



January 7<sup>th</sup>, 2014

Ms. Sophia Granchinho  
Monitoring Officer  
Nunavut Impact Review Board  
P.O. Box 1360  
Cambridge Bay, Nunavut X0B 0C0  
(867) 983-4615

Dear Ms. Granchinho,

**Re: File 03MN107 - AEM Response to The Nunavut Impact Review Board's 2012 – 2013 Annual Monitoring Report for the Meadowbank Gold Project and Board Recommendations**

As requested, the following information and comments are intended to address the recommendations outlined in response to the NIRB report dated November 27th, 2013 title '*The Nunavut Impact Review Board's 2012 – 2013 Annual Monitoring Report for the Meadowbank Gold Project and Board Recommendations*' made in accordance with the conditions of Project Certificate No.004.

**Meadowbank Airstrip Expansion Screening Decision Report (File No. 10XN039)**

NIRB Recommendation 1: The Board requests that AEM provide a summary of discussions held with the Baker Lake community members regarding its airstrip expansion as was required by the NIRB's Screening Decision Report for Screening File No. 10XN039. It is requested that this summary be provided within 30 days' receipt of the Board's recommendations.

**AEM Response**

On May 16<sup>th</sup>, 2011 AEM began consultations with the Baker Lake community members to discuss the proposed airstrip extension. Specifically, AEM consulted with HTO board members in the afternoon and hosted a community meeting in the evening at the Baker Lake community center. During these presentations AEM presented annual wildlife and fisheries monitoring information and responded to questions regarding the Meadowbank fire and the proposed airstrip extension. At this time the airstrip was planned to extend much further into Third Portage Lake and AEM presented conceptual fish habitat compensation plans; the HTO noted that "they generally agree that extension is good and that it was originally set up" when the project was proposed.



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Due to geotechnical issues and associated construction costs, the proposed airstrip extension was halted and a shorter extension was considered. On February 23<sup>rd</sup>, 2012, AEM hosted a visit with the HTO board members to review the fisheries and wildlife annual monitoring results and discussed the changes to the proposed airstrip extension. The final details of the design were submitted to the NWB application in January 2013, and through the NWB process, and the intervention of the NIRB, the public was consulted on the final design that was not expected to impact the receiving water as there was a significantly reduced encroachment into Third Portage Lake (only approximately 18 meters). Through due process, the airstrip extension proposal design was accepted and the construction was completed as planned by the end of March 2013. The construction monitoring report and as-built drawings were sent to NWB on June 21<sup>st</sup>, 2013 as per the Type A Water license Part D item 26 and Schedule D Item 1 requirements.

### **Project Certificate [No. 004] Appendix D and the Annual Report**

NIRB Recommendation 2: The Board requires that AEM provide a full discussion and summary on the PEAMP for the Project in accordance with commitments made within the FEIS, during the Final Hearing, and as required throughout Project Certificate [No. 004] Appendix D. This must include a discussion that references the baseline and previous years' monitoring data and indicates whether any trends have been observed at the mine site. It is requested that this be provided within 60 days' receipt of the Board's recommendations.

### **AEM Response**

NIRB noted in their letter that "the discussion and analyses presented did not provide a full discussion and summary on the PEAMP... this must include a discussion that references the baseline and previous year's monitoring date and indicates whether any trends have been observed at the mine site." AEM is of the opinion that the PEAMP documentation in the 2012 annual report meets the requirements of Appendix D (specifically Appendix D 1) a to e and 2) b). Appendix D does not require a "trends" analysis as stated in the recommendations letter, rather it requires "an analysis of the project's impacts to the environment... with reference to baseline and monitoring data used to support impact predictions and effects conclusions, with a discussion of data collection and analysis methodologies employed (Appendix 2 b)." A discussion of this information was provided in Section 12 of the annual report and adequately refers to other monitoring reports that have been provided to the NIRB in the annual report that describe trends over time (i.e. wildlife monitoring report, Core Receiving Environmental Monitoring Plan report, etc.). AEM is open to discussing with the NIRB on how best to present the information in the PEAMP (in advance of our 2013 annual report submission), however AEM believes the intention of the PEAMP is to serve as a high level review of annual monitoring results as compared to the final environmental impact predictions and should not require AEM to duplicate information that is found elsewhere in the annual report.



