

Mackenzie Valley Review Board



DRAFT
Terms of Reference
for the
Environmental Assessment
of
Fortune Minerals Ltd.'s
NICO Cobalt-Gold-Copper-Bismuth Project
EA 0809 - 004

September 15th, 2009

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1. Introduction

1.1 Overview

This document outlines the information required for the environmental assessment of the NICO Cobalt-Gold-Copper-Bismuth Project (NICO Project), a mine proposed in the Tlicho region of the Northwest Territories by Fortune Minerals Ltd. (“Fortune” or “the developer”). It is divided into the following sections:

- Section 1 – Introduction, including the reasons for environmental assessment referral, the legal context, and the *Terms of Reference* development process;
- Section 2 – Description of the scope of the development and the scope of the assessment, including minimum geographic and temporal boundaries for consideration of impacts of the proposed development on valued components of the biophysical and human environments; and
- Section 3 – The *Terms of Reference* that will direct the production of a *Developer’s Assessment Report*.

The *Terms of Reference* will be used by the developer to organize existing material, and conduct additional study and analysis as appropriate, in order to submit a “stand-alone” *Developer’s Assessment Report*. That report will then be used to inform all interested parties about the proposed development during the analytical phase of the environmental assessment¹.

1.2 Referral to Environmental Assessment

Fortune has applied to develop an underground and open pit mine and milling complex approximately 90km north of Bechoko and 50km northeast of Whati. The proposed site is approximately 10km east of Hislop Lake. Fortune proposes to ship concentrate from the proposed mine by truck to a processing plant in southern Canada.

In January of 2009 the Wek’eezhii Land and Water Board received applications for a Type A land use permit (W2008D0016) and Type A water license (W2008L2-0004) for the NICO Project. A description of the proposed development was filed by the developer as part of its application. The Wek’eezhii Land and Water Board initiated a preliminary screening of the NICO Project according to Section 124 of the *Mackenzie Valley Resource Management Act*.

On February 27th, 2009, Indian and Northern Affairs Canada referred the NICO Project application to environmental assessment under paragraph 126(2)(a) of the *Act*. Indian and Northern Affairs Canada stated that the project “may result in significant adverse environmental effects”.

The Review Board notified Fortune on March 2nd, 2009, that the development had been referred to environmental assessment.

1.3 Legal Context and the Terms of Reference Development Process

This environmental assessment is subject to the requirements of Part 5 of the *Mackenzie Valley*

¹ The role of the *Developer’s Assessment Report* and associated next steps in the environmental assessment are identified in the *Work Plan* issued by the Review Board as a companion document to the *Terms of Reference*.

Resource Management Act. Section Three of the Review Board's *Environmental Impact Assessment Guidelines* describes the environmental assessment process in detail. That document, as well as the Review Board's *Rules of Procedure*, other guidelines, reference bulletins and relevant policies applicable to this assessment are available online (www.reviewboard.ca) or by contacting Review Board staff.

The Review Board must conduct an environmental assessment of the proposed development that has regard to the protection of the environment from significant adverse impacts, and the protection of the social, cultural and economic well-being of Mackenzie Valley² residents and communities. The Review Board is also required to ensure public concerns are taken into account, and have regard for the importance of conservation to the well-being and way of life of Aboriginal peoples.

The Review Board has developed these *Terms of Reference* based on an examination of information from the following sources:

- The public record of the preliminary screening;
- All information on the public registry in relation to the NICO Project;
- Issues highlighted and information provided during scoping sessions held in Tlicho communities in April and May of 2009 and a technical scoping session held in Yellowknife in April of 2009; and
- Review Board experience in the conduct of environmental assessment.

2. Scope Considerations

2.1 Scope of Development

Under subsection 117(1) of the *Mackenzie Valley Resource Management Act*, the Review Board is required to determine the scope of development for every environmental assessment it conducts. The scope of development consists of all the physical works and activities required for the project to proceed.

Within this document the term "NICO Project" means all the physical works and activities required to extract, concentrate, store, and transport concentrates out of the Mackenzie Valley. Where this document refers to the "NICO mine site", that means the area covered by Fortune's mineral claims and mining leases, generally located between Lou and Bourke Lakes.

Fortune has stated that the NICO Project requires road access from the NICO mine site to Highway 3. Fortune anticipates that the Government of the Northwest Territories will apply to build an all-land road from Highway 3 to Whati and Gameti in the near future (referred to in this document as the "potential GNWT road"), which will be used in part for the NICO Project. A short stretch of road (approximately 25km) from the NICO mine site to this anticipated road will be built and operated by Fortune.

² Throughout this document, the term "Mackenzie Valley" refers to the area as defined in section 2 of the *Mackenzie Valley Resource Management Act*.

The scope of development for this EA does not include the construction or general operation of the potential GNWT road, which has not been proposed at this time, and which is not expected to be proposed, constructed and operated primarily by Fortune. The Review Board expects that the potential GNWT road will undergo appropriate environmental scrutiny once applications for that road have been received. However, Fortune's use of the potential GNWT road is required for the NICO Project, and is included in the scope of development.

With the above exception of the construction and maintenance of the potential GNWT road, the scope of this environmental assessment includes all physical works and activities required to construct, operate, close and reclaim the NICO Project within the boundaries of the Mackenzie Valley. The Review Board has used information provided by the developer to define the scope of development to include the following physical works or activities during any phases of mine construction, operation and closure:

Construction

- Construction of the mine rock management area, tailings pond and tailings management area (or co-mingled deposition of rock and tailings), including water management systems;
- Construction of a waste disposal facility within the tailings management area;
- Construction of facilities for milling, initial separation and concentration of ore
- Construction of power generation and heat recovery facilities;
- Construction of the Effluent Treatment Facility that will treat effluent from the tailings pond;
- Construction of drainage control structures, process pipelines and waste water pipelines from mine to surface, on surface at the NICO Project mine site, run-off collection trenches and sedimentation pond;
- Construction of any new roads at the mine site;
- Construction of the water treatment plant;
- Construction of management facilities, including the pump house and water intake, water discharge system (including seasonal water storage areas, all drainage ditches and discharge points) and potable water supplies for camps;
- Construction of fuel storage facilities on-site;
- Construction of the permanent camp west of NICO Lake;
- Construction of NICO access road to the mine site by Fortune;
- Construction of the airstrip
- Development of borrow sources for aggregate production at the mine site or along the NICO access road

Mining and Materials Storage

- Development of underground workings and open pit, including use of the existing decline and crosscut and drift development;
- Extraction and crushing of ore-bearing rock;
- Transport, storage and use of explosives;
- Mine dewatering;
- Transportation of materials to, and management of, the mine rock management area, tailings pond and tailings management area (or co-mingled deposition of rock and tailings), including water management systems;
- Management of a waste disposal facility within the tailings management area;

- Management of initial separation and concentration reject materials, and ore and tailings stockpiles on surface, including construction of any associated foundations, buildings, and water treatment and management systems;
- Backfilling of mined out stopes using cemented rock fill and engineered bulkheads; and
- Mining equipment operation, including vehicles and materials conveyance systems.

Milling

- Use of facilities for milling, initial separation and concentration of ore including:
 - Conventional concentrator with ball mill
 - Initial flotation, second flotation of bulk rougher concentrate, bulk cleaner flotation and any other processing
 - Extraction, transportation, consumption, recycling, treatment and discharge to the environment of mine water and process water; and
 - Storage, handling, use and disposal of milling process additives and chemicals
 - Thickening, filtration and packaging of concentrate for transportation

Other On-Site Facilities and Activities

- Power generation and heat recovery facilities;
- Use of the Effluent Treatment Facility that will treat effluent from the tailings pond;
- Use of drainage control structures, process pipelines and waste water pipelines from mine to surface, on surface at the NICO Project mine site, run-off collection trenches and sedimentation pond;
- Use of roads at the mine site;
- Use of the water treatment plant;
- Use during mine operations of the pump house and water intake, water discharge system (including seasonal water storage areas, all drainage ditches and discharge points) and potable water supplies for camps;
- Use of fuel storage facilities on-site;
- Use of the pioneer camp at Lou Lake and permanent camp west of NICO Lake;
- Sewage treatment plant;
- Ore stockpiling facilities;
- Service complex and mine equipment management building;
- Use of vehicles and all other emissions sources at the NICO mine site; and,
- Use of waste incinerator

Support/Ancillary Facilities and Activities

- Transportation activities by air and road (including the NICO access road and the potential GNWT road) that support the NICO Project's operation, including transportation of goods, fuel, contractors and employees in to and out of the mine, and removal and disposal of wastes or other materials
- Use of the airstrip at the mine site
- Use of borrow sources for aggregate production at the mine site or along the access road

Closure and Reclamation

- Removal or stabilization of all structures and equipment;
- Reclamation of tailings pond, tailings management area, and all other site water management facilities;
- Reclamation of the mine rock management area;

- Reclamation of the new road proposed by Fortune, and all roads on the NICO Project mine site;
- Reclamation of infrastructure foundations, piping, and all built structures at the mine site;
- Reclamation of any stockpiles and materials storage locations;
- Re-vegetation of areas affected by mining or support activities;
- Backfilling, bulkhead installation and other capping of the underground works; and
- Long-term mine water outflow monitoring and management around the mine site.

