Appendix A. Meadowbank Water License Review

Hutchinson
Environmental Sciences Ltd.

Meadowbank
Water License Review

Prepared for: GeoVector and the Kivalliq Inuit Association
Job #: J140091

December 11, 2014

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December 11, 2014 HESL Job #: J140091

Alan Sexton, P.Geo.
GeoVector Management Inc.
10 Green Street Suite 312
Nepean ON K2J 3Z6

Dear Mr. Sexton:

Re: Response to NWB 2AM MEA0815: Response to NWB completeness reviews of the Type A water license renewal application

I'm pleased to submit you our review of the Meadowbank application for renewal of their Water License. Our review is comprised of 27 separate information requests (IRs) with one presented in two parts. These IRs are directed at Agnico Eagle Mines (AEM) and are presented in the tables that have become standard when reviewing documents for GeoVector on behalf of the Kivalliq Inuit Association. These tables include AEM's response to our initial IR and our subsequent response to be carried forward to the Nunavut Water Board and associated technical hearings.

Our IRs and technical comments are guided by the Nunavut Water Board's (NWB) water quality framework seeking to protect, manage and regulate freshwaters in Nunavut in a manner that will provide the optimum benefits for the residents of the territory in particular and Canadians in general. This guidance is tied to our understanding of the Nunavut Land Claims Agreement and of the KIA's right to minimized changes to the environment.

Eleven of our original IRs have been resolved through AEM's initial set of responses leaving sixteen issues remaining. Hutchinson Environmental Sciences Ltd. would be happy to meet with AEM prior to the Technical Meetings and Pre-hearing Conference scheduled for January 14-15, 2015 in the Community of Baker Lake, NU to discuss and hopefully resolve any these outstanding issues.

We look forward to our continued participation in the Water License Review process with GeoVector to ensure the Meadowbank project minimizes their impact on the aquatic environment.

Sincerely,
Hutchinson Environmental Sciences Ltd.

Richard Nesbitt, M.Sc.
Richard.Nesbitt@environmentalsciences.ca

Signatures

Report Prepared by:

Richard A. Nesbitt, M.Sc.
Aquatic Scientist

Neil J. Hutchinson, Ph.D.
Principal Scientist

Executive Summary

GeoVector requested a review of Agnico Eagle Mine's (AEM) Meadowbank Mine Type A Water License – 2AM-MEA0815 (issued June 9, 2008 by the Nunavut Water Board) Renewal application by Hutchinson Environmental Sciences Ltd. (HESL). The original license (NWB 2AM MEA0815) was issued on June 9th, 2008 and expires May 31st 2015. AEM has proposed a 10 year license renewal; the expiration date proposed for the renewal is June 1, 2025 and is expected to take the mine into the closure and reclamation phase.

Our initial review was submitted to GeoVector on September 29, 2014 and subsequently forwarded to AEM. In this report, we provide our response to AEM's submission "NWB 2AM MEA0815: Response to NWB completeness reviews of the Type A water license renewal application". Our responses address only those IRs submitted by HESL and not those provided by GeoVector. We have included AEM's response to each KIA IR as provided in the document.

Our review is comprised of 27 separate information requests (IRs) with one presented in two parts. These IRs are directed at AEM and are presented in the tables that have become standard when reviewing documents for GeoVector on behalf of the Kivalliq Inuit Association. These tables include AEM's response to our initial IR and our subsequent response to be carried forward to the Nunavut Water Board and associated technical hearings.

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Appendices

1. Background

GeoVector requested a review of Agnico Eagle Mine's (AEM) Meadowbank Mine Type A Water License – 2AM-MEA0815 (issued June 9, 2008 by the Nunavut Water Board) Renewal application by Hutchinson Environmental Sciences Ltd. (HESL). The original license (NWB 2AM MEA0815) was issued on June 9th, 2008 and expires May 31st 2015. AEM has proposed a 10 year license renewal; the expiration date proposed for the renewal is June 1, 2025 and is expected to take the mine into the closure and reclamation phase.

We have broken down our review of the Water License Renewal application (NWB File No: 2AM-MEA0815 / Renewal) with individual staff responsibilities for specific sections based on their skillset.

Our approach to the review is systematic and is broken down into broad tasks:

1. Review the water license. Here we review the conditions in the existing water license and AEM's proposed changes. This allows us to highlight areas of potential concern, provides a reference for our assessment of mine activities covered under the existing license and provides us with the conditions which AEM were required to meet over the last seven years.
2. Review existing monitoring programs. This task includes focused review of AEM's monitoring data conducted under the previous water license. Specifically this includes a review of the CREMP and AEMP design and reports. We will identify where AEM has not met the requirements of the existing water license, where insufficient mitigation may pose a risk to the environment and any current risks to the receiving environment (ie: spills, leaks and seeps)
3. Review approved plans. This phase of our review seeks to assess the plans approved by the NWB to ensure they will prevent adverse changes to the environment. Particular attention will be paid to plans addressing issues highlighted through our review of the CREMP and AEMP results.
4. Throughout our review we will recommend changes to the plans, monitoring programs and Water License to address issues we have highlighted and ensure adequate protection of the aquatic environment.

Our initial review was submitted to GeoVector on September 29, 2014 and subsequently forwarded to AEM. In this report, we provide our response to AEM's submission "NWB 2AM MEA0815: Response to NWB completeness reviews of the Type A water license renewal application". Our responses address only those IRs submitted by HESL and not those provided by GeoVector. We have included AEM's response to each KIA IR as provided in the document.

2. Information Requests

2.1 KIA-IR-01

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-01
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Change in obtainable freshwater limit**
References:	Water License
Issue / Concern or Information Deficiency and Rationale:	The greatest change to the water license is a proposed increase in the permissible quantity of freshwater the mine obtains per year. AEM was permitted to obtain 700,000 m3 freshwater per year under the existing license. Freshwater use exceeded the limit in 2010 through 2013 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"*. AEM apparently opted to process ore at a higher than anticipated rate rather than to adhere to the existing license and this raises concerns over a) licence compliance by AEM and b) inspection and oversight of the licence by responsible authorities. AEM proposes a new maximum freshwater quantity of 9,119,652 m3 per year which will include the water required for reflooding the open pits and increased usage at the mill . Proposed yearly freshwater usage is presented in Table 6-1 from the Main Supporting Document and is an order of magnitude greater than that currently permitted. This summary of freshwater requirements indicates that the 9,119,652 m3 freshwater per year will only be required from 2018 through to 2023 and decrease slightly in 2024. No freshwater will be obtained in 2025 when completion of closure is anticipated.

Table 6-1 - Freshwater requirements from Third Portage Lake, Unnamed Lake and Wally Lake. Updated and Adapted From SNC 2013 Water Management Plan (Table 4-2)

Year	Mill/Camp Freshwater Use from TPL (m^3/yr)	Emulsion Plan Freshwater Use from Unnamed Lake (m^3/yr)	Portage and Goose Pit Flooding from TPL (m^3/yr)	Vault Lake Pit Flooding from Wally Lake (m^3/yr)
2013	1,585,009	2,400	0	0
2014	1,147,600	2,400	0	0
2015	1,147,600	2,400	450,000	0
2016	1,147,600	2,400	1,200,000	0
2017	1,147,600	2,400	1,200,000	0
2018	55,000*	0	4,880,000	4,184,652
2019	55,000	0	4,880,000	4,184,652
2020	55,000	0	4,880,000	4,184,652
2021	55,000	0	4,880,000	4,184,652
2022	55,000	0	4,880,000	4,184,652
2023	55,000	0	4,880,000	4,184,652
2024	55,000	0	4,880,000	4,053,862
2025	55,000	0	0	0

*Fresh water consumption for domestic camp use.

	AEM has demonstrated a lack of adherence to the maximum obtainable quantity of freshwater permissible under their current water license. We understand that additional water usage was permitted under an amended water license for 2013 and 2014. Permitting the proposed volume of 9,119,652 m3 freshwater per year prior to being required may mask excessive use of water in the interim. This comment is also made in light of the IVR discovery sites continued expansion mentioned in the Main Supporting document and publicized on AEM's website.
Technical Comment/ Information Request:	The NWB should permit maximum yearly obtainable quantities of freshwater based on the yearly requirements anticipated by AEM. These should cover known water requirements and are not to encompass anticipated water use as part of the IVR site should AEM move forward with the environmental assessment process there.
AEM Response	This will be discussed during the technical meetings.
KIA Response	The KIA looks forward to the Proponent's discussion. We wish to offer the following clarification of the original. Our initial concern stems from AEMs historic failure to adhere to their water license freshwater withdrawal limits. AEM has already provided estimates of their yearly requirements in Table 6-1 (included in the initial comment). The KIA wish to encourage water conservation to minimize changes to water quality, quantity and flow and therefore request that the NWB authorize a staged water license reflective of the mines required freshwater. Stage 1 should reflect operations of the mine, permitting up to 2,350,000 m^3/year. This reflects the maximum required freshwater required for the period up to 2017 at Meadowbank. Stage 2 should reflect closure and reclamation activities indicated for 2018 onward. This stage should permit up to 9,119,652 m^3/year as per AEM's requested amendment of the current water license. We further request that AEM's annual report to the NWB outline the annual freshwater usage and anticipate usage for the following year. Should AEM anticipate a greater volume of freshwater will be required in the coming year than is currently permitted under the water license, we request AEM apply in advance for an amendment to the water license. The KIA encourages AEM to be proactive rather than reactive in their water management with respect to meeting water license conditions freshwater withdrawal.

2.2 KIA-IR-01-B

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-01-B
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Neil Hutchinson, Hutchinson Environmental Sciences Ltd.
Subject:	**Change in obtainable freshwater limit**
References:	Water License Renewal Application, p. 22
Issue / Concern or Information Deficiency and Rationale Technical Comment/ Information Request:	AWM has proposed an increase in annual water takings from Third Portage Lake and state that 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. Monitoring of water levels will continue as per the water license amendment application. Withdrawal of 2.5% of the lake volume annually will represent a consumptive use of water until the pits are refilled and the rate of withdrawal needs to be considered against the annual inflow to the lake to determine its significance. Please provide a comparison of the projected increase in water volume taking against the annual volume of inflow to Third Portage Lake.
AEM Response	To ensure water levels in Third Portage Lake will not be affected during pit flooding, in Section 4.6 of Golder (2009) Doc 833 0717_09 RTP-Updated Water Management Plan specifies that the maximum allowable drawdown of Third Portage Lakes has been assumed to correspond to the water level necessary to maintain a minimum flow equal to the average annual (1:2-year return period) 60-day low flow at the outlet of the lakes over the four summer months (June through September). The low flow rates were computed based on regression curves developed by AMEC (2003) and presented in the original licensing hearings.
KIA Response	The KIA appreciates the Proponent's response. The KIA will address this issue further in our response to KIA-IR-23.

2.3 KIA-IR-02

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-02
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Neil Hutchinson , Hutchinson Environmental Sciences Ltd.
Subject:	**Discharge Limits and Determination of Environmental Effects**
References:	Water Licence Renewal Application pp. 23-28
Issue / Concern or Information Deficiency and Rationale:	AEM state that into the receiving environment. Therefore, in the occasional case where licensed limits for these onsite stations were exceeded, water quality data from the closest offsite stations was reviewed (based on CREMP, 2013) to determine whether any corresponding offsite impacts or receiving environment trends could be identified. And *"Overall, the analysis demonstrates that despite a few periodic exceedances, internal monitoring stations and limits are adequately protecting the receiving water environment."*
Technical Comment/ Information Request:	While we do not challenge the conclusion we are concerned that the assessment of impacts to receiving waters begins by comparison of monitoring results to Water Licence Limits. This presupposes that the Water Licence limits represent adequate protection of the receiving waters. We would recommend that the assessment should begin by checking the CREMP results to a) determine if any changes were documented in the receiving waters and b) if the changes were within the ranges predicted in the EIS. This would allow checking of water quality for parameters for which no licence limits were set and allow a better assessment of the adequacy of the existing licence limits. This approach provides a more robust approach to adaptive management as it is based on testing the hypothesis that "Water Licence limits are adequate to protect the environment" vs testing the implications of not meeting licence limits.
AEM Response	The evaluation of the receiving environment presented annually in the CREMP does exactly what KIA has recommended. The CREMP evaluates monthly water quality data against triggers and thresholds to ensure CCME limits are respected or changes are not significantly different from reference or baseline data conditions; this is done irrespective of the license limits. It serves as a "checks and balance" to ensure the limits are protective of the environment. If exceedances of the thresholds or triggers occur in the receiving environment, AEM evaluates the potential sources and takes corrective or mitigative action. The approach that the KIA is proposing is what AEM completes on a monthly basis and is reported annually within the CREMP. AEM believes the methods used to evaluate the appropriateness of the limits in support of the Type A water license was adequate and that the evaluation of changes in the receiving environment are well documented in the actual CREMP.
KIA Response	We thank you for this response and see it as a clarification of our concern as follows: 1. The AEM uses the CREMP to monitor the receiving environment and that forms their conclusion as to whether or not the Water Licence limits are protective, 2. In addition, *"in the occasional case where licensed limits for these onsite stations were exceeded, water quality data from the closest offsite station was reviewed (based on CREMP 2013) to determine whether any offsite impacts or receiving water trends could be identified."* This step would assess the implications of exceeding the onsite limits. The KIA request a map with the resolution provided in Appendix B2 Figure 1-A showing labeled locations of internal monitoring stations and CREMP environmental monitoring stations together. Our comparison of trends reported at internal monitoring stations indicated in Section 7 of the Main Supporting Document with results provided in Appendix D, Table 3.3-1 indicate that AEM's current assessment approach has not put the environment at unnecessary risk. However,

	the requested map would help clarify which CREMP stations are proximal to each internal monitoring station for future comparisons. The KIA considers this issue resolved if the requested map is provided and included in future annual monitoring reports.

2.4 KIA-IR-03

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-03
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Altered License Condition**
References:	Water License Part D Item 11:
Issue / Concern or Information Deficiency and Rationale:	AEM has proposed a changed wording from “in Third Portage Lake, Second Portage Lake and Wally Lake” to “nearby Lake”. This may alleviate the need to sample each lake, particularly because lake has not been pluralized.
Technical Comment/ Information Request:	We request that AEM continue to name specific lakes they shall monitor to increase accountability in the AEMP.
AEM Response	AEM agrees with the KIA recommendation and will continue to name the lakes by their specific names.
KIA Response	The KIA considers this issue resolved.

2.5 KIA-IR-04

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-04
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Altered License Condition**
References:	Water License Part E Item 8
Issue / Concern or Information Deficiency and Rationale:	AEM has proposed to remove the following condition: *"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."* We find it concerning that AEM will not be required to validate model predictions under the water license and that removal of the annual comparison will not provide the timely feedback that is necessary for effective adaptive management.
Technical Comment/ Information Request:	The KIA recommend that the current schedule of annual comparisons of predicted water quality and quantity within the pits to measured water quality and quantity be continued.
AEM Response	As discussed during a WebEx on November 28th , 2013 with KIA, NWB, EC and AANDC, and agreed upon by all parties at the time, AEM will continue to monitor the pit water quality and model on an annual basis to ensure that pit water quality will meet CCME limits and ultimately protect aquatic biota, prior to breaching the dikes. See attached Appendix D for meeting minutes and presentations made.
KIA Response	The KIA presumes AEM has referred to the subsection of Appendix D entitled "Discussion of Water Quality Modeling". We appreciate that AEM will continue to monitor pit water quality and that this was agreed to by the KIA and other stakeholders during the November 28, 2013 meeting, as shown in the section of the minutes entitled: Discussion of Water Quality Modeling. We note, however, the following, as taken from the Nov. 28. 2013 minutes in the section entitled: Water Balance and Water Quality Modelling Reports – Discussion and AEM responses to AANDC Issues. AANDC-requested that during the water license renewal the annual reporting conditions is clarified. **AEM agreed to discuss these issues during the water license renewal. AEM requested clarification on what predictions AANDC want AEM to compare to. AANDC asked to compare with the original model and give explanation in the difference between the two models.** **KIA needs a comparison and summary table that states why there are differences. This will assist KIA in making a comparison.** **AEM will include this information in our 2013 Annual Report – a comparison of results vs. predicted and offer explanations for significant changes.** The minutes show a) a discussion of the water quality /water balance reporting and comparison and agreement that this would be discussed during the renewal and b) a water quality model for pit water at closure which is what AEM refer to in their

	response above. We are therefore concerned that 1. The AEM response appears to refer to the pit refilling and meeting CCME guidelines for aquatic life after closure, and not to the need to manage the site water balance and contaminants during operations. 2. AEM no longer propose to compare monitored pit quality and quantity to the model, and to update the model as warranted, especially given the underestimate of water needs that was seen in the first licence and this amendment. Detailed, and regular quantitative review of predictions vs. observations will inform adaptive management and provide early notice of irregularities in the water and contaminant balances. The mine is operating as presented in the project description (with warranted alterations) which included predictions of water quality throughout mine life. Annual comparison between measured and predicted pit water quality indicates how closely the project is operating as planned. Significant divergence between predicted and measured water quality may indicate a need for adaptive management to ensure the Project does not exceed the accepted environmental impacts of operation. This assessment is made by continuing to compare predicted water quality with measured. The KIA therefore recommend that the current schedule of annual comparisons of predicted water quality and quantity within the pits to measured water quality and quantity be continued.

2.6 KIA-IR-05

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-05
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Altered License Condition**
References:	Water License Part F Item 2, Part F Item 3
Issue / Concern or Information Deficiency and Rationale:	Total cyanide does not have an associated CCME guideline. While it is helpful to measure the total within the water column, weak acid dissociable cyanide represents the toxic fraction and should be assessed as part of routine monitoring
Technical Comment/ Information Request:	We request Portage Attenuation Pond effluent discharges monitored at Station ST-9 include weak acid dissociable cyanide as well as total cyanide in the suite of monitored parameters as it represents the toxic fraction of total cyanide and is associated with a CCME water quality guideline. We also request that effluent discharged from the Vault Attenuation Pond monitored Station ST-10 include the same provision for monitoring weak acid dissociable cyanide. The following row should be added to Part F Item 2 and Part F Item 3: **Parameter** / **Maximum Average Concentration** / **Maximum Allowable Grab Sample Concentration** Free Cyanide / 0.0025 mg/L / 0.005 mg/L
AEM Response	AEM's strategy for cyanide includes complementary monitoring of both the receiving environment and effluent. As proposed in the renewal, AEM will continue to monitor cyanide in the receiving environment as part of the CREMP. Our approach is consistent with KIA's recommendation to ensure that receiving environment sampling includes the bioavailable/toxic forms of cyanide. To that end, the CREMP includes free cyanide (in addition to total cyanide), which is consistent with CCME's water quality guideline for the protection of aquatic life (i.e., based on free cyanide). The effluent monitoring program (for discharges at ST-9 and ST-10) is based on MMER requirements, which includes characterization of total cyanide and toxicity testing and stipulates standard decision criteria for management actions. AEM's position is that MMER requirements are protective of the environment, that the receiving environment is thoroughly monitored under the CREMP and that KIA's recommended addition stated above is not necessary.
KIA Response	AEM has committed to monitoring free cyanide in their response to KIA-IR-21. The KIA asserts MMER requirements are protective of the environment when implemented alongside the EEM program (which determines if the MMER are protective on a site specific basis) and other criteria, i.e.: the CCME water quality guidelines for the protection of aquatic life. Commitment to implement parallel but individually significant free cyanide CCME water quality guideline along with MMER criteria for total cyanide provides a higher standard of environmental protection the KIA, as stewards of the land, request. The KIA reasserts the initial IR and requests AEM include free cyanide in Water License conditions Part F Item 2 and Part F Item 3.

