maps had been posted in previous years. The map posted at site was dated 2011, with data on 2010 caribou migration paths, however the NIRB notes that two maps showing caribou migration routes provided in AEM's 2014 Annual Report were dated 2015 and that the data presented was collected up to 2012. Furthermore, the Annual Report does not indicate whether or how information collected from consultation with Elders and local HTOs had been incorporated into the development of the maps as the data source on the maps themselves is noted as being based on satellite and GPS [*global positioning system*] survey data (AEM 2015b). This was a concern that was brought up by the Board in 2014 (Section 2.2.2.2) and does not appear to have been addressed.

c. On-site incinerators – Condition 72

In its 2014 Annual Report, AEM indicated that the Daily Report Logbook entries for the incinerator operation were available for every month in 2014 with the exception of June, in which a few days of data were missing.

In the review of the available 2014 Incinerator Daily Report Logbook (AEM 2015c), the NIRB notes that the incinerator temperature in the secondary chamber was below the recommended 1000 ºC temperature on several occasions following the summer of 2014 after AEM's site service department completed maintenance and adjustment on the burner. The values below the recommended 1000ºC temperature were recorded in November and December of 2014. It was previously noted by EC [1] that the incinerator temperatures in the secondary chamber should be above 1000ºC to ensure complete combustion and to minimize the formation and release of contaminants and AEM indicated in its response to the Board's 2014 recommendations that corrective actions would be put in place to ensure the temperature set point in the secondary chamber would always reached the average recommended temperature.

Stack testing of the incinerator was completed in July 2014 and non-conformance was observed during the testing with mercury levels exceeded the Canadian Council of Ministers of the Environment (CCME) guideline for discharge of dioxins and furans. Laboratory testing confirmed the stack testing results. AEM conducted an investigation with Meadowbank's site services department to determine the potential sources of the mercury exceedance. Although AEM has an alkaline battery recycling program, the investigation

[1] Environment Canada letter to Nunavut Impact Review Board, Re: *Comments related to Agnico-Eagle Mine Ltd.'s Meadowbank Gold Project 2010 Annual Report*, November 2, 2011.

conducted by AEM revealed that the source could have been a significant volume of batteries disposed of along with regular solid waste destined for the onsite incinerator. As a result, AEM implemented a comprehensive site wide information program to reinforce the requirements of the battery recycling program. In addition confirmatory stack testing was to take place again in the summer of 2015.

In addition to stack testing, AEM conducts annual ash sampling from the incinerator. The results from the July 2014 testing indicated an exceedance of the chromium guidelines as set out by the GN Environmental Guidelines for Industrial Discharge. Further investigation revealed that that the source of chromium was from unnecessary burning of pop cans. Operators were instructed to not incinerate pop cans and AEM further notified site personnel to utilize pop can recycling containers. AEM indicated that the results from October sampling indicated that the chromium levels were below the GN guidelines.

d. Suppression of surface dust – Condition 74

As noted previously and within the NIRB's 2015 Site Visit Report (see Appendix II) and AEM's 2014 Annual Report, to date, dust suppression techniques have not been applied to manage dust along the AWAR between Baker Lake and Meadowbank, and have been limited to haul roads at the mine site, between the Meadowbank gatehouse and Exploration Camp site, and the airstrip. Dust suppression measures employed by AEM at these areas were noted to include the use of calcium chloride between the Meadowbank gatehouse and Exploration Camp site and water applied to the mine site roads (including Vault road) and the airstrip. With the exception of continuing the dustfall monitoring along the AWAR, AEM has not indicated any further commitment to apply dust suppressant to the AWAR in the future.

AEM has also noted in its response to the Board's 2014 recommendations that it does not believe Condition 74 applies to the AWAR as it is not specified in the specified in the "All Weather Road" section of the Project Certificate

e. Accidents and Malfunctions – Condition 75

Condition 75 requires that the Proponent provide a complete list of possible accidents and malfunctions for various Project components which includes an assessment of the accident risk and mitigation developed in consultation with Elders and potentially affected communities. In its 2014 Annual Report, the NIRB acknowledges that AEM complied with most of this condition, including the provision of a list of possible accidents and malfunctions, although it is still unclear in the submitted management plans whether and how these were developed in consultation with Elders and potentially affected communities. In the 2014 Annual Report, AEM noted that it consulted yearly with Elder representation and yearly meetings are held with the community in large.

