



Snap Lake Environmental Monitoring Agency
Main Floor, Lahm Ridge Tower
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Phone: 867-765-0961 FAX: 867-765-0963
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Shannon Hayden
Regulatory Officer
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
P.O.Box 2130
Yellowknife, NT X1A 2P6

File: Water Licence Annual Reprt

July19, 2010

RE: ARD 2009 and AEMP 2009

Dear Ms. Hayden,

Snap Lake Environmental Monitoring Agency (SLEMA) is pleased to provide Mackenzie Valley Land and Water Board (MVLWB) with the following comments related to the following reports.

- 2009 Acid Rock Drainage and Geochemistry Monitoring (ARD 2009), and
- Aquatic Effects Monitoring Program 2009 Annual Report (AEMP 2009, Section 2 Water Quality).

ARD 2009

The report put forward a lot of recommendations for ongoing adaptive management, water quality monitoring and geochemical characterization program at the Mine. SLEMA supports all of them, especially the one about updating water quality predictions and loading trends, and the one about monitoring of bogs downstream of the Emulsion Pad and the new Ammonium Nitrate (AN) Storage Facility (SNP 02-07 and 02-09).

Overall, the report is adequate and meets the annual ARD reporting requirement of the Water Licence (MV2001L2-0002).

AEMP 2009

Only Section 2 Water Quality was reviewed, and two concerns were raised.



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Fluoride

It is reported that approximately **one third** of the fluoride results in 2009 Snap Lake samples collected were marginally higher than the interim CCME guideline for inorganic fluorides of 0.12 mg/L. Although the toxicity of fluoride is expected to decrease with increases in hardness, chloride and calcium, it will remain a concern till De Beers provide further evidence to convince stakeholders that the observed fluoride concentrations are not expected to cause effects to aquatic biota in Snap Lake.

De Beers planned to review the application of the fluoride guideline because there are known ameliorating factors that would likely apply in Snap Lake, which could potentially allow development of a site-specific fluoride guideline for Snap Lake.

It is recommended that De Beers conduct literature review for the impacts of fluoride on aquatic life and share the review results with the stakeholders.

Total Dissolved Solids

The observed whole-lake average concentrations of total dissolved solids (TDS) show a clear uptrend, which is much higher than the Environmental Assessment Report (EAR) predictions. The reason is the higher than predicted TDS loads in the minewater.

De Beers acknowledged that the uptrend indicated a potential for TDS to increase above EAR predictions over the long-term. The initial water modeling conducted by SLEMA displayed the “potential”.

A highly simplified “box” model was applied to simulate the whole-water average TDS concentration in Snap Lake. By using the historical data, the model was calibrated and the correlation coefficient between the observed TDS dataset and the simulated TDS dataset is 0.993 (see Figure 1). It demonstrated the model could be used to predict future TDS concentrations in Snap Lake.

Two scenarios of TDS loads were assumed (see Figure 2). Predictions for the two scenarios were made up to December 2028 (see Figure 3 and Figure 4). The maximum TDS concentrations of Scenario #1 are slightly above 300 mg/L, but the counterparts of Scenario #2 are above the Water Licence limit – 350 mg/L, as early as January 2026.



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Figure 1. Simulation of TDS Concentrations in Snap Lake