2.7 KIA-IR-06

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-06
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Altered License Condition**
References:	Water License Part F Item 3, Part F Item 23
Issue / Concern or Information Deficiency and Rationale:	AEM has removed Part F Item 3 stating it will be included under Part F Item 23. The parameter list for Part F Item 23 does not include all removed parameters and only applies to the *"Baker Lake Bulk Fuel Storage Facility and the Meadowbank Fuel Storage Facility (ST-37 through ST40)"*. AEM has also proposed removing total lead and ammonia from the parameter list. Increases in either of these parameters may impair aquatic life and should be included in the discharge criteria for fuel containment facilities discharging to Land. We recognize that, while MMER and CCME do not apply to discharges to land, the criteria provide a framework for assessing these discharges in the event that runoff reaches the aquatic environment.
Technical Comment/ Information Request:	AEM should harmonize the required criteria between Part F Item 3 and Part F item 23. The breadth of the updated Part F Item 23 should reflect Part F Item 6. The introductory text should read "Effluent from fuel containment facilities that require Discharge to land, shall not exceed the following Effluent quality limits:". Lead and ammonia should continue to be part of parameter list for Baker Lake Bulk Fuel Storage Facility and the Meadowbank Fuel Storage Facility (ST-37 through ST40).
AEM Response	AEM has removed Part F Item 6 (effluent from fuel containment facilities that require discharge to land) and not Part F Item 3 which is the list of parameters for discharge from the Vault Attenuation Pond. All the parameters deleted from Part F, Item 6 were included in Part F, Item 23. The discharge limits are the same for benzene, toluene and ethylbenzene and more stringent for oil and grease. The only change from Part F Item 6 to Part F Item 23 is the limit of Lead for which we ask a limit of 0.1mg/L instead of 0.001 mg/L. The rationale behind this request is that during the original license, water was planned to be centrally collected by a series of ditches and sumps and ultimately discharged directly into Baker Lake. However, this is not occurring, rather all of the secondary containment berms are discharged to land, which is an improvement in the practices originally proposed, thus avoiding direct discharge into Baker Lake. As proposed in the Type A renewal, AEM will continue to monitor discharge from fuel containment for ammonia. AEM agrees with the KIA and will include the proposed introductory text as it relates to secondary containment discharge to land in Baker Lake Bulk Fuel Storage Facility and the Meadowbank Fuel Storage Facility (ST-37 through ST40).
KIA Response	We thank you for this clarification. The KIA consider this issue resolved.

2.8 KIA-IR-07

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-07
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Altered License Condition**
References:	Water License Part I Item 7
Issue / Concern or Information Deficiency and Rationale:	AEM has proposed rewording the condition to read: *"The Licensee shall confirm the locations and GPS coordinates for all monitoring stations referred to in Schedule I ~~with an Inspector~~."* External accountability is a critical part of environmental protection and begins with site selection.
Technical Comment:	AEM should continue to confirm monitoring station locations with an Inspector if changes to the monitoring program are required to reflect current mine activity. Confirmation with an Inspector should also be required if any new stations are added during the proposed water license tenure.
AEM Response	AEM is in agreement with KIA recommendations. All stations are currently approved by the inspector and it is for this reason that AEM removed this statement. In the case that future station are added, AEM will confirm the stations location with the Inspector.
KIA Response	The KIA considers this issue resolved.

2.9 KIA-IR-08

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-08
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Altered License Condition**
References:	Water License Part I Item 18
Issue / Concern or Information Deficiency and Rationale:	AEM has proposed removing this condition. Any new construction required over the next ten years will alter the existing environment. A photographic record will assist AEM in reclamation activities.
Technical Comment/ Information Request:	The Water License should continue to require a digital photographic record of all watercourse crossings before, during and after the construction has been completed under the water license. The condition should not be removed from the license as it is reasonable to expect that additional construction activities may occur.
AEM Response	AEM agrees with the KIA recommendation.
KIA Response	The KIA considers this issue resolved.

2.10 KIA-IR-09

<table>
<tr><td>Information Request Source:</td><td>Kivalliq Inuit Association</td></tr>
<tr><td>Information Number:</td><td>KIA-IR-09</td></tr>
<tr><td>Project:</td><td>Meadowbank Project Water License Renewal</td></tr>
<tr><td>Information Request From:</td><td>Kivalliq Inuit Association</td></tr>
<tr><td>Information Request For:</td><td>Agnico Eagle</td></tr>
<tr><td>Reviewer:</td><td>Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.</td></tr>
<tr><td>Subject:</td><td>Trend of Increasing Parameter Concentrations in Near Field sites</td></tr>
<tr><td>References:</td><td>Main Supporting Document, Review Freshwater Aquatic Environment between 2010 and 2013</td></tr>
<tr><td>Issue / Concern or Information Deficiency and Rationale:</td><td>Several parameters of concern were identified as part of the water quality results review between 2010 and 2013. Sites in which water quality that may be of concern to the environment were identified were those which 1) had measured water quality parameters exceeding applicable criteria (MMER, CCME, BC MOE) or 2) trends in key parameters that are considered to be representative of mine activity (SO4, TDS, TSS, conductivity, NH3, Fe and cyanide) which were tracked to identify any apparent patterns. Station locations with exceedances and parameters with increasing trends were:

Associated with the diversion ditches with water discharging to Third Portage Lake,
The attenuation pond discharging to Third Portage Lake, and
Near the Tailing Storage Facility (TSF) eventually discharging to Second Portage Lake Stations which discharged to land.

Although surface water guidelines criteria may not be directly applicable as these discharges do not directly reach surface water. the close proximity of surface water receivers to land and for inundation during the freshet suggest that any exceedances warrant concern. The aquatic ecosystem monitoring program also identified waterbodies and watercourses with changes resulting from mine activity. TSS exceeded criteria where indicated; other parameters indicate an increasing trend:

Third Portage Lake (East) – TSS, conductivity, calcium, TDS, sulphate, phytoplankton, benthic invertebrates
Third Portage Lake (North) – conductivity, sulphate
Third Portage Lake (South) – Sulphate, phytoplankton, benthic invertebrates, zinc in sediment
Second Portage Lake – TSS, alkalinity, TDS, phytoplankton, benthic invertebrates and
Tehek Lake (near field site) – TSS, sulphate, benthic invertebrates.

AEM indicated that several parameters were elevated during the dike construction. Elevated parameters during construction of the East Dike were nitrate, total phosphorus, total aluminum*, total chromium*, total copper*, total iron*, total manganese, total nickel, total titanium, and total uranium. Elevated parameters during construction of the Bay-Goose Dike were TSS, total aluminum*, total chromium*, total copper*, total iron*, total manganese, total nickel, total titanium, and total uranium. Parameters with a * exceeded CCME guidelines.</td></tr>
<tr><td>Technical Comment/ Information Request:</td><td>We request that AEM provide a discussion of mitigation measures which will be taken to address the trend of increasing key parameters in the Near Field sites. This discussion should provide modeled water quality in the Near Field receiving environment where appropriate and make comparisons of the observations with</td></tr>
</table>

	predictions made in the EIS.
AEM Response	The Type A water license (2AM-MEA0815) for the project issued by the Nunavut Water Board (NWB) in 2008 required a revised AEMP, and specified some of the requirements for that revision. Beginning in 2009, AEM began collecting data in support of this revision to strengthen the ability of the CREMP to detect changes in the receiving environment. AEM hosted workshops with the NWB (including representatives from KIA, Environment Canada and Fisheries and Oceans Canada) in March (Yellowknife) and June (Edmonton) 2010 to review the redesign of the AEMP (now an overarching 'umbrella' that serves to integrate the results across AEM's individual, but related, monitoring programs in accordance with the Type A water license requirements) and the CREMP (the core receiving environment monitoring program). The workshops were followed up with the submission of draft design documents for both the AEMP (which showed the linkages between monitoring program results and management actions) and CREMP (which included details for receiving environment monitoring such as statistical design, station identification, proposed references, decision criteria [triggers and thresholds], sampling protocols, and DQOs) and final design documents submitted to the NWB in December 2012. These complementary documents provide details ranging from how/when samples are collected to how monitoring results are interpreted (e.g., employing early warning "triggers" that lead to action [see next paragraph] before the corresponding "thresholds" are reached) and linked to follow-up management actions (see Management Response Plan [Section 4] of the AEMP design document [AEMP 2012]). The Management Response Plan consists of two main components: assessment and mitigation. The assessment process focuses on characterizing the situation (to determine magnitude, spatial scale and reversibility), assessing risks (to determine to ecological significance of any changes), and causality assessment (to ensure that the underlying mechanisms responsible for the change are understood and that it is related to the mine). The results of the assessment process inform whether the response needs to proceed to mitigation and provides clear direction on what needs to be done. Without rigorous assessment of apparent changes in the receiving environment the need for or effectiveness of any mitigation measures would be questionable. This process leads to informed decision making. The CREMP includes a comprehensive spatial-temporal assessment monitoring results and has identified some mine-related changes with temporal trends at near-field stations in the receiving environment (CREMP 2013). Management actions to date have focused on further assessment (with rationale provided in CREMP 2013); data to date suggest that the observed changes are generally consistent with those predicted in the EIS.
KIA Response	The KIA appreciates the CREMP overview AEM provided and understand assessment and mitigation are dual components of the program. We express continued concern with AEM's opinion that mine changes in line with EIS predictions do not warrant mitigation. The KIA feels mitigation of these trends discovered in the near field sites through assessment prior to impediment of the aquatic environment is the precautionary approach. The KIA have conducted independent comparison of FEIS predictions and monitoring results presented in the CREMP to verify AEM's claim that *"data to date suggest that the observed changes are generally consistent with those predicted in the EIS"*. Our review has identified several inconsistencies between water quality predictions for Second Portage and Third Portage lakes. We have summarized these results below and appended our full analysis in Appendix A.

Parameter	Third Portage Lake*						Second Portage	
	East Basin		North Basin		South Basin			
	Mean	Max	Mean	Max	Mean	Max	Mean	Max
Hardness	X	X	X	X	X	X	X	X
Total Alkalinity	X	X	X	X	X	X	X	X
Fluoride	-	-	-	-	-	-	-	-
Sulphate	X	X	X	X	X	X	X	X
Nitrate Nitrogen	✓	✓	✓	X	✓	X	✓	X
Total Phosphate-P	✓	✓	✓	✓	✓	X	✓	X
Total Phosphorus	-	-	-	-	-	-	-	-
Total Cyanide	-	-	-	-	-	-	-	-
Aluminum	X	X	✓	✓	✓	X	X	X
Calcium	X	X	X	X	X	X	X	X
Cobalt	-	-	-	-	-	-		
Iron	✓	X	✓	✓	✓	✓	✓	X
Magnesium	X	X	X	X	X	X	X	X
Nickel	✓	✓	✓	✓	✓	✓	X	X
Silver	-	-	-	-	-	-	-	-
Silicon	✓	X	✓	✓	✓	✓	X	X
Sodium	✓	✓	✓	✓	✓	✓	✓	X
Strontium	X	X	X	X	X	X	✓	✓

* Measured values compared with whole lake maximum predicted concentrations
X Exceeds FEIS Appendix E Maximum Prediction Water Quality Concentration
✓ At or below FEIS Appendix E Maximum Prediction Water Quality Concentration
\- Values not measured or presented in 2013 CREMP results but were modeled in FEIS

AEM had noted a trend of increasing TDS in Third Portage and Second Portage lakes. TDS was not modeled in the FEIS but total alkalinity and sulphate exceeded FEIS predicted water concentrations in both water bodies. We also express concern with concentrations of total aluminum, calcium, iron, magnesium, nickel, silicon and strontium measured as part of CREMP monitoring. Concentrations at various stations in Third Portage and Second Portage lakes exceed modeled maximum water quality concentrations presented in the FEIS. This indicates either 1) Meadowbank is not operating as designed or 2) the water license discharge criteria are not sufficiently stringent to maintain water quality in the receiving environment within predicted levels .

The KIA recognizes these concentrations have not exceeded CCME water quality guidelines but are still a source of significant concern. Our findings indicate that the EIA predictions are invalid and may be grounds for additional compensation under the NLCA. We recommend implementation of mitigation measures through adaptive management in light of these divergences from the FEIS prediction. AEM should provide a discussion of what mitigation measures will be implemented and how it will address these identified water quality issues. This discussion should be reflect the KIA's right to minimized changes to the environment and the NWB's mandate seeking to protect, manage and regulate freshwaters in Nunavut in a manner that will provide the optimum benefits for the residents of the territory in particular and Canadians in general.

We also express concern that total phosphorus (in addition to a metal scan using low level detection limits), fluoride, cyanide (total and free), cobalt and silver were not included in the 2013 CREMP suite after being modeled in the FEIS. Total phosphorus and cyanide (total and free) will be added to Schedule 1, Group 2 under AEM's proposed changes to the water license. The KIA requests the addition of cobalt, silver and fluoride to this list, allowing comparison with the FEIS predictions.

We further specify the following detection limits to allow comparison with the applicable CCME long-term guidelines:

Parameter	DL (mg/L)	CCME Guideline (mg/L)
Fluoride	0.02	0.120
Total Phosphorus	0.002	Trophic Status
Total Silver	0.00002	0.0001
Total Mercury	0.000002	0.000026

2.11 KIA-IR-10

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-10
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Wally Lake Reference Site**
References:	Main Supporting Document, CREMP Stations and Control/Impact Designations
Issue / Concern or Information Deficiency and Rationale:	AEM states *"A reference station for Wally Lake has not been established. While the characteristics of Wally Lake are somewhat unique (it is much shallower than other lakes), further evaluation of the advantages and disadvantages of establishing a separate reference station (versus using existing reference stations) is needed in advance of the commencement of construction activities at Wally Lake."* The Vault Site is entering operation which may influence water quality in Wally Lake, the near field site. Despite lack of baseline information, establishment of an appropriate reference lake will discern changes in water quality resulting from year to year variation from mine related impacts.
Technical Comment/ Information Request:	We recommend AEM establish a reference site for Wally Lake. The evaluation of the advantages and disadvantages of establishing a separate reference station should be conducted and presented for review prior to water license renewal.
AEM Response	The Type A water license (2AM-MEA0815) for the project issued by the Nunavut Water Board (NWB) in 2008 required a revised AEMP, and specified some of the requirements for that revision. Beginning in 2009, AEM began collecting data in support of this revision to strengthen the ability of the CREMP to detect changes in the receiving environment. AEM hosted workshops with the NWB (including representatives from KIA, Environment Canada and Fisheries and Oceans Canada) in March (Yellowknife) and June (Edmonton) 2010 to review the redesign of the AEMP (now an overarching 'umbrella' that serves to integrate the results across AEM's individual, but related, monitoring programs in accordance with the Type A water license requirements) and the CREMP (the core receiving environment monitoring program). The workshops were followed up with the submission of draft design documents for both the AEMP (which showed the linkages between monitoring program results and management actions) and CREMP (which included details for receiving environment monitoring such as statistical design, station identification, proposed references, decision criteria [triggers and thresholds], sampling protocols, and DQOs) and final design documents submitted to the NWB in December 2012. The CREMP design document (2012) does state that "further evaluation of the advantages and disadvantages of establishing a separate reference station (versus using existing reference stations) is needed…" While not formally documented, AEM chose to rely on the existing reference stations for Wally Lake. The primary reason for this decision is that there are varying degrees of differences among the lakes surrounding the mine and that the before-after-control-impact (BACI) approach does not rely on the assumption that control (reference) and impact (near field) stations are the same, only that they respond in a similar way to broader natural changes (e.g., climate-induced changes affecting the region). The BACI takes baseline differences into account when testing for temporal changes related to mining. Given that monitoring continued at Wally Lake in the absence of local mining activity, there are many more years of "before" data available for this lake,

	making the design more robust for this lake. Furthermore, Wally Lake is the only sampling area where the second reference area (Pipedream Lake, which was added in 2009) can formally be used within the BACI framework. The addition of a new reference area for Wally Lake would preclude the use of BACI and force a reliance on control-impact (CI) type designs whose foundation is the assumption that the control and impact sites are inherently the same. Our experience with the Meadowbank lakes since the mid-1990s is not consistent with this assumption. Thus, the establishment of a unique reference area for Wally Lake is unwarranted.
KIA Response	The KIA considers this issue resolved.

2.12 KIA-IR-11

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-11
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Data Quality Objectives**
References:	CREMP QA/QC Appendix B5, QA/QC plan
Issue / Concern or Information Deficiency and Rationale:	Data quality objectives used for the QA/QC program were less stringent than recommended by the USEPA. The water sample Data Quality Objectives (DQOs) for this project were: Laboratory Duplicate = 25% RPD for concentrations that exceed 10x the method detection limit (MDL). Field Duplicate = 50% RPD for concentrations that exceed 10 x MDL. The USEPA DQO is a 20% RPD for all concentrations that exceed 5x the MDL and is a more widely accepted standard[1]. AEM reported that *"Although there were some exceedences of the established DQOs, these exceedances represent much less than 1% of the total for QA samples and parameters measured."* While this is an acceptably low rate of DQO failure, we are concerned the failure percentage may increase to an unacceptable level if more stringent DQOs are applied. Similarly the DQO failure rates for other sample types were: 0 of the sediment samples ~1% in phytoplankton samples 2.2% in benthic invertebrate samples. Discussion of DQOs are also not provided in Appendix B5, the QA/QC plan.
Technical Comment/ Information Request:	Future CREMP years should use more stringent DQOs to evaluate blanks and duplicates. We suggest use of the USEPA DQO criteria. A discussion should be provided if AEM proposes continued use of less stringent DQOs. Discussion of DQOs should also be added to Appendix B5. This discussion should also include what actions will be taken if data fails to achieve the DQO. Together this will ensure only high quality data is used to characterize the aquatic environment and provide the basis for management decisions.
AEM Response	The CREMP is a comprehensive monitoring program that results in the generation of substantial data in any given year. CREMP DQOs for duplicate samples and field duplicates were set in consideration of the realities of analytical laboratory performance and receiving environment heterogeneity (field duplicates). We have worked closely with the main laboratory (ALS) to understand their capabilities regarding replication of laboratory results and feel that the DQOs are appropriate for this program. AEM feels that understanding the inherent limitations in analytical methods is important in setting realistic DQOs and that blind application of more stringent criteria would not serve the program. To that end, we have also worked with ALS to ensure that detection limits are appropriate for each parameter. The success of this approach is exemplified by the CREMPs proven ability to identify mine-related changes over time, which is founded on the integrated interpretations CREMP data accumulated over the years. That said, AEM continues to work on improving overall data quality.
KIA Response	The KIA appreciates AEM's partnership with ALS to achieve appropriate detection limits for each parameter. We are still concerned with the *"CREMPs proven ability to identify mine-related changes over time"* despite the overall robustness of the program. Statistical conclusions pertaining to mine-related trends may be obscured by greater variability in the dataset permitted by less stringent DQOs. The KIA

[1] *United States Environmental Protection Agency. 1994. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.*

	therefore feels use of more stringent DQOs is appropriate to ensure smaller effect size yet significant water quality impediments are identified. DQOs are in place to ensure data accurately represents the environment rather than to *"serve the program"*. The KIA has conducted an independent Quality Assurance / Quality Control (QA/QC) review of AEM's 2013 CREMP field duplicates using the USEPA criteria. Samples exceeding the USEPA DQO were those >20% RPD when >5x MDL. Full results of this analysis are available as Appendix B. AEM identified 17 instances where their DQOs were not met in the water quality field data representing 2.4% of the 696 analysis conducted. The KIA identified an additional 14 instances for a total of 31 representing 4.5% of the 696 analysis conducted. We note that this does not increase the total DQO failure above 5% of the total analysis indicating the criteria employed by AEM, while not as sensitive as it could be, is sufficient for this dataset. The KIA consider this issues resolved.

