MEADOWBANK GOLD PROJECT

2013 Annual Report

Prepared for:
Nunavut Water Board
Nunavut Impact Review Board
Fisheries and Oceans Canada
Aboriginal Affairs and Northern Development Canada
Kivalliq Inuit Association

Prepared by:
Agnico Eagle Mines Limited – Meadowbank Division

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

DOCUMENT CONTROL

Version	Date (YMD)	Section	Page	Comment
1	2014/03/31	All	All	This has been reviewed by Environmental Staff and will be incorporated into training for all mine staff on behalf of the Mine Manager and Senior Management

Prepared By: Meadowbank Environment Department

Approved By: 

Kevin Buck
Environmental Superintendent

The information in this document has been presented to mine managers and is endorsed and approved by senior management at AEM*.

* AEM is a recent signatory of the Mining Association of Canada- Toward Sustainable Mining. This document presents information related to assessment tools related to: Biodiversity Conservation Management and Tailings Management. Look for the * marked footnotes for TSM related information.

SECTION 1. INTRODUCTION

The Meadowbank Gold Project operated by Agnico Eagle Mines Limited - Meadowbank Division (AEM) is located approximately 70 km north of the Hamlet of Baker Lake, Nunavut. The project components include marshalling facilities in Baker Lake, the 110 km All Weather Private Access Road (AWPAR) between Baker Lake and Meadowbank, the Vault mine site and the Meadowbank mine site.

These various components and activities associated with the project require a number of different authorizations, leases and permits from regulatory agencies including the Nunavut Water Board (NWB), the Environment Canada (EC) Metal Mining Effluent Regulations (MMER); the Department of Fisheries and Oceans Canada (DFO), Aboriginal Affairs and Northern Development Canada (AANDC) (formerly Indian and Northern Affairs Canada (INAC)); the Kivalliq Inuit Association (KIA) and the Nunavut Impact Review Board (NIRB).

This report is written to address all of the 2013 annual reporting requirements of the project under these authorizations:

NWB Type A Water License 2AM-MEA0815;
NIRB Project Certificate No. 4;
DFO HADD Authorization NU-03-190 AWPAR;
DFO HADD Authorization NU-03-191 Mine Site;
INAC Land Leases 66A/8-71-2 (AWPAR) and 66A/8-72-2 (AWPAR Quarries); and
KIA Right of Way KVRW06F04.

Reporting requirements for the MMER have been submitted directly to Environment Canada; results are presented herein to comply with the NWB Type A water license.

Table 1.1 outlines each requirement by authorization and report section. Table 1.2 presents the status of each of the sampling stations stipulated in Part I, Schedule 1 of Water License 2AM-MEA0815.

SECTION 2. SUMMARY OF ACTIVITIES

2.1 2013 ACTIVITES

2013 saw the biggest annual decline in gold market prices since 1981 which has resulted in financial challenges facing the gold mining industry. Due to significantly lower metal prices (gold was down 18% over 2012) the earnings of Agnico Eagle Mines were negatively impacted and the company recorded a net loss of $406.5 million for 2013.

The mining industry has had to respond to the new gold market environment and like many others in the industry AEM has instituted a new global strategy to minimize risk and bring costs in line with reduced revenues. The strategy includes reducing exploration activities, postponing capital expenditures, maintaining companywide production growth from existing operations and optimizing costs of operations. The strategy will provide financial flexibility to withstand gold market changes while also providing for development growth.

The team at Meadowbank has embraced the strategy and the mine delivered record performance during 2013. The 2013 highlights include:

- During 2013 the Meadowbank mill processed an average of 11,350 tpd, compared to 10,440 tpd 2012. The continued improvement in mill throughput in 2013 compared to 2012 is due to significant improvements in equipment availability and maintenance.

- Gold production saw a record of 430,613 ounces during 2013 at total cash costs per ounce of $774. In 2012, the mine produced 366,030 ounces at total cash costs per ounce of $913. The increased production and decline in total cash costs is primarily due to better tonnage and grade than predicted, consistently high crusher throughput levels, slightly better recoveries and strong cost containment programs. All in sustaining costs were around $1,000.00 per ounce at Meadowbank for 2013.

- Meadowbank awarded over $171 million in contracts to Nunavut based contractors in 2013 and the company continues to encourage competitive growth and development of Inuit owned businesses.

- Meadowbank continued to support programs and initiatives that support communities and the families of our employees to cope with the socio-economic impacts of development.

- With valued support to the Kivalliq Mine Training Society from the Government of Nunavut and Government of Canada during 2013, Meadowbank made great strides in the design and implementation of a unique Inuit labor force development strategy.

Meadowbank's success and operating performance has been a key contributor to the overall operating success of the Company in 2013. Meadowbank’s continued success, particularly in light of the gold market environment, is a testament that mining in Nunavut can be successful.

In 2013, mining activities continued in both Portage and Bay Goose pit. In the first quarter, the construction of Vault Dike was completed. From June to October, the dewatering of Vault Lake occurred to permit mining operation in the beginning of 2014. On-site water management involved discharging effluent from the Portage attenuation pond (monitored at ST-9) to the receiving environment through the diffuser in Third Portage Lake and Vault Lake dewatering water discharged in Wally Lake. The airstrip extension was also completed in 2013 to allow a Boeing 737 to land at Meadowbank. In the fourth quarter, the Stormwater Dike was completed with a final elevation of 150m. Stage 2 of the Central Dike was completed during the months of April and May 2013. The construction consisted of the enlargement of the final footprint from 140m to 150m final elevation. The main rockfill embankment has been raised to elevation 120m after the re-enlargement. Containment of the North Cell TSF is now complete.

Freshwater consumption exceeded the permitted amount of 700,000 m^3 in 2013. AEM's intention is to operate in compliance. Despite completion of several successful projects at the mill to increase reclaim water was determined that, due to a reclaim barge problem at the end of February, capacity of the reclaim pumping system, increased production and the recommendations in the 2012 Water Management Plan (SNC), that an increase in freshwater was required. As a result of the increased fresh water use in 2013, AEM applied to amend the Type A Water License in April, 2013 to reflect the increase of freshwater to 1,587,409 m^3 in 2013. Specifically, AEM applied for an increase to 1,870,000m^3/yr (1,587,409 m^3 actual) for 2013 (due to the problems at the reclaim barge) and 1,120,000m^3/yr for 2014 – 2018. These totals do not include the water required to re flood the pits from 2PL and 3PL and this volume will be discussed through the water license renewal process (application for renewal scheduled for June, 2014). You can found more information regarding the Amendment of freshwater consumption in Section 8.1.14.

Quarterly progress reports, prepared for the Kivalliq Inuit Association as required by Production Lease KVPL08D280, are attached in Appendix A1. These reports provide further details of activities throughout the 2013 year.

AEM infrastructure can also be found in Figure 1, 2, 3 and 4.

2.2 2014 MINE PLAN

The Meadowbank gold mine began the mining phase of the project in February 2010, and thus, is entering its fifth year of operations. In addition to routine activities throughout the 2014 season, a number of secondary construction/modification projects will be undertaken near the main mine site area and Vault area, and dewatering activities will be completed in the Vault area. Construction of the Central Dike will resume in 2014.

As in the past, environmental monitoring (wildlife, aquatic effects, groundwater, noise and air) will continue through 2014 in support of all operational undertakings at the Meadowbank site as required by the NWB Type A Water License 2AM-MEA0815, NIRB Project Certificate No.004, DFO authorizations, and MMER regulations.

The "*2014 Mine Plan*" for the Meadowbank Gold Project, prepared for the Kivalliq Inuit Association as required by Production Lease KVPL08D280, is attached in Appendix A2. This report was submitted to the KIA in January 2014, and outlines the activities planned for the project throughout the 2014 year. Following discussion between AEM and KIA, a revised version of the 2014 Mine Plan was submitted to

include the waste rock seepage and the mill seepage. Version 2 of the 2014 Mine Plan was sent to KIA on February 5, 2014.

In 2014, AEM's mining plan is to operate Portage, Goose and Vault pits at the Meadowbank mine site. A total of 33.5 Mt of rock will be hauled from these three pits during the year. The mine plan consists of moving 28.9 Mt of waste rock and 4.2 Mt of ore from the open pits and 0.4 Mt of ore from the stockpiles.

11.2 Mt of material will be mined out from Portage pit and by the second half of the year the mining activities in Portage will be focused in its final phase. Goose pit will completed by the end of the year with a total production of 4.6 Mt of material and Vault pit will start commercial production in January 2014 ramping-up to a total of 17.3 Mt. According to the plan, no low grade material (<1.05 g/t) will be hauled to the mill in this year.

The Waste Management Plan for 2014 is to maximize waste storage facility (WSF) utilization and minimize haulage cycle times which will, in turn, minimize the greenhouse gas emissions and impact on the environment.

SECTION 3. CONSTRUCTION / EARTHWORKS

The following section discusses reporting requirements related to site construction and earthworks activities associated with dikes, dams and quarries.

3.1 DIKES AND DAMS

3.1.1 Performance Evaluation

As required by water license 2AM-MEA0815, Schedule B, Item 1:

a. An overview of methods and frequency used to monitor deformations, seepage and geothermal responses;

The surveillance program consists of several types of inspection:

- Daily inspection – carried out daily by a designated qualified engineer or technician;
- Detailed inspection - carried out, generally, monthly or bi-monthly by a designated qualified engineer or technician; and
- Engineering annual inspection – carried out annually by a qualified engineer (consultant), during open water, if possible, to verify that the facilities are functioning as intended.

Table 3.1 describes the routine geotechnical monitoring program.

b. A comparison of measured versus predicted performance;

For the dewatering dikes, i.e. East Dike, Bay Goose Dike, South Camp Dike and Vault Dike; from the analyses of the available geotechnical instrumentation data and as observed by visual inspection, it appears that the structures are performing as expected. No major concerns were identified in 2013. Regular monitoring will continue in 2014 to assess the performance of the structures.

For the Tailing Facilities structures in operation; i.e. Saddle Dam 1, Saddle Dam 2 and Stormwater Dike; from the analyses of the geotechnical instrumentation data available and as observed by visual inspection; the structures are performing as expected. No major concerns were identified in 2013. Regular monitoring will continue in 2014 to assess the performance of the structures.

Further comparison of the measured performance to the predicted performance will continue in 2014, as additional data will be available for analysis.

c. A discussion of any unanticipated observations including changes in risk and mitigation measures implemented to reduce risk;

East Dike

The installation of a seepage collection system downstream of East Dike to capture and pump the seepage water started in September 2011 and was completed in 2012. After the system installation, 3

zones of seepage were identified near the downstream toe. The zones at about Sta. 60+247 and Sta. 60+498 each had a collection sump with pump connected to a year round pumping and piping system.

In 2011, the downstream seepage at Sta. 60+498 was stable at a rate of about 864 m^3/day (10L/s) with no visual signs of turbidity. This was consistent with rates recorded during previous years. In 2011, the seepage downstream at Sta.60+247 appeared stable at around 345.6 m^3/day (4L/s) with no visual signs of turbidity noted, which was consistent with previous rates. Since the installation of the seepage collection system, all seepage is being captured within the sumps and no sign of additional seepage on the ground surface or downstream in the Portage Pit was observed. Flow meters were installed in 2013 at the discharge of each pump. The flow is approximately 1000 m^3/day.

In 2013, AEM applied for a modification to the Type A water license Part F, Item 4 to discharge East dike seepage water as non-contact water effluent. AEM proposed to discharge seepage water from East Dike collection system through a separate sump collection system and diffuser, back to Second Portage Lake prior to contact with mining activity (thus minimizing site contact water). In April 2013, NWB approved AEM's application to modify the Type A water license. This seepage is considered to be non-contact water seeping from Second Portage Lake. The discharge, from the East Dike sump back to SPL, began in January 2014. In compliance with Part G, Item 4, an as-built report will be and submitted to the authorities in 2014. See Section 8.1.8 for more information on this modification made to the Water License.

Bay Goose Dike

Four small seepage areas were identified with a total of 9 seepage channels along the dike. No turbidity was observed in the seepage. The total flow coming from these seepages is 97.2 m^3/day (1.22 L/s). The overall seepage is less than anticipated and is not presently a concern. The area will continue to be monitored to determine increases/decreases of the seepage in these areas.

Refer to the Annual Geotechnical Inspection (Appendix B1) for detailed field observations regarding this dike. Additional geotechnical instrumentation installation and field investigations in certain areas have been implemented to monitor and, if necessary, mitigate. No additional seepage collection has been implemented as the seepage is not affecting the mine operation or the integrity of the dike. The condition of the dike will continually be monitored and if the condition of the dike is judged to be deteriorating then management actions and remediation will be assessed.

d. As-built drawings of all mitigative works undertaken;

The installation of a seepage collection system downstream of East Dike to capture and pump the seepage water into the Portage Attenuation Pond started in September 2011 and was completed in April 2012. As-built drawings of the system installation are available in Appendix B3 of the 2012 Annual Report. In 2013, AEM applied for a modification to the Type A water license Part F, Item 4 to include East dike seepage water as non-contact water effluent.

e. Any changes in the design and/or as-built condition and respective consequences of any changes to safety, water balance and water quality;

Stage 2 of the Central Dike was completed during the months of April and May 2013. The construction consisted of the enlargement of the final footprint from 140m to 150m final elevation. The main rockfill embankment has been raised to elevation 120m after the re-enlargement.

None of the changes in the design and/or as-built conditions stated above have consequence on safety, water balance and water quality. Continuous monitoring will be done to ensure that the conditions remain stable.

f. Data collected from instrumentation used to monitor earthworks and an interpretation of that data;

Section 4.0 of the '*2013 Annual Geotechnical Inspection',* by Golder, provided in Appendix B1, presents the instrumentation data collected in 2013.

The document '*Annual Review of Portage and Goose Pit Slope Performance (2013*)' by Golder Associates, which presents the pit wall geotechnical inspection results, is also provided in Appendix B1, for informational purposes.

g. A summary of maintenance work undertaken as a result of settlement or deformation of dikes and dams; and

No major maintenance work on the dewatering or TSF structures was undertaken in 2013.

h. The monthly and annual quantities of seepage from dikes and dams in cubic metres.

See Section 3.1.1 c and 8.1.8 below for a discussion of seepage from the Vault Dike, East Dike and Bay Goose.

3.1.2 Meadowbank Dike Review Board

As required by water license 2AM-MEA0815 Part I, Item 14: ***The Licensee shall submit to the Board as part of the Annual Report required under Part B Item 5, all reports and performance evaluations prepared by the Independent Geotechnical Expert Review Panel.***

One report (Reports 14) was prepared by the Meadowbank Dike Review Board in 2013. This report is included in Appendix B2.

3.1.3 Airstrip Extension Construction

On January 27, 2013, Agnico Eagle Mines: Meadowbank Division (AEM) submitted an application to modify NWB license 2AM-MEA0815 under Part G to include an expansion of the current airstrip to accommodate jet aircraft. This was entitled "*Meadowbank Mine: Airstrip Expansion- NWB Modification Application*" (AEM, 2013). On February 15, 2013, the NWB distributed AEM's submission to interested parties for a fifteen (15) day review. The NWB received comments and approved the modification, Motion No. 2012-B1-019, (Appendix B3) and AEM was advised to follow the conditions set forth in the modification approval, supporting information and Type A License accordingly.

On April 6, 2013 AEM completed the extension of the airstrip from 1,495m x 45m to 1,752m x 45m, to accommodate a Boeing 737. This required an extension to the north portion by approximately 18m beyond the ordinary high water mark of Third Portage North. On April 30, 2013, the first Boeing 737 landed and departed from the Meadowbank mine site.

Construction of the in-water portion began on March 21, 2013. All fill material used for construction of the airstrip extension was non-potentially acid generating and non-metal leaching as per Part D Item 8 of the NWB license. As per Part D Item 23 and 25, daily inspections for QA/QC were completed and supervised by Stavibel, a qualified engineering firm, and AEM environment technicians to ensure the AEM (2013) airstrip extension plan was followed and that construction activity was not creating unexpected erosion.

As described above, a small portion of the airstrip extension was within the ordinary high water mark of Third Portage Lake thus construction methods were adapted to minimize the potential introduction of TSS. Construction was conducted under frozen conditions to prevent TSS spreading by wind currents and TSS monitoring was conducted. Overall operations described in planning documents (AEM 2013) were followed and as a result there was no risk to fish and fish habitat.

Data was collected at all routine monitoring stations on February 5, 2013 prior to the start of the work below the Third Portage Lake high water mark. Airstrip expansion TSS construction monitoring began on March 20, 2010, one day prior to construction. Routine turbidity monitoring was conducted once daily, weather permitting. Turbidity data indicated that the TSS concentrations at the routine monitoring stations did not exceed the NWB limits. All of the daily maximum TSS results by station and overall by day are presented in Table 3.2 of the *Construction Monitoring Report –Airstrip Extension* found in Appendix B4. No samples exceeded the 50 mg/L TSS maximum concentration of a grab sample as per Part D, Item 24. As a result, no additional mitigation or sampling was required for this construction monitoring.

In June 2013, in accordance with Water License 2AM-MEA0815, Part D, Item 26, a copy of the Airstrip Extension Construction As-Built Report was submitted to the NWB (Appendix B4). Please refer to this document to get more information on water quality monitoring, QA/QC and the as-built drawing.

3.1.4 Vault Dike Construction

The construction of Vault Dike at Meadowbank was conducted from February 2013 to March 2013. Vault Dike is located across a shallow creek which connects Wally Lake and Vault Lake, at the Vault Pit area. Vault Dike was constructed to allow the dewatering of Vault Lake and to isolate Vault Pit during mining activities from Wally Lake. Vault Dike is designed and constructed as a zoned rockfill dam with filter zones, an impervious upstream liner consisting of a bituminous membrane, and an upstream key trench made of aggregate mixed with bentonite. The filter zones minimize seepage, internal erosion and facilitate seepage collection.

Work carried out during construction of Vault Dike included blasting and excavation to bedrock, fill placement, membrane installation, and thermistor string installation. A monitoring program was essential to ensure the integrity of Vault Dike, including regular site visits, temperature measurement within the dike using the thermistors, monitoring of the upstream and downstream water level and detailed site

inspections. You will find in Appendix B5 the *Construction Summary Report Vault Dike* sent on August 8, 2013 to NWB.

No Wally Lake water quality monitoring was required during the Vault Dike construction because all the water was frozen in the vicinity of the dike construction.

3.2 QUARRIES

The annual reporting requirements listed in the following sections apply only to quarries located along the All Weather Private Access Road (AWPAR).

As required by INAC Land Lease 66A/8 72-2, Condition 8: ***The lessee shall file a report, annually, with the Minister in the manner and format stipulated by the Minister. The report shall include:***
i. Quantity of material removed and location of removal, for the immediately preceding calendar year; and
ii. Such other data as are reasonably required by the Minister from time to time.

And

As required by INAC Land Lease 66A/8 72-2, Condition 25: ***The lessee shall file, annually, a report for the preceding year, outlining the ongoing borrow area operations completed in conformity with the approved Borrow Management Plan, as well as any variations from the Plan.***

And

As required by KIA Right of Way Authorization KVRW06F04, Schedule E, Condition 8: ***The lessee shall file annually a report for the preceding year, outlining the ongoing borrow area operations completed in conformity with the approved Borrow Management Plan, as well as any variations from the Plan.***

No material was blasted from the quarries on INAC or KIA leased lands in 2013. All weather access road and mine site road maintenance utilized crushed NPAG material from the mine site.

SECTION 4. WATER MANAGEMENT ACTIVITIES

The following section addresses reporting requirements related to water management activities.

4.1 LAKE LEVEL MONITORING

As required by Water License 2AM-MEA0815 Schedule B, Item 2: ***Results of lake level monitoring conducted under the protocol developed as per Part D Item 11 (Water Quality Monitoring and Management Plan for Dike Construction and Dewatering)*****.**

Dewatering of the Vault Lake impoundment area began on June 27, 2013 and was suspended on October 22, 2013, due to ice buildup in the impoundment area. This water was discharged into Wally Lake as effluent.

The elevation measurement, in metres above sea level (masl), of Wally Lake began on July 22, 2013 and was conducted on a weekly basis, during open water season, weather permitting. The location of the lake level survey monitoring is identified as WL-survey on Figure 4. The lake level monitoring results are presented in Table 4.1; the lake level remained within the range of naturally occurring levels.

Water from the Portage Attenuation Pond was discharged into Third Portage Lake from August 22, 2013 to October 18, 2013. The elevation, in metres above sea level (masl), of Third Portage Lake was monitored on a weekly basis, during open water season, weather permitting. The location of the lake level survey monitoring is identified as TPL-survey on Figure 1. The lake level monitoring results are presented in Table 4.1; the lake level remained within the range of naturally occurring levels.

Water levels of the Portage Attenuation Pond and Vault Lake impoundment area were also monitored. Table 4.1 presents the elevation monitoring results at the water intake; the monitoring locations are identified as SPL-IN and VL-IN on Figure 1 and 4 respectively. This information is provided for informational purposes only.

4.2 WATER BALANCE WATER QUALITY MODEL REPORTING SUMMARY

As required by Water License 2AM-MEA0815 Schedule B, Item 3: ***Summary of reporting results for the Water Balance Water Quality model and any calibrations as required in Part E Items 6 and 7.***

A water balance and water management plan update for 2013 was completed in March 2014. The technical report, entitled "*Meadowbank Gold Project Water Management Report and Plan 2013*", is included in Appendix C1.

As in 2012, the 2013 water management plan for the Meadowbank mine site update consists of:

- The validation and update of the site hydrology, including the revision of drainage areas and the update of meteorological conditions.

- The update of the short-term and long-term water management plan, taking into account changes to the following elements:
    - Mining schedule;
    - Mill operation rate;
    - Mine pits layout;
    - Rock storage facility extent; and
    - Tailings management facilities filling.

- The development of a water balance model for the entire site and for the complete duration of the mining activities until final site closure.

- It presents a comparison of the predicted and recently remodeled pit water quality (SNC, 2014) forecast to assist in water treatment planning to assist in closure planning.

In summary, recent updates to the LOM have required revision of AEM's water management plan. The major changes observed in the life-of-mine plan affecting the water management include but are not limited to:

- Expansion of Portage Pit E;
- Goose and Vault Pit modifications;
- Updated truck mining fleet;
- Updated stockpile status; and
- Modification to the Central Portage Pit Waste Rock Disposal Area design and overall volume.

The above mentioned modifications to the LOM have added two months to the life-of-mine and tailings storage requirements as well as slightly affecting the pit flooding curves. In addition to the changes to the LOM, other modifications were made to the water balances that form the basis of this update. The major points are:

- Fresh water consumption revision;
- Total daily mill water requirement;
- Updated tailings deposition plan affecting the North Cell and South Cell deposition calendar;
- Pit water inflow revision based on observed flowmeter data;
- Water transfer requirements; and
- Updated East Dike seepage water management.

Detailing the nature of the revisions and their effects on the overall water management strategy are discussed in detail in the report. In summary, the total expected fresh water use planned for 2014 to mine closure varies from 70-90m^3/hr during mill operation, and drops to 4m^3/hr (exclusively for camp use) once the mill has ceased operation at the end of 2017. During the winter months AEM will require 90m^3/hr of freshwater in order to maintain an adequate reclaim water volume in the TSF. The ice cover during the winter months on the reclaim pond will vary between 0-1.8m in thickness which may represent up to 80% of the total reclaim water volume. The water balance presented has been optimized to reduce freshwater consumption to a minimum and minimize water treatment requirements through our water treatment plants. The water deficit encountered in the Tailings Storage Facilities during the winter months due to the ice cover, which can represent up to 75% of the pond volume at its peak thickness (maximum thickness of 1.8m in March and April), is mitigated by an increase in freshwater consumption during these

cold months. The East Dike seepage has been redirected to Second Portage Lake in order to reduce the water entry into the system, thus reducing the in-pit pumping requirements and subsequently the water treatment required in 2014. Once Portage Pit enters its reflooding stage, the East Dike seepage controls will be removed allowing the water to passively flow into Portage Pit with the reflooding operation.

Pit reflooding volumes and sequence (including Portage, Goose and Vault Pits) are presented in the report (Appendix C1). Reflooding will commence in 2015 with Goose Pit once mining has been completed, and subsequently in 2017 for both Portage and Vault Pits, and the entire reflooding process will be completed by the beginning of 2025. Contingent that the water quality meets CCME Guidelines for the Protection of Aquatic Life, dike breaching of the surrounding structures will occur to reconnect the Portage and Goose areas to Second Portage Lake and Vault area to Wally Lake (2025). It should be understood that the dikes will not be breached unless the water quality meets the CCME criteria.

Water quality modelling was completed by SNC Lavallin for the life of mine and included as an appendix to the report found in Appendix C1. The mandate of this report was to analyze the water quality as the mine proceeds through operating (life of the mine) and the reflooding operation and to determine the need for potential treatment of identified parameters of concern. The impact of transferring the TSF water to the pits during the reflooding process was explored using the latest available water quality results from the North Cell TSF, actual mill tailings and the Portage Attenuation pond obtained in 2013. Based on current water quality and the 2013 water balance, the report identifies that ammonia and copper may require removal treatment in order for the pit water quality to meet CCME criteria in 2025.

The following recommendations were presented the WMRP in order to improve on the current water management strategies and water balance:

- Continue to monitor and include any new flow monitoring locations/devices wherever possible to determine trends in pit water inflows, freshet volumes and seepage rates by using flowmeters. Specifically, flowmeters could be added to monitor the volume of water pumped at the toe of Saddle Dam 1 to the North Cell and also water pumped from the RSF seepage collection area (ST-16).
- Ensure all flowmeters are calibrated to ensure flows used in the water balance are accurate.
- Continue to update the deposition plans of the North and South Cell as needed to maximize water use and availability as well as increasing the accuracy of the models including but not limited to bathymetric readings.
- Conduct the water quality modelling analysis on a yearly basis based on updated water quality results and water balance through the life of mine. It will be beneficial to look at the opportunities to begin reflooding Portage Pit earlier if the mining schedule allows for such an operation to occur. As per the water quality modelling report, the water split between Portage and Goose must be considered in subsequent versions of the water balance to attempt to minimize potential future treatment requirements. Please refer to additional recommendations in the Water Quality Report in Appendix D of the Meadowbank Gold Project Water Management Report and Plan 2013 (Appendix C1).
- Develop or prepare a comprehensive Freshet Action Plan in 2013 to address the diversion ditches and their associated TSS control, including the possible implementation of a settling facility, RSF seepage including collection systems and long term control through the mine closure, required monitoring program of seepage around various infrastructures, Vault culvert

TSS control. This includes implementation of the Golder recommendations regarding the RSF seep.

- Include the Phaser deposit in the application to renew the Type A Water License which is due to be submitted in June 2014, one year in advance of expiration of the current License. Also include this updated Plan in the application.

4.3 BATHYMETRIC SURVEYS

As required by Water License 2AM-MEA0815 Schedule B, Item 4: ***The bathymetric survey(s) conducted prior to each year of shipping at the Baker Lake Marshalling Facility.***

The bathymetric survey in Baker Lake was completed on July 10, 2013 and is included in Appendix C2.

4.4 PREDICTED VS MEASURED WATER QUALITY

As required by Water License 2AM-MEA0815 Part E, Item 8: ***The Licensee shall, on an annual basis during Operations, compare the predicted water quantity and quality within the pits, to the measured water quantity and quality. Should the difference between the predicted and measured values be 20% or greater, then the cause(s) of the difference(s) shall be identified and the implications of the difference shall be assessed and reported to the Board.*** **The comparison of predicted water quality in reflooded pits also addresses Water License 2AM-MEA0815 Part E, Item 6**

The Table 4-2 provides a comparison between predicted (originally predicted in support of the NWB license) and measured water quantity and quality within Portage and Bay Goose Pit.

Relative percent difference was calculated by the following formulas:

RPD = (A-B)/ ((A+B)/2)*100;
where: A = measured value and B = predicted

Water Quantity

As presented in Table 4-2, the relative % difference between water volume predicted in Golder (2007) and water volume measured in Portage Pit and Bay-goose Pit was less than 20% of the predicted value. This indicates that the seepage and groundwater sources and volumes predicted that collectively make up the water in the pits in 2013, are less than what was originally predicted for operations. More specifically, Portage Pit was -72% less than the predicted value and Bay Goose was -121% less than the predicted value. This is primarily due to the fact that mine operations just began in Goose pit and the water quantity predicted (1,235.100 m^3) was calculated for a pit of 130 m depth.

Water Quality

According to the original NWB application documents (Golder, 2007- Water Quality Predictions), a Probable scenario and a Possible Poor End scenario predicted water quality results were developed to anticipate a representative range of water quality to allow for management and mitigative decisions. The probable scenario used input values that simulate predicted observed field conditions, and added realistic

scaling factors related to explosives management and pit operations. The Possible Poor End scenario input values simulated probable variance on observed field characteristics and selected input parameters to capture possible, conservative variance. The predicted values in the Probable scenario and the Possible Poor End scenario represented summer average. The measured values presented are summarized in Table 4.2. The mean and lower 25 centile of all the data available throughout the year at Portage Pit (ST-19) and Goose Pit (ST-20) was compared to the predicted values.

Exceedances of greater than 20% relative percent difference between predicted vs the mean of measured values in Third Portage Pit Sump water quality were found for ammonia, arsenic, copper and sulphate. Using the lower 25th centile of the data, only ammonia and arsenic exceeded the 20% predicted values. The mean of measured in Portage and Goose Pit sump water quality exceeded 20% predicted concentrations for most of the parameters except for pH, hardness and TDS. Ammonia exceedance is due to blast residue and is discussed in SNC, 2014. Although it is difficult to identify the potential cause for the other exceedances, it is most likely due to the fact that the predicted water volumes were significantly less than what was originally assumed (72 and 121% less than predicted). This reflects the fact that seepage, ground water, and local runoff volumes are being managed and less than what was originally predicted in these sumps. These concentrations will be monitored into the future and the results will assist in informing management of water quality and possible implementation of mitigative measures during operation and closure, which may require water treatment. Furthermore, it is important to note that the water is monitored extensively and not discharged into the environment, rather Portage Pit and Bay Goose Pit water reports to the Attenuation Pond. The water accumulated into the Attenuation Pond is either sent to Tailings Storage Facility or treated by the water treatment plant before discharge into the receiving environment (Third Portage Lake). The results can be found in Table 8.12 under sampling ST-9 (discharge). No discharge limits were exceeded in 2012 as all the results are below the maximum value required by NWB (Water License 2AM-MEA0815) and Environment Canada (MMER).

Comparison of Predicted Pit Water Quality

As discussed during follow-up workshops after the prehearing conference for the Meadowbank freshwater use amendment application (webex workshops were hosted by AEM in November 28, 2013 and January 22, 2014) with NWB, AEM contracted SNC to review the water quality predictions for pit reflooding. Table 4.3 summarizes the SNC water quality concentrations (based on measured water quality from the TSF) predicted in the pit and compares them to originally predicted concentrations. SNC evaluated parameters of concern that included Cyanide (total), Copper, Iron, Nitrate, Chloride and Ammonia; no other parameters are expected to exceed CCME guidelines and were therefore not modelled. This is generally consistent with the water quality in the pit as presented in Table 4.2. As presented in Table 4.3, originally predicted poor end scenario periodically exceeded CCME limits for copper, nitrate and chloride. Recent updates in SNC, 2014 suggest only copper and ammonia are expected to exceed CCME limits.

Based on current water quality and the 2013 water balance, the report identifies that ammonia and copper may require removal treatment in order for the pit water quality to meet CCME criteria in 2025. In 2012, the Water Management Plan referenced discharging all of the South Cell reclaim water into the pits in 2018. Recent updates indicate plans for the discharge of reclaim water as part of the reflooding to commence in 2015 and cease in 2018. This change in reflooding timing should assist in minimizing stratification of contaminants as the mixing and attenuation will be over a number of years instead of one

discharge over a 3 month period. It will also allow for smaller volumes for treatment, if required, which will assist in achieving CCME limits.

4.5 ADDITIONAL INFORMATION

As required by Water License 2AM-MEA0815 Schedule B, Item 24: ***Any other details on Water use or Waste Disposal requested by the Board by November 1st of the year being reported.***

No additional information was requested in 2013.

SECTION 5. WASTE ROCK MANAGEMENT ACTIVITIES

5.1 GEOCHEMICAL MONITORING

As required by NIRB Project Certificate No.004 Condition 15: ***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; results of the re-evaluations shall be provided to the NWB and NIRB's Monitoring Officer.***

And

In accordance with Water License 2AM-MEA0815 Schedule B, Item B-5: ***Geochemical monitoring results including:***

a. Operational acid/base accounting and paste pH test work used for waste rock designation (PAG and NPAG rock);

In 2013, AEM sampled 25% of blast holes and analyzed the percentages of sulphur and carbon. The results from these analyses are used to differentiate Non-Potentially Acid Generating (NPAG) from Potentially Acid Generating (PAG) materials. The Total Sulphur (S) analysis is converted into a Maximum Potential Acidity (MPA) value by multiplying the Total S weight % by 31.25 which yields an MPA value in Kg $CaCO_3$ equivalent. The Total Inorganic Carbon analysis is similarly converted into a Carbonate Neutralization Potential (NP) by multiplying the Total weight % Inorganic Carbon (reported as $\%CO_2$) by 22.7 which yields an NP value in Kg $CaCO_3$ equivalent. The Net Potential Ratio (NPR) for the blast hole drill cutting sample is then calculated as follows: NPR = NP/MPA. See Table 5.1 for a summary of Acid Rock Drainage (ARD) Guidelines used to classify Meadowbank Waste.

Table 5.1: Summary of ARD Guidelines used to classify Meadowbank Waste

Initial Screening Criteria	ARD Potential
NPR< 1	Likely Acid Generating (PAG)
1 < NPR < 2	Uncertain
2 < NPR	Acid Consuming Not Potentially Acid Generating (NPAG)

The mine geology staff uses the derived NPR to characterize the rock in the blast pattern. The mine surveyor uses this information to delineate the dig limits within the blasted rock to guide the shovel and loader operators in directing where the rock is to be taken. See Section 5.2 and Table 5.2 for a discussion of the use and location of waste rock.

The results and the resultant NPAG-PAG classification confirmation are logged in the Meadowbank GEMCOM database. Due to the large volume of data, the results are not included in this annual report. These results can be provided upon request.

To validate the method used by AEM, approximately 300 samples (including ultramafic volcanic, intermediate volcanic and iron volcanic rock types) from production drill holes were sent to an accredited commercial lab (external lab) for acid base accounting (ABA) analysis using the Modified Sobek Method for determination of NP/AP and metal leaching using the Shake Flask Method. The results confirmed AEM's methodology and results to differentiate PAG/NPAG rock.

b. As-built volumes of waste rock used in construction and sent to the Waste Rock Storage Facilities with estimated balance of acid generation to acid neutralization capacity in a given sample as well as metal toxicity;

Refer to the discussion in Sections 5.1a and 5.2.

c. All monitoring data with respect to geochemical analyses on site and related to roads, quarries, and the All Weather Access Road;

As per the recommendations in AEM (2012), unless there are significant changes during reclamation, it is recommended that quarry surface water sampling not be completed in the future as follow-up water sampling has not provided evidence of geochemical issues in the quarries. As in the past, Quarry 4 and 14 are permanently flooded but only Quarry 7 consistently had pooling; this small pool was contained within the quarry and evaporated by September. The majority of the quarries with geochemical concerns identified in AEM (2009b) did not contain pooling due to snow melt or precipitation during the summer period. As a result, they do not present a risk to the receiving environment and therefore do not require annual monitoring. In 2013, AWAR water quality monitoring followed these recommendations with priority placed on visual identification and turbidity monitoring, as well as evaluating erosional concerns at all crossings from pre-freshet to post freshet. On June 6th, small streams began flowing and by mid-June all of the streams and rivers along the road opened up. One formal erosion inspection was completed by environment on June 6th and weekly visual inspections were made by the environment department. Daily inspections were made in collaboration with site services department (who travel the road daily for ongoing maintenance). No turbidity issues were visually observed so surface water quality sampling was not deemed necessary at non-HADD crossings or quarry contact water pools. As in the past there was a small washout at KM 82, which is a non-fish bearing, ephemeral and undefined stream. In 2013, AEM added a culvert at KM 82 to avoid the wash out that occurs each year. This culvert was installed in the summer of 2013 after the freshet. Given the stability of the structures and the monitoring results of 2011 to 2013, it is recommended that unless turbidity issues are visually observed, surface water chemistry sampling should not be conducted at fish bearing watercourses. When an erosional issue occurs, detailed monitoring should be conducted that will include, at a minimum, a single water chemistry sample upstream and downstream of the source. If deemed necessary, additional follow-up sampling or monitoring should be conducted and if necessary additional mitigation will be undertaken.

d. Leaching observations and tests on pit slope and dike exposure;

No leaching was observed on the pit slope or dike faces.

e. Any geochemical outcomes or observations that could imply or lead to environmental impact;

In 2013 there was one geochemical outcome at the Portage RSF. Please refer to Section 8.1.4.2 regarding the seepage that occurs on NP2 Lake.

f. Geochemical data associated with tailings solids, tailings supernatant, cyanide leach residue, and bleed from the cyanide destruction process including an interpretation of the data;

AEM take quarterly sample of tailings and sent it to an accredited laboratory to analyse for ABA and SEF Leaching. In Table 5.4 you will find the results. The results indicate that the tailings are PAG but are low metal leaching.

g. Results related to the road quarries and the All Weather Private Access Road.

As per the recommendations in AEM (2012), unless there are significant changes during reclamation, it is recommended that quarry surface water sampling not be completed in the future as follow-up water sampling has not provided evidence of geochemical issues in the quarries. As in the past, Quarry 4 and 14 are permanently flooded but only Quarry 7 consistently had pooling; this small pool was contained within the quarry and evaporated by September. The majority of the quarries with geochemical concerns identified in AEM (2009b) did not contain pooling due to snow melt or precipitation during the summer period. As a result, they do not present a risk to the receiving environment and therefore do not require annual monitoring.

5.2 WASTE ROCK VOLUME

In accordance with Water License 2AM-MEA0815 Schedule B, Item B-6: ***Volumes of waste rock used in construction and placed in the Rock Storage Facilities.***

The total volume of waste rock generated in 2013 was 32,116,337 tonnes. The volume of waste rock from the Portage and Bay-Goose Pits in 2013 was 31,040,569 tonnes; 13,181,326 tonnes of non-potential acid generating (NPAG) and 17,859,243 tonnes of potential acid generating (PAG). The volume of waste rock from the Vault Pit in 2013 was 1,075,768 tonnes; 918,276 tonnes of NPAG and 157,492 tonnes of PAG. The use and location of all of the rock, by volume, is presented in Table 5.2 and identified by the following categories:

- Tailings Dams – used for the construction of dams or dikes adjacent to the tailings pond;
- Other Construction;
    - Dams and Dikes – used for construction of dams or dikes necessary for water control (not adjacent to the tailings pond);
    - Roads – used for road construction;
    - Crushers – taken to the mobile crusher and used for construction or maintenance purposes;
    - Miscellaneous uses;
- Waste Dump – taken to the waste rock storage facilities;
- Overburden – taken to the till stockpile;
- Backfill – waste return in the pit.

The *Mine Waste Rock and Tailings Management Plan* was revised in March 2014 and can be found on Appendix D1. In 2012, AEM decided to revise Portage rock storage facilities (PRSF) waste rock footprint which resulted in a temporary expansion from the original area of the waste storage facility from 63 ha to 80.8 ha. (see Figure 5). The main reason for this was that there was no area to store NAG rock within the PRSF. The NAG could not be stored in the current storage area as we are depositing upward and the

amount of NAG we are generating would have to be covered with PAG material (no area to store while the deposition upward is occurring). AEM wants to keep all available NAG material for reclamation and on site construction. Therefore a separate storage area of NAG rock was created. The total amount of waste rock is similar to the prediction in the 2009 Plan; the deposition pattern was changed to allow for a separate NAG material storage area. The expansion is still within our original mine footprint and all runoff is directed to the TSF or the Attenuation pond as originally designed. The North Diversion ditch ensures that all non-contact water drainage is diverted from the Tailings and waste rock storage areas. Construction of the diversion ditches was completed in 2012. The NAG waste rock extension construction will continue until closure (2017). Progressive closure may allow for material to be taken from the extension beginning in 2016. The material stored in the NAG waste rock storage facility extension is not expected to be deleterious; however, a hydraulic gradient exists towards the Tailings Storage Facility to the southeast in conjunction with PAG waste rock within the Portage waste rock storage facility. Ultimately, all waste rock seepage will be directed towards the existing collection systems of trenches and sumps located immediately downstream of the TSF. This is considered a minor revision in that the volume is similar and the material will be used for reclamation leaving the original deposition as designed. The waste rock extension provides storage for NAG waste rock material that will use for reclamation capping of Tailings and PAG waste rock storage areas.

5.3 TAILINGS STORAGE FACILITY

5.3.1 Tailings Storage Facility Capacity*

As required by Water License 2AM-MEA0815 Schedule B-7: ***An update on the remaining capacity of the Tailings Storage Facility.***

A total of 3,423,835 m^3 of tailings was placed in the tailings storage facility (North Cell TSF) in 2013. A monthly summary of the tailings volume is provided in Table 5.3.

From 2010 to 2013, a total of 10,109,326, m^3 of tailings were placed in the North Cell TSF.

