

# MEETING REPORT

**Main Issue:** Updated Receiving Water Quality Predictions, Site-specific Water Quality Objectives, and Aquatic Risk Assessment

**Attendees:**

**Meeting Date:** 18 April 2012

- |                                     |                               |
|-------------------------------------|-------------------------------|
| (1) Nathen Richae [AANDC]           | (2) Robert Jenkins [AANDC]    |
| (3) Paul Green [AANDC]              | (4) Barry Zadjdlik [AANDC]    |
| (5) Ginger Gibson [Tlcho]           | (6) Rick Schryer [Fortune]    |
| (7) Jason Parvianinen [Golder]      | (8) John Faithful [Golder]    |
| (9) Tammie Morgan-Gray [Golder]     | (10) Rein Jaagumagi [Golder]  |
| (11) Theresa Repaso-Subang [Golder] | (12) Andrea Amendola [Golder] |
| (13) Jen Gibson [Golder]            |                               |

## Summary of Discussion:

### Updated Receiving Water Quality Predictions

The below summarizes the questions asked by Aboriginal Affairs and Northern Development Canada (AANDC) during the call.

AANDC requested explanation on why predictions for Peanut Lake water quality concentrations are higher than end-of-pipe (EoP). Golder provided the following explanation:

This is primarily to do with dust deposition, which includes a highly conservative loading of metals associated with deposition of fugitive dust emissions. Fugitive dust deposition was noted as the largest source of projected changes in receiving water quality for the majority of metals during construction and operations. Winter dust emissions are very conservative, as there are no publically available data to support the winter attenuation of fugitive dust from haul traffic, despite anecdotal evidence and intrinsic understanding that these emissions are very low in winter conditions. In addition, a conservative assumption was incorporated into the model in that the fraction of deposited dust less than 10 microns ( $\mu\text{m}$ ) in diameter are assumed to remain in suspension indefinitely within the receiving waters, which is unlikely to happen. Based on settling velocities for 2.5 micron particles, a large portion of the less than 10  $\mu\text{m}$  size fraction would be expected to settle out under ice within in a month or two.

AANDC requested explanation if re-suspension and re-entrainment from sediments was accounted for. Golder provided the following explanation:

The baseline receiving environment model was calibrated to existing conditions and this calibration was intended to account for natural re-suspension. The receiving environment model accounted for background suspended sediment and mass fluxes between TSS and the water column. The receiving environment model did not specifically account for dissolved fraction mass flux between the water column and lake bed sediment, but rather for an overall calibration for observed baseline concentrations. Concentrations in background flows entering Nico, Peanut, and Burke lakes were sampled on a daily basis from water quality distributions, derived from data from samples collected from adjacent and upstream watersheds during baseline programs.

After reviewing Table 1 of the technical memorandum (Golder 2012a), AANDC requested clarification if dust was driving the EoP concentrations for 95th percentile and how realistic these numbers are. Golder provided the following explanation:

Yes, the highly conservative dust deposition numbers are the driver. However, it is noted that the numbers assumed are anticipated to be considerably lower than those predicted. It is likely that there will be attenuation of dust in the winter but an estimate of winter mitigation could not be put forward. As presented in the DAR, a dust mitigation plan will be in place and will manage dust on-site

AANDC requested clarification if there was an allowance for seepage in the Co-Disposal Facility (CDF). Golder provided the following explanation:

Seepage from the CDF will be collected in the lined Seepage Collection Ponds (SCPs), and it is anticipated that seepage from the SCPs will be minimal. A set of very small seepage rates from the site during the open water season were allotted as part of the site water balance and were included in the receiving environment model.

AANDC requested if Golder could provide a response to the breakdown of the loadings to the receiving environment. Golder provided the following explanation:

A breakdown can be provided on the basis of dust deposition vs effluent discharge.

#### Site-specific Water Quality Objectives

Throughout the conference call on 18 April 2012, there were various discussions around the development of the SSWQOs, how they are derived, and path forward. The below summarizes the general discussion.

The development of the SSWQOs, as a requirement of the Terms of Reference issued for the NICO Project, were developed for the environmental assessment process to be protective of receptors in the aquatic environment of the receiving lakes and provide a benchmark for the risk assessment. Fortune has had conversations with the Wek'eezhii Land and Water Board to work to developing action thresholds as part of the work required at the regulatory phase.