The NIRB acknowledges that discussion with community members on accidents and malfunctions that have occurred on a yearly basis is important but this does not meet the requirements of Condition 75 which is to develop risk and mitigation plans in consultation with Elders.

2.2.3. Compliance Monitoring by Authorizing Agencies

On June 2, 2015 the NIRB requested that authorizing agencies with a mandate or jurisdictional responsibility for the Meadowbank project review AEM's 2014 Annual Report and provide comments and information with respect to compliance monitoring for the 2014 – 2015 reporting period as required in Part D of Appendix D of the Meadowbank Project Certificate (NIRB 2011). Specifically, comments were requested regarding the following:

a) How the authorizing agency has incorporated the terms and conditions from the Project Certificate into their permits, certificates, licences or other government approvals, where applicable;
b) A summary of any inspections conducted during the 2014 reporting period, and the results of these inspections; and
c) A summary of AEM's compliance status with regard to authorizations that have been issued for the Project.

The following is a *summary* of the comments received from parties regarding compliance monitoring.

2.2.3.1. **Government of Nunavut (GN)**

The GN also commented on socio-economic monitoring and Condition 64 of the Project Certificate and noted the Proponent's ongoing active participation in the Kivalliq SEMC. The GN noted that it is the GN's understanding that AEM has engaged a third party consulting group to develop and finalize the first annual report and the final draft version will be presented to the regional Kivalliq SEMC later in the year. The GN also noted that Meadowbank SEMC is in the process of developing a socio-economic monitoring program and report as per Project Certificate Condition 64. The GN was of the understanding that the report will include FEIS predictions, monitoring information, analysis of results, and mitigation efforts, and that all of the information will be presented in a format agreed upon by the Meadowbank SEMC.

2.2.3.2. **Aboriginal Affairs and Northern Development Canada (AANDC)**

AANDC noted that it has been able to incorporate the Project Certificate terms and conditions by inserting a requirement for AEM to abide by and comply with the NIRB Project Certificate in AANDC's issued land lease for the portions of the AWAR located on Crown Land. Given the general requirement, AANDC has also included more specific requirements which capture Project Certificate Terms and Conditions: #5, #26, #33 (partially), #35, #78 (partially), and #79.

AANDC also commented on socio-economic monitoring association with term and condition #63, and acknowledged that AANDC has worked with AEM and the GN on the Kivalliq SEMC. AANDC further noted that it has met with AEM, the GN and the KIA to share data and information to work towards a comprehensive socio-economic monitoring report for the Meadowbank project. Furthermore, the Meadowbank SEMC has continued to work on developing a socio-economic monitoring framework for the Meadowbank mine satisfy term and condition #64. AANDC noted that a draft monitoring program was created in 2014 and later approved by the Working Group for further development. AANDC further noted that while

various forms of this data have been present in both AEM and SEMC annual reporting, it is anticipated that the information will be combined into one comprehensive socio-economic monitoring report for 2015.

AANDC noted that it did not perform any inspection visits at the Meadowbank site in 2014; which was due to the activities being carried out associated with the Inspector's Direction issued in 2013. AEM carried out works to ensure they were complying with the measures identified within the 2013 Inspector's Direction regarding seepage from the tailing storage facility sump into NP-2 Lake. Based on the works completed by AEM to comply with the measures, AANDC revoked the Inspector's Direction on March 12, 2015.

2.2.3.3. **Environment Canada**

EC reported that no onsite inspections of the Project were completed in 2014. No non-compliance was identified by EC during the inspections that required any enforcement actions.