In the *Developer's Assessment Report* (see section 3.2.5) the developer is required to fully describe all required facilities and activities for the development, including any not listed above. The Review Board may amend the scope of development during the environmental assessment if the proposed development changes or as further processing details become available.

2.2 Scope of Assessment

2.2.1 Overview

The scope of assessment defines which issues will be examined in the environmental assessment. The scope of assessment includes all potential impacts on valued components of the biophysical and the human environment (e.g. wildlife species or heritage resources) from the development, by itself and in combination with other past, present and reasonably foreseeable future developments (see section 2.2.3 for details).

To determine the scope of assessment, the Review Board reviewed Fortune's Project Description Summary and the public registries of the preliminary screening and ongoing environmental assessment. The Review Board also hosted scoping sessions in Whati, Gameti, Bechoko and Yellowknife.

2.2.1 Geographic Scope

The geographic scope will include all areas that may be affected by activities related to the NICO Project. The geographic scope considered for each valued component must be appropriate for the characteristics of that component or impact. For example, consideration of impacts on air should reflect the airshed and wind patterns, while the ranges of wildlife using the area may be relevant from a cumulative effects perspective. All of these areas together will be considered in the environmental assessment study area, which will be further defined by the developer in its *Developer's Assessment Report* (see section 3.2.3).

The minimum geographic scope will include the following areas:

- 1) Fortune's mineral and surface leases and mining claims in the area of the NICO Project mine site, sub-surface workings, and a reasonable impact footprint radius centered on the mine site;
- 2) The NICO access road connecting the NICO Project mine site to the potential GNWT road and a reasonable impact footprint corridor centered on the NICO access road and the potential GNWT road, including any portions of watercourses that may be affected;
- 3) The watersheds from Peanut Lake and Lou Lake downstream of the NICO Project to Marian River, Marian Lake and to the confluence of the North Arm of Great Slave

Lake, as well as areas further downstream if project-related impacts there are foreseeable.

The geographic scope for assessing impacts to the human environment includes the communities of Whati, Gameti, Wekweti, Bechoko and Yellowknife and includes the Tliche region as a whole. The concerns of aboriginal residents who use the land in the environmental assessment study area for traditional pursuits must be considered. Together, these groups are described in this document as “potentially-affected communities”.

In its response to section 3.2.3 (below) the developer is required to define and provide rationales for the specific spatial boundaries it used to examine the potential impacts on each of the valued components considered in its impact assessment.

2.2.2 Temporal Scope

The developer will use temporal boundaries for this environmental assessment according to potential long-term impacts on valued components, rather than on a single generic timeline. In all cases, the temporal boundary does not end with the duration of the operating phase of the NICO Project.

For project specific (that is, non-cumulative) impacts, the temporal scope will include all phases of the NICO Project lifespan including construction, operation, closure and reclamation, and extends until no potentially significant adverse impacts are predicted. For cumulative impacts, the temporal scope includes the period of the effects of past, present and reasonably foreseeable future projects that are predicted to combine with the impacts of the NICO Project.

The developer will place special focus on the consideration of times during the development when activities are particularly intense (such as during initial construction) or when valued components are particularly sensitive to potential impacts (such as during wildlife migration periods, or spawning and incubation periods for fish). The developer will also give special attention to appropriate temporal boundaries for considering any impacts that may require long-term monitoring and management after closure, such as mine water release into the environment (see section 3.3.3 for details on this subject).

In its response to section 3.2.3 (below) the developer is required to define and provide rationales for the specific temporal boundaries it used to examine the potential impacts on each of the valued components considered in its impact assessment.

2.2.3 Other Scope of Assessment Considerations

The scope of assessment will include an examination of cumulative effects. This will involve considering impacts from other past, present and reasonably foreseeable future developments or human activities that combine with the impacts of the NICO Project to affect the same valued components. Such cumulative effects will be assessed at a spatial and temporal scale appropriate to the particular effect or valued component under consideration.

For example, contaminated sites in the area that are not part of the NICO Project are excluded from the scope of development. However, where the impacts of past activities may

combine with the potential impacts of the NICO Project, they must be considered in the cumulative effects assessment (see Appendix K for more details).

The level of effort required in considering specific issues is discussed in section 3.1 below under “Issues Prioritization”.

The scope of assessment set out in these *Terms of Reference* may be re-examined at any time by the Review Board if new information emerges.

3. Terms of Reference

3.1 Considerations

The developer will consider the following when developing the specific material the Review Board requests in Section 3.2.

3.1.1 Issues Prioritization

The purpose of scoping is not only to identify issues, but also to prioritize them and if possible, focus required additional work on the most important ones. Fortune will consider all the items described in Section 3.2, because every issue identified in this *Terms of Reference* requires a sufficient analysis to demonstrate whether the development is likely to be the cause of – or a contributor to - significant adverse impacts. However, two particular issues were identified during scoping as requiring increased attention, because of high impact potential and concerns raised during scoping. Fortune is required to give special consideration to the following **key lines of inquiry** in the *Developer's Assessment Report*:

- **Impacts of the NICO Project on water quality**, particularly in relation to the quality of mine water and effluent released to groundwater and surface waters, and related impacts to human and environmental health downstream.
- **Long-term impacts following mine closure**, including risks of environmental contamination, and related reclamation plans and practices . This includes risks to water, wildlife and people.

These key lines of inquiry are the topics of greatest concern that require the most attention during the environmental assessment and the most rigorous analyses in the *Developer's Assessment Report*. These are designated as key lines of inquiry to ensure a comprehensive analysis of the issues most likely to cause significant environmental impacts or significant public concern. Data collection and analyses for these key lines of inquiry in the *Developer's Assessment Report* should be at a level of detail appropriate for other interested parties to understand the technical material prior to any technical sessions on these topics.

These key lines will be presented in comprehensive stand-alone sections in the *Developer's Assessment Report*. This will facilitate close examination of the developer's response to these key lines of inquiry, and will require only minimal cross-referencing with other parts of the report and appendices.

All other issues that require examination in the *Developer's Assessment Report* are treated as **Subjects of Note**. These issues do not have the same priority or expected level of detail as key lines of inquiry, but are nonetheless issues that require serious consideration and substantive analysis.

3.1.2 Incorporation of Traditional Knowledge

The Review Board values and considers both traditional knowledge and scientific knowledge in its deliberations. Fortune will make all reasonable efforts to assist in the collection and consideration of traditional knowledge relevant to the NICO Project. Where it is applicable, Fortune will use Traditional knowledge as a tool to collect information on and evaluate the specific impacts required in this *Terms of Reference*. The developer should refer to the Review Board's *Guidelines for Incorporating Traditional Knowledge into the Environmental Impact*

*Assessment Process*³ and community-specific traditional knowledge protocols.

3.1.3 Assessing the Impacts of the Environment on the Development

Potential impacts of the physical environment on the development, such as changes in the permafrost regime, other climate change impacts, seismic events, geological instability, and extreme precipitation must be considered in each of the applicable items of this *Terms of Reference*. Any changes to the design or management of the NICO Project as a result of considering potential impacts of the environment should be noted in the relevant sections.

3.1.4 Use of Appropriate Media

The Review Board encourages the developer to present information in user-friendly ways. The use of maps, aerial photos, development component/valued component interaction matrices, full explanation of figures and tables, and an overall commitment to plain language is encouraged. When it is necessary to present complex or lengthy documentation to satisfy the requirements of the *Terms of Reference*, the developer should make every effort to simplify its response in the main body of the text and place supporting materials in appendices.

The developer is strongly encouraged to visually represent the NICO Project and its surroundings using a diorama-type 3D landscape model to indicate scale, setting and direct footprint.⁴ For digital mapping, all Geographic Information Systems (GIS) data must conform to the standards set by the Government of the Northwest Territories' spatial data warehouse⁵.

The *Developer's Assessment Report* will be submitted as a stand-alone document. Relevant information and analyses from previous project descriptions should be incorporated into the *Developer's Assessment Report* and combined with the supplementary material and analyses required by this *Terms of Reference*. Where the developer references external sources of information, it should provide a succinct summary of the relevant information from the source report.

