NRI Application: Non-Technical Project Proposal Description

Project Title: Assessment of Total Suspended Solids Sedimentation on Macroinvertebrate Benthic Communities in Arctic In-land Lakes.

Researcher's Name and Affiliation: Ryan VanEngen, Agnico-Eagle Mines Ltd. Meadowbank Division & University of Guelph, School of Environmental Science

Contact Information: rvanenge@uoguelph.ca; telephone: 519.400.7979

Project Location: Meadowbank Gold Mine, 70km north of Baker Lake, Nunavut

Timeframe: July, 2010 to Sept, 2011

Project Description: As industrial development continues to expand in the north, it is important to select useful tools for aquatic monitoring and evaluation of industrial disturbance. Although much data has been collected on the tolerance of fish and invertebrates to sedimentation in southern lake systems, little information has been collected on the effects of sedimentation in arctic aquatic systems. This study proposes to assess the effects of sedimention on macrobenthic invertebrate communities, an important food source for lake trout and an ideal bioassessment endpoint for monitoring industrial stressors. During this study, the Meadowbank Mine-site facilities will be used as a camp. Transportation will be limited to the use of a truck provided by the mine-site and limited to its' roadways. An aluminum motorized boat will be provided by the mine and used to collect data on the project lakes (adjacent to the mine-site). All current mine-site infrastructure will be used and no additional structures are proposed to be constructed for the purpose of this research. There will be no increase in water consumption or waste accumulated on-site from those approved in NWB License 2AM- MEA 0815.

Methodology: In conjunction with mine-site aquatic monitoring programs, water quality and benthos data will be collected in the field to evaluate the impacts of sedimentation during mine in-water dike construction. Historical mine-site data and current data will be analyzed. 2010 sampling will be conducted by the researcher and at least one locally hired (from Baker Lake) field staff. Water samples will be collected using silicon lined

tubing and a small battery operated bilge pump and will be analyzed for general water parameters, nutrients, carbon and metals. All samples will be collected and then analyzed at a CALA certified laboratory. Macroinvertebrate benthic samples will be collected using a Petite Ponar grab sampler and then sieved from the boat using a 500 micron sieve. Following collection, invertebrates will be submitted to a laboratory for taxonomic identification. At the same time, sediment samples will be collected using a petite ponar for chemistry analysis at a CALA certified laboratory. The methods of collection will generally follow the Enivronment Canada Canadian Metal Mine Effluent Regulations: Environmental Effects Monitoring (EEM) protocols.

Data and Reporting: These data will be used for: annual Meadowbank mine related reporting, for the partial full-fillment of the researcher's Masters Thesis through the University of Guelph, methodological presentation at scientific conferences, and journal publication to assist in future regulatory decision making. The proposed project data, results and conclusions will be presented during regulatory workshops, to interested parties at workshops held in Baker Lake, during mine related consultation with regional stakeholders and during face-to-face creel survey data collection in Baker Lake.