2.13 KIA-IR-12

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-12
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle, Golder Associates
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Hold Times**
References:	CREMP QA/QC
Issue / Concern or Information Deficiency and Rationale:	AEM discussed several problems with sample transportation. Most issues appear to stem from mine proximity to an accredited laboratory. AEM identifies: Hold times were most often exceeded for the following parameters: Colour, Turbidity, Nitrate, Nitrite, Ortho-phosphate (dissolved as P). Lack of temperature control resulted in broken bottles enroute to analysis We are concerned the violation of hold times may compromise data quality used to make management and mitigation decisions and characterize the aquatic environment.
Technical Comment/ Information Request:	We recommend AEM commit to Part I, Item 23 of the existing water license requiring establishment of an accredited laboratory on-site. AEM has not adhered to this condition. Use of an on-site accredited laboratory will likely alleviate issues associated with sample hold times. As an alternative, please elaborate on what measures are being undertaken to improve holding time compliance.
AEM Response	AEM recognizes that sample transport has been a logistical challenge for the CREMP. Drastic changes were implemented in 2014 to improve the sample transport process for the CREMP. Reducing hold times was a key driver of this initiative. To that end, AEM started working closely with Multilab in Val D'Or and ALS in Burnaby to address the holding time and other transport issues (e.g., temperature control). Multilab has taken on the analysis of time-sensitive parameters and coordination of shipments from site to ALS. ALS continues to conduct the highly specialized trace metals and other analyses requiring extremely low detection limits. We have already seen improvements and will continue to refine this process to achieve better results. AEM does not think establishing an accredited lab onsite will improve overall data quality for the CREMP. Rather, keeping the practice of sending samples to highly specialized, third party, accredited labs ensures data quality and highly rigorous standards
KIA Response	The KIA applauds AEMs work to address issues with hold times and other transport issues. We recognize metals analysis have longer hold times and accept continued use of ALS laboratories to achieve requisite low-level analysis. Use of Multilab for time sensitive analysis is a positive step in addressing data quality issues. However, some of Multilab's cited detection limits in Appendix E are not appropriate for use in this environmental monitoring program. The KIA highlight the following parameters with insufficient detection limits:

Parameter	Multilab DL (mg/L)	Required DL (mg/L)
Ortho-Phosphate	0.01	0.002
Total Phosphorus	0.01	0.002
Dissolved Phosphorus	0.01	0.002
Total Cyanide	0.005	0.001
Free Cyanide	0.005	0.001

Required detection limits for ortho-phosphate, total phosphorus and dissolved phosphorus are required to detect changes to trophic status as indicated through the CCME Phosphorus guidance framework for the management of freshwater systems[2].

Our experience indicates these detection limits are available from ALS. If Multilab can meet these low level detection limits and the AEM can successfully deliver samples to the laboratory within the applicable hold time, the KIA will consider this issue resolved.

[2] *Canadian Council of Ministers of the Environment. 2004. Canadian water quality guidelines for the protection of aquatic life: Phosphorus: Canadian Guidance Framework for the Management of Freshwater Systems. In: Canadian environmental quality guidelines, 2004, Canadian Council of Ministers of the Environment, Winnipeg.*

2.14 KIA-IR-13

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-13
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Decision Making Criteria**
References:	CREMP Data Evaluation Criteria
Issue / Concern or Information Deficiency and Rationale:	Data was evaluated against trigger and threshold values. Trigger values for AEM consider that corrective actions are initiated: When a threshold (e.g., CCME guideline) was established, the trigger was set as the maximum of either (a) the value halfway between the baseline median and the threshold ("Method A"), or (b) the 95th percentile of the baseline data ("Method B"). When a threshold was not established, the trigger was set equal to the maximum of either the 95th percentile of the baseline data ("Method B") or two times the current detection limit ("Method C"). In most cases, the threshold was equal to a given guideline. In cases where a water quality guideline exists but Method B was used for trigger development (i.e., cases where baseline data already exceed the guideline for > 5% of cases), it is possible for the trigger to equal or exceed the guideline. In such cases, the guideline is reported as the threshold but is not used as a criterion for action; rather, the trigger is the only criterion for action as is the case for variables lacking water quality guidelines. This additional consideration was not needed for sediment data as threshold values could be developed for all parameters. AEM states that the *"formal application of the trigger for decision-making purposes was to the yearly mean for each sampling area"*. This is concerning as parameters concentrations vary more over the course of a year than a month making it difficult to statistically differentiate a yearly mean from a trigger concentration.
Technical Comment/ Information Request:	Yearly means are appropriate for sediment and benthic invertebrate samples as they are collected at a yearly frequency. Water quality samples are collected seasonally. Seasonal means should be used for decision making purposes or triggers should consider individual measurements or repeated individual measurements as decision criteria.
AEM Response	The Type A water license (2AM-MEA0815) for the project issued by the Nunavut Water Board (NWB) in 2008 required a revised AEMP, and specified some of the requirements for that revision. Beginning in 2009, AEM began collecting data in support of this revision to strengthen the ability of the CREMP to detect changes in the receiving environment. AEM hosted workshops with the NWB (including representatives from KIA, Environment Canada and Fisheries and Oceans Canada) in March (Yellowknife) and June (Edmonton) 2010 to review the redesign of the AEMP (now an overarching 'umbrella' that serves to integrate the results across AEM's individual, but related, monitoring programs in accordance with the Type A water license requirements) and the CREMP (the core receiving environment monitoring program). The workshops were followed up with the submission of draft design documents for both the AEMP (which showed the linkages between monitoring program results and management actions) and CREMP (which included details for receiving environment monitoring such as statistical design, station identification, proposed references, decision criteria [triggers and thresholds], sampling protocols, and DQOs) and final design documents submitted to the NWB in December 2012. These complementary documents provide details ranging from how/when samples are collected to how monitoring results are interpreted (e.g., employing early warning "triggers" that lead to action [see next paragraph] before

	the corresponding "thresholds" are reached) and linked to follow-up management actions (see Management Response Plan [Section 4] of the AEMP design document [AEMP 2012]). The application of triggers/thresholds and associated statistical testing for decision making purposes were presented and discussed in the aforementioned workshops. The CREMP Design Review (2012) provides more details. In short, program design contemplated identification of both short-term and longer-term changes in the receiving environment. For water quality samples, a detailed statistical power analysis was conducted to help inform what the design could be achieve (i.e., what the expected power would be for a range of time periods). The results suggested that formal application of the BACI design to single events provided low power to identify changes of interest and that 5 to 6 events provided good power. It should be noted that the formal BACI application includes paired events (i.e., events for near-field and reference areas occur at the same time), which serves to account for natural seasonal patterns. The trigger/threshold comparison process starts with the comparison of the results of each event to identify short-term, localized changes of interest. Temporal trends are also examined using time series plots that include the trigger/threshold values. These tools serve to identify cases where parameters exceed the triggers in one or more events; these are "flagged" for more scrutiny. The BACI-(paired) statistical model is formally applied to any parameters where the annual mean exceeds the trigger; these are indicative longer-term trends or a substantial short-term event. Combined, this approach provides a set of sensitive tools to identify mine-related changes in the receiving environment.
KIA Response	The KIA understands that a AEM's power analysis indicated single events yielded "low power" to identify changes while 5-6 events provided "good power". The KIA would like AEM to provide the power analysis results and their working definition of "low" and "good" power. This definition was not expressly provided in Appendix 2B – The CREMP Design Document. Further to this point, the KIA notes yearly water quality sampling frequency was 2 to 5 for Meadowbank sites and 2 to 3 for Baker Lake sites. Logically, the CREMP is unable to detect changes over the course of a single year using the BACI approach if sufficient statistical power is only achieved after 5-6 samples. This understanding leads the KIA to assume only conclusions based on multiple years of data will have sufficient power to detect mine-related environmental changes following the current sampling frequency. We have reviewed Appendix 2B, sub-appendix A and note limited power analysis results were presented. The appendix presents one tailed power analysis for aluminum, manganese, ammonia and total phosphorus, and a two tailed power analysis for pH. These results indicate 100% power is achieved over a 1 month period with 1 sample for aluminum and manganese for all Meadowbank stations, and near 100% power over a 3 month period for ammonia at all Meadowbank stations when alpha is set to 0.05. This logic is counter to the above assertion from AEM.

Table 20. Estimates of BACI statistical power for detecting a significant increase (one-tailed test) in a given variable by station (SP, TPE, TPN) as a function of sampling months (after period) and the number of sub-samples per month.

Note: Power is shown for two levels of alpha (0.05 and 0.10).

			alpha = 0.05			alpha = 0.10		
Variable	Months	Samples	SP	TPE	TPN	SP	TPE	TPN
Aluminum (T)	1	1	1.00	1.00	1.00	1.00	1.00	1.00
		2	1.00	1.00	1.00	1.00	1.00	1.00
		3	1.00	1.00	1.00	1.00	1.00	1.00
	3	1	1.00	1.00	1.00	1.00	1.00	1.00
		2	1.00	1.00	1.00	1.00	1.00	1.00
		3	1.00	1.00	1.00	1.00	1.00	1.00
	6	1	1.00	1.00	1.00	1.00	1.00	1.00
		2	1.00	1.00	1.00	1.00	1.00	1.00
		3	1.00	1.00	1.00	1.00	1.00	1.00
Manganese (T)	1	1	1.00	1.00	1.00	1.00	1.00	1.00
		2	1.00	1.00	1.00	1.00	1.00	1.00
		3	1.00	1.00	1.00	1.00	1.00	1.00
	3	1	1.00	1.00	1.00	1.00	1.00	1.00
		2	1.00	1.00	1.00	1.00	1.00	1.00
		3	1.00	1.00	1.00	1.00	1.00	1.00
	6	1	1.00	1.00	1.00	1.00	1.00	1.00
		2	1.00	1.00	1.00	1.00	1.00	1.00
		3	1.00	1.00	1.00	1.00	1.00	1.00
Ammonia-N	1	1	0.58	0.93	0.82	0.81	0.98	0.94
		2	0.87	1.00	0.98	0.96	1.00	0.99
		3	0.96	1.00	1.00	0.99	1.00	1.00
	3	1	0.98	1.00	1.00	1.00	1.00	1.00
		2	1.00	1.00	1.00	1.00	1.00	1.00
		3	1.00	1.00	1.00	1.00	1.00	1.00
	6	1	1.00	1.00	1.00	1.00	1.00	1.00
		2	1.00	1.00	1.00	1.00	1.00	1.00
		3	1.00	1.00	1.00	1.00	1.00	1.00
Total P	1	1	0.09	0.41	0.19	0.26	0.59	0.37
		2	0.17	0.65	0.31	0.33	0.82	0.50
		3	0.18	0.81	0.43	0.43	0.93	0.67
	3	1	0.29	0.85	0.55	0.54	0.92	0.73
		2	0.38	0.99	0.68	0.64	1.00	0.88
		3	0.44	1.00	0.81	0.74	1.00	0.93
	6	1	0.46	0.99	0.74	0.67	1.00	0.89
		2	0.61	1.00	0.91	0.83	1.00	0.97
		3	0.73	1.00	0.97	0.93	1.00	1.00

The KIA notes poor power for detecting changes in total phosphorus and the lower bound for pH. The KIA is willing to accept an alpha of 0.1 for environmental monitoring data yet this does not sufficiently improve power for those parameters. These are key parameters in the receiving environment requiring greater power than the current sample protocol provides. It appears decreased power to detect changes in Second Portage Lake total phosphorus concentrations is likely due to natural variability in the waterbody.

The KIA accepts formal BACI application accounts for seasonal variation but requests AEM provide a discussion of how short-term changes are detected using the current monitoring framework. We request sufficient power to detect seasonal changes from year to wear. For example, winter or summer changes from year to year. This should be bolstered by presentation of power analysis results for each parameter which was modeled in the FEIS (FEIS Appendix E) and each parameter for which a CCME water quality guideline exists. Further discussion of power analysis is made in KIA-IR-19.

2.15 KIA-IR-14

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-14
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle, Golder Associates
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Water Chemistry Discussion Criteria**
References:	CREMP Water Chemistry Discussion
Issue / Concern or Information Deficiency and Rationale:	Water quality parameters were only reported on when at least 10% of the samples exceeded the MDL. This presents a minimum threshold for discussion that may cause significant but acute changes to water quality to be overlooked. For example, a temporary failures in the treatment process may increase some water quality parameters in the effluent. These elevations still warrant discussion in the CREMP despite not exceeding license conditions.
Technical Comment/ Information Request:	AEM should alter the minimum criteria to discuss parameters to provide greater assurance that all potential adverse changes to water quality resulting from mine activity are highlighted. We recommend that parameters are discussed in future CREMP reports when 1) greater than 10% of the samples are above the MDL and 2) parameters that are detected less frequently than in 10% of samples but are >5x MDL in some samples where they were detected. This will provide assurance that the mine has had no or reversible adverse impacts to the aquatic environment under current water license conditions. This is critical as the water license has not been significantly altered in the renewal application.
AEM Response	The Type A water license (2AM-MEA0815) for the project issued by the Nunavut Water Board (NWB) in 2008 required a revised AEMP, and specified some of the requirements for that revision. Beginning in 2009, AEM began collecting data in support of this revision to strengthen the ability of the CREMP to detect changes in the receiving environment. AEM hosted workshops with the NWB (including representatives from KIA, Environment Canada and Fisheries and Oceans Canada) in March (Yellowknife) and June (Edmonton) 2010 to review the redesign of the AEMP (now an overarching 'umbrella' that serves to integrate the results across AEM's individual, but related, monitoring programs in accordance with the Type A water license requirements) and the CREMP (the core receiving environment monitoring program). The workshops were followed up with the submission of draft design documents for both the AEMP (which showed the linkages between monitoring program results and management actions) and CREMP (which included details for receiving environment monitoring such as statistical design, station identification, proposed references, decision criteria [triggers and thresholds], sampling protocols, and DQOs) and final design documents submitted to the NWB in December 2012. These complementary documents provide details ranging from how/when samples are collected to how monitoring results are interpreted (e.g., employing early warning "triggers" that lead to action [see next paragraph] before the corresponding "thresholds" are reached) and linked to follow-up management actions (see Management Response Plan [Section 4] of the AEMP design document [AEMP 2012]). AEM has worked hard over the past few years to make the CREMP a more user-friendly document while maintaining transparency. Given that results for the Meadowbank lakes and Baker Lake are reported separately and that there are over 70 parameters included in the analysis, a conservative rule set was adopted to identify parameters for the formal trend assessment that included consideration of:

	(1) overall detection frequency (>10%), (2) control-impact detection frequency - where the proportion of detected values did not differ by more than 0.1 between station types, and (3) for Meadowbank only, where the apparent pattern in detected values matched mining activity. Parameters for which any of these rules were met were included in the trend assessment; plots for all parameters that failed all rules are still provided in a CREMP appendix. AEM believes this approach is conservative, defensible and transparent. AEMs rule 1 is consistent with KIAs recommendation. AEMs rules 2 and 3 ensure that all parameters (even those less than 5x MDL) that possibly show a mine-related pattern are included in the trend assessment.
KIA Response	The KIA acknowledge the three decision rules for reporting AEM has imposed to *"make the CREMP a more user-friendly document while maintaining transparency"*. Rules one and two are appropriate. Rule three is well intentioned but relies on the professional opinion of the document author rather than an objective decision rule available for third party evaluation. We encourage AEM to provide a discussion outlining the kind of comparisons that will be made to assist CREMP authors in bringing forward *"apparent pattern[s] in detected values match[ing] mining activity"* to the body of the report. The KIA are concerned anomalous readings >5x MDL but <10% detection frequency may be overlooked or that trends could occur within the range of these criteria that could be addressed at an early stage. Such isolated results may not elevate the yearly mean sufficiently to warrant inclusion in the CREMP text as indicated by AEM through decision rule two. Short-term elevations may potentially impede water quality and should be discussed in the text. The KIA therefore requests AEM, as in the original IR, discuss parameters that are detected in <10% of samples but are >5x MDL. We are cognisant that this may add some unnecessary text to the CREMP report and invite AEM to provide an alternative decision rule to bring such detections forward.

2.16 KIA-IR-15

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-15
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Elevated Sediment Concentrations: Zinc and Lead**
References:	CREMP Sediment Chemistry Discussion, table 3.4-1
Issue / Concern or Information Deficiency and Rationale:	There were a few trigger values that were exceeded at impact areas (e.g., copper [WAL], chromium [TPN] and zinc [SP, WAL] but which were within the range of baseline conditions. Zinc was not highlighted as a potential risk to the environment in the CREMP but was highlighted in the summary in the Main Supporting Document. Lead was found at above both the trigger and threshold concentrations in WAL sediment samples in August 2013 but was not highlighted in the text.
Technical Comment/ Information Request:	AEM should harmonize the existing aquatic environment summary presented in the Main Supporting Document with results and findings presented in the CREMP. A discrepancy has been noted for zinc. The CREMP also does not discuss elevated lead concentrations in the WAL sediment samples. These concentrations are above both the trigger and threshold concentrations and require management actions. We recommend a condition in the water license that requires management actions when concentrations are above a threshold value. We also request AEM explain why elevated lead concentrations were overlooked in the CREMP discussion.
AEM Response	AEM will discuss these recommendations and comments related to sediment during the technical hearings.
KIA Response	The KIA looks forward to the Proponent's discussion and recommends "a-priori" development of triggers and initial responses so that management action can be initiated promptly. AEM has provided the following methods for trigger development: *"1. When a threshold (e.g., CCME guideline) is established, the trigger was set as the maximum of either (a) the value halfway between the baseline median and the threshold ("Method A"), or (b) the 95th percentile of the baseline data ("Method B").* *2. When a threshold is not established, the trigger was set equal to the 95th percentile of the baseline data ("Method B"), except in cases where less than 5% of the data exceeded the current detection limit (DL) – in the latter case, the trigger was set equal to two times the DL ("Method C")."* AEM further states *"For each sediment chemistry parameter, the trigger was set as the maximum of either (a) the value halfway between the baseline median and the threshold ("Method A"), or (b) the 95th percentile of the baseline data ("Method B")."* Sediment samples are proposed to be collected *"approximately every three years"*. We propose use of this time scale for application of management actions. We request the following requirement is added to the water license conditions: AEM shall implement adaptive management to mitigate changes to sediment quality if the threshold for a given parameter (as established through Method A, B

	or C as per Appendix B2 Section 3.2.1) presented in December 2012 CREMP Design Document in Tables 8, 9 10 for water quality and in Tables 12 for sediment quality.