AEM proceed to a revision of the tailings deposition plan in September 2013. The model deposition planning was completed until the end of the mining operation. The model was based, on the data collected during the last years of operation. The filling scheme for the two cells of the tailings storage facility is elaborated for a single point end of pipe discharge, aimed at:

- Avoiding ice accumulation on the dike liner;
- Prevent tailings beach to reach the reclaim barge;
- Reclaim water pond maximum elevation of 148m;
- Tailings beach to reach elevation 149.5 m;
- Limit as much as possible deposition at the north end of the tailings pond during winter to reduce risk of freezing pipe and ice entrapment;
- Raise beach on RF1 and RF2 to prevent tailings water from seeping out of the North Cell;
- Raise beaches on all external structures such as the roads around the tailings pond to prevent reclaim water from seeping towards the diversion ditches.

* TSM- Tailings Storage Facility

- Avoiding ice accumulation on the Central Dike liner;

An ice model has been developed to reproduce the impact of ice formation on the tailings deposition. Main parameters of the model consist as:

- The water balance used in this model assumes reclaim flow changes in function of season: summer 70 m³/h fresh water (FW) & 380m^3/hr reclaim water (RW), and winter 90 m³/h FW & 360 m³/h RW;
- The model assumes a tailings dry density and a water balance that incorporates ice entrapment of 1.21t/m^3 for both the North and South Cell;
- Sub aerial tailings slope set at 0.5% for both North and South Cell;
- Sub aqueous tailings slope set at 2.3% for the North cell (obtained from summer 2013 bathymetric analysis) and 4% for the South Cell (taken from the 2012 Golder Deposition plan of the North Cell) as this value seems to better represent the start of a new cell.

The main conclusions from the modeling results are:

- The total estimated capacity is 38.7 M t (30.7 M m^3);
- North cell: 16.7 M t (13.8 M m^3);
- South cell: TBD;
- The first phase of North cell deposition will be completed and the end of September 2014;
- The first phase of South cell deposition will be held from October 2014 to June 2015;
- The second phase of the North cell deposition will start in July 2015 and the cell will be closed in November 2015;
- The second phase of the South cell deposition will start in December 2015 until the end of mine life.
- As the deposition in the South cell resume in October 2014, the South cell reclaim road and different infrastructures needed for the tailings deposition must be set in place during the summer 2014. Central Dike would be raise also to elevation 136 m.

5.3.2 Fault Testing and Monitoring

As required by Water License 2AM-MEA0815 Schedule B, Item 15: ***Results of monitoring pursuant to the Fault Testing and Monitoring Plan (August 2007).***

Fault testing and monitoring were completed in 2011. See 2011 annual report for more information.

5.3.3 Tailings Freezeback and Capping Thickness

As required by NIRB Project Certificate No.004, Condition 19: ***Provide for a minimum of two (2) metres cover of tailings at closure, and shall install thermistor cables, temperature loggers, and core sampling technology as required to monitor tailing freezeback efficiency. Report to NIRB's Monitoring Officer for the annual reporting of freezeback effectiveness.***

And

As required by Water License 2AM-MEA0815 Schedule B, Item 17: ***A summary of on-going field trials to determine effective capping thickness for the Tailings Storage Facility and Waste Rock Storage Facilities for the purpose of long term environmental protection.***

AEM began to determine capping thickness in 2009 by installing thermistor SD1-T2, SD1-T3 and SD1-T4 on Saddle Dam 1 to monitor the thermal condition within the structure and its foundation. Another thermistor (SD1-T1) was also installing in 2009 to monitor the thermal condition of the deposited tailings. The results are illustrated on Figure 6 to 9. The result of SD1-T2, SD1-T3 and SD1-T4 showed that the dike foundation remained frozen during the past year. Data observed were consistent with the data for 2011-2012. The result of SD1-T1 records values similar to the ambient air temperature above the tailings. During the winter of 2013 all tailings were frozen. Temperatures above 0°C were recorded in the summer of 2013 above the tailings elevation. It is anticipated that data collected from this location will be useful in monitoring the freezing of the tailings in the coming years. Overall thermistor data from within the structure indicates that the dike foundation remained frozen in 2012-2013. Below the rockfill shell, the foundation soil or bedrock remained in a frozen state with temperatures ranging from about -4°C to about -7°C. At the upstream toe, below elevation 132 m, the compacted till base material below the liner remained frozen. Thermistor data showed that the tailings remained frozen in the summer of 2013. The rockfill shell remained frozen, with the exception of the active layer (upper 2 m) that thawed in August 2013.

AEM also installed thermistor SD2-T1, SD2-T2, SD2-T3 and SD2-T4 on Saddle Dam 2. SD2-T1 was installed in 2012 in the center of the upstream face of the dike immediately on top of the geomembrane liner to monitor the thermal regime of the tailings in contact with the structure. This thermistor records values similar to the ambient air temperature above the tailings. The tailings were frozen during the winter of 2013. Temperatures above 0 were recorded in the summer of 2013. It is anticipated that data collected from this location will be useful in monitoring the freezing of the tailings in the coming years. SD2-T2 to SD2-T4 was installed to monitor the thermal condition within the structure and its foundation. The results are illustrated in Figure 10 to 13. Overall, thermistor data from within the structure indicates that the dike foundation remained frozen from September 2012 to September 2013. Below the rockfill shell the foundation soil and the bedrock remained in a frozen state with temperatures ranging from about 0°C to -9°C. At the upstream toe of the dike, the upper 1 m of the semi-pervious backfill thawed during the summer of 2013. Most of the rockfill stayed in frozen condition with the exception of the upper 1.5 m (active layer) that thawed in August 2013.

In 2012, AEM installed a thermistor (T147-1) at the downstream toe of Stormwater Dike. Result for this thermistor can be found in Figure 14. This thermistor is being utilized to monitor the freeze back of the talik, and in the future will be used to monitor the thermal regime beneath the tailings in the South Cell. Overall, thermistor T147-1 shows the existence of a frozen crust of material from El. 120 m to El. 115 m that stayed frozen during the summer of 2013. Below El. 115 m, the temperature varied between 0.8°C and 0.1°C from the beginning of March 2013 to the end of August 2013 indicating a slow cooling of the near surface talik.

In 2012, AEM installed 2 thermistors (T121-1 and T122-1) on the first bench of the waste rock storage facilities and one thermistor (T90-2) within the talik of the former lakebed inside the North Cell of the TSF. The results are illustrated on Figure 15, 16 and 17, respectively. Thermistor (T121-1) installed on RF1 shows temperatures varying from 0°C to -5°C below El. 132 m. Thermistor (T122-1) installed on RF2 shows temperature varying from 0°C to -9°C, indicating that the RF2 foundation is in a frozen state. For

thermistor (T90-2), temperatures below 0 degrees Celsius were recorded in 2013 which seems to indicate that the tailings are continually frozen at this location. Additional thermistor was installed in February 2013 on the Waste Rock Storage Facility (RSF1) (see Figure 18 for result). This thermistor is installed in the waste dump and shows frozen condition below elevation 169 m. From elevation 169 m to 173 m temperate above 0°C can be observed in the summer. In November 2013, more thermistors (RSF3 to RSF6) were installed on the Waste Rock Storage Facility. Results of these thermistors will be provided in the 2014 Annual Report.

In 2014, AEM will install 4 thermistors in the TSF North Cell. Two thermistors will be added directly in the tailings and two will be installed in the road north of the North Cell. These 2 thermistors will not be part of the freezeback monitoring but are part of the general monitoring of North Cell.

In the 2012-2013 Annual Monitoring report NIRB (recommendation 14) "*The Board requests that AEM provide a plan of action and a discussion on its permafrost monitoring program that would include Second Portage Lake, Portage Pit and Bay Goose Pit as outlined in the FEIS*".

The action plan and permafrost monitoring program for Second Portage Lake, Portage Pit and Goose Pits are address in the response sent to address recommendation to NIRB but below is an update with the 2013 data.

Second Portage Lake

To monitor the permafrost aggradation and talik beneath Second Portage Lake, AEM installed a thermistor (T90-2) in the North Cell tailings and a single deep thermistor (T147-1) at the downstream toe of Stormwater Dike in 2012. Please refer to text above for more information. New thermistors were installed on Central Dike in the winter of 2013 to monitor the dike's performance, and provide information on the permafrost aggradation of SPL, along and following construction, operation, and into closure (Refer to Section 4.5 and Appendix C5 of the *2013 Annual Geotechnical Inspection* report). The following observation of the thermistors can be made:

- The instruments installed along the central key trench show thawed condition within the in situ Till and the bedrock.
- The instruments installed along the final Central Dike downstream toe show below 0º Celsius temperature within the rockfill and the in situ Till and thawed condition below the bedrock surface.
- The instruments along the Portage Pit limit show below 0º Celsius temperature.

Portage Pit

No thermistors were installed in Portage Pit because of the mining activities. However, the permafrost aggradation can be monitored with the thermistor installed in the East Dike and Central Dike.

Five thermistors have been installed on East Dike. Since different observations were made for each thermistors please refer to Section 4.1.2 of the *2013 Annual Geotechnical Inspection* found in Appendix B1.

New thermistors were installed on Central Dike in the winter of 2013 to monitor the dike's performance along and following construction, operation, and into closure. The following observation of the thermistors can be made:

- The instruments installed along the central key trench show thawed condition within the in situ Till and the bedrock.
- The instruments installed along the final Central Dike downstream toe show below 0º Celsius temperature within the rockfill and the in situ Till and thawed condition below the bedrock surface.
- The instruments along the Portage Pit limit show below 0º Celsius temperature.

Goose Pit

The permafrost in Goose pit can be monitored by the thermistor SD-09-A which is located on South Camp Dike approximately 20 m further upstream within Third Portage Lake. This thermistor showed:

- The temperature profile at SD-09 shows that the soils located beneath the dike foundation and liner appear to have remained frozen (permafrost) below elevation 128 m approximately;
- The active layer of SD-09 is frozen from mid-October to late June.

Also, thirty-three thermistors (from T1 to T30 and T3' to T5') are installed on Bay-Goose Dike. Please refer to Section 4.3 of the *2013 Geotechnical Inspection* for a complete review. New thermistors were installed in 2012 between Bay Goose Dike and Bay Goose Pit to monitored aggradation of permafrost. To date, result show that the freezeback occurred. Monitoring in the next year will provide more useful data about this aggradation of permafrost.

SECTION 6. WASTE MANAGEMENT ACTIVITIES

6.1 LANDFILL MONITORING

As required by Water license 2AM-MEA0815 Schedule B, Item 8*: Summary of quantities and analysis of seepage and runoff monitoring from the landfills.*

Seepage and runoff monitoring of the Landfill is discussed below in Sections 8.1.4 and 8.1.5.

6.2 SOLID WASTE DISPOSAL ACTIVITY

As required by Water License 2AM-MEA0815 Schedule B, Item 9: ***A summary report of solid waste disposal activities including monthly and annual quantities in cubic metres of waste generated and location of disposal.***

And

NIRB Project Certificate No.004 Commitment 74*: Provide annual report of the quantity and type of waste generated at the mine site distinguishing landfilled, recycled and incinerated streams.*

A monthly summary of the amount of waste transferred to the landfill and sent to the incinerator in 2013 is included as Table 6.1. The September and October amounts of waste transferred to landfill were unfortunately misplaced. Based on the available data, AEM estimated this amount to be 1,168 m^3 of solid waste sent to the landfill for each of these two months. The Environmental Department has advised Site Services Department that the monthly amounts of waste is required and all staff involved must ensure that the volumes are recorded for each month in the future.

AEM has determined that there has been an overestimation of the quantity of waste sent to the landfill in 2013. In the past AEM has calculated the amount of waste based on the number of truck roll off bins (containers) deposited at the landfill. Based on this method, AEM estimated the volume of waste sent to the landfill at 14,024m^3. However, by using this method, AEM assumed that the containers sent to the landfill were 100% full. This may not be the case for all containers. For this reason, beginning of 2014, engineering will conduct quarterly survey of the landfill to determine the actual volume deposited and a comparison of the two volumes will be conducted, i.e. number of containers vs. surveyed volume. The volume will be adjusted accordingly based on the actual volume. Table 6.2 below indicates the volume of waste in m^3, from the engineering survey, disposed in each sub-landfill and Figure 19 indicates the location of each sub-landfill used to date. Sub-landfill #5 is currently in operation and sub-landfill #1 to #4 were closed and covered with NAG waste rock.

Table 6.2: Volume of waste disposed in each sub-landfill (from engineering survey)

Landfill	Coordinates (UTM)			Volume (m^3)	Date Covered
	Northing	Easting	Elevation		
#1	7215715.58	638601.45	160	3650	Dec-12-2012
#2	7215795.79	638711.42	186	840	Feb-27-2013
#3	7215743.12	638827.77	195	1656	May-14-2013
#4	7215796.48	638890.93	200	9507	Jan-19-2014
#5	7206586.10	643115.90	210	TBA	TBA

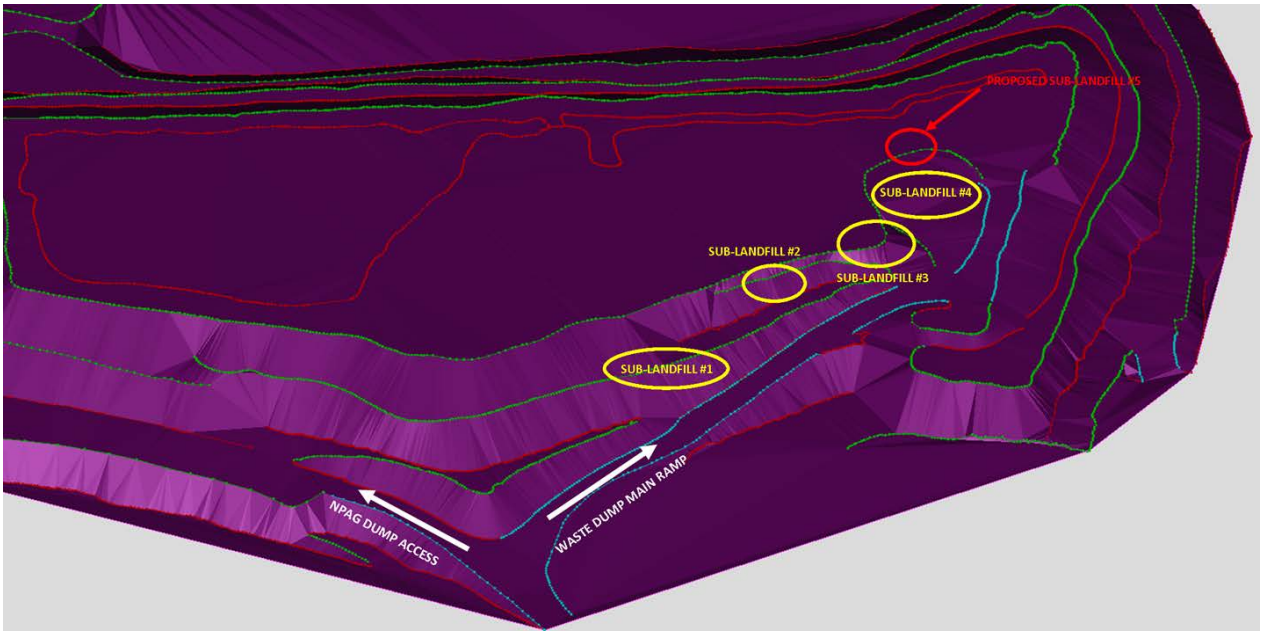


Figure 19: Sub-landfill location

In 2013, a total of 98 sea cans filled with hazardous waste materials (449 tonnes) and 144 sea cans filled with steel (1,631 tonnes) were collected from the Meadowbank project area. The sea cans were shipped from the spud barge at AEM's Baker Lake marshalling facilities to Becancour, Quebec by sealift. The materials were subsequently shipped to licensed hazardous waste and metal recycling companies in the Province of Quebec (recycling or permanent disposal). The waste materials were transported under Waste Manifest #'s 9331164-5, 9331166-0, and 9331167-8; copies of these manifests are attached in Appendix E1. A description of the types of waste, packaging and volume is provided in Table 6.3.

Several projects for waste reduction/recycling were undertaken in 2013 at Meadowbank:

- Recycling of used protective personnel equipment (PPE)
    - The objective of the *Used PPE Project* is to provide a second life to reusable PPEs. With the collaboration of all departments, AEM collected used PPE around the Meadowbank site to create a used PPE inventory. This used PPE is now reused instead of ordering

new equipment and disposing of reusable materials in the landfill. All employees have to search the used inventory prior to ordering new. This initiative has been successful in reducing waste sent to landfill and as an overall cost saving measure.

- Waste oil recycling plan
    - AEM has an existing waste oil recycling plan. In 2013 AEM reused approximately 60,000L of waste oil as a fuel source in the on-site incinerator (10,056L) and in two waste oil heaters (50,000L).
- Steel Recycling
    - A total of 1,631 tonnes of steel was packaged and transported south for recycling. This material was removed from our solid waste stream and not landfilled on site. In 2013, AEM also initiated a program of puncturing steel aerosol cans to render them as recyclable steel instead of hazmat. This added approximately 1.3 tonnes to our recyclable steel amount.
- Aluminum Recycling
    - 1000 Kg of aluminum pop cans were donated to the Baker Lake Girls Basketball team to assist in travel costs – these cans are sent south for recycling by Artic Co-Op on behalf of local groups and Sport Nunavut.

6.3 INCINERATOR

As per Water License 2AM-MEA0815 Schedule B, Item 10: ***Report of Incinerator test results including the materials burned and the efficiency of the Incinerator as they relate to water and the deposit of waste into water.***

And

NIRB Project Certificate No.004 Condition 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 AEM 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.***

The incinerator was in operation throughout 2013. The incinerator daily report logbook is included in Appendix E2. The daily report logbook entry is available for all the months except for August, for which the majority of the days are missing. These records were unfortunately misplaced. The Environmental Department has advised the responsible department to ensure the logbook is maintained for each month in the future. Based on the available data, approximately 40% of the material incinerated was food waste; the other 60% was dry waste comprised of food containers, cardboard boxes, paper and absorbent rags. The location of the incinerator is highlighted in Figure 1.

The last incinerator stack testing was completed by Exova Consultants from October 2 to October 3, 2012 in accordance with AEM's Incinerator Waste Management Plan. As per discussions with Environment

Canada, the stack testing is not necessary each year due to the fact that our waste stream has not changed. Therefore stack testing will be undertaken every two years. In 2013 no stack testing was conducted. However, AEM will conduct a stack testing in 2014.

An ash sample was collected from the incinerator on July 8, 2013, in accordance with AEM's '*Incinerator Waste Management Plan'* (AEM, November 2012, v4). The purpose of sampling ash is to determine its acceptability for disposal in the landfill pursuant to the Government of Nunavut (GN) Environmental Guidelines for Industrial Discharge (2002). Results from this monitoring are provided in Table 6.4. The samples met all of the GN discharge guidelines and therefore demonstrate the incinerator ash is acceptable for disposal in the Meadowbank landfill.

For 2013, it is estimated that 363,156 L of waste oil was generated on site; approximately 60,000L was reused as fuel on site with the remainder being transported south to an approved recycling facility. Table 6.5 provides a breakdown of the volume of incinerated waste oil by month.

In addition to the above testing, waste oil destined for burning in the incinerator was randomly sampled on a monthly basis and compared to the NWT Used Oil and Waste Fuel Management Regulations (NWT, 2003). This data is presented in Table 6.6. All metals and PCB parameters met the NWT guidelines with the exception of two samples containing an elevated level of chlorine. An investigation has not determined the source of the elevated Chlorine levels however AEM will continue to monitor this situation in 2014.

6.4 ADDITIONAL INFORMATION

As required by Water License 2AM-MEA0815 Schedule B, Item 24: ***Any other details on Water use or Waste Disposal requested by the Board by November 1st of the year being reported.***

The Board did not request any additional details on waste disposal in 2013.

SECTION 7. SPILL MANAGEMENT

As per Water License 2AM-MEA0815 Schedule B, Item 11 ***A list and description of all unauthorized discharges including volumes, spill report line identification number and summaries of follow-up action taken.***

A summary of unauthorized discharges that occurred in 2013 is presented in Table 7.1. This data was also included in monthly monitoring reports submitted to the NWB. GN Spill Report Forms for 7 reported spills are included in Appendix F1. AEM did not receive the spill report identification number for these occurrences.

Spill prevention training was emphasised in 2013 for employees to prevent and to report spills, as follows:

- All employees and contractors must participate in an induction session upon arrival at the mine site, which includes a training section on spill management (prevention, reporting and cleaning);

- Every employee and contractor who operates a vehicle on the site must participate in training on vehicle operation. Spill management is a component of this training session;

- A site wide online training module for Spill management was created in 2012 and was intended to be implemented in 2013. The site wide Spill response training was not implemented in 2013 due to unforeseen problems with the training software. However, the issue has been rectified and the online spill training for all personnel is now available thru the Meadowbank induction process. Any new personnel as well as contractors are required to complete this training; as well it is mandatory for any personnel working at the Meadowbank site to update their induction training every 3 years.

- 43 toolbox meetings were given by the Environmental Department to different departments at Meadowbank. Topics during the meetings included waste management, hazardous materials, spills, wildlife, environmental policy and department specific subjects. Departments receiving these toolbox sessions included security, powerhouse, warehouse, mine, mill, maintenance, site services, camp, kitchen, FGL maintenance and others (housekeeping, Arctic Fuels, etc.);

- 13 persons from various departments on site (including Environment and ERT) attended a 10 hrs of formal training on spill response. Training for this was provided by S.W.A.T. Consulting based out of Calgary, Alberta. This course gave this core group of people a better understanding on pre-planning to prevent spills, and how to effectively act in the case of a major spill;

- 3 security personnel at the Baker Lake Marshalling facility were given an information/training session on how to react to a major spill at the Baker Lake Bulk Fuel Storage & Marshalling Facility during the refueling barge season. This training was provided by the Environment Department.

- 5 personnel from the Baker Lake and Site Services road crew were also received training on the spill response sea cans located at the Baker Lake Marshalling area. This training provided these persons with the knowledge on how to use the spill response equipment in the sea cans. Since

these persons work on the AWPAR and in Baker Lake area, they are likely to be the first persons to respond to a spill incident at the Baker Lake Marshalling facility; and

- On December 17, mock disaster training took place at the Meadowbank mine site. This is a requirement of the Mines Act, cyanide code (ICMC) and also the TSM protocol (Towards Sustainable Mining program administered by the Mining Association of Canada). The purpose for this type of exercise is to test and practise our emergency response procedures. This exercise tested our response to fire, vehicle accident, spill response, and also our emergency response plan. Overall, the response to the mock disaster went very well.

Landfarm

The Meadowbank landfarm was constructed in 2012. Approximately 2,577 m^3 of soil was transported to the landfarm in 2013. This includes 295 m^3 from spills related to the Meadowbank site, 352 m^3 from a spill in Baker Lake (during construction of temporary Jet A pad), and 1,930 m^3 from Quarry 22 (which was used for contaminated soil storage prior to construction of the landfarm).

Approximately 180 m^3 of soil was removed from the landfarm following remediation and transported to the Portage Rock Storage Facility.

Overall rates of PHC degradation appear to be sufficiently rapid to warrant continued use of the landfarm as a viable treatment for spills of the designated materials. The addition of treated sewage sludge (pilot project) as a nutrient source appears to generally increase degradation rates, particularly for the F3 fraction. Use of the landfarm with application of sewage sludge as a nutrient treatment will be continued. Please see in Appendix F2 the "*2013 Landfarm Report"* which contains more information on this pilot study and landfarm activities in 2013.

Follow-up on Assay Road Seepage

On November 4, 2013, it was observed that water was seeping thru the road in front of the Assay Lab Road. After investigation, it was determined that the seepage was coming from the process plant (due to the presence of CN, Cu and Fe in sample analysis results). Monthly sample monitoring indicates that no contamination has reached Third Portage Lake (TPL-Assay, see Figure 20). On November 8, the discharge of seepage was reported to Government Agencies via the GN Spill Report Form. On November 12, spill report update #1 and #2 were sent. On November 19 and December 11, spill report update #3 and #4 were sent, respectively. Please refer to the spill report and update #1 to #4 for more information (Appendix F1).

No more seepage has been visible since November 24. On November 28, AEM held a meeting with the Baker Lake council to provide an update on this situation. In December, AEM has engaged EBA (Tetra Tech) to perform an assessment and provide recommendations in early 2014. EBA will provide recommendations for additional boreholes to delineate the plume, assist in the design and construction of an appropriate containment system before freshet and provide suggestions for the location of groundwater wells downstream of the seepage area. It is AEM's intent to follow the recommendations of EBA. Repairs of the containment systems in the mill have commenced and the intent is to have this completed prior to freshet. AEM is also completing a Freshet Action Plan for 2014 that will include actions and monitoring that will take place before, during and after the freshet.

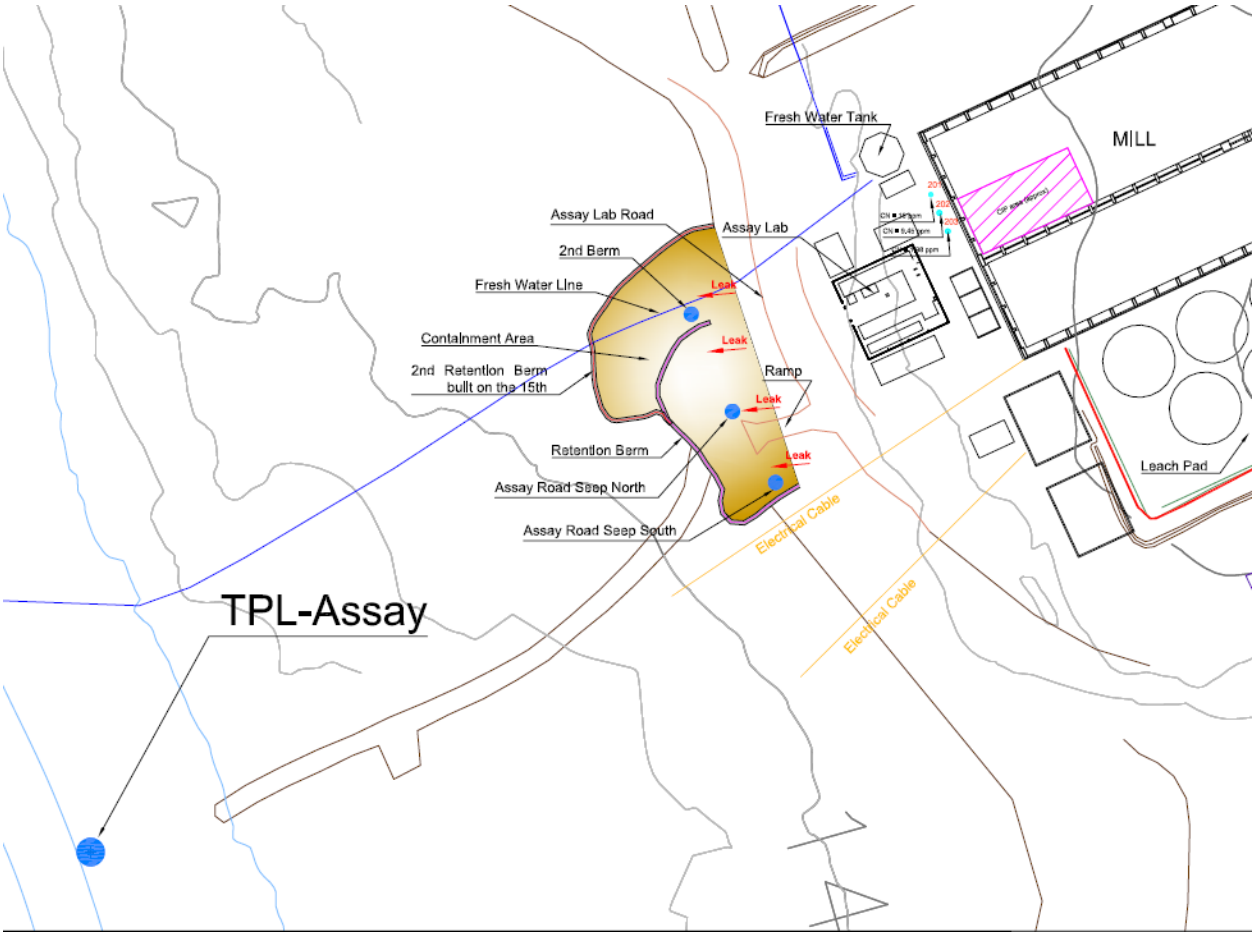


Figure 20: General Layout of the Assay Road Seepage

Follow-up on the October 6, 2010 spill at KM 23 on the AWPAR

Responsive Actions

Since the 3,000L spill at KM 23, in October 6, 2010, on the AWPAR (GN Report #2010-408), AEM has put many plans into place to prevent its reoccurrence:

- Speed limits have been reposted along the AWPAR; dispatch routinely reminds drivers of the speed limit and security officers have been enforcing the speed limit of the AWPAR with a radar gun. Furthermore, speeds are tracked through security dispatch communication records which provide an estimate of the speed of the driver based on the total time travelled along the road. This data is monitored and warnings are given to drivers accordingly;

- All users of the AWPAR are required to go through the AEM Meadowbank site induction which also includes Surface SOP (Standard Operating Procedure). The Surface SOP is an induction to driving vehicles on the Meadowbank mine site and on the AWPAR. This induction goes through

the rules for driving on the site and the AWPAR, the procedures that must be followed while driving, and what potential incidents can occur if these rules and procedures are not followed. Points that are focused on are speed, road conditions, spill response and proper communication;

- All drivers with heavy loads are also required to make regular stops on the AWPAR to check their equipment and the load they are carrying. During these stops drivers do visual inspections related to load security, tire pressure, and look for any other abnormalities with their equipment. If any problems are noticed these problems are remediated prior to continuing on; and

- The road supervisor for AEM also performs daily checks on the road. If weather conditions jeopardize the safe passage on the AWPAR, the road is closed to all traffic. In some cases, when road conditions are questionable an escort leads a convoy of vehicles that require travel (ex. crew bus, fuel trucks) in a safe manner.

Pro-Active Actions

Since the time of the spill, AEM has put in place Environmental Emergency Sea Cans at each water crossing along the AWPAR. These sea cans are equipped with spill supplies that will assist in minimizing the spread of contaminants in the case of an incident. The contents of these Environmental Emergency Sea Cans are as follows:

- Empty drums (Sealed)
- Mini berm 36"x36" x4'
- 4 drum spill berm 4x8
- Tarp 20'x30'
- Tarp 30'x50'
- Oil white spill pads
- Universal boom 5"x10' (Chemical)
- Universal boom 8"x10' (Chemical)
- Oil only booms 5"x10' (Hydro-carbons)
- Maritime barrier (Baffle)
- ABS pipe : 10' (4")
- Cell U-Sorb
- Amerisorb peat moss
- Oil gator absorbant
- Plug pattie
- Quattrex bags
- Long handle round point shovel
- Ice breaker chisel
- Sledge hammer 12 lbs 36"
- Rod bar (4')

Although most members of the environment department have formal spill response training. In 2013, 5 personnel from the Baker Lake and the Site Services road crew received training on the spill response sea cans located at the Baker Lake Marshalling area. This training provided these persons with the knowledge on how to use the spill response equipment in the sea cans. Since these persons work on the

AWPAR and in Baker Lake area, they are likely to be the first persons to respond to a spill incident at the Baker Lake Marshalling facility or on the road.

Follow-up Action

Throughout the summer of 2011, AEM performed continuous clean-up of the KM 23 spill site. Maritime barriers lined with absorbent booms were installed in the stream immediately after freshet and throughout the summer. These booms were inspected at a minimum of once a week. When the booms became saturated with contamination the booms were then removed and replaced with clean booms. Surface water quality samples were taken downstream of the contained spill site and were below detection limit for hydrocarbons and BTEX.

AEM also contained contaminated water in a series of pits/sumps that were created during the excavation of contaminated soil. These pits served as sumps for the remaining hydrocarbon contaminated soil to leach into and contain any contaminated water. AEM contracted BLCS (Baker Lake Contracting & Supplies Ltd.) to install an Oil Water Separator. This system was a gravity separator which cycled the water from the sumps and separated the hydrocarbons from the water. A vacuum truck was also taken to this site to skim the surface contamination from the containment cells.

The maritime barriers were left in place throughout the winter, so that during the 2012 freshet there was a protective barrier to prevent any residual from flowing downstream.

In 2012 AEM contracted Sana to treat the water remaining in the sumps through an activated carbon treatment system. Approximately 550,000 liters of water were treated at the site in 2012. After treatment the water was sampled and the results (provided to the AANDC Inspector) indicated the Type A Water License criteria for discharge were met. The water was discharged to the tundra away from any watercourse. Confirmatory sampling indicated ND results for petroleum hydrocarbons. The sumps were refilled and contoured back to the original state. The clean-up of the 4 sumps started on July 2012 and ended on September 2012. An update report containing all sample results and treated volumes was sent to AANDC and can be found in Appendix F2 of the 2012 Annual report. Previously, in 2011, approximately 1500 m^3 of soil was excavated from this area (stored at Quarry 5). The contaminated soil previously stored in Quarry 5 was moved to the contaminated soil landfarm at the Meadowbank site during August/September, 2012. It should be noted that results of monitoring in the watercourse in 2012 revealed no detection for any hydrocarbon material. However, maritime barriers remained in the watercourse through the 2013 freshet as a precaution. Three samples were taken in July 14, 2013 at the KM 23 stream and analyzed for BTEX. All the results indicated values of ND. The analysis certificate can be found in Appendix G1. As no petroleum hydrocarbon constituents were detected the maritime barriers were removed and no further monitoring or remedial measures (containment, treatment, interception trenches, etc.,) will be undertaken.

As required by NIRB Project Certificate No.004 Condition 82: ***Monitor the ingress/egress of ship cargo at Baker Lake and report any accidents or spills immediately to the regulatory agencies as required by law and to NIRB's Monitoring Officer annually.***

In 2013, AEM monitored the ingress/egress of ship cargo at Baker Lake and the results are summarized in the below Figure 21.

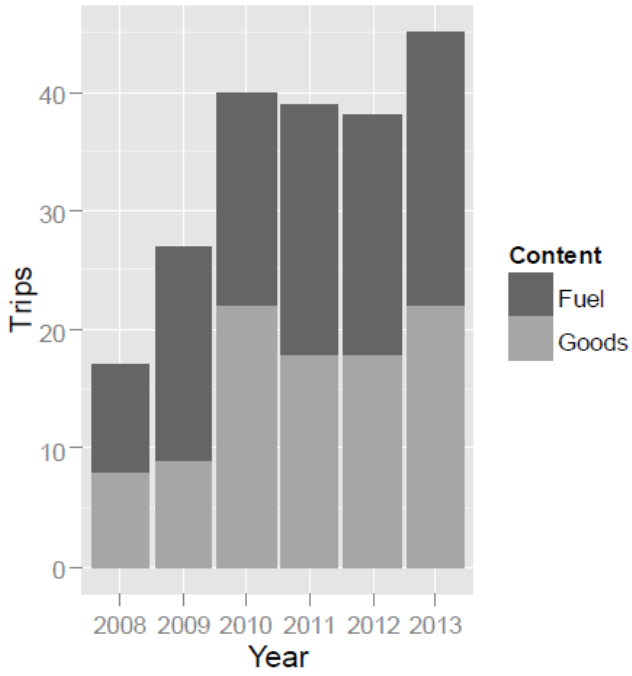


Figure 21- Barge traffic (number of trips/year) arriving in Baker Lake from Chesterfield Inlet since 2008.

In 2013, no spills occurred during the ship cargo ingress/egress.

As required by NIRB Project Certificate No.004 Condition 75: ***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***

A list of possible accidents and malfunctions are included in the following Meadowbank Gold Project management plans provided in Appendix I1:

• *Hazardous Materials Management Plan*, v3, October 2013;
• *Spill Contingency Plan*, v4, November 2013;
• *Emergency Response Plan,* v6, August 2013.

Table 7.1 show all spills related to the all-weather road and other spills related to mine activities.

SECTION 8. MONITORING

8.1 AQUATIC MONITORING

This section includes the aquatic monitoring requirements from all aspects of the Meadowbank Project.

As required by Water License 2AM-MEA0815 Schedule B-13: ***The results and interpretation of the Monitoring Program in accordance with Part I and Schedule I.***

And

As required by DFO Authorizations NU-03-0191.3 Condition 3.1 (Mine), NU-03-0191.4 (Vault) Condition 3.1; NU-03-0190 Condition 6 (AWPAR);: ***Submit written report summarizing monitoring results and photographic record of works and undertakings.***

A list of the sampling location GPS coordinates for aquatic monitoring programs conducted by AEM is provided in Table 8.1. Summaries of associated aquatic monitoring reports are presented in the following section of this report and supporting documents are located in the listed appendices. Figures 1, 2, 3 and 4 illustrate the location of sampling stations at the Meadowbank mine site, EEM receiving environment monitoring program, Baker Lake marshalling facilities and Vault Site, respectively. Certificates of Analysis are included in Appendix G1.

8.1.1 Construction Activities

As required by DFO Authorizations NU-03-0191.3 Condition 3.1, NU-03-0191.4 Condition 3.1;

The airstrip extension was completed in 2013 to allow a Boeing 737 jet aircraft to land and take off at Meadowbank. The construction of the airstrip was approved by the NWB in 2013 and by DFO through a letter of advice on September 26, 2012. During the construction activity sample monitoring indicated that turbidity and TSS concentrations did not exceed the NWB limits. All of the daily maximum TSS results by station and overall by day are presented in Table 3.2 of the *Construction Monitoring Report –Airstrip Extension* found in Appendix B4.

There were no incidences where runoff water from any facility under construction would flow directly or indirectly into a water body.

8.1.2 Dewatering Activities

Mining activity in Vault Pit began in 2014, which required the construction of Vault Dike in order to isolate the mining area and create the Vault Attenuation Pond (see Figure 4). The Vault Dike was finalized in March 2013 and allowed AEM to start the dewatering of Vault Lake during open water season of 2013. As of December 31, 2013, Vault Lake was partially dewatered in order to isolate four separate deeper basins (A, B, C and D) (Figure 22) which will act as the future Vault Attenuation Pond starting in 2014. Some dewatering will continue in May 2014 from Basins B and C. This water is still considered lake water until Vault pit water is discharged into the ATP.

In 2014, the remaining balance (approximately 750,000m^3), assumed to require treatment to remove TSS, will be discharged to Wally Lake (all in accordance with Water License and MMER requirements). Additional discharge in 2014 will be completed to remove the Vault Pit contact water estimated to be around 422,549m^3, bringing the 2014 total annual discharge to 1,172,549m^3. All other parameters other than TSS are predicted to be within Water License and MMER criteria.

After that, this area (all ponds) will become the Vault Attenuation Pond which will operate until the end of mine life in 2017. The Vault Attenuation pond will collect all pit and contact runoff water prior to any discharge to Wally Lake, and if needed, the water will be treated for TSS removal with an ACTIFLO solids removal system (Vault WTP) during summer months and discharged into Wally Lake. The discharge will be subject to both the Type A Water License Part F Item 3 and MMER discharge criteria.

Dewatering of Vault Lake area began on June 27, 2013 and was suspended on October 22, 2013. A total of 2,364,000 m^3 of non-contact water was discharged into Wally Lake. The Vault dewatering was completed alongside the fishout of Vault Lake that occurred from July 19 to September 24. Please refer to Section 8.1.16 for a summary of the fishout.

The dewatering water was released into the environment without TSS treatment as Vault Lake water (as it was non-contact lake water - no mine related, contact water was discharged in 2013) was compliant with section 4 (1) of the MMER regulation and Part D Item 4 of the NWB Water License (discharge criteria).

Turbidity and Total Suspended Solids (TSS) were monitored daily at each operating pump and once per week in Wally Lake near the receiving outlet. In addition, pH and total aluminum were measured weekly from each of the operating pump. All of this data was previously reported to the NWB in the monthly monitoring reports. The sampling locations, named ST-DD-3 to ST-DD-5 and WLE for the receiving outlet, are highlighted on Figure 4 and Table 8.2 provides the results.

Turbidity values were measured in the field by AEM environmental technicians and quality control calibration for the field equipment is discussed in Section 8.1.13. The license criterion for turbidity is 30 NTU for the 24 hour maximum, and 15 NTU for the 30 day mean maximum. For TSS, the 24 hour maximum grab sample criterion is 22.5 mg/L and 15 mg/L for the 30 day mean maximum. No exceedences of the license criteria were observed during the dewatering.

The results of pH and total aluminum monitoring are also presented in Table 8.2. pH values were measured in the field by AEM environmental technicians; quality control calibration for field equipment is discussed in Section 8.1.13. The license criterion for pH is between 6.0 and 9.0. For total aluminum, the 24 hour maximum grab sample criterion is 3.0 mg/L and 1.5 mg/L for the 30 day mean maximum. There were no exceedences of water license criteria.

In addition there were no exceedences of MMER criteria during Vault dewatering activities. Please refer to Section 8.1.12 for more details regarding the MMER monitoring of Vault Lake Discharge.

