



Mackenzie Valley
Environmental Impact
Review Board

Draft Terms of Reference
for the
Environmental Assessment
of
Tyhee NWT Corp.'s
Yellowknife Gold Project
EA0809-003

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Mackenzie Valley Environmental Impact Review Board

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Glossary of Acronyms

DFO – Department of Fisheries and Oceans

INAC – Indian and Northern Affairs Canada

MVRMA – Mackenzie Valley Resource Management Act

YGP – Yellowknife Gold Project

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Table of Contents

1. Overview.....	4
2. Legal Context.....	4
2.1 MVRMA Requirements.....	4
2.2 Definitions.....	5
3. Environmental Assessment History.....	6
4. Scoping.....	6
4.1 Scope of Development.....	6
4.2 Scope of Assessment.....	9
5. General Considerations.....	10
5.1 Approach.....	10
5.2 Issues Prioritization.....	10
5.3 Valued Components.....	11
5.4 Impact Predictions.....	11
5.5 Significance Determination.....	12
5.6 Uncertainty Analysis.....	13
5.7 Incorporation of Traditional Knowledge.....	13
5.8 Cumulative Effects.....	13
6. Terms of Reference.....	14
A - Description of the Existing Environment and Baseline Conditions Assessment.....	14
B - Development Description.....	15
C - Consideration of Alternatives.....	17
D - Community Engagement.....	19
E - Water Resources.....	20
F - Fish and Aquatic Habitat.....	23
G - Wildlife and Wildlife Habitat.....	25
H - Vegetation.....	26
I - Terrain.....	26
J - Air Quality and Climate.....	27
K - Assessment of the Human Environment.....	28
K-1 Employment and Business Opportunities.....	28
K-2 Distribution of Beneficial and Adverse Economic Impacts.....	30
K-3 Social Impacts.....	31
K-4 Cultural Impacts.....	32
K-4.1 Heritage Resources.....	32
K-4.2 Traditional Land Use and Wildlife Harvesting.....	33
L - Accidents and Malfunctions.....	34
M - Cumulative Effects.....	36
N - Closure and Reclamation.....	36
7. Additional Instructions.....	38
7.1 Utilization of Appropriate Media.....	38
8. Appendix 1.....	39

1 Overview

This *Terms of Reference* outlines the process and the applicable information the Mackenzie Valley Review Board requires for the environmental assessment (EA) of Tyhee NWT Corp.'s Yellowknife Gold Project in the North Slave region of the Northwest Territories. This document has the following sections:

Section 2 gives the legal context for the environmental assessment of the Yellowknife Gold Project.

Section 3 provides a brief history of the environmental assessment of the Yellowknife Gold Project.

Section 4 describes how the scoping process has influenced this Terms of Reference.

Section 5 describes the Review Board's general information requirements. This section outlines how the developer must describe impact predictions, significance criteria, use of traditional knowledge, monitoring efforts, etc.

Section 6 outlines the Terms of Reference – the major issues that the Review Board expects Tyhee to investigate and report on in the Developer's Assessment Report.

Section 7 indicates additional information requirements for the Developer's Assessment Report.

Section 8 is a satellite image of the local study area.

2 Legal Context

The Mackenzie Valley Environmental Impact Review Board (the "Review Board") carries out this environmental assessment pursuant to its responsibilities and vested authority under Part 5 of the federal *Mackenzie Valley Resources Management Act* ("MVRMA"). In general, this EA is subject to the Review Board's *Rules of Procedure* and *Environmental Impact Assessment Guidelines*. Those documents summarize the principles that maintain the integrity of the environmental assessment process and ensure fairness for environmental assessment participants.

Interested persons and parties can access environmental assessment information on the Review Board web site (www.reviewboard.ca) or by contacting the Review Board office for further information.

2.1 MVRMA Requirements

The *MVRMA* defines an impact on the environment to mean "any effect on land, water, air, or any component of the environment, as well as on wildlife harvesting, and includes any effect on the social and cultural environment or on heritage resources" (*MVRMA* Section 111(1)). Moreover, the *MVRMA* provides the environmental assessment process with guiding principles, including "having regard to:

- a) the protection of the environment from significant adverse impacts of proposed development;
- b) the protection of the social, cultural and economic well-being of residents and communities in the Mackenzie Valley; and
- c) the importance of conservation to the well-being and way of life of the aboriginal peoples of Canada [..]” (MVRMA Section 115).

Section 117(2) of *MVRMA* lists a number of provisions the Review Board must consider in its environmental assessment. These include:

- Impacts on the environment, including impacts of malfunctions and cumulative impacts, and their significance;
- Comments by members of the public; and
- The need for mitigative or remedial measures.

2.2 Definitions

In this environmental assessment, the definitions from Sections 3 and 111 of the *MVRMA* apply. The following are relevant documents to this environmental assessment:

- *Environmental Impact Assessment Guidelines*, Mackenzie Valley Environmental Impact Review Board, Yellowknife, NT. March 2004
- *Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment*, Mackenzie Valley Environmental Impact Review Board, Yellowknife, NT. July 2005.
- *Socio-Economic Impact Assessment Guidelines*, Mackenzie Valley Environmental Impact Review Board, Yellowknife. March 2006.
- *Reference Bulletin: Operational Interpretation of Key Terminology in Part 5 of the Mackenzie Valley Resource Management Act*. Mackenzie Valley Environmental Impact Review Board, Yellowknife. April 2006.

Throughout this environmental assessment, the term “community” refers to any affected settlement, town, village, or city, as well as any First Nation or Métis group unless the Review Board specifies otherwise. Please contact the Review Board for electronic copies of the above documents.

3 Environmental Assessment History

In March 2005, Tyhee NWT Corp. (“Tyhee” or the “developer”) applied to the Mackenzie Valley Land and Water Board (MVLWB) for approval to develop an underground gold mine and milling operation adjacent to the historic Discovery Mine site. The MVLWB subsequently referred the Yellowknife Gold Project (“YGP”, “project” or the “development”) to environmental assessment by the Mackenzie Valley Environmental Impact Review Board, based on the possibility that the project might have had significant adverse impacts on the environment. The Review Board scoped and produced a *Terms of Reference* for the 2005 Yellowknife Gold Project.

Following the release of the 2005 *Terms of Reference*, Tyhee opted to change the project design from a primarily underground operation to a transitional open pit/underground mine plan. As a result of this change, Tyhee withdrew its original application in July 2008, which concluded the accompanying environmental assessment (EA0506-004). Tyhee then submitted a new application to the MVLWB that encompassed the project design changes. As part of the new application, Tyhee submitted a 2008 YGP *Project Description Report* (PDR) that outlined some of Tyhee’s plans for the development, and also presented the company’s initial interpretation of how the project will impact the environment.

On August 27, 2008, Environment Canada referred the 2008 Yellowknife Gold Project to environmental assessment as per Section 126(2)(a) of the *MVRMA*, on the basis that the development might cause significant adverse impacts on the environment. Environment Canada also stated that in its opinion the information from the 2008 *Project Description Report* was insufficient for the purposes of assessing the project’s impacts to the environment.

4 Scoping

To better understand the information requirements of the interested parties for this environmental assessment, as well as to identify issues and levels of public concern for the project, the Review Board organized Scoping Sessions in Yellowknife on October 16th and 17th, 2008. To define the 2008 *Terms of Reference* for the project, the Review Board has combined its own experience with dialogue from the 2008 scoping sessions, subsequent scoping submissions, and also included relevant issues from the 2005 Yellowknife Gold Project *Terms of Reference*.

The *Specific Items* sections below contain these issues that Tyhee must address during this environmental assessment. Reports of the scoping sessions and scoping submission documents are available on the Review Board’s web site at: <http://www.reviewboard.ca/>.

4.1 Scope of Development

Tyhee has applied to develop a gold mining and milling operation approximately 88 kilometers north of the City of Yellowknife on property adjacent to the historic Discovery Mine. Pursuant to Section 117(1) of the *MVRMA*, the Review Board determines that the Scope of Development includes all project features (physical works and activities) that Tyhee identified in the 2008 *Project Description Report* for the Yellowknife Gold Project (unless this document specifies otherwise). The Review Board considers any alternative project components or configurations that Tyhee has suggested in the *Project Description Report*, or any alternatives that Tyhee adopts

as a result of this environmental assessment process, to also be within the scope of development for this environmental assessment. In summary, Tyhee must indicate how all feasible configurations for development may impact the environment, and present the impacts of those alternatives as though Tyhee has fully committed to developing those project features.

Table 1 below lists the major components of the proposed development and associated activities as defined in the 2008 *Project Description Report*. The Review Board has defined the scope of development to consist of, at minimum, the listed physical works or activities that will occur during the construction, operation and closure phases of the Yellowknife Gold Project. At any time during the environmental assessment the Review Board may amend the scope of development if the development description changes.

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Table 1: Current Project Components

The following are assessable project components that the Developer has identified to this point in the environmental assessment. As more detail emerges the Review Board reserves the right to add to the development scope.

