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23 May 2003

Bruce Donald  
Reclamation Manager  
Teck Cominco Limited  
Bag 2000  
Kimberly, B.Columbia  
V1A 3E1

Fax: (250) 427-8451

Dear Bruce Donald:

Subject: Effluent and Water Quality Monitoring

The purpose of this letter is to remind you that all mining companies subject to the Metal Mining Effluent Regulations (MMER) must commence with the effluent and water quality monitoring requirements set out in Schedule 5 by June 6, 2003.

I have enclosed a fact sheet on the MMER Environmental Effects Monitoring (EEM) Program. This fact sheet is intended to provide an overview of the EEM Requirements. Specific EEM requirements are outlined in the MMER and these regulations must be used in order to obtain compliance with the MMER.

Please note the following:

- Effluent characterization is to be conducted 4 times per calendar year and not less than one month apart, on aliquots of samples taken for compliance monitoring of deleterious substances.
- Sublethal toxicity testing is to be conducted on effluent from the final discharge point that potentially has the most adverse environmental impact. The testing must be conducted twice per calendar year for the first 3 years, then once per calendar year thereafter, on aliquots of effluent taken for effluent characterization.
- Water quality monitoring is to be conducted four times per calendar year and not less than one month apart, in both reference and exposure areas near each final discharge point. (These sampling stations will NOT likely be the same sampling stations used for biological monitoring.) Note that water

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quality monitoring must also be conducted at the same time and in the same sampling areas used for biological monitoring studies.

- An effluent and water quality report must be submitted to the Authorization Officer yearly, by March 31<sup>st</sup>.

If effluent is not deposited before June 6, 2003, effluent samples cannot be collected and sublethal toxicity testing cannot be conducted. The Regional Environmental Effects Monitoring Coordinator should be notified in writing if the effluent characterization and sublethal toxicity testing cannot be conducted for this reason.

The Regulations specify that water quality monitoring is to be conducted, starting no later than June 6<sup>th</sup>, 2003, four times per year and not less than one month apart. The policy intent is that water quality monitoring be conducted when effluent is being deposited in order to provide information that best contributes to the EEM program. It is therefore recommended that water quality monitoring be conducted when effluent is deposited and the same day that the sample for effluent characterization is collected. If this is not possible, mines should contact the Regional Environmental Effects Monitoring Coordinator.

Please note that according to Environment Canada's toxicity test method protocols, the sublethal toxicity tests should be initiated within 3 days of sample collection. Test results from tests up to four days after collection may be considered valid, if the Regional Environmental Effects Monitoring Coordinator was notified and concurs with the sample delay.

If you have any questions or concerns about these requirements, please do not hesitate to contact me [Tel: (780) 951-8750, Fax: (780) 495-2758, Email: Sandra.Blenkinsopp@ec.gc.ca].

Sincerely,



Sandra Blenkinsopp, Ph.D.  
Senior Environmental Effects Monitoring Coordinator

cc Peter Blackall, Authorization Officer  
Glenn Groskopf Jennifer Bernt  
Laura Johnson

## METAL MINING ENVIRONMENTAL EFFECTS MONITORING PROGRAM

### What is Environmental Effects Monitoring (EEM)?

EEM is a scientific monitoring approach that can be used to help determine the health of aquatic ecosystems potentially affected by human activity and the effectiveness of environmental protection measures.

EEM studies consist of iterative scientific evaluations of fish, fish habitat and fisheries resources. The program is set up in 2-6 year sequences of monitoring, interpretation and reporting phases, whereby the frequency and type of monitoring is dependent on the results from previous studies.

The EEM program for metal mining is based on a consensus agreement between stakeholders. The program requirements and associated guidance documents were developed through a multi-stakeholder consultation involving industry, government and community representatives.

All mines regulated under the Metal Mining Effluent Regulations (MMER), as part of the *Fisheries Act*, are required to conduct EEM as part of their authority to deposit effluent.

The MMER were registered June 6<sup>th</sup>, 2002 and were published in Canada Gazette II on June 19<sup>th</sup>, 2002 (SOR/DORS/2002-222).

### EEM Objective:

The objective of the EEM program is to evaluate the effects of mine effluent on fish, fish habitat and the use of fisheries resources.

### What are the Main EEM Requirements?

Section 7 of the MMER obligates the mine to: conduct EEM studies, submit reports within prescribed timelines and use standards of good scientific practice to conduct studies and interpret results. The "Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring" provides recommended scientific practices that can be used to meet the EEM requirements.

Section 23 of the MMER requires mines to submit their data to Environment Canada in a written and electronic format.

Section 32 of the MMER outlines the requirements for mines that wish to obtain recognized closed mine status.