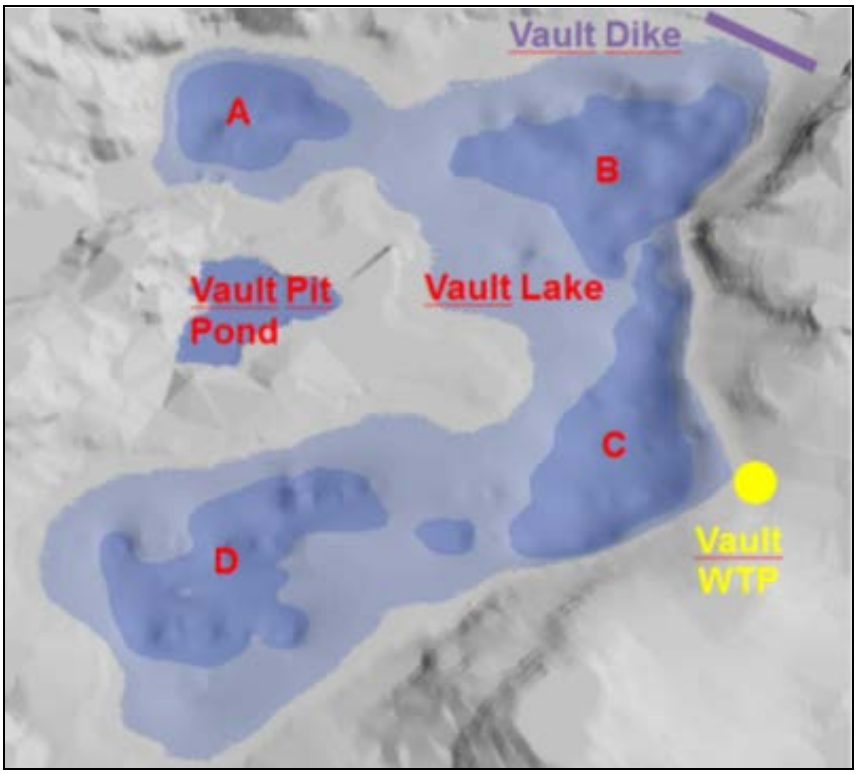


Figure 22 – Vault basin

Channel Crossing Inspections

Inspections of the Eastern and Central Channel Crossings were undertaken during the open water season in 2013 to ensure the banks of the channels were not being eroded as a result of the increase water flow due to the Attenuation Pond discharge in Third Portage Lake. The inspections were undertaken on June 30, July 30 and August 27, 2013 by AEM environmental technicians.

There were no signs of erosion of the channel banks and no visible turbidity plumes in the channels during any of these inspections. The discharge into Third Portage Lake from the attenuation pond has no adverse erosion effect on the channel crossings.

8.1.3 Water Collection System

A water collection system comprised of the stormwater management pond, attenuation ponds, ditches and sumps has been developed to control surface water for the Meadowbank project.

Surface water runoff around the mine site is directed to the attenuation pond, reclaim pond for the water accumulated at the base of Saddle Dam 1 or the stormwater management pond.

Stormwater management pond previously referred to as Tear Drop Lake collects runoff water as well as the STP treated effluent. A total of 96,000 m^3 of water was transferred to the North Cell TSF from July to September. The water was not released into the environment. This information is presented in Table 8.3.

Surface water was sampled monthly from the Attenuation Pond as per the requirements in the NWB Type A water license (sampling station ST-18), there are no applicable license limits. The data is presented in Table 8.4 for information purposes only. The location of sampling station ST-18 is illustrated on Figure 1.

In 2011 a sump was constructed in the North Portage pit in an area of water accumulation. Water from the North Portage Pit sump was sampled monthly during open water as per the requirements in the NWB water license (sampling station ST-17). However, in 2013 there was no surface water collected to permit sampling. As a result ST-17 was not sampled in 2013; the sampling location is illustrated on Figure 1.

In 2013, water from the South Portage Pit sump was sampled monthly during open water as per the requirements in the NWB water license (sampling station ST-19). The data is presented in Table 8.5; the sampling location is illustrated on Figure 1. There are no applicable license limits for this data as the water was not directly released into the environment; the data is presented for information purposes only; these data are evaluated in Section 4 of the report related to pit water quality predictions. As in the past, water from the East Dike seepage (ST-S-1) was pumped to ST-19, collected in this sump and ultimately pumped to the Attenuation Pond or the Stormwater Management Pond. As of January 2014 East Dike seepage is discharged to Second Portage Lake.

From January to August, the South Portage Pit water was pumped to Stormwater Management Pond; from September to December, the water was pumped to the Attenuation Pond. A total volume of 440,190 m^3 (including approximately 275,000 m^3 from East Dike Seepage) was transferred; the volume of water per month is provided in Table 8.3.

Water accumulated at the base of Saddle Dam 1 was pumped into the reclaim pond within the Tailings Storage Facility. This water originates from non-contact surface runoff from the surrounding terrain. Water samples were collected during the open water season to assess water quality. There are no applicable license limits for this location as the water was not been released into the environment; the data is presented in Table 8.6 for information purposes only. The sampling location (ST-S-2) is illustrated on Figure 1.

In 2012 a sump was constructed in the Bay Goose pit in an area of water accumulation. Water from the Bay Goose pit sump was sampled monthly during open water as per the requirements in the NWB water license (sampling station ST-20). The data is presented in Table 8.7; the sampling location is illustrated on Figure 1. The water that was collected in the Bay Goose pit sump was transferred to the Attenuation Pond. A total volume of 302,011m^3 was transferred; the volume of water per month is provided in Table 8.3. There are no applicable license limits for this data as the water was not directly released into the environment; the data is presented for information purposes only.

The North Cell diversion ditches, which divert non-contact around the tailings storage facility and a portion of the waste rock storage facility (also referred to as the West diversion ditch - which discharges into Third Portage Lake and East diversion ditche – which discharges into NP2) were constructed in 2012 to collect non-contact water. Water from the West diversion ditche (sampling station ST-6) and East diversion ditch (sampling station ST-5) was sampled monthly during open water as per the requirements in the NWB water license. The data is presented in Table 8.8 and Table 8.9 respectively; the sampling location is illustrated on Figure 1. You will find in Appendix G2 the As-built for the diversion ditches sent to NWB on August 8, 2013.

8.1.4 Tailings Storage Facility, Reclaim Pond, Attenuation Pond and Waste Rock Storage Facilities

The following section reviews the water quality monitoring that is conducted, at the Tailings Storage Facility, Attenuation Pond and the Waste Rock Storage Facility (PRSF), during the operational phase of the mine.

8.1.4.1 Tailings Storage Facility

The Tailings Storage Facility (North Cell) became operational in February 2010. Water from the Tailings Reclaim Pond is sampled, as per the requirements of the NWB water license (sampling station ST-21 – NWB License Table 2). There are no applicable license limits for this station as the water is used as reclaim water at the mill. Sample results are presented in Table 8.10. See Figure 1 for the location of ST-21.

8.1.4.2 Waste Rock Storage Facilities

The Portage Waste Rock Storage Facility (PRSF) has been in operation since 2009. In 2013, ponded water was observed at the south-east base of the PRSF (sampling station ST-16). Monthly samples were collected to assess water quality and the results are presented in Table 8.11. Water volumes pumped from this location and deposited in the North Cell TSF are located in Table 8.3. There are no applicable license limits at this location as there is no discharge to the environment; the data is presented for information purposes only. The location of this sampling station (ST-16) is illustrated on Figure 1.

During an AANDC Water License inspection on July 29 – 30, 2013 it was observed that "red" colored seepage from the south-east side of the Waste Rock Storage Facility at sample location ST-16 was migrating through the road perimeter into Lake NP-2. Following this observation, AEM increased pumping of the seep water to prevent migration through the road. By August 4, AEM had lowered the level in the seepage area to the point where it was felt that the seepage through the road had stopped. In Appendix G3 you will find the "*Preliminary AEM Report – Seepage Water From Waste Rock Storage Facility – Sample Location ST-16*" that was forwarded to regulators. Please refer to this document for a complete preliminary investigation regarding the historical background, cause, monitoring, result, and action plan.

From August 26 to September 1, a Waste Rock Plug/Dike was constructed, and continual sump pumping occurred. AEM also increased monitoring and a request to advise on seepage causes and recommendations for solutions was submitted to a third party consulting firm.

On November 8, AEM received an AANDC Inspector's Direction (Order) regarding the RSF Seepage into NP-2 and on November 20, AEM sent a response to this Inspector's Direction (Appendix G4). In this Inspectors' Direction, AANDC requested that AEM conduct an investigation and develop a Plan in consultation with an independent engineering firm. The independent engineering firm report from Golder and Associates, which includes recommendations, was submitted to AANDC in response to the Inspector's Direction and is attached as Appendix G5.

On November 15, AEM received an email advising that AANDC Field Operations Division has initiated an investigation in regard to the incident that was discovered during the AANDC July 29 – 30 Inspection. The investigation has been initiated for the purpose of gathering additional information in regard to alleged violations under subsection 12 (1) of the Nunavut Waters and Nunavut Surface Rights Tribunal

Act. AEM also received, on November 15, an email advising that Environment Canada Environmental Enforcement Division has initiated an investigation. The investigation has been initiated for the purposes of gathering additional information in regard to alleged violations under subsection 36(3) of the Fisheries Act. The investigation is still ongoing.

On January 29, 2014 a meeting was held with KIA and their consultant in Rankin Inlet to discuss the RSF seepage. AEM plans to continue our monitoring program at NP-2 Lake and will add stations requested by the KIA (which included monitoring at NP-1, Dogleg and Second Portage Lake, for the parameters specified by the KIA). Monitoring will start at these locations during freshet and will continue throughout the open water season. Monitoring of the seepage at Portage waste rock storage facility will continue in 2014 at ST-16 and NP-2 Lake.

Furthermore, AEM will be implementing a freshet action plan that will include the RSF seepage at ST-16, as a proactive measure to ensure non-contact and contact water is effectively monitored, diverted, controlled and managed. In addition, several guiding principles are applicable to the formation of this plan. The highest priority principles are 1) to ensure that mine contact water from runoff or seepage is managed to prevent any environmental impacts, 2) to ensure that the health and safety of AEM employees is protected, especially with respect to mining operations when excess water is present (i.e. pit wall seepage, ice melt in pit walls, etc.) and 3) to make sure the site is in compliance with the Nunavut Water Board (NWB) License, Part D, Item 33 and Part E, Item 9.

AEM's work plan in 2014 for the ST-16 seepage will include, as a minimum, implementing the Golder recommendations that can be found in the report "*Rock Storage Facility Seepage - Meadowbank Gold Mine, Nunavut*" (Appendix G5). These recommendations will also be included in AEM's Freshet Action Plan. The six recommendations are as follows:

1. AEM should continue to develop and maintain tailings beaches adjacent to RF1 and RF2 and to operate the Reclaim Pond towards the centre of the TSF. These are the key recommendations.

2. AEM should consider the installation of additional water management infrastructure which could take the form of a permanent collection and pumping system at the sampling station ST-16 current sump. Also, consideration should be given for contact water ditches and sumps in the surrounding areas of the RSF if additional seepages of contaminated water are observed in the future.

3. The seepage at station ST-16 should continue to be collected and redirected to the TSF and monitored (location, quantity, quality). Continued monitoring is strongly recommended during the winter for seepage water quantity monitoring and possible development of an ice plug in the RSF. The area at ST-16 should be kept clean of snow to allow visual observation and to ensure that water at ST-16 does not overflow over the till plug into Lake NP-2.

4. Regular inspections all around the RSF should be performed, particularly during freshet, to ensure that runoff or any observed seepage is controlled and monitored prior to being released into the environment if the analyses results meet the requirement.

5. AEM should continue to monitor the tailings and waste rock freeze back following the Thermistor Monitoring Plan in accordance with Part 1, Item 11 of the Type-A water license.

6. AEM should provide the results of the 2014 monitoring to Golder for review and comment.

8.1.4.3 Attenuation Pond

The water collected in the Attenuation Pond was discharged through the diffuser to Third Portage Lake as effluent, from August 22 to October 18, 2013, after being treated at the onsite WTP for TSS removal. Samples were taken weekly from the discharge (ST-9) as per the requirements of the Water License and MMER. Results are detailed in Table 8.12 and the location of ST-9 is shown on Figure 1.

On August 22, a daphnia toxicity testing failure occurred. This constitutes a non-compliance with Water License Part F, Item 24 discharge criteria. However it is not considered as non-compliance with MMER. The August toxicity sampling was undertaken the same day that the WTP was started (August 22). Following receipt of the toxicity results, AEM conducted another trout and daphnia acute lethality test on September 9. The test results showed 0% mortality for trout and daphnia. Another test was also done on October 7 and results showed 0% mortality for trout and daphnia. An investigation was made following receipt of the August 22 results, but no cause could be identified. AEM reviewed the Portage Attenuation Pond analysis results, the weekly effluent monitoring results for deleterious substance and the effluent characterization results from August 22 and no parameters exceeded the maximum authorized concentration. Therefore the Daphnia toxicity that occurred on August 22 is considered as a one-time event. As the September and October results show no mortality, it's difficult to identify a cause for this daphnia toxicity.

All other results were in compliance with Water License Part F, Item 2 for effluent quality limits with the exception of aluminium on October 2 and 7, 2013. The aluminum concentration was 2.16 mg/L and 1.96 mg/L, respectively, exceeding the license limit of 1.5 mg/L as a maximum grab sample. AEM did not exceed the monthly average concentration limit. The source of the elevated level of aluminium appears to be from the coagulant used in the water treatment plant, and the fact that the WTP was started and stopped several time before October 18. This makes it difficult to optimize coagulant dosage.

8.1.5 Mine Site

Other locations for water quality monitoring at the mine site include runoff from the landfill and water collected in the secondary containment area of the bulk fuel storage tank. The site layout is presented in Figure 1.

Sewage Treatment Plant

The Meadowbank mine site has one Seprotech L333 sewage treatment plant (STP) and three Little John 100 units in operation; the equipment operates together with one sewage discharge stream directed to the Stormwater Management Pond. This water is collected and is not discharged into the receiving environment; if needed water is pumped into the Tailings Storage Facility.

Samples are taken in accordance with *Operation & Maintenance Manuel – Sewage Treatment Plan (Aprils 2013)* for the purpose of determining operating efficiency of the units. In February 2013, AEM reduced sampling frequency to once every two weeks and to once per month in May 2013. The reasons for the sampling frequency reduction are:

- Sampling data from the last three years certainly indicates that units are operating as designed and show little variability in the results;

- Raw sewage stream has not significantly changed over the years;
- Operators do daily operational inspection and perform weekly maintenance and repairs, if necessary. The daily operational inspections identify problems efficiently and quickly and have proven to be as effective as sampling;
- If there is major problem or failure in the RBC it would be most likely due to changes in the influent (raw sewage) i.e. high strength sewage (BOD high) killing bacteria in the RBC. In this case, there would be visible effluent problems (part of daily operational checks), low dissolved oxygen (part of daily operational checks) and increased odours that the operator would note. If this occurs, a sample will be taken to try to determine the source of the problem; and
- RBC effluent is not discharged to the environment and is contained in the Stormwater management pond.

Sample results are available in Table 8.13. Results of the sample analysis are submitted to the NWB in monthly the monitoring reports.

The total volume of treated sewage discharged in 2013 was 28,029 m^3. In addition 360.7 m^3 of sewage sludge was collected and disposed of in the Tailings Storage Facility. A monthly summary of the volume of STP waste is presented in Table 8.14.

Landfill

No water quality monitoring was completed at the landfill in 2013 as no water pooled or was apparent in the area. The total volume of waste transferred to the landfill in 2013 is 14,024 m^3. A monthly summary of the solid waste disposed at the landfill is presented on Table 6.1.

Landfarm

The Meadowbank landfarm was constructed at the end of 2012. In 2013, following the freshet a very small pool of water was identified in the landfarm, and a sample (ST-14) was taken on June 2, 2013 and analyzed for BTEX, total oil and grease, and lead. All results were below detection limits. No seepage was identified, and the volume of water present did not warrant pumping. Sample results are available in Table 8.15.

Meadowbank Bulk Fuel Storage Facility

Water collected in the secondary containment area of the bulk fuel storage tank at the Meadowbank mine site was sampled on May 28 and October 7, 2013. The data is presented in Table 8.16 and the sampling location (called MB-fuel) is highlighted on Figure 1. No water quality parameters exceeded the water quality limit stipulated in Part F, Item 6 of the water license. As a result, 480 cubic meters were discharged on June 18 to the Stormwater Management Pond by a pipe from the secondary containment area of the Meadowbank bulk fuel storage tank. Notifications to the AANDC Inspector, made in accordance with Part F, Item 8 of NWB License 2AM-MEA0815, were sent May 29 and September 27, 2013, but AEM only discharged water one time in June 2013. AEM didn't discharge water at the end of September as per the notification because the water was frozen in the secondary containment when we

received the result from the accredited laboratory. The water license allows for this water to be discharged to land if the results indicate that license criteria is met; otherwise it can be discharged to Stormwater Management Pond.

8.1.6 Baker Lake Marshalling Facilities

The design of the Baker Lake marshalling facility includes a number of facilities that were not constructed. This include: two storage ponds to collect site precipitation runoff (east and west), an explosives storage area and an ammonium nitrate storage area. Consequently, no water quality monitoring of these facilities was conducted as these facilities as they do not exist.

In 2013, the Jet-A tank farm was modified in compliance with the Licence 2AM-MEA0815 Amendment No.1 - Marshalling Area Bulk Fuel Storage Facility Expansion. This amendment allows AEM to have 2 ML Jet-A fuel tanks installed to supply fuel for the aircrafts flying into the Meadowbank mine site. In 2013, AEM installed at Baker Lake Marshalling Facility that consisted of 20 tank of 100,00L each. You will find in Appendix G20 the Baker Lake As-built report. The location of these sampling stations (ST-40.3) is illustrated on Figure 3. Water collected in the secondary containment areas of the Jet-A storage tanks at Baker Lake was sampled on October 6, 2013. The samples for the Jet-A tank farm were analyzed for oil and grease, BTEX and lead; the results are presented in Table 8.17. One parameter, lead (0.022 mg/L), exceeded the water quality limit (0.001 mg/L) stipulated in Part F, Item 6 of the Water License. As a result, no water from the Jet-A secondary containment was discharge to the land in 2013.

Water collected in the secondary containment areas of the diesel bulk fuel storage tanks at the Baker Lake marshalling facility was sampled on May 27 and October 6, 2013 prior to discharge in accordance with Water License conditions. Notification to AANDC Inspector, made in accordance with Part F, Item 8 of NWB License 2AM-MEA0815, were sent May 29 and September 27, 2013, but AEM only discharge water from the containment in Baker Lake in June 2013. AEM didn't discharge water at the end of September as per notification because the water was frozen in the secondary containment when we received the result from the accredited laboratory. The samples for the diesel tank farm were analyzed for hydrocarbons, metals, ammonia, conductivity and TSS. Two parameters, lead (0.0058 mg/L) and TSS (35 mg/L), on May 27 sample for Tanks 1 to 4 exceeded the water quality limit (lead: 0.001 mg/L and TSS ; 30 mg/L) stipulated in Part F, Item 23 in the Water License. On June 12, AEM reanalyze lead and TSS for water in the secondary containment for Tanks 1 to 4. Following reception of results, AEM allow the discharge of approximately 3.5 million liters of water on the East side of the tank farm, on the land. On October 6, one parameter, lead (0.0203 mg/L), also exceeds the water quality limit for Tanks 1 to 4 so no discharge of the water from the secondary containment was discharge to the land.

No parameters exceed the water quality limit for Tank 5 and 6. Only one discharge from the secondary containment area of the bulk fuel storage tank at the Baker Lake marshalling facility occurred in June 2013. Approximately 1.5 million liters of water was discharged on the East side of the tank farm, on the land. The location of these sampling stations (ST-40.1 and ST-40.2) is illustrated on Figure 3 and results are presented in Table 8.17.

As part of the Core Receiving Environment Monitoring Program (CREMP), water quality samples are collected at stations on Baker Lake during the open water season. Four monitoring stations are sampled; one at the Baker Lake community barge dock, one at the Baker Lake marshalling area, and two at upstream reference locations. These marshalling area monitoring station meet the sampling requirements of ST-37. For more details, please refer to the report entitled ''*Core Receiving Environment Monitoring Program 2013"* prepared for AEM by Azimuth Consulting Group, attached as Appendix G6.

8.1.7 All Weather Private Access Road (AWPAR) and Quarries*

A geotechnical structural inspection of the AWPAR, including all culverts, bridges and quarries, was conducted by Golder Associates in 2013. The findings are presented in the report entitled '*2013 Annual Geotechnical Inspection, Meadowbank Gold Mine, Nunavut*', attached in Appendix B1.

According to Fisheries and Oceans Canada (DFO) Authorizations NU-03-0190, NU-03-0191.3 and NU-03-0191.4, AEM maintains a *Habitat Compensation Monitoring Plan* (HCMP; AEM, 2014) to ensure that fish habitat compensation features are constructed and functioning as intended. Based on the schedule described in the HCMP, monitoring of compensation features currently occurs every 2 years (this was discussed with DFO, and revised in HCMP (AEM, 2014) which is found in Appendix I1).

In 2013, monitoring was conducted for the constructed spawning pad, located at stream crossing R02 along the all-weather access road (AWAR) as per authorization NU-03-0190 Condition 6. Monitoring was not required for the mine site habitat compensation features according to the final HCMP and DFO Authorizations. As described in the schedule of monitoring events, the AWAR study included a visual assessment of stability, as well biological monitoring to confirm use by Arctic grayling. The field analysis was conducted from June 14 – 29, 2013. The major component of the program consisted of length and weight measurements and maturity identifications of adult fish captured in hoopnets. Nets were set to capture both upstream and downstream movements, and were set as soon as ice conditions allowed. Additionally, reproductive success in this reach was assessed using larval drift traps.

The constructed spawning pads were visually confirmed to be stable as designed. Rates of shifting of material have not exceeded expectations at construction. Generally, condition factors of adult fish, population size distributions and timing of migration were within the range of values seen in previous years, confirming continued use of this area by Arctic grayling. It is suspected that the primary upstream migration occurs below ice cover or immediately at ice-off, since Arctic grayling larval drift has been consistently caught within 1-3 days of study initiation. Larval drift rates of collection continue to exceed those observed prior to construction of the spawning pad, suggesting a positive impact on Arctic grayling reproduction, either through direct use or reduced pressure on upstream spawning areas.

Overall, the constructed spawning pads have not only increased the quantity of high-value habitat, but appear to be effectively increasing production rates in the local population. You can found in Appendix G7 the complete report entitled "*2013 Habitat Compensation Monitoring Report*".

8.1.8 Seepage

As required by Water License 2AM-MEA0815 Part I, Item 16: ***The results and interpretation of the Seepage Monitoring program in accordance with Part I, Item 15***

The Seepage Monitoring program includes the following locations:

- **Lake water Seepage Through Dewatering Dikes;**
- **Seepage (of any kind) Through Central Dike;**
- **Seepage and Runoff from the Landfill(s);**
- **Subsurface Seepage and Surface Runoff from Waste Rock Piles;**
- **Seepage at Pit Wall and Pit Wall Freeze/Thaw; and**

* TSM- Biodiversity and Conservation Management

Permafrost Aggradation.

Lake water seepage through dewatering dikes

As mentioned in Section 3.1.1 c, seepage rates and volumes through the East dike have been stable for the past fourth years.

Water samples were collected monthly from January to November. The sampling station (ST-S-1) includes seepage from the north and the south East dike, as the water was pumped from the sump to the attenuation pond in 2013. There are no applicable license limits for this data and it is presented in Table 8.18, for informational purposes only. The sampling locations are highlighted on Figure 1. Seepage water collected at the East dike was pumped to the Portage South Pit basin. Approximately 275,000 m^3 of water was pumped.

In 2013, AEM applied for a modification to the Type A water license Part F, Item 4 to include East dike seepage water as non-contact water effluent. AEM has proposed to discharge seepage water from Second Portage Lake (SPL) pump through a separate sump collection system and diffuser, back to Second Portage Lake prior to contact with mining activity (thus minimizing site contact water). In July 3 2013, AEM receive the NWB authorization to discharge the seepage water (from Second Portage Lake) back to Second Portage Lake (see Appendix G8 for approval letter from NWB). The discharge, back to SPL, started in January 2014 and all data related will be provide with the 2014 Annual report. The monitoring program will be part of the Core Receiving Environment Monitoring Program. The discharge must be compliant with Water License Part F, Item 4 for TSS and compliant with the MMER Regulation. In the NWB approval letter, the NWB ask to get a writing notification on how the MMER regulation will apply to this discharge. You will find in Appendix G8 the letter from Environment Canada advising that the effluent resulting from the discharge is subject to the requirement of MMER. The discharge water quality is not expected to cause adverse effects to aquatic environment. In compliance with Part G, Item 4, an as-built report will be done and provide in 2014.

As mentioned in Section 3.1.1 c, seepage rates and volumes through the Bay Goose dike are not significant. No seepage collection system has been implemented because there is no evidence of significant seepage that warrants collection.

There was no seepage found at the Vault Dike in 2013.

Seepage (of any kind) through Central Dike

No seepage was observed in 2013.

Seepage and runoff from the landfill

See Sections 8.1.5 above.

Subsurface seepage and surface runoff from waste rock piles

See Section 8.1.4 above.

Seepage at pit wall and pit wall freeze/thaw and permafrost aggradation

No seepage was observed in 2013 into Portage Pit.

The Goose Pit is currently experiencing significant seepage along the south, west, and north walls. Water in-flows were noted along the Bay Fault where it intersects the south wall of the Goose Pit. A sump is located at the south wall in the pit base and collects water in-flow from the Bay Fault and from water flowing down the ramp. Significant seepage and water inflows on the south and west walls of the pit were also noted. As per Golder's recommendations, it is suggested that the conceptual hydrogeological model be updated to incorporate the observations made during the site visit, and then compared with the previous groundwater model. The water in-flows appear to be greater than anticipated based on previous hydrogeological modeling. The flow rate of water of the main sump seepage was estimated by AEM to be about 0.4L/s, although it could be greater than this. Action will be taken in 2014 to have a better estimation of the flow. In Appendix B1 you will find the "*Annual Review of Portage and Goose Pit Slope Performance (2013) - Meadowbank Mine*" which includes more details regarding the seepage at the pit wall.

8.1.9 Groundwater

As required by NIRB Project Certificate No.004 Condition 8: Continue to undertake semi-annual groundwater samples and re-evaluate the groundwater quality after each sample collection; report the results of each re-evaluation to NIRB's Monitoring Officer, INAC and EC.

The results of the 2013 groundwater monitoring program are available in the report entitled '*2013 Groundwater Monitoring Report'* prepared by AEM, attached as Appendix G9.

The groundwater monitoring program was conducted from August to October 2013. In 2013, two monitoring wells were sampled (MW 08-02 and 08-03). Well MW-11-02, located east of the tailings storage facility, became obstructed with development materials during the 2012 groundwater monitoring program and therefore could not be sampled in 2012. Attempts were made in 2013 to remove the material, but these were unsuccessful. This well will be replaced in 2014.

As recommended in the 2012 groundwater monitoring report, a pit wall seep was added to the sampling program in 2013 to augment the monitoring data, and attempts were made to sample from production drill holes in August, September and October. While seep sampling was successful, production drill holes could not be effectively sampled since groundwater inflow was minimal and impacted from freshwater sources used in the drilling process. The collection of samples from production drill holes was not successful but AEM is of the opinion that this program is still feasible and will pursue sampling opportunities in 2014 (as recommended in Golder, 2012). The collection of one sample from a pit wall seep was successful in 2013 and AEM will continue to sample from this location (as long as seepage is present) and sample any additional seeps observed in 2014.

To obtain a sample from MW 08-03, AEM applied a saline solution in attempts to thaw an ice bridge that has blocked this well below the heat trace cables since it was installed. Although this is a common practice, and despite repeated purging over time, remnants of the sodium chloride solution could not be fully removed prior to sampling. This occurred previously during development of MW 11-01 when the sample chloride concentration was >10,000 mg/L as a result of drilling brine. Efforts will continue in 2014 to remove this blockage with steam, rather than saline, since the use of this solution impacted sample results in 2013 despite significant purging (although not to the degree observed at MW-11-01 in 2010). The addition of the saline solution to thaw monitoring wells is a common practice that is not expected to

adversely impact area groundwater, but results will be compared to 2014 results to verify this. However, concentrations of dissolved metals in the sample obtained from MW 08-03 are comparable to historical results and are still useful to assess mine impacts to groundwater.

Overall, concentrations of salinity-related parameters in samples collected from wells without salt water (MW-08-02 and pit wall seep) in 2013 were within the range of those observed historically in similar monitoring well locations on the mine site. Parameters indicative of tailings movement into groundwater (total cyanide and dissolved copper) were well below NWB license limits, and were similar to historical results, indicating no measureable movement of water from the TSF into groundwater.

8.1.10 Core Receiving Environment*

The CREMP (Appendix G6) focuses on identifying changes in limnological parameters, water and sediment chemistry, or changes to primary (phytoplankton) and secondary (benthic invertebrate community) aquatic producers that may be associated with mine development activities (at the mine site and in Baker Lake). This is accomplished through the application of a temporal/spatial trend assessment that includes application of quantitative decision criteria (i.e., early warning "triggers" and action "thresholds"; some of which were updated in 2013) to facilitate immediate and objective decision-making regarding appropriate management actions.

Meadowbank Study Lakes

CREMP monitoring started in 2006 and in-water mine development started in 2008. Key mine development activities that could result in changes to the aquatic receiving environment include: dike construction, dewatering of both lakes and impoundments, effluent discharge (2012 to present) and general site-related mining activities that mostly generate dust (e.g., rock crushing, blasting, ore and waste hauling). Key findings for 2013 are summarized below:

- Water Chemistry – There were some statistically significant mine-related changes (as compared to baseline) identified in 2013 at one or more near-field (NF) areas: total and bicarbonate alkalinity (SP), conductivity (SP, TPE & TPN), calcium (TPE) and TDS (SP & TPE) were elevated above their respective trigger values with statistically significant changes at one or more NF areas relative to baseline/reference conditions. These triggers were set at the 95th percentile of baseline data using an approach that evaluates a statistically significant trend as compared to baseline data, and were not derived from effects-based thresholds (e.g., CCME water quality criteria). While these results represent mine-related changes, the observed concentrations are still relatively low and unlikely to adversely affect aquatic life. These trends need to be reviewed again in 2014.

- Sediment Chemistry – Quantitative trigger analysis for sediment is based on coring results, which are scheduled to coincide with MMER EEM field studies (i.e., every three years); the next program will take place in 2014. Notwithstanding, visual trend analysis was conducted in 2013. The increasing trend in chromium concentrations in TPE continued in 2013 and exceeded the trigger value. No changes to benthic invertebrate communities were found to correspond with these results. Furthermore, these elevated levels of Cr have also been observed at PDL and TPS (reference stations). However, a follow-up coring study will be completed in 2014 to confirm

* TSM- Biodiversity and Conservation Management

the nature of the trend (i.e., to reduce residual uncertainty regarding the possibility of the results being due to a spatial trend).

- Phytoplankton Community – Statistically significant increases in total biomass (TPN, TPE, SP, TE & WAL) and taxa richness (TPN) were seen in 2013 relative to baseline/reference conditions. However, this apparent increase is due to a relative decrease in biomass at reference area INUG not an absolute increase at the near-field and mid-field areas, where results are fairly consistent with historical trends at those areas. While not apparently mine related, these trends should be watched again in 2014.

- Benthic Invertebrate Community – While the majority of near-field and mid-field areas showed apparent reductions in abundance and taxa richness relative to baseline/reference conditions, the only statistically significant adverse effect was a decrease (-46%) in abundance at far-field TEFF over the last three years combined. However, these results appear to be due to historically high abundance and taxa richness at reference area INUG, rather than absolute decreases at the near-field, mid-field or far-field areas, which generally tracked within baseline ranges. While these trends are not mine related, they should be watched in 2014.

Baker Lake

CREMP monitoring started in 2008. Key mine-related activities include barge/shipping traffic and general land-based activities associated with the tank farm area. No spills of fuels, hydrocarbons or any other materials occurred in the vicinity of the barge dock and jetty in 2013. No changes in the aquatic receiving environment were observed that were attributable to AEM's activities in Baker Lake. No follow-up management actions are required for 2014.

8.1.11 Blasting Activities*

As required by NIRB Project Certificate No.004, Condition 85*: develop a detailed blasting program to minimize the effects of blasting on fish and fish habitat, water quality, and wildlife and terrestrial VECs.*

As required by the NIRB Project Certificate No.004, Condition 85 and as part of the mine site fisheries monitoring in the DFO Authorization, AEM Meadowbank Division conducts monitoring to evaluate blast related peak particle velocity and overpressure to protect nearby fish bearing waters. Guidelines have been developed by DFO to protect fish and fish habitat from works or undertakings that involve explosives in or near fisheries waters.

The results of the 2013 blast monitoring program are available in the report entitled "*2013 Blast Monitoring Report for the Protection of Nearby Fish Habitat*" prepared by AEM, attached as Appendix G10.

Peak particle velocity (PPV) and overpressure monitoring data was recorded throughout 2013 during blasting activities at the North Portage Pit, South Portage Pit, Bay Goose Pit and Vault Pit. The Portage stations are located near the shoreline of Second Portage Lake and the station located on the Bay Goose Dike is near Third Portage Lake East Basin. In January 2013, AEM added a blast monitoring station at Vault, located between the Vault Lake and the Vault Pit, to evaluate blast levels and to be protective of fish in Vault Lake before the fishout.

* TSM- Biodiversity and Conservation Management

In 2013, PPV concentrations exceeded the DFO limit of 13 mm/s on 16 occasions over the entire year (n = 361 monitored blasts for the entire year). Nearly all of the exceedances were in Goose Pit operations due to the large pattern blasted and in Vault Pit as the blasts are pre-shear and were close to the monitoring station. The average PPV was 5.39 mm/s (CI +/- 0.39) with a maximum of 32.7 mm/s. The average was a bit higher than last year (5.09 mm/s in 2012). The upper 95% confidence limit for all of the annual data was 12.60 mm/s. The IPC measurements were all below the DFO limit of 50 kpa. From August 15 to June 30, during egg incubation, there were 12 exceedences of which 4 were in Vault, 1 in Portage Pit South and 7 in Goose Pit. At Vault, 3 of the 4 exceedance occurred from November to December once the Vault Lake fishout was completed. The blast monitoring results are reviewed after each blast and the blast mitigation plan was implemented immediately if the vibrations or the overpressure exceed the guidelines.

At Meadowbank, it is important to consider the location of the monitoring stations and distances to spawning and nursery habitat identified in the baseline habitat mapping. The closest high value habitat area is greater than 250m away from the monitoring station (Goose Pit station), thus incubating eggs would be exposed to significantly less PPV given the distance of the spawning and incubation site from the blast location compared to the distance from the blast to the monitoring station. As in the past, based on the monitoring station locations and comparison to Faulkner et al. (2006), periodic exceedances of 13 mm/s PPV with from the 2013 blasting are unlikely to impact salmonid incubation sites at the Meadowbank Mine site.

8.1.12 MMER and EEM Sampling

8.1.12.1 Portage Attenuation Pond Discharge

The Meadowbank gold mine became subject to the Metal Mines Effluent Regulations (MMER) on January 1, 2010 during the dewatering of Second Portage Lake. In 2013, the final effluent Water Treatment Plan (sampling ST-9, also named ST-MMER-1) still comes from the Portage Attenuation Pond and was discharging in Third Portage Lake (TPL) from August 22 to October 18. A total of 485,018 m^3 was discharged.

All water discharged to TPL is treated for TSS removal by the onsite WTP. Effluent monitoring samples were collected weekly for pH and TSS, other Schedule 4 parameters (arsenic, copper, lead, zinc and radium) and acute toxicity samples are analyzed quarterly, as per the approved 'reduced sampling frequency' program. The volume of water discharged to the environment is reported on a weekly basis under the MMER monitoring program and can be found on Table 8.19. On February 25th, 2014, AEM received an email from Environment Canada Inspector's informing AEM that we must return in normal frequency (once a week) for CN and Ni as soon as the discharge starts because the monthly mean concentration of CN and Ni exceeded 10 % of the value listed in Column 2 of Schedule 4. So, as per subsection 13(3) of the MMER, the reporting frequency of CN and Ni will be increased in 2014.

Under the Environmental Effects Monitoring (EEM) program, AEM collected one sub-lethal toxicity sample in 2013. As per subsection 6(1) *"[…] sub-lethal toxicity test under Section 5 shall be conducted two times each calendar year for three years and once each year after the third year […]*". As per the regulations, the sub-lethal toxicity was conducted twice a year from 2010 to 2012, and decreased to one sample event in 2013. The water quality samples were conducted from the discharge location, the receiving environment exposure area (TPN or ST-MMER-1-EEM-TPN) and reference area (TPS or ST-MMER-1-

EEM-TPS). These sampling locations are highlighted on Figures 1 and 2. Results of the MMER and EEM water quality monitoring programs are presented in Tables 8.20 and 8.21, respectively. The EEM effluent characterization monitoring samples were collected in August, September and October. Samples were collected from the exposure (TPN) and reference (TPS) areas in August and September. This data was previously reported to Environment Canada via the RISS electronic database reporting system.

There were no exceedences of the MMER water quality criteria in 2013. On several occasions there was no water quality monitoring completed as discharge did not occur; these sampling weeks are identified with 'NDEP' and parameters identified with 'NMR' on the table are not required due to the approved reduced sampling frequency program.

8.1.12.2 Vault Lake Discharge

In May 2013, AEM sent a request to Environment Canada to apply for implement a new discharge point. Vault Discharge (sampling ST-10, also named ST-MMER-2-EEM) has discharged into the receiving environment Wally Lake from June 27 to October 22 with a total discharged of 2,364,600 m^3.

In 2013, the TSS water treatment plan was not required as the dewatering of the Vault Lake water (non-contact with any mining activity) was compliant with section 4 (1) of the regulation. Dewatering discharge monitoring samples were collected weekly and acute toxicity sample monthly. The volume of water discharged to the environment is reported on a weekly basis under the MMER monitoring program and can be found on Table 8.22.

Under the Environmental Effects Monitoring (EEM) program, AEM was not required to collect sub-lethal toxicity sample at this discharge point as per subsection 5(2) of MMER regulation. The water quality samples were conducted from the discharge location, the receiving environment exposure area (WLE or ST-MMER-2-EEM-WLE) and reference area (TPS or ST-MMER-1-EEM-TPS). These sampling locations are highlighted on Figures 4 and 2. Results of the MMER and EEM water quality monitoring programs are presented in Tables 8.23 and 8.21, respectively. The EEM effluent characterization monitoring samples were collected in July, August and September. Samples were collected from the exposure (WLE) and reference (TPS) areas in July, August and September. This data was previously reported to Environment Canada via the RISS electronic database reporting system.

There were no exceedences of the MMER water quality criteria in 2013. However, in the first week of August, the weekly effluent monitoring sample did not take place following an oversight from the technicians. This omission is due to the confusion surrounding the Vault dewatering daily sampling schedule for which AEM was required to take, according to the NWB Water License 2AM - MEA0815, daily turbidity and TSS sample. You will find in Appendix G11 explanation sent to Environment Canada.

8.1.12.3 East Dike Discharge

In October 7, 2013, AEM also applied to add a new discharge point called East Dike Discharge. In 2013, there are two seepage collection points (North and South) on the west side of the East dike which collect Second Portage Lake seepage. Water will be pumped from both South and North seepage pump installation and will reconnect together before discharge through a diffuser into Second Portage Lake. The seepage water will be released into the environment, prior to contact with mining activity, without treatment as it is expected to be compliant with section 4 (1) of the regulation. If monitoring of the seepage detects levels near MMER or Water license parameters the seepage water will be directed to

the Portage Attenuation Pond for treatment before it is released via the Water Treatment Plan Discharge in Third Portage Lake. The discharge of East Dike seepage started on January 6th, 2014.

8.1.13 QAQC Sampling

As required by NIRB Project Certificate No.004, Condition 23: ***ensure that water quality monitoring performed at locations within receiving waters that allow for an assimilative capacity assessment of concern to regulators, be carried out by an independent contractor and submitted to an independent accredited lab for analysis, on a type and frequency basis as determined by the NWB; results of analysis shall be provided to the NWB and NIRB's Monitoring Officer.***

The objective of quality assurance and quality control (QA/QC) is to assure that the chemical data collected are representative of the material being sampled, are of known quality, are properly documented, and are scientifically defensible. Data quality was assured throughout the collection and analysis of samples using specified standardized procedures, by the employment of accredited laboratories, and by staffing the program with experienced technicians.

All chemical analyses were performed by Multi-Lab Direct in Val d'Or, Quebec, an accredited facility. All data from Multi-Lab underwent a vigorous internal QA/QC process, including the use of spiked samples and duplicate samples. All QA/QC data passed the laboratories acceptable limits. The laboratory certificates of quality control are presented in Appendix G1, following the corresponding certificates of analysis.

All toxicity tests were performed by Maxxam Analytique in Quebec City and Exova in Saint-Augustin-de-Desmaures, QC. Testing was conducted as stipulated in the corresponding Environment Canada Biological Test Methods. QAQC measures implemented by the lab, including the use of reference toxicants, met the acceptable limits. QAQC data is presented with the toxicity reports in Appendix G1.

Field blanks are laboratory bottles filled with deionized water in the field, and then treated as a normal sample. They are used to identify errors or contamination in sample collection and analysis. Duplicate field water quality samples are collected simultaneously in the field and used to assess sampling variability and sample homogeneity. The following presents the percentage of duplicate and field samples collected from each of the monitoring programs:

- MMER and EEM monitoring programs: 12 duplicate samples and 11 field blanks were collected from a total of 41 samples, representing 29.3%;
- Dewatering monitoring program: 54 duplicates samples were collected from a total of 189 samples, representing 28.6%;
- STP monitoring program: 6 duplicate samples were collected from a total of 57 samples, representing 10.5%;
- Surface water monitoring programs: 14 duplicate samples and 7 field blanks were collected from a total of 81 samples, representing 17.3%; and
- Bulk fuel storage facilities monitoring program: 2 duplicate samples and 2 fields blank were collected from a total of 9 samples, representing 22.2%.

This represents approximately 23.3% of the samples collected, which is higher than the QAQC program objective of 10%.

Analytical precision is a measurement of the variability associated with duplicate analyses of the same sample in the laboratory. Duplicate results were assessed using the relative percent difference (RPD) between measurements. The equation used to calculate a RPD is:

RPD = (A-B)/ ((A+B)/2)*100; where: A = analytical result; B = duplicate result.