Mining Process

- Development of underground workings, portals, adits, raises, drifts, stopes and all other mine workings;
- Management of topsoil, waste rock and overburden stockpiles, including associated water treatment and management;
- Management of ore stockpiles, including associated water treatment;
- Storage and use of explosives;
- Management of rock with potential for metal leaching / acid rock drainage (ML/ARD);
- Transportation of ore from Ormsby Zone or Nicholas Lake deposits to the process plant;
- Mine dewatering and the management and treatment of mine water; and
- Mining equipment operation.

Milling Process

- Construction and operation of the process plant;
- Consumption of fresh water from Giauque Lake;
- Storage, handling, use and disposal of process chemicals;
- Disposal of process water and tailings; and
- Construction and operation of the tailing containment area, including recycling and disposal of process water, as well as its treatment and discharge to the receiving environment.

Support/Ancillary Facilities and Activities

- Transportation activities that support the YGP's operation, including use of the winter road for YGP specific support activities;
- Expansion of the winter road for the purpose of supporting YGP operations;
- Construction and use of all-weather roads;
- Stream crossings and any proposed modifications to water courses;
- Construction and use of drainage control structures;
- Development and use of borrow sources for aggregate production;
- Construction and operation of power plant and transmission infrastructure;
- Construction and operation of the change house, compressor house, offices, warehouses, storage yards, maintenance shops, laboratory and all other support buildings;
- Construction and operation of hydrocarbon storage and handling facilities;
- Construction and operation of camp facilities;
- Treatment of camp wastewater at Ormsby Zone and Nicholas Lake developments;
- Solid and hazardous management and construction and operation of containment areas; and
- Modification and operation of an existing airstrip or construction and operation of a new airstrip.

Closure and Reclamation Activities

- Removal of structures and equipment;
- Reclamation of the Tailings Containment Area;
- Reclamation of the road network
- Reclamation of infrastructure foundations;
- Re-vegetation of areas affected by mining ;
- Reclamation of waste rock and overburden piles; and
- Reclamation of the airstrip, roads, tailings caps, and quarries.

4.2 Scope of Assessment

The *Scope of Assessment* is the determination of those issues and items that the Review Board will examine during this environmental assessment. After having reviewed Tyhee's *Project Description Report* and supporting appendices, the Review Board requires more information on the biophysical, social, economic, and cultural effects of the Development on the existing environment.

Geographic Scope

The Review Board determined that the geographical scope of this environmental assessment will include, but not be limited to, Tyhee's mineral leases, mining claims and a local study area surrounding the development as outlined in Map 1 (Appendix 1). For individual valued components of the environment the geographic scope may go beyond this minimum area. The inclusion of lakes outside of the Giauque Lake and Round/Winter/Narrow Lake watersheds that have not been contaminated from the Discovery Mine development will accommodate a full characterization of the natural background water quality.

For cumulative effects to water resources, the geographic scope will include all areas the project may potentially affect, including the Yellowknife River Basin downstream of the YGP. For cumulative effects to wildlife habitat, the Review Board considers ranges that overlap in the project area, as well as mine-related transportation activities on existing/proposed winter or all-season roads.

The geographical scope for assessing effects to the human environment will include, but not necessarily be limited to, the communities of Yellowknife, Dettah, N'Dilo, Rae-Edzo, Gameti, Wekweti and Wha Ti. Since the North Slave Metis Alliance (NSMA) is an organization representing the interests of Metis people in the North Slave region, the developer will include the NSMA and its constituents in any consideration that affects Aboriginal persons, communities or organizations.

Temporal Scope

The temporal scope covers all phases of the YGP, including construction and closure, and continues until such time that responsible agencies can no longer detect significant adverse impacts attributable to the Yellowknife Gold Project.

Other

Tyhee must also consider the effects of the physical environment on the Development. For example, climate change may affect underlying permafrost which in turn possibly affects project features to the extent that an adverse impact may occur.

Also, the Review Board shares and supports the view that remediations to any historic Discovery Mine components that Indian and Northern Affairs Canada (INAC) has conducted are features of the environment that require mitigation if the project adversely affects them.

5 General Considerations

5.1 Approach

The Review Board has released this *Terms of Reference* document to provide instructions to Tyhee NWT Corporation (the “developer”) for preparing a Developer’s Assessment Report (DAR) of its Yellowknife Gold Project. The *Terms of Reference* establishes both the scope of the development and assessment by building on the 2005 Yellowknife Gold Project *Terms of Reference*, the 2008 scoping sessions and submissions, and also addresses some of the data that the Developer produced in the *2008 Project Description Report*. At any time during the environmental assessment, the developer may contact the Review Board for clarification on how to interpret these instructions in writing.

The DAR must be a stand-alone document, and should not rely heavily on references to any earlier environmental assessment documents such as the *Project Description Report*. The Developer may take excerpts from the *Project Description Report* to provide a context for the new data that the DAR will present. However, the DAR must present additional information, particularly baseline data, reliable impact predictions, and effective mitigation strategies. For instance, the Review Board does not consider Giauque Lake as a suitable reference lake for studying background contaminations because the historic Discovery Mine has impacted this lake already.

To reduce the information requests that may follow the DAR’s release the Review Board encourages Tyhee to engage various responsible ministers and agencies to both produce suitable baseline studies and impact mitigation strategies.

5.2 Issues Prioritization

The Review Board prioritized issues to focus the developer’s efforts during the production of the Developer’s Assessment Report. In this light, particular aspects of the proposed development and their potential adverse impacts require higher levels of examination than others. Thus, to focus the Developer’s efforts in producing the DAR, the Review Board has prioritized issues into the following categories (in decreasing order of importance): *Key Lines of Inquiry*, *Subjects of Note* and *Other* within each section.

Key Lines of Inquiry are topics of the greatest concern that the Review Board deems to require the most attention during the environmental assessment and the most rigorous analysis and detail in the DAR.

Subjects of Note do not have the same priority as Key Lines of Inquiry, but are nonetheless issues that require substantive analysis.

Other issues require limited analysis to confirm that environmental impacts are not likely.

Responses to Key Lines of Inquiry and Subjects of Note must be comprehensive, stand-alone analyses which require only minimal cross-referencing with other parts of the DAR. The developer’s level of effort in providing an analysis of each issue must be appropriate for the category that the issue falls within. While the Developer must sufficiently address all items in

the Terms of Reference, the Review Board holds *Key Lines of Inquiry* responses to the highest order of scrutiny.

5.3 Valued Components

Environmental impact assessments commonly use valued components (also referred to as valued ecosystem components or valued socio-economic components) to focus impact predictions on important components of the bio-physical and human environment. Individual species or societal goals are common valued components.

The *Key Lines of Inquiry* and *Subjects of Note* involve highly valued components. The developer must use the issues identified during the environmental assessment as the basis for the selection of any valued components and also provide a rationale for selecting valued components in the Developer's Assessment Report. *Key Lines of Inquiry* are interdisciplinary issues, and typically will involve more than one valued component. The developer may select additional valued components, but must ensure that all *Key Lines of Inquiry* and *Subjects of Note* thoroughly reflect the identification of relevant valued components.

Along with baseline data, the Developer must create and present effective mitigation strategies to prevent the expression of these effects on the receiving environment. In summary, environmental assessments under the *MVRMA* identifies, for the Developer's implementation, appropriate impact mitigation strategies by defining the extent and type of impacts to the surrounding environment. As a condition for project approval past environmental assessment, it is incumbent upon the Developer to provide evidence to the Review Board that Tyhee has developed and will commit to adequate environmental management plans to prevent adverse impacts.

5.4 Impact Predictions

The methods for describing environmental conditions, as well as for identifying and measuring impacts on the environment must be consistent with high standards and best practices in relevant subject areas. The Developer must also present predictions in a way that facilitates the formulation of testable questions for future follow-up programs, as well as textually and schematically indicate the pathways of predicted impacts. The Developer must also explain any methods for predicting how environmental changes could affect the development.

For the Developer's Assessment Report, the Developer will:

- indicate the methodologies for:
 - describing the existing environment;
 - predicting potential impacts;
 - evaluating potential impacts; and
 - reaching any conclusions.
- document all models and studies so that analyses are transparent, and where appropriate, reproducible;
- identify which studies included the assistance of communities, participants and identify participant selection criteria;

- specify data collection methods together with the uncertainty and reliability of data and subsequent conclusions;
- support all analyses, interpretations of results, and conclusions with reference to appropriate literature;
- identify and justify any assumptions;
- identify all proposed mitigation measures, along with evaluations of confidence levels in the effectiveness of those measures, and describe the residual impacts.

5.5 Significance Determination

The developer must provide its views on the significance of impacts, using the following criteria:

Direction

The main focus of the environmental assessment is to assess whether the development is likely to cause significant adverse impacts on the environment or be cause for public concern. The Review Board encourages the Developer to report anticipated positive changes. The Review Board or parties to the environmental assessment may use or evaluate the overall impact of the development.

Magnitude

Magnitude refers to the degree of change that may occur, for example the volume of diverted water. Where possible the Developer must report magnitude in absolute and relative terms.

Likelihood

Likelihood refers to the probability of an impact occurring.

Geographical Extent

Geographical extent refers to the affected local study area. In using this criterion the Review Board suggests that the Developer must consider spatial intensities of impacts. For example, where an impact may affect various areas to differing degrees, the Developer may have to analyze and report impacts in a separate manner by reporting the particular effects of high, medium, low magnitude impacts rather than reporting an average impact on a large area.