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## **Compliance with licenses and authorizations**

NIRB Recommendation 3: The Board requested that AEM provide a discussion and explanation for the total oil and grease values having exceeded the water quality allowable limits and a discussion of any steps taken to ensure levels remain within limits in future years. It is requested that this be provided within 30 days' receipt of the Board's recommendations.

## **AEM Response**

Total Oil and Grease was detected at 7 mg/l from a sample taken in the fall of 2012 at the Baker Lake Fuel Storage Facility. This water was not pumped out of the containment at that time. It should be noted that in 2011, there were no levels above 1 mg/L. As well, in 2013 no levels were above 1 mg/L (this will be in 2013 annual Report).

The Table 8.22 in the 2012 Annual report depicts the QA/QC results which show a discrepancy in the Oil and Grease levels. In addition, the Field Blank which was taken at the same time, also has an Oil and Grease level of 7 mg/L. This would indicate that this elevated result was some type of sampling error – either from the lab or sampler. The fact that 2013 levels were very low (< 1.0 mg/l) would indicate that that was the case as no water was pumped out in the fall of 2012 when we reviewed the result indicating an exceedance of water license criteria (5.0 mg/l). As a result sampling protocols were reinforced with the Environment Department staff.



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Table 8.22: 2012 Bulk Fuel Storage Facility QAQC

Duplicate / Field Blank Analytical Certificate ID	Units	27-Sep-12			
		Original ID BL TF NEW	Duplicate ID BL TK NEW DUP	RPD	Field Blank BL TF NEW FB
Total Suspended Solids	mg/L	6	6	0	< 1
Ammonia Nitrogen	mg N/L	0.08	0.11	-32	3.70
Arsenic	mg/L	< 0.0005	< 0.0005	0	< 0.0005
Nickel	mg/L	0.0009	0.0006	40	< 0.0005
Lead	mg/L	< 0.0003	0.0009	-100	< 0.0003
Zinc	mg/L	< 0.001	< 0.001	0	0.003
Total Cyanide	mg/L	< 0.005	< 0.005	0	< 0.005
Benzene	µg/L	< 0.3	< 0.3	0	< 0.3
Toluene	µg/L	< 0.3	< 0.3	0	0.4
Ethylbenzene	µg/L	< 0.3	< 0.3	0	< 0.3
Xylene	µg/L	< 0.3	< 0.3	0	< 0.3
Oil & Grease	mg/L	7	4	55	7
Aluminium (Al)	mg/L	0.694	0.654	6	< 0.006
Antimony (Sb)	mg/L	< 0.0001	< 0.0001	0	0.0001
Barium (Ba)	mg/L	0.0326	0.0307	6	< 0.0005
Beryllium (Be)	mg/L	< 0.0005	< 0.0005	0	< 0.0005
Cadmium (Cd)	mg/L	< 0.00002	< 0.00002	0	< 0.00002
Chrome (Cr)	mg/L	< 0.0006	< 0.0006	0	< 0.0006
Cobalt (Co)	mg/L	< 0.0005	< 0.0005	0	< 0.0005
Copper (Cu)	mg/L	0.004	0.0033	19	0.0035
Tin (Sn)	mg/L	< 0.001	< 0.001	0	< 0.0010
Iron (Fe)	mg/L	0.52	0.5500	-6	< 0.0100
Lithium (Li)	mg/L	< 0.005	< 0.005	0	< 0.0050
Manganese (Mn)	mg/L	0.0086	0.0091	-6	< 0.0005
Molybdenum (Mo)	mg/L	0.0036	0.0033	9	< 0.0005
Selenium (Se)	mg/L	0.001	0.0010	0	< 0.0010
Strontium (Sr)	mg/L	0.11	0.1080	2	< 0.0050
Thallium (Tl)	mg/L	< 0.005	< 0.005	0	< 0.0050
Titanium (Ti)	mg/L	0.03	0.0300	0	< 0.0100
Uranium (U)	mg/L	0.007	0.0070	0	< 0.0010
Vanadium (V)	mg/L	< 0.0005	< 0.0005	0	< 0.0005
Hydrocarbons C10-C50	mg/L	< 0.1	< 0.1	0	0.2000

**Footnotes:**

RPD = Relative Percent Difference

## Water quality

NIRB Recommendation 4: The Board requests that AEM provide further discussion on predictions made in the FEIS for the water quality in the pits and whether or not these predictions will be updated as required by the PEAMP. It is requested that a discussion be provided within 60 days' receipt of the Board's recommendations.