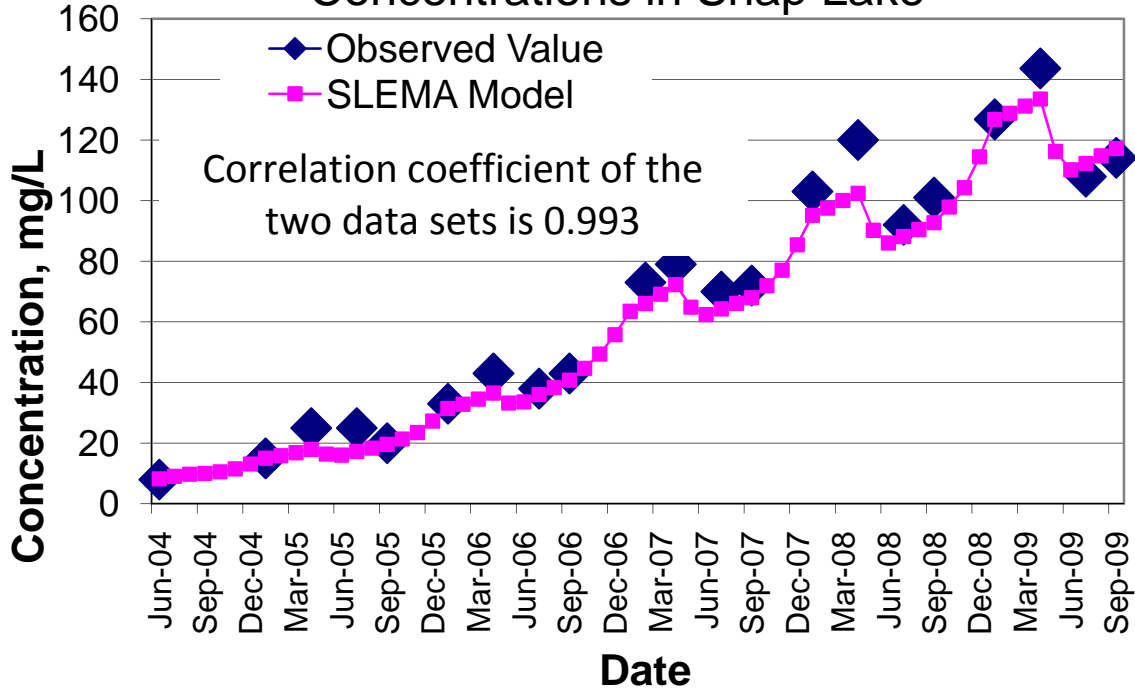
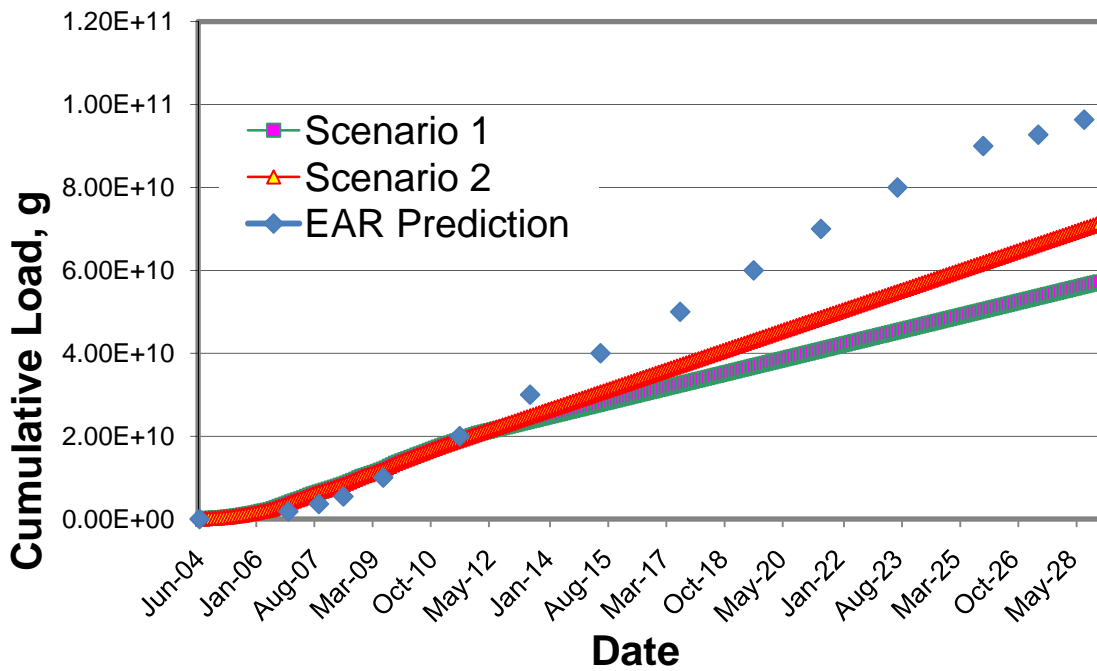


Figure 2. Accumulative TDS Load to Snap Lake





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Figure 3. Prediction of TDS Concentrations in Snap Lake - Scenario #1