Duration

The Developer must consider both the duration of individual events (i.e. waste water discharges) and the overall time frame during which the impact may occur (i.e. during construction, operation, and closure). In addition, the Developer must report the length of time that the effects will last.

Frequency

The Developer must consider the frequency of impacts and events causing impacts, as well as the length of time between occurrences.

Ecological Context

Ecological context refers to the type of the impact as well as the nature of the affected environmental component. For example, the mortality of a hundred caribou may be significant,

whereas the mortality of a thousand mosquitoes may not be significant. The Developer should consider that an impact on a highly valued component may trigger significance at relatively low magnitude, duration, and likelihood.

5.6 Uncertainty Analysis

Any impact prediction or impact analysis contains an amount of uncertainty. This may be a result of limitations in understanding of natural systems or rare occurrences such as natural disasters and very warm winters. The Developer's Assessment Report must provide a reasonably accurate description of the uncertainties associated with each prediction or analysis. Similarly, when making a significance determination the uncertainty analysis must include a description of the confidence in underlying assumptions, models, data sources, etc. The uncertainty analysis must also identify parameters that should receive particular attention when developing follow-up programs.

5.7 Incorporation of Traditional Knowledge

The Review Board recommends that Tyhee reviews and incorporates the *Guidelines for Incorporating Traditional Knowledge into the Environmental Impact Assessment Process*. Tyhee can obtain the guidelines via the Review Board website: <http://www.reviewboard.ca>.

The Review Board gives equal weight to science and traditional knowledge. Tyhee therefore will make all reasonable effort to collect and facilitate the collection of traditional knowledge relative to the YGP. In the assessment of each environmental component, Tyhee must identify all areas where it has attempted to engage with communities in the collection and/or sharing of traditional knowledge. During scoping, various parties indicated that their dissatisfaction with the adequacy of community engagement to date.

The Review Board directs Tyhee to continue such discussions and produce evidence of such future meetings. Where Tyhee determines traditional knowledge to not be applicable, Tyhee will produce a rationale for this determination. Where traditional knowledge is not available, or despite Tyhee's appropriate diligence, a party has not provided information in a timely manner, Tyhee will describe such efforts.

5.8 Cumulative Effects

Pursuant to Section 117(2)(a) of the *MVRMA*, the Review Board expects the Developer to expand on how the YGP will contribute to cumulative effects in the project area for each valued component. The Review Board reminds the Developer that an improved portrayal of baseline conditions (for any component but especially water quality) in the project region facilitates any consideration of cumulative effects. The Review Board expects the Developer to develop, implement and report the results of thorough and accurate baseline studies for valued components in this assessment.

6 Terms of Reference

A. Description of the Existing Environment and Baseline Conditions Assessment

Preamble:

The Review Board notes several parties raised concerns that the 2008 Project Description Report, while adequate for preliminary screening purposes, did not provide sufficient detail for environmental assessment. For example, in the 2008 Project Description Report the Developer asserted that high metal levels in a non-impacted lake from an adjacent watershed were a result of natural background contributions. The Developer based this assertion on the results of one lake from a 1970 investigation, and relied on this assumption in asserting that the high levels extrapolate to adjacent, non-impacted watersheds in the local study area. There is a legitimate concern that background water quality for this one lake does not constitute a reliable background level for the purposes of environmental assessment.

The Review Board requires the Developer to submit a scientifically defensible characterization of surface and sub-surface water quality in the local study area for the Developer's Assessment Report. Any statements concerning water quality, as well as the impact management plans these conclusions produce, must rely on recent water quality investigations that accurately portray water quality in the local study area. Similarly, a party raised concern during scoping that the Developer relied on studies from one night of owl population sampling, in addition to the sampling being one month too early for this migratory species to arrive in the area. The Review Board recommends that the Developer expand the investigations into both water quality baseline and wildlife studies in the local study area.

In light of previous development on the project property, the Developer must properly measure the extent of previous contamination by comparing to reliable background measurements in the region.

The Description of the Existing Environment will include, but not be limited to the following:

- 1) Regional, pristine full-spectrum surface and sub-surface (hydro-geological) water quality analysis from appropriate control lakes, and appropriate sub-surface water bodies that no other previous development has contaminated;
- 2) Thorough, full-spectrum water quality analysis for any surface or sub-surface (hydro-geological) 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.
- 3) A description of the sources and extent of pre-existing contamination;
- 4) Surface and sub-surface (hydro-geological) full-spectrum water quality analysis for any water bodies or watercourses near proposed mine-related structures;
- 5) A thorough prediction for water balance inflows to the mine site, with particular

- emphasis on Winter Lake or other tailings facility alternative;
- 6) Further depictions of typical surface and sub-surface geology;
 - 7) Aquatic organisms and aquatic habitat analyses;
 - 8) Wildlife and respective habitat;
 - 9) Further depiction of local air quality;
 - 10) Further characterization for local permafrost distribution and stability;
 - 11) Physical and chemical makeup of soils and lake sediments for both control and footprint lakes, including those from Giauque Lake;
 - 12) A determination of the existence and distribution of any rare plants within the study area;
 - 13) A robust characterization of the Mackenzie Valley labour pool at varying geographic scales, including: local small communities, Yellowknife, the North Slave and Tlicho regions, as well as territory-wide. To assist in the assessment of impacts on the human environment, the Developer must focus on determining the labour pool that is available for employment at the Yellowknife Gold Project;
 - 14) A complete listing of existing physical infrastructure in the study area, including but not limited to roads (winter and all-season), buildings, Tyhee's exploration facilities, all historic mining infrastructure and any other industrial works;
 - 15) A description of appropriate socio-economic conditions in and indicators for each of the potentially-affected communities in the scope of assessment;
 - 16) A summary of historic and present land use in the study area, including identification of traditional land use groups and a description of any areas where overlapping land-usage occurs; and
 - 17) Identification of cultural and heritage resources within the study area, including an identification of the cultural groups who associate with these resources.

B. Development Description

Preamble: *The Review Board notes that Tyhee produced little detail on any Nicholas Lake development plans, and that the Review Board identified such informational deficiency in the 2005 Terms of Reference as well. Where detailed plans for the Nicholas and Ormsby deposits do not yet exist, the developer must include a description of a variety of reasonable scenarios that the 'considerations of alternatives' section below indicates.*

The Development Description will include, but not be limited to the following:

- 1) As part of the reclassification of Winter Lake to a Tailings Impoundment Area, and pertaining to the 2005 joint letter from the Department of Fisheries and Ocean (DFO) and Environment Canada, Tyhee must provide:

- a. A fully-detailed description of the impoundment facilities, including an explanation of how such a design will contain any toxic compounds regardless of source;
 - b. A water balance for the impoundment area(s); and
 - c. Geological and geothermal analyses.
- 2) Full engineering designs and specifications for any tailings containment area dam;
- 3) Further details about any modifications to the existing airstrip, with geotechnical engineering plans that verify the stability of such changes;
- 4) A full description of any infrastructure and mine development plans for both the Nicholas and Ormsby deposits;
- 5) A full characterization of any naturally resident rock or aggregate that Tyhee intends to utilize for any project phase or purpose, including the source for any materials and specific probabilities for acid rock drainage/metal-leaching (or any other impacts). The description will include an estimate of the volumes that the Developer will need for all project phases, with particular focus on the Developer's need for use of esker aggregate;
- 6) A description of ore, waste rock, soil and overburden storage facilities with focus on the precise locations where the Developer will place any acid-producing or metal-leaching material, as well as the projected volumes for such material;
- 7) In conceptual Waste Management and Hazardous Waste Management Plans, The locations, designs and descriptions of any and all other solid and hazardous waste facilities including destinations for each waste type, and an explanation as to how such configurations will prevent impacts to the environment, with particular attention to the volume of material that Tyhee will process in these facilities;
- 8) The locations, designs and descriptions for any other water management and treatment structures, including a prediction for the volume of water that such structures will manage;
- 9) A description of and schedule for dewatering (or drawing down) any waterbody for any aspect of the Yellowknife Gold Project;
- 10) A full account of every chemical or other reagent that Tyhee will need during the milling process, with particular attention to cyanide, and the designs for the destruct circuits that may convert these compounds to less toxic forms;
- 11) Designs, descriptions and locations for any existing or potential all-season or winter roads that will in any way support the YGP, with particular focus on how the Developer will accommodate streams and other watercourses to minimize any effects to the surrounding environment;
- 12) Designs, description and location of water intake infrastructure at Giauque Lake, as well as for the overland pipeline for such water, with particular focus on how the Developer will maintain the integrity of any tailings in the area and also meet any *Fisheries Act* regulations for intake structures and docks;

- 13) Design, description and location of the process plant, milling facility and any support infrastructure;
- 14) Designs, descriptions and locations for any other structures that Tyhee will have to either construct or manipulate for the overall project;
- 15) A description of the types of explosive(s) Tyhee will use, including their storage, handling and application procedures, and a description for how Tyhee will prevent the contamination problems that other mines have experienced with similar compounds;
- 16) Tyhee's prediction for total raw material needs (for example wood, cement and steel, etc.) for all phases from construction to closure;
- 17) Tyhee's prediction for the capital costs for construction of the Yellowknife Gold Project;
- 18) Tyhee's prediction for the annual and total operating costs for the Yellowknife Gold Project;
- 19) A thorough estimate for the lifespan of the Yellowknife Gold Project, divided into the following project phases: construction; operation; closure and reclamation;
- 20) By project phase (construction, operation, etc.), the number of person-years that the Yellowknife Gold Project will require from its workforce;
- 21) Tyhee's proposed work schedule, worker transportation arrangements and employee housing plans; and
- 22) A listing and description of any supplementary developments that the Developer will need to build or improve in order for the project to proceed.

