Patty,

Please find attached the final DDMI submission which responds to the May 23, 2007 interventions. I have also attached a copy of the presentation we intend to give.

Gord
May 30, 2007
Ms. Violet Camsell-Blondin
Interim Chair
Wek’èezhii Land and Water Board
Box 32
Wekweeti, NT X0E 1W0

Re: Final Submission for Reconvened Hearings – Response to Interventions

DDMI received two interventions that were submitted to the WLWB on May 23, 2007 in preparation for the reconvened WLWB public hearing June 4 and 5, 2007:

• Indian and Northern Affairs Canada (INAC)
• Tlicho Government (Tlicho)

As requested by the WLWB, the following are DDMI’s specific responses to these submissions. DDMI intends to also respond to aspects of these interventions in our presentation at the public hearing.

1. Treatment Technology Based Limit

The NWT Water Board followed a generally accepted approach for determining effluent quality criteria (EQC) for Water License N7L2-1645. In April 2000, the Effluent Quality Criteria Subcommittee of the Technical Advisory Committee, established by the NWT Water Board, presented a report entitled “Development of Effluent Quality Criteria for the DDMI Class A Water Licence: Recommendations to the NWT Water Board” (referred to here as the “TAC Recommendations”) – this document was marked as Exhibit 1 to the November 7-10, 2006 WLWB public hearing. Among the “Guiding Principles for Developing Effluent Quality Criteria” is:

“The numerical criteria should not be higher than the level that can be achieved through the application of best available treatment technology.” [emphasis added]

Environment Canada (1999) and Indian and Northern Affairs Canada (2002) reviewed technologies applicable to the management of Canadian mining effluent and mining effluent of the Northwest Territories respectively. The definition of best available technology (BAT) used in both is:
“Ideally, factors that should be considered when establishing BAT for the treatment of contaminants in mining effluents include:

- the full scale demonstration of the technology in treating mine waters under Canadian conditions [Nordic climatic conditions for NWT];
- the availability of reliable data on the performance of the treatment process. This provides an assessment of confidence of being able to meet a given effluent limit;
- there needs to be an adequate technical basis to allow the system to be engineered;
- the system should have a reasonable cost (costs will be site-specific); and
- the technology train should be capable of producing a non-acutely toxic effluent.”

INAC and Tlicho have inappropriately re-defined treatment technology. In their definition management practices are equivalent to treatment technologies and should be used as the basis for developing an EQC.

Technology-based EQC or limits are established based on treatment technologies not management practices. DDMI is not aware of any documented procedure or approach to setting an effluent quality criteria based on management practices.

The MMER standards are based on environmental protection and demonstrated control technology – not on management practices. (Reference: Regulatory Impact Statement for the MMER, Canada Gazette Part II, Vol. 136, No. 13; see also INAC, April 2002). It is also our understanding that USEPA technology standards are also based on demonstrated treatment technology – not on management practices.

For the De Beers Canada Snap Lake Project, INAC recommended a water quality based EQC for total ammonia of 21 mg/L (this document was marked as Exhibit 3 to the November 7-10, 2006 WLWB public hearing), see the INAC Intervention, page 9, Table 6.1. No technology based limit was proposed as no treatment technology was identified. INAC also did not propose a technology-based EQC based on estimated performance from ammonia management practices.

DDMI does not agree that a technology- based EQC can be based on management plans. As we have shown above technology-based EQC or limits are based on treatment technologies that have been fully demonstrated and for which reliable data is available to provide the necessary level of confidence that a specific EQC can be met.

The modelling based estimates provided by the WLWB Expert Panel are not equivalent to the reliable treatment performance monitoring data required to establish a technology-based EQC.

An additional NWT Water Board guiding principle is that:

- “loadings of contaminants to Lac de Gras should be minimized through the use of best management practices and the timely implementation of various contingency plans.”