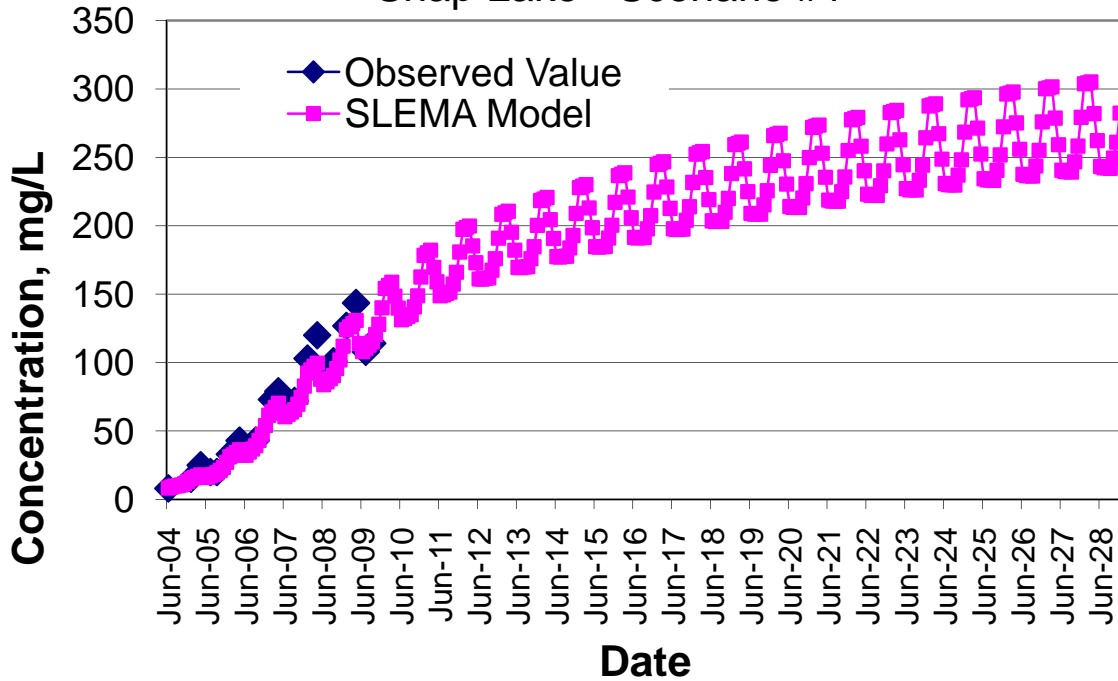
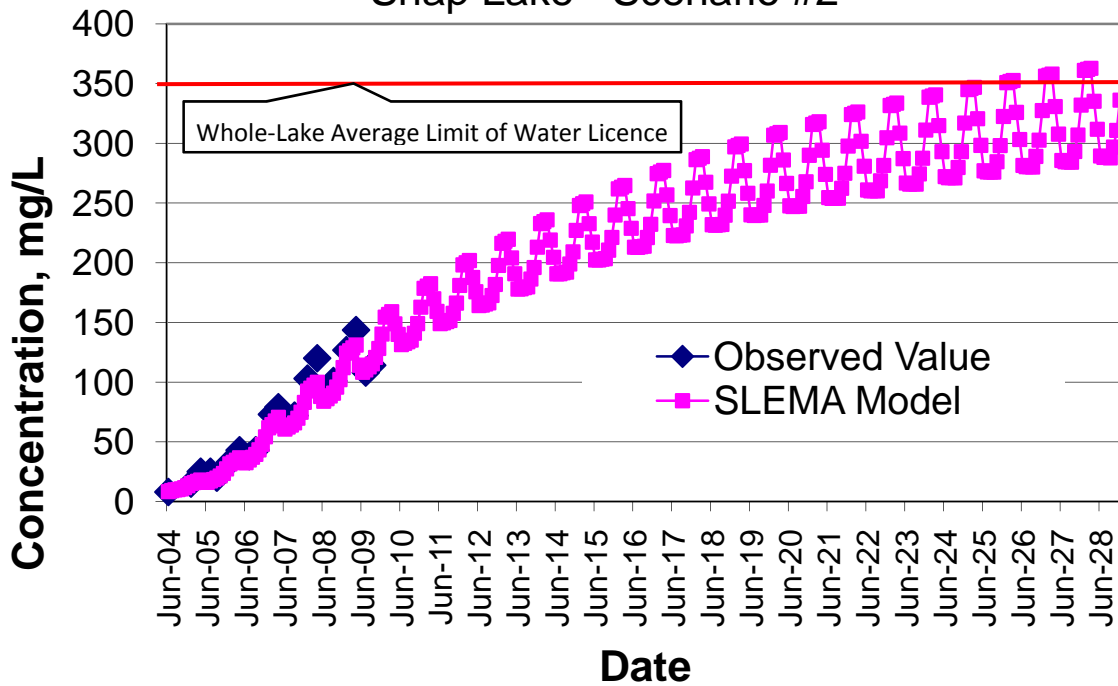


Figure 4. Prediction of TDS Concentrations in Snap Lake - Scenario #2





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It is noted that the TDS loads of Scenario #2 are higher than Scenario #1 but lower than EAR predictions. If the model predictions are trustworthy, and TDS loads follow the EAR predictions, the maximum TDS concentrations in Snap Lake might be much higher than the Water Licence limit. As a result, the serious concern about minewater and TDS concentrations in Snap Lake is raised.

It is strongly recommended that De Beers re-assess its mining plan and re-evaluate its water model system, and provide up-to-date predictions for stakeholders to review. If De Beers could not complete a full water modeling work during the 5-year AEMP review, preliminary water modeling work is recommended and preliminary modeling results may provide guidance for the AEMP review and help De Beers refine its AEMP.

If you have any questions whatsoever please feel free to contact the undersigned or David White at 867-765-0961 / dwhite@slema.ca.

Sincerely,

(original signed by)

Rachel Crapeau
Vice Chairperson

cc: Indian and Northern Affairs Canada
Environment and Natural Resources, GNWT
Environmental Canada
De Beers Canada Inc.