RPD values may be either positive or negative, and ideally should provide a mix of the two, clustered around zero. Consistently positive or negative values may indicate a bias. Large variations in RPD values are often observed between duplicate samples when the concentrations of analytes are very low and approaching the detection limit. Consequently, a RPD of 50% for concentrations that exceed 10x the method detection limit (MDL) is considered unacceptable.

Results for the QAQC data are presented in Tables 8.25 to 8.29 for the MMER and EEM, STP, Surface Water, Bulk Fuel Storage Facility and Vault dewatering monitoring programs, respectively. The following is a brief summary of the QAQC results, per table:

- MMER and EEM: 0 parameters exceeded the data quality objectives. However, for 3 samples (original or duplicate) values are within the 10x MDL, second sample (original or duplicate) values exceeded the 10x MDL. This sample was not considered as exceeding the data quality objectives;
- Dewatering: 0 parameters exceeded the data quality objectives. However, for 1 sample (original or duplicate) the value is within the 10x MDL but second sample (original or duplicate) value exceeded the 10x MDL. This sample was not considered as exceeding the data quality objectives;
- STP: 2 parameters exceeded the data quality objectives;
- Surface Water: 8 parameters exceeded the data quality objectives. However, for 17 samples (original or duplicate) the values were within the 10x MDL but the other second sample (original or duplicate) values exceeded the 10x MDL. These samples were not considered as exceeding the data quality objectives; and
- Bulk Fuel Storage Facility: 1 parameter exceeded the data quality objectives.

The QA/QC plan was followed and samples were collected by qualified technicians or biologists. Given the high number of samples collected in 2013, it is common to have some RPD exceedances as a result of the discrete differences in the original and field duplicates. Given the variability of these exceedances (occurring with different parameters, on different dates for different sampling programs) and the high number of successful samples, it is evident that field QA/QC standards during water sampling were maintained during sampling in 2013. In the future, AEM technicians will continue to follow standard QA/QC procedures (AEM, 2009) for surface water sampling that requires the use of sample bottles that are provided by an accredited laboratory, proper handling and storage of bottles to prevent cross-contamination between areas and, if appropriate, thoroughly rinsing the sample containers with sample water prior to sample collection

There did not appear to be any trends with the parameters that exceeded the QAQC data quality objectives, nor were there any indications of sampling errors or variability. All of the results of the field blank samples were acceptable and all other duplicate sample parameters met the QAQC data quality objectives. Consequently, the QAQC results indicate that the data quality is sufficient to meet the objectives of the monitoring programs.

For field measurements, the following equipment is used:

- Analite NEP 160 Meter (turbidity);
- Oakton PCS35 Meter (pH and conductivity); and
- Hanna Multi-Parameter Meter (pH, dissolved oxygen and conductivity).

The calibration data regarding these instruments is presented in Tables 8.30 to 8.34 for Analite Meters #2 and #4, the Oakton PCS35 Meter and Hanna Meters 1 and 2, respectively.

QAQC methods and results for specific field programs are discussed separately in their respective reports; these field programs are presented in the Appendices listed below:

- Appendix G6: *Core Receiving Environment Monitoring Program 2013* – Sections 2.3 and 3.1;
- Appendix 16: *Air Quality and Dustfall Monitoring Report 2013* – Section 6;
- Appendix G9: *2013 Groundwater monitoring report* – Sections 5.3.

8.1.14 Water Usage

The volume of freshwater pumped from the surrounding lakes and used for the Meadowbank Gold Project is listed in Table 8.35. A total volume of 1,593,579 m^3 of freshwater was used for the project in 2013. This volume exceeds the 2AM-MEA0815 water license limit of 700,000 m^3 per year.

Meadowbank's current NWB License (2AM-MEA0815) permits Agnico Eagle Mines Ltd. (AEM) to obtain 700,000 m^3 per year of fresh water for domestic camp use, mining, milling and associated uses. Despite significant success at engineering solutions to optimize fresh water use, requirements are projected to continue to exceed the permitted rate. Increased fresh water use is due to higher than anticipated rates of ore processing, and an adjustment of the initial water balance model, resulting in a deficit of reclaimed water. Also, in February 2013, the reclaim water barge became unusable as a result of accidental shifting and intake of excess solids (mill slurry). This was also due to an overall lack of water in the reclaim pond. On February 21, 2013, ore processing began using fresh water only. Attempts were made to repair the barge, but were not successful, and due to frozen conditions, repositioning of the barge at this time was not possible. However, the reclaim road was extended and a diesel pump installed temporarily to obtain reclaim water. As a result of these conditions, fresh water use was higher than anticipated in 2013. AANDC has recommended that AEM apply for a license amendment.

In April 2013, AEM updated their water balance based on the unexpected problems with the reclaim water barge. Under the maximum use scenario, fresh water requirements for the mill in 2013 would be 1,608,104 m^3, or 184 m^3/h on average. In the remaining years of operation (2014 – 2018), fresh water use is expected to be lower, as reclaimed water usage returns to maximum capacity. Under the maximum use scenario, total fresh water requirements for the mill in 2014 – 2018 would be 1,080,000 m^3/yr, or 123 m^3/h on average. This is based on the 2012 Water Management Plan and Balance prepared by SNC (2013). In addition, 50,000 m^3/yr are required for the camp, and 2,400 m^3/yr are required for the emulsion plant.

Based on the situations described above on April 23, 2013 AEM submitted an application for an amendment to NWB License 2AM-MEA0815, Part E, Item 3, to permit the withdrawal of 1,870,000 m^3/yr in 2013, and 1,150,00 m^3/yr thereafter, for domestic camp use, mining, milling and associated uses. No significant impacts to the local aquatic ecosystem are anticipated as a result of the requested increase in

fresh water use, because the total volume withdrawn for mining under maximum use for 2010 – 2018 would be less than 2.5% of the volume of Third Portage Lake.

Nevertheless, AEM is developing an action plan to further reduce fresh water withdrawal by using attenuation pond water for mill processing and tailings deposition. The requested fresh water withdrawal rates are therefore considered to represent a conservative worst case scenario, in the case that the planned reductions are not successful. If successful, the actual fresh water use rates are estimated to be approximately 790,000 m^3/yr in 2014.

In July 2013, AEM was notified that a public hearing would be required with technical meetings for the License amendment. The Water license amendment pre-hearing conference and technical meeting was held in Baker Lake on October 16 – 17, 2013. The NWB advised at the Pre Hearing Conference that AEM must hold a workshop in regard to issues raised at the technical meeting related to annual reporting and final pit water quality but not related to the water use increase. The Workshop was held by AEM via WebEx on November 28 with AANDC, KIA, NWB and EC. You will find in Appendix 12 minutes of the meeting sent to attendees. On October 1, 2013, AEM received a correspondence from NIRB advising that freshwater use amendment is exempt from screening. The final written hearing was held on January 17, 2014. On January 24, 2014 AEM received correspondence from NWB advising that hearing record is closed and the Panel will issue, in due time, a decision report to AANDC regarding whether or not to issue the requested amendment, to the Type A Water License, to the Applicant. AEM is still waiting for the final decision.

The volume of reclaim water used in the mill in 2013 was 2,291,994 m^3. The volume of freshwater that is contained in the ore to the mill in 2013 was 44,862 m^3. The monthly volume pumped is detailed in Table 8.35.

8.1.15 Creel Survey Results

As required by DFO Authorization NU-03-0190 (AWPAR) Condition 5.2.4: ***Engage the local Hunter Trapper Organization(s) in the development, implementation and reporting of annual creel surveys within the water bodies affected by the Plan.***

And

NIRB Project Certificate No.004 Condition 51: ***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.***

In March 2007, a harvest study was initiated by Agnico Eagle in association with the Baker Lake Hunters and Trappers Organization (HTO) in order to monitor and document the spatial distribution, seasonal patterns and harvest rates of hunter kills before and after construction of the Meadowbank All-Weather Access Road (AWAR). The harvest study is conducted annually and is open to both Inuit and non-Inuit residents of Baker Lake who are at least 16 years of age. The harvest study focuses primarily on terrestrial wildlife harvests; however, creel results are also recorded by the harvest study administrator in support of on-going creel surveys.

As in the past, the highest total catches were observed in the summer months (June and July). Spring (April, May) and winter (November, December) also show more fish caught than at other times of the year. No unusually high peaks of total fish harvest were observed in 2013. Reported total fish catch was the lowest it has been since 2009; however, participation rates and fishing effort were also low in 2013

(and at levels similar to 2009). Standardized results indicate that the highest number of catches per participant occurred in November and December, when fewer participants are fishing but catches were higher. However, these data are based on only one participant's reported fish catch (Lake Trout and Lake Whitefish) for each of these winter months in 2013. Most fishing activity (i.e., most number of participants) occurred in June (11 participant records) and July (nine participant records). Similar seasonal patterns have been observed in other years (although winter fishing in 2011 and 2012 involved more participants than in other years). The average monthly catch per participant was comparable to median monthly trends from the historical dataset (2007 to 2013 inclusive). Participant harvest rates were at or below historical minimums for offseason periods in 2013 (January to March, August to October).

Arctic Grayling catch continues to remain low across years. Arctic Char catch in 2013 returned to levels consistent with previous years (although with less reported fishing effort in 2013, Arctic Char catch was higher than expected). After two years of high Lake Trout harvest, this year's total harvest appears to be more in line with past trends, taking into consideration changes in participation and reporting rates. Lake Whitefish catch continues to vary widely between years. After generally increasing for the past three years, total catch of Lake Whitefish was at its lowest level in 2013.

The majority of participants continue to fish around the perimeters of Baker Lake and Whitehills Lake, and high fishing rates were also reported for Whitehills Lake in 2007 and 2008 prior to AWAR construction. Very few participants traveled north of Whitehills Lake in 2013. Thus, unless fishing trips are tied to hunting trips, it would appear that study participants are less willing to travel long distances to catch fish, regardless of AWAR access, likely due to the abundance of fish in close proximity to the Hamlet of Baker Lake. However, fishing trips in 2013 did appear to be centred along the southern portion of the AWAR, as has been seen historically. Based on the number of reported trips in the 2013 creel survey, it appears that fishing effort is decreasing, or, as observed with the hunter harvest study, study participation and reporting rates could be on the decline.

The results of the creel survey are available in the report entitled *'2013 Hamlet of Baker Lake Harvest Study – Creel Results'* prepared by Nunavut Environmental Consulting Ltd, attached as Appendix G13.

8.1.16 Fish-out program summary*

As required by NIRB Project Certificate No.004 Condition 49: ***develop, implement and report on the fish-out programs for the dewatering of Second Portage Lake, Third Portage Lake and Vault Lake.***

As required by DFO Authorizations NU-03-0191.4 Condition 2.1, 2.2, 2.2.1;

The final fish-out program planned for the Meadowbank site took place from July 19 – September 24, 2013 at Vault Lake. This fish-out followed protocols developed in the Vault Lake Fishout Work Plan (April 2013) in consultation with the retained fisheries consultant (North/South Consultants Ltd.) and Fisheries and Oceans Canada (DFO).

This project consisted of two phases; the "CPUE phase" in which fish removal was undertaken during the daytime only (to maximize successful transfer to adjacent Wally Lake), and the "final removal phase" (on September 4th) in which nets were also set overnight to maximize total catch.

* TSM- Biodiversity and Conservation Management

During the fish-out, a total of 3,183 fish were captured, with a total weight of 901 kg. Of these, 1,801 fish (57%) were successfully transferred to Wally Lake. Abundance and biomass for each species is shown in the Table below.

Table 8.36 - Total abundance and biomass by species for the fish-out of Vault Lake.

Species	Abundance		Biomass	
	# Fish	%	kg	%
Arctic char	101	3	49	5
Lake trout	1894	60	563	62
Round whitefish	1123	35	274	30
Burbot	65	2	15	2
TOTAL	**3183**	**100**	**901**	**100**

Length and weight were recorded for all fish captured (unless adverse weather conditions prohibited use of the scale). Gender and maturity were also recorded for all fish that did not survive (1361 fish). A subset of fish (112) that did not survive underwent a detailed biological assessment including stomach fullness, ovary weight, weight of 100 eggs, liver weight and examination for obvious deformities, erosions, lesions, and tumors (DELTs) and parasites. Fish were generally determined to be in good health, with average condition factors >1 for all species except burbot (similar to 2010), and a 5% incidence of DELTs or parasites.

The Fishout Summary report can be found on Appendix G14.

8.2 NOISE MONITORING

As required by NIRB Project Certificate No.004 Condition 62: ***Develop and implement a noise abatement plan to protect wildlife from significant mine activity noise, including blasting, drilling, equipment, vehicles and aircraft; sound meters are to be set up immediately upon issuance of the Project Certificate for the purpose of obtaining baseline data, and monitoring during and after operations.***

The 2013 noise monitoring program at Meadowbank was conducted in support of the Noise Abatement and Management Plan (AEM, 2009; 2013). In Appendix G15 you will find the complete report. The objective of the 2013 program was to measure noise levels at five previously determined monitoring locations around the Meadowbank site, over at least two 24 h periods.

While monitoring was conducted for a total of 23 days, the total amount of available data was reduced due to equipment malfunction, difficulties with software and filtering of the data recorded outside optimal weather conditions. However, one to two days of valid records were available for all stations except R1.

Since noise levels vary constantly over time, the monitoring instrument used at Meadowbank measures acoustical energy near-continuously and reports a single number for each minute, representing the “equivalent sound level” (Leq). Daytime, nighttime, 10-11pm and 24 h Leq values are shown for each monitoring location in Table 8.37.

No Leq values exceeded target sound levels of 55 dBA (daytime) and 45 dBA (nighttime). Since no Leqs were elevated as a result of mine activity, no additional mitigation measures or changes to the monitoring program are recommended at this time.

Table 8.37 - Daytime, nighttime, 10-11pm and 24 h Leq values for monitoring locations R1 – R5 and total hours of valid data available to calculate each Leq.

Site	Dates (2013)	$L_{eq, day}$ 7am-11pm (dBA)	Total Hours	$L_{eq, night}$ 11pm-7am (dBA)	Total Hours	$L_{eq, 1 h}$ 10pm-11pm (dBA)	$L_{eq, 24 h}$ (dBA)	Total Hours
R2	Sept. 7	-	-	-	-	-	36.4	5
	Sept. 9	51.7	11	40.1	8	47.7	44.2	21
R3	Jul. 12	34.1	10	-	-	-	34.1	10
	Jul. 13	-	-	41.2	4	39.7	40.6	6
	Jul. 14	-	-	37.4	8	-	36.6	10
	Jul. 15	41.9	9	39.5	8	38.5	41.2	16
R4	Jul. 27	35.4	9	-	-	36.1	35.4	9
R5	Aug. 12	-	-	42.7	6	-	42.0	11
	Aug. 13	41.1	5	44.6	8	-	45.0	17
	Aug. 14	43.1	16	39.0	8	28.7	38.1	17

8.3 AIR QUALITY MONITORING

As required by NIRB Project Certificate No.004 Condition 71*: 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*

The 2013 air quality and dustfall monitoring program at Meadowbank was conducted in support of the Air Quality Monitoring Plan - Addendum (Golder, 2008) and Air Quality and Dustfall Monitoring Plan - Version 2 (updated plan, November, 2013). This updated plan was developed to reflect current procedures, and includes no major changes to monitored parameters, locations or methods. You will find in Appendix G16 the "*2013 Air Quality and Dustfall Monitoring Report*".

The objective of the 2013 program was to measure dustfall, total suspended particulates (TSP), PM10, PM2.5 and NO_2 at four monitoring locations around the Meadowbank site. Locations were established in 2011 in consultation with Environment Canada.

Results obtained for the measured parameters were compared to Government of Nunavut (GN) Environmental Standards for Ambient Air Quality (October, 2011) for TSP, PM2.5 and NO_2; BC Air Quality Objectives (August, 2013) for PM10; and Alberta Ambient Air Quality Guidelines (August, 2013)

for dustfall. The Canadian Ambient Air Quality Standards for PM2.5 (May, 2013) are also referenced, although Nunavut has not yet incorporated these objectives into territorial guidance documents.

Of sixty-three TSP samples obtained, one exceeded the relevant GN standard of 120 µg/m^3, with a concentration of 459 µg/m^3. This sample was more than four times higher than the next highest measured concentration, and was obtained from DF-2, which is located immediately south (downwind) of the main mine plant area and adjacent to the TCG contractor area. Annual average TSP values at each station did not exceed the GN standard for that time period of 60 µg/m^3. No samples exceeded relevant standards or objectives for PM10 or PM2.5.

The Alberta recreational area guideline for dustfall was exceeded in 11 out of 43 samples, which is similar to 2012 (10 exceedances). The industrial area guideline was exceeded in only one sample. The GN annual average standard for NO_2 of 32 ppb was not exceeded, with a maximum monthly average of 5.3 ppb.

In addition, PM10 data from 2012 was re-analyzed based on comments received during the 2012 Annual Report review by NIRB. This analysis rectified a calculation error which had resulted in significantly over-estimated concentrations, and presents a comparison to the BC Air Quality Objectives (August, 2013) for PM10. No suspended particulate samples from 2012 exceeded the relevant standards or objectives.

In addition to required Air monitoring sampling, , in 2012 a preliminary study of dustfall was conducted along the AWAR to address concerns by NIRB and the Baker Lake Hamlet. The primary objective of the dustfall study was to characterize dust deposition based on proximity to the roadway and to compare rates of dustfall to those on the mine site. Overall, rates of dustfall along the AWAR were within the range of Alberta Environment's ambient air quality guidelines (recreational or industrial). Dustfall rates were not significantly different between 100 and 150 m from the road, and these rates were not significantly different from those at the mine site, it is likely that elevated rates of dustfall are confined to < 100 m from the road. This initial study was used to assess methods, and assist in the design of the larger scale study that was completed in 2013. The report of the 2012 study can be found in Appendix G7 of the 2012 Annual report.

In 2013, AEM conducted a second study of dustfall along the all-weather access road (AWAR) at the Meadowbank site to determine whether impacts predicted in the Final Environmental Impact Statement (FEIS) are being exceeded. The memorandum "*Evaluation of dustfall along the Meadowbank AWAR in 2013*" found in Appendix G16 presents the results of the study. The main objective of the AWAR dustfall study was to determine whether dustfall rates decline near background levels within the smallest denoted zone of influence (ZOI) (100 m from the road). If so, it is assumed that dustfall is not affecting valued ecosystem components (VECs) outside the ZOI. If dustfall rates are exceeding background levels outside the ZOI, there is the potential for impacts to vegetation and wildlife to be higher than predicted (i.e. >1% change), and direct analyses of these VECs may be warranted (e.g. vegetation or breeding bird surveys).

To do that, dustfall canisters were deployed to the ground level from August 10 to September 11, 2013, and calculated dustfall rates were normalized to 30 days. Sampling canisters were deployed at 50 m, 100 m, 150 m, 300 m and 1000 m from both sides of the road (east and west) in two duplicated transects. Sampling transects were located perpendicular to road segments that are relatively straight with few notable topographical features, in order to limit confounding factors that alter prevailing winds and create different micro-climates. Transects were located at km 78, to compare to results of the preliminary study in 2012, and at km 18, to provide a second full transect for dustfall characterization. Canisters were also

deployed at 50 m on either side of the road in three strategic locations to obtain preliminary information on dustfall rates: between Airplane Lake and the Baker Lake gatehouse, south of the emulsion plant turn-off and mid-way along the Vault haul road, in line with air quality station DF-4.

Only seven samples were able to be analyzed, results are compared by distance and location where possible. No standards for dustfall are available for Nunavut. Individual results of the total dustfall analysis are compared to Alberta Environment's ambient air quality guideline (February, 2013) for recreational areas of 0.53 mg/cm^2/30d, and commercial/industrial area guideline of 1.58 mg/cm^2/30d. All samples at 100 m and 150 m, and one at 50 m were below the industrial area guideline of 1.58 mg/cm^2/30 d. The 50 m samples at km 78 and the Vault Road were above this guideline. Two samples were also below the recreational area guideline of 0.53 mg/cm^2/30 d (100 m upwind of the road at km 18, and 150 m downwind of the road at km 78).

Since samples of background dustfall rates were not obtained in 2013 due to disrupted canisters, this objective could not be fulfilled, and the sampling program will be conducted again in 2014. The system used to fasten the canisters in place will be modified to help ensure more data is available. Furthermore, in conjunction with the screening level risk assessment vegetation sampling, the 2014 study will also evaluate the direct effects of potential contaminants in dust on vegetation, as well as indirect effects on wildlife. In the meantime, AEM will continue to implement an onsite dust suppression program which includes:

- Continuous watering of mine site roads (including Vault haul road);
- Application of liquid calcium chloride along the highest-use segment of the AWAR (from the Meadowbank Gatehouse to the Exploration Camp); and
- Watering of airstrip 30 min or less prior to arrival of aircraft, and 15 min or less prior to take-off.

8.4 WILDLIFE MONITORING*

8.4.1 Annual Monitoring

As Required by NIRB Project Certificate No.004, Condition 55: ***Provide the Annual Wildlife Summary Monitoring Report.***

The 2013 Wildlife Monitoring Summary Report represents the eighth of a series of annual Wildlife Monitoring Summary Reports for the Agnico Eagle Mines Meadowbank Mine. The report is provided in Appendix G17. Baseline and monitoring programs were first initiated in 1999 and will continue throughout the life of the mine. Details of the wildlife monitoring program for the project are provided in the Terrestrial Ecosystem Management Plan (Cumberland 2006). The 2013 report provides the objectives, methodology, historical and current year results, accuracy of impact predictors, and management recommendations of each monitoring program in standalone sections.

In 2013, five active Peregrine Falcon (Falco peregrinus) nests were observed and monitored at quarry sites along the AWAR. Quarries appear to have created suitable raptor nesting habitat, as four of the five nests have been active for the past four seasons. For the second year in a row, a Peregrine Falcon pair nested at Portage Pit; however, given its location away from mine operations, no additional management or deterrent activities were required. Raptor nest management plans were not warranted at any of the other active nest sites, and no project-related effects on falcon nesting success were confirmed.

* TSM- Biodiversity and Conservation Management

The Government of Nunavut Caribou (Rangifer tarandus) collaring program, ongoing for the past five years in the Baker Lake area, continued in 2013 with an additional 15 collars deployed as part of regional efforts to understand Caribou populations. Seasonal Caribou movements within and adjacent to the Meadowbank Regional Study Area were tracked and mapped throughout the year. The Hunter Harvest Study participation rates slightly decreased in 2013 (49 respondents), as did overall reported number of Caribou harvested in 2013 (n=420, compared to n=496 last year). In 2013, 43% of all reported Caribou harvests were within 5 km of the AWAR, the highest percentage since the start of the study. As in previous years, notices were distributed reminding employees to be aware of Caribou migration, as large herds of Caribou were observed near the AWAR on several occasions in November and December, but road closure in 2013 was not required. Five Caribou fatalities (one incident) on the AWAR and one Wolverine fatality at the mine site occurred in 2013. Improved foodhandling practices and employee awareness programs at the mine site helped ensure no Arctic Fox fatalities in 2013.

Each subsequent Wildlife Monitoring Summary Report builds on data presented in the previous year's report. Analyses of data from monitoring programs to date indicate that the programs are appropriate for comparing baseline conditions and reference areas to current conditions at the mine site. Monitoring programs will continue to meet the conditions of the Nunavut Impact Review Board Project Certificate but will evolve throughout the life of the mine, contingent on data quality objectives and the necessity for adaptive management strategy implementation and subsequent effectiveness monitoring. Ongoing collection of data will allow for increasingly robust statistical analyses each year, where warranted, that will build on an understanding of naturally occurring and potential mine-related effects.

The "*Meadowbank Mine 2013 Wildlife Monitoring Summary Report*" is attached in Appendix G17.

8.4.2 Harvest Study Results

As required by NIRB Project Certificate No.004 Condition 54

a. Updated terrestrial ecosystem baseline data

See "*Meadowbank Mine 2013 Wildlife Monitoring Summary Report*" attached in Appendix G17.

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.

At the end of 2013, hunting data had been collected from 49 participants interviewed, which is a decrease from 2012 levels when data were collected from 62 participants interviewed (the highest number of participants in a single study year). The total number of participants recording Caribou harvest during the course of the study year has remained fairly constant, ranging between 35 and 45 hunters. In 2013, 44 participants recorded Caribou harvests; 11.3 participants recorded harvest (Caribou, Muskox or Wolverine) each month, a decrease compared to the last four years of data. Lower reported harvest numbers may be a reflection of participant fatigue and declining response rate, given the length of time the study has been ongoing. The estimated 10% of Baker Lake hunters participating in the HHS continues to be used as the estimate of overall participation based on the 2008 HTO member list.

In 2013, the total number of Caribou harvested (182 animals) within 5 km of the AWAR was less than previous years; however, these numbers represent 43% of all harvests recorded by participants. This

percentage is similar to that recorded in 2011 (42%), and the average of 38% since the study began in 2007, suggesting that overall distribution of harvest has stabilized. It is not clear how the decline in number of participants in the HHS in 2013 is affecting results. For example, a few, very successful hunters along the AWAR who report all harvests could skew the results on an RSA-wide basis, as could the increased success of hunters related to a large Caribou herd near the road in December. Although, the subset of hunters participating in the HHS is thought to be generally representative of Baker Lake hunters, considerable bias could occur; therefore, conclusions on changes in hunting distribution or success must be made with caution. Meanwhile, total harvests per participant within 5 km of the AWAR continued to decrease, and were at their lowest in 2013 at 4.9 Caribou per participant.

In the historical NWMB study, Caribou harvests within 5 km of the road were estimated to be 18% of total harvest, while in the HHS data set, harvest along the AWAR has averaged 38% of total harvest. The total number of Caribou harvested along the AWAR increased during the first few years of the HHS, but has been lower over the past two years of data, likely related to an overall decrease in total harvest. A similar pattern was observed for the growing season, but a slight continual increase in total harvest numbers was observed along the road in the winter season. The road appeared to be used more often by hunters in the winter season, despite relatively unrestricted access to unroaded areas in the Baker Lake area.

Counts remained low for Muskox and Wolverine, precluding any interpretation of potential mine- related effects. Low densities of these species and their general aversion to humans require hunters to hunt well away from the AWAR; therefore, the presence of the AWAR is thought to have little effect on Muskox and Wolverine hunting patterns. Wolverine harvests have decreased from a maximum of 15 animals in 2010, to the lowest number recorded since the start of the HHS in 2013 (n=2).

f. Details of annual aerial surveys to be conducted to assess waterfowl densities in the regional study area during the construction phase and for at least the first three (3) years of operation, with the data analyzed and compared to baseline data to determine if significant effects are occurring and require mitigation.

Given the low densities of waterbird nests identified at the mine site and along the AWAR from 2005 - 2012 (i.e., too low to determine whether changes in nest abundance or success have occurred), and the absence of data suggesting that mine or road-related effects are occurring, the waterbird nest survey program has been discontinued.

g. Details of an annual breeding bird plot surveys and transects along the all-weather road to be conducted during the construction phase and for at least the first three (3) years of operation.

Details of the breeding bird plot surveys are provided in Section 4 of the "*Meadowbank Mine 2013 Wildlife Monitoring Summary Report*" (Appendix G17).

In summary, the objective of the breeding bird plot monitoring program is to confirm that a mine-related change of 20% function, determined by an increase or decrease in local breeding bird abundance, richness, and diversity, has not occurred. The program uses the widely accepted Canadian Wildlife Service's (CWS) Program for Regional and International Shorebird Monitoring (PRISM) protocols (CWS 2005). A secondary objective of the monitoring program is to determine more effective ways to prevent disturbance to nesting birds based on feedback from mitigation measures and observations.

The breeding bird plot monitoring program is to continue every year during the construction period and for at least the first three full years of mine operation (2010 to 2012) in accordance with the TEMP (Cumberland 2006). The next PRISM plot survey is planned for 2015, following which detailed analyses

of project effects will be undertaken. Result of the 2012 plot survey can be found in Section 4 of the "*Meadowbank Mine 2012 Wildlife Monitoring Summary Report*" found in Appendix G5 of the 2012 Annual Report.

To date, PRISM plot data show that most bird community indices are variable with little difference in the overall trends between mine and control plots. The next set of PRISM plot surveys will be conducted in 2015, following which detailed statistical analyses will be conducted to investigate potential project effects.

8.4.3 Caribou Migration Corridor Information Summary

As required by NIRB Project Certificate No.004 Condition 56: ***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, KIA and NIRB's Monitoring Officer annually.***

See Figure 23 and Figure 24 for spring and fall maps of caribou migration corridors, respectively.

8.4.4 Caribou Collaring Study

As required by NIRB Project Certificate No.004 Condition 57*: participate in a caribou collaring program as directed by the GN-DOE*

The joint satellite-collaring program was developed to provide information on the distribution of Caribou occurring within the Meadowbank RSA and contribute data to other ongoing satellite collaring programs for the Beverly, Qamanirjuaq, and other herds. The satellite-collaring program has become increasingly important as both a monitoring and management tool in recent years. The satellite-collaring program, along with GN DoE regional data, is also serving to provide a regional perspective on Caribou activity near mine operations and natural changes in Caribou populations in the region.

The satellite-collaring program was designed to continue for five consecutive years in accordance with the TEMP (Cumberland 2006). Caribou in the Baker Lake area were collared in May 2008, November 2009 and April 2011. An additional 15 animals were collared in the area around April 2013. Monitoring is scheduled to continue in 2014.

As of December 2013, 15 collars originally deployed in the Baker Lake area as part of the GN industry collaboration collaring program were active and transmitting signals (none from 2008 and 2009 deployment, four from 2011, and 13 from 2013). A summary of 2013 locations and movement patterns for animals collared around Baker Lake is provided below and summarized in Section 9 and Figure 9.1 of the *2013 Wildlife Monitoring Summary Report*. Movements in close proximity to the Meadowbank RSA and LSA are shown in Figure 9.2 of the *2013 Wildlife Monitoring Summary Report*.

A summary of Caribou migration patterns, which synthesizes migration information from satellite collaring data, has been developed by the GN for the spring and fall migrations (Figures 9.11 and 9.12 of the report in Appendix G17). These data and summary have not been updated since 2011 as the GN did not provide updated information to AEM in time for the annual report.

To generate the maps, satellite-collaring data was first used to generate 'walk lines' for each animal, and then a 'density' analysis was run on the walk lines for Caribou in spring and fall migration (on a per year

and subpopulation basis). This path-derived analysis assesses continuous corridors rather than points, which can artificially elevate density estimates for an area. The approach generates spatial patterns of migration and compares areas by relative intensity of use. Higher use areas represent more intense use by multiple animals within a particular year and/or regions of repeated use occurring over multiple years. One limitation of the data is that areas outside of defined migration corridors do not necessarily indicate it is unimportant to, or uninhabited by, Caribou, but instead could be an area where collared animals have not been located (i.e., and could potentially be an area of high density for non-collared animals).

8.4.5 Raptor Nest Survey

The raptor nest survey monitoring program has been designed to confirm that mine-related activities do not result in inadvertent negative effects on nesting raptors. Raptor surveys along the proposed AWAR alignment in 2005 (i.e., prior to construction) indicated that only low suitability habitat for nesting raptors was available. To construct the AWAR in 2007/2008, excavated and blasted rock materials were used from numerous quarries along the alignment, resulting in the creation of some moderate and high suitability raptor nesting habitat areas characterized by steep walls and overhangs. Established nests within some of these quarries are monitored on an annual basis to evaluate occupancy.

The primary objectives of the raptor nest survey monitoring program are to:

1. Confirm that raptor nest failures will not be caused by mine-related activities. The threshold level is one nest failure per year; and

2. Confirm that no project-related mortality of raptors will occur. The threshold level of mortality is one individual per year.

Annual raptor nest monitoring is to continue annually throughout the operational and decommissioning phases of the mine in accordance with the TEMP (Cumberland 2006).

Details of raptor (all Peregrine Falcon) nest sites identified along the AWAR during the 2013 field season are provided in the report. As in 2012, a Peregrine Falcon pair began nesting on the Portage Pit walls in the mine site. The general mine site Peregrine Falcon management and protection plan, developed in 2012, was followed in accordance with the TEMP for this nest site, and expert advice was sought from Dr. Alastair Franke, raptor expert from the University of Alberta. Given the location of the nesting activity away from mine operations, no additional management or deterrent activities were deemed necessary (also see details in Section 6.5.3 of the *2013 Wildlife Monitoring Summary Report*).

No new active nest sites were identified in 2013, and raptor nest management plans were not warranted at any of the active nest sites. Some observations are included in Appendix A of the report in Appendix G17.

Table 8.38: 2013 Raptor and Raven Nests Identified and Monitored at the Mine Site and along the AWAR between Baker Lake and the Meadowbank Mine Site from 2009 to 2013

Quarry #	Nest in 2009	Nest in 2010	Nest in 2011	Nest in 2012	Nest in 2013	Comments
1	No	No	No	No	No	Shallow quarry.
2	No	**Yes**	**Yes**	**Yes**	**Yes**	Good cliff faces for nesting.
3	No	**Yes**	**Yes**	**Yes**	**Yes**	Nest Management Plan in 2010.
4-6	No	No	No	No	No	Shallow quarry and/or flooded.
7	No	No	No	No	No	Old Common Raven (*Corvus corax* – CORA) nests. Lots of fractured rock forming cliff faces but limited ledges.
8	No	No	No	No	No	No cliff faces.
9	No	Yes (CORA)	Yes (CORA)	No	No	CORA stick nest with 3 chicks in 2011. Old CORA nest. Lots of fractured rock forming cliff faces but limited ledges.
10-15	No	No	No	No	No	Shallow quarry and/or flooded.
16	No	No	No	No	No	Moderate depth with good cliff faces but no ledges. Old fallen stick nest, likely CORA. Old Peregrine Falcon (PEFA?) nest observed in 2011, lots of whitewash in quarry.
17	No	No	No	No	No	Very shallow quarry. PEFA present but no nest.
18	No	**Yes**	**Yes**	**Yes**	**Yes**	Good, high cliff face but no ledges. Nest at top lip.
19	**Yes**	No	**Yes**	**Yes**	**Yes**	Good, vertical cliff face and some suitable ledges. Falcon eggs observed in 2013.
20	No	No	No	No	No	Very shallow quarry. Partially filled with snow. Lots of whitewash on north end of quarry, adult observed (2011).
21	No	**Yes**	**Yes**	**Yes**	**Yes**	Good, high cliff face but no ledges. Nest at top lip in 2010, but close to road in 2011.
22	No	No	No	No	No	Good, high cliff face. Currently used as tire/metal dump, which may deter nesting.
Portage Pit	No	No	No	**Yes**	**Yes**	Nesting efforts not deterred following implementation of raptor management and protection plan

Quarry mining activities along the AWAR corridor have created moderate to high suitability raptor nesting habitat. Raptors are expected to continue to use select quarries for the foreseeable future, which may necessitate the continued implementation of a raptor nest management plan for raptor nests if deemed necessary. Raptor nest surveys will be conducted annually at each of the quarries along the AWAR early in the nesting season (mid- to late June) to confirm the status of previously confirmed raptor nests, assess for the presence of new raptor nests, and determine the need, if any, for development and implementation of raptor nest management plans.

8.5 COUNTRY FOOD

As required by NIRB Project Certificate No.004 Condition 67: ***Develop and implement a program to monitor contaminant levels in country foods in consultation with HC; a copy of the plan shall be submitted to NIRB's Monitoring Officer***

As per the TEMP, in 2011, AEM completed a wildlife Screening Level Risk Assessment (WSLRA) using field data collected in 2011. AEM has also completed a Human Health Risk Assessment with respect to monitoring the contaminant levels in country foods. The document speaks to the possible effects of mine activity and contaminant levels. See 2011 NIRB annual report for more details.

On December 7, 2012, NIRB sent correspondence to Health Canada, Environmental Assessment Division. The NIRB requested Health Canada to provide comments on the results of both the WSLRA and PQRA reports as provided by AEM, and to indicate whether or not further information may be required with respect to the monitoring program as outlined in Condition 67. In a letter dated April 10, 2013, AEM provided additional information to Health Canada. On November 27, 2013, NIRB forwarded additional correspondence to Health Canada advising that they had not received any further response or comment from Health Canada in regard to this additional information that was requested from, and provided by, AEM. On January 27, 2014, Health Canada responded to NIRB by addressing concerns with the lead levels. AEM received this letter on March 3, 2014 from NIRB and plan to send a response in April 2014. You will find all correspondence sent to Health Canada and responses from Health Canada and AEM in Appendix G18.

As a requirement for the Meadowbank Gold site's Environmental Health Monitoring Plan, AEM will be collecting field data in 2014 in support of a Screening Level Risk Assessment (SLRA) that will be reported in the 2014 annual report. This report follows the baseline SLRA completed by Azimuth Consulting Group Inc. in 2006, and the follow-up report by AEM in 2011; it will provide an updated evaluation of soil and vegetation tissue samples collected near mine operations and in reference areas that will be used in the ecological risk assessment to evaluate the potential risk to resident birds and caribou, and model the potential risks related to human consumption of meat.

8.6 ARCHEOLOGY

As required by NIRB Project Certificate No.004 Condition 69: carry out the Project to minimize the impacts on archeological sites, including conducting proper archeological surveys of the Project area (including the all-weather road and all quarry sites); [Cumberland] shall provide to the GN an updated baseline report for archeological sites in the Project area.

No archaeological work was conducted at the Meadowbank site in 2013 for the operational activities. Agnico respects all identified archeological sites by ensuring ongoing avoidance and disturbance. In 2013 there were no new projects in areas that have not already been assessed by archaeological impact studies and therefore no archaeological studies were required or conducted during 2013. Should future expansion occur in areas not previously assessed Agnico is committed to ensuring that Archaeological Impact Assessment studies are completed in accordance with the regulations and the requirements of our Production Lease with the KIA regarding any new archaeological or heritage sites.

However, AEM requested Stantec Consulting Ltd. to conducted an archaeological impact assessment for the Meadowbank Gold Project 2013 exploration activities under Nunavut Archaeological Permit 13-015A.

The archaeological studies were requested by AEM in order to ensure that no archaeological sites would be impacted by the exploration program. The 2013 exploration program was relatively small, consisting of surficial hand exploration, and drilling of five core holes. The archaeological field program included inspection of five proposed drill locations, assessment of the exploration Priority Areas that encompass the drill locations, as well as additional assessment of the terrain surrounding the Priority Areas. No archaeological sites were identified.

Agnico Eagle is committed to ensuring avoidance of archaeological sites during exploration activities, and has continued to demonstrate this commitment through the conduct of these archaeological studies. Please refer to the "*Archeological Impact Assessment Agnico Eagle Meadowbank 2013 Exploration Studies*" in Appendix 19.

8.7 AEMP*

As required by Water License 2AM-MEA0815 Schedule B, Item 14: ***The results of monitoring under the Aquatics Effect Management Plan (AEMP).***

8.7.1 Introduction

The Aquatic Effects Management Program (AEMP) for Agnico Eagle Mines' (AEM) Meadowbank Gold Mine site was developed in 2005 as part of the project's Final Environmental Impact Statement (FEIS) (AEMP 2005), and has been formally implemented since 2006. In 2008, the Nunavut Water Board (NWB) issued Meadowbank's Type A water license (2AM-MEA0815), and requested a revised AEMP, and specified some of the requirements for that revision. Most importantly, while the 2005 AEMP focused on core receiving environment studies at the level of basins and lakes, the NWB advised that the revised AEMP needed to be broader in scope to comply with the following Type A water licence requirements (as stipulated in Part I-1):

- A detailed monitoring protocol to verify that the Canadian Council of Ministers of Environment Fresh Water Aquatic Life Guidelines are met thirty (30) metres from the outfall diffusers;
- Annual reporting for more immediate adaptive management;
- Mechanisms to measure changes to productivity in the lake as a result of the mine adding nutrients;
- Sampling and Analysis Plans; and
- Monitoring under Fisheries Authorizations, NWB Licence Compliance Monitoring, Environmental Effects Monitoring, and Groundwater Monitoring.

The last requirement diverged from traditional AEMPs, that are traditionally guided by INAC (2009), and required AEM to propose a new approach, which was presented in draft to the NWB (March 2-3, 2010 in a workshop). This draft was accepted without additional comments and submitted as a final revised plan in December 2012, and necessitated the restructuring of the AEMP. Through this process, the AEMP was restructured to serve as an overarching "umbrella" program that conceptually provides an opportunity to integrate results of individual, but related, monitoring programs in accordance with the Type A water license requirements (Azimuth, 2012). The scope of the 2005 AEMP, which was essentially the core receiving environment monitoring, is now one of the monitoring programs that is integrated under the restructured AEMP, and has been renamed the Core Receiving Environment Monitoring Program (CREMP).

* TSM- Biodiversity and Conservation Management

The 2013 AEMP synthesis report aims to:

- Identify potential sources of impact and develop a conceptual site model;
- Summarize the results of each of the underlying monitoring programs, including the CREMP (the cornerstone broad-level monitoring program);
- Review the inter-linkages among the monitoring programs;
- Integrate the results for each component program;
- Identify potential risks to the aquatic ecosystem; and
- Provide conclusions and recommend additional management actions, undertaken in 2013, or that should be considered in future monitoring.

