Attachment 1. EC comments on Agnico-Eagle Mines Limited - Meadowbank Division's 2010 Annual Report – Water License 2AM-MEA0815

Annual Report Section:	**Comment:**
General	The Annual Report provided a concise and useful description of the work reported for 2010.
Figures	Figures should be numbered and have directional markers.
Section 5.2.1 – Incinerator; Appendices F2 and F4	Section 5.2 states that 178,750 litres of waste oil was incinerated. Was the waste oil used as auxiliary fuel for the incinerator? What was the total amount of auxiliary fuel used for incineration? The annual report and the incinerator logs should include total amount of waste by weight incinerated. To ensure complete combustion and to minimize the formation and release of contaminants, the Technical Document for Batch Waste Incineration recommends that incinerator temperatures should be above 1000 C in the secondary chamber. The 2010 Incinerator Daily Report Logbook, provided in Appendix D2, indicate that incinerator temperatures for the secondary chamber are usually above 1000 C however there are several occasions when the incinerator does achieve sufficient temperatures. There were 16 burn cycles where the secondary chamber was less than 900 C and for 4 burn cycles the temperature of the secondary chamber temperature was less than 600 C. Temperatures less than 600 C are optimal for the formation of dioxins and furans. Explanations for these low temperatures and any corrective measures employed should be provided in the annual report.
Section 7.2 Dewatering Activities	Table 7.2 presents the turbidity and total suspended solids data for the dewatering effluent. There is not a consistent relationship between the TSS and turbidity values, and EC notes that turbidity could not be used as a surrogate for TSS for this effluent. Has an explanation for the variability been determined?
Section 7.5	The landfarm is not constructed yet, and alternative disposal methods should be identified. How are hydrocarbon-contaminated soils currently being managed, and what is the longer-term plan for managing/disposing of soils and larger-sized materials?

Section 7.12	Results for the MMER-regulated parameters are reported on Table 7.14. It is interesting to note that CN is being detected in the dewatering effluent, with the highest concentrations being seen during under-ice periods. CN was also measured in the receiving environment and the in-lake control site (Table 7.15, TPS). The 2005 Baseline Aquatic Ecosystem Report did not detect cyanide above detection limits (DL not specified) in any surface waters in any year (Section 5.2.2.1 BAER 2005). CN was not measured in 2006 – 2009, as the mill was not in production, and the 2010 AEMP CREMP report does not report cyanide measurements. The two receiving environment measurements for total cyanide were both above the CCME guideline of 0.005 mg/L free CN, so this parameter should be reviewed in the next annual report.
7.13 QAQC Sampling	Page 29 describes the sampling done to assess precision and accuracy. EC supports the implementation of sample collection procedures to ensure 10% replication of samples. Duplicate sample results are used to assess analytical precision by looking at the relative percent difference (RPD) between the results for the same sample. Data quality objectives are normally set which determine how high of a difference is acceptable and represents a valid result. Work done for the Mine's EEM uses an objective for lab replicates of 25% for concentrations that are above ten times the detection limit, and for field replicates, 50% where <u>less</u> than 10x the detection limit. The annual report uses 50% as an acceptable value for field replicates' concentrations that are <u>above</u> ten times the detection limit, and this appears to be too high. The MMER EEM Technical Guidance Document recommends 10% for metals, and 15% for TSS, where results are above ten times the detection limit. Ideally, data quality objectives should be the same for all sampling programs, to improve comparability between results. A cursory review of the QA/QC results presented in the tables shows that only a few results had a RPD above 50%, and that a similar number would additionally be above 25% RPD for results exceeding 10x the detection limit. How were the results handled that were above the data quality objective of 50%? What was the percentage of valid or acceptable data obtained?
Appendix A3 Aquatic Effects Monitoring Program – Targeted Study : Dike	AEM has done extensive work to identify effects associated with the elevated TSS which occurred due to dike construction. The supporting studies, which looked at sediment toxicity and metals bioavailability, provided useful information. Questions related to the interpretation of benthic invertebrate results will be reviewed in connection with the 2011 CREMP sampling. Further work on periphyton will also be done in 2011 to assess recovery in