2.2.3.4. **Fisheries and Oceans Canada (DFO)**

DFO noted that it no compliance monitoring or site inspection for the Meadowbank mine site was completed for the 2014 year. DFO further noted that habitat compensation monitoring activities for the Meadowbank mine site are to be performed every year with the next round to be performed in 2015 by AEM. DFO will review the habitat compensation monitoring activities in accordance with the Habitat Compensation Monitoring Plan, in compliance with the *Fisheries Act* authorizations that will be forthcoming in AEM's 2015 Annual Report.

2.2.3.5. **Transport Canada (TC)**

In its submission, TC noted that it carried out an inspection of the Oil Handling Facility at Baker Lake in 2014 and issued a non-compliance letter related to the Oil Pollution Emergency Plan. Following receipt of confirmation from AEM of completed items addressed in the updated Oil Pollution Emergency Plan, TC issued a letter of compliance in February 2015.

TC noted that it conducted an Arctic Fuel Contractor Inspection at the Baker Lake facility in August 2014 and identified non-compliance related to Transportation of Dangerous Goods. All non-compliance items have since been resolved and TC has no outstanding concerns related to Transportation of Dangerous Goods.

2.2.4. Compliance with Instruments

2.2.4.1. **Compliance with licenses and authorizations as described in the 2014 Annual Report**

Within its 2014 Annual Report, AEM noted that effluent samples taken from the Portage Attenuation Pond (ST-9) had elevated levels of aluminum for all four samples collected in June and the one sample collected in July. The July sample also tested toxic for Daphnia. The source of the elevated level of aluminum appeared to be from the coagulant used in the water treatment plant (WTP) and from the WTP decommissioning. AEM noted that staff were made aware of the exceedances; improvements in commissioning and decommissioning will be made

in the future should the WTP be used in the future. Although AEM noted that there will be no further discharge from this location in the future as the former attenuation pond is now the South Cell tailings storage facility, there was no discussion provided as to why the effluent tested toxic for Daphnia and how AEM will prevent future exceedances of these parameters in the future.

AEM noted that the water collected in the Vault Attenuation Pond was discharged through the diffuser to Wally Lake as effluent from July 24 to August 14, 2014. The water was not treated at the onsite WTP for total suspended solids (TSS) removal as the water quality was in compliance with Water License Part F, Item 3 and the metal mining effluent regulations; however AEM further noted that TSS concentration exceeded both the metal mining effluent regulations and NWB water licence requirements on August 6 and Daphnia toxicity on August 12. AEM conducted onsite testing of TSS samples taken periodically from the effluent and noted that the results from the August 6 sampling was not representative of the water quality during discharge and was potentially an anomaly caused either by cross contamination or sampling error. AEM noted that the result from the August 6 sampling was received on August 27, two weeks after discharged was stopped. AEM noted that the TSS exceedance is considered an outlier and with the short duration of the discharge, AEM is confident the aquatic environment was protected. Core receiving environment monitoring in Wally Lake revealed that Wally Lake has not been impacted by mining activity.

2.3. EFFECTS MONITORING

Effects monitoring can be described as an assessment of the measurable change to a particular environmental or socio-economic component, as compared to the potential effects that were predicted to result from a proposed development. In the case of Meadowbank, impact predictions and mitigation measures were outlined and developed throughout the environmental review of the Project, and were recorded and presented through the Proponent's Final FEIS and other related documents.

On June 2, 2015 the NIRB also requested that authorizing agencies with a mandate or jurisdictional responsibility for the Meadowbank project review AEM's 2014 Annual Report and provide comments and information with respect to effects monitoring as required in Part D of Appendix D of the Meadowbank Project Certificate (NIRB 2011). Specifically, comments were requested regarding the following:

a) Whether the conclusions reached by AEM in its 2014 Annual Report are valid;
b) Any areas of significance requiring further studies; and,
c) Changes to the monitoring program which may be required.

The following section provides the NIRB's review of the 2014 Annual Report and a *summary* of the comments received from parties.