2.17 KIA-IR-16

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-16
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Elevated Sediment Concentrations: chromium**
References:	CREMP Sediment Chemistry Discussion
Issue / Concern or Information Deficiency and Rationale:	There was a temporal/spatial pattern observed in 2013 for chromium in TPE sediments which demonstrated a continued increase from the pattern highlighted in the 2012 CREMP. Chromium exceeded the trigger concentration in 2013 TPE sediments. A coring study is currently planned for 2014 to confirm the trend. This study is timed to coincide with the year's EEM program.
Technical Comment/ Information Request:	The CREMP recommends management action to follow up increased chromium concentrations. Management action can be coupled with more stringent discharge criteria for chromium in the water license. We recommend a condition in the water license to address elevated chromium in TPE sediments prior to reaching the trigger value. We initially suggest more stringent discharge criteria for chromium. We invite AEM to provide other management options.
AEM Response	AEM will discuss these recommendations and comments related to sediment during the technical hearings.
KIA Response	The KIA looks forward to the Proponent's discussion.

2.18 KIA-IR-17

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-17
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Zooplankton Sampling**
References:	Appendix B2, Sampling Frequency
Issue / Concern or Information Deficiency and Rationale:	AEM has indicated a violation of the water license condition requiring monthly water quality samples. We are sympathetic to this violation based on our understanding of challenges faced by arctic environmental sampling. Statements such as *"Sampling in June, October and early November is highly dangerous due to thin ice conditions"* reflect AEM's understanding of these challenges. Six months (April, May, July, Aug, Sept, plus November or December) of full water chemistry data for the annual period was proposed to support BACI analyses of the aquatic environment. AEM has also proposed collection of "basic field water quality data" in nearfield areas (i.e., TPN, TPE, SP and eventually Wally) at least once mid-winter. AEM has provided a useful rationale for sampling frequency of each parameter based on expected response time to mine impacts. Water quality – up to 6x/year Phytoplankton – up to 6x/year in open water season samples Sediment – yearly Benthic invertebrates – yearly Zooplankton and periphyton – discontinued due to variability in data collected to date
Technical Comment/ Information Request:	We find this distribution of samples to be acceptable as it adequately characterizes both under ice conditions and the open water. However, we are concerned that zooplankton and periphyton sampling will be discontinued. While we recognize that zooplankton sampling is not required by EEM under MMER, the inclusion of zooplankton monitoring is required by the NWT in Aquatic Effects Monitoring Programs (AEMPs) within similar environmental conditions. Furthermore zooplankton are important to young of the year fish and can help characterize changes related to mine impacts. Please include zooplankton as part of the AEMP for the project.
AEM Response	The Type A water license (2AM-MEA0815) for the project issued by the Nunavut Water Board (NWB) in 2008 required a revised AEMP, and specified some of the requirements for that revision. Beginning in 2009, AEM began collecting data in support of this revision to strengthen the ability of the CREMP to detect changes in the receiving environment. AEM hosted workshops with the NWB (including representatives from KIA, Environment Canada and Fisheries and Oceans Canada) in March (Yellowknife) and June (Edmonton) 2010 to review the redesign of the AEMP (now an overarching 'umbrella' that serves to integrate the results across AEM's individual, but related, monitoring programs in accordance with the Type A water license requirements) and the CREMP (the core receiving environment monitoring program). The workshops were followed up with the submission of draft design documents for both the AEMP (which showed the linkages between monitoring program results and management actions) and CREMP (which included details for receiving environment monitoring such as statistical design, station identification, proposed references, decision criteria [triggers and thresholds], sampling protocols, and DQOs) and final design documents submitted to the NWB in December 2012. These complementary documents provide details ranging from how/when samples are collected to how monitoring results are interpreted (e.g., employing early warning "triggers" that lead to action [see next paragraph] before the corresponding "thresholds" are reached) and linked to follow-up management

	actions (see Management Response Plan [Section 4] of the AEMP design document [AEMP 2012]). The potential inclusion of zooplankton was studied in detail in the CREMP Design Report (2012). Despite early discussions during the aforementioned workshops to drop zooplankton from further consideration, AEM decided to conduct further sampling to reassess the situation. Samples were collected in 2010 and 2011; these data were assessed for power using the BACI statistical framework. There was low power for detecting 20% (over any number of years) or 50% changes in zooplankton metrics in a single year. Power improved only when trying to detect a 50% change with two to three years of after data. Consequently, it was removed as a monitoring component of the CREMP. That said, it was acknowledged that zooplankton studies may still be appropriate for more intensive spatial gradient designs as those employed for targeted studies (i.e. TSS Effects Assessment Studies (EAS)) where they might also be coupled with zooplankton-based toxicity testing. Considering the comprehensive and conservative approach applied to water in the CREMP, AEM does not feel that this decision detracts from the CREMPs ability to detect mine related changes in the receiving environment (i.e., as the assessment phase of the Management Response Plan would address the ecological significance of changes to water quality [e.g., as described for the EAS case above).
KIA Response	The KIA understands AEM's concern regarding power as noted in our response to KIA-IR-13. The KIA feels that zooplankton results are applicable beyond toxicity testing and warrant inclusion in the CREMP. Statistical discussion of zooplankton results should span several years and examine long-term trends rather than year-to-year variation from control lakes or baseline conditions. This would account for the low statistical power detecting *"20% (over any number of years) or 50% changes in zooplankton metrics in a single year."* The KIA requests AEM provide a discussion regarding statistically detectable effect size over different timeframes. AEM should then select a reasonable effect size and timeframe to discuss zooplankton and periphyton results in the CREMP. Zooplankton collection should be continued as per the original IR. We stress the importance of detecting changes to total biomass which has been included as one of AEM's specific zooplankton metrics in the CREMP Design Document. The KIA has reconsidered our request for AEM to continue monitoring periphyton. We endeavour to stay abreast of emerging science and have become aware of critical issues regarding analysis of periphyton samples and the endpoints to be reported. To quote the work of Minnow Environmental (2014): *"Seven periphyton samples were homogenized, split in quarters and sent to each of four commercial laboratories for taxonomic identification and enumeration. Even after standardizing for differences in algal taxonomy reported by each of the labs, results indicated substantial differences in community composition in each sample. Rarely was the same species identified by all four laboratories in the same sample. The proportions of species identified by one laboratory that were also identified in the same sample by at least one other laboratory never exceeded 58%, meaning at least 42% of all species identified in a given sample were unique to a specific laboratory."* *"Two overarching issues were identified that currently undermine the utility of periphyton community as an aquatic environmental monitoring tool: (1) lack of standardized methods for laboratory sample handling, analysis and QA/QC, and (2) no formal program for independent verification of taxonomic identifications (e.g., a program for taxonomist certification and/or laboratory performance testing)."* *"With so little agreement of results among the four laboratories tested, it was not possible to infer which of the laboratories, or associated procedures, provided the most accurate results."* Our updated understanding of laboratory variability introduces too much uncertainty into year to year periphyton data interpretation rendering little utility of the analysis.

2.19 KIA-IR-18

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-18
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Depth Samples**
References:	Appendix B2, Experimental Design
Issue / Concern or Information Deficiency and Rationale:	At-depth water quality samples are not proposed for Meadowbank. They were collected in 2009-2010, to determine the potential importance of differences in measurements associated with depth but the magnitude of differences associated with depth was minimal compared to the magnitude of differences occurring naturally between samples and stations. AEM did document an earlier response of elevated TSS in Third Portage Lake resulting from dike construction. Concentrations during the curtain breach were elevated at surface but above the threshold for acute lethality to fish at depth, as shown in the special investigations undertaken by Azimuth in response to the silt curtain breach. Consistent sampling at depth may better inform mitigation decisions through increased probability of detection of any episodic changes to water quality. This point will be further discussed in KIA-IR 23, Seepage at ST-16 and Lake NP2
Technical Comment/ Information Request:	Depth samples should be required from 1 meter off lake bottom as part of the CREMP at sample sites where stratification has been demonstrated through routine lake profiles of field temperature, conductivity, dissolved oxygen and pH.
AEM Response	The CREMP has been designed to detect changes in the receiving environment at the lake basin spatial scale. Complementary programs were developed specifically to monitoring changes requiring more spatially and temporally more intensive monitoring (e.g., dike construction monitoring). AEM agrees that there are times when sampling at depth would be useful to better characterize the receiving environment. Based on baseline limnological data, the Meadowbank lakes are generally considered to be well mixed. This assumption was formally tested in the CREMP Design Report (2012) to determine if a routinely collecting depth sample was warranted in the CREMP; the conclusion was that surface samples adequately characterized the water column. That said, it is recognized that stratification may occur and that sampling at depth may be appropriate. This has been incorporated into the CREMP by instructing field teams to take samples at depth when vertical profiling suggests the presence of stratification (e.g., abnormally high conductivity measurements).
KIA Response	The KIA agrees with AEM that surface samples are adequate if the lake is well mixed. We are concerned AEM only cites conductivity as the profile criteria for when depth sampling is required. This concern is highlighted through profiles displayed in the CREMP. Depth samples were not collected in April, 2013 despite evidence of inverse stratification (Figure 3.2-1). Here conductivity does not indicate stratification while temperature in both second and third portage lakes indicates inverse stratification under ice. This thermal mixing barrier may result in differing water quality between the lake surface and bottom. The CREMP indicates only surface samples were collected at this sampling date.

<table>
<tr>
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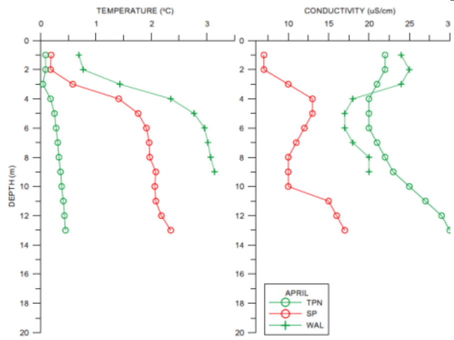

As per the initial IR, we recommend that samples at depth be taken where field profiles of conductivity, temperature, dissolved oxygen or turbidity indicate poorly mixed or stratified conditions. This may be either stratification during the open water season or inverse stratification under ice. We further stipulate that depth samples should be collected when a waterbody exceeds a depth of 15m.
</td>
</tr>
</table>

2.20 KIA-IR-19

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-19
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Statistical comparison of Biological Monitors**
References:	Appendix B2, Experimental Design
Issue / Concern or Information Deficiency and Rationale:	The use of Before-After-Control-Impact (BACI) analysis is an appropriate analysis framework to evaluate potential impacts in a particular lake or basin over a particular time period. It is also effectively used to identify long-term trends in data. Benthic invertebrate and phytoplankton sample and statistical design are not problematic. We acknowledge the low statistical power of phytoplankton sample comparison resulting from high natural variability. Similarly as stated by AEM: *"zooplankton variables are not realistically capable of detecting effects in a given year"*. However, we disagree with AEM's decision to remove zooplankton from the CREMP.
Technical Comment/ Information Request:	Biological monitoring is inherently variable but can be partially addressed using an approach recommended by Wiens and Parker[3] and used in the Doris North AEMP analysis of benthos. This approach is an impact level-by-time analysis, where the benthos and other biological monitor trends at exposure sites are compared to the trends at reference sites to determine if there is evidence of non-parallelism over time. We recommend use of the Wiens and Parker approach in addition to the BACI assessment for biological monitoring results (benthic invertebrates, phytoplankton, zooplankton).
AEM Response	The Type A water license (2AM-MEA0815) for the project issued by the Nunavut Water Board (NWB) in 2008 required a revised AEMP, and specified some of the requirements for that revision. Beginning in 2009, AEM began collecting data in support of this revision to strengthen the ability of the CREMP to detect changes in the receiving environment. AEM hosted workshops with the NWB (including representatives from KIA, Environment Canada and Fisheries and Oceans Canada) in March (Yellowknife) and June (Edmonton) 2010 to review the redesign of the AEMP (now an overarching 'umbrella' that serves to integrate the results across AEM's individual, but related, monitoring programs in accordance with the Type A water license requirements) and the CREMP (the core receiving environment monitoring program). The workshops were followed up with the submission of draft design documents for both the AEMP (which showed the linkages between monitoring program results and management actions) and CREMP (which included details for receiving environment monitoring such as statistical design, station identification, proposed references, decision criteria [triggers and thresholds], sampling protocols, and DQOs) and final design documents submitted to the NWB in December 2012. These complementary documents provide details ranging from how/when samples are collected to how monitoring results are interpreted (e.g., employing early warning "triggers" that lead to action [see next paragraph] before the corresponding "thresholds" are reached) and linked to follow-up management actions (see Management Response Plan [Section 4] of the AEMP design document [AEMP 2012]).

[3] *Wiens, J. A. and Parker, K. R. 1995. Analyzing the effects of accidental environmental impacts: approaches and assumptions. Ecological Applications 5 (4): 1069-83*

	In addition to presentation/discussions at the two NWB workshops, the statistical approaches employed in the CREMP were also discussed with Dr. Carl Schwarz of Simon Fraser University. The BACI models employed in the CREMP take advantage of baseline data collected prior to mine development to provide an understanding of the natural dynamic state present at all stations; these models specifically incorporate natural initial differences among stations and track changes (nonparallelism) over time related to mining. We are familiar with Wiens and Parker (1995) and agree that the authors provide some practical approaches for environmental monitoring in cases when trying to assess the implications of environmental perturbations that were not envisioned (e.g., where baseline data do not exist and investigators need to make inferences regarding impacts). That said, the statistical approaches presented by Wiens and Parker are no less susceptible to reduced power; the authors quote Underwood (1994): "When natural variation in time and space is great, the only effects of human disturbance that are likely to matter are very large ones." While zooplankton was dropped from the CREMP, AEM acknowledges that zooplankton studies may still be appropriate for more intensive spatial-gradient designs as those employed for the targeted studies (i.e.TSS Effects Assessment Studies (EAS)) where they might also be coupled with zooplankton-based toxicity testing. Considering the comprehensive and conservative approach applied to water in the CREMP, AEM does not feel that this decision detracts from the CREMPs ability to detect mine related changes in the receiving environment (i.e., as the assessment phase of the Management Response Plan would address the ecological significance of changes to water quality [e.g., as described for the EAS case above).
KIA Response	The KIA directs AEM to our response in KIA-IR-17. We further assert that the zooplankton are not only useful as part of toxicity testing or more intensive spatial-gradient sampling designs. The KIA agrees with AEM that zooplankton studies do not have sufficient power in this context to detect year-to-year changes. It is for this reason we request AEM use multiple statistical measurements to assess this biological data. Weight of evidence provided through multiple analyses (parallelism and BACI) over several years of data will better inform discussions regarding community composition shifts related to mine activity. The full quote from Underwood (1994) cited by Wiens and Parker is: *"When natural variation in time and space is great, the only effects of human disturbance that are likely to matter (or that can be reasonably detected) are very large ones."* The KIA feels that the omitted bracketed text indicates the problem over the short-term is lack of statistical power. This can be overcome by assessing changes to zooplankton over an extended period of record. The KIA offers an alternative to multiple analyses types. AEM has not presented the alpha used in the BACI assessment of biological indicators. We note this oversight in the CREMP report (Appendix D) and the CREMP Design Document (Appendix B2). The KIA recommends use of a less stringent alpha if AEM currently employs the standard 0.05 or a less stringent 0.1. AEM should assess biological indicators using an alpha of 0.02 which will increase the chance of detecting changes in the biological community at AEM's selected 20% and 50% effect sizes. We acknowledge use of a larger alpha increases the chance of a false positive (detecting a statistically significant change in the biological community when none has occurred) but assert this is balanced by the relatively large effect size selected by AEM. As stewards of the land, the KIA prefer to err on the side of caution and increase the chance of detecting a mine related change in the environment. The KIA request that an alpha of 0.02 is used for both BACI and parallelism analysis.

2.21 KIA-IR-20

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-20
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Lack of Event Monitoring Discussion**
References:	Appendix B6, Event Monitoring Appendix B7 Appendix B9
Issue / Concern or Information Deficiency and Rationale:	A critical aspect of the water management plan is event monitoring. The reader is directed to Appendix B6 - Meadowbank Gold Project Spill Contingency Plan (November 2013); and Appendix B9 - Meadowbank Gold Project Emergency Response Plan (August 2013). Event monitoring has not been addressed in these appendices.
Technical Comment/ Information Request:	AEM should include the event monitoring requirements in Appendix B7 and Appendix B9 as discussed in Appendix B6.
AEM Response	AEM agrees and will make a clearly reference to the event monitoring requirements in the next revision of the Spill Contingency Plan (SCP) as discussed in the Water Quality and Flow Monitoring Plan. The Emergency Response Plan (EMR) is a consolidated source of information for employees, contractors, and site visitors to respond quickly and efficiently to any foreseeable emergency (for example major spill) that would likely occur at the Meadowbank project site and do not provide information on monitoring after response. Emergency Response Plan (ERP) already refers to the Spill Contingency Plan in which event monitoring requirement will be clarify. Both plan (SCP and ERP) are considered to be implement in the case of an event monitoring depending of the magnitude of the event.
KIA Response	The KIA considers this issue resolved.

2.22 KIA-IR-21

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-21
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Monitoring Parameters**
References:	Appendix B6, Event Monitoring Water License, Schedule I, Monitoring Group
Issue / Concern or Information Deficiency and Rationale:	AEM has proposed to simplify the number of monitoring groups used at each sample site. The parameters included in each group are acceptable. This list has been presented in both Appendix B6 and as part of the Water License. Use of adequate detection limits is a common problem when assessing environmental data. Detection limits used for silver, cadmium and total phosphorus are often too high to allow for a useful assessment of environmental conditions. We also note that weak acid dissociable (WAD) cyanide has not been included in all parameter groups where cyanide will be assessed.
Technical Comment/ Information Request:	We request AEM commit to use of the lowest commercially available detection limits for water quality parameters and present a list of what these will be. WAD cyanide should be included in Group 1 and Group 3 or AEM should commit to taking a conservative approach and compare total cyanide with the CCME guideline for free cyanide: 0.005 mg/L free cyanide.
AEM Response	AEM uses an accredited laboratory that use low detection limits for all parameters in the CREMP and additional AEMP receiving environment ponds. You will find in Appendix E a list of detection limits from our accredited laboratory in Val-D'Or and ALS. AND As proposed in the renewal, AEM will continue to collect free and total cyanide samples as part of the CREMP monitoring to ensure the protection of the receiving environment (i.e. group 3). As originally suggested by the KIA in 2013, AEM will continue to monitor free cyanide in the receiving environment and AEM will continue to monitor total cyanide at discharge points ST-9 and ST-10, as per MMER.
KIA Response	The KIA directs AEM to our response to KIA-IR-12. We reiterate the required detection limits and once again cite the CCME[2]: (see table below) Bolded detection limits do not meet the required minimum standard. We request AEM work with their chosen laboratories to reach the required detection limits while still adhering to specified hold times and the highest standard of sample transportation. We note that the minimum detection limits are available from commercial laboratories.