Construction TSS Effects Assessment Study 2010	Second Portage Lake. EC concurs with the proposed work, and has no further recommendations for this study.
Appendix A4 2010 Causeway and Dike Construction Monitoring Report	Section 3.5.1 discussed quality control, and references Table 3.5.1. This table is missing from this document. As mentioned for the other monitoring programs, use of 50% RPD is high, and it would be useful to discuss the rationale, and how invalid data points are handled.
Appendix B1 Site Wide Water Balance Model Update	The water balance model focuses on contact water management, and uses average year climate conditions over life of mine through closure. Operational data (dewatering, mill and tailings) was used to update the model, along with the updated mine plan. The model used a maximum withdrawal rate of 400 m^3/hr for withdrawals of make-up water from the Reclaim Pond, and includes increased inputs to the pond. Reclaim treatment will need to be in place by May 2017, a change from the original prediction of end of mine life. Treated effluent will be discharged to Portage Pit Lake. What will be the means of treatment, and the target treatment quality? Attenuation pond water will not be used in the mill due to TSS concerns and logistics. Would it be feasible to use treated water from the Attenuation Pond for dust control?
Appendix C1 AWPAR 2010 Water Quality Management Report Section 2.1, June Water Quality Monitoring	EC noted that on June 13 and 14, respectively, a section of the road was excavated at KM 19 to avoid a potential wash-out and a part of the road was excavated above the high water mark to accommodate the high freshet flow at HADD bridge R02. In spite of visual confirmation of turbidity at both locations during these incidents, no on-site water quality measurements or total suspended solids (TSS) sampling were undertaken at either site. The report indicated that there was no water quality diminishment associated with either incident as evidenced by low turbidity and conductance readings taken on June 21. However, these measurements occurred well after the excavation such that any fines in the system during those events would have likely settled. Recommendation: If excavations are necessary due to freshet in future spring seasons, EC recommends AEM field personnel take in-situ readings of conductivity and turbidity and collect samples for TSS analysis.

Section 6, Conclusions and Recommendations	The report suggests that water quality has improved around HADD crossing R02, R06, R09 and R15 since road construction compared to historical water quality results but no data were provided to support this claim.
Section 6, Conclusions and Recommendations	The report recommends that 2011 water sampling along the AWPAR continue in-line with 2010 sampling. EC agrees with this recommendation provided all crossings, including non-HADD bridge crossings and culverts, are visually inspected during and immediately following freshet, weekly thereafter and during rainfall events.
Section 6, Conclusions and Recommendations	The report recommends reducing chemistry sampling from once monthly during the ice-free season to one sample as close to freshet as possible and one follow-up sample, if deemed necessary, in August. The surface water quality around the monitored HADD bridges (R02, R06, R09, R16) looks acceptable, so EC does not object to reducing sampling frequency. If a change in quality or use/activity occurs it would be appropriate to increase sampling frequency at that time.
Section 6, Conclusions and Recommendations	The report recommends removing the requirement of annual quarry surface water sampling as follow-up water sampling has not provided evidence of geochemical issues. The only quarries that were flagged for further follow-up were quarries 2, 6, 7, 16, 17, and 20. Of these, only Q7 and Q16 had standing water to sample. Q4 was also sampled as it had standing water and appears to be influenced by a perched groundwater feature. There were a few CCME guideline exceedences in all quarries. Water was not actively discharged from any of the quarries in 2010. If there are no plans to discharge from the quarries, EC feels it would be reasonable to discontinue sampling until prior to such time as discharge may occur.
Appendix F2 AEMP: Core Receiving Environment Monitoring Program 2010	The CREMP Section 2.4 notes that the top 3-5 cm of sediments are collected. EC is concerned this would "dilute" any recent deposition with underlying sediments and limit the ability to detect changes in chemistry. Sediment coring done in connection with dike monitoring in 2008 and 2009 did detect increases in metals in the top layer. EC was under the impression that further coring would be used for sediment chemistry evaluation in order to obtain the top 1-2 cm as a discrete layer. Given the slow deposition rate, EC recommends the use of cores for sediment chemistry to detect mine-

	related changes. Further discussion about using this method is requested. It is reasonable to use the upper few centimeters to assist in interpretation of benthic invertebrate results, but there is poor sensitivity for detection of changes to sediment chemistry.
Appendix F4 Groundwater Quality Monitoring Program	Two groundwater wells were sampled, and one borehole, and concentrations of constituents reported. MW03-01 has data from 2003 to 2010, and the results show a more dilute sample quality in 2010. The chloride is two orders of magnitude lower than values measured in 2008 and 2009, and TDS and conductivity are an order of magnitude lower. Is this a valid sample? Data comparability is a concern with the analysis of total metals in 2010 for MW08-02, whereas dissolved metals were analysed in 2009 and 2008. For well MW03-01 and borehole BH10-01 both total and dissolved were analysed. The purposes of the groundwater monitoring include having the ability to re-run the water quality model with current data, and to be aware of how groundwater quality may influence pit water quality at closure. EC recommends having a discussion on how data can be used/improved to meet these objectives, prior to the 2011 groundwater monitoring.