C. Consideration of Alternatives

Preamble: *The Review Board notes that various parties indicated during scoping that the 2008 Project Description Report was vague in describing a number of the mine plan elements. This means that various alternatives are still in play, such as a new airstrip, an all-season road to Nicholas Lake, and any number of possibilities for Nicholas Lake infrastructure. This uncertainty reinforces the need for accurate and recent baseline studies of water quality and other potentially affected biophysical components in the development region. With this kind of baseline information, the Review Board will be in a better position to define and attribute the environmental impact for a given project feature or any number of alternatives, and subsequently this data can be used to assess the acceptability of proposed mitigation.*

The Review Board requires that the Developer consider and explicitly outline alternative approaches to planning, developing, operating and closing the YGP in the DAR, with particular focus on the reclassification of Winter Lake as a Tailings Impoundment Area. The process of redefining Winter Lake as a Tailings Impoundment Area under Schedule 2 of the Metal Mining Effluent Regulations in the Fisheries Act requires any proponent to conduct and publish a thorough assessment of alternatives to permanently destroying a freshwater lake. The Review

Board directs the Developer to conduct the thorough alternatives assessment that Environment Canada (EC) and the Department of Fisheries and Oceans Canada (DFO) have requested of the Developer in the joint 2005 letter from both agencies, and present those results to the Review Board. Tyhee can access this letter and other environmental assessment documents on the Review Board's website at <http://www.reviewboard.ca>.

In the 2008 Project Description Report, the Developer suggested two alternatives to using Winter Lake as a Tailings Containment Area. The Review Board notes that these options were deficient both in capacity and ability to truly function as containment facilities. Therefore, to properly assess the project for impacts from various angles, the Review Board requires the Developer to present any alternatives, with description and location, a reliable rationale supporting the premise that an alternative is or is not feasible. For any particular option, the Review Board requires that Tyhee provide evidence for why a particular alternative was not chosen given its feasibility. The Developer will also include accurate biophysical baseline data specific to the alternatives' location.

In addition to determining impact analysis, environmental assessments offer an opportunity to inform the public about the rationale behind mine planning. While some considerations may be intuitive to those in the mining industry, each assessment may be the first chance for various parties to see a project and its alternatives. Such information transfer may alleviate public concern that cost-savings is not the primary driver for re-classifying Winter Lake as a Tailings Impoundment Area. If the Developer concludes that some alternatives either are not economically/operationally feasible, then the Developer must provide a detailed rationalization for rejecting the alternatives in the Developer's Assessment Report. Where uncertainty exists about the merits of competing alternatives, the Review Board requires the Developer to produce an assessment of the potential effects on the environment of each alternative.

The Review Board expects the Developer to provide detailed responses to the following items in the DAR:

Key Lines of Inquiry

- 1) Conduct and report the results of an alternatives assessment, as DFO/Environment Canada requested in their joint 2005 letter, that scientifically, practically and economically justifies the sequential elimination of any alternatives or relevant combinations to the use of Winter Lake (or another fish bearing water body) for tailings disposal. The analysis must demonstrate that the eliminated alternatives are not viable;
- 2) Outline alternative gold extraction processes that would not require the use of cyanide;
- 3) Provide a feasible alternative airstrip location that would not affect the existing Discovery Mine airstrip and its tailings cap;
- 4) Evaluate and list the advantages and disadvantages to existing winter road route alternatives, for example using the existing Lupin Mine winter road as a means of minimizing cumulative impacts;
- 5) Evaluate alternative mine development schedules that consider prolonging the

opportunity that Tyhee has to leave a positive socio-economic legacy for Northerners beyond short term employment;

Subjects of Note

- 6) A discussion on the possibility and environmental impacts of alternative tailings management strategies, including but not limited to examples such as placing tailings as paste backfill in the old Discovery Mine shafts and workings;
- 7) Compare alternatives to producing aggregate other than by extracting from local esker formations, such as crushing non- metal-leaching/acid-rock-drainage-prone rock;
- 8) Produce and rank alternatives to transporting ore from Nicolas Lake to the process plant other than by all-season road; and
- 9) Evaluate alternatives to diesel power generation, with particular consideration to utilizing hydro-electric power, as well as possibilities for co-generation.

D. Community Engagement

Preamble: *Community engagement is one of the processes through which the residents of a potentially affected community may influence how development will affect them and the ecosystem upon which they base their culture and existence. The developer must show due diligence and effort in contacting, consulting and incorporating concerns from such constituents. Section 4 of the Review Board's Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment contains suggestions for working with communities to obtain traditional knowledge.*

Various parties voiced concerns during scoping that the Developer did not solicit their input in an appropriate manner for many project aspects. The Review Board requires the following augmented evidence for the Developer's Assessment Report:

- 1) A discussion of Tyhee's revised consultation plan that specifically focuses upon the holders of Aboriginal and Treaty rights in the project area. This will consider how Tyhee will accommodate the concerns and issues of such rights holders, including any plans, strategies or commitments from Tyhee, alone or in combination with any other group, to maintain consultation ties in a set forum during the EA process and throughout the life of the YGP;
- 2) In addition to identifying new engagement dates, discussion topics, and the individuals and organizations that Tyhee has consulted, the developer will identify and reference the following:
 - a. All methods used to identify, inform and solicit input from potentially-affected parties;
 - b. All commitments and agreements made in response to issues that the public raised

- during these consultations, and how these commitments altered the planning of the proposed YGP; and
- c. All outstanding issues that remain, and document any further efforts towards resolution that either parties make.
- 3) As part of the ‘public consultation’ requirement in the *Fisheries Act* Schedule 2 redefinition of Winter Lake as a Tailings Impoundment Area, Tyhee must provide a detailed description of the following (the Department of Fisheries and Oceans and Environment Canada have indicated that this public consultation requirement must be National in scope):
- a. The methodologies for public consultation;
 - b. The communities and venues that Tyhee visited for public consultation;
 - c. The participants during such sessions;
 - d. The comments that Tyhee received during such sessions; and
 - e. A list of commitments that Tyhee has made to alleviate any concerns that the public raised during such public consultation, including particular rationales in the event that Tyhee does not commit to alleviating any particular concern.

E. Water Resources

Preamble: *Any development from ore bodies near the historic Discovery mine may further impact water quality in the region given the extent of contamination from previous ore extraction (notwithstanding effects from mercury). Tyhee’s proposed use of the toxic compound cyanide in the gold extraction process was among the important issues at scoping sessions.*

The Review Board requires Tyhee to produce detailed strategies for how the Developer will meet criteria for effluent quality rather than merely a commitment that the Developer will monitor for changes to any condition. The Developer may use the Metal Mining Effluent Regulations to set preliminary goals for effluent quality, but the Board reminds Tyhee that a possible outcome of the environmental assessment may be the establishment of more stringent discharge criteria. The Review Board encourages the Developer to engage with other regulatory agencies to cooperatively produce such water management plans.

Regarding impacts to water resources, the Developer must provide responses to the following points in the DAR:

Key Lines of Inquiry

- 1) An analysis of the potential effects of the YGP on water quality downstream of the proposed Tailings Containment Area, the Ormsby and Nicolas Lake developments, which will include, but not be limited to:
 - a) Tailings Input Analysis:
 - i. In a thorough Effluent Management Plan, the steps Tyhee will take for treating effluent prior to discharge into the Tailings Containment Area;
 - ii. Tyhee's prediction of full-spectrum pre-treatment effluent quality and quantity prior to discharge into the Tailings Containment Area;
 - iii. Tyhee's prediction of post-treatment full-spectrum effluent quality prior to discharge into the Tailings Containment Area;
 - iv. Tyhee's prediction of discharge rates into the Tailings Containment Area, including schedules and total volumes.
 - b) Tailings Output Analysis:
 - i. In a thorough Effluent Management Plan, the steps Tyhee will take for treating effluent prior to discharge from the Tailings Containment Area;
 - ii. Tyhee's prediction for full-spectrum pre-treatment effluent quality and quantity prior to discharge from the Tailings Containment Area;
 - iii. Tyhee's prediction of post-treatment full-spectrum effluent quality prior to discharge from the Tailings Containment Area;
 - iv. Tyhee's prediction of discharge rates from the Tailings Containment Area, including schedules and total volumes.
- 2) Tyhee's prediction for the downstream concentrations of residual cyanide, cyanide-breakdown products (for example ammonia) and also for cyanide derivatives that will form with metals in the ore other than gold, with particular attention to copper cyanide-complexes, and lead from the mineral *galena*. Tyhee will also describe the particular effects from these substances and indicate the relevant management strategies;
- 3) A detailed plan for the treatment and management of effluent that Tyhee will discharge from the Nicholas Lake development;
- 4) Modeling and prediction of the extent of chemical loading and dispersion into the receiving environment of Tailings Containment Area effluent, both during mine operation and after closure;
- 5) Modeling and prediction of the extent of chemical loading and dispersion into the receiving environment of Nicholas Lake development effluent, both during mine operation and after closure;
- 6) The potential effect of YGP operations on increasing contaminant concentrations in the sediments downstream of the Ormsby and Nicholas Lake developments.
- 7) A plan for water quality monitoring and management that will include, but not be limited to the following aspects:

- a. The development of an aquatic effects monitoring program that will consider water quality and quantity, fish and aquatic habitat monitoring;
 - b. The development and implementation of an “Adaptive Management” strategy to mitigate adverse impacts to water quality, quantity, aquatic organisms and aquatic habitat that Tyhee identifies during YGP operations;
 - c. A discussion outlining how Tyhee incorporated traditional knowledge and other community input in the development of these programs.
- 8) The effects of YGP operations on the local hydrology/water balance, which will include but not be limited to:
- a. Predictions for changes in timing, volume and deviation of peak and minimum water flows resulting from the Development;
 - b. Water balance effects from the operation of the Tailings Containment Area.
- 9) The effects of the development on the promotion of metal-leaching and acid-rock-drainage, which will include but not be limited to the following:
- a. A discussion of recent and new results of testing for metal leaching and acid rock drainage from tailings, waste rock and low-grade ore that YGP operations will generate, with their implications on water quality; and
 - b. Conceptual procedures for the identification, segregation, management and disposal of rock with potential for metal leaching and acid rock drainage.

Subjects of Note

- 10) Due to the shallowness of Winter Lake, an investigation and specific determination of the probability for any tailings to oxidize and cause acid-rock-drainage/metal-leaching effects within any tailings containment facility. Tyhee will include plans for mitigation against this occurrence;
- 11) A discussion of the effects that YGP activities will have on the Yellowknife River basin downstream of the Development, with particular emphasis on effects to the City of Yellowknife’s drinking water quality, and the prospect of establishing remote water quality monitoring points;
- 12) The effects of YGP operations on the quality, quantity and behaviour of sub-surface water flows, including Tyhee’s plans for managing and mitigating any adverse impacts these effects may cause. The Developer must describe and quantify the influence and impacts of underground workings on groundwater flows for both the Ormsby and Nicholas Lake developments in addition to mitigation strategies for such effects;
- 13) An assessment of the potential effects of mine water discharge from the Ormsby and Nicholas Lake developments, which will include, but not be limited to the following:
- a. Tyhee’s prediction for the quality and quantity of mine water that the Developer will discharge into the receiving environment from the mine workings;
 - b. Mine de-watering effects on the hydrology, groundwater flows and chemistry of the local study area; and

- c. A discussion regarding the effects of all mine workings, following closure, on the surrounding ground water regime;
- 14) An assessment of the effects of YGP operations on promoting erosion and sedimentation;
- 15) The particular effects of introducing any de-watering effluent into any waterbody, and the mitigation strategies for preventing adverse effects;
- 16) The effects of drawing water from Nicholas Lake for any purpose, and the mitigation strategies for preventing adverse effects;
- 17) An impact analysis of drawing water from Giauque Lake, with particular focus on the probabilities for re-suspending tailings sediments in that waterbody.

F. Fish and Aquatic Habitat

Preamble: *In the executive summary for the 2008 Project Description Report (PDR), Tyhee reported not catching any fish from Winter Lake. However, further in the executive summary and in the main body of the PDR, Tyhee reported catching several fish in Winter Lake. In light of such contradictory evidence, the Review Board more detailed analysis in the Developer's Assessment Report of the value of Winter Lake as habitat for fish and other aquatic species.*

The Review Board directs Tyhee to respond to the points in Fisheries and Oceans Canada's letters of submission on the public registry for this environmental assessment. Given that Tyhee proposes to permanently remove a lake from an ecosystem, the Review Board requires Tyhee to further investigate the value of Winter Lake to that ecosystem by responding to the following discussion points for the Developer's Assessment Report:

Key Lines of Inquiry

- 1) For the purposes of a Fish Habitat Compensation Plan that Fisheries and Oceans Canada and Environment Canada have requested in their joint 2005 letter, an analysis of the impacts to fish habitat through reclassification of Winter Lake to a Tailings Impoundment Area. Tyhee must investigate and report on:
 - i. a scientifically defensible quantification of productive capacity and habitat losses; and
 - ii. the fish species present, and the various life stages that the construction will affect.
- 2) A list of commitments and a description of Tyhee's methods for incorporating and implementing the DFO's *Principle of No Net Loss* through compensation works during YGP's construction, operation and closure;
- 3) A description of the measures that Tyhee will take to prevent net loss of fish or fish habitat during construction of the habitat compensation works. Tyhee must also include the following for such processes:

- i. Maps;
 - ii. Schedules;
 - iii. Proposed work designs; and
 - iv. Site specific mitigations.
- 4) Tyhee's comprehensive measures for monitoring the success of the compensation works. Tyhee will also provide the methodology and reporting format for monitoring surveys and a monitoring schedule with justifications for the proposed schedule, frequency and duration. The monitoring program that Tyhee must present will include measures for assessing the structural integrity of the proposed works and a detailed assessment of accompanying biological and physical parameters;
- 5) A detailed schedule for all aspects of the compensation program, from construction to operation and associated monitoring strategies;
- 6) A description and quantification of any adverse effects to downstream aquatic habitat resulting from the removal of water flows from Winter Lake, with particular focus on downstream inflow areas;
- 7) An estimate of all costs for implementing the compensation program from construction to operation and closure. This estimate will also include the monitoring costs;

Subjects of Note

- 8) The downstream effects of all effluents originating from YGP operations on aquatic organisms and their habitat. This will consider, but not be limited to effluent from the Tailings Containment Area, Ormsby development and Nicholas Lake development infrastructure, roads and borrow areas;
- 9) The effects that road development, including water crossings, will have on aquatic organisms and habitat, with Tyhee's thorough plans for minimizing adverse impacts;
- 10) The effects of YGP operations on the aquatic organisms and habitat of Nicholas Lake with specific regard to any infrastructure Tyhee may build in aquatic habitat there, as well as the effects of using any water from Nicholas Lake;
- 11) The effects of fresh water withdrawal from Nicholas Lake for mining and camp purposes on aquatic habitat and organisms;

Other

- 12) The effects of YGP operations on Giauque Lake's aquatic organisms and habitat which will include, but not be limited to:
 - a. The effects of freshwater withdrawal on Giauque Lake's over-wintering habitat, littoral habitat and oxygen concentration; and
 - b. The effects of the freshwater intake and supporting infrastructure footprint.
- 13) The effects that YGP operations may have in increasing contaminant concentrations in fish.

G. Wildlife and Wildlife Habitat

Preamble: *The development will be an artificial feature of the environment that may affect local and migratory wildlife in a number of ways. For example, migrating waterfowl or terrestrial ungulates may confuse the Tailings Containment facility with a natural and pristine water body and will use the potentially harmful facility unless Tyhee implements measures for their protection. As part of the environmental assessment process, the Review Board expects Tyhee to fully outline how they will manage wildlife for protection from adverse developmental impacts by providing the following for the DAR:*

Key Lines of Inquiry

- 1) A list of all species that the Yellowknife Gold Project will impact, including a reasonable rationale for excluding a species from consideration (if the Developer has a strong case for that exclusion);
- 2) For each species in (1), predict the mode of that impact, be it through effects to air quality, water quality, soil quality, or combinations thereof as well as against the impact prediction criteria in the *General Considerations* section;
- 3) For each project component that the Developer identifies in the *Development Description* section, predict impacts to those species in (1) using the the impact prediction criteria in the *General Considerations* section;
- 4) A YGP Wildlife Management Plan for any aspect of the Yellowknife Gold Project that incorporates furbearers, migratory birds, waterfowl, large ruminants, and large carnivores, in regards to activities occurring at the mine site and in the transportation corridor, including but not limited to:
 - a. wildlife monitoring plans for any wildlife 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 Tyhee will accommodate any rare, threatened or endangered species that the *Committee on the Status of Endangered Wildlife in Canada* defines;
 - b. adaptive management measures to avoid, minimize, and mitigate effects to wildlife when Tyhee detects problems for wildlife that the development has caused.

Subjects of Note

- 5) Tyhee's strategy for restricting wildlife access to any project component that may threaten the ability of wildlife to thrive in the area. On this point, Tyhee must plan for but not be limited to hazards such as open pits, toxic tailings facilities, roads and airstrips;
- 6) An analysis of how the project may block migratory routes or confuse migratory animals and what mitigations strategies Tyhee will implement to avoid adverse impacts to such wildlife.