During the conference call, AANDC brought forth that only using toxicological information to derive SSWQOs ignores best management practices of pollution and prevention principles, as outlined in the Water and Effluent Quality Management Policy (MVLWB 2011). Objectives should also consider existing conditions and what can be readily achieved. If there are difficulties meeting CCME or background type concentrations, then consider using toxicity based objectives.. The SSWQOs are critical as they will be used to calculate the EQCs at the EoP.

Aboriginal Affairs and Northern Development Canada acknowledges Fortune's approach in the treatment system changes from IX to RO and believes a RO system is a good news story for the North. By committing to RO, it shows doing what is reasonably and practicably feasible for the pollution and prevention principles.

It was felt by AANDC that we are running into a terminology issue. AANDC defines a WQO as the number to be achieved at the edge of a mixing zone. AANDC suggested changing the title of column three in Table 1 (Golder 2012a), along with all references to SSWQOs to "toxicity thresholds" or an equivalent wording that does not connote a SSWQO. Fortune and Golder agreed to this; however, it is noted that it does not change how the objectives or the rationale as to why they were derived.



AANDC requested if Golder and Fortune could put thoughts together on an appropriate mixing zone. Golder provided the following explanation:

In the DAR, Appendix 7.IV of the water quality Key Line of Inquiry, presented a mixing zone in general terms; however, a specific mixing zone was not identified. Golder can provide a recommendation; however, at this time a complete analysis has not been completed.

#### **Aquatic Risk Assessment**

After review of the technical memo (Golder 2012b) it was noted, and is a concern, that the food-web contribution to exposure by aquatic life was not considered and rationale for exclusion of this potential exposure pathway was requested. It was also mentioned that a recent paper by Franklin et al. (2005) identified that dietary exposure can contribute significantly to tissue accumulation in fish with uptake of cadmium from dietary exposure being greater than uptake from waterborne exposure. The following response was provided by Golder:

In the risk assessment for the NICO Project, the dietary input would be a minor contributor; therefore, the focus of the assessment was on the water column as the dietary number would be small. Golder would review referenced paper for further consideration.

AANDC requested that additional rationale be provided for the elimination of essential elements such as calcium, magnesium, potassium, and sodium as CoPCs in the aquatic risk assessment.

No direct response was provided during the conference call; however, Golder indicated a rationale could be provided.

#### **Other**

The Tłıchǵ Government inquired as to when the Bench Scale Passive Treatment Testing Results, as referenced in Golder (2012a), would be made available.

Fortune indicated this memo would be issued shortly and posted on the Public Registry.

#### **Developer Commitment(s):**

See below action items.

#### **Outstanding Issue(s) for the Party:**

See below action items.

#### **Action(s):**

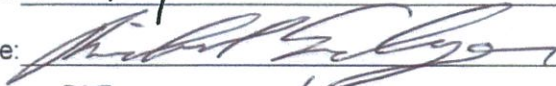
- (1) AANDC = Provide information from other operators who have completed trials on different types of dust suppressants in the North (i.e., specifically for ramps), pending approval for distribution from the Land and Water Board.
- (2) AANDC = Will contact the Wek'eezhii Land and Water Board (WLWB) to continue with discussions (prior to the Technical Reports being produced) around water quality objectives in the future between Fortune, AANDC, and the Wek'eezhii Board.

- (3) Golder = Provide an update of Table 1 of Golder (2012a) to include correction for incorrect nitrate concentration values.
- (4) Golder = Provide a breakout of the annual loading from various project-related sources to Nico, Peanut, and Burke lakes. These include: effluent from the diffuser, dust, and seepage from the site.
- (5) Golder = Provide a recommendation for a mixing zone. Although this is discussed in general terms in the water quality key line of inquiry, Appendix 7.IV, a specific demonstrable point of assessment is necessary.
- (6) Golder = Provide rationale for the elimination of essential elements, such as calcium, magnesium, potassium, and sodium as chemicals of potential concern in the aquatic risk assessment.
- (7) Golder = Review Franklin et al. (2005) for further consideration in aquatic risk assessment.

Signature of party representative:



Signature of Developer representative:



Date:

June 05/2012

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