3.2 General Information Requirements

This *Terms of Reference* document describes the general information required on a subject-by-subject basis. For the sake of readability, detailed requirements are included in corresponding appendices for many of the following sections. The developer is encouraged to consider the information gaps identified and questions raised by interested parties on the public record in scoping submissions when determining the level of detail required in its *Developer's Assessment Report* for specific issues covered in these *Terms of Reference*.

3.2.1 Summary Materials

The following summary materials are required:

1. English and Tlicho plain language, non-technical summaries of the *Developer's Assessment Report*;
2. An audio (.mpeg) translation of the plain language summary in the Tlicho language;
3. A concordance table that cross references the items in the *Terms of Reference* with relevant sections of the *Developer's Assessment Report*; and

3 Available at http://www.reviewboard.ca/upload/ref_library/MVEIRB_TK_Guide.pdf.

4 For an example, see *EA 0708-07- Taltson Hydroelectric Expansion Project*.

5 The GNWT's spatial data warehouse may be accessed at <http://maps.gnwtgeomatics.nt.ca/portal/index.jsp>.

4. A commitments table listing all mitigation measures the developer will undertake, in addition to those described in the project application. These should be organized by subject (e.g. water quality, wildlife) for easy reference.

3.2.2 Developer

Provide the following information regarding the developer:

1. A summary of Fortune's corporate history and operational experience in Canada and the Northwest Territories;
2. How the developer will ensure that its contractors and subcontractors honour commitments made by Fortune;
3. Fortune's environmental performance record during prior exploration and development work in support of the NICO Project, including discussion of regulatory compliance (for example, regarding land use permits and water licenses). List any situations where compliance was breached, the issue and cause, and how and when it was mitigated to the regulator's satisfaction;
4. A description of any corporate policies, programs or plans concerning Fortune's environmental, sustainable development, community engagement and workplace health and safety commitments or policies;
5. A description of Fortune's financial capacity to carry through with proposed mitigation measures and commitments related to the NICO Project.

3.2.3 Developer's Assessment Boundaries

The developer will provide a description, map and rationale for all of the chosen geographic and temporal boundaries used during its impact assessment. Certain minimum requirements and other instructions to assist in the determination of appropriate boundaries are discussed in Section 2.2 of the *Terms of Reference*. Separate boundaries may be required for cumulative effects assessment (see Section 3.5).

The developer will describe and provide rationales for:

1. An overall environmental assessment study area and the rationale for its boundaries;
2. Fortune's chosen spatial boundaries for the assessment of potential impacts for each of the valued components considered; and,
3. The temporal boundaries chosen for the assessment of impacts on each valued component.

3.2.4 Description of the Existing Environment

A detailed description of the existing environment is required, including current status and trends for all valued components. Wherever possible, the developer is responsible for providing a clear picture of what typical environmental conditions in the environmental assessment study area existed prior to industrial activity occurring. This must consider the current state of the baseline conditions, and the natural range of background conditions.

Describe the biophysical environment, including:

- the location
- air quality
- climate
- hydrology
- water quality
- aquatic organisms
- wildlife
- vegetation
- terrain

Describe the human environment, including:

- surrounding communities
- existing infrastructure
- regional labour pool, skill levels and regional business capacity
- socio-economic conditions in communities and the region
- historic and present land use, including harvesting
- heritage resources
- other economic activities

Appendix A elaborates on the information required for the description of the existing environment.

3.2.5 Development Description

Fortune will ensure that a description of all its planned facilities and activities is included in the *Developer's Assessment Report*, including any proposed or existing facilities and activities not listed in Section 2.1 of these *Terms of Reference*. In this section, Fortune is only asked to provide details on the NICO Project itself, not to comment on potential impacts from the development.

Where the developer feels it would be helpful to reviewers, the *Developer's Assessment Report* should describe alternative development components, management systems, or alternative locations for physical works and activities considered for the NICO Project. Where applicable, the developer will provide reference to research that identifies the successful use of the specific technologies being proposed, and their relevance for this environmental setting.

Describe the proposed NICO Project, providing details of all works and activities throughout construction, operation, closure and reclamation, and long-term monitoring phases, with a description of major activities by phase.

This description will include:

- facilities, mine components
- any on-site processing
- chemicals and explosives
- tailings and mine rock management
- stockpiling, water usage
- management and treatment
- power generation
- transportation
- site infrastructure
- employment
- any other activities

Appendix B elaborates on the information required in the development description.

3.2.6 Public Engagement

Engagement with communities, Aboriginal groups, governments, or other organizations with interests related to areas that might be affected by the NICO Project should be considered in this section. Aboriginal groups, government agencies and other interested parties may have information useful to the conduct of this impact assessment and all reasonable efforts should be made to engage with them. The Review Board encourages the developer to meet with interested groups outside the environmental assessment process, and to place any information from those discussions they consider may be relevant to the Review Board's decision on the

public record.

The following items are required for consideration of public engagement:

- An engagement log, describing dates, individuals and organizations engaged with, the mode of communication, discussion topics and positions taken by participants, including:
 - All commitments and agreements made in response to issues raised by the public during these discussions, and how these commitments altered the planning of the proposed NICO Project; and
 - All issues that remain unresolved, documenting any further efforts envisioned by the parties to resolve them;
- Description of all methods used to identify, inform and solicit input from potentially-interested parties, and any plans Fortune has to keep engagement moving forward;
- Discussion of the implications for environmental monitoring and management of any relevant agreement between the developer and other interested parties, and
- How Fortune has engaged, or intends to engage, traditional knowledge holders⁶ in order to collect relevant information for the impact assessment, as well as a summary table indicating where and how in which of the subsequent sections (3.3-3.6) traditional knowledge was analyzed and used.

3.3 Impacts on the Biophysical Environment

3.3.1 Impact Assessment Steps and Significance Determination Factors

In order to facilitate the consideration of the specific questions posed in this section, the developer is required to address the following impact assessment steps. In assessing impacts on the biophysical environment, the *Developer's Assessment Report* will for each subsection:

- Identify any valued components used and how they were determined;
- For each valued component, identify and provide a rationale for the criteria and indicators used;
- Identify the sources, timelines and methods used for data collection;
- Identify natural range of background conditions (where historic data are available), and current baseline conditions, and analyze for discernible trends over time in each valued component, in light of the natural variability for each;
- Identify any potential direct and indirect impacts on the valued components that may occur as a result of the proposed development, identifying all analytical assumptions;
 - Predict the likelihood of each impact occurring prior to mitigation measures being implemented, providing a rationale for the confidence held in the prediction;
 - Describe any plans, strategies or commitments to avoid, reduce or otherwise manage the identified potential adverse impacts, with consideration of best management practices in relation to the valued component or development component in question;
- Assess the significance of any residual adverse impacts predicted to remain after mitigation measures; and
- Identify any monitoring, evaluation and adaptive management plans required to ensure that predictions are accurate and if not, to proactively manage against adverse impacts when they are encountered.

⁶ Suggestions for working with communities to obtain traditional knowledge are described in Section Four of the Review Board's *Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment*.

The developer will characterize each predicted impact⁷. These criteria will be used by the developer as a basis for its opinions on the significance of impacts on the biophysical environment. The Review Board will make ultimate determinations of significance after considering all the evidence on the public record later in the environmental assessment.

3.3.2 Key Line of Inquiry: Water Quality

During the issues scoping process, potential impacts of the NICO Project on water quality was identified as a top priority by most interested parties, including the developer. The developer will consider all potential impacts of water quality in the watershed to the point where no changes can be measured in a stand-alone section of the Developer's Assessment Report.

- Describe the impacts of the proposed project on water quality in the Fortune claim block and downstream. Include discussion of predicted physical or chemical changes. This will include predictions of any changes in levels of contaminants, pollutants or other harmful or deleterious substances caused entirely or partly by the NICO Project. Discuss these in terms of:
 - potential impacts on aquatic resources and habitat
 - changes to the safety of water for drinking in Bechoko and for people on the land
- Describe any predicted changes from the NICO Project on
 - waterbodies in the Fortune claim block
 - waterbodies downstream of the project until no changes can be measured
 - Marian River, Marian Lake, and Hislop Lake
- Predict potential impacts on any ephemeral streams and groundwater flows from the project area.
- Consider the natural baseline conditions, such as naturally occurring arsenic, in predicting potential impacts.
- Predict potential impacts to water quality from accidents in transport of processing chemicals and other dangerous goods.

Appendix C elaborates on the information required on water quality.