H. Vegetation

The Review Board requires Tyhee to provide the following for the Developer's Assessment Report:

Subjects of Note

- 1) Tyhee's prediction for the type, extent and reach of impacts to vegetation in the project area, which will include but not be limited to:
 - a. The effects of vehicle, mill and power plant emissions on vegetation; and
 - b. The effects of dust emissions on vegetation.
- 2) An adaptive management plan for the project's effects on vegetation, such as dust suppression activities and materials for such purposes, including any monitoring programs and their reporting schedule to a Responsible Minister;

Other

- 3) An investigation into the impacts of removing vegetation, for any project purpose, on the various species that depend on vegetation for food, shelter or other reason.

I. Terrain

For the Developer's Assessment Report, Tyhee must provide the following:

Subjects of Note

- 1) Quantify how each project component, such as open pits, esker quarries, or waste rock piles, will impact the surrounding environment;
- 2) An adaptive management plan to monitor and mitigate against adverse effects on local terrain, including:
 - a. A quarry management plan;
 - b. A waste management plan;
 - c. A geotechnical monitoring plan; and
 - d. A commitment for how and when Tyhee will report monitoring results to regulators and potentially-affected communities.

Other

- 3) The effects of YGP operations, with particular attention to the effects of each open pit and waste rock pile, on permafrost conditions in the mining area and how Tyhee can mitigate adverse impacts from those effects.

J. Air Quality and Climate

Preamble: *Since Tyhee will be incinerating various wastes, burning fossil fuels and possibly waste oil as energy sources for vehicles, electricity, or warmth, the development will emit carbon dioxide, oxides of nitrogen and sulfur and various heavy metals. Upon emission, these contaminants may either linger in the local atmosphere or fall as local precipitation. The Review Board encourages Tyhee to engage in discussions with Responsible Ministers, such as the GNWT or Environment Canada, to develop appropriate Air Quality Management Plans.*

The Review Board requires Tyhee to provide the following for the Developer's Assessment Report:

Subjects of Note

- 1) A discussion of the standards, guidelines and regulations that Tyhee will incorporate before during and after YGP operations to minimize and mitigate effects to air quality;
- 2) Through modeling, predictions for how project emissions will disperse from the development on a local and regional scale, the effects of such emissions and Tyhee's strategies for mitigating those impacts, which will include but not be limited to:
 - a. Emissions from waste incinerator(s), with particular emphasis on the generation of dioxins, furans and mercury;
 - b. Emissions from the gold refinery;
 - c. Dust from roads, waste rock and ore stockpiles, tailings containment areas, quarries, and mill activities; and
 - d. Emissions from vehicles and diesel generators.
- 3) A list of the technologies that Tyhee will use to prevent significant adverse impacts to air quality (including an identification of impacts that the technology has prevented);
- 4) An air quality monitoring and adaptive management plan, which will include thresholds for action and mitigations strategies, as well as how Tyhee will report monitoring results to regulators and any impacted communities;

Other

- 5) A thorough investigation into the possibility for sub-aerial tailings to become airborne and contaminate the surrounding environment;
- 6) Tyhee's plan's for minimizing impacts from dust production and settlement;
- 7) A discussion of YGP operations as a source for acidic precipitation as well as an evaluation of those effects;
- 8) Predictions for the effects of YGP operations in generating greenhouse gas emissions, which shall include but not be limited to the following:
 - a. Tyhee's total annual atmospheric loading of greenhouse gases in CO₂ equivalent

values;

- b. Comparison of the value determined in a) to the total emission generated in NWT, as well as Canada as a whole; and
- c. A list of Tyhee's commitments to minimizing greenhouse gas emissions.

K. Assessment of the Human Environment

Preamble: *Assessment of the human environment - social, cultural and economic impact assessment - is an important part of any environmental assessment in the Mackenzie Valley. The Review Board assesses social, economic and cultural impacts with the same level of scrutiny as other deliberations in the assessment process. The determination of social, economic and cultural effects is most effective when the Developer works with potentially-affected communities in a cooperative way through each step of the environmental assessment. The Developer will make reasonable effort to include potentially-affected communities in the assessment of potential social, economic and cultural effects, and document those efforts. The Developer's Assessment Report will examine all components of the human environment that the YGP might affect, whether the potential impacts are beneficial or adverse.*

For studying any aspect of the human environment, the Review Board requires Tyhee to use the same high level of professional rigour to support analysis and predictions as that Tyhee used to assess biophysical impacts. The Developer can find acceptable data sources and research methodologies in the Review Board's Socio-Economic Impact Assessment Guidelines.

K-1 Employment and Business Opportunities

Preamble: *The Guiding Principles of Part 5 of the MVRMA (Section 115) requires the Review Board to have regard for the economic well-being of the residents and communities of the Mackenzie Valley. Understanding the effects of a development on economic well-being requires in-depth analysis of what sorts of effects may occur, how they may spread geographically and across demographic groupings, and how the Developer can mitigate adverse impacts. Tyhee will assess the potential effects of the YGP on the economies of the Mackenzie Valley, with a focus on the North Slave and Tlicho regions and each affected community. In addition to beneficial economic impact predictions, Tyhee must also identify any adverse economic impacts and commit to the implementation of mitigation strategies to combat them.*

As part of this assessment, the Developer will rely on its statistically defensible labour pool characterization from the Description of the Existing Environment section. This will support the Developer's assertion that the available Mackenzie Valley labour pool is at its maximum capacity due to the presence of larger mines.

In assessing and mitigating any adverse economic impacts, Tyhee will provide the following:

Key Lines of Inquiry

- 1) A full accounting of human resource requirements for the development that includes the most recent listing of all direct employment requirements by skills category for each phase of the life of the Yellowknife Gold Project. Tyhee will base this account on the most current mine plan and the skill-levels that each position requires;
- 2) A rigorous assessment of the likely percentage of direct employment for northern and Aboriginal residents at the Yellowknife Gold Project, in light of the current and likely future labour pool context;
- 3) A thorough description of any barriers to direct employment, advancement and retention for Mackenzie Valley residents, with particular emphasis on Aboriginal people and residents of smaller communities. This description must include minimum skill requirements, employee availability, and a discussion on the lack of training opportunities for community members. Tyhee must also list any current training or education gaps that may inhibit maximal direct employment of Mackenzie Valley residents and/or Aboriginal persons at the Yellowknife Gold Project;
- 4) A description of any plans, strategies or other commitments that Tyhee has to increase the mine-ready workforce and support career paths in mining. Tyhee must specifically outline how these strategies create or contribute to training opportunities for northern and Aboriginal persons in general, and employees in particular;
- 5) Tyhee's strategies and commitments for maximizing direct employment of Northern and Aboriginal persons;

Subjects of Note

- 6) By project phase and until mine closure, an estimate of all contractor and subcontractor goods and services that the YGP will require, as well as an estimate of what percentage of goods and services Tyhee will source from local and regional businesses versus those from other jurisdictions;
- 7) Tyhee's policies, plans, strategies and commitments associated with maximizing contracting to Northern owned and operated businesses;
- 8) A thorough assessment of any barriers to maximizing the utilization of northern businesses;
- 9) Tyhee's prediction for any training, education or other improvements necessary to maximize prosperity for local businesses in affected Mackenzie Valley communities;
- 10) A discussion of the YGP's contribution to sustainable development in the Mackenzie Valley, including any plans, strategies or other commitments Tyhee has to maximize such contributions.

K-2 Distribution of Beneficial and Adverse Economic Impacts

Tyhee will provide predictions for how the YGP will contribute to economic growth and development in the Mackenzie Valley. In assessing and mitigating any adverse economic impacts, Tyhee will provide evidence for the following:

Subjects of Note

- 1) Qualitative and quantitative estimates for all possible beneficial and adverse economic impacts from the YGP, including but not limited to:
 - a. Gross revenues and expenditures related to all phases of the YGP, including the commodity price assumptions underlying project valuation estimates;
 - b. Federal, territorial and municipal taxes that Tyhee may remit, as well as from linked economic development;
 - c. Employment numbers, including a prediction of employment multipliers for the development, and estimated effect on employment levels in Mackenzie Valley communities;
 - d. Future increases in local income and disposable income levels;
 - e. A prediction for the impacts that the YGP may have on local and regional inflationary pressures and cost of living;
 - f. All possible increases in physical and social service infrastructure that will occur as a result of the YGP (i.e. medical care or family social services etc.); and
 - g. Tyhee's prediction for the effects of the YGP on other types of economic activity occurring in affected communities, with emphasis on the traditional economy.
- 2) Tyhee's estimate for how much of the project's economic benefit will accrue to smaller communities in the North Slave and Tlicho regions, Yellowknife, the NWT, in comparison with other Canadian jurisdictions;
- 3) Tyhee's description for how the project may produce adverse pressures on other organizations and businesses servicing the region, including those who maintain infrastructure or provide social services, through:
 - a. The mobilization of local labour away from Mackenzie Valley communities during YGP employment; and
 - b. Socio-economic effects resulting from increased disposable income and larger reliance on the wage economy.

Other

- 4) Assessing any particular sub-populations within the Mackenzie Valley that are more vulnerable to any of the adverse economic impacts;
- 5) Identification and description of any lessons that Tyhee may take from economic impacts of previous mine developments in the NWT and the North, and how Tyhee will incorporate such lessons into the impact identification, prediction and mitigation for the

YGP; and

- 6) Tyhee's policies, strategies, plans, and commitments for the mitigation of any adverse economic impacts including but not limited to those that the above points identify.