2.3.1. NIRB's Review of AEM's 2014 Annual Report

Appendix D of the Project Certificate provides an outline of the requirements for the Proponent's annual report for the Meadowbank Project. Particularly, the annual report should

include a summary of the results from the PEAMP, including an analysis of the Project's impact upon the environment with reference to the predictions and environmental and socio-economic indicators referenced throughout the FEIS and the Final Hearing. As part of its PEAMP, AEM provided a summary on how the current environmental and socio-economic effects of the Meadowbank mine site compare to the impacts as predicted in the FEIS for the following:

- Aquatic Environment
- Terrestrial and Wildlife Environment
- Noise
- Air Quality
- Permafrost
- Socio-economic

The NIRB reviewed these items as presented in AEM's 2014 Annual Report summarized as follows:

2.3.1.1. **Aquatic Environment**

AEM reported in the PEAMP section of the 2014 Annual Report that observed impacts to water quantity, water quality, fish and fish habitat measured in 2014 appear to have been within FEIS predictions.

In review of the 2014 Annual Report, the NIRB notes that Table 8.42 in Section 8.7 recorded stressor variables for sediment toxicants, water borne toxicants and other physical stressors. It is not clear from the review of the table by the NIRB what areas of the mine site were impacted based on these stressors. The discussion provided by AEM within the Annual Report noted that elevated levels of chromium (increased by 50%) were observed in sediment core sampled during the Core Receiving Environment Monitoring Program (CREMP) in 2014. AEM further noted that there were some apparent mine-related changes in conventional parameters relative to baseline/reference conditions at one or more of the near-field areas. AEM indicated that follow-up studies were recommended and will be conducted in 2015. The PEAMP section of the 2014 Annual Report did not provide any discussions on the CREMP or AEMP programs and any discussion on the changes observed/detected at the aquatic stations even though AEM noted increased levels of parameters within sediment samples and aquatic samples in 2014. AEM did not provide a discussion on the apparent mine-related changes observed at the near-field stations, the changes observed over time at these stations since operations commenced, what the cause may be for the changes observed at these stations, and whether AEM is considering finding other near-field stations that could be used for baseline/reference conditions. A year over year comparison would have been useful to help identify trends in the data collected for the aquatic environment, specifically for the water quality and sediment quality data.

2.3.1.2. **Noise Quality Monitoring**

In its 2014 Annual Report, AEM indicated that it had successfully conducted noise monitoring at all of the five previously determined monitoring locations (AEM 2014a). AEM reported that no equivalent sound levels (Leq) exceeded day-time sound values while two values exceeded

the nighttime target sound levels at station R1 and R5 (AEM 2015a). AEM noted that these values were well within the range of those observed in previous years and were likely the result of increased helicopter activity associated with exploration projects during the monitoring time period as these two stations were closest to the helicopter route. AEM further noted that the measured sound levels exceeded predicted sound levels only at station R5 and that this was likely because the FEIS predictions for noise did not include the exploration camp and the AWAR located adjacent to station R5 as noise sources in modeling. Therefore predicted noise levels for this location were not realistic based on actual site activities.

In review of the noise monitoring data and the sound levels (AEM 2015d), it is unclear to the NIRB why the 2014 reported sound levels at station R5 were elevated compared to the sound levels in 2013 especially since the exploration camp and the AWAR have been in operation during both these years. Furthermore, from the NIRB's review of the 2012 Noise Monitoring Report (AEM 2013b), it appeared that noise levels were higher in 2012 at both the R1 and R5 stations for calculated daytime and night-time values as compared to previous monitoring years. There appears to be a trend developing at these two stations that was not discussed by AEM.

2.3.1.3. **Air Quality Monitoring**

Dustfall Monitoring along the AWAR

In 2014, AEM noted that it completed a successful dustfall study with 41 canisters deployed analyzed. The study was aimed to characterize dust deposition rates with respect to distance from the AWAR in order to determine the potential for degradation of vegetation (habitat) in excess of impacts predicted in the FEIS. AEM noted that while predicted dustfall rates were not specified, the FEIS indicated that the majority of dustfall was anticipated to occur within 100 m of the road.