3.3.3 Key Line of Inquiry: Closure and Reclamation

During the issues scoping process, long-term impacts related to closure and reclamation of the NICO Project were identified as a high priority by most interested parties. Fortune will present on its preliminary Closure and Reclamation Plan for the NICO Project in the *Developer's Assessment Report*. The developer should consider existing guidance, such as Indian and Northern Affairs Canada's mine closure and reclamation policy and guidelines for the NWT, when developing its reclamation plan for the NICO Project. The developer is also advised to work with communities and other parties to determine clear closure objectives and link them to measureable closure criteria and indicators.

- Describe to what standard Fortune plans to reclaim the site, and how that standard was selected.
- Describe how and when the mine site will be reclaimed, including how plans will

⁷ in terms of magnitude, areal extent, timing, reversibility, likelihood and all other criteria required by section 3.8 of the Review Board's *EIA Guidelines*.

ensure that the site does not contaminate water or pose an ongoing hazard to people or wildlife.

- Describe plans for reclaiming the NICO access road.
- Describe consultations with governments and communities regarding reclamation, and how plans have been adapted as a result.

Appendix D elaborates on the information required on closure and reclamation.

3.3.4 Water Quantity

- Describe the potential impacts of the NICO Project on upstream and downstream water quantity, with a particular emphasis on changes in:
 - Lou, Peanut Lake, and Burke Lakes
 - Connecting waterways (including any streams from Burke Lake feeding Marion River) and ephemeral springs that form during freshet, and
 - groundwater flows
- Provide a water balance for the project (with proposed water recycling).
- Describe potential impacts of water withdrawals and the loss of littoral habitat.
- Describe potential effects of changes in water quantity on the Marian River, Marian Lake and the availability of drinking water in Bechoko.

3.3.5 Fish and Aquatic Habitat

Describe the potential impacts of the NICO Project on fish and fish habitat.

- Identify the fish bearing lakes and rivers that the project may affect.
- Describe the potential impacts on aquatic life, including changes to water quality and quantity, and any introduction of contaminants to aquatic food chains.
- Describe in detail the mitigations Fortune will do to avoid or reduce impacts to fish and aquatic habitat, and predict the effects of the NICO Project after those mitigations.
- Describe how accidents and malfunctions could affect fish and the aquatic environment, how Fortune will avoid these incidents, and what actions Fortune will take if they happen.

Appendix E elaborates on the information required on fish and aquatic habitat.

3.3.6 Wildlife

The Review Board notes that Section 79 of the federal *Species at Risk Act* requires that all SARA-listed species be identified and any adverse impacts of a development on them be thoroughly assessed and mitigated, regardless of whether the impacts are deemed “significant”. Cumulative effects on wildlife are examined in section 3.6.

- Describe potential effects from the NICO Project on wildlife and its habitat. This will include impacts on hoofed mammals, large carnivores, furbearers (terrestrial and aquatic), and migratory birds. This description will consider:
 - direct and indirect habitat loss
 - behavioural disturbance from NICO Project activities
 - barriers to movements

- impacts related to increased access, and
 - any other sources of direct or indirect mortality.
- Special consideration is required for species that are harvested, and for species of wildlife at risk (SARA and COSEWIC listed species).
- Describe any mitigation proposed to avoid or reduce impacts to wildlife, and predict the final impact after mitigation.

Appendix F elaborates on the information required on wildlife.

3.3.7 Terrain

- Describe the stability of the proposed mine rock management and tailings management areas and evaluate potential impacts.
- Describe how Fortune will ensure the stability of all engineered structures against a range of climate, seismic and precipitation scenarios.
- Describe plans to mitigate impacts on terrain, including plans for monitoring, evaluation and adaptive management of the mine rock management area, tailings management area the system of dykes and dams.

Appendix G elaborates on the information required on terrain.

3.3.8 Air Quality

The *Developer's Assessment Report* will evaluate the NICO Project's potential impacts on air quality due to project emissions. While considering impacts and mitigation on air quality, the developer is encouraged to enter dialogue with Environment Canada and the Government of the Northwest Territories about appropriate methods for modeling air quality and strategies for minimizing air quality impacts, and should consider the *Guideline for Ambient Air Quality Standards in the Northwest Territories* and Government of the Northwest Territories *Guideline for Dust Suppression*.

- Describe existing conditions with respect to air quality.
- Predict the emissions and potential impacts from all stages of the NICO Project.
- Describe proposed mitigations and any plans for air quality monitoring, evaluation and adaptive management.

Appendix H elaborates on the information required on air quality.

3.3.9 Vegetation

- Describe the total amount of land cleared (relative to pre-fire conditions), and related impacts on soil
- Describe potential impacts on rare plants
- Describe how Fortune will prevent the introduction of invasive plants
- Describe mitigations and best management practices related to vegetation

Appendix I elaborates on the information required on vegetation.

3.4 Impacts on the Human Environment

The *Mackenzie Valley Resource Management Act* lists, social impacts, cultural impacts, impacts on heritage resources and impacts on wildlife harvesting in the definition of impact on the environment. In addition, the Guiding Principles of Part 5 of the Act require the consideration of the social, economic and cultural well being of residents and communities of the Mackenzie Valley during every environmental assessment. The developer is encouraged to work with communities and responsible government authorities to identify valued components of the human environment, appropriate indicators and sources of information to measure change, pathways by which change may likely occur, and mitigation and monitoring strategies that may be required to maximize benefits and minimize adverse impacts. Mitigation may not be entirely the responsibility of the developer, as governments and communities have social, economic and cultural protection mandates. However, it is primarily the responsibility of the proponent of the project to initially document these issues in its Developer's Assessment Report.

- Describe employment, training and business opportunities from the NICO Project, and any plans to maximize opportunities for Tlicho residents and other Northerners.
- Describe project costs, taxes and socio-economic impacts, with a focus on the distribution of beneficial and adverse impacts. Include a description of any plans or strategies to mitigate adverse socio-economic impacts.
- Describe the social impacts of the NICO Project, focusing on community wellness and population health issues at community, family and individual levels.
- Describe potential cultural impacts, including potential impacts on physical heritage resources, traditional land use (including hunting, fishing, gathering, use of the traditional Idaa Trail and any impacts on activities at Hislop Lake).
- Describe commitments and plans to monitor, evaluate and manage impacts on the human environment.

Appendix J elaborates on the information required on the human environment.

3.5 Accidents and Malfunctions

- Conduct a risk assessment for the NICO Project, including components, systems, hazards, and failure modes.
- Assess likelihood and severity of each risk identified.
- Describe all accident and emergency response plans that will be in place during the construction phase and operations phase, including emergency communication plans.

3.6 Cumulative Effects

Pursuant to paragraph 117(2)(a) of the *Mackenzie Valley Resource Management Act*, the Review Board considers cumulative effects in its determinations. Cumulative effects are the combined effects of the development in combination with other past, present or reasonably foreseeable future developments and human activities. In addressing cumulative effects, the developer is encouraged to refer to Appendix H of the Review Board's Environmental Impact Assessment Guidelines.

- Identify which of the valued components may be affected by other past, present or

- reasonably foreseeable future developments and human activities.
- Describe which past, present or reasonably foreseeable future developments and human activities may affect the valued components identified above.
 - Predict the combined effect of these human activities on the identified valued components.
 - Describe any mitigations and monitoring proposed to reduce or avoid the predicted effects, specifying if and how adaptive management will be used, and what remaining impacts are predicted.

Appendix K elaborates on the information required for the cumulative effects assessment.

4. Conclusion

The Review Board anticipates that the requirements described in this document will help Fortune produce a Developer's Assessment Report that clearly describes Fortune's predictions of the impacts of the NICO Project, while providing sufficient basis for the Review Board and parties to analyze and evaluate those predictions.

The developer is encouraged to seek clarification from the Review Board in writing if specific requirements in the Terms of Reference are unclear.

Appendix A: Existing Environment

Biophysical Environment

Describe the following:

- 1) The physical location of the proposed development and identification of associated ecozones and ecoregions;
- 2) Ambient air quality and background noise levels (with a description of all human-caused noise sources);
- 3) Climatic conditions, including temperature and precipitation;
- 4) Hydrology and hydrogeology, including surface water, shallow subsurface water and groundwater amounts, direction of flow, likely surfacing points/discharge area (for groundwater and shallow subsurface water), and maps and descriptions of associated watersheds. Discussion should focus in particular on:
 - The NICO Project mine site, including groundwater flow from the mine itself
 - Seasonal and annual variation in groundwater and surface water quantity around the mine site, including trends over time;
 - The relative contribution of water from the NICO Project mine site to the volume of Burke Lake and the Marian River; and
 - Surface water and groundwater flow regimes associated with the plateau on which the mine site is located.