Schedule 5 of the MMER presents the specific EEM requirements and is divided into 2 parts:

- Part 1: Effluent and Water Quality Monitoring*
- Part 2: Biological Monitoring*

### Effluent and Water Quality Monitoring:

The objectives of effluent and water quality monitoring are to monitor changes and trends in the receiving environment and collect supporting information to help interpret biological monitoring data. This portion of EEM requires:

- Effluent characterization: conducted 4 times per calendar year on aliquots of samples taken for compliance monitoring of deleterious substances. Hardness and alkalinity must be measured, as well as the total concentrations of: Al, Cd, Fe, Hg, Mo, NH<sub>3</sub>, NO<sub>3</sub>.
- Sublethal toxicity testing: conducted twice per calendar year for the first three years, then once per year thereafter on aliquots of effluent taken for effluent characterization. Sublethal toxicity is tested using a fish, an invertebrate, a plant and an algal species. Mines can use historical sublethal toxicity data to reduce this frequency, if the mine has data to meet the requirements.
- Water quality monitoring: conducted four times per calendar year in both reference and exposure areas near each final discharge point and at the same time and in the same sampling areas as biological monitoring studies. The parameters measured for water quality monitoring are the same as those measured for effluent characterization plus: temperature, dissolved oxygen, deleterious substances and pH.

An effluent and water quality monitoring report must be submitted to Environment Canada yearly, by March 31<sup>st</sup>. This report outlines when and where samples were collected, the results of effluent characterization, sublethal toxicity testing and water quality monitoring, methodologies and method detection limits, and the QA/QC implemented.

<sup>1</sup> Note: this factsheet is intended to provide an overview of the EEM requirements. Specific EEM requirements are outlined in the MMER and these regulations must be used in order to obtain compliance with the MMER.

### Biological Monitoring:

The objectives of biological monitoring are to determine whether or not there are effects on fish, fish habitat and the use of fisheries resources. This portion of the EEM requires:

- A fish survey (if the concentration of effluent is >1% within 250 m of a final discharge point)
- A fish tissue analysis (if the effluent characterization identifies a concentration of total mercury in the effluent equal to or greater than 0.10 µg/L)
- A benthic invertebrate community survey.

### Study Design

Study designs describe how, when, where, and what biological monitoring studies will be conducted, and present the scientific rationale for the EEM studies.

The first study design must be submitted by December 6, 2003. However, if historical biological data exists at a mine, the mine may submit a report that contains the scientific results of the historical study by December 6, 2003. These latter mines would then submit their first EEM study design by December 6, 2004.

The second and subsequent study designs must be submitted at least 6 months prior to conducting field monitoring.

### Data Assessment

Statistical analyses are conducted on specific endpoints to determine if there are significant differences between the exposure area and the reference area. A significant difference represents an "effect" in EEM. Fish endpoints are indicators of population growth, reproduction, condition and survival.

Benthic invertebrate endpoints include: abundance, richness, Simpson's Diversity Index, Bray Curtis Index. An effect in fish tissue is defined as measurements of total mercury that exceed 0.45 µg/g wet weight in exposure fish tissue, and that are statistically different from reference fish.

### Interpretative Reports

Interpretative reports outline changes in the study designs, present the monitoring and data interpretation results, the QA/QC procedures undertaken and the schedule for the next EEM phase.

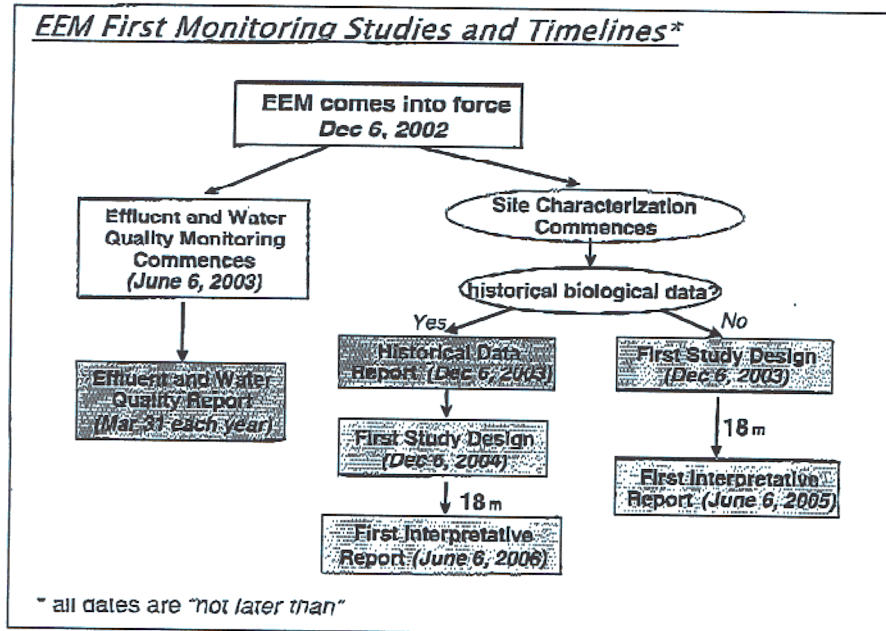
For mines that did not submit a historical data report, the first interpretative report must be submitted by June 6, 2005. For mines that did submit a historical data report by December 6, 2003, the first interpretative report must be submitted by June 6, 2006.

The submission of the second and subsequent interpretive reports will depend on the results of previous monitoring. Generally, the frequency will be every 36 months; however it may range from 24 months (if effects are seen in all 3 components) to 72 months (if no effects are seen in any component of 2 consecutive biological monitoring studies).

### Recognized Closed Mines

A mine is required to conduct a complete biological monitoring study, including the submission of an interpretive report, within 36 months of the owner or operator of the mine providing written notice of its intent to close. Effluent and water quality monitoring is continued until the mine obtains recognized closed mine status.

### EEM First Monitoring Studies and Timelines\*



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