The Government of the Northwest Territories

Public Hearing Presentation

Diavik Diamond Mines (2012) Inc. Diavik Diamonds Project
Water Licence Amendment
W2015L2-0001

Yellowknife, NT
February 12th, 2016
Presentation Overview

• Introduction/Background
• Compliance Limits for TSS
  – TSS Limits
  – Application for a 7-day and 30-day average time period
  – Action Levels
• Monitoring
• Closing
Introduction and Background

• DDMI has applied to amend Part H, Item 31 of the WL, namely to amend its existing compliance limit for Total Suspended Solids (TSS) from a daily grab sample of 25 mg/L to a 30-day moving average of 25 mg/L.

• Additionally, DDMI requested a change to the placement of SNP locations within the WL.

• ENR has no concern related to the latter request but have outlined concerns and comments related to TSS limits.
Compliance Limits for TSS

- CCME guidelines recommend a daily limit of 25 mg/L and a 30-day average of 5 mg/L.
- GNWT notes that the most sensitive species/life stage used in establishing the CCME guideline is not likely to be at risk within the potentially impacted area.

<table>
<thead>
<tr>
<th>Aquatic life — Freshwater, estuarine, and marine</th>
<th>Guideline value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Suspended sediments</strong></td>
<td></td>
</tr>
<tr>
<td>clear flow</td>
<td>Maximum increase of 25 mg L⁻¹ from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg L⁻¹ from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d).</td>
</tr>
<tr>
<td>high flow</td>
<td>Maximum increase of 25 mg L⁻¹ from background levels at any time when background levels are between 25 and 250 mg L⁻¹. Should not increase more than 10% of background levels when background is &lt;250 mg L⁻¹.</td>
</tr>
</tbody>
</table>
Compliance Limits for TSS

• While ENR concurs that the CCME guideline may not be suitable, an appropriate limit must still be established.
• GNWT retained the services of MESL to provide advice on an adequate compliance limit related to TSS.
• MESL conducted an assessment of the proposed limit based on TSS limits, exposure periods and aquatic species occurring in the lake.
Compliance Limits for TSS

• Of note, when assessing potential effects to the receiving waters of Lac De Gras, a potential exposure time of 106-days was considered.

• It is important to note that although the GNWT understands that DDMI is not anticipating a TSS level of 25 mg/L over background for the entire 106-day operating season, this is the potential upper limit of the exposure period at DDMI’s proposed TSS limit, and the basis upon which the calculations should be conducted.
Compliance Limits for TSS

• As the effects of TSS are directly linked to both concentrations and exposure time, the GNWT has recommended multiple TSS limits to be assessed over longer time periods.

• The GNWT feels that this is required to ensure that the aquatic environment in Lac de Gras is adequately protected.
Compliance Limits for TSS

- ENR recommends the following TSS limit:
  - A maximum daily TSS limit of 50 mg/L (max grab).

- No lethal, para-lethal, or major physiological effects on non-salmonid fish are predicted at this level of exposure to TSS.

- Proposed limit is achievable based on past operational information:
  - ENR notes the maximum daily average during 2015 was 32 mg/L and was specific to an isolated discharge event related to a combination of high winds and a malfunctioning silt curtain.
Compliance Limits for TSS

- ENR recommends the following TSS limit:
  - 7-day moving average TSS limit of 25 mg/L (max avg.).
- No lethal, para-lethal, or major physiological effects on non-salmonid fish are predicted at this level of exposure to TSS.
- Proposed limit appears achievable based on past operational information:
  - There was only one occurrence of TSS above 25 mg/L during the 2015 open water season, and very few values above 10 mg/L. Proposed limit appears achievable even when factoring in the occurrence of isolated weather events or malfunctions.
Compliance Limits for TSS

• ENR recommends the following TSS limit:
  - 30-day moving average TSS limit of 11 mg/L (long term avg.).

• No lethal, para-lethal, or major physiological effects on non-salmonid fish are predicted at this level of exposure to TSS.

• Proposed limit appears achievable based on past operational information.
  – ENR notes that the 30-day average for the 2015 operating season did not exceed 5 mg/L.
Application of Averages

• ENR was initially concerned that any high concentrations during the initial construction period might be dismissed, but now recognizes that all values will be factored into an overall exposure assessment.

• ENR remains concerned about the potential for delays in detecting higher concentrations and implementing mitigation for any non-compliance events during the initial 30 days of monitoring.
Action Levels

• DDMI noted that if the proposed amendment to a 30-day average is approved, updated trigger levels would include a combination of daily grab samples, 3-day moving average, 5-day moving average and 30-day moving average.

• ENR supports updating the A21 CEMP to reflect any modifications to the TSS limit within the Water Licence.

• Additionally, this updated CEMP should include detailed information related to the utilization of the TSS-Turbidity correlation curve.
Action Levels

ENR recommends that the A21 Construction Effects Monitoring Plan (CEMP) be updated prior to the 2016 construction period. A draft CEMP should be developed for review with a final plan to be approved prior to construction. The CEMP should include action levels which ensure compliance levels approved by the WLWB are not exceeded.

ENR recommends that the A21 Construction Effects Monitoring Plan include detailed information related to the utilization of the TSS-Turbidity correlation curve in the establishment of trigger levels.

ENR recommends that the A21 Construction Effects Monitoring Plan include mitigative actions for situations when TSS triggers and limits are exceeded.
Monitoring

• Compliance monitoring during dredging and dike construction is an essential component of the in-lake construction management process (i.e. as conducted under the surveillance network program; SNP).

• Due to the nature and location of in-lake construction activities, the levels of TSS and turbidity in waters within Lac de Gras are likely to vary substantially over time and space.

• Evaluation of exposure of aquatic organisms to these substances necessitates design and implementation of an in-lake construction monitoring program that provides reliable information on the concentrations of TSS and turbidity in Lac de Gras in the vicinity of the A21 Pit construction activities.
Monitoring

ENR recommends collection of three water samples at each of the three SNP Stations that are located at the edge of the IDZ (i.e., 1645-82, 1645-83, and 1645-84) each day to support determination of TSS concentrations. These water samples should be collected at three water depths at each sampling station, including surface (i.e., 1 m below the surface), mid-depth, and bottom (i.e., 1 m above the sediment-water interface).

ENR recommends collection of continuous turbidity data at each of the three SNP Stations that are located at the edge of the IDZ (i.e., 1645-82, 1645-83, and 1645-84). Continuous turbidity monitoring should be conducted at mid-depth at each sampling station. In addition, depth-turbidity profiling (i.e., collection of matching turbidity and depth data, at 1 m intervals in the water column) should be conducted at each sampling station each day at the same time that surface water samples are collected for TSS measurements.
ENR recommends the collection of turbidity measurements periodically each day at temporary sampling stations located within the construction area (i.e., within 100 m of the centerline of the dike and/or within 100 m of primary construction activities; e.g., dredging, rock placement, etc.).

ENR recommends that continuously-collected turbidity data be used to support estimation of TSS levels in Lac de Gras and that those estimates of TSS concentrations be used to support management decisions related to in-lake construction mitigation (i.e., implementation of the response plan).
Questions?