The developer will also provide a map detailing drainage patterns for surface and groundwater for the mine site and mine workings.

- 5) Current and historic data on surface water and groundwater quality for the immediate mine site area; This should include recent arsenic data and changes in baseline arsenic levels with reference to the recent forest fire, and should contrast baseline levels following the fire with the overall range of natural variability of background conditions.
- 6) Aquatic organisms and aquatic habitat in the environmental assessment study area. Include waterbodies on the mine site, water sources and downstream areas. Describe the following for key aquatic species:
 - seasonal and life cycle movements;
 - local and regional abundance and distribution;
 - known or suspected sensitive habitat areas for different development stages and times of year;
 - the health of the food chain that supports the species; and
 - any known issues currently affecting fish and other aquatic life forms in the area;
- 7) Wildlife (including resident and migratory bird species) and wildlife habitat and migration corridors. Special emphasis will be placed on key harvested species including moose, caribou and furbearers. For each species, information on the following is required (by population if more than one distinct population is present in the environmental assessment study area):
 - population trends, including abundance, distribution and demographic structures;
 - habitat requirements, including identification of local areas of important habitat, attributes of the seasonal habitats that relate to how the species use them (e.g. travel routes, forage) and sensitive time periods;
 - migration routes, patterns and timings including typical patterns and the range of known variation;
 - factors known or suspected to be currently affecting the species in the environmental assessment study area (e.g. harvesting, disease);

- known or suspected sensitivities to human activities; and
 - gaps in current knowledge of the species such as the impacts of disturbance on behaviour or abundance.
- 8) Wildlife at risk occurring in the environmental assessment study area. The developer will:
- Identify any species present or potentially present in the environmental assessment study area that are listed under schedule 1 of the federal *Species At Risk Act (SARA)*;
 - Identify any species present or potentially present in the project area assessed by the Committee on the Status of Endangered Wildlife in Canada; and
 - Describe each species in terms of the requirements of Item #8 above.
- 9) Vegetation and plant communities, including identification of any areas where rare plants are known or suspected to be present;
- 10) Terrain, surficial geology, structural geology, mineralogy, bedrock geology (type, depth, composition, permeability), seismic activity records and risk factors, permafrost locations and types within the environmental assessment study area. In particular:
- Describe the structure, permeability, stability, and other relevant characteristics of the plateau on which the mine site is located.
 - identify the chemical composition of host rock and ore bodies at the mine site;
 - describe and map the ground composition underlying the proposed mine site;
 - identify the location, amounts and type of granular material deposits; and
 - describe the ground conditions under and around the mine site and road proposed by Fortune , with emphasis on identifying areas susceptible to erosion, and permafrost instability; and
- 11) Physical and chemical makeup of soils and water body sediments.

Human Environment

Describe the following:

- 12) Any other physical infrastructure present in the environmental assessment study area, including habitations, roads, buildings, quarries, power lines and industrial works;
- 13) Available information pertaining to the area from the Tlicho land use planning process.
- 14) The availability and average training or skill levels of the local and Tlicho regional labour pool and local and regional business capacity;
- 15) Current socio-economic conditions and relevant trends in the potentially-affected communities and the Tlicho region as a whole, using appropriate indicators of well-being and quality of life;
- 16) A summary of historic and present land use in the study area, including identification of traditional land use groups, areas used and traditional travel routes and timings;
- 17) Traditional harvesting activities for - and traditional values about – all relevant animal (including fish) and plant species, including annual average harvesting data by species where available;
- 18) Known physical heritage resources locations, areas of high potential for unfound physical heritage resources and cultural values associated with the environmental assessment study area,; and
- 19) Other current economic activities in the environmental assessment study area.

Appendix B: Development Description

Provide a development description including descriptions of:

General Items

1. The estimated lifespan, illustrated by Gantt chart, of the NICO Project broken down into construction, operation, closure and reclamation, and long-term monitoring phases, with a description of major activities by phase;
2. The direct physical footprint of the NICO mine site, with locations and descriptions of all structures and all aboveground and underground infrastructure;
3. A list of all regulatory permits, licenses and other authorizations required to carry out the development;
4. Land tenure and any existing or anticipated agreements related to access to facilitate the proposed development; and
5. A list of any other required developments that need to be constructed or improved in order for the NICO Project to proceed.

Specific Items

6. All underground and open pit facilities, including ramps, portals, declines, location of infrastructure, machinery requirements, and water management facilities and methods;
7. The types and estimated amounts of explosives to be used, their storage, handling and application, both aboveground and underground;
8. The mining, crushing, and ore transportation methods used in the open pit and underground works;
9. The backfill technology to be used, the backfill plant (if any), transport of the backfill to the underground works, the planned bulkheads system, and when and how rock stored on the surface will be transported to and used in the backfill system;
10. The location, contents and estimated amounts of mined materials, soil and overburden at all surface storage facilities, along with estimates of storage requirements and storage capacity limits;
11. A description of the milling process from initial separation to concentrate, including primary and secondary crushing and flotation and filtration processes;
12. Location(s) and proposed activities of aggregate production and storage, with an estimate of the amount of aggregate that will be produced per year over the life of the mine, by location;
13. The type, volume, storage (location and method), handling, and disposal of all potentially hazardous materials used on site (including Material Safety Data Sheets);
14. The water collection, management and treatment system and all of its component parts, including drainage and other control structures, water and sewage treatment facilities, water storage facilities, and water transport components;
15. The total amount of water in cubic meters estimated to be collected from the mine and other mine site components and eventually be released into local watercourses, with consideration of changes during the life of the NICO Project and the range of seasonal fluctuations;
16. Management of tailings, including a description of how closure considerations affected the weighing of any alternative locations for tailing facilities;
17. Sources and estimated amounts of water required for all on-site activities;

18. Water quality and quantity monitoring proposed for the NICO mine site and its surroundings;
19. Energy requirements, generation sources, and fuel storage facilities, on-site transport and handling procedures;
20. All other infrastructure and activities proposed for the NICO mine site, including estimates of frequency and type of aircraft landings and takeoffs, and intensity and type of on-site vehicle traffic;
21. The proposed NICO access road and any roads within the mine site, including construction and maintenance, any proposed water crossings, and amount of water and other materials required;
22. Water quality and quantity management and monitoring along the transportation corridor;
23. The expected number of single, one-way trips per day to and from the NICO mine site by truck type and weight of load, any related storage, packaging in Flexible Intermediate Bulk Containers or any other containers, transfer and handling, and estimated duration of the annual haul season;
24. The number of full-time job equivalents and person years of work associated with the NICO Project, broken down by life cycle phase; and
25. Worker transportation and proposed work scheduling.

Appendix C: Water Quality

In predicting the impacts on water quality from NICO Project, the developer will:

1. Identify, describe, and estimate amounts of contaminants from all potential sources at the NICO mine site. Predict the likelihood and consequences for each of the following, alone or in combination, to leach metals, create acid rock drainage, or otherwise affect water quality:
 - a. Mine water from the underground workings and open pit;
 - b. The mine rock management area;
 - c. The tailings management area;
 - d. Reagent chemicals, hydrocarbons, explosives, and any other potentially hazardous products used at the mine site;
 - e. Any other materials stored on surface at the NICO mine site, including aggregates; and,
 - f. Other site runoff.

This discussion will include estimates of how much of the waste rock will likely be placed in the mine rock management area, delineation of all potential contaminant pathways and receptors, and post-closure locations, predicted amounts, and management systems for all surface materials storage systems;

2. Predict the water quality and quantity of final effluent discharged to the environment during all phases of the NICO Project life cycle, incorporating:
 - a. Identification of the constituents of, and quantity likely to come out of, each on-site water source;
 - b. Predicted changes over time in the amount or quality of mine water outflows;
 - c. All relevant water quality parameters including pH, concentrations of metals, nutrients, total suspended solids, major ions, process chemicals and bacteria;
 - d. Identification of all committed-to mitigation measures to minimize initial water contamination (e.g. mitigative measures to limit blasting residues) and to remove contaminants via the treatment process;
 - e. Identification of the uncertainties and confidence levels in the predictions, the assumptions used, and the likely range of variation for the parameters identified;
3. Describe naturally occurring arsenic, the range of natural variation, flows and ecological pathways, and how the NICO Project will affect this range of conditions. Describe how arsenic solubility under site conditions (both acidic and neutral) has been considered in long term mine planning and engineering designs.
4. Assess potential impacts of effluent discharge in Peanut Lake, NICO Lake, Burke Lake, Marian River and Marian Lake (to the point that no changes are measurable) including the predicted likelihood and severity of:
 - a. Changes to pH in downstream watercourses;
 - b. Increasing sediment levels and water turbidity;
 - c. Increasing contaminant concentrations (including arsenic and mercury) in the sediments, fish and other aquatic organisms, including consideration of bio-accumulation effects;
 - d. Discharge of ammonia, including possible changes in nutrients available in the food chain in downstream water bodies; and
 - e. Any other impacts which may alter water quality or aquatic ecosystem integrity downstream of the mine.