8.7.2 Potential Sources of Impacts and the Conceptual Site Model (CSM)

The framework for the AEMP is founded on a conceptual site model, which is used in ecological risk assessment to help understand potential relationships between site activities and the environment (e.g., water quality or certain ecological receptors). The foundation of the 2012 conceptual site model (CSM) is presented in Table 8.39 and consists of the following elements (Azimuth, 2012):

- Stressor sources –the sources of chemical (e.g., metals) or physical (e.g., total suspended solids) stressors that can potentially impact the environment.
- Stressors –the actual agents that have the potential to cause adverse effects to the receiving environment.
- Transport pathways –the ways in which a stressor is released from the source to the receiving environment.
- Exposure media –the media where a stressor occurs in the receiving environment. A single stressor might actually end up in multiple exposure media, with different ones being most important at different times. For example, if an effluent contained mercury, it would initially be found in the water column, and then most likely would settle to sediments where it would then enter the food chain (i.e., biota tissue).
- Receptors of concern –ecological entities selected for a variety of reasons, usually including sensitivity to relevant stressors and perceived ecological importance (i.e. could be determined to be valued ecosystem components).

In 2013, all of the potential pathways, exposure media and receptors of concern listed in Table 8.39 were relevant to the 2013 AEMP analysis and were evaluated with the exception of fish tissue (i.e. fish health was evaluated in the Vault Lake fishout, however no fish tissues were collected in 2013) and periphyton (which is collected as habitat compensation monitoring, which will be conducted in 2015).

Table 8.39- Primary transport pathways, exposure media, and receptors of concern for the AEMP.

	Transport Pathways		Exposure Media		Receptors of Concern
g,h	Effluent	a,f,g,h,j,l	Water	a, g	Phytoplankton
f	Groundwater	a	Sediments	g	Zooplankton
h,j	Surface water		Tissue	g	Fish
l	Air			a	Benthic community
NA	Direct			d	Periphyton
				a,d,k	Fish habitat

Notes:	
a	Core Receiving Environment Monitoring Program
~~b~~	~~Effects Assessment Studies~~
~~c~~	~~Dike Construction Monitoring~~
d	Habitat Compensation Monitoring Program - No Net Loss Fisheries Planning (AWAR)
e	Dewatering Monitoring
f	Groundwater Monitoring
g	MMER Monitoring
h	Water Quality and Flow Monitoring
i	Fish-Out Studies (Vault Lake)
j	AWPAR and Quarry Water Quality Montoring
k	Blast Monitoring
l	Air quality monitoring
NA	Direct, so measured in exposure medium.

Note: ~~strikethrough~~ text is an "AEMP" monitoring program that was not required to be completed in 2013

8.7.3 Summary of Results of AEMP-Related Monitoring Programs

In 2013, in accordance with the Type A license the AEMP-related monitoring programs included:

- the Core Receiving Environment Monitoring Program (CREMP);
- Metal Mining Effluent Regulation (MMER) Monitoring;
- Habitat Compensation Monitoring Program (in 2013 it was completed along the AWAR);
- Mine site Water Quality and Flow Monitoring (and evaluation of NP-2);
- Fishout studies were completed at Vault Lake;
- Visual AWAR water quality monitoring;
- Blast Monitoring; and
- Groundwater Monitoring.

The results of the monitoring programs are integrated in the AEMP, and assist in the evaluation of potential effects of mining activities on the aquatic environment.

Air quality was also considered as part of the conceptual site model and are included in the AEMP discussion to inform the process, but this program is not a requirement of the Type A License; Part I-1.

Table 8.40 summarizes the results of the AEMP programs in 2013. Details of the programs are described previously in this Monitoring Section (discussed throughout Section 8 of the annual report). For detailed results on individual monitoring programs, refer to the appended reports.

Table 8.40- Summary of results for aquatic effect monitoring programs in 2013.

Table 8.33 - Summary of Key AEMP Monitoring Findings

	Core Receiving Environment Monitoring Program	Effects Assessment Studies	Dike Construction Monitoring	Habitat Compensation Monitoring Program - NNL related monitoring	Dewatering Monitoring	MMER Monitoring	Environmental Effects Monitoring (as part of MMER)	Water Quality and Flow Monitoring	Fish-Out Studies	AWPAR and Quarry Water Quality Montoring	Blasting Monitoring
Completed in 2013?	**Yes**	**No**	**NA**	**No**	**Yes**	**Yes**	**NA**	**Yes**	**No**	**Yes**	**Yes**
Stressor Variables											
suspended solids	○				○	○		○	○	○	NA
sediment deposition	NA				NA	NA		NA	NA	NA	NA
water-borne toxicants	○				○	○		●	○	○	NA
sediment toxicants	●				NA	NA		NA	NA	NA	NA
nutrients	○				○	○		○	○	○	NA
other physical stressors	○				○	○		○	○	○	●
Effects Variables											
Phytoplankton	●				NA	○		NA	NA	NA	NA
Zooplankton	NA				NA	○		NA	NA	NA	NA
Fish	NA				NA	○		NA	○	NA	NA
Benthic invertebrate community	○				NA	NA		NA	NA	NA	NA
Periphyton	NA				NA	NA		NA	NA	NA	NA
Fish habitat	○				NA	NA		NA	NA	NA	NA

Notes:

○ No observed effects

● Trigger or guideline exceedance - early warning explained in report

● Observed effects explained in report

The following section discusses the stressor and effects based results of the monitoring programs presented in Table 8.40. As per Environment Canada regulations, Environmental Effects Monitoring (EEM) studies that include fish population surveys and fish health monitoring were completed in 2011 and were not required in 2013. A study design for Cycle II EEM was recently submitted to EC (received on February 13, 2014) and the field work will be completed at the end of August with the interpretive report

results submitted in 2015. As well, according to DFO authorizations and recent monitoring plans, habitat compensation monitoring along the AWAR was conducted and mine site monitoring will be conducted in 2015. As agreed upon by AEM and DFO, habitat compensation monitoring will be conducted every other year as outlined in the Habitat Compensation Monitoring Plan (AEM, 2014)

Overall, none of the site specific stressors, effects based triggers or guideline exceedances monitored onsite had the potential to cause significant risks to the aquatic environment. The CREMP determined that there were some apparent mine-related changes in conventional parameters at one or more near-field (NF) areas. Specifically, alkalinity (in Second Portage Lake - SP), conductivity (in Third Portage North- TPN, East -TPE and SP) and total dissolved solids (TDS) in TPE and SP were elevated above their respective trigger values with statistically significant changes at one or more NF areas relative to baseline/reference conditions. These triggers were not derived from effects-based thresholds (e.g., CCME water quality criteria) rather were set at the 95% percentile of baseline data using an approach that evaluates a statistically significant trend as compared to baseline data. Consistent with 2012, the CREMP identified sediment toxicants (Chromium) in Third Portage Lake East (TPE) that exceeded trigger levels, indicating that it is elevated beyond baseline conditions, but are consistent with other reference sites. Sediment coring is planned for 2014 which inform periodic exceedances in PELs and next steps for monitoring these changes from baseline conditions. Lastly phytoplankton populations exceeded early warning trigger values (>20% change in species richness and >50% change in total biomass) in near-field stations, which may be attributed to changes in conventional water parameter changes due to mine activity (most likely effluent) or simply due to natural variability. In 2013, there was a natural increase at the reference area (INUG) which caused a relative decrease in total biomass and species richness. The results of the CREMP are summarized in Table 8.41 and these results are subsequently evaluated in the AEMP.

Consistent with past results, blast monitoring results periodically exceeded DFO guidelines for peak particle velocity (PPV) predominately due to pre-sheer surface blasting immediately adjacent to the monitoring station. It should be noted that blast monitoring stations are set up on land to permit accurate and consistent readings, and are therefore overly protective of spawning habitat which is at least 250 m away. Furthermore, in comparison to other studies conducted at Ekati, the numbers of observed PPV exceedances at Meadowbank are well below a “no-observed-effect-level”.

Site water quality monitoring demonstrated elevated levels of aluminum in October during discharge at samples taken from ST-9 (located in the attenuation area). There were no observed MMER exceedances during discharge and. on August 22, the daphnia test failed laboratory toxicity testing. This is non-compliant with Water License Part F, Item 24 but is not considered as non-compliance under MMER. As discussed in Section 8.1.4.3, the August toxicity sampling was taken the same day that the WTP started (August 22). Following receipt of the toxicity results, AEM conducted another trout and daphnia acute lethality test on September 9. The test results showed 0% mortality for trout and daphnia. Another test was also done on October 7 and results showed 0% mortality for trout and daphnia. An investigation was made following receipt of the August 22nd results, but no cause could be identified. As discussed in the previous monitoring sections of the annual report and summarized in Table 8.40, discharge and groundwater monitoring programs had no observed effects to the receiving environment.

As reported in Section 8.1.4.2, as part of the site wide water collection system monitoring, in July 2013, during an AANDC site inspection, water collected in portage waste rock pile sump ST-16 seeped through the roadway into an isolated, offline waterbody called NP-2. Additional water quality sampling in the sump and in near-shore areas of NP-2 showed elevated levels of copper, nickel and cyanide, which triggered additional monitoring throughout NP-2 and at Phaser Lake (as a reference). The water quality

samplings were collected weekly by AEM started in August through until ice-up in mid-October. Furthermore AEM proactively installed a containment dike in August between the road and ST-16 sump, closely monitored, and actively pumped water from ST-16 to the TSF to eliminate inputs to NP-2 and ensured the protection of NP-2. As reported in the CREMP, there was no evidence of changes in water quality in Second Portage Lake. However, AEM plans to continue monitoring NP-2 Lake and will add stations requested by the KIA (which included monitoring at NP-1, Dogleg and Second Portage Lake). Monitoring will start at these locations during freshet and throughout the open water season.

The dewatering water was released into the environment without TSS treatment as Vault Lake water (as it is considered non-contact as all mine related, contact water reports to the Vault Pit) was compliant with section 4 (1) of the MMER regulation and Part D Item 4 of the NWB Water License as no parameters were exceeded.

The final fish-out program planned for the Meadowbank site took place from July 19 – September 24, 2013 at Vault Lake. This fish-out followed protocols developed in the Vault Lake Fishout Work Plan (April 2013) in consultation with the retained fisheries consultant (North/South Consultants Ltd.) and Fisheries and Oceans Canada (DFO). During the fish-out, a total of 3,183 fish were captured, with a total weight of 901 kg. Of these, 1,801 fish (57%) were successfully transferred to Wally Lake. Fish were generally determined to be in good health, with average condition factors >1 for all species (except burbot, which was similar to 2010), and a 5% incidence of DELTs or parasites (which was similar to previous fishouts).

Table 8.41- Summary of results of the CREMP

Variable Type & Variable	Magnitude[1]	Spatial Scale[2]	Causation[3]	Permanence[4]	Uncertainty[5]	Comments	Management Action[6]
Exposure - Limnology							
Oxygen	**0**	n/a	n/a	n/a	?		**0**
Temperature	**0**	n/a	n/a	n/a	?		**0**
Conductivity	**0**	n/a	n/a	n/a	?		**0**
Exposure - Water Chemistry							
Conventionals	**1**	Large	High	Low	?	Alkalinity (SP), conductivity (TPN, TPE, SP), calcium (TPE), and TDS (TPE, SP) are elevated relative to baseline; concentrations suggest low potential for adverse effects.	**1**
Nutrients	**0**	n/a	n/a	n/a	?		**0**
Total Metals	**0**	n/a	n/a	n/a	?		**0**
Dissolved Metals	**0**	n/a	n/a	n/a	?		**0**
Total Suspended Solids	**0**	n/a	n/a	n/a	?		**0**
Exposure - Sediment Chemistry							
Physical	**0**	n/a	n/a	n/a	?		**0**
Total Metals	**1**	Moderate	Moderate	Moderate	??	Chromium (TPE); increasing temporal trend	**1**
Organics	**0**	n/a	n/a	n/a	?		**0**
Effects - Phytoplankton							
Chlorophyll-*a* *	**0**	*	*	*	?		**0**
Total Biomass	**2**	Large	Low	Low	??	>50% higher (TPN, TPE, SP, TE, WAL); due to relative decrease at reference (INUG)	**1**
Species Richness	**1**	Moderate	Moderate	Low	??	>20% higher at TPN; due to relative decrease at reference (INUG)	**1**
Effects - Benthic Invertebrates							
Total Abundance	**0**	n/a	n/a	n/a	?	Apparent "decreases" (most stations); due to increase at reference (INUG)	**1**
Total Richness	**0**	n/a	n/a	n/a	?		**0**

NOTES:

[1] Magnitude Ratings (narrative in brackets used in the absence of specific triggers/thresholds):

0 – no exceedances of triggers or thresholds (or no apparent changes from baseline of concern)

1 – early warning trigger exceeded (or change from baseline warranting concern)

2 – threshold exceeded (or change from baseline exceeding magnitude of concern)

[2] Spatial Scale Ratings:

n/a – no magnitude of effect, therefore not evaluated

Small – localized scale

Moderate – sub-basin to basin scale

Large – basin to whole lake scale

*Data quality issue is being addressed (chlorophyll-*a*)

[3] Causation Ratings:

n/a – no magnitude of effect, therefore not evaluated

Low – no evidence for a mine-related source

Moderate – some likelihood of a mine-related source

High – the source of the problem is very likely to be mine-related

[4] Permanence Ratings:

n/a – no magnitude of effect, therefore not evaluated

Low – rapidly reversible (e.g., months to years)

Moderate – slowly reversible (e.g., years to decades)

High – largely irreversible (e.g., decades +)

[5] Uncertainty Ratings:

? – low uncertainty

?? – moderate uncertainty

??? – high uncertainty

[6] Management Actions:

0 – no action

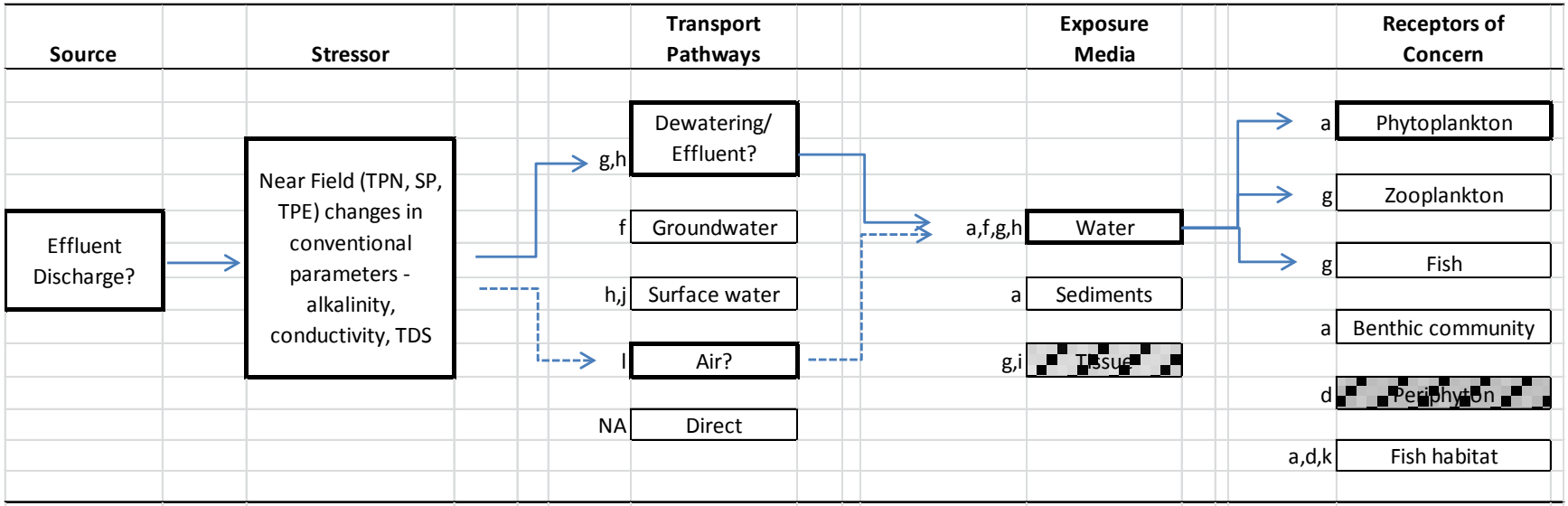
1 – continued trend monitoring in 2014

2 – active follow-up with more detailed quantitative assessment in 2014

8.7.4 Integration of Monitoring Results

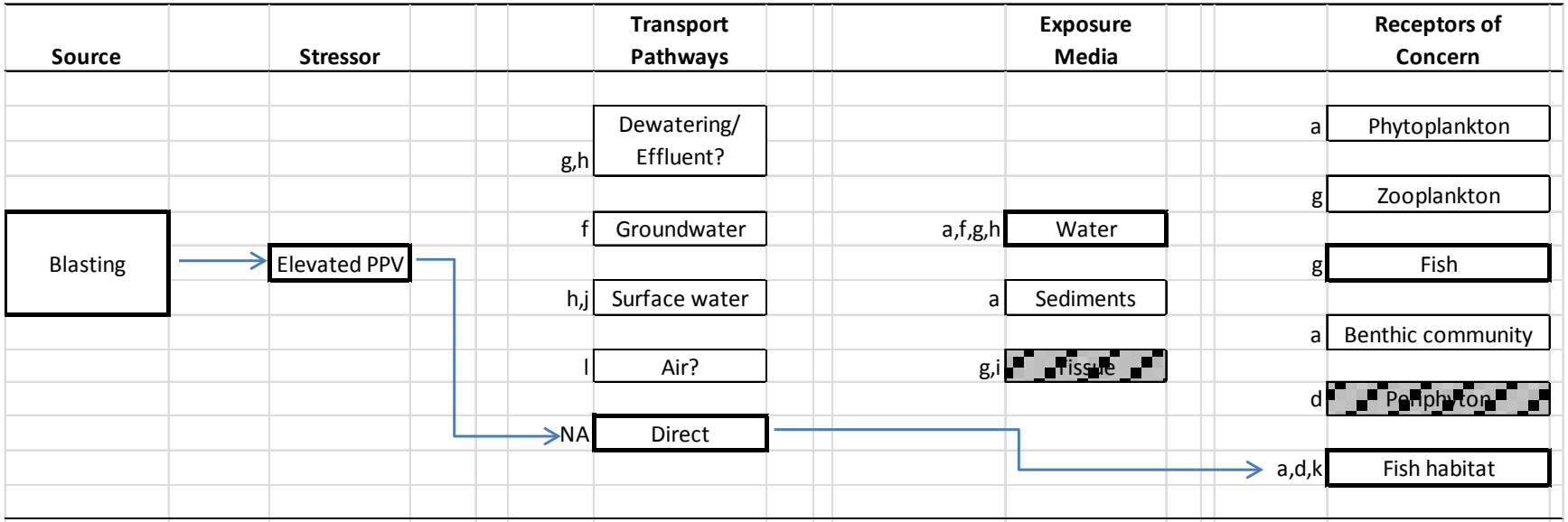
The 2013 AEMP monitoring programs were integrated into the conceptual site model which assisted in the evaluation of the transport pathways, provides information on specific media (identifies stressors) and evaluates receptors of concern (effects variables). As previously discussed, fish tissue and periphyton data were not collected in 2013 in the mine site area and therefore are not included in the conceptual model (shaded grey in the table).

As per Azimuth (2012), the results of the monitoring programs were integrated in a mechanistic fashion that required a thorough review of the results to identify any patterns among the programs. Although the receiving environment water quality changes at TPN, TPE, and SP in 2013 are considered unlikely to cause any adverse environmental effects, a conceptual site model was developed to address the issue of changes in conventional parameters to assist in determining if the causes to observed changes in phytoplankton are a result of mine related sources (see Figure 25a). As per Azimuth (2012), source, stressor, transport pathways, exposure media, and effects measures were evaluated in 2013. Although independent programs did not identify risks to the environment, each stressor/transport-pathway, stressor/medium and medium/effect measure combination related to the issue was assessed for programs that had exceedances of relevant guidelines (blast monitoring, water quality and flow monitoring) or triggers (CREMP).



Notes:	
a	Core Receiving Environment Monitoring Program
~~b~~	~~Effects Assessment Studies~~
~~c~~	~~Dike Construction Monitoring~~
d	Habitat Compensation Monitoring Program (AWAR)
e	Dewatering Monitoring
f	Groundwater Monitoring
g	MMER Monitoring
h	Water Quality and Flow Monitoring
i	Fish-Out Studies (Vault Lake)
j	AWPAR and Quarry Water Quality Montoring
k	Blasting
l	Air quality monitoring
NA	Direct, so measured in exposure medium.

Figure 25a: Integrated conceptual site model for 2013 AEMP – Near Field changes in conventional parameters



Notes:	
a	Core Receiving Environment Monitoring Program
~~b~~	~~Effects Assessment Studies~~
~~c~~	~~Dike Construction Monitoring~~
d	Habitat Compensation Monitoring Program (AWAR)
e	Dewatering Monitoring
f	Groundwater Monitoring
g	MMER Monitoring
h	Water Quality and Flow Monitoring
i	Fish-Out Studies (Vault Lake)
j	AWPAR and Quarry Water Quality Montoring
k	Blasting
l	Air quality monitoring
NA	Direct, so measured in exposure medium.

Figure 25b: Integrated conceptual site model for 2013 AEMP – Elevated Peak Particle Velocity (PPV)

8.7.5 Identification of Potential Risks and Discussion

The only mine-related activities undertaken in 2013 with point-source discharges were effluent discharges to Third Portage North (TPN) and Wally (WAL). In addition, as mentioned previously there was a seepage event in July whereby seepage from the Waste Rock Storage Facility migrated through the perimeter rockfill road at sample station ST-16 into NP-2 Lake. Elevated Copper and Total Cyanide were noted. Appropriate actions were undertaken to stop and control any further seepage to the lakeand a full report was submitted to authorities. As reported in the CREMP, receiving environment water quality changes in conventional parameters at TPN, TPE and SP in 2013 would not suggest any risk to aquatic life. Notwithstanding, consideration was taken in the AEMP for all of the potential mine-related sources of total dissolved solids, or other contributors to changes in general parameters in near-field stations (TPN, SP and TPE) were considered in the AEMP. The conceptual site model presented in Figure 8.32 assisted in understanding the possible linkages (i.e., effect to stressor to source) and it was determined that the most likely source of changes to conventional parameters is effluent discharge. Another possible contributer, albeit not likely based on air monitoring results to date, could be fugitive dust migration. Air quality monitoring results indicated that dustfall, total suspended particulates (TSP), PM10, and PM2.5 (potential sources of changes to conventional parameters) generally did not exceed available standards or guidelines at stations nearest to the mine. Although dust is considered an unlikely, but possible contributor source that might cause changes to conventional parameters evaluated in the CREMP, the dust levels generated in 2013 were not high enough to cause the observed changes. Despite very low levels it is likely that effluent discharge is the primary cause of minor changes in conventional parameters in TPN; the changes in TPE and SP could be related to fugitive dust as a contributor, the source of these changes is uncertain.

Phytoplankton changes observed may be a result of effluent (at stations TPN and WAL) from baseline conditions and dust may be altering the water quality (as compared to baseline) at stations (TPE and SP), however this doesn't explain the changes also observed at Tehek lake (TE) in phytoplankton. As stated in the CREMP, this apparent increase in phytoplankton is due to a relative decrease at reference area INUG and is not an absolute increase at the near-field and mid-field areas, where results are fairly consistent with historical trends at those areas. Given that no other effects were identified and the phytoplankton surveys are inherently uncertain, it remains unclear if these changes in phytoplankton productivity are due to mine-related activities but is most likely due to natural variability. As discussed in the CREMP further trend monitoring in 2013 will be required to determine the source of these changes, however the pattern in changes are not consistent with water quality results.

The trigger exceedance for chromim in sediment at TPE is consistent with historical levels that have also been found in PDL and TPS; PEL exceedances have been previously observed, and the chromium exceedance is not likely to be related to mine activities as there is no pattern of Cr inputs in water quality data collection to date. Furthermore, as described in the CREMP report, there are no significant changes to benthos. However, given that there has been an increasing trend and the Cr PEL has been exceeded, AEM will conduct a sediment coring sampling program in 2014 to respond to these exceedances and related uncertainties.

In 2013, the average PPV at Meadowbank was 5.39 mm/s, with 16 DFO guidance exceedances with a maximum of 32.7 mm/s. Faulkner et al. (2006) found no effects on lake trout eggs due to blasts at Diavik Mine, NWT, with a maximum PPV of 28.5 mm/s and reported 80 exceedances of DFO guidance of 13 mm/s PPV at these stations. This study found there were no differences in mortality of lake trout eggs in

incubators between exposure sites and reference sites that resulted from blasting at Diavik in 2003-2004. During the Vault Lake fishout, blasts occurred nearby, yet there was no evidence of changes to the fish health or the population in basins nearest to the blasts. Specifically, the population of fish in basin D, which is near the Vault pit blast monitoring station, appeared healthy and unimpacted by blast activity despite being located approximately 300m from quarrying activity. This is consistent with results collected previously during habitat compensation monitoring at Meadowbank along the dike faces, which found healthy populations of juvenile and adult fish occupying the dike faces. Overall, historical habitat compensation monitoring and the successful fishout of Vault Lake (i.e. a collection of a healthy population of fish, despite nearby blasting), suggests that it is unlikely that blasting has caused any impacts to fish incubation, therefore there are no expected risks to fish habitat due to periodic PPV exceedances at the monitoring stations.

8.7.6 Recommended Management Actions

Overall, based on the integration of results from the monitoring programs, the AEMP evaluation did not find an apparent excess risk to the aquatic environment due to mine-related activities. Although some trigger levels were exceeded for general parameters in the CREMP and there were concerns due to seepage at NP-2, AEM has adequately addressed these concerns. Water quality monitoring is recommended to continue in 2014, as in the past. Additionally, as recommended by KIA, water quality samples should be collected in NP-2, NP-1 and Dogleg pond. As well, water chemistry sampling should continue at all stations at the mine-site, and cyanide should be added to the list of parameters in the CREMP (although it is not required in the Type A Water License- Table 1,); results of these monitoring programs should be closely examined to ensure the protection of the receiving environment. Lastly, trends in phytoplankton community metrics will be watched closely in 2014 to see if the patterns identified in 2013 continue. Furthermore, a freshet action plan will be developed to ensure contact and non-contact water quality and flow are monitored and immediately managed to avoid any impacts to nearby receiving water environments (i.e. in TPN, SP, NP2, etc.).

In addition to water quality sampling, to investigate the potential point sources of changes to conventional water quality, targeted dustfall monitoring studies in conjunction with the Screening level risk assessment (planned for 2014) should be conducted in 2014. This will further evaluate dust deposition around the mine site to understand the potential sources of changes related to conventional parameters. The findings of the annual air quality monitoring and SLRA will be considered in the 2014 AEMP synthesis report.

SECTION 9. CLOSURE

9.1 PROGRESSIVE RECLAMATION

9.1.1 Mine Site

As required by Water License 2AM-MEA0815 Schedule B, Item 16: ***A summary of any progressive closure and reclamation work undertaken including photographic records of site conditions before and after completion of operations, and an outline of any work anticipated for the next year, including any changes to implementation and scheduling.***

In 2013, AEM updated the 2008 site closure plan using revised life of mine calculations. You will find in Appendix H1 the updated "*Interim Closure and Reclamation Plan*".

The current mine plan includes progressive closure associated with the following mine components: Portage and Goose open pits, Portage WRSF, Tailings Storage Facilities, water management infrastructure, and site infrastructure (limited structures).

Progressive reclamation of Portage and Goose will start only once the mining activities in each pit has ceased, 2016 and 2015 respectively. Overall, the works will consist of decommissioning and removing the pumping system and an actively reflooding the pits.

Water management infrastructure has been decommissioned consists of all the pumping system that had served for the dewatering of Second Portage Arm and the Bay Goose Impoundment. Following the conversion of the Portage Attenuation Pond into the Reclaim Pond, all of the dewatering equipment (i.e. dewatering pipelines, effluent diffuser pipelines, pumps and water treatment equipment) will be dismantled and either shipped from the mine site or disposed of in the on-site landfill.

Certain site infrastructure will be closed progressively during the life of the mine, such as camps, temporary workspace, marshalling yards, quarries and storage areas. Buildings that are no longer required will be dismantled and the areas contoured to restore natural drainage or new acceptable drainage. The disturbed areas will also be scarified to promote natural re-colonization of vegetation from surrounding areas.

Under the current design plans, waste rock from Portage and Goose Pits are currently being stored in the Portage Rock Storage Facility and will be stored in the Portage Pit following the completion of mining in this area. The Portage waste rock storage facility (PRSF) was constructed to minimize the disturbed area, restrict runoff to the Tailings Storage Facility and subsequently be capped with a 4m layer of non-acid-generating (NAG) rock to constrain the active layer within relatively inert materials. The control strategy to minimize the onset of oxidation and the subsequent generation of acid rock drainage includes freeze control of the waste rock through permafrost encapsulation and capping with an insulating convective layer of NPAG rock. The waste rock below the capping layer is expected to freeze, resulting in low rates of acid rock drainage (ARD) generation in the long term. Results to date from the thermistors indicate that freeze back is occurring in the WRSF structures. In 2012, AEM completed a major portion of

the reclamation of the PRSF and this was continued in 2013. Placement of a 4m NPAG rock cover over the exterior slopes as the PRSF is filled in lifts, including development of internal cells to encapsulate PAG materials by NPAG rock; as of January 2013, 42% of the ultimate area of the Portage PRSF had been covered with NPAG rock.

The same principle is used for the Tailings Storage Facility. Thermal modelling indicates that the tailings will freeze in the long term, and that the talik that currently exists below 2PL Arm will freeze before seepage from the TSF reaches the groundwater below the permafrost. The tailings are potentially acid generating (PAG), therefore a 4-m thick cover of NPAG material will be placed over the tailings to physically isolate the tailings and to confine the active layer within relatively inert materials. Cover trials will be completed in the TSF North Cell during operations to confirm the required cover thickness to physically isolate the tailings and to confine the active layer within relatively inert materials. The control strategy to minimize water infiltration into the TSF and the migration of constituents out of the facility includes freeze control of the tailings through permafrost encapsulation.

For more information regarding these activities you can refer to Section 3.4 of the closure plan found in Appendix H1.

9.1.2 AWPAR

As required by INAC Land Lease 66A/8-71-2, Condition 33: ***The lessee shall file annually a report for the preceding year, outlining ongoing restoration completed in conformity with the approved Abandonment and Restoration Plan, as well as any variations from the said Plan.***

And

As required by KIA Right of Way KVRW06F04, Condition 26: ***File annually a progress report for the preceding year, outlining any ongoing restoration completed, in conformity with the Abandonment and Restoration plan***.

No restoration work was completed in 2013.

9.1.3 Quarries

As required by INAC Land Lease 66A/8-72-2, Condition 33: ***The lessee shall file annually a report for the preceding year, outlining ongoing restoration completed in conformity with C&R Plan, as well as any variations from the said Plan.***

No restoration work was completed in 2013.

9.2 RECLAMATION COSTS

9.2.1 Project Estimate

As required by Water License 2AM-MEA0815 Schedule B, Item 18: ***An updated estimate of the current restoration liability based on project development monitoring, results of restoration research and any changes or modifications to the Appurtenant Undertaking.***

And

As required by NIRB Project Certificate No.004, Condition 80: ***File annually with NIRB's Monitoring Officer an updated report on progressive reclamation and the amount of security posted, as required by KivIA, INAC, and/or the NWB.***

See Section 9.1 for the progressive reclamation completed in 2013. Progressive closure measures undertaken to date, which are reflected in the financial security cost estimate, include the PRSF reclamation works. The financial security cost estimate has been conservatively developed assuming no further progressive rehabilitation activities are completed through the remaining life of the mine, and all remaining reclamation costs are incurred at the onset of permanent closure. For this reason the financial security cost estimate should be revisited as progressive reclamation measures are completed.

A financial security cost estimate of the closure and reclamation activities for the Project, based on the current end of mine life configuration, has been prepared using the RECLAIM template (Version 6.1, March 2009); details of this estimate are provided in Section 4.0, Appendix I1 and I2 of the closure plan found in Appendix H1. The cost estimate has been developed assuming third party contractor rates, on the basis that AEM is unable to fulfill its closure and reclamation obligations, and the government is required to take over reclamation of the Meadowbank Gold Project.

The estimated closure costs have been divided between Land Liability and Water Liability costs following the breakdown of the previous cost estimate prepared by Brodie Consulting Ltd. in 2008 (Brodie 2008). The updated closure and reclamation cost estimate for the Meadowbank Gold Project is $73,666,647 compared to $43,874,543 in the 2008 closure plan. Of this, the direct costs for demolition and rehabilitation total $56,993,484. The remaining cost is comprised of mobilization and demobilization ($2,424,791), a 5% allowance for project management and 5% for engineering ($2,849,674, each) and a 15% contingency allowance on direct closure costs ($8,549,023).

The more recent version of the RECLAIM Excel template used to develop this updated cost estimate uses higher unit rates than the version used in 2008 by Brodie, to better match current demolition and rehabilitation costs. In general, the unit rates have been increased by approximately 10% of those reported in the Brodie cost estimate, resulting in an expected increase of 10% to the overall closure costs with no other factors considered.

9.2.2 AWPAR and Quarries

As required by INAC Land Lease 66A/8-71-2, Condition 19: ***The lessee shall submit to the Minister every two years after the commencement date of this lease (January 2007), a report describing any variations from the Abandonment and Restoration Plan and updated cost estimates.***

And

As required by INAC Land Lease 66A/8-72-2, Condition 37: ***The lessee shall submit to the Minister every 2 years after the commencement date of this lease (January 2007), a report describing cumulative variations from the C&R Plan with updated cost estimates.***

And

As required by KIA Right of Way KVRW06F04, Condition 14: ***Submit to KIA every two years on each anniversary of the commencement date (February 2007), a report describing any variations from the Abandonment and Restoration Plan and updated cost estimates.***

No progressive reclamation has been completed on the AWPAR or associated quarries in 2013. No major modifications were made in the updated closure plan compared to with the '*AEM Closure and Reclamation Plan, September 2008*'. The cost estimate for the reclamation of the AWPAR and quarries are $1,061,664.

SECTION 10. PLANS / REPORTS / STUDIES

10.1 SUMMARY OF STUDIES

As required by Water License 2AM-MEA0815 Schedule B, Item 19: ***A summary of any studies requested by the Board that relate to Waste disposal, Water use or Reclamation, and a brief description of any future studies planned.***

On November 8, 2013, AEM received an AANDC Inspector's Direction (Appendix G4) in regard to the Portage Waste Rock Storage Facility Seepage. Please refer to Section 8.1.4.2 for more details. In this Inspector's Direction, the inspector as told AEM to, immediately:

- Conduct an investigation into the release of waste from ST-16 location into NP-2 Lake which includes determining the source of the contaminated water in ST-16 sump.

- Conduct an investigation, in consultation with an independent engineering firm, into the possible failure of the Waste Rock Plug that is designed to prevent waste from migrating out of ST-16 location into NP-2 Lake.

- Develop a Plan in consultations with an independent engineering firm:

    1. corrective measures that will be taken to immediately stop the release of waste ;

    2. long term corrective measures that will be taken to secure waste in the future.

    3. counteraction and/or remediation of the adverse impacts of the prior releases.

To fulfill requirement AEM equested that Golder Associates Ltd. (Golder) prepare an assessment report regarding the RSF based on the above. The assessment report includes findings and immediate actions, as well as presenting recommendations about the immediate- and long-term corrective actions. This report "*Rock Storage Facility Seepage - Meadowbank Gold Mine, Nunavut*" (Appendix G5) was sent January 2014.

10.2 SUMMARY OF REVISIONS

As required by Water License 2AM-MEA0815 Schedule B, Item 20: ***Where applicable, revisions will be completed as Addendums, with an indication of where changes have been made, for Plans, Reports, and Manuals.***

The following monitoring and management plans were revised in 2013:

- Landfarm Design and Management Plan, Version 3;
- Air Quality and Dustfall Monitoring Plan, Version 2;
- Meteorological Monitoring Plan, Version 1;
- Noise Monitoring and Abatement Plan, Version 2;
- 2013 Vault Lake Fishout Work Plan, Version 1;
- Groundwater Monitoring Plan, Version 4;

- Habitat Compensation Monitoring Plan, Version 3;
- Emergency Response Plan, Version 6;
- Hazardous Materials Management, Version 3;
- Oil Pollution Emergency Plan; Meadowbank Mine Fuel Farm in Baker Lake, Version 3;
- Spill Contingency Plan, Version 4;
- Operational ARD/ML Testing and Sampling Plan, Version 2;
- Interim Closure and Reclamation Plan, Version 2;
- Landfill Design and Management Plan, Version 2;
- Wildlife Protection and Response Plan, Version 3;
- Ammonia Management Plan, Version 1;
- Operation & Maintenance Manual : Sewage Treatment Plan, Version 4;
- Updated Mine Waste Rock and Tailings Management Plan, Version 3 (Appendix D1);
- Tailings Storage Facility – Operation, Maintenance and Surveillance Manual, Version 3;
- Dewatering Dike – Operation, Maintenance and Surveillance Manual, Version 3;
- Transportation Management Plan: All Weather Private Access Road, Version 3; and
- 2013 Water Management Report and Plan (Appendix C1).

The above listed plans are included in Appendix I1. A brief description of revisions made to each of plans is provided in Appendix I2.

10.3 EXECUTIVE SUMMARY TRANSLATIONS

As required by Water License 2AM-MEA0815 Schedule B, Item 21: ***An executive summary in English, Inuktitut and French of all plans, reports, or studies conducted under this Licence.***

Appendix I2 includes an executive summary in English, French and Inuktitut for the following documents:

- All monitoring and management plans listed in Section 10.2 above.

- Reports or studies submitted in 2013:
    - Production Lease KVPL08D280 2013 Mine Plan;
    - 2012 Annual Geotechnical Inspection;
    - Annual Review of Portage and Goose Pit Slope Performance (2012);
    - 2012 Independent Geotechnical Expert Review Panel Report;
    - Meadowbank Gold Project Water Management Plan 2012;
    - All Weather Access Road: 2012 Water Quality Management Report;
    - Stack sampling tests Outlet of the incinerator;
    - Core Receiving Environment Monitoring Program 2012;
    - 2012 Hamlet of Baker Lake Harvest Study – Creel Results;
    - 2012 Groundwater Monitoring and Water Quality Results, Meadowbank Mine, Nunavut;
    - 2012 Wildlife Monitoring Summary Report;
    - 2012 Blast Monitoring Report for the Protection of Nearby Fish Habitat;
    - 2012 Air Quality and Dustfall Monitoring Report;
    - Fisheries Habitat Mapping of Bay-Goose Basin: Pre-mine- operations versus post-dewatering analysis; and
    - 2012 Noise Monitoring report.

SECTION 11. MODIFICATIONS / GENERAL / OTHER

11.1 MODIFICATIONS

As required by Water License 2AM-MEA0815 Schedule B, Item 12: ***A summary of modifications and/or major maintenance work carried out on all water and waste related structures and facilities.***

In 2013, AEM applied for a modification to the Type A water license Part F, Item 4 to include East dike seepage water as non-contact water effluent. See Section 8.1.8 for more information.

In 2013, AEM applied for an amendment to the NWB Water License (2AM-MEA0815). The current Meadowbank's current NWB License (2AM-MEA0815) permits AEM to obtain 700,000 m^3 per year of fresh water for domestic camp use, mining, milling and associated uses. Despite significant success at engineering solutions to optimize fresh water use, requirements are projected to continue to exceed the permitted rate. For this reason, AEM is requesting an amendment to NWB License 2AM-MEA0815, Part E, Item 3, to permit the withdrawal of 1,870,000 m^3/yr in 2013, and 1,150,00 m^3/yr thereafter, for domestic camp use, mining, milling and associated uses. The amendment process is still ongoing. See Section 8.1.14 for more information.

On January 27, 2013, AEM sent a modification application with supporting information to the NWB to modify NWB license 2AM-MEA0815 under Part G to include expansion of the airstrip. The modification was approved by the NWB. Refer to Section 3.1.3 for more details.

In 2013, the Jet-A tank farm was modified in compliance with the Licence 2AM-MEA0815 Amendment No.1 - Marshalling Area Bulk Fuel Storage Facility Expansion. This amendment allows AEM to have 2 ML Jet-A fuel to refuel aircraft flying into the Meadowbank mine site. In 2013, AEM installed 20 double walled CCME approved storage tanks with a capacity of 100,000L each. The location of the Jet-A Tank farm can be found on Figure 3. As-built report can be found in Appendix G20.

11.2 INSPECTIONS, COMPLIANCE REPORTS AND NON-COMPLIANCES ISSUES

As required by Water License 2AM-MEA0815 Schedule B, Item 22: ***A summary of actions taken to address concerns or deficiencies listed in the inspection reports and/or compliance reports filed by an Inspector.***

And

As required by NIRB Project Certificate Condition 4: ***Take prompt and appropriate action to remedy any noncompliance with environmental laws and regulations and/or regulatory instruments, and shall report any noncompliance as required by law immediately and report the same to NIRB annually.***

The KIA contracted an independent auditor, EEM to conduct an environmental compliance audit of the Meadowbank mine in October, 2012. The report "*Environmental Legal Compliance Audit Report*", found in Appendix I1 of the 2012 Annual report, covers the environmental compliance evaluation conducted by EEM. AEM responded to the audit recommendations with an action plan in February 26, 2013 and sent an update on February 12, 2014 (Appendix J1).

The Water Resources Officer from Aboriginal Affairs and Northern Development Canada (AANDC) visited the site from June 4 to June 6, 2013. A draft inspection report has been received and actions were taken to address concerns made by the inspector. On July 14, 2013 AEM sent a written response to the inspector. The Inspection Report and AEM's response can be found in Appendix J1.

In July 2013, AANDC and KIA conducted the annual surface water sampling (non-regulatory). AEM did not receive any follow up report in 2013 for this event.