While all data has been incorporated into the 2014 annual report summary, AEM noted that the study in 2012 was preliminary with only 10 sample locations, and in 2013 only seven samples were able to be analyzed due to disruption of sample canisters in the field. Results from the 2014 study indicated that there was approximately a two time reduction in dustfall from 50 m to 100 m on the downwind (most impacted) side of the road, from an average of 0.94 milligram/centrimetre^2/30 days (mg/cm^2/30d) to 0.46 mg/cm^2/30d, indicating that the majority of dustfall settled within the predicted 100 m zone. At distances greater than 100 m from the AWAR, most of the samples were less than the Alberta Environment's recreational area guideline for dustfall (0.53 mg/cm^2/30d). Overall, the results of the dustfall study in 2014 corroborated the findings in 2012 and 2013 with dustfall decreasing by approximately two times when moving from 50 m to100 m from the road.

AEM further noted that quantitative relationships between road dust and habitat degradation are not well defined in the North, and no guidelines are currently available for dustfall based on ecological considerations. Therefore, AEM indicated that direct measurements of dustfall have been used in these studies as a conservative screening tool to assess the potential for effects on habitat. The results to date suggest that most of the dustfall occur within the predicted 100 m zone, and generally reaches the range of background levels within approximately 150 m on the downwind side of the AWAR. However, AEM noted that only two true background reference

samples were collected in 2014, and that further collection is proposed for 2015 to confirm these results. AEM further noted that it is unlikely that impacts to the VECs (vegetation community productivity and wildlife) due to dust are occurring beyond the smallest assumed zone of influence (100 m) and the results are supported by wildlife monitoring conducted under the terrestrial ecosystem management plan. Despite the evidence that wildlife is not being impacted beyond established thresholds, and that dust suppression measures around the mine site and in high traffic areas have proven effective, AEM plans to continue dustfall monitoring along the AWAR in 2015 and will conduct bird studies along the AWAR to confirm these results.

On-site air and dust monitoring

AEM reported that there appeared to be no apparent trends towards increasing air quality concerns at the Meadowbank site but noted that 12 out of 232 suspended particulate samples collected exceeded impact predictions in 2014. No discussion was provided in comparison to historical data making it difficult to determine if a trend is or is not being observed in the air quality monitored around the Meadowbank site.

Incinerator

Further discussion on the NIRB's review of the incinerator results from the 2014 period is provided in Section 2.2.2.4.

2.3.1.4. **Wildlife Monitoring**

Hunter Harvest Study

AEM noted that the Hunter Harvest Study participants rates remained relatively constant in 2014 (46 participants compared to 49 participants in 2013 and 62 in 2012) and the number of participants recording caribou harvest have decreased dramatically from n=44 in 2013 to n=27 in 2014. AEM suggested that the lower total reported harvest numbers of caribou within five (5) km of the AWAR could be a result of participant fatigue and a decrease in participant response rate rather than a decrease in wildlife abundance. AEM further noted that due to the number of caribou harvested along the AWAR in 2014, it suggests that overall distribution of harvest has stabilized. AEM did not provide a discussion to how they came to this conclusion as the data collected by AEM from the participants generally underestimate true harvest levels and different methods of surveys should be conducted especially as AEM points out that there may be participant fatigue with the Hunter Harvest Study. Further no evidence was provided within the 2014 Annual Report on any additional information regarding AEM's efforts and relevant results of further studies conducted to better understand the Projects related effects on caribou.

Creel Survey

In addition, AEM's results of creel surveys as presented within its 2014 Annual Report indicated that the study participants decreased compared to the 2013 year; however, the overall fishing effort per participant increased. The assumption by AEM is that the participants recording creel harvests in 2014 were those who are more likely to fish frequently and

successfully (AEM 2015a). This is opposite of what AEM suggested occurred for the 2013 creel survey noting the fishing effort was decreasing due to study participants being less willing to travel long distances to catch fish, regardless of the AWAR access (AEM 2014a). It is further noted that no evidence was provided within the 2014 Annual Report on any additional information regarding AEM's efforts and relevant results of further studies conducted to better understand the Projects related effects on the creel populations within the local study area.

