

EAO809-003 Tyhee NWT Corp – Yellowknife Gold Project

Review Board Information Requests

Introduction

On July 26, 2011 the Review Board announced that it had decided to enter the information request stage for the environmental assessment of Tyhee's proposed Yellowknife Gold Project. During the conformity check preceding this announcement the Review Board found that the Developer's Assessment Report provided some information on most questions raised in the Terms of Reference. The Review Board, however, identified a number of areas where further information or clarification is needed to adequately assess whether the proposed development is likely to cause significant adverse impacts on the environment or not. Consequently the Review Board is issuing the information requests listed below for the developer to respond to before other parties are asked to submit information requests.

The information requests are organized in two parts. Part 1 deals with water quality issues, which the Review Board identified as key line of inquiry in the terms of reference. Part 2 deals with all other issues identified in the terms of reference.

In accordance with the Terms of Reference, which instructed the developer to provide a comprehensive analysis of the key line inquiry, Tyhee should put more emphasis on the questions related to the key line of inquiry. To facilitate this, the information requests in part one contain short descriptions of the information gaps that the Review Board identified in the DAR.

Part 1 - Key Line of Inquiry Issues

IR Number: 1-1-1

Source: Mackenzie Valley Review Board

To: Tyhee

Issue: **Estimation of Tailings Containment Area Concentrations**

Background

The DAR identifies effluent concentrations, estimated Tailings Containment Area (TCA) concentrations and TCA concentrations that would be required to achieve CCME guidelines in Narrow Lake (section 6.2, Technical Memo from EBA) for 6 elements. There are significant differences between the "estimated TCA" and "required TCA" concentrations, e.g. 199.7 µg/l vs. 5.8 µg/l for arsenic and 24.1 µg/l vs. 5.8 µg/l for cyanide. While the DAR provides detailed information on simulation modeling of contaminant behaviour in Narrow Lake, it provides virtually no information on how the "required TCA concentration" will be achieved from the "estimated TCA concentration".

Request:

1. Please provide an explanation for how the “required TCA concentrations” will be achieved for all six elements.

IR Number: 1-1-2

Source: Mackenzie Valley Review Board
To: Tyhee
Issue: **Cyanide Attenuation**

Background

For cyanide Tyhee appears to rely on natural attenuation through volatilization, leaching, and bacterial activity. In the DAR Tyhee identifies temperature, aeration, UV light availability and bacterial growth as factors determining the rate of attenuation. Yet it does not provide evidence that these factors will allow sufficient attenuation at the Yellowknife Gold Project’s sub-arctic location, or an explanation how leaching of cyanide will mitigate environmental effects. In addition, the DAR does not contain an analysis of concentrations of cyanide breakdown compounds.

Request

1. Please submit studies, or relevant excerpts, that support Tyhee’s reliance on natural attenuation of cyanide under the conditions prevailing at the proposed mine site.
2. Please provide an explanation how leaching of cyanide will mitigate environmental impacts and a description of where leached cyanide will likely end up and any environmental effects associated with it.
3. Please provide an analysis of cyanide breakdown compounds, their toxicity, and their concentrations and distribution.

IR Number: 1-1-3

Source: Mackenzie Valley Review Board
To: Tyhee
Issue: **Effluent Treatment Options**

Background

Tyhee estimates the effluent from the TCA to be “on the lower end of the toxicity scale for cyanide” without explaining how this estimation was reached – in the DAR Tyhee states that no detailed analysis of processes in the TCA was undertaken. The technical memo by EBA presenting modeling results for Narrow Lake indicates that arsenic, cyanide, and copper require additional treatment to meet CCME guidelines. In the DAR Tyhee indicates that treatment options exist but does not propose any treatment for cyanide and copper. For cyanide Tyhee relies on further natural attenuation in a 165 meter stretch between the last point of control and when the effluent reaches Narrow Lake in its determination that the effluent will not likely be toxic to aquatic life. Similarly, in the DAR Tyhee provides relatively little information on treatment options and their proposed implementation for other effluent constituents, such as arsenic and copper.

In the Review Board’s view, CCME guidelines may serve as an appropriate standard to mitigate to, although meeting CCME may not in all cases prevent significant impacts on the environment. While the DAR identifies the goal Tyhee intends to achieve - that is meeting

CCME guidelines - it is silent about the means to achieve it. The Review Board requires a description of the means to achieve CCME guidelines. Further, the Review Board requires a reasonably detailed description of the treatment options and their reliability, as well as some information on how they would be implemented.

Request

1. Please provide a description of how Tyhee reached the conclusion that the effluent from the TCA will be “on the lower end of the toxicity scale for cyanide”.
2. Please provide a description of what “on the lower end of the toxicity scale for cyanide” means in terms of its potential to cause significant adverse effects.
3. Please provide a concise description of treatment options available for cyanide and other elements identified in the DAR.
4. Please identify under which conditions treatment options would be implemented, including an outline of how they would be implemented.
5. Please submit contingency plans for how Tyhee will ensure that no significant adverse impacts on the environment are likely and CCME guidelines are met at all times, while treatment options are being implemented.