This guiding principle appropriately acknowledges a separate role for management practices, one that is not directly related to the derivation of the numeric value for an EQC. Approval of the Ammonia Management Plan will ensure the implementation of this principle for ammonia.
2.0 Additional Toxicity Monitoring

INAC proposes an additional requirement for acute toxicity testing of Lac de Gras water from the edge of the initial mixing zone (SNP 1645-19). INAC bases this proposal on the hypothesis that in Lac de Gras the benthic invertebrate *Hyalella azteca* will be exposed to elevated levels of ionized ammonia from the treated DDMI effluent discharge, without the protective buffer provided by the sodium and potassium ions also present in the treated.

DDMI does not support this proposal for the following reasons:

1. No plausible explanation has been provided or can be envisaged as to how ammonium ions in the effluent could be discharged to Lac de Gras without the potassium and sodium ions also present in the effluent.

2. Ammonium, sodium and potassium ions will be dispersed into Lac de Gras through identical physical processes (dispersion) resulting in identical levels of dilution.

3. Sodium and potassium levels in the final effluent are shown in Attachment #1. Major ions (including sodium and potassium) are expected to increase over time as deeper groundwater with higher major ion concentrations, seep into the mine (DDMI 1998 pg 2-25).

4. Even if levels of total ammonia approached the EQC values of 10 mg/L maximum average and 20 mg/L maximum daily in the final effluent, the concentrations of ammonia would be well below levels expected to be acutely toxic to *Hyalella azteca* in the presence of expected sodium and potassium ions.

5. *Hyalella azteca* is not a benthic invertebrate found in Lac de Gras (see DDMI 2007).

Possible effects (chronic and acute) of the treated effluent discharge on the benthic invertebrates of Lac de Gras are more appropriately assessed through the direct monitoring of the benthic invertebrates that actually live in Lac de Gras and are continually exposed to actual effluent concentrations. Benthic invertebrate monitoring has been fully included in the AEMP (DDMI 2007).

Please see also DDMI’s Response to Submissions October 30, 2006 (pg 13).

3.0 Ammonia Record of Agreement

The Tlicho Government submission of May 22, 2007, point #4, indicates that it was the Tlicho Governments’ understanding that the mediated Record of Agreement and its incorporation into the Water License by the Mackenzie Valley Land and Water Board specified that the EQC for ammonia was to be based on levels practically achievable.

As submitted in DDMI’s Outline of Legal Position of February 23, 2007, there is no commitment or direction in the Record of Agreement or in the current Water License which specifies that the long-term EQC is to be set at the “lowest practical level”.

In the Record of Agreement, DDMI committed to doing the studies necessary for the Ammonia Discussion Paper, and to presenting an Ammonia Management Plan. The Record of Agreement does not contain any agreement by DDMI that the EQC, to be determined by the Board, was to be based on lowest practical levels.
Thank you for the opportunity to provide these responses.

Regards,

Gord Macdonald

cc Patty Ewaschuk (WLWB)
Attachment 1: Sodium and potassium concentrations – 1645-18.

References Cited:


Attachment 1 – SNP Results – Sodium and Potassium

Sodium 1645-18

Potassium 1645-18
DDMI Submission to WLWB Water License N7L2-1645
Renewal Public Hearing
June 4 & 5, 2007 Yellowknife, NWT

Outline

• Overview and Objectives
• Deriving Effluent Quality Criteria
• Revisions to Ammonia Management Plan
• Summary of DDMI Position
Overview

DDMI believes that there is general consensus to achieve two objectives:

1. Protection of the environment by identifying environmental protection limits; and
2. Establishing measures and objectives to maintain ammonia concentrations at the lowest practical levels.

Each of these objectives is valid, and each should be incorporated in the most appropriate place in the regulatory provisions.