Parameter	Multilab DL (mg/L)	ALS DL (mg/L)	Minimum Required DL (mg/L)
Ortho-Phosphate	**0.01**	0.001	0.002
Total Phosphorus	**0.01**	0.002	0.002
Dissolved Phosphorus	**0.01**	0.002	0.002
Total Cyanide	**0.005**	**0.0050**	0.001
Free Cyanide	**0.005**	**0.0050**	0.001

2.23 KIA-IR-22

<table>
<tr><td>Information Request Source:</td><td>Kivalliq Inuit Association</td></tr>
<tr><td>Information Number:</td><td>KIA-IR-22</td></tr>
<tr><td>Project:</td><td>Meadowbank Project Water License Renewal</td></tr>
<tr><td>Information Request From:</td><td>Kivalliq Inuit Association</td></tr>
<tr><td>Information Request For:</td><td>Agnico Eagle</td></tr>
<tr><td>Reviewer:</td><td>Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.</td></tr>
<tr><td>Subject:</td><td>Seepages not included under spill contingency plan</td></tr>
<tr><td>References:</td><td>Appendix B9, What is a Spill? Appendix B9, Materials and reportable (to regulatory authorities) spills,</td></tr>
<tr><td>Issue / Concern or Information Deficiency and Rationale:</td><td>The plan provides guidance for addressing a spill and a hierarchical framework to progress through a spill response. Chemicals stored on site are described and a list of response equipment and locations is provided. Materials and reportable (to regulatory authorities) spills on site are described. The substances and compulsory reporting amounts are provided in Table 1 of the appendix:

Table 1 - Spill quantities that must be reported to the NT-NU 24-HOUR SPILL REPORT LINE
<table>
<tr><th>Transportation Class</th><th>Type of Substance</th><th>Compulsory Reporting Amount</th></tr>
<tr><td>4.3</td><td>Water reactant solids</td><td>25 kg</td></tr>
<tr><td>5.1</td><td>Oxidizing substances</td><td>50 L or 50 kg</td></tr>
<tr><td>5.2</td><td>Organic peroxides</td><td>1 L or 1 kg</td></tr>
<tr><td>6.1</td><td>Poisonous substances</td><td>5 L or 5 kg</td></tr>
<tr><td>7</td><td>Radioactive substances</td><td>Any amount</td></tr>
<tr><td>8</td><td>Corrosive substances</td><td>5 L or 5 kg</td></tr>
<tr><td>9.1 (in part)</td><td>Miscellaneous substances</td><td>50 L or 50 kg</td></tr>
<tr><td>9.2</td><td>Environmentally hazardous</td><td>1 L or 1 kg</td></tr>
<tr><td>9.3</td><td>Dangerous wastes</td><td>5L or 5 kg</td></tr>
<tr><td>9.1 (in part)</td><td>PCB mixtures of 5 ppm or more</td><td>0.5 L or 0.5 kg</td></tr>
<tr><td>None</td><td>Other contaminants</td><td>100 L or 100 kg</td></tr>
</table>
Note: L = litre; kg = kilogram; PCB = polychlorinated biphenyls; ppm = parts per million.

Seepages have not been considered spills under the spill contingency plan. We are concerned that seepages like that from the waste rock storage facility to Lake NP2 was not immediately reported when changes were detected at sampling station ST-16.</td></tr>
<tr><td>Technical Comment/ Information Request:</td><td>We request AEM provide a discussion of unanticipated seepages as part of the spill contingency plan. Seepages such as that in Lake NP2 was brought to the attention of regulatory bodies by an AANDC inspector rather than AEM itself. These seepages should be considered “spills” as they have unintentionally or accidently been allowed to breach their intended containment and may have an adverse impact on the environment. This is in line with AEM’s definition of what a spill is: “major spill is defined as an accidental release of product into the environment that has the potential for adverse impact.”</td></tr>
<tr><td>AEM Response</td><td>AEM agrees with KIA recommendation and will add a section in the updated version of the Spill Contingency Plan that will include unanticipated seepage that can occur on the mine site.</td></tr>
<tr><td>KIA Response</td><td>The KIA considers this issue resolved.</td></tr>
</table>

2.24 KIA-IR-23

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-23
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Impact of violating obtainable freshwater limit**
References:	Appendix B17, 3.2.1Water Management Plan and Water Balance
Issue / Concern or Information Deficiency and Rationale:	AEM outlines the water management strategy stating *"At Meadowbank, there are three major sources of water entering into the water management system: freshwater pumped from Third Portage Lake, natural pit groundwater inflow and freshet flows. The water is removed from the system through the following mechanisms: water treatment plants at the attenuations ponds (Portage ATP and Vault ATP), trapped in the capillary voids of the tailings fraction and ice entrapment at the TSF, East Dike seepage discharge into Second Portage Lake and water trapped within the in-pit central wasterock disposal area voids. The AEM water balance is subdivided into the following sections: Fresh Water from Third Portage, Reclaim Tailings Water, Mill, North Cell TSF, South Cell TSF, ATPs (Portage and Vault), Portage Pit, Goose Pit, Water Transfers and East Dike Seepage pumped to Portage. The following sections will discuss each item and their inherent parameters."* The strategy continues to outline exactly how water was used, a critical point in understanding why the current maximum quantity of obtainable freshwater outlined in the existing water license was exceeded in 2013 and earlier years. AEM attributes exceedances of the 700,000m^3/year license limit to *"problems associated with the booster pump and the reclaim barge at the North Cell TSF"*. The impact of the additional draw on Third Portage Lake is not discussed nor are the implications of unused reclaim water on the TSF capacity.
Technical Comment/ Information Request:	AEM should provide a discussion of the impact additional use of freshwater from Third Portage Lake for milling purposes has had. Initial discussion should outline the influence on lake level and outflow. If there was a significant change to either, a follow up discussion should focus on impacts to aquatic life (particularly fish habitat) and water quality. AEM should also provide a discussion of the impact diminished use of reclaim water will have on the TSF and what measures are in place to prevent a significant loss of freeboard or unanticipated discharge volumes.
AEM Response	AEM refers the KIA to previous responses to DFO comments and recommendations related to pit reflooding and closure planning. To ensure water levels in Third Portage Lake will not be affected during pit flooding, in Section 4.6 of Golder (2009) Doc 833 0717_09 RTP-Updated Water Management Plan specifies that the maximum allowable drawdown of Third Portage Lakes has been assumed to correspond to the water level necessary to maintain a minimum flow equal to the average annual (1:2-year return period) 60-day low flow at the outlet of the lakes over the four summer months (June through September). The low flow rates were computed based on regression curves developed by AMEC (2003) and presented in the original licensing hearings. In response to the final point of this recommendation, it is important to note that as per the NWB Water License Part J, Item 3, AEM will submit the Final Closure and Reclamation Plan at least twelve (12) months prior to the expected end of mining (targeted date of Q3 2016). However, during the technical meetings, AEM will discuss conceptual plans to close the TSF.

KIA Response	AEM has referred to the Golder report written in 2009. We do not doubt that these predictions were accurate for fresh water usage permitted under the original water license. Our comment seeks to elucidate impacts on Third Portage Lake during mine operation resulting from additional fresh water usage. Our secondary IR regarding the TSF also focusses on impacts during mine operation rather than closure. The KIA looks forward to AEM's discussion of conceptual plans to close the TSF during the technical meetings. We reiterate the original IR, requesting AEM provide discussions regarding impacts of additional fresh water usage during operation rather than closure. We understand this concern may be addressed through AEM's discussion of conceptual plans to close the TSF.

2.25 KIA-IR-24

<table>
<tr><td>Information Request Source:</td><td>Kivalliq Inuit Association</td></tr>
<tr><td>Information Number:</td><td>KIA-IR-24</td></tr>
<tr><td>Project:</td><td>Meadowbank Project Water License Renewal</td></tr>
<tr><td>Information Request From:</td><td>Kivalliq Inuit Association</td></tr>
<tr><td>Information Request For:</td><td>Agnico Eagle</td></tr>
<tr><td>Reviewer:</td><td>Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.</td></tr>
<tr><td>Subject:</td><td>Modeling Results and Mitigation</td></tr>
<tr><td>References:</td><td>Appendix B17, Water Quality Modeling Report, Appendix D – Water Quality Report</td></tr>
<tr><td>Issue / Concern or Information Deficiency and Rationale:</td><td>
<table>
<tr><td>Total Cyanide (CN)</td><td>0.005 as free CN</td><td>-</td><td>-</td><td>0.00</td><td>0.00</td><td>-</td><td>-</td><td>0.00</td><td>0.00</td></tr>
<tr><td>Copper (Cu)</td><td>0.004</td><td>0.0014</td><td>0.013</td><td>0.0042</td><td>0.06</td><td>0.001</td><td>0.001</td><td>0.0048</td><td>0.28</td></tr>
<tr><td>Iron (Fe)</td><td>0.3</td><td>-</td><td>-</td><td>0.00</td><td>0.006</td><td>-</td><td>-</td><td>0.00</td><td>0.029</td></tr>
<tr><td>Ammonia (NH3)</td><td>0.86 (mg N/L)</td><td>0.00057</td><td>0.0006</td><td>0.212</td><td>0.97</td><td>0.0006</td><td>0.0006</td><td>0.2956</td><td>3.38</td></tr>
<tr><td>Nitrate (NO3)</td><td>2.9 (mg N/L)</td><td>2.60</td><td>4.40</td><td>0.00</td><td>0.26</td><td>4.00</td><td>4.00</td><td>0.00</td><td>1.13</td></tr>
<tr><td>Chloride (Cl)</td><td>120</td><td>630</td><td>630</td><td>0.00</td><td>12.97</td><td>440</td><td>440</td><td>0.00</td><td>51.61</td></tr>
</table>
Grey shading indicates exceedances of CCME guidelines

Comparison of total cyanide concentrations to the free cyanide guideline is sufficiently conservative. Free cyanide is a component of the total thus use of the free cyanide guideline would over represent the risk posed to aquatic life. Mitigation would be required at lower concentrations of free cyanide. The full SNC water quality report outlines the potential for elevated copper and ammonia concentrations in the pits after reflooding. This poses a risk to aquatic life in Third Portage Lake which will mix with pit water once water levels are equivalent to Second Portage Lake and the dike is breached. The water license stipulates that this will not occur until pit water quality meets CCME criteria.</td></tr>
<tr><td>Technical Comment/ Information Request:</td><td>AEM should provide modeling results for free cyanide or commit to comparing total cyanide to the free cyanide guideline in all samples. The approach varies between reports and plans and should be harmonized prior to renewal of the water license. Furthermore, AEM should provide modeling results in the water management report and plan indicating when pit water quality will meet CCME guidelines. This will provide insight into management actions AEM may consider to mitigate copper and ammonia concentrations in the pit water.</td></tr>
<tr><td>AEM Response</td><td>AEM will discuss these recommendations and comments during the technical meetings.</td></tr>
<tr><td>KIA Response</td><td>The KIA looks forward to the Proponent’s discussion.</td></tr>
</table>

2.26 KIA-IR-25

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-25
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Seepage at ST-16 and Lake NP2**
References:	Appendix B17, Appendix D – Water Quality Report
Issue / Concern or Information Deficiency and Rationale:	This report details AEM's response to the seepage discovered at the ST-16 site in Lake NP2 from the rock storage facility. The interim till plug was located on the upstream side of the access road to the North Cell Ditches, between the Waste Rock Storage Facility (RSF) and the NP2 lake. A staff gauge was placed at the seepage location to determine and visually quantify the water level increases. AEM has instructed a water truck to pump the water and dispose of it in the tailings pond should water levels become too high on the upstream side of the till plug as seen in Appendix A Figure 10**.**  *Figure 10: photo of the final result of the entire till plug from West to East. The actual pumping station and the 2 active seepage channels are visible on the eastern abutment.*
Technical Comment/ Information Request:	As indicated in HESL 2014[4], we conclude that both Golder and AEM have followed a reasonable approach in response to the seepage detected at ST-16. Monitoring ST-16 and Lake NP2 during and after the 2014 freshet will confirm if the mitigation measures were successful.
AEM Response	AEM acknowledges the KIA comment.
KIA Response	The KIA looks forward to reviewing 2014 monitoring results.

[4] *Hutchinson Environmental Sciences Ltd. 2014. Review of Golder Assessment on RSF Seepage Issue at Meadowbank. Prepared for the Kivalliq Inuit Association.*

2.27 KIA-IR-26

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-26
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Depth sample collection for Dike Monitoring**
References:	APPENDIX B19
Issue / Concern or Information Deficiency and Rationale:	AEM discusses the East Dike - Seepage Collection System stating its purpose is to collect and convey seepage and runoff away from the downstream toe area; and allow measurement of seepage through the dike. It was installed to capture and pump the seepage water that started in September 2011. Despite the potential risk posed to aquatic life, detection of seepages during construction rely on visual monitoring in combination with installed thermistors and piezometers for dike integrity. Assessment of TSS and turbidity concentrations are not conducted. In a previous HESL (2013[5]) review, TSS were reported to escape the silt curtains by movement beneath or between the curtain panels during routine operations and extremely high TSS values were recorded in a deep plume of TSS in Third Portage Lake in late August 2009. Elevated TSS was potentially acutely lethal at depth but not at the surface. TSS also escaped the silt curtains in the fall of 2008 during construction of the East Dike. Reliance of visual inspections alone may be insufficient to detect implications of the TSS seepage of September 2011 allowing AEM to employ mitigation measures in a timely manner. AEM states regarding water quality that *"Water quality of the seepage and runoff collected in the sumps and ditches at the toe of the Dewatering Dikes is to be monitored during operations. Daily inspections during dewatering and weekly inspections during operation are required as an indicator of dike performance to note whether seepage water is clear, cloudy or if fine material is present."* As part of the seepage monitoring during operations, AEM also states "*the water quality should be monitored daily by visual observations for sediments (turbidity)."* Visual inspection should document sediment, ice or snow deposits in the ditches and sumps. This represents the detail of water quality monitoring which is employed during mine operation as described in the manual. Further water quality monitoring will occur during dewatering as described in the water management plan as per the Water License.
Technical Comment/ Information Request:	Samples collected at depth downstream of all dikes during operation are required to detect water chemistry changes resulting from seepages. Aquatic life downstream of the dikes is unnecessarily put at risk by reliance on visual monitoring of seepage water in the ditches and the toe rather than in the potential receiver should failures occur. Water quality monitoring should be required as part of the emergency response plans when conditions for Threshold Criteria "Yellow" or above are met: East dike: seepage through dike of > 3000 m^3/day and/or turbidity in seepage water. Bay Goose Dike at toe: seepage of > 300 m^3/day and/or turbidity in seepage water Bay Goose Dike at North Channel Area: seepage of > 150 m^3/day and/or turbidity in seepage water South Camp Dike: seepage of > 300 m^3/day and/or turbidity in seepage water Vault Dike: seepage of > 300 m^3/day and/or turbidity in seepage water We understand that AEM has taken daily profiles using a hand held turbidity meter during dike construction downstream of the silt curtains. We request a

[5] *Hutchinson Environmental Sciences Ltd. 2013. KIA Compensation Claim for Sediment Releases at Meadowbank Site Prepared for the Kivalliq Inuit Association.*

	turbidity profile is collected downstream of the dike when the outlined Threshold Criteria "yellow" is met. Potential profile collection locations and mitigation measures should be evaluated and presented for review prior to renewal of the water license.
AEM Response	AEM is requesting clarification on the comments from KIA. There are statements throughout this comment such as "detection of seepage during construction rely on visual monitoring in combination with installed thermistors and piezometers for dike integrity" and the statement "Reliance of visual inspections alone may be insufficient to detect implications of the TSS" and "Aquatic life downstream of the dikes is unnecessarily put at risk by reliance on visual monitoring of seepage water in the ditches and the toe rather than in the potential receiver should failures occur." AEM would like to clarify the differences between dike seepage monitoring (which is monitoring the inflow of water quality and quantity for lake water that is seeping into the pit through the dike; this water most often reports to a down-gradient sump and is collected and pumped to the reclaim area, and therefore does not impact the receiving environment) and dike construction monitoring; the methods used for monitoring are different. AEM refers the KIA to the dike construction monitoring plan included in the Type A renewal and the associated annual monitoring reports that document the thoroughness of AEM's dike construction monitoring and subsequent targeted studies. As per the dike construction monitoring plan, AEM does not rely solely on visual observations. Rather as approved by the NWB, during dike construction, AEM uses calibrated turbidity meters at numerous stations outside of the turbidity curtains to collect depth profiles and real-time TSS data for immediate mitigation, we have used the onsite laboratory for TSS monitoring (including dewatering and seepage water monitoring) and routine sample collection at all depths in areas with maximum readings of turbidity / TSS for submission to an accredited laboratory. AEM also refers the KIA to the annual geotechnical inspections reports and the Meadowbank dike review board reports that ensure the geotechnical structures are constructed, monitored and that the integrity of the structure is not impacted by seepages.
KIA Response	We thank you for the clarification and consider this issue resolved.

2.28 KIA-IR-27

Information Request Source:	Kivalliq Inuit Association
Information Number:	KIA-IR-27
Project:	Meadowbank Project Water License Renewal
Information Request From:	Kivalliq Inuit Association
Information Request For:	Agnico Eagle
Reviewer:	Richard A. Nesbitt, Hutchinson Environmental Sciences Ltd.
Subject:	**Anomalous Thermistor or Piezometer Reading Response**
References:	APPENDIX B20, 6.2.2 Anomalous Readings
Issue / Concern or Information Deficiency and Rationale:	AEM has provided a response progression when anomalous readings are recorded from thermistors or piezometers used to monitor the tailings storage facility (TSF). Operators are instructed to *"increase monitoring frequency to assess progression of [the] anomaly"* if they are able to confirm readings are not a relic of the instrumentation. While this is the appropriate response it provides no assurance monitoring will be sufficiently increased to detect failures that may results in increased seepage. This concern is bolstered by delayed detection of the seepage from the waste rock facility bordering the northeast side of the TSF.
Technical Comment/ Information Request:	We request AEM describe the frequency of monitoring associated with their instruction to *"increase monitoring frequency"*. This will provide assurance that the response to thermistor and piezometer reading changes is sufficient to protect the aquatic environment from potential seepages resulting from TSF structural deficiencies and wear over time.
AEM Response	AEM will discuss these recommendations and comments during the technical meetings.
KIA Response	The KIA looks forward to the Proponent's discussion.