## AEM Response

AEM did not provide a thorough discussion in the annual report of the comparisons of the FEIS water quality predictions of the pit water rather focused the discussion in the PEAMP was at a high level and evaluated the general site water quality and receiving environment trends. The differences in the FEIS predicted water quality results versus actual water quality (presented in the 2012 annual report in Table 4.2) is unclear, as the operational methods and the geology



have not significantly changed as was predicted in the original FEIS model. The best explanation is that the natural and geochemical variability was not captured in the original model (i.e. a model is only as good as the input data). Regardless of the natural variability, AEM continues to meet license limits prior to discharging, which are set to be protective of the aquatic environment and is the primary reason for developing a water quality model in the FEIS and the NWB Type A water license process.

Despite pit water exceeding the FEIS predicted values, data to date for South Portage Pit (ST-19) has shown a general decline in TDS, Sulfate, Ammonia and Iron (key parameters) since 2010. Goose Pit (ST-20) has been relatively consistent since the start of operation in 2012. As we approach pit reflooding, AEM will be updating our water quality model annually. As was recently discussed with the NWB in preparation for our Type A water license renewal, this will assist us in ensuring we meet CCME limits to protect aquatic biota prior to breaching the dikes. Beginning this year, AEM has committed to updating our pit water quality predictions and provide an updated site wide water balance in our annual report. This will assist the NWB, NIRB and AEM in understanding annual changes between annual water quality and model predictions.

#### **Groundwater monitoring wells – Condition 8**

NIRB Recommendation 5: It is recommended that AEM consider developing alternative approaches to sampling and analysis to obtain groundwater chemistry and flow data which would inform operational water management and provide information for closure. AEM's Groundwater Plan should include consideration of alternative approaches as outlined; it is requested that this Plan be submitted to the Board for review within 60 days' receipt of the Board's recommendations.

#### **AEM Response**

AEM will submit to the NIRB within 60 days a revised groundwater monitoring plan. This plan will reflect changes that were presented in the 2012 annual groundwater monitoring report based on recommendations provided by Golder Associates in the 2012 Groundwater Monitoring Report (December 11, 2012). Alternative approaches for obtaining groundwater samples were tested in 2013 as planned; these included attempted sampling of production drill holes and sampling of pit wall seeps. AEM would like to request a meeting with NIRB's Monitoring Officer as soon as convenient to further discuss conditions of the Project Certificate pertaining to groundwater monitoring (Condition 8).



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## **Noise quality monitoring**

NIRB Recommendation 6: The Board requires AEM to discuss the linkages between the potential effects of noise on wildlife and habitat effectiveness and to provide further discussion of its conclusion that noise values currently detected above the calculated PSL value at the site are not affecting wildlife (both terrestrial and birds). Further, it is requested that AEM provide a discussion regarding the potential impacts of noise to human health at site. It is requested that this information be submitted to the Board within 60 days' receipt of the Board's recommendations.

## **AEM Response**

The Meadowbank noise monitoring program is summarized and the linkages to monitored noise levels, for each receptor of concern at the mine site are discussed below.

### *Offsite Human Receptors -*

The permissible sound level (PSL) of 55 dBA derived for Meadowbank is based on noise levels that could potentially cause disturbance to offsite human receptors at a nearby temporary dwelling (e.g. a recreational or trapper cabin). If such a cabin were to be built, the PSL would be applicable at a distance of 15 m from the dwelling. To date, no cabins have been built, and no noise-related complaints have been received from residents of the area. Therefore, no impacts of PSL exceedance on offsite human receptors are anticipated at this time. Furthermore, all monitoring stations with PSL exceedances are located within 500 m of Meadowbank facilities (specifically, the emulsion plant and exploration camp). Since it is unlikely that a cabin would be built in this proximity, anticipated mine-related noise levels for future offsite receptors could reasonably be expected to be lower than measured at these stations. However, AEM continues to conduct annual monitoring at stations located at various distances from the mine footprint in order to proactively identify opportunities for abatement wherever feasible.