2.3.1.5. **General**

Water Management and Monitoring of the Culverts at the Vault Road

In review of the 2014 Geotechnical Inspection Report (AEM 2015e), it was noted that the consultant recommended that AEM monitor the performance of the three culverts installed on Vault Road at freshet as these culverts were partially collapsed in the middle and showed signs of erosion. No action except ongoing monitoring was recommended by the consultant as it appeared that the condition of the culverts were stable and seemed to perform well during freshet. Furthermore, the 2014 Water Management Report and Plan (AEM 2015f) only discussed the monitoring for the freshet season (May period) and mitigation measures at these culverts but did not discuss the potential monitoring issues associated with the culverts being collapsed, the potential that fish passage might be compromised, or the potential need to repair or replace the culverts.

2.3.2. Effects Monitoring by Authorizing Agencies

2.3.2.1. **Government of Nunavut (GN)**

Within its submission, the GN commented on the lack of monitoring data available for the wildlife monitoring program within the 2014 Annual Report. The GN noted that all monitoring data including ground surveys should be include in the annual reports in order for the GN to properly check the annual wildlife monitoring report for quality assurance/control to ensure mitigation measures are being applied appropriately.

The GN also noted that the AWAR ground surveys were not adequate. Having one observer limits the observation to one site of the road only and surveying the AWAR by driving along the road does not record the wildlife disturbed before being within view of the observer. The GN recommended that the survey methodology be updated to include two observers and that another monitoring method in addition to the road surveys be implemented to be able to detect wildlife that may be disturbed by the AWAR before they are within sight of the road observer.

The GN commented on AEM's 2014 Hunter Harvest Study and noted that it did not agree with the AEM's conclusions regarding harvesting along the AWAR. The GN noted that the data provided in the annual report did not adequately support the conclusion that harvest rates have stabilized along the road especially since hunter harvest surveys generally underestimate true harvest levels. Additionally, when harvest rates are lower one would need to have even more participation by hunters to accurately estimate harvest levels. The GN recommended that until harvest levels have dropped to the appropriate threshold levels, adaptive management strategies continue to be implemented.

The GN further indicated that it did not agree with AEM's conclusions that caribou were not displaying unnatural patterns beyond 1000 m of the AWAR. The GN noted that it is difficult to discern whether or not caribou were influenced by the road however, it appeared that the caribou that entered the local study area continued to parallel the road for several days while the caribou whose course did not interact with or just barely interacted with the local study area continued on their trajectory. This is suggestive of an effect and the GN indicated that it would like further investigation into the collar data for caribou interacting with the AWAR. The GN also noted that annual report did not provide evidence on the length of time between mapped collar locations which may potentially lead to caribou interactions with the road going unrecorded. The GN recommended further investigation into the collar data for caribou interacting with the AWAR. The GN also recommended additional monitoring to complement the road surveys to investigate the effect the road could be having on caribou as the collar data appears to suggest.

2.3.2.2. **Aboriginal Affairs and Northern Development Canada (AANDC)**

Within its comment submission, AANDC noted that the Geotechnical Reports from 2013 and 2014 recommended that AEM monitor the performance of the three culverts installed on Vault Road at freshet as these culverts were partially collapsed in the middle. The *Meadowbank Gold Mine 2014 Water Management Report and Plan* discusses monitoring and mitigation measures but does not discuss the potential monitoring issues associated with the culverts being collapsed, or the potential need for fixing or replacing the culverts.

AANDC noted that it was unclear whether AEM is analysing trends in spill occurrences. AANDC recommended that if trend analysis was not currently being performed, monitoring programs should be updated to include this activity.

AANDC further noted that there was no discussion within the *2014 Annual Report* or the *Water Management Monitoring Report and Plan* on water monitoring within the quarries. *The 2014 Geotechnical Report* stated that quarries 4 and 14 remained flooded since 2013, and that additional ponding is now occurring in quarries 5, 13, 15 and 23. AANDC recommended that information on monitoring in these areas along with any potential need for mitigation measures such as ditches to facilitate water drainage should be provided.