Objective 1 – Environmental Protection Limits

- The Water License EQC for ammonia be confirmed at 10 mg/L maximum average concentration and 20 mg/L maximum grab sample; and
Objective 2 – Lowest Practical Levels

• The AMP be revised to include
  • Addition of an objective to identify and implement ammonia management options to achieve the lowest practical ammonia concentrations in the treated mine water discharge to Lac de Gras.
  • Confirmation that concentrations of 6 mg/L (maximum average) and 12 mg/L (maximum daily) total ammonia are predicted to represent the expected lowest practical level (2008 onward)

Rationale

• Gives full consideration to the two objectives and uses the appropriate regulatory tool to achieve each objective
• Meets environmental protection objective and provides a clearly define threshold
• Meets objective of controlling ammonia levels to lowest practical levels through an approved AMP
• Meets the objectives of adaptive management and continuous improvement through regular review of AMP and lowest practical levels
• Consistent with approaches – other mines and other parameters
• Meets statutory requirement of the Board
• Recognizes the responsibility of the company to identify and adopt practical measures for managing ammonia
NWT Water Board Guiding Principles for EQC

• “Numerical EQC must be established at levels that are sufficient to protect the designated uses of Lac de Gras”

  • An EQC of 10 mg/L average and 20 mg/L maximum will protect the designated uses of Lac de Gras.

• “Protection of the designated uses of Lac de Gras can be facilitated by developing and attaining the ambient water quality objectives (WQOs) for the lake”

  • An EQC of 10 mg/L average and 20 mg/L maximum will attain ambient levels below the ambient WQO’s
• “Numerical EQC can be calculated from the ambient WQOs and appropriate dilution factors”
  
  • The values of 10 mg/L average and 20 mg/L maximum were calculated in this way.

• “the numerical EQC should not be higher than the levels that can be achieved through the application of best available treatment technologies”
  
  • no treatment technologies have been identified that are applicable to the DDMI mine site.
  • values of 10 mg/L average and 20 mg/L maximum are consistent with this principle.
• “Loadings of contaminants to Lac de Gras should be minimized through the use of best management practices and the timely implementation of various contingency plans”

  • The ammonia management practices identified in the draft AMP will minimize loadings of ammonia to Lac de Gras.

Revisions to draft AMP
(see also DDMI May 23, 2007 submission)

• Addition of an objective to identify and implement ammonia management options to achieve the lowest practical ammonia concentrations in the treated mine water discharge to Lac de Gras.

• Confirmation that concentrations of 6 mg/L (maximum average) and 12 mg/L (maximum daily) total ammonia are predicted to represent the expected lowest practical level (2008 onward);
Explosives Management

• Reduction of explosives residence time from four days to two days when blasting new water collection sumps in the open-pit operations;

• Revision of the Stemming Standard Operating Procedures to specify a minimum 45 minute period between loading and stemming of a blast hole;

• Field experimentation with the use of blast hole liners in flowing holes and in winter conditions, to evaluate the operational practicality of this ammonia measure.

Liner Challenges
Residence Time Targets

- Reducing the residence time would result in smaller blast patterns and more frequent blasts. For each blast:
  - Large digging equipment must be moved a safe distance from the blast
  - Pit operations must be suspended during the final clearance, blast and post blast inspection
  - Drills must be moved off patterns prior to final tie-in

- Regular blastholes
  - Some blastholes in the pattern could be wet but are unlikely to be flowing
  - lower AN loss potential - 4 day residence time

- Sump blastholes
  - Most blastholes in the pattern will be wet and some may be flowing
  - higher AN loss potential - 2 day residence time

Summary of DDMI Position

- Expert evidence has established that to protect the Lac de Gras environment from acute or chronic toxicity the EQC should be 10 mg/L average 20 mg/L maximum.

- DDMI recommends that the WLWB confirm the Water License EQC for ammonia at 10 mg/L maximum average concentration and 20 mg/L maximum grab sample
The Expert Evidence of the WLWB Expert Panel is that the measures identified in the draft Ammonia Management Plan will result in the mine achieving a final effluent with the lowest practical ammonia concentration and that those levels are:

- 6 mg/L average 12 mg/L maximum.

DDMI recommends that the WLWB allow DDMI to finalize the Ammonia Management Plan with the revisions proposed including the objective of achieving 6 mg/L average and 12 mg/L maximum.