AANDC Water Resource Officer conducted a general site inspection on July 29-30, 2013. AEM received the inspection report from AANDC Water Resource Officer on September 26, 2013 and sent a response on November 12, 2013. These documents are found in Appendix J1. On November 8, 2013, AEM received an AANDC Inspector's Direction in regard to the Portage Waste Rock Storage Facility Seepage that was found by AANDC during the July 29-30 Inspection. AEM responded to this Inspector's Direction on November 20. On November 15, AEM received an email advising that AANDC Field Operations Division has initiated an investigation in regard to the incident that was discovered during the AANDC July 29 – 30 Inspection. The investigation has been initiated for the purpose of gathering additional information in regard to alleged violations under subsection 12 (1) of the Nunavut Waters and Nunavut Surface Rights Tribunal Act. AEM also received, on November 15, an email advising that Environment Canada Environmental Enforcement Division has initiated an investigation. The investigation has been initiated for the purposes of gathering additional information in regard to alleged violations under subsection 36(3) of the Fisheries Act. The investigation is still ongoing. Please refer to Section 8.1.8 and Appendix G4 (Inspector's direction and AEM response) for more details on the RSF Seepage.

DFO conducted a general site inspection from August 7 to 9, 2013. No inspection report was received.

2 AANDC and 2 Environment Canada Inspector attended Meadowbank unannounced on August 27 to take samples at the ST-16 seep and NP-2 Lake. This visit was a follow up to sampling that AANDC conducted during the site visit on July 29-30.

The NIRB Monitoring Officer was on site for an inspection on September 13, 2013. On September 15, AEM provided a written explanation to NIRB about barrels observed at the Meadowbank Landfill during the September 13, 2013 inspection. AEM received the NIRB Inspection report on November 14. AEM sent correspondence to DFO on November 22 regarding the elevated turbidity observed by NIRB during their inspection. All of these documents can be found in Appendix J1.

GN Renewable Resources along with GN Conservation Officer attended the site an unannounced visit on October 23. The visit went well and no inspection report was received.

KIA was on site on November 29 to inspect the Assay Road Seepage. The visit went well and no inspection report was received.

AEM received the 2012-2013 Annual Monitoring report from NIRB on November 27 and a response to the recommendations was forwarded to NIRB on January 7, 2014. These documents can be found in Appendix J1.

A total volume of 1,593,579 m^3 of freshwater was used for the project in 2013. This exceeded the water license limit of 700,000 m^3 per year. See Section 8.1.14 for explanations.

Non-compliances were observed in 2013 at the Portage Attenuation Pond Discharge (ST-9):

- On August 22, the daphnia toxicity test failed. This is considered as non-compliance with Water License Part F, Item 24 but is not considered a violation pursuant to MMER. See Section 8.1.4.3 for more details.
- All additional discharge results were in compliance with Water License Part F, Item 2 for effluent quality limits with the exception of aluminum on two occasions. On October 2nd and 7th, 2013 the aluminum concentration was 2.16 mg/L and 1.96 mg/L, respectively, exceeding the license limit of 1.5 mg/L as a maximum grab sample. AEM did not exceed the monthly average concentration limit. See Section 8.1.4.3 for more details.

In 2013, modifications were made to the north cell diversion ditch. Beginning on September 12, extending into the NIRB inspection on September 13, 2013, Meadowbank experienced unusually high amounts of rain. This caused some erosion within the North Cell non-contact West Diversion ditch ultimately discharges into Third Portage Lake. This was considered a rare event but ultimately resulted in elevated turbid water reaching the near shore area. This was noted by the NIRB Monitoring Officer but not deemed an occurrence by onsite staff at the time. This was primarily due to the fact that the technicians felt some of the TSS was naturally occurring (as turbid water was observed upstream of the discharge area of the West ditch). In addition, turbidity curtains that were in place (placed during freshet as a precaution) contained the turbid water close to the near shore. This event was later reported to DFO on November 22, 2013. DFO advised AEM that these incidents are reportable to DFO. Environment and Site Services staff department on-site have been made aware of this requirement. Visual inspections will increase during 2014 as part of the overall Freshet Action Plan referred to previously.

11.3 AWPAR USAGE REPORTS

11.3.1 Authorized and Unauthorized Non-Mine Use

As required by NIRB Project Certificate Condition 32g: ***Record all authorized non-mine use of the road, and require all mine personnel using the road to monitor and report unauthorized non-mine use of the road, and collect and report this data to NIRB one (1) year after the road is opened and annually thereafter.***

And

As required by NIRB Project Certificate Condition 33: ***Cumberland shall update the Access and Air Traffic Management Plan to: 1. Include an All-weather Private Access Road Management Plan, including a right-of-way policy developed in consultation with the KivIA, GN, INAC and the Hamlet of Baker Lake, for the safe operation of the all-weather private access road; and 2. To facilitate monitoring of the environmental and socio-economic impacts of the private road and undertake adaptive management practices as required, including responding to any concerns regarding the locked gates.***

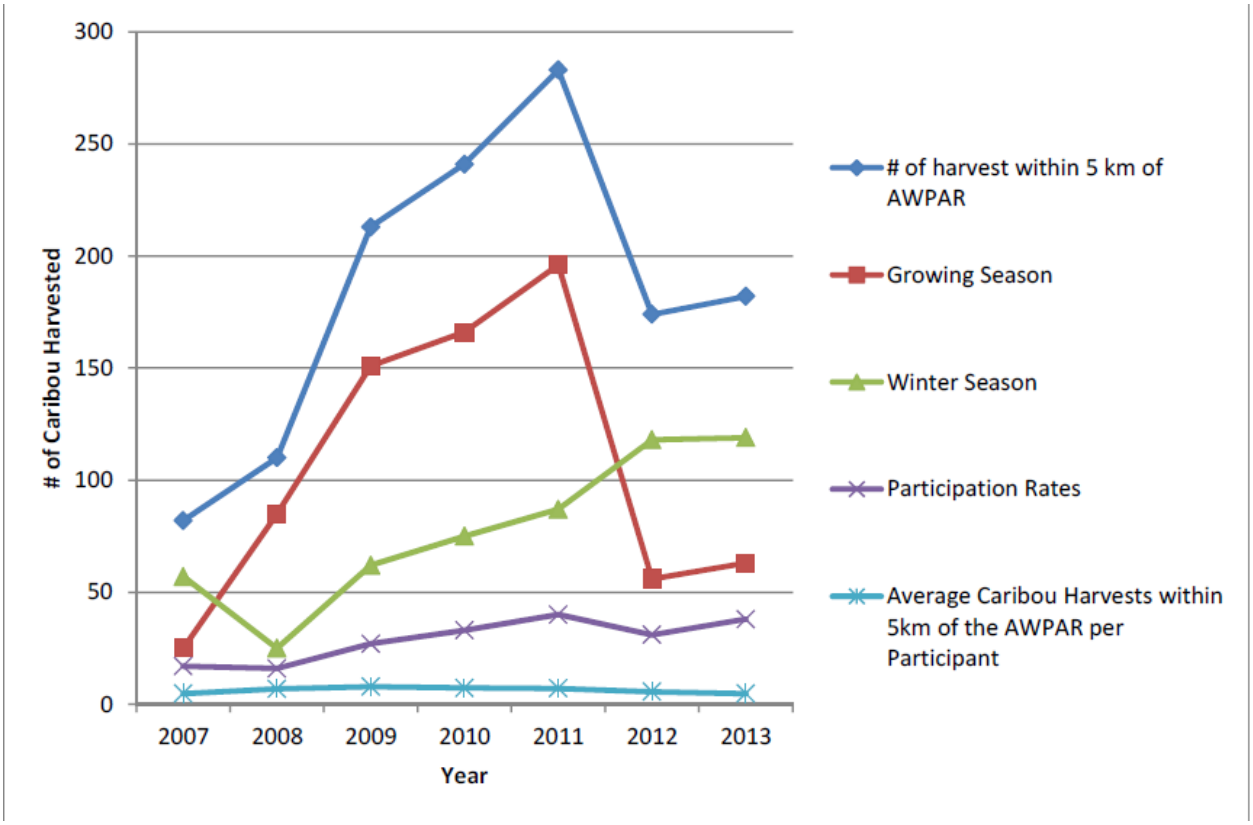
The security department at the Meadowbank Gold Project maintains fully staffed security entry gates house on a 24/7 schedule; one at the entrance to the AWPR in Baker Lake and one at the entrance to the

Meadowbank mine site. Security staff monitor the safety and security of all personnel using the road. AEM procedures for non-mine uses of the road requires that any local users report to the Baker Lake Gatehouse and sign a form that describes the safety protocol while on the road. The road is used primarily by local hunters using ATV's and snowmobiles. Daily records are kept. A summary of the non-mine authorized road use for 2013 are provided in Table 11.1. In 2013 AEM is confident that our current procedures and protocols provide for the safety of the local public while using the road either for hunting access or for general recreational opportunities. There have been no accidents to date involving mine related truck traffic and locals using ATV's.

Table 11.1 2013 AWPAR ATV Usage Records

Month	# of ATV's
January	0
February	0
March	0
April	0
May	32
June	525
July	244
August	246
September	639
October	238
November	34
December	0

According to "*Meadowbank Mine 2013 Wildlife Monitoring Summary Report*", in 2013, the total number of Caribou harvested (182 animals) within 5 km of the AWAR was less than previous years; however, these numbers represent 43% of all harvests recorded by participants. Total harvests per participant within 5 km of the AWAR continued to decrease, and were at their lowest in 2013 at 4.9 Caribou per participant (see Figure 25 below). In the historical NWMB study, Caribou harvests within 5 km of the road were estimated to be 18% of total harvest, while in the HHS data set, harvest along the AWAR has averaged 38% of total harvest. The total number of Caribou harvested along the AWAR increased during the first few years of the HHS, but has been lower over the past two years, likely related to an overall decrease in total harvest. A similar pattern was observed for the growing season, but a slight continual increase in total harvest numbers was observed along the road in the winter season. The road appeared to be used more often by hunters in the winter season, despite relatively unrestricted access to unroaded areas in the Baker Lake area.



Note that sharp decreases in 2012 data points reflect lower overall harvest totals

Figure 25: Caribou Harvests (Total Harvest and Average by Participant) Along the AWAR (2007 to 2012).

Counts remained low for Muskox and Wolverine, precluding any interpretation of potential mine- related effects. Low densities of these species and their general aversion to humans require hunters to hunt well away from the AWAR; therefore, the presence of the AWAR is thought to have little effect on Muskox and Wolverine hunting patterns. Wolverine harvests have decreased from a maximum of 15 animals in 2010, to the lowest number recorded since the start of the HHS in 2013 (n=2).

11.3.2 Safety Incidents

As required by NIRB Project Certificate Condition 32e: ***Prior to opening of the road, and annually thereafter, advertise and hold at least one community meeting in the Hamlet of Baker Lake to explain to the community that the road is a private road with non-mine use of the road limited to approved, safe and controlled use by all-terrain-vehicles for the purpose of carrying out traditional Inuit activities.***

And

As required by NIRB Project Certificate Condition 32f: ***Place notices at least quarterly on the radio and television to explain to the community that the road is a private road with non-mine use of road limited to***

authorized, safe and controlled use by all-terrain-vehicles for the purpose of carrying out traditional Inuit activities.

And

As required by NIRB Project Certificate Condition 32h: ***Report all accidents or other safety incidents on the road, to the GN, KivIA [KIA], and the Hamlet immediately, and to NIRB annually.***

In May 30, 2013, AEM held a meeting in the Hamlet of Baker Lake to explain to the community the Policies and Procedures of the All Weather Private Road from Baker Lake to the Meadowbank Mine site. You will find the presentation and meeting minutes in Appendix J2. AEM also placed a notice on the local radio station talking about Policies and Procedures of the All Weather Private Road from Baker Lake to the Meadowbank Mine site. In 2014, a notice will be placed on the radio at least once during each quarter. AEM also conducts quarterly meetings with the Baker Lake Community Liaison Committee and issues related to the use of the AWPR are discussed regularly.

There have been no accidents to date involving mine related truck traffic and locals using ATV's. However, on April 1, 2013 a snowmobile accident occurred on the road near bridge 1 (Km 9) and caused minor injuries to one person. The accident did not involve a mine vehicle. The injured person attended the Baker Lake Health Center where he received stiches.

A total of 4 environmental spills occurred along the AWPAR in 2013. Table 7.1 provides details on each of these spills.

Road kill data along the AWAR for 2013 are provided in Table 11.2. Based on available records, road kill counts for 2013 decreased from previous years. To avoid this kind of incident, messages are continually provided to employees and contractors to reinforce the procedures for wildlife protection during road use.

Table 11.2: 2013 AWAR Wildlife Mortality Data

Dates	Species	Count	Comments
6 May 2013	Caribou	5	Early morning collision with grader at Km 76
6 Sept 2013	Unidentified bird	1	On Saddle Dam road; fox scavenged carcass
9 Dec 2013	Arctic Hare	1	From AWAR survey database
No date	Arctic Fox	1	No details

11.4 ON-BOARD VESSEL ENCOUNTER REPORTS

As required by NIRB Project Certificate Condition 36: ***Inuit observation and encounter reports for on-board vessels transporting goods and fuel through Chesterfield Inlet.***

AEM engaged one local representative to act as marine mammal monitors for the 2013 shipping season.

In fulfillment of NIRB Condition 36, the following table summarizes the observations made by local marine mammal monitors onboard AEM vessels transporting fuel or materials for the Meadowbank Mine through Chesterfield Inlet. You will find in Appendix J3 the observation reports from the local representative

wildlife monitor. Gulls are the main wildlife observed. There were no adverse incidents reported. Ten (10) muskox were observed on land.

Table 11.3: 2013 Summary of local area marine mammal monitor's observations

Name	Direction/Location	Start Date	Finish Date	Observations	Comments
Nick Ipkarnerk	Baker Lake to Helicopter Island	Aug. 13	Aug. 14	Seagulls	During fuel transfer at Helicopter Island 6:45am
Nick Ipkarnerk	Baker Lake to Helicopter Island	Aug. 13	Aug. 14	Seagulls	During fuel transfer at Helicopter Island 10:30am
Nick Ipkarnerk	Baker Lake to Helicopter Island	Aug. 13	Aug. 14	Seagulls	Fuel transfer done at Helicopter Island 10:35am
Nick Ipkarnerk	Helicopter Island to Baker Lake	Aug. 14	Aug. 14	2 small birds	All activities normal 4:10pm
Nick Ipkarnerk	Helicopter Island to Baker Lake	Aug. 14	Aug. 14	3 birds	All activities normal 6:55pm
Nick Ipkarnerk	Baker Lake to Helicopter Island	Aug. 16	Aug. 16	Loon	All activities normal 6:24am
Nick Ipkarnerk	Helicopter Island to Baker Lake	Aug. 16	Aug. 16	1 Seagull	During fuel transfer at Helicopter Island 10:35am
Nick Ipkarnerk	Helicopter Island to Baker Lake	Aug. 16	Aug. 16	4 small birds	During fuel transfer at Helicopter Island 10:41am
Nick Ipkarnerk	Helicopter Island to Baker Lake	Aug. 16	Aug. 16	3 Seagulls	During fuel transfer at Helicopter Island 1:22pm
Nick Ipkarnerk	Helicopter Island to Baker Lake	Aug. 16	Aug. 16	3 Seagulls	During fuel transfer at Helicopter Island 1:53pm
Nick Ipkarnerk	Helicopter Island to Baker Lake	Aug. 16	Aug. 17	12 Snow Geese	All activities normal 5:50pm
Nick Ipkarnerk	Helicopter Island to Baker Lake	Aug. 16	Aug. 17	2 small birds	Near a small Island 7:15pm
Nick Ipkarnerk	Helicopter Island to Baker Lake	Aug. 16	Aug. 17	Seagulls	During fuel transfer at Baker Lake 7:50pm
Nick Ipkarnerk	Baker Lake to Helicopter Island	Aug. 17	Aug. 18	Small birds	All activities normal 8:45am
Nick Ipkarnerk	Baker Lake to Helicopter Island	Aug. 17	Aug. 18	1 Snow Goose	All activities normal 9:14am
Nick Ipkarnerk	Baker Lake to Helicopter Island	Aug. 17	Aug. 18	Small birds	All activities normal 11:18am
Nick Ipkarnerk	Baker Lake to Helicopter Island	Aug. 17	Aug. 18	Seagulls	All activities normal 1:50pm
Nick Ipkarnerk	Baker Lake to Helicopter Island	Aug. 17	Aug. 18	Seagulls	All activities normal 3:15pm
Nick Ipkarnerk	Baker Lake to Helicopter Island	Aug. 17	Aug. 18	Seagulls	During fuel transfer at Helicopter Island 5:56pm
Nick Ipkarnerk	Helicopter Island to Baker Lake	Aug. 18	Aug. 19	Seagulls	All activities normal 7:46pm

Nick Ipkarnerk	Helicopter Island to Baker Lake	Aug. 18	Aug. 19	Snow Geese	All activities normal 9:15pm
Nick Ipkarnerk	Helicopter Island to Baker Lake	Oct. 9	Oct. 9	1 Raven	All activities normal 1:00pm
Nick Ipkarnerk	Helicopter Island to Baker Lake	Oct. 10	Oct. 10	1 Seagull	All activities normal 4:22pm
Nick Ipkarnerk	Helicopter Island to Baker Lake	Oct. 11	Oct. 11	2 Seagulls	All activities normal 5:50pm
Nick Ipkarnerk	Helicopter Island to Baker Lake	Oct. 13	Oct. 14	1 Seagull	During fuel transfer at Baker Lake 2:50pm
Nick Ipkarnerk	Helicopter Island to Baker Lake	Oct. 15	Oct. 15	2 Seagulls	All activities normal 8:40am
Nick Ipkarnerk	Helicopter Island to Baker Lake	Oct. 15	Oct. 16	12 Snow Geese	All activities normal 1:00pm
Nick Ipkarnerk	Helicopter Island to Baker Lake	Oct. 15	Oct. 16	Raven	During fuel transfer at Baker Lake 3:10pm

11.5 TRADITIONAL KNOWLEDGE, CONSULTATION WITH ELDERS AND PUBLIC CONSULTATION

As required by NIRB Project Certificate No.004, Condition 39: ***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.***

And

As required by NIRB Project Certificate No.004, Condition 40: ***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. Report to the KIA and NIRB's Monitoring Officer annually on the Traditional Knowledge gathered including any operational changes that resulted from concerns shared at the workshop.***

And

As required by NIRB Project Certificate No.004, Condition 58: ***"in consultation with Elders and the HTOs and subject to safety requirements, design the lighting and use of lights at the mine site to minimize the disturbance of lights on sensitive wildlife and birds"***

And

As required by NIRB Project Certificate No.004, Condition 59: ***in consultation with Elders and the HTOs, design and implement means of deterring caribou from the tailing ponds, such as temporary ribbon placement or Inukshuks, with such designs not to include the use of fencing"***

And

As required by Water License 2AM-MEA0815 Schedule B, Item 23: ***A summary of public consultation and participation with local organizations and the residents of the nearby communities, including a schedule of upcoming community events and information sessions.***

In 2013, meetings were held to discuss different topics with the community of Chesterfield Inlet including shipping.

AEM held an Inuit Qaujimajatunqagit (IQ) workshop in Chesterfield Inlet for two days on January 26 and 27, 2010. This workshop was focused on gathering information on traditional use and traditional environmental knowledge of Chesterfiled Inlet residents, as well as project-specific effects and mitigation recommendations including search and rescue operations and safety. The second part of the condition 40 is to 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. Following meetings with Chesterfield residents in 2012, no change in the TK gathered was report to AEM and no operational changes were necessary. AEM believes this complies with the condition 40.

A log of 2013 public consultation activities is included in Appendix J4.

During the week on April 22nd, the Meadowbank Environment Department sent one technician for Trade Week at JASS in Baker Lake Hamlet. The purpose of the event was to give students, who had volunteered, a firsthand look of environmental field work. Topics included were:

- Sampling techniques for on-ice work, including auger work;
- Use of analysis meters and probes for on-ice work, including depth profiling;
- Drinking water sampling procedures;
- Introduction to spill response and deployment of equipment; and
- Hazardous materials storage and good practices.

Both students and the teacher gave positive feedback from presentation and the AEM technician appreciated efforts and participation from the class. All benefited from the exchange of time and knowledge. This program will continue in 2014.

On May 8, 2013, AEM met with Hamlet and HTO of Chesterfield Inlet to discuss activities at Meadowbank, wildlife and general information. A summary of the meeting is included in Appendix J5.

11.5.1 AEM Kivalliq Donations Policy

AEM is committed to be an active participant in Kivalliq communities. An important aspect of participation is to provide donations that enrich the cultural and social well-being of Kivalliq communities. AEM is also committed to sponsor major events that promote interest and activity related to the mining industry in Nunavut.

Unfortunately, due to the difficult economic situation as a result of falling gold prices, AEM had to review its donation policy in 2013 and limit its ability to contribute through contributions. AEM maintained its contributions for major events but had to decline many donation requests in the second half of the year. This decision allowed the company to maintain sustainable operations in Nunavut and elsewhere where the company operates. With the difficult economic context being maintained in 2014 it is expected that the level of donations will be kept to a minimum again in 2014.

However AEM continues to value the importance of the different groups that are involved at all levels in the communities and will do everything possible to continue to support these organizations in the limit of our cost structure.

11.5.2 Community Engagement Initiatives

The following is a summary of community initiatives that AEM has participated in during 2013.

11.5.2.1 Community Coordinators Program

In April 2012 Agnico agreed to sponsor a part time AEM Coordinator within the Hamlets of Repulse Bay, Coral Harbour, Whale Cove, Chesterfield Inlet and Arviat. AEM's offices in the communities of Rankin Inlet and Baker Lake already have resources to provide for improved community relations. In 2013 even though the program was maintained it was reviewed based on actual needs and results from the previous year. Following a thorough evaluation Coordinators were maintained in Chesterfield Inlet and Arviat where we have the highest concentration of workers. AEM employees continue giving the support in Baker Lake and Rankin Inlet.

The objectives of the community based AEM coordinators are to provide a point of contact in each community to facilitate communications, provide services and coordinate activities in the following areas.

- Provide support to the HR Department:
    - Assist HR and other AEM departments to contact employees as required
    - Contact employees in advance of their shift departure times
    - Pick up employees from their residence and take them to the airport on shift departure days
- Provide advice and assistance to AEM to organize and hold community information sessions on AEM projects and initiatives
- Provide advice and assistance on the design, development and implementation of community based projects (training, AEM employee well-being and community development initiatives)
- Provide updates to the Hamlet Council on AEM activities
- Distribute AEM information and promotional materials

AEM is generally satisfied with this program. There is a clear link and opportunity between the agreements with Hamlets and the practical socio-economic mitigation activities that may be considered by the SEMC.

11.5.2.2 Baker Lake Student Clean up

Again in the summer of 2013 AEM funded 8 students to conduct various clean - up and other community projects in Baker Lake. The students generally conducted clean – up of litter and other debris. Additional projects related to this program included painting at the arena and the installation of soccer nets at the sports park.

11.5.2.3 Summer Student Employment program

AEM's companywide policy offers summer employment programs to the children of all AEM employees (both Nunavut and non-Nunavut based) that are participating in post-secondary education. Summer jobs opportunities were also offered to Inuit students who are participating in post-secondary activity, even though they had no family relative working at the mine. There were unfortunately no Inuit students working at the mine site in 2013. However, as mentioned above, many were hired in Baker Lake for different maintenance tasks.

11.5.2.4 Site Tours for Baker Lake Residents

AEM continued to offer tours of the Meadowbank Project site to all residents of Baker Lake throughout the summer of 2013. This program started in 2008 with tours being offered to all elders. It was subsequently extended to youth groups and then to all residents of Baker Lake. People sign up at the AEM Baker Lake office for tours of the site typically offered on a Saturday or Sunday. The tours are bussed from Baker Lake to the mine, have a tour of the Mine, enjoy a meal in the camp where they can talk with other residents and see for themselves working and living conditions before returning to Baker Lake. It has now become a tradition that will be once again offered to Baker Lake residents next summer. Over 170 residents participated in the site tours during 2013.

On November 5, 2013, AEM held a Meadowbank Mine site tour with Baker Lake JASS students. The visit include an introduction to the mine site and presented information by power point about the methods of mining, pit infrastructure, general milling process and energy used for mining. This was followed by a site tour that explained and showed the students the crushers, mill, powerhouse, waste management (incinerator and hazardous waste), sewage treatment, bulk storage onsite, pit, water treatment and tailings facilities. You will find in Appendix J6 a report of the visit.

11.5.2.5 Sports Day in Canada – Baker Lake

Under the Sports Day event this year AEM contributed to the annual baseball tournament of Baker Lake. For this occasion players from other communities in the Kivalliq traveled to Baker Lake to participate in the tournament. Equipment and food was provided to the local canteen so that additional funds were raised to assist in providing prizes. Some representatives of AEM were present for the event and it was considered a real success.

11.5.2.6 Supply of Carving Stone to Baker Lake and Arviat Carvers

In 2013 AEM was not able to restart providing carving stone from the Meadowbank Mine to local carvers in both Baker Lake and Arviat. Although good quality carving stone is found within the waste rock generated by open pit mining at Meadowbank the company is testing the carving stone for asbestos content. Tests were conducted and unfortunately it was found that the company cannot certify for sure if asbestos will be present or not in the stones shipped. Therefore it was decided to stop this program for an undetermined period.

11.6 MINE EXPANSION

As required by NIRB Project Certificate Condition 29: ***report to NIRB if and when [Cumberland] develops plans for an expansion of the Meadowbank Gold Mine, and in particular if those plans affect the selection of Second Portage Lake as the preferred alternative for tailings management.***

No plans to expand the Meadowbank Gold Project were developed in 2013.

11.7 INSURANCE

As required by NIRB Project Certificate Condition 45: ***"[Cumberland] shall carry, and require contracted shippers to carry adequate insurance to fully compensate losses arising from a spill or accident, including but not limited to the loss of resources arising from the spill or accident; any claims are to be reported to proper officials with a copy to NIRB's Monitoring Officer"***

No claim was reported by our marine shipper in 2013.

As required by NIRB Project Certificate No.004 Condition 45: ***[Cumberland] shall carry, and require contracted shippers to carry adequate insurance to fully compensate losses arising from a spill or accident, including but not limited to the loss of resources arising from the spill or accident; any claims are to be reported to proper officials with a copy to NIRB's Monitoring Officer***

Contractors have insurance to fully compensate losses arising from a spill or accident, including but not limited to the loss of resources arising from the spill or accident.

11.8 SEMC

As required by NIRB Project Certificate Condition 63: ***the GN and INAC shall form a Meadowbank Gold Mine Socio-Economic Monitoring Committee ("Meadowbank SEMC") to monitor the socio-economic impacts of the Project and the effectiveness of the Project's mitigation strategies; the monitoring shall supplement, not duplicate, the monitoring required pursuant to the IIBA negotiated for the Project, and on the request of Government or NPC, could assist in the coordination of data collection and tracking data trends in a comparable form to facilitate the analysis of cumulative effects; the terms of reference shall focus on the Project, include a plan for ongoing consultation with KivIA and affected local governments and a funding formula jointly submitted by GN, INAC and [Cumberland]; the terms of reference shall be submitted to NIRB for review and subsequent direction within six (6) months of the issuance of a Project Certificate; [Cumberland] is entitled to be included in the Meadowbank SEMC***

And

As required by NIRB Project Certificate No.004, Condition 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.***

The 2013 annual report "*Socio-economic Monitoring Committee*" is not yet complete. The final report will be sent to NIRB when complete.

The Kivalliq Regional SEMC met in Arviat on November 26 and 27 2013. AEM participated at the meeting and provided two presentations. The first presentation focused on workforce statistics and training initiatives that the company is developing. There was considerable discussion on human resource initiatives, mostly on the latest training and employment programs. Copies of these presentation materials were previously provided to the GN and are included in the Kivalliq Regional SEMC report and are available on the GN SEMC website (http://www.nunavutsemc.com/Kivalliq).

The second presentation presented a summary of the economic situation of the company and the mining industry in general. This presentation aimed to increase the knowledge of the committee about the current challenges faced by the mining industry related to the drastic lowering of the price of gold and changing investor expectations.

AEM will continue to actively participate in the Kivalliq Regional SEMC and will meet its socio-economic reporting requirements to NIRB through the SEMC annual report. To the best of our knowledge AEM has complied with all of the requests for data made by the SEMC and is current with all commitments made to the SEMC by AEM.

11.9 SOCIO ECONOMIC

As required by NIRB Project Certificate No.004, Condition 65: ***Cumberland shall include in its socio-economic monitoring program for the Meadowbank Project the collection and reporting of data of community of origin of hired Nunavummiut.***

11.9.1 Meadowbank Workforce

The total number of people working at the Meadowbank Mine site as of December 31, 2013 was 1,020 persons (Contractors, AEM Permanent + Temporary), broken down as follows:

- # Working for contractors: 255
- # Working for AEM: 765
-

The total AEM workforce at the end of 2013 was 765 broken down as follows:

• Permanent AEM employees	672	87.8%
• Temporary AEM employees	93	12.2%
• AEM employees who are Inuit / Nunavummiut	244	31.9%
• Proportion of AEM employees who are female	77	10%

Table 11.4 -Total Workforce at the Meadowbank Mine as of Dec 31, 2013

Total # of AEM employees on AEM on December 31, 2013; 765		
# of above employees who are permanent AEM employees	**672**	**87.8%**
of these employees who are Inuit /Nunavummiut	158	23.5%
of these employees who are female	41	6.10%
# of above employees who are temporary employees	**93**	**12.15%**
of these employees who are Inuit	86	92.4%
of these employees who are female	36	38.7%

AEM defines a permanent employee as an employee whose current job is not specifically tied to a short-term project and the position is expected to be required throughout the LOM. A temporary employee is considered as an employee whose current job will not continue beyond a specified period of time. A temporary on-call employee, 100% filled by Inuit/Nunavummiut, is an employee who has an indefinite contract and is called upon when the need arises.

All AEM employees are required to provide a medical health certificate before they are offered a permanent position. Most Inuit employees, in particular those from Baker Lake, have been unable to provide a medical certificate as examination services are not available to our employees from GN Nursing Stations. In 2013 AEM continued providing new medical exam services at Meadowbank using qualified medical staff brought in from outside Nunavut. These services are provided at no cost to employees. In future, unless Inuit employees are hired specifically for a short period due to a special project or situations (i.e. replacement leave); employees will undergo a medical examination after three months of temporary status. The company will continue to offer more Inuit with permanent offers of employment to ensure that employees can enjoy a full range of benefits and feel more confident and secure about their employment status.

At the end of December 2013, 244 Inuit were employed at Meadowbank. Table 11.5 lists the types of jobs held by Inuit employed at Meadowbank as of December 2013.

Table 11.5 - Types of job positions held by Inuit/Nunavummiut at Meadowbank as of Dec 31, 2013

Job position	Total
Apprentice	7
Auxiliary Equip. Operator	9
Career Development Services	1
Cook Helper	4
Dishwasher	23
Driller & Blaster	3
Environmental Technician	1
Fixed Equipment Operator	1
Grade Control Sampler	2
Guest Services Leader	1
Haul Truck Operator	61
Health & Safety Officer	1
Heavy Equipment Operator	9
Helper	29
Human Resources Agent	2
IIBA Coordinator	1
Janitor	61
Labourer	16
Millwright	1
Production Loading Equip. Operator	1
Receptionist	1
Security Guard	4
Skills and Development Counselor	1
TOTAL	**244**

Table 11.6 - Skill level of position held by Inuit/Nunavummiut at Meadowbank as of Dec 31, 2013

Total # of AEM Inuit employees as of December 31, 2013		
# of these employees that have a *skilled* level job	22	9.01%
# of these employees that have a *semi-skilled* level job	175	71.7%
# of these employees that have a *unskilled* level job	47	19.26%
Total	**244**	**100.00%**

11.9.2 Hours Worked by AEM Employees at Meadowbank

The total person hours worked by all AEM Meadowbank employees (Permanent + Temporary) for the 12-month period ending December 31, 2013 was 1,670,760. Table 11.7 provides a breakdown by Nunavut and non-Nunavut based employees.

Table 11.7: - Person-hours worked - Nunavut based vs. Non-Nunavut based Employees

Jan. 1, 2013 to Dec. 31, 2013	Person-Hours	%
All AEM Employees		
Nunavut Based AEM Employees	532,896	31,9%
Non Nunavut Based Employees	1,137.864	68.1%
Total	**1,670,760**	100.00%

Although the number of Inuit Employees at Meadowbank remains comparable to 2012, the Inuit hours of employment increased by 16,008 hours in 2013 and the percentage of Inuit employed increased from 31.4% in 2012 to 31,9% in 2013. By having the Kivalliq region candidates do the work readiness training and an interview prior to their employment, we can assume that we are now having better success at finding the right position for each employees or vice versa, the right person for each job opening.

Furthermore, establishing the on-call contracts has given us the chance to quickly replace the unplanned or planned absences of employees, which is reflected in the increase of the hours worked. As those on the on-call contracts are from the Kivalliq communities they have the possibility to work more hours given their more immediate availability.

11.9.3 Employment Demographics for Nunavut Based Employees

The Meadowbank Nunavut workforce is primarily from Baker Lake. Table 11.8 shows the breakdown of the home communities of the Nunavut based employees as of December 31, 2013 compared to December 2012 and December 2011.

Table 11.8 - Home Communities of Nunavut Based Employees

	As of December 31, 2013		As of December 31, 2012		As of December 31, 2011	
Arviat	28	11.5%	44	17.8%	48	19.3%
Baker Lake	162	66.4%	154	62.3%	138	55.4%
Chesterfield Inlet	3	1.2%	5	2.0%	5	2.0%
Coral Harbor	3	1.2%	1	0.4%	4	1.6%
Rankin Inlet	31	12.7%	29	11.7%	35	14.1%
Repulse Bay	4	1.6%	2	0.8%	2	0.8%
Whale Cove	3	1.2%	2	0.8%	10	4.0%
Others	10	4.1%	10	4.0%	7	2.8%
Total	**244**	**100.00%**	**247**	**100.00%**	**249**	**100.00%**

AEM pays for the transportation of all Nunavut based employees from their point of hire to the Mine for each work rotation. AEM has a service contract with First Air to transport AEM employees by charter plane from Kivalliq Communities directly to and from the Meadowbank Mine airstrip. Currently all Nunavut resident employees from the southern Kivalliq communities (Arviat, Chesterfield Inlet, Whale Cove and Rankin Inlet) are flying by charter direct from their home communities to the Meadowbank mine site. Employees based out of Coral Harbour and Repulse Bay are transported by commercial carrier to Rankin Inlet to connect with the First Air charter to the mine site. All travel costs for employees coming to and from their work rotation at Meadowbank are paid by AEM.

During 2013 AEM saw a total of 162 Nunavummiut employees terminate their employment (voluntary and involuntary terminations). Of these, 109 were temporary employees and 53 were permanent employees.

11.9.4 Employee retention

In 2013, AEM continued to experience some turnover of Inuit employees but the company realized a significant decrease in the rate from 127% in 2012 to 67% in 2013 for the employees who occupied temporary positions. This decrease can be explained by the fact that numerous temporary employees have been converted to permanent status in 2013.

In 2013, a contract was signed with a medical clinic and a nurse comes to site to do the pre-employment exams every 4-6 weeks. This measure is reducing the delays to complete the employee's file and after to move employees from a temporary to a permanent status.

Furthermore, the on-call contracts allowed new employees to better adapt to their new work environment because they start replacing for a couple of days, therefore experiencing the camp life. This helps decreasing the gap between their understanding of Meadowbank and the reality of the work environment; consequently it contributes to reduce the voluntary resignations. Also, some Inuit/Nunavummiut want to work on-call only for individual reasons.

Based on AEM's experience it has become apparent that many Inuit have never had a full time work experience in their home communities where full time employment opportunities are often very limited; and although they want a job, working away from home for two weeks at a time in a structured industrial environment is a change that many cannot adapt to.

Exit interviews and focus group meetings support this assumption and the following provides the most common reasons given for voluntary terminations; spousal relationships issues, did not like the work or too tired to continue working, too much gossip amongst co-workers, no babysitter or daycare, found a new job in town Home sick – need to go home, family wanted them to come home, work was too hard or did not like the work, and increase in rent for social service housing (example $30 to $880 per month).

However, the turnover rate of Inuit employee's occupying permanent positions has increased to a 23%. This increase compared to the 11% rate seen in 2012 may be the consequence of a collateral effect of turning temporary employee to permanent status in the prescript delays. However, the global Inuit turnover rate has considerably decreased from 67% to 36% when considering both permanent and temporary employees.

During 2013 AEM saw a total of 162 Nunavummiut employees terminate their employment (voluntary and involuntary terminations). Of these, 109 were temporary employees and 53 were permanent employees. The top 5 with the highest turnover are, respectively: helper (process plan), janitor, dishwasher, cook helper and helper (mine). The average length of employment for the employees terminated was 730 days, with a range from 3 to 2348 days.

11.9.5 Education & Training

The total hours of training provided to all AEM Meadowbank employees during 2013 was 28,584 hours, of which Inuit employees received 13,530 hours of training. Training is categorized in two areas, Mandatory, which is training related to health and safety and provided in an e-learning format, and General & Specific, which represent all training related to the job of the employee, which is delivered both in class and in field. These data, as well as the comparison for the previous 12 month period is shown in Table 11.9.

Table 11.9 - Training Hours for Meadowbank Employees Period Ending December 31, 2013

Total training hours				
Training Hours for AEM Employees	**Training Hours (Jan. 1 2012 - Dec. 31 2012)**	**Training Hours (Jan. 1 2013 - Dec. 31 2013)**		
Inuit Employees	**Total**	Mandatory Training	General & Specific Training	**Total**
	8,662	612	12,918	13,530
Non Inuit Employees	**Total**	Mandatory Training	General & Specific Training	**Total**
	16,506	612	14,442	15,054
Total	**25,168**	**1,224**	**27,360**	**28,584**

There are related reasons for the improvement in training to Inuit over 2013. Although mandatory training (Safety, WHMIS etc.) is only provided to new employees, many employees took the opportunity of an e-learning format to refresh their knowledge as we determined an expiry date of three (3) years for all mandatory training. As these training have been converted into an e-learning format, which means that they must be completed via computer, it allows more flexibility in the process regarding the moment of the training and the duration, which is also shorter than it was before. As noted in the turnover rates, AEM may hire the same Inuit employee twice in one year and there is no requirement to train them again in this area.

As previously noted, Inuit content has decreased in 2012, which could have affected the amount of training offered in that area that year, therefore, we could expect a significant increase in 2013.

In 2012 Meadowbank began to shift focus towards upward mobility training of Inuit who have adapted to the mine working life. In 2013, Meadowbank was still working towards that goal as 47% of the general and specific training was delivered to Inuit, which is focused towards career advancement and upward mobility. The data shows that AEM provided Inuit employees with an opportunity for skill development as 95% of all training provided to Nunavut based employees was in training specific to their job.

11.9.5.1 Haul Truck Driver Training

An important objective for Agnico Eagle Mines is to improve the abilities of existing employees and enhance their future opportunities within the company. The current haul truck driver team at the Meadowbank mine is mostly composed of Inuit. The majority of AEM's haul truck drivers started in entry levels positions, such as dishwashers and janitors. As of December 31 2013, there was a total of 61 Inuit working as haul truck drivers, of which 15 are women. In 2013, 11 Inuit have been trained as haul truck drivers and eight (8) Inuit have been recertified on the Haul Truck training. The recertification process consists in ensuring that returning employees can operate safely; therefore, they do not receive a full 336 hours re-training program as their initial training is still valid, but they are assessed on the equipment. This total of 19 successful Inuit on haul truck is a number exceeding our expectation as only 16 Inuit were expected to be trained in 2013. On this number, 18 Inuit are still in position or higher as of December 31

2013. The remaining haul truck trainee that is no longer in position is neither a dismissal nor a resignation; it is a transfer as the employee chose to return to her former position.

AEM believes that the Haul Truck driver training developed at Meadowbank has been successful. The Haul Truck training duration is 28 days (336 hours). Although Agnico's expenses related to training have increased the company believes that increasing the training period reduces the level of pressure and stress on trainees, risk of accident and results in a more confident, productive and competent employee.

In 2014, AEM is planning a minimum of seven (7) intakes of haul truck trainees. In each program, the company is expecting to train four (4) Inuit, for a total of 28 new Inuit haul truck drivers by August 2014. The 336-hour course also includes new curriculum to help educate and train operators with an aim to help employees achieve their goals and advance in their career paths. During the program, state of the art technology is used to train on safety and theory portions before hands on practical training at the mine pit. The skills and education gained are transferable to other sectors of the economy.

During 2013 haul truck training accounted for a substantial amount of the training hours provided to Inuit.

11.9.5.2 Career Path

In 2012 Meadowbank designed a new "Career Path" program that is intended to support the upward mobility of Inuit employees within the company. The program is designed to offer employees with limited formal skills or education an opportunity to advance towards more meaningful employment and improved compensation. This program identifies the incremental steps that an employee is required to accomplish to advance in their chosen career of interest. The path directs a combination of work experiences, hours of completion, training and skills development for an employee to achieve each step. The Career Path is currently available in five (5) career path areas; Heavy Equipment Operators, Drillers, Process Plant, and Site Services & Road Maintenance.

The Career Path program has been well received by Meadowbank's Inuit employees and as of December 31 2013, 105 Inuit have enrolled in the program (89 men and 16 women). In 2013, 40 Inuit have been trained in an entry level position, such as dishwasher, chambermaid and janitor, amongst others. During the same year, one (1) Inuit operator has been trained in the Process Plant, 20 auxiliary equipment operators have been trained on, at least, one (1) piece of equipment and one (1) operator has been trained on production equipment.

11.9.5.3 Training Matrix

In 2013, a training matrix has been developed for each department, containing the list of all mandatory, general and specific training required for the different positions. The supervisors of each department will be able to review the training received and the training required for each of their employee. With this tool AEM will ensure that all employees have received the appropriate training to advance to the next step in their career path. This training matrix will be useful as part of the phase 2 of the Training Management System (TMS) which will be detailed in a further section.