K-3 Social Impacts

Preamble: *During environmental assessments, the MVRMA requires a Developer to identify and mitigate any future adverse impacts on the social environment. This includes direct and indirect effects from the development itself, including the relationship between economic changes from the project and social outcomes. While conducting an impact assessment, the Developer will give specific consideration to the following:*

Subjects of Note

- 1) Community/population health and associated indicators such as, but not limited to:
 - a. Population in- and out-migration;
 - b. Alcohol and drug access and use;
 - c. Access to health care;
 - d. Housing pressures;
 - e. Crime rates;
 - f. Access to child care;
 - g. Increased divisions within or between communities;
 - h. Public safety, especially in regards to the use of the winter road; and
 - i. Educational access and education completion levels.
- 2) The physical, mental, and cultural health of mine workers and mine workers' families, including a discussion on family violence;
- 3) A discussion concerning the development and implementation of a Human Resources Management Plan and any programs that Tyhee will offer at the mine site to identify and mitigate social problems;
- 4) Existing and required social service networks to support community health and wellness;
- 5) The effect of the YGP and other developments (either past, present or pending) on the political development, social development, cultural values, traditions and language among Mackenzie Valley communities;

Other

- 6) A description, for each identified potential effect, for how the YGP may affect valued social components:
 - a. At the regional level;

- b. At the local level for each potentially-affected community; and
 - c. Among particularly vulnerable sub-populations within potentially-impacted communities, such as women, children and elders.
- 7) Identification and description of any lessons that Tyhee may take from the social impacts of previous mine developments in the NWT and the North, and how Tyhee will incorporate such lessons into the impact identification, prediction and mitigation for the Yellowknife Gold Project; and
 - 8) A comparison of the relative distribution of beneficial and adverse social impacts among the different potentially-affected communities.

K-4 Cultural Impacts

K-4.1 Heritage Resources

Preamble: *The protection of known or potential heritage resources is an essential element of environmental assessments in the Mackenzie Valley. The MVRMA definition of “impact on the environment” expressly recognizes effects on heritage resources. It is of particular importance to consult both local traditional knowledge holders and the Prince of Wales Northern Heritage Centre and when determining the location of heritage resources and relevant impact mitigation. The Review Board reminds Tyhee that the definition for heritage resources includes both archaeological artifacts and sacred places.*

Some Aboriginal organizations have expressed concern that while Tyhee has conducted archaeological assessments, these investigations may be incomplete. In particular, the prospect exists that previous development on the mine site may have already affected heritage resources in the area. Tyhee’s accountability in this regard began when Tyhee started using existing Discovery Mine components such as the Winter Road, airstrip etc. Tyhee must investigate, through consultation, the possibility that such historical but now contemporary components may have affected cultural heritage resources.

While conducting an impact assessment for how the Yellowknife Gold Project may impact heritage resources, Tyhee will specifically investigate, report on, but not be limited to the following points:

Subjects of Note

- 1) Listing all correspondence and consultation, with traditional knowledge holders, archaeologists, anthropologists, the Prince of Wales Northern Heritage Centre, and the GNWT, that Tyhee conducted during the socio-economic portion of the environmental assessment, and indicate where and how such interactions influenced mine planning. Tyhee will give particular attention to and report on the possibility that the historical Discovery Mine components that Tyhee will use have already impacted cultural heritage resources. To supplement such consultations, Tyhee will also analyze the *NWT Protected Areas Strategy*;
- 2) Through the above consultation, identifying all known archaeological and heritage

resources, as well as sites or areas of cultural significance in or near the required environmental assessment local study area. To protect these resources, Tyhee will NOT include their exact locations in the Developer's Assessment Report but Tyhee will submit such findings to the Review Board and the relevant party; and

- 3) Listing all recommended mitigation measures that consultation produced for the protection of local known and high potential areas of cultural and heritage resources.

K-4.2 Traditional Land Use and Wildlife Harvesting

Preamble: *The MVRMA recognizes effects on wildlife harvesting as an “impact on the environment” that the Review Board must consider during an environmental assessment. Section 115(c) of the MVRMA speaks to the capacity for access to renewable resources and “the importance of conservation to the well-being and way of life of the Aboriginal peoples... who use an area of the Mackenzie Valley”. Given the essential role of communal land use and wildlife harvesting as the engine of the traditional economy, the Developer must explicitly identify and assess any adverse impacts that the Yellowknife Gold Project will have on land use and traditional economic harvesting activities.*

While conducting an impact assessment of how the YGP will potentially affect traditional and contemporary land use and wildlife harvesting, Tyhee will specifically consider but not be limited to the following:

Key Lines of Inquiry

- 1) Through consultation, identification of the historic and current relative value and usage levels for the environmental assessment local study area by wildlife harvesters;
- 2) Identification of all approaches, strategies and commitments for mitigation against adverse effects on both traditional land use and resource harvesting from the land, or compensate for losses that Tyhee cannot prevent. The Review Board particularly expects Tyhee to focus on, but not be limited to:
 - a. A description for how the Winter Road may contribute to increased incidences of squatting;
 - b. Tyhee's strategies to protect the Bathurst Caribou from overhunting effects by discouraging or outright limiting usage of the Winter Road for hunting wildlife.

Subjects of Note

- 3) Descriptions for any potential direct or indirect effects that the YGP may have, on its own or in combination with other developments, on hunting, fishing, trapping and other activities for persons and organizations from the potentially-affected communities, including but not limited to:
 - a. Loss of use of the immediate area for wildlife harvesters (including hunting, trapping, fishing, berry picking and medicinal plant collection);
 - b. Loss of harvesting success and quality of harvested materials due to any

Yellowknife Gold Project activities;

- c. Loss of the use of the area for any leisure activities.

L. Accidents and Malfunctions

Preamble: *As part of the assessment process, the Review Board requires the developer to submit conceptual guidelines to demonstrate the ability to prevent adverse environmental impacts in the event of accidents or malfunctions. The Review Board considers such possible outcomes in the environmental assessment process, and requires the Developer to plan for such contingencies (including for any alternatives Tyhee proposes).*

A party raised concern during scoping that in the 2008 Project Description Report, Tyhee used a ten-year value as a measure for extreme precipitation and that the data in that report also indicated that precipitation events have reached 80% of this maximum in each of the last three years. The Review Board considers a 100-year maximum value a more adequate measure of extreme precipitation events. The Review Board also requires Tyhee to plan more feasibly for any and all possible scenarios where accidents or malfunctions may occur that could adversely impact the environment.

Tyhee will present such conceptual contingency plans in the DAR, together with responses to the following specific items:

Key Lines of Inquiry

- 1) Predictions for the risks, modes of failure, and impacts of accidents and malfunctions including how Tyhee will use such information in planning and designing, with particular consideration to:
 - a. a failure of any feature of the tailings containment area;
 - b. major fuel spills at the YGP site or along transportation routes;
 - c. accidents involving the transportation and handling of cyanide containing compounds; and
 - d. the occurrence of 100-year extreme precipitation events causing greater-than-expected inflows into the tailings facility.
- 2) In light of similar problems that other mines have had with tailings facilities, a full investigation into the possibility that ‘ice-lensing’ in the sediment and ground underneath any Tailings Containment Area will decrease the volume of the facility and thus increase any chance for a malfunction to occur. The Developer will also include a thorough management plans for such a possibility;
- 3) Tyhee’s contingency plans for higher than expected inflows to any mine workings;
- 4) Discuss emergency response measures, that will include, but not be limited to the following:

- a. Storage, transportation and handling system failures of cyanide and other hazardous process chemicals;
- b. Storage, transportation and handling system failures of hydrocarbons;
- c. Storage, transportation and handling system failures of explosives;
- d. Storage, transportation and handling system failures of any other hazardous compounds to be used at the YGP;
- e. Failures of the Tailings Containment Area, including worst case scenarios such as catastrophic failure of the dyke, as well as tailings spills;
- f. Responses to vehicular and industrial accidents;
- g. A description of the measures for preventing, responding to and mitigating any accident or malfunction in a thorough environmental emergency response plan, which will include spill response and contingency plans; and

Subjects of Note

- 5) Guidelines, in a conceptual Adaptive Management Plan, for how Tyhee will adaptively manage deviations from any predictions for effluent quality and level of impacts to the environment;
- 6) If Tyhee will use reclaim water from Winter Lake, a prediction of the risks of Winter Lake reclaim water becoming so chemically loaded as to affect the chemical milling processes and thus compel the Developer to use water from alternative sources. Tyhee will include a description of alternative water sources and any impacts coming from such usage;
- 7) A full description of the level of accountability that Tyhee will hold for the actions, accidents and/or malfunctions of any contractors under Tyhee's employ, in addition to an explanation for how the contractor's environmental management plans will meet or exceed the goals for Tyhee's environmental management plans;
- 8) A description of Tyhee's plans, capacity and ability for stabilizing, caring and expeditiously transporting any critically-injured personnel to an advanced medical care facility; and
- 9) A discussion on how any other potential impacts of the environment on the development may cause any affect or malfunction to any of the environmental management systems or mine infrastructure, including but not limited to
 - a. Climate change effects; or
 - b. Geotechnical instability from permafrost-shifting or seismic events.