IR Number: 1-1-4

Source: Mackenzie Valley Review Board
To: Tyhee
Issue: **Water Quality Monitoring and Adaptive Management**

Background

The Terms of Reference included a line item for “a comprehensive plan for water quality monitoring, evaluation and management that indicates how the developer will meet water quality objectives prior to discharge”. In the DAR Tyhee refers to monitoring on various occasions but does not provide a lot of information. For example the proposed effluent and water quality monitoring does not include monitoring for cyanide, copper, and arsenic, which are important effluent constituents to monitor. The DAR contains a section on adaptive management but Tyhee does not identify management options the developer has at its disposal.

Request

1. Please provide, at minimum, a conceptual monitoring plan including likely monitoring locations, sampling frequencies and methods, and elements monitored.
2. Please provide more information on how the adaptive management plan will serve to both detect and prevent a potential significant adverse impact. At minimum, include a conceptual description of the management options at Tyhee’s disposal and the criteria that will be used to decide when action is required.

IR Number: 1-1-5

Source: Mackenzie Valley Review Board
To: Tyhee
Issue: **Water Quality Issues Related to Existing Impacts from Discovery Mine (Cumulative Effects)**

Background:

Tyhee proposes to use the tailings cap at Discovery Mine as an airstrip for mine construction and operation on a long term basis. Tyhee also proposes to use Round Lake, which currently receives runoff water from Discovery mine, as a settling pond.

To properly assess the likelihood of significant cumulative impacts on water quality the Review Board requires additional information on the existing contaminants load in Round Lake and how Tyhee's development plans may add to it, as well as impacts that may result from damage to the tailings cap due to continued use as an airstrip.

Request

1. Please provide a discussion and analysis of potential impacts from a tailings cap failure.
2. Provide more information on Tyhee's plans for Round Lake. With respect to water quality, please account for Round Lake inputs to the tailings facility. Also indicate how Tyhee may add to contaminant load in Round Lake.

IR Number: 1-1-6

Source: Mackenzie Valley Review Board
To: Tyhee
Issue: **Water Balance**

Background

Section 3.3.1 of the Terms of Reference asked Tyhee to "*Identify the potential impacts of drawing water from Nicholas Lake and Giauque Lake, for any purpose, and the mitigation strategies for preventing adverse effects. Include probability of re-suspending contaminated tailings currently capped by the water cover that Giauque Lake provides*". While Tyhee addressed this issue, the DAR did not include an estimate for withdrawal volumes from Nicholas Lake.

Request

1. Please provide estimated volumes of water withdrawal from Nicholas Lake.

Part 2 - Other Issues

The Review Board identified a number of areas where additional information would be helpful in assessing the likelihood of significant impacts on the environment. The Developer should provide any additional information that is available on the items listed below. The remainder of this section provides the relevant sections of the terms of reference and the Review Board's questions in relation to those sections.

IR Number: 1-2-1

Source: Mackenzie Valley Review Board
To: Tyhee
Issue: **Existing Water Quality**

Terms of Reference - 3.2.1 Existing Environment and Baseline Conditions

1. Surface and groundwater quality, reflecting the range of natural variability in the existing environment. This will provide baseline information in order to differentiate project effects from natural conditions and changes due to previous developments. This includes:

a. water quality analysis for any water bodies (including Round Lake, Winter Lake, Narrow Lake and Giauque Lake) that previous development may have affected in order to identify the extent of previous contamination.

- See Additional Items in final section

Request

Surface Water Quality for non-impacted water bodies near potential components

1. Baseline needed for small ponds downstream of Nicholas Lake settling pond discharge area. The water quality in these ponds is an important part of any determination of significance for potential impacts to water quality if this area is to receive effluent from the Nicholas Lake development.
2. See also Additional Items in final section.

IR Number: 1-2-2

Source: Mackenzie Valley Review Board
To: Tyhee
Issue: **Existing Surface and Subsurface Water Flow**

Terms of Reference - 3.2.1 Existing Environment and Baseline Conditions

2. Topographical maps to indicate the direction of surface and sub-surface watershed flows from the proposed development's basin to the Yellowknife River.

Request

1. Figure 6.2.1 is a good indication of surface flow for the Round-Winter-Narrow watershed down to connection with the Yellowknife River. However, the following water bodies will need flow identification in the same manner for surface flows downstream to Yellowknife River from: Nicholas Lake; Eclipse Lake; Maguire Lake; Brien Lake, Giauque Lake. Include similar flow patterns for all lakes Tyhee refers to in the baseline assessment or impact assessment section.