11.9.5.4 Training Manual for Trainers

As per the implementation of many initiatives in training in 2013, such as the Training Management System, Learning Management System and e-learning, the implementation of the training manual has been delayed to 2014. The purpose of this manual is to provide consistent training standards and resource tools to all trainers. The manual is composed of three sections, training theory, training standards and training delivery. The last section of the manual also includes the evaluation tool that will be used to evaluate the trainers' performance to ensure a transparency in the evaluation.

The trainer's manual was developed by Agnico Eagle and is specifically designed for the company's operating environment. In 2014 the trainers will be oriented in the use of the manual and a trainer will be retained to coach the trainers and guide the implementation of the program. Meadowbank Mine is pleased that the training team will feature two (2) Inuit trainers.

11.9.5.5 E-Learning Training at Meadowbank

An e-learning program has been implemented in 2013. Before coming to Meadowbank for the first time, newly hired employees must complete their Mandatory Training. The General Induction consists in on-line chapter that provide general information about Agnico Eagle and working life at Meadowbank Mine. Once completed, employees are invited to access the online training that includes health and safety training.

To ensure that everyone can benefit from the program, no matter the availability of an Internet connection, computer or computer skills level, AEM provided Community Agents with the appropriate resources and electronic material to support all employees in communities.

To implement the e-learning approach, training material has been revised and tests have been translated into English, French and Inuktitut. Lesson plans have been created and updated in order to improve the quality and the consistency of the training.

Agnico Eagle believes that using e-learning tools will improve the productivity of trainers as well as the trainees by increasing available time on specific training, skills and competencies improvement. This can partly explain the increase in the amount of hours in General & Specific training in 2013 as the 1,224 hours spent on mandatory training was computerized which allowed trainers to focus on General & Specific training.

The benefits of an e-learning program are so important that Agnico Eagle is aiming at developing more specific training in 2014 such as the Chemical Awareness and the Process Plant Induction and software training to ensure an efficient use of the Office Suite.

With this initiative, Agnico Eagle is a candidate for the Octas prize in recognition of its e-learning platform. This award recognizes an organization that uses outstandingly the potential of information technology (IT) in aim of improving knowledge, skills development and productivity of employees or improves organizational performance through the implementation of a learning environment.

11.9.5.6 TMS & LMS

To ensure a better management of the training activities, a Training Management System has been developed and implemented in 2013. This system allows a tracking of all training sessions offered, a monthly calendar to ensure a better planning of the activities and electronic training employee files to ensure time efficiency and accuracy in the tracking of employees' training.

The phase 2 of the TMS is intended to be rolled out in 2014. By the end of this phase, supervisors will be able to follow the progression and the training gap of their employees. A tool will be developed in the TMS, based on the training matrix, where each position will be associated with the required training. This will ensure a consistency amongst employees. The system will allow supervisors to be notified when the training of an employee is expired. That way, AEM will be ensured that all employees are constantly up-to-date in terms of safety and training.

In the same vein, the Learning Management System (LMS) has been put in place in order to ensure the proper management of all e-learning training. Reports can be generated for the data transfer in employee's file. With this tool, Meadowbank has the insurance that all new employees have successfully completed their training, even before coming on site. In the event of the unsuccessful completion of a mandatory training, the LMS allows the company to mobilize the resources to target individual needs to succeed based on one-on-one training sessions.

11.9.5.7 Apprenticeship Training at Meadowbank

Since the beginning of mine operations, AEM has placed its priority on the hiring of Kivalliq residents to fill as many available jobs as possible. For this reason most of the training hours and opportunities incurred during this first phase of moving from a mine under construction to an operating mine have been focusing on heavy equipment operation, process plant operation and site services. This approach also generated the most jobs for local Inuit Beneficiaries in the shortest time period.

Now that production is mature and Meadowbank has reached its objective of filling most of the job positions in the different departments, the focus has moved to include training in other areas, with one priority being on creating an AEM Apprenticeship Program.

The Human Resources department at Meadowbank continues to develop a new apprenticeship program in collaboration with the Nunavut Arctic College. With this partnership AEM will develop a plan to advance the training and development of its Inuit employees in skilled trades' apprenticeship programs.

Meadowbank organized information sessions for employees, supervisors and superintendents to brief them on apprenticeship opportunities. AEM supported eight (8) Inuit employees to enroll in the apprenticeship program at Meadowbank in 2013. Four (4) are registered in the Heavy Equipment Technician program and are currently working in the Maintenance department. Four (4) are working in the Process Plant department and are registered in the Industrial Mechanic program (Millwright).

There are many Inuit who are interested in becoming apprentices but Agnico Eagle is finding that most failed the trades' entrance exam due to low comprehension, literacy and numeracy skills. This is recognized as a problem within the mining industry and private sector in Nunavut. Agnico Eagle delivered a pre-apprenticeship program in Baker Lake in 2013. Also, Agnico Eagle is still working with

the department of Education to improve the interest and capacity of high school students to pursue a trades or professional career in mining. In addition on this initiative, the company held a 14-weeks pre-trade program in Baker Lake in fall 2013.

In 2014, AEM plans to enroll more Inuit employees in the apprenticeship program from the Maintenance department and the Process Plant.
Agnico Eagle is aiming at extending the program in order to allow AEM Inuit employees in as many fields as possible. Therefore, Agnico Eagle will target more trades, such as plumbers, welders and carpenters. The company is also aiming at developing skills assessment to evaluate the level of Inuit employees' competencies regarding to a trade to ensure a better fit between skills, interests and job position.

The company is confident that this approach will be beneficial for Inuit employees' ambitions, needs and accomplishments and the company's objectives of maximizing the percentage of local Inuit Beneficiaries working at Meadowbank.

11.9.5.8 Collaboration committee training

All members of AEM's collaboration committee were part of a training session relating to topics they are interested to be trained on. As part of their role as an employee representative, they are sometimes encountering situations that can be challenging or outside of their comfort zone. In order to give them tools to manage their responsibility, the training provided included communication, teamwork, conflict management, motivation, and personality and emotions management. A total of five (5) Kivalliq Inuit participated in this training in 2013.

11.9.5.9 JOH&S committee training

Members of the Meadowbank Joint Occupational Health and Safety (JOH&S) committee received training in order to better their skills related to the management of Health & Safety. The training covered various topics including: Roles & Responsibilities of the JOH&S committee, interpretation of the Mines Act & Regulations, conducting inspections, conducting accident/incident investigations due diligence, part of the Criminal code and Supervision Formula training as well as a coaching phase. Six (6) Inuit participated on the JOH&S committee in 2013 and additional training is expected to continue in 2014.

11.9.5.10 Emergency Response Team (ERT) training

At AEM, the safety of employees is the number one priority. Every month, all team members must attend mandatory training. Among ERT, Meadowbank counts six (6) Inuit, from which two (2) are women and four (4) are men. Training topics includes first aid, firefighting, extrication, search & rescue, rope rappelling, a written exam, etc. Part of our Emergency Response Team participated in the 56th annual Mine Rescue Championship that was held in Yellowknife during June 2013. Intensive and rigorous training was delivered to the competition team.

11.9.5.11 Work Readiness Training Program

In 2012 the company began the development of a Work Readiness Training program for our current and future employees in cooperation with the Kivalliq Mine Training Society (KMTS).

Many new workers from Kivalliq communities lack the work experience and basic soft skills necessary to succeed in the workplace. In addition, AEM's increasingly diverse workforce brings varying beliefs and customs regarding appropriate behavior at work. The common-sense expectations many employers expect may be foreign to those with little experience in the workplace. The goal with workers like these is not simply to find them jobs, but to help them stay in those jobs long enough to advance and discover the value of work. Work Readiness curriculum helps new employees find success at work by offering them the insights and skills needed to adjust to the social environment of work.

The Meadowbank work readiness program is providing future employees with the following;

1. Insight into personal beliefs that drive behaviors in their social lives;
2. Awareness of employers' unspoken expectations;
3. Self-control skills for managing strong emotions;
4. Communication skills for dealing with difficult social interactions, and;
5. Problem solving skills for logically resolving interpersonal workplace issues.

The development of a work readiness program prepares workers for entry-level positions in the exploration and mining industry. AEM has partnered with the Kivalliq Mine Training society to develop and deliver this program and has received commitment of funding from the KMTS for delivery of the program at the community level. KMTS will be delivering the work readiness program at the community level while AEM will be delivering the program at the Meadowbank site.

The program has been implemented in April 2013 at site. It has shown positive outcomes in many ways. In 2013, 2,500 hours of work readiness training has been provided by AEM at Meadowbank which represent the equivalent of 62 employees successful with the training program.

Furthermore, the feedback received from participants through an anonymous appraisal form is very positive. Many consider the training as beneficial, both in a personal and a professional way. As shown in an above section, the work readiness training partly contributed to reduce the turnover rate of temporary employees, which went from 127% to 67%. This represents a significant reduction of the turnover rate for temporary employees compared to the previous year. The work readiness allows workers to understand better the mine environment and the opportunities offered while allowing Agnico Eagle to find and recruit Inuit employees with great potential and high motivation.

In the implementation phase, the training has been offered mostly at Meadowbank and in the hamlet of Baker Lake in 2013. Agnico Eagle can expect an increase in the number of employees trained in the next year as two (2) trainers are now working on the project on a full-time basis. Therefore, in 2014, we are aiming at training a greater number of Nunavummiut as the training will be provided not only in Baker Lake, where most our employees are originating, but also in most communities of the Kivalliq.

11.9.5.12 Cross Cultural training program

AEM implemented a cross-cultural training program in 2010. Since then, the company has provided the program to a majority of employees. The program consists of a 5 hour in-class training course. The

course allows employees from different cultures and background to understand each other's culture better in order to improve the well-being of all and the productivity in the workplace.

In 2012, AEM decided to review the cross cultural training program and, based on comments and experience, decided to modify the course and make it a mandatory training module offered in the orientation program. The content has been developed and translated in Inuktitut and French. A lesson plans has been created in order to improve the quality and the consistency of the training. The program has been reinforced in 2013 and it will be mandatory to every employee, in 2014, to receive the training.

11.9.5.13 Memorandum of Understanding (MOU) with Department of Education

The Department of Education, Government of Nunavut (EDU) and AEM share the belief that developing the capacity of Inuit to pursue skilled trades and professional careers will lead to confident, responsible and capable individuals who are prepared to join the labor force or purse relevant trades or professional careers. Both parties have agreed to develop a partnership agreement that recognizes the mutual benefit to be gained through collaborative efforts.

The Memorandum of Understanding was signed in April 2012 to establish a strengthened partnership between the Department of Education and AEM, with a focus on increasing the number of students in the Kivalliq region who are able to successfully transition from high school to trades and mining-related career opportunities.

The MOU Coordinator, based in Baker Lake, continued to support the implementation of the MOU in 2013. Activities to date include the design of a career fair program and development of a Kivalliq schools visits to mine program. These programs are being developed and tested with Baker Lake Schools and will lead towards organized programs for all Kivalliq Schools.

Over the summer of 2013, eight (8) students from Baker Lake participated in the opportunity of a summer employment. With the support of AEM, these students completed various tasks to improve work in their community.

During 2013, AEM continued his sponsorship to the Mining Matters group as part of the MOU with Education. Mining Matters is a branch of the Prospectors and Developers Association of Canada (PDAC) that is dedicated to bringing knowledge and awareness about Canada's geology and mineral resources to students and educators. The organization provides current information about rocks, minerals, metals, mining and the diverse career opportunities available in the minerals industry. Mining Matters offers exceptional educational resources that meet provincial curriculum expectations. Core to the program are the Mining Matters educational resources, created by educators and Earth science experts.

In 2013 AEM and the Mining Matters group have participated with the GN Department of Education, Curriculum Review Services to assist in a review of Earth Sciences Curriculum of Nunavut Schools. The review concluded that with some adjustments to meet the unique culture, language and learning needs of Nunavut that the Mining Matters curriculum could be adapted as the Earth Sciences Curriculum for Nunavut schools.

The review and curriculum design has continued over 2013 and is still ongoing today. It is also pending Departmental and Ministerial approvals that will be required for school use. Mining Matters programs

were delivered in the classrooms of Arviat and Chesterfield Inlet in 2013. The program includes in service support to teachers as well as in class program delivery support.

In 2013 AEM was the key sponsor of the regional Science Culture Camp operated by the Kivalliq Science Educators Community. AEM's educational partners from Mining Matters assisted with the camp. The camp was organized just outside of Baker Lake and the weeklong program included a mix of traditional, cultural and educational studies related to earth sciences. The program included presentations of mining jobs to students.

11.9.5.14 Arviat Diamond Drilling Training Program

There is a long-term demand for diamond core drilling to support Agnico's exploration activities in the Kivalliq region, and there are other mining companies with active exploration projects in the area. This has created a demand for locally available diamond core drillers and driller helpers.

In 2011 the Hamlet of Arviat proposed a partnership to invest in a community based drilling school that would provide Inuit with the skills needed to work in diamond drilling. With advice and support of AEM the Hamlet brought together a range of partners to acquire the drilling equipment, develop the curriculum and operate the training program. Government training agencies, the KIA and drilling companies provided partnership investments.

The curriculum of Arviat's driller's school has been modeled based on a well-developed and successful program offered by Northern Ontario College. The program is instructed by experienced trainers and includes both in class theory and practical hands-on training. Graduates receive a certificate that is recognized by the diamond drilling industry across Canada.

The first program was launched in October 2011 with 11 graduates, a second intake in January 2012 saw 11 graduates and in November 2012 a third intake saw 10 graduates. All graduates have been offered employment by Agnico's diamond drilling service suppliers or by the suppliers of other explorations companies. Agnico Eagle contributed $90,000.00 toward the program in 2012. The program counts 14 graduates in 2013 and will continue in 2014.

11.9.5.15 Kivalliq Mine Training Society

AEM has been a member of the Kivalliq Mine Training Society (KMTS) since its inception.

In May 2012 AEM was invited by Human Resources & Skills Development Canada (HRSDC) to participate in discussions with the KIA and KMTS members on a new mine training initiative. HRSDC proposed a two-year "northern pilot project" program that would see five of Canada's program areas bundled in a seamless application and delivery program. The parties agreed to proceed and a proposal has since been developed and submitted by the KMTS to HRSDC. AEM has expended considerable time and effort towards the development of the proposal.

A major focus of the new KMTS proposal is to support AEM's upward mobility initiative at Meadowbank. The proposal also provides financial support for the development and delivery of a labour pool initiative to prepare for future mining company expansion. The KMTS will support the Arviat Drillers program as well

as some interesting community based initiatives that will provide new supports to communities to help employees and their families cope with the challenges that come with employment.

The KMTS proposal is valued at approximately $9.5 million over a two year period, from April 2013 to the end of March 2015. AEM is committed to provide up to $6.8 million in cash and in kind support towards the overall initiative in order to receive 2.6 million for its training initiatives from the KMTS. Every initiative at Meadowbank, from e-learning, to upward mobility to work readiness is touched by funds from the KMTS. The current program is due to sunset in March 2015 and AEM has expressed interest to extend the program beyond the 2-year pilot project. Given the volatile gold market and associated impacts on AEM's financial situation it is unlikely that AEM can independently continue to independently sponsor the level and magnitude of training programs beyond March 2015.

SECTION 12. POST-ENVIRONMENTAL ASSESSMENT MONITORING PROGRAM (PEAMP) – EVALUATION OF IMPACT PREDICTIONS

Per Meadowbank's NIRB Project Certificate, Appendix D (Post-Environmental Assessment Monitoring Program (PEAMP)), the following provides a review of monitoring conducted in 2013 in relation to impacts described in the Final Environmental Impact Statement (FEIS; Cumberland, 2005). As stated in the NIRB Project Certificate, the PEAMP is a conceptual program designed "*to work as an instrument of the proponent's overall monitoring efforts and should provide feedback to the NIRB and other agencies regarding ongoing project monitoring*." The overall goal of this program is to provide the NIRB and other regulatory agencies with information on how current environmental and socioeconomic effects of the Meadowbank minesite compare to impacts predicted in the FEIS.

More specifically, the objectives of the PEAMP as specified in the Project Certificate Appendix D are to:

a) Measure the relevant effects of the project on the ecosystemic and socioeconomic environment(s). These effects may be measured through biophysical and socioeconomic monitoring programs undertaken by the Proponent or by other means as described in the Project Certificate;
b) Assess the accuracy of the predictions made within the FEIS;
c) Evaluate the effectiveness of project monitoring procedures and plans;
d) Identify impacts requiring additional mitigation or adaptive management; and
e) Provide relevant data and information to support regional monitoring initiatives where feasible.

The methods, objectives, results and recommendations of the specific monitoring reports are discussed in greater detail in the preceeding annual report or appendices.

It should be noted that the monitoring programs as described in the FEIS were developed at a conceptual level to assist in evaluating the overall potential impacts of the project. These were supporting documents in the FEIS and assisted in informing predictions, establishing regulatory limits, and forecasting management and mitigation actions to assist in the impact prediction process. Monitoring plans and sampling locations have since undergone changes to reflect actual mine operations. These differences are taken into account when making comparisons to FEIS predictions.

This section has been organized into 6 main categories: Aquatic Environment, Wildlife and Terrestrial Environment, Noise Quality, Air Quality, Permafrost, and Socio-Economics. For each of these categories, Table 12.1 summarizes the valued ecosystem components (VECs) identified in the FEIS, the original impact predictions and the management plans/mitigative measures submitted as part of the FEIS. This review focuses on the potential impacts for which monitoring were recommended, for the phase of mine activity currently underway (i.e. operations).

AEM is currently working with various researchers in multiple disciplines (i.e. tailings storage and optimization, wildlife and aquatic researchers, socio-economic researchers, etc.) and would be interested in discussing other opportunities with the NIRB to advance regional monitoring initiatives as requested.

Table 12.1 - Summary of FEIS VECs, assessment endpoints and references for the predictions, management and mitigative measures.

VEC	Summary of Potential Impacts	Reference for Impact Predictions	Reference for Management and Mitigative Measures
Aquatic Environment			
Surface water quantity	Reduced water level and flow in receiving lakes	FEIS, Section 4.21.2.3 FEIS App B, Table B4	FEIS, Section 4.24.2.5
Surface water quality	Contamination of receiving lakes	FEIS, Section 4.21.2.3 FEIS App B, Table B5 FEIS App E FEIS - WQ	FEIS, Section 4.24.2.5
Fish populations	Direct impacts through blasting. Indirect impacts through habitat changes.	FEIS, Section 4.21.2.7 FEIS App B, Table B13	
Fish habitat	Direct impacts through habitat destruction or alteration. Indirect impacts through introduction of contaminants.	FEIS, Section 4.21.2.7 FEIS App B, Table B14	FEIS, Section 4.24.2.3 NNL
Terrestrial Environment			
Vegetation (wildlife habitat)	Removal of plant cover, abrasion/grading, salt, dust, grey water release	FEIS, Section 4.21.2.4 FEIS App B, Table B6	FEIS, Section 4.24.2.1 TEMP
Ungulates	Habitat loss, mortality	FEIS, Section 4.21.2.5 FEIS App B, Table B7	FEIS, Section 4.24.2.2 TEMP
Predatory mammals	Habitat loss, mortality	FEIS, Section 4.21.2.5 FEIS App B, Table B8	FEIS, Section 4.24.2.2 TEMP
Small mammals	Habitat loss, mortality	FEIS, Table 4.24 FEIS App B, Table B9	FEIS, Section 4.24.2.2 TEMP
Raptors	Habitat loss, noise	FEIS, Section 4.21.2.6 FEIS App B, Table B10	FEIS, Section 4.24.2.2 TEMP FEIS App B, Table B10

VEC	Summary of Potential Impacts	Reference for Impact Predictions	Reference for Management and Mitigative Measures
Waterfowl	Habitat loss, ingestion of contaminants	FEIS, Section 4.21.2.6 FEIS App B, Table B11	FEIS, Section 4.24.2.2 TEMP
Breeding birds	Habitat loss, mortality	FEIS, Section 4.21.2.6 FEIS App B, Table B12	FEIS, Section 4.24.2.2 TEMP
Air Quality	Contamination of aquatic environment by dust. Contamination of terrestrial environment by dust. Poor air quality. Odours may attract scavengers. Production of greenhouse gases, other gaseous contaminants and particulate matter.	FEIS, Section 4.21.2.2 FEIS App B, Table B2	FEIS, Section 4.24.2.3
Noise	General disturbance of wildlife as a result of regular noises (behavioural changes, displacement). Reduced habitat effectiveness.	FEIS, Section 4.21.2.2 FEIS App B, Table B3	FEIS, Section 4.24.2.3
Permafrost	Thaw instability. Changes in permafrost depth in various areas (increase/decrease). Ice entrapment in tailings/reclaim.	FEIS, Section 4.21.2.1 FEIS App B, Table B1	FEIS, Section 4.24.2.4
Socio-economic		FEIS, Section 4.21.4 FEIS App B, Table B15	FEIS, Section 4.24.3
Traditional Ways of Life (personal and community)	Reduced access to land. Reduction in traditional activities including harvesting. Undervaluing traditional ways and loss of knowledge.		
Wellness (personal and community)	Poor financial decision making. Increased income disparity. Increased public health and safety risks. Stress from rotational employment. Increased traffic accidents and emergencies. Disturbance by project activities.		

VEC	Summary of Potential Impacts	Reference for Impact Predictions	Reference for Management and Mitigative Measures
Infrastructure and social services	Shortage of housing and other infrastructure. Increased demand for social services.		
Sites of heritage significance	Potential degradation of historically significant sites.		

12.1 AQUATIC ENVIRONMENT

In agreement with the PEAMP objectives, the results of the 2013 aquatic monitoring programs were evaluated and a comparison was made to the impacts predicted in the FEIS. The aquatic environment VECs identified in the FEIS were: surface water quantity, surface water quality, and fish/fish habitat. The following sections summarize the predicted impacts to the aquatic environment, assess the accuracy of the predictions, discuss the effectiveness of the monitoring program at targeting predicted impacts and provide recommendations for any additional required mitigation or adaptive management. Any use of the monitoring data in regional monitoring initiatives is described.

12.1.1 Accuracy of Predictions

In general, Meadowbank's water quality and quantity monitoring programs intend to meet the requirements of the NWB (Type A license) and Environment Canada (MMER). As anticipated, the mine lay-out and infrastructure have changed since the FEIS was produced, and sampling locations have been adjusted accordingly. Overall, observed impacts to water quantity, water quality, fish and fish habitat measured in 2013 appear to have been within FEIS predictions, as described in the following text, and summarized in Tables 12-2, 12-3 and 12-4.

12.1.1.1 Water Quantity

Water usage predictions were made during the FEIS to predict potential impacts to water levels due to dewatering activity in Third Portage Lake, Second Portage Lake that would influence untouched portions of these lakes. Although rates of dewatering (i.e. pumping rates) were underestimated during the FEIS, water levels have not significantly changed at monitoring stations in TPL and SPL and have fluctuated within a normal natural range since dewatering began in 2009.

A summary of predictions for impacts to water quantity and the accuracy of these predictions (observed impacts) is provided in Table 12.2.

Table 12.2. Water Quantity

Potential Impact	Potential Cause(s)	Proposed Monitoring	Applicable Monitoring (2013)	Observed Impacts in 2013 that exceed FEIS predictions
Reduced water levels in Second and Third Portage Lakes	Potentially high seepage rates (from lakes into pits)	Monitor pit seepage rates	Lake levels monitored	No observed change in lake levels
	Freshwater consumption	Monitor freshwater use and reclaim water use	Lake levels monitored	
Increased water levels in Third Portage Lake	Discharge from Attenuation Pond	Monitor discharge volumes and timing	Lake levels monitored	No observed change in lake levels
	Non-contact water diverted from Second Portage Lake drainage	Monitor discharge volumes of non-contact water	Lake levels monitored	

Interference with surface drainage patterns.	Plant site/shop/tank farm footprint	Monitor integrity of drainage structures.	Inspections and water collection systems monitored around the mine site infrastructure	No observed change
Increased water levels in Wally Lake	Discharge from Attenuation Pond	Monitor discharge rates	Lake levels monitored	No observed change in lake levels
Increased water level in Turn Lake	Planned drawdown of Phaser Lake	Ongoing hydrological monitoring at Turn Lake outlet	Visual inspections at culvert installations	No observed changes
	Culverts could restrict outflow during freshet	Ongoing hydrological monitoring at Turn Lake outlet and check culverts	Visual inspections at culvert installation	No observed changes

12.1.1.2 Water Quality

Many monitoring programs evaluate water quality at Meadowbank, because this is the first tier in informing mitigation and adaptive management. As outlined in the FEIS, the Core Receiving Environment Monitoring Program (referred to as the AEMP in the FEIS) is intended to monitor large-scale (e.g. basin-wide) changes in physical and biological variables to evaluate potential impacts from all mine related sources in the receiving environment. It therefore serves as the most important monitoring program for evaluating short term and long term potential impacts to populations. Each year, information from the CREMP and other targeted programs is evaluated in an integrated manner to determine any required changes to mitigation practices.

In 2012 AEM submitted an updated CREMP design to the NWB and NIRB. It provided a thorough review of the historical data, updating the analysis that was completed as part of the FEIS by incorporating all of the baseline data (1992-2008) and data collected from 2008-2012. An updated CREMP was submitted to address the requirements in the Type A water license, DFO authorization for the protection of fish habitat and FEIS. The scope of the 2005 AEMP, which was essentially the core receiving environment monitoring, is now one of the monitoring programs that is integrated under the restructured AEMP and has been renamed the CREMP to minimize confusion.

The 2013 AEMP synthesis report summarized the results of each of the underlying monitoring programs, including the CREMP (which presents comparisons to baseline conditions and WQ trends analysis from 2006 to the present), reviewed the inter-linkages among the monitoring programs; integrated the results; and recommended management actions. Neither the 2012 CREMP nor AEMP detected any significant changes in the water quality that had the potential to cause risks to the aquatic environment. This is consistent with FEIS predictions.

Other programs aimed at monitoring water quality in 2013 included: the AWAR erosion inspections, non-contact water collection, mine site contact water collection, dewatering, seepage collection, groundwater monitoring, and MMER and EEM sampling.

Impacts to water quality predicted in the FEIS are summarized Table 12.3, along with results of the monitoring programs aimed at assessing these impacts.

Table 12.3. Water quality

Potential Impact	Potential Cause(s)	Proposed Monitoring	Applicable Monitoring (2013)	Observed Impacts in 2013 that exceed FEIS predictions
Sedimentation	Construction activity (general)	TSS monitoring through AEMP	North Cell Diversion Ditch Monitoring; Airstrip extension monitoring	No exceedances of license limits during construction
	Runoff from roads and plant	TSS monitoring through AEMP	AWAR visual inspections; mine-site visual inspections	No observed impacts
	Dewatering discharge	TSS monitoring through AEMP	Vault Lake Dewatering monitoring	No exceedances of license or MMER limits
	Erosion in non-contact diversion facilities	Monitoring through AEMP	North Cell Diversion Ditch Monitoring (ST-5 and ST-6)	1 sedimentation event reported to DFO in September in West Ditch; did not exceed license limits at ST-6 and no observed impacts.
Contamination by metals and acidity	Seepage and runoff from dikes	Monitor water quality adjacent to dikes. Monitor internal temperature of tailings dike	Dike geotechnical monitoring (thermistors, seepage flows etc.). Seepage water collection and monitoring	No significant changes in sump water quality as compared to the FEIS predictions
	Runoff from pit walls	Water quality monitoring of pit seepage	Seepage water collection and monitoring	No significant changes in sump water quality as compared to the FEIS predictions
	Runoff from mine site roads and plant	Water quality monitoring through AEMP	Water quality monitoring as part of AEMP programs	No observed impacts
	Seepage and runoff from waste rock (inc. into groundwater)	Water quality monitoring through AEMP	Water quality analysis of seepage collection and monitoring of adjacent water bodies in AEMP	Waste Rock Seepage from ST-16 into NP-2; poor water quality observed in nearshore areas of NP-2, however no observed impacts
Contamination by blasting residue	Rock placed during dike construction	Water quality monitoring through AEMP	Vault Dike construction completed in winter; no WQ monitoring required. Airstrip extension completed during winter	No exceedances of license limits; no observed impacts

	Pit seepage	Water quality monitoring of pit seepage	Seepage water collection and monitoring	No significant changes in sump water quality as compared to the FEIS predictions
	Mine site road and explosive storage facility runoff	Water quality monitoring through AEMP	Water quality monitoring as part of AEMP programs	No observed impacts
	Seepage and runoff from waste rock (inc. into groundwater)	Water quality monitoring through AEMP	Water quality analysis of seepage collection and monitoring of adjacent water bodies in AEMP	No observed impacts
Contamination by dust and emissions (incineration waste)	Construction (general) Road dust Tailings dust Incinerator	Water quality monitoring through AEMP. Dust and emissions monitoring	Water quality monitoring as part of AEMP programs	No observed impacts; additional dust monitoring and sediment coring will be completed in 2014. 2012 stack testing results are compliant with EC guideline.
Tailings-associated contamination	Decant from tailings process water and runoff from exposed tailings beaches	Monitor cyanide destruction plant and reclaim. Monitor tailings internal temperatures.	Monitoring and managing tailings storage facility – engineers dedicated to tailings and water management; monitoring water quality in ST-21	No observed changes in tailings contamination
	Concentrated pore water release during tailings freezeback	Monitor tailings beach and recycle	Monitoring and managing tailings storage facility – engineers dedicated to tailings and water management; monitoring water quality in ST-21	No observed changes in tailings contamination
	Process water movement into groundwater through talik	Monitor permafrost development in underlying talik	Monitoring of dikes, seepages, water collection systems and groundwater monitoring	No observed impacts
	Spills	Monitor tailings line pressure	Monitoring spills during site inspections and as part of managing the TSF	No observed impacts
Contamination by fuel, transferred metals, explosives, reagents	Truck or barge spills	Event-based targeted monitoring	Spill response and monitoring spills during site inspections	No observed impacts

12.1.1.3 Fish and Fish Habitat

In addition to water quality and quantity, site specific monitoring programs were developed to address the impacts of mining activities to fish and fish habitat. These are primarily guided by the No Net Loss Plan (NNLP) and associated fisheries monitoring (e.g. CREMP, Habitat Compensation Monitoring Plan, blast monitoring) as set out in the DFO Authorization for the mine-site. Results of these programs are summarized in Table 12-4, below. All measured impacts to fish and fish habitat were within FEIS predictions.

Table 12.4 Fish and Fish Habitat

Potential Impact	Potential Cause(s)	Proposed Monitoring	Applicable Monitoring (2013)	Observed Impacts in 2013 that exceed FEIS predictions
Reduced fish egg survival and larval development	Metals leaching and low pH from effluent, leachate or runoff	Water quality monitoring under MMER (effluent). Monitor fish biomass changes (Portage); plume delineation study (Wally). Monitor water quality along dike faces.	MMER and EEM monitoring, Habitat Compensation Monitoring along road, dewatering monitoring,	No exceedances of MMER; No observed impacts
Mortality of fish and fish eggs	Blasting	Targeted study in AEMP	Blast monitoring	Few exceedances; no expected
	Particulates in run-off and road dust	Water quality monitoring through AEMP	Water quality monitoring as part of AEMP programs	No observed impacts; additional dust monitoring and sediment coring will be completed in 2014
	Increased suspended sediment (effluent discharge)	TSS monitoring through AEMP	Water quality monitoring as part of AEMP programs (CREMP, dewatering and MMER)	No TSS exceedances of license or MMER limits
	Spilled substances (e.g. fuel)	Event-based monitoring	Monitoring spills during site inspections and as part of managing the TSF	No observed impacts
Loss of fish biomass	Habitat disruption (pit area)	NNL monitoring	-	-
	Habitat loss (tailings area, dike footprint)	-	-	-
Fish stress, behavioural changes, avoidance	Increased particulates (runoff, road dust)	Water quality monitoring through AEMP	Water quality monitoring as part of AEMP programs	No observed impacts
	Increased concentrations of dissolved metals (effluent discharge, leachate/runoff)	EEM program (effluent), AEMP Targeted Monitoring (leachate/runoff)	Water quality monitoring as part of AEMP programs (CREMP, dewatering and MMER)	No observed impacts
	Increased suspended sediment (effluent discharge)	TSS monitoring through AEMP	Water quality monitoring as part of AEMP programs (CREMP,	No observed impacts

Table 12.4 Fish and Fish Habitat				
Potential Impact	**Potential Cause(s)**	**Proposed Monitoring**	**Applicable Monitoring (2013)**	**Observed Impacts in 2013 that exceed FEIS predictions**
			dewatering and MMER)	
	Increased pH (leachate/runoff)	AEMP Targeted Monitoring	Water quality monitoring as part of AEMP programs (CREMP, dewatering and MMER)	No observed impacts
	Barge activity, noise and TSS	Monitoring through AEMP	Water quality monitoring as part of AEMP programs (CREMP)	No observed impacts
Impaired benthic habitat (incl. loss of periphyton and benthos)	Sedimentation	Water quality monitoring through AEMP	Water quality monitoring as part of AEMP programs (CREMP)	No observed impacts
	Leaching of metals from dikes	NNL monitoring	Habitat Compensation Monitoring	Not required in 2013
Increased fish biomass	Release of nutrients in treated sewage	Water quality and primary productivity monitoring through AEMP	Water quality monitoring as part of AEMP programs (CREMP and MMER)	No observed impacts
Impaired fish passage	AWAR crossings	NNL monitoring	AWAR habitat compensation monitoring	No observed impacts
	Spills	Targeted monitoring	Spill response and monitoring spills during site inspections	No observed impacts

12.1.2 Effectiveness of Monitoring Programs

The aquatic monitoring programs at Meadowbank were originally designed as part of the FEIS and adapted to meet the requirements of the NWB Type A License, Environment Canada regulations and DFO authorizations for the protection of the aquatic system. Beyond meeting the regulatory requirements, the numerous 2012 aquatic monitoring programs addressed all relevant potential impacts to water quantity, water quality and fish/fish habitat identified in the FEIS. Table 12.5 provides a summary of the evaluation of the monitoring programs.

Table 12.5 Summary of the aquatic environment monitoring programs at the Meadowbank site

	Aquatic Environment Monitoring Programs											
	Mine Site Water Quality Sampling*	Core Receiving Environment Monitoring Program*	Water Quality and Flow Monitoring*	Effects Assessment Studies	Dike Construction Monitoring*	Habitat Compensation Monitoring Program - No Net Loss	Dewatering Monitoring*	MMER Monitoring	Environmental Effects Monitoring (EEM) (part of MMER)	Fish-Out Studies	AWPAR and Quarry Water Quality Monitoring	Blast Monitoring
Completed in 2013?	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Water Quality	○	○	○	○	○	○	○	○	○	○	○	NA
Water Quantity	NA	NA	○	○	○	NA	○	○	○	NA	NA	NA
Fish Populations	NA	NA	NA	○	NA	○	NA	NA	○	○	NA	NA
Fish Habitat	NA	○	NA	○	NA	○	NA	NA	○	○	NA	○

* Type A Water License requirements

Notes:

○ Effectively evaluates impact predictions

● Does not effectively evaluate impact predictions

NA Not Applicable

12.1.3 Recommendations for Additional Mitigation or Adaptive Management

Overall, the measured impacts to water quantity, water quality, fish and fish habitat appeared to be within the FEIS predictions. In most cases operation activities were accurately predicted (summarized in Table

12.2) and monitored in 2013. Potential impacts onsite in 2013 were within impact predictions or had no observed effects, indicating that the original predictions were conservative. Given the results at NP2, it was recommended that additional water quality monitoring be conducted in waterbodies downstream of NP2 and that the cut-off structure at sump ST-16 be monitored closely. There are no other specific recommendations for further mitigation of impacts to water quality, water quantity or fish/fish habitat were required in 2013, because all impacts were within predicted and acceptable limits.

12.1.4 Contributions to Regional Monitoring

In 2013, AEM met with the HTO, KIA, and DFO to discuss environmental issues related to water quality and quantity and, fish and fish habitat on at least one occasion. In addition, AEM continues to work closely with the University of Guelph to improve aquatic monitoring methods and is working in collaboration to inform future aquatic ecology research in the north. Specifically, AEM is working with the university of Alberta raptor researcher to extend terrestrial modelling to include linkages to aquatic food webs, which will also assist to inform productivity models. Furthermore, AEM has discussed refining current methods of evaluating fish habitat and productivity of a fishery under the new DFO Fisheries Act and fisheries protection policy with consultants, academic researchers and have provided all of the raw fishout data and habitat mapping to DFO scientists. At a regional level, the information, monitoring tools, monitoring data and modelling that is used at Meadowbank are currently being applied by AEM and other consultants at other proposed projects in Nunavut including, but not limited to the Meliadine Gold Project.

12.2 TERRESTRIAL AND WILDLIFE ENVIRONMENT

In agreement with the PEAMP objectives, the results of the 2013 terrestrial and wildlife monitoring programs were evaluated and a comparison was made to the impact predictions for each VEC (vegetation (wildlife habitat), ungulates, predatory mammals, small mammals, raptors, waterfowl and breeding birds).

The following sections summarize the predicted impacts to terrestrial and wildlife VECs, provide an assessment of the accuracy of the predictions and discuss the effectiveness of the monitoring program at targeting predicted impacts. Furthermore, additional recommendations are made for any required mitigation or adaptive management. Any use of the monitoring data in regional monitoring initiatives is described.

12.2.1 Accuracy of Predictions

For each VEC, a summary of predicted impacts and the accuracy of those predictions (observed impacts) as determined through various monitoring programs is provided in Tables 12.6.

Overall, the majority of impacts to terrestrial VECs were below predicted thresholds as presented in Table 10.1 in Appendix G5. Although a few mortality thresholds were exceeded in 2013 (i.e. accident/ collision with 5 caribou, resulting in mortalities and the dispatch of a habituated wolverine), these are generally consistent with FEIS predictions, and have been dealt with internally and have assisted in decision making and mitigation action.

Table 12.6. Terrestrial impacts and associated effects predicted in the FEIS, proposed monitoring, actual monitoring (2013) and any observed impacts (2013). Adapted from Table 10.1 in Appendix G5

Potential Impact	Potential Cause(s)	Monitoring Methods	Applicable monitoring (2013)	Observed Impacts in 2013 that exceed FEIS predictions
Vegetation (Wildlife Habitat)				
Habitat Loss	Mine site footprint, pits, roads, water management and collection systems	Ground Surveys, Mapping, GIS Analysis	No (in 2012 and scheduled for 2014)	2012 results: Below Threshold: Mine Site – 211 ha < predicted (Heath Tundra exceeds) AWAR – 173ha < predicted
Habitat Degradation by Contamination	Dust from roads, TSF, airstrip	Vegetation and Soil Samples	No (in 2011 and scheduled for 2014)	NA
Ungulates				
Habitat Loss and Degradation	Mine site footprint, pits, roads, water management and collection systems	Ground Surveys, Mapping, GIS Analysis	No (in 2012 and scheduled for 2014)	2012 results: Below Threshold: Growing - 144ha of High Suitability Habitat (60% of Predicted) Winter – 99ha (68%)
Sensory Disturbance	Avoidance due to noise and activity (roads, airstrip, mine site)	Ground Surveys, Satellite-collaring	Yes	No evidence of disturbance
Vehicle Collisions	Vehicular or air traffic collisions	Ground surveys, Collision Reporting System	Yes	Threshold Exceeded – 5 Caribou Mortality
Hunting by Baker Lake Residents	Improved access to hunting along the AWAR	Hunter Harvest Study	Yes	Threshold Exceeded – 43% of harvest within 5km of AWAR (18% historically)
Other Mine-related Mortality	Vehicular or air traffic collisions; stuck in TSF	Ground surveys	No	Below Threshold
Exposure to Contaminated Water or Vegetation	Consumption of contaminated dust deposited on vegetation	Vegetation and Soil Samples	In 2011, scheduled for 2014)	NA
Predatory Mammals				
Project-related Mortality	Vehicular or air traffic collisions, trapped in tailings	Ground Surveys, Collision Reporting	Yes	Threshold Exceeded – 1 Wolverine Mortality

Potential Impact	Potential Cause(s)	Monitoring Methods	Applicable monitoring (2013)	Observed Impacts in 2013 that exceed FEIS predictions
		System		
Small Mammals				
Habitat Loss and Degradation	Mine site footprint, pits, roads, water management and collection systems	Ground Surveys, Mapping, GIS Analysis	No (in 2012, scheduled for 2014)	2012 results: Below Threshold- 95ha of High Suitability Habitat (55% of Predicted)
Project-related Mortality	Vehicular or air traffic collisions, trapped in tailings	Ground Surveys, Collision Reporting System	Yes	Below Threshold - 1 Mortality
Exposure to Contaminated Water or Vegetation	Consumption of contaminated dust deposited on vegetation	Vegetation and Soil Samples	In 2011, scheduled for 2014)	NA
Raptors				
Healthy Prey Populations	Mine Footprint, dust and exhaust, noise (road, airstrip, mine site, Baker Lake barge area)	Vegetation and Soil Samples	In 2011, scheduled for 2014)	NA
Disturbance of Nesting Raptors	Noise and Activity	Active Nest Monitoring	Yes	Below Threshold
Project-related Mortality	Vehicle/ bird collisions	Ground Surveys, Collision Reporting System	Yes	Below Threshold
Waterbirds				
Habitat Loss and Degradation	Mine Footprint, dewatering dust and exhaust, noise (road, airstrip, mine site, Baker Lake barge area)	Ground Surveys, Mapping, GIS Analysis	No (2012, scheduled for 2014)	2012 results: Below Threshold: 304ha of High Suitability Habitat (79% of Predicted)
Disturbance of Nesting Waterfowl	Noise and Activity; dewatering	Waterfowl Nest Surveys	Yes	Below Threshold
Exposure to Contaminated Water or Vegetation	Mine site dust; Secondary containment structures and tailings storage facilities	Vegetation and Soil Samples	In 2011, scheduled for 2014)	NA

Potential Impact	Potential Cause(s)	Monitoring Methods	Applicable monitoring (2013)	Observed Impacts in 2013 that exceed FEIS predictions
Project-related Mortality	Vehicle/ bird collisions	Ground Surveys, Collision Reporting System	Yes	Below Threshold
Other Breeding Birds				
Habitat Loss and Degradation	Mine Footprint, dewatering dust and exhaust, noise (road, airstrip, mine site, Baker Lake barge area)	Ground Surveys, Mapping, GIS Analysis	No (in 2012 and scheduled for 2014)	Below Threshold: 197ha of High Suitability Habitat (69% of Predicted)
Project-related Mortality	Vehicle/ bird collisions	Ground Surveys, Collision Reporting System	Yes	Below Threshold (1 Individual)
Exposure to Contaminated Water or Vegetation	Mine site dust	Vegetation and Soil Samples	In 2011, scheduled for 2014)	NA
Changes in Breeding Bird Populations	Mine Footprint, dewatering dust and exhaust, noise (road, airstrip, mine site, Baker Lake barge area)	Breeding Bird Plots and Transects	Plots – 2012 Transects – 2011. Plots scheduled for 2015	Below Threshold

12.2.2 Recommendations for Additional Mitigation or Adaptive Management

As summarized in Table 12.5, three Terrestrial Ecosystem Monitoring Program thresholds (TEMP - developed as part of the FEIS) were exceeded in 2013, namely for the road-related mortality of five caribou and one wolverine. The incidences were reported to AEM staff and thereafter to the DOE Conservation Officer. In the case of the caribou, the incident was accidental; in the case of the wolverine, it had become unnerved by human contact (habituated) and appeared to threaten workers safety and was therefore dispatched. These incidents resulted in the implementation of mitigative action to reduce mortalities along the AWAR, such as signage, announcing wildlife presence on the radio, reminders to yield to traffic, caribou migration management (including road closures) and reducing speeds for daily traffic. Furthermore, monitoring and frequent ground surveys reduced any wildlife-related incidents around the mine site.