5. For Peanut Lake, describe:
 - a. Method and location of effluent discharge
 - b. Plume behaviour of effluent including an estimate of mixing behaviour and an estimate of where the plume will be sufficiently mixed that there is no chronic toxicity
6. For Peanut Lake, Burke Lake and water bodies in between, describe:
 - a. contaminant mobility in water under likely environmental conditions
 - b. effects on dissolved oxygen and nutrient levels, especially during winter
 - c. potential increase in sedimentation and erosion (including lake bed and banks)
7. Identify any potential sources of contaminated groundwater not captured in the mine water management system. This discussion should identify
 - a. Where losses to the groundwater system could occur;
 - b. Estimated quantities of contaminated groundwater loss; and
 - c. Potential impacts of contaminated groundwater on the environment and their likely geographic distribution;
8. Describe potential effects on project effluent from *incoming* groundwater quality, and resulting impacts on the environment.
9. Describe:
 - a. Site-specific characteristics of the receiving environment;
 - b. Proposed site-specific water quality objectives, effluent levels, limits and proposed thresholds for water quality that the developer is committed to meeting in order to protect the downstream environment;
 - c. Fortune's proposed draft framework for aquatic effects monitoring and environmental effects monitoring programs, considering historical arsenic levels.
10. Describe Fortune's evaluation of water treatment alternatives. For the proposed water management and treatment facilities, provide an analysis of the adequacy of:
 - a. The effluent treatment facility, specifically to meet site specific water quality objectives for:
 - i. *Metal Mining Effluent Regulation* metals ;
 - ii. Other metals such as selenium, iron, cobalt, bismuth
 - b. All water collection systems, including that surrounding the mine rock and tailings management areas;
 - c. The sewage treatment system; and
 - d. Any water storage facilities.

This discussion should emphasize the ability of these facilities and the system as a whole to handle expected increased mine water outflows and retention capacity timelines and contingency plans for greater than expected outflows, the ability to handle greater than predicted concentrations of contaminants in pre-discharge waters or other treatment upsets, and impacts of any identified failure mode. Include discussion of seasonal effects on the effectiveness of the effluent treatment facility

11. Describe the likelihood and consequences of accidents, malfunctions, or impacts of the environment on the development influencing water quantity and quality and the ability of the water management system to function. This discussion should include the required circumstances for a failure to occur, and what monitoring, evaluation and adaptive management systems will be in place to identify, proactively avoid and deal with, at minimum, the following scenarios:

- a. Extreme short-term precipitation events, snowpack buildup or other factors leading to flooding events;
 - b. Geologic instability or seismic activity causing landslides at or near the NICO mine, impacts on the mine workings, or compromising of the mine rock management area;
 - c. Failure of existing water retention structures;
 - d. Freezing effects on water transportation systems;
 - e. How mine water will be managed if the water treatment system malfunctions, with a focus on retention capacity timelines for water storage facilities and contingency water treatment plans.
 - f. Potential impacts to water from accidents in transport of processing chemicals and other dangerous goods
 - g. Potential impacts to water from tailings spills or leaks
12. Describe the effect of water recycling on water quality for different water recycling scenarios.
13. Describe water quality monitoring and management during operations and over the long-term (closure and post-closure) including:
- a. Conceptual contingency plans in case metals leaching or acid rock drainage occurs
 - b. Contingency plans for unacceptable effluent quality;
 - c. Spill contingency plans on site and along transportation routes;
 - d. Conceptual plans for surface water and ground water monitoring;
 - e. Whether and how Fortune will incorporate Tlichio residents in environmental monitoring, and how it will report monitoring results to potentially-affected communities; and
 - f. How long will post-closure monitoring be required, what aspects of the mine and the receiving environment will be monitored, and how monitoring into the extremely long-term will be ensured if required.

Appendix D: Closure and Reclamation

1. Describe policies, regulations and industry standards that Fortune considered in the development of its *Conceptual Closure and Reclamation Plan*;
2. Provide a preliminary *Conceptual Closure and Reclamation Plan*, which will include:
 - a. Identification of the overall reclamation objectives, standards and criteria the Closure and Reclamation Plan is designed to achieve and over what time period;
 - b. A list of closure and reclamation components and activities including alternatives considered, a rationale for why Fortune chose a particular alternative and how it best meets the developer's reclamation objectives;
 - c. An outline for the methods and locations for disposal of materials during reclamation;
 - d. A conceptual program and schedule for any progressive reclamation envisioned; and
 - e. A conceptual post-closure monitoring plan that includes a reporting strategy and a rationale for an "end-date" for monitoring;
3. In the *Conceptual Closure and Reclamation Plan*, discuss management and monitoring programs for any materials/locations (including the underground works) that may cause acid rock drainage or metals leaching. Include:
 - a. Creating a sufficient barrier for the prevention of tailings and waste rock oxidation;
 - b. The likely rate of movement of water (including groundwater) through the tailings, mine rock management area and underground working, associated uptake of acids, metals or any other contaminants into groundwater or surface waters, and monitoring location requirements and contingency plans for greater than expected rates of contaminant release;
 - c. The long-term physical integrity of permanent features; and
 - d. Monitoring coverage required to track any other reasonably foreseeable post-closure contamination pathways;
4. Visually show how the mine site is expected to look at one, ten and 25 years after closure and reclamation of the mine compared to its present and operating conditions. Include a plan view of the site and an illustration of visual impacts on the viewshed as seen from Marian River, Hislop Lake and other points along the Idaa Trail.
5. Describe Fortune's plans for establishing a self-sustaining vegetation community at the mine site after closure, including:
 - a. re-vegetation techniques, with a discussion on what species the developer will consider for this activity; and
 - b. an outline for how soon the area will return to a natural state of vegetation, if ever;
6. Describe how closure and reclamation activities will ensure long-term suitability of Peanut and Burke lakes for fish and fish habitat (using pre-fire background conditions for reference);
7. Describe closure and reclamation plans associated with decommissioning of the NICO access road, including stabilization and re-vegetation of banks near water crossings; and
8. Describe how reclamation will manage ongoing hazards to wildlife on the mine site, and how reclamation will affect wildlife movements.
9. Within the record of consultations that Fortune has had with potentially-affected communities, Aboriginal groups and responsible government agencies (see section 3.2.6), identify where there arose any concerns related to closure, reclamation, and long-term monitoring issues, and how the developer has adapted its plans to address the parties' concerns.

Appendix E: Fish and Aquatic Habitat

When assessing impacts on fish and aquatic habitat:

1. Describe fish and aquatic habitat in Lou Lake, Peanut Lake, NICO Lake, any other water bodies within the mine site on the Fortune claim block, Burke Lake, and any water bodies the NICO access road crosses or that the development otherwise affects;
2. Describe the impacts of the NICO Project on aquatic organisms and habitat, including potential impacts from:
 - a. Changes to flow or habitat, including alterations to banks and shores of waterbodies near road water crossings, and associated changes in habitat availability;
 - b. Reduced oxygen concentration;
 - c. Increased concentrations of metals, nutrients and other contaminations (including arsenic and mercury) in water, sediment and the aquatic food chain;
 - d. Increased sedimentation in watercourses, especially from the mine rock management area, the mine site, and road activities; and
 - e. Alteration of pH.
3. Describe the developer's commitments to
 - a. mitigate any habitat losses (such as habitat creation); and
 - b. specific management activities and plans, such as the adoption of relevant *Operational Statements* of the Department of Fisheries and Oceans;
4. Identify best management practices to minimize impacts on fish in this type of environment (including specific consideration of activity timing windows to avoid spawning and incubation periods and proper sedimentation and erosion control measures in close proximity to water bodies), a listing of all commitments to mitigate impacts on fish, fish habitat and other aspects of the aquatic ecosystem, and, where the two differ, a rationale for why certain management practices have not been adopted; and
5. Describe the potential for the NICO Project to affect fish in Hislop Lake, or to affect fish downstream of the project which may migrate to Hislop Lake.
6. Describe all water crossings along the NICO access road and roads on the mine site, providing details on flow, fish passage, sediment and erosion control measures and any monitoring plans.
7. Discuss how accidents, malfunctions or impacts of the environment on the development could create additional impacts on fish and aquatic species, and how the developer will minimize the potential for these scenarios to occur and manage them via contingency plans if they do occur.