Appendix A. Comparison between Core Receiving Environment Monitoring Program Results and Final Environmental Impact Statement Water Quality Predictions

Hutchinson Environmental Sciences Ltd

	FEIS Appendix E Maximum Prediction Water Quality Concentration - Table E.2							Mean and Max Water Quality Concentrations Calculated using 2013 CREMP Table 3.3-1 (mg/L)						Water Quality Guideline Concentrations (mg/L)[1] Aquatic Life	NWT Drinking Water Criteria
	Expected Loadings (kg/yr)		Average Baseline Conc. (mg/L)[2]	Simulated Maximum Lake Concentration (mg/L)[3]											
				Mid-range Mixing Estimate (92 Mm^3)		Upper Mixing Estimate (169 Mm^3)		East Basin		North Basin		South Basin			
Parameter	Water Releases[4]	Dike Leaching		Without Dike Leaching	With Dike Leaching	Without Dike Leaching	With Dike Leaching	Mean	Max	Mean	Max	Mean	Max		
Conventional Parameters															
Hardness	21769	8075	5.3	6.0	6.4	5.7	6.0	7.9425	10.4	8.2120	10.3	7.9525	8.16		
pH	n/a	n/a	6.8	n/a	n/a	n/a	n/a	7.2688	7.74	7.1160	7.72	7.1150	7.22	6.5-8.5	
Dissolved Anions															
Total Alkalinity	8924	318	4.0	4.23	4.24	4.13	4.14	7.6125	9	5.5000	6.6	5.1250	5.4		
Chloride	14199	589	0.5	1.0	1.1	0.8	0.8	0.6375	0.72	0.6720	0.79	0.6200	0.62	230	250
Fluoride	43	261	0.07	0.07	0.09	0.07	0.08	-	-	-	-	-	-		1.7
Sulphate	18990	501	1.3	2.0	2.0	1.7	1.7	3.7513	4.33	4.3250	5.21	3.8450	3.86		250
Nutrients									0		0		0		
Ammonia Nitrogen	1110	0	0.010	0.0497	0.0497	0.0333	0.0333	0.0075	0.01	0.0160	0.03	0.0075	0.01	7.2	
Total Kjeldahl Nitrogen	n/a	n/a	0.09	n/a	n/a	n/a	n/a	0.1225	0.21	0.1250	0.14	0.1325	0.14	n/a	n/a
Nitrate Nitrogen	1465	42	<0.0040	0.0569	0.0588	0.0351	0.0363	0.0151	0.0237	0.0566	0.0682	0.0579	0.0652	2.9	45
Nitrite Nitrogen	n/a	n/a	0.0010	n/a	n/a	n/a	n/a	0.0010	0.0012	0.0014	0.0016	0.0017	0.0023		
Total Phosphate-P	10.9	0.0	0.0020	0.0024	0.0024	0.0022	0.0022	0.0021	0.0022	0.0020	0.0022	0.0022	0.0025		
Total Phosphorus	34.3	6.2	0.002	0.0032	0.0035	0.0027	0.0029	-	-	-	-	-	-		
Organic Parameters Dissolved	n/a	n/a	1.4	n/a	n/a	N/a	n/a	1.6375	2	1.8300	2.2	1.7500	2.2		
Cyanides															
Total Cyanide	0	0	<0.005	0	0	0	0	-	-	-	-	-	-	0.005	
Total Metals															
Aluminum	38	50	0.006	0.007	0.01	0.007	0.009	0.0098	0.0187	0.0044	0.0065	0.00615	0.0081	0.1	
Antimony	3.2	0.28	<0.0005	0.0006	0.00062	0.00056	0.00057	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001		
Arsenic	6.1	0.04	<0.0005	0.00072	0.00072	0.00062	0.00062	0.0005	0.0007	0.0002	0.0002	0.0002	0.0002	0.005	0.05
Barium	21	32.8	<0.02	0.02	0.023	0.02	0.022	0.0026	0.0029	0.0027	0.0034	0.0030	0.0031		1
Beryllium	1.38	0.00	<0.001	0.001	0.001	0.001	0.001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001		
Boron	178	0.0	<0.1	0.104	0.104	0.102	0.102	0.0100	0.01	0.0100	0.01	0.0100	0.01		
Bismuth	0.25	0.00		0.00001	0.00001	0.00001	0.00001	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005		
Cadmium[1]	0.10	0.003	<0.00005	**<0.000052**	**<0.000052**	**<0.000051**	**<0.000051**	0.000011	0.000020	0.000010	0.000010	0.000010	0.000010	0.00010 – 0.00017 (EPA) 0.0000026 to 0.000017 (CCME)	0.01
Calcium	7592	1692	1.2	1.5	1.5	1.3	1.4	2.2250	2.62	1.8580	2.41	1.9575	1.99		
Chromium	0.4	0.006	<0.001	0.001	0.001	0.001	0.001	0.0002	0.0006	0.0001	0.0001	0.0002	0.0005	0.001/0.0089	0.05
Cobalt	3.24	17.84	<0.0003	0.0004	0.0017	0.004	0.0013	-	-	-	-	-	-		
Copper	9.0	0.26	<0.001	0.0013	0.0013	0.0012	0.0012	0.0006	0.001	0.0006	0.0013	0.0005	0.0005	0.002	1
Iron	44.3	10.0	<0.03	0.03	0.03	0.03	0.03	0.0188	0.04	0.0100	0.01	0.0100	0.01	0.3	0.3
Lead	1.8	0.1	0.0006	0.0006	0.0007	0.0006	0.0006	0.00005	0.00007	0.00005	0.00009	0.00005	0.00005	0.001	0.05
Lithium	2.3	0.0	<0.0050	0.005	0.005	0.005	0.005	0.0005	0.0005	0.0006	0.0009	0.0005	0.0005		
Magnesium	4056	935	0.5	0.6	0.7	0.6	0.6	0.8000	0.96	0.7460	0.97	0.8050	0.82		
Manganese	386	841	0.001	0.015	**0.072**	0.009	**0.052**	0.0020	0.0036	0.0026	0.0043	0.0026	0.003		0.05
Mercury	0.029	0.056	<0.0001	0.00005	0.00005	0.00005	0.00005	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.0001	
Molybdenum	2.8	0.06	<0.001	0.001	0.001	0.001	0.001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.073	
Nickel	27.6	1.6	<0.001	0.002	0.0021	0.0016	0.0016	0.0006	0.0008	0.0005	0.0006	0.0006	0.0006	0.025	
Potassium	1826	892	<2	2.0	2.1	2.0	2.1	0.4488	0.55	0.4300	0.56	0.4800	0.5		
Selenium	0.62	0.01	<0.001	0.001	0.001	0.001	0.001	0.0001	0.00012	0.0001	0.0001	0.0001	0.0001	0.001	0.01
Silver	0.014	0.039	<0.00002	0.00002	0.00002	0.00002	0.00002	-	-	-	-	-	-	0.0001	0.05
Silicon	568	1380		0.02	0.12	0.01	0.08	0.0838	0.13	0.0620	0.09	0.0750	0.09		
Sodium	2578	563	2.0	2.0	2.1	2.0	2.0	0.7575	0.92	0.9350	1.27	0.9650	0.98		
Strontium	108	70		0.004	0.007	0.002	0.005	0.0096	0.0111	0.0087	0.0111	0.0093	0.0095		
Thallium	0.07	0.00	<0.0002	0.0002	0.0002	0.0002	0.0002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.0008	
Tin	n/a	n/a	<0.0006	n/a	n/a	n/a	n/a	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001		
Titanium	n/a	n/a	<0.01	n/a	n/a	n/a	n/a	0.0100	0.01	0.0100	0.01	0.0100	0.01		5
Uranium	0.77	0.7	<0.0002	0.0002	0.0003	0.0002	0.0002	0.00005	0.00007	0.00004	0.00006	0.00005	0.00005		0.02
Vanadium	4.0	1.1	<0.03	0.03	0.03	0.03	0.03	0.0010	0.001	0.0010	0.001	0.0010	0.001		
Zinc	272	1.3	0.005	0.015	0.015	0.011	0.011	0.0032	0.0046	0.0030	0.003	0.0030	0.003	0.03	5

Meadowbank FEIS Notes:

1. Canadian Water Quality Guidelines are used, except for aquatic life.. Both CWQG and US EPA values are shown for cadmium, with range of published value to hardness adjusted. **2.** Total metals. **3.** Dissolved metals. **4.** Average loadings per year based on predicted data for the 8 years of operations. Maximum predicted arsenic concentrations are predicted to vary from 0.003 to 0.029 mg/L, which ranges from less than the guideline to six times the guideline of 0.005 mg/L. Maximum predicted nickel concentrations are predicted to vary from 0.005 to 0.035 mg/L, which ranges from less than the guideline to 1.6 times the guideline of 0.025 mg/L. [5] Simulated maximum lake concentrations based on worst case predictions and are expected to be higher than those based on expected case predictions. Values in **bold** indicate exceedance of the WQGC and NWT drinking water guidelines.
Source: Golder (2005b)

KIA Analysis Legend: Pink shaded cells exceed the most stringent FEIS prediction.

Hutchinson Environmental Sciences Ltd.

Parameter	FEIS Appendix E Maximum Prediction Water Quality Concentration - Table E.1: Expected Loadings (kg/yr) Dike Leaching	Average Baseline Conc. (mg/L)[2]	Simulated Maximum Lake Concentration (mg/L): Lower mixing estimate (92 Mm^3) Without Dike Leaching	Lower mixing estimate (92 Mm^3) With Dike Leaching	Upper Mixing Estimate (169 Mm^3) Without Dike Leaching	Upper Mixing Estimate (169 Mm^3) With Dike Leaching	Mean and Max Water Quality Concentrations Calculated using 2013 CREMP Table 3.3-1 (mg/L) Second Portage Lake: Mean	Second Portage Lake: Max	Water Quality Guideline Concentrations (mg/L)[1] Aquatic Life	NWT Drinking Water Criteria
Conventional Parameters										
Hardness	572	8.9	8.9	8.9	8.9	8.9	11.7800	15.5		
pH	n/a	7.5	n/a	n/a	n/a	n/a	7.4883	8.07	6.5-8.5	
Dissolved Anions										
Total Alkalinity	23	7.00	7.00	7.00	7.00	7.00	10.1417	11.7		
Chloride	42	0.6	0.8	0.8	0.7	0.7	0.6458	0.93	230	250
Fluoride	18	0.070	0.07	0.071	0.07	0.071	-	-		1.7
Sulphate	35	2.8	2.8	2.8	2.8	2.8	3.6067	5.07		250
Nutrients										
Ammonia Nitrogen	0	0.020	0.031	0.031	0.025	0.025	0.0096	0.02	72	
Total Kjeldahl Nitrogen	n/a	0.08	n/a	n/a	n/a	n/a	0.1300	0.17	n/a	n/a
Nitrate Nitrogen	3	0.007	0.025	0.025	0.017	0.017	0.0085	0.0319	2.9	45
Nitrite Nitrogen		0.0010					0.0010	0.001		
Total Phosphate-P	0.0	0.0030	0.0030	0.0030	0.0030	0.0030	0.0022	0.0032		
Total Phosphorus	0.4		0.0031	0.0031	0.003	0.003	-	-		
Organic Parameters Dissolved	n/a	1.7	n/a	n/a	n/a	n/a	2.0750	2.8		
Cyanides										
Total Cyanide	0	0.000	0.000	0.000	0.000	0.000	-	-	0.005	
Total Metals										
Aluminum	3.5	0.007	0.007	0.007	0.007	0.007	0.0076	0.0161	0.1	
Antimony	0.02	<0.0005	0.0005	0.0005	0.0005	0.0005	0.0001	0.0001		
Arsenic	0.003	<0.0005	0.0006	0.0006	0.0005	0.0005	0.0003	0.0006	0.005	0.05
Barium	2.3	<0.02	0.02	0.02	0.02	0.02	0.0025	0.0041		1
Beryllium	0.00	<0.0010	0.0010	0.0010	0.0010	0.0010	0.0001	0.0001		
Boron	0.0	<0.1	0.1	0.1	0.1	0.1	0.0100	0.01		
Bismuth	0.00		0.000	0.000	0.000	0.000	0.0005	0.0005		
Cadmium	0.00023	<0.00005	**<0.000051**	**<0.000051**	**<0.00005**	**<0.00005**	0.000015	0.000046	0.00010 – 0.00017 (EPA) 0.0000026 to 0.000017 (CCME)	0.01
Calcium	120	2.3	2.3	2.3	2.3	2.3	3.1233	3.83		
Chromium	0.0004	<0.0010	0.0010	0.0010	0.0010	0.0010	0.0001	0.0002	0.001	0.05
Cobalt	1.26	<0.0003	0.0003	0.0004	0.0003	0.0004				
Copper	0.018	<0.0010	0.0011	0.0011	0.0011	0.0011	0.0007	0.0008	0.002	1
Iron	0.7	<0.03	0.03	0.03	0.03	0.03	0.0200	0.04	0.3	0.3
Lead	0.008	<0.001	0.0009	0.0009	0.0009	0.0009	0.0001	0.00067	0.001	0.05
Lithium	0.0	<0.0050	0.0050	0.0050	0.0050	0.0050	0.0006	0.0008		
Magnesium	66	0.8	0.8	0.8	0.8	0.8	1.0258	1.37		
Manganese	60	0.0016	0.0066	0.0089	0.0044	0.0067	0.0015	0.0028		0.05
Mercury	0.004	<0.00005	0.00005	0.00005	0.00005	0.00005	0.00001	0.00001	0.0001	
Molybdenum	0.004	<0.0010	0.0010	0.0010	0.0010	0.0010	0.0001	0.0002	0.073	
Nickel	0.1	<0.001	0.001	0.001	0.001	0.001	0.0048	0.0515	0.025	
Potassium	63	<2.0	2.0	2.0	2.0	2.0	0.4683	0.7		
Selenium	0.0008	<0.001	0.001	0.001	0.001	0.001	0.0001	0.0001	0.001	0.01
Silver	0.003		0.00001	0.00001	0.00001	0.00001	-	-	0.0001	
Silicon	98	<0.01	0.01	0.01	0.00	0.01	0.1900	0.26		
Strontium	40		0.8	0.8	0.8	0.8	0.6575	1.09		
Sodium	5	2.00	2.00	2.00	2.00	2.00	0.0139	0.0166		
Thallium	0.00	<0.0002	0.0002	0.0002	0.0002	0.0002	0.00001	0.00001	0.0008	
Tin	n/a	<0.0005	n/a	n/a	n/a	n/a	0.0001	0.0001		
Titanium	n/a	<0.01	n/a	n/a	n/a	n/a	0.0100	0.01		
Uranium	0.05	<0.0002	0.0002	0.0002	0.0002	0.0002	0.00004	0.00006		
Vanadium	0.08	<0.03	0.03	0.03	0.03	0.03	0.0010	0.001		
Zinc	0.09	0.005	0.009	0.009	0.007	0.007	0.0031	0.0043	0.03	5

Meadowbank FEIS Notes:
1. Canadian Water Quality Guidelines are used, except for aquatic life.. Both CWQG and US EPA values are shown for cadmium, with range of published value to hardness adjusted. **2.** Total metals. **3.** Dissolved metals. **4.** Average loadings per year based on predicted data for the 8 years of operations. Maximum predicted arsenic concentrations are predicted to vary from 0.003 to 0.029 mg/L, which ranges from less than the guideline to six times the guideline of 0.005 mg/L. Maximum predicted nickel concentrations are predicted to vary from 0.005 to 0.035 mg/L, which ranges from less than the guideline to 1.6 times the guideline of 0.025 mg/L. [5] Simulated maximum lake concentrations based on worst case predictions and are expected to be higher than those based on expected case predictions. Values in **bold** indicate exceedance of the WQGC and NWT drinking water guidelines.
Source: Golder (2005b)

KIA Analysis Legend: Pink shaded cells exceed the most stringent FEIS prediction.

Appendix B. Comparison of AEM Data Quality Objectives with More Stringent ones from the United States Environmental Protection Agency

Hutchinson Environmental Sciences Ltd.

ANALYTE	MDLs	Third Portage Lake		AEM		HESL Recalc	
		TPN-59 18-Apr-13	**APR DUP-1** 18-Apr-13	**RPD %**	**>10x MDL**	**RPD %**	**>5x MDL**
CONVENTIONAL PARAMETERS							
Physical Tests							
Conductivity (µS/cm)	2.0	26.3	26.3	0	Yes	0	Yes
Hardness (mg/L)	0.50	9.47	9.32	1.6	Yes	2	Yes
pH	0.10	6.86	6.94	-1.2	Yes	1	Yes
Total Suspended Solids (mg/L)	1.0	*<1.0*	*<1.0*	--	No	--	No
Total Dissolved Solids (mg/L)	3.0	17.0	14.6	15	No	15	Yes
Turbidity (NTU)	0.10	0.15	0.12	22	No	--	No
Anions and Nutrients (mg/L)							
Alkalinity, Bicarbonate (as CaCO3)	2.0	6.4	6.4	0	No	--	No
Alkalinity, Carbonate (as $CaCO_3$)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Hydroxide (as CaCO3)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Total (as $CaCO_3$)	2.0	6.4	6.4	0	No	--	No
Ammonia, Total (as N)	0.0050	0.0208	0.0188	10	No	--	No
Bromide (Br)	0.050	*<0.05*	*<0.05*	--	No	--	No
Chloride (Cl)	0.10	0.74	0.73	1.4	No	1	Yes
Nitrate (as N)	0.0050	0.0664	0.0662	0	Yes	0	Yes
Nitrite (as N)	0.0010	*<0.001*	0.0011	--	No	--	No
Total Kjeldahl Nitrogen	0.050	0.112	0.126	-12	No	--	No
Orthophosphate (as P)	0.0010	*<0.001*	*<0.001*	--	No	--	No
Total Phosphate (as P)	0.0020	*<0.002*	*<0.002*	--	No	--	No
Silicate (as SiO2)	0.50	*<0.5*	*<0.5*	--	No	--	No
Sulfate (SO_4)	0.50	4.53	4.49	0.9	No	1	Yes
Organic / Inorganic Carbon (mg/L)							
Dissolved Organic Carbon	0.50	2.14	2.58	-19	No	--	No
Total Organic Carbon	0.50	1.66	2.08	-22	No	--	No
Plant Pigments (ug/L)							
Chlorophyll-a	0.010	*<0.01*	*<0.01*	--	No	--	No
TOTAL METALS (mg/L)							
Aluminum	0.0030	*<0.0030*	*<0.0030*	--	No	--	No
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	0.00022	0.00020	10	No	--	No
Barium	0.000050	0.00325	0.00318	2.2	Yes	2	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Calcium	0.050	2.24	2.18	2.7	Yes	3	Yes
Chromium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Copper	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Iron	0.010	*<0.01*	*<0.01*	--	No	--	No
Lead	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Lithium	0.00050	0.00088	0.00087	1.1	No	--	No
Magnesium	0.10	0.90	0.88	2.2	No	2	Yes
Manganese	0.000050	0.00202	0.00203	0	Yes	0	Yes
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	0.000221	0.000225	-1.8	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.51	0.51	0	Yes	0	Yes
Selenium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Silicon	0.050	0.068	0.077	-12	No	--	No
Sodium	0.050	1.07	1.03	3.8	Yes	4	Yes
Strontium	0.00020	0.0104	0.0106	-1.9	Yes	2	Yes
Sulfur	0.50	1.57	1.46	7.3	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000048	0.000050	-4.1	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0030	*<0.0030*	*<0.0030*	--	No	--	No
DISSOLVED METALS (mg/L)							
Aluminum	0.0010	0.0014	0.0017	-19	No	--	No
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	0.00018	0.00018	0	No	--	No
Barium	0.000050	0.00327	0.00339	-3.6	Yes	4	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Calcium	0.050	2.28	2.24	1.8	Yes	2	Yes
Chromium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Copper	0.00020	0.00039	0.00038	2.6	No	--	No
Iron	0.010	*<0.01*	*<0.01*	--	No	--	No
Lead	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Lithium	0.00050	0.00083	0.00075	10	No	--	No
Magnesium	0.10	0.92	0.91	1.1	No	1	Yes
Manganese	0.000050	0.00171	0.00164	4.2	Yes	4	Yes
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	0.000209	0.000201	3.9	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.53	0.54	-1.9	Yes	2	Yes
Selenium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Silicon	0.050	0.067	0.082	-20	No	--	No
Sodium	0.050	1.09	1.08	0.9	Yes	1	Yes
Strontium	0.00020	0.0105	0.00996	5.3	Yes	5	Yes
Sulfur	0.50	1.54	1.50	2.6	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000045	0.000046	-2.2	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0010	*<0.001*	*<0.001*	--	No	--	No

Legend

RPD= \|(x-y)\| / (x+y)/2

AEM Analysis: >10xMDL and >20% RPD

HESL Analysis: >5xMDL and >20% RPD

Hutchinson Environmental Sciences Ltd.