### *Onsite Workers -*

The impact of noise on the health of onsite workers (i.e. occupational exposure) is a component of Health and Safety planning, and should not be specifically addressed under the environmental monitoring program. The noise monitoring stations target general sound levels around the mine site, and are not necessarily located in common workplaces. In addition, occupational exposure durations and limits are different from those used in the derivation of the PSL of 55 dBA presented in the Plan. For example, Nunavut's maximum permitted occupational exposure level for 8 h is 85 dBA. None of the sound levels recorded in 2012 approach that value. AEM's Health and Safety Department has conducted noise assessments and determined when appropriate PPE is required for workers. The appropriate PPE/hearing protection is provided to all AEM workers who require it.



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### *Wildlife -*

With respect to wildlife disturbance, quantitative noise limits (such as a PSL) which may potentially cause disturbance are not readily available, and research regarding effects of noise on wildlife is scarce and often inconclusive (Noise EIS, 2005). Terrestrial wildlife (including ungulates, predators and birds) activities are monitored as part of the Terrestrial Ecosystem Management Plan (Cumberland, 2006), per Condition 54 of the NIRB Project Certificate. Acceptable levels for various types of impacts were established in the FEIS. Since monitoring is occurring as planned, and no thresholds of predicted impacts to wildlife have been exceeded (e.g. Table 12.7; 2012 Annual Report), it follows that noise is not causing excess unpredicted impacts to wildlife.

Regardless of the receptor type however, the Noise Monitoring and Abatement Plan indicates that exceedances of the PSL will occasionally occur, and that monitoring will be used to identify the source and implement appropriate mitigation, wherever possible. In 2012 at R1, the source of PSL exceedances was mainly identified as construction of the North Cell diversion ditch, which was a temporary activity. In addition, while this site was at least 400 m from mine activity in previous years, a spur road and storage area now exists within 100 m. Loading activities are clearly audible in audio files for this site, and may have contributed to the increase in measured noise levels in 2012 compared to previous years. The R1 station now falls within the smallest zone of influence considered for roads in the FEIS, where all habitat is conservatively assumed to be lost due to sensory disturbance. Therefore, exceedances of the PSL as observed in 2012 are anticipated in this area, and no additional abatement is suggested. AEM aims to move this location in 2014 to maintain the originally intended location relative to site activity (details to be submitted with the revised Noise Monitoring and Abatement Plan).

While exceedances at R5 were not attributed to a specific activity, sound files were again reviewed, and it was noted that helicopter activity and wind appear to cause most of the PSL exceedances. This site is situated within 450 m of the exploration camp, where helicopter use is a common occurrence during the summer season. While helicopter noises are not filtered from the datasets, fixed and rotary wing aircraft were excluded from the site noise model in the FEIS because they were considered to be irregular and of short duration. Wind noises alone also regularly resulted in sound levels above the PSL at this location. Wind speeds during these times often approached the limit of 4.17 m/s, but were not high enough to warrant exclusion of the data. Since helicopter sounds are likely attributable to the exploration camp, and it is clear that wind sounds would not impact animal behaviour, further abatement of sound levels at this station do not appear to be feasible or warranted.

Since the activities contributing to excess sound levels in 2012 were generally temporary, monitoring in 2013 was increased (at all sites) to four days in order to obtain more



representative data. Changes to the plan will be noted in Meadowbank's Noise Monitoring and Abatement Plan which is being updated prior to submission of the 2013 Annual Report to NIRB.

**All weather private access road – Condition 32(e)**

NIRB Recommendation 7: As annual consultation with the community of Baker Lake to discuss the private nature of the access road is a requirement of Meadowbank Project Certificate [No. 004] term and condition 32(e), by not conducting these consultations AEM is not in compliance with the condition. The Board requests that AEM hold public meetings as set out in Condition 32, and that it report on this information within its 2013 Annual Report.