M. Cumulative Effects

Preamble: *In addressing cumulative effects, the Review Board directs the Developer to Appendix H of the Review Board's Environmental Impact Assessment Guidelines. As part of the consideration for the Development's cumulative effects, Tyhee will produce the following for the DAR:*

1. A description of how the Development will contribute to cumulative effects against each of the Valued Components (VCs);
2. A plan for the monitoring of cumulative effects and the adaptive management of the project's contribution to regional cumulative effects;
3. Investigations into the following particular points:
 - a. The effects of Tyhee's planned use of the Discovery Mine airstrip;
 - b. Cumulative biophysical effects from the development on water quality in the Yellowknife River system, which shall include consideration of any downstream of the Tailings Impoundment Area or Waste Rock Storage Facilities;
 - c. The Yellowknife Gold Project's contribution to cumulative social, economic and cultural effects associated with the increased development in the Mackenzie Valley and other areas of the Slave Geological Province;
 - d. A matrix, with reference to any supporting data, that depicts how each project aspect will contribute to cumulative effects on wildlife in the area, with particular attention on the effects of the project on the Bathurst Caribou herd.

N. Closure and Reclamation

Preamble: *The design and implementation of closure and reclamation plans serve as an assurance that development will not leave an adverse footprint on any ecosystem. Therefore, the Review Board expects Tyhee to present conceptual Closure and Reclamation Plans for the Yellowknife Gold Project in the DAR. The Review Board notes that as a Responsible Minister under the MVRMA, INAC has provided closure and reclamation guidelines for Tyhee to use in the development of such plans for the YGP.*

Regarding Closure and Reclamation for the YGP, Tyhee will include the following in the DAR:

Subjects of Note

- 1) A description of the policies, regulations and industry standards that Tyhee will consider in the development of the Closure and Reclamation plans;
- 2) A conceptual Closure and Reclamation Plan, which will include:

- a. A list of Closure and Reclamation components and activities including a rationale for why Tyhee chose a particular option and how it best meets the goals for responsible reclamation;
 - b. A depiction of the project area after closure and reclamation of the mine in relation to its present condition , which will include various reclamation scenarios for the site that include structural demolition and equipment removal, and with particular attention to how Tyhee will reclaim the open pits;
 - c. An outline for the methods and location for on- and off-site disposal of materials;
 - d. A conceptual post-closure monitoring plan that assures protection for the surrounding environment, including a schedule for reporting; and
 - e. A cost-estimate component of reclamation activities;
 - f. An outline of Tyhee's liabilities for the Tailings Containment Area, airstrip, quarries, as well as for any Discovery-project remediations, including relevant financial securities.
- 3) A discussion concerning the adequacy of the Tailings Containment Area conceptual closure design to prevent acid rock drainage from tailings, with respect to providing a sufficient barrier for the prevention of tailings oxidation, the re-suspension of tailings due to wave action, movement of groundwater through the tailings sediment, or any other pathway for contamination to spread from the Tailings Containment Area post-closure;
 - 4) A discussion concerning the provision of financial security for government liabilities in the event of bankruptcy or other unforeseen failure to complete the project;
 - 5) Conceptual management and monitoring programs for waste rock, overburden or other material that may cause an acid rock drainage effect;

Other

- 6) The social and economic effects of mine closure, including Tyhee's commitments for assisting workers in the transition from employment with the Yellowknife Gold Project after closure;
- 7) A history of consultations, since October 2008, that Tyhee has had with local communities and Aboriginal groups for the identification of various Closure and Reclamation issues, as well as a record that shows how Tyhee has adapted plans to alleviate such concerns; and
- 8) Tyhee's plans for establishing a self-sustaining vegetation community on the mine site after closure, which shall include the following:
 - a. re-vegetation techniques including a discussion on what species Tyhee will consider for this activity; and
 - b. an outline for how soon the area will rebound to a natural state of vegetation, if ever, with supporting data.

7 Additional Instructions

As part of the DAR, the Developer must provide the following items:

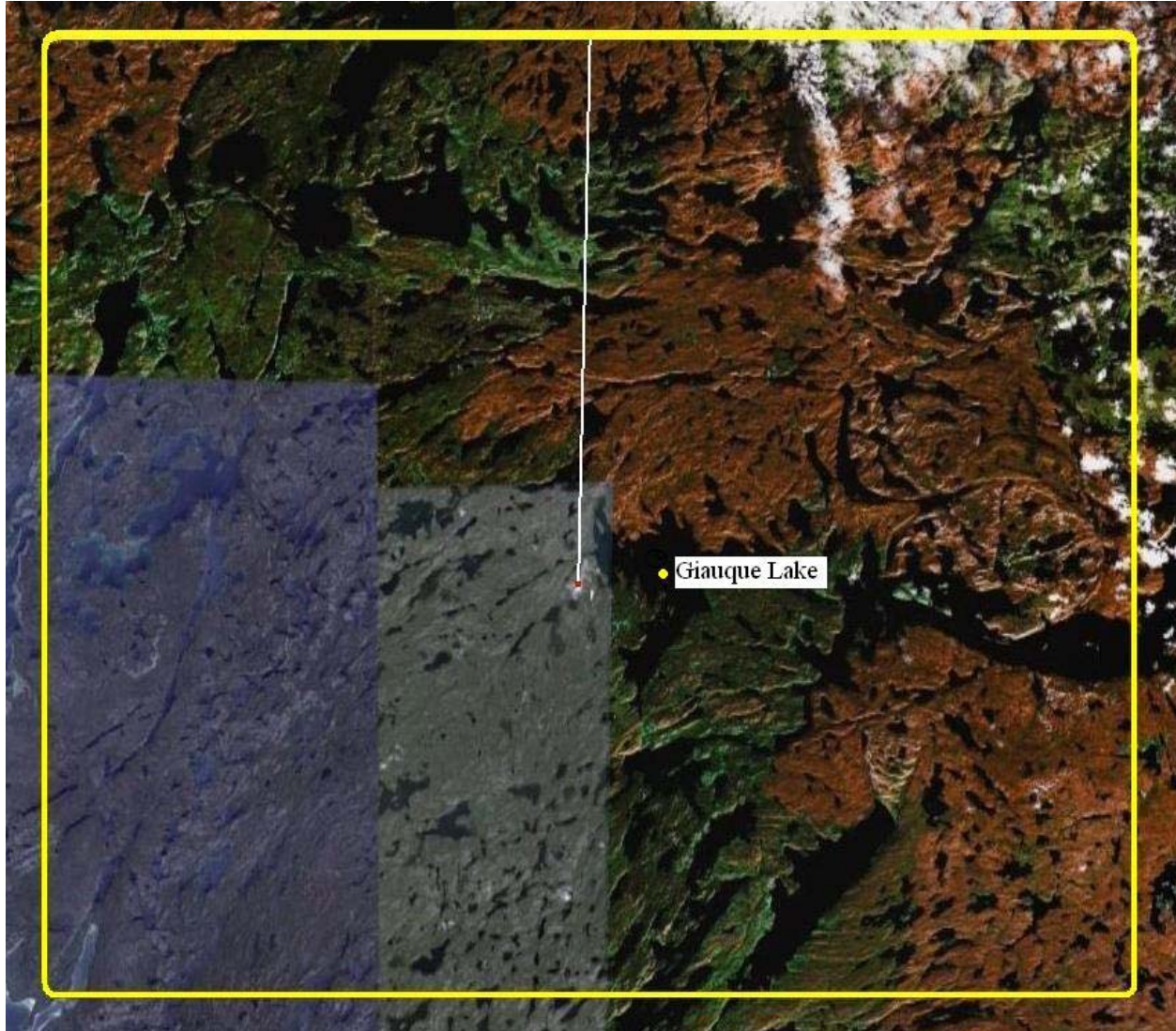
- a. A table that cross references items in the 2008 Terms of Reference with the corresponding sections of the main body of the DAR, including reference to the relevant data in the appendices.
- b. English, Dogrib and Chipewyan plain language, non-technical summary of the DAR;
- c. An audio translation of the plain language summary of the DAR in both Dogrib and Chipewyan languages;
- d. A summary the company's corporate history in Canada and the Northwest Territories;
- e. A description of corporate and individual responsibilities for the proposed development and associated operations, including the governance relationship between Tyhee Development Corp and Tyhee NWT Corp;
- f. A discussion describing the relationship between the Tyhee NWT Corp and its contractors/subcontractors and provide details as to how the company will ensure that the contractors/subcontractors will be responsible for and honour commitments made by Tyhee NWT Corp;
- g. A detailed record of the environmental performance of the company and its contractors during exploratory work in support of the Development; and
- h. Any policy, directives or terms of reference concerning Tyhee's Environmental, Health and Safety Committee.

7.1 Utilization of Appropriate Media

Tyhee must make all reasonable efforts to provide materials, such as GIS data, to parties in a format that is utilizable for their purposes. The Review Board encourages Tyhee to enter into discussions with parties who are seeking such information.

8 Appendix 1

The following map defines the local study area for the environmental assessment of the Yellowknife Gold Project.



Map 1: The developer may use reference data from non-impacted lakes from the above Local Study Area. The white line above represents approximately twenty kilometres.