IR Number: 1-2-3

Source: Mackenzie Valley Review Board
To: Tyhee
Issue: **Water Balance**

Terms of Reference - 3.2.1 Existing Environment and Baseline Conditions

3. A water balance that incorporates inflows to and outflows from the mine site, with particular emphasis on the Winter Lake System (including Round Lake, Winter Lake and Narrow Lake) or other tailings facility alternatives, and that also accounts for seasonal variations and peak-flow periods such as during the spring freshet...

Water balance for the main site is important since, in order to prevent tailings dam failure, the capacity of the tailings facility will determine the absolute timing of discharge from the tailings facility regardless of the status of effluent with respect to compliance. Tyhee has proposed a water balance and has conducted some work, but indicated that “...insufficient information is presently available to characterize the hydraulic connections between surface water features and shallow and deep fractures...the degree of connectivity between the area drilled and the nearby Winter Lake is presently unknown...additional testing will be required to better define the regional flow system and the area of groundwater flow contributing to the Ormsby pit....[page 150-151]

Request

1. Taking into account the above paragraph, please provide additional information on pit inflows in order for the Board to be able to determine the likelihood of potential effects to water quality.

IR Number: 1-2-4

Source: Mackenzie Valley Review Board
To: Tyhee
Issue: Existing Permafrost

Terms of Reference - 3.2.1 Existing Environment and Baseline Conditions

8. Local permafrost distribution and stability (Concordance reference 2.6.3).

Request

1. Tyhee identifies the presence of semi-continuous permafrost distribution around the minesite. Later Tyhee points to permafrost acting as an aquitard [a barrier to underground water flow] that might prevent pit inflows. If Tyhee is to depend on permafrost as an aquitard to pit inflows, please indicate if sufficient permafrost is present to adequately prevent such inflows.

IR Number: 1-2-5

Source: Mackenzie Valley Review Board
To: Tyhee
Issue: Traffic Volumes

Terms of Reference - Section 3.2.2 Development Description

16. Truck loads and incoming/outgoing weights, for all phases from construction to closure, by annual winter road season.

Request

1. Please provide an estimate of the number of truck loads and weights for all project phases for the annual winter road season.

IR Number: 1-2-6

Source: Mackenzie Valley Review Board
To: Tyhee

Issue: Ammonia

Terms of Reference - Section 3.3.2 Fish and Aquatic Habitat

1. Commitments for minimizing loss of fish habitat.
- c. impacts from blasting (the developer is encouraged to refer to the following DFO website: http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/water-eau/explosivesexplosifs/page03_e.asp).

Request

1. Describe predicted impacts from ammonia in the water quality assessment section and describe potential impacts to fish and aquatic habitat.

IR Number: 1-2-7

Source: Mackenzie Valley Review Board
To: Tyhee
Issue: Wildlife Monitoring

Terms of Reference - Section 3.3.3 Wildlife and Wildlife Habitat

4. A Conceptual Wildlife Monitoring and Management Plan that incorporates furbearers, migratory birds, waterfowl, large ruminants, and large carnivores. The Review Board encourages the developer to consult with the Department of Environment and Natural Resources, GNWT to create an appropriate wildlife monitoring and management program:

conceptual wildlife monitoring plans for wildlife [from (1)] in the vicinity of the YGP that especially outline what effects the mine causes and what effects are part of the natural environment, with specific attention to how the developer will accommodate any rare, threatened or endangered species listed on the Species At Risk Act or under the auspices of the Committee on the Status of Endangered Wildlife in Canada.

Request

1. Please provide more information regarding the wildlife monitoring and management program.

IR Number: 1-2-8

Source: Mackenzie Valley Review Board
To: Tyhee
Issue: Removing Vegetation

Terms of Reference - Section 3.3.5 Vegetation

2. The impacts of removing vegetation, for any project purpose, on the various species that depend on vegetation for food, shelter or other reason.

Request

1. The DAR concordance table indicates that this information is included in section 6.5.1, but the information does not appear in that section.

IR Number: 1-2-9

Source: Mackenzie Valley Review Board

To: Tyhee

Issue: **Accidents and Malfunctions**

Terms of Reference - Section 3.5 Accidents and Malfunctions

4. Emergency response measures, that will include... (d) failures of the Tailings Containment Area, including worst case scenarios such as catastrophic failure of the dyke, as well as tailings spills...

Request

1. Please describe management actions that Tyhee would take in response to a failure of the TCA dyke.

IR Number: 1-2-10

Source: Mackenzie Valley Review Board

To: Tyhee

Issue: **Additional Items**

Terms of Reference

The conformity check also revealed these general information gaps not directly associated with line items in the terms of reference.

Request

- 1)** The Tailings Alternatives Assessment is illegible in key sections of the document. Resubmit this document in the original PDF form or some other legible form.
- 2)** Tyhee refers to various studies that are currently not available to the Review Board and parties. These are a basis for a number of important assumptions about baseline conditions, and for Tyhee's impact predictions on water quality. These studies, or relevant excerpts of them, should be compiled and submitted.