Appendix F: Wildlife

For potential impacts to wildlife, the developer will do the following:

1. Describe the impacts the NICO Project is likely to have on wildlife and wildlife habitat. For each species, consider
 - a. Potential impacts to habitat, including degradation and fragmentation, with a focus on important wildlife habitat;
 - b. Potential for increased mortality from all sources (including from vehicle collisions and changes to hunting access);
 - c. Potential for increased attraction to the NICO mine site, risk of bear-human encounters, risk to people and associated carnivore mortality;
 - d. Potential for increased sensory disturbance from all sources (e.g., noise, odours, activity, vibrations, overflights, dust). Predict effective habitat loss resulting from changed behaviour;
 - e. Potential for disruption of movement and migration patterns; and
 - f. Potential for increased contamination of food and water, including bio-accumulation, from all sources;
2. Describe the potential adverse impacts of the NICO mine on any “wildlife at risk” species known or suspected to reside in the environmental assessment study area or potential adverse impacts on their habitat including residences. Describe any management plans and specific mitigation commitments and monitoring proposed for any potentially affected species.
3. Considering that the NICO Project is on a regionally distinctive plateau landform, describe:
 - a. Fortune’s efforts to determine whether the plateau landform and surrounding cliffs supports regionally limited wildlife habitat
 - b. How the NICO Project is expected to affect any specialized species using this distinctive habitat
 - c. How Fortune proposes to mitigate those impacts identified.
4. Describe how NICO Project planning has considered potential impacts on wildlife and wildlife habitat, best management practices to minimize impacts on wildlife, and what mitigation commitments have been made, with specific consideration of:
 - a. Rules for road use by employees and contractors;
 - b. Minimizing wildlife access to project components (e.g. by reducing attractants); and
 - c. Spill avoidance techniques and spill response plans for the transportation routes;
5. Describe Fortune’s draft wildlife management plan, including discussion of:
 - a. Which other interested parties have been involved in the development of the plan;
 - b. Efforts to be undertaken to monitor wildlife in the area and report the presence of species to the appropriate authorities when necessary;
 - c. Identification of measures to avoid or minimize, potential impacts to wildlife
 - d. Wildlife monitoring, evaluation and adaptive management of the project activities, and,
 - e. How monitoring results will be reported to regulators, responsible authorities and potentially-affected communities.

Appendix G: Terrain

When assessing impacts and risks related to terrain:

1. Describe the geotechnical stability of the proposed mine rock management and tailings management areas, including
 - a. Soil and hydrological conditions;
 - b. Description of the physical and chemical characteristics of mine rock and tailings; and
 - c. Topography and slope stability.
2. Describe potential impacts of NICO Project operations on terrain stability and vice versa, in light of Fortune's analyses of accidents and malfunctions (see section 3.5). Consider:
 - a. Geotechnical instability, especially of the mine rock management area, the tailings management area and the system of dykes and dams on site; and
 - b. Permafrost failure at the mine site.
3. Describe how the geotechnical stability of all engineered structures at the NICO mine site will be ensured against a range of climate, seismic and precipitation scenarios
4. Identify any plans to mitigate and monitor against impacts on terrain, including:
 - a. Erosion control measures;
 - b. Prevention of permafrost degradation at all mine site locations where it is found to be present;
 - c. How the geotechnical stability of the mine rock management area, tailings management area the system of dykes and dams will be monitored, and for what extent of time;
 - d. How monitoring results will be reported to regulators and potentially-affected communities; and
 - e. Adaptive management measures and contingency plans that will be adopted if terrain stability is compromised.

Appendix H: Air Quality

While assessing impacts on air, describe:

1. Pre-development conditions including:
 - a. General climatology (typical temperatures, precipitation, air flows, etc.), terrain type and topography; and
 - b. Baseline ambient concentrations of criteria air contaminants (total suspended particulates, particulate matter (PM₁₀, PM_{2.5}), nitrogen oxides, sulphur dioxide and carbon monoxide);
2. Potential impacts from project emissions during construction, operation and closure phases:
 - a. Estimate emissions from all project sources including fugitive dust;
 - b. Predict total carbon emissions on an annual basis and over the life of the NICO Project
 - c. Predict local and regional dispersion of the project emissions and resulting ambient concentrations and deposition of pollutants;
 - d. Compare predicted ambient concentrations and deposition rates to relevant ambient air quality guidelines and standards;
 - e. Discuss potential sources of contaminants from the handling and transport of ore and concentrate;
 - f. Discuss any potential links between predicted air quality impacts and other valued components such as water quality, fish, wildlife and human health; and
3. Monitoring, mitigation and adaptive management strategies:
 - a. Use predicted ambient air quality concentrations to design an appropriate monitoring program and to develop mitigation and adaptive management strategies to minimize emissions of criteria air contaminants;
 - b. Describe specific mitigation and adaptive management strategies to minimize contamination by fugitive dust from the handling and transport of raw ore and concentrate; and
 - c. Describe any offsets proposed to mitigate carbon emissions;
 - d. Describe specific mitigation and adaptive management strategies to minimize incineration emissions and to ensure compliance with the Canadian Council of Ministers of the Environment *Canada-Wide Standards for Dioxins and Furans* and *Canada-Wide Standards for Mercury Emissions*.

Appendix I: Vegetation

While assessing impacts on vegetation, the developer will provide the following:

1. Estimate the total amount of land clearing required for the NICO Project, with estimates of losses of trees, other plants, soil and overburden materials. Describe this relative to conditions before and after the recent fire. Include a description of how the soil materials will be removed and disposed of or stored, and the likely impacts of loss of soil or compaction on long-term re-growth capacity.
2. Describe the potential for the NICO Project to impact on rare plants;
3. Describe the potential impacts of NICO Project operations on culturally or economically significant harvested plants;
4. Describe the potential impacts of vehicle, mine equipment and power plant emissions on vegetation around the mine site and roads;
5. Describe the potential impacts of dust generation on vegetation at the mine site, along roads, and downwind of the plateau;
6. Describe the likelihood that invasive species will be introduced, by what means, and potential impacts; and
7. Describe best management practices for avoidance of impacts on vegetation, mitigation committed to, and where they differ, the rationale for not adopting best management practices.

Appendix J: Human Environment

J1 Employment and Business Opportunities

The developer will assess the potential impacts of the NICO Project on the economy of the Mackenzie Valley, with a focus on the Tlicho region and each potentially-affected community.

In assessing access to employment and business opportunities, the developer will provide:

Employment

1. An estimate of human resource requirements for the development that includes a listing of all direct and contract employment requirements by skills category for each phase of the life of the NICO Project. The developer will identify the skill-levels that each position requires, and shall include employment in all aspects of the operation of the mine, including for example transportation and monitoring activities;
2. An assessment of the likely percentage of direct employment for northern and aboriginal residents at the NICO Project, in light of the current and likely future (extending for the expected 15 year life of the mine) labour pool context (i.e., likely available numbers of workers in light of total regional economic activity), and identification of any target goals for northern and Aboriginal employment;
3. A description of any barriers to direct or contract employment, advancement and retention for Mackenzie Valley residents, with particular emphasis on Tlicho residents and Aboriginal people. This description must include employee availability and employability in light of minimum skill requirements and an investigation of current training opportunities for community members. The developer will also discuss:
 - a. Current skills gaps in the available labour pool that require additional training programs;
 - b. Hiring and retention policies related to minimum education levels, criminal records and drug and alcohol use; and
 - c. Any identified barriers to maximizing regional and Aboriginal employment.
4. The developer's plans, strategies and commitments for maximizing direct employment and retention of Tlicho residents, Northern and Aboriginal people;
5. A description of any plans, strategies or other commitments the developer has to support increasing the mine-ready workforce, support career paths in mining, and assist training programs in related support activities. The developer will outline how these strategies will create or contribute to training opportunities for northern and Aboriginal persons in general, and its employees in particular, over the life of the mine. The developer will also identify when any committed-to mitigations will be enacted, keeping in mind the lead time required for job-ready training programs; and
6. A discussion of whether and how the developer's strategies and commitments for maximizing employment of aboriginal and Northern residents will extend to its contractors.

Business Opportunities

7. An estimate of all contractor and subcontractor goods and services that the NICO Project will require, by project phase, as well as an estimate of what percentage of required goods and services can feasibly be sourced from local and regional businesses;
8. The developer's policies, plans, and commitments associated with maximizing contracting to aboriginal and Northern-owned and operated businesses, with emphasis on assisting business development initiatives and joint ventures with Tlicho-based businesses;
9. An assessment of any barriers to maximizing the utilization of northern businesses; and
10. The developer's prediction for any training, education or other improvements necessary to maximize local and regional business capacity to benefit from the NICO Project.