**AEM response**

In 2013 a public meeting was held with the community of Baker Lake. This meeting took place on May 30, 2013. The meetings minutes and presentation from this meeting will be included in the 2013 Annual Report.

**Condition 40: Gathering of Traditional Knowledge information.**

NIRB Recommendation 8: As Condition 40 of the Meadowbank Project Certificate [No. 004] requires that AEM collect and report annually to both the KivIA and the NIRB on the Traditional Knowledge gathered from the residents of Chesterfield Inlet, AEM is not in compliance with the condition. The Board requests that AEM report on further Traditional Knowledge gathered in its future annual reporting as submitted to the NIRB.

**AEM response**

AEM held an Inuit Qaujimajatuqagit (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 Chesterfield 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.





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## **Monitoring of country foods – Condition 67**

NIRB Recommendation 9: The Board invites Health Canada to provide comments on the additional information provided by AEM with respect to the PQRA report and to indicate whether or not further information may be required with respect to the monitoring program as outlined in Condition 67. The Board respectfully requests that Health Canada provide any comments within 60 days' receipt of these recommendations.

### **AEM Response**

AEM acknowledges NIRBs request to Health Canada and will await their response.

## **On-site incinerators – Condition 72**

NIRB Recommendation 10: The Board requests that AEM provide an explanation for the incinerator having not achieved recommended temperatures in the secondary chamber on various occasions in 2012. Further, it is recommended that AEM describe any corrective measures employed at the incinerator. It is requested that this information be provided within 30 days' receipt of the Board's recommendations.

### **AEM Response**

AEM's incinerator runs at a high capacity, to keep the wildlife attractant waste to a bare minimum. The days in question, in which the secondary chamber did not reach the recommended temperatures, are generally due to mechanical issues with burners not working properly. When these burners do not work properly, maintenance is performed as needed on the incinerator and site services department fix the problem as soon as the incinerator has completed its cycle and cools down to allow personnel to safely work on the system. Although efforts are made to ensure occurrences such as these are minimal, emission testing by offsite Consultant Exova, indicated that we met Environment Canada Guidelines (See Appendix E3 in 2012 Annual Report). Further emission testing is planned in 2014.

## **Suppression of surface dust – Condition 74**

NIRB Recommendation 11: The Board requests that AEM provide a discussion of its plans to address dust control for the access road and to provide the Board with a summary of the outcome of any related studies that have been completed to date. Potential adaptive management strategies that may result from the results of these studies should also be included. It is requested that this information be provided within 30 days' receipt of the Board's recommendations.



### **AEM Response**

In accordance with NIRB Project Certificate No.004, AEM has conducted annual dustfall and air quality monitoring around the Meadowbank site since 2011. The monitoring results are presented in the annual reports. In 2012, an additional, preliminary study of dustfall was conducted along the AWAR, which included sampling of two replicate transects along the road, and two clusters on the minesite. The results of the 2012 preliminary study are presented in the 2012 annual report and were discussed with NIRB during site visits. Overall, maximum observed dustfall rates at AWAR locations without dust suppressant were more than four times lower than those observed on Ekati Diamond Mine haul roads after application of dust suppressants (Male and Nol, 2005<sup>1</sup>). Despite much higher levels of dust deposition at Ekati, Male and Nol (2005) did not find a measurable effect of roads on the birds studied (Lapland longspurs). Based on these results, AEM does not plan to apply dust suppressants along the AWAR from Baker Lake to the Meadowbank exploration camp, as it is AEM's opinion that impacts due to dust along the AWAR are less than FEIS predicted impacts.

Notwithstanding, in 2013, AEM engaged in a more robust dustfall study along the AWAR to thoroughly evaluate the impacts within the zone of influence predicted in the FEIS. Unfortunately, study results were compromised due to field data collection problems (many of the dustfall canisters were knocked over, likely by wind, during the sampling process). The available dustfall data are currently being analyzed and will be reported in our 2013 annual report. As a result of these difficulties, AEM is still evaluating dust levels and will compare them to the zone of influence predicted in the FEIS. In 2014, AEM will improve on the 2013 study and complete an analysis of the impacts of road dust using an ecological screening level risk assessment approach.