As a recap of the 2012 ELC analysis, overall, AEM has impacted a smaller terrestrial footprint than originally predicted; a reanalysis will be done in 2014 to evaluate the project effects as compared to the

FEIS. Overall the 2013 monitoring and wildlife reporting found that the majority of potential impacts had no observed effects or were within FEIS predictions.

12.2.3 Contributions to Regional Monitoring

Throughout the year, Meadowbank environment staff routinely monitored the pit and other areas on the mine site for birds to ensure their protection and adequate management. As in 2012, in 2013 Peregrine falcons were observed nesting in the Portage Pit directly within mine operations. In response, a general mine site Peregrine falcon management and protection plan was followed in accordance with the TEMP. Furthermore, AEM contacted Dr. Alastair Franke from the University of Alberta and he provided immediately advise on site-specific protective measures. In the end it was deemed that AEM did not need to continue deterrence. Regionally, AEM is working with Dr. Franke to conduct surveys near Rankin Inlet; in the future he may extend his work to the Baker Lake area.

In addition, Meadowbank has been contributing to the GN DOE caribou collaring program since 2009. To date, Meadowbank has funded the deployment of 25 caribou collars (greater than $250 000). In early 2011, Meadowbank contributed an additional $35 000 towards the GN-led program to estimate the number of breeding females in the Beverly herd of taiga-wintering barren-ground caribou. In 2013, AEM finalized discussions with the GN and entered into a new Memorandum of Understanding (MOU) to commit to another long term (3 year) contribution in support of the regional GN caribou monitoring program. This agreement will continue to assist the GN- DOE- Wildlife branch in directing the implementation, data analysis and management of caribou populations in the Kivalliq region.

12.3 NOISE

In support of the PEAMP, a review was conducted of the predictions made in the FEIS regarding sources of noise and potential effects. While noise generation was predicted for many minesite components, a significant effect of noise (disturbance of wildlife; reduced habitat effectiveness) was only associated with three components: pit development, the mine plant and the airstrip. Noise monitoring was proposed in association with pit development, waste rock, tailings handling and the mine plant.

The following section summarizes the predicted sources with significant noise impacts at the Meadowbank site, provides an assessment of the accuracy of the predictions and discusses the effectiveness of the monitoring program at targeting predicted impacts. Furthermore, additional recommendations are made for any required mitigation or adaptive management. Any use of the monitoring data in regional monitoring initiatives is described.

12.3.1 Accuracy of Predicted Impacts

Table 12.7, below, summarizes the noise impacts and associated effects predicted in the FEIS, identifies the monitoring measures proposed in the FEIS, and indicates the accuracy of predictions based on results of monitoring conducted in 2013 (observed impacts). Since the potential impacts of noise were all identified as wildlife disturbance, the accuracy of these predictions is largely monitored through the terrestrial environment monitoring programs, as discussed above. However, general noise levels around the minesite are analyzed annually and compared to target sound levels.

Table 12.7. Noise impacts and associated effects predicted in the FEIS, proposed monitoring, actual monitoring (2013) and any observed impacts (2013).

Potential Impact	Potential Cause(s)		Proposed Monitoring	Applicable Monitoring (2013)	Observed Impacts in 2013 that exceed FEIS predictions
Disturbance of wildlife; reduced habitat effectiveness	Pits	Noise from blasting, etc.	Monitor noise levels and responses of wildlife	Monitored noise levels (best represented by R3)	Target sound levels not exceeded
	Waste Rock /Tailings Facility	Noise from berm construction, material handling	Monitor noise levels and responses of wildlife	Monitored noise levels (best represented by R1)	Target sound levels not exceeded
	Roads and Traffic	Noise from maintenance and use	Monitor noise levels and responses of wildlife	Monitored noise levels (AWAR best represented by R5)	Target sound levels not exceeded
	Airstrip	Noise from air traffic	Monitor noise levels and responses of wildlife	Monitored noise levels (best represented by R2)	Target sound levels not exceeded
	Mine plant and associated facilities	Noise	Monitor sound levels of various activities	Monitored noise levels around site (5 locations)	Target sound levels not exceeded

12.3.2 Effectiveness of Monitoring

All sources of noise identified in the FEIS are realistic based on operations in 2013. Noise generation is associated with all mine components listed. Disturbance of wildlife and reduced habitat effectiveness was identified as an effect of noise generation from pits, the airstrip, and the mine plant. According to the Alberta Energy and Resources Board Directive 038 (February 16, 2007), it is unlikely that noise generated by industrial sources, such as minesites, has a significant long-term effect on wildlife populations and habitat use. AEM conducts terrestrial wildlife monitoring, including analyses of sensory disturbance for caribou and raptors. In both cases, disturbance was below the threshold of predicted effects.

In addition, AEM conducts annual noise monitoring at 5 locations around the minesite, according to the Noise Management and Abatement Plan (September, 2009). This plan was updated in 2013, particularly with respect to the permissible sound level (PSL) of 55 dBA, since the derivation and application of this value was not clear in the previous plan. Although updates have not yet been processed by NIRB (included in the 2013 Annual Report), noise monitoring data for 2013 are assessed in accordance with the target sound levels presented in the updated plan (55 dBA, daytime L_{eq}, and 45 dBA, nighttime L_{eq}). Although this program does not specifically isolate sounds from pit development, the waste rock pile, the tailings facility, or the mine plant, as identified in the FEIS, samples are representative of the combination

of minesite activities that occur on a daily basis. The chosen locations encompass a variety of distances from the site, allowing for a thorough analysis of generated noise levels. Overall, since noise level and terrestrial wildlife monitoring is being conducted in a manner that addresses the impacts predicted in the FEIS, these monitoring programs are judged to be effective.

12.3.3 Recommendations for Additional Mitigation or Adaptive Management

Since no L_{eq} values were elevated as a result of mine activity in the 2013 noise monitoring campaign, no additional mitigation measures or changes to the monitoring program are recommended at this time.

12.3.4 Contributions to Regional Monitoring

In 2013, Meadowbank has not contributed to regional monitoring of noise.

12.4 AIR QUALITY

A review was conducted of the predicted sources of impacts to air quality and associated effects identified in the FEIS. While dust generation or air emissions were predicted for many minesite components, a significant effect on terrestrial and aquatic environments was only associated with three components (pit development, the mine plant and the waste rock and tailings facilities). Therefore, although all predicted sources and effects are outlined, the discussion of PEAMP objectives focuses on these areas for which significant effects were predicted.

The following sections summarize the predicted impacts to air quality in relation to the Meadowbank site, provide an assessment of the accuracy of the predictions and discuss the effectiveness of the monitoring program at targeting predicted impacts. Furthermore, additional recommendations are made for any required mitigation or adaptive management. Any use of the monitoring data in regional monitoring initiatives is described.

12.4.1 Accuracy of Predicted Impacts

Table 12.8, below, summarizes the predicted impacts to air quality, associated effects, and monitoring measures proposed in the FEIS, and indicates whether monitoring was conducted in 2013.

The main monitoring program for air quality recommended in the FEIS is static dustfall, which is being continuously monitored at four locations around the minesite. In addition, AEM conducts monitoring of TSP, PM_{10}, $PM_{2.5}$ and NO_2, in accordance with the Air Quality and Dustfall Monitoring Plan.

Table 12.8. Predicted impacts to air quality, associated effects, monitoring measures proposed in the FEIS, actual monitoring conducted in 2013 and any observed impacts.

Potential Impact	Potential Cause(s)		Proposed Monitoring	Applicable Monitoring (2013)	Observed Impacts in 2013 that exceed FEIS predictions
Poor air quality and terrestrial/aquatic contamination	Dikes	Generation of dust during placement of dike material	Static dustfall	N/A (no dikes constructed)	-
	Dewatered Basins	Generation of dust from exposed lake sediment	Static dustfall	As proposed plus NO_2 (four locations around site) and suspended particulates (2 locations)	No observed effects however, one TSP sample exceeded GN standard. One dustfall sample exceeded AB industrial area guideline.
	Pits	Generation of dust and gases from blasting, excavation etc.	Static dustfall		
	Waste Rock Pile and Tailings Facility	Generation of dust from material deposited on waste rock pile or tailings	Static dustfall		
	Airstrip	Generation of dust and emissions from development, maintenance and use	Static dustfall		
	Roads and Traffic	Generation of dust and emissions from development, maintenance and use	Static dustfall	As above, plus AWAR targeted study	AWAR study had sampling difficulties. Will be re-done in 2014.
	Sewage and Solid Waste Disposal	Release of pollutants from incineration	Maintain scrubbers; report emissions	GHG emissions reported	Similar to 2012

12.4.2 Effectiveness of Monitoring

All sources of impacts to air quality identified in the FEIS are realistic based on operations in 2013. Dust generation is the major air quality concern, and sources are accurately identified in the FEIS.

Effects of dust generation were predicted to occur due to operation activities in pits, the mine plant and associated facilities. These effects were described as “impacts on terrestrial and aquatic habitats”. For the purposes of this assessment, impacts on terrestrial habitats are taken to include 1) ground-level air quality exceeding relevant guidelines, 2) smothering of vegetation (reduced growth), and 3) consumption of excess chemical contamination in dust. Impacts on aquatic habitat are taken to mean degradation in water quality (increased concentrations of contaminants associated with dust). While these effects are possible, monitoring programs have indicated they are unlikely to be occurring under current operations. Firstly, ground-level air quality (total suspended particulates, $PM_{2.5}$, PM_{10}, and NO_2) is monitored at two (particulates) and four (NO_2) minesite locations through the Air Quality and Dustfall Monitoring Plan. Only one data point exceeded the relevant GN Air Quality Standard in one location for TSP (out of 63 samples). No exceedances occurred for $PM_{2.5}$, PM_{10}, and NO_2. Total dustfall, which may contribute to smothering of vegetation, is also monitored at four locations through this plan, and along the AWAR through a targeted dustfall study in 2013. While some exceedances of nuisance guidelines published by Alberta Environment were observed in the AWAR study and on the minesite, total dustfall rates were typically an order of magnitude lower than those measured at Ekati Diamond Mine, where no change in vegetative communities was reported (Male and Nol, 2006). However, some sampling difficulties were encountered in the AWAR study, and it will be conducted again in 2014. As discussed in that section, no impacts to water quality in the surrounding area have been observed to date. Based on the results of these monitoring programs, the adverse effects of dust generation and air emissions on terrestrial and aquatic habitat identified in the FEIS do not appear to be occurring as predicted.

12.4.3 Recommendations for Additional Mitigation or Adaptive Management

Dust suppression efforts began to be increased in 2012 in order to reduce dust generation. Beginning in June 2012, liquid calcium chloride was applied as a dust suppressant on the roads onsite. Several applications were made throughout the summer of 2012, and this practice was continued in 2013. Use of solid flakes is recommended for 2014, because of the longer lasting effect. A light oil based dust suppressant was tested on a portion of the airstrip in 2012, but safety concerns were identified and use was discontinued in 2013. Instead, watering of the airstrip was aimed to be conducted 20 min prior to arrival and departure. Water was also used continuously (2 water trucks) during summer months as a dust suppressant on mine haul roads in 2013. Other than better communication with water trucks to ensure the timeline is met for airstrip application, no additional mitigation measures were recommended for 2014.

12.4.4 Contributions to Regional Monitoring

In 2013, Meadowbank has not contributed to regional monitoring of air quality.

12.5 PERMAFROST

In agreement with the PEAMP objectives the results of permafrost were evaluated and a comparison was made to the potential effect predictions by subdividing the project components. The following tables and concluding text summarize the impacts on permafrost due to specific mine activities in 2013 as compared to the FEIS predictions, provides an assessment of the accuracy of the predictions, effectiveness of the monitoring program and provides conclusions. Furthermore, recommendations are made for mitigation or adaptive management.

12.5.1 Accuracy of Predicted Impacts

A summary of potential project effects, as described in the FEIS and results of monitoring in 2013 to assess the accuracy of these predictions is provided in Table 12.9.

Table 12.9 Permafrost

Potential Impact	Potential Cause(s)	Proposed Monitoring	Applicable Monitoring (2013)	Observed Impacts in 2013 that exceed FEIS predictions
Permafrost aggradation and stabilization of new active layer in dikes	-	Monitor ground temperatures; monitor slopes; monitor sub-permafrost pore pressures (tailings dike)	Thermistor monitoring of permafrost are done for East Dike, Central Dike, Bay Goose Dike, Vault Dike, South Camp Dike and Stormwater Dike For Tailings Dike: -AEM began field trials to determine capping thickness in 2009 by installing thermistor SD1-T2, SD1-T3 and SD1-T4 on Saddle Dam 1 to monitor the thermal condition within the structure and its foundation. Another thermistor (SD1-T1) was also installing in 2009 to monitor the thermal condition of the deposited tailings.	Please refer to Section 4 of the 2013 Annual Geotechnical Inspection report for a complete review of the monitoring made on all dike. Overall thermistor data (SD1-T1 to SD1-T4) from within the structure indicates that the dike foundation remained frozen in 2012-2013. Below the rockfill shell, the foundation soil or bedrock remained in a frozen state with temperatures ranging from about -4°C to about -7°C. At the upstream toe, below elevation 132 m, the compacted till base material below the liner remained frozen. Thermistor data showed that the tailings remained frozen in the summer of 2013. The rockfill shell remained frozen, with the exception of the active layer (upper 2 m) that thawed in August 2013.
			-AEM also installed thermistor SD2-T1, SD2-T2, SD2-T3 and SD2-T4 on Saddle Dam 2. SD2-T1 was installed in 2012 in the center of the upstream face of the dike immediately on top of the geomembrane liner to monitor the thermal regime of the tailings in contact with the structure.	SD2-T1 records values similar to the ambient air temperature above the tailings. The tailings were frozen during the winter of 2013. Temperatures above 0 were recorded in the summer of 2013. It is anticipated that data collected from this location will be useful in monitoring the freezing of the tailings in the coming years.
			SD2-T2 to SD2-T4 was installed to monitor the thermal condition within the structure and its foundation.	Overall, thermistor data from within the structure indicates that the dike foundation remained frozen from September 2012 to September 2013. Below the rockfill shell

				the foundation soil and the bedrock remained in a frozen state with temperatures ranging from about 0°C to -9°C. At the upstream toe of the dike, the upper 1 m of the semi-pervious backfill thawed during the summer of 2013. Most of the rockfill stayed in frozen condition with the exception of the upper 1.5 m (active layer) that thawed in August 2013.
Permafrost changes in 2PL NW arm area	Dewatering, reclaim and attenuation pond filling, and tailings deposition	Representative monitoring of ground temperatures; assessment of anticipated ice entrapment (i.e. ground ice development)	To monitor the permafrost aggradation and talik beneath SPL, AEM has installed, in 2012, a thermistor (T90-2) within the talik of the former lakebed inside the North Cell tailings and a single deep thermistor (T147-1) at the downstream toe of Stormwater Dike. Thermistor T147-1 is being utilized to monitor the freeze back of the talik, and in the future will be used to monitor the thermal regime beneath the tailings in the South Cell In 2013, new thermistors were installed on Central Dike. These thermistors will provide information on the permafrost aggradation of SPL.	Thermistor (T90-2) shows temperatures below 0°C in 2013 which seems to indicate that the tailings are continually frozen at this location. Thermistor T147-1 shows the existence of a frozen crust of material from El. 120 m to El. 115 m that stayed frozen during the summer of 2013. Below El. 115 m, the temperature varied between 0.8°C and 0.1°C from the beginning of March 2013 to the end of August 2013 indicating a slow cooling of the near surface talik. Thermistor on Central Dike indicates: -The instruments installed along the central key trench show thawed condition within the in situ Till and the bedrock. -The instruments installed along the final Central Dike downstream toe show below 0º Celsius temperature within the rockfill and the in situ Till and thawed condition below the bedrock surface. -The instruments along the Portage Pit limit show below 0º Celsius temperature.
Permafrost changes in TPL north central shoreline and Portage Pit area	Portage pit development	Assessment of suspected ground ice development in conjunction with permafrost aggradation. Assessment of ground ice content of select	The permafrost in Goose pit is monitored by the thermistor SD-09-A which is located on South Camp Dike approximately 20 m further upstream within Third Portage Lake. 33 thermistors (from T1 to T30	Temperature profile at SD-09 shows that the soils located beneath the dike foundation and liner appear to have remained frozen (permafrost) below elevation 128 m app. and the active layer is frozen from mid-October to late June Please refer to Section 4.3.2 of

		shoreline polygons.	and T3' to T5') are installed on Bay-Goose Dike New thermistors were installed in 2012 between Bay Goose Dike and Bay Goose Pit to monitored aggradation of permafrost. No thermistors were installed in Portage Pit because of the mining activities. However, the permafrost aggradation can be monitored with the thermistor installed in the East Dike and Central Dike:	the 2013 Annual Geotechnical Inspection report for a complete review of the Bay Goose Thermistors. To date, result of thermistors between Bay Goose Dike and Bay Goose Pit show that the freezeback occurred. Monitoring in the next year will provide more useful data about this aggradation of permafrost. Five thermistors have been installed on East Dike. Since different observations were made for each thermistors please refer to Section 4.1.2 of the 2013 Annual Geotechnical Inspection report. Thermistor on Central Dike indicates: -The instruments installed along the central key trench show thawed condition within the in situ Till and the bedrock. -The instruments installed along the final Central Dike downstream toe show below 0º Celsius temperature within the rockfill and the in situ Till and thawed condition below the bedrock surface. -The instruments along the Portage Pit limit show below 0º Celsius temperature.
Increased sediment in effluent during dewatering	Lowering of water table in ice-rich areas, permafrost thaw and subsidence	Assessment of suspected ground ice development in conjunction with permafrost aggradation. Assessment of ground ice content of select shoreline polygons. (during dewatering only)	TSS Level	To date, no TSS was observed during the dewatering. This result indicates that the dewatering activities have no impact on the permafrost.
Permafrost changes in waste rock area	Construction of waste rock facility	Internal and foundation temperatures to be monitored.	In 2012, AEM installed 2 thermistors (T121-1 and T122-1) on the first bench of the RSF.	Dike around RSF indicated that the foundation is in a frozen state. Thermistor (T121-1) installed on RF1 shows temperatures varying from 0°C to -5°C below

				El. 132 m. Thermistor (T122-1) installed on RF2 shows temperature varying from 0°C to -9°C, indicating that the RF2 foundation is in a frozen state.
			Additional thermistor (RSF1) was installed in February 2013 on the RSF. In November 2013, more thermistors (RSF3 to RSF6) were installed on the RSF. Results of these thermistors will be provided in the 2014 Annual Report.	RSF1 is installed in the waste dump and shows frozen condition below elevation 169 m. From elevation 169 m to 173 m temperature above 0°C can be observed in the summer.
Potential settlement of buildings	Loss of permafrost under heated structures	Ground temperature measurements when necessary.	None	No ground temperature measurements but no sign of thawing of the foundation during the year.
Permafrost changes below pipelines	-	Monitor pipeline alignment for potential permafrost degradation	None	No ground temperature measurements but no sign of thawing due to pipeline.

12.5.2 Effectiveness of Monitoring

Overall, the potential impact predicted for mine activities impacts to permafrost were adequately estimated during the FEIS.

Aggradation of permafrost and stabilization of the active layer can be monitoring adequately for dike and tailings storage facility. However, no instrumentation was in place to monitor stabilization or loss of permafrost for pipeline and infrastructure. As the pipeline and the infrastructure are stable, we can suppose that the permafrost is lightly impacted by the mine activities. Furthermore, monitoring and ground surveys reduced any occurrences around the mine site.

12.5.3 Recommendations for Additional Mitigation or Adaptive Management

Generally, FEIS predictions were consistent with the result.

Throughout the year, Meadowbank staff routinely monitored thermistors, dike, pits and pipeline. Some thermistor was installed in 2012 and 2013 to monitor aggradation of permafrost within Bay Gosse Pit, SPL and TSF. Other thermistors will be installed in 2013 in the North Cell to increase monitoring of tailings freezaback. Regular monitoring and assessment of the monitoring data should continue.on regular basis in 2014.

12.6 SOCIO ECONOMIC

In the Meadowbank IIBA AEM has committed to prepare an annual report on the wellness of the Inuit residents of Baker Lake. The KIA has agreed that the report will be community based and driven. The Hamlet of Baker Lake is directing the wellness report with support from the University of Guelph.

The objective of each Wellness Report and Implementation Plan is to provide an overview of any impacts of the Meadowbank Mine on the wellness of the Inuit residents of Baker Lake in as much detail as practically possible, including any impacts on:

a) the state of the physical and mental health of the Inuit residents of Baker Lake;

b) the extent of alcohol and drug abuse in the community of Baker Lake;

c) personal and family relationships of the Inuit residents of Baker Lake, including any impacts attributable to employment at a remote work site under a rotational work schedule;

d) migration into or out of the community;

e) the prevalence and use of Inuktitut in the community of Baker Lake;

f) Inuit culture and traditional practices;

g) job satisfaction of the Inuit residents of Baker Lake employed at the Meadowbank Project;

h) management of personal finances by the Inuit residents of Baker Lake; and

i) any other aspect of the wellness of the Inuit residents of Baker Lake that the Meadowbank Mine could reasonably be expected to affect.

For the purpose of developing Hamlet wellness indicators that is meaningful to Baker Lake residents, qualitative community-based research was conducted to capture how Baker Lake residents define and perceive their Hamlet's wellness. Between July and September 2012, two focus groups and 45 semi-structured interviews were conducted. One focus group was held with women and another with youth, with a total of 15 participants. Interview participants represented a diverse cross-section of the community in terms of age, gender, education and socio-economic background. These 45 interviews included elders, young adults, Meadowbank Mine employees, community leaders, front-line workers and administrators.

A proposed list of wellness indicators, based upon interviews and focus groups with Baker Lake residents in 2011 and 2012, is attached to Appendix K1 of the 2012 Annual report. The first Wellness Report and Implementation Plan offering a comprehensive picture of Hamlet wellness for 2011 and 2012 is ongoing and will be submitted once they are completed. The following information is based on the draft report.

12.6.1 Accuracy of Predicted Impacts

Based on results of this report, the accuracy of both positive and negative impacts as predicted in the FEIS are assessed below in Table 12.10.

Table 12.10 Socio-economic – positive impacts as compared to FEIS predictions

Potential Impact	Proposed Monitoring	Applicable Monitoring (2011-2012)	Observed Positive impacts as compared to FEIS predictions (2011-2012)
Expenditure of $23 million annually over 10 years	Employment and contracting reporting	*Benefits delivered for Nunavut-based businesses:* As of September 1, 2011, 52.2% ($479 million) of total expenditures were attributed to Nunavut-based companies, an increase from $237.4 million in 2010. In 2012 this increased to 58.8% of total expenditures, and all Nunavut-based vendors for AEM in 2012 were at least 51% Inuit-owned businesses. Of the $479 million captured by Nunavut-based companies in 2011, $159 million (33%) went to Baker Lake-based suppliers; this is a significant increase from $17 million in 2009. In 2012, 30.8% of expenditures were allocated to businesses located in Baker Lake, an overall increase since 2010 (26.5%: $62.8 million) but slight decrease from 2011 (33%: $159 million). The majority of these dollars spent in Baker Lake were captured by Baker Lake Construction and Supply, Peter's Expediting, and Arctic Fuel; these three companies took in 22.4% of AEM expenditures in 2011.	The indirect influence of mining contracts and the increase in traffic through Baker Lake has infused significant new money into the town's economy. As with the individual impacts of direct employment, these benefits have been felt unevenly across the community. When construction for the Meadowbank Mine began, three main community businesses signed large contracts with Agnico-Eagle and have generated substantial revenues In the context of high economic growth spearheaded by mineral development, these data further highlight the significant potential for further business growth and development in Baker Lake and the Kivalliq region. AEM has developed a program, the Building People Initiative, to assist Kivalliq business development in order to meet their market needs. They also launched the AEM Inuit Business Opportunities Initiative in April 2010 to assist Inuit businesses seeking contract opportunities through Meadowbank.
Employment of at least 60 workers	Employment reporting, by ethnicity, point of hire, gender etc.	*AEM statistic*: As of the end of August 2011, 37.2% of new permanent hires for the year were Inuit beneficiaries, representing an increase of 57 individuals since 2010. Most of the Inuit beneficiary employees at Meadowbank have been from Baker Lake; at the end of 2012, there were 154 employees from the Hamlet. The overall number of Inuit employed at Meadowbank has remained steady since production began, with 249 in 2011 (36.8% of the workforce) and 247 in 2012 (31.4% of the workforce).	Direct employment is the most substantial impact from the mine With the arrival of the mine, anyone who wanted to be employed could be. Residents highlighted the fact that before the mine, many people in Baker Lake were unable to access employment, even with a high school diploma.

Potential Impact	Proposed Monitoring	Applicable Monitoring (2011-2012)	Observed Positive impacts as compared to FEIS predictions (2011-2012)
		Most of these new Inuit beneficiary hires in 2011 were men – 229 men compared with 60 female. Overall the percentage of Inuit female employees was 20.8% in 2011, which increased to 35.1% in 2012, demonstrating a relatively low but growing representation of women. In 2012, 31% of the Baker Lake Inuit workforce was female and 69% was male. Of the contract workforce in 2011, a small number (5.4%) were Inuit beneficiaries, equal to 25 of 457 workers.	
Goods and service contracts for local businesses	Contract reporting, by type of good and location and status of business	See Above – Potential Impact "Expenditure of $23 million annually over 10 years"	See Above – Potential Impact "Expenditure of $23 million annually over 10 years"
Overall increased economic activity, including indirect and induced effects Increased individual, family and community wellness	Government economic indicators	*Tax-filers with employment, SEMC:* The 2009 SEMC Report stated that "[t]he Kivalliq has not seen economic growth in the wage economy of [this] magnitude since first contact." A need for Kivalliqmiut to adapt to these rapid changes in order to benefit from regional economic growth is recognized. Median annual employment income in Baker Lake has increased since construction began for the Meadowbank Mine: from $12,600 in 2004 to $22,020 in 2009	With employment at Meadowbank, salaries range between $20 and $40 per hour. For many, this new income has enhanced their quality of life by offering a reliable means to afford food, hunting equipment, and consumer goods, such as vehicles and entertainment systems. As a result of increased demand, a greater abundance and variety of foods are available at the community grocery stores. While there are still families asking for Inuit food over the local radio, the number of people waiting in line for the monthly food bank has decreased substantially. This was noted as being the most positive impact of the mine. When employment was very low, many residents accumulated considerable debt with the housing corporation, the power corporation, the Northern, and credit cards, and they are now paying that back. Expectations of financial support to younger siblings or other family members places an added strain on some workers, who have their own financial obligations. For those without extensive debt, homeownership has become an attainable goal, though the community lacks legal and banking services that would enable easier navigation of these processes.

Potential Impact	Proposed Monitoring	Applicable Monitoring (2011-2012)	Observed Positive impacts as compared to FEIS predictions (2011-2012)
Increased capacity of local labour force to participate in project and in formal economy more generally	Training and human resource reporting, government economic indicators, possibly special purpose studies	AEM statistic. The majority of the Nunavummiut workforce is in unskilled and semi-skilled positions at the mine. At the end of August 2010, there were 8 Inuit working in skilled positions. However this trend is changing with the establishment of the Kivalliq Mine Training Society (towards which AEM has contributed funding) and the addition of more on-site training and apprenticeship programs, allowing for greater income capture among the Inuit workforce accessing these higher-paying jobs. At the end of August 2011, 58% of training offered by AEM was provided to Inuit employees, an increase of 3,740 hours since 2010. For 2012, 46% of the training offered was provided to Inuit employees, and 85% of this training offered was general and specific job training (i.e., for career advancement). There are a number of Inuit employees who started their employment with AEM in unskilled positions and have since advanced through training to skilled level positions. By the end of August 2011, 75% of the Baker Lake Inuit employees were working in skilled positions, and Baker Lake has the highest proportion of Meadowbank employees from Kivalliq working such jobs. In comparison, the average for across Kivalliq is 66.8%, though only Baker Lake and Rankin Inlet have a representation of more than 62% employment in skilled positions.	These data suggest that Baker Lake is taking advantage of training initiatives offered at Meadowbank, such as the on-site haul-truck simulator purchased in 2010 and the “Career Path” program for driver advancement
Some increase in interest in school on part of youth	Government social indicators, consultation results	*Nunavut Bureau of Statistics:* Throughout Kivalliq, the rate of high school graduates has been increasing, and this can be attributed partly to population growth While the rising number of high school graduates is promising, graduation rates further demonstrate an increase in the percentage of 17 to 18 year-olds in Kivalliq graduating from high school, with a high of 44% in 2010, more than double the 21% graduation rate in 200	Since the opening of the Meadowbank mine, many informants have observed decreasing dropout rates and higher graduation rates, which is encouraging for the future of Baker Lake. Some parents said that students now are more focused on graduating because they have something concrete to have as a goal for employment

Table 12.11. Socio-economic – negatively perceived and observed impacts

Potential Impact	Proposed Monitoring	Applicable Monitoring (2011-2012)	Negatively Observed Impacts (2011-2012)
Reduced access to traditional land	Consultation results	Interview	Many reported an increase in the number of trips on the land by those with employment-generated monies used to buy equipment, some residents suggested that the stress associated with life in a community, and increasingly busy work and school schedules, limit the length of time that individuals can spend on the land
Reduction in traditional activities including harvesting	Government social indicators, consultation results, possibly special purpose studies	Interview	A number of community members are concerned with the influx of money, Southern material goods and technologies that are providing "too many distractions", and limiting healthy socializing and volunteerism in the community. There is concern that growing individualism and materialism are displacing Inuit values and the influence of elders. Mine impacts on harvesting activities were discussed more frequently than general environmental impacts, and seem to be the most important environmental concern for Baker Lake residents. For some people, the two weeks off provide a chance to recover from the 12-hour shifts at camp. Some reported being too tried to participate in family or community events, including hunting and land-based activities during their two weeks off. However, others reported that they enjoyed using this time specifically for harvesting, using the mine road to access caribou grounds, and enjoying quality time with their family
Undervaluing traditional ways and loss of knowledge	Government social indicators, consultation results	*NBS indicator* In Baker Lake in 2011, 1,170 of 1,865 local residents reported Inuktitut as their mother tongue, or first language learned and still understood. This can be compared with 645 residents who indicated English to be their mother tongue (ibid). In terms of the language spoken most often at home in 2011, 525 Baker Lake residents indicated this to be Inuktitut, compared with 1,320 who speak English most often at home (NBS 2012). The more frequent use of English at home over Inuktitut has been increasing over the past decade. In 2001, 61.3% of Baker Lake residents	In 2011, issues of language use and culture clashes between Inuit and Southern workers were cited by participants as reasons some Baker Lake employees left Meadowbank to pursue other opportunities in town. At this time, Inuit were unable to speak Inuktitut while working on the job site, but resented the fact that French-speaking workers were speaking their native language. In 2012, this situation improved: Inuktitut was accepted as a language spoken on site for safety reasons. Participants stressed the importance of open communication and working together as a team at camp to address social and cultural tensions. The levels of Inuktitut speaking and number of residents who claim Inuktitut to be their mother tongue is lower in Baker Lake than in several other Kivalliq and Nunavut

Potential Impact	Proposed Monitoring	Applicable Monitoring (2011-2012)	Negatively Observed Impacts (2011-2012)
		reported English to be the main language spoken at home compared to 36.1% who spoke Inuktitut most frequently. In 2011, 70.8% indicated English to be the main home language and 28.2% spoke Inuktitut predominately (NBS 2012).	communities. Community and school-based language initiatives are hoping to reverse these trends while promoting literacy in both English and Inuktitut.
Poor financial decision making	Government social indicators, consultation results, possibly special purpose studies	*NBS Indicator* With an increased standard of living, there are some concerns associated with spending. Across Nunavut, sales of alcoholic beverages have been increasing. The total income and revenue from legal alcohol sales between 2010 and 2011 increased 55.4% across the territory. While regional or community-specific data on alcohol sales are not publically available, the proportion of newly earned monies spent towards alcohol, drugs and gambling is of concern to Baker Lake residents.	Every respondent in 2012 mentioned drug and alcohol use as a concern for community wellness, affected by underlying structural issues, rising incomes, the two-week schedule, and population growth. The two weeks of downtime without structure, combined with a lack of money management skills, was also identified as a concern, and a cause of reckless spending, including gambling and drug and alcohol consumption.
Increased income disparity	Government social indicators, consultation results, possibly special purpose studies	Interview	Making money is not the only concern for Inuit working at Meadowbank; for many Inuit, other responsibilities, such as family, take priority over employment and income. Problematically, when incomes grow, an employee's rent in Baker Lake can increase substantially (e.g. upwards of 25x the cost before employment). This has created a disincentive for some to continue employment, given that the majority of Kivalliq Inuit are home renters.
Increased public health and safety risks	Government social indicators, consultation results	*DPA, NBS* At the 2011 SEMC meeting in Baker Lake, the RCMP clearly stated that Agnico's provision of income has stimulated staggering increases in crime due to incomes being used to purchase alcohol and drugs. Agnico is currently in the midst of developing a new Employee Assistance Program that will include education to our employees on managing a paycheque and counselling related to assisting families cope with adjusting to shift rotations and employment" Across the territory of Nunavut, crime rates have been increasing	Population growth and an increase in consumer goods, drugs, alcohol and gambling were affecting crime-rates, and particularly thefts and home break-ins. It is not uncommon to hear of vehicle theft now in the community, and participants were concerned by this lack of respect for personal property. With more vehicles on the road, several participants were concerned with increased traffic, drinking and driving, and the safety of youth in particular. Several participants noted there are more "unsavoury characters" on the streets than there used to be, making it less safe for families to let their children, especially girls, out in the town without supervision. Respondents discussed not knowing who their neighbours are anymore, locking their doors when home in the middle of the day, and a concern for their family's safety. A few participants expressed

Potential Impact	Proposed Monitoring	Applicable Monitoring (2011-2012)	Negatively Observed Impacts (2011-2012)
		over the last decade. However, crime rates have been rising in Kivalliq over the last several years at a rate faster than the territory of Nunavut is experiencing on average. In Baker Lake, the number of criminal code violations (including traffic violations) has increased from 316 in 2006 to 753 in 2011 (NBS 2012). The majority of these criminal violations are incidents of mischief, disturbing the peace and assault. Crimes against persons, including acts and threats of violence, have been on the rise as well (NBS 2012). In Baker Lake, the rate of crimes against the person (calculated as crimes per 1,000 residents) increased from 66 in 2006 to 85 in 2010 (SEMC 2011). Rates of suicide, violence and sexual assault, have been also increasing in recent years, some of which can be attributed to overcrowded housing and associated stressors Community health centre visits have been decreasing per annum since 2006 when there were 12,903 visits to 2011 with 9,652 visits recorded	a social reluctance in the community to report incidents such as disturbing the peace and domestic abuse to the authorities, but noted that this attitude is changing as priorities ultimately lie in ensuring the safety of one's family and home.
Stress from rotational employment	Government social indicators, consultation results	The two-week rotation has contributed to spousal stress in Baker Lake, and that gossip and rumours of infidelity are causing relationship problems Important are childcare responsibilities and lack of community childcare facilities that can prevent Inuit, and particularly single mothers, from accessing or maintaining a job at Meadowbank. The relationship between supervisors and workers and amongst workers was also discussed at the 2011 meeting as an area of concern, with issues of gossip and miscommunication creating tension between employees.	The relative impact of the two week in-two week out schedule varies greatly as well. Participants indicated that working out of the community for 2 weeks at a time is a big adjustment for many who are "not used to that type of time" maintaining a strict work schedule. For some, leaving the community for two weeks at a time presents a huge challenge for childcare and other family obligations. Single mothers in particular noted that they are unable to access job opportunities with the mine because of inadequate childcare within Baker Lake. This raises concerns of socio-economic inequality, particularly given the high costs of living in the Arctic.

Potential Impact	Proposed Monitoring	Applicable Monitoring (2011-2012)	Negatively Observed Impacts (2011-2012)
		While no previous data appear to exist, marital status rates for ages 15+ indicate 20 cases of separation and 15 cases of divorce in Baker Lake during 2011. If these statistics continue to be collected, they could serve as an indicator of family stability	
Increased traffic accidents and emergencies	Project health and safety reporting	NA	NA
Disturbance by project activities	Consultation results	Interview	There are some concerns about the environmental impacts of mining and industrial development, but most feel that Agnico-Eagle is following the required procedures and taking necessary precautions. Some respondents expressed concerns about the mine's impacts on the spiritual health of the land, with 23 reports of spirit disturbances at the Meadowbank site; healing measures have been undertaken to address these concerns. There is significant scepticism about land reclamation, however, as the tundra takes longer to regenerate compared with other ecosystems.
Shortage of housing and other infrastructure	Consultation results	The lack of sufficient and adequate housing contributes to household stress. About 300 Baker Lake residents over the age of 15 reported being on the waiting list for public housing at the time of this survey. Of these individuals, 100 had been on the waiting list for between one and three years, and about 50 others indicated being on the waiting list for five years or longer (NBS 2011). These housing data, while merely a snapshot from a one-year period, provide an indication of community wellness as Baker Lake continues to grow and more demand is placed on community housing and infrastructure.	The development of the Meadowbank Mine has generated in-migration of individuals from the Kivalliq and across Canada seeking employment. This has accelerated the need for improvements in Baker Lake's housing and infrastructure.
Increased demand for social services	Government social indicators, consultation results	*SEMC:* The number of households collecting social assistance has decreased in recent years. In 2006, the monthly average social assistance caseload was 239 households, representing 706 individuals, compared with 124	Levels of social assistance have decreased with the mine, with a large impact on material well-being for those able to access new employment opportunities. Of course, there are still people living on social assistance or working minimum wage jobs in town, meaning that there may actually be a widening economic gap with the increase in the number of higher wage employees in

Potential Impact	Proposed Monitoring	Applicable Monitoring (2011-2012)	Negatively Observed Impacts (2011-2012)
		households and 537 individuals in 2010. The main attributable factor for these lower levels is the more than 150 residents of Baker Lake working at the Meadowbank camp, and new job opportunities in town. The same trend is occurring in Rankin Inlet, while other communities in Kivalliq are experiencing a rising number of social assistance cases.	town.
Potential degradation of historically significant sites	Consultation results	Archeology study	No destruction

12.6.2 Effectiveness of Monitoring

Potential impacts to socio economic identified in the FEIS are realistic based on interview with focus groups with Baker Lake residents in 2011 and 2012. Overall, the mines have a positive economic impact on Nunavut Community. AEM contributes to the development of the community by giving contract and jobs to people, even if are unskilled. Meadowbank thru is socioeconomic program help the worker to develop itself. AEM also have a positive impact on the scholarship of the young. The students want to graduate because they have now something concrete to have as a goal for employment. On the other side, with an increased standard of living, there are some concerns associated with the lack of money management skills and the expenditure for drug, alcohol and gambling. Community also have some concerns regarding the environmental impact of mining and industrial development, but most feel that AEM is following the required procedures and taking necessary precautions. Overall, the predictions made in the FEIS are accurate.

12.6.3 Recommendations for Additional Mitigation or Adaptive Management

AEM will continue to listen to the Nunavut Community and worker about all the concern that they have and will address this concern in the best manner possible. AEM will also continue to do the annual report on the wellness of the Inuit residents of Baker Lake as request by the Meadowbank IIBA

12.6.4 Contributions to Regional Monitoring

Overall, AEM contribute to the regional economy and socio economic part of the Nunavut Community.