J2 Distribution of Beneficial and Adverse Socio-economic Impacts

The developer will provide the following information and analysis:

1. Qualitative and quantitative estimates of all beneficial and adverse economic impacts from the NICO Project, including at minimum:
 - a. Capital costs associated with placing the NICO Project in operation, broken down by major components (estimates should be in 2009 dollars Cdn. and may be in a +/- 20% range);
 - b. Annual operating costs during the life of the NICO Project (estimates should be in 2009 dollars Cdn. and may be in a +/- 20% range);
 - c. Federal, territorial and municipal taxes that the developer may remit by year, as well as from linked economic development (a +/- 20% range is acceptable);
 - d. Total employment impact on the Tlicho region and Mackenzie Valley, including a prediction of employment multipliers from the development;
 - e. A prediction of any adverse impacts the development may have on public infrastructure maintenance and associated costs (with emphasis on the potential GNWT road between the NICO Project and Highway 3);
2. Discussion of any plans, strategies or other commitments the developer has to help potentially-affected communities avoid over-exposure to “boom and bust” economic fluctuations, with a focus on
 - a. Potential social and economic effects of mine closure (including unforeseen early closure or project hiatus) on potentially-affected communities and the Tlicho region; and
 - b. Any plans to assist post-closure transition for mine employees;
3. Discussion of the following:
 - a. Socio-economic impacts potentially resulting from increased disposable income and larger reliance on the wage economy;
 - b. Any impacts on social services provision, infrastructure and costs that may occur as a result of the NICO Project (e.g., emergency medical care or family social services); and
 - c. Whether and how the project may create or contribute to impacts on other organizations and businesses servicing the region through mobilization of local skilled labour away from smaller NICO Project communities and associated impacts on maintenance of infrastructure and basic service provision; and
4. The developer’s policies, strategies, plans, and commitments, alone or in combination with other parties, for the mitigation of any adverse socio-economic impacts.

J3 Social Impacts

While conducting a social impact assessment, the developer will describe:

1. Potential impacts associated with the development on community wellness and population health issues such as:
 - a. Population in- and out-migration;
 - b. Alcohol and drug access and use;
 - c. Sexually-transmitted infections rates;
 - d. Crime rates;
 - e. Access to child care;
 - f. Language retention and other key indicators of cultural maintenance; and

- g. Education completion rates by level.
- 2. How each identified potential impact may affect individual potentially-affected communities;
- 3. The physical, mental, and cultural health of mine workers and mine workers' families, considering potential impacts of long-distance commuting and greater engagement in the wage economy on the population health status of small, primarily aboriginal communities. This discussion should identify any alternative shift rotations considered by the developer, with the rationale for the chosen rotation;
- 4. Human resources management plans and programs the developer will offer at the mine site to identify and mitigate potential social problems associated with the NICO Project, that will include but not be limited to discussion of
 - a. Increased income and money management;
 - b. Potential stressors associated with long-distance commuting and stress management programs;
 - c. Substance abuse and treatment policies;
 - d. Avoidance of cross-cultural conflicts at the work site; and
 - e. "Home" – community and family - support programs.
- 5. Potential impacts on public safety, especially in regards to the use of the NICO access road and the potential GNWT road and identification of mitigation to minimize the potential for vehicle accidents;
- 6. Any lessons learned about short and long-term social and economic impacts of previous mine developments in the Mackenzie Valley and the Canadian north, and how the developer has incorporated such lessons into its impact assessment and mitigation commitments for the NICO Project.

J4 Cultural Impacts

The analysis of heritage resources is inclusive of both sites and objects of cultural significance, and cultural impacts include both tangible and intangible aspects of culture.

J4a Physical Heritage Resources

The developer will report on:

- 1. Consultation with traditional knowledge holders, archaeologists, anthropologists, and the Prince of Wales Northern Heritage Centre, that the developer conducted during its cultural impact assessment, indicating how such interactions influenced:
 - a. Heritage resource survey locations;
 - b. The identification of locations of known or high potential for heritage resources; or
 - c. Heritage resource management plans;
- 2. Identification of all known archaeological and heritage resources, sites or areas of cultural significance, and areas of high potential for unfound heritage resources in the environmental assessment study area; and
- 3. All recommended mitigation measures that consultation produced for the protection of local known and high potential areas of physical heritage resources and other sites of cultural significance, and associated developer's commitments or reasons for not adopting recommendations.
- 4. Describe any potential impacts from the NICO Project on physical heritage on Hislop Lake and any other point on the Idaa Trail.

J4b Traditional Land Use and Wildlife Harvesting

The developer will:

1. Describe any potential impacts of the NICO Project on traditional harvesting activities for Aboriginal residents of Tlicho communities, including changes from impacts to wildlife, changes in all-season access from Tlicho communities due to the NICO access road, and any changes in access by non-resident hunters
2. Provide a prediction of the total impact of the NICO Project on traditional economic activity in the areas (expressed in dollar terms as well as in terms of reduced or increased harvesting success); and
3. Identify all mitigation commitments by the developer, alone or in combination with other parties, to minimize adverse impacts on traditional land use and resource harvesting, or to compensate for losses that the developer cannot prevent. This should include discussion of:
 - a. How access along the NICO access road will be monitored and, if feasible, managed; and,
 - b. Any plans for any ongoing monitoring, adaptive management and harvester compensation.
4. For visual and audible changes perceptible from the Idaa Trail:
 - a. Describe and illustrate any potential visual impacts to the viewshed as seen from Marian River and Hislop Lake;
 - b. If there are any points along remainder of the Idaa Trail where the NICO Project will be most visible or audible, illustrate and describe how it will look and sound;
 - c. Describe any measures taken to minimize these sensory disturbances; and,
 - d. Describe how any remaining sensory changes will affect the traditional authenticity of users' experiences along the Idaa Trail.
5. Describe potential impacts from the NICO Project on traditional activities at Hislop Lake.

J5 Human Environment Monitoring and Management Plans

1. Describe any commitments, plans and strategies to engage with responsible authorities and potentially-affected communities in monitoring impacts on the human environment such as:
 - a. Success of local and regional residents and Aboriginal people in gaining employment at the NICO Project, and the success of training initiatives;
 - b. Success of local and regional businesses in providing goods and services to the NICO Project, with identification of gaps to maximizing engagement;
 - c. Employee retention and worker and family wellness;
 - d. The contribution of the NICO Project to beneficial and adverse social impacts at the regional and local levels across a spectrum of appropriate indicators;
 - e. Impacts on wildlife harvesting and practice of traditional culture on the land.
2. Identify relevant existing initiatives monitoring community wellness and investigate how it will engage with, contribute to, and consider results from these programs in its ongoing monitoring and adaptive management programs;
3. Describe how results from monitoring the human environment will be evaluated and reported to regulators, responsible authorities and potentially-affected communities;
4. Describe the adaptive management systems will be in place to deal with issues identified during monitoring; and
5. Provide a summary table listing all human environment monitoring and management systems and where they are described in the *Developer's Assessment Report*.

Appendix K: Cumulative effects

The following items are required for consideration of cumulative effects:

1. In terms of cumulative effects, predict:
 - a. Potential impacts of the NICO Project on the Bathurst caribou herd in combination with impacts of other developments in the range of the Bathurst caribou herd;
 - b. Potential socio-economic changes, cultural changes and changes to community well-being from the NICO Project in combination with the potential GNWT road to Whati and Gameti
 - c. Potential socio-economic changes, cultural changes and changes to community well-being from the NICO Project in combination with other with other industrial developments including:
 - i. existing and proposed diamond mines
 - ii. the proposed Yellowknife Gold Project
 - iii. the proposed Mackenzie Gas Project
 - d. Potential impacts on fish and wildlife due to increased access from the NICO access road in combination with the potential GNWT road to Whati and Gameti
 - e. Potential impacts of the NICO Project on fish and wildlife in combination with impacts from past or present pollution from contaminated sites in the area, including Rayrock and Colomac.
2. Determine any other past, present and reasonably foreseeable human activities or developments that may affect the same valued components as the NICO Project
3. Predict the combined impact of the NICO Project in combination with the impacts of the other developments identified above;
4. Identify means for Fortune, either on its own or cooperatively with others, to reduce or avoid the predicted cumulative effects;
5. Describe the residual cumulative effects following mitigation;
6. Provide the rationale for including the developments that are chosen for examination on specific valued components, as well as a description of and rationale behind the chosen geographic cumulative effects study area and temporal boundary; and
7. Describe any plans for the monitoring and evaluation of cumulative effects and the adaptive management of the NICO Project's contribution to cumulative effects.