Nevertheless, AEM has an active dust suppression program for all mine site surface roads and will continue to apply dust suppressants in highest traffic zones (i.e. along haul roads around the mine site, and between the exploration camp and Meadowbank, etc.). As convenient at a future meeting, AEM would like to discuss the requirements of Condition 74 of the Project Certificate with NIRB's Monitoring Officer.

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<sup>1</sup> Male, S. and E. Nol. 2005. Impacts of roads associated with the Ekati Diamond Mine, Northwest Territories, Canada, on reproductive success and breeding habitat of Lapland longspurs. Canadian Journal of Zoology 83:1286-1296.



**Spill at Baker Lake Marshalling Area – Condition 37 & 82 and Commitments 34, 35 & 38**

NIRB Recommendation 12: The Board requests that Transport Canada provide information on the conclusions of the investigation related to the fuel spill into Baker Lake in August 2012 and any outcomes that might have resulted from the investigation of the incident. The Board respectfully requests that this information be provided within 60 days' receipt of the Board's recommendations.

**AEM Response**

AEM acknowledges NIRB's request to Transport Canada and will await their response.

**Harmful Alteration, Disruption or Destruction Crossings along the Access Road**

NIRB Recommendation 13: The Board requests that AEM work with the appropriate authorizing agencies to ensure that any changes to its monitoring programs, specifically the HADD monitoring programs, meet the approval of the authorizing bodies, and that any changes be communicated to the NIRB. It is requested that a report summarizing any discussions to this end be provided to the NIRB within 90 days' receipt of the Board's recommendations.

**AEM Response**

AEM has worked extensively with the DFO (the authorizing agency) and the Baker Lake HTO since March 2011 in revising the DFO authorizations and developing associated monitoring programs. Table 1 below, taken from the revised No Net Loss Plan (AEM, 2012), summarizes the consultation for the development of the No Net Loss Plan, consultation for the revision of the authorizations and subsequent discussions that led to a revision of the Habitat Compensation Monitoring Plan (AEM, 2013). Conditions of the new authorizations stipulated that AEM was required to revise the Habitat Compensation Monitoring Plan. As part of this process, AEM had numerous telephone conversations with DFO leading up to a meeting with DFO representatives Elizabeth Patreau and Derek Moggy, in Ottawa on February 19<sup>th</sup>, where we reviewed a draft version of "Table 3 – Summary of monitoring methods, analytical parameters, sampling frequency and number of samples for dike faces and finger dikes". Subsequently, AEM followed up with the submission to the DFO of a draft plan on April 28<sup>th</sup>, for their review and comments. AEM finalized the plan by incorporating DFO's comments and submitted a Final Habitat Compensation Plan on July 23<sup>rd</sup>, 2013.



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*Table 1: Summary of No Net Loss Planning Consultation taken from AEM, 2012 Appendix C.*