AANDC indicated that the comparison of predicted pit water quantity and quality was only compared to the 2014 measured values and suggested that a year over year comparison would have been useful to help identify trends in the pit water quantity and quality data.

AANDC further indicated that some of the information presented for the socio-economic sections are out of date and do not provide a full analysis of socio-economic impacts and mitigations in relation to the impacts that were predicted at the time of the FEIS.

2.3.2.3. **Environment Canada (EC)**

EC noted concern that the groundwater well MW-08-02 (*noted as MW-02-02 in EC's submission*) was purged until dry which is not the preferred method of sampling as a dry well screen can result in oxidation of metals, causing them to drop out of solution. The preferred sampling method is to undergo low flow purging and sampling to gain a more representative

sample without drying out the well screen. The 2014 Groundwater Monitoring Report indicated that low flow sampling was not possible at this location due to a malfunction of a heat tracer (AEM 2015g). EC recommended that future sampling should strive to achieve low flow purging and sampling, and to not dry out the well screen.

EC further noted that the 2014 Ammonia Management Plan (AEM 2015h) as presented by AEM listed the same potential ammonia treatment technologies as were previously listed in the 2012 Ammonia Management Plan. EC indicated that it had previously identified concerns with the treatment technologies and previously recommended that further ammonia treatment options be explored. In response to this previous recommendation, AEM stated that assessment for alternative ammonia treatment would be provided in the final closure plan (i.e. one year prior to closure). EC recommended that, if the same ammonia treatment options are retained in future iterations of the Ammonia Management Plan, that potential concerns are flagged for future consideration with respect to:

- in-situ volatilization of ammonia during the summer months (i.e. potential air quality issues); and
- ammonia removal by snow making (i.e., Northern challenges).

2.3.2.4. **Fisheries and Oceans Canada (DFO)**

In its submission, DFO noted that 8 out of 243 blasts in 2014 exceeded the DFO guideline limit of 13 millimetre/second (mm/s) particle velocity with a maximum value of 23.8 mm/s observed. However, DFO agreed with AEM's conclusion that these periodic exceedances that occurred between February and June are unlikely to impact salmonid incubation sites at the mine site.

With respect to any areas of significance requiring further studies, DFO recommended that AE conduct further studies to verify their prediction of low peak particle velocities experienced by fish eggs and embryos at spawning and incubation sites. DFO also further recommended that AEM add additional blast monitoring stations closer to spawning habitat and continue to implement the blast mitigation plan to minimize blasting effects on fish eggs and embryos.

2.3.3. Areas Requiring Further Study or Changes to the Monitoring Program

2.3.3.1. **Appendix D and the Annual Report**

The NIRB notes that AEM's 2014 Annual Report provided a detailed analysis of results from its 2014 monitoring program and that it compared observed impacts noted in 2014 to predictions made within the FEIS. AEM's evaluation focused on the VECs that had been identified in the FEIS, including the aquatic environment, the terrestrial and wildlife environment, noise quality, air quality, permafrost and socio-economics. The NIRB acknowledges that AEM has worked to improve upon its reporting of findings within its PEAMP and notes the general clarity of the presentation of information in its tables of potential impacts, potential cause(s), proposed monitoring, monitoring conducted for the year, predicted values and measured values/observed impacts. However, the NIRB found that the discussion and analysis within the PEAMP could be expanded upon especially to trends that may be observed. The overall lack of reference to baseline data or to data from previous years makes it

difficult to quantify or measure the relevant effects of the project. While comparison between monitoring as proposed in the FEIS and monitoring undertaken in 2014 was helpful, rationale for why these were different was not always clearly presented. The NIRB also found that some of the sections within the PEAMP provided more clarity than others; a consistent approach across VECs would be helpful in future annual reporting.

2.4. OTHER ACTIONABLE ITEMS

2.4.1. Summary of AEM's response to comments received by Parties

The NIRB will provide AEM with an opportunity to respond to comments received by parties on AEM's 2014 Annual Report following the Board's October board meeting.