ANALYTE	MDLs	Wally Lake		AEM		HESL Recalc	
		WAL-30 19-Jul-13	JULY DUP-1 19-Jul-13	RPD %	>10x MDL	RPD %	>5x MDL
CONVENTIONAL PARAMETERS							
Physical Tests							
Conductivity (µS/cm)	2.0	39.6	31.4	23	Yes	23	Yes
Hardness (mg/L)	0.50	12.50	12.50	0	Yes	0	Yes
pH	0.10	7.93	7.56	4.8	Yes	5	Yes
Total Suspended Solids (mg/L)	1.0	*<1.0*	*<1.0*	--	No	--	No
Total Dissolved Solids (mg/L)	3.0	19.0	22.7	-18	No	18	Yes
Turbidity (NTU)	0.10	0.26	0.32	-21	No	--	No
Anions and Nutrients (mg/L)							
Alkalinity, Bicarbonate (as CaCO3)	2.0	10.3	10.3	0	No	0	Yes
Alkalinity, Carbonate (as $CaCO_3$)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Hydroxide (as CaCO3)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Total (as $CaCO_3$)	2.0	10.3	10.3	0	No	0	Yes
Ammonia, Total (as N)	0.0050	*<0.005*	*<0.005*	--	No	--	No
Bromide (Br)	0.050	*<0.05*	*<0.05*	--	No	--	No
Chloride (Cl)	0.10	0.49	0.49	0	No	--	No
Nitrate (as N)	0.0050	*<0.005*	*<0.005*	--	No	--	No
Nitrite (as N)	0.0010	*<0.001*	*<0.001*	--	No	--	No
Total Kjeldahl Nitrogen	0.050	0.142	0.138	2.9	No	--	No
Orthophosphate (as P)	0.0010	*<0.001*	*<0.001*	--	No	--	No
Total Phosphate (as P)	0.0020	0.0034	0.0034	0	No	--	No
Silicate (as SiO2)	0.50	0.72	0.69	4.3	No	--	No
Sulfate (SO_4)	0.50	2.51	2.51	0	No	0	Yes
Organic / Inorganic Carbon (mg/L)							
Dissolved Organic Carbon	0.50	2.85	2.95	-3.4	No	3	Yes
Total Organic Carbon	0.50	2.77	2.51	10	No	10	Yes
Plant Pigments (ug/L)							
Chlorophyll-a	0.010	0.261	0.294	-12	Yes	12	Yes
TOTAL METALS (mg/L)							
Aluminum	0.0030	0.007	0.0072	-2.8	No	--	No
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	0.00024	0.00021	13	No	--	No
Barium	0.000050	0.00196	0.00185	5.8	Yes	6	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Calcium	0.050	3.33	3.23	3.0	Yes	3	Yes
Chromium	0.00010	0.00011	0.00011	0	No	--	No
Copper	0.00050	0.00095	0.00101	-6.1	No	--	No
Iron	0.010	0.02	0.02	0	No	--	No
Lead	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Lithium	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Magnesium	0.10	0.99	0.96	3.1	No	3	Yes
Manganese	0.000050	0.00161	0.00157	2.5	Yes	3	Yes
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	0.000083	0.000085	-2.4	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.40	0.39	2.5	No	3	Yes
Selenium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Silicon	0.050	0.325	0.317	2.5	No	2	Yes
Sodium	0.050	0.48	0.45	5.2	No	6	Yes
Strontium	0.00020	0.0165	0.0159	3.7	Yes	4	Yes
Sulfur	0.50	0.88	0.85	3.5	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000043	0.000044	-2.3	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0030	*<0.0030*	*<0.0030*	--	No	--	No
DISSOLVED METALS (mg/L)							
Aluminum	0.0010	0.0025	0.0028	-11	No	--	No
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	0.00021	0.00021	0	No	--	No
Barium	0.000050	0.00190	0.00179	6.0	Yes	6	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Calcium	0.050	3.38	3.37	0	Yes	0	Yes
Chromium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Copper	0.00020	0.00083	0.00079	4.9	No	--	No
Iron	0.010	*<0.01*	*<0.01*	--	No	--	No
Lead	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Lithium	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Magnesium	0.10	0.99	0.99	0	No	0	Yes
Manganese	0.000050	0.00077	0.00074	4.2	Yes	4	Yes
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	0.000074	0.000079	-6.5	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.39	0.38	2.6	No	3	Yes
Selenium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Silicon	0.050	0.328	0.320	2.5	No	2	Yes
Sodium	0.050	0.48	0.47	1.9	No	2	Yes
Strontium	0.00020	0.0160	0.01570	1.9	Yes	2	Yes
Sulfur	0.50	0.87	0.89	-2.3	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000038	0.000039	-2.6	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0010	*<0.001*	*<0.001*	--	No	--	No

Legend

RPD= |(x-y)| / (x+y)/2

AEM Analysis: >10xMDL and >20% RPD

HESL Analysis: >5xMDL and >20% RPD

ANALYTE	MDLs	Baker Lake		AEM		HESL Recalc	
		BAP-28 20-Jul-13	JULY DUP-2 20-Jul-13	RPD %	>10x MDL	RPD %	>5x MDL
CONVENTIONAL PARAMETERS							
Physical Tests							
Conductivity (µS/cm)	2.0	71.3	71.3	0	Yes	0	Yes
Hardness (mg/L)	0.50	14.30	14.50	-1.4	Yes	1	Yes
pH	0.10	7.30	7.30	0.0	Yes	0	Yes
Total Suspended Solids (mg/L)	1.0	*<1.0*	*<1.0*	--	No	--	No
Total Dissolved Solids (mg/L)	3.0	39.0	45.3	-15	Yes	15	Yes
Turbidity (NTU)	0.10	0.47	0.48	-2.1	No	--	No
Anions and Nutrients (mg/L)							
Alkalinity, Bicarbonate (as CaCO3)	2.0	9.2	8.7	5.6	No	--	No
Alkalinity, Carbonate (as $CaCO_3$)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Hydroxide (as CaCO3)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Total (as $CaCO_3$)	2.0	9.2	8.7	5.6	No	--	No
Ammonia, Total (as N)	0.0050	*<0.005*	*<0.005*	--	No	--	No
Bromide (Br)	0.050	0.06	0.061	-1.7	No	--	No
Chloride (Cl)	0.10	14.00	13.90	0.7	Yes	1	Yes
Nitrate (as N)	0.0050	0.0320	0.0314	1.9	No	2	Yes
Nitrite (as N)	0.0010	*<0.001*	*<0.001*	--	No	--	No
Total Kjeldahl Nitrogen	0.050	0.211	0.209	1.0	No	--	No
Orthophosphate (as P)	0.0010	*<0.001*	*<0.001*	--	No	--	No
Total Phosphate (as P)	0.0020	0.0046	0.0048	-4.3	No	--	No
Silicate (as SiO2)	0.50	*<0.5*	*<0.5*	--	No	--	No
Sulfate (SO_4)	0.50	2.50	2.50	0	No	--	No
Organic / Inorganic Carbon (mg/L)							
Dissolved Organic Carbon	0.50	3.30	3.31	0	No	0	Yes
Total Organic Carbon	0.50	3.17	3.60	-13	No	13	Yes
Plant Pigments (ug/L)							
Chlorophyll-a	0.010	0.245	0.454	-60	Yes	60	Yes
TOTAL METALS (mg/L)							
Aluminum	0.0030	0.0241	0.023	4.7	No	5	Yes
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	0.00016	0.00013	21	No	--	No
Barium	0.000050	0.01720	0.01660	4	Yes	4	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Calcium	0.050	2.68	2.66	1	Yes	1	Yes
Chromium	0.00010	0.00027	0.00013	70	No	--	No
Copper	0.00050	0.00056	*<0.0005*	--	No	--	No
Iron	0.010	0.033	0.029	13	No	--	No
Lead	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Lithium	0.00050	0.00066	0.00054	20	No	--	No
Magnesium	0.10	1.90	1.86	2	Yes	2	Yes
Manganese	0.000050	0.00397	0.00390	2	Yes	2	Yes
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	0.000080	0.000064	22	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.71	0.70	1	Yes	1	Yes
Selenium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Silicon	0.050	0.230	0.228	1	No	--	No
Sodium	0.050	7.26	7.21	1	Yes	1	Yes
Strontium	0.00020	0.0215	0.0211	2	Yes	2	Yes
Sulfur	0.50	0.96	0.89	8	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000050	0.000050	0	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0030	*<0.0030*	*<0.0030*	--	No	--	No
DISSOLVED METALS (mg/L)							
Aluminum	0.0010	0.0050	0.0052	-3.9	No	--	No
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	0.00012	*<0.0001*	--	No	--	No
Barium	0.000050	0.01700	0.01720	-1.2	Yes	1	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Calcium	0.050	2.67	2.70	-1.1	Yes	1	Yes
Chromium	0.00010	0.00016	*<0.0001*	--	No	--	No
Copper	0.00020	0.00036	0.00033	8.7	No	--	No
Iron	0.010	*<0.01*	*<0.01*	--	No	--	No
Lead	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Lithium	0.00050	0.00058	0.00066	-13	No	--	No
Magnesium	0.10	1.85	1.87	-1.1	Yes	1	Yes
Manganese	0.000050	0.00232	0.00252	-8.3	Yes	8	Yes
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	0.000067	*<0.00005*	--	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.69	0.70	-1.4	Yes	1	Yes
Selenium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Silicon	0.050	0.186	0.190	-2.1	No	--	No
Sodium	0.050	7.04	7.35	-4.3	Yes	4	Yes
Strontium	0.00020	0.0207	0.02040	1.5	Yes	1	Yes
Sulfur	0.50	0.95	0.90	5.4	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000041	0.000039	5.0	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0010	*<0.001*	*<0.001*	--	No	--	No

Legend

RPD= |(x-y)| / (x+y)/2

AEM Analysis: >10xMDL and >20% RPD

HESL Analysis: >5xMDL and >20% RPD

ANALYTE	MDLs	Innugugayualik Lake INUG-50 23-Aug-13	AUG DUP-1 23-Aug-13	AEM RPD %	>10x MDL	HESL Recalc RPD %	>5x MDL
CONVENTIONAL PARAMETERS							
Physical Tests							
Conductivity (µS/cm)	2.0	14.3	14.3	0	No	0	Yes
Hardness (mg/L)	0.50	5.38	5.30	1.5	Yes	1	Yes
pH	0.10	6.75	6.64	1.6	Yes	2	Yes
Total Suspended Solids (mg/L)	1.0	*<1.0*	*<1.0*	--	No	--	No
Total Dissolved Solids (mg/L)	3.0	13.8	14.3	-3.6	No	--	No
Turbidity (NTU)	0.10	0.28	0.28	0	No	--	No
Anions and Nutrients (mg/L)							
Alkalinity, Bicarbonate (as CaCO3)	2.0	5.4	4.9	10	No	--	No
Alkalinity, Carbonate (as $CaCO_3$)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Hydroxide (as CaCO3)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Total (as $CaCO_3$)	2.0	5.4	4.9	10	No	--	No
Ammonia, Total (as N)	0.0050	*<0.005*	0.0249	--	No	--	No
Bromide (Br)	0.050	*<0.05*	*<0.05*	--	No	--	No
Chloride (Cl)	0.10	0.66	0.66	0	No	0	Yes
Nitrate (as N)	0.0050	*<0.005*	*<0.005*	--	No	--	No
Nitrite (as N)	0.0010	*<0.001*	*<0.001*	--	No	--	No
Total Kjeldahl Nitrogen	0.050	0.157	0.142	10	No	--	No
Orthophosphate (as P)	0.0010	*<0.001*	*<0.001*	--	No	--	No
Total Phosphate (as P)	0.0020	0.003	0.0033	-10	No	--	No
Silicate (as SiO2)	0.50	*<0.5*	*<0.5*	--	No	--	No
Sulfate (SO_4)	0.50	0.85	0.85	0	No	--	No
Organic / Inorganic Carbon (mg/L)							
Dissolved Organic Carbon	0.50	1.95	1.76	10	No	--	No
Total Organic Carbon	0.50	2.05	1.76	15	No	--	No
Plant Pigments (ug/L)							
Chlorophyll-a	0.010	0.168	0.133	23	Yes	23	Yes
TOTAL METALS (mg/L)							
Aluminum	0.0030	0.0081	0.0067	19	No	--	No
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Barium	0.000050	0.00177	0.00175	1.1	Yes	1	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Calcium	0.050	1.12	1.12	0	Yes	0	Yes
Chromium	0.00010	0.00011	0.0001	10	No	--	No
Copper	0.00050	0.00054	*<0.0005*	--	No	--	No
Iron	0.010	0.018	0.014	25	No	--	No
Lead	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Lithium	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Magnesium	0.10	0.69	0.68	1.5	No	1	Yes
Manganese	0.000050	0.00207	0.00195	6.0	Yes	6	Yes
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.37	0.37	0	No	0	Yes
Selenium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Silicon	0.050	0.138	0.132	4.4	No	--	No
Sodium	0.050	0.52	0.52	0	Yes	0	Yes
Strontium	0.00020	0.0064	0.0064	0.8	Yes	0	Yes
Sulfur	0.50	*<0.5*	*<0.5*	--	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000046	0.000046	0	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0030	*<0.0030*	*<0.0030*	--	No	--	No
DISSOLVED METALS (mg/L)							
Aluminum	0.0010	0.0021	0.0019	10	No	--	No
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Barium	0.000050	0.00173	0.00166	4.1	Yes	4	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Calcium	0.050	1.07	1.05	1.9	Yes	2	Yes
Chromium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Copper	0.00020	0.00034	0.00035	-2.9	No	--	No
Iron	0.010	*<0.01*	*<0.01*	--	No	--	No
Lead	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Lithium	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Magnesium	0.10	0.66	0.65	1.5	No	2	Yes
Manganese	0.000050	0.00043	0.00039	11	No	10	Yes
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.33	0.33	0	No	0	Yes
Selenium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Silicon	0.050	0.122	0.121	0.8	No	--	No
Sodium	0.050	0.50	0.50	-0.8	No	0	Yes
Strontium	0.00020	0.0060	0.00631	--5.0	Yes	5	Yes
Sulfur	0.50	*<0.5*	*<0.5*	--	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000035	0.000038	-8.2	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0010	*<0.001*	*<0.001*	--	No	--	No

Legend

RPD= |(x-y)| / (x+y)/2

AEM Analysis: >10xMDL and >20% RPD

HESL Analysis: >5xMDL and >20% RPD

Hutchinson Environmental Sciences Ltd.

ANALYTE	MDLs	Third Portage Lake		AEM		HESL Recalc	
		TPN-63 26-Aug-13	AUG DUP-3 26-Aug-13	RPD %	>10x MDL	RPD %	>5x MDL
CONVENTIONAL PARAMETERS							
Physical Tests							
Conductivity (µS/cm)	2.0	23.4	23.4	0	Yes	0	Yes
Hardness (mg/L)	0.50	7.91	7.98	-0.9	Yes	1	Yes
pH	0.10	7.08	7.05	0	Yes	0	Yes
Total Suspended Solids (mg/L)	1.0	<1.0	<1.0	--	No	--	No
Total Dissolved Solids (mg/L)	3.0	17.6	17.8	-1.1	No	1	Yes
Turbidity (NTU)	0.10	0.27	0.23	16	No	--	No
Anions and Nutrients (mg/L)							
Alkalinity, Bicarbonate (as CaCO3)	2.0	5.4	5.4	0	No	--	No
Alkalinity, Carbonate (as $CaCO_3$)	2.0	<2.0	<2.0	--	No	--	No
Alkalinity, Hydroxide (as CaCO3)	2.0	<2.0	<2.0	--	No	--	No
Alkalinity, Total (as $CaCO_3$)	2.0	5.4	5.4	0	No	--	No
Ammonia, Total (as N)	0.0050	<0.005	0.0052	--	No	--	No
Bromide (Br)	0.050	<0.05	<0.05	--	No	--	No
Chloride (Cl)	0.10	0.64	0.63	1.6	No	2	Yes
Nitrate (as N)	0.0050	0.0476	0.0484	-1.7	No	2	Yes
Nitrite (as N)	0.0010	0.0012	<0.001	--	No	--	No
Total Kjeldahl Nitrogen	0.050	0.139	0.133	4.4	No	--	No
Orthophosphate (as P)	0.0010	<0.001	<0.001	--	No	--	No
Total Phosphate (as P)	0.0020	<0.002	<0.002	--	No	--	No
Silicate (as SiO2)	0.50	<0.5	<0.5	--	No	--	No
Sulfate (SO_4)	0.50	3.89	3.93	--1.0	No	1	Yes
Organic / Inorganic Carbon (mg/L)							
Dissolved Organic Carbon	0.50	1.42	1.43	-0.7	No	--	No
Total Organic Carbon	0.50	1.39	1.36	2.2	No	--	No
Plant Pigments (ug/L)							
Chlorophyll-a	0.010	0.22	0.195	12	Yes	12	Yes
TOTAL METALS (mg/L)							
Aluminum	0.0030	0.005	0.0056	-11	No	--	No
Antimony	0.00010	<0.0001	<0.0001	--	No	--	No
Arsenic	0.00010	0.00019	0.00018	5.4	No	--	No
Barium	0.000050	0.00270	0.00308	-13	Yes	13	Yes
Beryllium	0.00010	<0.0001	<0.0001	--	No	--	No
Bismuth	0.00050	<0.0005	<0.0005	--	No	--	No
Boron	0.010	<0.01	<0.01	--	No	--	No
Cadmium	0.000010	<0.00001	<0.00001	--	No	--	No
Calcium	0.050	1.99	2.08	-4.4	Yes	4	Yes
Chromium	0.00010	<0.0001	<0.0001	--	No	--	No
Copper	0.00050	<0.0005	<0.0005	--	No	--	No
Iron	0.010	<0.01	<0.01	--	No	--	No
Lead	0.000050	<0.00005	<0.00005	--	No	--	No
Lithium	0.00050	<0.0005	<0.0005	--	No	--	No
Magnesium	0.10	0.81	0.82	-1.2	No	1	Yes
Manganese	0.000050	0.00253	0.00261	-3.1	Yes	3	Yes
Mercury	0.000010	<0.00001	<0.00001	--	No	--	No
Molybdenum	0.000050	0.000183	0.000187	-2.2	No	--	No
Nickel	0.00050	<0.0005	0.00051	--	No	--	No
Phosphorus	0.050	<0.05	<0.05	--	No	--	No
Potassium	0.050	0.47	0.48	-2.1	No	2	Yes
Selenium	0.00010	<0.0001	<0.0001	--	No	--	No
Silicon	0.050	0.054	0.059	-8.8	No	--	No
Sodium	0.050	0.99	1.01	--2.0	Yes	2	Yes
Strontium	0.00020	0.0095	0.0098	-3.8	Yes	3	Yes
Sulfur	0.50	1.32	1.39	-5.2	No	--	No
Thallium	0.000010	<0.00001	<0.00001	--	No	--	No
Tin	0.00010	<0.0001	<0.0001	--	No	--	No
Titanium	0.010	<0.01	<0.01	--	No	--	No
Uranium	0.000010	0.000042	0.000044	-4.7	No	--	No
Vanadium	0.0010	<0.001	<0.001	--	No	--	No
Zinc	0.0030	<0.0030	<0.0030	--	No	--	No
DISSOLVED METALS (mg/L)							
Aluminum	0.0010	0.0020	0.0025	-22	No	--	No
Antimony	0.00010	<0.0001	<0.0001	--	No	--	No
Arsenic	0.00010	0.00016	0.00015	6.5	No	--	No
Barium	0.000050	0.00269	0.00267	0.7	Yes	1	Yes
Beryllium	0.00010	<0.0001	<0.0001	--	No	--	No
Bismuth	0.00050	<0.0005	<0.0005	--	No	--	No
Boron	0.010	<0.01	<0.01	--	No	--	No
Cadmium	0.000010	<0.00001	<0.00001	--	No	--	No
Calcium	0.050	1.90	1.91	-0.5	Yes	1	Yes
Chromium	0.00010	<0.0001	<0.0001	--	No	--	No
Copper	0.00020	0.00038	0.00035	8.2	No	--	No
Iron	0.010	<0.01	<0.01	--	No	--	No
Lead	0.000050	<0.00005	<0.00005	--	No	--	No
Lithium	0.00050	<0.0005	<0.0005	--	No	--	No
Magnesium	0.10	0.77	0.78	-1.3	No	1	Yes
Manganese	0.000050	0.00172	0.00178	-3.4	Yes	3	Yes
Mercury	0.000010	<0.00001	<0.00001	--	No	--	No
Molybdenum	0.000050	0.000172	0.000164	4.8	No	--	No
Nickel	0.00050	<0.0005	<0.0005	--	No	--	No
Phosphorus	0.050	<0.05	<0.05	--	No	--	No
Potassium	0.050	0.43	0.43	0	No	0	Yes
Selenium	0.00010	<0.0001	<0.0001	--	No	--	No
Silicon	0.050	<0.05	0.051	--	No	--	No
Sodium	0.050	0.94	0.96	-1.7	Yes	2	Yes
Strontium	0.00020	0.0095	0.00946	0	Yes	0	Yes
Sulfur	0.50	1.26	1.29	-2.4	No	--	No
Thallium	0.000010	<0.00001	<0.00001	--	No	--	No
Tin	0.00010	<0.0001	<0.0001	--	No	--	No
Titanium	0.010	<0.01	<0.01	--	No	--	No
Uranium	0.000010	0.000035	0.000035	0	No	--	No
Vanadium	0.0010	<0.001	<0.001	--	No	--	No
Zinc	0.0010	<0.001	<0.001	--	No	--	No