Date	Description	Attendees	Document Attached?
7-Mar-11	AEM No Net Loss Contingency Plan Terms of Reference	Sent to DFO by AEM	✗
28-Apr-11	DFO Approves Terms of Reference	Accepted by DFO	
30-May-11	Invitation to attend July 13th Workshop	sent to: KIA, NWB, NIRB, HTO, DFO	✗
13-Jun-11	Meadowbank Site visit with HTO- inpart discussed NNL Planning	HTO and AEM	
13-Jul-11	No Net Loss Planning Workshop	HTO, KIA, DFO, AEM, Consultants	✗
8-Aug-11	Email to DFO outlining DFO Authorization discrepancies	Sent to DFO by AEM	✗
12-Aug-11	Helicopter Tour with Workshop Attendees	HTO, KIA and AEM	
15-Aug-11	DFO Site Visit to Meadowbank and Meliadine	AEM and DFO	
11-Nov-11	Agenda sent for November 17th meeting in Ottawa	AEM and DFO	✗
17-Nov-11	November 17th and 18th meetings in Ottawa	AEM and DFO	✗
13-Dec-11	Follow-up teleconference	AEM, DFO and Consultants	
31-Jan-12	Technical Memorandum detailing a HEP method comparison	AEM, DFO and Consultants	✗
12-Feb-12	Exploratory Meeting with DFO Science to discuss research opportunities	AEM, U of G researchers, DFO Habitat and DFO Science	✗
23-Feb-12	Site visit and presentation on NNL Planning, Wildlife and Fisheries monitoring	AEM and HTO board members	
30-Mar-12	Email from DFO detailing expectations for a new Meadowbank NNLP	Sent by DFO to AEM	✗
7-Jun-12	Technical Memorandum detailing a adjusted HEP with example	Sent to DFO by AEM	
15-Jun-12	Submission of Draft NNL Plan	Sent to DFO by AEM	
16-Jul-12	Telephone conversation to discuss NNL Plan- Ryan V and Bobby Bedingfield	DFO and AEM	
19-Jul-12	Email- Comments and feedback from DFO on Draft NNL Plan; Email Entitled- Meadowbank Authorization Amendment and NNLP Contingency Plan	DFO response to AEM	✗
13-15 Aug-2012	Meadowbank site visit- discussions included the review of DFO comments and feedback on NNL Plan and monitoring programs	DFO and AEM	
28-Aug-12	DFO and AEM Meeting- Summary and Action Items	DFO and AEM	
12-Sep-12	AEM reponse to DFO July 19 email	AEM response to DFO	✗
26-Sep-12	DFO Response to AEM Email dated Sept 12	DFO response to AEM	✗

## Permafrost

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. It is requested that this information be provided within 60 days' receipt of the Board's recommendations.

## AEM Response

The action plan and permafrost monitoring program for Second Portage Lake, Portage Pit and Goose Pits are as follow:

### Second Portage Lake

To monitor the permafrost aggradation and talik beneath Second Portage Lake, AEM has installed, in 2012, a thermistor (T90-2) in the North Cell tailings and a single deep thermistor (T147-1) at the downstream toe of Stormwater Dike. Thermistor (T90-2) was installed within the former lakebed inside the North Cell of the TSF. In 2012, temperatures below 0 degrees Celsius are recorded below El.140 m which appears to indicate that the tailings are continually frozen at this location. In 2012, 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 2012. Below El.



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115 m the temperature varied between 0.5°C and 0.1°C from the beginning of March 2012 to the end of August 2012 indicating the beginning of freeze back of the talik. In 2013, new thermistors were installed between the Central Dike and the Portage Pit. These thermistors will provide information on the permafrost aggradation of Second Portage Lake. All thermistors are monitored on a regular basis and the 2013 data will be provided with the 2013 Annual Report.

### 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, Central Dike and the new thermistors installed between Central Dike and Portage Pit in 2013. A discussion about the 2013 data will be providing in the Annual Report.

### 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 in 2012 that the soils located beneath the dike foundation and liners appear to have remained frozen (permafrost) below elevation 130 m. Also, thirty-three thermistors (from T1 to T30 and T3' to T5') are installed on Bay-Goose Dike and new thermistors were installed between Bay Goose Dike and Bay Goose Pit. These thermistors are monitored regularly and the data provide more information about aggradation of permafrost. This information will be included in the 2013 Annual Report.

### **NWB Water License Amendment**

NIRB Recommendation 15: The Board requests that AEM provide information regarding the potential dewatering of Phaser Lake including detailed consideration of potential effects of the proposed expansion and dewatering to wildlife, water quality, and closure methods.

It is further requested that AEM provide any additional plans as needed related to the potential future dewatering Phaser Lake, including an indication of authorizations required, plans to engage the NIRB's assessment process, and a timeline for these submissions. It is requested that this information be provided within 60 days' receipt of the Board's recommendations.

### **AEM Response**

In accordance with the NIRB Project Certificate and based on the most current life of mine plans, AEM does not intend to mine Phaser Pit and do not have plans to dewater Phaser Lake. At present, these are conceptual plans, however if these plans change, AEM will inform the NIRB, develop management plans accordingly, and will engage NIRB in the assessment process.