2.5. SITE VISIT

Based on the observations made during the 2015 site visit, all Meadowbank facilities which are in operation and all sites currently under construction continue to appear to be well managed, and generally are maintained with adequate environmental protection measures and procedures in place. Details provided by AEM during the site visit provided the Monitoring Officer with additional information regarding the company's continued efforts to address ongoing water and waste management issues observed at the site.

As with years past, AEM appears to be in compliance with a majority of the terms and conditions contained within the Meadowbank Project Certificate [No. 004]; however, there may be certain situations in which the Proponent has not yet fully met the requirements of the Project Certificate and which require further consideration and attention.

The Monitoring Officer noted that the landfarm and hydrocarbon remediation program undertaken in 2012 appeared to have been successful and now this technique is used to treat all of AEM's hydrocarbon contaminated soils at the Meadowbank site.

Regarding Condition 8, only two groundwater wells appeared to be operational during the 2015 site visit. AEM was unable to use production wells instead of groundwater wells to assess existing groundwater conditions, which was previously proposed as an alternative method to sample existing groundwater conditions.

The Monitoring Officer observed the instances of seepage containing potentially hazardous compounds occurring at the Portage waste rock storage facility and at the Assay laboratory, and also noted that AEM had implemented mitigation measures to contain and treat the water seepage.

Condition 25 requires that the Proponent employ legal deterrents to deter carnivores and/or raptors from the Meadowbank site. AEM stated that wildlife (including muskox, caribou and birds) had been observed around the site, and that wildlife tracks were evident in the tailings storage facility. Further, the Monitoring Officer noted that the owl decoys on the bulk fuel tanks at the Baker Lake fuel storage facility being used as a means to deter birds from nesting were falling apart and have not been replaced.

Condition 26 requires that spills be cleaned up immediately and that the site be kept clean of debris. There was no evidence of wind-blown material observed around the Meadowbank site and at the ancillary facilities in Baker Lake during the 2015 site visit.

Condition 27 requires that the Proponent use safe, environmentally protective methods at areas used to store fuel or hazardous materials. The Monitoring Officer observed that the fuel storage facilities appeared to be well maintained and properly set up for the re-fuelling of vehicles.

Condition 59 requires that the Proponent consult with Elders and the Hunters and Trappers Organization (HTOs) to design and implement deterrence measures to impede caribou from access to the tailings ponds. While the wildlife tracks noted by the Monitoring Officer at the tailings storage facility were not those of caribou, the tracks did provide evidence that wildlife are accessing the tailings storage facility.

The Proponent has not fully met the requirements of Condition 74, as dust suppression techniques were being applied at the Meadowbank site, but were not being applied along the AWAR from Baker Lake to site.

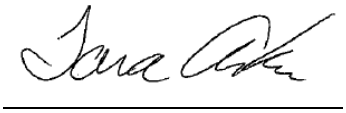
The complete site visit report can be found in Appendix II.

3.0 SUMMARY

The Meadowbank Gold mine began commercial production in March 2010 and is now in its fifth year of operations. The Proponent appears to be in compliance with the majority of the terms and conditions contained within the Meadowbank Project Certificate, and is generally meeting the objectives of monitoring and mitigation plans and procedures put in place for the Project. However, certain outstanding issues will require the Proponent's attention as discussed throughout this report. These items are addressed in the Board's recommendations provided to the Proponent under separate cover.

Pursuant to NLCA Sections 12.7.2 and 12.7.3, the NIRB will continue to work with AEM and other agencies in order to provide the required evaluation of monitoring efforts, results and compliance as outlined within the Board's project-specific monitoring program and in accordance with the requirements set out in the Meadowbank Project Certificate.

Reviewed by: Tara Arko
Title: Director, Technical Services
Date: October 4, 2015

Signature: 

Prepared by: Sophia Granchinho
Title: Senior Technical Advisor/Monitoring Officer
Date: October 14, 2015

Signature: 

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Appendix I:
Public Information Meeting Summary Report September 9 and September 11, 2015 for the NIRB's Monitoring of Agnico Eagle Mines Ltd.'s Meadowbank Gold Mine Project

Appendix II:
The NIRB's 2015 Meadowbank Site Visit Report