Legend

RPD= |(x-y)| / (x+y)/2

AEM Analysis: >10xMDL and >20% RPD

HESL Analysis: >5xMDL and >20% RPD

ANALYTE	MDLs	Baker Lake BAP-29 30-Aug-13	Baker Lake AUG DUP-2 30-Aug-13	AEM RPD %	AEM >10x MDL	HESL Recalc RPD %	HESL Recalc >5x MDL
CONVENTIONAL PARAMETERS							
Physical Tests							
Conductivity (µS/cm)	2.0	101.0	101.0	0	Yes	0	Yes
Hardness (mg/L)	0.50	16.50	16.60	-0.6	Yes	1	Yes
pH	0.10	7.68	7.40	3.7	Yes	4	Yes
Total Suspended Solids (mg/L)	1.0	*<1.0*	*<1.0*	--	No	--	No
Total Dissolved Solids (mg/L)	3.0	60	61.3	--2.0	Yes	2	Yes
Turbidity (NTU)	0.10	0.23	0.26	-12	No	--	No
Anions and Nutrients (mg/L)							
Alkalinity, Bicarbonate (as CaCO3)	2.0	6.9	9.3	-30	No	--	No
Alkalinity, Carbonate (as $CaCO_3$)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Hydroxide (as CaCO3)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Total (as $CaCO_3$)	2.0	6.9	9.3	-30	No	--	No
Ammonia, Total (as N)	0.0050	0.0053	0.0183	-110	No	--	No
Bromide (Br)	0.050	0.079	0.079	0	No	--	No
Chloride (Cl)	0.10	22.00	22.00	0	Yes	0	Yes
Nitrate (as N)	0.0050	0.0259	0.0263	-1.5	No	2	Yes
Nitrite (as N)	0.0010	*<0.001*	*<0.001*	--	No	--	No
Total Kjeldahl Nitrogen	0.050	0.15	0.163	-11	No	--	No
Orthophosphate (as P)	0.0010	*<0.001*	*<0.001*	--	No	--	No
Total Phosphate (as P)	0.0020	0.0036	0.0040	-11	No	--	No
Silicate (as SiO2)	0.50	*<0.50*	*<0.5*	--	No	--	No
Sulfate (SO_4)	0.50	3.62	3.62	0	No	0	Yes
Organic / Inorganic Carbon (mg/L)							
Dissolved Organic Carbon	0.50	3.1	3.06	2.3	No	1	Yes
Total Organic Carbon	0.50	3.0	2.98	0.7	No	1	Yes
Plant Pigments (ug/L)							
Chlorophyll-a	0.010	0.47	0.444	5.9	Yes	6	Yes
TOTAL METALS (mg/L)							
Aluminum	0.0030	0.0100	0.0105	-4.9	No	--	No
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	0.0001	0.00015	-6.9	No	--	No
Barium	0.000050	0.0174	0.01780	-2.3	Yes	2	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Calcium	0.050	2.83	2.79	1.4	Yes	1	Yes
Chromium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Copper	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Iron	0.010	0.01	0.012	15	No	--	No
Lead	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Lithium	0.00050	0.0010	0.00106	-7.8	No	--	No
Magnesium	0.10	2.41	2.44	-1.2	Yes	1	Yes
Manganese	0.000050	0.00187	0.00187	0	Yes	0	Yes
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	0.000074	0.000057	26	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.95	0.97	-2.1	Yes	2	Yes
Selenium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Silicon	0.050	0.18	0.177	-0.6	No	--	No
Sodium	0.050	11.50	11.40	0.9	Yes	1	Yes
Strontium	0.00020	0.0243	0.0246	-1.2	Yes	1	Yes
Sulfur	0.50	1.23	1.24	-0.8	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000045	0.000046	-2.2	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0030	*<0.0030*	*<0.0030*	--	No	--	No
DISSOLVED METALS (mg/L)							
Aluminum	0.0010	0.0041	0.0047	-14	No	--	No
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	0.00012	0.00012	0	No	--	No
Barium	0.000050	0.0182	0.01720	5.6	Yes	6	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Calcium	0.050	2.76	2.75	0.4	Yes	0	Yes
Chromium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Copper	0.00020	0.00029	0.00030	-3.4	No	--	No
Iron	0.010	*<0.01*	*<0.01*	--	No	--	No
Lead	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Lithium	0.00050	0.0012	0.00104	11	No	--	No
Magnesium	0.10	2.34	2.36	-0.9	Yes	1	Yes
Manganese	0.000050	0.0005	0.00044	7.1	No	13	Yes
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	0.0001	0.000057	-5.4	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.88	0.87	1.1	Yes	1	Yes
Selenium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Silicon	0.050	0.158	0.160	-1.3	No	--	No
Sodium	0.050	11.40	11.20	1.8	Yes	2	Yes
Strontium	0.00020	0.0246	0.02350	4.6	Yes	5	Yes
Sulfur	0.50	1.22	1.19	2.5	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000041	0.000041	0	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0010	*<0.001*	*<0.001*	--	No	--	No

Legend

RPD= |(x-y)| / (x+y)/2

AEM Analysis: >10xMDL and >20% RPD

HESL Analysis: >5xMDL and >20% RPD

ANALYTE	MDLs	Third Portage Lake TPE-67 26-Nov-13	Third Portage Lake NOV DUP-1 26-Nov-13	AEM RPD %	AEM >10x MDL	HESL Recalc RPD %	HESL Recalc >5x MDL
CONVENTIONAL PARAMETERS							
Physical Tests							
Conductivity (µS/cm)	2.0	28.1	28.4	-1.1	Yes	1	Yes
Hardness (mg/L)	0.50	5.76	10.5	-58	Yes	58	Yes
pH	0.10	7.56	7.42	1.9	Yes	2	Yes
Total Suspended Solids (mg/L)	1.0	*<1.0*	*<1.0*	--	No	--	No
Total Dissolved Solids (mg/L)	3.0	23.7	21.0	12	No	12	Yes
Turbidity (NTU)	0.10	0.37	0.28	28	No	--	No
Anions and Nutrients (mg/L)							
Alkalinity, Bicarbonate (as CaCO3)	2.0	7.6	7.5	1.3	No	--	No
Alkalinity, Carbonate (as $CaCO_3$)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Hydroxide (as CaCO3)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Total (as $CaCO_3$)	2.0	7.6	7.5	1.3	No	--	No
Ammonia, Total (as N)	0.0050	0.0059	0.0085	-36	No	--	No
Bromide (Br)	0.050	*<0.05*	*<0.05*	--	No	--	No
Chloride (Cl)	0.10	0.68	0.67	1.5	No	1	Yes
Nitrate (as N)	0.0050	0.0127	0.0131	-3.1	No	--	No
Nitrite (as N)	0.0010	*<0.001*	*<0.001*	--	No	--	No
Total Kjeldahl Nitrogen	0.050	0.056	0.090	-47.0	No	--	No
Orthophosphate (as P)	0.0010	*<0.001*	*<0.001*	--	No	--	No
Total Phosphate (as P)	0.0020	*<0.002*	*<0.002*	--	No	--	No
Silicate (as SiO2)	0.50	*<0.5*	*<0.5*	--	No	--	No
Sulfate (SO_4)	0.50	4.05	4.01	1.0	No	1	Yes
Organic / Inorganic Carbon (mg/L)							
Dissolved Organic Carbon	0.50	1.65	1.31	23	No	--	No
Total Organic Carbon	0.50	1.20	1.07	11	No	--	No
Plant Pigments (ug/L)							
Chlorophyll-a	0.010	0.114	0.434	-117	Yes	117	Yes
TOTAL METALS (mg/L)							
Aluminum	0.0030	0.006	0.0044	31	No	--	No
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	0.00051	0.00028	58	No	58	Yes
Barium	0.000050	0.00280	0.00156	57	Yes	57	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Calcium	0.050	2.45	1.36	57	Yes	57	Yes
Chromium	0.00010	0.00016	*<0.0001*	--	No	--	No
Copper	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Iron	0.010	0.011	*<0.01*	--	No	--	No
Lead	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Lithium	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Magnesium	0.10	0.87	0.49	56	No	56	Yes
Manganese	0.000050	0.00122	0.00072	51	Yes	52	Yes
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	0.000178	0.000109	48	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.48	0.26	59	No	59	Yes
Selenium	0.00010	0.00012	*<0.0001*	--	No	--	No
Silicon	0.050	0.065	*<0.05*	--	No	--	No
Sodium	0.050	0.83	0.45	59	Yes	59	Yes
Strontium	0.00020	0.0102	0.0058	56	Yes	55	Yes
Sulfur	0.50	1.21	0.69	55	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000047	0.000027	54	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0030	*<0.0030*	*<0.0030*	--	No	--	No
DISSOLVED METALS (mg/L)							
Aluminum	0.0010	*<0.001*	0.0012	--	No	--	No
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	0.00029	0.00052	-57	No	--	No
Barium	0.000050	0.00167	0.00288	-53	Yes	53	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Calcium	0.050	1.45	2.65	-59	Yes	59	Yes
Chromium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Copper	0.00020	*<0.0002*	0.00034	--	No	--	No
Iron	0.010	*<0.01*	*<0.01*	--	No	--	No
Lead	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Lithium	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Magnesium	0.10	0.52	0.93	-57	No	57	Yes
Manganese	0.000050	0.00009	0.00024	-93	No	--	No
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	0.000097	0.000186	-63	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.28	0.51	-58	No	58	Yes
Selenium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Silicon	0.050	*<0.05*	0.065	--	No	--	No
Sodium	0.050	0.48	0.87	-59	No	58	Yes
Strontium	0.00020	0.0059	0.01070	-58	Yes	58	Yes
Sulfur	0.50	0.69	1.28	-60	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000026	0.000043	-49	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0010	*<0.001*	*<0.001*	--	No	--	No

Legend

RPD= |(x-y)| / (x+y)/2

AEM Analysis: >10xMDL and >20% RPD

HESL Analysis: >5xMDL and >20% RPD

Hutchinson Environmental Sciences Ltd.

ANALYTE	MDLs	Third Portage Lake TPE-68 09-Dec-13	DEC DUP-1 09-Dec-13	AEM RPD %	AEM >10x MDL	HESL Recalc RPD %	HESL Recalc >5x MDL
CONVENTIONAL PARAMETERS							
Physical Tests							
Conductivity (µS/cm)	2.0	30.4	30.7	--1.0	Yes	1	Yes
Hardness (mg/L)	0.50	4.17	7.70	-59	No	59	Yes
pH	0.10	7.12	7.09	0	Yes	0	Yes
Total Suspended Solids (mg/L)	1.0	*<1.0*	*<1.0*	--	No	--	No
Total Dissolved Solids (mg/L)	3.0	15.4	17.6	-13	No	13	Yes
Turbidity (NTU)	0.10	0.19	0.19	0	No	--	No
Anions and Nutrients (mg/L)							
Alkalinity, Bicarbonate (as CaCO3)	2.0	9.0	8.7	3.4	No	--	No
Alkalinity, Carbonate (as $CaCO_3$)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Hydroxide (as CaCO3)	2.0	*<2.0*	*<2.0*	--	No	--	No
Alkalinity, Total (as $CaCO_3$)	2.0	9.0	8.7	3.4	No	--	No
Ammonia, Total (as N)	0.0050	0.0087	0.0381	-126	No	--	No
Bromide (Br)	0.050	*<0.05*	*<0.05*	--	No	--	No
Chloride (Cl)	0.10	0.72	0.72	0	No	0	Yes
Nitrate (as N)	0.0050	0.0138	0.0134	2.9	No	--	No
Nitrite (as N)	0.0010	*<0.001*	*<0.001*	--	No	--	No
Total Kjeldahl Nitrogen	0.050	0.108	0.139	-25	No	--	No
Orthophosphate (as P)	0.0010	*<0.001*	*<0.001*	--	No	--	No
Total Phosphate (as P)	0.0020	*<0.002*	*<0.002*	--	No	--	No
Silicate (as SiO2)	0.50	*<0.5*	*<0.5*	--	No	--	No
Sulfate (SO_4)	0.50	4.33	4.35	0	No	0	Yes
Organic / Inorganic Carbon (mg/L)							
Dissolved Organic Carbon	0.50	1.68	1.35	22	No	--	No
Total Organic Carbon	0.50	1.26	1.51	-18	No	--	No
Plant Pigments (ug/L)							
Chlorophyll-a	0.010	0.279	0.186	40	Yes	40	Yes
TOTAL METALS (mg/L)							
Aluminum	0.0030	0.0037	0.0042	-13	No	--	No
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	0.00032	0.00025	25	No	--	No
Barium	0.000050	0.00172	0.00129	29	Yes	29	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Calcium	0.050	1.44	1.17	21	Yes	21	Yes
Chromium	0.00010	0.0001	0.00013	-26	No	--	No
Copper	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Iron	0.010	*<0.01*	*<0.01*	--	No	--	No
Lead	0.000050	*<0.00005*	*<0.00005*	--	No	--	No
Lithium	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Magnesium	0.10	0.51	0.41	22	No	22	Yes
Manganese	0.000050	0.00071	0.00052	29	Yes	31	Yes
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	0.000113	0.000082	32	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.27	0.24	12	No	12	Yes
Selenium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Silicon	0.050	*<0.05*	*<0.05*	--	No	--	No
Sodium	0.050	0.49	0.39	22	No	23	Yes
Strontium	0.00020	0.0063	0.0050	24	Yes	23	Yes
Sulfur	0.50	0.72	0.57	23	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000028	0.000023	20	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0030	*<0.0030*	*<0.0030*	--	No	--	No
DISSOLVED METALS (mg/L)							
Aluminum	0.0010	*<0.001*	0.0027	--	No	--	No
Antimony	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Arsenic	0.00010	0.00021	0.00031	-38	No	--	No
Barium	0.000050	0.00128	0.00199	-43	Yes	43	Yes
Beryllium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Bismuth	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Boron	0.010	*<0.01*	*<0.01*	--	No	--	No
Cadmium	0.000010	*<0.00001*	0.000019	--	No	--	No
Calcium	0.050	1.06	2.11	-66	Yes	66	Yes
Chromium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Copper	0.00020	*<0.0002*	0.00034	--	No	--	No
Iron	0.010	*<0.01*	*<0.01*	--	No	--	No
Lead	0.000050	*<0.00005*	0.000114	--	No	--	No
Lithium	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Magnesium	0.10	0.37	0.59	-46	No	--	No
Manganese	0.000050	0.00014	0.00036	-88	No	--	No
Mercury	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Molybdenum	0.000050	0.000078	0.000129	-49	No	--	No
Nickel	0.00050	*<0.0005*	*<0.0005*	--	No	--	No
Phosphorus	0.050	*<0.05*	*<0.05*	--	No	--	No
Potassium	0.050	0.19	0.34	-57	No	--	No
Selenium	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Silicon	0.050	*<0.05*	*<0.05*	--	No	--	No
Sodium	0.050	0.35	0.59	-50	No	51	Yes
Strontium	0.00020	0.0047	0.00782	-49	Yes	50	Yes
Sulfur	0.50	*<0.5*	0.87	--	No	--	No
Thallium	0.000010	*<0.00001*	*<0.00001*	--	No	--	No
Tin	0.00010	*<0.0001*	*<0.0001*	--	No	--	No
Titanium	0.010	*<0.01*	*<0.01*	--	No	--	No
Uranium	0.000010	0.000017	0.000029	-52	No	--	No
Vanadium	0.0010	*<0.001*	*<0.001*	--	No	--	No
Zinc	0.0010	*<0.001*	0.0011	--	No	--	No

Legend

RPD= |(x-y)| / (x+y)/2

AEM Analysis: >10xMDL and >20% RPD

HESL Analysis: >5xMDL and >20% RPD